2019 State of Indiana
Standard Multi-Hazard Mitigation Plan

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A school bus lays off its frame in front of the remnants of Henryville, Ind., Elementary School in southern Indiana, March 3, 2012, after a large tornado devastated the town the day before. The Indiana National Guard activated roughly 250 soldiers to come to the community's aid.
By Sgt. John Crosby - https://www.dvidshub.net/image/534849, Public Domain, https://commons.wikimedia.org/w/index.php?curid=41274211

Mission Statement

The Indiana Department of Homeland Security will provide statewide leadership, exemplary customer service, and subject matter expertise for the enhancement of public and private partnerships and the assurance of local, state and federal collaboration to continually develop Indiana's public safety capabilities for the wellbeing and protection of our citizens, property and economy.

To learn more about the Indiana Department of Homeland Security visit https://www.in.gov/dhs.

Acknowledgments

The Indiana Department of Homeland Security would like to extend special thanks to The Polis Center at Indiana University-Purdue University Indianapolis for its support in developing the 2019 State Hazard Mitigation Plan. IDHS also recognizes the contributions of the Indiana Silver Jackets, a unique collaboration among federal, state, and local agencies that work together to leverage resources and more effectively address Indiana's natural hazards.

Acronyms

ACS	American Community Survey
AGI	Adjusted Gross Income
ASDSO	Association of State Dam Safety Officials
BFE	Base Flood Elevation
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosives
CCIA	Climate Change Impacts Assessment
CDBG	Community Development Block Grant
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CICERO	Center for International Climate Research
CMSI	Crop Moisture Stress Index
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map
DOH	Department of Health
DRU	Disaster-Resistant University
EMA	Emergency Management Agency
ENSO	El Niño-Southern Oscillation
EOC	Emergency Operations Center
FBI	Federal Bureau of Investigation
FEH	Fluvial Erosion Hazard
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Studies
FMA	Flood Mitigation Assistance
GDP	Gross Domestic Product
GIO	Geographic Information Office
GIS	Geographic Information Systems
HA	Housing Assistance
HAV	Hepatitis A Virus
HMGP	Hazard Mitigation Grant Program
HUC	Hydrologic Unit Code
IA	Individual Assistance
IAC	Indiana Administrative Code
IARC	Indiana Association of Regional Councils
IC	Indiana Code
IDEM	Indiana Department of Environmental Management
IDHS	Indiana Department of Homeland Security
IDLGF	Indiana Department of Local Government and Finance
IDNR	Indiana Department of Natural Resources
IDOA	Indiana Department of Administration
IEAP	Incident and Emergency Action Plan

IED	Improvised Explosive Device
IGS	Indiana Geological Survey
IHCDA	Indiana Housing and Community Development Authority
IHP	Individuals & Household Program
IMPD	Indianapolis Metropolitan Police Department
IN	Indiana
INAFSM	Indiana Association for Floodplain and Stormwater Management
INDOT	Indiana Department of Transportation
INFIP	Indiana Floodplain Information Portal
IN-ISAC	Indiana Information Sharing and Analysis Center
IOT	Indiana Office of Technology
IP	Internet Protocol
ISDH	Indiana State Department of Health
ISHMC	Indiana State Hazard Mitigation Council
ISJ	Indiana Silver Jackets
IT	Information Technology
IU	Indiana University
IUPUI	Indiana University-Purdue University Indianapolis
KY	Kentucky
MHMP	Multi-Hazard Mitigation Plan
MMI	Modified Mercalli Intensity
MSA	Metropolitan Statistical Area
NCDC	National Climatic Data Center
NFIF	National Flood Insurance Fund
NFIP	National Flood Insurance Program
NLE	Non-Levee Embankment
NOAA	National Oceanic and Atmospheric Administration
NSSL	National Severe Storms Laboratory
NTSB	National Transportation Safety Board
NWS	National Weather Service
OCRA	Office of Community and Rural Affairs
ONA	Other Needs Assistance
PA	Public Assistance
PDM	Pre-Disaster Mitigation
PDSI	Palmer Drought Severity Index
PGA	Peak Ground Acceleration
RCP	Representative Concentration Pathway
REP	Radiological Emergency Preparedness
RFC	Repetitive Flood Claims
Risk MAP	Risk Mapping, Assessment, and Planning
RL	Repetitive Loss
RSI	Regional Snowfall Index

SBA	Small Business Administration
SDRF	State Disaster Relief Fund
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
SHMP	Standard Hazard Mitigation Plan
SHPO	State Historic Preservation Officer
SRL	Severe Repetitive Loss
THIRA	Threat and Hazard Identification Risk Assessment
US	United States
USACE	United States Army Corps of Engineers
USD	United States Dollar
USDA	United States Department of Agriculture
USGCRP	US Global Change Research Program
USGS	United States Geological Survey
WCT	Wind Chill Temperature

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Executive Summary

The Indiana Multi-Hazard Mitigation Plan was developed in collaboration with government, academic, and other private partners for the purpose of preventing, protecting against, responding to, and recovering from natural disasters that may threaten the State's citizens, infrastructure, and economy.

The federal Disaster Mitigation Act of 2000 provides the legal basis for FEMA mitigation planning requirements for State, local, and tribal governments as a condition of federal grant assistance. Indiana must have a FEMA approved State Multi-Hazard Mitigation Plan to remain eligible to receive federal assistance through the following programs:

- Public Assistance (Categories C-G)
- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation Grant Program (PDM)
- Flood Mitigation Assistance Grant Program (FMA)
- Fire Management Assistance Grants (FMAG)

Since 2008, Indiana has received almost $50,000,000 in Mitigation grant funding through these programs.

The 2019 Indiana Multi-Hazard Mitigation Plan lays the framework for accomplishing one of the Indiana Department of Homeland Security's top 2019-2020 strategic priorities of expanding mitigation and resiliency in the State of Indiana. This includes expanding statewide collaboration and planning, promoting safety, implementing a statewide mitigation strategy, and strengthening partnerships that impact resiliency.

Throughout this plan, there are boxes highlighting some of Indiana's best practices in Mitigation. These best practices include projects for the acquisition and demolition of flood prone properties, the construction of residential and community safe rooms to protect citizens during severe weather, collaboration between multiple federal, state, and local agencies and other partners to develop solutions to natural hazard issues, and planning efforts across the State to assess natural hazard risks, identify mitigation opportunities, and help build the resiliency of communities, and the State.

There have been some significant changes to this plan since the last version was adopted back in 2014. Some of these changes include:

- Future climate trends in Indiana are discussed in the State Profile section. Projections are indicating that the State could see an increase in precipitation (6-8%) by mid-century. This will increase the flooding risk in communities throughout the State. There is also projected to be an increase in extreme temperature events (hot and cold). New research is indicating that the most frequent area of tornado activity nationwide (Tornado Alley) is starting to shift eastward due to these precipitation and temperature changes. This shift would bring more frequent severe storms and/or tornadoes to the State.
- Earthquakes - A major update of the earthquake hazard section emphasizes that the threat of earthquakes is not confined to only southwestern Indiana. The entire State needs to be prepared for an earthquake, and five new scenarios in this plan update show the projected effects of an earthquake in various parts of the State.

- New Mitigation Strategies – In collaboration with 63 subject matter experts, seven State agencies, State universities, and other national partners, 91 strategies to help mitigate the risk from natural hazards and build the resiliency of the State have been identified in this plan update. These strategies are all described in section 9 of the plan.
- All data and analyses in the plan were updated for 2019 using the most recent version of FEMA's Hazus-MH Risk Assessment software, along with other GIS analyses, and updated information from all 92 counties.

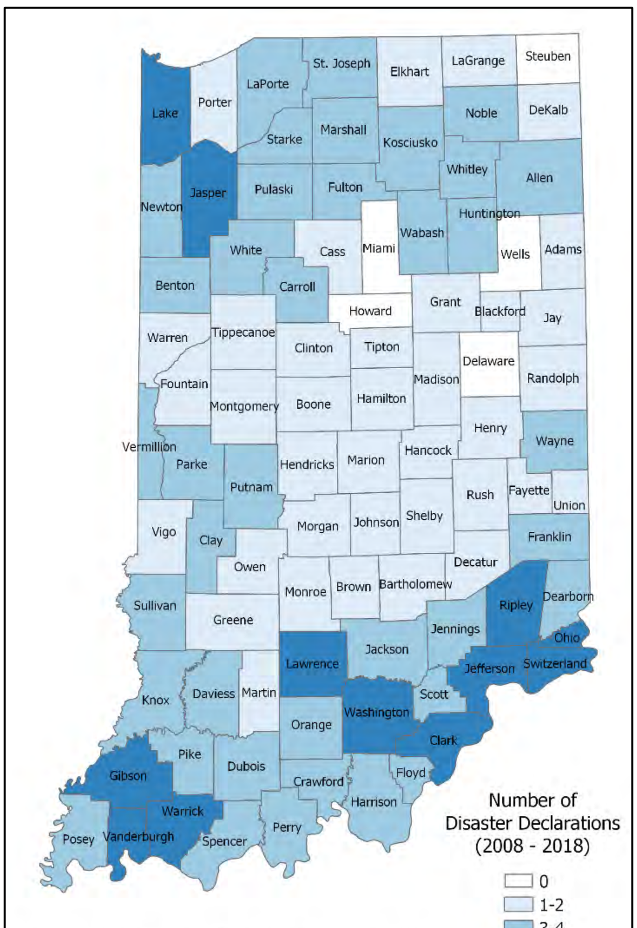
The Indiana Multi-Hazard Mitigation Plan and the Indiana Department of Homeland Security's planning process comply with all applicable Federal statutes and regulations, and the State will amend the plan as necessary to reflect changes in State and Federal laws and statutes as required in 44 CFR 201.1 - 7.

1 Introduction

The Indiana Standard Hazard Mitigation Plan (SHMP) seeks to examine the disasters that have impacted the state, identify high-risk communities and areas of vulnerability, and explore emerging threats. It is the basis by which the State encourages local jurisdictions to adopt sound mitigation principles and activities, and allows the State to provide technical assistance and funding opportunities to help communities become more resilient to disasters. All of the assistance provided through federal and state funding has been, and will continue to be, granted to local and state agencies within the scope and guidance provided as required by federal, state, and local rules, laws, and regulations.

In the past decade, Indiana has received 9 federal disaster declarations, which have impacted 87 of its 92 counties (Figure 1). The most recent disaster (DR-4363) was declared on May 4, 2018 after melting snow and heavy rain resulted in extensive floods in northwestern Indiana and along the Ohio River in southern Indiana after a severe winter storm resulted in the second highest calendar day snowfall for Indianapolis. Some areas had 4 to 7 inches of precipitation above normal in February. It was the wettest February on record in Evansville.

Figure 1. Federal Disaster Declarations (2008-2018)



Source: Federal Emergency Management Agency, 2018

Decade of Disasters (2008-2018)

DR-4363: Severe storms and flooding causing extensive and record flooding along the Yellow, Kankakee and Iroquois Rivers.

DR-4173: Severe winter storm and snowstorm with the second highest calendar day snowfall for Indianapolis, 11.4", since records began.

DR-4058: Severe storms, straight-line winds, and tornadoes. 14 deaths due to tornadoes, including an EF4 tornado that destroyed a school.

DR-1997: Severe storms, tornadoes, straight-line winds, and flooding, including up to 2" hail, EF0 to EF2 tornadoes.

DR-1832: Severe storms, tornadoes and flooding, including an EF3 tornado.

DR-1828: Severe winter storm with both ice and snow accumulations up to 8".

DR-1795: Severe storms and flooding with wind gusts up to 70mph.

DR-1766: Devastating flood with over $150 million dollars in disaster dollars.

DR-1740: Significant flooding in Northern Indiana with record flowing along the Tippecanoe River.

In the event of a federally declared disaster, individuals, families, and communities may be eligible for financial assistance to help with critical expenses. Assistance may be categorized as Individual Assistance (IA), Public Assistance (PA), or Hazard Mitigation Assistance.

The following types of assistance may be available in the event of a disaster declaration:

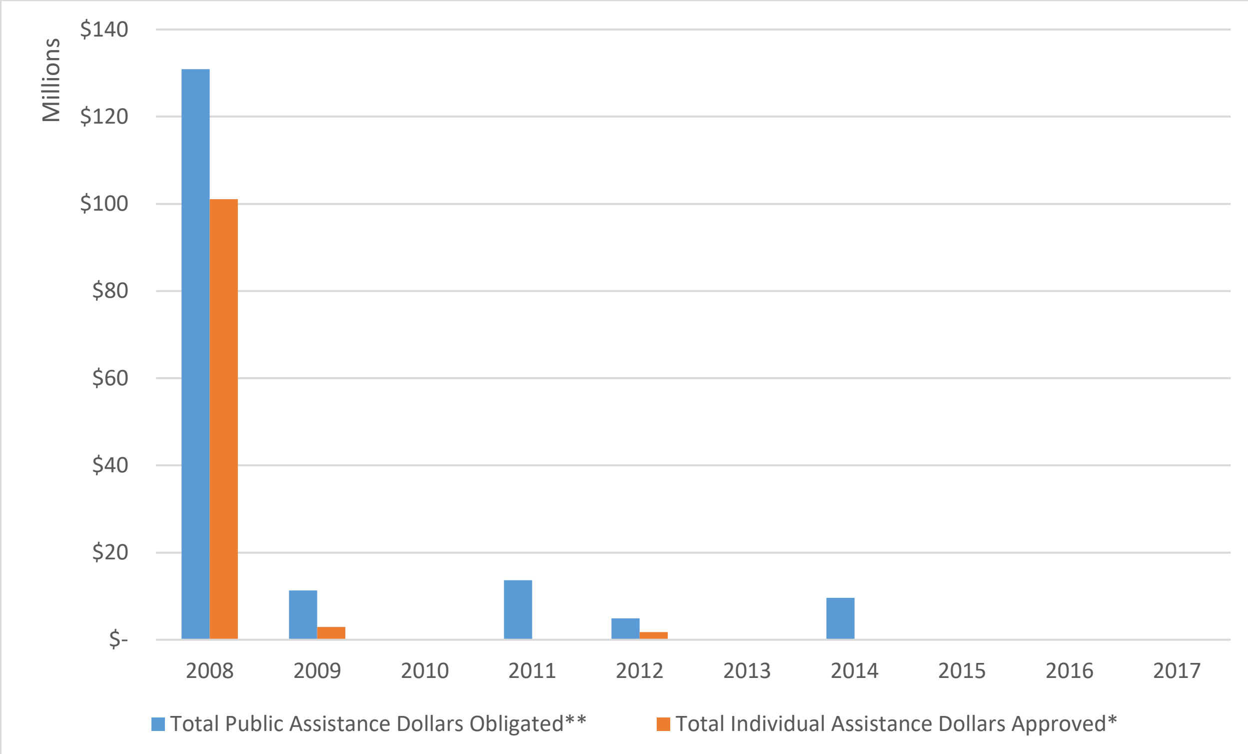
- **Individuals & Households Program:** Provides financial and direct services to eligible individuals and households affected by a disaster who have uninsured or underinsured necessary expenses and serious needs.
- **Housing Assistance:** Provides assistance for disaster-related housing needs.
- **Other Needs Assistance:** Provides assistance for other disaster-related needs such as personal property, transportation, and medical expenses.
- **Public Assistance:** Disaster grant assistance available for communities to quickly respond to and recover from major disasters or emergencies declared by the president.
    - **Emergency Work (Categories A-B):** Work that must be performed to reduce or eliminate an immediate threat to life, to protect public health and safety, and to protect improved property that is significantly threatened due to disasters or emergencies declared by the president.
    - **Permanent Work (Categories C-G):** Work that is required to restore a damaged facility, through repair or restoration, to its pre-disaster design, function, and capacity in accordance with applicable codes and standards.
    - **Section 406 – Public Assistance Program:** Provides discretionary authority to fund mitigation measures in conjunction with the repair of disaster-damaged facilities.
- **Community Development Block Grants:** Provides grants to help cities, counties, parishes, and states to recover from presidentially declared disasters, especially in low- and moderate-income areas. This program is administered by the Indiana Housing and Community Development Authority (IHCDA).
- **Assistance for Farmers and Ranchers:** Provides financial assistance to eligible producers affected by natural disasters through the United States Department of Agriculture (USDA) and Small Business Administration (SBA) programs.
- **Hazard Mitigation Assistance:** Grant program providing assistance to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration.

The majority of disaster assistance is provided via low-interest disaster loans, which are available after a disaster for homeowners and renters from the US Small SBA to cover uninsured property losses. These loans are available to individuals for the repair or replacement of homes, automobiles, and damaged personal property; they are also available to businesses for property loss and economic injury. SBA disaster loans can be available for federally and non-federally declared disaster events.

At the time of this writing, 2018 disaster and related information were not yet finalized. In order to compare annual information, this section includes disaster information for 2008 through 2017.

Figure 2 illustrates (by year) how federal dollars were split between IA and PA. There were no federal dollars approved or obligated in 2010, 2013, 2015, 2016, and 2017.

Figure 2. Federal Disaster Assistance by Type for Indiana Disasters (2008-2017)



* Dollars Approved: assistance dollars approved but not necessarily disbursed
** Dollars Obligated: funds made available to the state via electronic transfer following the Federal Emergency Management Agency's (FEMA) final review and approval of PA projects

Note about Figure 2 Chart:

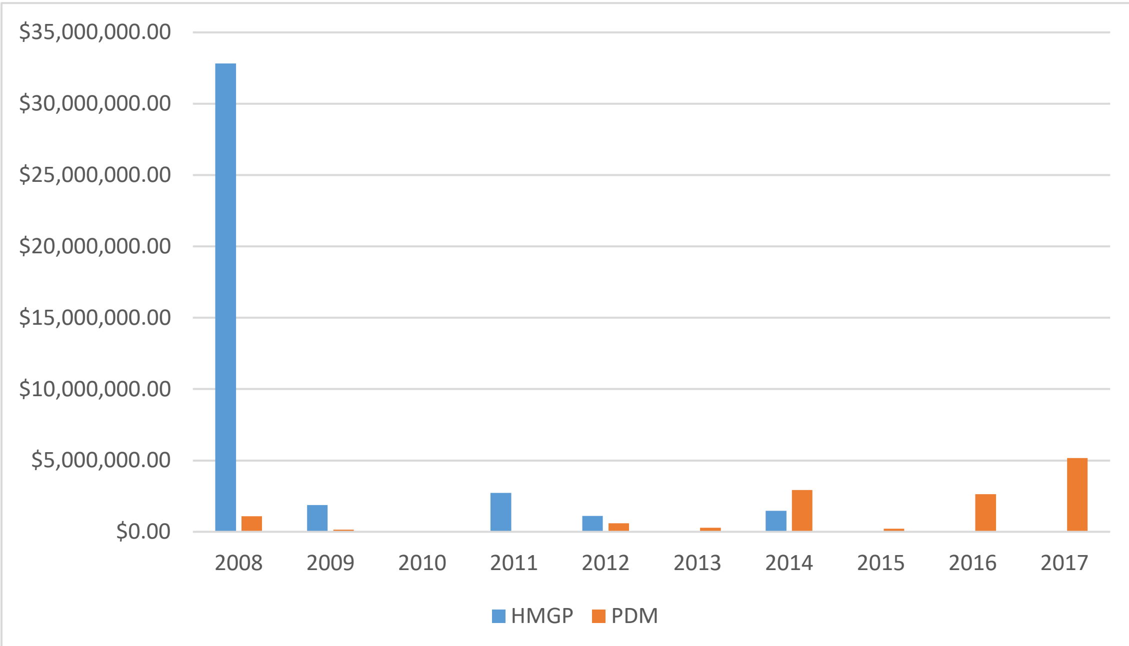
- Total Individual Assistance includes Individuals & Household Program (IHP), Housing Assistance (HA), and Other Needs Assistance (ONA).
- Total Public Assistance includes Public Assistance, Emergency Work, and Permanent Work.

INDIANA BEST PRACTICE

The Indiana Department of Natural Resources (IDNR) developed the Indiana Floodplain Information Portal (INFIP) as a digital repository for hydrologic and hydraulic models and floodplain maps. This information is used to update Flood Insurance Studies (FIS) and Flood Insurance Rate Maps (FIRMs) in a digital format. The new flood maps allow the State and local jurisdictions to better administer their flood management programs. It is available at https://dnrmaps.dnr.in.gov/appsphp/fdms/.

Total obligated Hazard Mitigation Grant Program (HMGP) funding between 2008 and 2017 totaled $40,257,203. The majority of the total obligated in the past decade ($25.2 million) was for assistance related to catastrophic flooding in 2008 (DR-1766). The State also received $267,173.75 in 2008-09 from the Flood Mitigation Assistance (FMA) program. Total obligated Pre-Disaster Mitigation (PDM) funding between 2008 and 2017 totaled approximately $9,800,000. As can be seen in Figure 3 below, HMGP funds, resulting from disaster declarations, have significantly decreased, while PDM funds have started to increase. This is, in part, a result of the government's emphasis on pre-disaster mitigation.

Figure 3. HMGP and PDM Funding Obligated for Indiana Disasters (2008-2017)



The Indiana State Disaster Relief Fund (SDRF) is a state disaster recovery fund for events that have seriously impacted communities, but that do not rise to the level of a federal declaration. Although established in 2003 to provide infrastructure damage assistance, the Indiana SDRF was not funded until 2007. This funding is very limited as it is tied to the public safety fund and is dependent on the state's fireworks sale. In 2007, the SDRF was expanded to provide Individual Assistance for homeowners and renters whose primary residence was damaged/destroyed. Table 1 provides a summary of total SDRF program costs since 2007.

Table 1. Summary of State Disaster Relief Fund Total Funding (2008-2017)

	# Eligible Households	# Applicants	# Awards	Total Amount Awarded
Individual Assistance				
Total	844	566	490	$2,168,741.86
Average Award/Event	70	47	41	$180,728.49
Public Assistance				
Total		42	36	$2,315,647.90
Average Award/Event		7	6	$385,491.32

Program costs for the Public Assistance Infrastructure totals more than $2.3 million since 2007.

Table 2 identifies awards related to the Public Assistance Infrastructure Program from 2007 through 2017.

Table 2. State Disaster Relief Fund Infrastructure Program Funding (2007-2017)

Date of Event	Event Description	Community	County	Award Amount
November 2007	Tornado - Severe Storms	Napanee	Elkhart	$198,423.35
			Subtotal	$198,423.35
Feb. – March 2011	Severe Storms - Flooding	Jay County	Jay	$102,207.98
Feb. – March 2011	Severe Storms - Flooding	Dubois County	Dubois	$204,094.81
Feb. – March 2011	Severe Storms - Flooding	Portland	Jay	$1,137.02
Feb. – March 2011	Severe Storms - Flooding	Jasper	Dubois	$3,972.76
			Subtotal	$311,412.57
May – June 2011	Tornado - Severe Storms	Greensburg	Decatur	$89,469.31
May – June 2011	Tornado - Severe Storms	Bloomington	Monroe	$108,034.23
May – June 2011	Tornado - Severe Storms	Terre Haute	Vigo	$122,387.86
May – June 2011	Tornado - Severe Storms	Rensselaer	Jasper	$20,991.04
May – June 2011	Tornado - Severe Storms	DeMotte	Jasper	$73,107.00
			Subtotal	$413,989.44
June 29 – July 3 2012	Severe Storms High Winds	Ft Wayne	Allen	$435,364.92
June 29 – July 3 2012	Severe Storms High Winds	New Haven	Allen	$73,933.69
June 29 – July 3 2012	Severe Storms High Winds	Leo-Cedarville	Allen	$12,711.00
			Subtotal	$522,009.61
July 31 2012	Tornado - Severe Storms	Gibson County	Gibson	$30,145.87
July 31 2012	Tornado - Severe Storms	Oakland City	Gibson	$44,328.13
			Subtotal	$74,474.00
April 7 – 27 2013	Severe Storms - Flooding	North Manchester	Wabash	$19,939.06
April 7 – 27 2013	Severe Storms – Flooding	North Salem	Hendricks	$3,764.40
April 7 – 27 2013	Severe Storms – Flooding	Warren County	Warren	$10,948.67
April 7 – 27 2013	Severe Storms – Flooding	City Of Kokomo	Howard	$134,636.19
April 7 – 27 2013	Severe Storms – Flooding	City Of Attica	Fountain	$13,846.11
April 7 – 27 2013	Severe Storms – Flooding	Town Of Zionsville	Boone	$18,046.32
April 7 – 27 2013	Severe Storms – Flooding	City Of Delphi	Carroll	$42,714.00
April 7 – 27 2013	Severe Storms – Flooding	City Of Greencastle	Putnam	$16,086.21
April 7 – 27 2013	Severe Storms – Flooding	Town of Avon	Hendricks	$28,486.17
April 7 – 27 2013	Severe Storms – Flooding	Carroll County	Carroll	$39,693.20
April 7 – 27 2013	Severe Storms – Flooding	City of Wabash	Wabash	$17,587.33
April 7 – 27 2013	Severe Storms – Flooding	Fountain County	Fountain	$7,208.09
April 7 – 27 2013	Severe Storms – Flooding	City Of Tipton	Tipton	$34,221.06
April 7 – 27 2013	Severe Storms – Flooding	Putnam County	Putnam	$53,724.02
April 7 – 27 2013	Severe Storms – Flooding	Vermillion County	Vermillion	$90,880.27
April 7 – 27 2013	Severe Storms – Flooding	Clinton County	Clinton	$85,117.65
April 7 – 27 2013	Severe Storms – Flooding	City Of Frankfort	Clinton	$842.56
April 7 – 27 2013	Severe Storms – Flooding	Tipton County	Tipton	$4,908.45
April 7 – 27 2013	Severe Storms – Flooding	Knox County	Knox	$43,407.17
April 7 – 27 2013	Severe Storms – Flooding	Boone County	Boone	$97,786.75
April 7 – 27 2013	Severe Storms - Flooding	City Of Vincennes	Knox	$31,495.25
			Subtotal	$795,338.92
			Infrastructure Program Total	**$2,315,647.90**

Program costs for the Individual Assistance Homeowner/Renter Assistance Program totals more than $2.1 million since 2007. The award threshold for this program is $500 for a minimum award and

$5,000/household for a maximum award. Table 3 identifies awards related to the Individual Assistance (Homeowner/Renter) Program from 2007 through 2017.

Table 3. State Disaster Relief Fund Individual Assistance Program Funding (2007-2017)

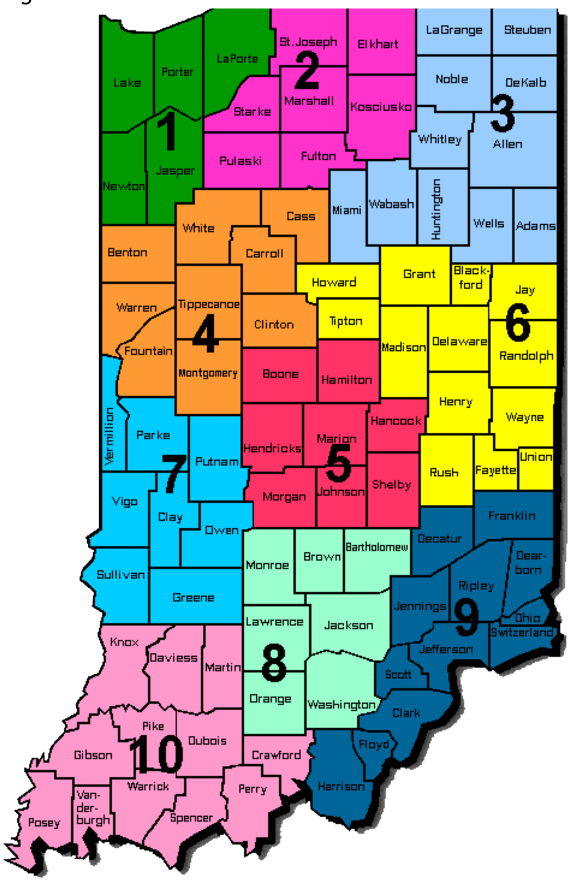
Date of Event	Event Description	SBA Declaration #	# Awards	Total Amount Awarded
8/19/09	Severe Storms and Tornadoes	11870	0	$0.00
8/4/09 – 8/9/09	Severe Storm, Flooding	11926	51	$242,772.60
2/27/11 – 3/8/11	Flooding	12499	29	$111,604.70
4/19/11 – 6/6/11	Floods, Tornadoes, Hail and Severe Storms	12813	32	$139,294.37
11/14/11	Tornadoes and Severe Storms	12949	2	$7,526.36
6/29/12 – 7/3/12	High Winds, Storms	13174	8	$26,700.20
7/31/12	Macroburst , Storms	13217	16	$77,309.00
4/17/13 – 4/24/13	Flooding	13569	178	$859,390.00
6/7/15 – 7/29/15	Severe Storms, Tornado, Flooding	14430	67	$285,236.39
8/15/16 – 8/16/16	Torrential Rainfall	14833	71	$289,903.05
8/24/16	Tornadoes	14849	28	$107,966.18
5/19/17	Severe Storms, Flooding	15165	5	$16,768.82
4/26/17 – 5/10/17	Severe Storms, Flooding	15170	3	$11,227.05
		Totals	490	$2,176,574.43
		Average	41	$181,381.20

The goals of the SHMP include the following:

- Identify areas of vulnerability throughout the state and estimate the cost and magnitude of potential disasters
- Establish strategies and priorities to mitigate risks to citizens and property from natural, technological, and human hazards
- Identify specific mitigation projects to pursue for identified hazard
- Guide each Indiana Department of Homeland Security (IDHS) district in its risk management priorities and activities
- Establish eligibility for future mitigation project funds

2 State Profile

Figure 4. IDHS Districts



Located in the Great Lakes region of the United States, Indiana is the 17th most populous state and 38th in terms of land area. It is comprised of 92 counties, 681 census places, 16 metropolitan statistical areas (MSA), and 25 micropolitan statistical areas. The Indiana Department of Homeland Security (IDHS) has divided the state into 10 districts (Figure 4) to more effectively coordinate disaster activities such as response, damage assessment, preparedness, and outreach and education.

2.1 Geography and Topography

In terms of land area, Indiana is one of the smallest states west of the Appalachian Mountains, but its topography varies significantly from the northern portion of the state to the southern portion. The northern two-thirds are characterized primarily by flat plains and numerous small lakes, and the effect of Lake Michigan often induces heavy winter precipitation, especially snowfall. In contrast, the unglaciated southern region is characterized by rolling hills, caves, and waterfalls. Underlying limestone produces soils with poor water retention capacity, making it difficult for crops to grow and develop without frequent rains. The growing season is longer in the southwest part of the state where asparagus, strawberries, and melons are grown commercially.

The Central Till Plain is primarily drained by the Wabash River system and produces the state's highest crop yields. Corn, soybeans, vegetables, and fruit are grown throughout the Wabash River Basin, but the risk of frost, late spring freezes, and severe winter kill must be considered for mitigation purposes. Figure 5 illustrates Indiana's physiographic landscape. Figure 6 shows the state's perennial streams while Figure 7 shows the Hydrologic Unit Code (HUC) 8 basins.

Figure 5. Indiana Physiography

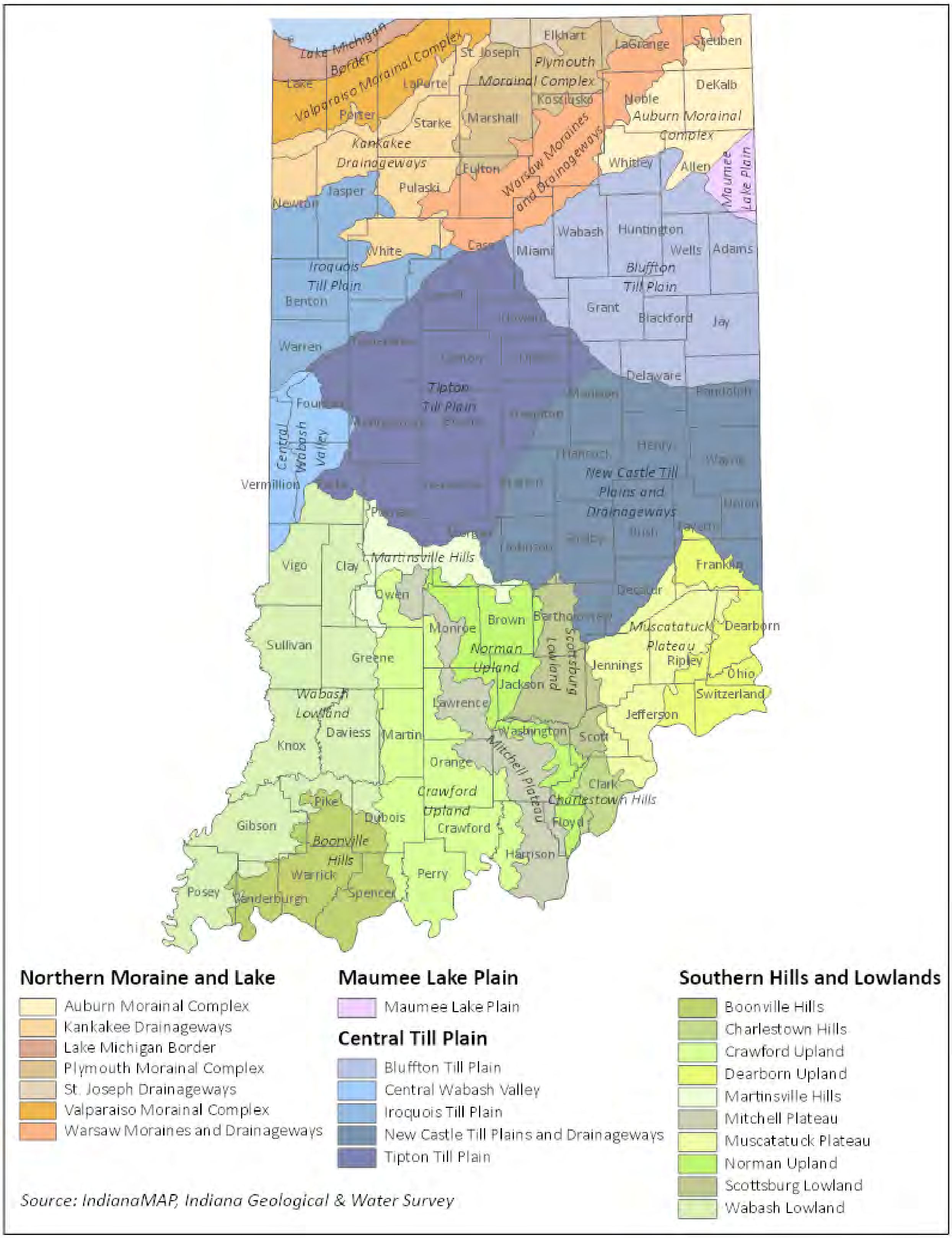
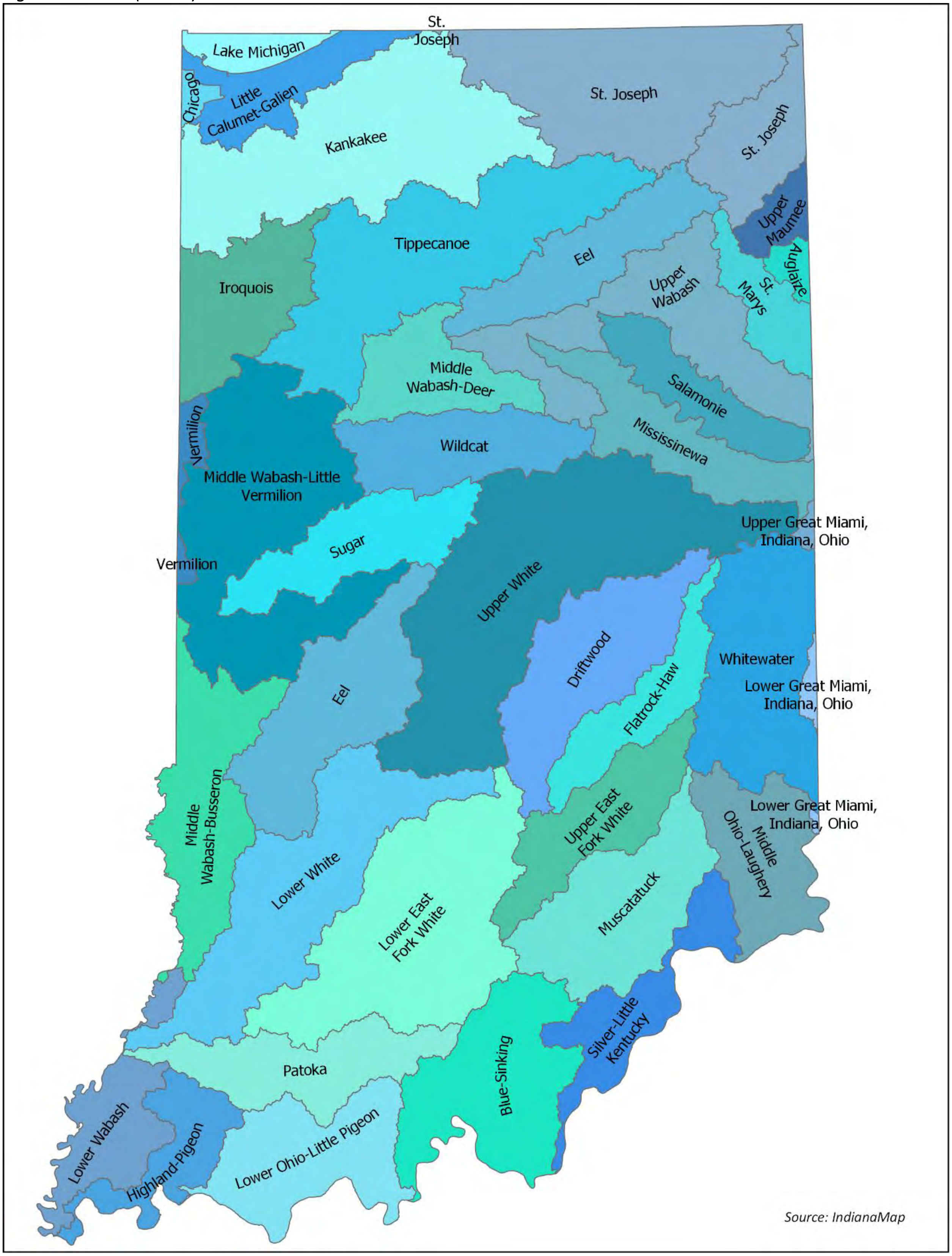


Figure 6. Perennial Streams

Figure 7. Basins (HUC 8)



2.2 Climate

Indiana is in the hot-summer humid continental climate zone, with large seasonal temperature differences. The state has four distinct seasons with cold winters and hot and humid summers. Due to latitude differences, northern Indiana tends to be cooler than southern Indiana. Precipitation typically averages 40 inches per year, increasing from north to south. Indiana's climate is affected by both the Gulf of Mexico, with warm and humid air, and the jet stream, which brings polar air from Canada.

The state is impacted by the El Niño-Southern Oscillation (ENSO). ENSO is a recurring climate pattern involving changes in the temperature of waters in the central and eastern tropical Pacific Ocean. ENSO has three phases: El Niño, La Niña, and neutral. During El Niño, the central and eastern tropical Pacific Ocean water surface warms while during La Niña the water surface cools. During the neutral phase, the tropical Pacific sea surface temperatures are close to average. Indiana winters during El Niño tend to be drier than normal while La Niña winters tend to be wetter than normal. Looking at 24 El Niño winters since 1950, the average winter temperature in Indiana was warmer than normal in 11 of them and colder than normal in 13 of them. However, if a particularly strong El Niño occurs, then Indiana winters tend to be warmer than normal.

The state is subject to extreme weather such as thunderstorms and tornadoes, especially in the spring. Spring is the wettest season, bringing with it floods, while fall tends to be drier.

2.2.1 Past and Current Climate

Figure 8 through Figure 10 show the average temperatures and precipitation per month in three Indiana cities. Mishawaka is located in northern Indiana near the Michigan border, Evansville is in the southwestern tip of the state, while Indianapolis is centrally located.

Average high temperatures in January range from the low 30s in the northern part of the state to the low 40s in the southern part. July highs range from the low 80s to the upper 80s. January is the coldest month of the year while July is the warmest.

Figure 8. Mishawaka Climograph (Your Weather Service, 2018)

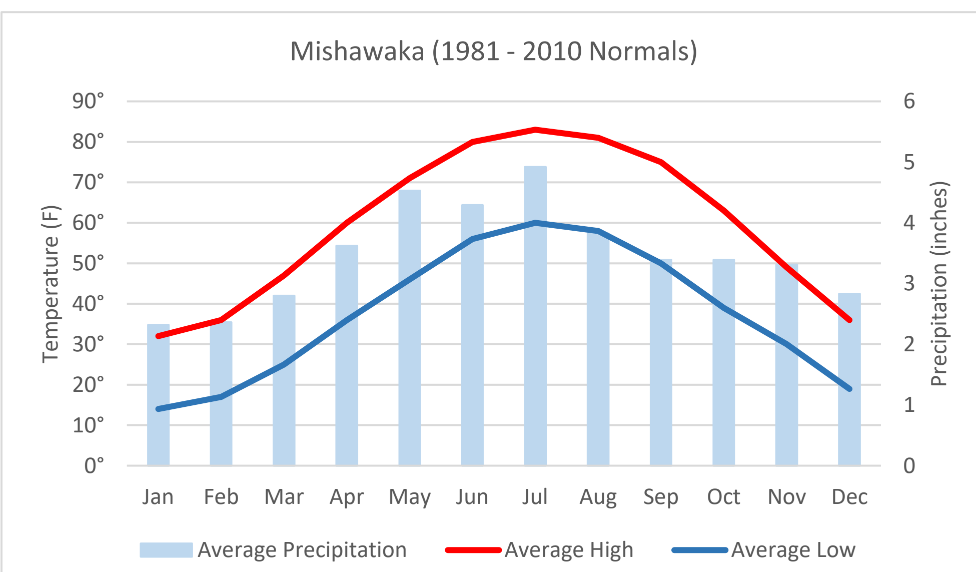


Figure 9. Indianapolis Climograph (Your Weather Service, 2018)

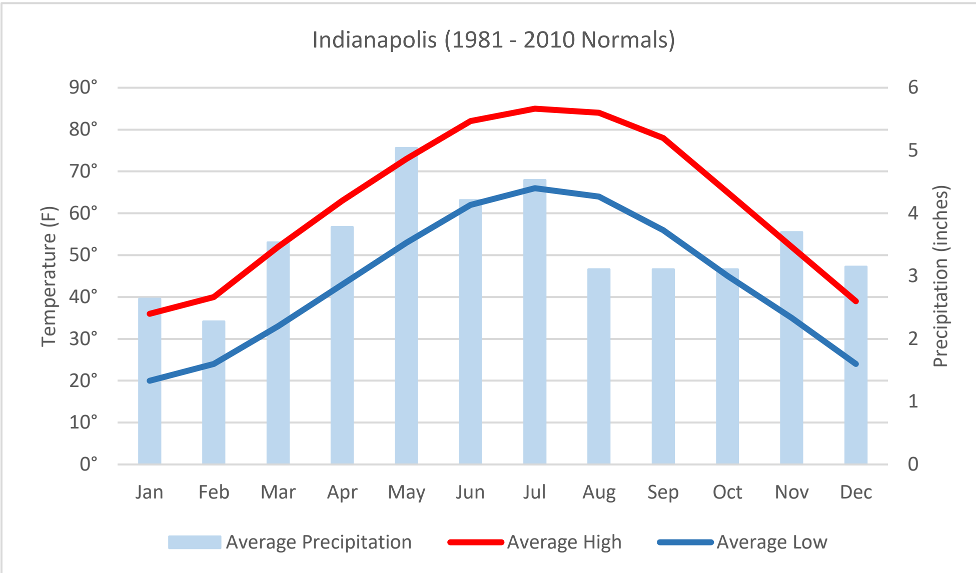
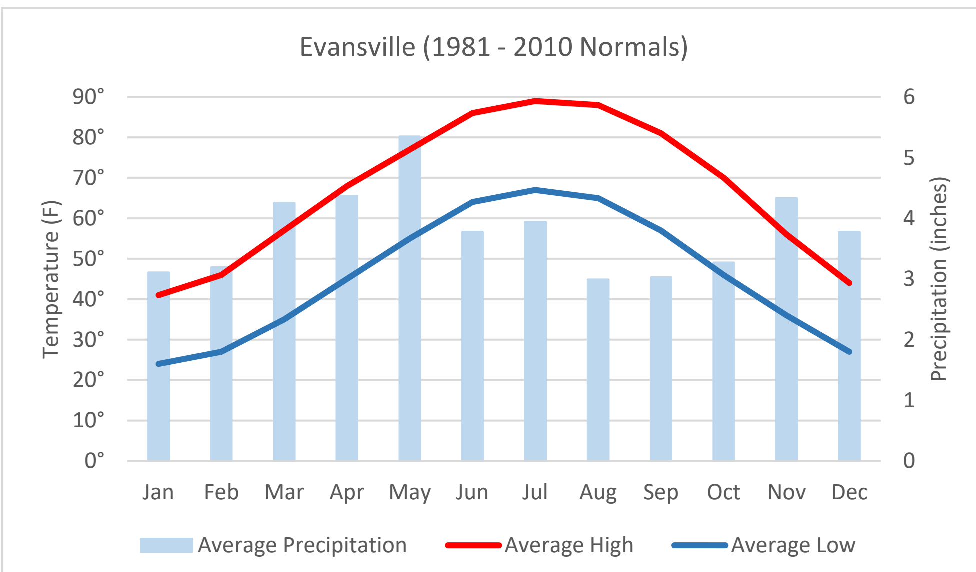


Figure 10. Evansville Climograph (Your Weather Service, 2018)



Average annual precipitation ranges from 41 inches in Mishawaka to 45 inches in Evansville. May is typically the wettest month of the year, but the months of greatest flood frequency in Indiana are from January through June (see Figure 11). Flash floods, however, are most frequent from May to July (see Figure 12).

Figure 11. Indiana Floods by Month (National Centers for Environmental Information, 2018)

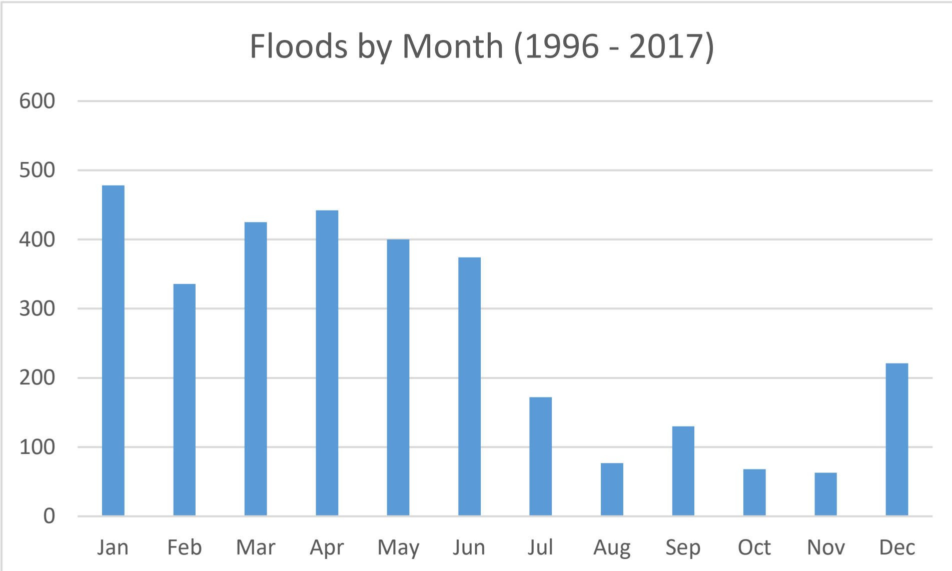
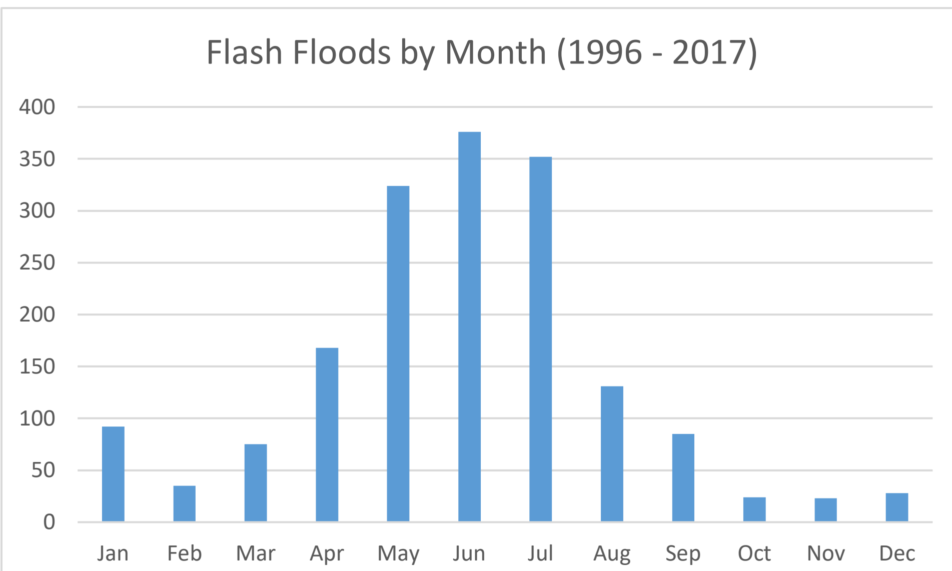
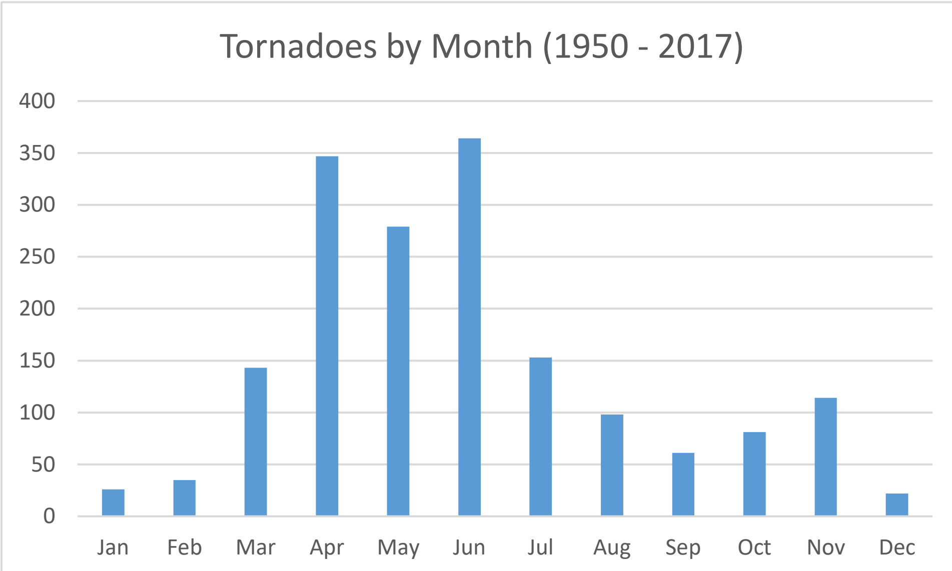


Figure 12. Indiana Flash Floods by Month (National Centers for Environmental Information, 2018)



Tornadoes are a common occurrence in Indiana. Over 1700 tornadoes have been reported in the state from 1950 to 2017, with the majority of those from April to June (see Figure 13).

Figure 13. Indiana Tornadoes by Month (National Centers for Environmental Information, 2018)



Indiana is subject to other storm events, besides flooding and tornadoes. Table 4 shows the top ten types of events from 1996 through 2017 according to the National Climatic Data Center (NCDC).

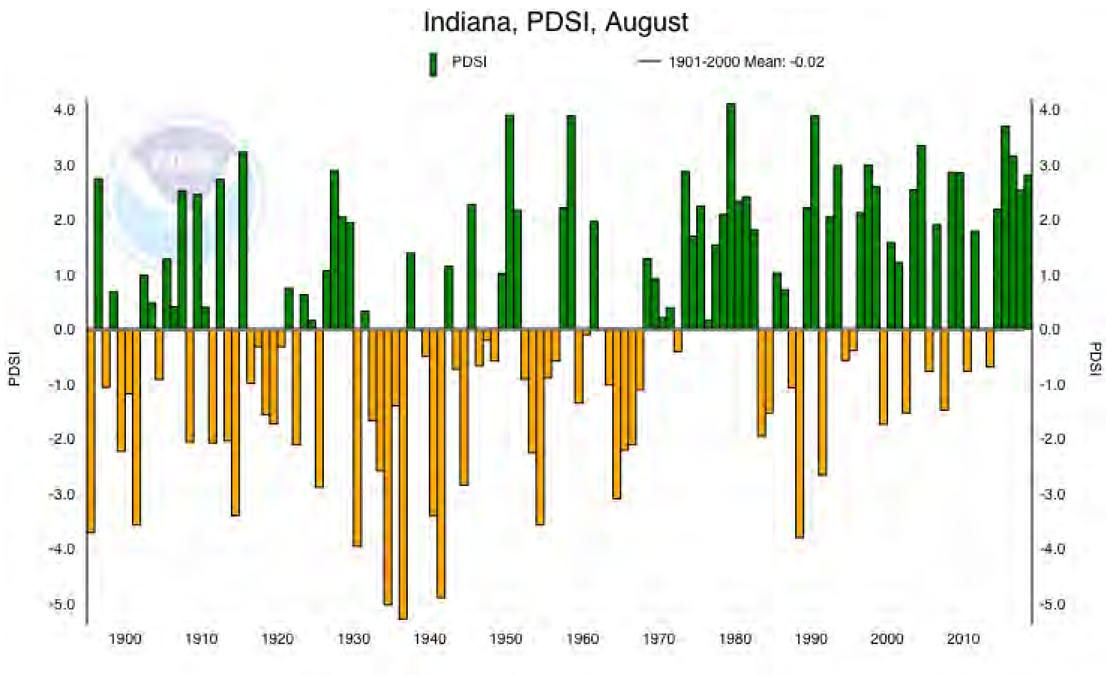
Table 4. Top 10 Storm Events

Event Type	Occurrences
Thunderstorm Wind	8857
Hail	5071
Flood	3186
Flash Flood	1713
Winter Storm	1495
Winter Weather	1108
Heavy Snow	970
Tornado	686
High Wind	559
Drought	370

Drought is a period of unusually dry weather that persists long enough to result in negative impacts such as crop damage, decreasing water supply, and/or the ignition of wildfires. It is a normal, recurrent feature of climate that occurs in virtually all climate zones (National Oceanic and Atmospheric Administration, 2018). Drought is unique from other hazards, which can make it more challenging to manage and plan for effectively. It is unique because it often develops gradually, can last for months or years, and the spatial extent varies depending on the drought. There are cases, though, when drought develops relatively quickly and lasts a very short period of time, exacerbated by extreme heat and/or wind (i.e., flash drought).

Even though recent decades have trended towards wetter conditions in Indiana, drought has been a prominent hazard known to impact the state (Figure 14). The drought of record for the state was in the early 1930s, while the most recent drought to impact Indiana was a flash drought in 2012. Even though the drought in 2012 pales in comparison to the droughts in the early 1900s, there were still significant negative impacts to Indiana in 2012. Indiana's agriculture saw a significant impact, with poor corn and soybean conditions, decreased crop yields (lowest corn yield in the last 75 years), issues with aflatoxin in corn, and Indiana's crop insurance payouts topped $1 billion for drought impacts on corn, soybeans, and wheat. In addition, water restrictions were implemented in major metropolitan areas such as Indianapolis, and burn bans were in effect in 84 of Indiana's 92 counties by July 2012 (National Drought Resilience Partnership, 2018).

Figure 14. Values for the Palmer Drought Severity Index for Indiana, 1895 – 2017



Palmer Drought Severity Index (PDSI)

The PDSI is the most prominent index of meteorological drought used in the United States for long-term drought monitoring and research. It uses readily available temperature and precipitation data to estimate relative dryness. It is a standardized index that spans -10 (dry – yellow bars) to +10 (wet – green bars). PDSI calculations are based on precipitation and temperature data as well as the local available water content of the soil.

Future model projections for precipitation changes are less certain than those for temperature, but in general, average precipitation is likely to occur and increases in the frequency and intensity of extreme precipitation (i.e., heavy precipitation and stretches of dry weather) are expected across the Midwest. Some regional climate models project increased spring precipitation, but decreased summer precipitation, particularly in the southern portions of the Midwest. The average number of days without precipitation is expected to increase in the future, which could lead to agricultural drought and suppressed crop yields. Figure 15 shows the projected change in the average maximum number of consecutive days each year with less than 0.01 inches of precipitation for the middle of the current century (2041 – 2070) relative to the end of the last century (1971 – 2000) across the Midwest under continued emissions. An increase in this variable has been used to indicate an increase in the chance of drought in the future (USGCRP, 2018).

Figure 15. Projected Consecutive Dry Days

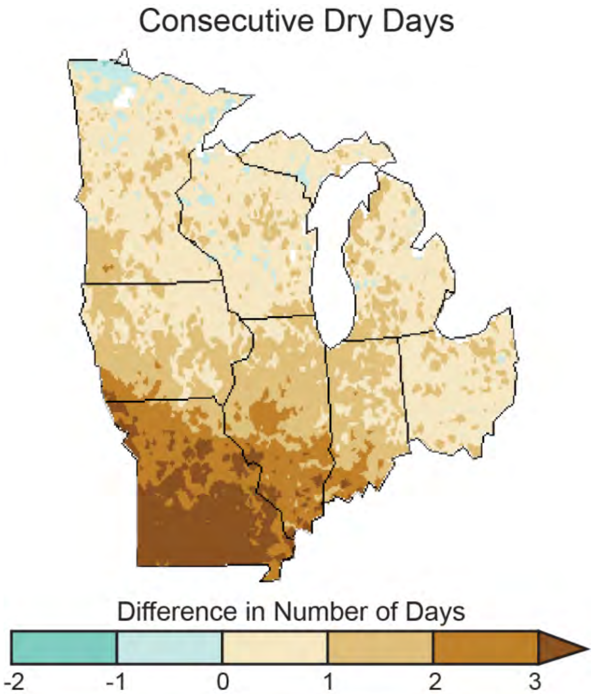
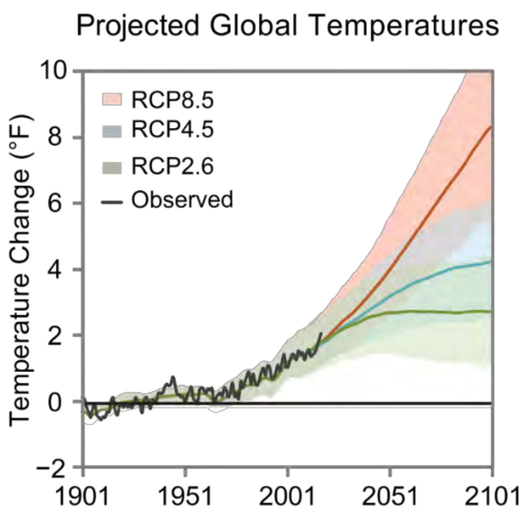


Figure 16. Projected Global Temperatures (USGCRP, 2017)



2.2.2 Future Climate Trends

Scenarios are used to explore how much humans are likely to contribute to future climate change given uncertainties in factors such as population growth, economic development, and development of new technologies. In order to calculate how human activities could affect the climate system, scientists insert greenhouse gas concentrations, pollution, and changes in land cover to their models. These factors influence the Earth's climate. How much emissions and land use change scientists should add depends on future social and economic development. This information is provided by scenarios produced by integrated assessment models (CICERO, 2018).

Four emissions pathways are commonly used in future climate modeling, ranging from significantly reduced emissions levels to continuing on the current-day high emissions trajectory. While all of these scenarios are considered possible, the lowest emissions scenario is highly unlikely.

Figure 16 shows a multimodel simulated time series from 1900 to 2100 for the change in global annual mean surface temperature relative to 1901-1960 for a range of the Representative Concentration Pathways (RCPs). These scenarios account for the uncertainty in future emissions from human activities, as analyzed with the 20+ models from around the world used in the most recent international assessment. The mean (solid lines) and associated uncertainties (shading, showing ±2 standard deviations across the distribution of individual models based on the average over 2081-2100) are given for all of the RCP scenarios as colored vertical bars. The numbers of models used to calculate the multimodel means are indicated.

According to the Indiana Climate Change Impacts Assessment (IN CCIA) from 2018 (Widhalm, et al., 2018), Indiana weather is predicted to change this century. The main findings are listed below:

- Temperatures are projected to rise about 5-6°F by mid-century.
- The number of extremely hot days will rise.
- Extreme cold events will decline.
- The frost-free season will lengthen.

2.2.2.1 Temperatures

The IN CCIA indicates that Indiana has warmed 1.2°F since 1895 (see Figure 17) and temperatures will rise by about 5°F to 6°F by mid-century. This has multiple impacts for Indiana, including changes to the timing and length of the frost free season, and the occurrence of temperature extremes. These shifts will impact air quality, extend the growing season and the allergy season, and create more favorable conditions for some pests and invasive species.

Indiana's growing season is expected to increase by 35 days for the northern part of the state, 33 days for the central part of the state, and 30 days for the southern part of the state (see Figure 18).

Warming temperatures in the winter months will affect the types of plants and pests that can thrive in Indiana and alter the amount of energy needed to heat and cool homes and businesses.

2.2.2.2 Precipitation

Since 1895, average annual precipitation in Indiana has increased by about 15%, or about 4.5 inches, based on a linear trend. This trend is projected to continue, though the type of precipitation and when it falls are changing and will continue to do so.

The southern and west-central regions of the state have observed the largest increases in precipitation, while the east-central and northeast regions observed the smallest. Spring and fall increases were smallest in the north and largest in the south. The opposite was true in summer, when increases were larger in the north and west.

Figure 17. Annual Average Temperature (Widhalm M. H., 2018)

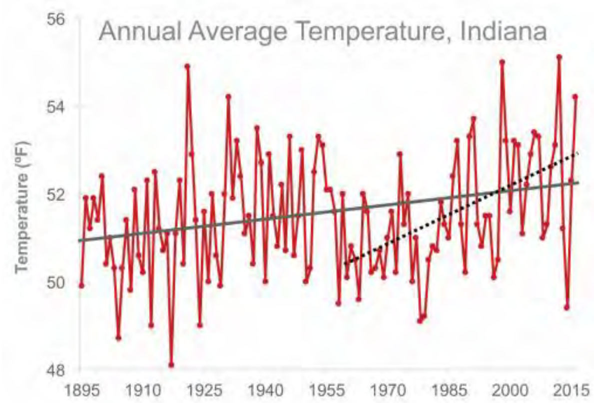


Figure 18. Indiana's Growing Season (Widhalm M. H., 2018)

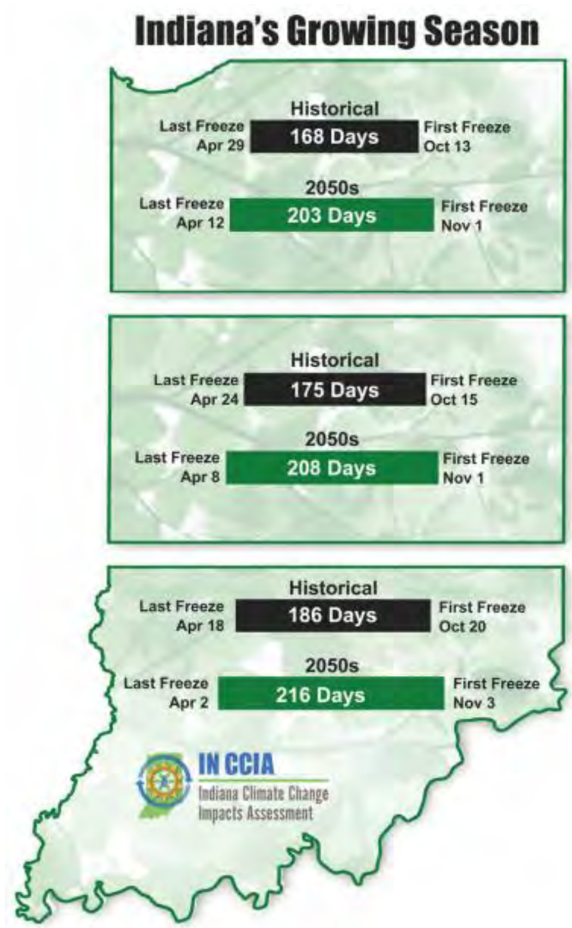


Figure 19. Annual Precipitation (Widhalm M. H., 2018)

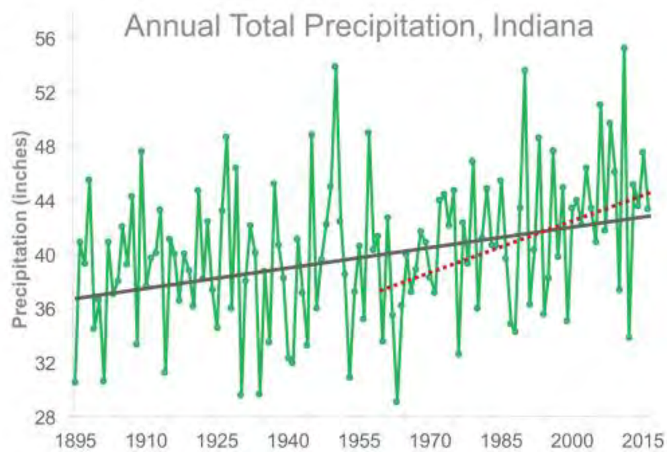
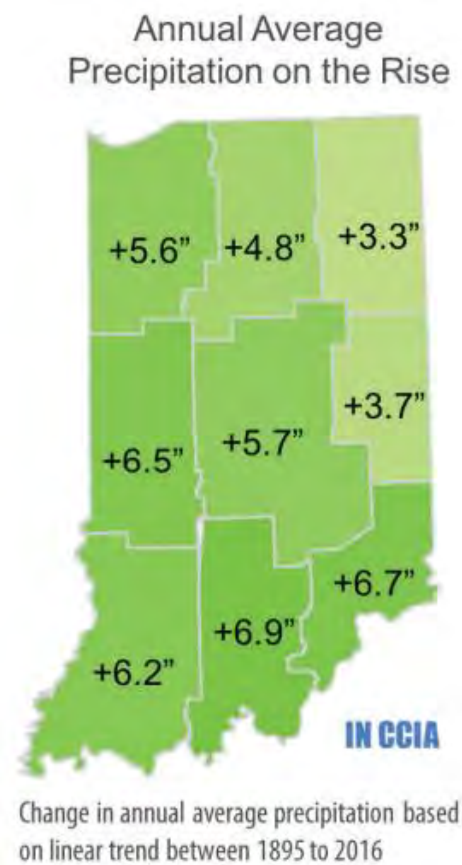


Figure 20. Average Precipitation Increase (Widhalm M. H., 2018)



Annual precipitation is projected to continue to increase. It is estimated that by mid-century, Indiana will see about 6 to 8% more rainfall than in the recent past. However, this increase will not be spread evenly throughout the year. Winter and spring are expected to see substantial increases in precipitation (13 to 20 percent), and more falling as snow. There is high agreement among climate models for the winter and spring seasons. Increased precipitation will create challenges for flood control and storm water management. Summer and fall precipitation projections are less confident across models, with the average projection showing modest declines. Declining warm season rainfall coupled with higher temperatures is expected to increase water stress and lead to possible water shortages for crops, drinking water and wildlife.

With increasing temperatures, it is expected that rain will replace snow in the cold season. Fewer snow days would save municipality and state funding for plowing and salting roadways. However, wetter winters and springs will increase the risk of flooding and combined sewer system overflows, resulting in decreased water quality.

2.2.2.3 Extreme Events

While the annual number of extremely hot days between 1960 and 2013 has not changed, it is expected to rise significantly in the future. By mid-century, it is projected that the hottest temperature of the year will rise by about 8°F. These higher temperatures can cause roadways and pavement to warp and buckle in addition to causing heat-related illnesses among people and pets.

Extreme rainfall events (more than 0.86” of rain in a day) have increased in the past century and this is expected to continue. The northwestern part of the state has experienced the largest increase. Rainfall totals during these events are also increasing. The events contributed to soil erosion and nutrient runoff, affecting both water quality and crop productivity.

Figure 21. Observed Change in Heavy Precipitation

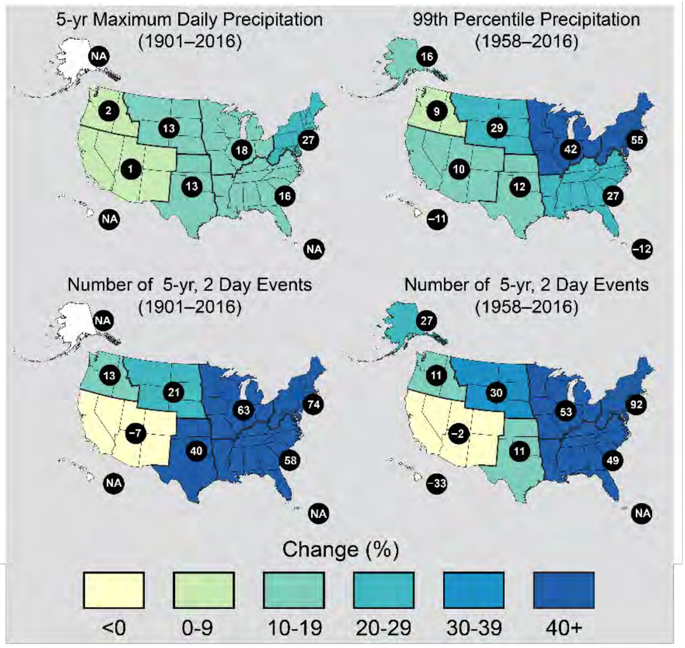
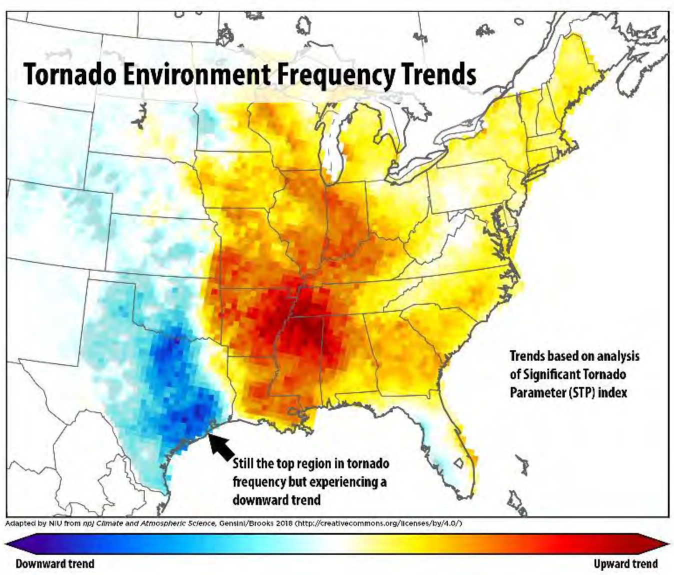


Figure 22. Tornado Environment Frequency Trends (Gensini & Brooks, 2018)



In the Midwest (which includes Indiana), there has been a 53% increase in heavy rain events (defined as 2-day rainfall totals with a 5-year return period) from 1958 to 2016. During the same time frame, there has been a 42% increase in the amount of rain falling in heavy downpours. See Figure 21 for the change in heavy precipitation by region of the United States (USGCRP, 2017).

In addition to extreme temperatures and rainfall evidence, new research appears to demonstrate that while "national annual frequencies of tornado reports have remained relatively constant, […] significant spatially-varying temporal trends in tornado frequency have occurred since 1979" (Gensini & Brooks, 2018). Indiana is one of the states showing this upward trend. Historically, tornadoes occurred most frequently in the Southwest, over less populated areas. This increased frequency and spatial varying will put more residents and property at risk, while increasing response and recovery costs.

2.3 Natural Hazards

Indiana's unique geography, geology, and meteorology make it vulnerable to earthquakes, floods, tornadoes/high winds, severe winter storms, droughts, and extreme temperatures. Incidents involving other natural hazards, such as subsidence, landslide, and wildfire have been rare or localized and unreported, making the risk to the state as a whole difficult to assess. According to the United States Geological Survey (USGS) and IDNR, there has been no documented subsidence in urbanized areas of the state.

Most of the underground coal mines and karst topography that would cause these subsidence events are located in southern and south central rural farming areas. However, these areas have begun to convert to residential or mixed commercial developed areas due to the abandonment or reduction of coal activities in the state and the pressures of increased development throughout the first decade of the 21st century. The increased development will likely cause more and more incidents of subsidence affecting the built environment. Where karst topography and reclaimed mines once created sinkholes in pasture or farm fields, they will now impact a residential subdivision or commercial park. Lands once associated with mining have additional hazards associated with abandoned tunnels and entrances, acidic runoff, and the infiltration of carbon dioxide gas into lower levels of buildings.

Also of note but not individually addressed, are the natural hazards, such as hail, that are associated with tornadic-type storms. The SHMP addresses these within the broader category of severe thunderstorms and tornadoes.

Indiana had the 6th highest number of properties affected by hail damage in 2017 with 456,215 properties or 18% of all properties. Ahead of Indiana were Texas, Illinois, Missouri, Minnesota, Oklahoma, and Kansas (Insurance.com, 2018).

2.4 Demography

According to the 2016 American Community Survey (ACS) 5-year estimate, Indiana is the 17th most populous state in the nation with 6,589,578 people and a population density of 181 people per square mile. The most populous city is the capital of Indianapolis. Table 5 lists the ten counties with the highest total population.

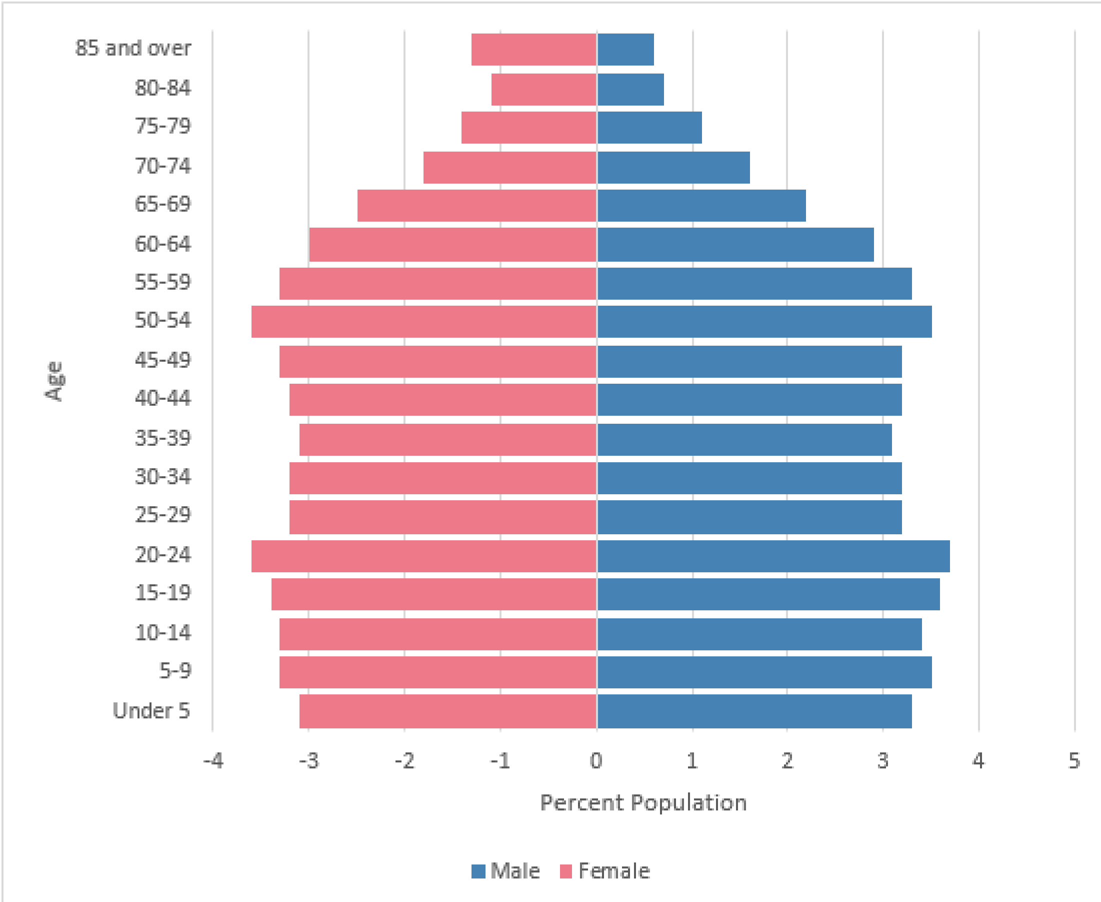
Table 5. Indiana's Most Populous Counties

County	Total Population	Percent of State Population
Marion	932,142	14.1%
Lake	489,698	7.4%
Allen	365,565	5.5%
Hamilton	303,042	4.6%
St. Joseph	267,696	4.1%
Elkhart	201,640	3.0%
Tippecanoe	183,397	2.8%
Vanderburgh	181,692	2.7%
Porter	167,016	2.5%
Hendricks	155,817	2.4%

Figure 23 on the following page shows Indiana's population pyramid, which illustrates the distribution of the state's population in terms of age groups and gender. Population pyramids are used to analyze growth or decline of fertility, mortality, and migration within the specified area.

Indiana's population pyramid is relatively stable indicating slow population growth, long life expectancy, and low infant mortality. It shows the same general shape as a population pyramid of the United States. The slight increase in population from 50 to 59 years represents the tail end of baby boom generation, which is defined as the population cohort born between 1946 and 1964. This increase will continue to travel upward as that population ages.

Figure 23. Indiana Population Pyramid (2016 ACS 5-Year Estimate)



Most of Indiana's counties exhibit a population distribution similar to the state's; however, there are some areas (see the charts on the following page) with atypical distributions, indicating the presence of populations that may require special consideration in terms of disaster mitigation.

> In 2013, IDHS, The Polis Center, and Indiana University (IU) collaborated to develop a comprehensive Disaster-Resistant University (DRU) plan for all eight of the university's campuses. This was one of the first DRUs to include campus-specific, Level 2 Hazus analyses for flood and earthquake.

Figure 24 shows the population pyramid for the City of West Lafayette. The spike for the population aged 20 to 24, which accounts for more than 30% of the city's total population, is due to the significant student population at Purdue University.

Figure 25 shows the pyramid for the Town of Westville. The male population aged 20 to 39 far surpasses the female population in the same age group. This is because the town is home to the state-operated Westville Correctional Facility, a prison for adult males.

Figure 24. City of West Lafayette Population Pyramid

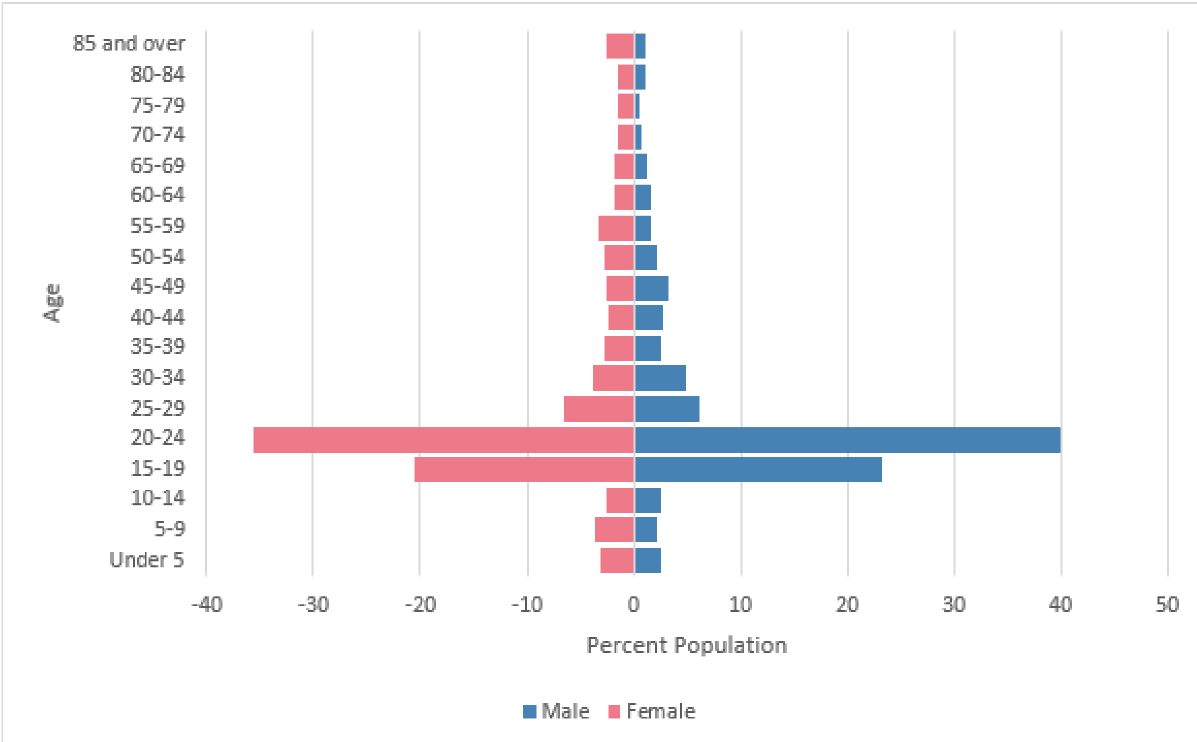
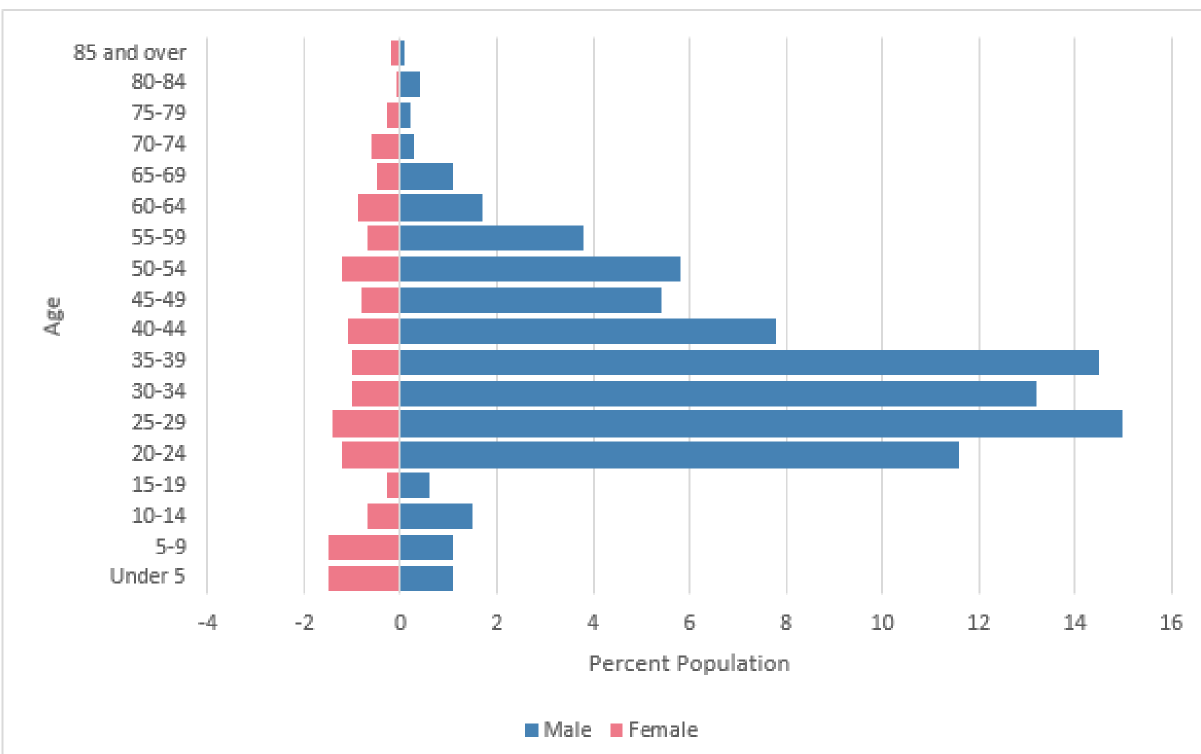
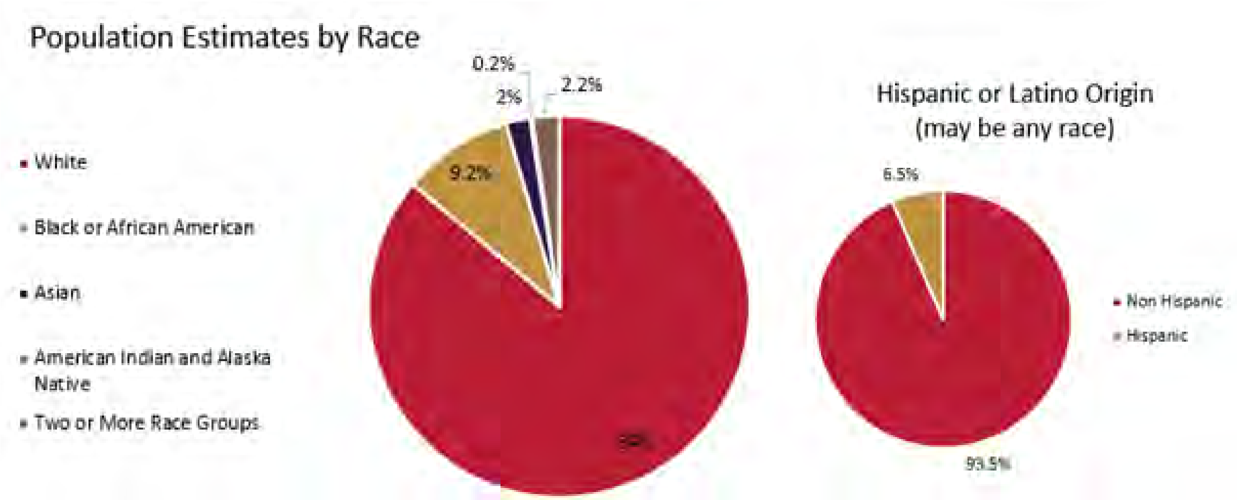


Figure 25. Town of Westville Population Pyramid



The State of Indiana is becoming increasingly diverse, comprising many cultures and sub-cultures, which are important to consider in mitigation planning. Figure 26 shows the state's racial composition as estimate for 2016.

Figure 26. Indiana's Racial and Ethnic Composition

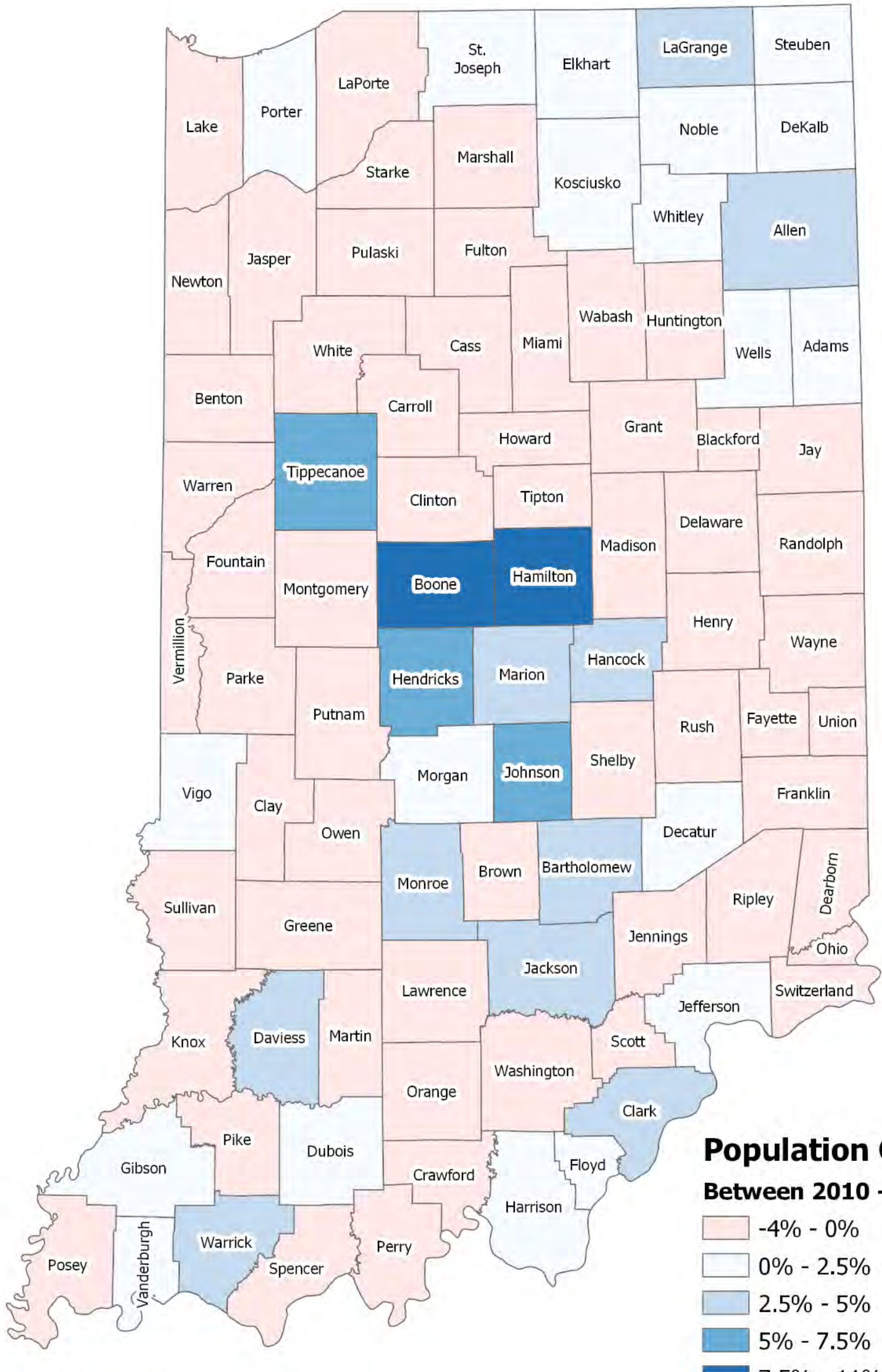


2.5 Population Change

According to the US Census Bureau's Estimates of the Components of Resident Population Change (2010-2016), Indiana's population grew by more than 172,180 or 2.7%, well above the average growth of the Midwest. Hamilton County had the most significant increase (10.4%), and Pulaski County had the most significant decrease (-3.7%) in population. Figure 27 on the following page illustrates population change from 2010 to 2016 for each county.

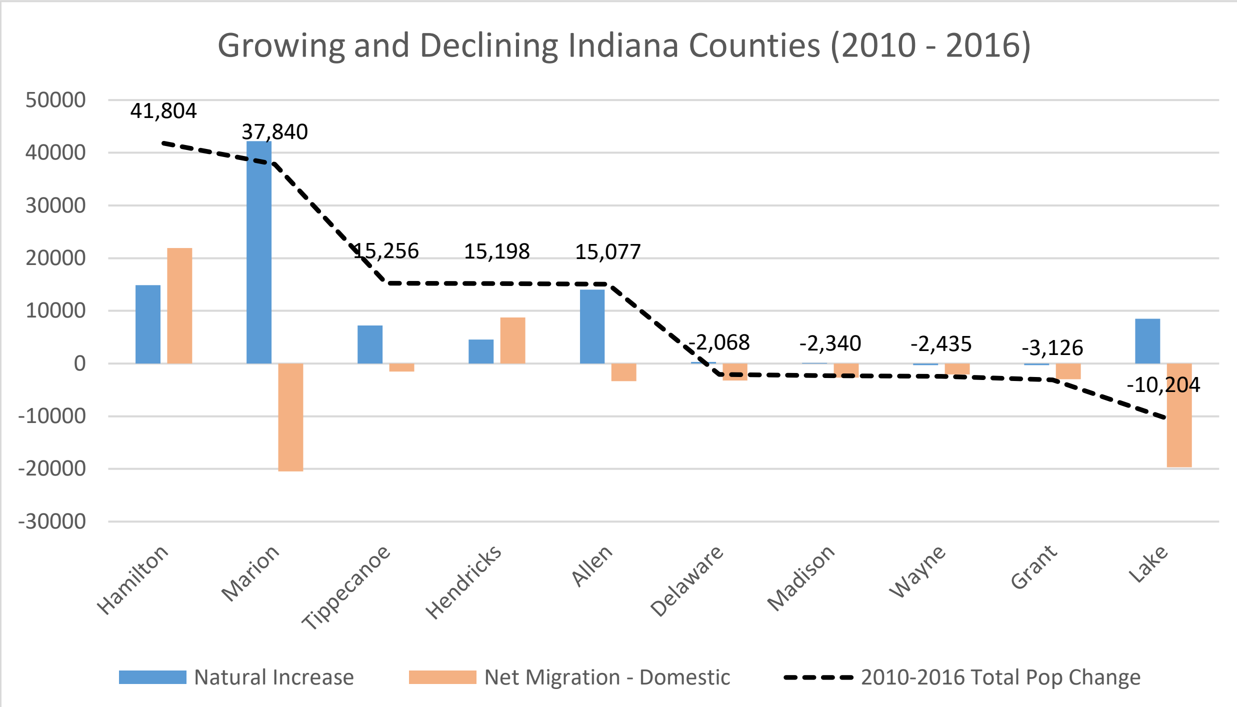
Populations grow or decline through migration and natural increase, and often these two components offset each other. Because international migration data was not as reliable as domestic migration data, this plan only references net domestic trends. From 2010 to 2016, 71 of 92 counties registered a positive natural increase, and only 14 counties added population through net in-migration. Figure 28 shows the five counties with the most significant net growth in population and the five counties with the most significant net decline in population.

Figure 27. Indiana Population Change by County (2010 - 2016)



Source: 2016 American Community Survey 5-Year Estimates

Figure 28. Counties with Significant Net Population Change



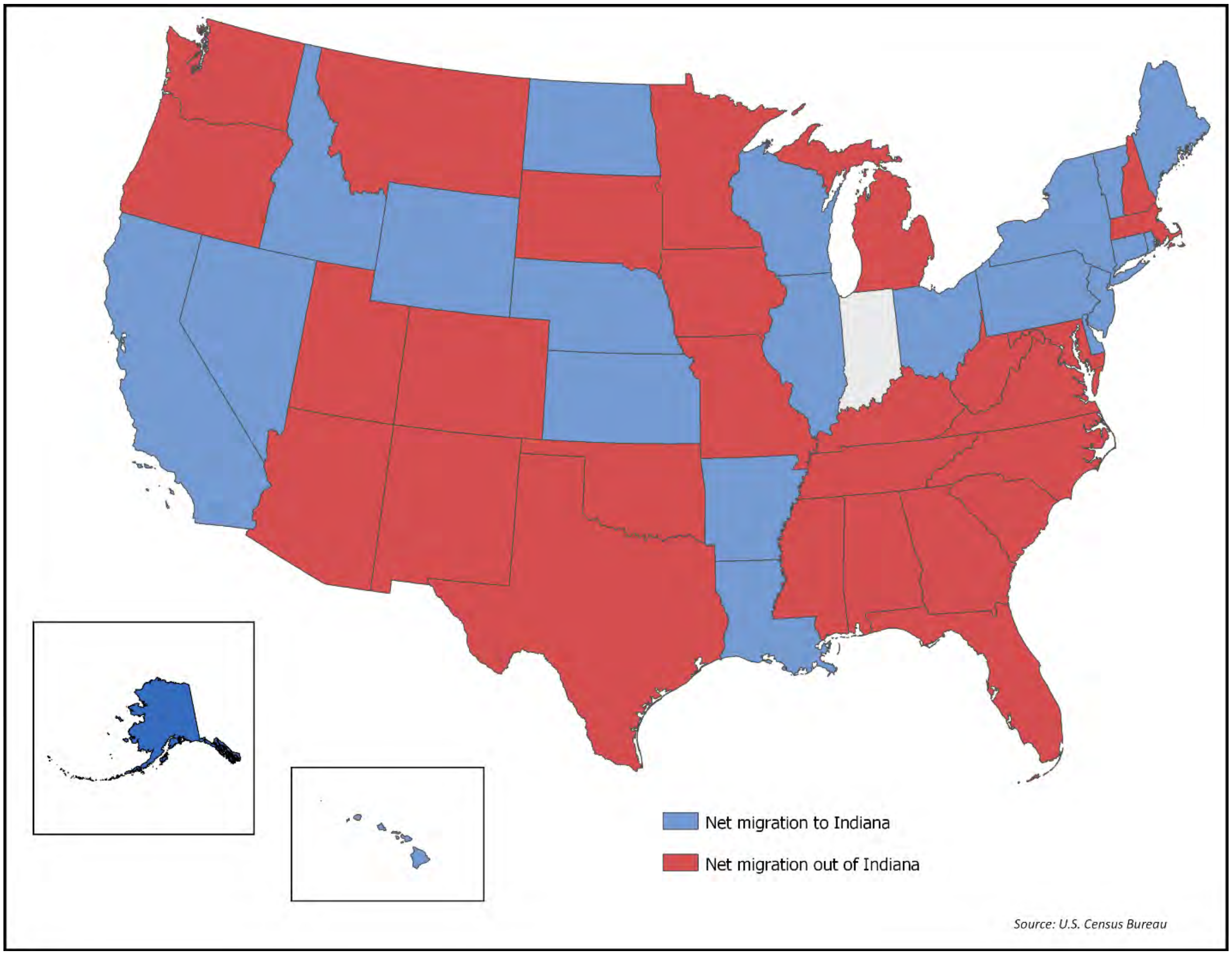
Migration trends inform hazard mitigation by highlighting areas of population growth and decline, revealing immigration and emigration patterns, and informing public officials of changes in net adjusted gross income (AGI) as a result of migration.

Figure 29 shows Indiana's migration patterns between 2010 and 2017 in terms of inbound and outbound domestic migration. Table 6 shows the top 5 states with migration to Indiana and the top 5 states with migration from Indiana.

Table 6. Indiana Migration

State	In Migration	State	Out Migration
Illinois	97,835	**Florida**	28,572
New Jersey	8,179	**Texas**	15,889
California	6,939	**Tennessee**	15,415
Idaho	2,670	**South Carolina**	11,917
Connecticut	2,321	**Arizona**	9,566

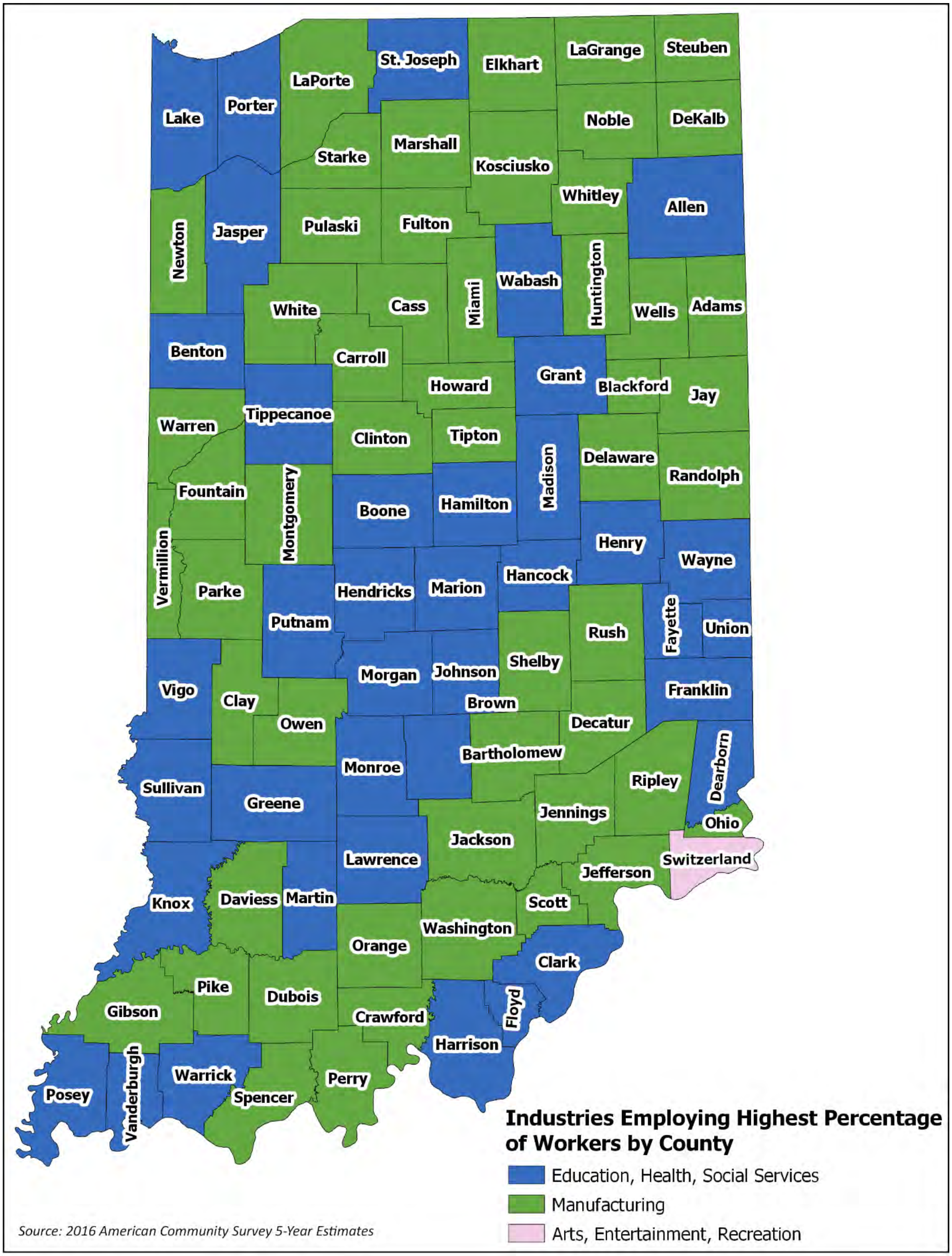
Figure 29. Indiana's Net Domestic Migration (2010-2017)



2.6 Economy

Disasters can significantly disrupt a community's business operations and overall economy. It is important for key local businesses to have a recovery plan, back-up generator in case of power outage, and disaster insurance. Indiana has a diverse economy with a 2017 gross domestic product (GDP) of $352 billion according to the US Bureau of Economic Analysis, the 16th highest in the nation. Its GDP grew from $280 billion (in current dollars), which represents a 25% increase. Manufacturing represents the largest portion of its GDP, while construction grew the most over that time frame. Figure 30 highlights the industries employing the greatest percentage of workers by county.

Figure 30. Industries Employing Highest Percentage of Workers by County



Source: 2016 American Community Survey 5-Year Estimates

Figure 31 illustrates the total GDP by MSA and the lead industry by number of workers for each MSA (Indiana only). Table 7 provides the same information in tabular format, along with the percentage of the working age population within the Indiana portion of the MSAs that work in the lead industry.

Figure 31. Total GDP and Lead Industry by MSA

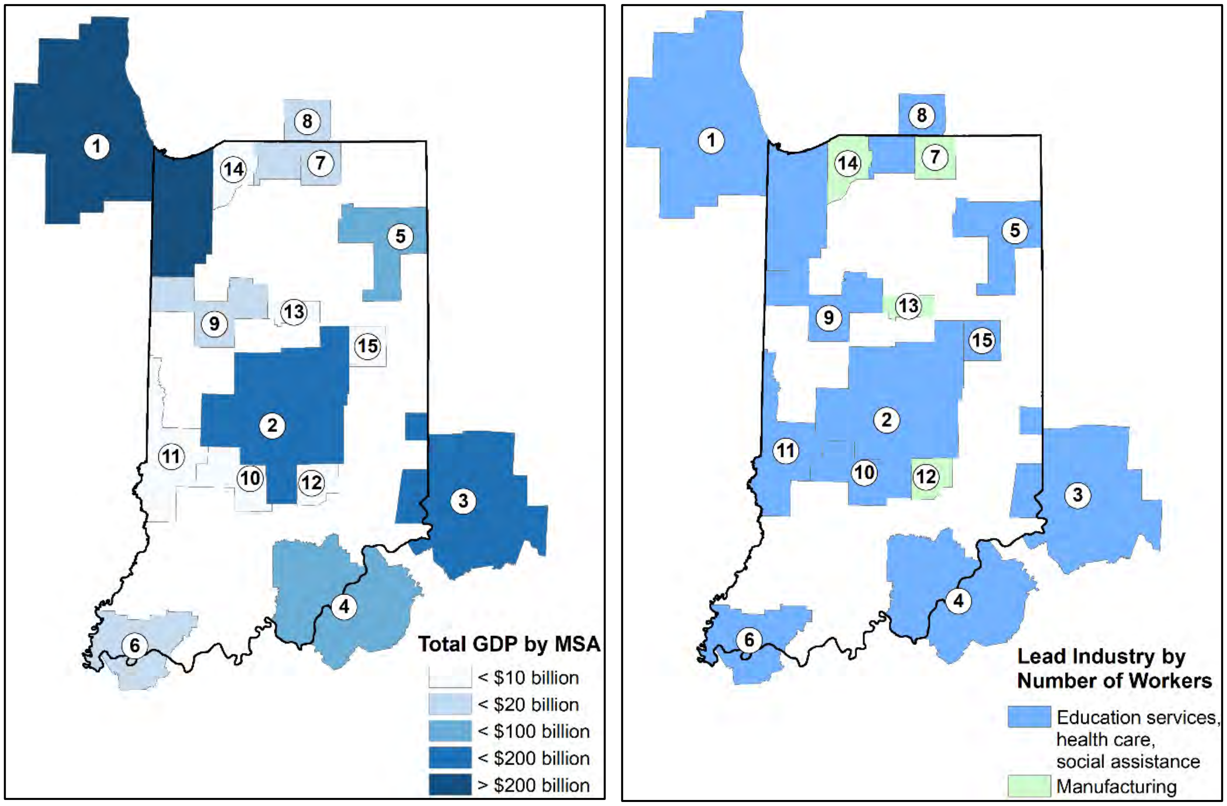


Table 7. Total GDP and Lead Industry by MSA

	MSA	Total GDP (Billion USD)	Lead Industry by Employment	Lead Industry %
1	Chicago-Naperville-Elgin, IL-IN-WI	$679,699	Education, health, social services	24%
2	Indianapolis-Carmel-Anderson, IN	$143,873	Education, health, social services	22%
3	Cincinnati, OH-KY-IN	$138,034	Education, health, social services	21%
4	Louisville/Jefferson County, KY-IN	$76,063	Education, health, social services	22%
5	Fort Wayne, IN	$22,358	Education, health, social services	22%
6	Evansville, IN-KY	$18,001	Education, health, social services	24%
7	Elkhart-Goshen, IN	$17,132	Manufacturing	36%
8	South Bend-Mishawaka, IN-MI	$14,225	Education, health, social services	29%
9	Lafayette-West Lafayette, IN	$10,415	Education, health, social services	32%
10	Bloomington, IN	$7,425	Education, health, social services	33%
11	Terre Haute, IN	$6,534	Education, health, social services	27%
12	Columbus, IN	$6,044	Manufacturing	34%
13	Kokomo, IN	$4,624	Manufacturing	25%
14	Michigan City-La Porte, IN	$4,015	Manufacturing	22%
15	Muncie, IN	$3,961	Education, health, social services	32%

Indiana's 2017 per capita GDP is approximately $48,170 compared to the national average of $55,418 according to the US Bureau of Economic Analysis. According to the US Census Bureau, the poverty rate has been decreasing since 2010. The 2017 poverty rate for Indiana was 13.3%, compared to a national rate of 13.4%. Similarly, according to the US Bureau of Labor Statistics, the state's unemployment rate has decreased from a high of 11% in January 2010 to 3.3% in June 2018 (compared to a national average of 4%). Unemployed and impoverished populations face special needs in the event of disasters. The following section provides additional information about the unique vulnerabilities of special needs populations.

2.7 Special Needs Population

Certain populations require special attention in mitigation planning because they may suffer more severely from the impacts of disasters. It is important to identify these populations and develop mitigation strategies to help them become more disaster-resilient. Although there are numerous types of vulnerable populations, IDHS has identified five significant groups, which include low-income citizens, older adults, non-English-speaking people, people with disabilities, and people without high school diplomas.

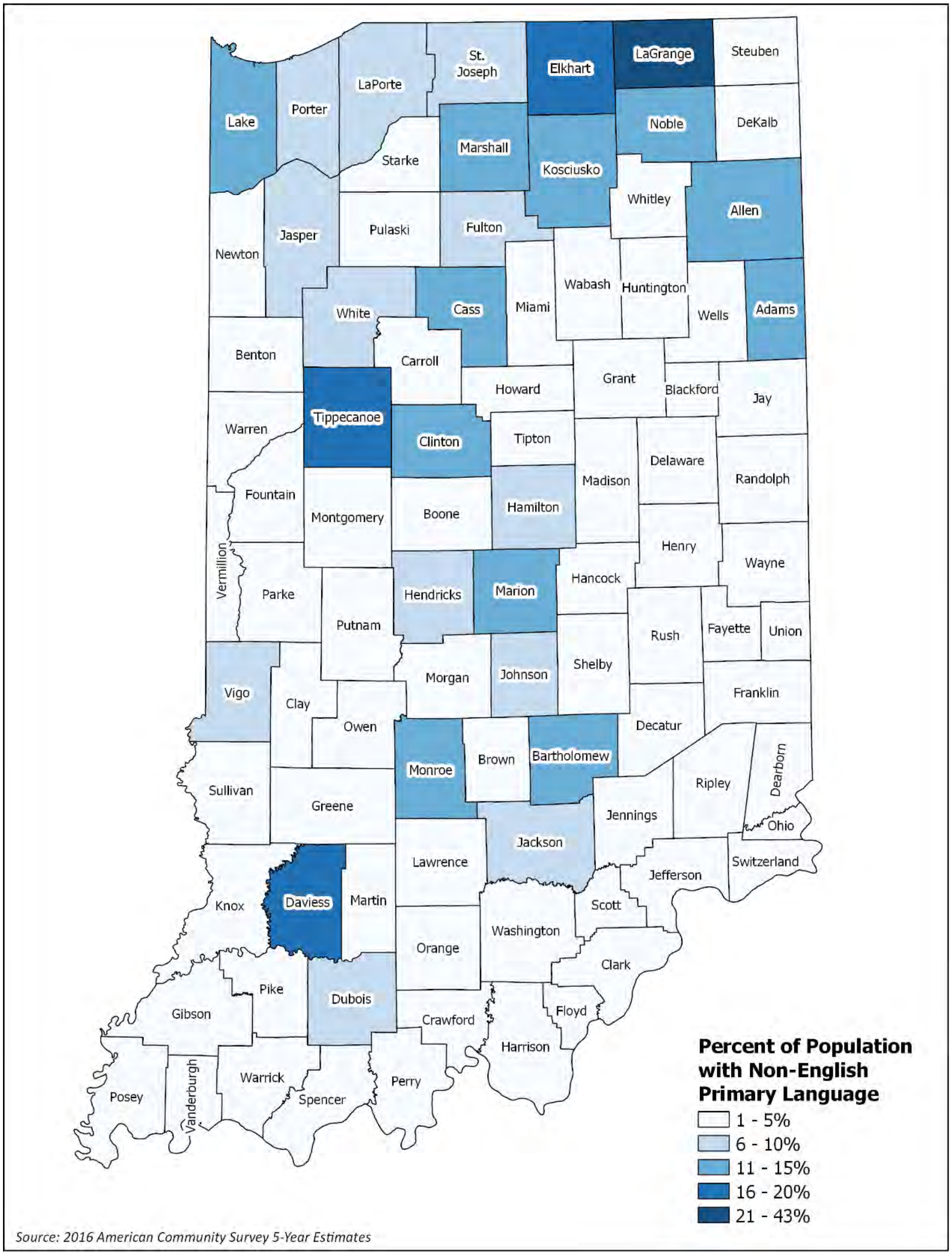
Table 8 lists the top 5 counties for each special needs population category. It is important to note that Indiana has a significant Amish population, especially in LaGrange, Elkhart, and Daviess counties. The Amish typically end formal education in the 8th grade and report speaking German, Pennsylvania German, or Dutch at home.

Table 8. Counties with highest Percentage of Special Needs Population

% Non-English Primary Language	% in Poverty	% with Disability	% Aged 65+	% without High School Diploma
LaGrange (42.4%)	Monroe (25%)	Blackford (20.7%)	Brown (21%)	LaGrange (35.7%)
Elkhart (19.1%)	Delaware (22%)	Crawford (20.2%)	Blackford (19.8%)	Daviess (25.3%)
Daviess (16.6%)	Tippecanoe (21.8%)	Greene (19.5%)	Wabash (19.4%)	Elkhart (19.5%)
Tippecanoe (15.4%)	Switzerland (21.5%)	Grant (19%)	Ohio (19.4%)	Fayette (18.8%)
Adams (14.8%)	Marion (20.5%)	Orange (19%)	Tipton (19.3%)	Switzerland (17.3%)

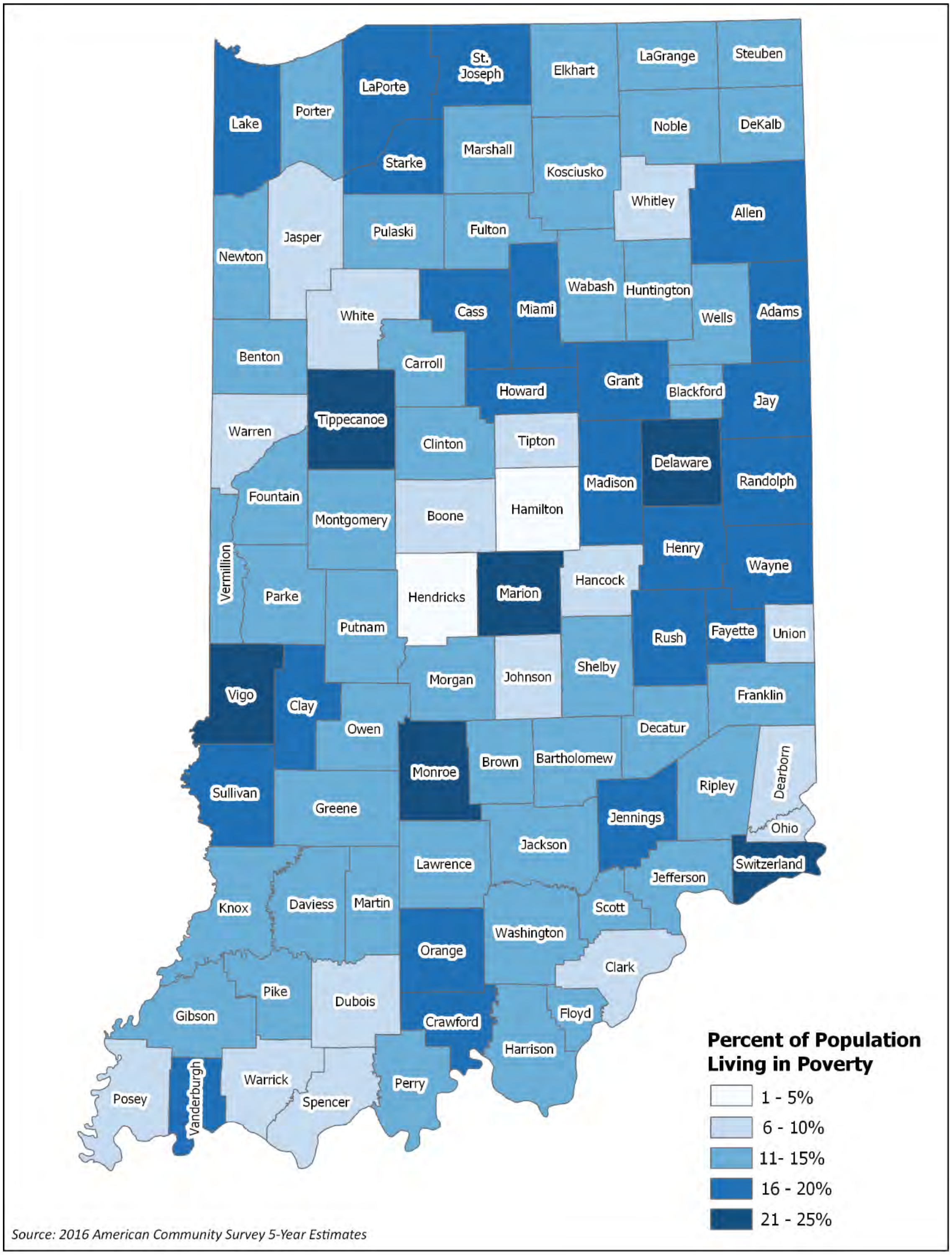
Figure 32 through Figure 36 show the distribution of special needs populations by county.

Figure 32. Percent Population with Non-English as Primary Language



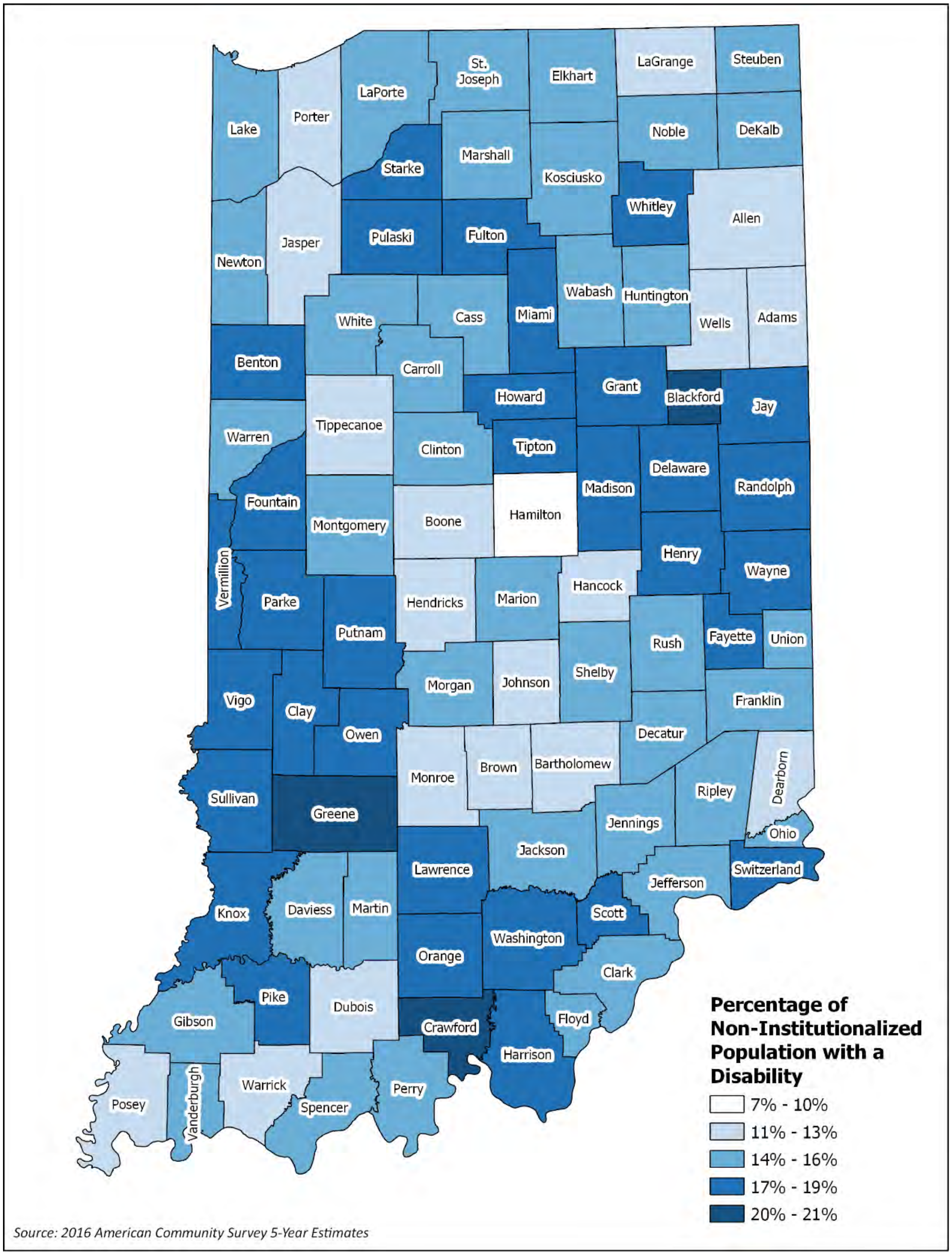
Non-English speakers are those who speak a language other than English at home. Some of the challenges emergency managers face in helping non-English speakers mitigate disasters include lack of multi-language emergency communications, cultural differences in the way information is interpreted, and mistrust of government services.

Figure 33. Percent Population Living in Poverty



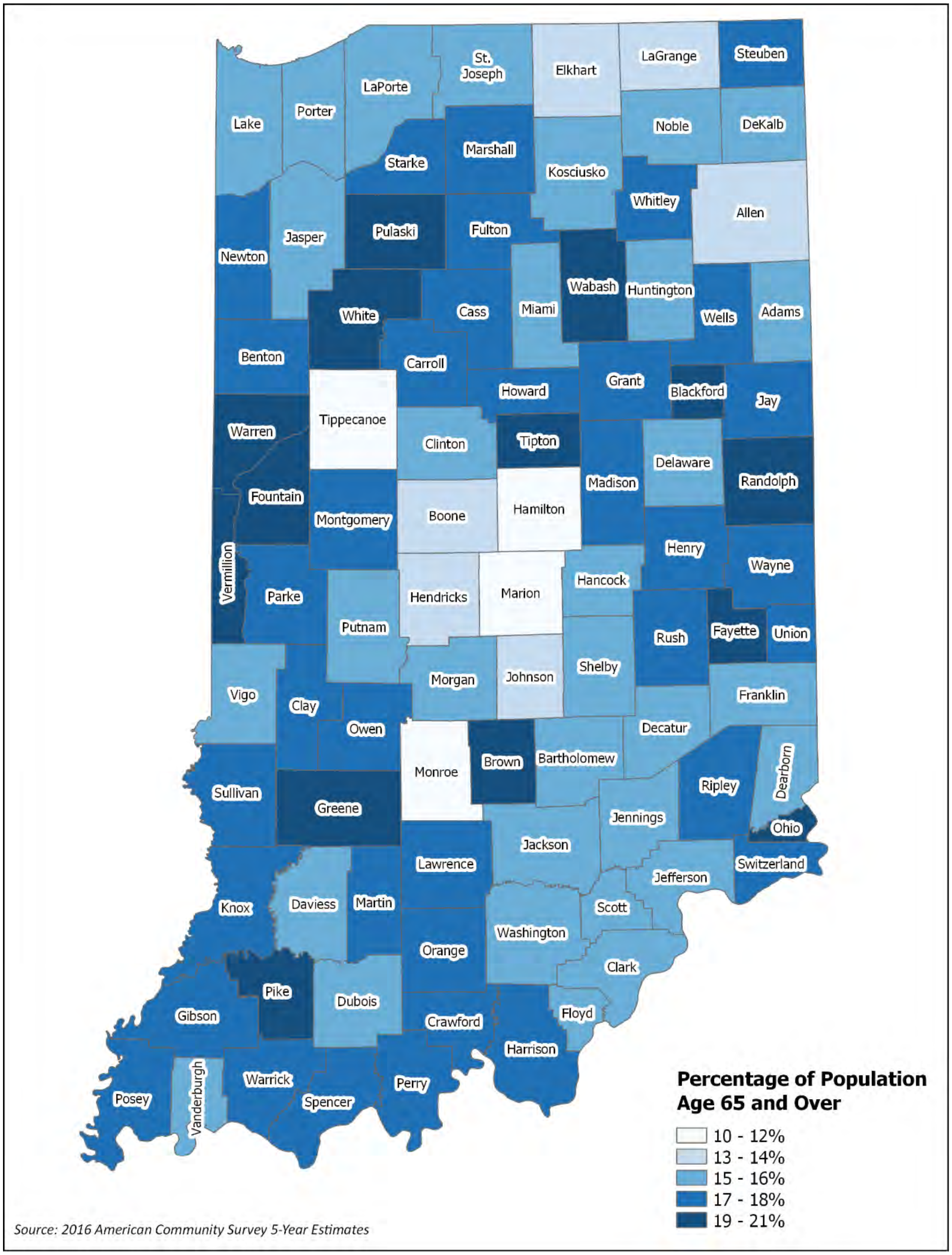
Disasters disproportionately affect impoverished populations because they are less likely to have the resources to cope with a disaster's impacts, which further entrenches them in the poverty cycle. As this figure shows, poverty in Indiana persists in both urban and rural areas.

Figure 34. Percent Population with a Disability



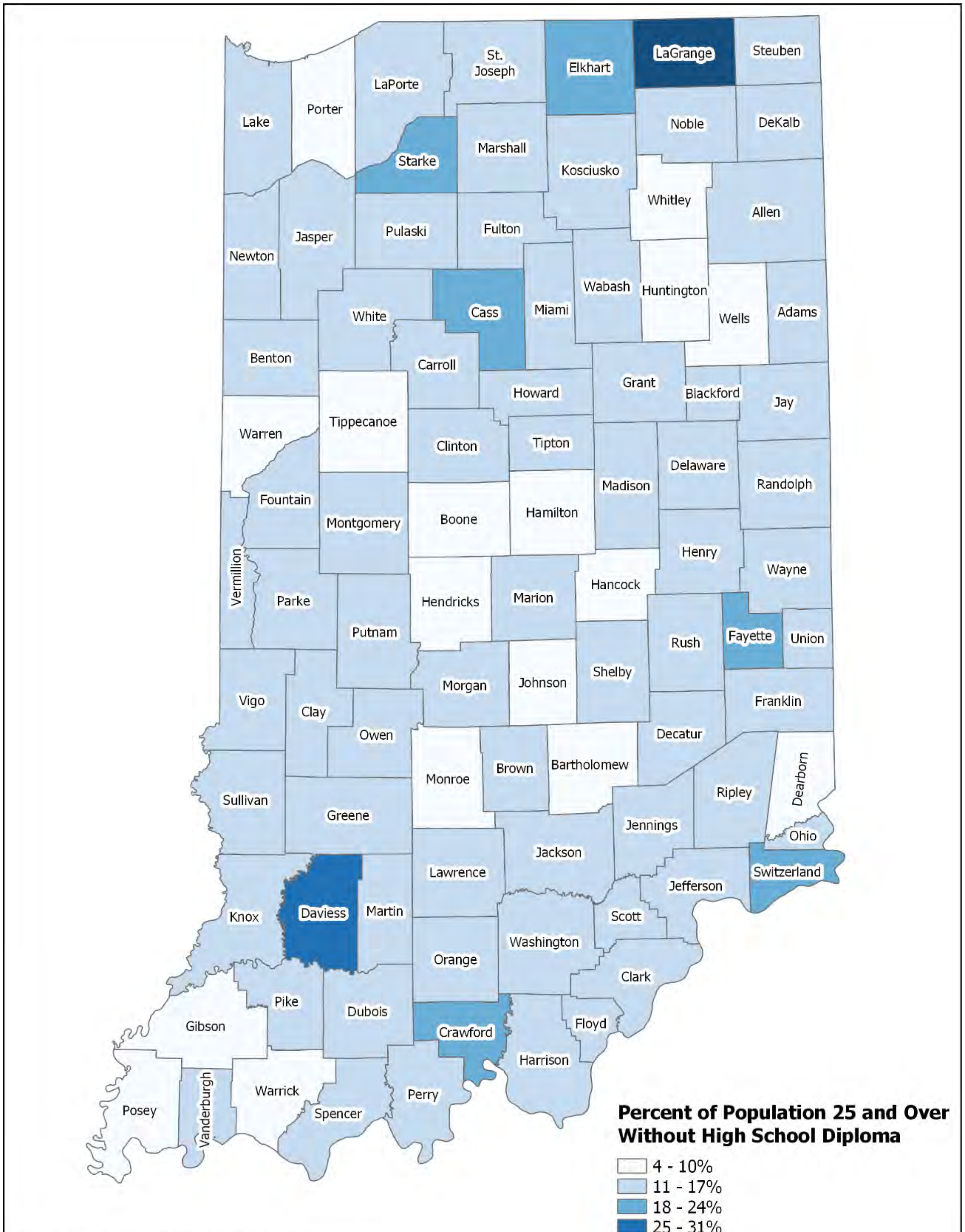
People with disabilities have physical, sensory, or mental impairments that limit their day-to-day activities. They may be physically challenged by lack of accessibility to services and community assets or cognitively challenged in understanding instructions following the event. Those with sensory disabilities, e.g. blind and hearing impaired, may have difficulty communicating.

Figure 35. Percent with Population Age 65 and Over



As the baby boomer generation continues to age, the percent elderly population will increase. Older adults face many of the same challenges as disabled people including lack of transportation and physical or mental impairments. Additionally, many older adults may require medication or specialized healthcare.

Figure 36. Percent Population without High School Diploma



Source: 2016 American Community Survey 5-Year Estimates

The relationship between education and disaster vulnerability is not well understood. However, education is often associated with both income and poverty. Those with higher education are more likely to have higher incomes and more resources upon which to rely in the event of a disaster.

2.8 Land Use

Community development and transportation demand are primarily driven by population growth, urban and economic development, location of utilities, and land use. The Indiana Department of Transportation (INDOT) is responsible for the development and maintenance of Indiana's roadway system, which includes US routes and state routes and the overpasses and ramps for these roadways. The other roadways are regulated by local jurisdictions. In total, INDOT maintains 11,000 centerline miles of the state's 95,701 roadway miles, and over 6,000 bridges (Indiana Department of Transportation, 2013).

Increased urban development occurs as communities develop new residences and businesses to accommodate a growing population. The distribution of projected population growth is heaviest in the urban fringe areas of metropolitan areas as shown in Figure 37. These 14 counties will see the most significant urban development and the highest levels of conversion of rural land to urban uses.

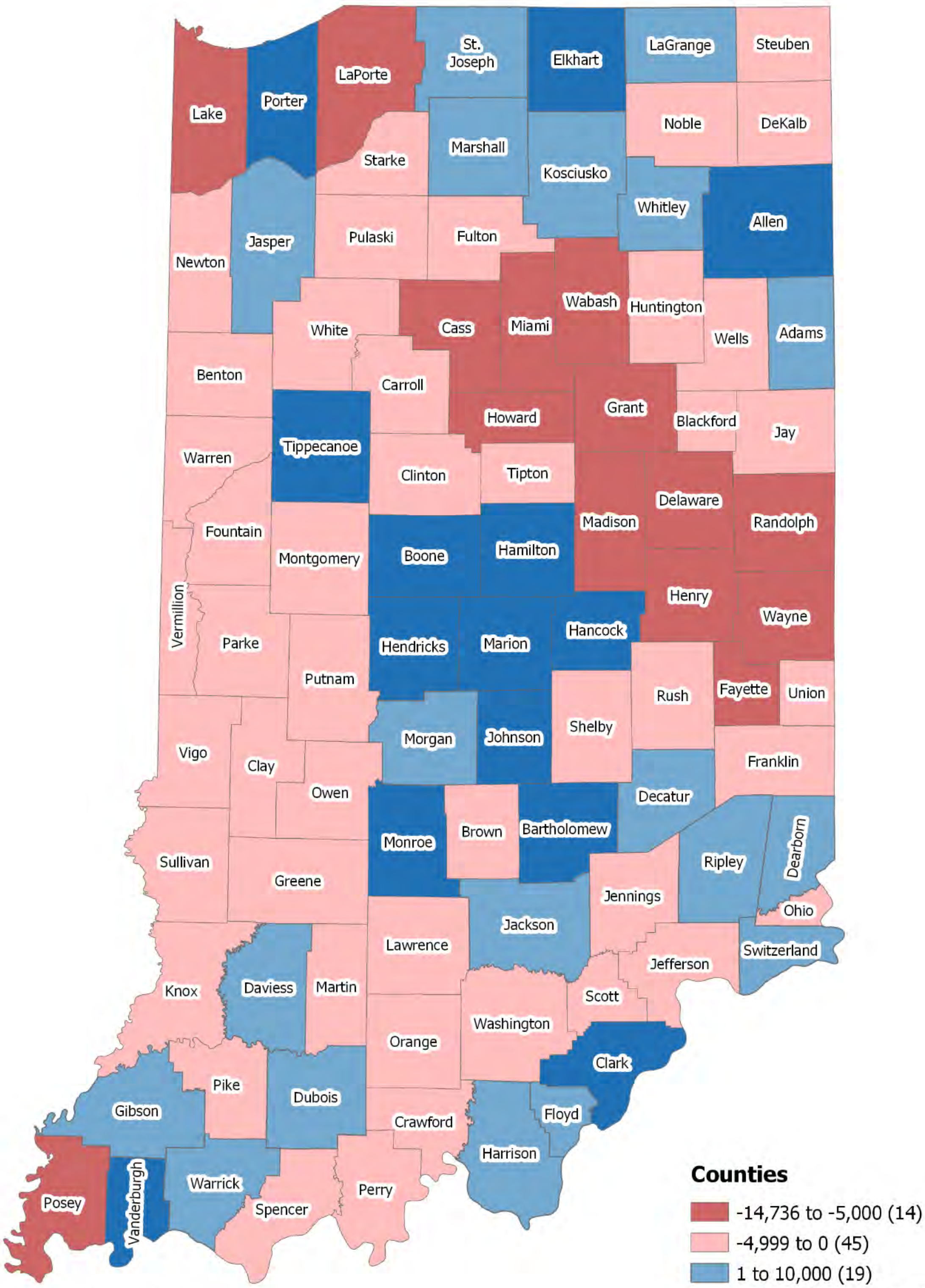
Significant increases in population lead to new development, and it is important to ensure that the new development does not occur in hazard-prone areas. Boone, Hamilton, Hancock, Hendricks, and Johnson counties have been identified for greatest population increase. Fortunately, these counties also have some of the most organized and proactive building codes and stormwater ordinances in the state, and they strictly enforce these codes.

However, many communities with intense development also continue to have localized flash flooding. In Hamilton County, for example, this flash flooding manifests as urban flooding but can also cause small streams and creeks to rapidly rise outside of their banks and floodplains, resulting in damage to infrastructure and uninsured homes and businesses. The storm of June 2008 demonstrated this, and many communities saw devastating floods along smaller creeks and record levels along larger rivers. Some even reached levels beyond the Great Flood of 1913.

Agriculture is also a significant component of Indiana's existing and future land use. The Indiana Land Resources Council helps local and state decision-makers with land use tools and policies. Part of its mission is to evaluate how Indiana counties can minimize conflicting land uses and ensure that agriculture remains a strong component of the state's economy. Figure 38 shows the state's crop and land cover as of 2012.

Land ownership affects how communities can implement mitigation policies and projects. For example, in recent years, the availability for private land for new development has begun to decrease. There is also a small portion of northern Indiana (LaGrange County) designated as tribal land. Figure 39 shows distribution of ownership of significant natural land areas.

Figure 37. Future Population Growth (2015-2050)



Source: Indian Business Research Center

Figure 38. Indiana Crop and Land Cover

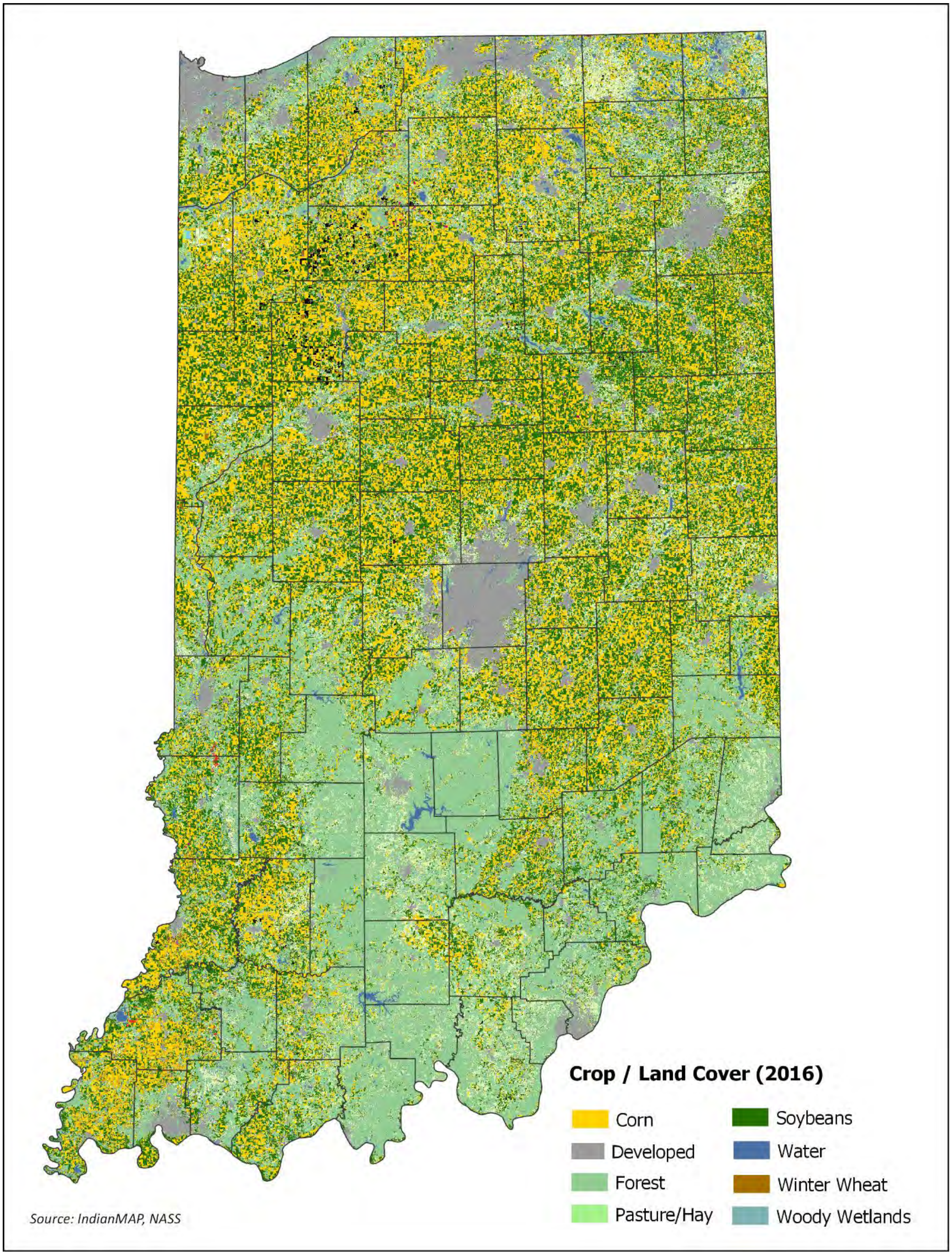
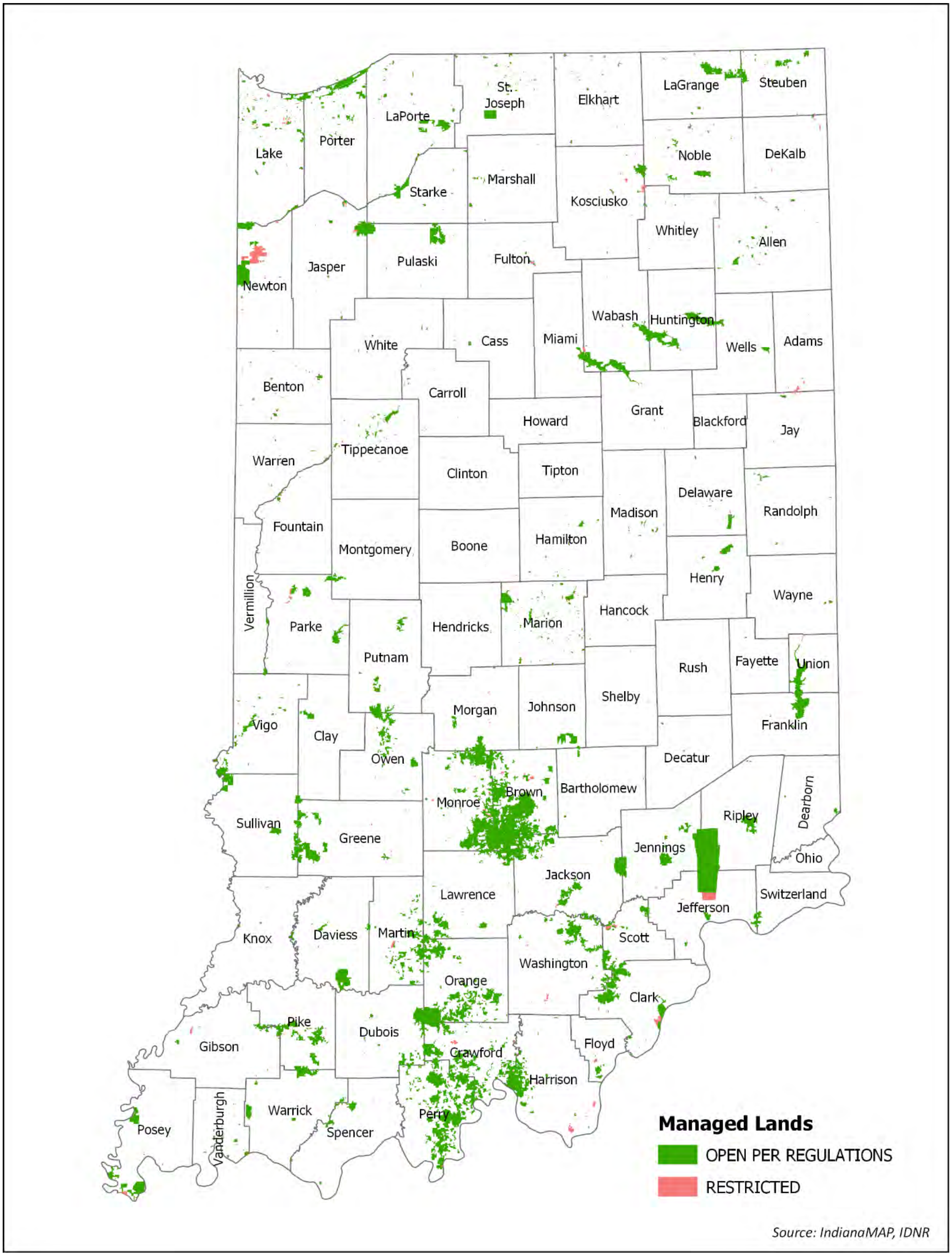


Figure 39. Ownership of Significant Natural Lands



3 Planning Process

3.1 Plan Update Procedure

The IDHS Mitigation Section is the lead agency responsible for coordinating the State Hazard Mitigation Plan. The State Hazard Mitigation Plan is intended to facilitate mitigation activities throughout the state across the boundaries of federal, state, and local governments and private and nonprofit institutions. To achieve this goal, IDHS collaborated with The Polis Center of Indiana University-Purdue University Indianapolis (IUPUI), multiple state agencies, and the Indiana Silver Jackets Risk Reduction Task Force.

The Polis Center has worked with IDHS since 2003 to develop and update Multi-Hazard Mitigation Plans (MHMP) for 77 of Indiana's 92 counties. Polis also has been involved in Indiana's Risk MAP activities in conjunction with IDNR. Risk MAP projects are described in more detail in Section 6.1.3.1 of this plan.

The Indiana Silver Jackets is a multi-agency charter that includes representatives from federal, state, local agencies, higher educational facilities, and regional professional organizations who collaborate to share information and leverage resources to develop sustainable solutions to natural hazard issues.

INDIANA BEST PRACTICE

The Indiana chapter of Silver Jackets is very active in risk-reduction and resiliency projects throughout the state. Since 2007, the Indiana Silver Jackets has successfully completed projects in dam safety, fluvial erosion mitigation, levee identification and mapping, flood risk education and outreach, and much more.

The partnership between IDHS, Polis, and the Indiana Silver Jackets has resulted in a contributing planning team of agencies and subject matter experts as listed in Table 9. These planning team members provided essential input by reviewing drafts of the plan, contributing data to the risk assessment, providing updates on existing and ongoing mitigation activities, and developing new mitigation strategies.

Table 9. Planning Team Members

Name	Title	Agency
Mary Moran	Recovery Branch Director	Indiana Department of Homeland Security
Torrey Glover	State Hazard Mitigation Officer	Indiana Department of Homeland Security
Alicia Schoening	Mitigation Program Specialist	Indiana Department of Homeland Security
Kisha Morris	Mitigation Program Specialist	Indiana Department of Homeland Security
Marianne Cardwell	GIS Project Coordinator	The Polis Center at IUPUI
Kayla Swoveland	GIS Analyst	The Polis Center at IUPUI
Jim Sparks	GeoInformatics Director	The Polis Center at IUPUI
Kavya Urs Beerval Ravichandra	GIS Analyst	The Polis Center at IUPUI
Melissa Long	GIS Analyst	The Polis Center at IUPUI
Kevin Mickey	Director Professional Development and Geospatial Technologies Education	The Polis Center at IUPUI

Name	Title	Agency
Matt Riggs	Geospatial Research Manager	The Polis Center at IUPUI
Unai Miguel Andres	GIS and Data Analyst	The Polis Center at IUPUI
Allison Curry	Natural Hazard Planner	Indiana Department of Homeland Security
Amber Kent	Communications Manager	Indiana Department of Homeland Security
Anita Nance	Floodplain Management Section Manager	Indiana Department of Natural Resources
M. Anna Nowicki Jessee	Lecturer	Indiana University-Purdue University Indianapolis
Ashlee Moore	Information Technologist/GIS	Indiana Department of Homeland Security
Beth Hall	Indiana State Climatologist	Purdue University
Bob Barr	Research Scientist Center for Earth and Environmental	Indiana University
Brad Thatcher	Response Branch Director	Indiana Department of Homeland Security
Brian Renner	Deputy Commissioner	Indiana Department of Administration
Bryan Sacks	Chief Information Security Officer	State of Indiana
Carrie Tauscher	State Urban Forestry Coordinator	Indiana Department of Natural Resources
Chris Ritz	Civil Engineer	NRCS
Crystal Pettet	Lead Meteorologist	National Weather Service
Darren Bridges	State Fire Coordinator	Indiana Department of Natural Resources
Darren Pearson	State NFIP Coordinator	Indiana Department of Natural Resources
David B. Knipe	Engineering Section Manager (Central Basin Team)	Indiana Department of Natural Resources
Dave Nance	Project Development Section Manager Div. of Water	Indiana Department of Natural Resources
David Huntley	Associate State Engineer, Project Manager	Indiana Department of Administration
David J. Smith	Water Resources Planner	Indiana Department of Natural Resources
Dev Niyogi	Professor and Former State Climatologist	Purdue University
Devan Strebing	Communications Specialist	Indiana Office of Technology
Elizabeth Sherrill	Graduate Research Assistant	Indiana University - Bloomington
Erin Rowe	Response & Recovery Division Director	Indiana Department of Homeland Security
Graig Lubsen	Director of Communication and External Affairs	Indiana Office of Technology
Jamie Miller	Water Planner	Indiana Department of Natural Resources
Jeff Frye	Deputy Director	United State Geological Survey
Jeffrey Motz	GIS Analyst	Indiana Department of Transportation
Jill Flachskam	State Land Office Director & Division of Forestry GIS Coordinator	Indiana Department of Natural Resources
Kathy Borgman	Technological Hazards Planner	Indiana Department of Homeland Security
Ken Smith	Assistant Director Water Division	Indiana Department of Natural Resources
Larry Cassagne	Individual Assistance Officer	Indiana Department of Homeland Security
Lyle Sadler	Field Liaison, Emergency Planning & Response	Indiana Department of Transportation
Manuela Johnson	State Disaster Relief Fund Administrator & IDHS Indiana Silver Jackets Lead	Indiana Department of Homeland Security
Melissa Widhalm	Operations Manager	Purdue Climate Change Research Center

Name	Title	Agency
Michael Hamburger	Professor of Geophysics, department of Earth & Atmospheric Sciences	Indiana University - Bloomington
Michael Timlin	Regional Climatologist	Midwestern Regional Climate Center
Mike Ryan	Senior Meteorologist	National Weather Service - Indianapolis
Miranda Hancock	GIS Coordinator	Indiana Department of Environmental Management
Molly Woloszyn	Regional Drought Information Coordinator	National Oceanic and Atmospheric Administration National Integrated Drought Information System
Peri Rigowski	Senior Planner	Indiana Department of Homeland Security
Rebecca Joniskan	Chief of Permits	Indiana Department of Environmental Management
Riley Harden	Public Information Officer	Indiana Department of Homeland Security
Robin Stump	EMS Section Chief	Indiana Department of Homeland Security
Roger Koelpin	State GIS Officer	Indiana Department of Homeland Security
Sam Lashley	Senior Meteorologist	National Weather Service
Sally L. Letsinger	Associate Research Scientist	Indiana University - Bloomington
Siavash Biek	Board Member	Indiana Association of Floodplain Management
Susan Shearer	Public Assistance Program Manager	Indiana Department of Homeland Security
Tom Reaugh	Meteorologist	National Weather Service - Louisville
Tom Vanderpool	Director Emergency Planning & Response	Indiana Department of Transportation
Wyatt Johnston	Undergraduate Research Assistant	Indiana University - Bloomington

IDHS coordinated with other agencies in a series of meetings during this planning process. Attendance records and meeting minutes for each are available in Appendix A. The core team of IDHS and Polis staff, met on a weekly basis from October 2018 through April 2019. The following meetings included additional staff focused on specific needs:

- Climate Discussion Meeting (October 31, 2018): IDHS and Polis staff met with a number of climate specialists from the National Oceanic and Atmospheric Administration (NOAA), the National Weather Service (NWS), IDNR, Purdue University, and the University of Illinois to discuss information related to climate and, in particular, to climate change.
- Natural Resources Meeting (November 14, 2018 – morning): IDHS and Polis staff met with IDNR representatives to review datasets that would be relevant for inclusion in the state plan, such as locations of dams, low head dams, bridges, landslides, flood, wetlands, levees, etc.
- Earthquake Meeting (November 14, 2018 – afternoon): IDHS and Polis staff met with Indiana University and Indiana University-Purdue University Indianapolis professors to discuss datasets and information related to earthquakes in Indiana.
- Transportation Meeting (January 7, 2019): IDHS and Polis staff met with INDOT representatives to review datasets that would be relevant for inclusion in the state plan, such as known landslides, underground coal mines, hazardous materials transportation, maintenance of right-of-ways, and stream gauges.

In addition, the Planning Team wishes to acknowledge the informal guidance and advice provided by members of the Indiana Silver Jackets during their monthly meetings that occurred throughout the planning process.

On March 1, 2019, IDHS issued a press release informing the public that a draft version of the plan would be posted on IDHS's website and a public meeting would be held at the Indiana Government Center on March 14, 2019. This information was also sent through its GovDelivery Communications Cloud, an email-based communications tool used to distribute notices and press releases. Press releases are distributed to a compiled list of 387 reporters and news outlets throughout the state of Indiana, as well as to another 203 individuals that have requested to receive updates from the office of Public Affairs.

On March 8, 2019, IDHS issued a press release informing the public that a draft version of the plan was made available on its website along with an online survey allowing the public to provide comments on the plan. This press release also utilized the GovDelivery service.

On March 14, 2019, IDHS hosted morning and afternoon meetings at the Indiana Government Center in downtown Indianapolis. IDHS gave a brief overview of the draft plan and sought feedback from the public. All emergency management agency directors within the state were invited.

3.2 Plan Implementation

The Indiana State Hazard Mitigation Officer (SHMO) is responsible for the maintenance and implementation of this plan. The SHMO is also responsible for monitoring the funding and implementation of mitigation strategies in the state administered by the Indiana Department of Homeland Security Mitigation Section.

The SHMO will implement the SHMP through the coordinated efforts of IDHS, various state/federal agencies and the Indiana Silver Jackets (ISJ). Few states have a Silver Jackets chapter as engaged and active as Indiana's chapter is. The group meets monthly to discuss recent and current mitigation projects and share resources to undertake new activities. The initial focus of the ISJ was addressing statewide flooding concerns. As the ISJ team has evolved and risk exposure has changed, it has begun to take an all hazards approach to risk reduction, focusing on all natural hazards.

The 2019 SHMP defines and prioritizes specific projects and vulnerable communities, it will serve as a guide to the Silver Jackets to determine the highest priority mitigation projects, the best suited agencies to lead those projects, and potential sources of funding. As projects begin, the State Hazard Mitigation Officer will be responsible for coordinating the continued development of the SHMP, finding non-traditional mitigation funding and opportunities for public involvement. Now that IDHS Mitigation Section has sufficient staff, the plan will be reviewed by the SHMO annually or after newly declared disaster events.

3.3 Integration with Other Planning Efforts

The 2019 State Hazard Mitigation Plan integrates with all of the state's mitigation planning efforts and informs many of the local planning efforts. IDHS Mitigation coordinated with the IDHS Planning Division to understand the breadth of their plan library, how their plans are developed according to existing risks and how the SHMP will be used to integrate all planning activities going forward. The process also considered the planning efforts of a number of other state agencies including the Indiana Department of Transportation, Indiana Department of Natural Resources Incident Emergency Action Plans for high hazard dams in Indiana, and the Office of Community and Rural Affairs Flood Response Plans.

Additionally, the 2019 SHMP integrates with FEMA's Risk MAP program. Since 2010, IDHS, IDNR, Polis Center and FEMA contractors have partnered with local governments to complete 12 Discovery projects (one additional Discovery project is slated to be completed in 2019). For each Risk MAP initiative, IDHS reviews with participating counties their local mitigation plans and assists them in updating existing strategies and/or offering technical support to develop additional mitigation strategies. This collaborative effort helps local governments take a more holistic approach to planning.

In 2016, IDHS completed a statewide hazard/treat identification and risk assessment. This assessment utilized a modified version of the Calculated Priority Risk Index (CPRI). The HIRA lists the following natural hazards as High or Moderate risk:

- High hazard dam
- Flash flood
- Tornado (EF0-EF5)
- Severe thunderstorm
- Earthquake
- Major levee failure
- Major flood
- Wildfire
- Derecho
- Ice storms
- Drought
- Extreme temperatures

For this update, each hazard was evaluated by a team of subject matter experts who reviewed historical occurrences, mitigation efforts, and known vulnerabilities. Each county Emergency Management Agency was strongly encouraged to complete a county based HIRA using the WebEOC HIRA calculator. Please see Appendix B – 2016 County HIRA for additional details.

3.4 Plan Adoption

The Indiana State Hazard Mitigation Plan meets the minimum requirements of Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Public Law 93-288 as amended). Additionally, this plan meets the minimum planning requirements under 44 Code of Federal Regulations, Part 78 (Flood Mitigation Assistance).

It is intended that this plan also meet the requirements of the Disaster Mitigation Act of 2000, Section 322. Section 322 requires that states, as a condition of receiving federal disaster mitigation funds, have a mitigation plan in place that describes the planning process for identifying hazards and risks and vulnerabilities. This plan also must identify and prioritize mitigation actions, encourage the development of local mitigation, and provide technical support for these efforts. In addition, the act requires local and tribal governments to have mitigation plans.

Development and implementation of this plan will be carried out in accordance with state regulations and statutes, as well as conform to federal and state laws/statutes that apply when considering intentional, criminal, or unintentional technological and human incidents.

IDHS is responsible for the coordination, preparation, and continuous updating of the SHMP and will ensure that the plan is consistent with federal, county, and municipal plans.

The 2019 State Hazard Mitigation Plan was adopted by the State of Indiana under the executive powers of the governor and approved by FEMA's Mitigation Division on April 23, 2019.

4 2014 Strategies Progress

The goal of mitigation is to build disaster-resistant communities by reducing the impacts of future disasters and lessening the amount of public and private funds spent to assist with disaster recovery. Mitigation actions and projects should be based on a well-constructed risk assessment and should be an ongoing process, adapting over time to accommodate the needs of local communities and the state.

The 2014 SHMP included comprehensive mitigation strategies for each of the identified risks. Due to the lengthy list of strategies identified, IDHS Mitigation was not able to implement all of these strategies. 2014 strategies were carried forward and new strategies collected from planning team members and the Survey Monkey results in Section 9 were added. The 2014 strategies with significant progress made are summarized below.

Table 10. 2014 Strategies Progress

Priority	Goal	Objective	Strategy	Section	Strategy Status
High	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Engage regularly with Congressional and Legislative officials, and especially Congresswoman Susan Brooks, to provide status of state and local mitigation activities	Flood	IDHS and IDNR are in constant contact with elected officials in normal business operations and during emergency events.
High	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Identify new partners to collaborate on the state hazard mitigation planning team.	Invite representatives from the social sciences to join the Silver Jackets to better engage local universities to participate in mitigation planning	Flood	IDHS continues to invite partners to join the ISJ Risk Reduction task force. Since the last plan, several agencies have joined the ISJ including but not limited to IHCDA, Purdue Climate Center and the Center for Earth and Environmental Science. The goal for 2109 is to add Department of Energy and the Environmental Protection Agency representatives.
High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Collaborate with Silver Jackets to determine a sustainable funding source for continued collection of LiDAR data	Flood	IDNR continues to work with their funding sources. Mapping progress continues and the goal is to have the state completely mapped by 2020.
High	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Support compliance with the NFIP.	Use new LiDAR data and ortho products to compile a comprehensive database of building footprints, which will help to promote flood insurance	Flood	INDR continues to work on updating flood maps with new LiDAR data through both the RiskMap efforts and the State Best Available data project.
High	Promote research education, and outreach to expand Indiana's knowledge	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	Flood	IUPUI continues to update and share SAVI data on social vulnerabilities. IDHS is partnering with IUPUI to share this information with all aspects of IDHS activities.

Priority	Goal	Objective	Strategy	Section	Strategy Status
	about disasters and their impacts.				
High	Minimize the loss of life and injuries caused by disasters	Develop public awareness and outreach programs	Work with local communities, EMA Directors, flood plain administrators and building officials to encourage good flood plain management development and mitigation to reduce flood insurance costs and property losses.	Flood	DNR and IDHS continue to partner on the biannual "Stay Afloat" conference to educate jurisdictions and elected officials on good flood plain management best practices. IDHS Mitigation has also reached out to begin partnering with the Indiana Department of Insurance.
High	Minimize the loss of life and injuries caused by disasters	Develop public awareness and outreach programs.	Facilitate development of projects and programs that educate or protect vehicular traffic and emergence responders from driving into flood roads.	Flood	IDHS and IDNR use social media and press releases to advise drivers to 'Turn Around Don't Drown" during rain and flooding events. IDHS GIS section has also worked with local jurisdictions to create an interactive map detailing flooded road conditions.
High	Integrate Indiana's mitigation programs to maximize efficiency and leverage funding	Ensure better coordination of federal, state, and local mitigation activities.	Coordinate with IHCDA and OCRA to consider good flood plain management and resiliency programs and ideas when award considering local projects for funding under their programs for economic development.	Flood	IDHS continues to partner with OCRA and will be joining them in their 2019 resilience outreach to Indiana communities.
Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Convene a sub-committee of Silver Jackets to develop a good working definition of resiliency. Conduct a pilot outreach program to communicate that theme to local communities, focusing on physical risk, socioeconomic risk, and risk to community development	Flood	IUPUI continues to partner with ISJ in updating and sharing SAVI data on social vulnerabilities. IDHS continues to utilize and share this social vulnerability data with internal and external partners.

Priority	Goal	Objective	Strategy	Section	Strategy Status
High	Minimize the loss of life and injuries caused by disasters.	Improve emergency sheltering.	Work to implement safe rooms in any new addition or construction to schools that will accommodate all students and surrounding neighborhood population	Severe Storm and Tornado	IDHS has partnered with locals to build storm shelter areas in one school and is beginning construction at a Scout Camp. IDHS has applied to FEMA to install 2 more in schools and a second scout camp.
High	Minimize the loss of life and injuries caused by disasters.	Improve emergency sheltering.	Work with local communities, EMA Directors, State-wide building trades, and home builders, and architects to design and install saferooms in residential and businesses.	Severe Storm and Tornado	IDHS has completed installation of 20 residential safe rooms to date. IDHS Mitigation is also preparing to apply for another round of installations in the PDMC 2019 grant cycle. Future applications may be submitted, depending on available funding.
High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	Severe Storm and Tornado	IUPUI continues to partner with ISJ in updating and sharing SAVI data on social vulnerabilities. IDHS has also formed a partnership with Indiana University's Environmental Resilience Institute to share data and research projects to understand how different hazards impact different social vulnerabilities.
High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Continue and expand current public awareness programs so they would be compatible with employer/employee educational programs on OSHA safety and extend into what to do at home.	Severe Storm and Tornado	IDHS Public Information Office continues to provide public information throughout the year concerning personal preparedness tips and risk information
Low	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop mobile applications to communicate risks to the public	Severe Storm and Tornado	As part of Indiana's Low Head Dam Initiative, the USGS designed an interactive map application to show paddlers when they are approaching a low head dam and where safe portages are located.

Priority	Goal	Objective	Strategy	Section	Strategy Status
High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	Earthquake	IUPUI continues to partner with ISJ in updating and sharing SAVI data on social vulnerabilities. IDHS has also formed a partnership with Indiana Universities Resiliency Institute to share data and research projects to understand how different hazards impact different social vulnerabilities.
Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Develop a statewide earthquake analysis and plan based on the most likely possible scenario – include mitigation strategies and secondary impacts that more northern areas of the state may experience	Earthquake	IDHS and embedded FEMA Planners are working on updating both the Catastrophic Earthquake Response Plan and Earthquake Recovery Plan.
Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Convene a Seismic Council (sub-committee of Silver Jackets) to meet regularly and discuss issues, concerns, and opportunities	Earthquake	ISJ has added Indiana Geological & Water Survey to the membership of ISJ to bring more information on the State's earthquake risks and impacts to the team so project funding sources can be examined to identify possible earthquake resiliency projects. IDHS Mitigation has formed a partnership with earthquake subject matter experts at IU Bloomington to develop new earthquake project ideas.
Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Work with CUSEC to further Indiana's Earthquake Mitigation Goals and National objectives for funding through NEHRP.	Earthquake	IDHS Planning Division Director is a member of the CUSEC board and the Planning section works closely with the board to develop projects tied to the NEHRP funding
High	Promote research education, and outreach to expand Indiana's knowledge	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	Other Natural Hazards - Winter Storm, Drought, Extreme Temps,	IUPUI continues to update and share SAVI data on social vulnerabilities related to multiple hazards. Additionally, ISJ and IDHS Mitigation

Priority	Goal	Objective	Strategy	Section	Strategy Status
	about disasters and their impacts.			Wildfire, Disease Outbreak, Fluvial Erosion Hazard	have partnered with the Purdue Climate Center to better understand social vulnerability issues.
High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop and distribute information on severe winter storm mitigation	Other Natural Hazards - Winter Storm	IDHS PIO's office has several pre scripted media releases related to winter storms, ice and extreme cold temperature events. These releases are sent out when an event is approaching and then during the event as well. Hazard specific Recovery information is provided once the event has ended.
Medium	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Create a media campaign that outlines the dangers of extreme temperatures, populations at risk, and actions to minimize exposure	Other Natural Hazards - Extreme Temps	IDHS PIO's office has several pre scripted media releases related to extreme temperature events. These releases are sent out when an event is approaching and then during the event as well. Hazard specific Recovery information is provided as needed.
Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Convene a Drought Council (subcommittee of Silver Jackets) to meet regularly and discuss issues, concerns, and opportunities in design, training, and exercising to reduce risk to responders and built environment	Other Natural Hazards - Drought	IDHS Recovery hosts a weekly drought monitor call with IDNR, NWS, IDEM, Midwestern Regional Climate Center, State Climatologist and the Purdue Extension office. These calls discuss the current drought status, upcoming predicted weather discussions and possible impacts resulting from an event. This information is shared with IDHS Response and Planning Divisions to inform tactical and strategic decision making.
Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of state and local mitigation activities.	Invite representatives from IDHS planning departments and local universities to participate as subcommittee of the Mitigation Council	Other Natural Hazards - Winter Storm, Drought, Extreme Temps, Wildfire, Disease	The State Mitigation Council has been replaced by the ISJ task force. Several State Universities are now part of the ISJ membership and IDHS Planning is invited to each monthly ISJ meeting.

Priority	Goal	Objective	Strategy	Section	Strategy Status
				Outbreak, Fluvial Erosion Hazard	
Medium	Promote research education, and outreach to expand Indiana’s knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Enhance statewide weather monitoring to better predict and communicate severe winter weather	Other Natural Hazards - Winter Storm	NWS has been recruiting and training CoCoRAHS observers to improve the statewide monitoring of snowfall.
Low	Promote research education, and outreach to expand Indiana’s knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Develop drought contingency plans to include residential and agricultural water delivery	Other Natural Hazards - Drought	The current Water Shortage Plan is being updated by IDNR Division of Water. Additionally, a water usage symposium was held in Indianapolis in October 2018 and follow up meetings are being scheduled.
Low	Promote research education, and outreach to expand Indiana’s knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Provide enhanced public awareness of open burn bans	Other Natural Hazards - Wildfire	During times of burn ban activities, IDNR and IDHS Public Information Offices release ban information and best practice tips for avoiding wildfire.
High	Promote research education, and outreach to expand Indiana’s knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	Technological Hazards - Communications System Failure, Public Utility Failure, Air Transportation, Explosion	IUPUI continues to partner with ISJ in updating and sharing SAVI data on social vulnerabilities. IDHS has also formed a partnership with Indiana University's Environmental Resilience Institute to share data and research projects to understand how different hazards impact different social vulnerabilities.
High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop guidance for communities to use to develop response plans to dam failures and identify evacuation routes. Local EMAs should provide opportunities for downstream residents to view inundation	Technological Hazards - Dam/Levee Failure	IDNR, IDHS and OCRA have worked to develop IEAPS for over 30 of the state's high hazard dams. Periodic table top exercises are held with local jurisdictions to familiarize citizens of the risks and response procedures. IDHS Mitigation and OCRA have partnered to complete

Priority	Goal	Objective	Strategy	Section	Strategy Status
			maps and provide information on risk and mitigation		20 local comprehensive Flood Response Plans.
High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Continue to work with Realtors, EMAs, dam owners to communicate risk of dam failures, responsibilities of owners for maintenance, and expand efforts to develop Incident and Emergency Action Plans (IEAPs)	Technological Hazards - Dam Failure	IDNR, IDHS and OCRA have worked to develop IEAPS for over 30 of the state's high hazard dams. Periodic table top exercises are held to familiarize citizens of risks and response procedures. IDHS Mitigation and OCRA have partnered to complete 20 local comprehensive Flood Response Plans. During potential dam failure/overtopping events, IDHS Recovery works closely with local EMA's, IDNR Dam Section, and Dam owners to monitor the condition of the dam and notify the public of potential issues.
High	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Work with state agencies to complete the state recovery plan, continuity of government, and continuity of operations plans for all state agencies	Human Hazards - Cyber Attack, Active Shooter, Arson, CBRNE Attack, Hostage Situation, Riot, Terrorism	IDHS is in the process of updating its Continuity of Operations Plan(COOP) and the Continuity of Government (COG) Plans. Several state agencies have completed their plans.

5 Risk Assessment Overview

5.1 Purpose

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, disruption to local and regional economic activity, and the expenditure of public and private funds for recovery. Sound mitigation must be based on sound risk assessment. A risk assessment involves quantifying the potential losses resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people. It considers historical data but must be sensitive to emerging trends in climate and weather events in order to adapt mitigation activities accordingly and remain cost effective.

This assessment identifies 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.

5.2 Indiana's Disaster History

In the past decade (2008 – 2017), Indiana has had 8 federally-declared disasters and 7 state-declared disasters.

Table 11. Disaster Declarations by Total Cost (2008 - 2017)

Disaster Number	Disaster Type	Disaster Description	Date Declared	Total IA	Total PA	Total Cost
Federal						
1740	Federal	Storms, Flooding	1/30/2008	$7,674,152.07	$4,976,848.47	$12,651,000.54
1766	Federal	Storms, Flooding	6/8/2008	$56,466,751.44	$100,905,332.70	$157,372,084.14
1795	Federal	Storms, Flooding	9/23/2008	$36,964,928.76	$25,003,384.15	$61,968,312.91
1828	Federal	Winter Storm	3/5/2009	$0.00	$11,300,288.42	$11,300,288.42
1832	Federal	Storms, Tornadoes, Flooding	4/22/2009	$2,961,606.39	$0.00	$2,961,606.39
1997	Federal	Storms, Tornadoes, Straight-line Winds, Flooding	6/23/2011	$0.00	$13,658,731.09	$13,658,731.09
4058	Federal	Storms, Straight-line Winds, Tornadoes	3/9/2012	$1,727,998.34	$4,896,874.71	$6,624,873.05
4173	Federal	Winter Storm, Snowstorm	4/22/2014	$0.00	$9,618,232.15	$9,618,232.15
State						
13569	State	Storms, Flooding	5/10/2013	$859,390.00	$795,338.93	$1,654,728.93
13883	State	Storms, Straight-line winds, Tornadoes	2/5/2014	$0.00*	$0.00*	$0.00*
14430	State	Storms, Tornadoes, Flooding	8/18/2015	$285,236.39	$0.00	$285,236.39
14833	State	Torrential Rainfall	9/2/2016	$289,903.05	$0.00	$289,903.05
14849	State	Tornadoes	9/8/2016	$107,966.25	$0.00	$107,966.25
15165	State	Storms, Flooding	6/12/2017	$16,768.82	$0.00	$16,768.82
15170	State	Storms, Flooding	6/14/2017	$11,227.05	$0.00	$11,227.05

* The State Disaster Relief Fund did not have any funds available at that time.

Most Recent Disaster (DR-4363): From February 14 to March 4, 2018, severe storms and flooding affected northwestern Indiana and counties bordering the Ohio River in the southern part of the state. The federal disaster declaration was issued on May 4, 2018 for 31 counties. Total dollars awarded from public and individual assistance to date are $11,162,555.12.

Most Expensive and Widespread Disaster (DR-1766): The June 2008 Midwest flooding significantly impacted central and southwest Indiana. The highest recorded rainfall occurred in the town of Edinburgh, which received nearly 11 inches in seven hours. Many areas of the state were evacuated, including hospitals, and the flooding caused three deaths. 40 of Indiana's 92 counties were affected. Total dollars awarded from public and individual assistance are $157,372,084.14.

Most Expensive State Declaration (13569): SBA Declaration 13569 is a flood event that occurred in April 2013. The State is still processing awards, so total estimates are not yet confirmed; however, the amount awarded is $859,390 for state IA and $795,338.93 for PA, which already far exceed other state declarations. From April 16 to 19, thunderstorms brought heavy rain to much of Central Indiana, and several areas reported between 4 and 8 inches in just three days. The result was flooding of numerous streams and rivers, some of which reached record levels.

5.3 Vulnerability Assessment

This SHMP includes 23 hazards: 9 natural, 6 technological (human-caused, accidental), and 7 human (human-caused, intentional). The hazards are listed in Table 12.

Table 12. Indiana Hazards Addressed in 2019 SHMP

Natural Hazards (Section 6)	Technological Hazards (Section 7)	Human Hazards (Section 8)
Flood	Dam and Levee Failure	Cyber Attack
Severe Weather	Hazardous Materials Release	Active Shooter
Earthquake	Structural Fire	Arson
Extreme Temperatures	Communications System Failure	CBRNE Attack
Drought	Public Utility Failure	Hostage Situation
Winter Storms	Air Transportation Incidents	Riot
Ground Failure		Terrorism
Wildfire		
Disease Outbreak		

5.3.1 Hazus-MH and other GIS Analysis of Earthquake and Flood Impacts

For the 2014 SHMP update, the State of Indiana provided parcel and property assessment data for all counties except Crawford and Parke. Potential social and economic impacts from flood and earthquake hazards were quantified using FEMA's Hazus-MH Risk Assessment tool (https://www.fema.gov/hazus) and other forms of Geographic Information Systems (GIS) analyses that leveraged this data. As a result, the analysis was able to consider factors such as the cost of building construction (labor and materials), the costs to replace building contents, and the value of building inventory. This process reflected an enhanced approach to analyzing hazards as defined for Hazus-MH. The approach included substitution of selected Hazus-MH provided data with local data to improve the accuracy of the model predictions.

As with the 2014 Plan, the 2019 SHMP update included substitution of selected default data with local data. However, this plan includes additional enhancements that improved on the 2014 update including placing a point on the center of the largest building of each parcel to represent buildings in the parcel instead of locating the point on the centroid of the parcel. This improved building inventory was specifically applied to model flood hazard impacts (see Section 5.5).

The 2019 SHMP update leveraged Hazus-MH version 4.2.1 to generate a combination of site-specific and aggregated loss estimates. Aggregated inventory loss estimates, which for this study included earthquake building economic and structural resiliency impact analysis, are based upon the assumption that buildings are evenly distributed across the landscape.

Site-specific analysis in this study was based upon loss estimations for individual structures. In Hazus-MH, factors that guide how structures will respond to hazards vary by what is being evaluated. For example, estimates of damage to structures from flooding take into account the depth of water in relation to the structure. It is also important to note that Hazus-MH applies a number of assumptions in its processes. For instance, it is assumed that each structure will fall into a structural class, and structures in each class will respond in a similar fashion to a specific depth of flooding. Site-specific analysis is also based upon a point location rather than a polygon; therefore, the model does not account for factors such as the percentage of a building that is inundated.

It is important to note that Hazus-MH is not intended to be a substitute for detailed engineering studies. Rather, it is intended to serve as a planning aid for communities interested in assessing their risk to selected natural hazards. This documentation does not provide full details on the processes and procedures completed in the development of this project. It is only intended to highlight the major steps that were followed during the project.

5.3.2 Historical

The state conducted historical vulnerability assessments for each hazards hazard. This process included documentation of previous occurrences in the past 50 years and analysis of how likely and how impactful the hazard would be if it occurred today.

As with the 2014 SHMP, the 2019 plan does not include a detailed vulnerability analysis for many of the technological and human hazards due to concerns over publication of sensitive data. These analyses exist in the State of Indiana Threat and Hazard Identification Risk Assessment (THIRA) and the State of Indiana Comprehensive Emergency Plan.

5.4 Hazard Prioritization

In 2018, IDHS conducted a unified State-level THIRA to classify Indiana hazards as high risk, moderate risk, or low risk based on the probability of occurrence and the potential impact of the occurrence. The THIRA results are included in Appendix B. The guidelines used to determine probability and impact ratings are listed in Table 13.

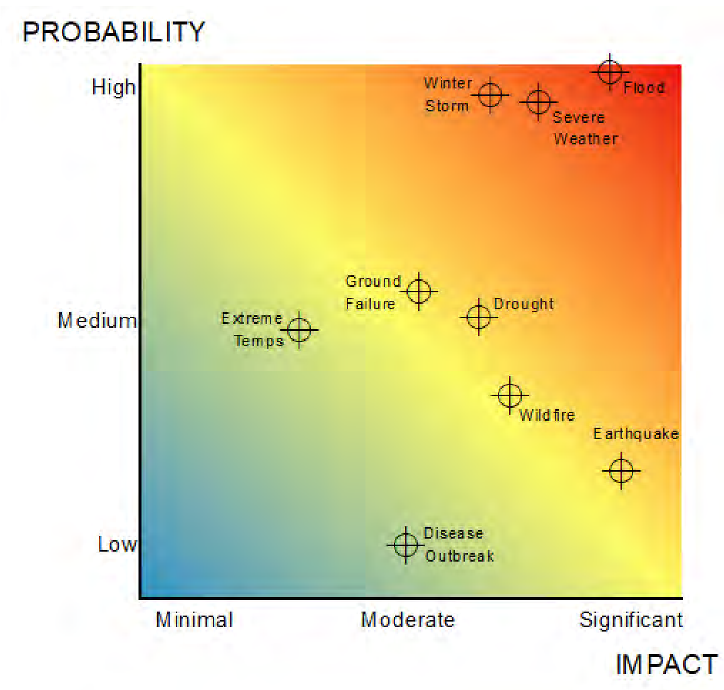
Table 13. Guidelines for Hazard Prioritization

PROBABILITY		IMPACT	
Low	Event is probable within the next 10 years	Minimal	▪ Local jurisdiction is able to effectively respond with standard mutual aid support ▪ Local medical services are able to manage volume of injuries and fatalities ▪ Limited evacuations and sheltering required ▪ Loss of public utilities, government, and social services for up to 24 hours ▪ Response operations lasting up to 72 hours may be required
Medium	Event is probable within the next 5 years	Moderate	▪ Local jurisdiction is unable to effectively respond without significant mutual aid support and state assistance ▪ Local medical services unable to manage number of injuries and fatalities. Patients require transportation to outside areas ▪ Local area evacuations, shelter, and care of displaced residents and medical patients ▪ Loss of public utilities, government, and social services for up to 2 weeks ▪ Response operations lasting up to 2 weeks may be required.

High	Event is probable within the calendar year	Significant	▪ Local jurisdiction is overwhelmed and unable to effectively respond to the hazard. Complete loss of communications. Massive state and federal response required. ▪ Local medical services unable to manage the volume of injuries and fatalities. Mass evacuation, sheltering and care of displaced citizens required. ▪ Loss of public utilities, government, and social services for 30 days or more. ▪ Response operations lasting up to 30 days may be required.

The overall hazard risk is determined by multiplying probability and impact. It is important to consider both probability and impact when determining risk. IDHS plotted each hazard on a risk grid according to probability (y-axis) and potential impact (x-axis). Figure 40 represents the state's overall hazard vulnerabilities.

Figure 40. Hazards Risk Grid



5.5 Essential Facilities & State-Owned Facilities

5.5.1 Essential Facilities

For the purpose of this plan, essential facilities are defined as those that are vital to the state in the event of a hazard. These include emergency operations centers, police departments, fire stations, schools, and care facilities.

The essential facility updates were applied to the Hazus-MH model using data from local MHMPs and data from the Indiana Department of Education, Indiana Department of Health, and IDHS. Hazus-MH reports of essential facility losses reflect updated data. A summary of the essential facility updates is included in Table 14.

Table 14. Indiana Essential Facilities

Facility Name	Number of Facilities
Schools	2,780
Police Stations	578
Fire Stations	1,344
EOCs	119
Hospitals	174
Care	3,321

INDIANA BEST PRACTICE

Hazus-MH is a valuable tool for assessing vulnerability in mitigation planning. Since 2003, IDHS and The Polis Center have partnered with local officials to complete over 100 multi-hazard mitigation plans using Hazus Level 2 or Advanced analyses in the risk assessments.

In 2018, Microsoft released 125 million building footprints for the United States that were generated from imagery using machine learning (https://github.com/Microsoft/USBuildingFootprints). This data is licensed through the Open Data Commons Open Database License. The Polis Center extracted the building footprints for the state of Indiana and created point centroids of each building. Each building centroid was then joined spatially to the state's land parcels provided by the Indiana Geographic Information Office on April 12, 2018 via IndianaMAP. This process provided the parcel identifier for each building and was then linked to the statewide Real Property Tax Assessment Data provided by the Indiana Department of Local Government and Finance (IDLGF) from April 2018, also available via IndianaMAP. Indiana counties annually submit an extract of property appraisal data to the IDLGF that contains detailed building information such as square footage, construction type, year built, foundation type, and building replacement cost. The IDLGF data allows Polis to identify the occupancy class of each building based on the parcel within which it is located. Approximately 1% of the buildings were not located in a parcel and were not included. Table 15 provides the number of parcels and their total improvement value from the IDLGF dataset, organized by occupancy class, along with the number of Bing buildings located within those parcels.

Table 15. Indiana Buildings and Exposure

Occupancy Class	Total Parcels	Estimated Total Buildings	Total Exposure
Agricultural	281,942	476,666	$19,460,236,857
Commercial	98,588	223,032	$50,098,506,906
Industrial	20,988	35,634	$17,795,002,885
Residential	1,530,588	2,408,300	$228,575,251,504
Other	125,120	82,976	$14,613,795,685
Total	**2,057,226**	**3,226,608**	**$330,542,793,837**

5.5.2 State-Owned Facilities

State-owned facilities were extracted from the IDLGF database and are summarized in Table 16. Note that only the improvement value of each facility was included, not the parcels' land values. Table 17 details the state-owned acreage, excluding INDOT, by department or agency.

Table 16. State-Owned Facilities

	Parcel Count	Total Improvement Value	Average Improvement Value
Industrial	36,283	$20,455,977,385	$563,790
Commercial	170,516	$56,428,901,706	$330,930
Utilities	13,745	$713,495,532	$51,909
Agricultural (excluding crops)	2,298	$571,457,500	$248,676

Table 17. State-Owned Acreage

Agency	Acres
Department of Administration	81
Department of Corrections	3,022
Department of Education	140
Department of Health	184
Department of Natural Resources - Fish & Wildlife	150,666
Department of Natural Resources - Forestry	158,712
Department of Natural Resources - Nature Preserves	20,949
Department of Natural Resources - Outdoor Recreation	5,392
Department of Natural Resources - State Parks	75,173
Department of Veterans Affairs	111
Family and Social Services	832
Finance Authority	1,286
Kankakee River Basin Development Commission	637
Little Calumet River Basin Development Commission	1,007
National Guard	2,406
Port Commission	2,658
State Fair	252
State Museum and Historic Sites	1,174
State Police	479
War Memorial Commission	16
White River State Park Development Commission	172
Total Acreage	425,349

5.6 Change in Development

According to the IDLGF database described above, 156,321 parcels have an effective construction year between and including 2014 and 2019. According to the same database, the appraised value for these parcels totals $17 billion dollars. Table 18 breaks down the parcels by occupancy class while Table 19 breaks their value down by county.

Table 18. Parcel Improvements by Occupancy Class (2014-2019)

Occupancy Class	Appraised Value
Agricultural	$1,083,037,353
Commercial	$4,185,949,900
Exempt	$558,158,900
Industrial	$2,131,184,300
Residential	$9,040,760,154
Utility	$29,357,900
Other	$2,737,700
Grand Total	**$17,031,186,207**

Table 19. Parcel Improvements by County (2014-2019)

County	Parcel County	Appraised Value
Adams County	1,405	$60,976,800
Allen County	8,387	$1,093,462,900
Bartholomew County	2,862	$356,995,800
Benton County	251	$10,216,400
Blackford County	319	$6,993,300
Boone County	2,647	$601,050,900
Brown County	860	$42,085,400
Carroll County	1,023	$33,217,000
Cass County	835	$16,337,000
Clark County	3,318	$512,997,973
Clay County	514	$37,097,800
Clinton County	817	$97,476,600
Crawford County	284	$9,149,300
Daviess County	2,774	$107,354,800
Dearborn County	1,263	$92,233,200
Decatur County	967	$59,122,800
DeKalb County	1,030	$99,231,800
Delaware County	1,536	$126,758,800
Dubois County	2,093	$109,774,100
Elkhart County	3,402	$385,624,100
Fayette County	517	$11,427,100
Floyd County	1,695	$174,982,400
Fountain County	564	$14,403,800
Franklin County	880	$38,593,500
Fulton County	383	$17,338,600
Gibson County	986	$52,784,600
Grant County	868	$90,189,800
Greene County	691	$26,457,700
Hamilton County	9,287	$2,694,453,880
Hancock County	2,267	$364,048,400
Harrison County	1,691	$90,530,400
Hendricks County	4,193	$1,032,874,500
Henry County	792	$84,472,600
Howard County	1,722	$106,595,200
Huntington County	1,130	$51,972,700
Jackson County	1,372	$80,021,700
Jasper County	975	$98,506,700
Jay County	1,108	$49,982,600
Jefferson County	600	$24,646,400
Jennings County	724	$24,781,200
Johnson County	3,530	$525,343,900
Knox County	1,173	$56,160,400
Kosciusko County	3,388	$214,117,400
LaGrange County	3,156	$184,071,500
Lake County	9,874	$1,265,178,600
LaPorte County	1,680	$123,254,500
Lawrence County	1,124	$43,760,200
Madison County	2,847	$109,982,864
Marion County	6,750	$1,495,411,500

County	Parcel County	Appraised Value
Marshall County	1,193	$79,410,000
Martin County	524	$14,764,100
Miami County	816	$21,789,400
Monroe County	2,269	$482,955,800
Montgomery County	1,329	$63,951,100
Morgan County	2,683	$119,560,700
Newton County	325	$20,569,700
Noble County	1,596	$78,779,300
Ohio County	274	$8,861,200
Orange County	2,152	$37,039,300
Owen County	1,011	$25,496,100
Parke County	491	$25,343,800
Perry County	531	$25,452,900
Pike County	663	$20,062,600
Porter County	4,119	$452,272,300
Posey County	828	$45,969,900
Pulaski County	1,144	$21,002,800
Putnam County	1,095	$46,562,000
Randolph County	1,126	$32,176,000
Ripley County	877	$47,319,960
Rush County	596	$17,856,800
Scott County	429	$35,607,700
Shelby County	739	$63,074,000
Spencer County	637	$34,313,000
Starke County	1,055	$24,869,900
Steuben County	1,212	$94,617,900
St Joseph County	3,516	$423,981,330
Sullivan County	763	$23,785,700
Switzerland County	516	$11,775,700
Tippecanoe County	3,138	$491,427,800
Tipton County	565	$23,337,200
Union County	155	$5,491,600
Vanderburgh County	2,902	$371,676,200
Vermillion County	312	$12,260,700
Vigo County	2,824	$166,828,300
Wabash County	838	$31,402,900
Warren County	463	$19,449,500
Warrick County	2,071	$195,635,800
Washington County	867	$38,784,800
Wayne County	1,269	$79,793,000
Wells County	966	$62,309,500
White County	1,699	$60,508,000
Whitley County	1,189	$68,558,500
Grand Total	**156,321**	**$17,031,186,207**

6 Natural Hazards

6.1 Flood

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 Indiana can be classified as one of two types: flash floods or riverine floods, both are common in Indiana.

Flash Floods

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 can 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 are most common in the spring and summer months.

Riverine Floods

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 can occur anytime but occur most often during the spring or summer.

Over the past 30 years, communities throughout the state have worked with the IDHS Mitigation Program to apply for and receive FEMA grant funding to voluntarily acquire and demolish over 1,200 flood prone residential properties. The jurisdictions of the City of English, Vigo County, City of Ft. Wayne, Morgan County, City of Franklin, and City of Decatur have each acquired and demolished more than 75 residential properties, and returned the land to natural green space. This type of mitigation will eliminate the flood risk to the participating homeowners and increase the natural flood storage of the area. These properties become deed restricted in perpetuity, to restrict future redevelopment.

6.1.1 Historical Occurrences

From 2008 to 2017, Indiana received 5 federal disaster declarations related to flooding. Individual Assistance (IA) approved for these declarations totaled $104 million and Public Assistance (PA) obligated totaled $144.5 million.

The most recent federal disaster declaration (DR-4363) occurred in early 2018 when severe storms and flooding caused extensive and record flooding along the Yellow, Kankakee, and Iroquois Rivers. The IA and PA for this disaster are not included in the numbers above since they are still being finalized. Figure 41 shows the extent of the early 2018 flooding, the affected parcels, and both their land and improvements values according to the IDLGF database.

Table 20. Federal Flood-Related Disaster Declarations (2008 – 2018)

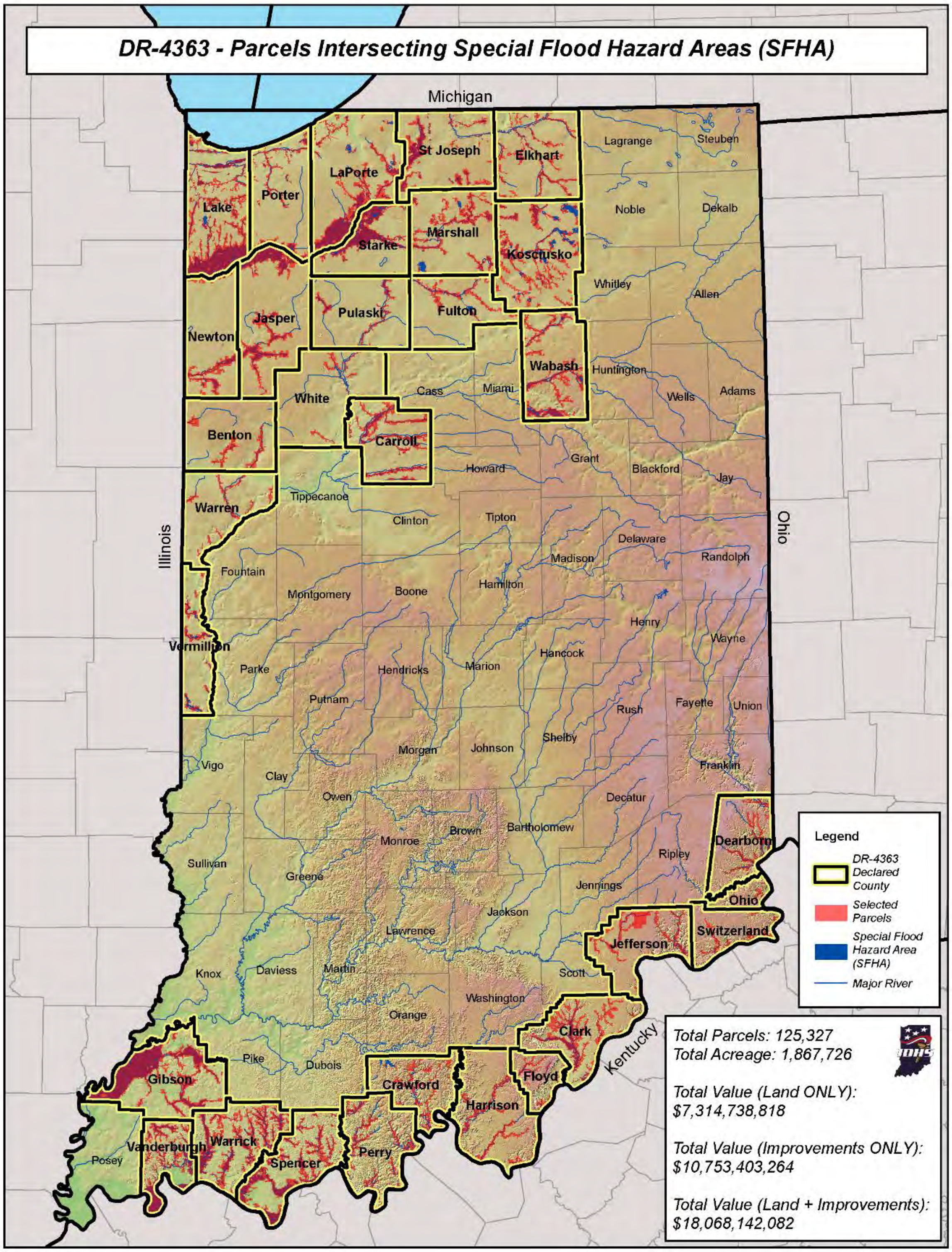
Disaster	Counties	IA Dollars Approved	PA Dollars Obligated
DR-1740	(IA) Allen, Benton, Carroll, Cass, DeKalb, Elkhart, Fulton, Huntington, Jasper, Kosciusko, LaPorte, Lake, Marshall, Newton, Noble, Pulaski, St. Joseph, Starke, Tippecanoe, White, Whitley (PA) Allen, Benton, Carroll, Cass, DeKalb, Elkhart, Fulton, Jasper, Kosciusko, Marshall, Newton, Noble, Pulaski, Starke, White	$7,674,152.07	$4,976,848.47
DR-1766	(IA) Adams, Bartholomew, Brown, Clay, Daviess, Dearborn, Decatur, Gibson, Grant, Greene, Hamilton, Hancock, Hendricks, Henry, Huntington, Jackson, Jefferson, Jennings, Johnson, Knox, Lawrence, Madison, Marion, Monroe, Morgan, Owen, Parke, Pike, Posey, Putnam, Randolph, Ripley, Rush, Shelby, Sullivan, Tippecanoe, Vermillion, Vigo, Washington, Wayne (PA) Adams, Bartholomew, Benton, Brown, Clay, Daviess, Decatur, Fountain, Franklin, Gibson, Greene, Hancock, Hendricks, Henry, Jackson, Jay, Jefferson, Jennings, Johnson, Knox, Madison, Marion, Monroe, Montgomery, Morgan, Ohio, Owen, Parke, Pike, Posey, Putnam, Randolph, Ripley, Rush, Shelby, Sullivan, Switzerland, Union, Vermillion, Vigo, Wabash, Washington, Wayne	$56,466,751.44	$100,905,332.70
DR-1795	(IA) Clark, Crawford, Dearborn, Floyd, Franklin, Gibson, Harrison, Jackson, Jasper, Jefferson, Jennings, Knox, LaPorte, Lake, Lawrence, Martin, Ohio, Orange, Perry, Pike, Porter, Posey, Ripley, Scott, Spencer, St. Joseph, Switzerland, Vanderburgh, Warrick, Washington (PA) Clark, Crawford, Daviess, Dearborn, Decatur, Dubois, Fayette, Floyd, Franklin, Gibson, Harrison, Jackson, Jefferson, Jennings, LaPorte, Lake, Lawrence, Martin, Newton, Ohio, Orange, Perry, Pike, Porter, Ripley, Rush, Scott, Spencer, Switzerland, Union, Vanderburgh, Warrick, Washington, Wayne	$36,964,928.76	$25,003,384.15
DR-1832	(IA) Allen, Carroll, Daviess, DeKalb, Fulton, Jasper, Kosciusko, LaPorte, Lake, Lawrence, Marshall, Noble, Pulaski, St. Joseph, White, Whitley	$2,961,606.39	
DR-1997	(PA) Benton, Clark, Clay, Crawford, Daviess, Dearborn, Dubois, Floyd, Franklin, Gibson, Harrison, Jackson, Jefferson, Jennings,		$13,658,731.09

Disaster	Counties	IA Dollars Approved	PA Dollars Obligated
	Knox, Lawrence, Martin, Monroe, Ohio, Orange, Parke, Perry, Pike, Posey, Putnam, Ripley, Scott, Spencer, Starke, Sullivan, Switzerland, Vanderburgh, Vermillion, Warrick, Washington, Wayne		

Table 21. Indiana Flood-Related Disaster Declarations (2008 – 2017)

Disaster	IA Dollars Approved	PA Dollars Obligated
13569	$859,390.00	$795,338.93
14430	$285,236.39	
15165	$16,768.82	
15170	$11,227.05	

Figure 41. 2018 Flood Extent



From January 1, 2013, to October 31, 2018, there have been 987 flood and flash flood events reported to NCDC. These events resulted in 14 deaths, 3 injuries, and more than $10 million in damages to property and crops. Table 22 lists NCDC-reported events by county and district.

Table 22. NCDC-Reported Flood Events (2013-2018)

County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
	IDHS DISTRICT 1				
Jasper	4	0	0	$288,000	$0
LaPorte	3	0	0	$500,000	$0
Lake	22	0	0	$70,000	$5,000
Newton	8	0	0	$1,000	$0
Porter	13	0	0	$411,000	$0
District Subtotal	**50**	**0**	**0**	**$1,270,000**	**$5,000**
	IDHS DISTRICT 2				
Elkhart	2	0	0	$0	$0
Fulton	5	0	0	$250,000	$0
Kosciusko	8	0	0	$56,000	$0
Marshall	4	0	0	$0	$0
Pulaski	2	0	0	$38,000	$0
St. Joseph	5	1	0	$0	$0
Starke	1	0	0	$0	$0
District Subtotal	**27**	**1**	**0**	**$344,000**	**$0**
	IDHS DISTRICT 3				
Adams	1	0	0	$0	$0
Allen	11	0	0	$300,000	$0
DeKalb	1	0	0	$0	$0
Huntington	10	0	0	$0	$0
LaGrange	1	0	0	$54,000	$0
Miami	3	0	0	$0	$0
Noble	1	0	0	$0	$0
Steuben	0	0	0	$0	$0
Wabash	2	0	0	$0	$0
Wells	4	0	0	$0	$0
Whitley	6	0	0	$0	$0
District Subtotal	**40**	**0**	**0**	**$354,000**	**$0**
	IDHS DISTRICT 4				
Benton	4	0	0	$0	$0
Carroll	5	0	0	$3,000	$6,000
Cass	3	0	0	$500,000	$500,000
Clinton	6	0	0	$2,000	$1,000
Fountain	2	1	0	$0	$1,000
Montgomery	4	0	0	$11,000	$0
Tippecanoe	6	0	0	$458,000	$1,000
Warren	1	0	0	$0	$1,500
White	3	0	0	$230,000	$0
District Subtotal	**34**	**1**	**0**	**$1,204,000**	**$510,500**
	IDHS DISTRICT 5				
Boone	16	0	0	$32,000	$0
Hamilton	23	2	0	$89,000	$6,000
Hancock	2	0	0	$50,000	$0

County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
Hendricks	16	0	0	$63,000	$9,000
Johnson	6	0	0	$62,000	$0
Marion	40	0	0	$376,000	$0
Morgan	10	0	0	$188,000	$9,000
Shelby	4	0	0	$10,000	$3,000
District Subtotal	**117**	**2**	**0**	**$870,000**	**$27,000**
	IDHS DISTRICT 6				
Blackford	1	0	0	$0	$0
Delaware	17	0	0	$174,000	$0
Fayette	6	0	0	$30,000	$0
Grant	4	1	0	$0	$0
Henry	3	0	0	$4,000	$4,000
Howard	3	0	0	$300,000	$0
Jay	4	0	0	$0	$0
Madison	11	0	0	$82,500	$13,000
Randolph	6	0	0	$14,000	$0
Rush	3	0	0	$16,000	$0
Tipton	5	0	0	$3,000	$1,000
Union	11	0	0	$45,000	$30,000
Wayne	22	0	0	$60,000	$0
District Subtotal	**96**	**1**	**0**	**$728,500**	**$48,000**
	IDHS DISTRICT 7				
Clay	3	0	0	$25,000	$7,000
Greene	7	2	0	$47,000	$5,000
Owen	7	1	0	$19,000	$15,000
Parke	6	0	0	$34,500	$11,000
Putnam	6	0	0	$7,000	$4,000
Sullivan	2	0	0	$1,000	$0
Vermillion	5	0	0	$4,000	$5,500
Vigo	10	0	0	$42,000	$11,000
District Subtotal	**46**	**3**	**0**	**$179,500**	**$58,500**
	IDHS DISTRICT 8				
Bartholomew	6	1	0	$41,000	$0
Brown	6	0	0	$50,000	$3,000
Jackson	8	0	1	$47,000	$4,000
Lawrence	5	0	0	$2,000	$2,000
Monroe	6	2	0	$101,000	$12,000
Orange	10	0	0	$0	$0
Washington	16	0	0	$40,000	$0
District Subtotal	**57**	**3**	**1**	**$281,000**	**$21,000**
	IDHS DISTRICT 9				
Clark	29	1	0	$122,000	$0
Dearborn	19	0	0	$77,000	$0
Decatur	6	0	0	$57,000	$11,500
Floyd	13	0	0	$10,000	$0
Franklin	8	0	0	$1,000	$0
Harrison	13	0	0	$30,000	$0
Jefferson	21	0	0	$120,000	$0
Jennings	5	0	0	$17,000	$3,000

County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
Ohio	2	0	0	$0	$0
Ripley	47	0	0	$72,000	$0
Scott	6	0	0	$100,000	$0
Switzerland	12	0	0	$29,000	$0
District Subtotal	**181**	**1**	**0**	**$635,000**	**$14,500**
			IDHS DISTRICT 10		
Crawford	20	0	0	$15,000	$0
Daviess	9	0	0	$14,000	$3,000
Dubois	29	0	0	$58,000	$0
Gibson	83	0	0	$583,000	$789,000
Knox	17	0	0	$30,500	$22,000
Martin	5	0	0	$4,000	$2,000
Perry	16	0	0	$0	$0
Pike	39	1	1	$262,000	$510,000
Posey	53	0	0	$235,000	$162,000
Spencer	13	0	0	$370,000	$0
Vanderburgh	28	1	1	$783,000	$0
Warrick	27	0	0	$151,000	$5,000
District Subtotal	**339**	**2**	**2**	**$2,505,500**	**$1,493,000**
Grand Total	987	14	3	$8,371,500	$2,177,500

6.1.2 Vulnerability Assessment

Vulnerability to flooding was determined in three ways: 1) Hazus-MH Level 2 analysis, 2) analysis of community participation in the National Flood Insurance Program (NFIP), and 3) an overview of repetitive and severe repetitive loss properties.

It is important to note that the losses to buildings, particularly essential facilities, extends beyond physical damage. The economic and social impacts associated with loss of governmental, public safety, and health care infrastructure are far more significant for a community. When assessing the cost of building construction, it is important for government agencies to consider these impacts.

6.1.2.1 Hazus-MH Analysis

Hazus-MH generated the flood depth grid for a 100-year return period event and made calculations by clipping the digital elevation model (DEM) to the 100-year Digital Flood Insurance Rate Map (DFIRM) boundary. Hazus-MH then utilized a level 2 user-defined analysis of the state with site-specific building data combined with IDLGF assessor data. More information on the creation of the statewide site-specific building data can be found in Section 5. It is important to remember that Hazus-MH is not a substitute for detailed engineering studies or as a response tool. Rather, it serves as a planning aid for communities interested in assessing their risk to flooding, earthquake, and hurricane-related hazards.

Hazus-MH estimates the 100-year flood would damage 57,377 buildings at a replacement cost of $5.2 billion statewide. IDHS District 5 experienced the most damage to buildings, totaling $1.4 billion in damages with 15,000 buildings affected. Figure 43 shows the loss ratio by county for flood damage. The loss ratio is calculated by dividing the estimated building damages by the total replacement cost.

The total estimated amount of damages to buildings are listed in Table 24 and mapped in Figure 42. Residential structures are by far the most susceptible to damage and comprise 80% of the total buildings damaged. They only comprise 48% of the total amount of damage done to buildings. The total number of buildings damaged is summarized in Table 25 and mapped in Figure 44 and Figure 45.

6.1.2.2 Analysis of Essential Facilities

While damage to any building in the event of a flood would be detrimental, essential facilities are of particular concern as they provide services essential the emergency response abilities of the county. For this reason, essential facilities were closely examined in relation to the Special Flood Hazard Area (SFHA) boundary. A total of 161 facilities were mapped as intersecting the SFHA for Indiana. These facilities have been listed, by type, in Table 23 and are mapped in Figure 46 through Figure 50.

Table 23. Damaged Essential Facilities

Facility Type	State Total	Approximate Impacted by SFHA
Schools	2,780	20
Police Stations	578	17
Fire Stations	1,344	45
EOCs	119	2
Care Facilities	3,321	77

6.1.2.3 Analysis of State Facilities

INDOT has a total of 224 facilities statewide and IDNR has 780, covering every county in the state. Of those, 6 INDOT and 45 IDNR facilities were mapped as being within the SFHA, thus susceptible to flooding in the event of a 100-year flood. As can be seen in Figure 51, the affected INDOT facilities are mainly located in south central Indiana while the IDNR facilities are spread throughout the state. These damaged facilities would be unable to lend aid in the event of a disaster.

6.1.2.4 Analysis of Newly Developed Properties

As described in Section 5.6, a number of parcels in the state had improvements made to them from 2014 to 2019. Figure 52 displays the locations of the buildings located on these parcels. A total of 1,514 buildings were found to be located in those parcels. Note that some buildings may be missing due to differences in data sources and that this does not necessarily indicate new construction on a property.

Table 24. Building Damage by Occupancy

County Name	Total Building Losses	Building Occupancy Class						
		Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
	IDHS DISTRICT #1							
Jasper	$29,690,921	$2,241,313	$2,379,954	$0	$0	$5,197,739	$0	$19,871,915
LaPorte	$42,242,760	$2,491,617	$1,208,056	$12,343	$341,955	$2,028,850	$1,004,648	$35,155,291
Lake	$626,813,364	$20,981,897	$119,439,564	$127,898	$30,088,983	$254,226,892	$22,690,279	$179,257,852
Newton	$6,414,467	$365,835	$483,872	$0	$52,086	$1,966	$64,981	$5,445,728
Porter	$25,513,115	$740,084	$4,361,512	$0	$808,503	$612	$151,557	$19,450,848
District Subtotal	**$730,674,627**	**$26,820,746**	**$127,872,958**	**$140,241**	**$31,291,527**	**$261,456,059**	**$23,911,465**	**$259,181,634**
	IDHS DISTRICT #2							
Elkhart	$75,513,495	$402,285	$20,323,191	$0	$3,446,502	$5,202,905	$865,216	$45,273,397
Fulton	$5,875,858	$284,203	$0	$0	$0	$0	$0	$5,591,655
Kosciusko	$62,151,339	$720,549	$5,951,833	$27,497	$1,214,486	$7,333,945	$207,544	$46,695,485
Marshall	$17,892,701	$256,518	$5,653,422	$0	$1,173,472	$4,319,119	$428,148	$6,062,021
Pulaski	$15,109,397	$328,058	$524,969	$0	$0	$0	$0	$14,256,370
St. Joseph	$44,108,149	$1,392,507	$11,104,826	$23,263	$876,153	$4,671,253	$3,171,394	$22,868,754
Starke	$5,934,498	$930,899	$401,279	$0	$8,072	$2,203	$0	$4,592,045
District Subtotal	**$226,585,437**	**$4,315,019**	**$43,959,520**	**$50,760**	**$6,718,685**	**$21,529,425**	**$4,672,302**	**$145,339,727**
	IDHS DISTRICT #3							
Adams	$18,247,386	$1,100,730	$3,760,250	$0	$56,280	$5,384,334	$1,560,326	$6,385,468
Allen	$345,545,182	$4,633,275	$72,681,742	$4,809,125	$2,186,729	$80,147,953	$5,648,959	$175,437,399
DeKalb	$12,211,156	$778,247	$537,412	$0	$209,814	$314,736	$4,850,976	$5,519,971
Huntington	$14,590,140	$0	$1,960,131	$0	$3,505,086	$2,136,808	$97,069	$6,891,046
LaGrange	$32,803,739	$522,171	$762,443	$0	$26,396	$307,693	$237,969	$30,947,067
Miami	$16,351,139	$202,518	$7,648,042	$0	$482,267	$2,741,860	$0	$5,276,452
Noble	$59,600,211	$2,026,535	$826,574	$4,098,612	$292,732	$4,065,327	$325,907	$47,964,525
Steuben	$23,746,718	$336,975	$489,245	$0	$0	$182,354	$1,922,724	$20,815,420
Wabash	$22,115,197	$2,171,857	$3,217,183	$0	$316,534	$1,132,643	$1,210,021	$14,066,958
Wells	$6,466,596	$222,991	$2,868,099	$0	$649,187	$0	$0	$2,726,319
Whitley	$9,294,097	$1,691,018	$785,339	$82,398	$378,459	$144,721	$0	$6,212,161
District Subtotal	**$560,971,561**	**$13,686,317**	**$95,536,460**	**$8,990,135**	**$8,103,484**	**$96,558,429**	**$15,853,951**	**$322,242,786**
	IDHS DISTRICT #4							

County Name	Total Building Losses	Building Occupancy Class Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
Benton	$373,626	$0	$0	$0	$0	$0	$0	$373,626
Carroll	$46,936,619	$914,968	$1,473,348	$0	$472,383	$150,174	$116,556	$43,809,190
Cass	$17,162,371	$309,014	$2,426,558	$43,014	$134,354	$879,700	$203,674	$13,166,058
Clinton	$6,360,815	$605,998	$1,242,172	$0	$86,697	$0	$499,023	$3,926,925
Fountain	$3,378,411	$832,917	$0	$0	$230,127	$0	$0	$2,315,367
Montgomery	$15,959,483	$1,321,449	$2,973,361	$0	$752,093	$576,898	$0	$10,335,683
Tippecanoe	$79,734,660	$1,427,136	$19,056,340	$0	$161,116	$2,117,796	$8,338,825	$48,633,447
Warren	$3,532,612	$1,738,155	$0	$0	$0	$0	$136,664	$1,657,793
White	$40,021,168	$60,965	$1,004,057	$23,101	$310,021	$186,498	$144,005	$38,292,521
District Subtotal	**$213,459,765**	**$7,210,602**	**$28,175,836**	**$66,115**	**$2,146,791**	**$3,911,066**	**$9,438,747**	**$162,510,610**
	IDHS DISTRICT #5							
Boone	$47,208,936	$772,134	$831,442	$0	$277,947	$20,956,387	$50,555	$24,320,469
Hamilton	$139,502,329	$542,751	$40,149,224	$0	$5,528,988	$4,108,073	$506,084	$88,667,208
Hancock	$32,845,100	$1,221,234	$6,137,089	$0	$1,558,141	$1,342,034	$472,077	$22,114,525
Hendricks	$37,823,331	$2,853,861	$9,606,669	$0	$299,734	$224,285	$543,238	$24,295,545
Johnson	$87,039,414	$1,606,157	$19,056,669	$593,748	$215,546	$3,415,909	$3,866,635	$58,284,750
Marion	$975,227,482	$1,405,914	$145,814,395	$1,711,313	$108,636	$253,402,090	$32,471,354	$540,313,779
Morgan	$26,474,973	$2,943,130	$4,673,055	$0	$141,295	$4,826,438	$342,049	$13,549,005
Shelby	$32,844,374	$1,324,524	$847,273	$44,461	$1,090,298	$6,556,630	$847,450	$22,133,737
District Subtotal	**$1,378,965,939**	**$12,669,705**	**$227,115,816**	**$2,349,522**	**$9,220,585**	**$294,831,846**	**$39,099,442**	**$793,679,018**
	IDHS DISTRICT #6							
Blackford	$3,694,835	$56,261	$858,323	$0	$335,172	$1,184,463	$0	$1,260,617
Delaware	$91,789,086	$1,139,897	$20,506,338	$0	$5,868,241	$10,251,285	$4,972,476	$49,050,849
Fayette	$17,580,423	$5,234,989	$1,428,009	$0	$886,634	$1,325,509	$159,155	$8,546,126
Grant	$30,696,380	$1,581,143	$6,023,327	$0	$1,740,326	$3,570,401	$2,786,714	$14,994,469
Henry	$19,214,619	$1,591,628	$7,571,478	$0	$860,951	$55,568	$1,210,286	$7,924,708
Howard	$22,196,675	$534,076	$5,212,214	$0	$1,468,512	$4,024,929	$583,114	$10,373,830
Jay	$6,472,233	$262,637	$619,593	$144,286	$457,739	$46,478	$1,011,504	$3,929,997
Madison	$79,784,544	$2,278,933	$22,019,511	$0	$5,140,516	$4,886,556	$1,269,642	$44,189,387
Randolph	$17,500,900	$469,916	$2,970,109	$0	$61,430	$1,783,908	$854,531	$11,361,006
Rush	$13,877,089	$1,176,419	$419,430	$8,542,991	$675,205	$0	$1,076,064	$1,986,980

County Name	Total Building Losses	Building Occupancy Class						
		Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
Tipton	$19,032,074	$349,793	$2,354,372	$294,217	$3,136,370	$579,399	$1,021,029	$11,296,894
Union	$1,547,346	$603,940	$0	$0	$0	$0	$0	$943,406
Wayne	$73,902,784	$1,472,053	$11,437,475	$0	$6,812,555	$34,344,943	$3,608,560	$16,227,197
District Subtotal	**$397,288,988**	**$16,751,685**	**$81,420,179**	**$8,981,494**	**$27,443,651**	**$62,053,439**	**$18,553,075**	**$182,085,466**
	IDHS DISTRICT #7							
Clay	$12,360,528	$4,302,482	$34,246	$0	$91,384	$12,283	$279,659	$7,640,475
Greene	$25,007,560	$7,058,955	$6,228,140	$0	$203,637	$266,945	$710,434	$10,539,450
Owen	$9,520,463	$1,366,622	$180,731	$0	$78,505	$0	$385,766	$7,508,839
Parke	$12,891,840	$2,789,058	$737,370	$0	$11,081	$147,774	$68,746	$9,137,811
Putnam	$15,444,426	$4,686,645	$279,878	$0	$361,481	$10,651	$0	$10,105,771
Sullivan	$3,506,060	$1,447,363	$172,600	$0	$127,990	$1,692	$0	$1,756,415
Vermillion	$13,832,844	$418,192	$1,084,015	$0	$208,188	$0	$407,470	$11,714,979
Vigo	$77,260,692	$2,600,114	$18,043,418	$12,012,010	$2,490,782	$985,283	$10,213,447	$30,915,638
District Subtotal	**$169,824,413**	**$24,669,431**	**$26,760,398**	**$12,012,010**	**$3,573,048**	**$1,424,628**	**$12,065,522**	**$89,319,378**
	IDHS DISTRICT #8							
Bartholomew	$84,636,627	$2,454,883	$26,184,891	$0	$1,650,347	$10,288,712	$1,780,687	$42,277,107
Brown	$55,560,634	$10,942,665	$14,696,222	$0	$3,017,001	$341,058	$1,029,433	$25,534,256
Jackson	$45,832,467	$1,985,593	$11,733,632	$1,032,285	$276,000	$11,458,365	$419,973	$18,926,620
Lawrence	$22,107,736	$6,985,089	$888,895	$2	$1,271,525	$1,823	$1,738,046	$11,222,358
Monroe	$68,391,652	$4,151,765	$14,690,614	$0	$4,670,665	$11,425,635	$1,959,839	$31,493,134
Orange	$68,642,424	$1,712,384	$31,392,901	$0	$12,087,898	$12,765,715	$1,472,268	$9,211,259
Washington	$26,513,821	$2,169,366	$11,117,288	$0	$169,076	$7,053,949	$65,834	$5,938,309
District Subtotal	**$371,685,361**	**$30,401,745**	**$110,704,443**	**$1,032,287**	**$23,142,512**	**$53,335,257**	**$8,466,080**	**$144,603,043**
	IDHS DISTRICT #9							
Clark	$188,884,264	$4,371,347	$57,683,932	$0	$14,073,985	$22,580,270	$4,882,447	$85,292,282
Dearborn	$100,781,552	$5,627,771	$53,810,419	$0	$1,844,584	$26,479,664	$3,389,909	$9,629,206
Decatur	$8,874,664	$1,149,525	$1,509,325	$84,313	$765,411	$502,581	$0	$4,863,508
Floyd	$106,937,525	$2,273,318	$63,426,877	$27,002	$2,794,439	$7,857,351	$1,257,289	$29,301,248
Franklin	$40,096,707	$8,063,768	$3,622,663	$0	$1,248,706	$17,548,578	$450,830	$9,162,162
Harrison	$128,456,511	$3,551,724	$102,007,728	$0	$816,471	$5,551,677	$3,067,713	$13,461,198
Jefferson	$29,299,480	$2,579,253	$4,468,740	$97,796	$2,379,447	$671,871	$2,326,094	$16,776,279

County Name	Total Building Losses	Building Occupancy Class						
		Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
Jennings	$18,510,119	$4,300,683	$575,209	$0	$3,511,505	$0	$289,278	$9,833,444
Ohio	$10,746,451	$2,119,019	$3,651,898	$0	$1,319,705	$0	$0	$3,655,829
Ripley	$7,140,829	$1,343,980	$1,424,753	$0	$942,278	$0	$387,101	$3,042,717
Scott	$5,621,533	$99,120	$614,057	$	$62,588	$116,439	$0	$4,729,330
Switzerland	$21,504,679	$2,491,338	$2,103,230	$0	$401,385	$0	$1,744,136	$14,764,590
District Subtotal	**$666,854,314**	**$37,970,846**	**$294,898,831**	**$209,111**	**$30,160,504**	**$81,308,431**	**$17,794,797**	**$204,511,793**
	IDHS DISTRICT #10							
Crawford	$17,337,141	$1,688,415	$3,800,555	$0	$189,012	$0	$516,939	$11,142,220
Daviess	$1,358,060	$160,715	$0	$0	$0	$0	$0	$1,197,345
Dubois	$48,808,069	$4,332,109	$7,481,960	$0	$214,175	$24,880,198	$3,331,582	$8,568,045
Gibson	$17,967,890	$2,287,509	$1,194,000	$0	$53,737	$578,656	$1,954,670	$11,899,318
Knox	$32,382,266	$5,713,850	$4,706,864	$322,548	$143,070	$9,665,512	$0	$11,830,421
Martin	$16,581,055	$2,290,549	$4,496,061	$0	$488,443	$70,302	$329,335	$8,906,366
Perry	$20,932,212	$3,822,250	$2,840,016	$0	$12,292	$804,345	$27,419	$13,425,889
Pike	$1,407,146	$8,804	$236,753	$0	$168,188	$339,982	$168,971	$484,448
Posey	$33,001,926	$1,965,978	$1,814,943	$0	$718,296	$5,999,342	$8,557,854	$13,945,513
Spencer	$32,415,230	$2,198,879	$7,174,738	$0	$171,102	$9,991,142	$804,874	$12,074,495
Vanderburgh	$236,953,853	$5,915,297	$82,713,813	$584,436	$1,889,305	$49,953,599	$5,696,654	$90,200,748
Warrick	$78,740,964	$2,868,613	$24,597,319	$9,818,043	$373,521	$2,442,435	$1,524,749	$37,116,284
District Subtotal	**$537,885,812**	**$33,252,968**	**$141,057,022**	**$10,725,027**	**$4,421,141**	**$104,725,513**	**$22,913,047**	**$220,791,092**
Grand Total	$5,254,196,216	$207,749,064	$1,177,501,458	$44,556,702	$146,221,926	$981,134,091	$172,768,429	$2,524,264,547

Figure 42. Projected Total Building Losses by County

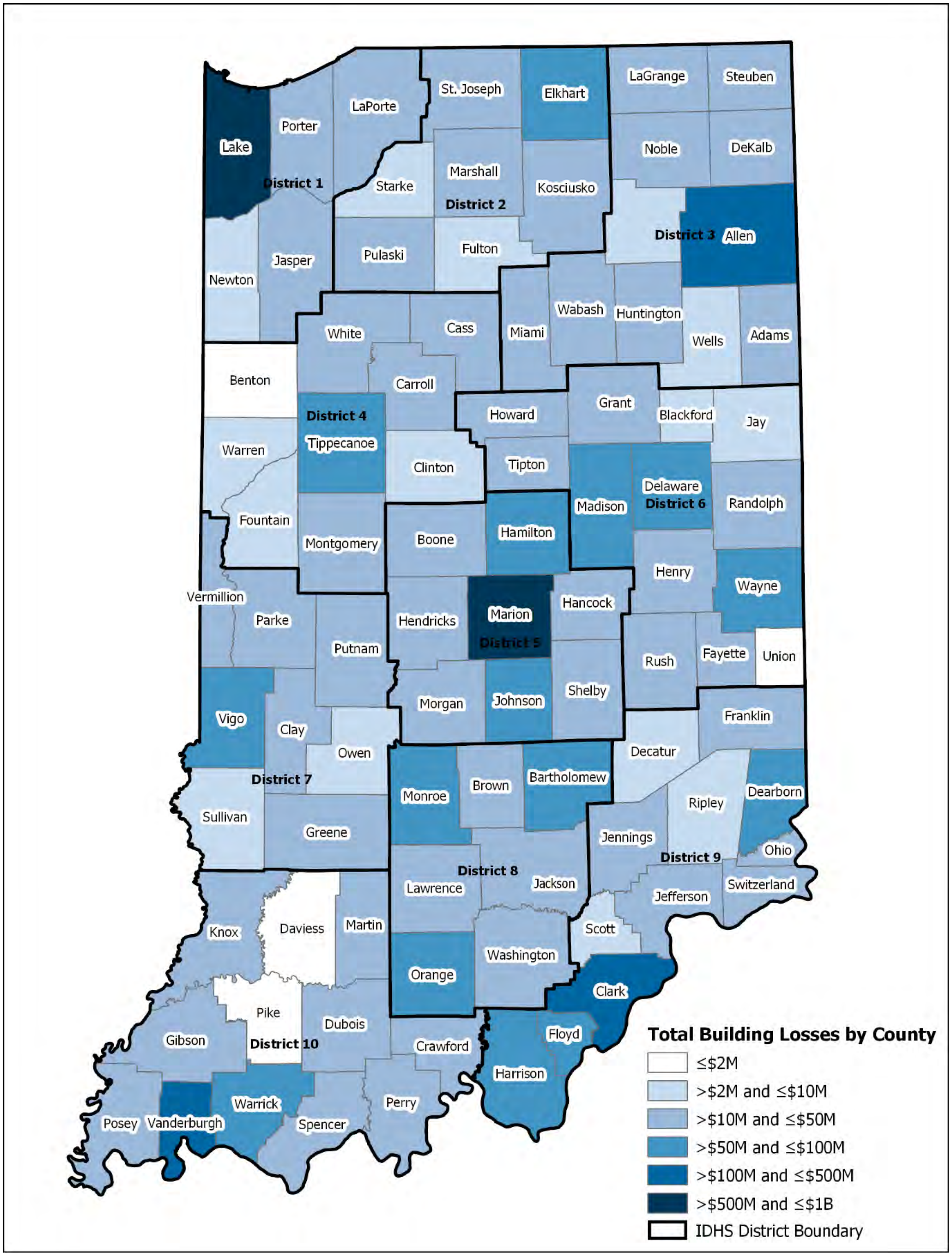


Figure 43. Projected Loss Ratio by County

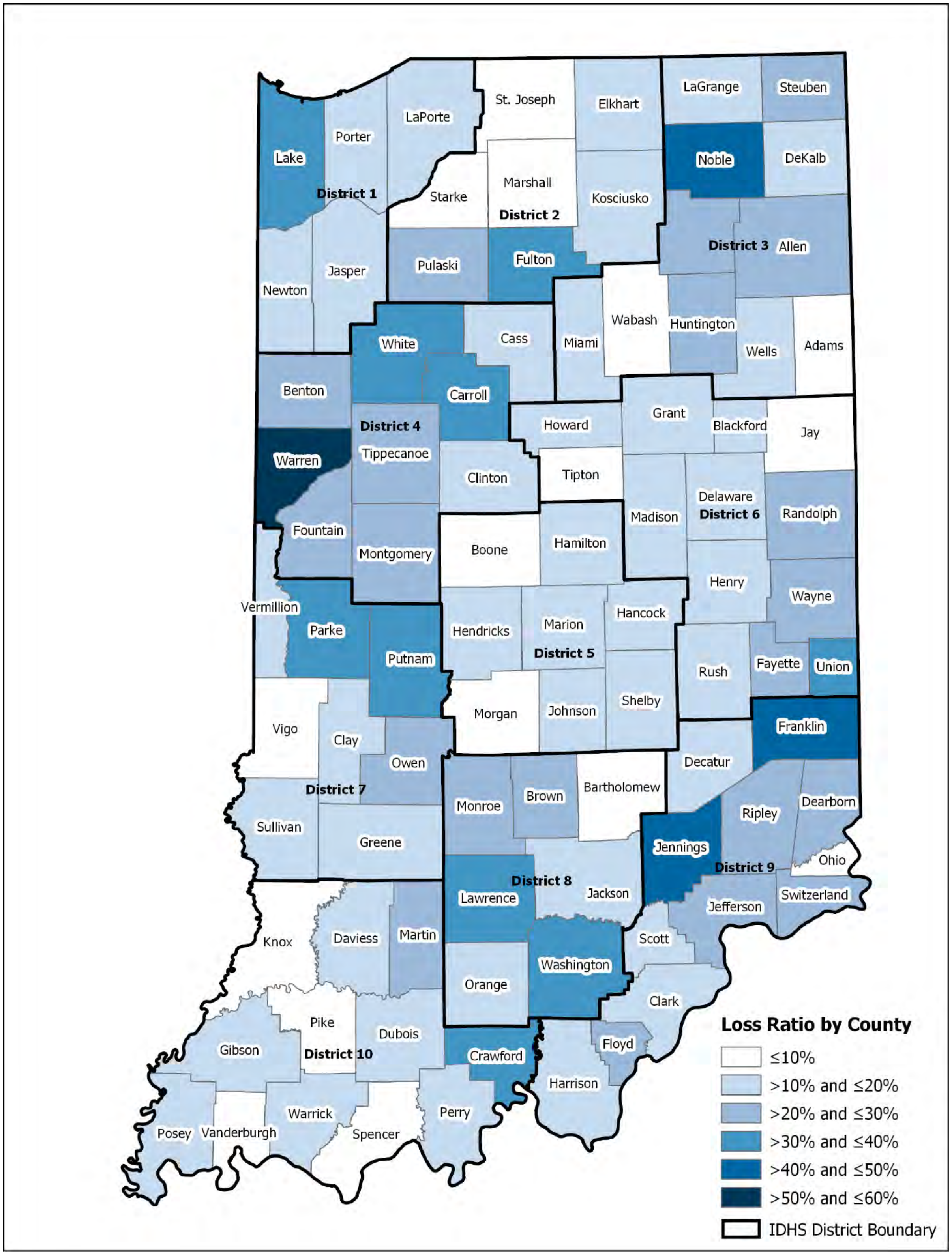


Table 25. Damaged Buildings by Occupancy

County Name	Total Buildings Damaged	Building Occupancy Class						
		Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
	IDHS DISTRICT #1							
Jasper	527	63	19	0	0	4	0	441
LaPorte	629	112	10	2	14	6	4	481
Lake	2,412	102	150	2	91	95	24	1,948
Newton	255	32	8	0	4	1	2	208
Porter	256	34	12	0	4	1	3	202
District Subtotal	**4,079**	**343**	**199**	**4**	**113**	**107**	**33**	**3,280**
	IDHS DISTRICT #2							
Elkhart	1,245	31	122	1	37	23	16	1,015
Fulton	175	8	0	0	2	0	0	165
Kosciusko	1,919	40	56	1	25	10	9	1,778
Marshall	254	18	29	0	19	9	10	169
Pulaski	372	24	5	0	1	0	1	341
St. Joseph	598	69	43	1	10	12	9	454
Starke	259	92	7	0	4	1	0	155
District Subtotal	**4,822**	**282**	**262**	**3**	**98**	**55**	**45**	**4,077**
	IDHS DISTRICT #3							
Adams	241	56	13	0	6	16	2	148
Allen	1,690	80	141	5	33	33	19	1,379
DeKalb	236	23	9	1	18	1	9	175
Huntington	155	7	30	0	10	7	3	98
LaGrange	1,266	49	5	0	1	2	1	1,208
Miami	222	7	21	0	12	8	2	172
Noble	898	17	7	1	3	3	2	865
Steuben	752	19	9	0	0	1	2	721
Wabash	310	25	33	0	11	10	15	216
Wells	85	17	5	0	9	0	0	54
Whitley	189	12	4	1	4	2	0	166
District Subtotal	**6,044**	**312**	**277**	**8**	**107**	**83**	**55**	**5,202**
	IDHS DISTRICT #4							
Benton	6	1	0	0	0	0	0	5
Carroll	880	42	13	0	12	1	5	807
Cass	397	17	20	1	9	5	4	341

County Name	Total Buildings Damaged	Building Occupancy Class					
		Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
Clinton	117	19	10	0	4	1	2	81
Fountain	74	21	0	0	5	0	0	48
Montgomery	155	26	12	0	7	5	0	105
Tippecanoe	570	58	15	0	5	5	6	481
Warren	50	23	0	0	0	0	2	25
White	656	6	5	1	2	1	2	639
District Subtotal	**2,905**	**213**	**75**	**2**	**44**	**18**	**21**	**2,532**
	IDHS DISTRICT #5							
Boone	561	22	16	0	8	5	5	505
Hamilton	1,260	41	83	0	42	15	9	1,070
Hancock	586	68	39	1	9	4	12	453
Hendricks	385	38	28	0	10	2	4	303
Johnson	1,381	61	64	2	6	16	10	1,222
Marion	10,413	18	562	5	5	122	82	9,619
Morgan	520	65	61	1	8	17	7	361
Shelby	767	116	14	2	8	7	10	610
District Subtotal	**15,873**	**429**	**867**	**11**	**96**	**188**	**139**	**14,143**
	IDHS DISTRICT #6							
Blackford	46	6	5	0	6	2	0	27
Delaware	1,156	34	66	0	41	16	14	985
Fayette	267	78	16	0	2	6	2	163
Grant	484	26	52	0	32	9	19	346
Henry	220	44	31	0	4	3	4	134
Howard	332	14	21	0	12	11	7	267
Jay	216	11	42	3	10	2	10	138
Madison	1,300	66	107	0	27	13	12	1,075
Tipton	462	48	30	3	16	2	10	353
Randolph	281	32	9	0	3	4	9	224
Rush	147	40	8	3	9	0	3	84
Union	24	10	0	0	0	0	0	14
Wayne	515	49	76	1	26	20	17	326
District Subtotal	**5,450**	**458**	**463**	**10**	**188**	**88**	**107**	**4,136**
	IDHS DISTRICT #7							
Clay	228	92	2	0	6	1	3	124

County Name	Total Buildings Damaged	Building Occupancy Class						
		Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
Greene	310	129	34	0	4	6	6	131
Owen	217	34	4	0	3	0	12	164
Parke	207	42	7	0	2	1	2	153
Putnam	224	64	2	0	9	1	3	145
Vigo	750	62	91	2	13	12	20	550
Sullivan	92	42	2	0	2	1	0	45
Vermillion	319	14	19	0	6	0	7	273
District Subtotal	**2,347**	**479**	**161**	**2**	**45**	**22**	**53**	**1,585**
	IDHS DISTRICT #8							
Bartholomew	1,467	116	76	0	23	44	11	1,197
Brown	452	95	41	0	10	2	6	298
Jackson	791	148	53	3	11	20	9	547
Lawrence	252	76	8	0	5	1	10	152
Monroe	484	36	101	0	20	9	13	305
Orange	321	21	85	0	17	15	9	174
Washington	215	43	22	0	6	4	2	138
District Subtotal	**3,982**	**535**	**386**	**3**	**92**	**95**	**60**	**2,811**
	IDHS DISTRICT #9							
Clark	1,981	68	156	1	31	13	22	1,690
Dearborn	439	75	170	0	16	11	15	152
Decatur	161	19	12	2	4	1	1	122
Floyd	502	34	50	1	12	20	12	373
Franklin	328	100	27	0	4	4	8	185
Harrison	500	67	125	0	18	11	20	259
Jefferson	438	34	26	2	17	2	12	345
Jennings	161	39	3	0	8	0	3	108
Ohio	117	30	9	0	8	0	0	70
Ripley	93	21	18	0	4	0	6	44
Scott	74	6	7	0	2	1	0	58
Switzerland	456	35	22	0	24	0	5	370
District Subtotal	**5,250**	**528**	**625**	**6**	**148**	**63**	**104**	**3,776**
	IDHS DISTRICT #10							
Crawford	310	32	26	0	3	0	5	244
Daviess	47	16	1	0	0	0	0	30

County Name	Total Buildings Damaged	Building Occupancy Class						
		Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
Dubois	271	40	62	0	3	39	5	122
Gibson	361	85	13	0	6	3	9	245
Knox	481	192	37	1	5	15	7	224
Martin	241	49	15	0	1	2	4	170
Perry	346	61	23	0	1	9	3	249
Pike	48	6	9	0	5	6	2	20
Posey	663	146	18	0	16	7	17	459
Spencer	672	121	51	0	12	33	13	442
Vanderburgh	2,381	109	231	1	22	110	25	1,883
Warrick	804	96	58	3	14	17	8	608
District Subtotal	**6,625**	**953**	**544**	**5**	**88**	**241**	**98**	**4,696**
Grand Total	**57,377**	**4,532**	**3,859**	**54**	**1,019**	**960**	**715**	**46,238**

Figure 44. Percent Projected Buildings Damaged

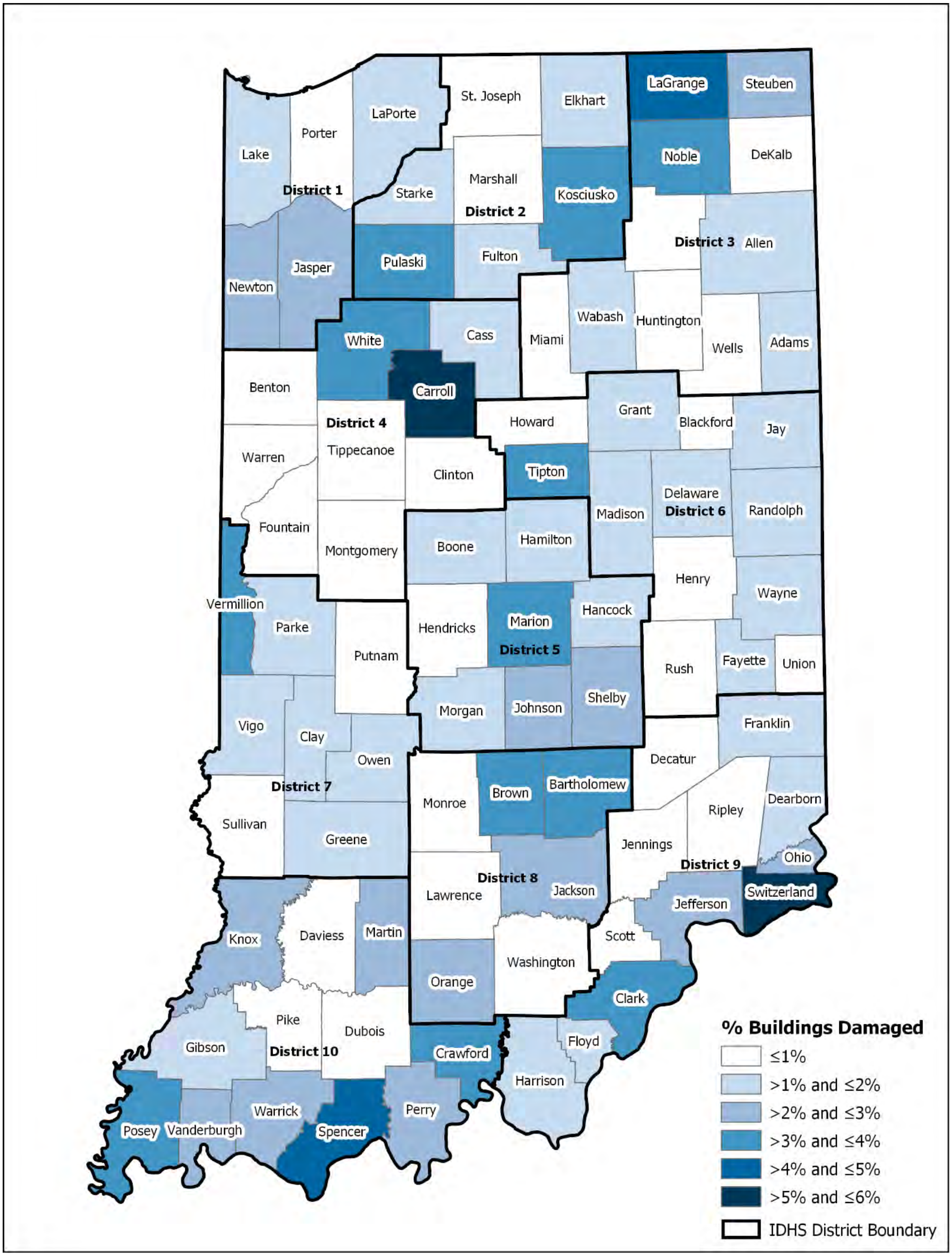


Figure 45. Projected Total Buildings Damaged

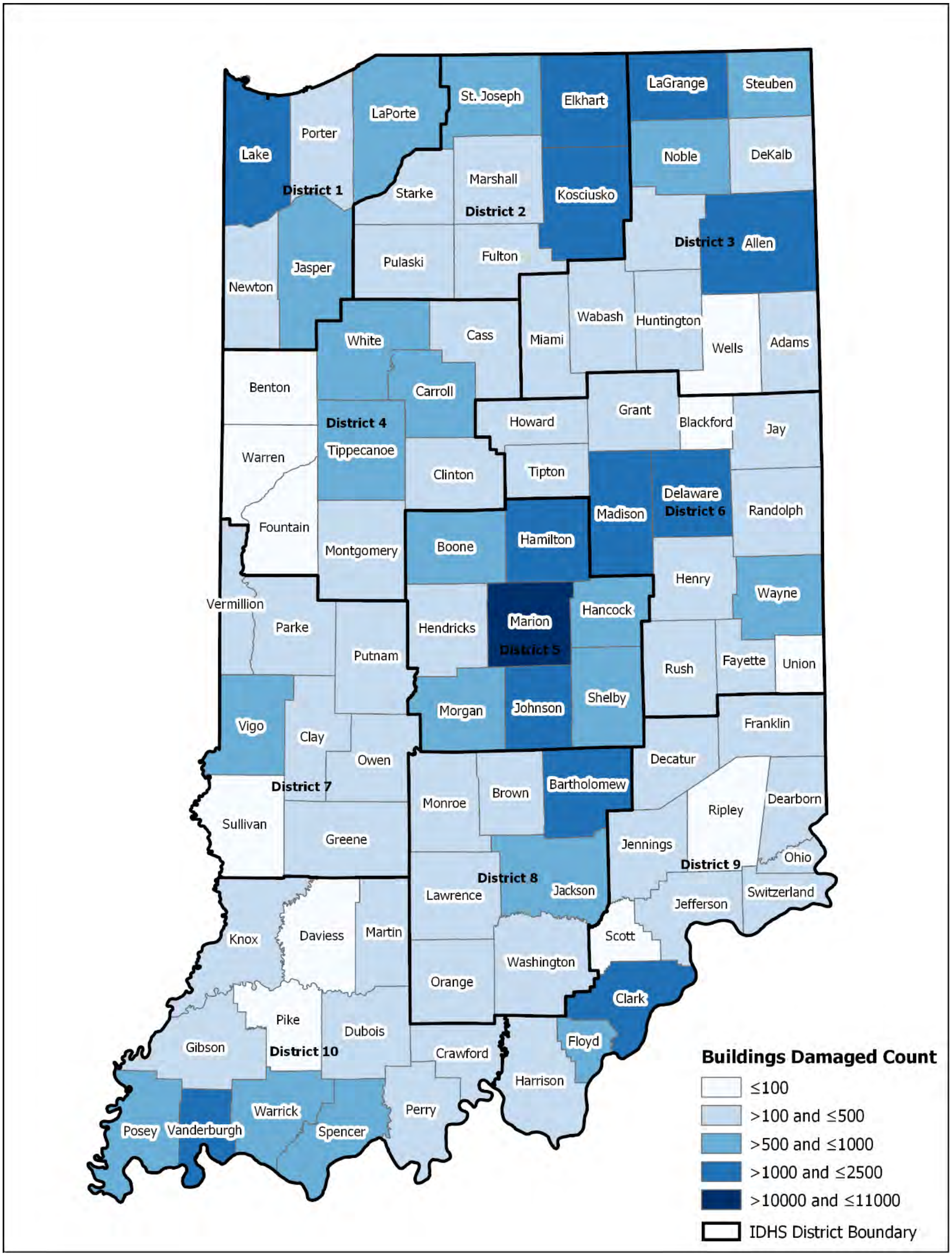


Figure 46. Projected Damaged Schools during a 100-Year Flood

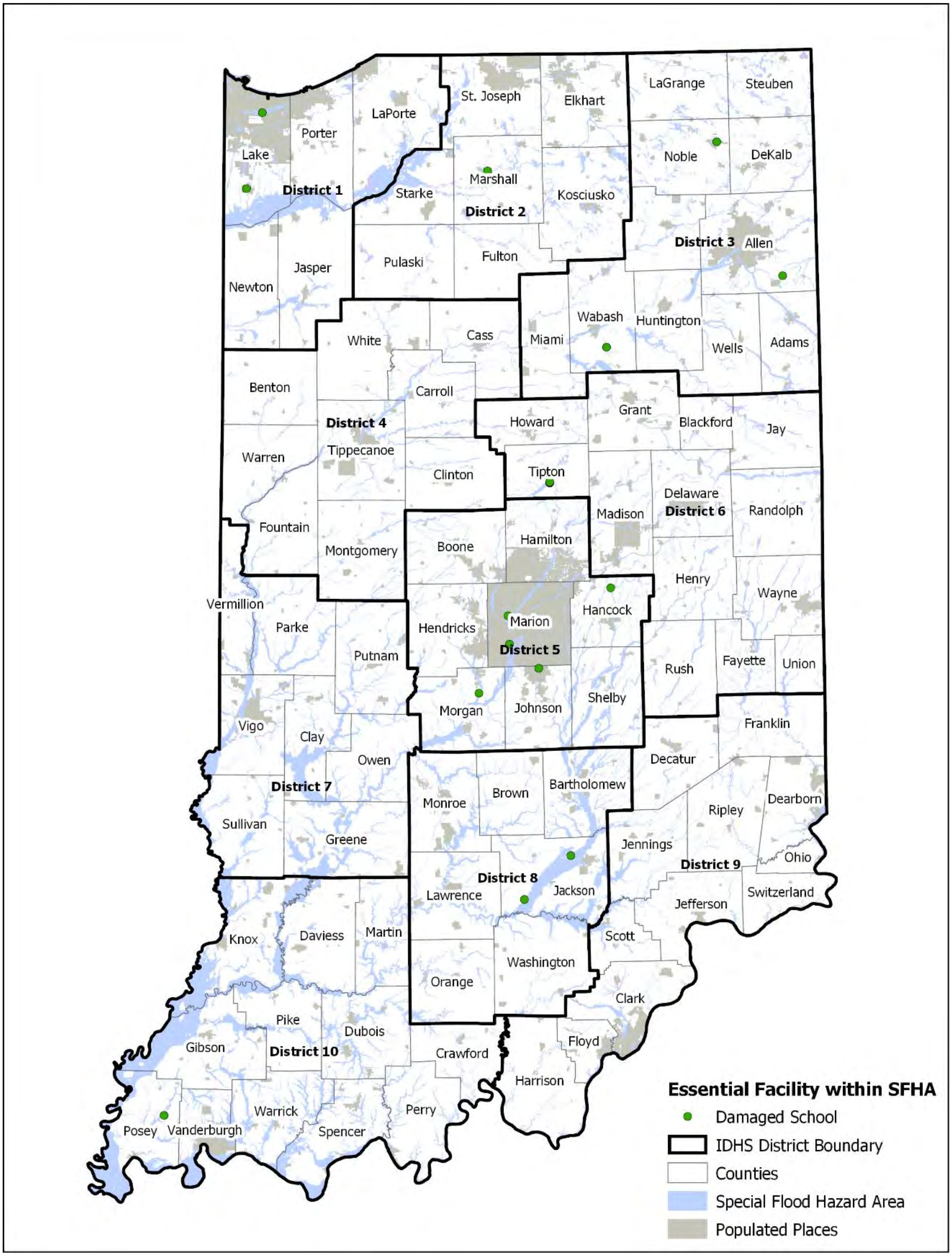


Figure 47. Projected Damaged Police Stations during a 100-Year Flood

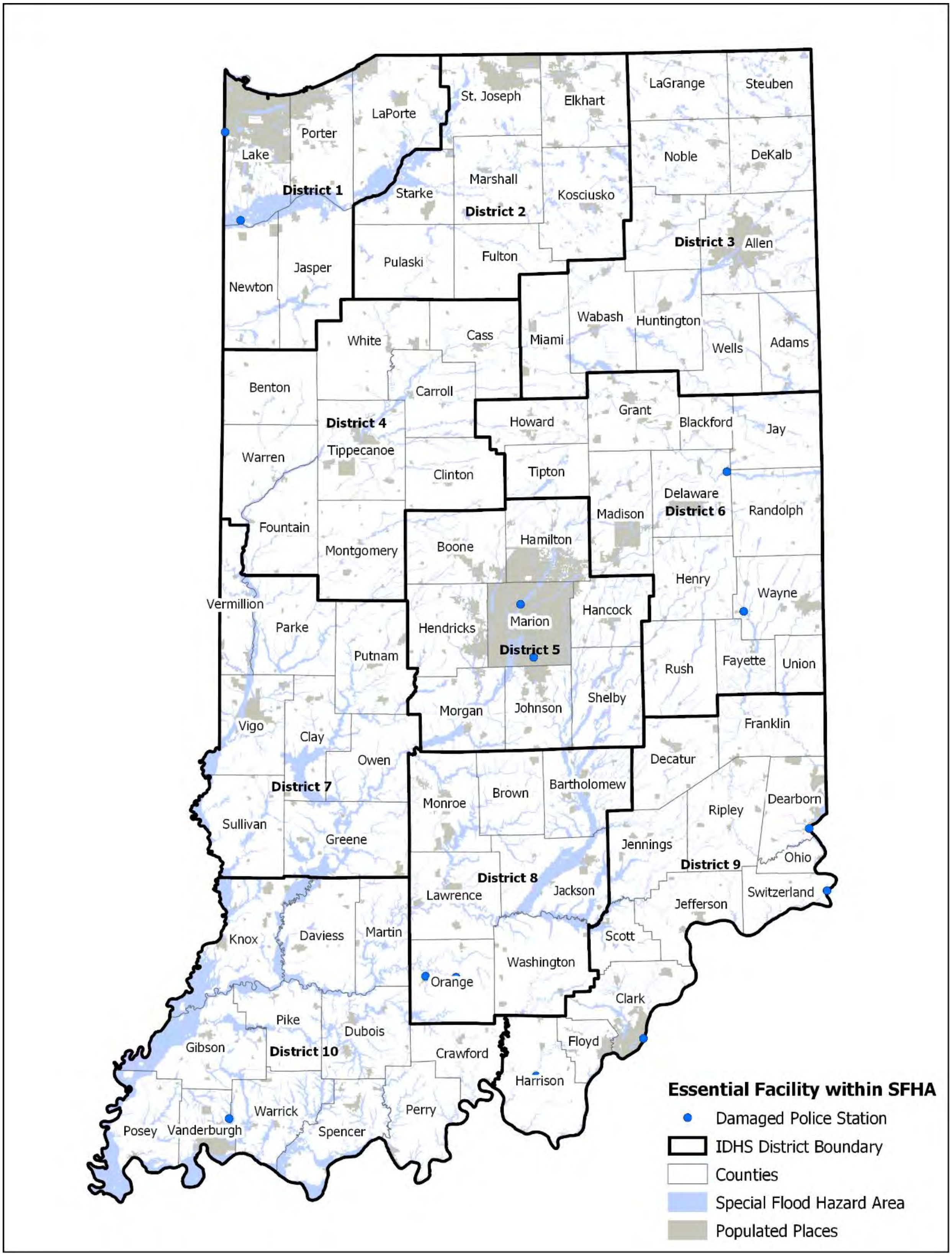


Figure 48. Projected Damaged Fire Stations during a 100-Year Flood

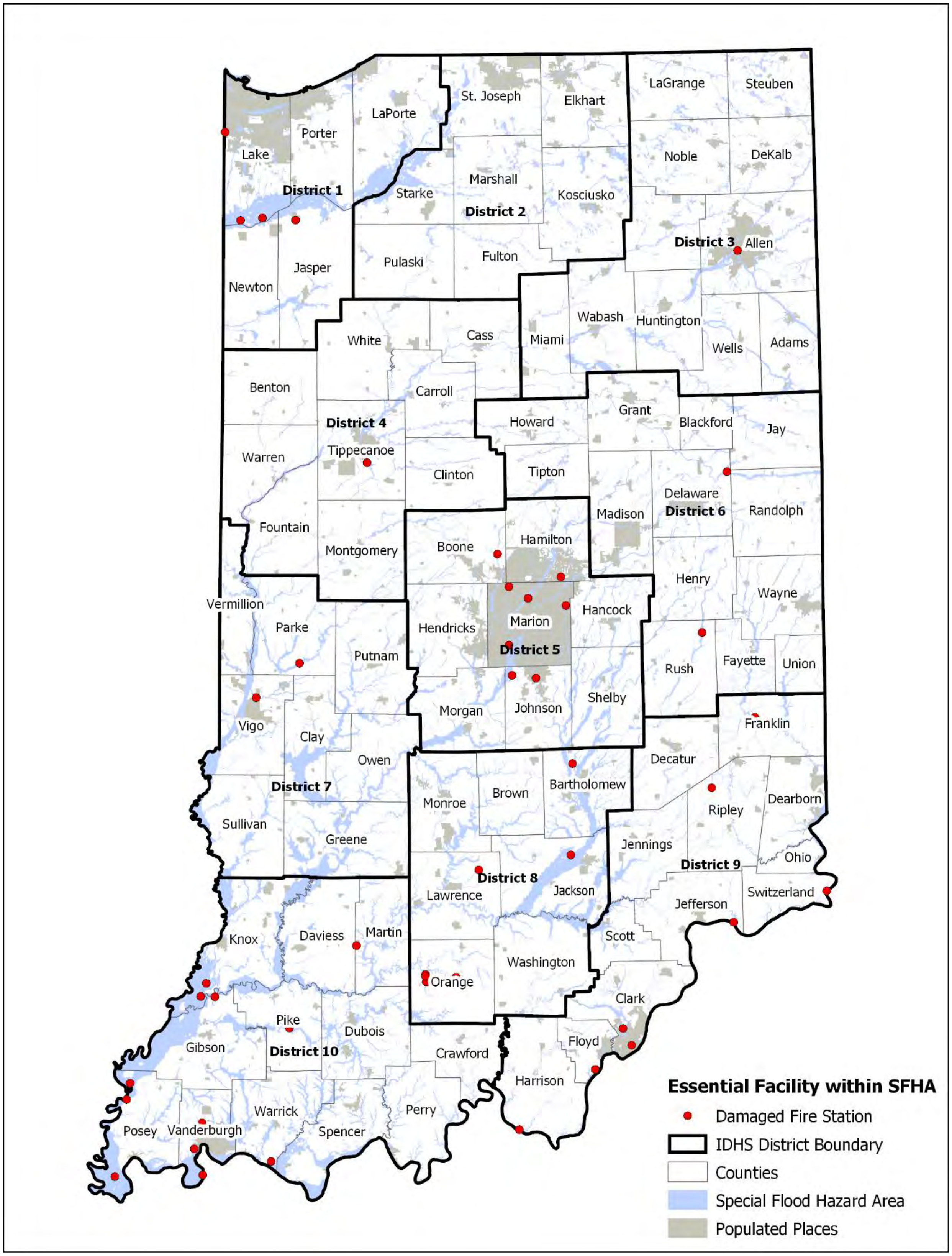


Figure 49. Projected Damaged EOCs during a 100-Year Flood

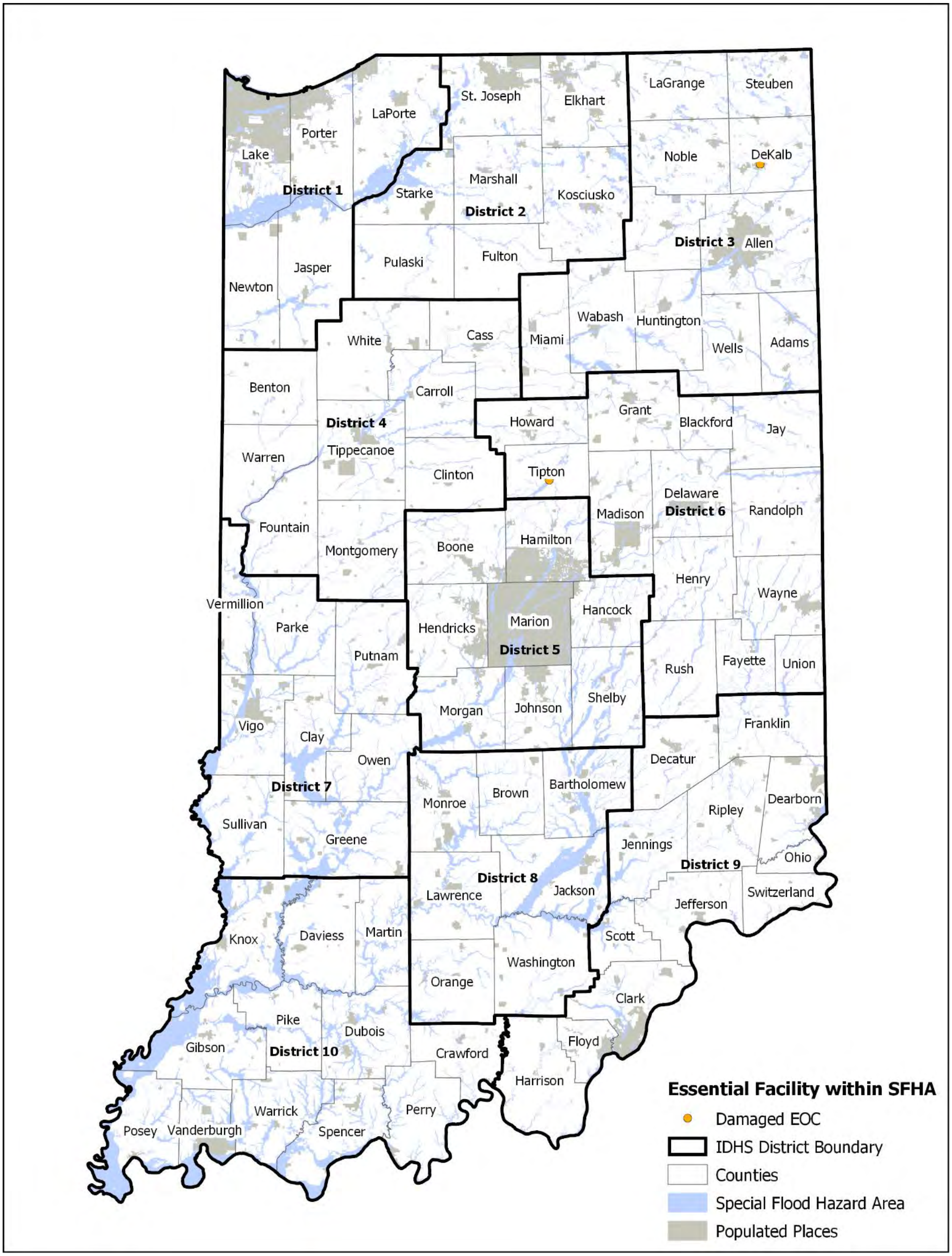


Figure 50. Projected Damaged Care Facilities during a 100-Year Flood

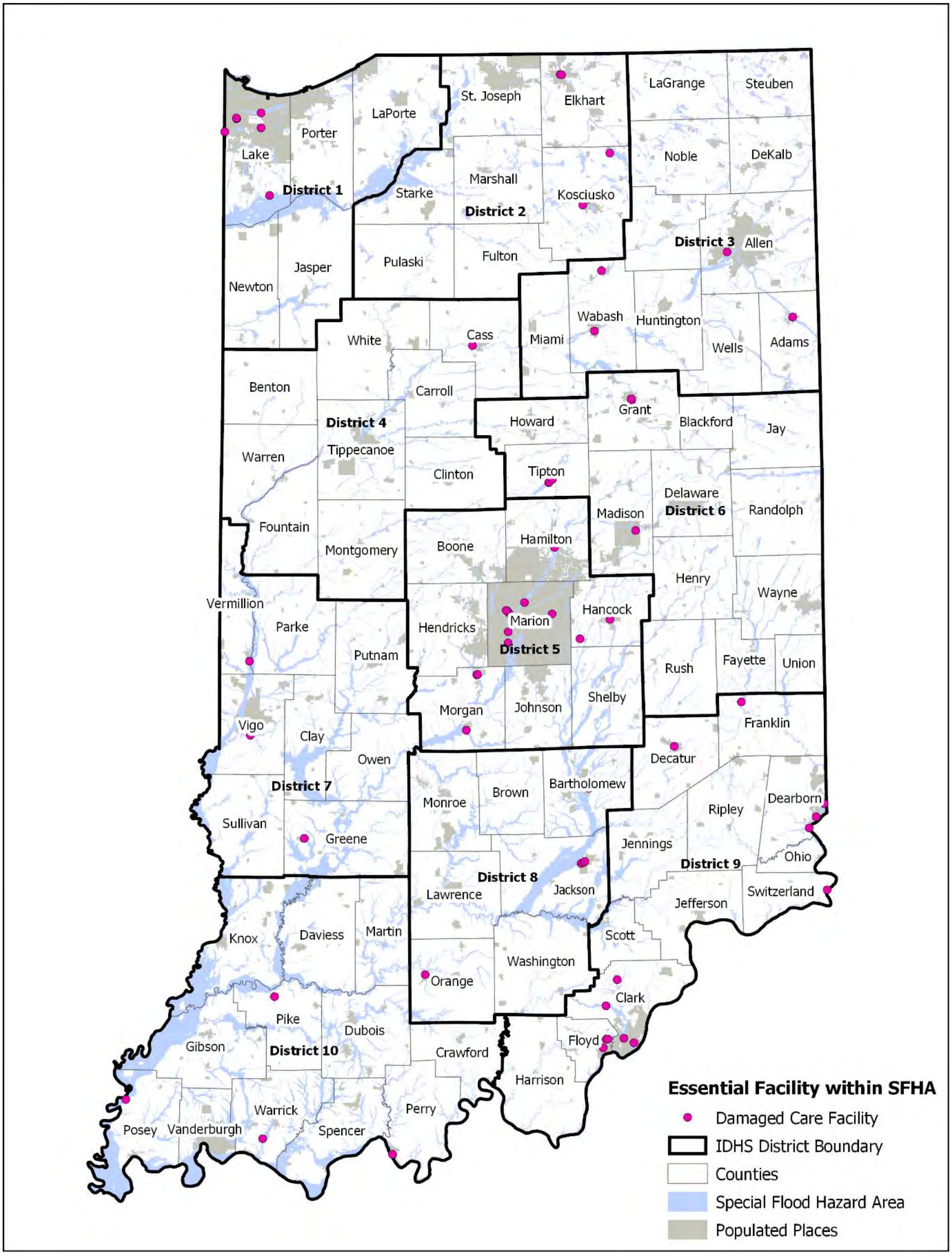


Figure 51. Projected Damaged State Facilities during a 100-Year Flood

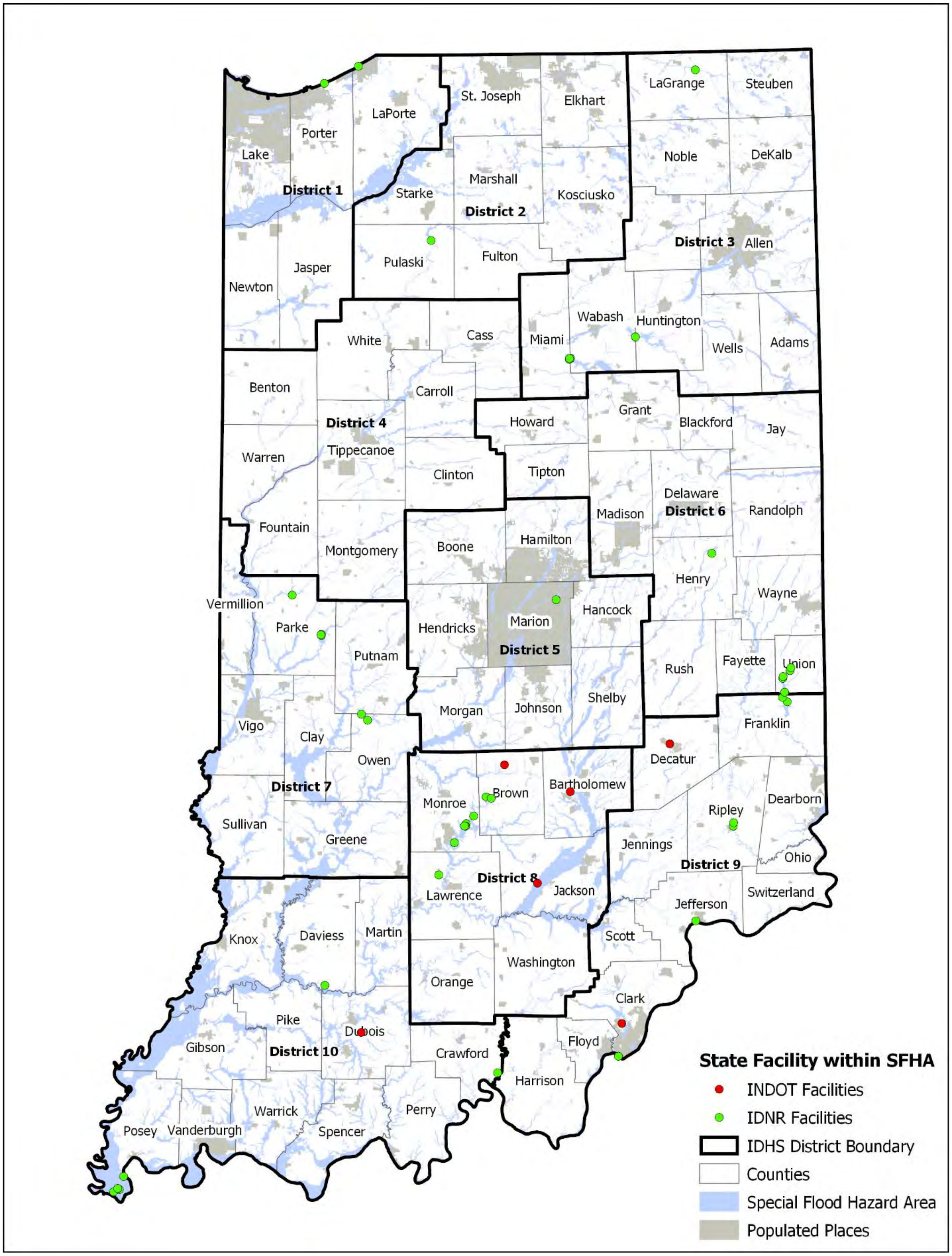
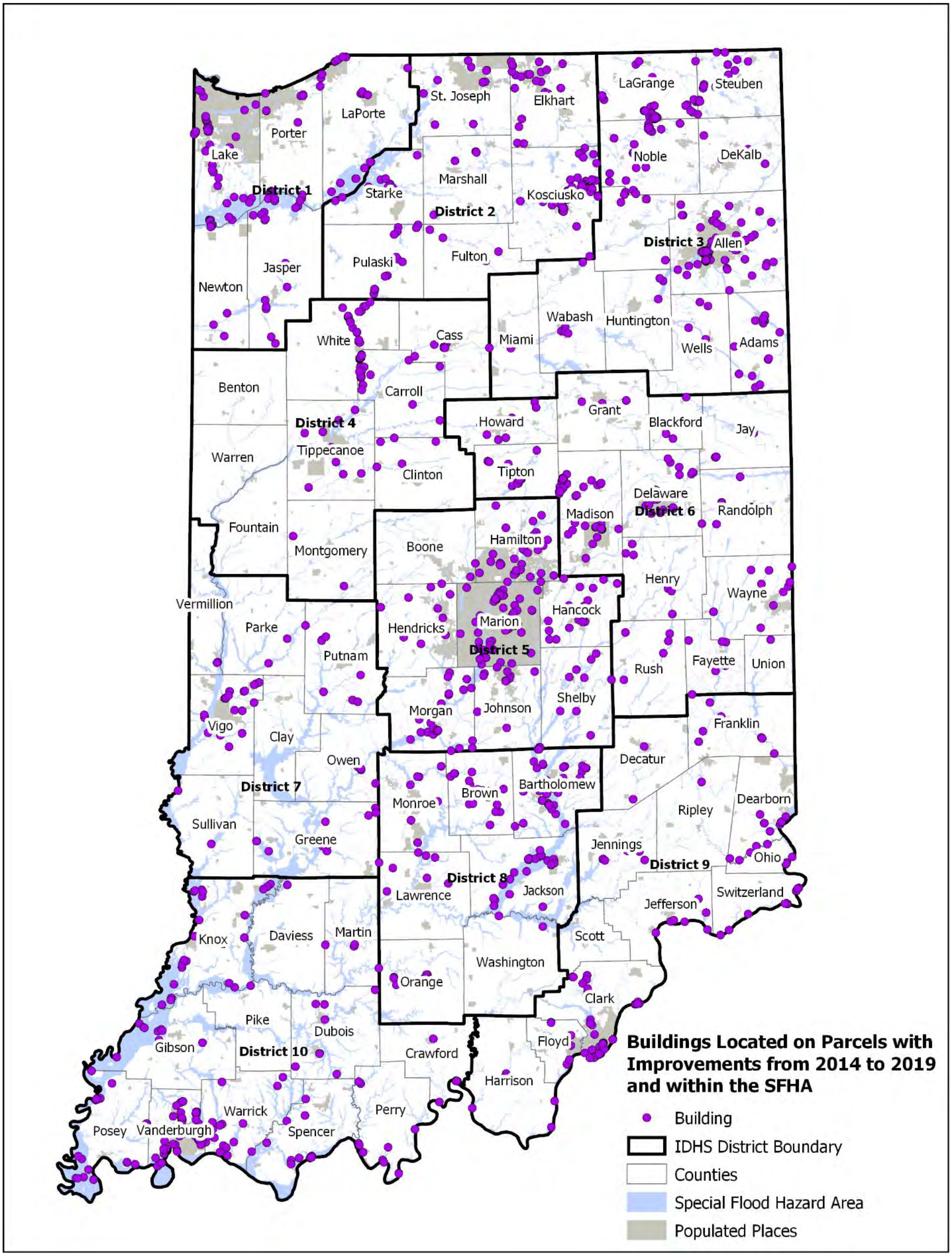


Figure 52. Improvements from 2014 to 2019 in SFHA



6.1.2.5 National Flood Insurance Program

The NFIP seeks to reduce the impact of flooding on private and public structures by providing affordable insurance for property owners. It is IDHS's goal to encourage more communities to adopt and enforce floodplain management regulations, which will mitigate the effects of flooding new and improved structures.

> Since 1978, the NFIP has paid more than $68 billion in flood insurance claims in the United States, including over $273 million in Indiana.

The NFIP has three major functions that focus on reducing flood risk and the impact of flood disasters:

1. **Flood Hazard Mapping and Risk Analysis:** The NFIP requires reliable information about flood risk, which it obtains through FEMA's Risk Mapping, Assessment, and Planning (Risk MAP) program. Risk MAP is a multi-year mapping effort designed to meet the FEMA statutory requirement to review flood hazards maps every five years and address flood hazard data updates as funding is available.
2. **Reducing Flood Risk:** Local floodplain managers are encouraged to seek flood-related grants and assistance such as Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss (SRL). By law, FEMA can only provide flood insurance to homeowners of communities that adopt and enforce floodplain management regulation and meet NFIP's requirements.
3. **Insuring Flood Risk:** Homeowners in communities participating in the NFIP can purchase affordable protection to insure against flood losses.

To help better understand flood risk, the total structures in the SFHA were compared to the total number of policies in the community. This is based on the approximate buildings locations, and therefore should not be used as an absolute comparison. However, this information may be used to target further mitigation through additional engagement with the NFIP. Table 26 displays the insurance policies and total coverage for each county as well as the estimated number of buildings in the SFHA along with total estimated replacement cost. The last two columns represent the approximate percentage of buildings insured and the approximate percentage of exposure. Figure 53 maps the percentage of buildings insured, the total number of estimated buildings in the SFHA divided by the total number of polices in the county. Figure 54 maps the total amount of estimated exposure.

Table 26. Comparison of Estimated Building Exposure to Insured Buildings

County	Number Policies	Total Coverage	Total Buildings in the SFHA	Total Replacement Cost of Buildings in SFHA	Approximate % of Buildings Insured	Approximate % of Exposure Insured
Adams	84	$12,477,600	241	$18,247,386	35%	68%
Allen	895	$183,522,000	1,690	$345,545,182	53%	53%
Bartholomew	694	$149,979,200	1,467	$84,636,627	47%	177%
Benton	3	$1,050,000	6	$373,626	50%	281%
Blackford	5	$909,000	46	$3,694,835	11%	25%
Boone	249	$46,094,900	561	$47,208,936	44%	98%
Brown	124	$26,040,500	452	$55,560,634	27%	47%

County	Number Policies	Total Coverage	Total Buildings in the SFHA	Total Replacement Cost of Buildings in SFHA	Approximate % of Buildings Insured	Approximate % of Exposure Insured
Carroll	288	$45,409,100	880	$46,936,619	33%	97%
Cass	128	$17,179,600	397	$17,162,371	32%	100%
Clark	947	$177,681,100	1,981	$188,884,264	48%	94%
Clay	44	$5,463,300	228	$12,360,528	19%	44%
Clinton	62	$12,183,100	117	$6,360,815	53%	192%
Crawford	37	$4,243,100	310	$17,337,141	12%	24%
Daviess	14	$2,329,400	47	$1,358,060	30%	172%
De Kalb	133	$30,044,100	439	$100,781,552	30%	30%
Dearborn	47	$7,737,900	161	$8,874,664	29%	87%
Decatur	70	$11,453,200	236	$12,211,156	30%	94%
Delaware	467	$87,393,300	1,156	$91,789,086	40%	95%
Dubois	48	$13,093,800	271	$48,808,069	18%	27%
Elkhart	495	$98,102,700	1,245	$75,513,495	40%	130%
Fayette	81	$10,843,200	267	$17,580,423	30%	62%
Floyd	211	$46,192,300	502	$106,937,525	42%	43%
Fountain	13	$1,829,400	74	$3,378,411	18%	54%
Franklin	64	$9,086,700	328	$40,096,707	20%	23%
Fulton	52	$8,557,500	175	$5,875,858	30%	146%
Gibson	46	$8,345,700	361	$17,967,890	13%	46%
Grant	115	$18,916,400	484	$30,696,380	24%	62%
Greene	69	$10,739,100	310	$25,007,560	22%	43%
Hamilton	784	$204,915,000	1,260	$139,502,329	62%	147%
Hancock	237	$46,319,100	586	$32,845,100	40%	141%
Harrison	103	$18,844,200	500	$128,456,511	21%	15%
Hendricks	268	$66,530,200	385	$37,823,331	70%	176%
Henry	66	$10,963,400	220	$19,214,619	30%	57%
Howard	229	$57,870,800	332	$22,196,675	69%	261%
Huntington	80	$12,969,000	155	$14,590,140	52%	89%
Jackson	269	$49,115,400	791	$45,832,467	34%	107%
Jasper	112	$18,569,400	527	$29,690,921	21%	63%
Jay	41	$6,195,700	216	$6,472,233	19%	96%
Jefferson	125	$18,047,500	438	$29,299,480	29%	62%
Jennings	26	$2,826,800	161	$18,510,119	16%	15%
Johnson	499	$112,069,300	1,381	$87,039,414	36%	129%
Knox	108	$21,854,700	481	$32,382,266	22%	67%
Kosciusko	644	$113,528,200	1,919	$62,151,339	34%	183%
La Porte	229	$41,971,800	1,266	$32,803,739	18%	128%
Lagrange	1,558	$364,788,300	2,412	$626,813,364	65%	58%
Lake	224	$49,715,400	629	$42,242,760	36%	118%
Lawrence	42	$6,651,600	252	$22,107,736	17%	30%
Madison	354	$49,885,100	1,300	$79,784,544	27%	63%
Marion	4,038	$816,591,400	10,413	$975,227,482	39%	84%
Marshall	98	$19,501,300	254	$17,892,701	39%	109%
Martin	11	$1,638,400	241	$16,581,055	5%	10%

County	Number Policies	Total Coverage	Total Buildings in the SFHA	Total Replacement Cost of Buildings in SFHA	Approximate % of Buildings Insured	Approximate % of Exposure Insured
Miami	89	$16,910,900	222	$16,351,139	40%	103%
Monroe	259	$56,414,700	484	$68,391,652	54%	82%
Montgomery	54	$9,516,000	155	$15,959,483	35%	60%
Morgan	330	$80,936,400	520	$26,474,973	63%	306%
Newton	70	$8,971,900	255	$6,414,467	27%	140%
Noble	250	$39,466,600	898	$59,600,211	28%	66%
Ohio	45	$7,656,000	117	$10,746,451	38%	71%
Orange	87	$18,395,800	321	$68,642,424	27%	27%
Owen	83	$11,404,700	217	$9,520,463	38%	120%
Parke	29	$2,502,400	207	$12,891,840	14%	19%
Perry	58	$9,666,400	346	$20,932,212	17%	46%
Pike	9	$1,726,100	48	$1,407,146	19%	123%
Porter	189	$46,169,900	256	$25,513,115	74%	181%
Posey	153	$28,384,200	663	$33,001,926	23%	86%
Pulaski	64	$7,203,100	372	$15,109,397	17%	48%
Putnam	53	$11,144,300	224	$15,444,426	24%	72%
Randolph	111	$13,565,400	281	$17,500,900	40%	78%
Ripley	19	$2,802,300	93	$7,140,829	20%	39%
Rush	49	$7,327,100	147	$13,877,089	33%	53%
Scott	33	$6,052,300	74	$5,621,533	45%	108%
Shelby	272	$45,459,400	767	$32,844,374	35%	138%
Spencer	114	$13,670,000	672	$32,415,230	17%	42%
St. Joseph	339	$86,491,100	598	$44,108,149	57%	196%
Starke	74	$8,697,900	259	$5,934,498	29%	147%
Steuben	156	$25,863,600	752	$23,746,718	21%	109%
Sullivan	11	$408,500	92	$3,506,060	12%	12%
Switzerland	61	$6,994,200	456	$21,504,679	13%	33%
Tippecanoe	244	$57,130,100	570	$79,734,660	43%	72%
Tipton	181	$35,992,400	462	$19,032,074	39%	189%
Union	6	$937,000	24	$1,547,346	25%	61%
Vanderburgh	886	$233,367,700	2,381	$236,953,853	37%	98%
Vermillion	58	$6,101,300	319	$13,832,844	18%	44%
Vigo	918	$169,398,400	750	$77,260,692	122%	219%
Wabash	95	$15,135,400	310	$22,115,197	31%	68%
Warren	2	$320,600	50	$3,532,612	4%	9%
Warrick	206	$49,424,800	804	$78,740,964	26%	63%
Washington	38	$2,154,400	215	$26,513,821	18%	8%
Wayne	138	$17,319,400	515	$73,902,784	27%	23%
Wells	63	$16,937,600	85	$6,466,596	74%	262%
White	169	$31,855,400	656	$40,021,168	26%	80%
Whitley	82	$16,774,100	189	$9,294,097	43%	180%
State Total	21,777	$4,384,909,000	57,377	$5,254,196,216	38%	83%

Figure 53. Projected Percentage of Buildings Insured per County

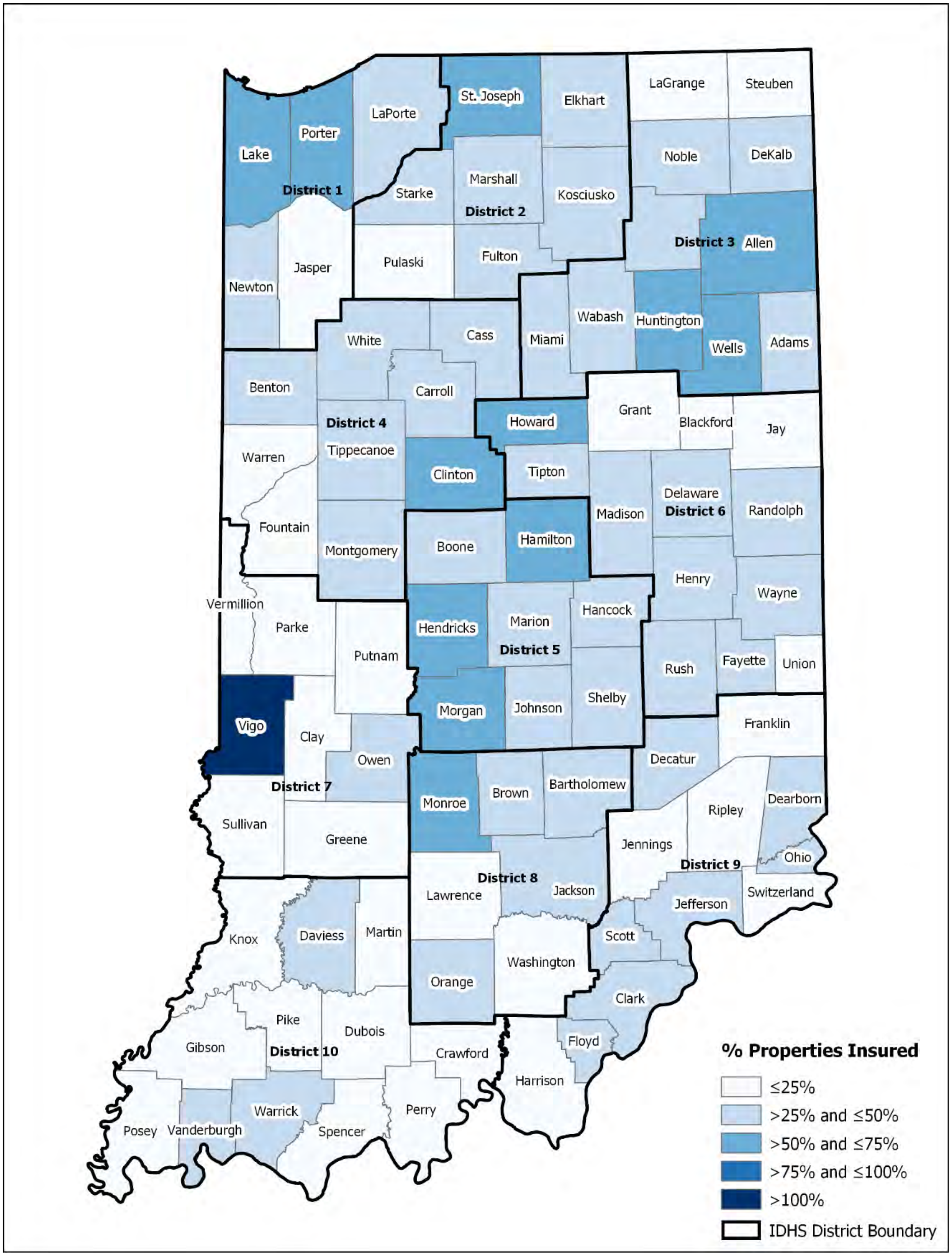
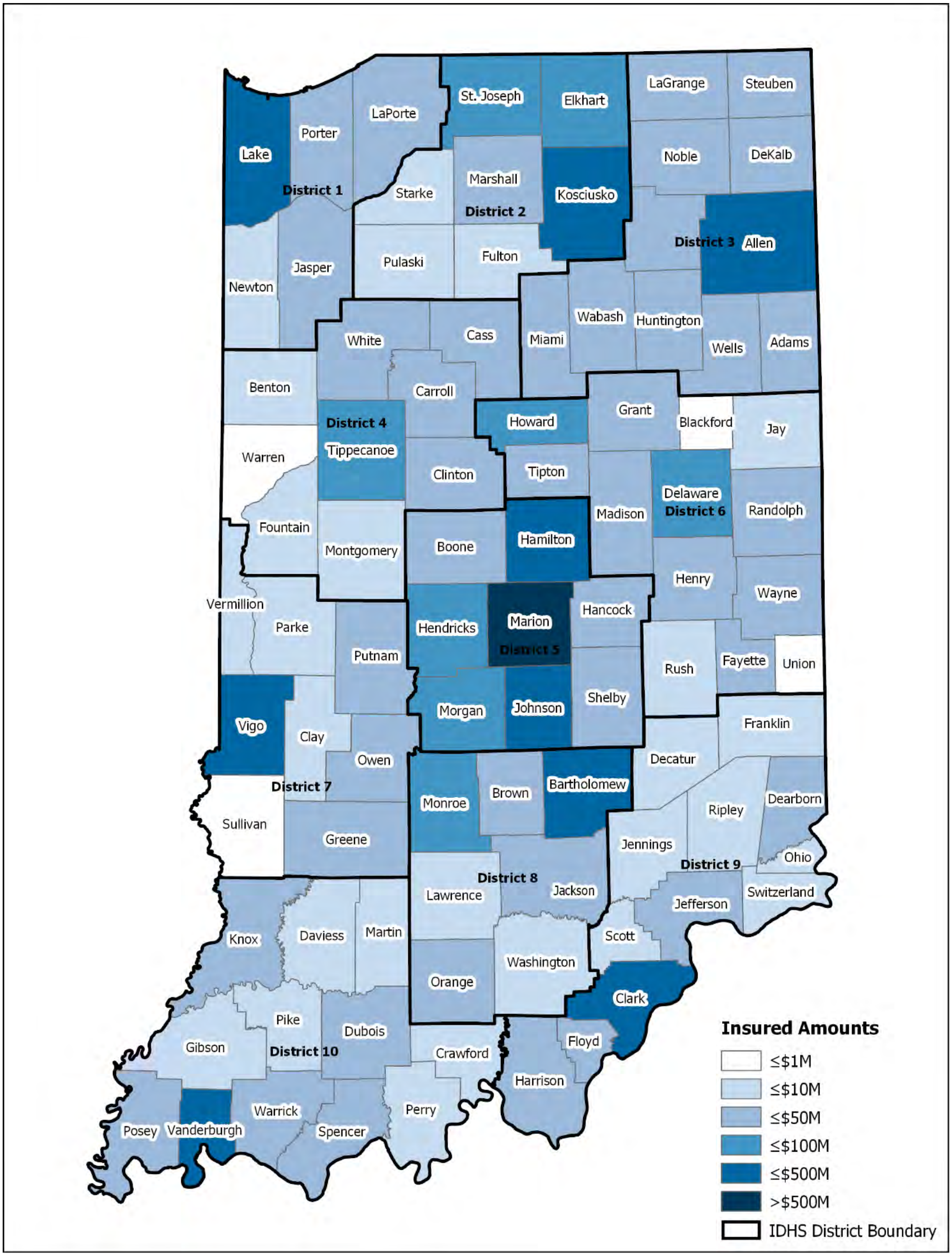


Figure 54. Total Coverage per County



Indiana has 447 communities and counties participating in the NFIP program while 74 do not. Since 2014, 26 communities and counties have joined the NFIP program. These are listed in Table 27.

Table 27. Communities Who Joined the NFIP Since 2014

Community Name	County	Date Joined
Town of Centerville	Wayne	4/16/2014
Town of Colfax	Clinton	10/10/2014
Town of Cynthiana	Posey	3/6/2015
Town of Dunreith	Henry	12/22/2015
Town of Elizabeth	Harrison	8/20/2018
Town of Kingsford Heights	LaPorte	12/12/2014
Town of Kirklin	Clinton	10/10/2014
Town of Medaryville	Pulaski	11/17/2014
Town of Mount Etna	Huntington	6/3/2015
Town of Palmyra	Harrison	11/20/2014
Town of Rossville	Clinton	9/23/2014
Town of Silver Lake	Kosciusko	2/7/2014
Town of St. Leon	Dearborn	6/25/2014

6.1.2.5.1 Community Rating System (CRS)

The NFIP's Community Rating System (CRS) was implemented in 1990 and recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. Any community that is in full compliance with the NFIP's minimum floodplain management requirements may apply to join CRS. Nearly 3.6 million policyholders in 1,444 communities participate in the CRS by implementing local mitigation, floodplain management, and outreach activities that exceed the minimum NFIP requirements.

Under the CRS, flood insurance premium rates are discounted to reward community actions that meet the three goals of the CRS, which are: (1) reduce flood damage to insurable property; (2) strengthen and support the insurance aspects of the NFIP; and (3) encourage a comprehensive approach to floodplain management. Although CRS communities represent only 5 percent of the over 22,000 communities participating in the NFIP, more than 69 percent of all flood insurance policies are written in CRS communities.

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. Indiana has a total of 34 communities and counties participating in the CRS. These are listed in Table 28.

In Indiana CRS communities can get higher credit for Activity 340 Hazard Disclosure, Activity 410 Mapping and Regulations for the state having more restrictive floodway regulations, Activity 430 Higher Standards for having a 2' freeboard and Activity 610 Dams if a community has a state-regulated high hazard dam that would affect them.

The cities of Fort Wayne and Noblesville were some of Indiana's earliest participants in the CRS along with Hamilton County. Since the 2014 plan, 15 communities and counties joined the CRS, furthering

Indiana's commitment to upholding the NFIP. Those communities are Lake, Huntington & Wells counties, the cities of Bluffton and Huntington, and the towns of Dyer, Merrillville, Andrews, Ossian, Roanoke, Vera Cruz, Warren and Zanesville.

Table 28. Communities Participating in the Community Rating System

Community or County Name	CRS Entry Date	CRS Current Class	% Discount for SFHA	% Discount for Non SFHA	Status C – Current R – Rescinded
Anderson, City of	5/1/2007	9	5	5	C
Andrews, Town of	5/1/2015	8	10	5	C
Bartholomew County	10/1/1993	8	10	5	C
Bluffton, City of	5/1/2015	7	15	5	C
Clarksville, Town of	5/1/2014	8	10	5	C
Columbus, City of	10/1/1998	7	15	5	C
Decatur, City of	10/1/1993	7	15	5	C
Dyer, Town of	10/1/2014	9	5	5	C
Evansville, City of	10/1/1999	8	10	5	C
Fort Wayne, City of	10/1/1991	10	0	0	R
Hamilton County	10/1/1991	7	15	5	C
Hancock County	10/1/2003	7	15	5	C
Hendricks County	5/1/2012	8	10	5	C
Huntington County	5/1/2015	8	10	5	C
Huntington, City of	5/1/2015	8	10	5	C
Indianapolis, City of	10/1/2007	8	10	5	C
Jeffersonville, City of	5/1/2014	8	10	5	C
Kokomo, City of	10/1/1995	8	10	5	C
Kosciusko, County of	10/1/1997	9	5	5	C
Lake County	10/1/2014	10	0	0	R
Lebanon, City of	10/1/2013	7	15	5	C
Merrillville, Town of	10/1/2014	7	15	5	C
Milford, Town of	10/1/1997	9	5	5	C
Noblesville, City of	10/1/1991	7	15	5	C
North Webster, Town of	10/1/1997	9	5	5	C
Ossian, Town of	5/1/2015	8	10	5	C
Roanoke, Town of	5/1/2015	8	10	5	C
Syracuse, Town of	10/1/1997	9	5	5	C
Vanderburgh County	5/1/1999	8	10	5	C
Vera Cruz, Town of	5/1/2015	7	15	5	C
Vigo County	10/1/1995	10	0	0	R
Warren, Town of	5/1/2015	8	10	5	C
Wells County	5/1/2015	8	10	5	C
Zanesville, Town of	5/1/2018	8	10	5	C

6.1.2.5.2 IDNR "Best Available" Floodplain layer

For many years, the IDNR Division of Water has assisted Indiana communities in determining base flood elevations (BFEs) and floodway limits for streams that did not have detailed floodplain information shown on their FIRMs. Typically, this included asking requestors for survey data, then using that data to run hydrology and hydraulic models to determine floodplain limits on a case-by-case basis.

Because this process took months to complete, both from obtaining the survey data and the modeling by the Division of Water, floodplain management activities suffered due to the time lag. However, with the advent of detailed GIS data, namely LiDAR elevation data, many of the traditional barriers to completing high-level floodplain information have been removed.

The Division of Water has completed a dataset for the state that incorporates the detailed level-floodplain data included in the FEMA FIRMs and enhanced it with a lower-level, but still quality, floodplain data for the majority of all streams in Indiana. This dataset is known as the “best available” floodplain layer, due to the phrasing of the standard local floodplain ordinance in Indiana, which requires the use of “best available” data to make sound floodplain management decisions when the needed information is not available on the FEMA FIRM.

The dataset features flood elevations for five annual chance flood return periods (10%, 4%, 2%, 1% and 0.2%), as well as floodplain and floodway limits for more than 18,000 miles of stream that previously only had Zone A or Zone X designations on the FIRMs. Along with the 4,000 miles of stream published on the FIRMs with elevation and floodway data, this dataset provides floodplain data for more than 22,000 miles of stream in Indiana, covering every major waterway in the state, along with many critical tributaries.

In February and March 2019, IDNR Division of Water hosted multiple webinars to introduce these data to community planners, engineers, surveyors, realtors, and other stakeholders.

6.1.2.6 Repetitive & Severe Repetitive Loss

FEMA provides annual funding through the National Flood Insurance Fund (NFIF) to reduce the risk of flood damage to existing buildings and infrastructure. The Flood Mitigation Assistance (FMA) program, created as part of the National Flood Insurance Reform Act of 1994, aims to reduce or eliminate claims under the National Flood Insurance Program. FMA funding is available through the National Flood Insurance Fund (NFIF) for flood hazard mitigation projects as well as plan development. FMA includes the RL and SRL programs.

FEMA defines a repetitive loss structure as a structure covered by a contract of flood insurance issued under the 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.

A severe repetitive loss property is defined as a residential property covered under an NFIP flood insurance policy and:

A) Has at least four NFIP claim payments over $5,000 each with a cumulative payment amount that exceeds $20,000.

OR

B) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion exceeding the market value of the building.

For both A and B, at least two of the claims must have occurred within any 10-year period and must be greater than 10 days apart.

Table 31 lists all repetitive (RL) and severe repetitive loss (SRL) information for the state of Indiana, grouped by county. Statewide, there are 1,582 properties reported as a repetitive loss, with the total number of losses submitted recorded at 3,919. Of those losses reported, 1,387 were single-family properties, the remaining 195 were a mix of residential and non-residential properties.

Statewide, there are 240 properties reported as a severe repetitive loss, with the total number of losses submitted recorded at 1,258. Of those losses reported, 217 were single-family properties; the remaining 23 were a mix of residential and non-residential properties

Table 29 and Table 30 list the top five communities with the most repetitive & severe repetitive loss properties reported.

Table 29. Top 5 Repetitive Loss Communities

Community Name	RL Properties	Count of RL	Total RL Payments
City of Indianapolis (Marion County)	170	449	$5,180,882
City of Fort Wayne (Allen County)	101	231	$3,251,462
City of Kokomo (Howard County	52	132	$2,094,568
City of Evansville (Vanderburgh County)	34	86	$1,016,252
City of Hammond (Lake County)	32	71	$421,268

Table 30. Top 5 Severe Repetitive Loss Communities

Community Name	SRL Properties	Count of SRL	Total SRL Payments
City of Indianapolis (Marion County)	34	222	$3,831,399
City of Fort Wayne (Allen County)	12	63	$2,302,546
City of Jeffersonville (Clark County)	10	66	$1,391,993
City of Alexandria (Madison County)	6	28	$582,336
City of Evansville (Vanderburgh County)	5	36	$647,340

Table 31. Repetitive & Severe Repetitive Loss Properties per County

County	RL Properties	Count of RL	Total RL Payments	SRL Properties	Count of SRL	Total SRL Payments
	IDHS DISTRICT 1					
Jasper	4	12	$317,776	2	9	$105,564
La Porte	3	14	$193,381	0	0	$0
Lake	9	426	$7,354,511	10	39	$835,903
Newton	30	7	$56,145	0	0	$0
Porter	12	51	$596,271	1	6	$346,900
District Subtotal	**58**	**510**	**$8,518,085**	**13**	**54**	**$1,288,367**
	IDHS DISTRICT 2					
Elkhart	18	47	$417,895	3	16	$193,415
Fulton	3	97	$920,100	12	49	$932,708
Kosciusko	6	120	$1,699,034	9	38	$807,414
Marshall	1	60	$523,218	1	12	$187,578
Pulaski	2	72	$1,295,754	3	12	$237,338
St. Joseph	1	33	$440,672	1	8	$187,405
Starke	3	3	$83,735	0	0	$0
District Subtotal	**34**	**432**	**$5,380,408**	**29**	**135**	**$2,545,858**
	IDHS DISTRICT 3					

County	RL Properties	Count of RL	Total RL Payments	SRL Properties	Count of SRL	Total SRL Payments
Adams	4	8	$112,561	0	0	$0
Allen	119	270	$4,548,998	16	86	$2,612,139
De Kalb	3	8	$730,875	0	0	$0
Huntington	8	41	$491,352	1	6	$193,767
Lagrange	180	6	$21,846	0	0	$0
Miami	5	4	$40,238	0	0	$0
Noble	18	81	$781,350	3	12	$176,867
Steuben	5	7	$36,315	0	0	$0
Wabash	8	8	$123,224	0	0	$0
Wells	32	7	$119,490	0	0	$0
Whitley	1582	6	$77,614	0	0	$0
District Subtotal	**1964**	**446**	**$7,083,861**	**20**	**104**	**$2,982,773**
			IDHS DISTRICT 4			
Benton	0	0	$0	0	0	$0
Carroll	62	167	$4,192,758	30	123	$4,132,996
Cass	4	10	$257,464	0	0	$0
Clinton	2	5	$86,058	0	0	$0
Fountain	3	2	$11,517	0	0	$0
Montgomery	21	5	$95,661	0	0	$0
Tippecanoe	9	75	$1,379,081	5	19	$484,915
Warren	0	0	$0	0	0	$0
White	3	75	$1,743,216	4	16	$633,071
District Subtotal	104	339	$7,765,754	39	158	$5,250,982
			IDHS DISTRICT 5			
Boone	6	13	$121,695	0	0	$0
Hamilton	12	99	$1,400,325	7	38	$722,270
Hancock	11	27	$578,685	0	0	$0
Hendricks	2	19	$214,378	0	0	$0
Johnson	11	68	$1,844,907	1	4	$101,984
Marion	22	451	$5,185,685	34	222	$3,831,399
Morgan	3	50	$1,106,842	3	16	$523,899
Shelby	14	62	$1,087,796	5	22	$466,478
District Subtotal	81	789	$11,540,313	50	302	$5,646,030
			IDHS DISTRICT 6			
Blackford	0	0	$0	0	0	$0
Delaware	24	55	$989,458	3	21	$383,307
Fayette	17	0	$0	1	3	$12,153
Grant	38	26	$419,898	4	35	$733,509
Henry	75	4	$28,816	0	0	$0
Howard	15	188	$3,704,121	4	27	$410,423
Jay	7	8	$141,297	0	0	$0
Madison	171	82	$1,444,646	7	38	$643,650
Randolph	2	2	$6,485	0	0	$0
Rush	26	7	$42,668	0	0	$0
Tipton	73	18	$244,271	1	6	$278,183
Union	0	0	$0	0	0	$0
Wayne	3	14	$154,609	0	0	$0
District Subtotal	451	404	$7,176,269	20	130	$2,461,225

County	RL Properties	Count of RL	Total RL Payments	SRL Properties	Count of SRL	Total SRL Payments
	IDHS DISTRICT 7					
Clay	3	7	$269,400	0	0	$0
Greene	0	0	$0	0	0	$0
Owen	1	44	$1,003,471	1	6	$144,320
Parke	3	3	$23,996	0	0	$0
Putnam	1	6	$42,694	0	0	$0
Sullivan	0	0	$0	0	0	$0
Vermillion	27	18	$125,172	0	0	$0
Vigo	4	79	$1,891,890	8	44	$1,049,828
District Subtotal	39	157	$3,356,623	9	50	$1,194,148
	IDHS DISTRICT 8					
Bartholomew	30	68	$1,740,433	3	11	$206,577
Brown	17	40	$994,124	1	20	$168,783
Jackson	6	19	$201,259	0	0	$0
Lawrence	28	21	$512,988	1	3	$23,075
Monroe	2	13	$160,457	0	0	$0
Orange	20	52	$493,653	1	5	$55,022
Washington	6	22	$371,635	0	0	$0
District Subtotal	109	235	$4,474,548	6	39	$453,458
	IDHS DISTRICT 9					
Clark	55	155	$3,241,870	19	119	$2,584,326
Dearborn	7	21	$251,613	0	0	$0
Decatur	3	7	$451,134	0	0	$0
Floyd	1	43	$918,779	3	19	$561,754
Franklin	39	7	$227,104	1	2	$66,381
Harrison	8	24	$495,769	4	24	$451,577
Jefferson	1	14	$282,309	3	11	$197,402
Jennings	28	2	$30,743	0	0	$0
Ohio	0	0	$0	0	0	$0
Ripley	2	4	$56,709	0	0	$0
Scott	0	0	$0	0	0	$0
Switzerland	34	11	$134,482	1	4	$112,327
District Subtotal	178	288	$6,090,511	31	179	$3,973,767
	IDHS DISTRICT 10					
Crawford	16	36	$767,637	2	8	$156,588
Daviess	0	0	$0	0	0	$0
Dubois	1	2	$7,632	0	0	$0
Gibson	12	7	$56,616	1	2	$55,065
Knox	47	26	$256,342	1	7	$245,568
Martin	2	2	$47,782	0	0	$0
Perry	22	7	$65,184	0	0	$0
Pike	0	0	$0	0	0	$0
Posey	30	35	$585,478	6	23	$412,553
Spencer	0	0	$0	0	0	$0
Vanderburgh	7	185	$2,302,744	13	67	$1,439,244
Warrick	9	19	$182,196	0	0	$0
District Subtotal	**146**	**319**	**$4,271,611**	**23**	**107**	**$2,309,019**
Grand Total	3164	3919	$65,657,981	240	1258	$28,105,626

6.1.3 Risk Mapping, Assessment, and Planning

The vision for Risk MAP is to deliver quality data that increases public awareness and leads to action that reduces risk to life and property. Since the launch of the program in 2010, Indiana has been actively involved in Risk MAP's various phases, and IDHS and Polis have incorporated key recommendations and mitigation strategies into the flood vulnerability assessment of this plan.

6.1.3.1 Indiana RiskMAP Activity

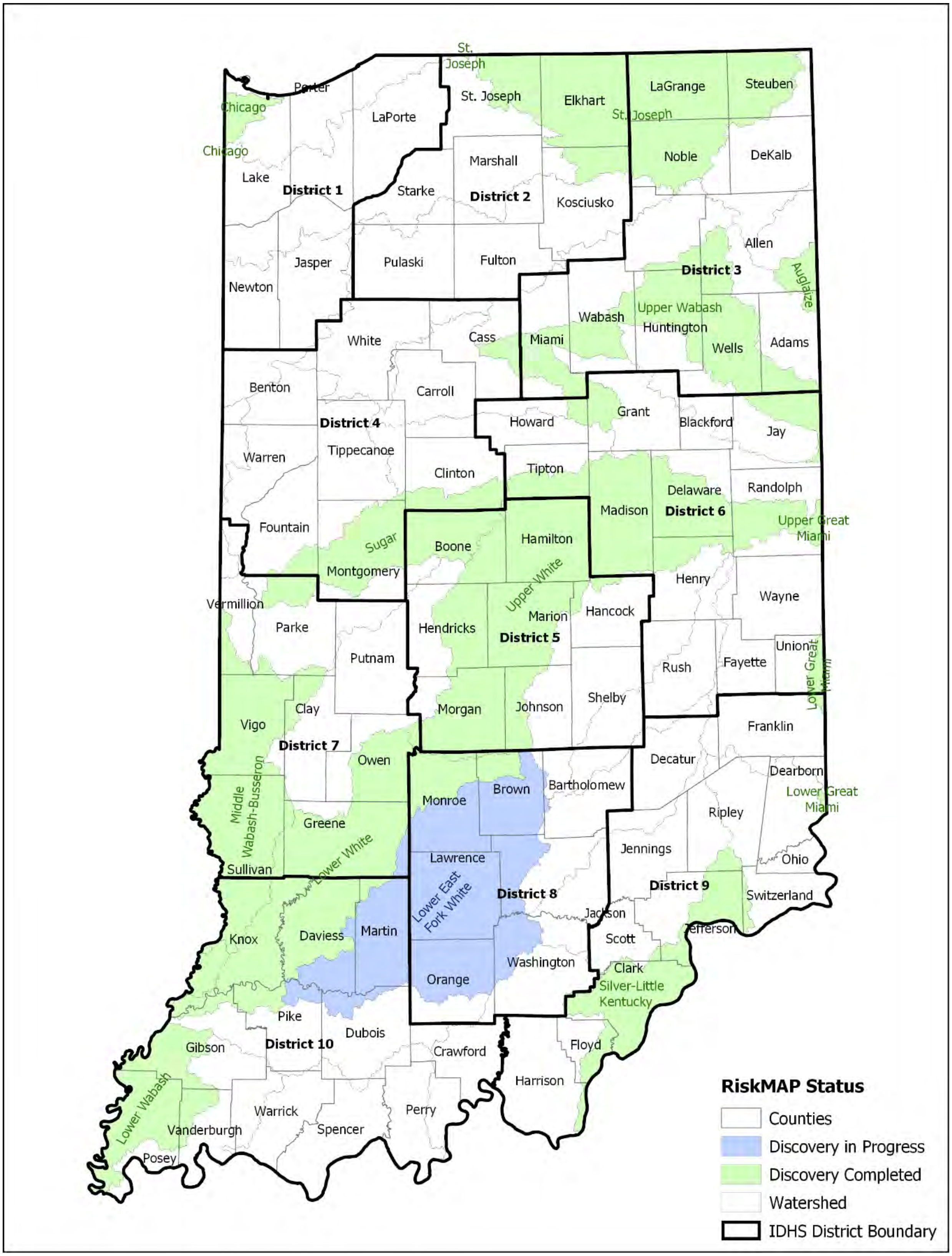
Discovery: The Discovery phase helps communities better understand local flood risk and mitigation efforts and encourages watershed-wide discussions about increasing resilience to flooding. Figure 55 identifies the watersheds in Indiana that have completed or are currently undergoing Discovery stakeholder meetings and developed final Discovery reports. IDNR, IDHS, and Polis led or participated in each of the Discovery initiatives.

Non-Regulatory Products: Indiana has been heavily involved in developing Risk MAP regulatory products for all 92 counties in the state. This includes updating FIRMs and FIS that focus on the probability of floods and describe where and how often flooding may occur. Of the 92 counties in Indiana, 89 have had their flood maps modernized to digital form. The three counties that do not have completed digital form are Sullivan, Knox and Daviess Counties.

The following lists some of the non-regulatory RiskMAP products the state of Indiana has completed:

- City of Tipton Flood Resilience Plan (Christopher B. Burke Engineering, Ltd.)
- North Vernon Tier 1 Country Squire Dam Inundation Mapping (IDNR, Polis)
- Logansport Tier 1 Goose Creek Report (IDNR, Polis)
- Owen County Transportation Vulnerability Analysis (IDNR, Polis)
- White Lick Creek System Assessment (Christopher B. Burke Engineering, Ltd.; Indiana University-Purdue University Indianapolis Center for Earth and Environmental Sciences)
- Brown County Dam EAPs (IDNR, Polis)
- City of Washington Hawkins Creek Analysis (IDNR, Polis)
- City of Winchester, Sugar Creek and Salt Creek Analysis (IDNR, Polis)
- Town of Ellettsville, Jacks Defeat Creek Analysis (IDNR, Polis)

Figure 55. RiskMAP Discovery Projects



The cities of Lebanon & Crawfordsville are both in the process of RiskMAP projects that hope to be completed in the near future. The City of Lebanon is working to create a flood resilience plan while the City of Crawfordsville is working on a study of the Sugar Creek Erosion issue.

In addition, mapping updates have been scheduled to counties within the following watersheds; Sugar Creek, Middle Wabash Busseron, Lower Wabash, Upper Wabash, and Lower White.

Depth Grid Development: Indiana has worked to create depth grids statewide and has made considerable progress. Below is a list of county and/or community depth grid projects along with a brief description of the project.

- City of Noblesville, IN
  - Depth grids created for White River near the wastewater treatment plant.
- Harrison County, IN
  - Depth grids created along the Ohio River.
- City of Salem, IN
  - Depth grids created for three areas identified by City.
  - These areas include portions of Highland Creek, Brock Creek and West Fork Blue River.
- Floyd County, IN
  - Depth grids created for five areas identified by County.
  - These areas include portions of Indian Creek, Yellow Fork, Georgetown Creek, Little Indian Creek, and Fall Run.
- Towns of French Lick and West Baden, IN
  - Depth grids created for two areas identified by the Towns.
  - These areas include portions of French Lick Creek within the town limits of French Lick and West Baden and Lost River to the north of the town limits of West Baden.
- Washington County, IN
  - Depth grids created for four areas identified by County.
  - These areas include portions of East Fork White River, Muscatatuck River, West Fork Blue River, South Fork Blue River and an area near West Washington School Road.
- Jackson County, IN
  - Depth grids created for five areas within the county. These areas were identified based on high populated areas within the 1-percent-annual-chance floodplain.
  - These areas include portions of Medora Creek and South Branch Medora Creek in the Town of Medora. Along a portion of East Fork White River northwest of the Town of Brownstown, along a portion of East Fork White River northwest of the City of Seymour, along a portion of Von Fange Ditch in the City of Seymour, and along a portion of Grassy Fork near intersection of County Road 600 and State Road 39.
- City of Tipton, IN
  - Depth grids were created as part of a demonstration project for the City of Tipton. These were part of a suite of Non Regulatory products including Changes Since Last Firm and Chance of Flooding Over 30 Years.
  - These were created for a portion of Big Cicero Creek

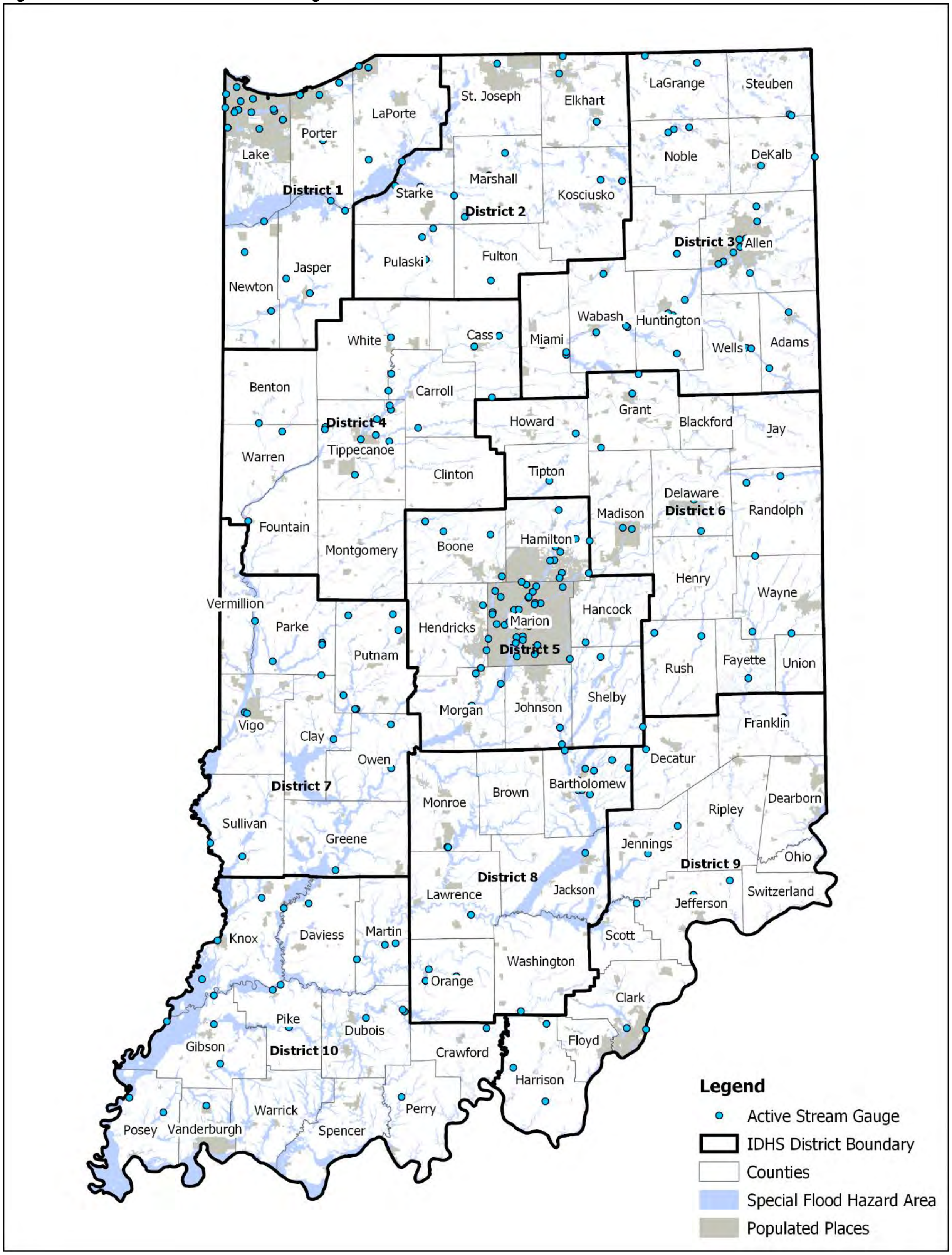
6.1.4 Indiana Stream Gauges

The USGS, in cooperation with many state agencies and local utility and surveyor offices, helps maintain stream gauges, which provide the capability to obtain estimates of the amount of water flowing in streams and rivers. Water managers, emergency responders, utilities, environmental agencies, universities, consulting firms, and recreational enthusiasts use data from the stream gauge network to understand the flow of water in their area. IDNR and the Indiana Department of Environmental Management (IDEM) use the stream gauge 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. Stream gauges for the state of Indiana have been mapped in Figure 56.

6.1.5 Probability of Future Occurrences

The probability of future occurrences of flooding—expressed in terms of frequency—is the likelihood that a specific event will happen. The Hazus analysis in this chapter identified the current facilities that are at risk for a 1%-annual-chance flood, based on the NFIP maps and studies that use the 1%-annual-chance floodplain area (area inundated during a 100-year flood). Due to the unpredictability of this hazard, both rural and urban areas in Indiana are at risk. Controlling floodplain development is an important step to reducing food-related damages. Areas with recent development within the county may be more vulnerable to drainage issues, which could induce flash flooding as well as exacerbating flooding problems. As was covered in Sections 2.2.2.2 and 2.2.2.3 of this plan, current climate research indicates that Indiana will begin to experience wetter winters and springs and will continue to experience extreme rainfall events. These increase the chance of extreme flooding events as well as placing extra strain on combined sewer systems, which often overflow in the event of flooding. An increase in frequency and intensity of flooding events in the years to come means an even greater strain on flood control systems statewide.

Figure 56. Indiana Active Stream Gauges



6.2 Severe Weather

The World Meteorological Organization defines severe weather as any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life. For Indiana, those include thunderstorms, tornadoes, high winds, hail, and excessive precipitation. Floods are covered in Section 6.1 and winter storms are covered in Section 6.6. This section focuses on thunderstorms and related severe weather such as tornadoes, damaging winds, and hail.

Severe weather can occur during any month of the year and at any time during the day or night. Their unpredictability and potentially deadly impact make them one of Indiana's most dangerous hazards. Thunderstorm wind is the most common storm event type in Indiana (see Table 4).

Thunderstorms

According to NOAA's National Severe Storms Laboratory (NSSL), a thunderstorm is a rain shower that includes lightning. A severe thunderstorm is a thunderstorm that has one or more of the following: hail one inch or greater, winds gusting in excess of 50 knots (57.5 mph), or a tornado.

There are about 100,000 thunderstorms each year in the United States; about 10% of them are severe.

Tornadoes

Tornadoes are defined as violently rotating columns of air (funnel clouds) extending from thunderstorms to the ground. Once the funnel cloud touches the ground, it becomes a tornado.

There are about 1,000 tornadoes each year in the United States. Tornadoes are classified according to the Enhanced Fujita intensity scale shown in Table 32.

Table 32. Enhanced Fujita Intensity Scale

Fujita Number	Estimated Wind Speed	Path Width	Path Length	Description of Destruction
EF0 Gale	65-85 mph	6-17 yards	0.3-0.9 miles	Light damage, some damage to chimneys, branches broken, shallow-rooted trees blown over.
EF1 Moderate	86-110 mph	18-55 yards	1.0-3.1 miles	Moderate damage, roof surfaces peeled off, mobile homes off foundations, attached garages damaged.
EF2 Significant	111-135 mph	56-175 yards	3.2-9.9 miles	Considerable damage, entire roofs torn from houses, mobile homes demolished, large trees snapped or uprooted.
EF3 Severe	136-165 mph	176-566 yards	10-31 miles	Severe damage, walls torn from well-constructed houses, trains overturned, most trees in forests uprooted, heavy cars thrown about.
EF4 Devastating	166-200 mph	0.3-0.9 miles	32-99 miles	Complete damage, well-constructed houses leveled, structures with weak foundations blown off for some distance, large missiles generated.
EF5 Incredible	> 200 mph	1.0-3.1 miles	100-315 miles	Foundations swept clean, automobiles become missiles and thrown for 100 yards or more, steel-reinforced concrete structures badly damaged.

Damaging Winds

Damaging winds are often called "straight-line" winds resulting from strong thunderstorms in order to differentiate the damage they cause from tornado damage. Damaging winds are classified as those exceeding 50-60 mph.

A Derecho is a widespread, long-living, and fast moving windstorm, associated with bands of showers or thunderstorms. Although a derecho can produce destruction similar to that of a tornado, the damage typically occurs in one direction along a relatively straight path. By definition, if the swath of wind damage extends for more than 250 miles, includes wind gusts of at least 58 mph along most of its length, and includes multiple instances of wind gusts of at least 75 mph or more, then the event may be classified as a derecho. A derecho is known for its distinctive bow signature, and the fact that they can occur over a period of several hours.

Derechos are most common during the summer months, making those involved in outdoor activities especially at risk. Another reason that those outdoors are vulnerable to derechos is the rapid movement of the parent convective system. Typically, derecho producing storm systems move at speeds of 50 mph or greater, with a few clocked at greater than 70 mph.

Hail

Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into balls of ice. Hail can damage aircraft, homes and cars, and can be deadly to livestock and people.

Lightning

Lighting is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. Thunder, the sound wave caused by lightning, can be heard up to 25 miles away from the lightning discharge.

6.2.1 Historical Occurrences

On June 30-July 1, 2014, a pair of derechos swept through the Mississippi Valley and Great Lakes Region producing a swath of damage. NOAA called it an unusual “One-Two Punch”. The most intense activity was over northern Indiana, northern Illinois, Nebraska, and Iowa. The derechos produced 300 reports of severe weather, 24 tornadoes, wind gusts of over 75 mph, and two-inch diameter hail. Throughout Indiana, roofs were damaged, trees were uprooted, and power lines fell. A tree that fell onto a mobile home in Winona Lake, IN killed a teenager inside the home. In Big Long Lake, IN, a man was killed when a large tree fell through the roof of his house. High winds caused the partial collapse of a roof and wall at a school in LaGrange County, IN.

Figure 57. July 2014 Derechos

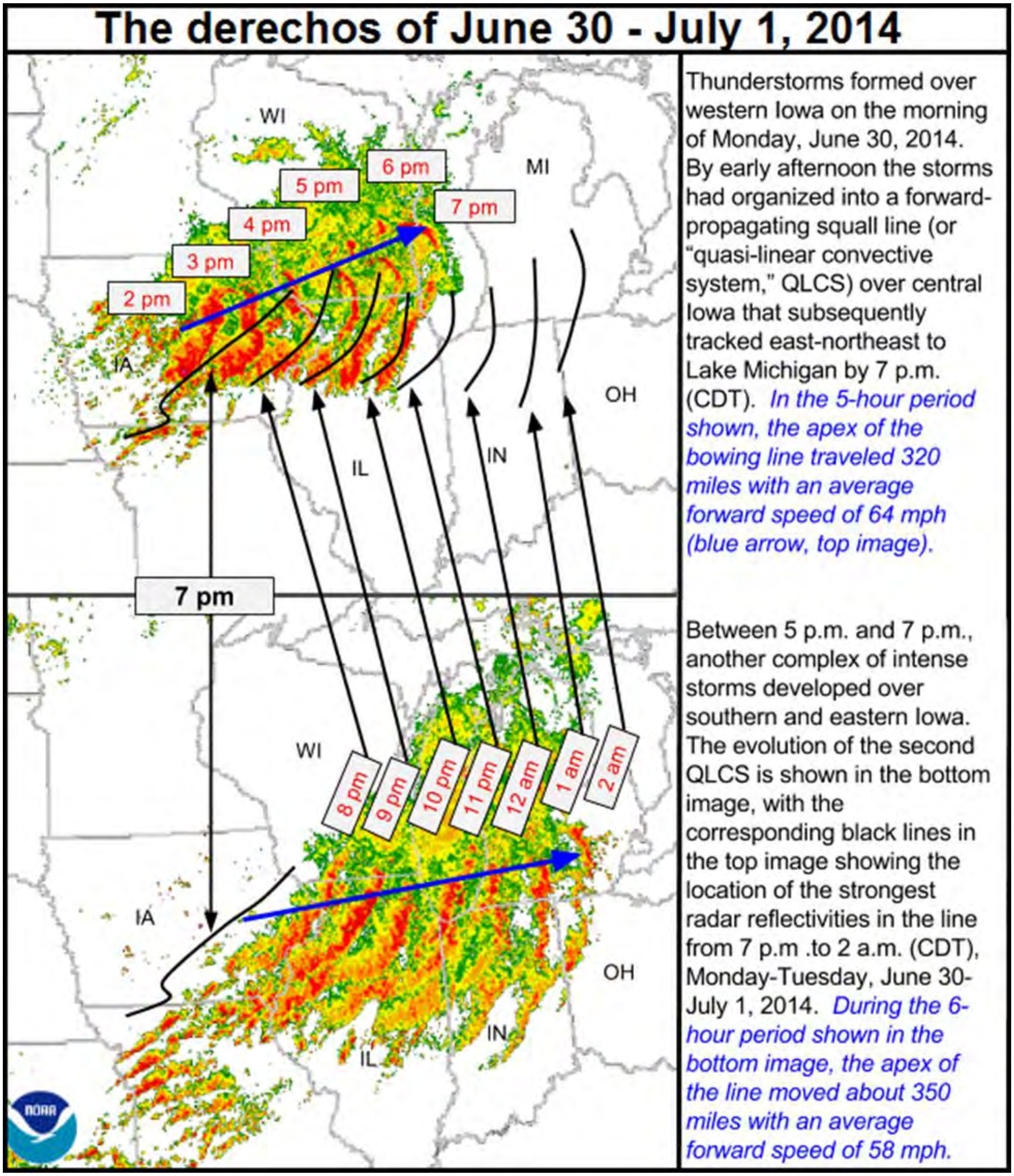
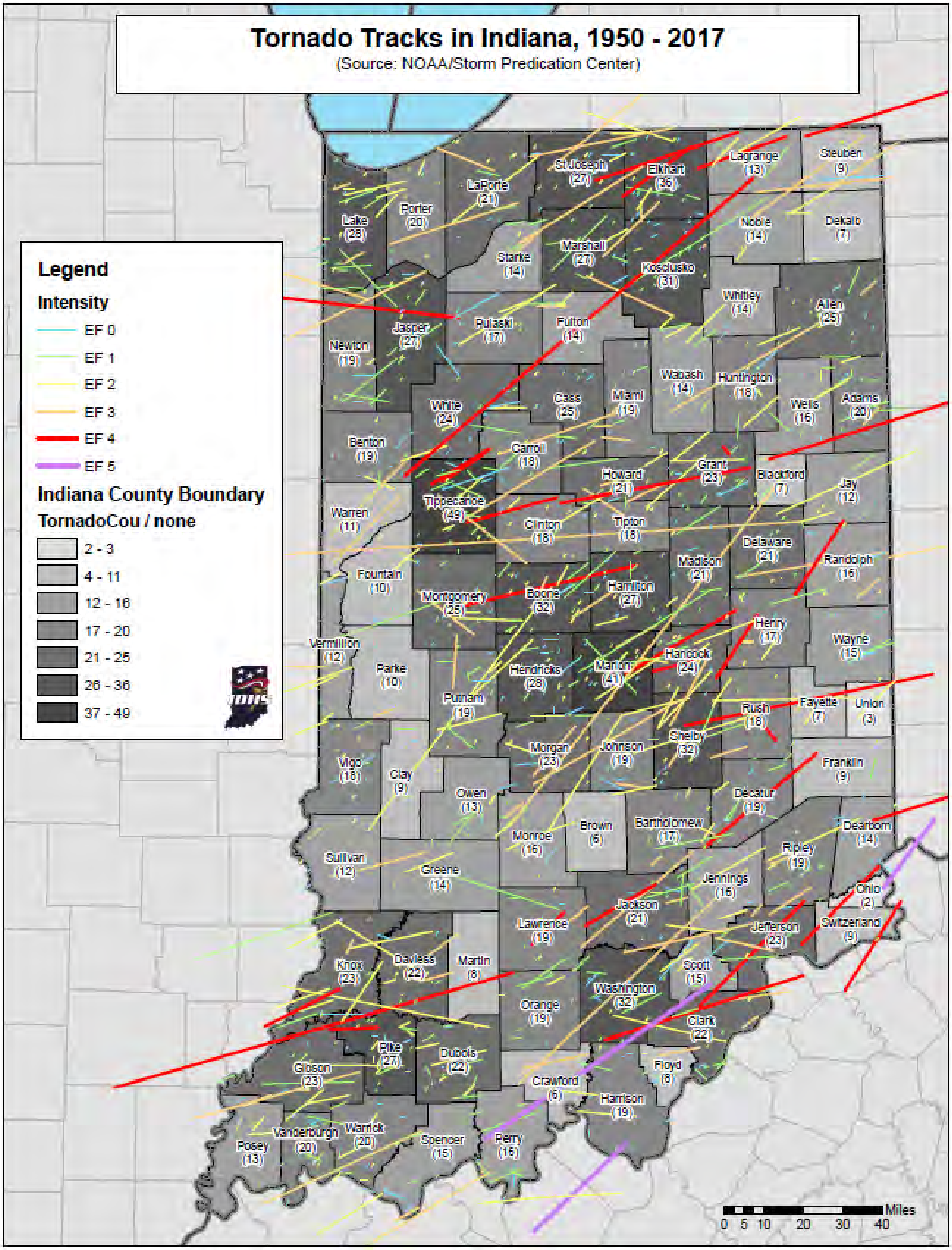


Figure 58 illustrates historical tornado paths from 1950 to 2017 as reported to NOAA.

Figure 58. Historic Tornado Paths

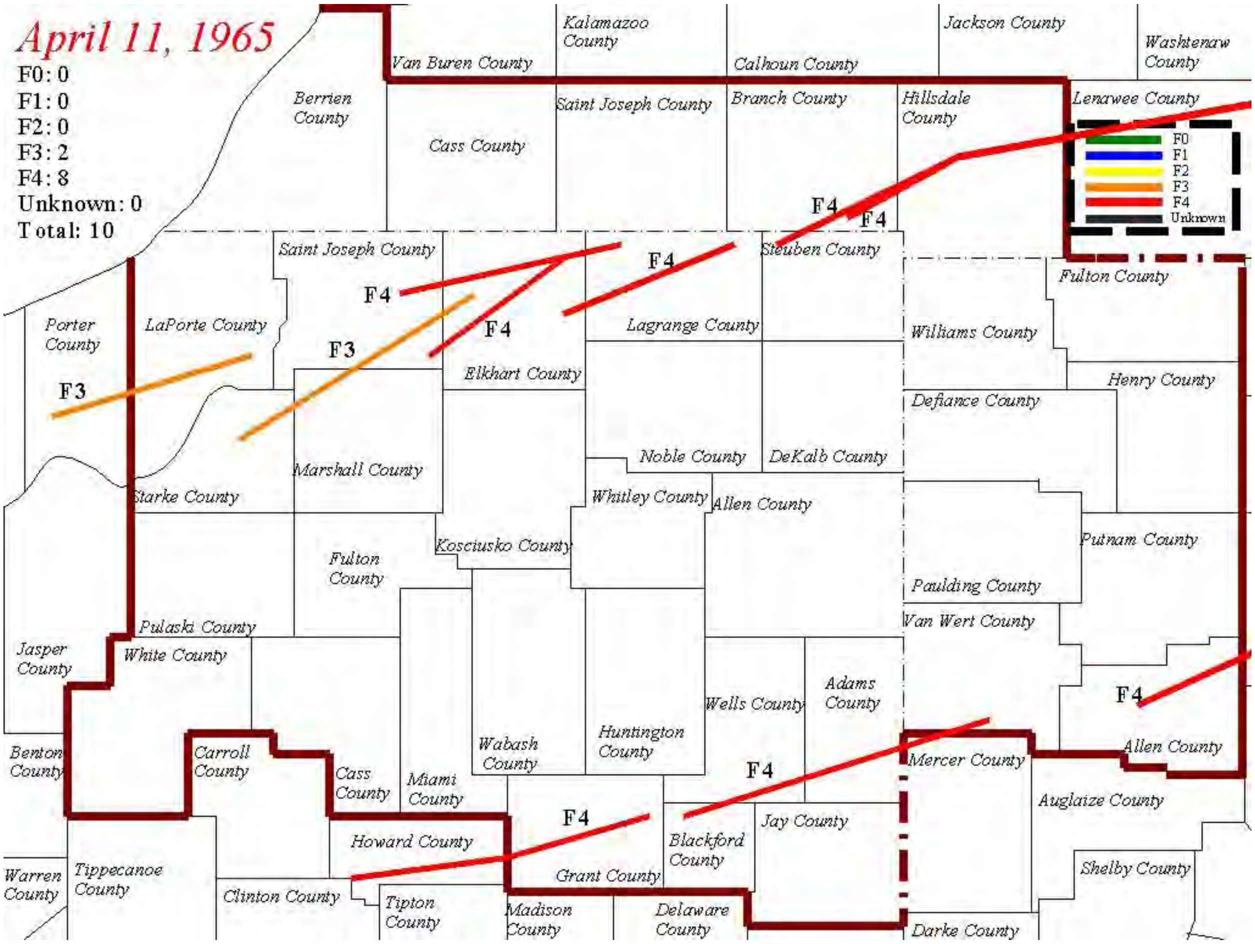


On Palm Sunday, April 11, 1965, Indiana was one of six Midwest states hit by an outbreak of deadly tornadoes. In total, 47 tornadoes killed 271 people and injured over 1,500. According to the NWS, this is the deadliest tornado outbreak in Indiana history, with 145 killed and over 1,200 injured. The twin tornadoes that struck Dunlap, IN (Figure 59) killed 45 people, 33 of which were in a mobile home community. Other northern Indiana communities that were affected by this outbreak include South Bend, Goshen, and Elkhart. In central Indiana, a tornado destroyed much of the town of Russiaville, and caused severe damage on the south side of Kokomo. Other central Indiana communities affected include Greentown and Marion. In all, there were eight F4 and two F3 tornadoes that struck the state that day (see Figure 59 and Figure 60).

Figure 59. Palm Sunday, April 11, 1965 Twin Tornadoes in Dunlap

Source: Paul Huffman for National Oceanic and Atmospheric Administration [Public domain], via Wikimedia Commons

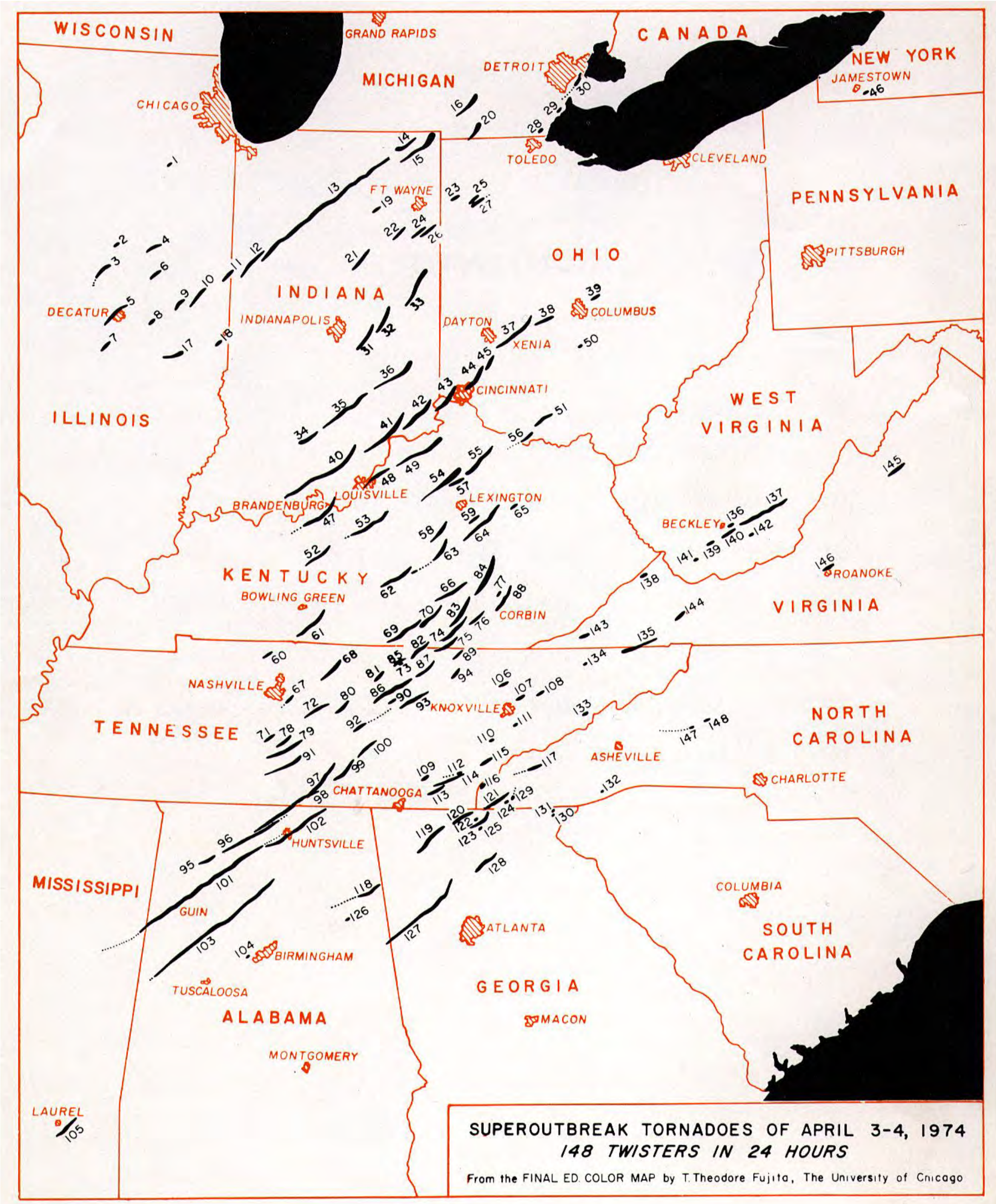
Figure 60. Palm Sunday, April 11, 1965 Tornado Tracks



Source: National Weather Service [Public domain], via Wikimedia Commons

On April 3-4, 1974, the United States experienced the largest tornado outbreak in the nation's history at that time. The "Super Outbreak" consisted of 148 tornadoes that swept across 13 states (Figure 61). According to the NWS, this was one of the largest tornado outbreaks in Indiana history, with 21 tornadoes striking 38 counties, killing 47 and injuring nearly 900. One tornado was on the ground for 121 miles and severely damaged the communities of Monticello, Rochester, and Ligonier. In Monticello, three schools were destroyed, and statewide, 24 schools were damaged or destroyed. Of the 21 tornadoes to strike the state during this outbreak, seven were classified at F4 strength, and two were rated as F5. This is the most recent occurrence of an F/EF5 tornado in Indiana.

Figure 61. April 3-4, 1974 Super Outbreak



Source: From the National Weather Service, Courtesy of Ted Fujita

From January 1, 2013 to October 31, 2018, there have been 2,308 high wind, lightning, hail, and thunderstorm wind events reported to NCDC. These events resulted in 9 deaths, 38 injuries, and $72 million in damages. Table 33 lists the NCDC reports by county and district.

Table 33. NCDC-Reported High Wind, Lightning, Hail, and Thunderstorm Wind Events (2013-2018)

County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
	IDHS DISTRICT 1				
Jasper	17	0	0	$55,000	$0
LaPorte	56	0	1	$0	$0
Lake	92	1	0	$450,000	$25,000
Newton	23	0	1	$38,000	$0
Porter	54	0	0	$178,000	$0
District Subtotal	**242**	**1**	**2**	**$721,000**	**$25,000**
	IDHS DISTRICT 2				
Elkhart	75	0	1	$0	$0
Fulton	19	1	0	$0	$0
Kosciusko	98	1	1	$75,000	$0
Marshall	45	0	0	$0	$0
Pulaski	16	0	0	$0	$0
St. Joseph	100	0	2	$0	$0
Starke	19	0	0	$0	$0
District Subtotal	**372**	**2**	**4**	**$75,000**	**$0**
	IDHS DISTRICT 3				
Adams	23	2	0	$0	$0
Allen	85	0	0	$75,000	$0
DeKalb	30	0	5	$0	$0
Huntington	84	0	0	$45,000	$0
LaGrange	28	1	0	$0	$0
Miami	37	0	0	$0	$0
Noble	57	0	0	$20,000	$0
Steuben	41	0	0	$20,000	$0
Wabash	13	0	0	$0	$0
Wells	29	0	0	$0	$0
Whitley	27	0	0	$0	$0
District Subtotal	**454**	**3**	**5**	**$160,000**	**$0**
	IDHS DISTRICT 4				
Benton	10	0	0	$21,000	$0
Carroll	16	0	0	$62,200	$1,000
Cass	36	0	1	$0	$0
Clinton	28	0	1	$392,500	$0
Fountain	18	0	0	$30,250	$0
Montgomery	33	0	0	$41,000	$0
Tippecanoe	70	0	0	$148,000	$0
Warren	12	0	0	$43,000	$1,000
White	29	0	0	$0	$0
District Subtotal	**252**	**0**	**2**	**$737,950**	**$2,000**
	IDHS DISTRICT 5				
Boone	64	0	1	$143,000	$0
Hamilton	70	0	0	$168,750	$1,000
Hancock	33	0	0	$102,850	$0

County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
Hendricks	67	0	0	$174,300	$1,000
Johnson	54	0	0	$189,950	$0
Marion	168	0	4	$414,750	$0
Morgan	43	0	0	$93,250	$500
Shelby	37	0	0	$182,250	$0
District Subtotal	**536**	**0**	**5**	**$1,469,100**	**$2,500**
	IDHS DISTRICT 6				
Blackford	12	0	0	$0	$0
Delaware	35	0	0	$95,750	$0
Fayette	19	0	0	$20,500	$0
Grant	43	0	0	$0	$0
Henry	19	0	0	$54,400	$0
Howard	22	0	1	$82,750	$0
Jay	19	0	0	$0	$0
Madison	63	0	2	$399,450	$2,000
Randolph	24	0	0	$136,500	$0
Rush	27	0	0	$280,250	$26,000
Tipton	27	0	0	$76,000	$0
Union	12	0	0	$37,500	$0
Wayne	59	0	0	$154,750	$0
District Subtotal	**381**	**0**	**3**	**$1,337,850**	**$28,000**
	IDHS DISTRICT 7				
Clay	7	0	0	$35,500	$0
Greene	19	0	0	$264,500	$0
Owen	9	0	0	$36,000	$0
Parke	11	0	0	$25,000	$0
Putnam	36	0	1	$150,000	$3,000
Sullivan	13	0	0	$52,500	$0
Vermillion	13	0	0	$38,250	$500
Vigo	35	0	0	$142,850	$0
District Subtotal	**143**	**0**	**1**	**$744,600**	**$3,500**
	IDHS DISTRICT 8				
Bartholomew	24	0	0	$92,700	$0
Brown	23	0	0	$74,200	$0
Jackson	21	0	0	$67,000	$0
Lawrence	16	0	0	$102,000	$0
Monroe	42	1	0	$77,750	$0
Orange	36	0	0	$275,000	$0
Washington	36	0	0	$525,500	$0
District Subtotal	**198**	**1**	**0**	**$1,214,150**	**$0**
	IDHS DISTRICT 9				
Clark	69	0	0	$458,000	$0
Dearborn	33	0	0	$106,000	$0
Decatur	32	0	3	$231,750	$0
Floyd	35	0	0	$107,000	$0
Franklin	17	0	0	$37,000	$0
Harrison	54	0	0	$206,500	$0
Jefferson	36	0	0	$416,000	$0
Jennings	8	0	0	$22,500	$0

County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
Ohio	23	0	0	$201,000	$0
Ripley	59	0	0	$207,500	$0
Scott	23	0	11	$490,000	$0
Switzerland	22	1	0	$80,200	$0
District Subtotal	**411**	**1**	**14**	**$2,563,450**	**$0**
	IDHS DISTRICT 10				
Crawford	57	0	0	$420,000	$30,000
Daviess	23	0	0	$164,750	$0
Dubois	46	0	0	$335,000	$0
Gibson	36	1	1	$622,000	$0
Knox	80	0	0	$132,600	$0
Martin	7	0	1	$77,000	$0
Perry	23	0	0	$60,000	$0
Pike	10	0	0	$28,000	$0
Posey	13	0	0	$331,000	$0
Spencer	27	0	0	$368,000	$0
Vanderburgh	38	0	0	$35,571,000	$0
Warrick	20	0	0	$25,235,000	$0
District Subtotal	**380**	**1**	**2**	**$63,344,350**	**$30,000**
Grand Total	3369	9	38	$72,367,450	$91,000

From January 1, 2013 to October 31, 2018, there have been 202 tornado events reported to NCDC. These events resulted in 43 injuries, and almost $25 million in damages. Table 34 lists the NCDC reports by county and district.

Table 34. NCDC-Reported Tornado Events (2013-2018)

County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
	IDHS DISTRICT 1				
Jasper	6	0	0	$735,000	$0
LaPorte	5	0	0	$75,000	$0
Lake	6	0	0	$220,000	$0
Newton	2	0	0	$250,000	$0
Porter	0	0	0	$0	$0
District Subtotal	**19**	**0**	**0**	**$1,280,000**	**$0**
	IDHS DISTRICT 2				
Elkhart	1	0	0	$0	$0
Fulton	0	0	0	$0	$0
Kosciusko	8	0	0	$0	$0
Marshall	4	0	0	$0	$0
Pulaski	1	0	0	$0	$0
St. Joseph	2	0	0	$0	$0
Starke	3	0	0	$0	$0
District Subtotal	**19**	**0**	**0**	**$0**	**$0**
	IDHS DISTRICT 3				
Adams	1	0	0	$0	$0
Allen	2	0	0	$0	$0
DeKalb	0	0	0	$0	$0
Huntington	2	0	0	$0	$0
LaGrange	1	0	0	$0	$0
Miami	4	0	2	$0	$0

County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
Noble	1	0	0	$0	$0
Steuben	2	0	0	$0	$0
Wabash	5	0	0	$0	$0
Wells	1	0	0	$0	$0
Whitley	1	0	0	$0	$0
District Subtotal	**20**	**0**	**2**	**$0**	**$0**
			IDHS DISTRICT 4		
Benton	4	0	0	$50,000	$0
Carroll	3	0	0	$37,000	$7,000
Cass	3	0	0	$0	$0
Clinton	3	0	0	$105,000	$0
Fountain	2	0	0	$176,000	$5,000
Montgomery	5	0	0	$181,000	$0
Tippecanoe	12	0	0	$1,085,500	$2,000
Warren	2	0	0	$15,000	$750
White	9	0	0	$40,000	$0
District Subtotal	**43**	**0**	**0**	**$1,689,500**	**$14,750**
			IDHS DISTRICT 5		
Boone	5	0	2	$290,000	$3,000
Hamilton	3	0	0	$100,000	$2,000
Hancock	0	0	0	$0	$0
Hendricks	6	0	0	$1,045,500	$0
Johnson	2	0	0	$100,000	$5,000
Marion	3	0	0	$564,000	$0
Morgan	1	0	0	$10,000	$0
Shelby	0	0	0	$0	$0
District Subtotal	**20**	**0**	**2**	**$2,109,500**	**$10,000**
			IDHS DISTRICT 6		
Blackford	1	0	1	$0	$0
Delaware	3	0	0	$111,000	$0
Fayette	0	0	0	$0	$0
Grant	2	0	0	$0	$0
Henry	0	0	0	$0	$0
Howard	8	0	25	$10,478,500	$5,000
Jay	1	0	0	$0	$0
Madison	1	0	0	$30,000	$500
Randolph	0	0	0	$0	$0
Rush	2	0	0	$17,000	$0
Tipton	1	0	0	$5,000	$0
Union	0	0	0	$0	$0
Wayne	2	0	0	$190,000	$0
District Subtotal	**21**	**0**	**26**	**$10,831,500**	**$5,500**
			IDHS DISTRICT 7		
Clay	0	0	0	$0	$0
Greene	2	0	0	$15,000	$0
Owen	1	0	0	$12,000	$0
Parke	0	0	0	$0	$0
Putnam	4	0	0	$102,000	$0
Sullivan	0	0	0	$0	$0

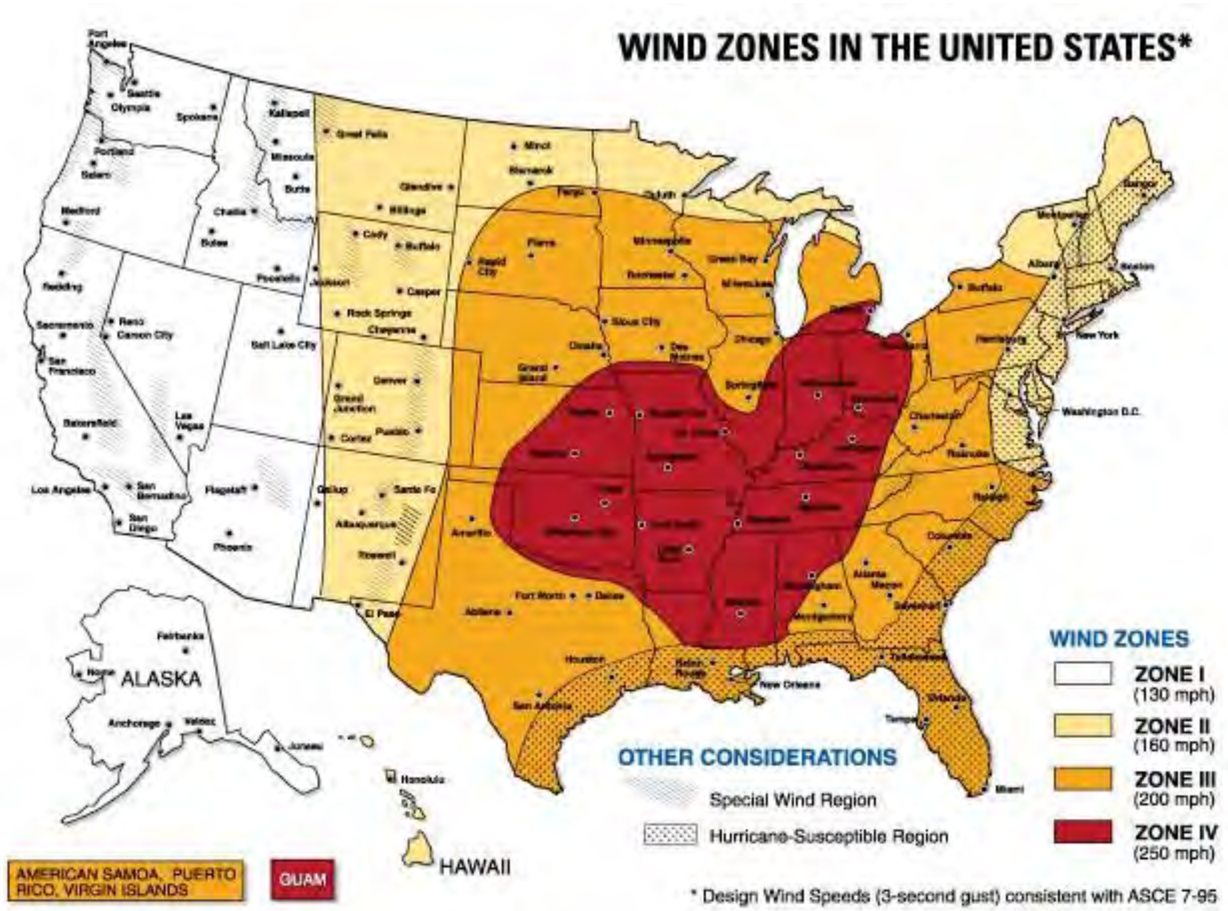
County	# of Events	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
Vermillion	1	0	0	$300,000	$0
Vigo	2	0	0	$3,500	$0
District Subtotal	**10**	**0**	**0**	**$432,500**	**$0**
	IDHS DISTRICT 8				
Bartholomew	0	0	0	$0	$0
Brown	0	0	0	$0	$0
Jackson	1	0	0	$45,000	$0
Lawrence	4	0	0	$317,000	$0
Monroe	0	0	0	$0	$0
Orange	2	0	1	$100,000	$0
Washington	5	0	0	$750,000	$0
District Subtotal	**12**	**0**	**1**	**$1,212,000**	**$0**
	IDHS DISTRICT 9				
Clark	1	0	0	$200,000	$0
Dearborn	1	0	0	$20,000	$0
Decatur	2	0	0	$55,000	$0
Floyd	0	0	0	$0	$0
Franklin	0	0	0	$0	$0
Harrison	2	0	0	$640,000	$0
Jefferson	1	0	0	$75,000	$0
Jennings	0	0	0	$0	$0
Ohio	0	0	0	$0	$0
Ripley	2	0	0	$165,000	$0
Scott	1	0	10	$250,000	$0
Switzerland	0	0	0	$0	$0
District Subtotal	**10**	**0**	**10**	**$1,405,000**	**$0**
	IDHS DISTRICT 10				
Crawford	1	0	0	$250,000	$0
Daviess	5	0	0	$305,000	$0
Dubois	1	0	0	$350,000	$0
Gibson	2	0	1	$3,205,000	$0
Knox	1	0	1	$75,000	$0
Martin	0	0	0	$0	$0
Perry	4	0	0	$285,000	$0
Pike	2	0	0	$70,000	$0
Posey	2	0	0	$530,000	$0
Spencer	4	0	0	$83,000	$0
Vanderburgh	2	0	0	$650,000	$0
Warrick	4	0	0	$132,000	$0
District Subtotal	28	0	2	$5,935,000	$0
Grand Total	202	0	43	$24,895,000	$30,250

6.2.2 Vulnerability Assessment

Because the threat of severe weather is equally distributed across the state (see Figure 62), all communities and infrastructure are vulnerable. The types of infrastructure impacted could include roadways, utility lines, railroads, bridges, and more. Physical impacts may include structural failure, damaging debris (trees or limbs), roofs blown off or windows broken by hail or high winds, impassable bridges and roadways, fires caused by lightning, and lost building functionality.

The vulnerability assessment for tornadoes is similar to that of severe thunderstorms and often results in the same types of physical impacts, though usually more severe. Based on reported damages from tornadoes, urbanized and industrial areas face the greatest vulnerability because of their concentration of buildings, population, and lifeline utilities. Rural communities also face the potential for significant economic impact from loss of crops, livestock, and storage facilities. Because the economy in rural counties is less diversified than in urban areas, the impacts of a tornado may destroy the economic livelihood of a majority of the county's population.

Figure 62. Wind Zones in the United States (FEMA)



6.2.2.1 GIS Tornado Analysis

The Polis Center modeled two tornado scenarios, the November 6, 2005 EF3 that crossed through Vanderburgh and Warrick Counties and the 2012 EF4 event that crossed through Washington, Clark and Jefferson Counties.

Within any given tornado, there are degrees of damage. The most intense damage occurs within the center of the path with decreasing amounts of damage away from the center. Table 35 describes the damage zones of EF3 and EF4 tornadoes used during the analysis.

Table 35. Tornado Damage Zones

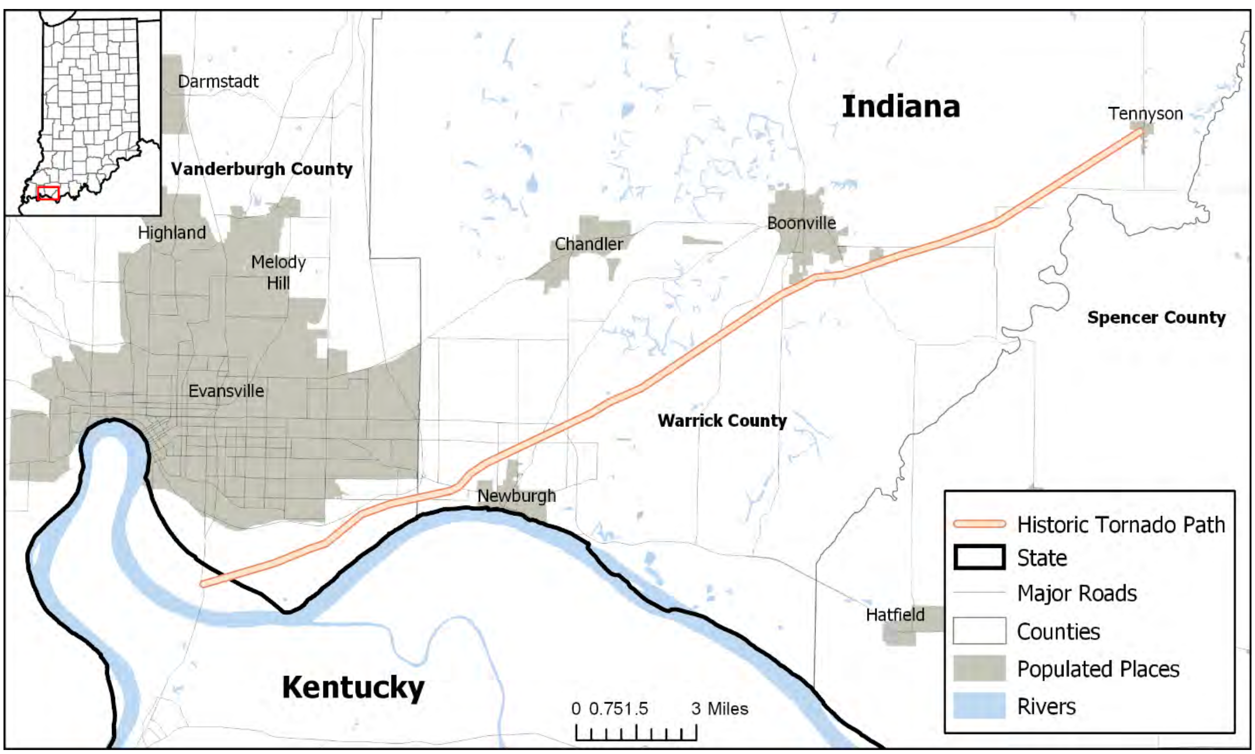
Zone	Buffer (feet)	Damage Curve EF 4	Damage Curve EF 3
4	900-1200	10%	< 10%
3	600-900	50%	10%
2	300-600	80%	50%
1	0-300	100%	80%

6.2.2.1.1 Evansville Tornado

The November 6, 2005 EF3 tornado was tracked for 41 miles from Henderson County, KY through Vanderburgh, Warrick and into Spencer County, IN. According the NCDC database, it was the deadliest tornado in Indiana since April 1974. The tornado entered Vanderburgh county near Ellis Park horse racing facility moving east-northeast at close to 60 mph staying south of Evansville city limits. The path crossed through a mobile home park of about 350 homes. One hundred mobile homes were destroyed and another 125 were damaged. The tornado then moved into Warrick County just south of Interstate 164 at the Angel Mounds State Historic Site. It crossed the entire county in less than 20 minutes. The tornado reached its peak intensity in Warrick County causing winds to reach about 200 mph.

The tornado caused $80 million in property damage, 24 deaths and injured 230. Figure 63 shows the path of the tornado.

Figure 63. Evansville Tornado Path and Projected Building Losses

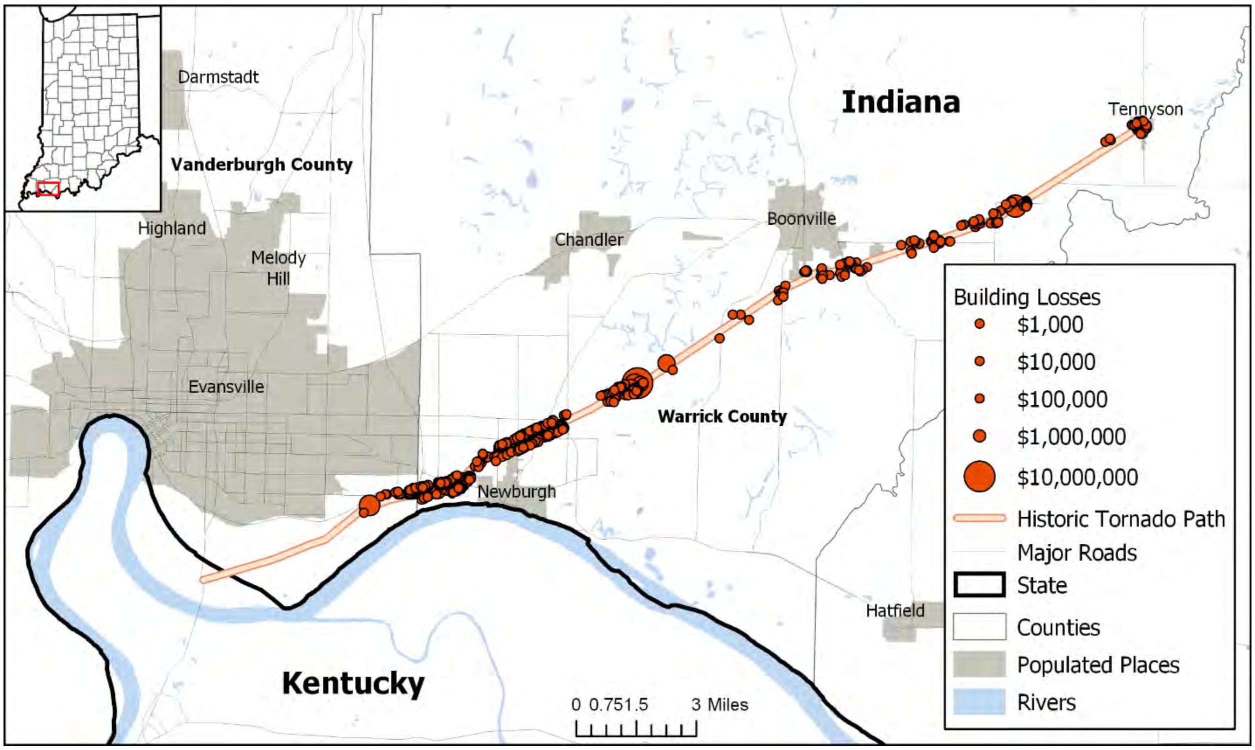


Within any given tornado, there are degrees of damage. The most intense damage occurs within the center of the path with decreasing amounts of damage away from the center. According to the analysis, the tornado damaged 1,328 buildings at a total replacement cost of $120.5 million. The results by occupancy are listed in Table 36, and Figure 64 shows the building losses by varying degrees of damage.

Table 36. Projected Evansville Tornado Building Damage

Occupancy Class	Buildings Damaged	Building Losses
Agriculture	25	$1,136,540
Commercial	38	$7,254,456
Government	4	$255,099
Industrial	31	$33,156,145
Religious	13	$7,378,509
Residential	1,217	$71,275,013
Total	**1,328**	**$120,455,762**

Figure 64. Projected Evansville Tornado Building Damage



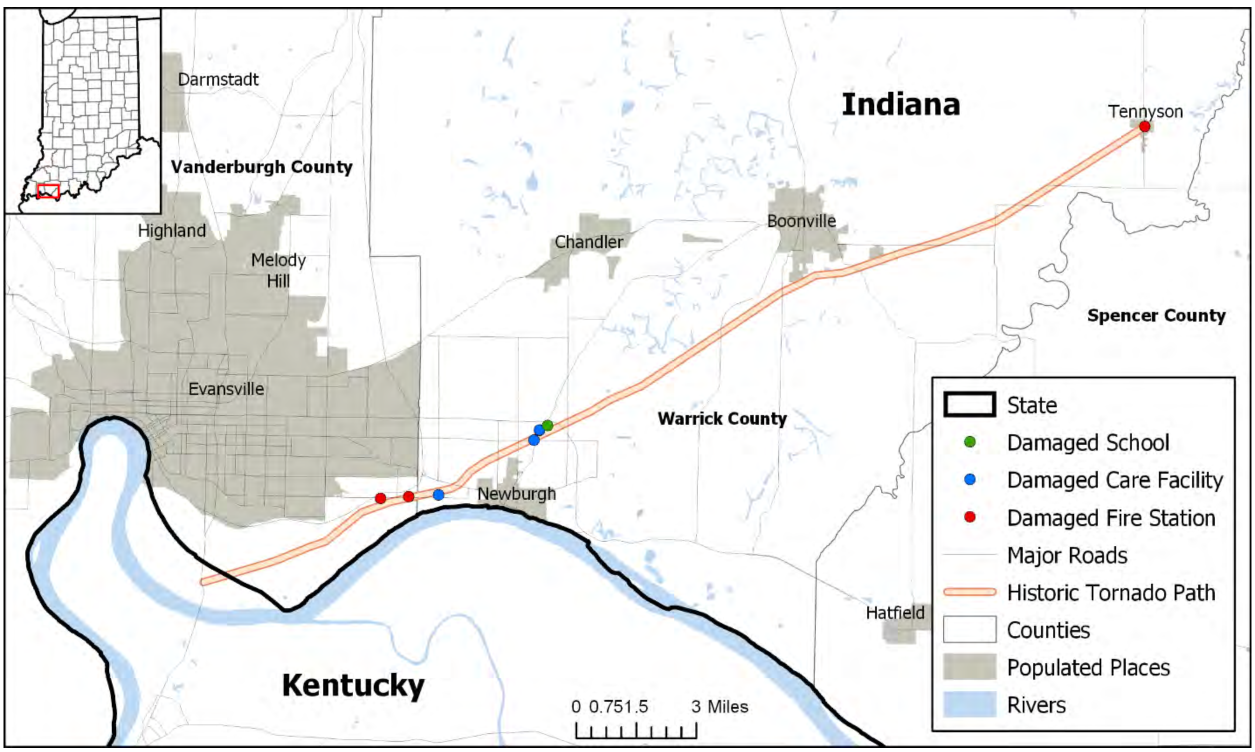
Beginning in 2015, IDHS applied for and received a FEMA Pre-Disaster Mitigation grant to provide a rebate for homeowners to install/construct a residential safe room at their residence. To date, IDHS has provided funding for up to 40 homeowners to complete installation/construction of these life-saving shelters. The first FEMA grant funded residential safe room was installed underground in the backyard of a home in Evansville, IN, in January 2018. Due to the high interest in this program, IDHS will continue to apply for additional grant funding for residential safe rooms in the years to come. For more information on Indiana's Residential Safe Room Program, visit the program website at: https://www.in.gov/dhs/4140.htm.

The GIS analysis of the historic Evansville tornado reported damage to eight essential facilities, listed in Table 37 and shown in the map in Figure 65. No INDOT or IDNR facilities were found to be in the path of the tornado. This model predicts estimated damages based on the best available data. The results may not match those actually incurred in 2005.

Table 37. Projected Evansville Tornado Essential Facilities Damage

Facility Class	Facility Name	City
Fire Station	Knight Twp-Company 7	Evansville
Fire Station	Skelton Township Fire Department	Tennyson
Fire Station	Knight Twp Fire Department	Evansville
Medical Facility	Newburgh Healthcare & Residential Center	Newburgh
Medical Facility	Community Alternatives SW IN	Newburgh
Medical Facility	Davita Newburg Dialysis	Newburgh
Medical Facility	Da Vita Inc	Newburgh
School	Newburgh Christian School	Newburgh

Figure 65. Projected Evansville Tornado Essential Facilities Damage



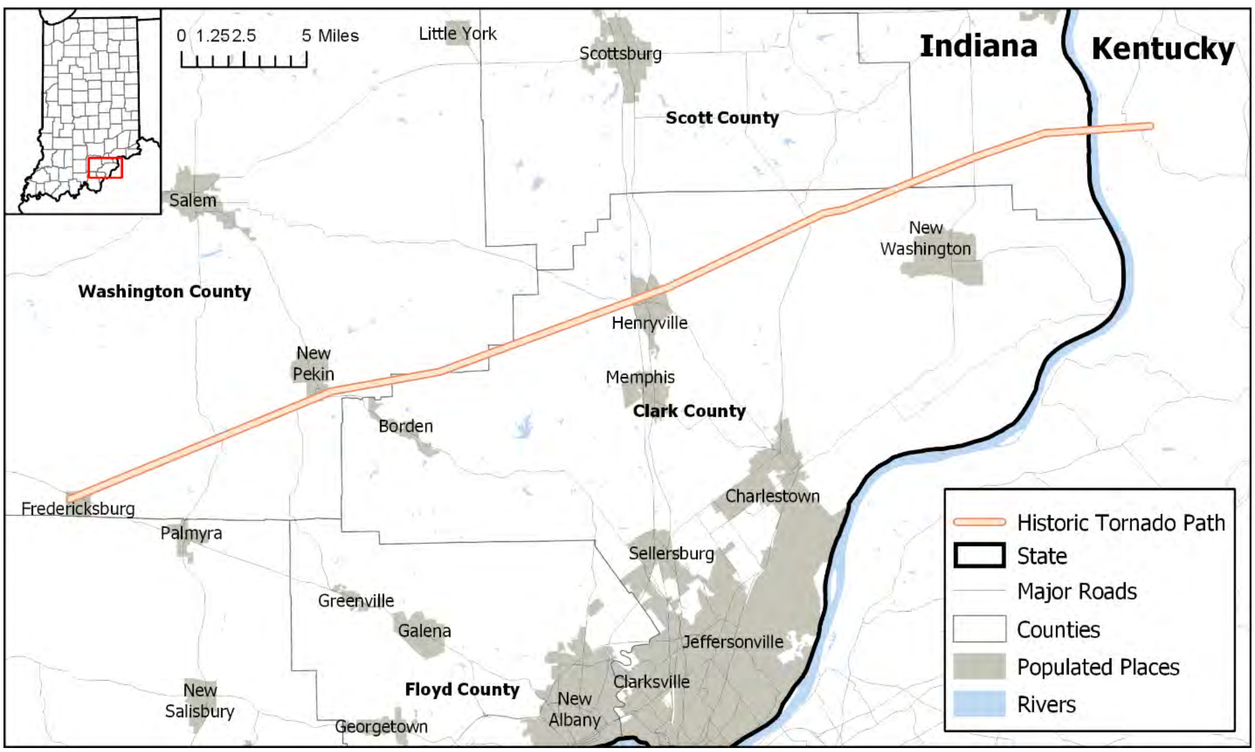
6.2.2.1.2 Henryville Tornado

The March 2, 2012 EF4 tornado carved a 49-mile path through Indiana's Washington, Clark, and Jefferson counties and into Kentucky. The tornado touched down first in Washington County just south of Fredericksburg. The tornado path widened and intensified after crossing farmland, toppling a high-tension metal power structure. After passing south of New Pekin, a large well-constructed factory building was cleared to its foundation slab, numerous anchoring bolts having been bent or stripped. The tornado traveled 17 miles in Washington County, felling thousands of trees and destroying scores of buildings. The tornado caused $2 million in property damages and five deaths before moving into Clark County.

The tornado moved into Clark County with a path width of one-third of a mile destroying or severely damaging numerous homes and businesses in its path across the county. As the tornado crossed Interstate 65, several people were trapped within damaged vehicles, resulting in the closure of the highway for several hours. The Henryville Junior-Senior High School sustained severe damage, the cafeteria was completely destroyed and six automobiles were piled up along the south side of the school. A Civil Air Patrol Flight revealed extensive ground scouring across several fields east of Marysville indicating a multiple vortex tornado. The tornado caused one death in Clark County and property damages were estimated at $55 million.

The tornado continued into Jefferson County, destroying several mobile homes, severely damaging several frame houses, power lines and felling many trees. As the tornado moved south of Chelsea, it destroyed several well-built brick homes with anchor bolts attached to steel plates and a concrete foundation. One home was lifted and slid 65 yards off its foundation while remaining essentially intact. Wind speeds were estimated at around 170 mph with a damage width of one quarter of a mile. The tornado caused 4 deaths and an estimated $750,000 in property damages before exiting Jefferson County and moving over the Ohio River. Figure 66 shows the path of the tornado.

Figure 66. Henryville Tornado Path and Projected Building Losses



Within any given tornado, there are degrees of damage. The most intense damage occurs within the center of the path with decreasing amounts of damage away from the center. Using data provided by the NWS for the boundary of the 2012 tornado path, the Polis Center used a GIS model to predict building inventory losses.

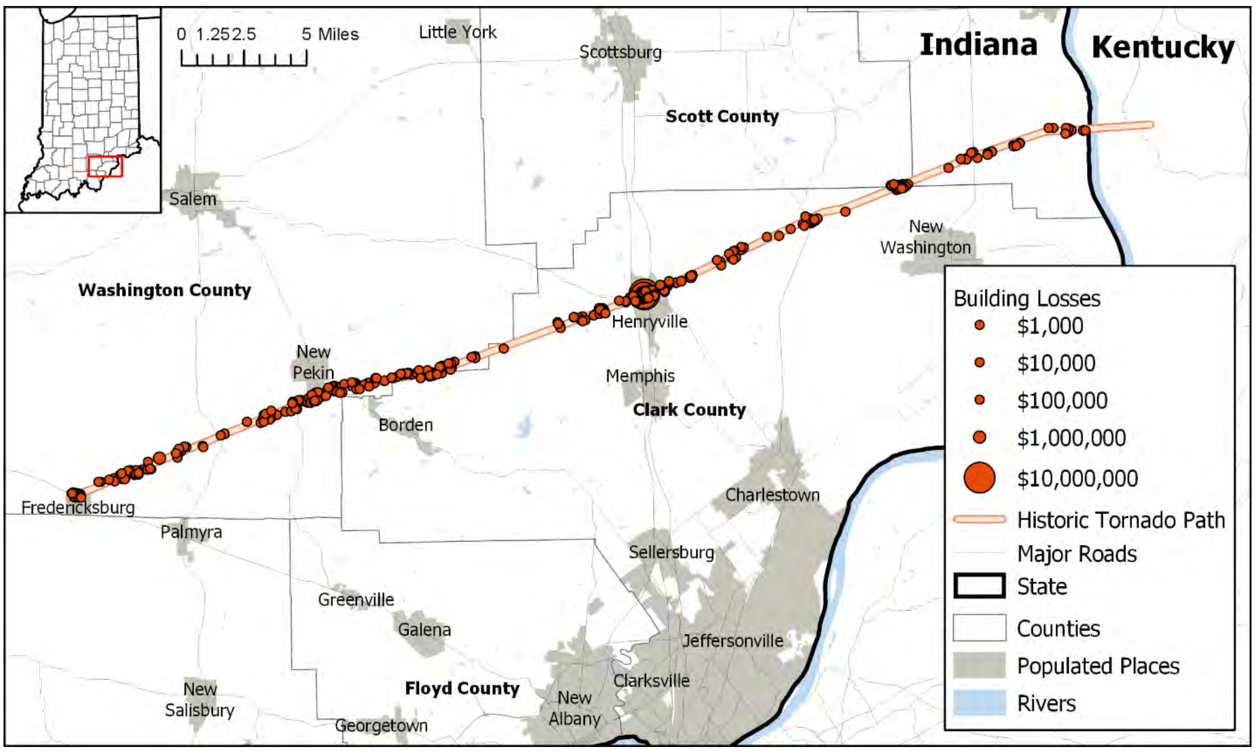
According to the analysis, the tornado damaged 510 buildings at a total replacement cost of $59.4 million. The results by occupancy are listed in Table 38, and Figure 67 shows the building losses by varying degrees of damage.

Note: In 2012, there were two tornadoes that ran through the same relative area of Southern Indiana. The first was an EF4 and the second an EF3. This model predicts estimated damages based on the best available data for the EF4 event. The results may not match those actually incurred in 2012.

Table 38. Projected Henryville Tornado Building Damage

Occupancy Class	Buildings Damaged	Building Losses
Agricultural	109	$ 10,632,351
Commercial	14	$ 3,814,036
Education	3	$ 2,443,191
Government	4	$ 1,069,363
Industrial	3	$ 598,158
Religious	10	$ 14,514,554
Residential	367	$ 26,405,348
Total	**510**	**$ 59,477,001**

Figure 67. Projected Henryville Tornado Building Damage

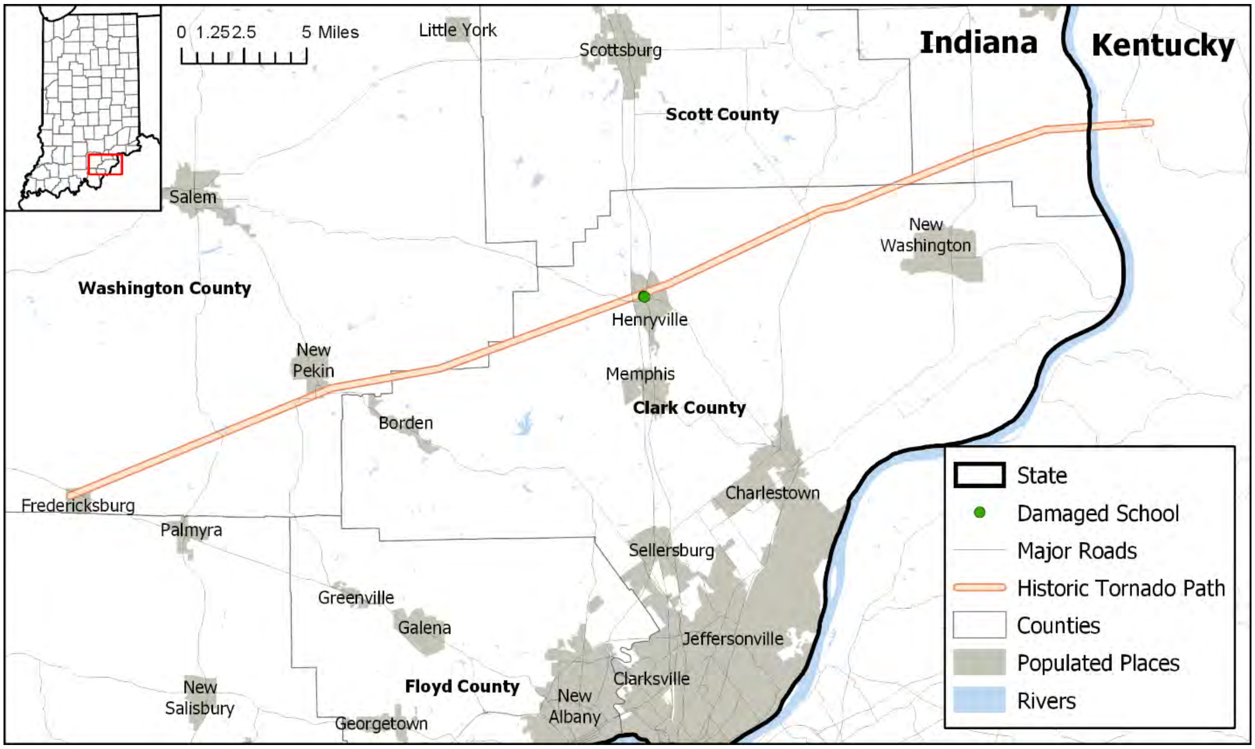


The GIS analysis of the Henryville EF4 tornado reported damage to two essential facilities, listed in Table 39 and shown in the map in Figure 68. No INDOT or IDNR facilities were found to be in the path of the tornado. This model predicts estimated damages based on the best available data. The results may not match those actually incurred in 2012.

Table 39. Projected Henryville Tornado Essential Facilities Damage

Facility Class	Facility Name
School	Henryville Elementary School
School	Henryville Junior & Senior High School

Figure 68. Projected Henryville Tornado Essential Facilities Damage



In 2014, IDHS worked with Salem Community Schools in Washington County, IN, to apply for and receive a FEMA Pre-Disaster Mitigation grant to build a community safe room at Bradie Shrum Elementary School, in Salem, IN. The safe room, completed in May 2018, consists of four classrooms and a multi-purpose room that can be used to protect the entire student body of the school, along with staff and guests, during severe weather events. Additional schools and not-for-profit organizations have worked with IDHS to apply for FEMA grant funding in recent years to construct similar community safe rooms.

6.2.3 Probability of Future Occurrences

The probability of future tornadoes will remain high, meaning it is likely to occur within the calendar year. Due to the unpredictability of this hazard, all buildings and infrastructure in Indiana are at risk of damage including temporary or permanent loss of function. For tornadoes, it is not possible to isolate specific essential or non-essential facilities that would be more or less vulnerable to damages.

Construction of new buildings to codes that address tornado strength winds will reduce damage in future events. Continuing efforts to increase public awareness to the dangers of tornadoes should mitigate injury, death and property losses in the future. As the population increases and more areas are developed, the potential damage from such storms will increase.

As indicated in Section 2.2.2.3, new research appears to indicate that Indiana may experience an increase in tornado activity.

6.3 Earthquake

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. 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 United States. The most seismically active area in the central US is 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 Seismic Zone (Figure 69a), located near the Wabash River in southwestern Indiana and southeastern Illinois, shows evidence of large earthquakes in its geologic history, and the Anna Seismic Zone in western Ohio also has a history of moderate-sized earthquakes that could affect Indiana. There may be other currently unidentified faults that could produce strong earthquakes. Residents of Indiana could be affected both by moderate-sized earthquakes within the state's borders, as well as by larger earthquakes with epicenters outside of the state. Both due to its proximity to the New Madrid seismic zone and exposure to the neighboring Wabash Valley seismic zone, the southwestern part of the state is considered the most earthquake-vulnerable portion of Indiana.

Earthquakes are also capable of producing a wide variety of secondary effects, including landslides and liquefaction (loss of cohesion of unconsolidated soils), fires, large waves or seiches in lakes, and damage or collapse of human structures. Many critical facilities, such as bridges, dams, and power stations, may be particularly sensitive to earthquake shaking.

Seismological research in the region suggests that a large earthquake that will seriously impact Indiana is inevitable; however, it is currently impossible to predict when such an earthquake will occur. According to one hazard model (Johnston & Nava, 1985), there is a very high probability of a moderate sized (magnitude 6.0 or greater) earthquake in the next 50 years for the central US and a much smaller likelihood (<4%) of a repeat of events similar to the New Madrid earthquakes of 1811-12. However, these estimates are highly debated, and some researchers (e.g., Newman, et al., 1999) suggest considerably lower probabilities. Nonetheless, the occurrence of moderate-sized earthquakes, including the 2002 Darmstadt, Indiana earthquake and the 2008 Mt. Carmel, Illinois earthquake, combined with evidence for larger, prehistoric earthquakes (Figure 69b) (Obermeier, et al., 1992) indicates continuing tectonic activity and the potential for infrequent, larger-magnitude events.

Ground shaking from strong earthquakes can collapse buildings and bridges, disrupt gas, electric, and phone services; and sometimes trigger landslides, flash floods, and fires. Buildings with foundations resting on unconsolidated landfill and other unstable soil, as well as trailers or homes not tied to their foundations are at risk because they can be shaken off their mountings or the soil itself can give way during an earthquake. When an earthquake occurs in a populated area, it may cause deaths, injuries, and extensive property damage. Older structures, particularly those constructed of unreinforced masonry (stone or brick) are particularly sensitive to the impacts of earthquake shaking.

Earthquake 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 of people, human structures, and the natural environment.

Table 40 and Table 41 define earthquake magnitudes and their corresponding intensities.

Table 40. Abbreviated Modified Mercalli Intensity (MMI) Scale

Modified 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 41. Earthquake Magnitude vs. Modified Mercalli Intensity Scale

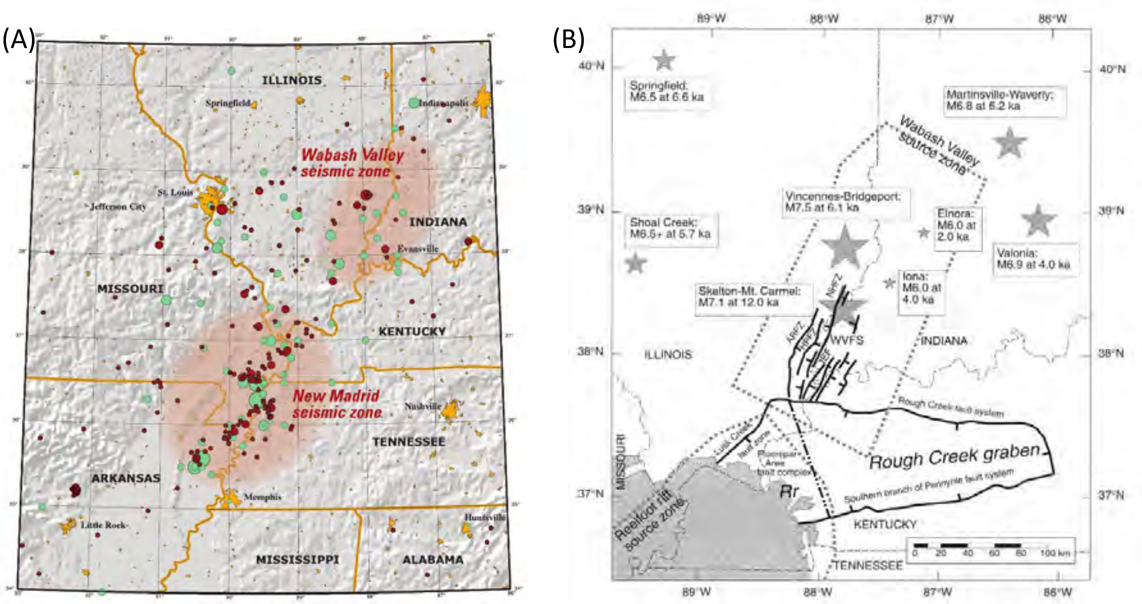
Earthquake Magnitude	Typical Maximum MMI
1.0-3.0	I
3.0-3.9	II-III
4.0-4.9	IV-V
5.0-5.9	VI-VII
6.0-6.9	VII-IX
7.0 and higher	VIII or higher

6.3.1 Historical Occurrences

Residents of Indiana have been affected by earthquakes both within the boundaries of the state and those occurring in neighboring areas of the Midwest. Prominent sources of earthquake activity include the New Madrid seismic zone, located along the Mississippi River valley in southeastern Missouri/western Tennessee and Kentucky, and the Wabash Valley seismic zone, extending along the

Wabash River valley along the Indiana/Illinois border. The New Madrid seismic zone was the site of three large (magnitude > 7) earthquakes in the winter of 1811-1812 (Johnston & Schweig, 1996; Bakun & Hopper, 2004) and is the site of continuing activity since that time, including the magnitude 6.0 Charleston, Missouri earthquake of 1895 (Street, Couch, & Konkler, 1986). There is accumulating evidence of at least three large prehistoric earthquakes in the same area (Tuttle et al., 2002). The Wabash Valley seismic zone, located closer to, and within southwestern Indiana, has been the site of numerous moderate-sized earthquakes. This includes the 1968 magnitude 5.5 Carbondale, Illinois earthquake and the April 2008 magnitude 5.2 Mt. Carmel, Illinois earthquake. There is growing evidence of larger, prehistoric earthquakes in this area as well (Obermeier, et al., 1992), as shown in Figure 69b. In addition to these zones, the Anna seismic zone in west-central Ohio (near the town of Anna, Ohio), has also been the site of continuing, moderate-level seismic activity, including a pair of magnitude ~5 earthquakes in 1937 (Schwartz & Christensen, 1988). Because of its proximity to Indiana, this zone also has the potential to affect Indiana residents in the eastern part of the state.

Figure 69. New Madrid and Wabash Valley Seismic Zones



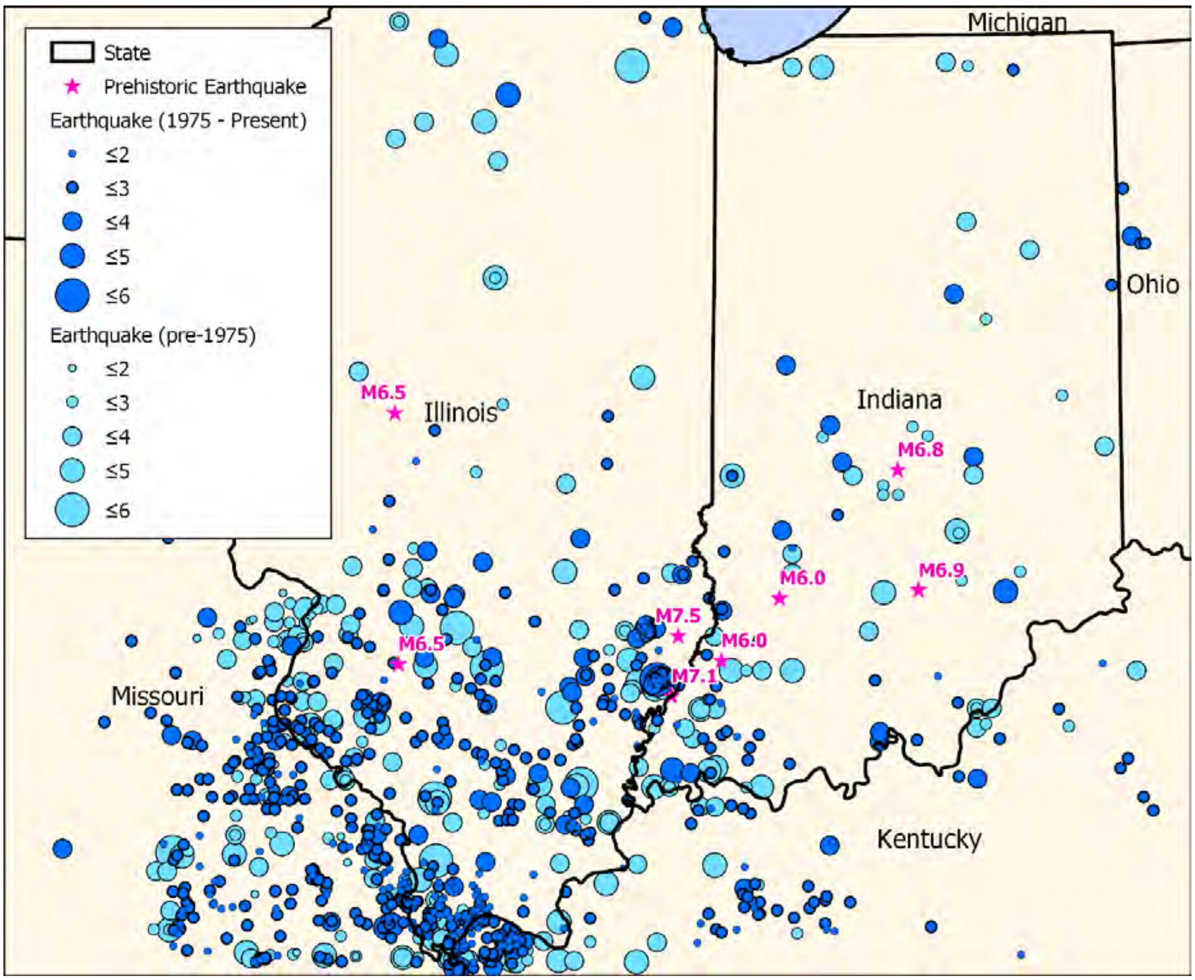
(A) Map of the New Madrid and Wabash Valley seismic zones showing earthquakes as circles. Red circles indicate earthquakes that occurred from 1974 to 2002 with magnitudes larger than 2.5 located using modern instruments (data from the Center for Earthquake Research and Information, University of Memphis). Green circles denote earthquakes that occurred prior to 1974 (USGS Professional Paper 1527). Larger earthquakes are represented by larger circles. From http://pubs.usgs.gov/fs/2006/3125/pdf/FS06-3125_508.pdf. (B) Map of large, prehistoric earthquakes in the Wabash Valley region, with estimates of approximate magnitude and age, compiled by Wheeler and Cramer (2002).

At least 43 earthquakes, M3.0 or greater, have occurred in Indiana since 1817. The last such event was a M3.1 centered just north of Vincennes on May 10, 2010. A M3.8 earthquake occurred 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. However, an even larger number of earthquakes originate just across the boundary in Illinois and can be felt in

Indiana. The M5.2 Mt. Carmel event on April 19, 2008, located in the Wabash Valley seismic zone, was felt by residents in Indiana, Kentucky, and many more states across the central US. The most recent event in this zone was a September 2017 M3.8 event, located at 11.7 kilometers (7.3 miles) depth. Figure 70 depicts historical earthquake epicenters in and around the state of Indiana. Instrumentally recorded earthquakes from 1975 to 2018, located using modern instruments (data from the Center for Earthquake Research and Information, University of Memphis) are shown as dark blue circles. Light blue circles denote earthquakes that occurred prior to 1975, based largely on felt effects (from the Central and Eastern United States Seismic Source Characterization for Nuclear facilities catalog at http://www.ceus-ssc.com). Stars represent large, prehistoric earthquake epicenters, compiled by Wheeler & Cramer (2002).

Figure 70. Historical Epicenters in Indiana



6.3.2 Vulnerability Assessment

The possibility of the occurrence of a catastrophic earthquake in the central and eastern United States is real, as evidenced by history and described throughout this section. The impacts of significant earthquakes affect large areas, terminating public services and systems needed to aid the suffering and displaced. These impaired systems are interrelated in the hardest struck zones. Power lines, water and sanitary lines, and public communication may be lost; highways, railways, rivers, and ports may not allow transportation to the affected region. Critically, some of the most highly affected areas of southwestern Indiana are also the most dependent on major bridges crossing the Ohio and Wabash rivers for transport of goods and services in the aftermath of an earthquake; these lifelines are themselves highly vulnerable to earthquake-related damage.

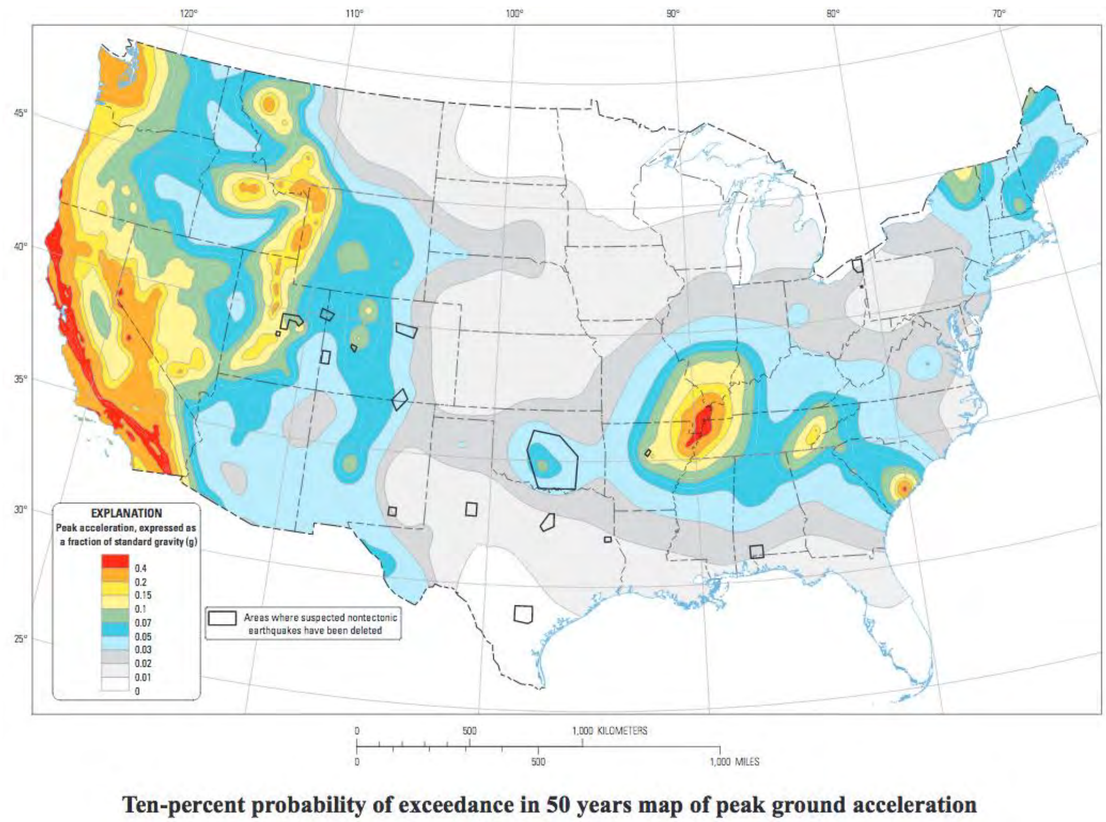
Soils with little clay and a high water table may experience liquefaction, a phenomenon caused by increased pore pressures between individual soil particles. This can cause slope failures, lateral spreading, surface subsidence, and sand blows and can cause buildings to tilt or sink into the ground.

6.3.2.1 Hazus-MH Analysis

A research team from Indiana University's Department of Earth & Atmospheric Sciences and Indiana University-Purdue University Indianapolis' Department of Earth Sciences provided geological information and recommendations for modeling earthquake scenarios. The IU-Polis team used a combination of the US Geological Survey's ShakeMap software and FEMA's Hazus-MH software and performed six modeling scenarios. Two distinct approaches were applied in order to analyze seismic hazards facing the state of Indiana. The first approach uses a probabilistic earthquake hazard estimate from the U.S. Geological Survey's (USGS) most recent (2014) edition of the National Earthquake Hazard Maps. The USGS national seismic hazard map, shown in Figure 71, indicates that the southwestern part of the state, near Evansville, is subject to the highest earthquake hazard, with the level of expected earthquake shaking gradually decreasing through the southern half of the state. The hazard is associated both with the area's proximity to the New Madrid seismic zone and the exposure to nearby earthquakes from the Wabash valley seismic zone. The northern portion of the state is exposed to significantly lower shaking hazard.

The second approach uses a "deterministic seismic hazard assessment" to illustrate the impacts of a series of specific possible future events that might affect residents of the State of Indiana. These deterministic case studies are by definition arbitrary scenarios representing individual cases of a virtually infinite set of possible combinations of earthquake location, magnitude, source type, depth, and wave propagation characteristics that might influence the impact of earthquakes in Indiana's future. Nonetheless, they serve to illustrate the potential impacts of particularly significant cases of geologically realistic disasters. The selection of events proposed here includes five possible scenario events, two within the state's borders and three outside the state that could have significant impacts on Indiana's communities.

Figure 71. USGS Seismic Hazard Map



Map showing the earthquake hazard throughout the coterminous United States, presented as relative levels of shaking (expressed in Peak Ground Acceleration, or PGA) that would be expected to occur at a one-in-ten probability during a 50-year time interval. Polygons represent areas of the country influence by human-induced seismic activity. USGS map from Petersen et al. (2014)

6.3.2.1.1 7.6 Magnitude Scenario: Major New Madrid Earthquake

This event represents a large-magnitude, high-impact regional event situated in the Mississippi Valley region approximately 150 km (100 miles) from the southwestern corner of the state. The magnitude of this event (M7.6) approximates the size of the largest of the three earthquakes in the 1811-1812 New Madrid sequence (e.g., Bakun & Hopper, 2004) and is comparable to prehistoric events in the region (Tuttle, et al., 2002). Although the primary impacts would likely be felt in the states immediately surrounding the event (Missouri, Kentucky, Illinois, Tennessee), the earthquake would have impacts through the southern half of Indiana. In order to observe the maximum potential impact of the event on Indiana communities, we arbitrarily place this event in the northern segment of the New Madrid seismic zone, near Cairo, Illinois.Figure 72 shows an intensity map of this scenario, along with the location of the earthquake. Note the table at the bottom of the graphic that indicates perceived levels of shaking, reported as levels in the Modified Mercalli Intensity scale. Note that strong shaking (intensity > VII) is concentrated in the southwestern portion of the state, and that much of the southern half of the state is expected to experience at least moderate (intensity > V) levels of shaking. Expected shaking is also intensified by the presence of thick layers of unconsolidated sediment, which tend to amplify ground motions at these sites.

Hazus estimates the economic loss within the state of Indiana for the earthquake at 692.91 million dollars. The vast majority, 567 million dollars, are building-related losses. Hazus estimates that 357 buildings could be at least moderately damaged, and 40 could be damaged beyond repair. Figure 73 shows where the damage could occur. It is important to note that these losses do not represent the comprehensive economic impact of the event, as losses from social impacts such as displaced households, casualties, etc. are not taken into account. This also does not include the impacts on neighboring states, which in the case of states closer to the source (Illinois, Kentucky, Tennessee, Missouri) could be significantly higher. The regional nature of this earthquake could significantly affect our ability to get help from neighboring state emergency response agencies.

Figure 74 maps the state-owned facilities on top of the earthquake intensity map for this scenario. Some of these facilities are located in areas with more shaking than others.

Table 42 shows the estimated impact of the earthquake on essential facilities throughout the state. Four fire stations and 1 Emergency Operations Center (EOC) could suffer moderate damage. The damage to a particular facility depends on the distance to the earthquake, but also to the particular soil conditions and building construction type of that facility. Figure 75 through Figure 79 map the locations of the damaged essential facilities. Hospitals would experience minimal impact to their operations.

Table 42. Projected New Madrid Scenario Essential Facilities Damage

	Total Essential Facilities	Facilities with Slight to No Damage	Facilities with Moderate Damage > 50%	Facilities with Complete Damage > 50%
Hospitals	3,423	3,423	0	0
Schools	2,947	2,947	0	0
EOCs	123	122	1	0
Police Stations	593	593	0	0
Fire Stations	1,385	1,381	4	0

Figure 72. Projected New Madrid Scenario Intensity Map

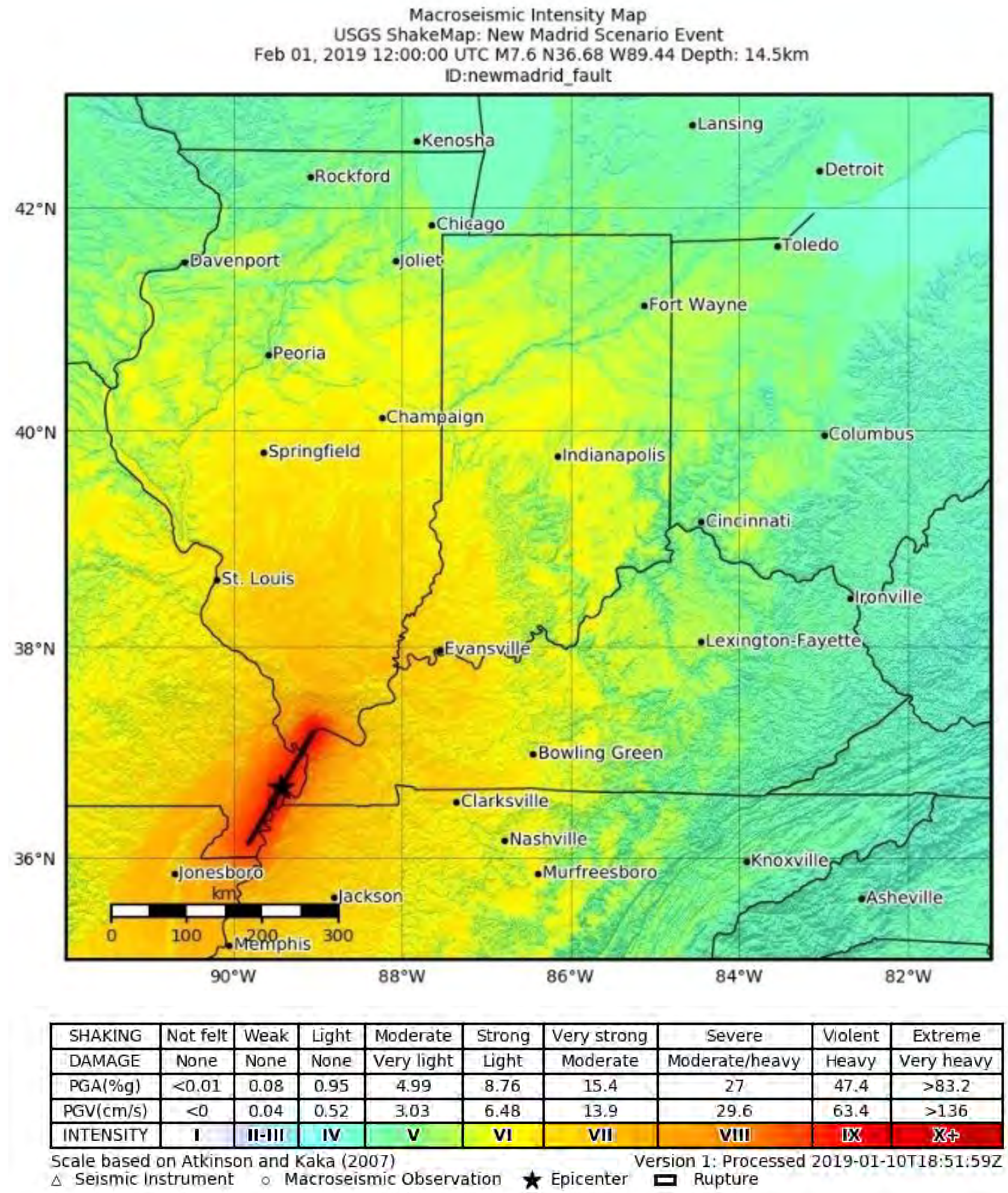


Figure 73. Projected New Madrid Scenario Building Damage

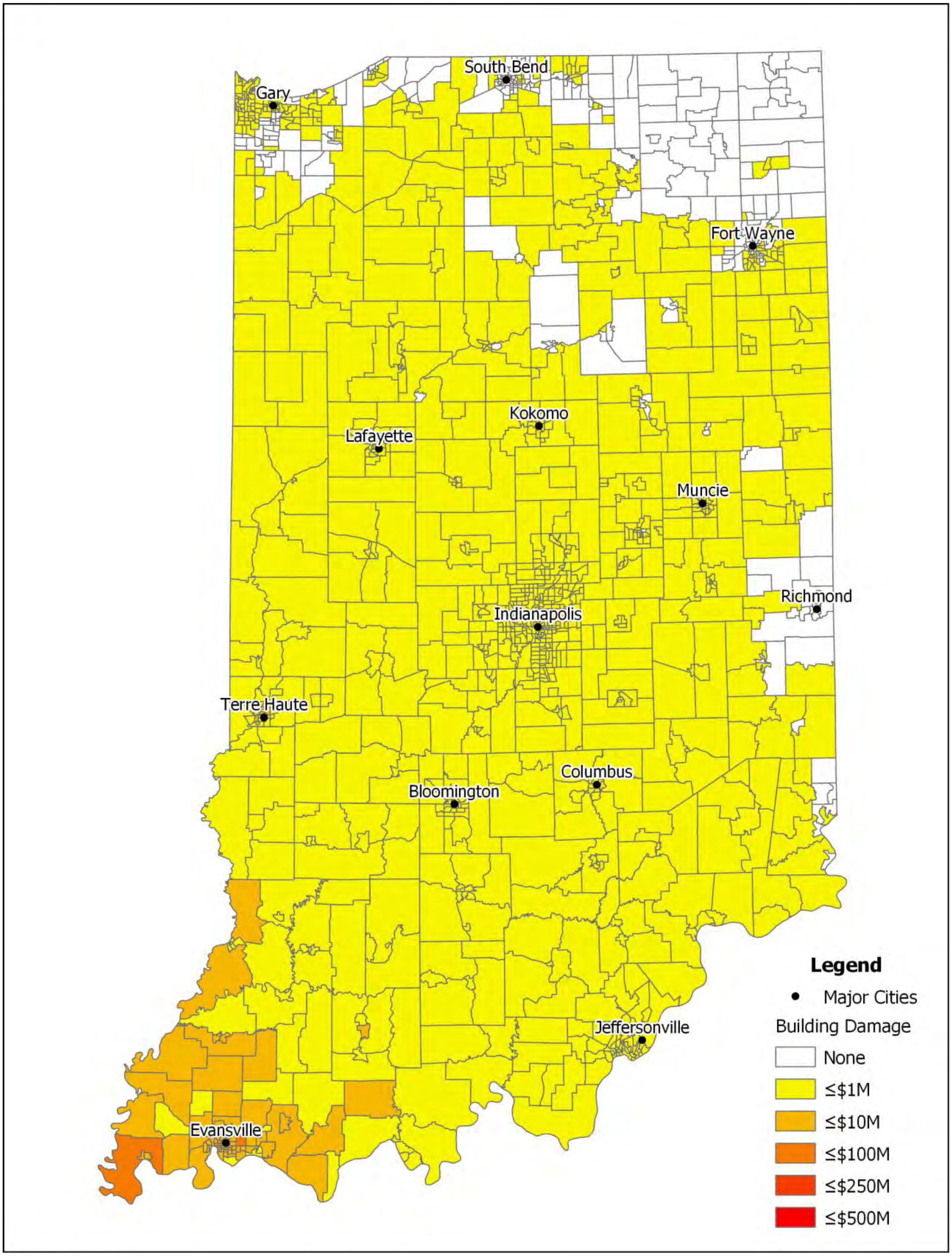
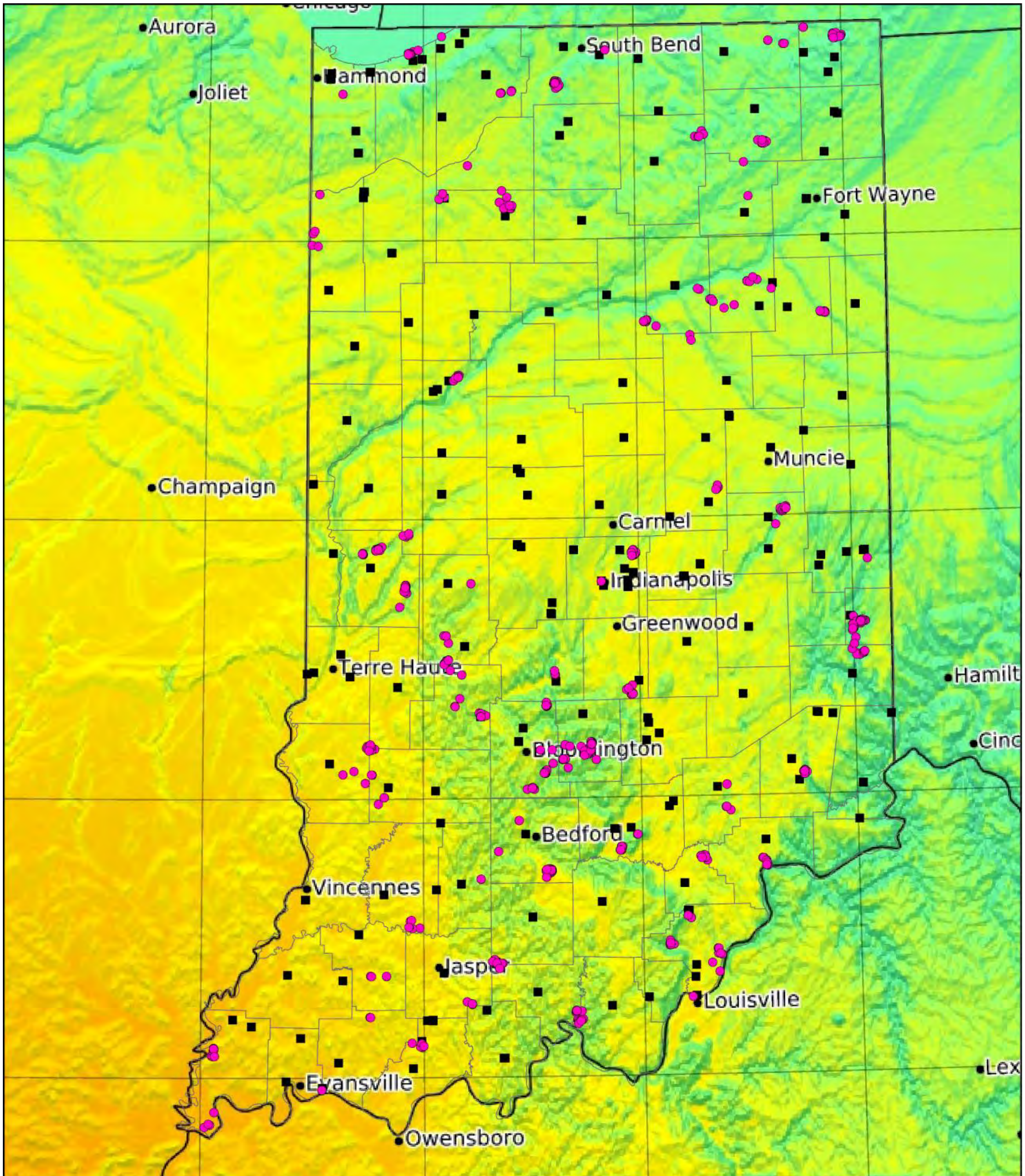


Figure 74. Projected New Madrid Scenario State Facilities



SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	None	None	None	Very light	Light	Moderate	Moderate/heavy	Heavy	Very heavy
PGA(%g)	<0.01	0.08	0.95	4.99	8.76	15.4	27	47.4	>83.2
PGV(cm/s)	<0	0.04	0.52	3.03	6.48	13.9	29.6	63.4	>136
INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based on Atkinson and Kaka (2007) Version 1: Processed 2019-01-10T18:51:59Z

△ Seismic Instrument ○ Macroseismic Observation ★ Epicenter ▭ Rupture

Legend

- IDNR Facility
- INDOT Facility
- Counties

Figure 75. Projected New Madrid Scenario Care Facility Damage

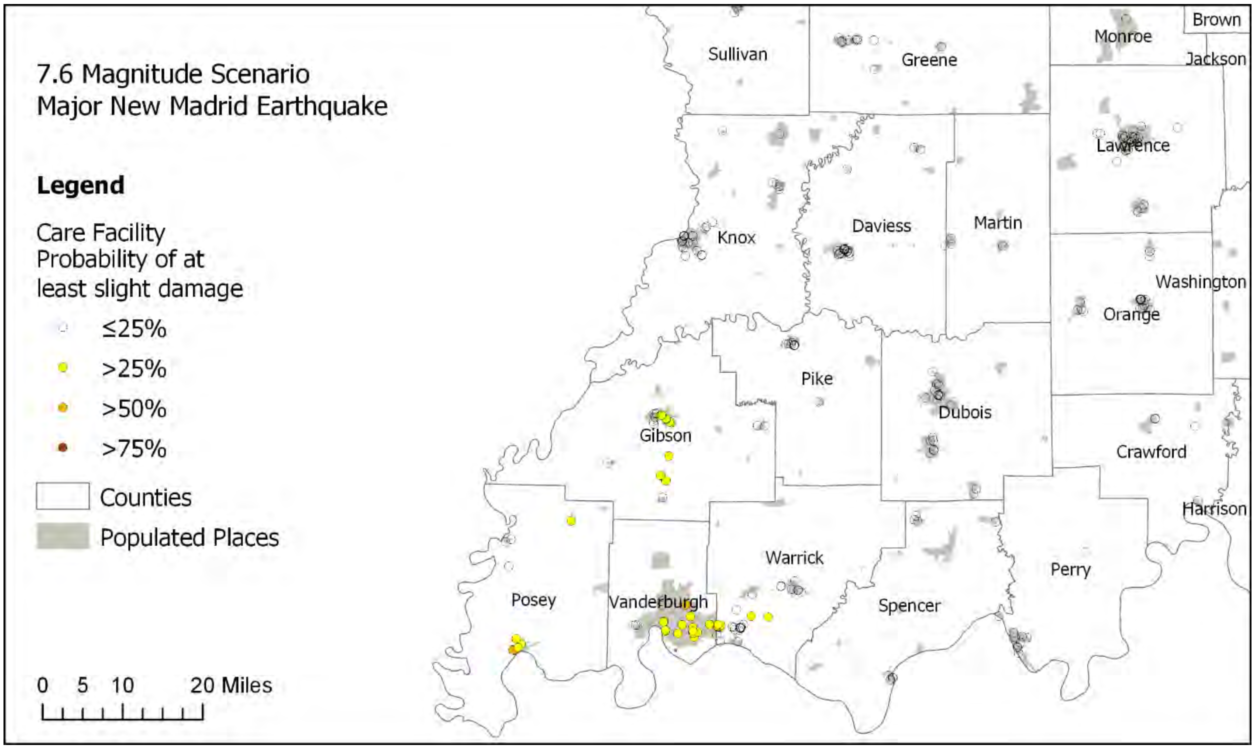


Figure 76. Projected New Madrid Scenario School Damage

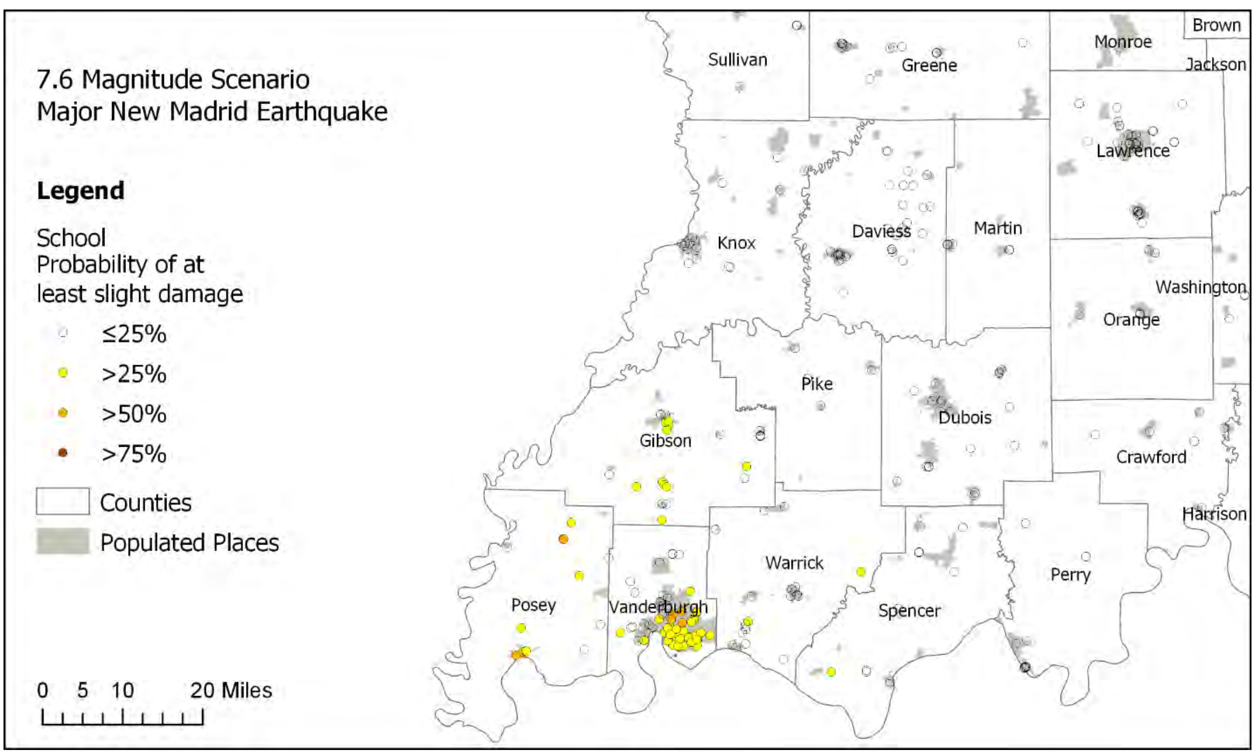


Figure 77. Projected New Madrid Scenario EOC Damage

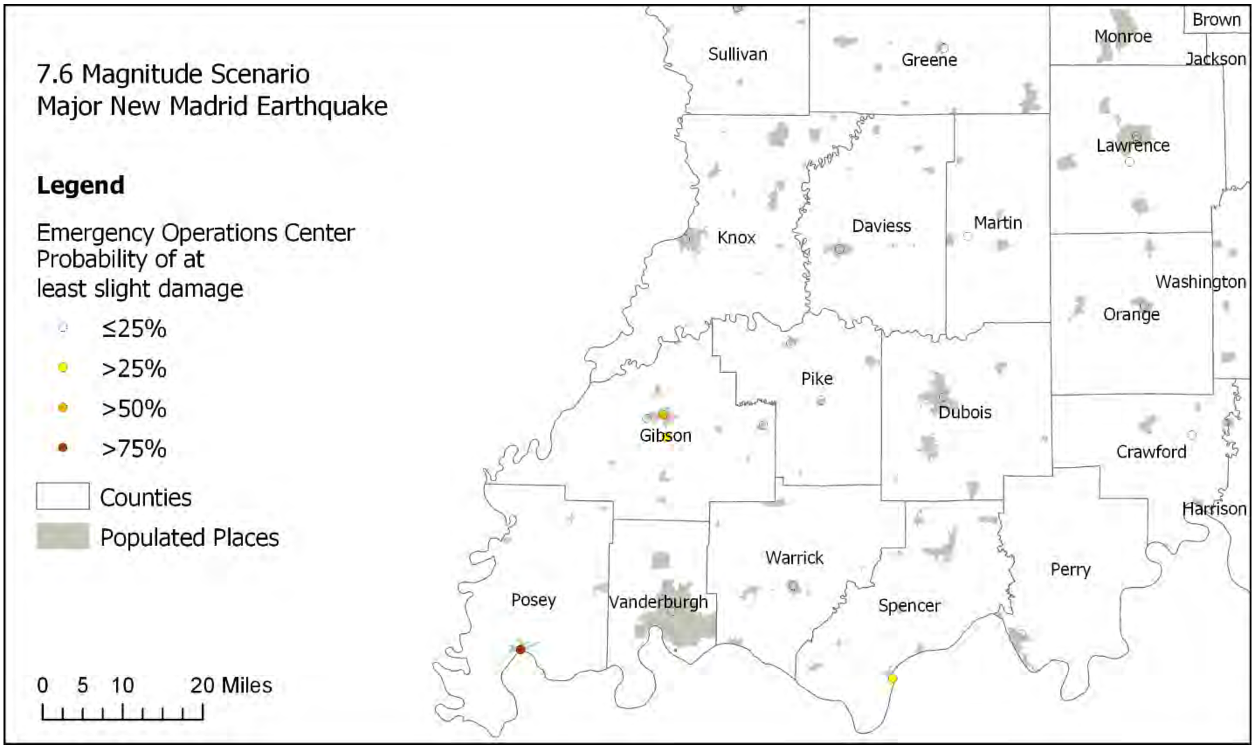


Figure 78. Projected New Madrid Scenario Fire Station Damage

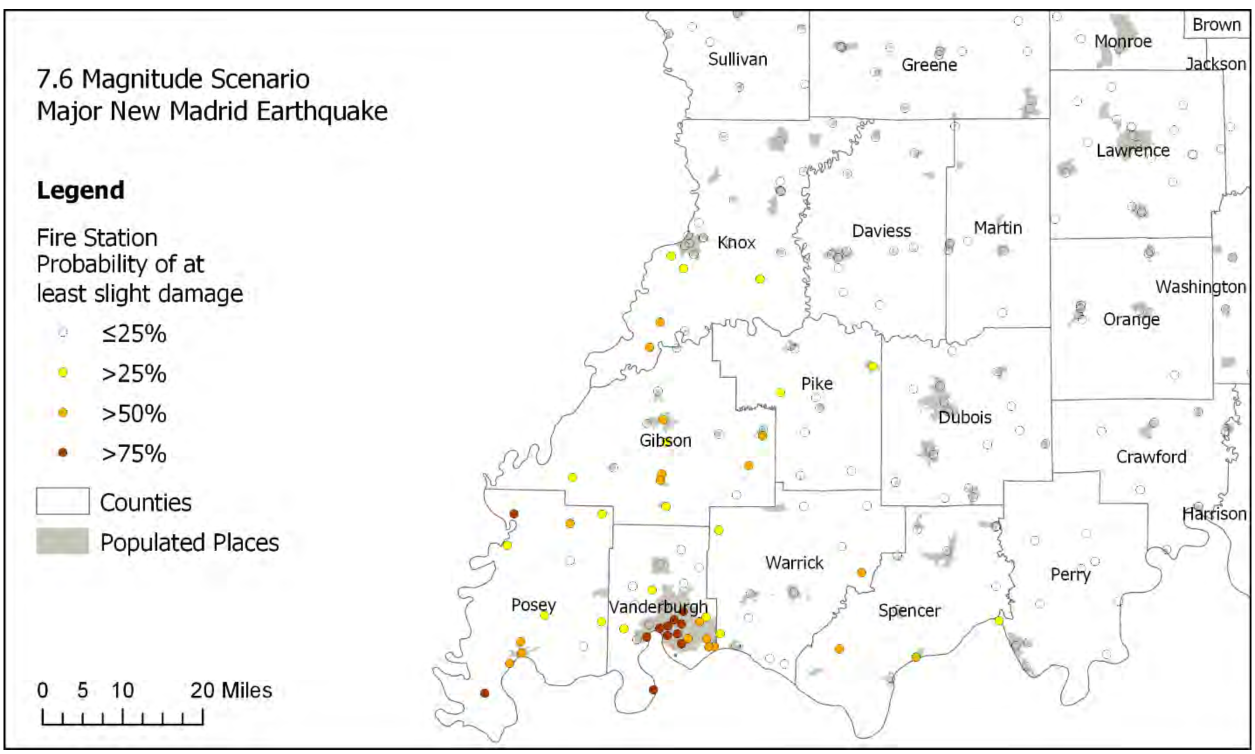
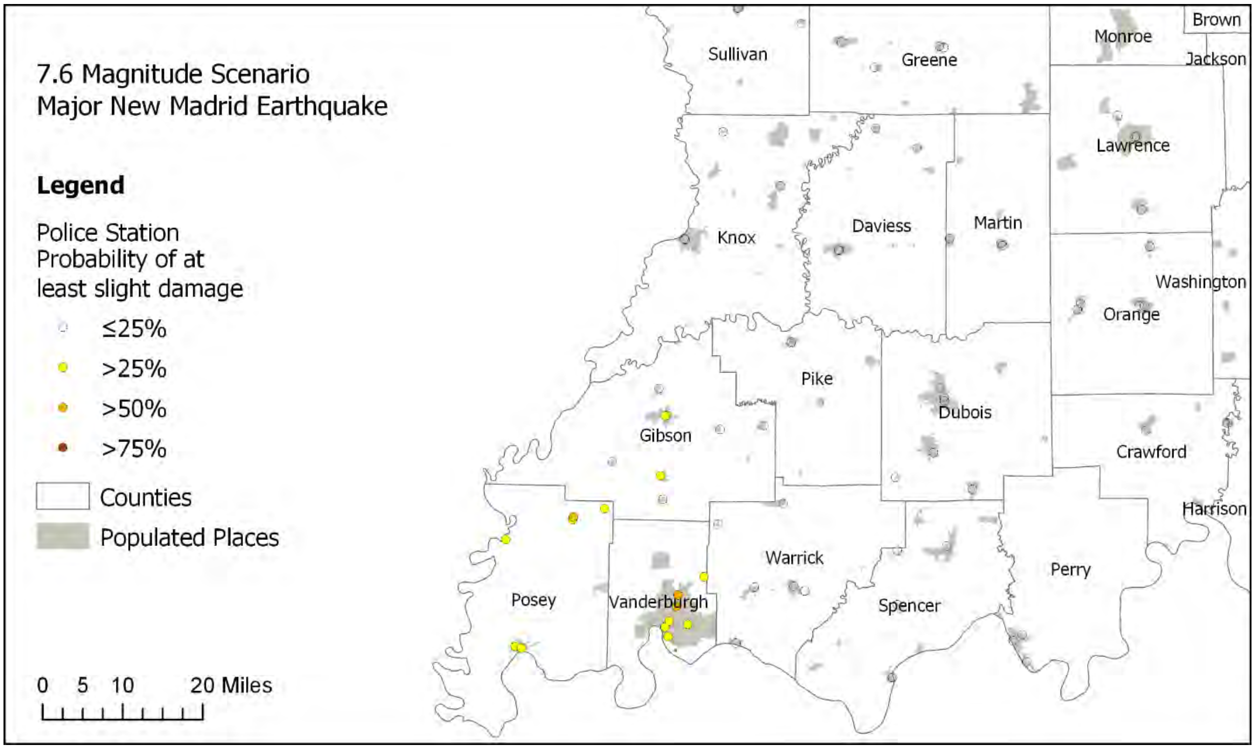


Figure 79. Projected New Madrid Scenario Police Station Damage



Hazus estimates that 25 households could be displaced and 15 persons could be seeking temporary public shelter as a result of the earthquake. Additionally, Hazus estimates that a total of 50,000 tons of debris could be generated. Assuming 25 tons per truck, it would require 2000 truckloads to remove the debris generated by the earthquake.

As described in Sections 6.3.2.2 and 6.3.2.2.3, landslides and liquefaction are both secondary effects of earthquakes. Nowicki Jessee et al. (2018) developed a model for estimating the probability of landslide occurrence given ground shaking due to a particular earthquake or earthquake scenario. These modeled landslide probabilities are based on how hard the ground is expected to shake, the steepness of the ground, the type of rock present, the type of landcover present, and how wet the ground is expected to be. The distribution of predicted landslides for this scenario as calculated by the Nowicki Jessee et al. (2018) model are shown in Figure 80. The values in each location of the map indicate how much of that area is expected to landslide. The results indicate that Indiana would be subjected to only modest landslide risk, mostly associated with steep river banks in the Wabash and Ohio river valleys, and possible isolated landslide activity in areas of high relief in the south-central part of the state.

Predicted liquefaction is shown in Figure 81. The results indicate the presence of widespread liquefaction potential throughout the southwestern part of the state, centered on the areas dominated by thick unconsolidated river sediments in the Wabash and Ohio river valleys and their tributaries. This widespread liquefaction damage could affect populated areas in the Evansville, Vincennes, and Terre Haute metropolitan areas, and could have significant impact on post-earthquake transportation and utility services.

Figure 80. Projected New Madrid Scenario Landslide Risk

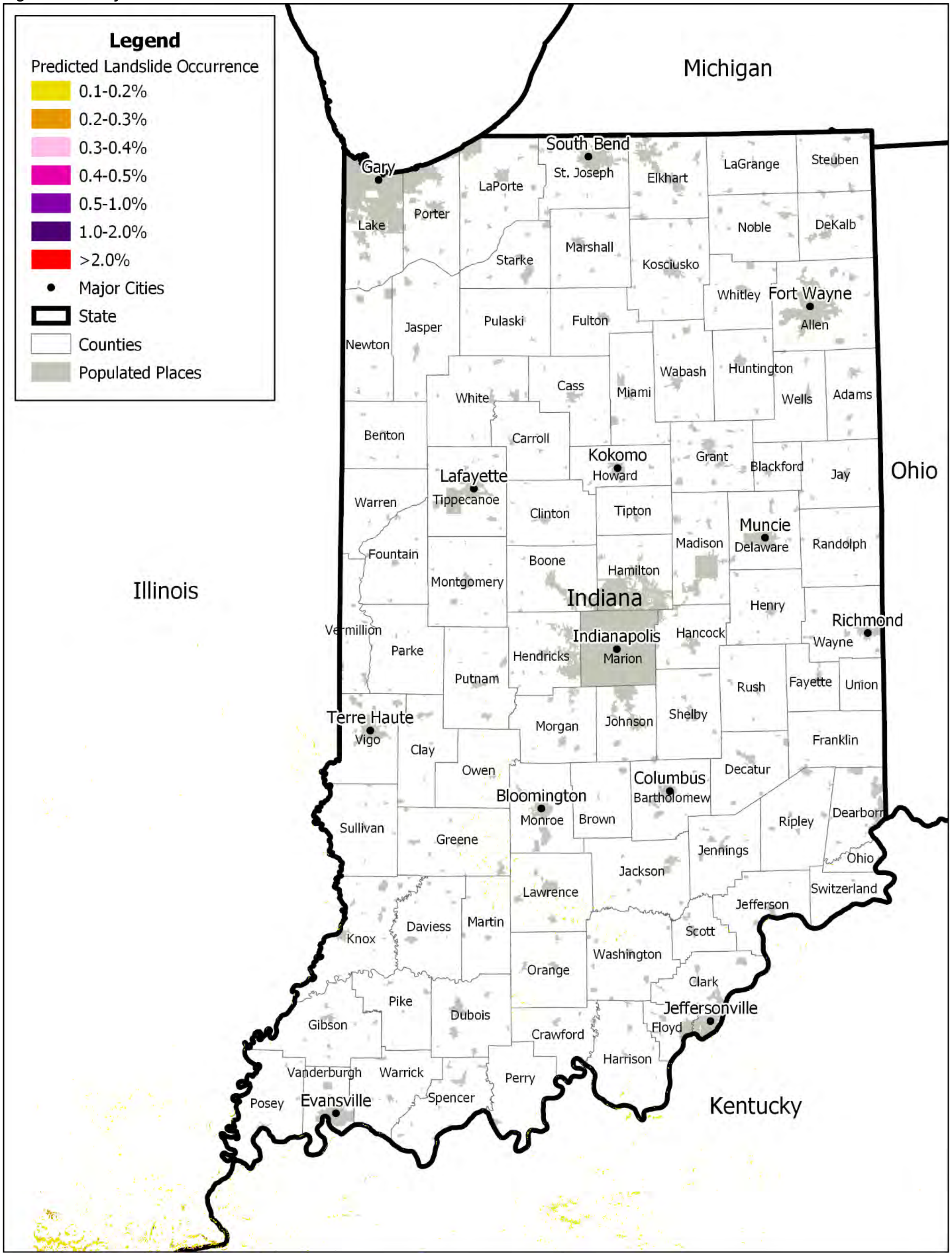
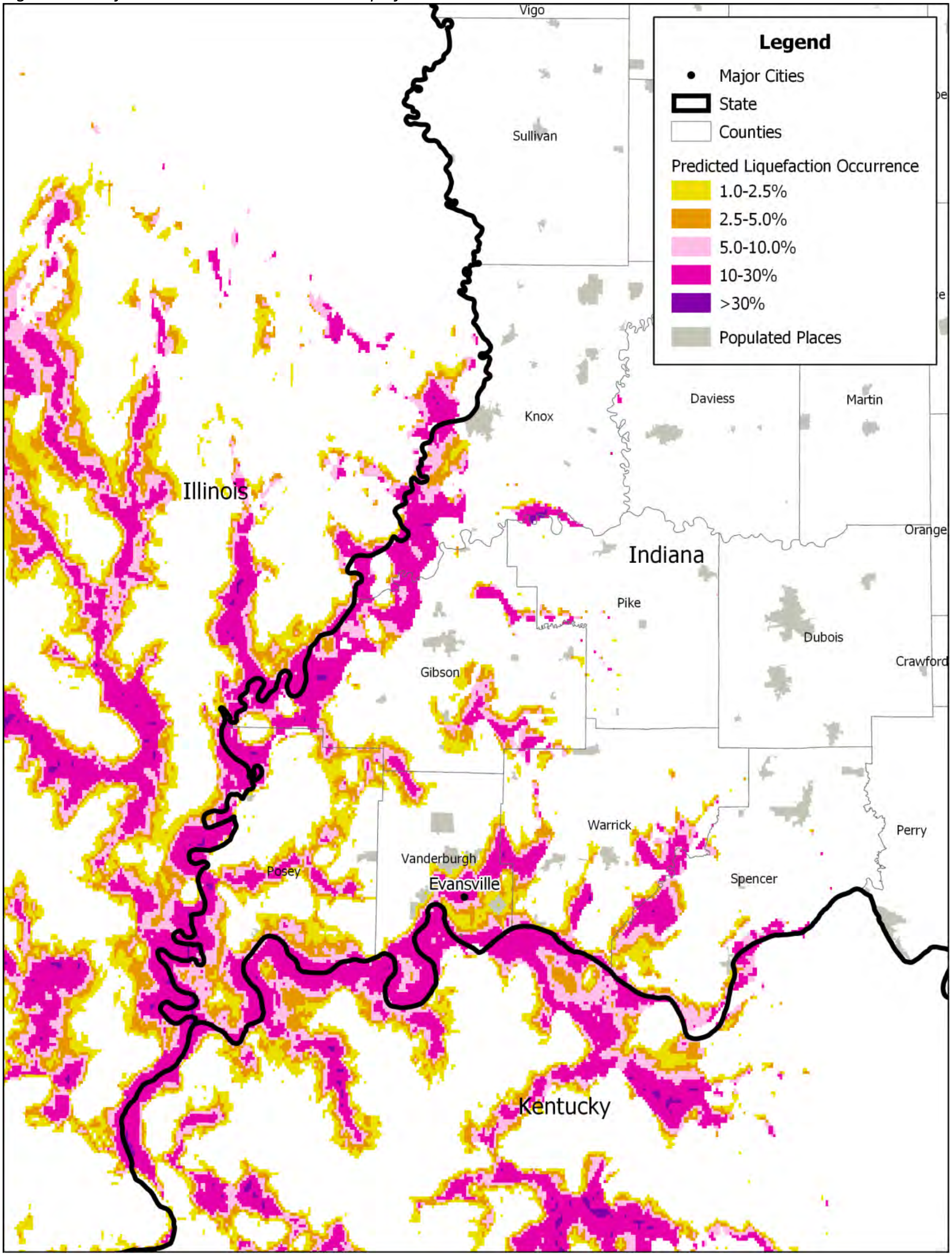


Figure 81. Projected New Madrid Scenario Liquefaction Risk



6.3.2.1.2 7.3 Magnitude Scenario: Major Wabash Valley Earthquake

This event represents a 'worst case' scenario of a large-magnitude event occurring along the Wabash Valley fault system, just outside the state of Indiana in southeastern Illinois. The chosen magnitude (M7.3) is significantly larger than any historic events in the region (the largest being the M5.5 southern Illinois earthquake of 1968). However, it is comparable to the largest prehistoric earthquake (M7.5, estimated age ~6,000 years before present) reported by Obermeier et al. (1992). Its location and magnitude is represented by a strike-slip earthquake rupturing the entire Mt. Carmel – New Harmony Fault system. A strike-slip fault is a vertical or nearly vertical fracture where the blocks have mostly moved horizontally.Figure 82 shows an intensity map of this scenario, along with the location of the earthquake. Note the table at the bottom of the graphic that indicates perceived levels of shaking, reported as levels in the Modified Mercalli Intensity scale. Note that strong shaking (intensity > VII) is concentrated in the southwestern portion of the state, with extremely high levels near the Indiana-Illinois border region. Much of the state is expected to experience at least moderate (intensity > V) levels of shaking. Expected shaking is also intensified by the presence of thick layers of unconsolidated sediment, which tend to amplify ground motions at these sites.

Hazus estimates the economic loss for the earthquake in Indiana at 13 billion dollars. The vast majority, almost 11 billion dollars, are building-related losses. Hazus estimates that 18,000 buildings could be at least moderately damaged, and 1,733 could be damaged beyond repair. Figure 83 shows where the damage could occur. It is important to note that these losses do not represent the comprehensive economic impact of the event, as losses from social impacts such as displaced households, casualties, etc. are not taken into account.

Figure 84 maps the state-owned facilities on top of the earthquake intensity map for this scenario. Some of these facilities are located in areas with more shaking than others.

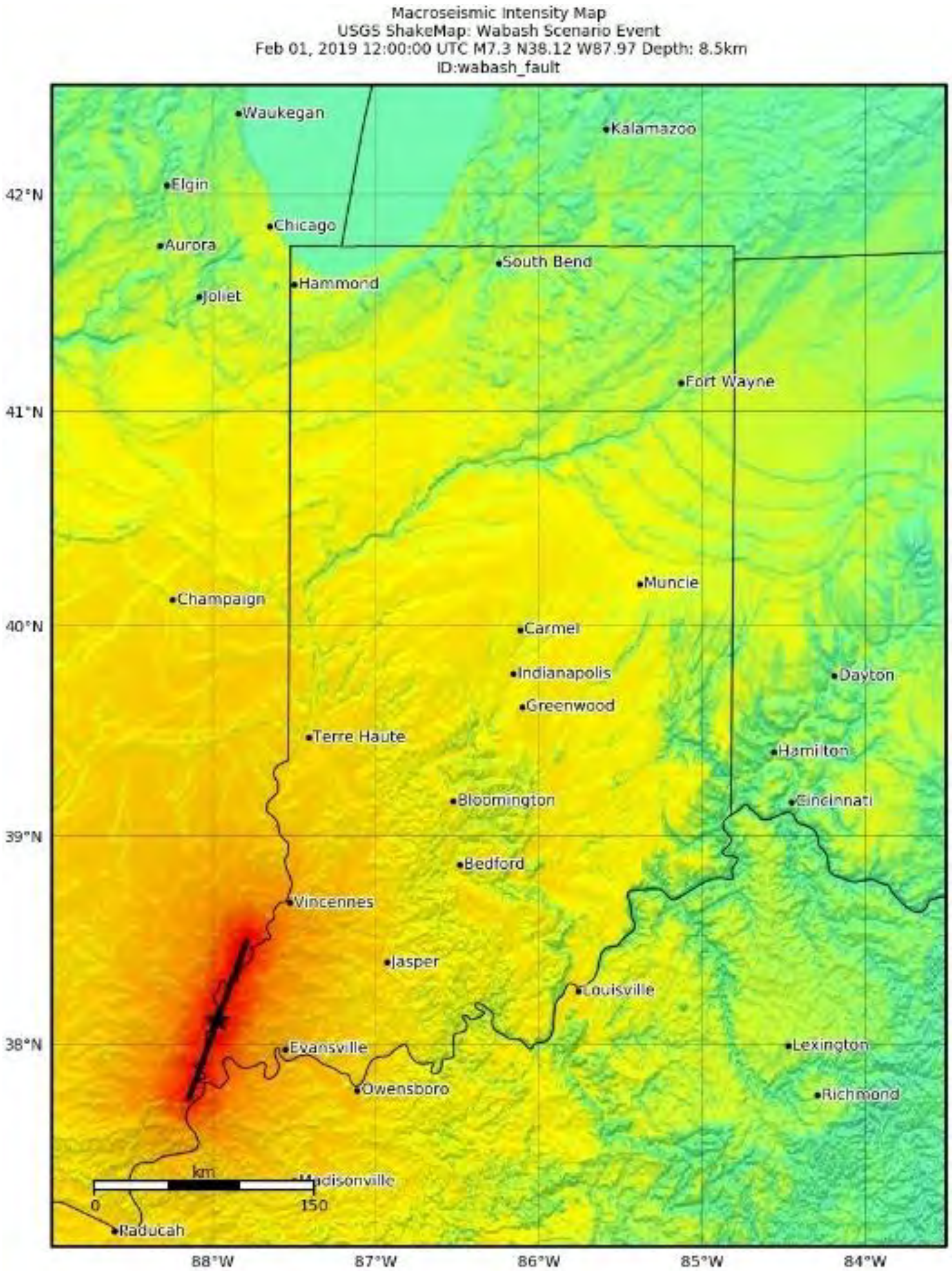
Table 43 shows the estimated impact of the earthquake on essential facilities throughout the state. 91 hospitals, 110 schools, 8 EOCs, 26 police stations, and 67 fire stations could suffer moderate damage. The damage to a particular facility depends on the distance to the earthquake, but also to the particular soil conditions and building construction type of that facility. Figure 85 to

Figure 89 map the locations of the damaged essential facilities. On the day of the earthquake, the model estimates that a portion of the beds in hospitals that sustained earthquake-related damage would be unavailable for use. 89% of the beds would likely be available for use by patients already in those facilities. After one week, 96% of the beds impacted by earthquake damage would be back in service.

Table 43. Projected Wabash Valley Scenario Essential Facilities Damage

	Total Essential Facilities	Facilities with Slight to No Damage	Facilities with Moderate Damage > 50%	Facilities with Complete Damage > 50%
Hospitals	3,423	3,327	91	5
Schools	2,947	2,832	110	5
EOCs	123	115	8	0
Police Stations	593	563	26	4
Fire Stations	1,385	1,315	67	3

Figure 82. Projected Wabash Valley Scenario Intensity Map



SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	None	None	None	Very light	Light	Moderate	Moderate/heavy	Heavy	Very heavy
PGA(%g)	<0.01	0.08	0.95	4.99	8.76	15.4	27	47.4	>83.2
PGV(cm/s)	<0	0.04	0.52	3.03	6.48	13.9	29.6	63.4	>136
INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based on Atkinson and Kaka (2007) Version 1: Processed 2019-01-10T18:51:59Z
△ Seismic Instrument ○ Macroseismic Observation ★ Epicenter ▭ Rupture

Figure 83. Projected Wabash Valley Scenario Building Damage

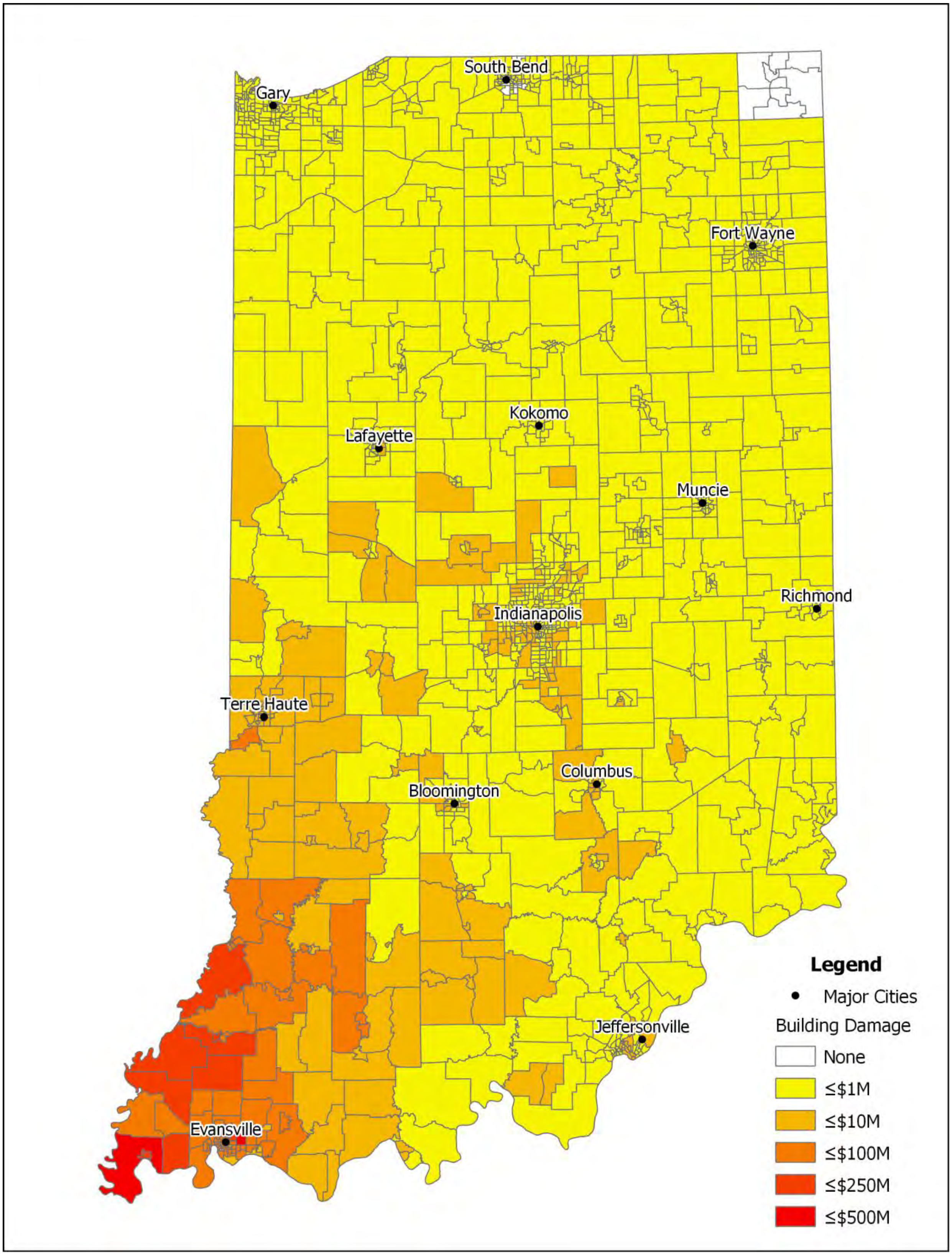


Figure 84. Projected Wabash Valley Scenario State Facilities

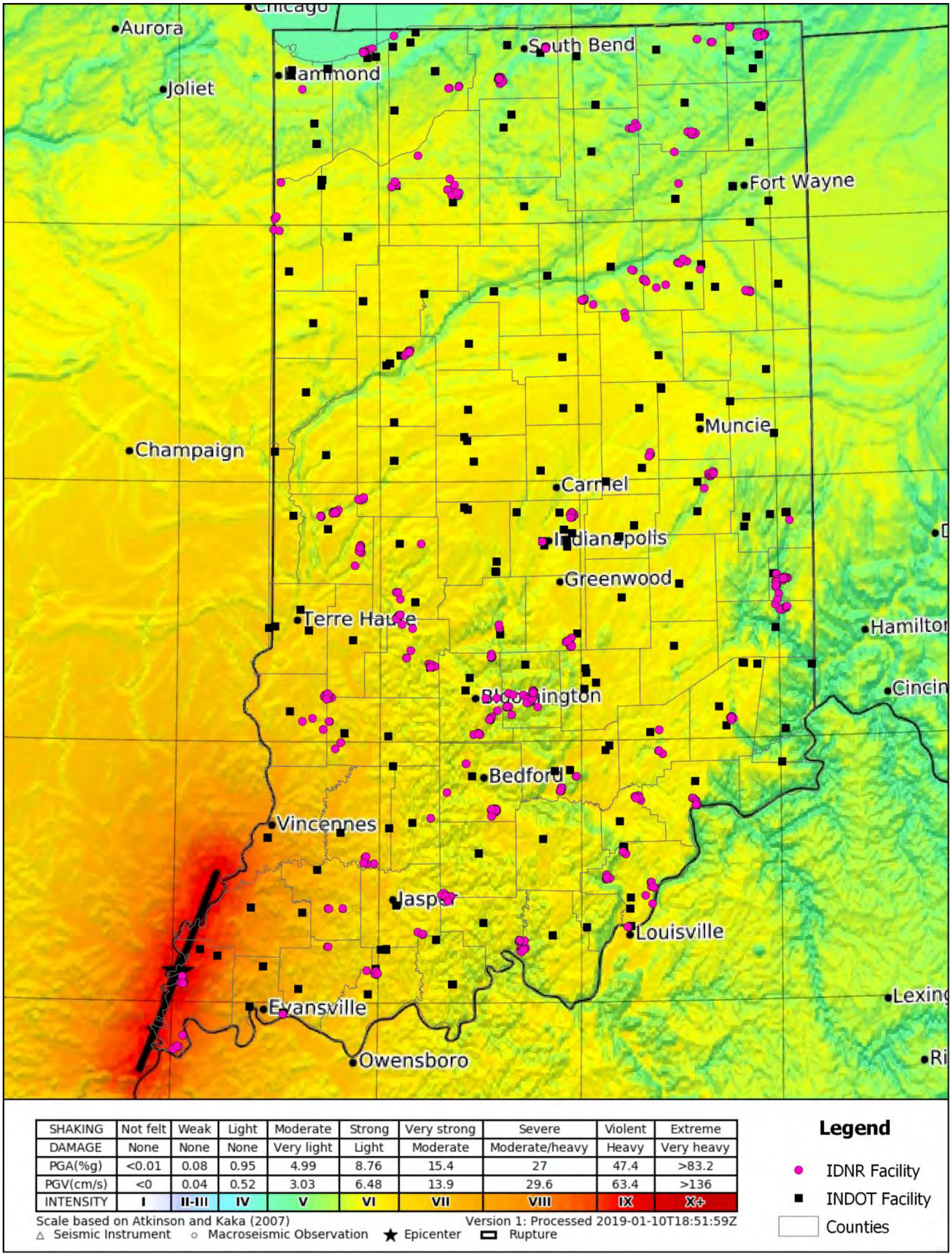


Figure 85. Projected Wabash Valley Scenario Care Facility Damage

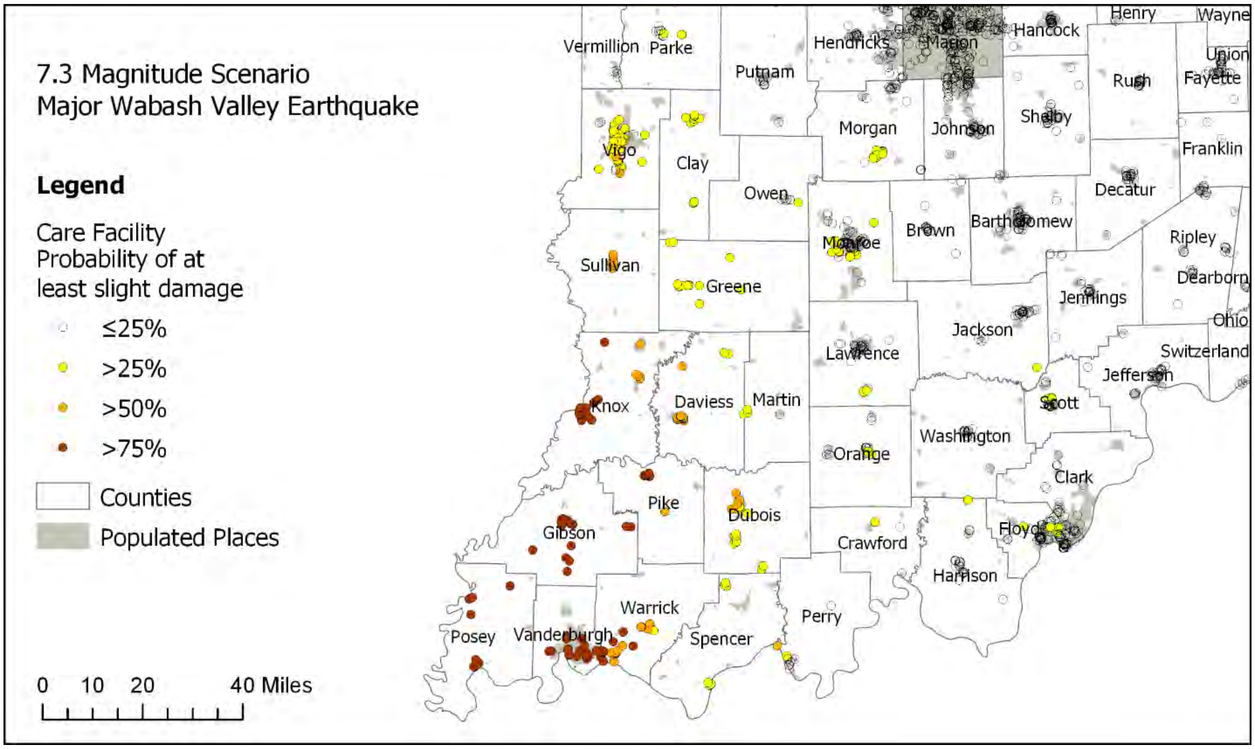


Figure 86. Projected Wabash Valley Scenario School Facility Damage

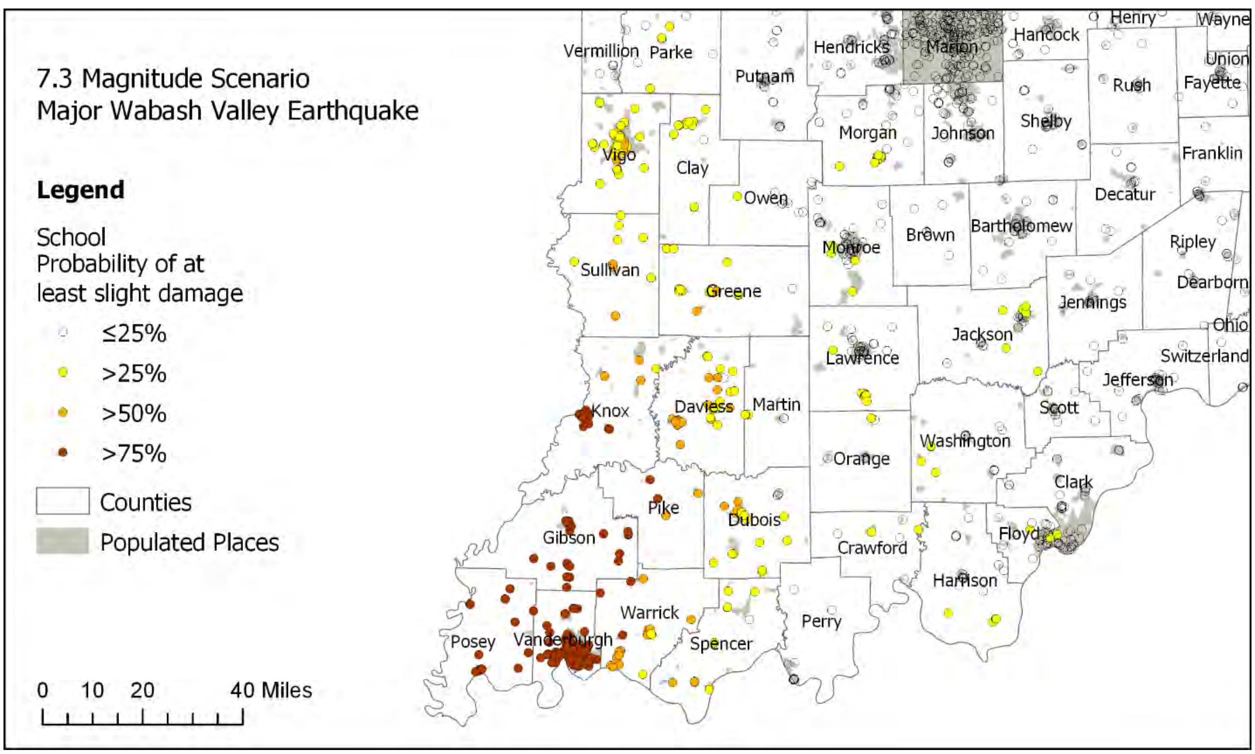


Figure 87. Projected Wabash Valley Scenario EOC Damage

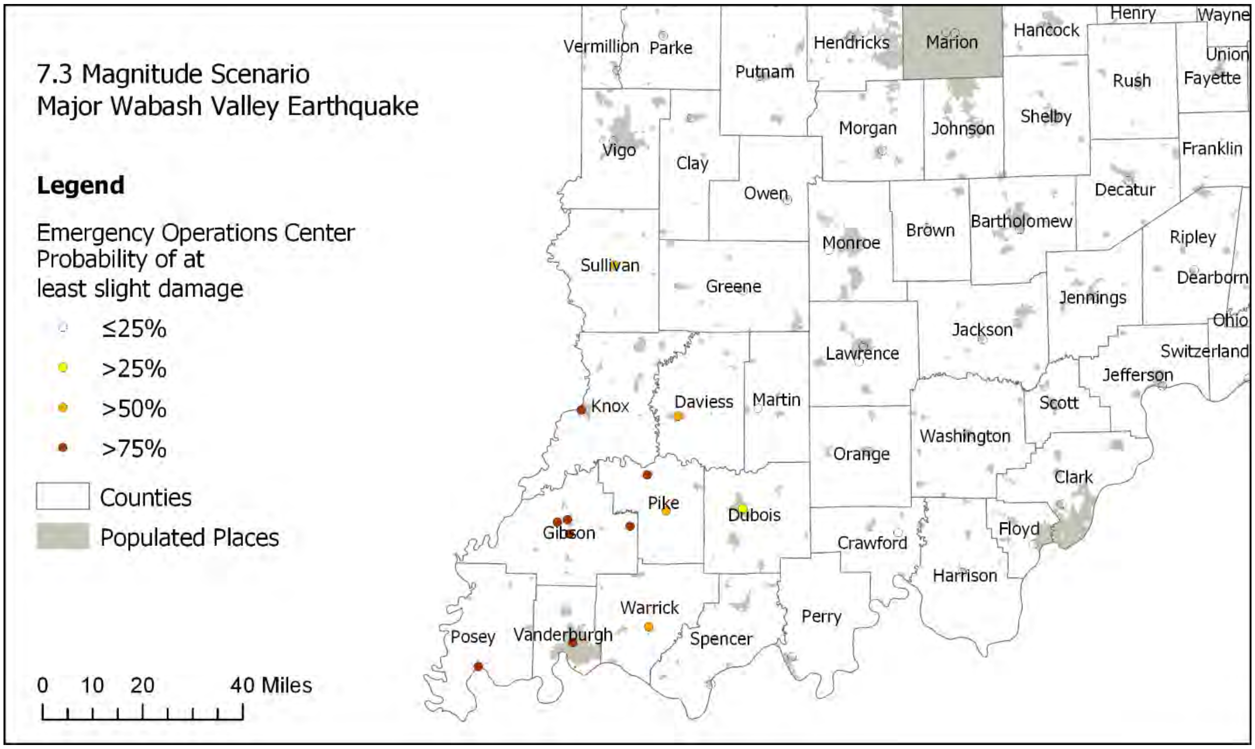


Figure 88. Projected Wabash Valley Scenario Fire Station Damage

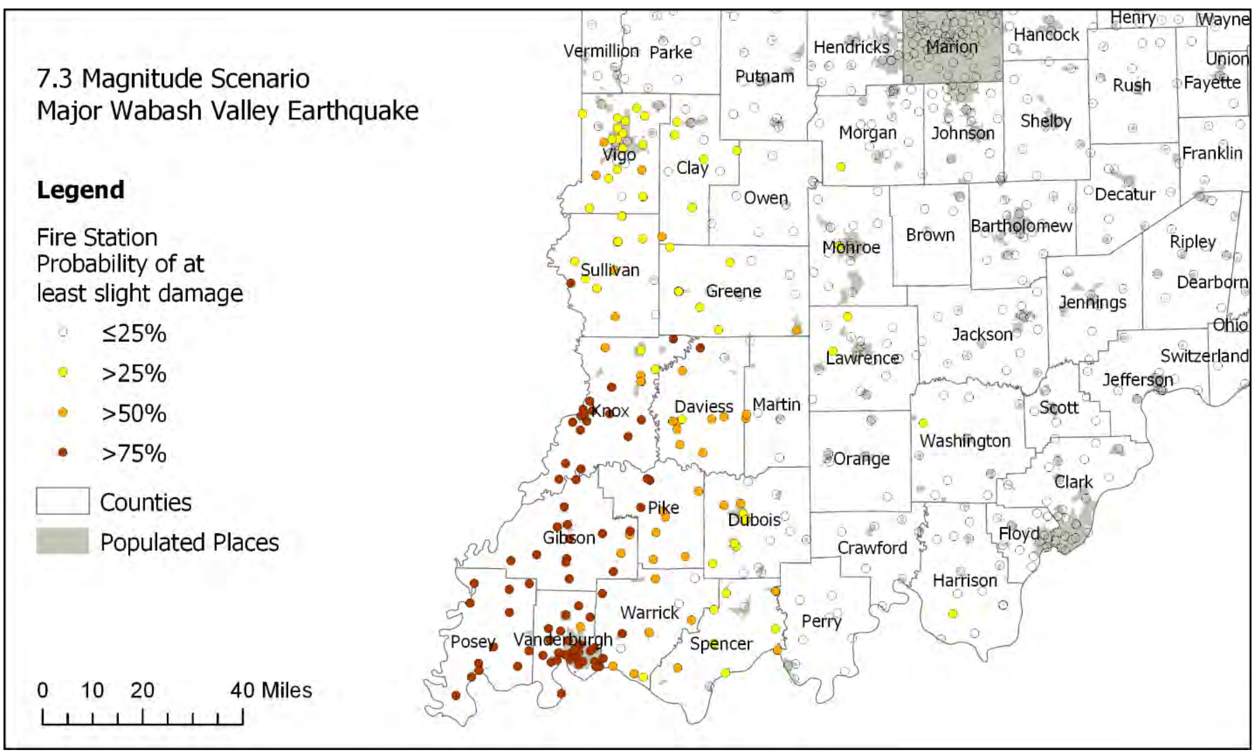
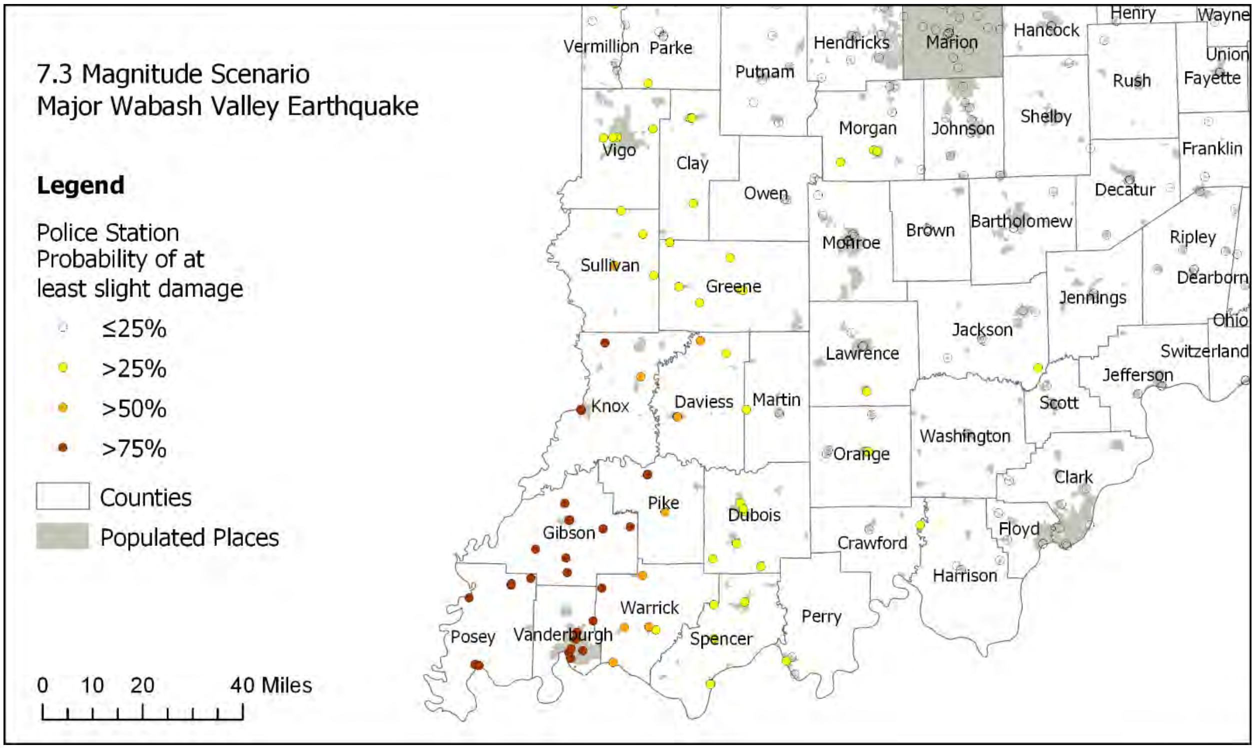


Figure 89. Projected Wabash Valley Scenario Police Station Damage



Hazus estimates that 4,408 households could be displaced and 2,713 persons could be seeking temporary public shelter as a result of the earthquake. Additionally, Hazus estimates that almost 2 million tons of debris could be generated. Assuming 25 tons per truck, it would require 75,680 truckloads to remove the debris generated by the earthquake.

The predicted landslide probabilities for this scenario are shown in Figure 90. The results indicate that portions of the southwestern part of the state would be subjected to significant landslide risk, mostly associated with steep river banks near the Wabash and Ohio river valleys, and isolated landslide activity in areas of high relief in the south-central part of the state.

Predicted liquefaction is shown in Figure 91. The results indicate the presence of widespread liquefaction potential throughout the southwestern part of the state, centered on the areas dominated by thick unconsolidated river sediments in the Wabash and Ohio river valleys and their tributaries. The widespread liquefation damage could affect populated aras in the Evansville, Vincennes, and Terre Haute metropolitan areas, and could have significant impact on post-earthquake transportation and utility services.

Figure 90. Projected Wabash Valley Scenario Landslide Risk

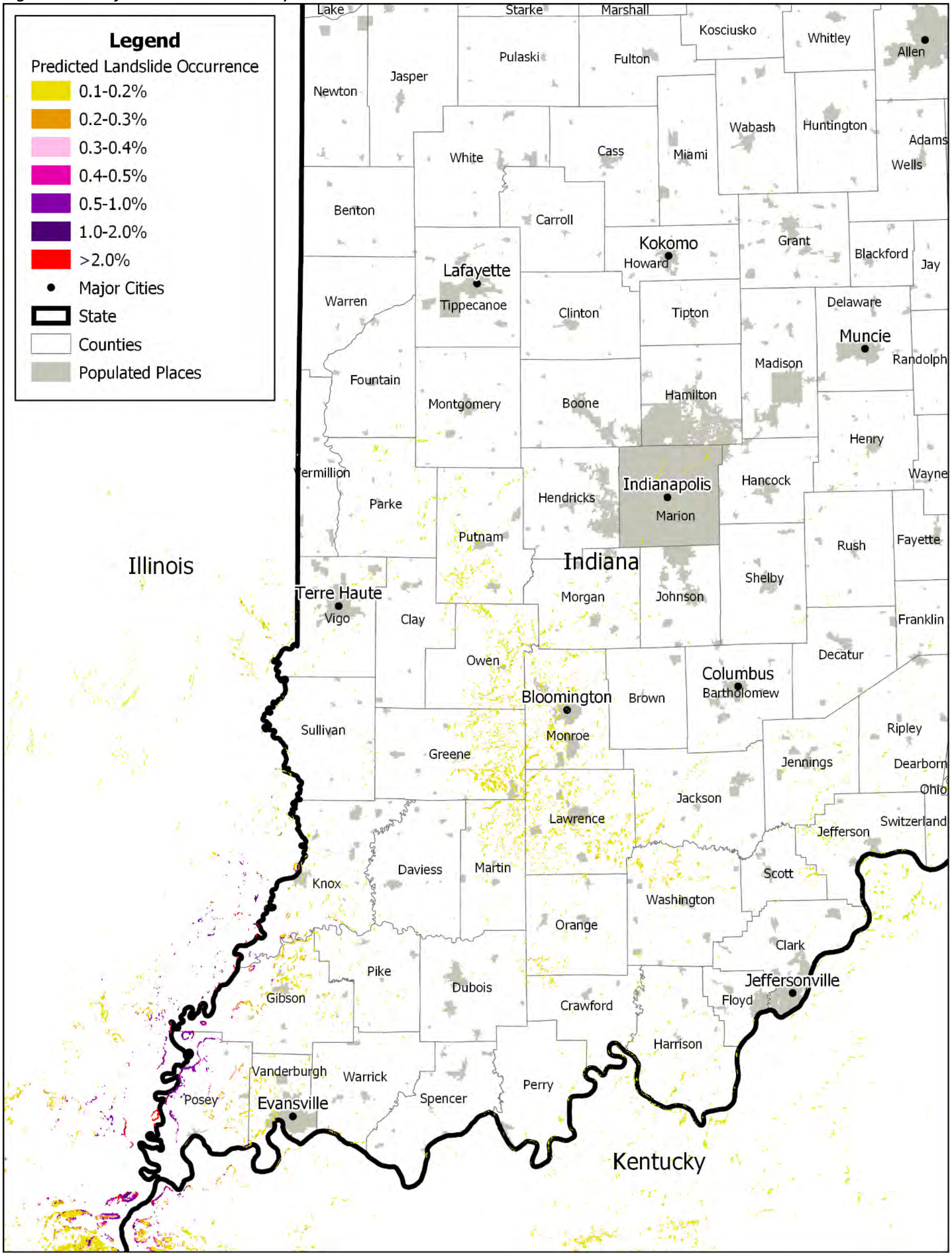
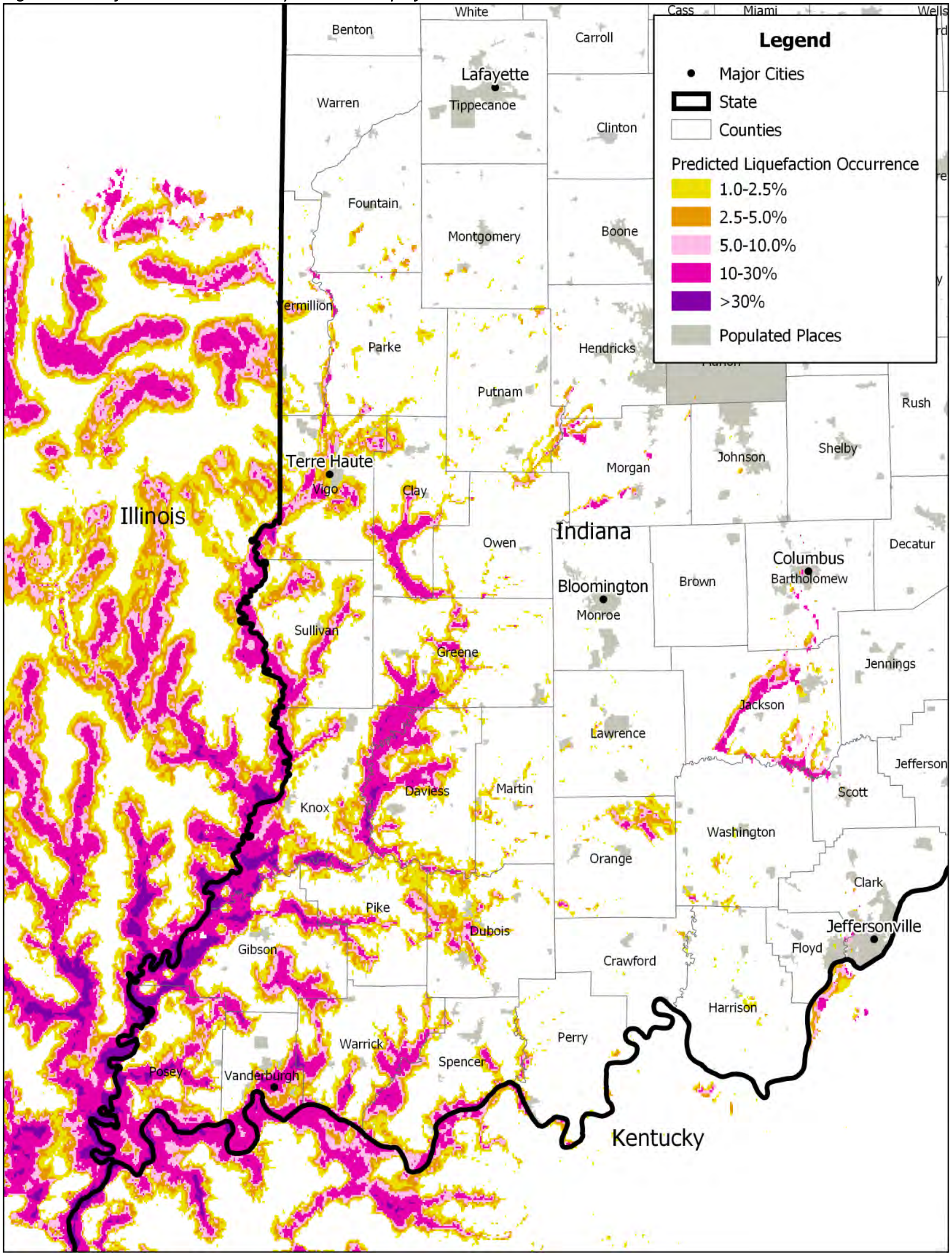


Figure 91. Projected Wabash Valley Scenario Liquefaction Risk



6.3.2.1.3 6.2 Magnitude Scenario: Anna, Ohio Earthquake

This scenario represents a moderate-sized (M6.2) event located just west of the Indiana-Ohio border near Anna, Ohio. This site is selected to represent a known seismic zone associated with current seismic activity (Schwartz & Christensen, 1988). The scenario earthquake is located at 15 km depth near the epicenter of the largest of the March, 1937 earthquakes (M5.5) and close to the Auglaize fault and the Fort Wayne Rift, which may be the source of these intraplate events. The earthquakes were strongly felt in Ohio, Indiana, Michigan, and Kentucky, and produced minor damage in the epicentral region. The magnitude is significantly higher than reported earthquakes in the area, but smaller than the maximum magnitude estimated by the US Geological Survey for stable continental interior regions of the central-eastern U.S. (Moschetti, et al., 2015). Unlike the Wabash Valley seismic zone, there have been no comprehensive paleoseismic studies in this area to constrain the history and magnitude of prehistoric earthquakes in the area.

Figure 92 shows an intensity map of this scenario, along with the location of the earthquake. Note the table at the bottom of the graphic that indicates perceived levels of shaking, reported as levels in the Modified Mercalli Intensity scale. Note that strong shaking (intensity > VII) is concentrated outside the boundaries of the state, but that moderate (intensity > V) levels of shaking would be experienced in the east-central part of the state, including Muncie and Fort Wayne. Expected shaking is also intensified by the presence of thick layers of unconsolidated sediment, which tend to amplify ground motions at these sites.

Hazus estimates the economic loss for the earthquake at 246 million dollars. The majority, 170 million dollars, are building-related losses. Hazus estimate that 17 buildings could be at least moderately damaged. Figure 93 shows where the damage could occur. It is important to note that these losses do not represent the comprehensive economic impact of the event, as losses from social impacts such as displaced households, casualties, etc. are not taken into account.

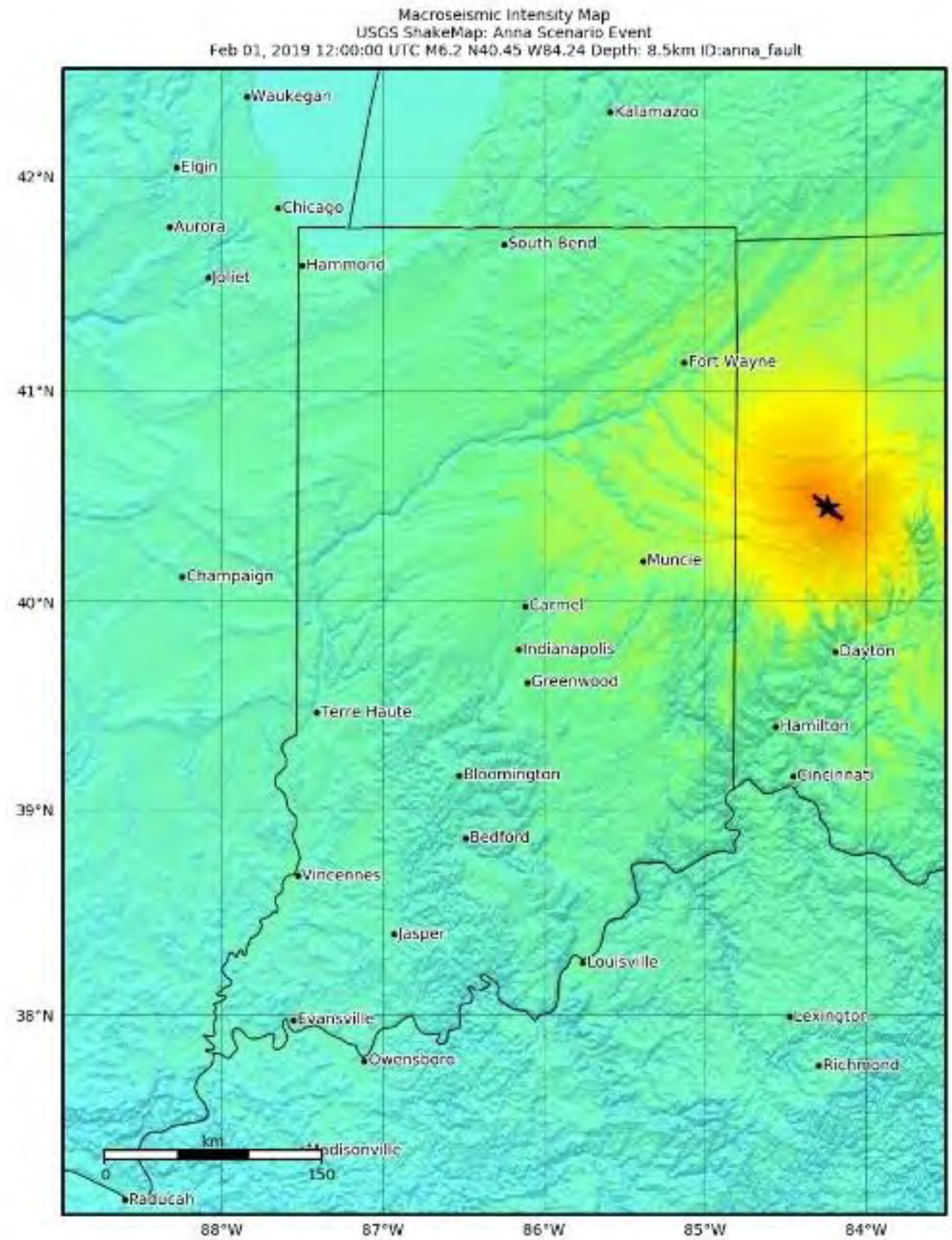
Figure 94 maps the state-owned facilities on top of the earthquake intensity map for this scenario. Some of these facilities are located in areas with more shaking than others.

Table 44 shows the estimated impact of the earthquake on essential facilities throughout the state. None are modeled to suffer moderate damage. The damage to a particular facility depends on the distance to the earthquake, but also to the particular soil conditions and building construction type of that facility. Figure 95 to Figure 99 map the locations of the damaged essential facilities. Hospitals would experience minimal impact to their operations.

Table 44. Projected Anna, Ohio Scenario Essential Facilities Damage

	Total Essential Facilities	Facilities with Slight to No Damage	Facilities with Moderate Damage > 50%	Facilities with Complete Damage > 50%
Hospitals	3,423	3,423	0	0
Schools	2,947	2,947	0	0
EOCs	123	123	0	0
Police Stations	593	593	0	0
Fire Stations	1,385	1,385	0	0

Figure 92. Projected Anna, Ohio Scenario Intensity map



SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	None	None	None	Very light	Light	Moderate	Moderate/heavy	Heavy	Very heavy
PGA(%g)	<0.01	0.08	0.95	4.99	8.76	15.4	27	47.4	>83.2
PGV(cm/s)	<0	0.04	0.52	3.03	6.48	13.9	29.6	63.4	>136
INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based on Atkinson and Kaka (2007) Version 1: Processed 2019-01-10T18:51:59Z
△ Seismic Instrument ○ Macroseismic Observation ★ Epicenter ▭ Rupture

Figure 93. Projected Anna, Ohio Scenario Building Damage

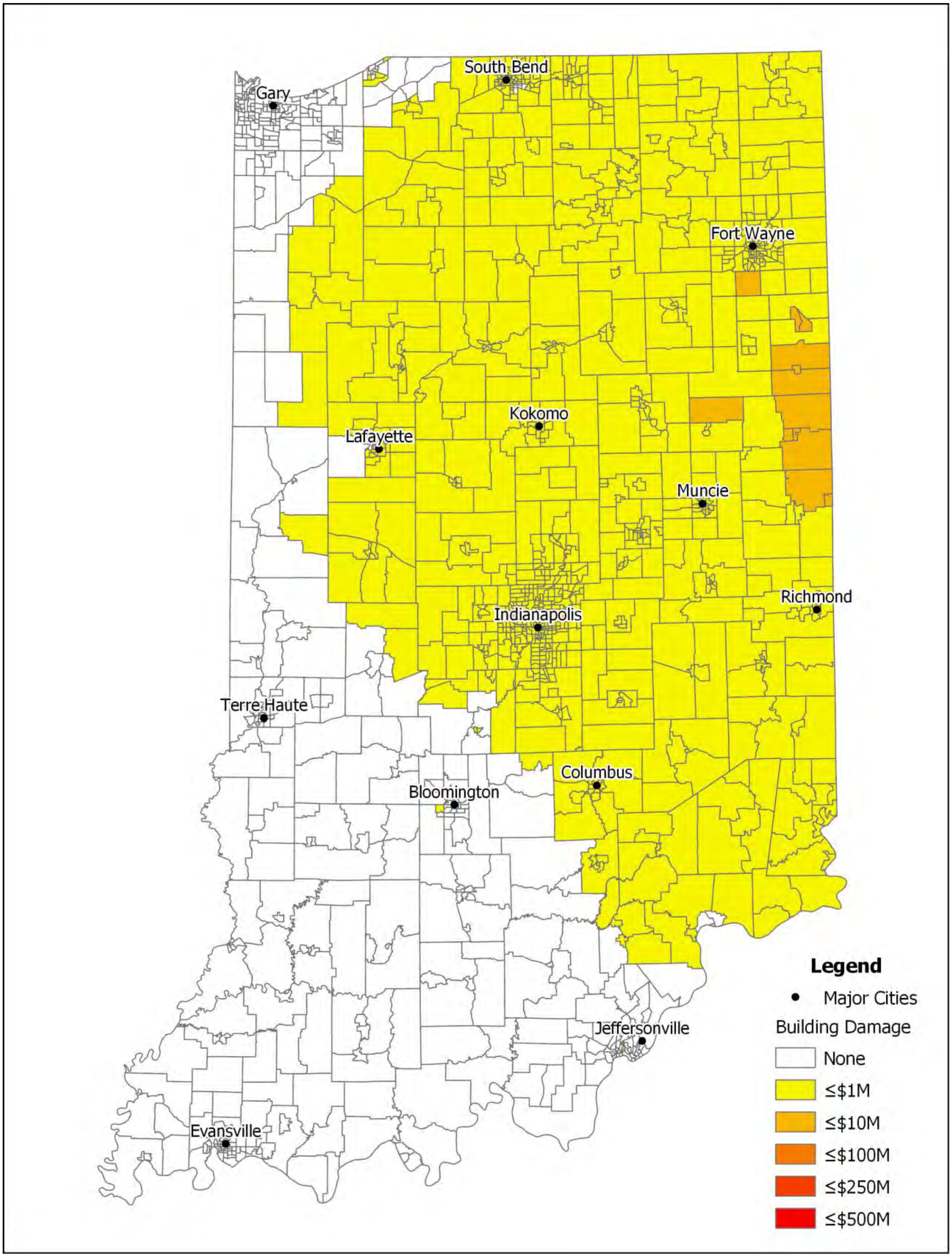


Figure 94. Projected Anna, Ohio Scenario State Facilities

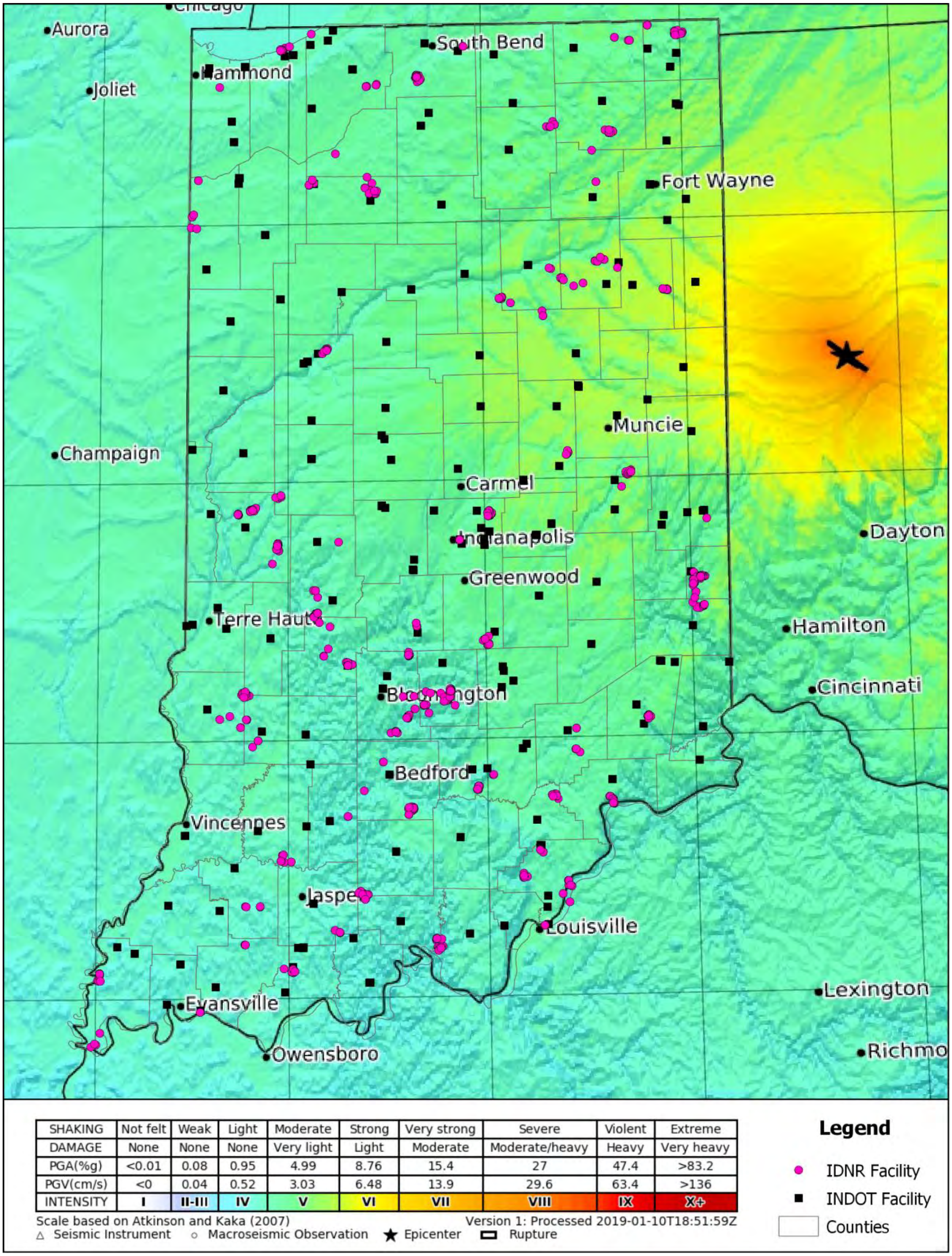


Figure 95. Projected Anna, Ohio Scenario Care Facility Damage

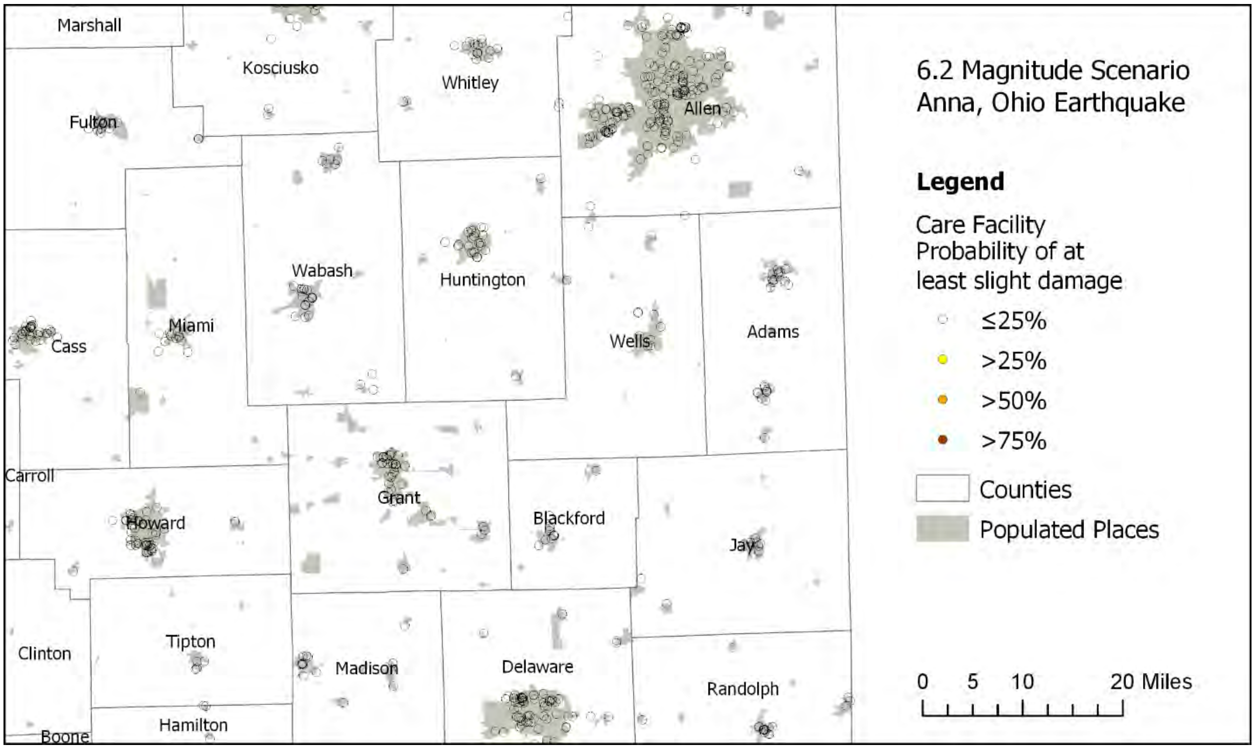


Figure 96. Projected Anna, Ohio Scenario School Damage

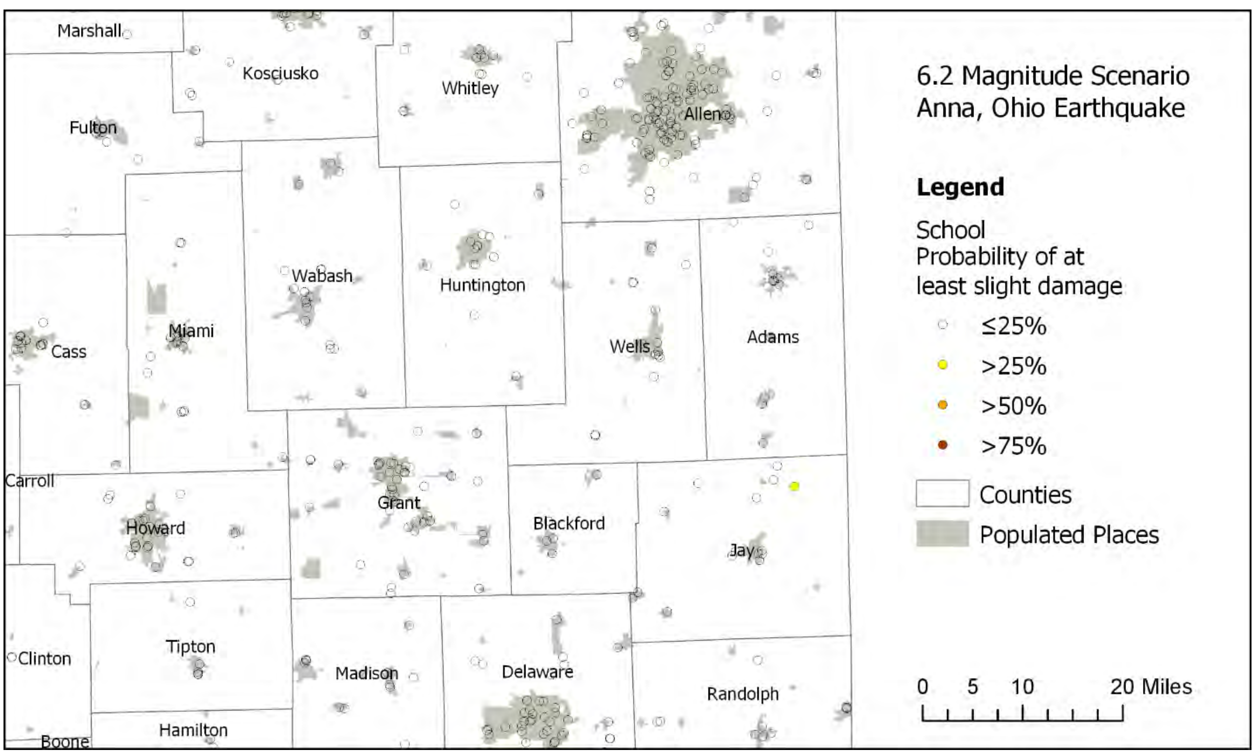


Figure 97. Projected Anna, Ohio Scenario EOC Damage

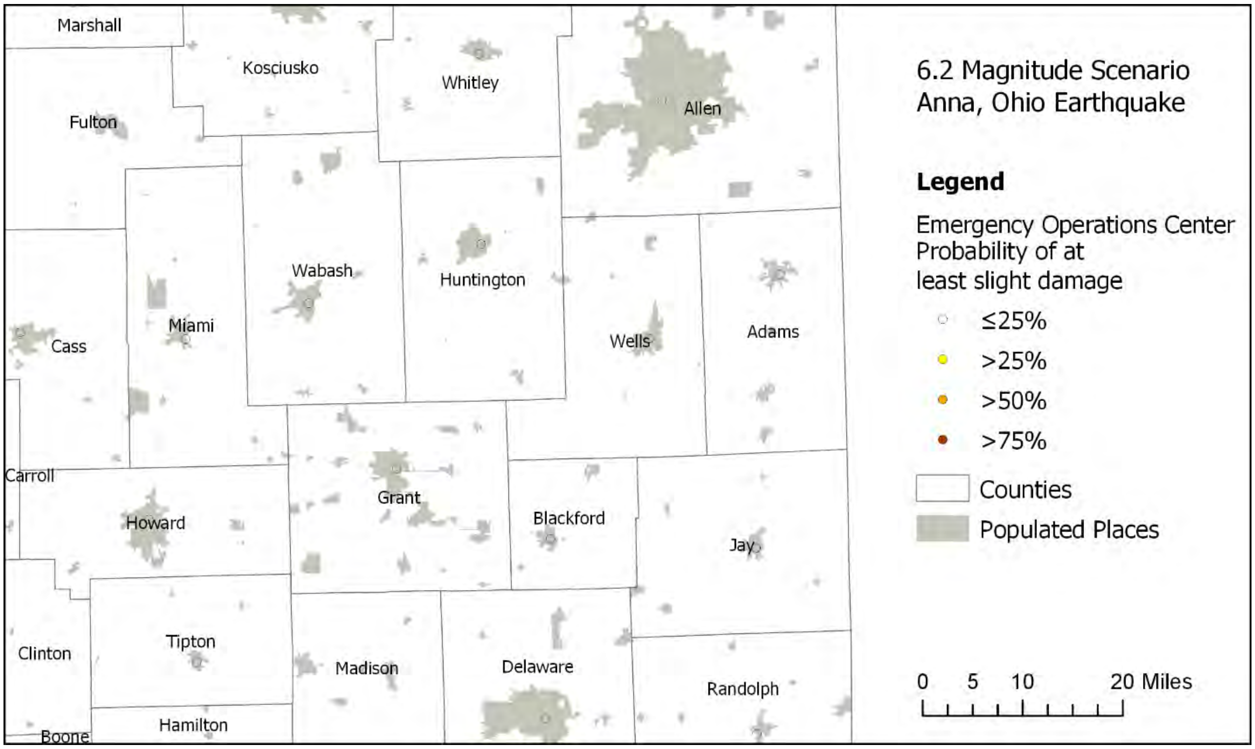


Figure 98. Projected Anna, Ohio Scenario Fire Station Damage

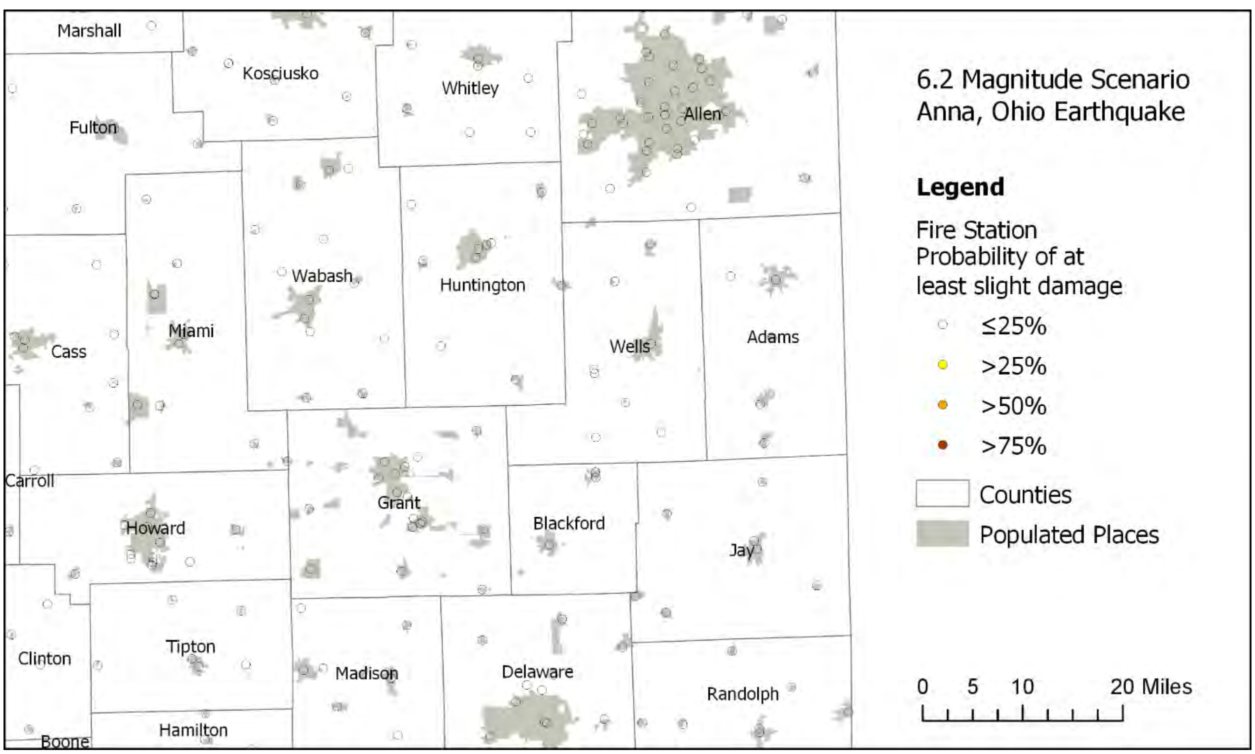
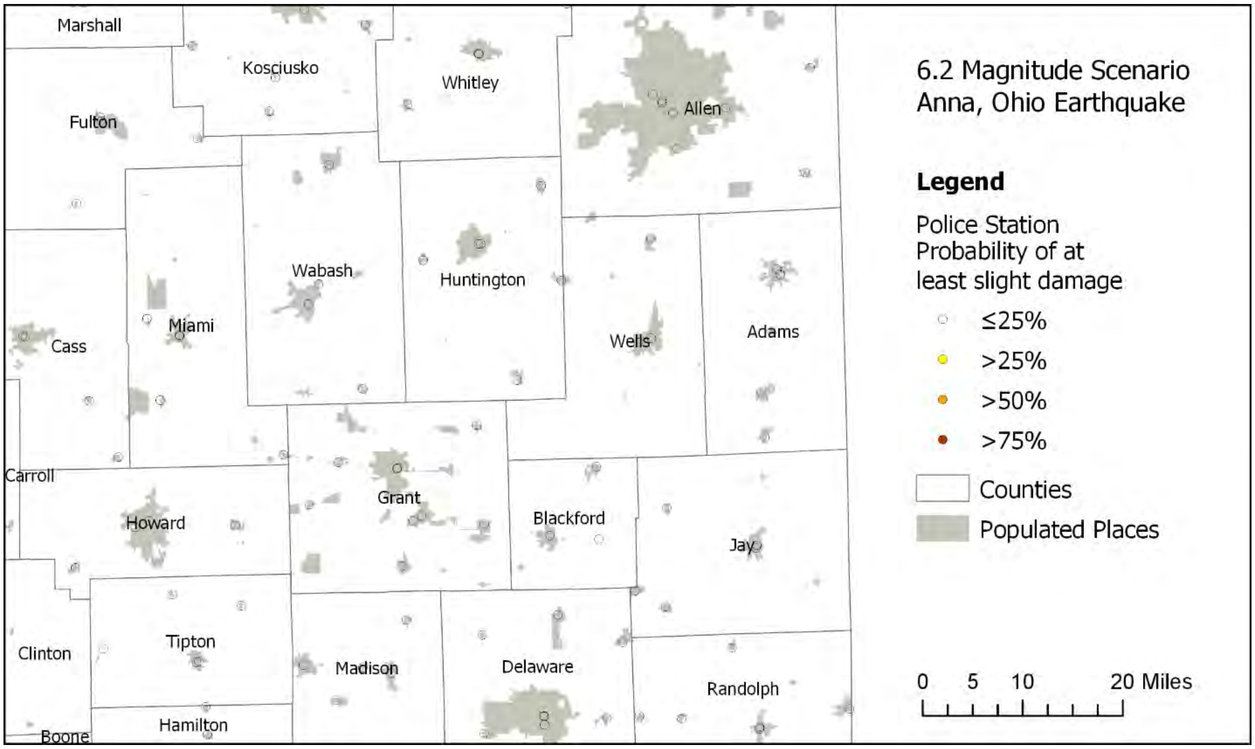


Figure 99. Projected Anna, Ohio Scenario Police Station Damage



Hazus estimates that no households could be displaced nor seeking temporary public shelter as a result of the earthquake. Additionally, Hazus estimates that a total of 3,000 tons of debris could be generated. Assuming 25 tons per truck, it would require 120 truckloads to remove the debris generated by the earthquake.

Because of its modest size and distance from Indiana, the earthquake is not expected to have significant landslide impacts within the state (see Figure 100). However, the earthquake could produce some liquefaction damage, as shown in Figure 101. The results indicate the presence of modest liquefaction potential in the east-central part of the state, centered on the areas dominated by thick unconsolidated river sediments in the Wabash river valley and its tributaries. This widespread liquefaction damage could affect populated areas in the Evansville, Vincennes, and Terre Haute metropolitan areas, and could have significant impact on post-earthquake transportation and utility services.

Figure 100. Projected Anna, Ohio Scenario Landslide Risk

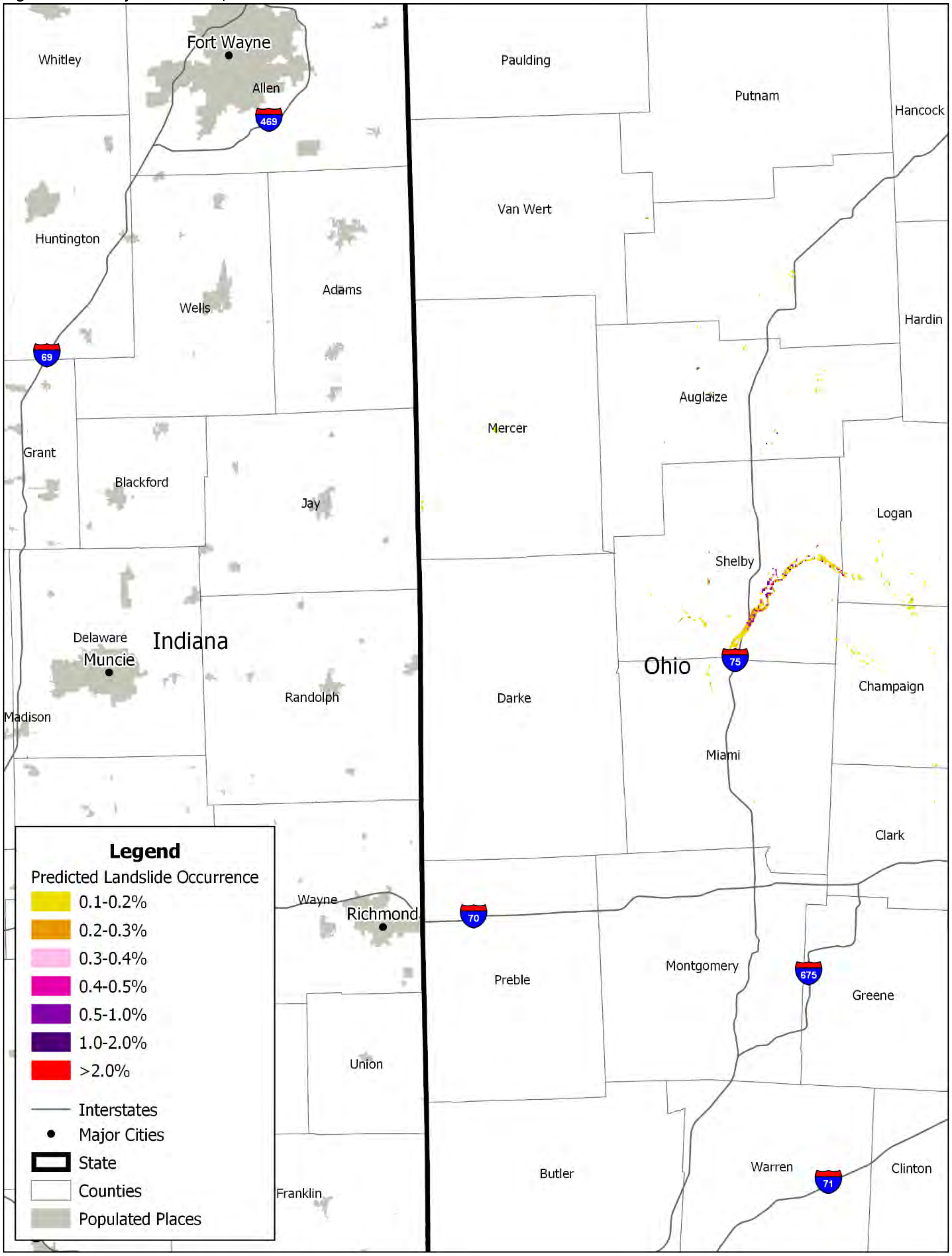
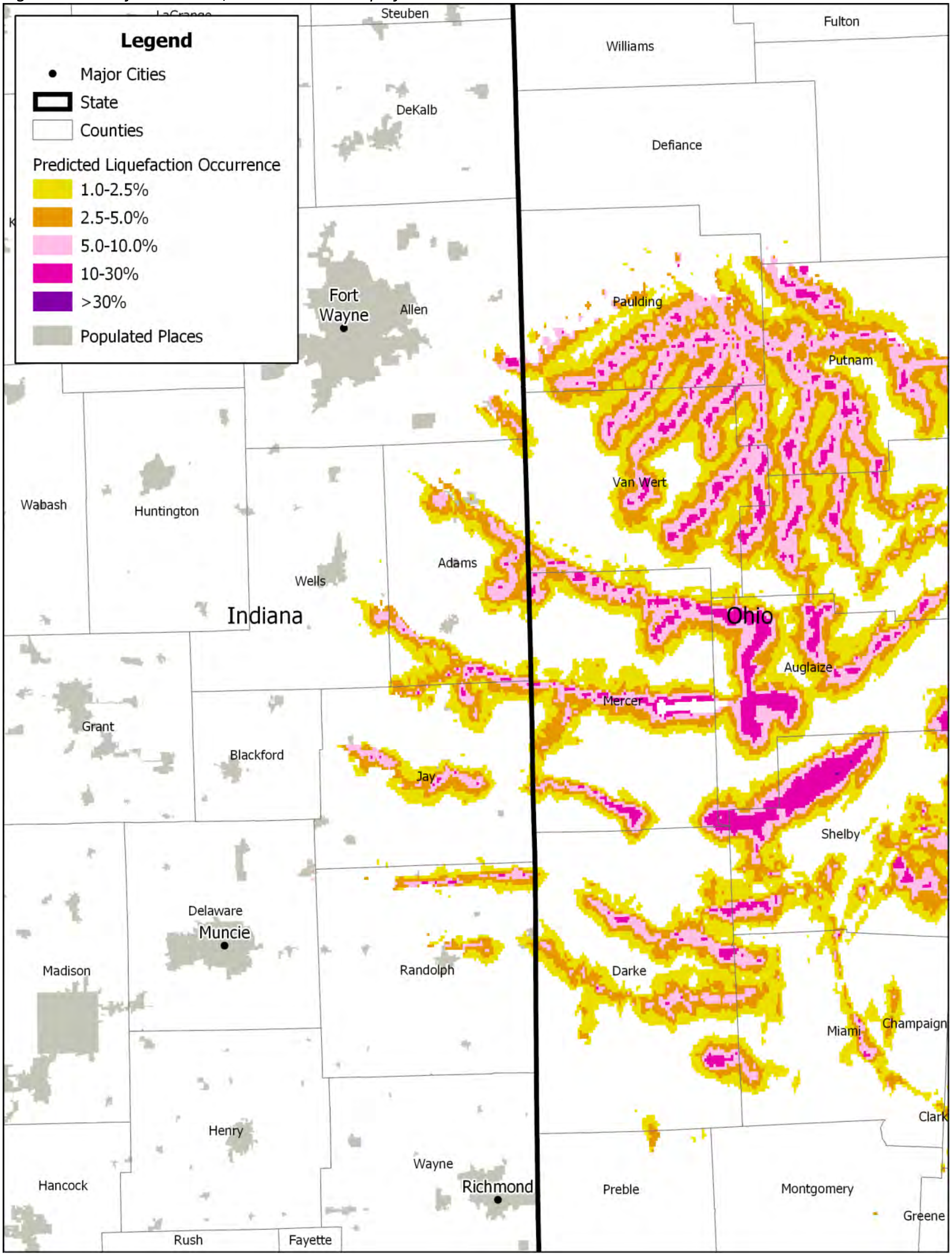


Figure 101. Projected Anna, Ohio Scenario Liquefaction Risk



6.3.2.1.4 6.2 Magnitude Scenario: Darmstadt (Evansville) Earthquake

This scenario represents a moderate-sized earthquake located close to one of Indiana's most seismically vulnerable cities. The location was chosen to match the epicentral location of the June, 2002 M5.0 earthquake (Kim, 2003), which was strongly felt in southern Indiana and neighboring areas of Kentucky and Illinois. The earthquake magnitude (M6.2) was chosen to represent a reasonable-case large earthquake that could occur close to the city of Evansville. While the magnitude is somewhat larger than any historic events in the region (the largest being the M5.5 southern Illinois earthquake of 1968), it is significantly smaller than the largest prehistoric earthquake (M7.1, estimated age ~14,000 years before present) reported by Obermeier et al. (1992). It is represented by a strike-slip earthquake rupturing the neighboring Caborn Fault.

Figure 102 shows an intensity map of this scenario, along with the location of the earthquake. Note the table at the bottom of the graphic that indicates perceived levels of shaking, reported as levels in the Modified Mercalli Intensity scale. Note that strong shaking (intensity > VII) is concentrated in the Evansville area, with much of the southwestern third of the state expected to experience at least moderate (intensity > V) levels of shaking. Expected shaking is also intensified by the presence of thick layers of unconsolidated sediment, which tend to amplify ground motions at these sites.

Hazus estimates the economic loss for the earthquake at almost 11 billion dollars. The vast majority, almost 10 billion dollars, are building-related losses. Hazus estimates that 16,648 buildings could be at least moderately damaged, and 1,151 could be damaged beyond repair. Figure 103 shows where the damage could occur. It is important to note that these losses do not represent the comprehensive economic impact of the event, as losses from social impacts such as displaced households, casualties, etc. are not take into account.

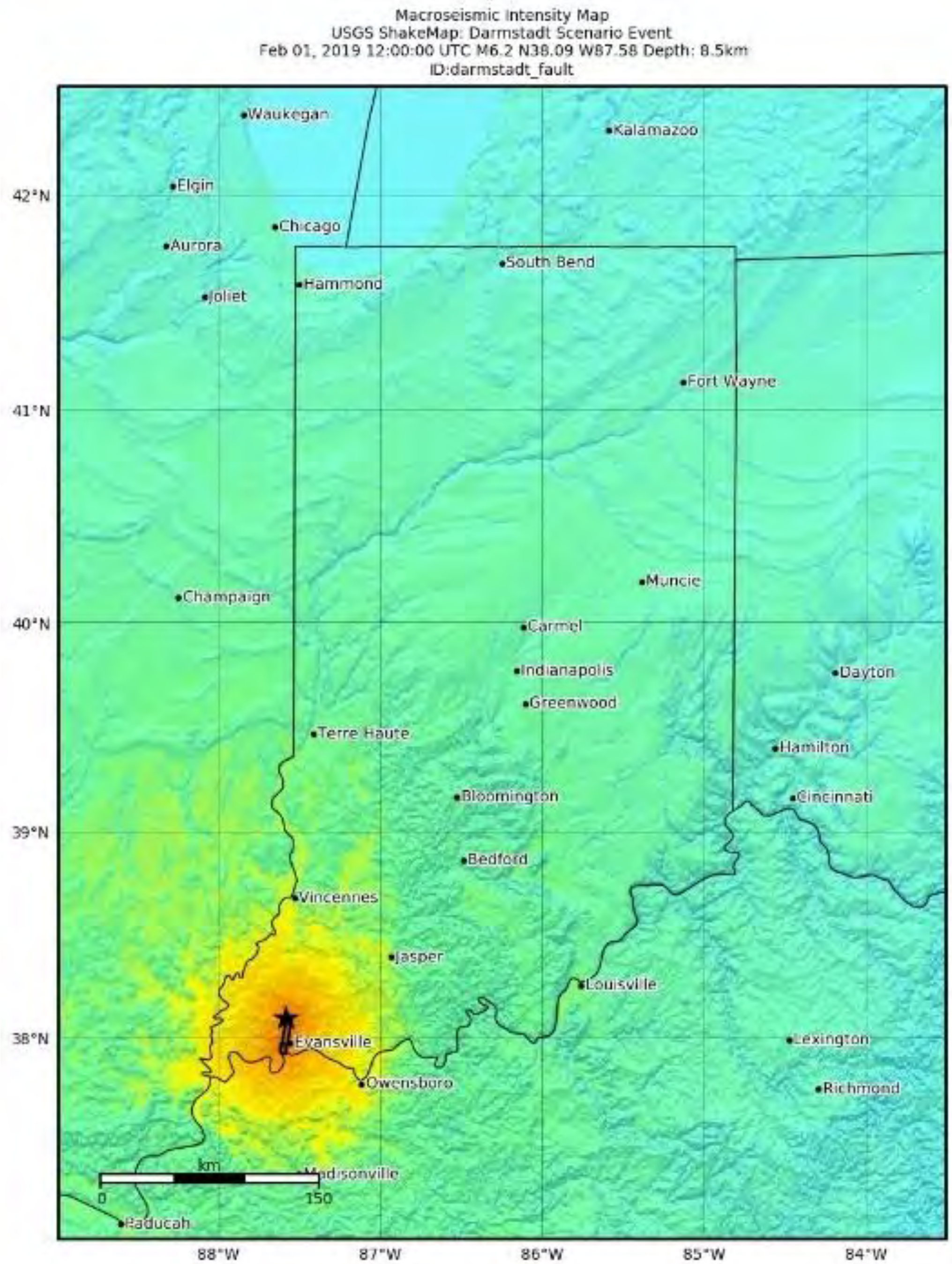
Figure 104 maps the state-owned facilities on top of the earthquake intensity map for this scenario. Some of these facilities are located in areas with more shaking than others.

Table 45 shows the estimated impact of the earthquake on essential facilities throughout the state. 36 hospitals, 75 schools, 1 EOC, 13 police stations, and 32 fire stations could suffer moderate damage. The damage to a particular facility depends on the distance to the earthquake, but also to the particular soil conditions and building construction type of that facility. Figure 105 to Figure 109 map the locations of the damaged essential facilities. Hospitals would experience minimal impact to their operations.

Table 45. Projected Darmstadt Scenario Essential Facilities Damage

	Total Essential Facilities	Facilities with Slight to No Damage	Facilities with Moderate Damage > 50%	Facilities with Complete Damage > 50%
Hospitals	3,423	3,387	36	0
Schools	2,947	2,872	75	0
EOCs	123	122	1	0
Police Stations	593	580	13	0
Fire Stations	1,385	1,353	32	0

Figure 102. Projected Darmstadt Scenario Intensity Map



SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	None	None	None	Very light	Light	Moderate	Moderate/heavy	Heavy	Very heavy
PGA(%g)	<0.01	0.08	0.95	4.99	8.76	15.4	27	47.4	>83.2
PGV(cm/s)	<0	0.04	0.52	3.03	6.48	13.9	29.6	63.4	>136
INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based on Atkinson and Kaka (2007) Version 1: Processed 2019-01-10T18:51:59Z

△ Seismic Instrument ○ Macroseismic Observation ★ Epicenter ▭ Rupture

Figure 103. Projected Darmstadt Scenario Building Damage

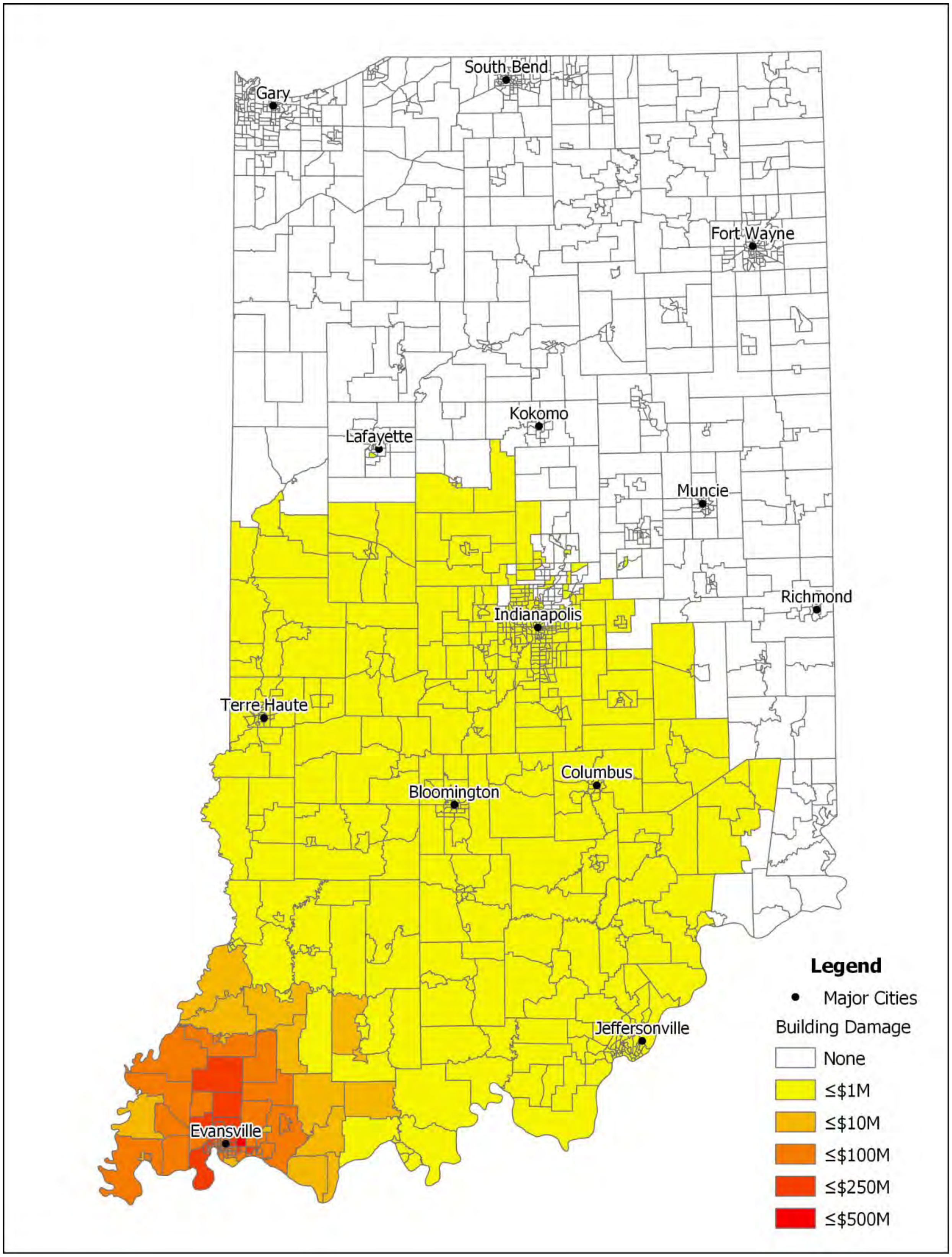


Figure 104. Projected Darmstadt Scenario State Facilities

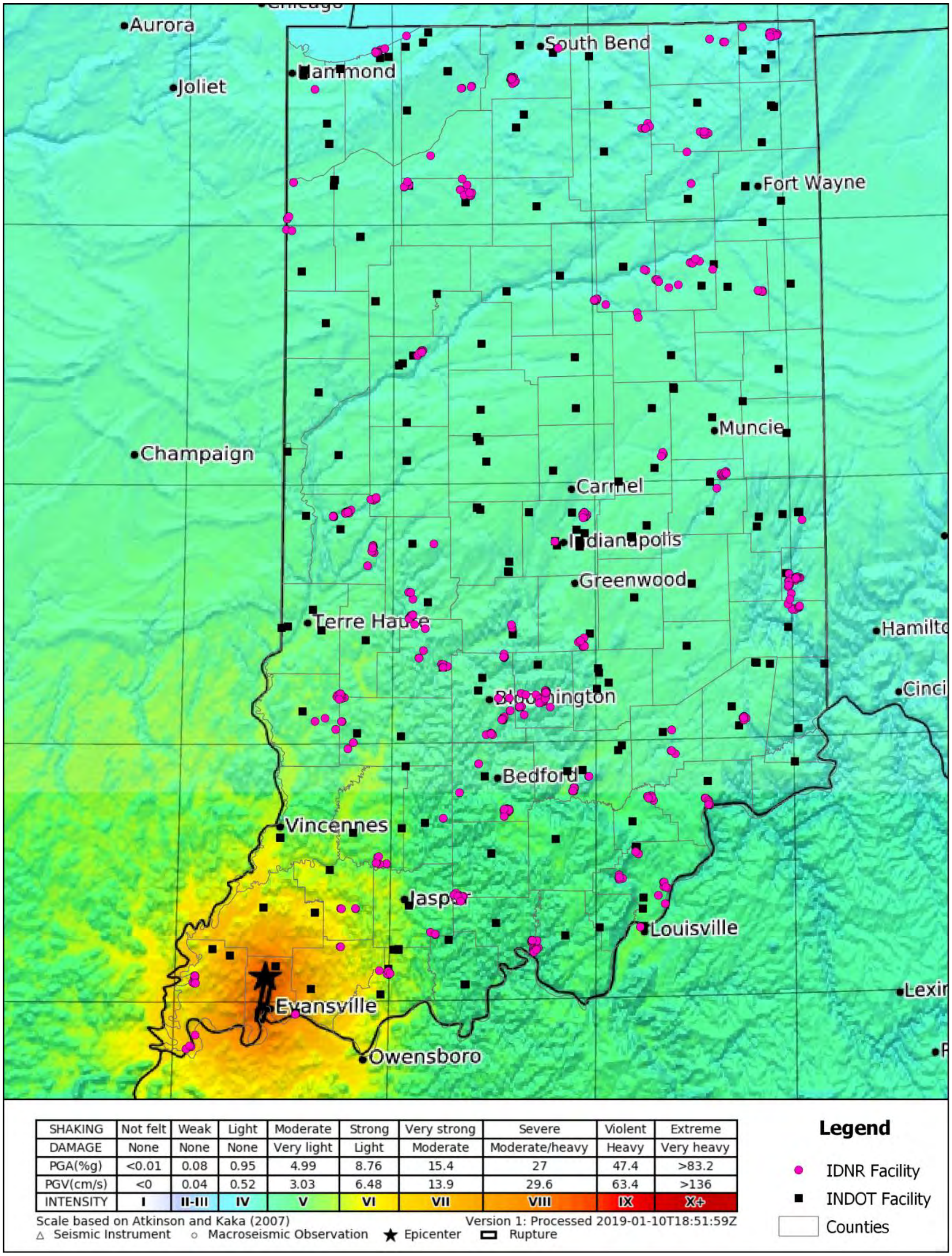


Figure 105. Projected Darmstadt Scenario Care Facility Damage

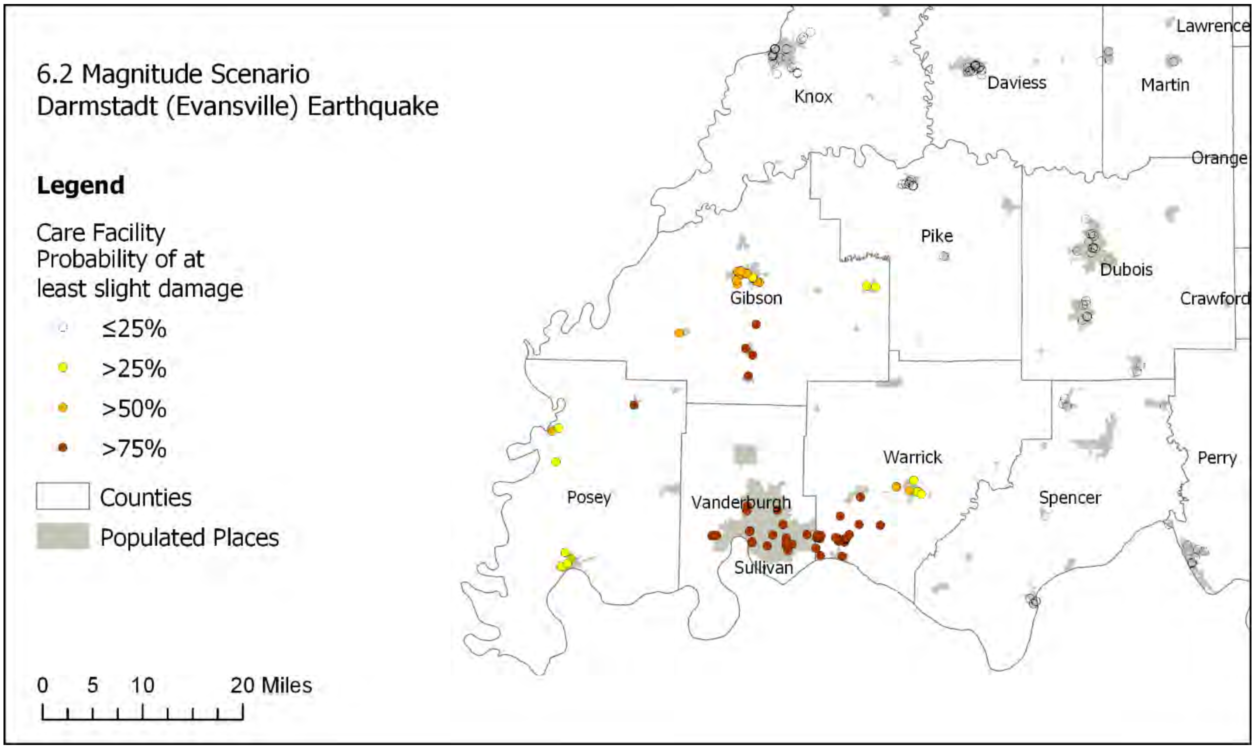


Figure 106. Projected Darmstadt Scenario School Damage

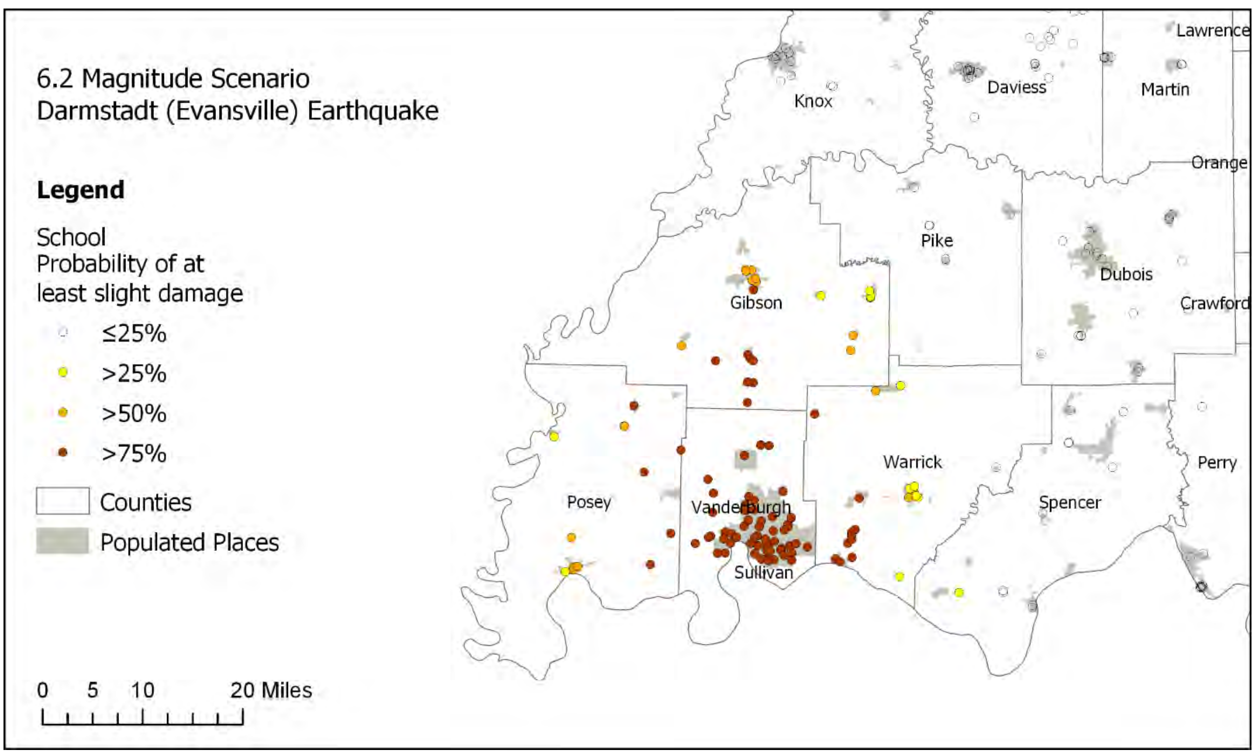


Figure 107. Projected Darmstadt Scenario EOC Damage

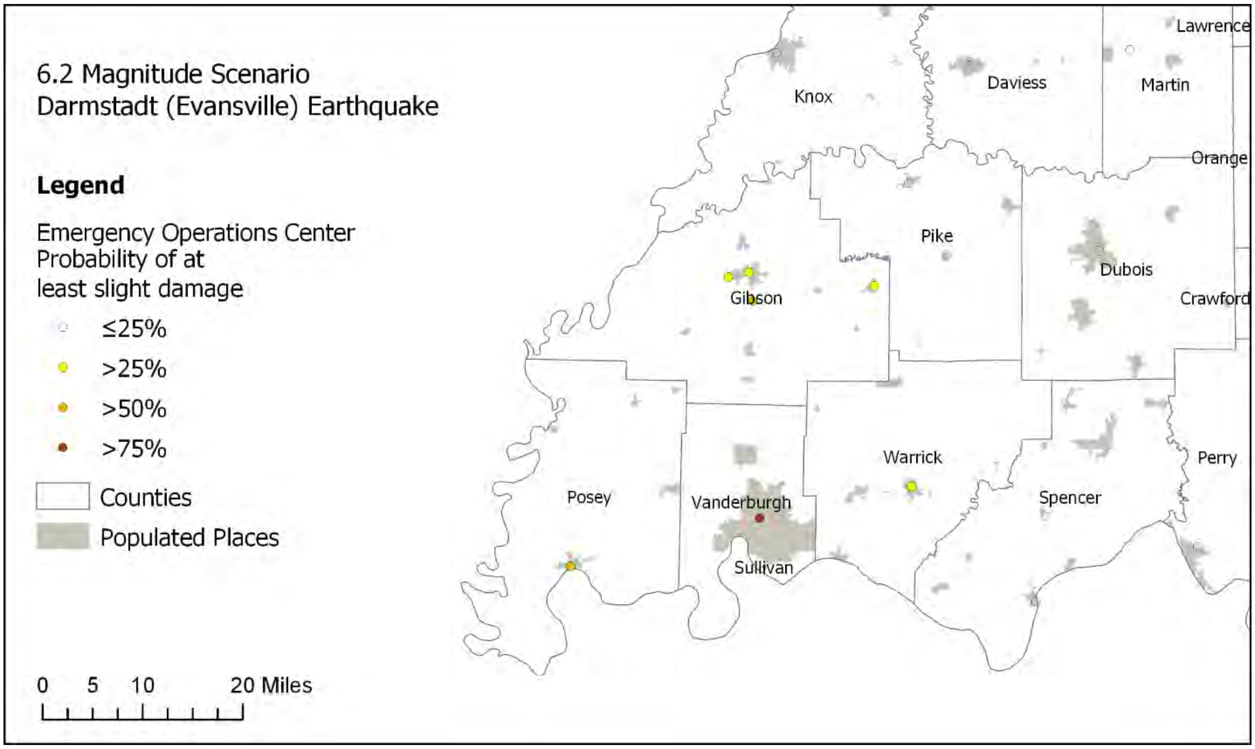


Figure 108. Projected Darmstadt Scenario Fire Station Damage

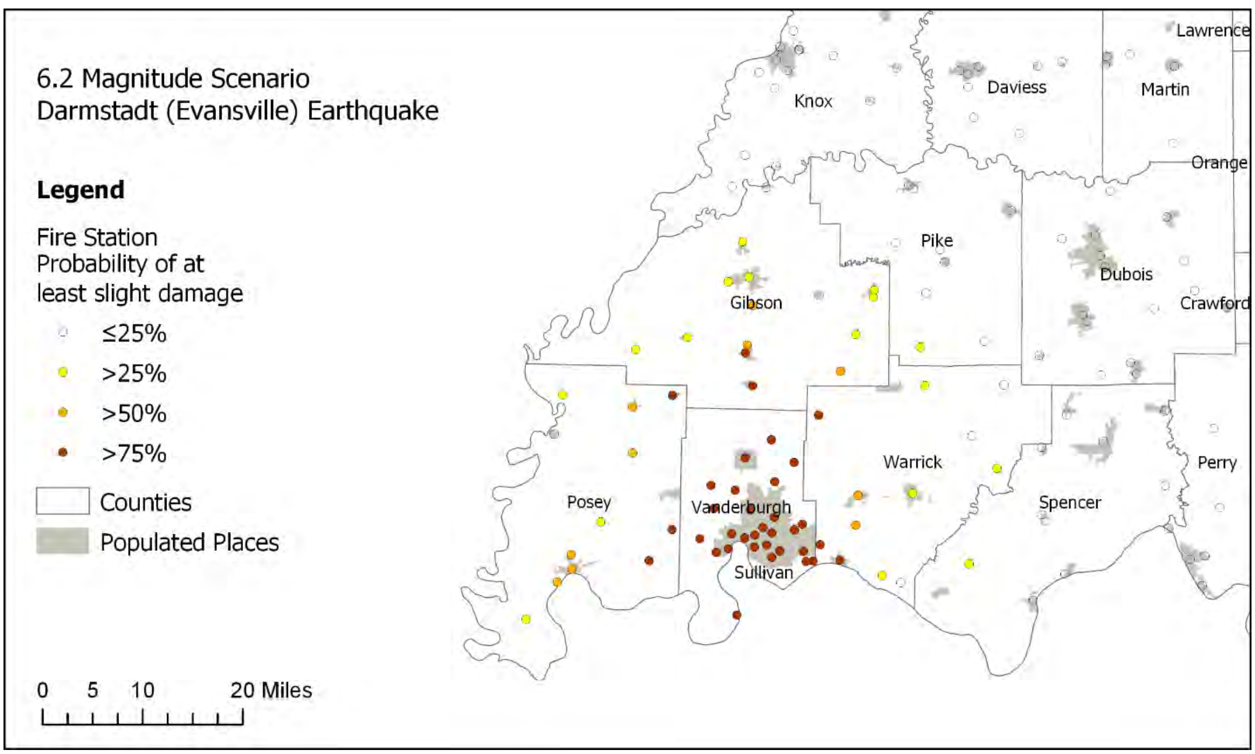
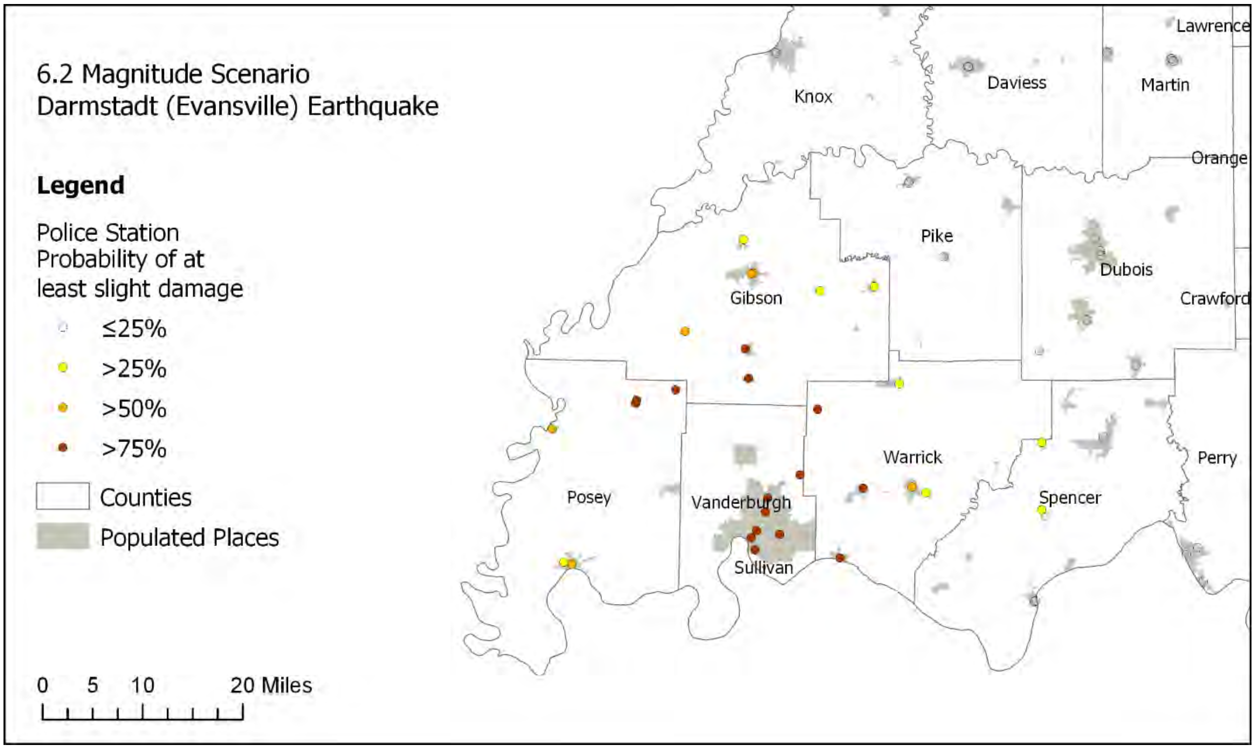


Figure 109. Projected Darmstadt Scenario Police Station Damage



Hazus estimates that 5,601 households could be displaced and 3,435 persons could be seeking temporary public shelter as a result of the earthquake. Additionally, Hazus estimates that almost 1.7 million tons of debris could be generated. Assuming 25 tons per truck, it would require 67,360 truckloads to remove the debris generated by the earthquake.

Predicted landslide probabilities for this scenario are shown in Figure 110. The results indicate that there would not be widespread landslide activity, but that areas of high relief to the west and north of Evansville may be subjected to significant landslide risk.

Predicted liquefaction is shown in Figure 111. These results indicate the presence of widespread liquefaction potential throughout the southwestern part of the state, centered on the areas dominated by thick unconsolidated river sediments in the Wabash and Ohio river valleys and their tributaries. This widespread liquefaction damage could affect populated areas in the Evansville and Vincennes metropolitan areas, and could have significant impact on post-earthquake transportation and utility services.

Figure 110. Projected Darmstadt Scenario Landslide Risk

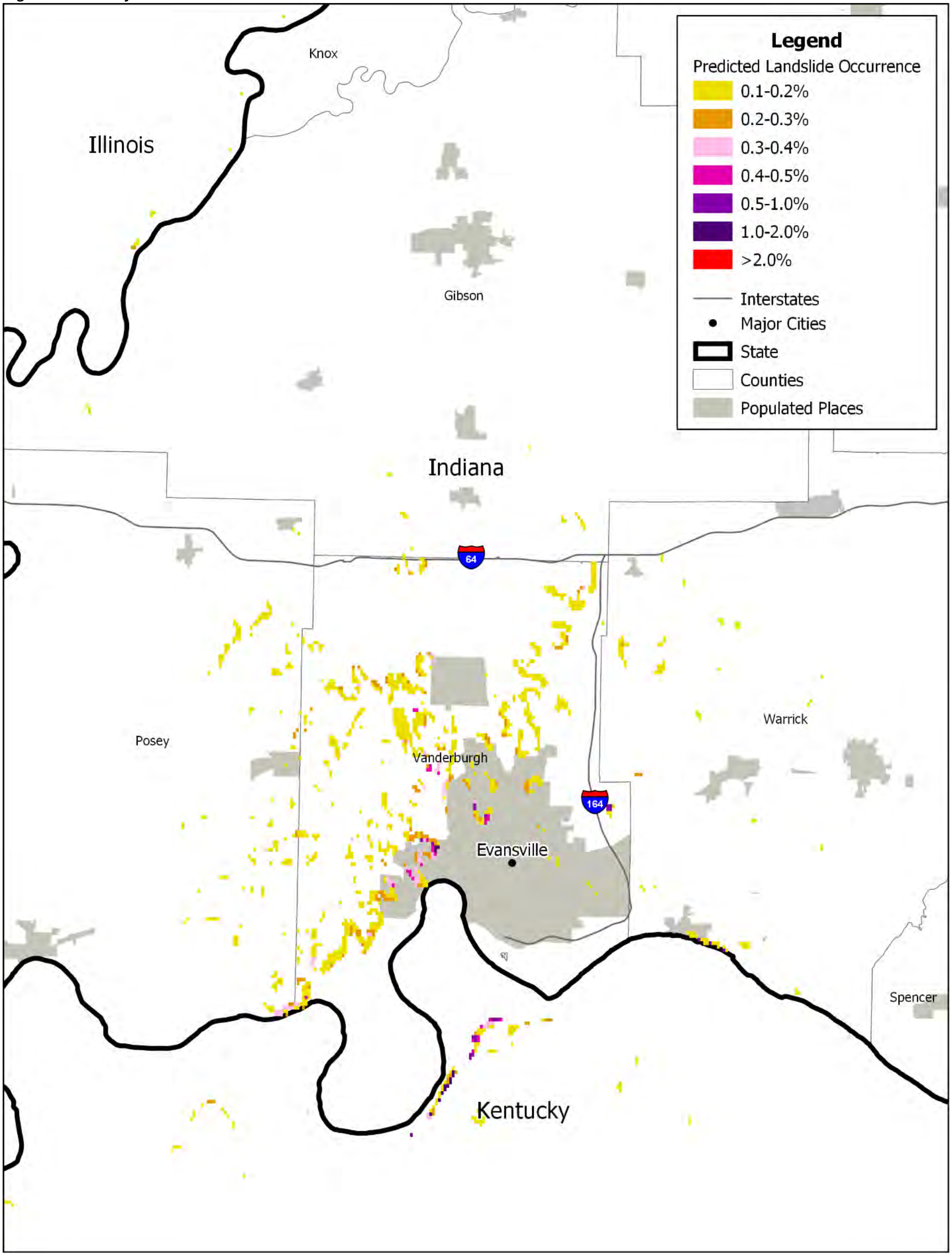
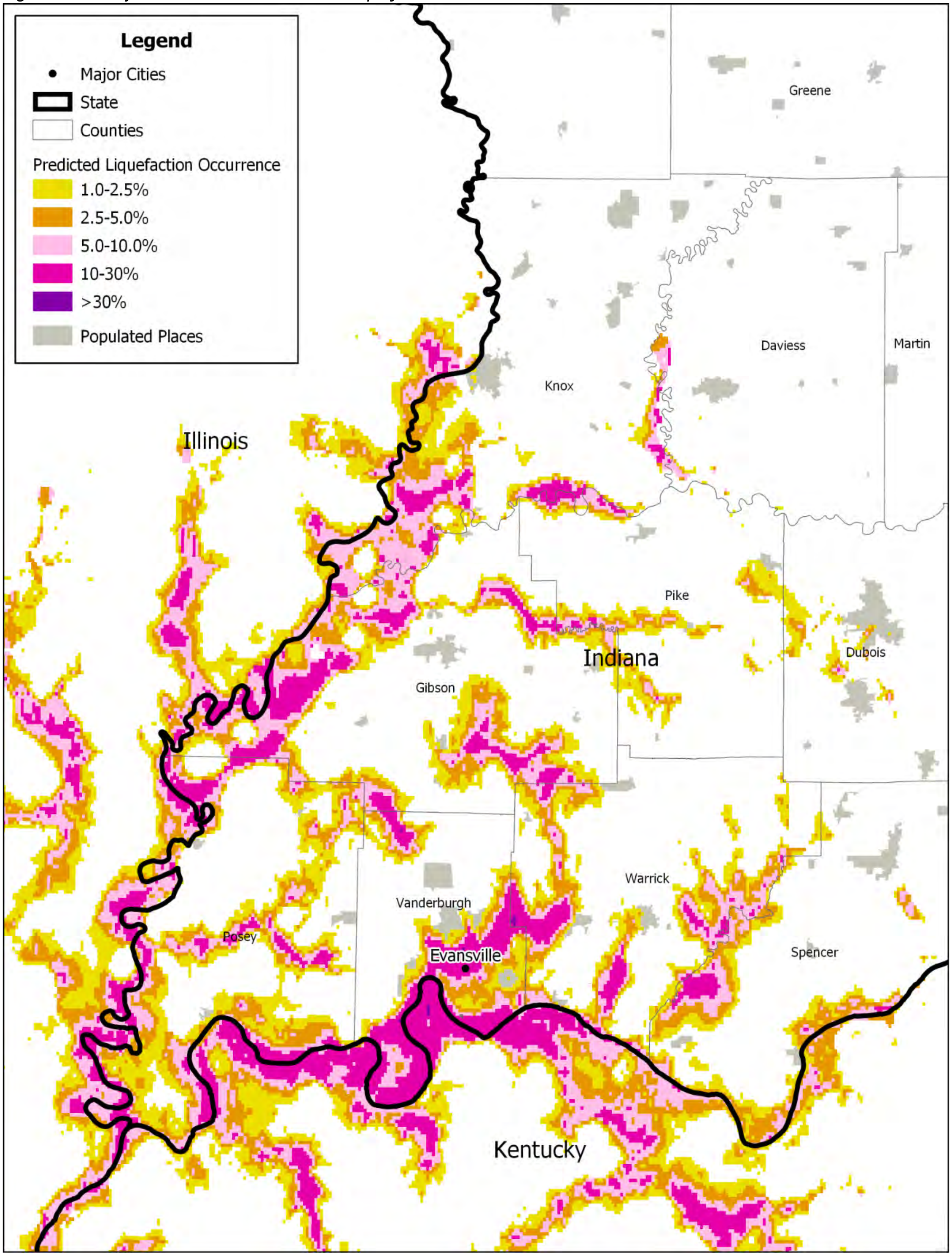


Figure 111. Projected Darmstadt Scenario Liquefaction Risk



6.3.2.1.5 5.8 Magnitude Scenario: Central Indiana Earthquake

This moderate event was chosen to represent the possible occurrence of a moderate-sized (M5.8) earthquake that could, in principle, occur anywhere within the state. The earthquake size is comparable to the largest earthquakes that have occurred in the region (including the 1937 Anna, Ohio sequence and the 1965 southern Illinois earthquake), and well below the maximum magnitude used for "background" seismic activity in the stable continental interior of the central U.S. (Petersen, et al., 2014). While the location is arbitrary, it is placed close to the surface location of the Fortville Fault, which extends for about 50 km (30 miles) in a NE direction from central Marion County (West & Warder, 1983). The earthquake is chosen to illustrate the potential effects of a moderate-magnitude event within a densely populated urban setting.

Figure 112 shows an intensity map of this scenario, along with the location of the earthquake. Note the table at the bottom of the graphic that indicates perceived levels of shaking, reported as levels in the Modified Mercalli Intensity scale. Note that strong shaking (intensity > VII) is concentrated in a very localized area surrounding the epicenter, but that a much larger area, extending to 30-50 miles from the epicenter, is expected to experience at least moderate (intensity > V) levels of shaking. Expected shaking is also intensified by the presence of thick layers of unconsolidated sediment, which tends to amplify ground motions at these sites.

Hazus estimates the economic loss for the earthquake at almost 20 billion dollars. The vast majority, almost 19 billion dollars, are building-related losses. Hazus estimates that 18,769 buildings could be at least moderately damaged, and 1,441 could be damaged beyond repair. Figure 113 shows where the damage could occur. It is important to note that these losses do not represent the comprehensive economic impact of the event, as losses from social impacts such as displaced households, casualties, etc. are not taken into account.

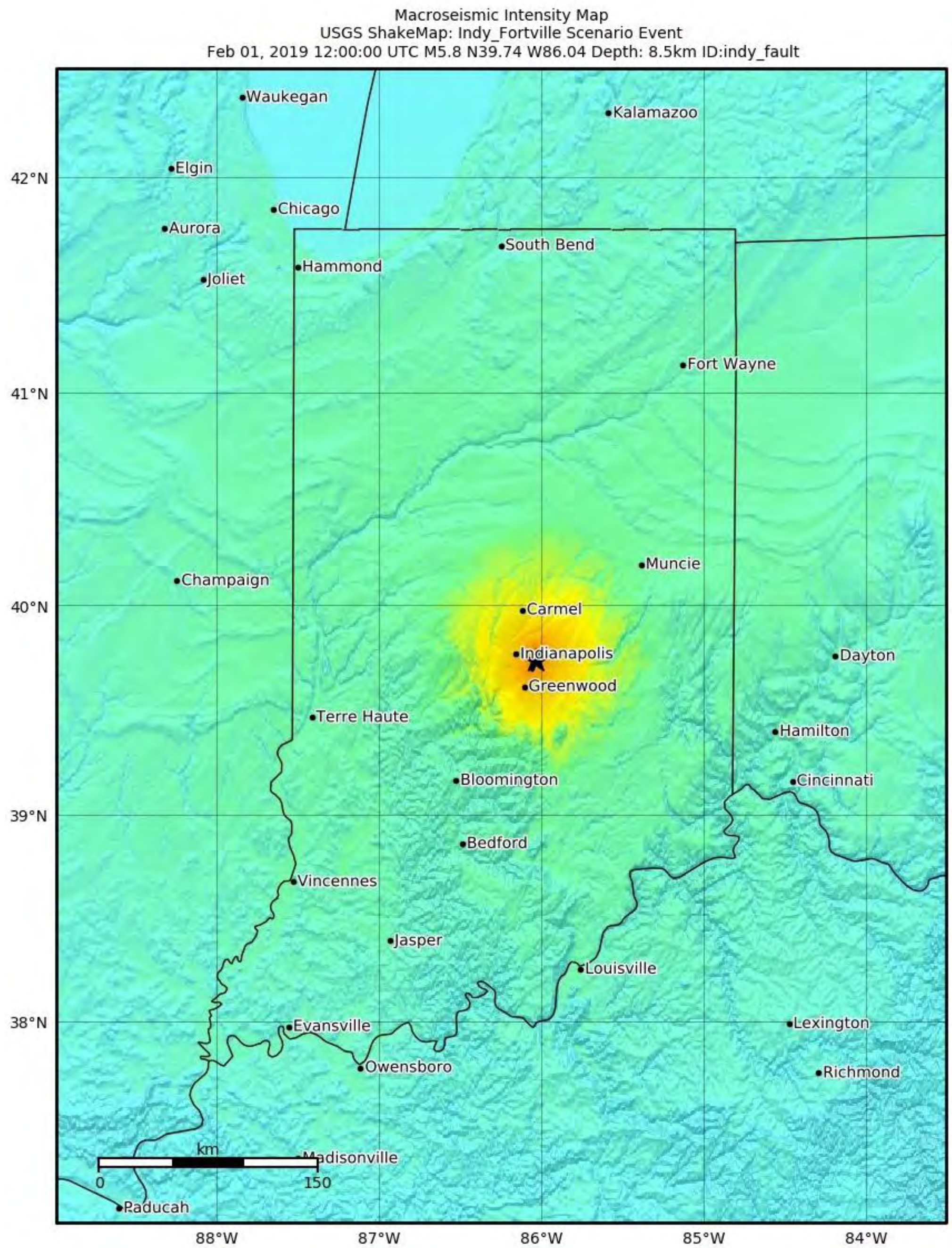
Figure 114 maps the state-owned facilities on top of the earthquake intensity map for this scenario. Some of these facilities are located in areas with more shaking than others.

Table 46 shows the estimated impact of the earthquake on essential facilities throughout the state. 158 hospitals, 108 schools, 14 fire stations and 8 police stations could suffer moderate damage. The damage to a particular facility depends on the distance to the earthquake, but also to the particular soil conditions and building construction type of that facility. Figure 115 to Figure 119 map the locations of the damaged essential facilities. On the day of the earthquake, the model estimates that a portion of the beds in hospitals that sustained earthquake-related damage would be unavailable for use. 86% of the beds would likely be available for use by patients already in those facilities. After one week, 93% of the beds impacted by earthquake damage would be back in service.

Table 46. Projected Central Indiana Scenario Essential Facilities Damage

	Total Essential Facilities	Facilities with Slight to No Damage	Facilities with Moderate Damage > 50%	Facilities with Complete Damage > 50%
Hospitals	3,423	3,265	158	0
Schools	2,947	2,839	108	0
EOCs	123	123	0	0
Police Stations	593	585	8	0
Fire Stations	1,385	1,371	14	0

Figure 112. Projected Central Indiana Scenario Intensity Map



SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	None	None	None	Very light	Light	Moderate	Moderate/heavy	Heavy	Very heavy
PGA(%g)	<0.01	0.08	0.95	4.99	8.76	15.4	27	47.4	>83.2
PGV(cm/s)	<0	0.04	0.52	3.03	6.48	13.9	29.6	63.4	>136
INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based on Atkinson and Kaka (2007) Version 1: Processed 2019-01-10T18:51:59Z

△ Seismic Instrument ○ Macroseismic Observation ★ Epicenter ▭ Rupture

Figure 113. Projected Central Indiana Scenario Building Damage

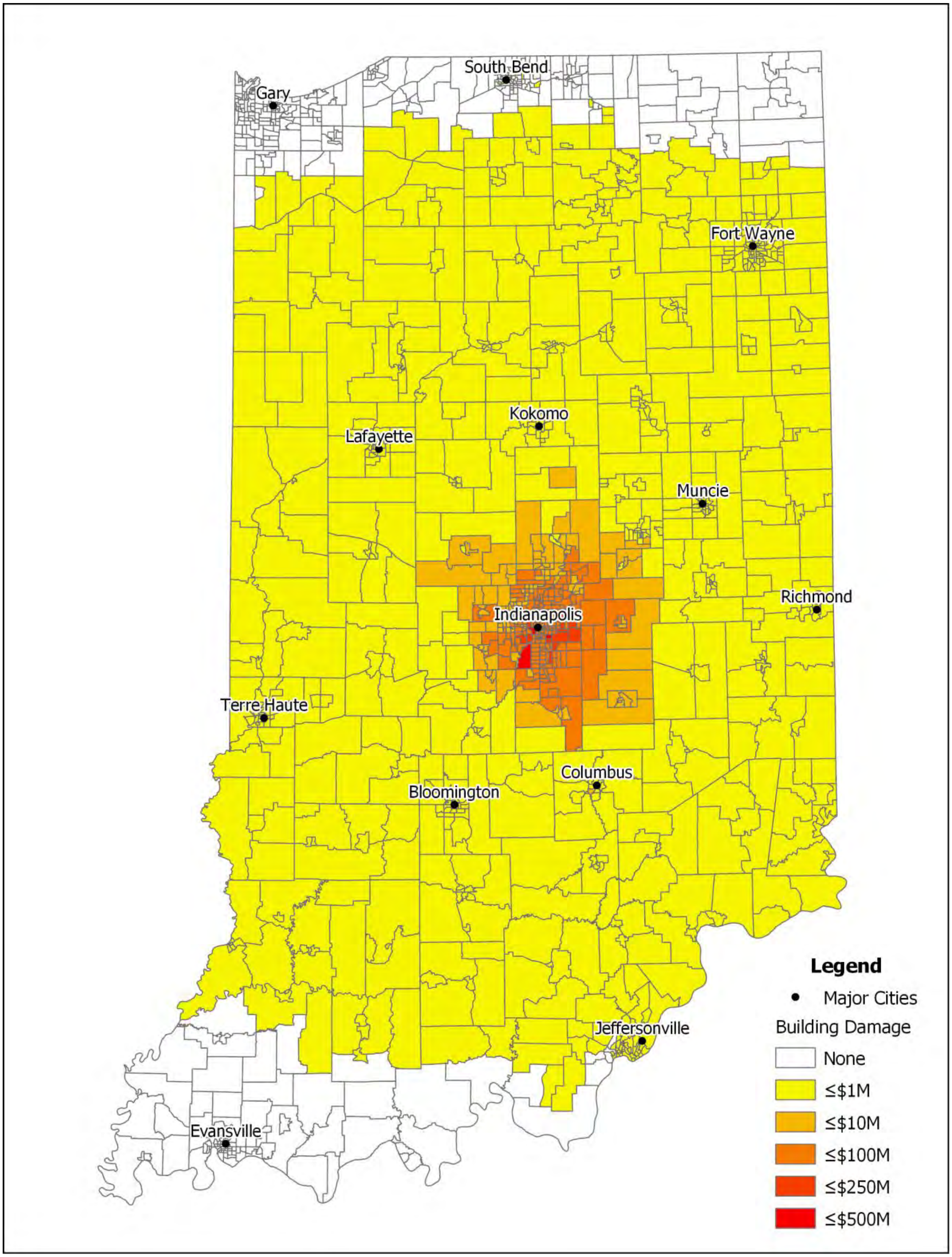


Figure 114. Projected Central Indiana Scenario State Facilities

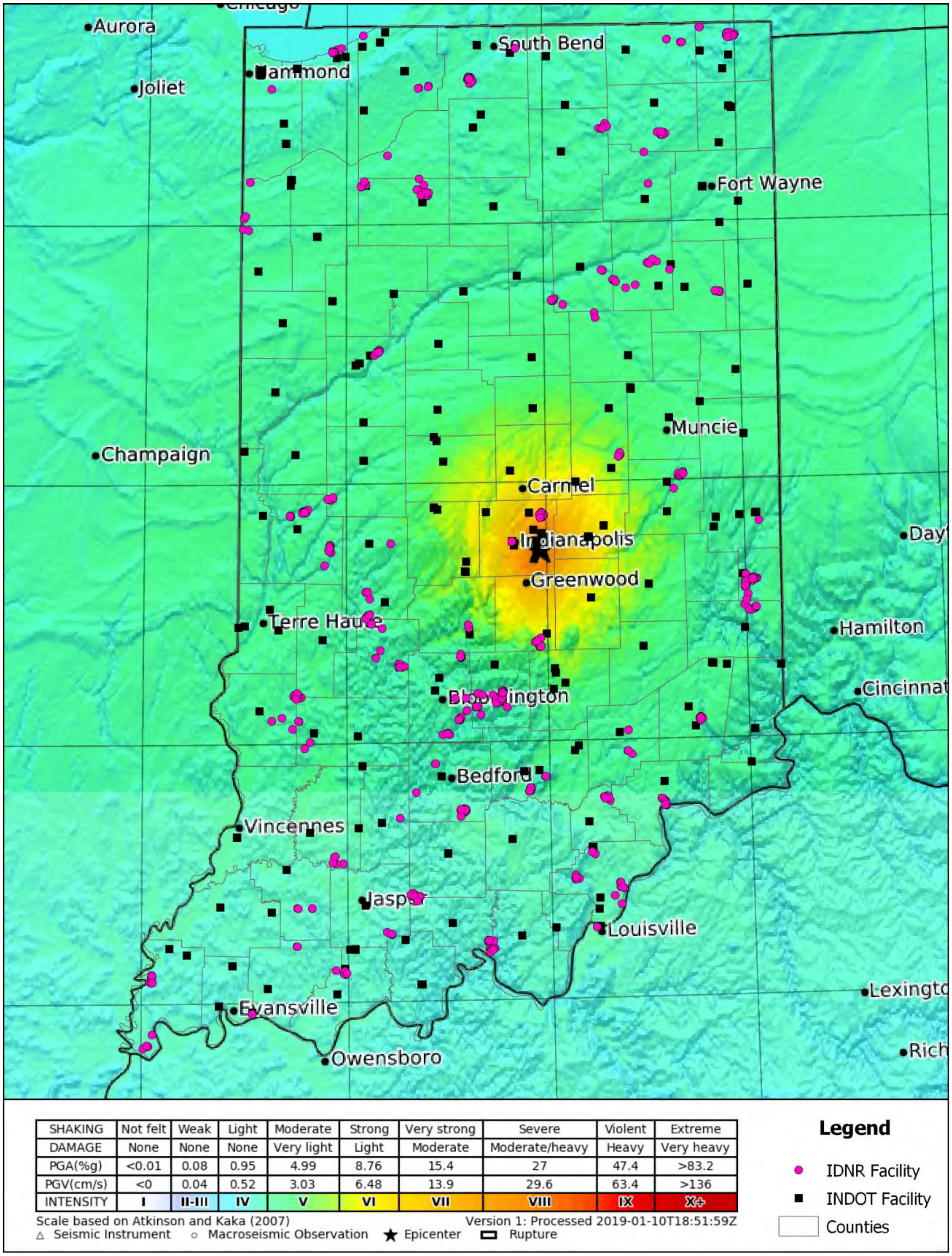


Figure 115. Projected Central Indiana Scenario Care Facility Damage

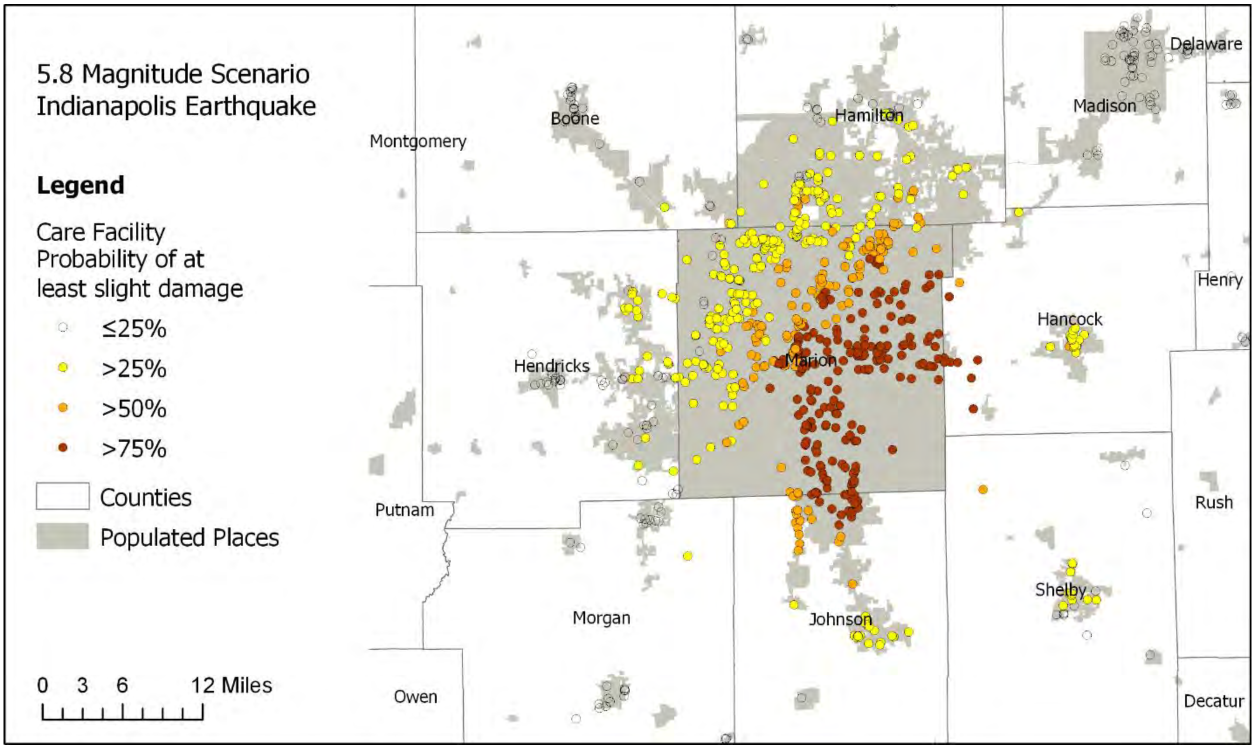


Figure 116. Projected Central Indiana Scenario School Damage

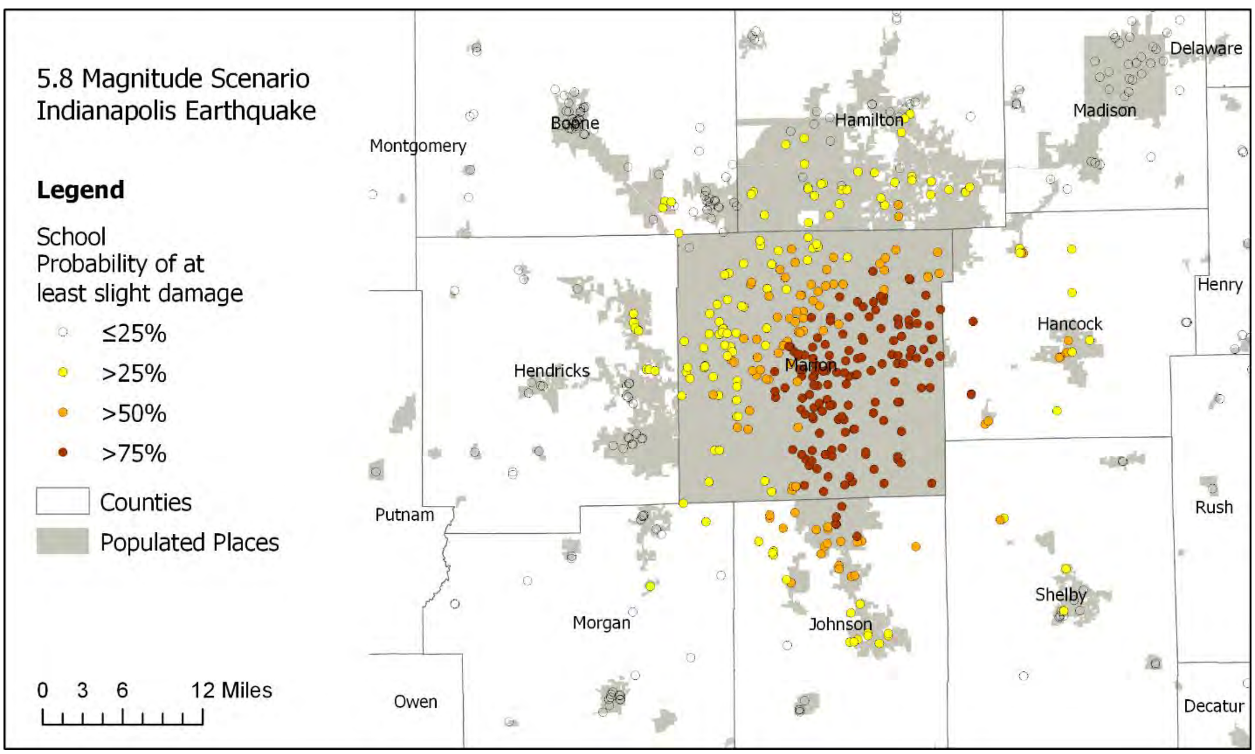


Figure 117. Projected Central Indiana Scenario EOC Damage

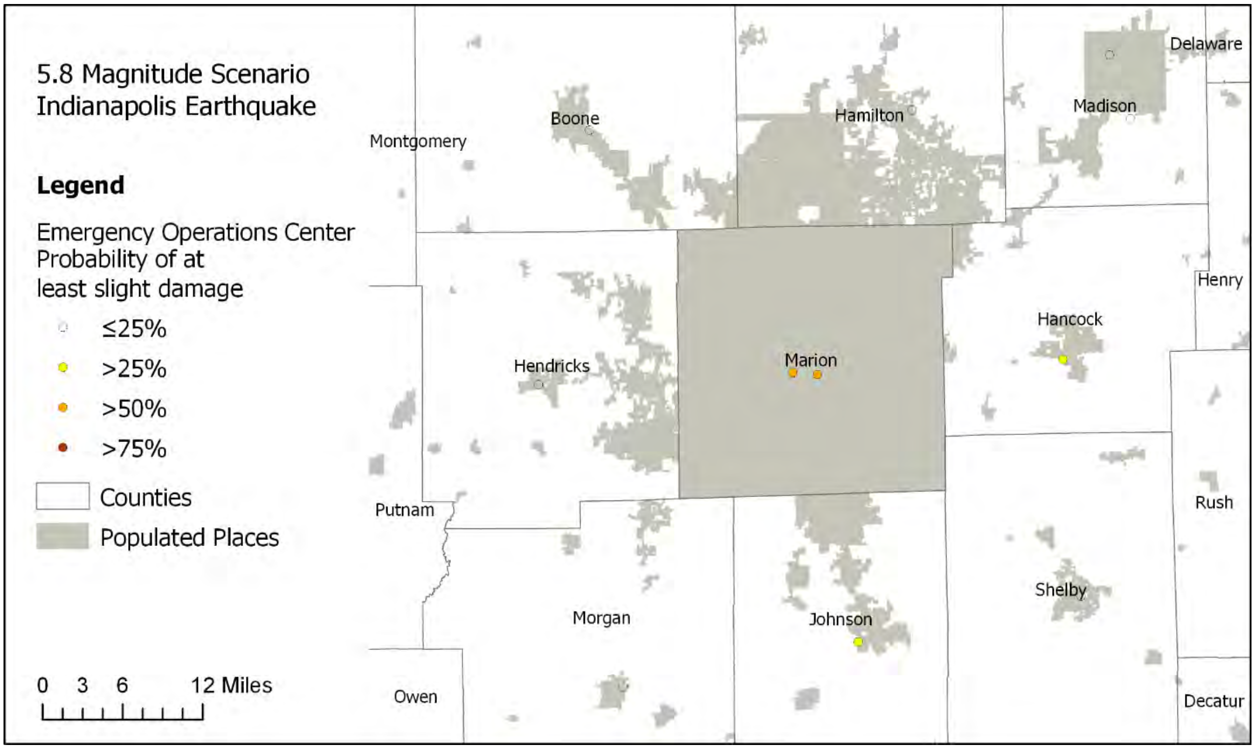


Figure 118. Projected Central Indiana Scenario Fire Station Damage

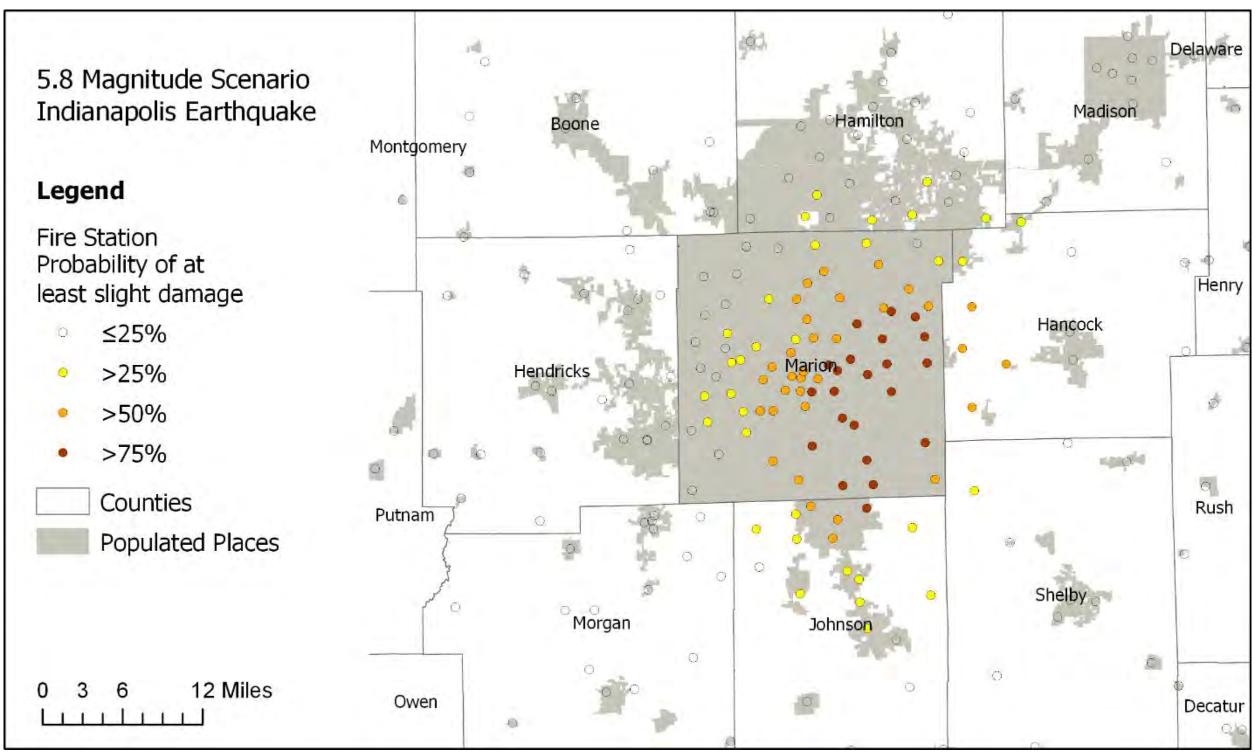
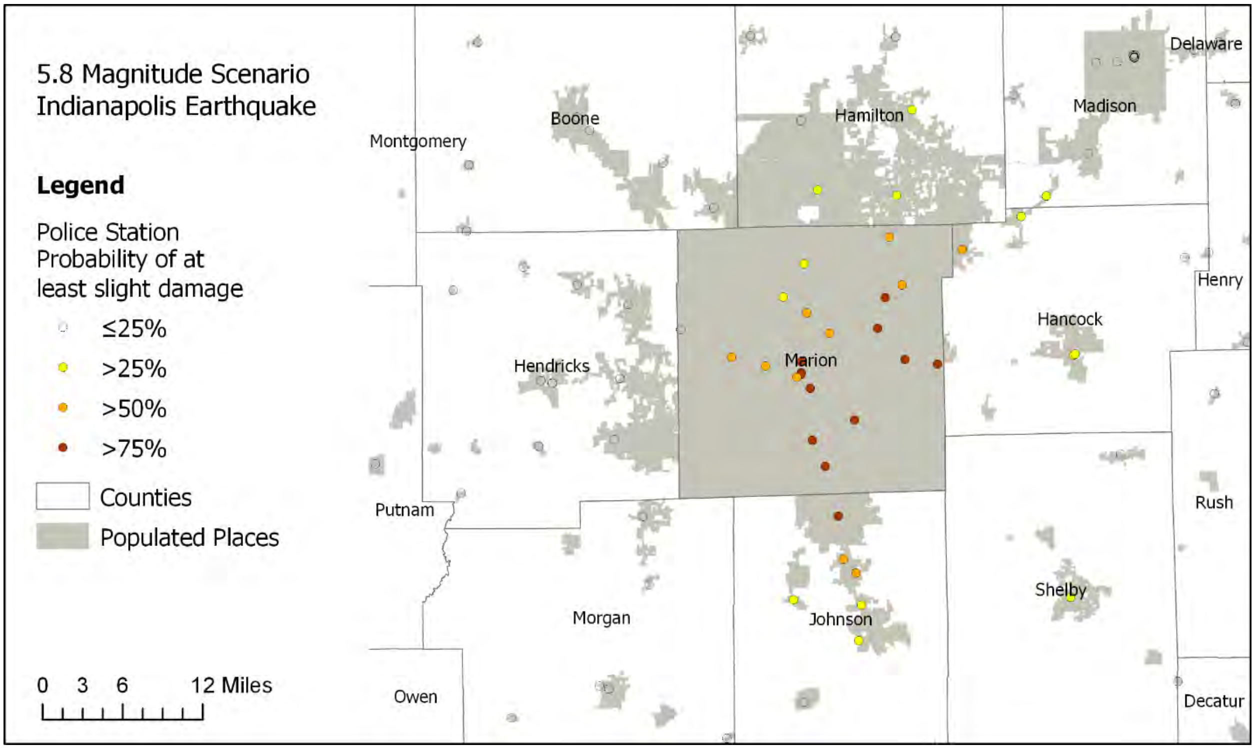


Figure 119. Projected Central Indiana Scenario Police Station Damage



Hazus estimates that 5,696 households could be displaced and 3,765 persons could be seeking temporary public shelter as a result of the earthquake. Additionally, Hazus estimates that 2 million tons of debris could be generated. Assuming 25 tons per truck, it would require 80,320 truckloads to remove the debris generated by the earthquake.

Predicted landslide probabilities for this scenario are shown in Figure 120. Because of the localized nature of this earthquake, widespread landslide activity is not expected. These results suggest that a few areas of high relief near Indianapolis may be subjected to moderate landslide risk, mostly associated with steep river banks near the White River and Fall Creek river valleys.

Predicted liquefaction is shown in Figure 121. The results indicate the presence of localized but significant liquefaction potential throughout Central Indiana, particularly in the areas dominated by thick unconsolidated river sediments in the White River and Sugar Creek river valleys and their tributaries. This liquefaction damage could affect populated areas in the Indianapolis metropolitan areas, and could have significant impact on post-earthquake transportation and utility services.

Figure 120. Projected Central Indiana Scenario Landslide Risk

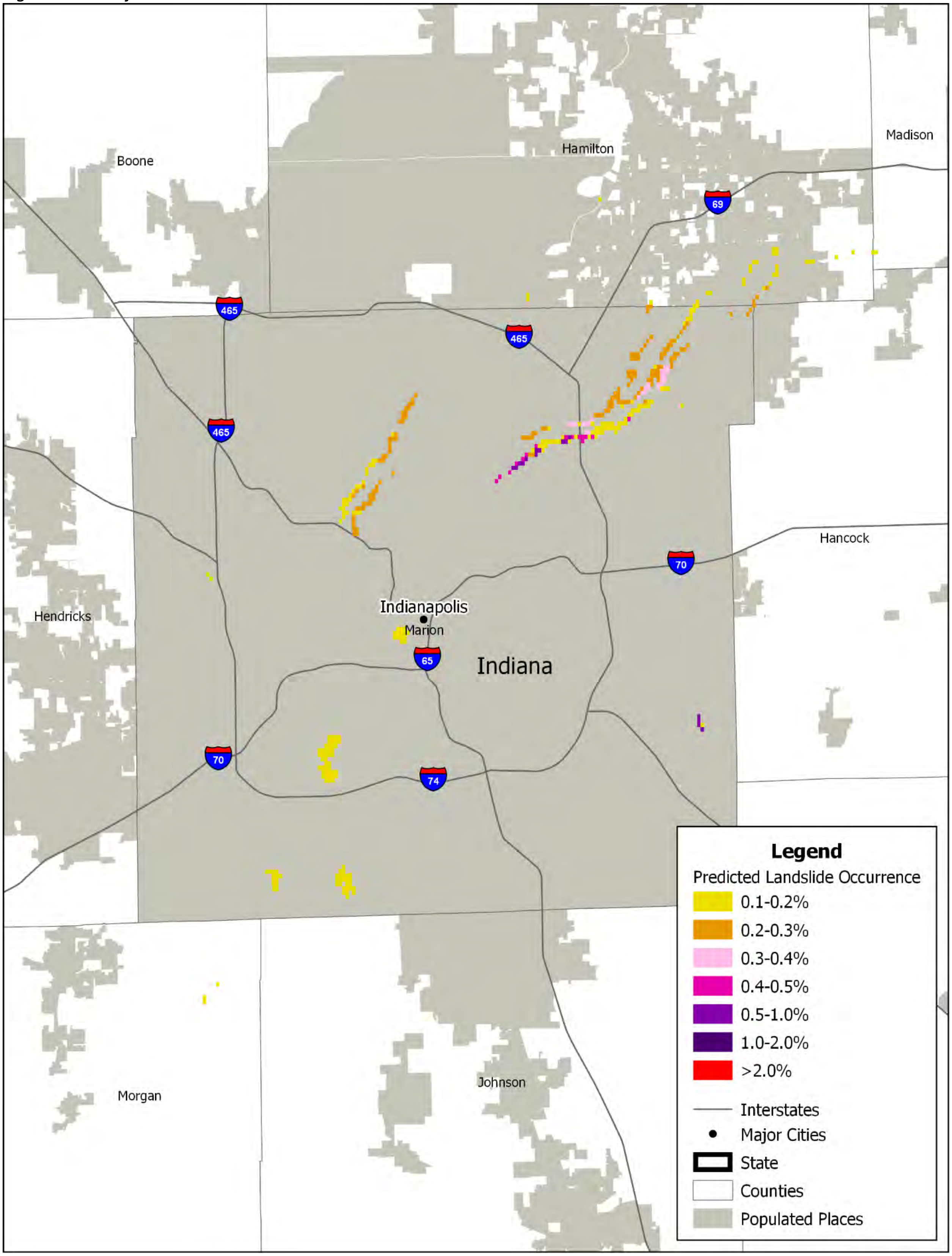
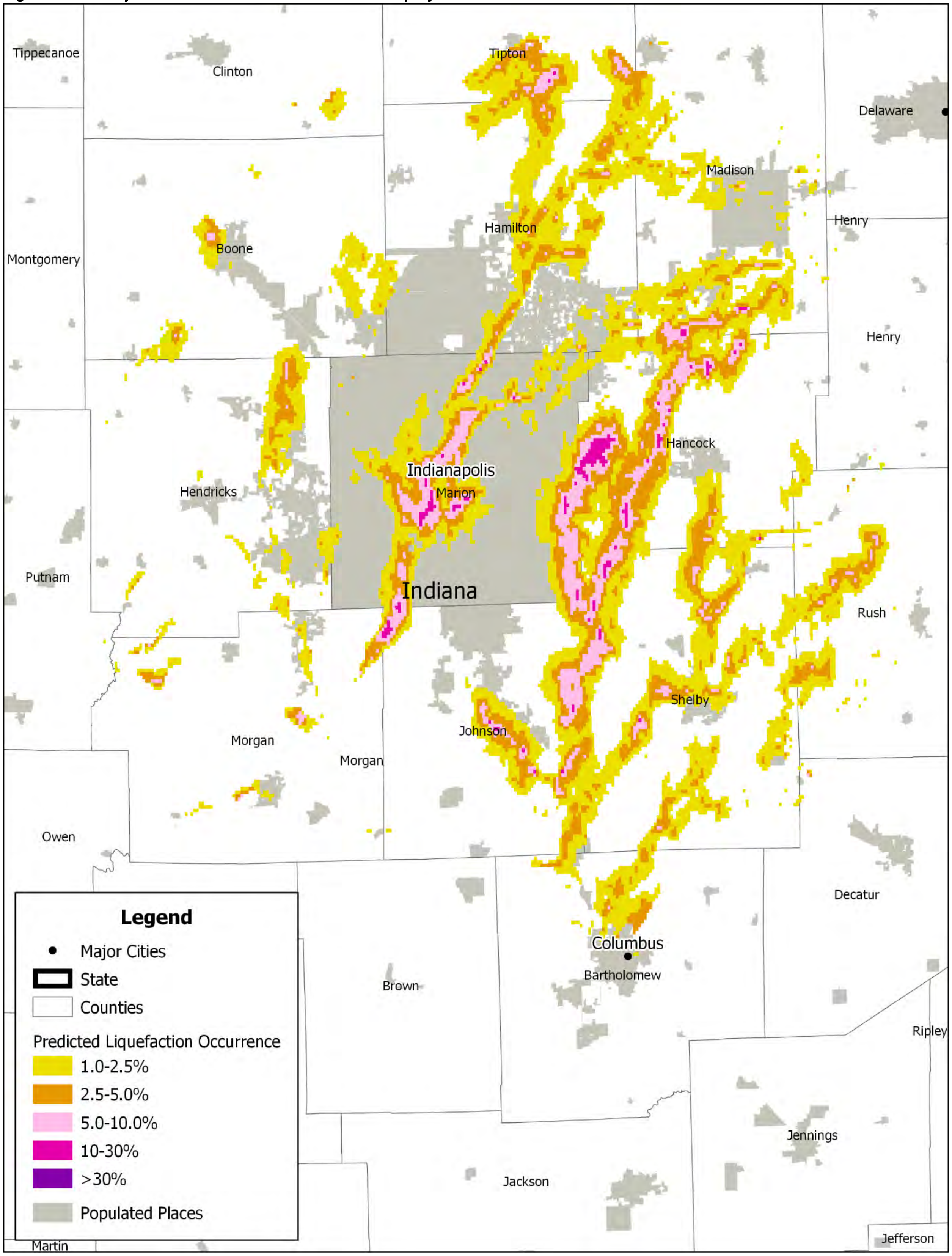


Figure 121. Projected Central Indiana Scenario Liquefaction Risk



6.3.2.1.6 500-Year Probabilistic Scenario

This scenario seeks to represent the cumulative hazard facing each area of the state based on a probabilistic likelihood of ground shaking associated with all of the sources that could potentially affect a given area. Shown here is the estimated ground shaking associated a .2% annual probability of exceedance (equivalent to a 500-year return period). In principle, this analysis evaluates the average impacts of a multitude of possible earthquake sources with a magnitude that would be typical of that expected for a 500-year return (.2% probability).

Hazus estimates the economic loss for the earthquake at just shy of 3 billion dollars. The vast majority, about 2.5 million dollars, are building-related losses. Hazus estimates that 6,576 buildings could be at least moderately damaged, and 32 could be damaged beyond repair. Figure 122 shows where the damage could occur. It is important to note that these losses do not represent the comprehensive economic impact of this probabilistic scenario, as losses from social impacts such as displaced households, casualties, etc. are not taken into account.

Table 47 shows the estimated impact of the earthquake on essential facilities throughout the state. None are modeled to suffer moderate damage. The damage to a particular facility depends on the distance to the earthquake, but also to the particular soil conditions and building construction type of that facility. Figure 123 to Figure 127 map the locations of the damaged essential facilities. On the day of the earthquake, the model estimates that a portion of the beds in hospitals that sustained earthquake-related damage would be unavailable for use. 86% of the beds would likely be available for use by patients already in those facilities. After one week, 95% of the beds impacted by earthquake damage would be back in service.

Table 47. Projected 500-Year Probabilistic Scenario Essential Facilities Damage

	Total Essential Facilities	Facilities with Slight to No Damage	Facilities with Moderate Damage > 50%	Facilities with Complete Damage > 50%
Hospitals	3,423	3,423	0	0
Schools	2,947	2,947	0	0
EOCs	123	123	0	0
Police Stations	593	593	0	0
Fire Stations	1,385	1,385	0	0

Figure 122. Projected 500-Year Probabilistic Scenario Building Damage

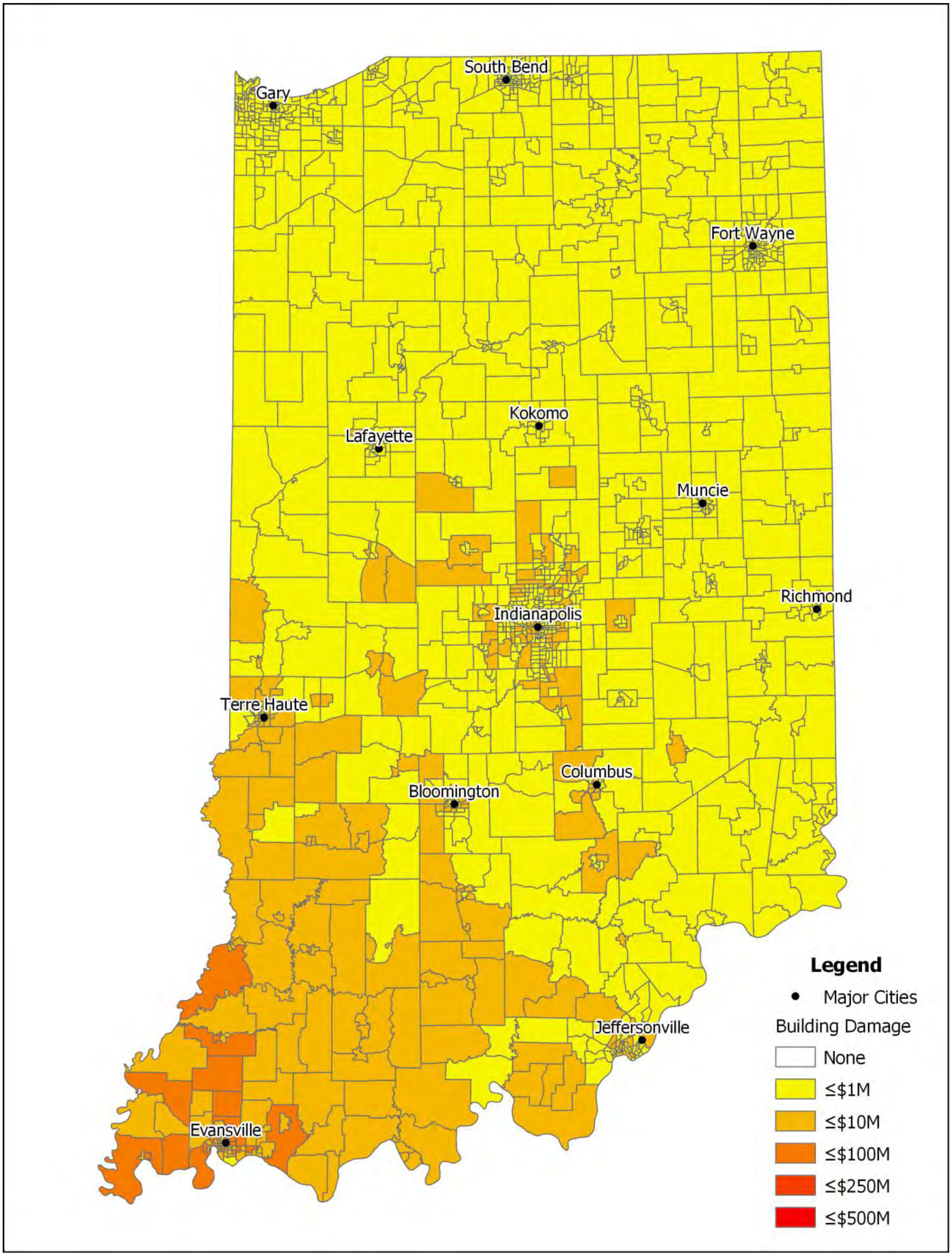


Figure 123. Projected 500-Year Probabilistic Scenario Care Facilities Damage

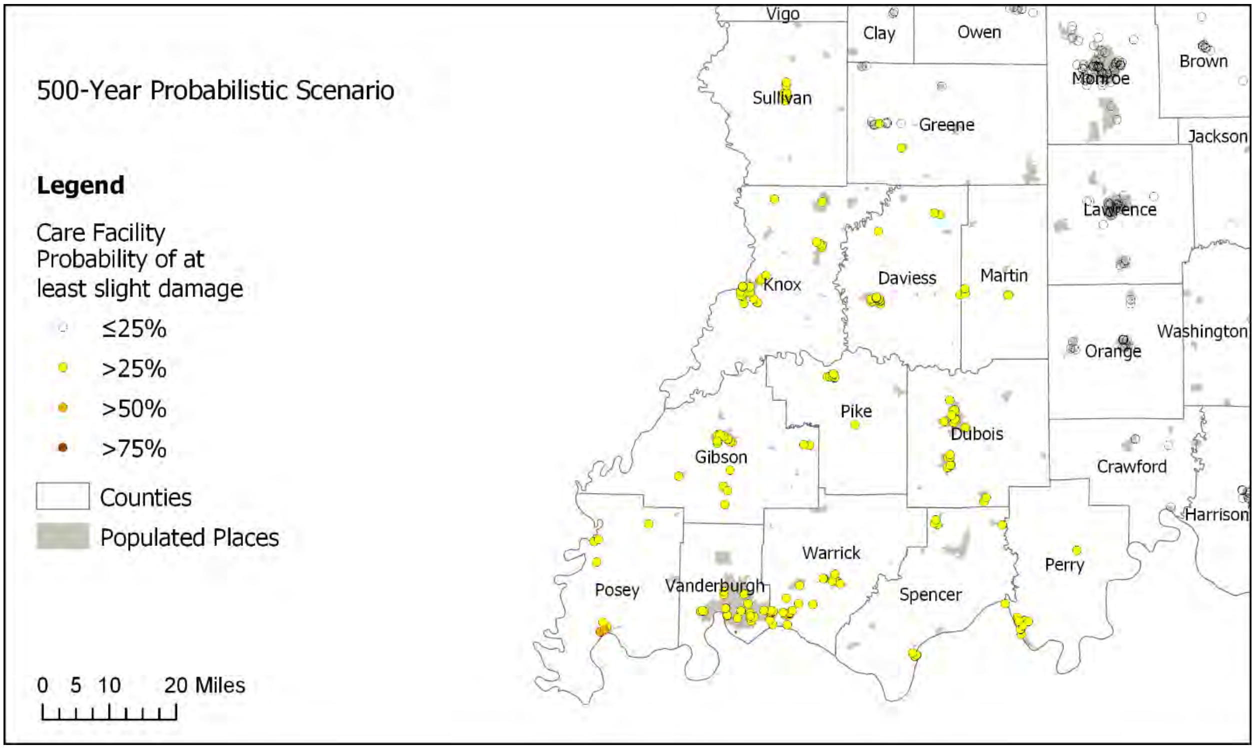


Figure 124. Projected 500-Year Probabilistic Scenario School Damage

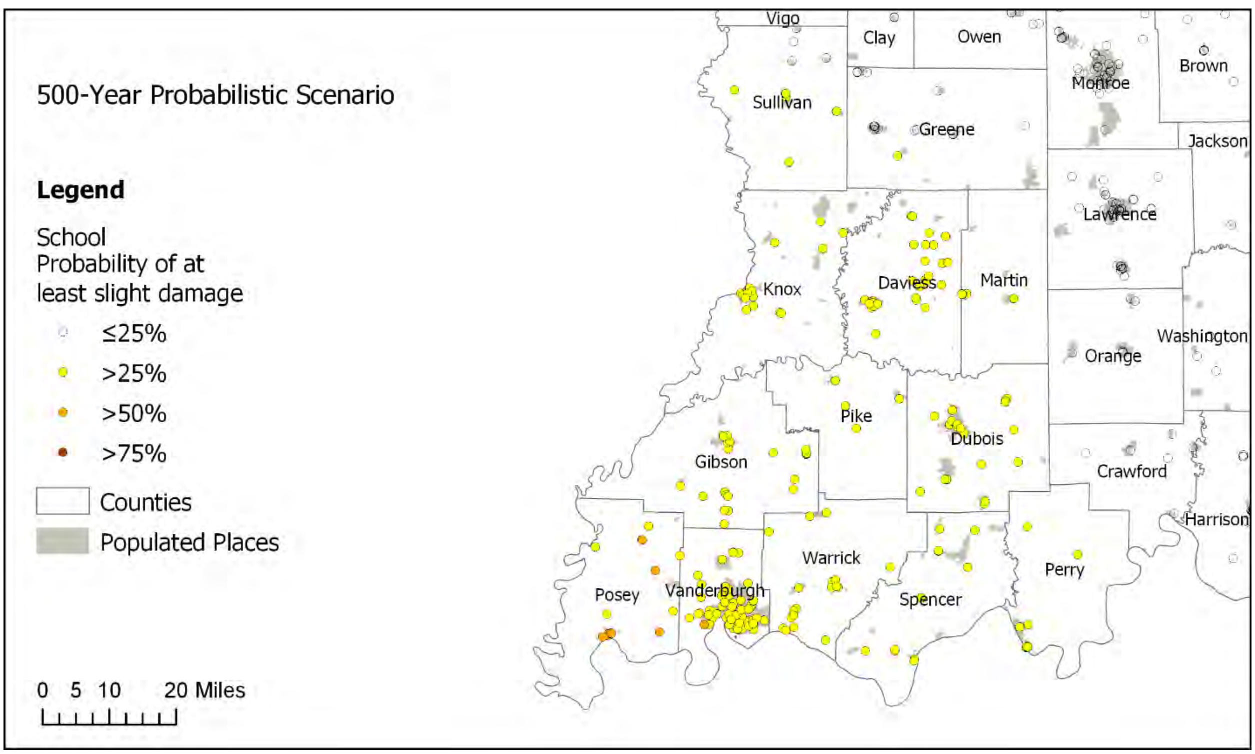


Figure 125. Projected 500-Year Probabilistic Scenario EOC Damage

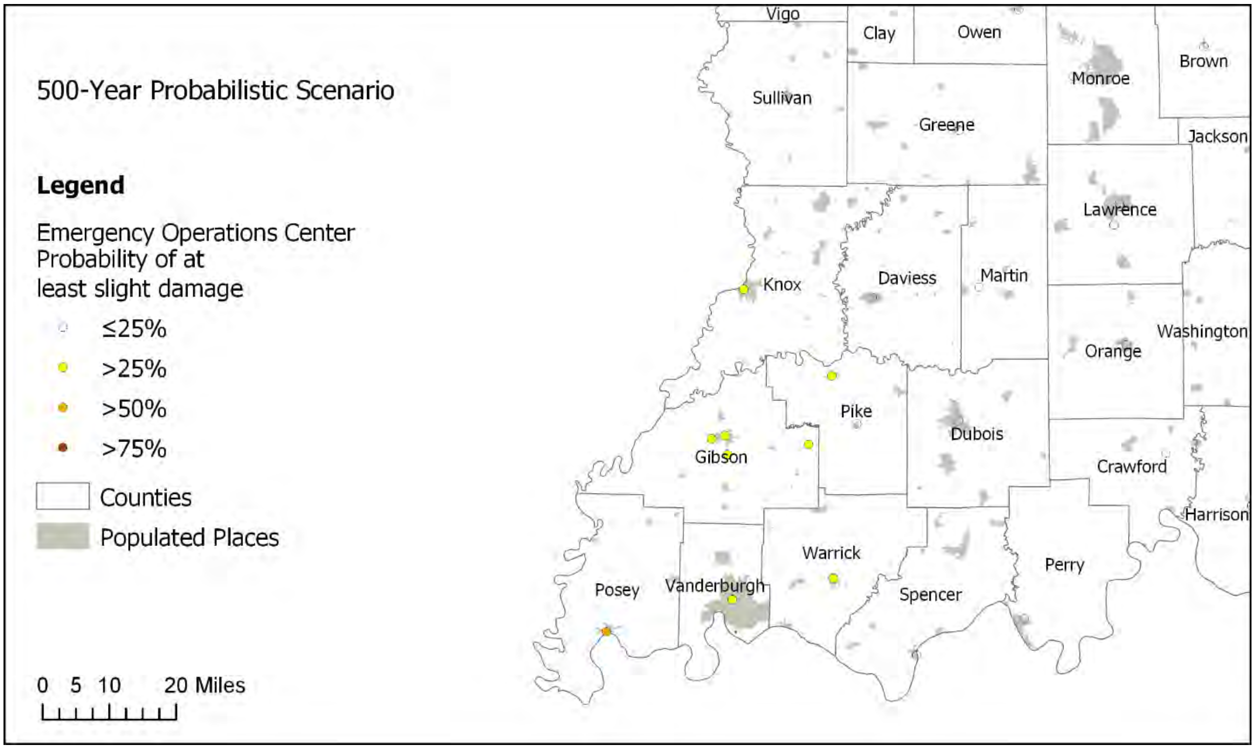


Figure 126. Projected 500-Year Probabilistic Scenario Fire Station Damage

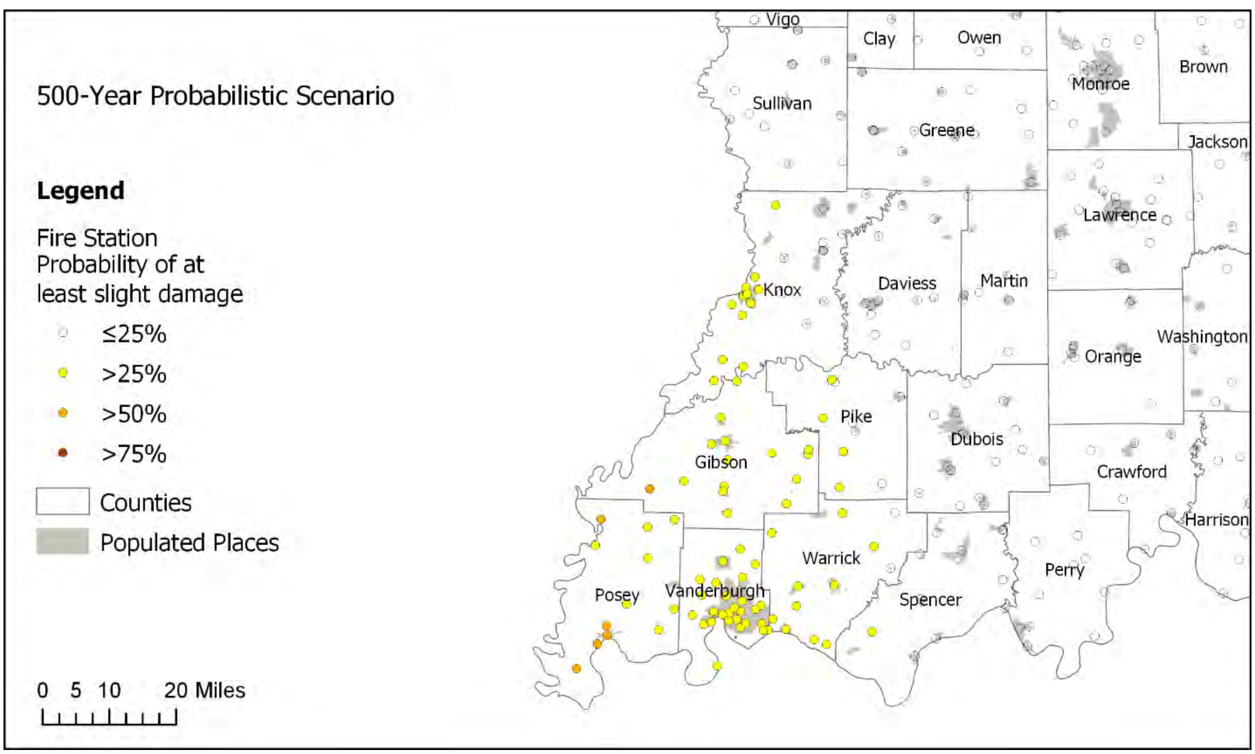
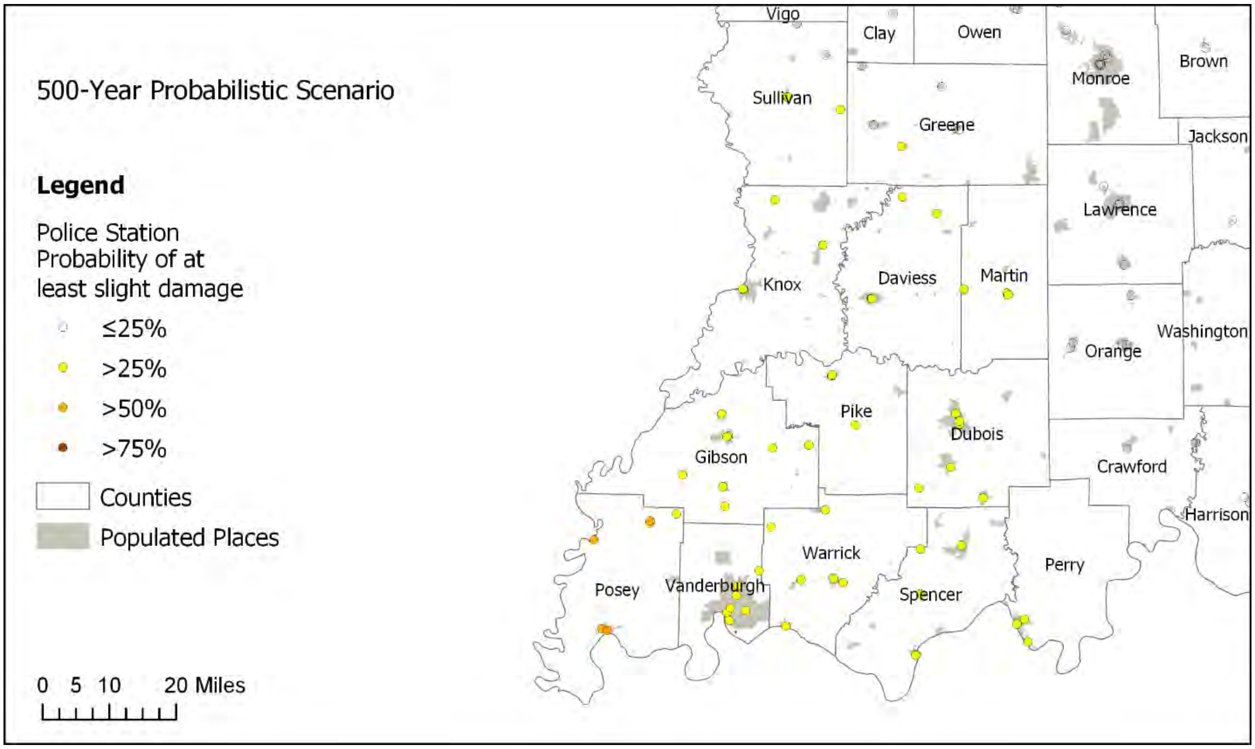


Figure 127. Projected 500-Year Probabilistic Scenario Police Station Damage



Hazus estimates that 930 households could be displaced and 577 persons could be seeking temporary public shelter as a result of the composite earthquake hazard. Additionally, Hazus estimates that over 400,000 million tons of debris could be generated. Assuming 25 tons per truck, it would require 17,360 truckloads to remove the debris generated by the earthquake.

6.3.2.2 Earthquake Secondary Effects

The primary damage caused by an earthquake is associated with the ground motion caused by seismic waves. Most earthquake damage results when those seismic waves pass beneath buildings, roads, and other structures. For example, ground shaking may cause a building's exterior walls to crumble, injuring people, blocking sidewalks and streets and bringing down utility lines. The earthquake impacts are highly variable, depending on a site's location relative to the earthquake. Damages at a particular site are determined by the earthquake source parameters (magnitude, duration of shaking, depth), the distance to the site, and the local site conditions (including what type of Earth material is present at that location.

These factors contribute to generate the spatial variation of ground motions (represented by ground acceleration or intensity). The direct impact of the earthquake depends largely on the characteristics of affected buildings in which people live or work, including the building use, design type, occupancy, year of construction, height, floor plan, etc. For instance, older buildings constructed of unreinforced brick or stone are particularly vulnerable to earthquake-related damage. Newer construction types with more flexible building materials such as steel or wood tend to be more resistant to the effects of ground vibration.

Earthquake-resistant construction is one of the main ways of reducing the enormous destructive potential of earthquakes and the threat they pose to human life. Rigorous building codes for exposed regions, and enforcement of those codes, are essential to widespread implementation of state-of-the-art earthquake-resistant building methods.

In addition to the primary impacts of the ground-shaking on buildings, strong earthquakes often trigger serious secondary effects which also have a high potential for damage and loss of life. They are often the prime factor for determining whether an earthquake is categorized as a catastrophe. These are the main secondary effects: fire, landslide, liquefaction, and tsunami and seiches.

6.3.2.2.1 Fires

Fire has long been recognized as a major hazard following earthquakes. Earthquake shaking can rupture gas lines, trigger electrical sparks, upset burning candles, stoves and fireplaces. The effects of fire can in some cases be more severe than the primary impacts of the earthquake shaking. Perhaps the most infamous earthquake-initiated fires in US history burned much of the City of San Francisco in the aftermath of the 1906 earthquake. Up to 90% of building damage after the earthquake was attributed to the fires and the crude firefighting techniques employed in an effort to contain the blaze. In addition to their direct impacts, earthquakes can block access to fire-fighting equipment and damage water supplies, making fighting the blazes, of which there might be many across a city, especially challenging. The potential impacts of post-earthquake fires are, in principle, incorporated into the damage estimates provided by the Hazus models discussed in the previous section.

6.3.2.2.2 Landslides

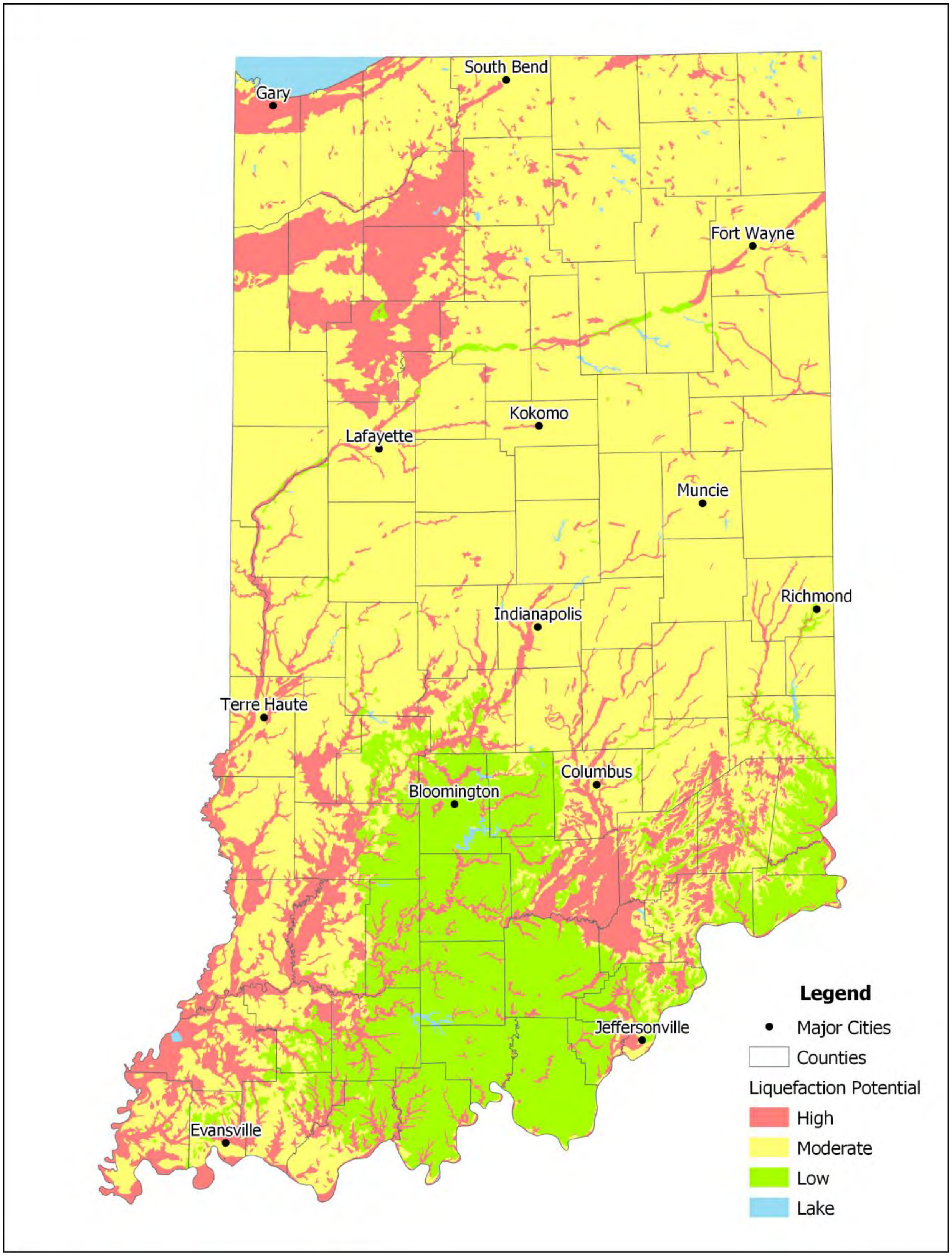
Earthquakes can trigger landslides, especially in areas with steep slopes and water-saturated soils, often associated with river banks or other areas of high relief. Landslides may result in falling rocks, soils, and fluid masses that impact people, buildings and vehicles. They also can block roads, temporarily dam streams, and disrupt utility lines. In general, areas of landslide risk are associated with the zones of strongest ground motion and zones of high relief and weak soils.

6.3.2.2.3 Liquefaction

Soil liquefaction is a secondary effect of earthquakes in which the strength of a soil is modified by earthquake shaking. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world. Particularly notable is the damage associated with the 2011 Christchurch, New Zealand earthquake, in which large areas of the city were damaged by liquefaction-related ground failure.

Liquefaction is a process that turns normally solid soils in “quicksand.” The process occurs in soils that are saturated with water. Prior to an earthquake, the pressure in the soil pore spaces is relatively low--the weight of the buried soil rests on the framework of grain contacts that comprise it. However, earthquake shaking can disrupt the structure, the soil particles no longer support all the weight, and the groundwater pressure begins to rise and the soil particles can become entrained in the water and flow. Liquefied soil will force open ground cracks in order to escape to the surface in the form of “mud volcanoes” or “lateral spreads”. The ejected material often results in flooding and may leave cavities in the soil.

Figure 128. Liquefaction Potential (Gray et al., 2012)



Whether and where liquefaction will take place depends on many factors. These include (1) the degree of saturation, (2) the distribution of soil grain sizes, (3) the strength, duration, and frequency content of the shaking and even the grain shape and depth of soil. The vulnerability to soil liquefaction can be determined based on these characteristics. A map of relative liquefaction potential for Indiana, based on the composition and thickness of unconsolidated soils throughout the state is presented in Figure 128. The potential impacts of post-earthquake liquefaction are, in principle, incorporated into the damage estimates provided by the Hazus models discussed in the previous section.

6.3.2.2.4 Disruptions

The primary impacts of earthquakes have the potential to destroy roads and bridges, disrupt power grids and other utilities, and shut down manufacturing and production plans in the affected areas. These disruptions may, in turn, impact the delivery of life critical products and services such as groceries, water, heating and cooling, availability of prescription drugs, and access to medical care. The duration of these large scale disruptions could be hours, days, or even weeks until temporary repairs or workarounds are made to essential systems. The impact to human and animal health may be significant, especially to those injured by the primary impacts of the earthquake event, and will worsen over a longer term disruption period.

6.3.2.2.5 Tsunami and Seiches

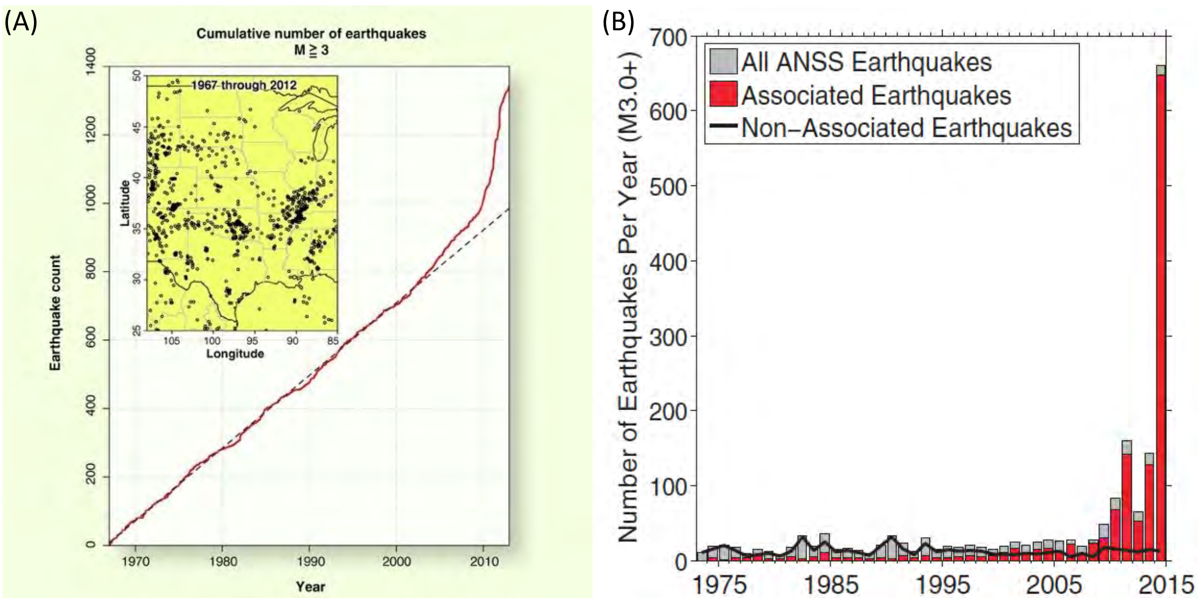
One of the most severe secondary effects of earthquakes in oceanic areas are tsunamis, which are earthquake-triggered sea waves. Inland earthquakes will not result in tsunamis because they do not uplift the seafloor. However, they can trigger seiches, which are standing waves in lakes. A seiche (pronounced: saysh) is a standing wave in any enclosed or partially enclosed body of water. Triggered by earthquake waves, seiches and seiche-related phenomena have been observed on lakes, reservoirs, swimming pools, bays, harbors, and seas. The key requirement for formation of a seiche is that the body of water be at least partially bounded, allowing the formation of the standing wave. They can produce damage to boats, piers, and structures close to the shoreline of a lake.

6.3.2.3 Induced Seismicity

In addition to the occurrence of naturally occurring earthquake activity, Indiana residents could be affected by “induced seismic activity,” the process by which human activity affects the ambient state of stress in the earth’s crust enough to trigger earthquakes. Although this phenomenon has been well documented for many years (e.g., Healy, Rubey, Griggs, & Raleigh, 1968), there has been a pronounced increase in induced seismic activity over the past decade, associated in particular with subsurface injection of fluids associated with oil and gas production (Ellsworth, 2013; National Research Council, 2013; Ground Water Protection Council, 2015). Other engineering activities, such as impoundment of reservoirs and mining, construction, or weapons testing explosions, also have the potential of inducing seismicity (National Research Council, 2013). Future activity associated with underground storage of carbon dioxide also has the potential to produce induced seismic activity. Well documented cases of induced seismic activity have been observed throughout the Midwest, including occurrences in Ohio, Arkansas, Texas, Oklahoma, and Kansas, including some cases of damaging earthquakes. Although small earthquakes have been linked to the process of hydraulic fracturing (or “fracking”), larger events are typically associated with large-volume wastewater injection. The high volume of wastewater is produced either as a result of the hydraulic fracturing or as a byproduct of petroleum production.

Induced earthquakes are, in essence, the equivalent of naturally occurring earthquakes whose timing has been triggered by human activity. Factors influencing the occurrence of induced earthquakes include the durations and volumes of injection, spatial proximity of injection to active faults, and changes in hydraulic pressures that bring the faults to failure. In the central United States, the occurrence of small- and moderate-magnitude earthquakes had been mostly constant from the 1960s until the turn of the century; that rate showed a significant increase in 2001, followed by a rapid acceleration in 2010 (Figure 129). Ellsworth, 2013, among others, attributes this rise in earthquake numbers to induced seismicity associated with increased oil and gas activity in the central United States.

Figure 129. Induced Earthquakes in the Central United States



Evidence of induced seismic activity in the Central U.S. (A) Cumulative count of earthquakes as a function of time in the central and eastern United States,1967–2012 (earthquakes in the area studied shown in inset). The dashed line corresponds to the long-term average rate of earthquakes occurrence. Note the substantial increase in activity beginning in 2008. From Ellsworth (2013) (B) Comparison of induced vs. naturally occurring earthquakes. Gray bars represent the number of earthquakes per year in the central U.S. from 1973 to 2014. The red bars represent the number of earthquakes that are associated with wastewater injection wells. The black line denotes the number of naturally occurring earthquakes per year. Note the significant increase in 2011 through 2014, a result of enhanced oil and gas exploration in the region. From Weingarten et al. (2015).

A recent study by the Indiana Geological and Water Survey (Rupp et al., 2016) summarized the state of knowledge about induced seismic activity in the state. Like many of our neighboring states, Indiana is an oil- and gas-producing state that also disposes of wastewater related to oil production through subsurface injection. Compared to other states, Indiana shows limited evidence of earthquakes that are associated with these practices. Indiana has not been identified by the USGS annual assessment of short-term induced seismicity hazards (Petersen, et al., 2018). However, at least one research study (Weingarten et al., 2015) provided circumstantial evidence for induced earthquakes in Indiana and Illinois; a second study (Eagar et al., 2006) suggested that the occurrence of a swarm of very small-magnitude earthquakes in the mid-1990s along the Wabash River in southwestern Indiana may have been triggered by oil and gas exploitation in the region. Because the majority of the wastewater injection wells (Figure 130) are located in the southwestern part of the state (Figure 131)—the area most heavily dominated by active natural seismic activity—it is in the state's best interest to monitor wastewater injection and seismic activity within Indiana so that any future activity can be assessed with high-quality observational data. The wells with the highest rates and volumes of wastewater injection are those with the highest potential for future induced seismicity. Wastewater injection practices are monitored by the Division of Oil & Gas, a regulatory agency of IDNR. As in other states affected by induced earthquake activity, occurrences of documented induced seismic activity could result in modification or termination of wastewater injection at neighboring wells.

6.3.3 Probability of Future Occurrences

The probability of future earthquakes occurring is unknown. The USGS asserts that a large earthquake that will seriously impact southwestern Indiana is inevitable; however, it is currently impossible to predict when such an earthquake will occur. According to the USGS, there is a 25 to 40% chance of a magnitude 6.0 or greater earthquake in the next 50 years for the central US. There is a 7 to 10% chance of a repeat of events similar to the New Madrid earthquakes of 1811-12.

Future earthquake events will affect larger populations, business development, and aged vulnerable infrastructure. Upgraded building codes will protect newer construction, but much of the population will remain vulnerable because of low public interest in earthquake safety due to the relative inactivity of the fault systems, which presents a serious problem.

Figure 130. Indiana Class II Injection Wells Active from 2004 to 2014 (Rupp et al., 2016)

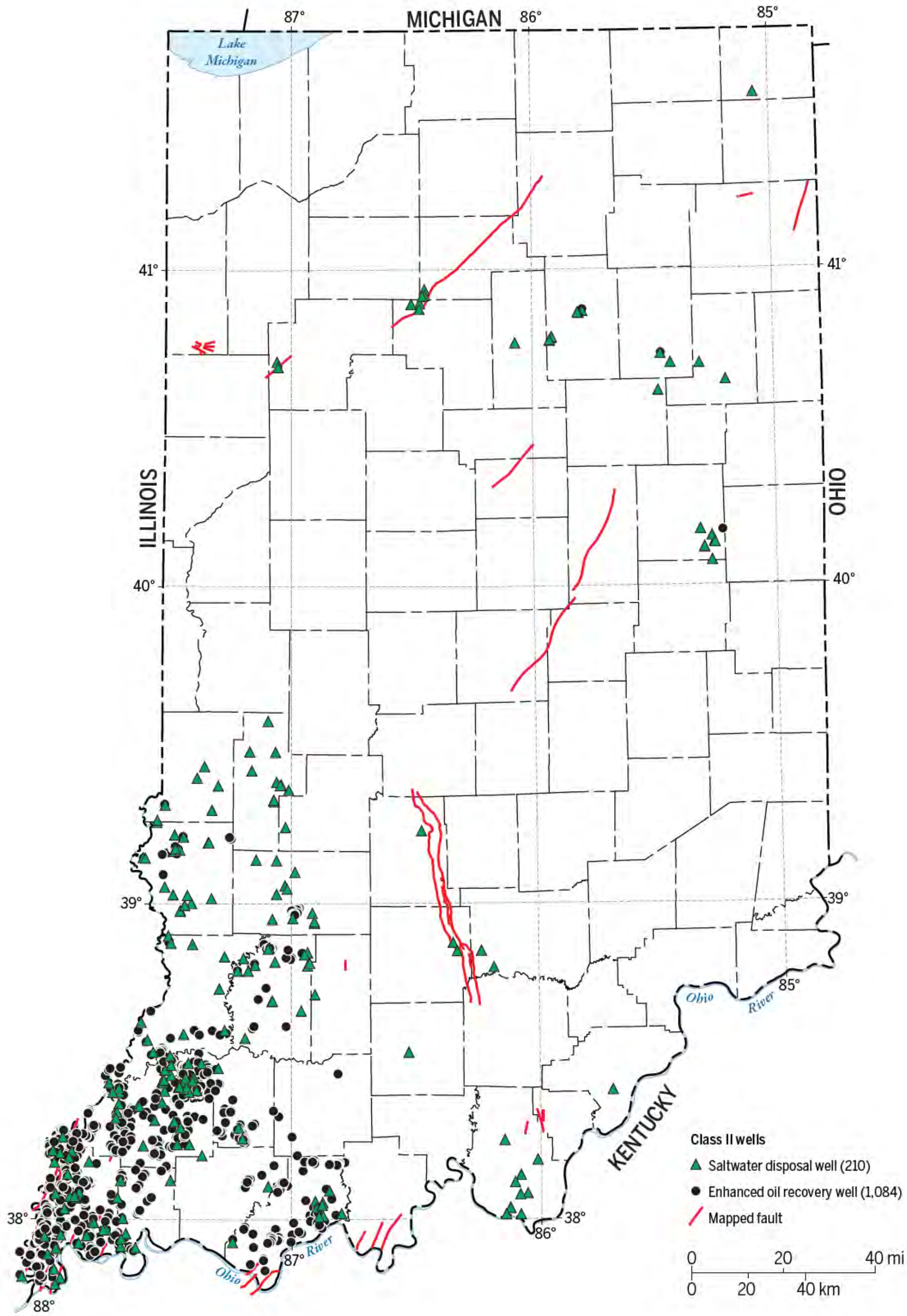
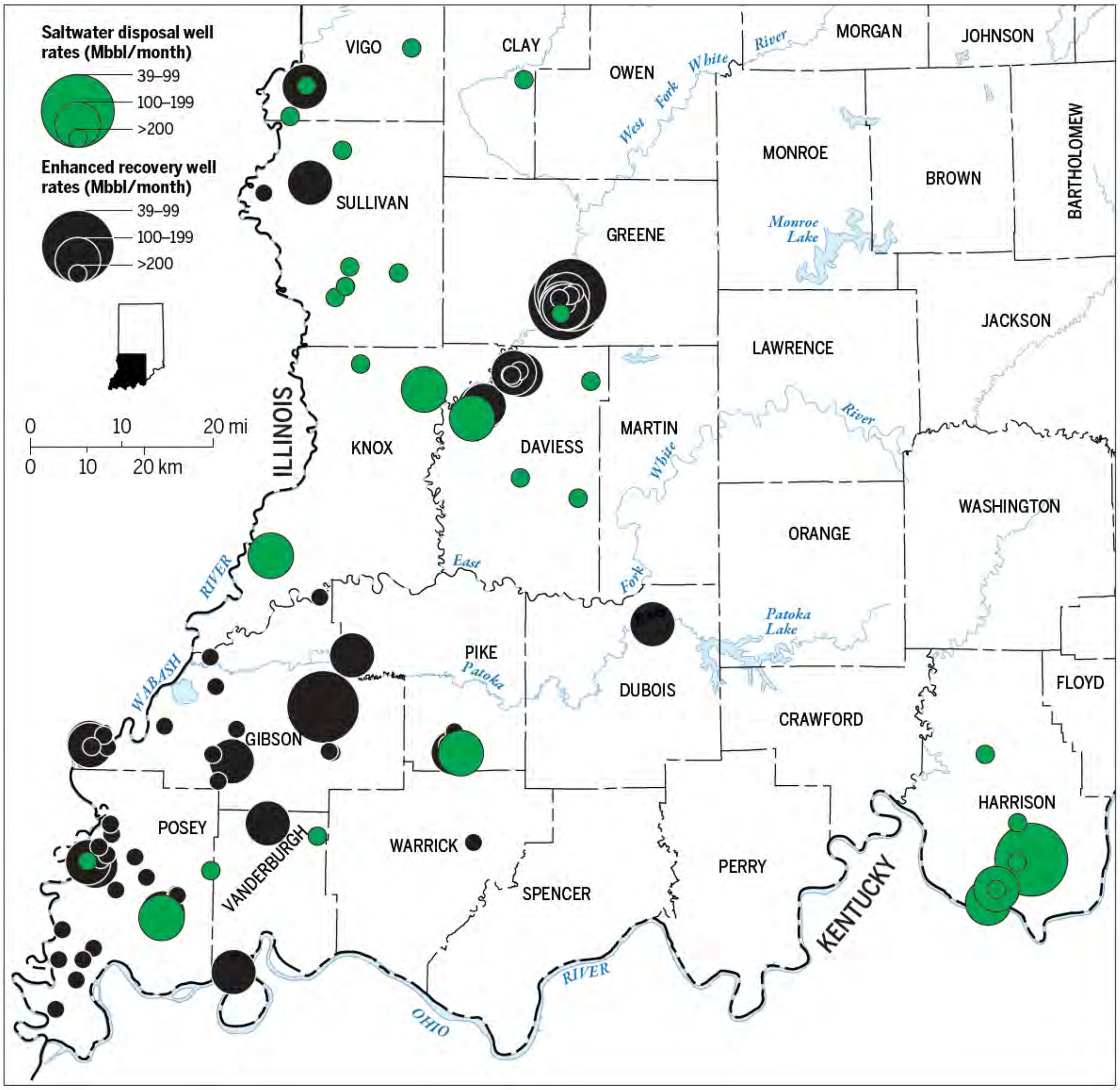


Figure 131. Southwestern Indiana Class II Injection Wells Active from 2004 to 2014 (Rupp et al., 2016)



6.4 Extreme Temperatures

Extreme temperatures—both hot and cold—can have significant impact on human health and safety, commercial businesses, agriculture, and primary and secondary effects on infrastructure (e.g. burst pipes, power failures, etc.). Weather conditions described as extreme heat or cold vary across different areas of the state, based on the range of average temperatures within the region.

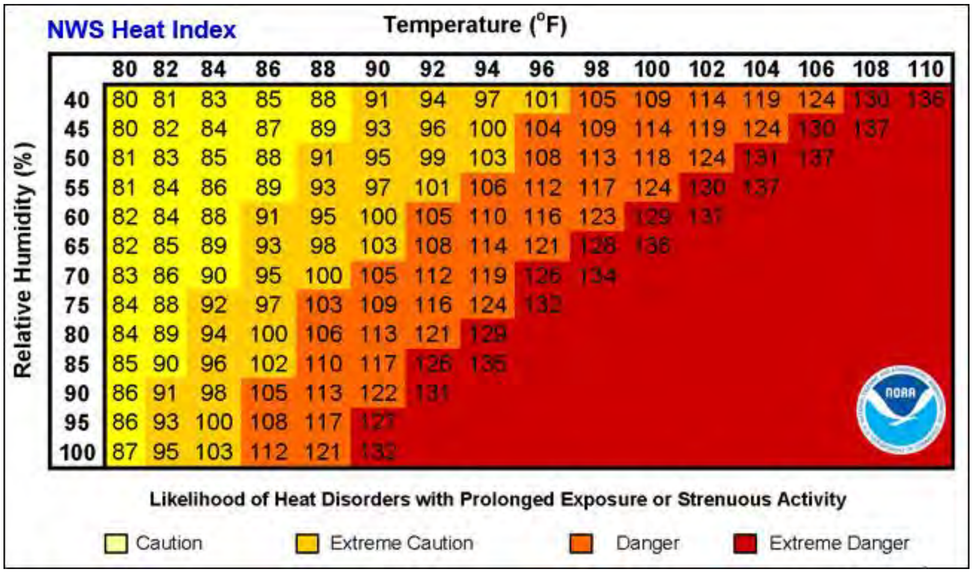
Extreme Heat

According to the Centers for Disease Control and Prevention (CDC), there is no single agreed upon definition of an extreme heat event. These events typically refer to an extended period of time, such as several days or more, with unusually hot weather conditions that can potentially harm human health.

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 NWS Heat Index Chart can be seen below in Figure 132.

> IDHS has created an extreme heat fact sheet (https://www.in.gov/dhs/files/Extreme_Heat_7-20-11.pdf) and a heat-related illness factsheet (https://www.in.gov/dhs/files/Xtrm_Heat.pdf). Heat-related illnesses include heat cramps, heat exhaustion, and heat stroke.

Figure 132. National Weather Service Heat Index Chart


NWS Heat Index

Temperature (°F)

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										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Extreme Cold

What constitutes an extreme cold event, and its impacts, varies across the United States. 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 0 degrees Fahrenheit or below.

The magnitude of extreme cold temperatures is generally measured through the Wind Chill Temperature (WCT) Index. WCT is the temperature that is felt when 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 index, shown in Figure 133, includes a frostbite indicator, showing points where temperature, wind speed, and exposure time will produce frostbite in humans.

Figure 133. National Weather Service Wind Chill Chart

Wind Chill Chart

Wind (mph) \ Temperature (°F)	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

6.4.1 Historical Occurrences

Indiana experienced 14 excessive heat events from 2008 through 2018 according to the NCDC, 11 of those from 2010 through 2012. The last event occurred on July 5, 2018. The 2012 heat wave was particularly severe and resulted in 82 heat-related deaths in the United States and Canada. Fort Wayne tied its all-time record high with 106°F and Indianapolis broke its monthly record at 104°F.

There were 10 extreme cold/wind chill events in Indiana from 2008 through 2018 according to the NCDC, with 7 of those since 2014. On January 1, 2018, the jet stream moved south and led to a new low temperature record of -12°F for Indianapolis and -15°F for South Bend.

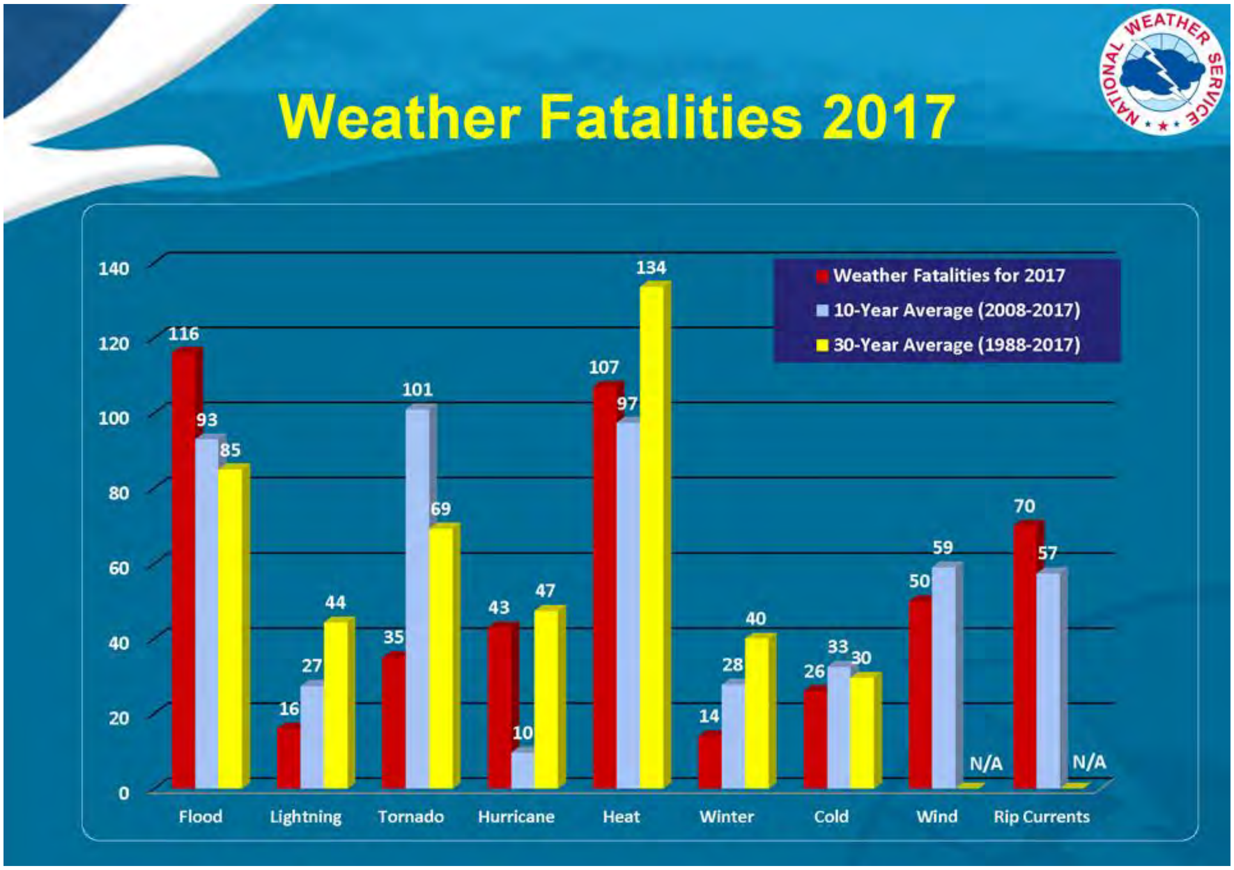
6.4.2 Vulnerability Assessment

One of the cascading events of extreme cold temperatures over a long period of time is the formation of ice dams that result in damage to bridges and other infrastructure. In extreme events, ice will damage residential and commercial structure foundations, but the typical result in Indiana is flash flooding. The flooding may be further exacerbated if the ice dam "self-destructs" or officials are forced to intervene to open the channel.

Extreme temperature events often lead to severe short and long term health conditions, or even death, particularly for special needs populations and the elderly. Urban populations are particularly vulnerable because of elevated temperatures in cities—known as the "urban heat island effect—caused by lack of tree cover and the magnifying effect of heat on paved surfaces. However, extreme temperatures can occur within any area in the state; therefore, the entire state population and all buildings are vulnerable to extreme temperature hazards.

According to the NWS, extreme heat is the number one cause of weather-related fatalities in the United States over the past 30 years, with an average of 134 per year (see Figure 134).

Figure 134. Weather Fatalities 2017 (Source: National Weather Service)



6.4.3 Probability of Future Occurrences

The probability of future extreme temperatures is medium, meaning it is probable to occur within the next 5 years. According to the 2018 Indiana Climate Change Impacts Assessment, extreme cold events are predicted to decline while the number of extremely hot days will rise.

6.5 Drought

Droughts are created by below normal rainfall; however, excessive heat can lead to increased evaporation, which will enhance drought conditions. A drought can occur in any month and is the consequence of a reduction in the amount of precipitation over an undetermined length of time (usually a growing season or more). The severity of a drought depends on location, duration, and geographical extent. Additionally, drought severity depends on the water supply, usage demands made by human activities, vegetation, and agricultural operations.

Indiana is increasingly vulnerable to drought hazards due to growth and shifts in population; land use changes, which can result in water shortage and degrade water quality; and climate change, which increases the frequency, severity, and duration of drought events.

The US Drought Monitor categorizes droughts on a scale from D0 to D4 as outlined in Table 48.

Table 48. US Drought Monitor – Categories of Drought Severity

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

6.5.1 Historical Occurrences

Since 2008, there have been 22 separate drought events reported to the NCDC (see Figure 135). There were no reports of deaths, injuries, or crop damage in NCDC records. All but one of these drought events occurred from 2010 to 2012. The latest recorded drought was in November 2016, affecting the southern Indiana counties of Pike, Spencer, Vanderburgh, Warrick, Gibson, and Posey. Its drought category was at most a D1.

Indiana's most recent significant drought occurred in 2012. The month of March was characterized by record-breaking warmth, which resulted in an early start to the growing season. This, combined with lack of precipitation from the 2011-2012 winter, led to abnormally dry conditions across the state in April. From July through December more than half of the state was under a moderate drought (D1) or worse. In July, 51% of the state experienced a severe drought, and in August, 7% of the state was in an exceptional drought. Figure 136 illustrates the status of the drought at its worst on July 31, 2012. Lack of rainfall and extreme temperatures devastated crops and impaired livestock feed and water supplies across Indiana.

Figure 135. US Drought Monitor Indiana Time Series

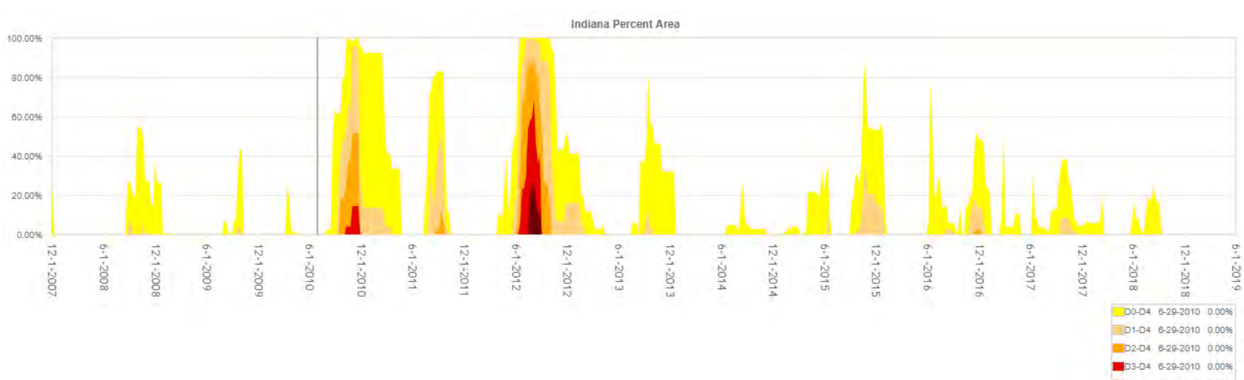
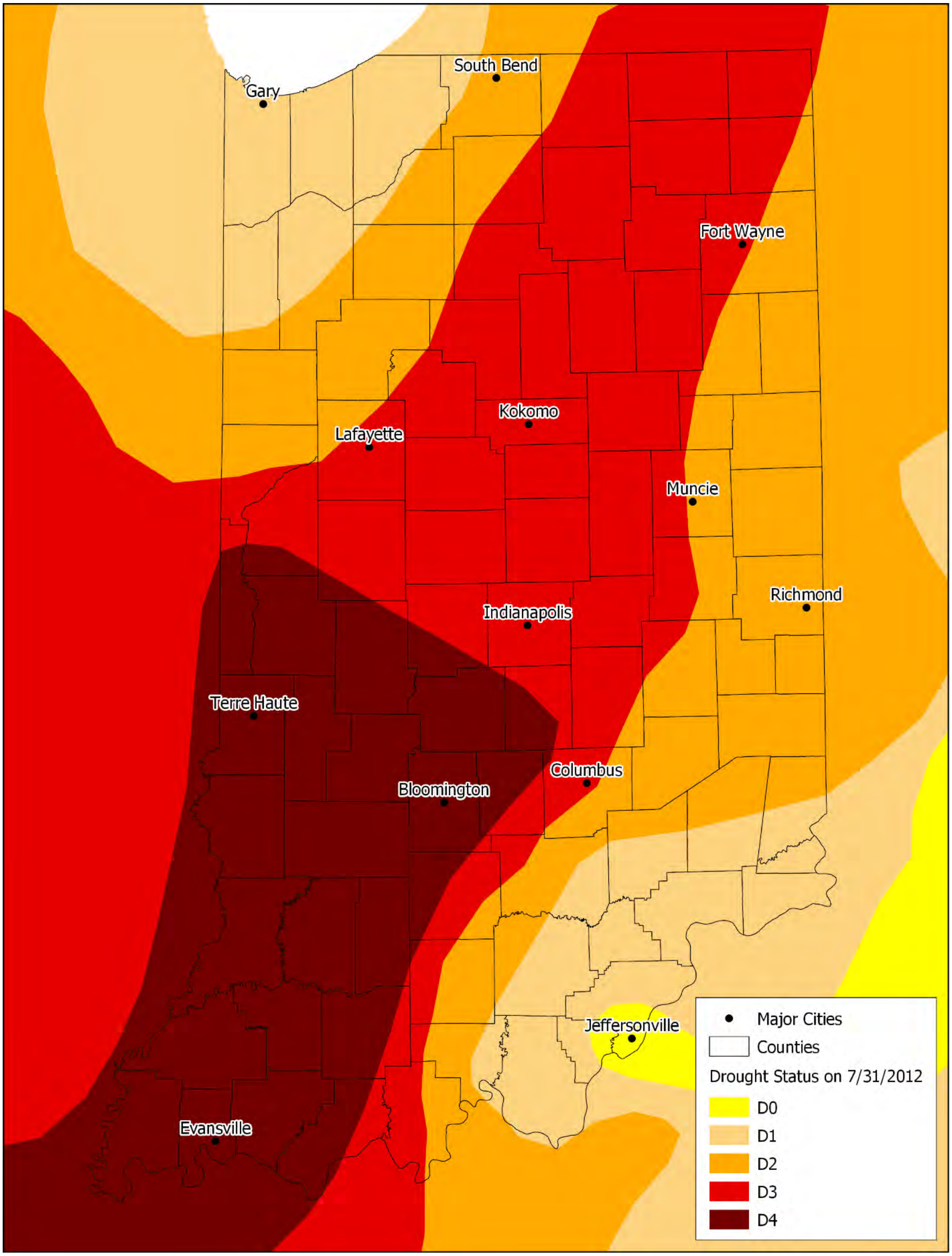


Figure 136. July 31, 2012 Drought Status (Source: US Drought Monitor)



6.5.2 Vulnerability Assessment

The hazard extent for a drought is statewide; therefore, all communities and infrastructure are vulnerable. Communities are often reactive in their approach to drought planning. Instead of developing detailed and comprehensive mitigation strategies for future droughts, they respond to imminent droughts by implementing strategies (e.g., burn bans and water restrictions) that do little to minimize the costs of response and recovery.

Drought impacts on corn and soybeans crops can be assessed using the NCDC's Crop Moisture Stress Index (CMSI), which is calculated through the use of a drought index (Palmer Z Index) and annual average crop productivity values within each US climate division. Moisture stress, either a lack or an abundance of, can critically affect crop growth and development.

Figure 137 and Figure 138 show the corn and soybean moisture stress index for the US from 1900 to 2018.

Figure 137. Corn Moisture Stress Index

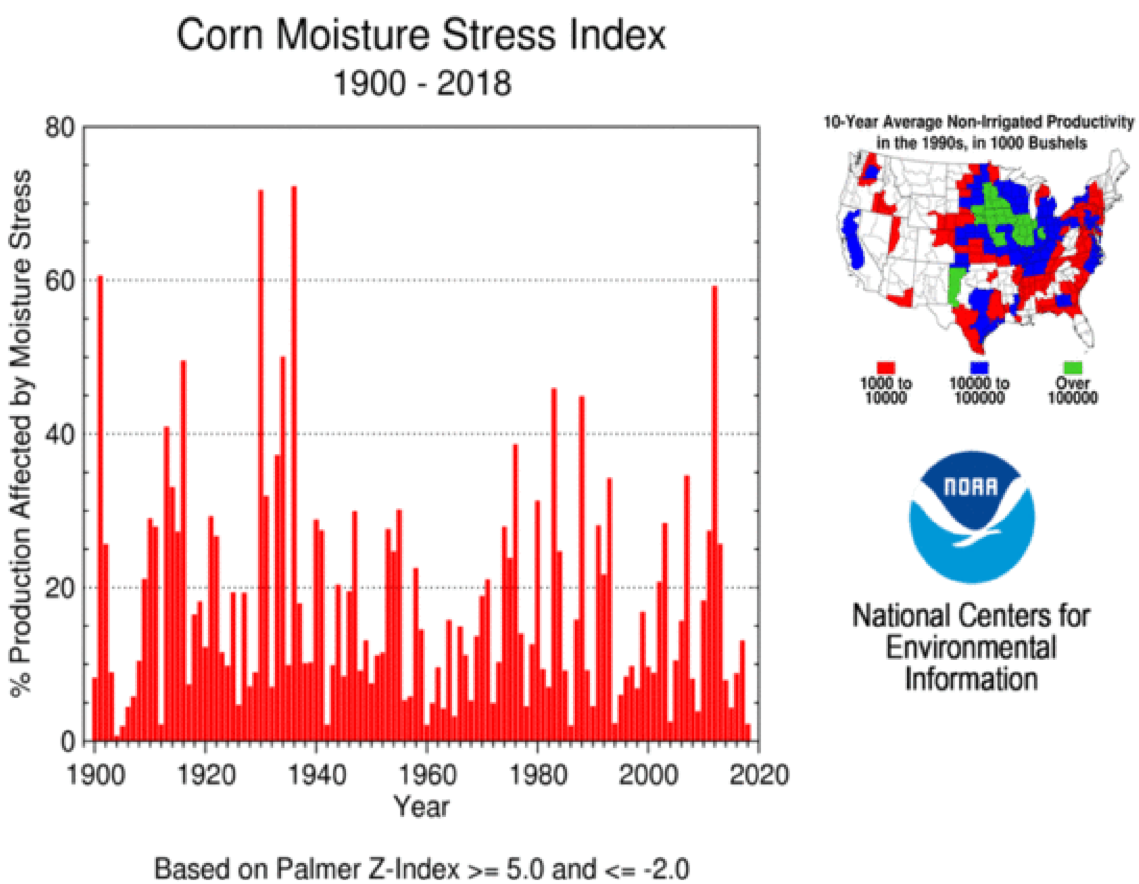
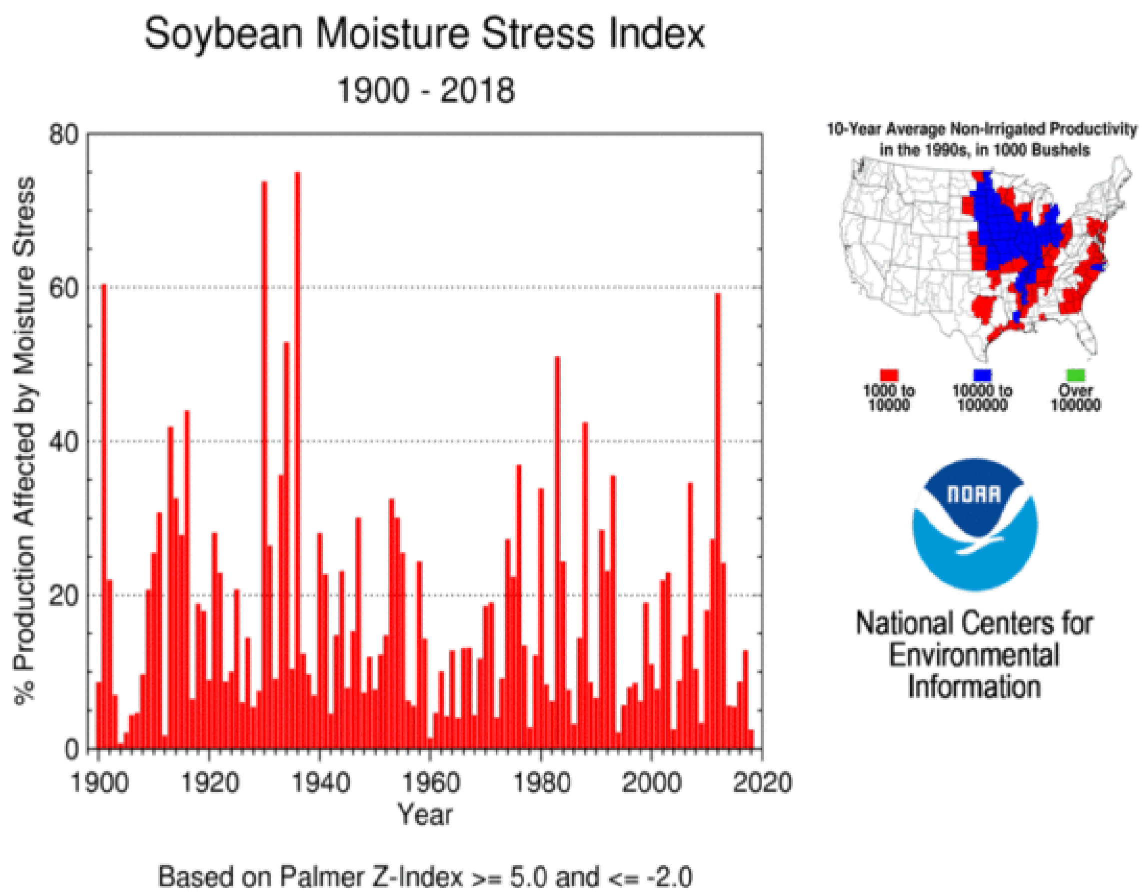


Figure 138. Soybean Moisture Stress Index



6.5.3 Probability of Future Occurrences

The probability of future droughts is medium, meaning it is probable to occur within the next 5 years. While the state has not experienced significant droughts since the last plan update in 2014, the 2018 IN CCIA predicts that with temperature increases reduced summer precipitation, and increased water demand, soil moisture will decrease, leading to drought or drought-like conditions.

6.6 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.

6.6.1 Historical Occurrences

6.6.1.1 Ice Storms

Based on NCDC data since 1996, Indiana is at risk of ice storms from December through February, with just one ice storm recorded in March. Particular bad years were 2007 and 2008, with 5 and 3 storms respectively. Most years see on average 1 recorded ice storm.

From January 31 to February 2, 2011, up to an inch of ice fell across parts of central Indiana. Over 80,000 residents lost power, some for days.

6.6.1.2 Snowstorms

Indiana can experience snowfall during most years from November through March, especially in the lake effect snow belt in the northern part of the state. Snow has occurred as early as September and as late as May, although these events are rare. The first measurable snowfall of the season usually occurs by the start of November in northern Indiana and by mid-November in southern Indiana.

NOAA's NCDC produced a Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two-thirds of the US. This index is similar to the Enhanced Fujita scale (tornadoes) and Saffir-Simpson scale (hurricanes) but differs from these indices because it takes into account. RSI is based on the spatial extent of a storm, the amount of snowfall, and population from the 2000 Census. The RSI is based on the spatial extent of the storm and the amount of snowfall and considers how these elements interact with an area's population (Table 49). It is produced for each of the six NCDC climate regions (Figure 139).

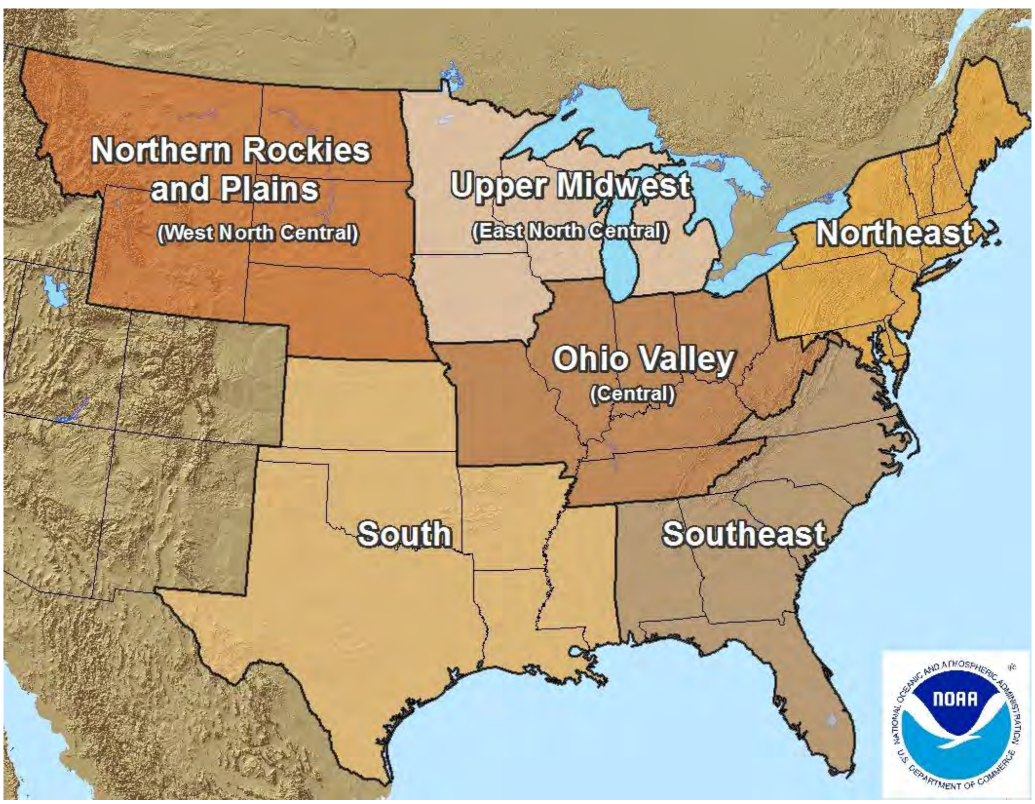
Table 49. Regional Snowfall Index

Category	RSI Value	Description
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18+	Extreme

Since 2008, the NCDC has reported 37 snowstorms in the Ohio Valley region (see Figure 139). The vast majority (26 or 70%) were category 1 storms, seven were category 2, three were category 3 and one was a category 5. The most recent category 2 or above storm was the January 2016 blizzard that mainly impacted the mid-Atlantic and northeastern states. Seven states saw snowfall in excess of 30 inches and at least 55 people were killed in storm-related incidents. The southern Indiana counties of Pike, Warrick, Spencer, Perry, Crawford, Harrison, Floyd, and Clark counties saw heavy snow with accumulations of 4 to 5 inches. This storm's RSI was almost 9.96.

From January 5 to 9, 2014, a category 3 snowstorm impacted Indiana. The northern third of the state experienced 10 to 17 inches of snow accumulations. This storm's RSI was 8.4.

Figure 139. NCDC Climate Regions



6.6.2 Vulnerability Assessment

The hazard extent of a winter storm is statewide, but is historically more severe in northern Indiana due to lake effect snow. Therefore, communities and infrastructure in the northern part of the state are at greater risk than in the southern part of the state. Heavy snow causes many problems for the public. Snowfall rates can exceed an inch per hour. As these systems intensify, wind speeds can approach hurricane force (74 mph). The blowing and drifting snow that results can paralyze a region. Automobiles are stranded on highways and peoples' lives are at risk in the absence of adequate shelter. With roads impassable, travel may be restricted for significant periods.

To further compound risks, cold air moving south behind the retreating low pressure area can cause temperatures to plummet. As the arctic high pressure area behind the low builds into the region temperatures can fall to 20 to 30 degrees below normal. A cold air mass can stay over the region for up to a week, until the next weather system moves in. These conditions can tax utility systems that are already working at peak output.

The weight of the snow itself can also be a problem, especially if the snow has a high water content. Tremendous weight of snow from significant storms can cause structures to collapse. Tree branches, especially on fully-leaved trees, can easily break under the weight of heavy snow. For example, if a snow cover of 12 inches has a water equivalent of 1.0 inch of water it would weigh 5.2 pounds per square foot. Additional snowfall would continue to increase this weight and structures could eventually become stressed. Flat roofs are especially susceptible to this problem but sloping roofs, especially if the structural components are weak, can also be damaged.

- **Population Exposure** - Historical information indicates that the entire state is at risk of winter storms. Winter storms affect mostly humans, particularly special needs populations, and animals due to lack of mobility or isolation from supplies. They are more reliant upon the roads and vehicular travel for access to needed supplies. Lack of communication due to downed phone and power lines, will further isolate and make obtaining assistance more difficult if needed.
- **Human Services** - The loss of usual means of transportation to provide emergency services and the dependence upon back-up power systems will be the first of many impacts upon the Human Service Agencies. The lack of reliable communications and personnel to staff and provide services paired with increased demand for services they provide may overwhelm smaller agencies and tax many larger agencies to near exhaustion.
- **Transportation Exposure** - The transportation network will be the first impacted. Snow and ice accumulations will make travel along these systems difficult or impossible. These types of storms do not usually destroy this type of infrastructure, but rather result in temporary effects. The problem is normally debris related. The freeze thaw of winter and its related damage to roads is normal and planned for throughout the state. Transportation is more likely to be affected by cascading events, such as debris from ice storms or flooding from excessive snowmelt.
- **Utility Infrastructure Exposure** - A community's infrastructure is likely to experience the most physical damage. Power and communication equipment are vulnerable to winds, but the addition of ice on the lines quickly renders the community without power or communication. The loss of power may mean that communities and individuals may not have water, since it

takes electricity to convey it to the customer. Towns and cities depend upon electricity to pump, treat and deliver water to their citizens.

- **Economic Exposure** - Economically, industry and agriculture can suffer the effects of a winter storm. Both are dependent on transportation. The collapse of structures due to snow loading, loss of man-hours and inability to ship goods, receive material or to receive orders for goods and services will impact the economic community. Historically, Indiana has suffered agriculturally from loss of livestock or crops due to winter storms and cascading events such as flooding.

The loss potential to above-ground infrastructure could be devastating. The lack of past history of frequent severe winter storms does not provide a large sample of information upon which to base loss estimates. The January 2014 severe winter storm and snowstorm resulted in a federal disaster declaration (DR-4173) for 30 Indiana counties. Almost $10 million of public assistance were approved. Winter storms in Indiana normally are not long-term recovery programs. These events typically only require emergency snow and debris removal. They can also be deadly due to exposure, fire, carbon monoxide poisoning, and transportation accidents.

The lack of public awareness, preparedness, and mitigation will result in increased losses as the population and the dependence upon technology continues. The recovery time to restore power and communication infrastructure can be improved by the requirement that electric and communications service lines be buried. The lack of heat in residences and the exposure to cold is the greatest threat to people. Public education on the dangers of alternative heating systems, and what to do if caught outside during a storm would reduce the risk to the population. These programs can prevent the state's exposure to loss from these storms from increasing as the population increases.

6.6.3 Probability of Future Occurrences

The probability of future winter storms will remain high, meaning it is likely to occur within the calendar year. Due to the unpredictability of this hazard, all buildings and infrastructure in Indiana are at risk of damage including temporary or permanent loss of function. While current climate predictions indicate increased precipitation, especially in the winter and spring, it is expected that rain will replace snow in the cold season.

6.7 Ground Failure

Ground failure refers to a variety of processes that can affect the land surface through gravitational movement of unstable geological materials. Some types of ground failure (e.g., land subsidence) involve a slow movement of earth materials, over time scales of days to years; others (e.g., landsides) can occur suddenly and have the potential to produce severe damage and even loss of life. Many types of ground failure are associated with human activity, such as mining, dam construction or roadway development. Indiana has four principal types of ground failure that could affect Indiana residents. These include landslides, fluvial erosion, liquefaction, and ground subsidence, which includes both naturally occurring processes such as karst sinkholes and human-induced processes such as a collapse of underground coal mines. Soil liquefaction, a particular type of ground failure associated with earthquakes, is discussed in Section 6.3.2.2.3.

6.7.1 Landslides

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

The term landslide is a general designation for the downslope movement of earth material, due to the effects of gravity. This material can move as a somewhat coherent mass or may be broken up into poorly consolidated soils or rock fragments. Landslides are classified by the type of material in which they occur as well as the type of movement that occurs (Varnes, 1978). As a result, there can be many different types of landslides with highly variable effects on the surrounding area. Figure 140 shows several of the most common types of landslides that can occur. Table 50 summarizes the types of landslides that can occur as a combination of different types of material and types of movement.

Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. A particularly important variable affecting ground movement is the presence of water, which significantly affects the type and behavior of landslide activity. Gravity is the force driving landslide movement, but usually, some external trigger is required to initiate landslide activity. The main causes of landslides include:

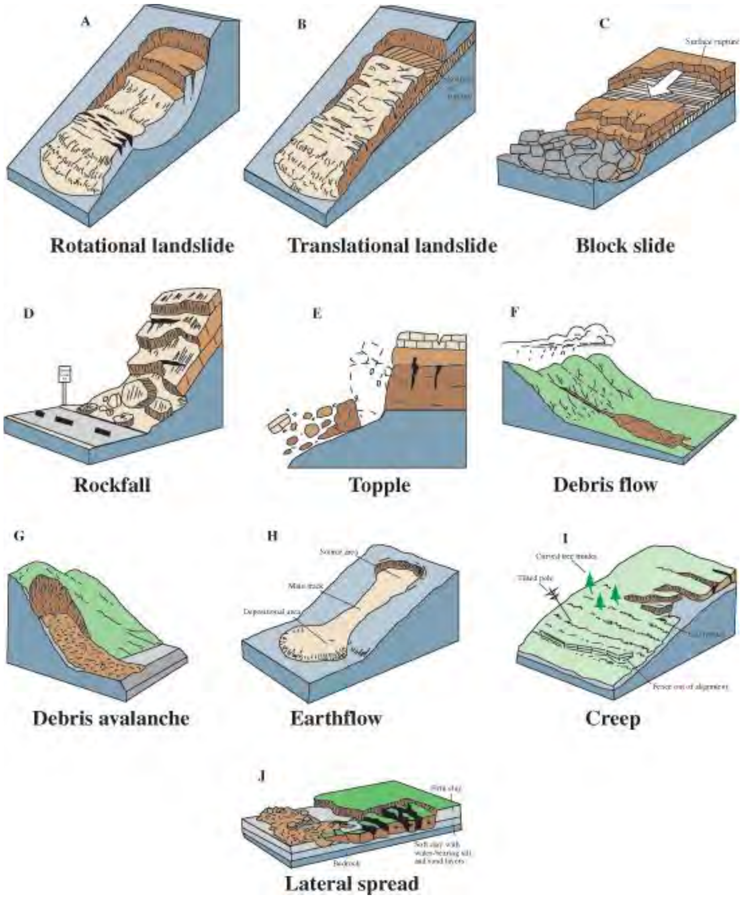
- Ground vibration (e.g., earthquakes, blasting activity)
- Failure of slopes due to downward movement (caused by gravity)
- Changes in the water table or surface water (often caused by heavy rains)
- Weakened geologic material due to weathering
- Removal of vegetation due to fire
- Human causes such as excavation or loading of slopes, deforestation/removal of vegetation, mining, or irrigation
- Erosion by rivers causing oversteepening of river banks

Whether or not a landslide occurs typically depends on (1) the degree to which the area is naturally susceptible to landslide activity, and (2) the presence of a process (natural or human-influenced) that triggers the landslide activity. A few key factors determine how susceptible an area is to landslide activity:

- How steep the slopes in the area are (steeper slopes are most vulnerable to landslides)
- How strong the Earth material is (unconsolidated soils or material that is heavily weathered is much weaker than solid bedrock)
- The presence or absence of vegetation (areas with strong root mass to hold sediment in place are less susceptible to landslides)

There are a number of natural forces that can trigger landslides. These include large amounts of rainfall over very short time periods, or steady rainfall over long time periods, which both increase the weight of slopes and can lubricate planes of weakness within rock or sediment. Snowmelt can also trigger landslide activity. Earthquake shaking will loosen the material and cause weak material to move downslope.

Figure 140. Schematic Illustration of Various Types of Landslides



Source: USGS Fact Sheet 2004-3072, "Landslide Types and Processes"

Table 50. Landslide Classifications Based on the Type of Material and Type of Movement that Occurs

<table>
<tr><th colspan="2" rowspan="3">Type of Movement</th><th colspan="3">Type of Material</th></tr>
<tr><th rowspan="2">Bedrock</th><th colspan="2">Engineering Soils</th></tr>
<tr><th>Predominantly coarse</th><th>Predominantly fine</th></tr>
<tr><td colspan="2">FALLS</td><td>Rock fall</td><td>Debris fall</td><td>Earth fall</td></tr>
<tr><td colspan="2">TOPPLES</td><td>Rock topple</td><td>Debris topple</td><td>Earth topple</td></tr>
<tr><td rowspan="2">SLIDES</td><td>ROTATIONAL</td><td rowspan="2">Rock slide</td><td rowspan="2">Debris slide</td><td rowspan="2">Earth slide</td></tr>
<tr><td>TRANSLATIONAL</td></tr>
<tr><td colspan="2">LATERAL SPREADS</td><td>Rock spread</td><td>Debris spread</td><td>Earth spread</td></tr>
<tr><td colspan="2" rowspan="2">FLOWS</td><td rowspan="2">Rock flow
(deep creep)</td><td>Debris flow</td><td>Earth flow</td></tr>
<tr><td colspan="2">(soil creep)</td></tr>
<tr><td colspan="2">COMPLEX</td><td colspan="3">Combination of two or more principal types of movement</td></tr>
</table>

Source: USGS Fact Sheet 2004-3072, "Landslide Types and Processes"

A nationwide survey produced by the USGS in 1982 (Radbruch-Hall et al., 1982) assessed the areas of the United States that are susceptible to landslides, and summarized the sites where landslides have occurred across the country. Figure 141, modified from their study, shows the estimated landslide susceptibility and historical occurrence (incidence) of landslides in and around the state of Indiana. The map shows areas of moderate landslide susceptibility in the northwestern and south-central portions of the state. The southeastern portion of Indiana has a large area of high landslide susceptibility and incidence (shown in dark red), indicating that a high number of landslides have occurred in this portion of the state in the past—and that significant hazard exists for future landslides in that area.

A study conducted by the Joint Transportation Research Center (Deschamps & Lange, 1999) documented the history of earthquakes in the state through much of the 20th century. The map of landslide occurrence in the state (Figure 142) confirms the general patterns of landslide susceptibility shown in Figure 141. Most historical landslides have been concentrated in the areas of high relief in south-central and southeastern Indiana. There is also a significant correlation with bedrock type, as the highest density of landslide occurrence is associated with the Buffalo Wallow and Kope formations, dominated by fine-grained shale, mudstone, and siltstone.

A more recent compilation of detailed records of landslides since 2017 that have affected Indiana roadways is shown in Figure 144. As shown in this map, the majority of the most recent landslide events have occurred in the southeastern part of the state, including areas of Dearborn, Ohio, and Switzerland counties. Neighboring areas of southwestern Ohio (Cincinnati area) and north-central Kentucky are also highly susceptible to landslide damage. The area is particularly susceptible due to the combination of steep slopes near the Ohio River and its tributaries and exposures of weak shale bedrock of the Kope Formation (Potter et al., 2013). The distribution of the Kope formation is shown in Figure 143.

Landslides can impact human-made structures such as bridges, roads, pipelines, dams, and railroads, as well as buildings. They can also impact an area by (temporarily) damming rivers and subsequently cause flooding of large areas.

Areas around Lake Michigan and in the southern portion of the state are at higher risk of landslides. However, the area in the southeastern tip of the state is at greatest risk. Over 1,500 essential and state-owned facilities are located in areas of at least moderate susceptibility and low incidence of landslides. Of those, 52 essential and no state-owned facilities are in areas of high landslide incidence. These 52 facilities are listed in Table 51.

Table 51. Essential Facilities in Areas of High Landslide Incidence

County	Facility Type	Facility Name
Dearborn	School	Central Elementary School
Dearborn	Care	Community Mental Health Center
Dearborn	EOC	Dearborn County Emergency Management
Dearborn	Care	Dearborn County Hospital
Dearborn	Care	Dearborn County Hospital Home Health & H
Dearborn	Care	Dearborn County Hospital Home Health & H
Dearborn	Police Station	Dearborn County Sheriff's Office
Dearborn	Fire Station	Dearborn County Water Rescue
Dearborn	Care	Dearborn County WIC Program
Dearborn	Fire Station	Greendale Fire Department
Dearborn	School	Greendale Middle School
Dearborn	Police Station	Greendale Police Department
Dearborn	Care	Interim Healthcare Of Se Indiana, Inc.
Dearborn	Care	Interim Homestyle Services Of Se Indiana
Dearborn	Care	Kroger 361
Dearborn	Care	Lawrenceburg Dialysis Center
Dearborn	Fire Station	Lawrenceburg FD Hilltop

County	Facility Type	Facility Name
Dearborn	Fire Station	Lawrenceburg Fire Department
Dearborn	School	Lawrenceburg High School
Dearborn	Police Station	Lawrenceburg Police Department
Dearborn	School	Lawrenceburg Primary School
Dearborn	Fire Station	Miller/York Volunteer Fire Department
Dearborn	Care	Personal Touch Home Care Of Indiana, Inc.
Dearborn	Care	Pineknoll Assisted Living Center
Dearborn	Care	Ridgewood Health Campus
Dearborn	School	Saint Lawrence School
Dearborn	Care	Shady Nook Care Center
Dearborn	Care	Tri-State Health Care Training Center, L
Dearborn	Care	Voca Corporation Of Indiana
Dearborn	Care	Wal Mart 1160
Dearborn	Care	Woodland Hills Care Center
Ohio	Care	Ohio County WIC Program
Ohio	Care	Tandy'S Foodliner R Sun
Switzerland	Care	Cash Saver Market Vevay
Switzerland	Fire Station	EAST ENTERPRISE VOLUNTEER FIRE DEPT
Switzerland	Fire Station	East Enterprise Volunteer Fire Department Station
Switzerland	Care	Fisks Grocery
Switzerland	School	Jefferson-Craig Elem School
Switzerland	Fire Station	Jefferson-Craig Fire & Rescue
Switzerland	Fire Station	Patriot Volunteer Fire House
Switzerland	Police Station	Police Department Of Vevay
Switzerland	Fire Station	Posey Township Fire Department
Switzerland	Care	Swiss Villa Nursing And Rehabilitation C
Switzerland	School	Switzerland Co Elem School
Switzerland	School	Switzerland Co Middle School
Switzerland	School	Switzerland Co Senior High School
Switzerland	EOC	Switzerland County EMA
Switzerland	Police Station	Switzerland County Jail
Switzerland	Care	Switzerland County Nurse Managed Clinic
Switzerland	Police Station	Switzerland County Sheriff Office
Switzerland	Police Station	Switzerland County Sheriff Satellite Office
Switzerland	Care	Switzerland County Wic Program

Figure 141. Indiana Landslide Susceptibility and Incidence

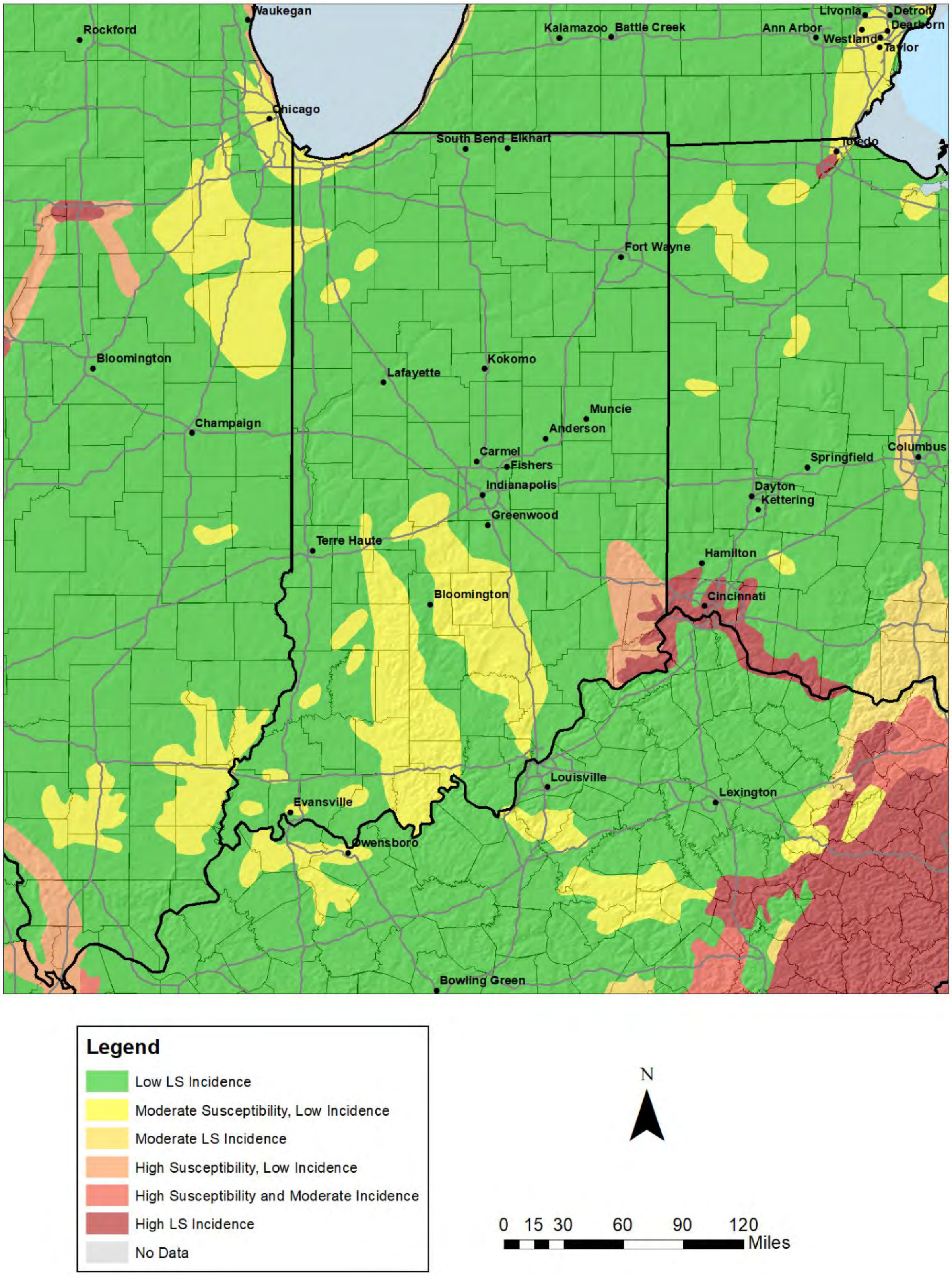
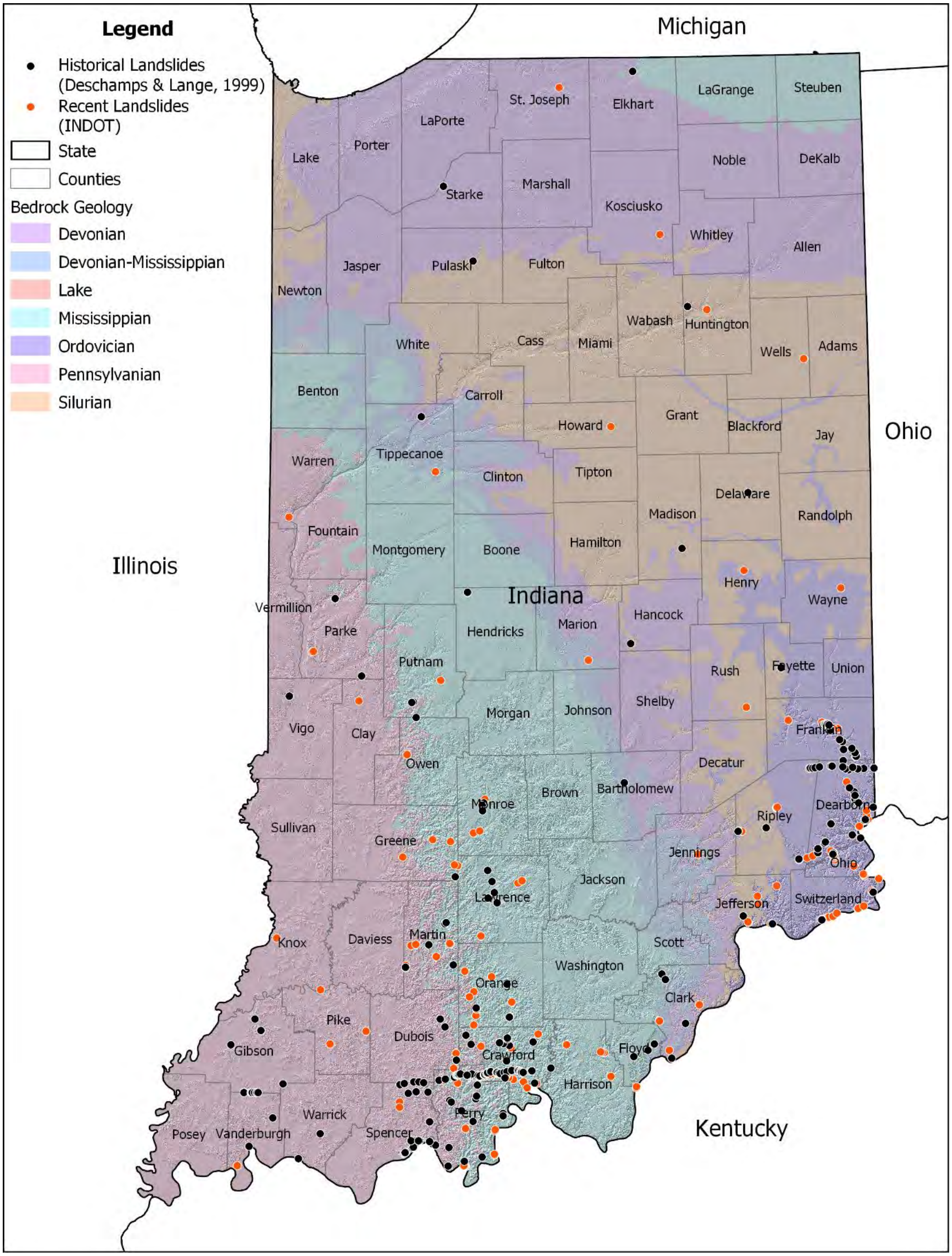
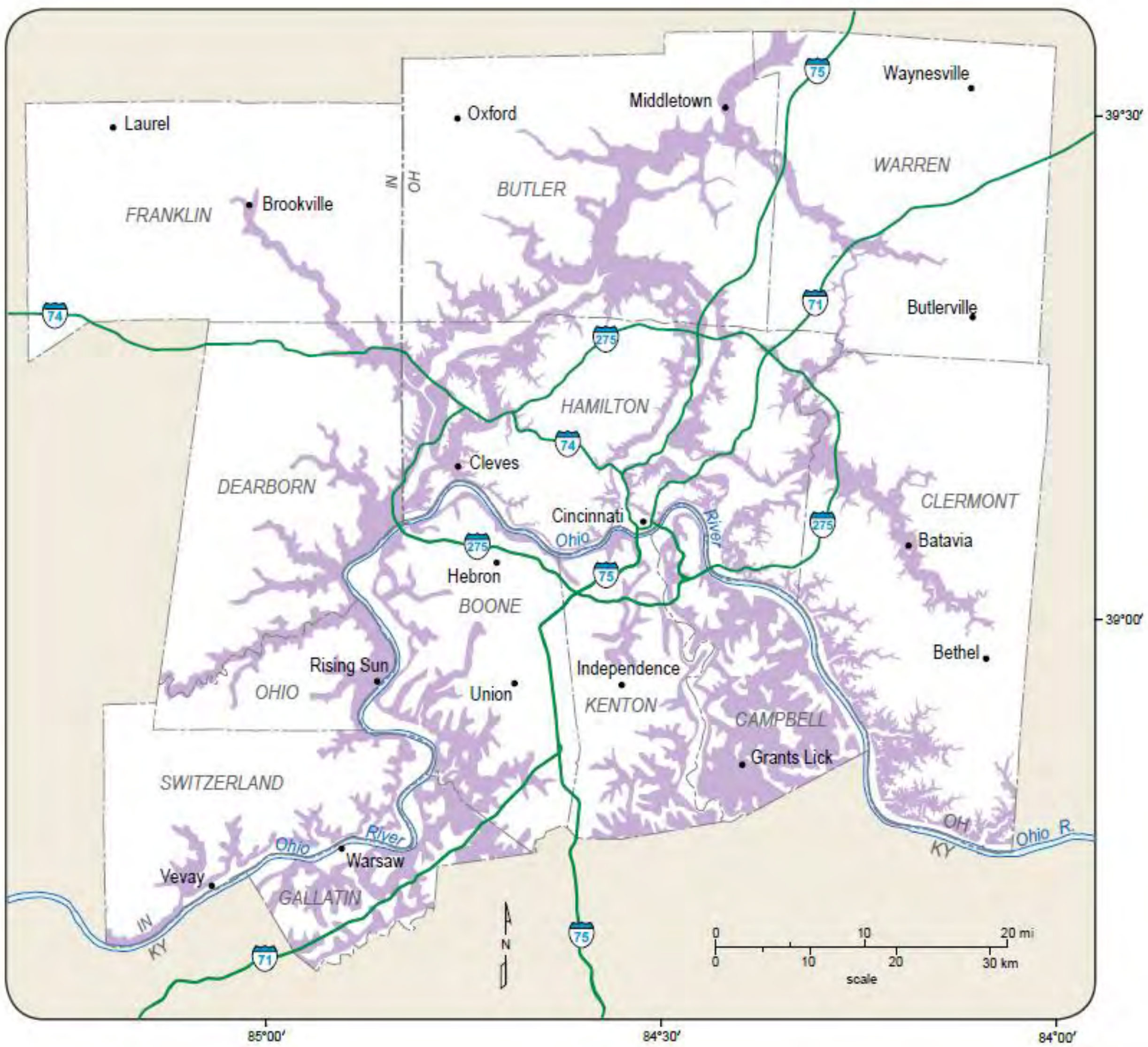


Figure 142. Occurrence of Known Landslides



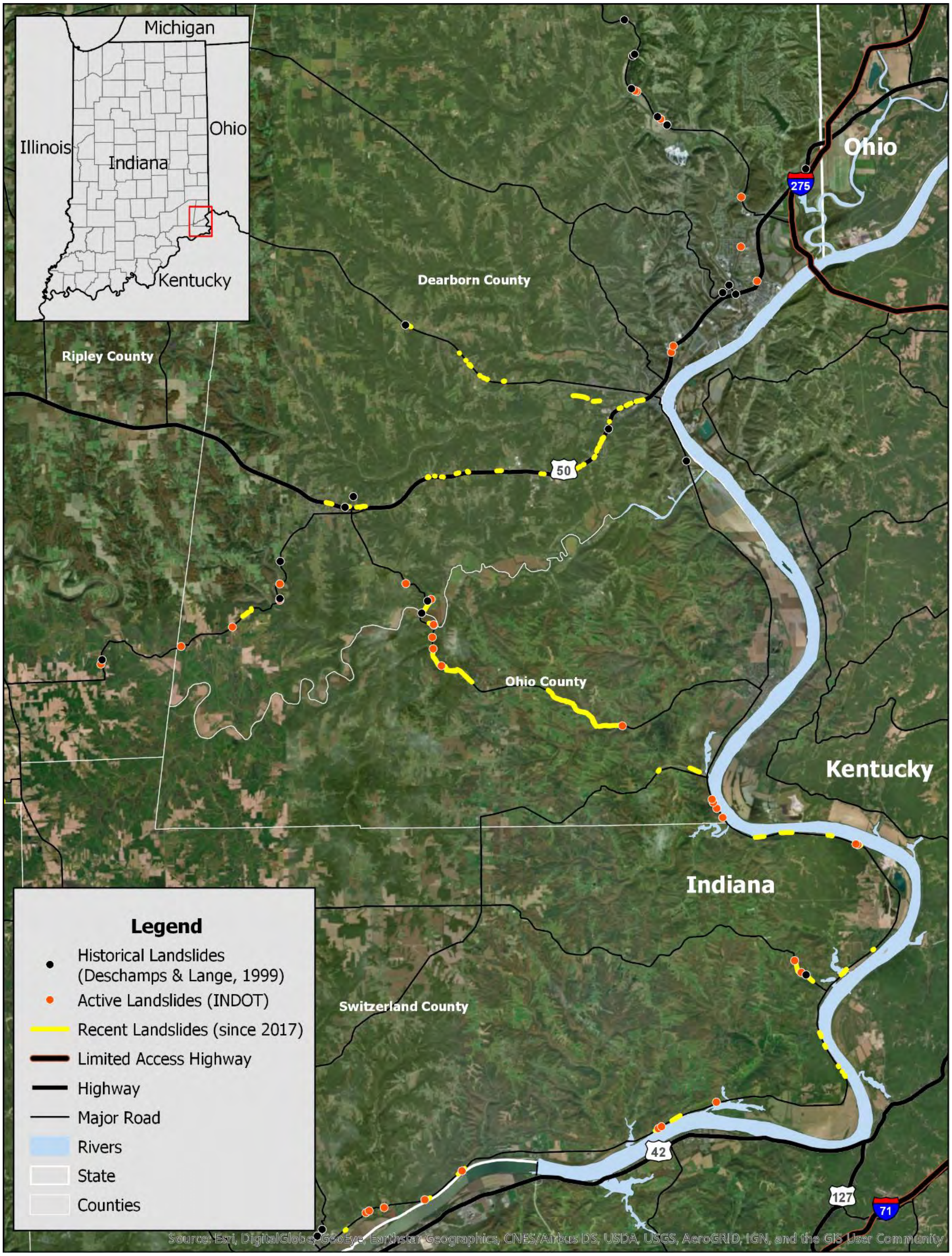
Preventive and remedial mitigation measures include modifying the landscape of a slope to reduce erosion and increase stability, controlling the groundwater and draining water when necessary, constructing tie backs, spreading rock nets, using landslide hazard estimates in developing land use regulations, building retaining walls at the toes of areas likely to landslide, removing mass from the top of slopes, etc. (Highland & Bobrowsky, 2008) 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.

Figure 143. Exposures of Kope (Shale) Formation in the Cincinnati Area (Potter et al., 2013)



Shaded area indicates exposure of the Kope formation (siltstone, shale, and mudstone) along the Ohio River and its tributaries. The Kope Formation is highly susceptible to landslide activity.

Figure 144. INDOT Landslides Along Roadways in SE Indiana



Over the years, a number of landslide locations have been mitigated. One such site was in Newburgh, IN where a landslide was causing structural damage to utility power lines, a gas line, and a wooden fence. The landslide was within a few feet of a small historic wooden cabin. In 2011, the FEMA Public Assistance Program funded a project to remove, repair, and replace sidewalks, a handicap ramp, terraced stairs, and asphalt pavement that reduced the risk of future landslides. There were also surface drainage improvements near the buildings and on the slope to catch surface water and divert to an underground drainage tile.

Figure 145. Newburgh Landslide Prior to Mitigation

Figure 146. Newburgh Landslide Post Mitigation

6.7.2 Karst

Southern Indiana has a network of underground caves formed by the natural physical interaction of groundwater with its bedrock, forming what is known as a karst landscape. According to the Indiana Geological & Water Survey, karst topography is a distinctive type of landscape largely shaped by the dissolving action of groundwater, which is naturally slightly acidic, on carbonate bedrock, which in this area is mostly 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. This process typically erodes material in the subsurface, resulting in caves and open space underground; these features have the potential to collapse under the weight of the ground above them, creating a sinkhole. Ground failure of this nature is known as land subsidence. Any structures built above a karst formation could potentially be subject to land subsidence and collapse into a resulting sinkhole. Figure 147 shows the density of karst sinkholes in southern Indiana. The possibility of sinkhole formation is dependent on the physical characteristics of the geology and hydrology of an area. A 2015 study by the Indiana Geological & Water Survey determined the probability of sinkhole formation throughout southern Indiana. Their analysis is based on the density of known sinkholes, as well as a number of geologic, topographic, and hydrologic variables that indicate the future vulnerability to sinkhole formation.

Figure 148 shows the results of this study, showing that areas with the highest probability of sinkhole development generally occur throughout central southern Indiana, with less chance of sinkhole occurrence toward the eastern and western parts of southern Indiana (Letsinger, 2011). This process may occur multiple times in a given area, as the interaction between groundwater and bedrock continues to weaken the subsurface and remove additional material. Additional subsidence may then occur over time in areas with known sinkholes.

Figure 147. Indiana Sinkhole Density (data from IndianaMap)

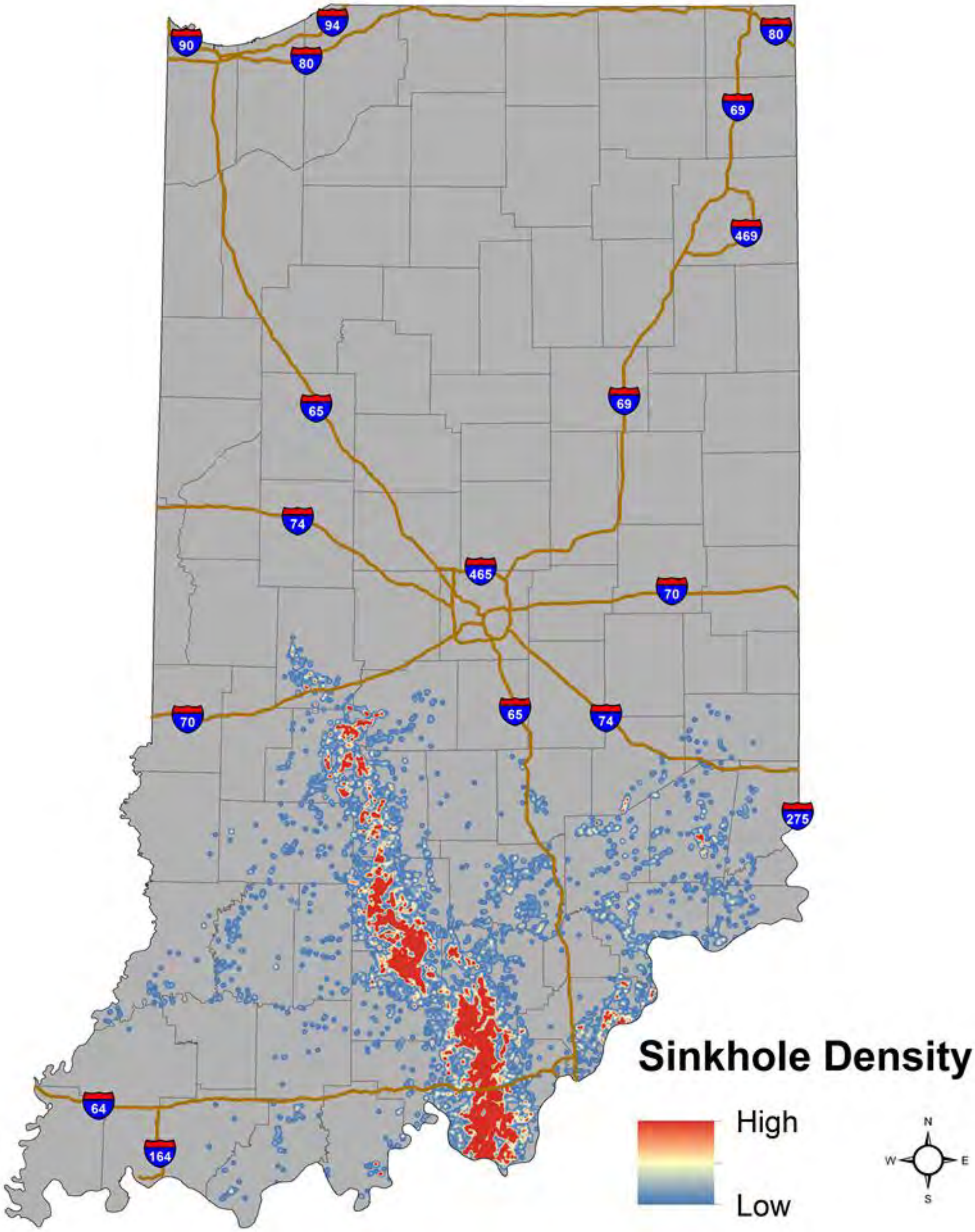


Figure 148. Risk of Sinkhole Development in Southern Indiana (data from Letsinger, 2011)

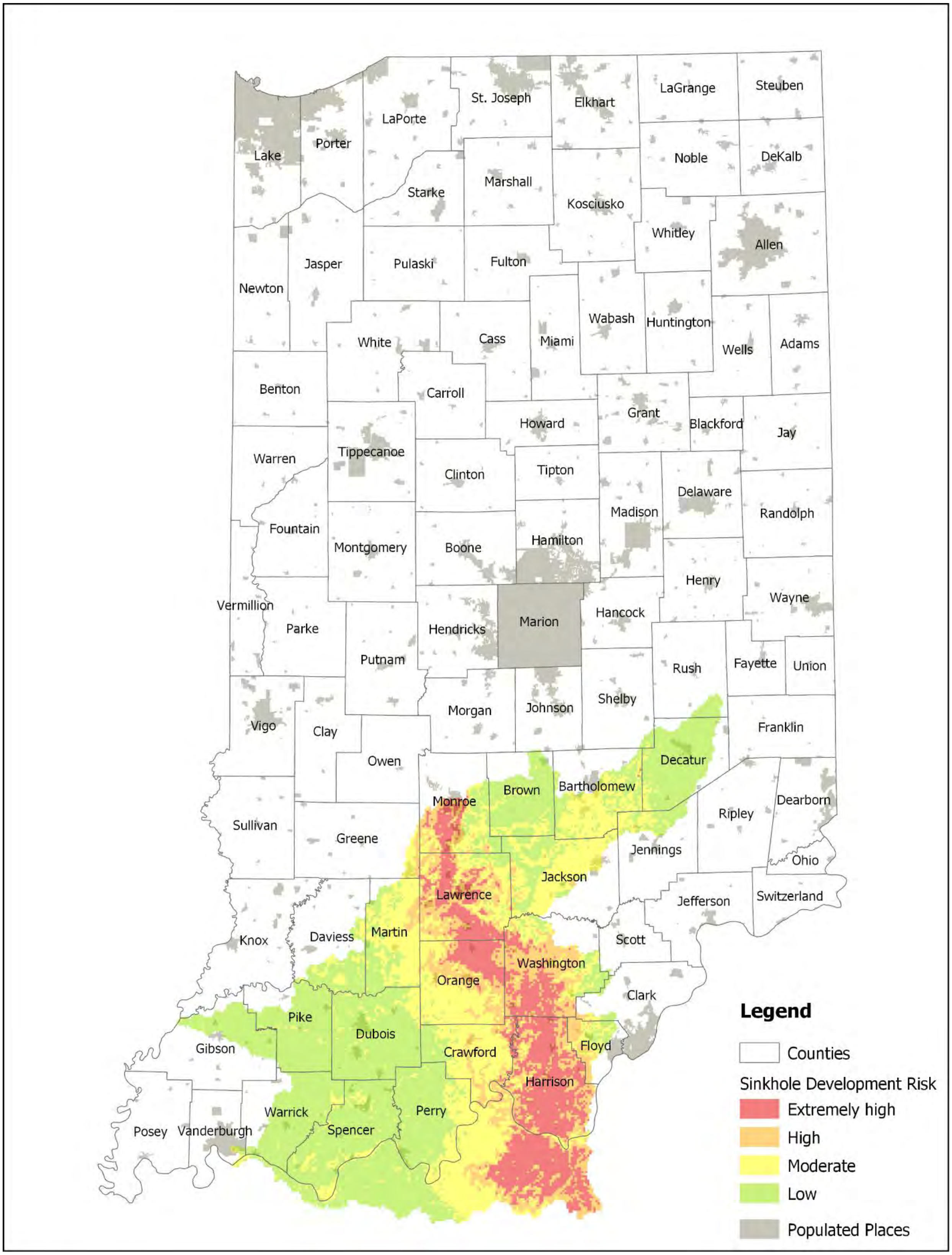
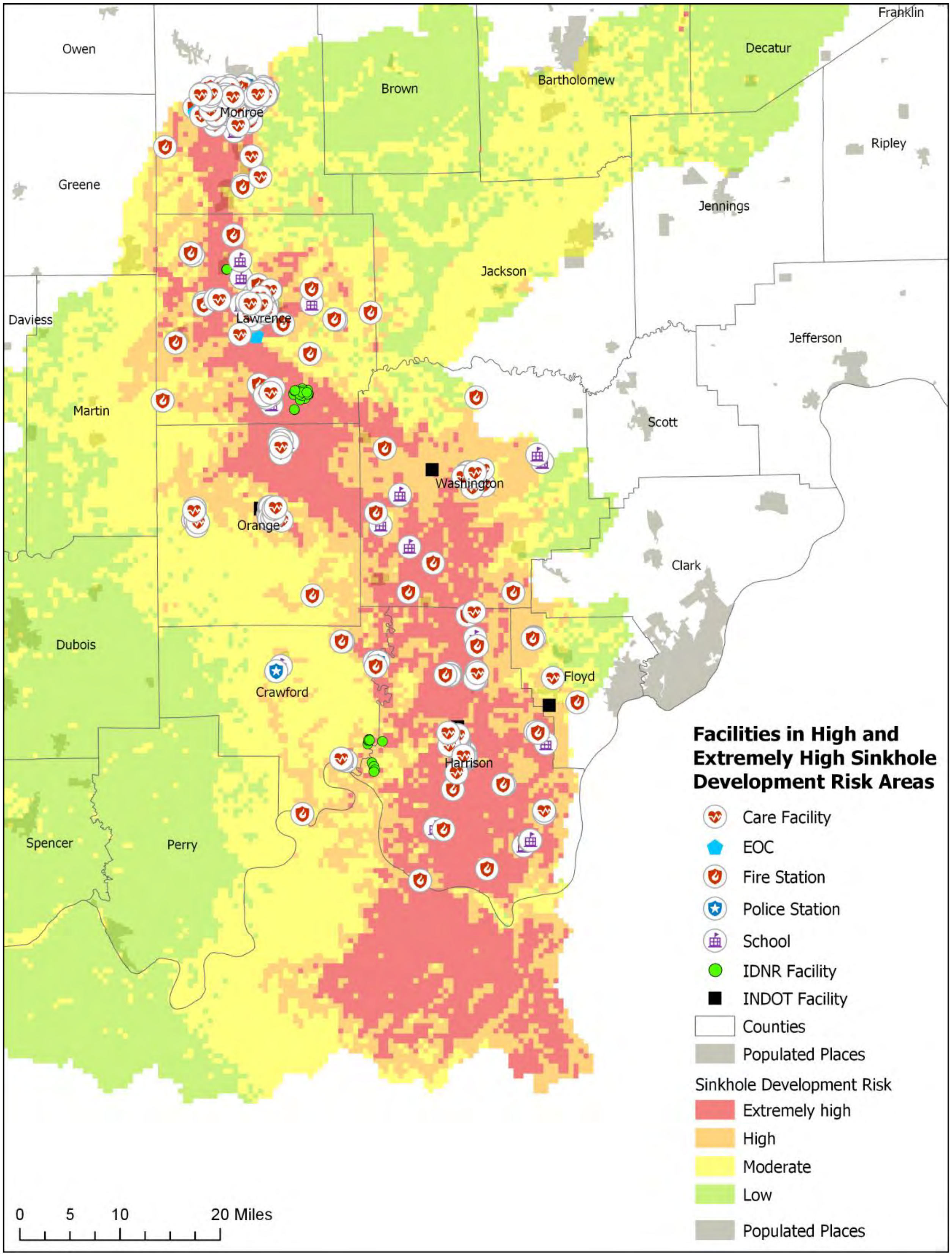


Figure 149. State & Essential Facilities in High and Extremely High Sinkhole Development Risk Areas



There are 389 state-owned and essential facilities located in areas of high and extremely high risk of sinkhole development. These include six INDOT facilities, 55 IDNR facilities, 100 schools, 20 police stations, 62 fire stations, 8 emergency operations centers, and 138 care facilities. These are displayed on Figure 149.

6.7.3 Underground Coal Mines

Indiana has networks of underground coal mines scattered throughout southern Indiana. Mine subsidence is a vertical ground movement caused by man-made underground mines. These coal mines can fail and create ground failures damaging anything on the overlying surfaces. Mine entrances may be classified as slopes (horizontal entrance) or hoists (vertical entrance). Most mine openings have been permanently sealed and present no danger. However, many openings were sealed improperly and present the risk of sudden collapse or deterioration of the fill material. Currently there is no way to know when or where mine subsidence will occur. Figure 150 maps known coal mine locations by type of entrance.

The southwestern portion of the state is at greatest risk for ground failure due to mine subsidence. Sixty-one essential and state-owned facilities were found to be within areas identified as actively migrating stream corridors. These are mapped in Figure 151 and listed in Table 52.

Table 52. State & Essential Facilities above Underground Coal Mines

County	Facility Type	Facility Name
Clay	Care Facility	Child Adult Resource Services
Clay	Care Facility	Cloverleaf Of Knightsville
Clay	Fire Station	Dick Johnson Township Trustee
Clay	Care Facility	Normal Life Of Indiana (N. Pine St, Brazil)
Clay	Care Facility	Normal Life Of Indiana (W. White Trail Ct, Brazil)
Clay	IDNR State Parks	Shakamak SP Main Gate
Clay	IDNR State Parks	Shakamak SP Saddle Barn and Camp Store
Gibson	School	Brumfield Elementary
Gibson	School	Fort Branch Community School
Gibson	Fire Station	Francisco Volunteer Fire Department
Gibson	Care Facility	Gibson County Arc 8th St
Gibson	Care Facility	Gibson General Hospital
Gibson	Care Facility	Gibson General Hospital
Gibson	Care Facility	Gibson Home Health Services
Gibson	EOC	Mobile Emergency Operations Center
Gibson	School	Princeton Community Middle School
Gibson	Fire Station	Princeton Fire Station 3
Gibson	EOC	Station #3 PFT
Gibson	Care Facility	The Waters Of Princeton
Greene	School	Blessed Hope Baptist School
Greene	Care Facility	Glenburn Home
Greene	IDNR Reclamation	Reclamation Field Office
Greene	IDNR Outdoor Recreation	Redbird SRA Gatehouse
Greene	IDNR Outdoor Recreation	Redbird SRA Office and Service Building
Greene	Care Facility	Shakamak Good Samaritan Center
Knox	Fire Station	Bicknell Vigo Township Fire Department
Knox	Care Facility	Guardian Angel Home Health

County	Facility Type	Facility Name
Knox	Care Facility	Knox County Arc - Bicknell 1
Knox	Care Facility	Knox County Arc - Bicknell 2
Knox	School	North Knox Primary Elementary
Knox	Fire Station	Station 17 Vigo Township Vol Fire
Pike	INDOT Facility	Petersburg Unit
Pike	Fire Station	South Patoka Township Volunteer Fire Department
Sullivan	Fire Station	Curry Township Fire Department
Sullivan	Fire Station	Dugger Fire Department
Sullivan	Police Station	Dugger Police Department
Sullivan	INDR Forestry	Greene-Sullivan SF PM Residence
Sullivan	IDNR Fish & Wildlife	Minnehaha FWA Service Area
Vanderburgh	School	Academy For Innovative Studies
Vanderburgh	School	Cedar Hall Elementary School
Vanderburgh	Fire Station	Evansville Fire Dept. Station # 5
Vanderburgh	Fire Station	Evansville Fire Dept. Station #7
Vanderburgh	INDOT Facility	Evansville Unit 1 (Addison)
Vanderburgh	School	Francis Joseph Reitz High School
Vanderburgh	School	Helfrich Park Middle School
Vanderburgh	School	Marian Day School
Vanderburgh	School	Mater Dei High School
Vanderburgh	School	S E Private Parochial
Vanderburgh	School	St Theresa School
Vanderburgh	EOC	Vanderburg County EMA
Vermillion	Fire Station	Clinton Township Fire Department
Vigo	School	Fayette Elementary School
Vigo	Fire Station	Nevins Fire Department Station
Vigo	Fire Station	New Goshen Fire Department Station 11
Vigo	Care Facility	Normal Life Of Indiana (Terre Haute)
Vigo	Fire Station	Seelyville Fire Department Station 81
Vigo	Police Station	Seelyville Town Marshal
Vigo	School	Sugar Creek Consolidated Elementary School
Vigo	Fire Station	Terre Haute Intl-Hulman Field
Warrick	Police Station	Chandler Police Department
Warrick	INDOT Facility	Chandler Unit

Figure 150. Indiana Coal Mines (data from IndianaMap)

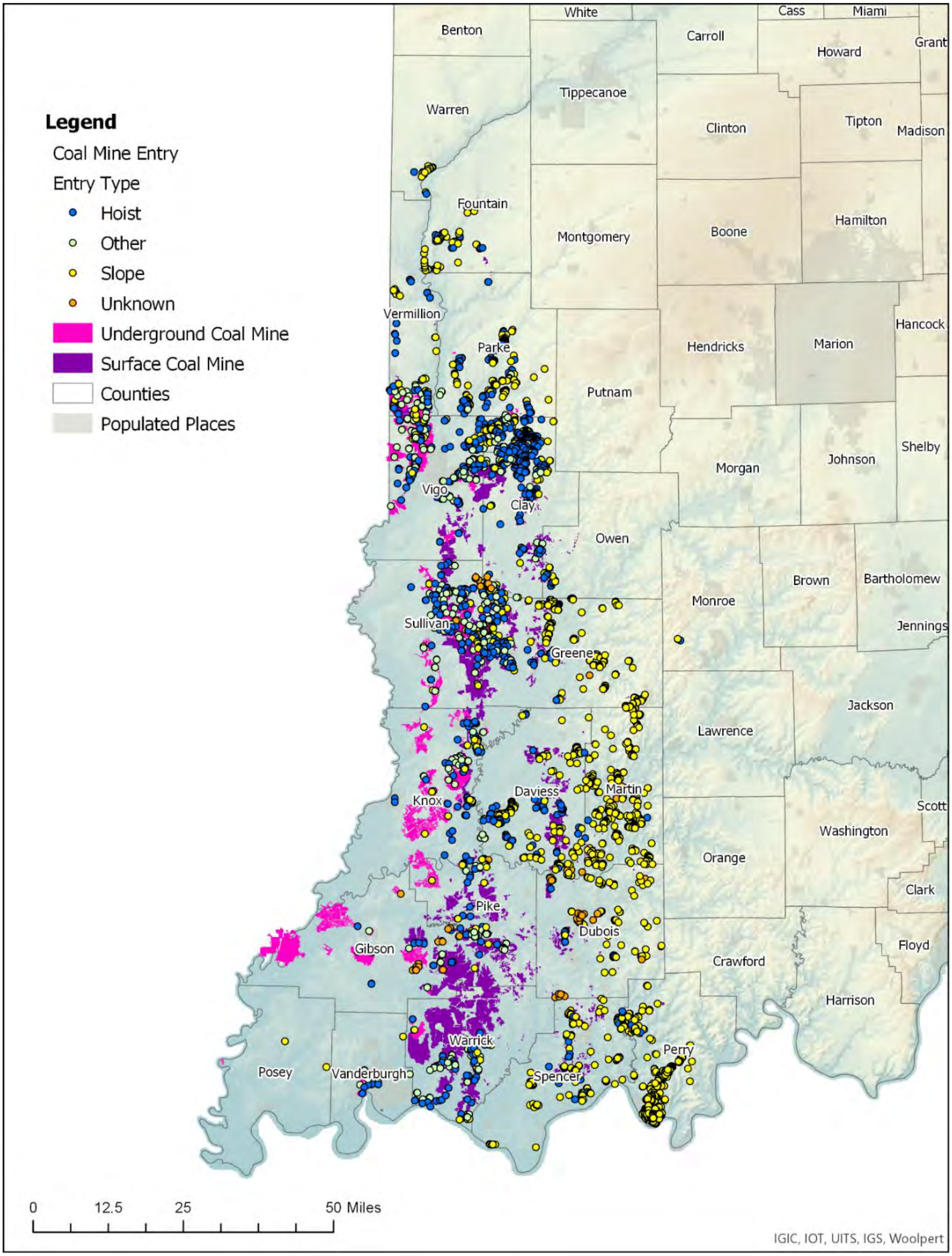
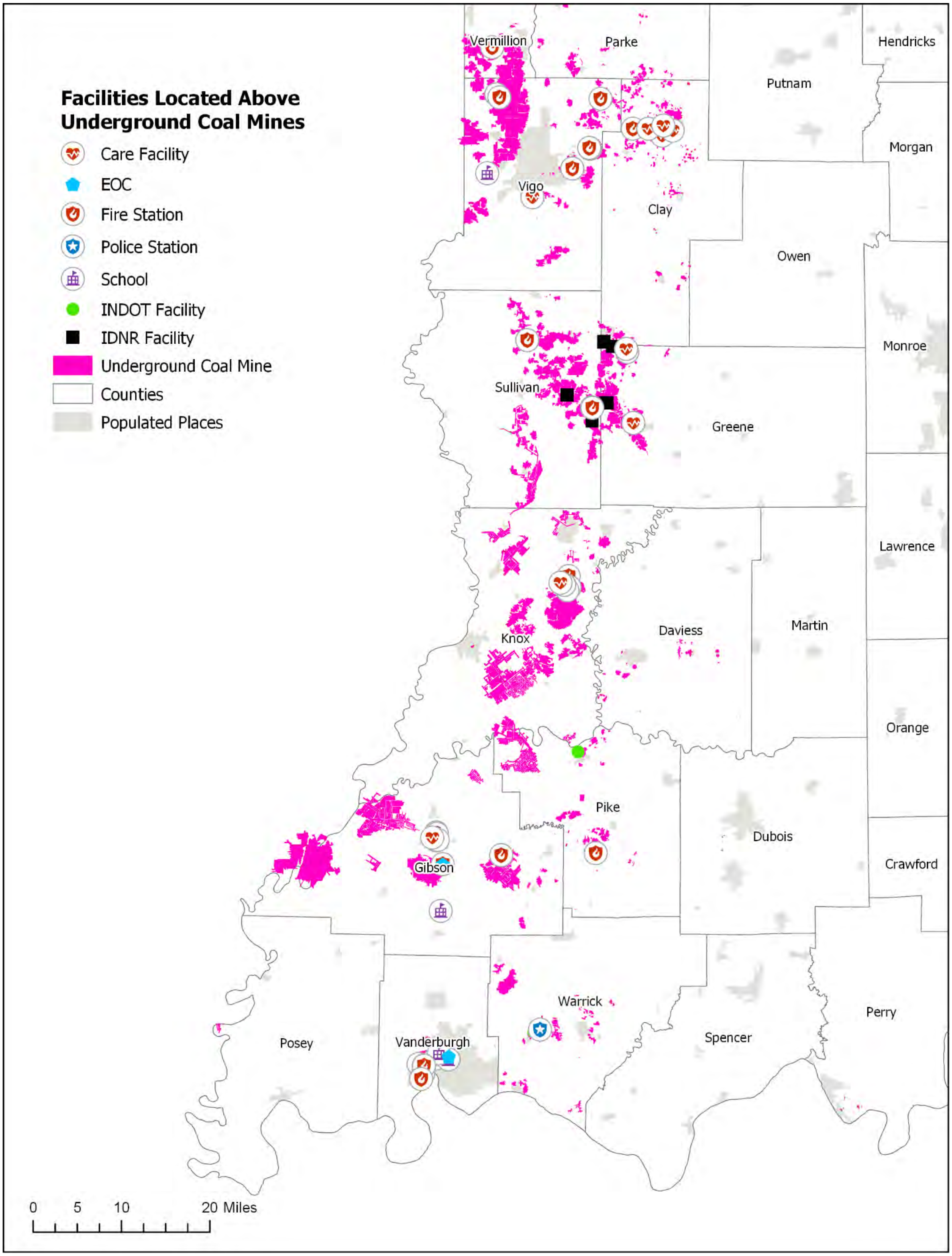


Figure 151. State & Essential Facilities above Underground Coal Mines



6.7.4 Fluvial Erosion Hazard (FEH)

Fluvial erosion is defined as the erosion caused by the channel migration of streams, rivers, creeks, and other flowing bodies of water.

Removing homes or restricting property development in the floodway, floodway fringe, or fluvial erosion hazard zone, thereby creating in perpetuity, green spaces, parks, golf courses, and other unobstructed land are prime examples of the state's current mitigation efforts to combat the pressures of development of floodways.

FEH has been of particular focus in recent years in Indiana and has resulted in the development of a number of reports. In 2013, the USGS published a report document channel-migration rates of selected streams in Indiana (Robinson, 2013). More recently, in 2017, the USGS published another report addressing vulnerable transportation and utility assets near actively migrating streams in the state (Sperl, 2017). Meanwhile, the Indiana Silver Jackets are supporting a program to identify mitigation resources for individuals and communities wanted to adopt FEH-avoidance strategies. Funding for this project has been provided by the Indiana Office of Community and Rural Affairs (OCRA). The Indiana Fluvial Erosion Hazard Program website (http://feh.iupui.edu) provides a link to an interactive map of major streams and rivers in Indiana that are more susceptible to being impacted by fluvial erosion (https://indnr.maps.arcgis.com/apps/webappviewer/index.html?id=43e7b307a0184c7c851b5068941e2e23). Figure 152 and Figure 153 show examples of erosion in the state while Figure 154 shows the location of actively migrating and relatively stationary streams in Indiana.

Forty-five essential and state-owned facilities were found to be within areas identified as actively migrating stream corridors. These are mapped in Figure 155 and listed in Table 53.

Table 53. State & Essential Facilities in Actively Migrating Stream Corridors

County	Facility Type	Name
Brown	Care Facility	Brown Co Iga
Brown	Police Station	Brown County Sheriff
Brown	EOC	Brown EMA
Brown	Care Facility	Cvs 6712
Brown	Care Facility	Nashville Family Medicine
Brown	Police Station	Nashville Town Marshall
Brown	IDNR Forestry	Yellowwood SF PM Residence
Decatur	Care Facility	Harvest #9
Fountain	Police Station	Hillsboro Town Marshall
Franklin	Care Facility	Brookville Iga
Franklin	Care Facility	Brookville Save A Lot
Franklin	Fire Station	Cedar Grove Volunteer Fire Dept
Franklin	Care Facility	Joanne Guttman Md
Franklin	Police Station	Laurel City Police Station
Gibson	Fire Station	White River Hazleton Vol Fire Dept
Hendricks	Fire Station	Danville Fire Dept Station 92
Hendricks	Care Facility	Kroger J947
Jennings	Fire Station	Scipio/Geneva Twp
Knox	Care Facility	Good Samaritan Hcs Of Vinncennesinc
Knox	Care Facility	Help At Home Inc
Knox	Care Facility	Knox County Wic Program
Knox	Care Facility	Physiotherapy Associates, Inc

County	Facility Type	Name
Knox	Fire Station	Station 3 Vincennes Fire
Knox	School	Vincennes Catholic-Rivet Mid & High Schl
Knox	Care Facility	Vincennes Surgery Center
Lawrence	IDNR Fish & Wildlife	Avoca SFH PM Residence
Lawrence	Fire Station	Pleasant Run Volunteer Fire Dept.
Martin	Police Station	Martin County Sheriff Dept
Monroe	IDNR State Parks	Monroe Lake FOR Residence
Montgomery	Fire Station	Waynetown Community Fire Dept
Orange	Fire Station	Paoli Fire Department
Orange	Police Station	Paoli Police Dept
Parke	Fire Station	Bridgeton Fire Department
Parke	Fire Station	Mecca Fire Dept
Parke	Police Station	Montezuma Police Department
Parke	IDNR State Parks	Raccoon Lake Mansfield Mill
Parke	IDNR State Parks	Turkey Run Inn Overlook Cabin
Vermillion	Fire Station	Clinton Fire Department
Vermillion	Police Station	Clinton Police Dept
Vermillion	INDOT Welcome Center	Spring Creek Welcome Center EB
Vermillion	Care Facility	Union Hospital Clinton
Vigo	Fire Station	Otter Creek Fire Dept Sta. 1
Vigo	Care Facility	Royal Oaks Health Care And Rehabilitatio
Wayne	Police Station	Cambridge City Police Dept
Wayne	Police Station	Greens Fork Police Dept

While Indiana's FEH program has been going on for several years, the state is currently seeking additional funds in order to identify and mitigate at-risk infrastructure. Meanwhile, numerous counties are starting to use the FEH zone in their planning and zoning, considering them to be areas of avoidance and areas that should be avoided for a planned expansion.

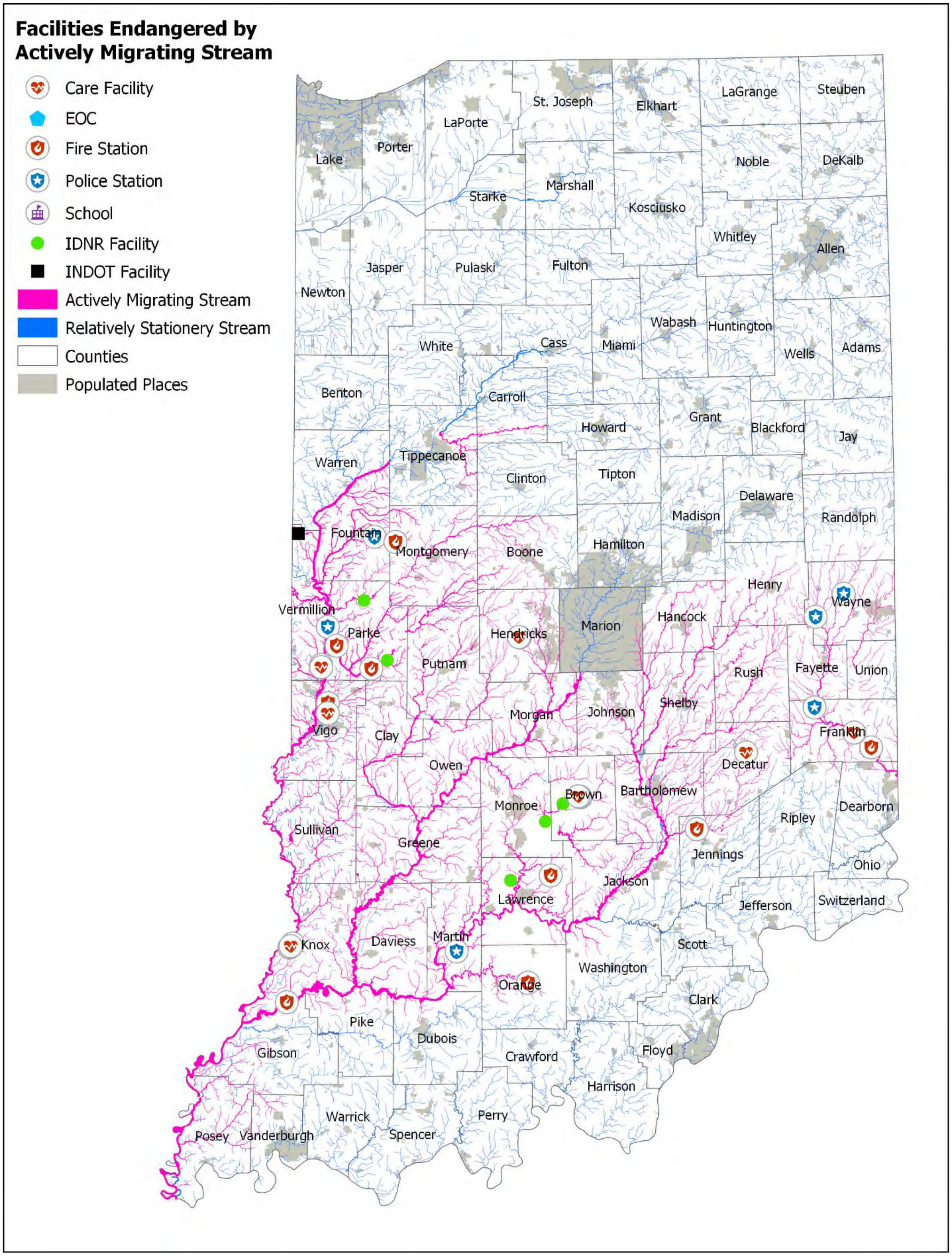
Figure 152. Fluvial Erosion Example (from http://feh.iupui.edu/)

Figure 153. Fluvial Erosion Example (from http://feh.iupui.edu/)

In 2016, a FEMA Risk MAP mitigation grant funded a system assessment of the White Lick Creek, a major tributary to the West Fork White River (Christopher B. Burke Engineering, LLC, 2016). The stream originates in Boone County and flows through Hendricks and Morgan counties. Multiple recommendations resulted from the study, including passive mitigation strategies for reducing fluvial and flooding risk, site-specific mitigation of fluvial and flooding risk, and system monitoring and adaptive management.

Figure 154. Stream Migration

Figure 155. State & Essential Facilities in Actively Migrating Stream Corridors



6.8 Wildfire

The hazard extent of wildfires is greatest in the heavily forested areas of southern Indiana. The IDNR is responsible for almost 1 million acres, of which approximately 411,000 are state-owned forestry, fish & wildlife, state parks, nature preserves, and outdoor recreation. 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.

Indiana Code 14-23-5-1, Establishment of Firefighting Organization, states:

> The department, acting through the director and the state forester, shall establish and equip a firefighting organization within the division of forestry for the purpose of detecting, preventing, fighting, and controlling fires in state forest land. The department may extend the same fire detection, prevention, fighting, and control services established to other state land under the department's supervision and control. The department may also establish the same services for land not owned by the state and not lying within a city or town for the purpose of protecting the forests, fields, and grassland of the state.

IDNR is concerned with Wildland Urban Interface wherever the topography and forest land align with houses and communities. Two examples include Brown County in the Nashville area and Ogden Dunes in the northwestern part of the state. Indiana has experienced several wildfires over the years throughout the state that have cause loss of structures and homes.

6.8.1 Historical Occurrences

On October 26, 1952, at 1:15 PM, a fire was accidently started when a homeowner improperly disposed of hot ashes from his wood stove into a nearby field just east of the community of Bartlettsville, IN, in northeastern Lawrence County. The fire danger at the time was said to have been "past the extreme stage", with the humidity lower than had ever been previously recorded to date. The fire burned until November 3, when rainfall helped to control the fire. This fire alone burned approximately 4,000 acres. Adding in several other smaller fires in the area at this same time, an estimated 6,200 acres were burned during this time period.

On November 10, 1964, at 2:18 PM, a wildfire was spotted in the Hoosier National Forest in southwestern Lawrence County, IN. The fire was reported by Clarisse Carroll, who was stationed in a nearby fire lookout tower (Georgia Tower) at the time. During this period of time, Lawrence County was experiencing record drought conditions and had not seen rain in days. By 4:00 PM that afternoon, the fire was under control with the exception of a small parcel of private land that firefighters were told they could not gain access to. By the next morning, with winds gusting up to 35 mph, the fire was again out of control. After an additional four days of battling, the fire was considered controlled, with patrols taking place until there was adequate rainfall. An estimated 2,500 acres were burned, with the initial cause of the fire remaining unknown.

In the northwest part of the state, the Indiana Dunes National Lakeshore experiences, on average, 20 to 30 wildland fires in the park each year. Park fire management staff work closely with the 13 local fire departments in the event of a wildfire.

6.8.2 Vulnerability Assessment

The heavily forested areas of southern Indiana as well as Ogden Dunes in northwestern Indiana are at greatest risk of wildfire.

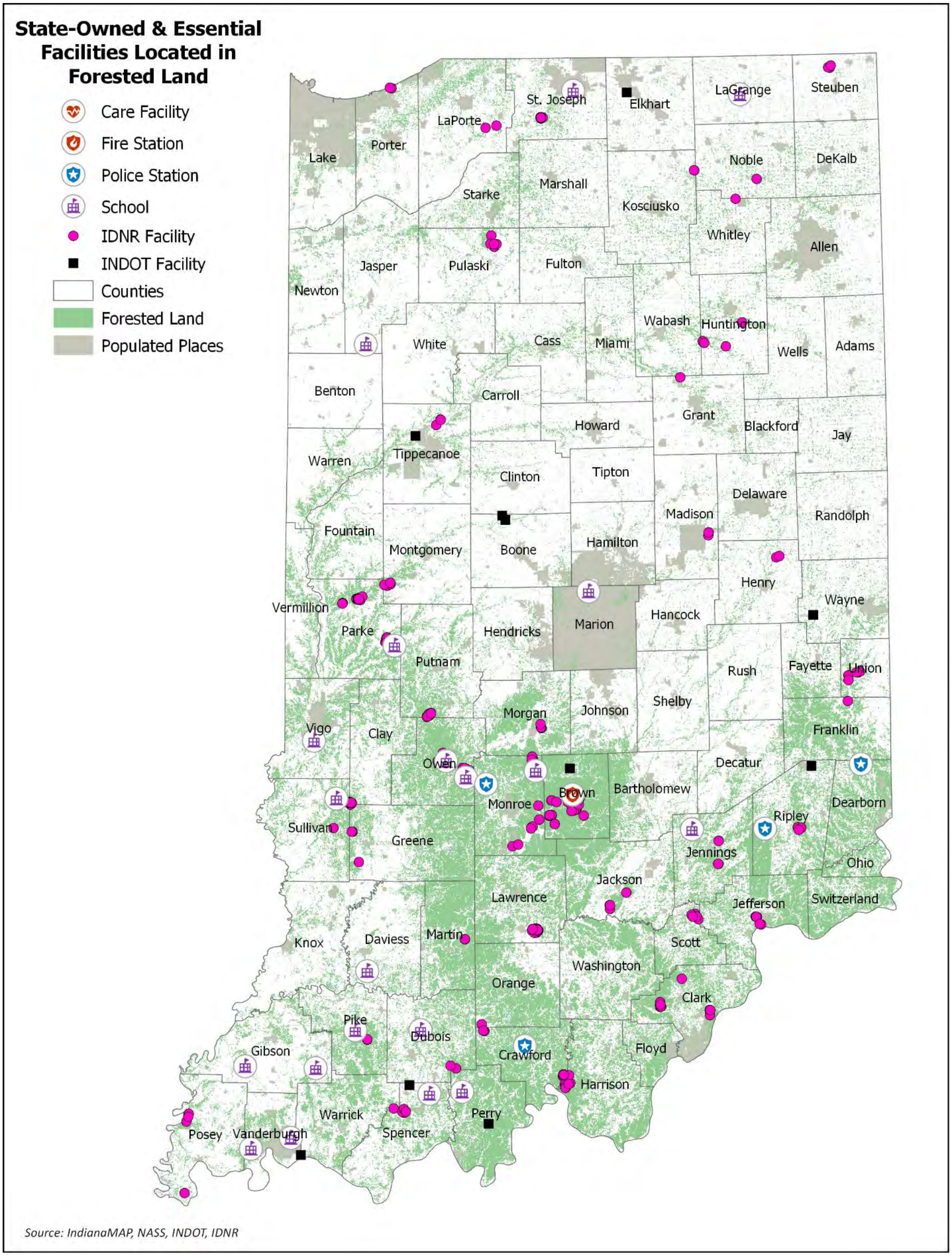
The USDA National Agricultural Statistics Service (NASS) released a Cropland Data layer in 2016 with a ground resolution of 30 meters. Using this dataset, Figure 156 displays those state-owned and essential facilities that are located in areas identified deciduous forest, evergreen forest, or mixed forest. Eleven INDOT, 317 IDNR facilities, 20 schools, 5 police stations, one fire station, and 53 care facilities were found to match those criteria. These facilities may be at greater risk in the event of a wildfire.

6.8.3 Probability of Future Occurrences

The probability of future wildfires will be low for the whole state, meaning it is likely to occur within the next ten years. However, the probability for the Hoosier National Forest and Indiana Dunes National Lakeshore is high, meaning it is probable to occur within the next year.

The probability of future wildfires is directly related to the extreme heat and drought vulnerabilities. According to the NCDC, since the last plan update, the state has experienced significant heat events in 2015, 2017, and 2018. The latest recorded drought was in November 2016, affecting the southern Indiana counties of Pike, Spencer, Vanderburgh, Warrick, Gibson, and Posey. Its drought category was at most a D1. Global climate change may have an impact on the probability of future events; however, it is unclear as to the extent of this impact. While current predictions indicate higher temperatures and an increase in extremely hot days, they also indicate wetter conditions.

Figure 156. State-Owned Facilities Located in Forested Land



6.9 Disease Outbreak

The CDC characterizes a disease outbreak as a sharp increase in the number of incidences of a disease in the population. When the expected or routine amount of incidences of a disease rapidly grows into a public health threat, public health and emergency management officials and medical care professionals must act swiftly to limit morbidity and mortality. The CDC requires state and local health departments to report 75 different types of infectious diseases along with foodborne and waterborne disease outbreaks. Transmission of infectious diseases may occur through a variety of pathways, including airborne inhalation, food, liquids, bodily fluids, contaminated objects, ingestion, or vector-borne spread. Disease outbreaks pose a particular risk to urban and suburban communities due to the close environments in which people interact.

6.9.1 Historical Occurrences

Since November 2017, the Indiana State Department of Health (ISDH) has been investigating an outbreak of acute hepatitis A virus (HAV). In previous years, Indiana had an average cases of 20 HAV per 12-month period. Since the outbreak and as of February 8, 2019, the state has seen 989 cases resulting in 499 hospitalizations and 2 deaths. Over 117,000 vaccines have been administered since January 1, 2018.

On Friday December 11, 2015, a staff member at an elementary school in Allen County was diagnosed with meningococcal disease (meningitis). The Fort Wayne-Allen County Department of Health (DOH), ISDH, and the CDC worked together and decided to offer preventative antibiotics to all students and faculty of the school. On Tuesday December 15, 2015, 449 people were provided with preventative antibiotics. School nurses and volunteers weighed all children to determine the appropriate dosage.

> The Disease Reporting and Control Rule requires health care providers, hospitals, and laboratories to report communicable diseases and conditions.
>
> The Indiana State Department of Health Epidemiology Resource Center publishes an annual report of infectious diseases documented in the state and their incidence. Recent reports can be found at https://www.in.gov/isdh/20667.htm.

6.9.2 Probability of Future Occurrences

The 2018 IN CCIA predicts a rise in temperature and fewer extremely cold temperature days. As a result, more pests may survive winter, leading to a potential increase in cases of the West Nile virus, the Zika virus, and Lyme disease. According to the report “Traps in Marion County already show a 500% increase in the number of mosquitoes from 1981 to 2016” (Widhalm, et al., 2018).

7 Technological Hazards

"Technological hazards can affect localized or widespread areas, are frequently unpredictable, can cause property damage and loss of life, and can significantly affect infrastructure in many areas of the United States. FEMA recognizes that a comprehensive strategy to mitigate the nation's hazards cannot address natural hazards alone."(https://www.fema.gov/media-library-data/20130726-1545-20490-2423/mhira_te.pdf). This section of the plan will discuss the following technological hazards:

- **Dam and levee failures** - collapses or failures of impoundment structures that cause downstream flooding
- **Low head dams** - A low head dam is a manmade structure spanning a river or stream channel from bank to bank in which water flows over the entire length of the top of the dam which may produce strong turbulent and recirculating currents at the base.
- **Hazardous materials release** - uncontrolled releases of hazardous materials from fixed sites or during transport
- **Structural fire** - uncontrolled burning in residential, commercial, industrial or other properties in rural or developed areas (not forest and wildfires)
- **Communication system failure** - communications failures are sometimes a consequence of disasters such as hurricane-force winds, floodwaters, and seismic activity resulting in damage to communication equipment
- **Public utility failure** – Similar to communication system failures, public utilities located in vulnerable areas can be impacted by disasters
- **Air transportation incidents** - Aircraft accidents can occur for a variety of reasons, including mechanical failure, poor weather conditions, human error, and intentional causes.

7.1 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 and below the dam creates large amounts of 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 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, a false sense of security often leads to new construction, added infrastructure, and increased population in at risk areas 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 the 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. IDNR has created the Indiana Dam Safety Inspection Manual, which can be found at https://secure.in.gov/dnr/water/3593.htm. The regulation of dams in Indiana is addressed under Indiana Code: IC 14-27-7.5 Regulation of Dams, and 312 IAC Article 10.5 Regulation of Dams. Many structures across the US have been under-funded or otherwise neglected, leading to the recognition that certain structures are unsafe or, rarely, can lead to 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. Additionally, levees prohibit the natural dissemination and storage of flood waters resulting in more water being forced downstream than would otherwise be the case.

The IDNR Division of Water assigns the hazard potential for dams and levees based on the federal classification system. Table 54 below describes each hazard classification.

Table 54. Hazard Potential Classification System for Dams

Federal Classification	Description
High	Probable loss of life. Economic, environmental, and lifeline losses are possible but not necessary.
Significant	No probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.
Low	No probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

Both population and infrastructure located downstream are at risk in the event of a dam or levee failure. Developing an Incident and Emergency Action Plan (IEAP) and updated inundation maps is the first step toward highlighting the areas of greatest vulnerability in each community. Figure 157 shows the locations of all dams in Indiana, Figure 158 shows state-regulated dams in Indiana, symbolized by their federal hazard classification, and Figure 159 shows the locations and density of high hazard dams in Indiana. The state has 243 high hazard dams, 128 of which have an IEAP. These dams are listed in Appendix C. The southern part of the state, especially in and around Brown County, has the highest concentration of high hazard dams.

Starting in 2015, IDHS began a partnership with IDNR and OCRA to fund and develop 29 IEAPs for communities throughout the state.

The following table lists dam failures that have occurred in Indiana since 2014.

Table 55. Dam Failures Since 2014

Dam Name	County	Month	Year
Smith Lake Dam	Morgan	May	2018
Huntingburg Conservation Club Dam	Dubois	April	2018
Lake George Dam	Lake	February	2018

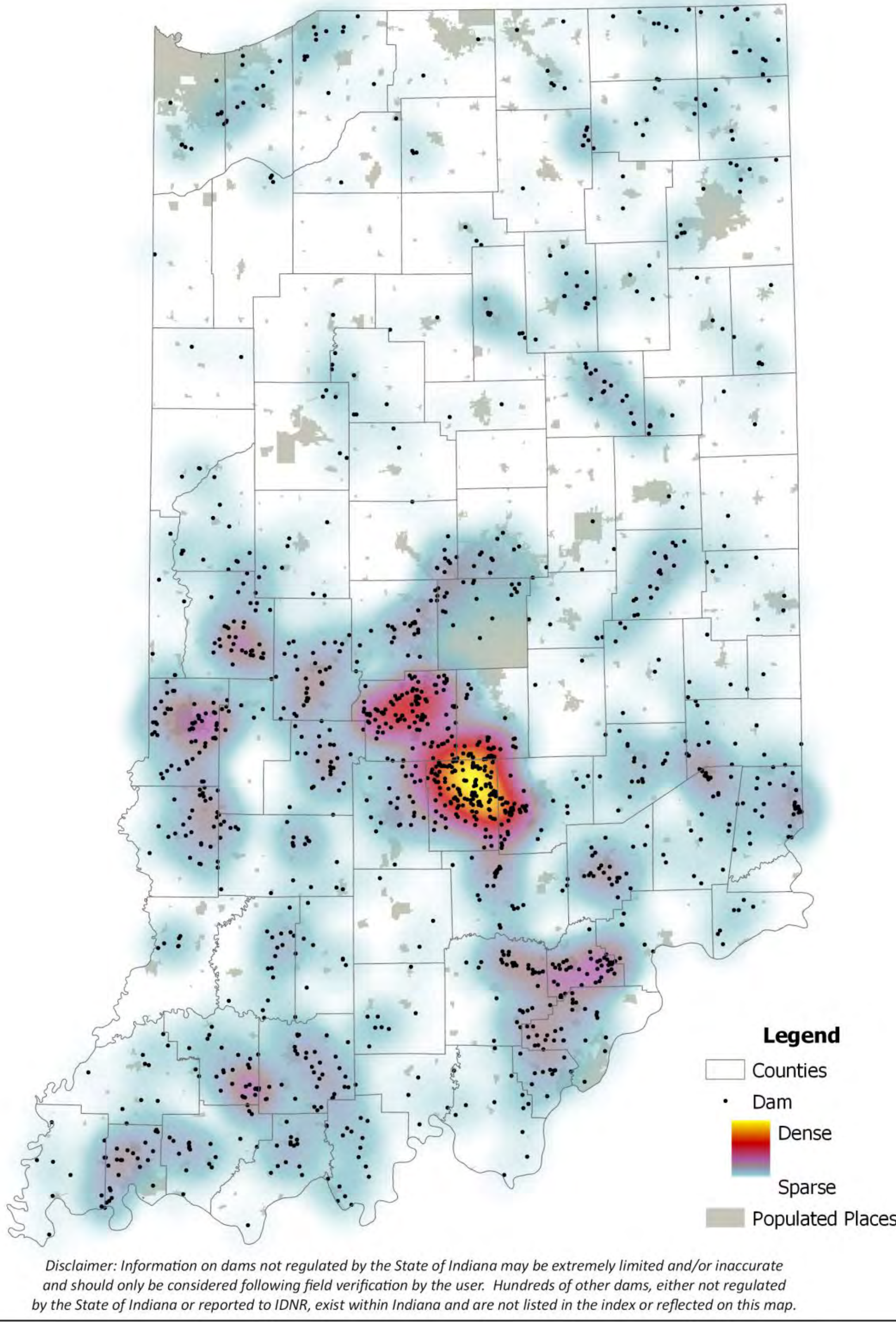
Dam Name	County	Month	Year
Lake of the Woods Dam	Porter	February	2018
Lutheran Hills Camp Lake Dam	Brown	February	2018
Rolling Vista Dam	Morgan	February	2018
Sylvan Lake Dam	Noble	February	2018
Princes East Lake Dam	Johnson	February	2018
Hidden Valley Lake Dam	Dearborn	January	2018
Tamerix Lake Dam	Bartholomew	July	2018
Yellow River Levee	Marshall	March	2018
Emerichsville (in-channel) Dam	Marion	October	2018
Lake Haven Dam	Henry	September	2018
Sylvan Lake Dam	Noble	May	2017
Autumn Winds Dam	Vanderburgh	February	2017
Country Squire Lake Dam	Jennings	October	2017
Little Wabash River (in-channel) (Huntington) Dam	Huntington	January	2016
Rolling Vista Dam	Morgan	May	2015
Unregulated Dam	Brown	May	2015
Keystone Woods Dam	Hamilton	April	2015
Russell Lake Dam and Levee	Boone	December	2015
Forest Lake Dam	Hendricks	July	2015
Terry Lake	Steuben	March	2015
Unregulated Dam	Clark	April	2014
Harrison Lake North Dam	Brown	April	2014
Harrison Lake North Dam	Brown	August	2014
Lake Mohee Dam	Blackford	August	2014
Brush Creek Reservoir Dam	Jennings	September	2014

The Indianapolis North Flood Damage Reduction Project, once completed, will protect more than 1,000 homes in the Warfleigh, Broad Ripple, and Butler-Tarkington neighborhoods, including much of the of the Butler University campus, from damage in the case of a 300-year flood event.

The U.S. Army Corps of Engineers is constructing this project in coordination with the City of Indianapolis Department of Public Works.

All phases of the project will be built and maintained to qualify the project for FEMA accreditation, a process which should redraw the floodplain and reduce flood insurance rates for many residents.

Figure 157. All Dams



Disclaimer: Information on dams not regulated by the State of Indiana may be extremely limited and/or inaccurate and should only be considered following field verification by the user. Hundreds of other dams, either not regulated by the State of Indiana or reported to IDNR, exist within Indiana and are not listed in the index or reflected on this map.

Figure 158. State-Regulated Dams

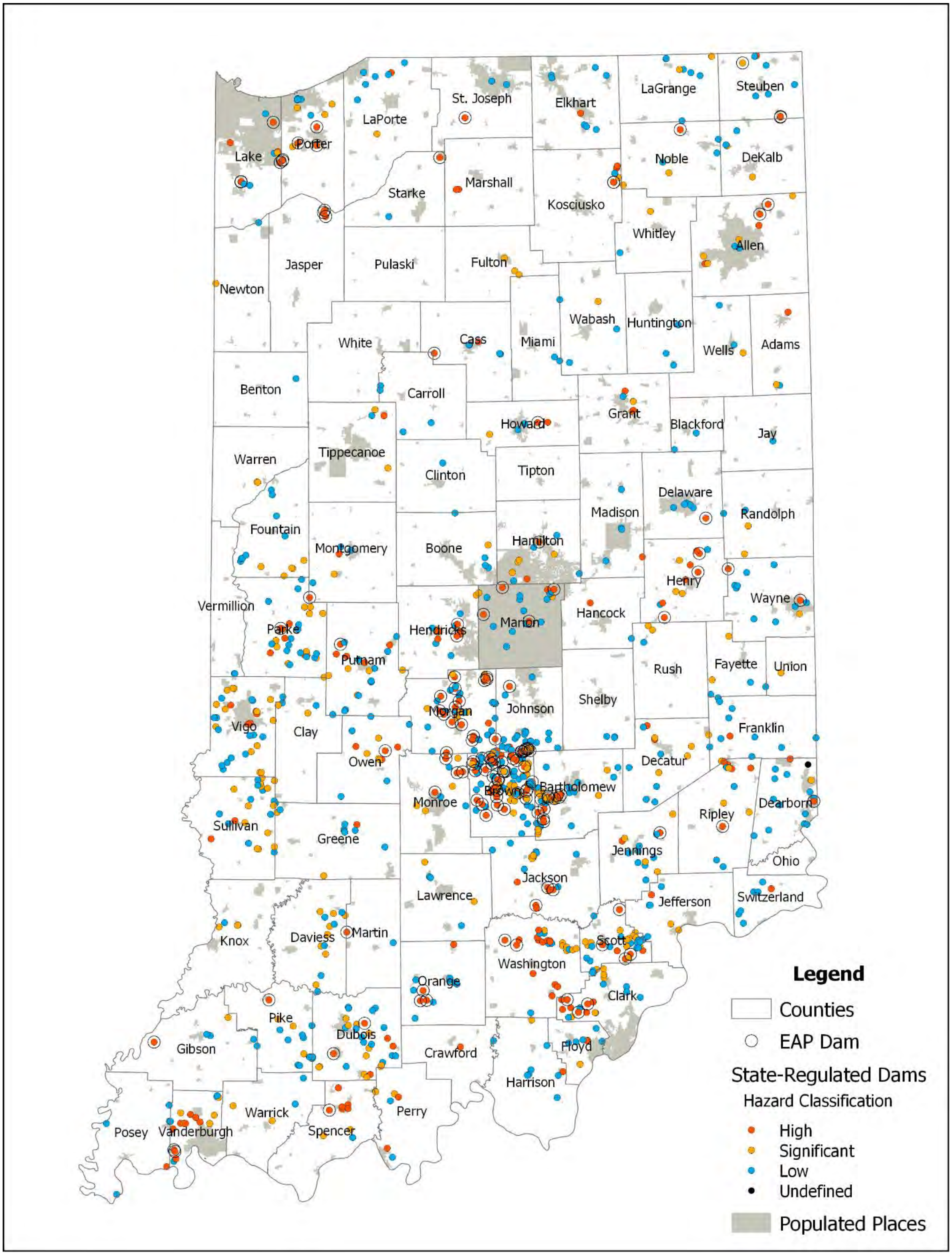
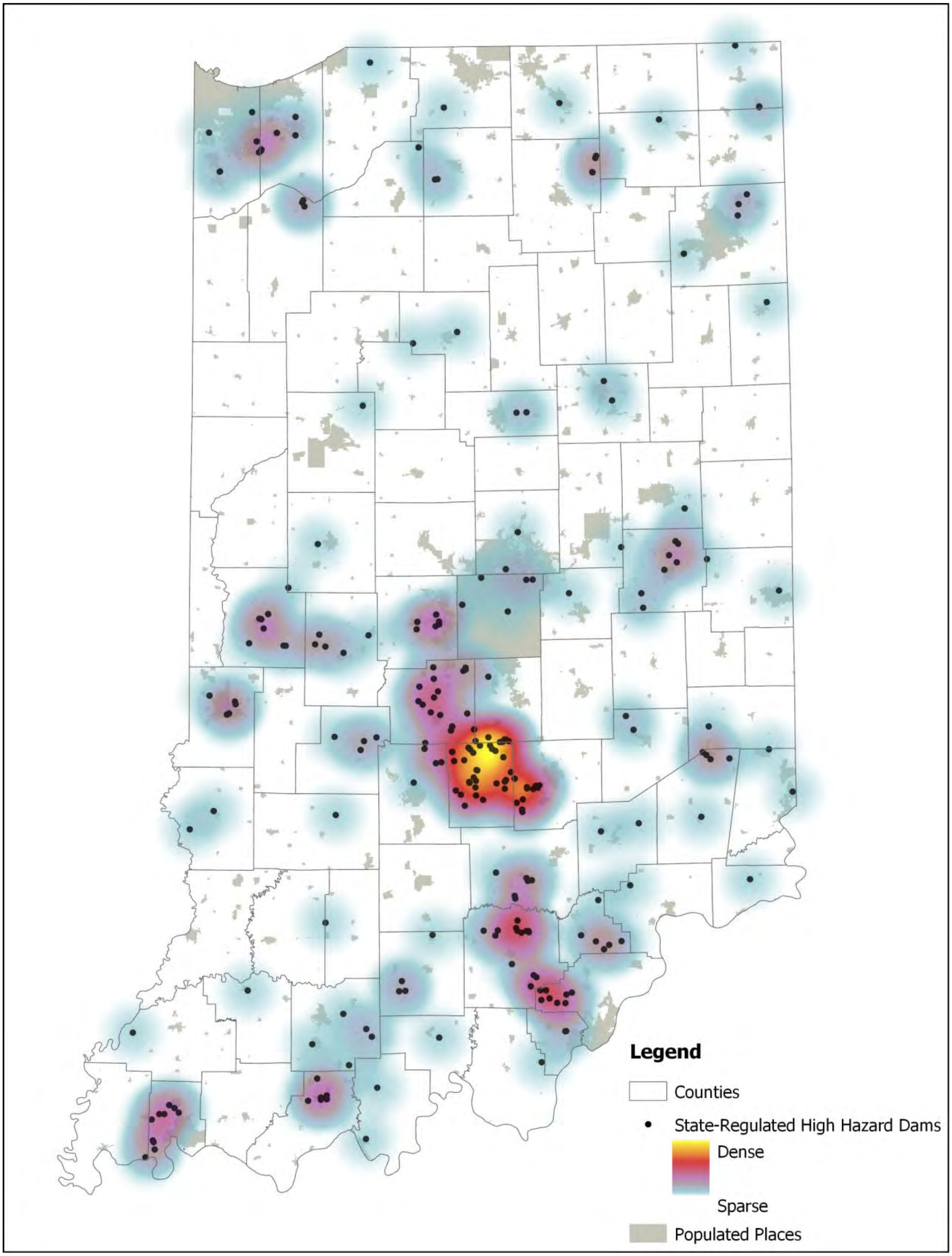


Figure 159. State-Regulated High Hazard Dams



7.1.1 Low-Head Dams

Low-head dams were first built in Indiana in the 1800s to provide energy for milling, power generation, and water diversion. Over time, many of these dams were damaged or abandoned and left in rivers. Low-head dams obstruct the general flow of water in rivers and span from bank to bank. As of 2018, 164 low-head dams were known to remain in Indiana Waterways (see Figure 160). The number of low-head dams fluctuates as they are discovered and/or removed. These dams pose a great risk to water enthusiasts due to many being in disrepair and the hydraulic churning motion that takes place as the water velocity drives the water to the river bottom and recirculates the highly aeriated water back to the surface. This churning action, much like a washing machine, traps debris, boats and people who mistakenly get too close to the structures and are pulled to the face of the dam. In Indiana, from May 1997 through October 2018, 27 people have lost their lives at low-head dams and 86 have been rescued, with at least 23 sustaining injuries.

Thanks to a grant IDHS received in 2015 to conduct education and outreach activities on the risks and hazards of low-head dams, a number of activities have taken place. These include the development of a 30-minute documentary, a 14-minute youth-oriented program, and a 1-minute social media piece; a one-day low-head dam symposium attended by over 300 people; an inventory of low-head dams; the development of a web-based interactive map (https://indnr.maps.arcgis.com/apps/webappviewer/index.html?id=729f94f7963a42d9ab0d38c639590fea); and the development of an outreach campaign.

"Over, Under Gone – The Killer in Our Rivers" documentary received the National Association of State Dam Safety Officials Midwest Region Award of Merit in 2017. The documentary is available online at https://www.wfyi.org/programs/over-under-gone/television/over-under-gone-the-killer-in-our-rivers.

Indiana Silver Jackets team members have developed artwork for a low-head dams warning sign that both verbally and visually warns people of the hazard and utilizes color schemes and word choices similar to workplace warning signs. 37 such signs were placed upstream and downstream of the 3 low-head dams in the Fort Wayne area and Citizens Energy has deployed smaller signs near dams where the public can walk near their low-head dam structures. Team members have presented at both statewide and national conferences including INAFSM, Association of State Dam Safety Officials (ASDSO), Boat Sport and Travel Show, Stay Afloat Biannual Conference, etc. encouraging public education (https://www.in.gov/dnr/outdoor/9419.htm) and the development of local champions to help educate and encourage the removal or modification of low-head dam structures. A student curriculum has been developed to teach students about low-head dams. The curriculum is currently being beta tested with a few select teachers. The goal is to provide the board of education compliant curriculum, and all the teaching materials to local schools, scouting groups and agricultural youth organizations so they can spread the message. Most recently, team members have been working with IDEM and the United States Army Corps of Engineers (USACE) to develop a set of guidelines to assist dam owners navigate the environmental testing and permitting processes for dam removals.

Pete Cinotto, a USGS Silver Jackets team member, developed a prototype app that locates known low-head dams within 12 miles of a user and warns the user when approaching a dam. The app links to DNR's online inventory.

7.1.2 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:

- They 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 and maintaining levee systems are the levee sponsor responsibility, local officials are adopting protocols and procedures for ensuring public safety and participation in the NFIP.

Figure 160. Known Low-Head Dams

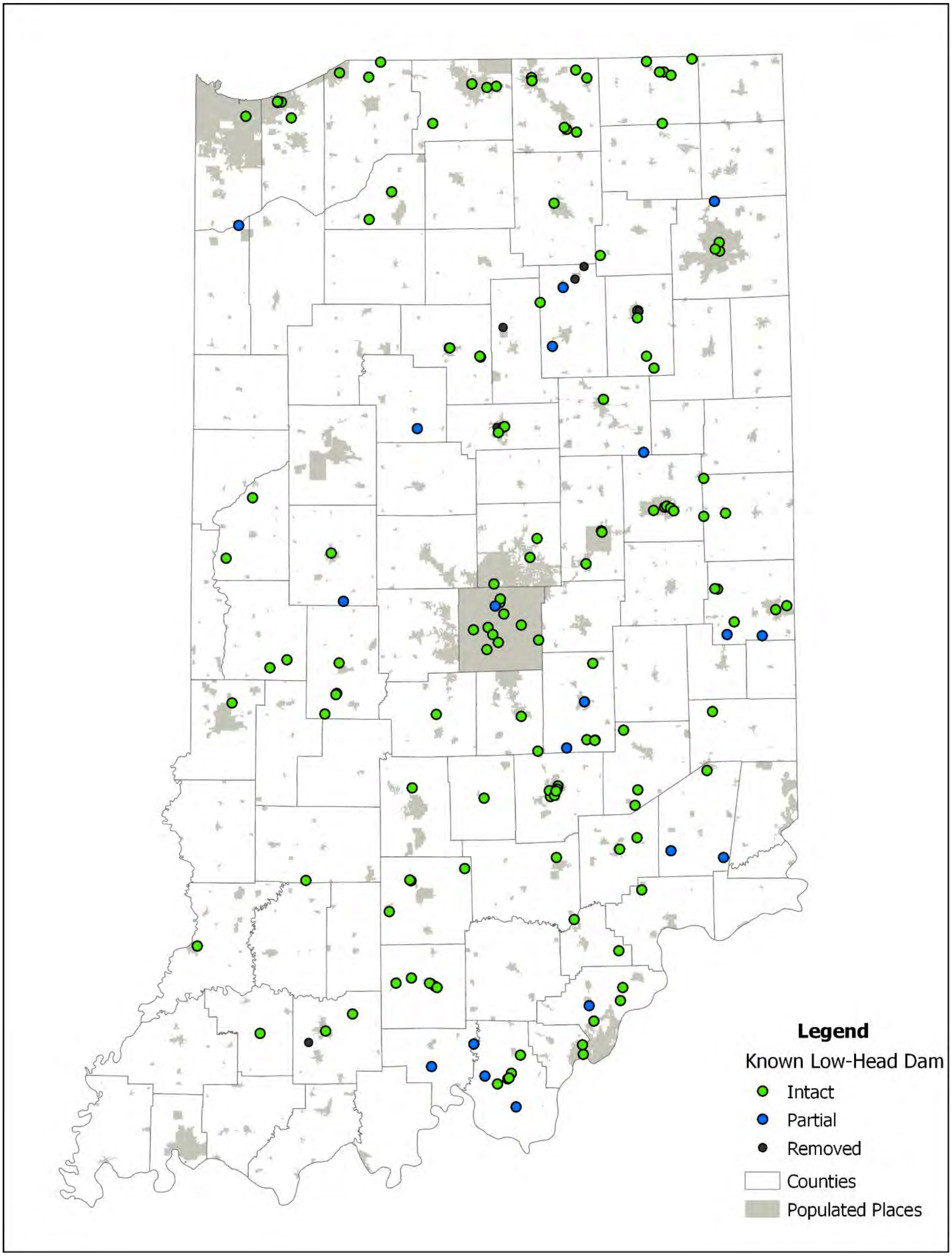
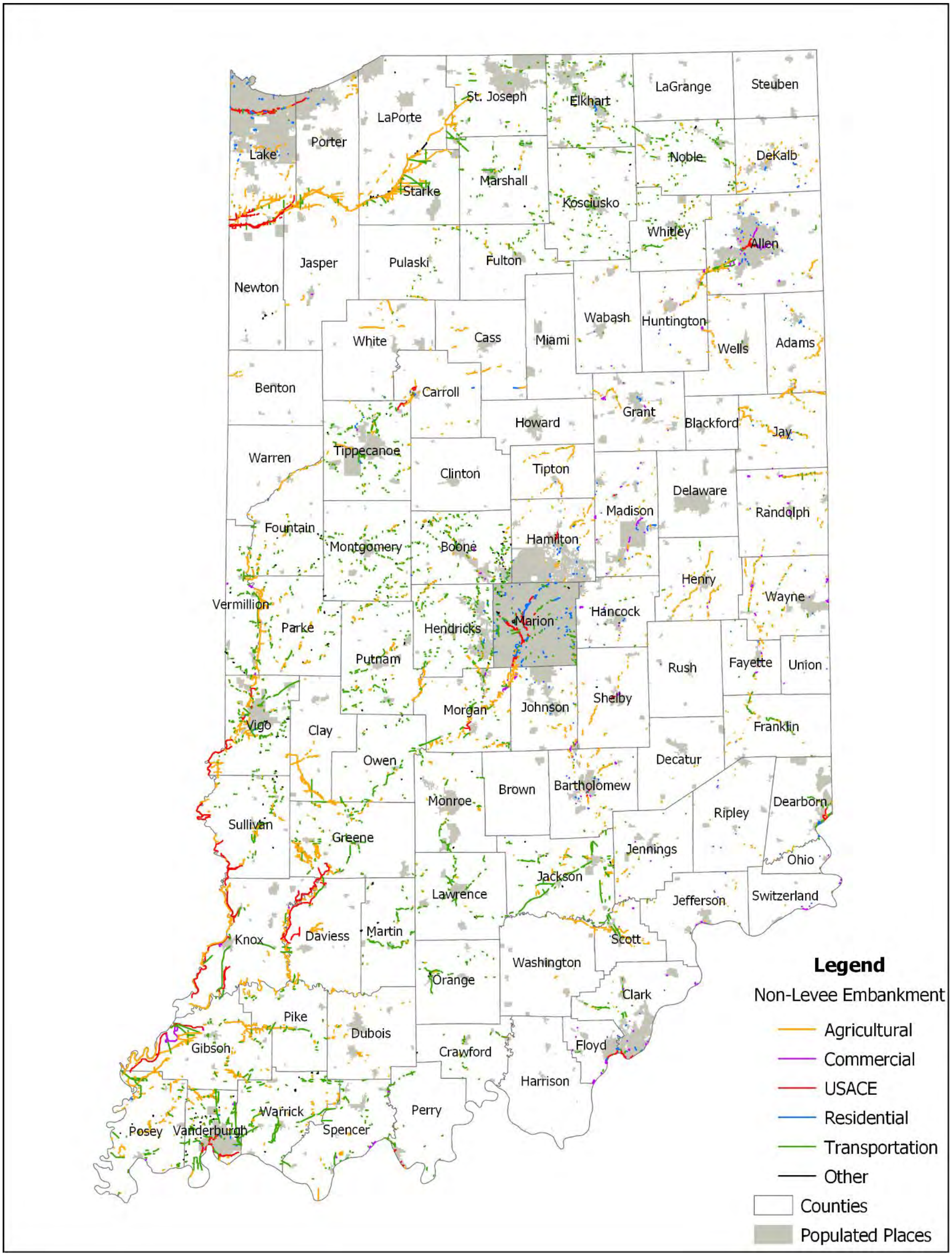


Figure 161. Non-Levee Embankments



7.2 Hazardous Materials Release

Hazardous materials are any solid, liquid, or gas that can pose a threat to human health and/or the environment due to being radioactive, flammable, explosive, toxic, corrosive, a biohazard, an oxidizer, an asphyxiant, or capable of causing severe allergic reactions. Hazardous materials are most often released as a result of accidents during transportation or at fixed facilities.

The transportation of chemicals and substances along interstate routes and railroads 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. Also, Indiana is bordered by the Ohio River to the south. 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/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. The release of hazardous materials can also lead to property damage, short and long term health effects, serious injuries, and even death. Emergency response to incidents involving the release of hazardous materials may require fire, safety/law enforcement, search and rescue, and hazardous materials units.

The emergency personnel assigned to IDHS's Division of Fire and Building Safety serve as on-site technical advisors at large fires and hazardous materials incidents to the more than 900 fire departments within the state. They respond to a wide range of emergencies, often working side by side with other state agencies, such as the Indiana State Police, IDEM, and state and local health departments. When an incident becomes so involved or so large that local resources are taxed beyond their capabilities, the emergency responders often assist these jurisdictions by identifying and placing in action the appropriate state resource.

IDEM's Office of Land Quality's Emergency Response program responds to incidents involving spills to soil or waters of the state. Responders in IDEM's four regional offices work closely with local, federal, and other state responders to protect Indiana's environmental resources.

Environmental emergencies can be reports by calling IDEM's 24-hour Emergency Spill Line at 1.888.233.7745 or 1.317.233.7745. The Office of Land Quality's emergency responders are available any time to receive spill reports and provide response assistance.

Indiana Code requires any shipment of low-level radioactive waste, high-level radioactive waste, spent nuclear fuel, and/or Highway Route Control Quantity radioactive material be permitted before traveling in Indiana. An online application is available for low-level radioactive waste.

7.3 Structural Fire

Structural fires are uncontrolled fires in populated areas that threaten life and property. Structural fires have many causes, including smoking, arson, industrial accidents, electrical malfunctions, damage to utility lines, laboratory accidents, lightning, and explosive or combustible materials.

Structural fires occur in virtually every community and are the most common hazard facing most communities in Indiana and across the country.

According to the U.S. Fire Administration, there were 2.8 deaths and 8.6 injuries per 1,000 fires in 2016 in Indiana. For residential structure fires, the numbers were higher at 7.8 deaths and 25.2 injuries per 1,000 fires. These numbers are higher than the national average. Structural fires accounted for 80% of fire-related deaths and 86.2% of fire-related injuries. Residential fires accounted for the majority of structural fire deaths and injuries. The relative risk of dying in a fire in 2016 was slightly higher in Indiana (1.1) than the average relative risk for the country (1.0).

On December 18, 1964, a nursing home in Fountaintown, IN was engulfed with flames. The home was once a 15-room mansion that was converted into a private convalescent center in 1946. There were 34 patients that lived in the home at the time of the fire, and 20 patients lost their lives. The fire started at 2:30 A.M. in the basement where the furnace overheated and ignited a wall while the temperature outside was four degrees above zero. There was no hydrant system nearby, therefore the firemen had to use tanker trucks to fight the fire. They also broke through the ice on nearby Brandywine Creek to get water for the fire.

On January 11, 2004, a major structural fire swept through the historical district of Jeffersonville, IN. Winds gusted at 20-30 mph at the time of the blaze, which made it difficult for firefighters to combat. The fire started in an electrical junction box in the first floor ceiling of the Horner Novelty Company on Spring Street. This was a two-story building occupying around 40,000 square feet of the district. Seven area mutual aid engines were called in to assist, including assistance from Kentucky. These mutual aid engines included over 100 firefighters on scene. In total, seven commercial buildings, one apartment building, one residential structure, and three garages were completely destroyed, with damages exceeding $7,000,000.

7.4 Communications System Failure

Communications failure can include telecommunications failure, radio communications failure, and information technology (IT) failure.

7.4.1 Telecommunications Failure

Telecommunications assets consist of any electronic device—operated by a privately- or publicly-owned entity—used for the purposes of message delivery.

Telecommunications failure may have a significant impact on a community since nearly every aspect of modern life is dependent on digital infrastructure. Economic and national security, as well as emergency response and recovery, relies on the assets and operations of telecommunications infrastructure. Disruption to telecommunications systems, whether as a result of terrorist or other malicious attacks, natural disasters, or human failure to adhere to best practices, can lead to technological and financial losses, or even loss of life.

7.4.2 Radio Communications Failure

Radio communication failure is the severe interruption or loss of private and/or public radio communications systems. The disruption may be caused by equipment failure, deliberate or unintentional human acts, or as a result of a natural, technological, or human-induced disaster. The most common associated problems can range from minor, for example, brief public inconvenience, to severe losses of production and revenues for businesses and institutions and command and control at the government level.

7.4.3 Information Technology Failure

Information technology (IT) infrastructure consists of all state government computers and servers, as well as Ethernet and Internet connectivity. The Indiana Office of Technology (IOT) manages IT operations for all state facilities, providing tools and services to support the regulatory, administrative, and daily operations of the state, including high-speed network with wireless access, central web hosting, free and low-cost software for individual use, tools and support for instruction and research, and supercomputers for data analysis and visualization.

An IT infrastructure failure may consist of a localized, statewide, or nationwide disruption of the hardware, programs, Ethernet, and/or Internet. Failure of any one of these elements can impact the entire IT system. Failure can result from the following exposures:

- Physical: consists of possible physical damage to server equipment and critical hardware caused by either natural hazards or intentional destruction
- Capacity: consists of possible overload of available resources resulting in services slowing or shutting down
- External: consists of an attack of the university network from either an external IP address or a computer with direct network access. External attacks undermine the confidentiality, integrity, and/or availability of hardware and the information on it.

7.5 Public Utility failure

Public utility failure refers to short- or long-term disruptions to electrical power, water, and/or gas. There are two types of electrical failures: brownouts and blackouts. Brownouts occur when there is a brief drop in voltage due to excessive demand for power (e.g. during heat waves). Brownouts may last for a few minutes or few hours and cause lights to dim, appliance motors to slow, equipment to reset, and less heat/air to be generated. Blackouts occur when there is widespread loss of power as a result of a natural hazard, equipment failure, sabotage, or accident.

In the event of an electrical failure, numerous community functions may be affected, including information technology, communication, and emergency services. Additionally, public buildings could lose climate control, posing health risks during extreme heat or cold.

Water failure occurring from water pipe breaks can result in flood damage to buildings and infrastructure. Additionally, the loss of water usage may occur due to contamination of the water supply. Prolonged water failure can prevent or hinder daily operations and could affect the health and safety of the population.

Gas failure occurs as a result of a broken valve or ruptured pipeline and typically results in the release of natural gas into the environment or structure. The release of natural gas can ignite a fire or explosion, and prolonged exposure can lead to serious health risks, including loss of consciousness or death.

On October 31, 1963, a propane leak at a concession stand at the Indiana State Fairgrounds Coliseum led to a massive explosion during a “Holiday on Ice” show. Out of the more than 4000 spectators, 81 died and nearly 400 were injured. The Ohio State University’s Disaster Research Center wrote a detailed report, “Disaster in Aisle 13” for the Office of Civil Defense. This report documents not only the events of the disaster, but also the organizational changes that occurred within the next year. These include the creation of a Safety Director position and the development of an inter-hospital radio-telephone system.

On April 6, 1968, two explosions occurred at the Marting Arms Sporting Goods Store in downtown Richmond, killing 41 people and injuring more than 127. The first explosion led to the second explosion, which ignited gunpowder and primers stored in the basement. The explosion destroyed three buildings, twenty nearby buildings were condemned, and 125 were damaged. The total estimated dollar loss was $15 million (over $100 million dollars today). Fire departments from Wayne County, neighboring counties and Ohio assisted.

7.6 Air Transportation Incidents

Air transportation is used to carry human passengers, as well as thousands of tons of cargo. Aircraft accidents can occur for a variety of reasons, including mechanical failure, poor weather conditions, human error, and intentional causes. The majority of aircraft accidents takes place during take-off or landing and may affect unpopulated, residential, or metropolitan areas. Incidents involving military, commercial, or private aircraft can also occur while the aircraft is on the ground. Aircraft accidents can lead to incidents of significant property damage, environmental damage, fire, explosion, hazardous material release, serious injuries, and death.

On December 13, 1977, Air Indiana Flight 216 crashed on takeoff at the Evansville Regional Airport as it was headed to Nashville. All 26 passengers and 3 crew perished. The passengers included the University of Evansville basketball team. The National Transportation Safety Board (NTSB) determined that the probable cause of the accident was an attempted takeoff with the rudder and right aileron control locks installed, in combination with a rearward center of gravity due to inappropriately loaded passenger baggage.

On October 31, 1994, American Eagle Flight 4184 headed to Chicago O’Hare from Indianapolis crashed into a field in Roselawn, IN while on a hold pattern in Chicago. All 64 passengers and 4 crew perished. The NTSB determined that the probable causes of the accident were the loss of control, attributed to a sudden and unexpected aileron hinge moment reversal that occurred after a ridge of ice accreted beyond the deice boots.

8 Human Hazards

The SHMP has a stronger focus on the risk assessment and mitigation of natural hazards for many reasons, but primarily because there is better understanding of the return period for most natural hazards. The frequency and potential severity of human hazards is far less predictable. Other planning efforts, including the Indiana THIRA, address the preparedness and response activities related to human hazards.

8.1 Cyberattack

Cyberattacks are malicious attempts to access or damage a computer system (Department of Homeland Security, 2018). Unlike physical attacks which can be immediately responded to, cyberattacks are often difficult to identify and address. Cyberattacks can be in the form of viruses or the introduction of malware which alter or erase programs and systems, accessing and/or altering restricted files or systems, and accessing the computer or device of another person to attack others or steal confidential information. Cyberattacks can have wide-ranging effects on the individual, organizational, community, and national level.

These risks include:

- Organized cybercrime, state-sponsored hackers, and cyber espionage can pose national security risks.
- Transportation, healthcare, power, and other services may be disrupted by large-scale cyber incidents.
- Vulnerability to data breach and loss increases if an organization's network is compromised. Information about a company, its employees, and its customers can be at risk.
- Unauthorized access to individually-owned devices such as computers, tablets, mobile phones, and gaming systems that connect to the Internet. Personal information may be at risk without proper security.

In February 2018, the Director of National Intelligence, Daniel Coats, identified cyber threats at the top of the list of worldwide threats (Department of Defense, 2018). In 2014, the Federal Bureau of Investigation (FBI) expanded its "Most Wanted" list with a "Cyber Most Wanted" list. As of December 2018, it included 63 individuals or groups. While there were 12 billion records stolen in 2018, it is expected for that number to grow to 33 billion by 2023. Identity theft has affected about 60 million Americans in 2018, compared to 15 million in 2017 (Norton by Symantec, 2018).

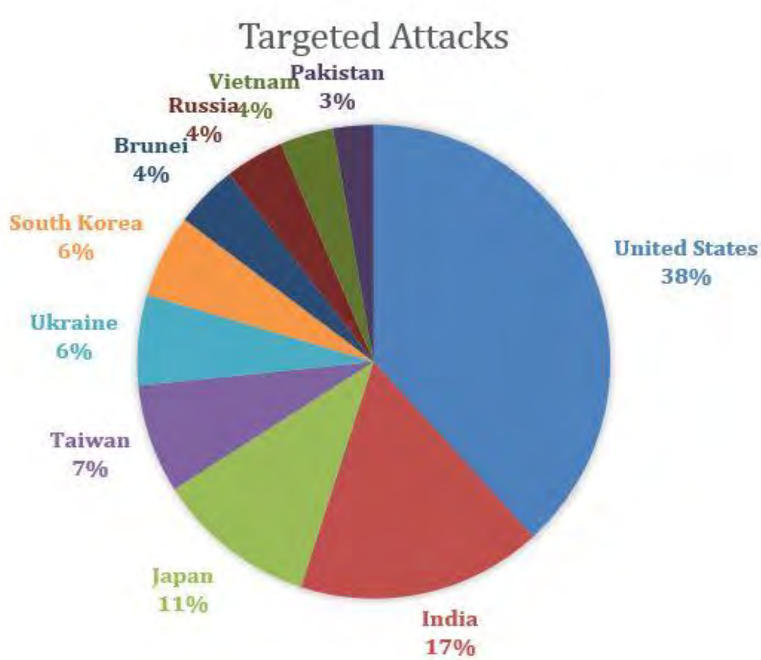
> The Indiana Information Sharing and Analysis Center (IN-ISAC) offers high-level consulting at no cost to organizations. This consulting is intended to help those with limited or no cybersecurity knowledge or skills in-house, get their questions answered and their security programs started. See https://www.in.gov/cybersecurity/in-isac/3649.htm.

Figure 162. Number of Identity Theft Victims and Amount Stolen (Norton by Symantec, 2018)

While ransomware has been publicized in the news in recent years, a growing number of attacks were remote code execution attacks associated with cryptomining (Imperva, 2018).

The past few years have seen a number of high-visibility attacks in Indiana. These include attacks on Lutheran Hospital in Fort Wayne (Becker's Hospital Review, 2018), Hancock Health in Greenfield (IndyStar, 2018), the Indiana Department of Education (IndyStar, 2018), and the Indiana National Guard (WFYI Indianapolis, 2018). The United States is the top target of cyberattacks in the world.

Figure 163. Attacks by Target Country (Norton)



Indiana State government systems are not immune. Approximately 41% of the email received is legitimate. Over a 9-month period in 2018, more than 30 million emails and 24,000 viruses were blocked from entering State computer infrastructure. Additionally, over 2 billion connection requests were blocked at the firewall. The most common source of blocked connections came from the Ukraine, followed by Russia and China.

8.2 Active Shooter

An active shooter is a person who appears to be actively engaged in killing or attempting to kill people in a populated area — typically employing the use of firearms. In some cases, active shooters use other weapons and/or improvised explosive devices (IED) to cause additional victimization and act as an impediment to law enforcement and emergency services responders. There may be no pattern or method to their selection of victims.

These situations are dynamic and evolve rapidly, demanding immediate deployment of law enforcement resources to stop the shooting and mitigate harm to innocent victims. The average active shooter incident lasts approximately 12 minutes, while 37 percent last less than five minutes. In 57 percent of active shooter incidents, police arrive while the shooting is still underway.

In recent years, the United States has experienced a number of active shooter events on school campuses. According to the Washington Post, 220,000 students have experienced gun violence at school since the Columbine High School shooting in 1999 (The Washington Post, 2019). Indiana has also been affected, including a shooting involving a 13-year-old boy at Noblesville West Middle School on May 25 (IndyStar, 2018), 2018, that injured a teacher and a student, and a shooting at Dennis Intermediate School in Richmond on December 13, 2018, that resulted in the death of the 14-year-old shooter (IndyStar, 2018).

The Indiana State Police has prepared a number of resources for schools and places of work, worship, and recreation to help the public understand how to respond to an active shooter event. These are available from https://www.in.gov/isp/3191.htm. The Indiana State Police will do live Active Shooter Event presentations upon request.

Indiana is one of just a handful of states that has a “Red Flag Law”. This law addresses circumstances where it would be appropriate for a police officer to take custody of a citizen’s firearms, by way of a warrant, or immediately when exigent circumstances are present and it can be clearly articulated the safety of the public was in jeopardy. In Indiana, this law is more commonly referred to as the “Jake laird Law”.

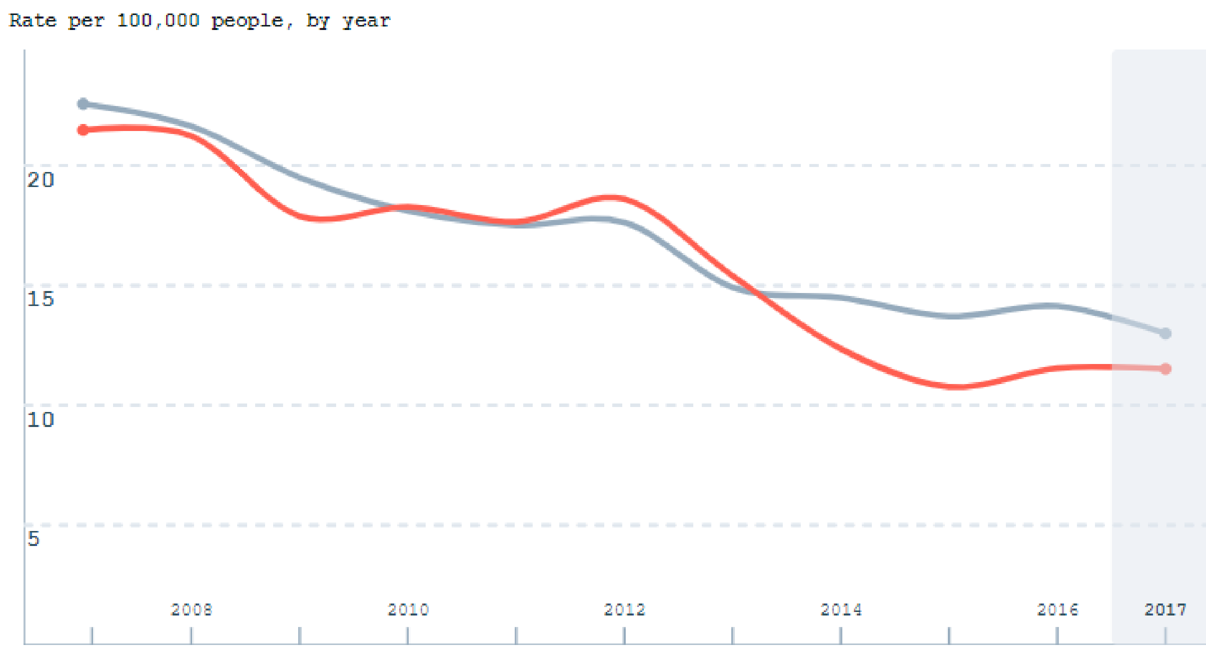
Jake Laird was an Indianapolis Metropolitan Police Department (IMPD) officer killed on August 18, 2004 when IMPD responded to numerous 911 calls reporting gunfire in a near south side neighborhood of Indianapolis (Indianapolis Metropolitan Police Department, 2019).

8.3 Arson

Arson is any willful or malicious burning, or attempt to burn—with or without intent to defraud—a dwelling, public building, motor vehicle or aircraft, and/or the personal property of another individual or entity. The FBI reports that in 2017, law enforcement agencies reported 41,171 arsons cases in the nation, representing a rate of 13.2 arson offenses from every 100,000 inhabitants nationwide. Forty-five percent of all arson offenses involved structures (e.g., residential, storage, public, etc.) Mobile property was involved in 24.5 percent of arsons, and other types of property (such as crops, timber, fences, etc.) accounted for 30.5 percent of reported arsons. The average dollar loss per arson incident was $15,573.

The arson rate in Indiana in 2017 was 11.5 incidents per 100,000 people, which was lower than the rate of the United States as a whole. Overall, the arson rate has declined since 2007 (see Figure 164).

Figure 164. Arson Rate from 2007 to 2017



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Year	Location	Rate	Total	Population
2017	United States	13.0	42,323	325,719,178
2017	Indiana	11.5	768	6,666,818

Source: FBI estimated data for Indiana

Source: https://crime-data-explorer.fr.cloud.gov/explorer/state/indiana/crime/2007/2017

8.4 CBRNE Attack

CBRNE refers to chemical, biological, radiological, nuclear, or explosive attacks. There is a growing threat of terrorism incidents employing biological, chemical, and radiological agents. A biological agent is a naturally occurring substance that can cause harm to living organisms and can be adapted for use as a weapon (i.e., anthrax, cholera, and tularemia.) It is estimated that there are over 1,200 biological agents that can be found or modified into liquid droplets, aerosols, or dry powders. Chemical agents are primarily produced with the purpose to incapacitate or kill. Chemical agents can be found in liquid, gas, or solid form and are disseminated by using heat to evaporate the agent, exploding munitions, or a mechanical spray device. Radiological agents can be naturally occurring or manmade and may be weaponized using an explosive device. Exposure to radiological agents can cause changes in cell growth and functioning, resulting in significant health issues, or death.

The emergency response staff assigned to the CBRNE section of IDHS are hazardous materials and radiation specialists who have been trained and equipped to assist local jurisdictions with any major incident. Services provided by the CBRNE section are provided at no cost to the requesting agency.

Local, state, or federal emergency response agencies needing emergency assistance from the IDHS CBRNE staff can request this assistance by calling the State of Indiana Emergency Operations Center at 1.800.669.7362 (press 1).

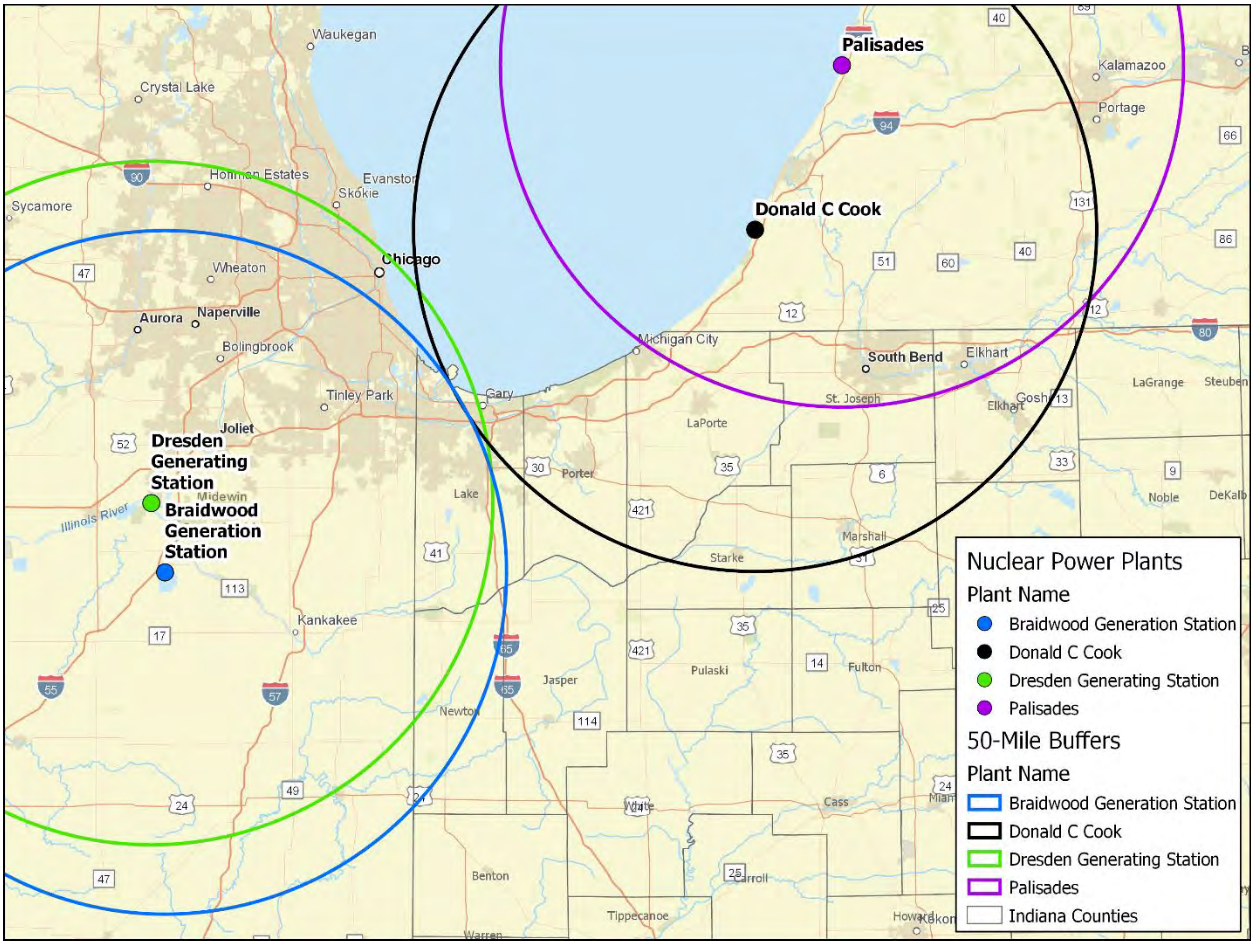
8.4.1 Radiological Emergency Preparedness Program

The IDHS Radiological Emergency Preparedness Program (REP Program) coordinates efforts to protect and respond to incidents involving commercial nuclear power plants. The REP Program provides the State of Indiana and local communities with plans, training and guidance related to nuclear energy incidents. The IDHS REP Program follows federal guidance and policies to ensure capabilities exist to prevent, protect against, mitigate the effects of and respond to and recover from incidents involving nuclear power plants.

Indiana is considered part of the emergency preparedness zones for four commercial nuclear power plants, two in Michigan and two in Illinois (see Figure 165). This is a geographical area surrounding a commercial nuclear power plant for which specialized emergency planning is needed. Indiana is part of the ingestion pathway emergency preparedness zone, which includes a radius of approximately 50 miles from each of the nuclear power plants.

The IDHS REP Program provides training and education regarding nuclear power plants and the ingestion pathway, including the basic effects of radiation, identification of possible preventative protective actions taken for food and water as well as sampling techniques for soil, water and food stuffs. FEMA evaluated exercises for Ingestion Emergency Planning Zone are conducted every eight years.

Figure 165. Nuclear Power Plants



8.5 Hostage Situation

Hostage situations involve an individual or group being forcefully held by another individual or group as security against an implied threat, or in order to assure that specified terms are met in a conflict. Barricade situations involve an individual or group that have taken position in a physical location, most often a structure or vehicle, and does not allow immediate police access and refuses police orders to exit. Subjects of barricade situations may be known to be armed, thought to be armed, have access to weapons in the location, or be in an unknown weapon status. Hostage and barricade situations may be the result of individual criminal activity, public disturbances, or terrorism.

8.6 Riot

Riots and civil unrest occur when groups or individuals disrupt a community to the degree that intervention is required to protect public safety. They typically occur in more urban areas or where there are dense populations. Common triggers of such events include racial tension, religious conflict, unemployment, and unpopular political actions. In extreme cases, riots and civil unrest can result in injuries, deaths, and property damage. The most common activities associated with this hazard include looting, vandalism, and arson.

8.7 Terrorism

There is no universally accepted definition of terrorism, even among US government agencies. The Code of Federal Regulations (CFR) defines terrorism as “the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives” (28 C.F.R. Section 0.85). Acts of terrorism can occur in many forms, depending on technological means available to the terrorist, the motivation behind the act, the points of weakness of the target, and the terrorist’s ingenuity.

Sabotage is the destruction of property or an obstruction of normal operations in order to defeat, hinder, or subvert a cause or endeavor. Acts of sabotage may be carried out by an individual or group, for the purpose of terrorism or in the course of a public disturbance. Sabotage can take many forms, including: bombings; organized extortion; use of biological, chemical, and radiological agents; pre-meditated plans of attack on institutions of public assembly; information technology disruptions; ethnic/religious/gender intimidation; and disruption of legitimate scientific research or resource-related activities.

8.7.1 Indiana Intelligence Fusion Center

The Indiana Intelligence Fusion Center is a collaborative effort of multiple agencies operated by the Indiana state Police that provides resources, expertise, and information to the Center with the goal of maximizing the ability of local, state, and federal partners to detect, prevent, investigate, and respond to criminal and terrorist activity. The primary product of the Fusion Center is situational awareness provided through notifications, warnings, and alerts supported by law enforcement intelligence derived from the application of the intelligence process. Based on law enforcement’s requirement of actionable intelligence, information is collected, integrated, evaluated, analyzed, disseminated, and maintained.

The core function of the Fusion Center is the Intelligence process, which is the orderly, systematic process by which information is gathered, assessed, and distributed. Regardless if the mission of the Fusion Center is All-Crimes, Terrorism focused, or All-Hazards, regardless if the stakeholders supported are strictly Law Enforcement, Public Health, or Emergency Response, and regardless of the types of information the Fusion Center receives, the intelligence process is means by which raw information becomes a finished intelligence product for use in decision making and action planning.

9 Mitigation Strategies

In sections 6 and 7 of this plan the risk assessment identified a number of natural, technological and man-made hazards that the State of Indiana experiences. The state planning team members understand that although hazards cannot be eliminated altogether, the state can work with partners towards building a more disaster-resistant state.

Priorities

The planning team ranked priorities based on the desired timeline for completion. The timelines described below are based on funding availability.

- High: desired to be accomplished within the next year
- Medium: desired to be accomplished within the next two to three years
- Low: desired to be accomplished within the next four to five years

Goals & Objectives

The goals and objectives listed below are a valid representation of the long-term and broad visions of the state's mitigation efforts. The strategies listed in Table 56 are how the state will work towards achieving the goals and objectives listed here.

1. Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding
    a. Ensure better coordination of federal, state and local mitigation activities
    b. Identify new partners to collaborate on the state hazard mitigation planning team
    c. Develop a program of affordable housing that is resilient to flooding
2. Lessen the impacts of disaster to new and existing infrastructure, residents and responders
    a. Encourage the integration of Hazard Mitigation Planning into local Comprehensive Plans
    b. Evaluate and strengthen communication and transportation emergency services
    c. Retrofit critical and essential facilities and structures to withstand disasters
    d. Support compliance with the NFIP
    e. Identify opportunities to reduce repetitive loss and severe repetitive loss incidents
3. Minimize the loss of life and injuries caused by disasters
    a. Develop public awareness and outreach programs
    b. Improve emergency sheltering
4. Promote research education and outreach to expand Indiana's knowledge about disasters and their impacts
    a. Conduct new studies/research to profile hazards and promote mitigation
    b. Improve education and training of emergency personnel and public officials
    c. Review and update existing, or create new, community plans, maps & ordinances

Table 56. 2019 Mitigation Strategies

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
1	High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop an outreach program to educate communities on green infrastructure and provide opportunities for them to seek additional training	IDHS, IDNR, IUPUI, USGS	NRCS, FEMA, DOE, URC	Flood
2	High	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Engage regularly with Congressional and Legislative officials, and especially Congresswoman Susan Brooks, to provide status of state and local mitigation activities	IDHS External Affairs, Silver Jackets	Existing programs	Flood
3	High	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Identify new partners to collaborate on the state hazard mitigation planning team.	Invite representatives from the social sciences to join the Silver Jackets to better engage local universities to participate in mitigation planning	Silver Jackets, IUPUI, Indiana University, Purdue University, Ball State, Indiana State University	Existing programs	Flood
4	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Collaborate with Silver Jackets to determine a sustainable funding source for continued collection of LiDAR data	Silver Jackets	State funding, lottery, gaming funds	Flood
5	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Develop electronic photo repository of high flood, landslide and sinkhole potential areas and post-disaster imagery to help prioritize new projects	IDHS, Indiana Air National Guard	FEMA, NFIP, HSEP, NOAA, USACE	Flood, Landslide, Karst/Sinkhole
6	High	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Support compliance with the NFIP.	Use new LiDAR data and ortho products to compile a comprehensive database of building footprints, which will help to promote flood insurance	Silver Jackets, IOT	State funding, local funding, HSEP, FEMA	Flood
7	High	Promote research education, and outreach to expand Indiana's knowledge about	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	IUPUI	FEMA, NSF, NIH	Flood

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
		disasters and their impacts.					
8	High	Minimize the loss of life and injuries caused by disasters	Develop public awareness and outreach programs	Work with local communities, EMA Directors, flood plain administrators and building officials to encourage good flood plain management development and mitigation to reduce flood insurance costs and property losses.	IDHS, IDNR, FEMA, NFIP, OCRA, IHCDA, CEO and APA.	FEMA, DNR, IHCDA, OCRA	Flood
9	High	Lessen the impacts of disaster to new and existing infrastructure, residents and responders	Identify opportunities to reduce repetitive loss and severe repetitive loss incidents	Encourage communities to work with interested property owners or reduce risk to or remove Repetitive Loss and Severe Repetitive Loss properties from areas of high risk, and institute programs to assist non flood plain properties become more flood resistant.	Local Governments, IDHS, DNR, FEMA, OCRA, IHCDA, Building trade Associations	FEMA, CDBG, Private Mortgage companies	Flood
10	High	Minimize the loss of life and injuries caused by disasters	Develop public awareness and outreach programs.	Facilitate development of projects and programs that educate or protect vehicular traffic and emergence responders from driving into flood roads.	NOAA, ISP, EMA, IDHS, IDNR, CEO, Law Enforcement	Existing funding, FEMA, NOAA, FHWA, Local Government	Flood
11	High	Integrate Indiana's mitigation programs to maximize efficiency and leverage funding	Ensure better coordination of federal, state, and local mitigation activities.	Coordinate with IHCDA and OCRA to consider good flood plain management and resiliency programs and ideas when award considering local projects for funding under their programs for economic development.	OCRA, RPCs, Legislative representatives	Existing funding	Flood
12	High	Minimize the loss of life and injuries caused by disasters.	Improve emergency sheltering.	Work to implement safe rooms in any new addition or construction to schools that will accommodate all students and surrounding neighborhood population	IDHS, County EMAs, local schools, DOE	FEMA	Severe Storm and Tornado
13	High	Minimize the loss of life and injuries caused by disasters.	Improve emergency sheltering.	Work with local communities, EMA Directors, State-wide building trades, and home builders, and architects to design and install saferooms in residential and businesses.	IDHS, DNR, FEMA, NFIP, OCRA, IHCDA, CEO and APA.	FEMA, DNR, IHCDA, OCRA	Severe Storm and Tornado
14	High	Minimize the loss of life and injuries caused by disasters.	Improve emergency sheltering.	Conduct assessments of schools to ensure they are providing the necessary refuge for students and neighboring population	IDHS, County EMA, local schools	FEMA	Severe Storm and Tornado

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
15	High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop public education program in partnership with builders, real estate, and loan producers to provide information on residential saferoom loans as part of a mortgage	IDHS, HUD, local building and real estate agencies	FEMA, HUD	Severe Storm and Tornado
16	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Work with county highway departments to conduct pipe analyses to improve debris clearing	INDOT, IDHS	FEMA, FHWA	Severe Storm and Tornado
17	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	IUPUI	FEMA, NSF, NIH	Severe Storm and Tornado
18	High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Work with local and state wide Chambers of Commerce building officials to encourage local contractors to become certified by the National Storm Shelter Association for the construction, manufacture and installation of safe rooms in residential and small businesses.	Building Trades, IDHS Building Commissioner, Home builder association, IDHS, FEMA	FEMA, HSEP	Severe Storm and Tornado
19	High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Continue and expand current public awareness programs so they would be compatible with employer/employee educational programs on OSHA safety and extend into what to do at home.	Local Governments, IDHS, IN OSHA, EMA, Local Governments, Unions, and trades.	FEMA, HSEP	Severe Storm and Tornado
20	High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Create a program that provides online earthquake education for the general public, including secondary effects, such as landslides and liquefaction, associated with earthquakes.	IDHS, IUPUI	FEMA	Earthquake
21	High	Promote research education, and outreach to expand Indiana's	Conduct new studies/research to profile hazards and	Conduct research on the social vulnerabilities associated with these hazards	IUPUI	FEMA, NSF, NIH	Earthquake

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
		knowledge about disasters and their impacts.	promote mitigation.				
22	High	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Work with state and local officials to adopt relevant sections of the IBC/IRC for earthquake resistant construction.	IDHS, NEHRP, IGS, PU, Building trades Local Building Officials	FEMA, State Funding	Earthquake
23	High	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Work with local officials and EMA to develop mitigation programs that educate local residents on the need for non-structural retrofits of furniture, HVAC and other utility and mechanical systems to make them earthquake resistant.	Building Trades, IDHS Building Commissioner, Home builder association, IDHS, FEMA	FEMA, HSEP	Earthquake
24	High	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Train EMA, State employees in nonstructural retrofit techniques to encourage good mitigation practices in their communities and their places of employment.	Local Governments, IDHS, IN OSHA, EMA, Local Governments, Unions, and trades.	FEMA, HSEP	Earthquake
25	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	IUPUI, FEMA, NSF, NIH	FEMA, NSF, NIH	Winter Storm, Drought, Extreme Temps, Wildfire, Disease Outbreak, Fluvial Erosion Hazard
26	High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop and distribute information on severe winter storm mitigation	IDHS, FEMA	FEMA	Winter Storm
27	High	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of state and local mitigation activities.	Provide state employees with NOAA weather radios	IDHS, FEMA	FEMA	Extreme Temps

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
28	High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop guidance for communities to minimize water usage and fuel reduction strategies	IDNR, USDA, OCRA, USGS, NRCS	OCRA, FEMA, DNR Forestry, USDA	Extreme Temps, Drought
29	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Develop water resource plan to coordinate local and state efforts to minimize drought impacts on water infrastructure and resources. Impacts include water quantity and quality of new developments	USGS, NRCS, OCRA, IDNR, IWRC, IDHS	HSEP, OCRA, IWRC	Extreme Temps, Drought
30	High	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Retrofit critical and essential facilities and structures to withstand disasters.	Retrofit state facilities to provide adequate capabilities in the event of disasters. Include green infrastructure to reduce unnecessary strain on water resources	INDOT, URC, NRCS, INDOT, IOT, IDOC, IDHS	FEMA, HSEP, existing state and federal funding	Winter Storm, Drought, Extreme Temps, Wildfire, Disease Outbreak, Fluvial Erosion Hazard
31	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Conduct research on the social vulnerabilities associated with these hazards	IUPUI, Silver Jackets	FEMA, NSF, NIH	Communications System Failure, Public Utility Failure, Air Transportation, Explosion
32	High	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop guidance for communities to use to develop response plans to dam failures and identify evacuation routes. Local EMAs should provide opportunities for downstream residents to view inundation maps and provide information on risk and mitigation	IDHS, IDNR, OCRA, USGS, USACE, NRCS, IEMA	OCRA, FEMA, NRCS, USACE	Dam/Levee Failure
33	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Continue to work with Realtors, EMAs, dam owners to communicate risk of dam failures, responsibilities of owners for maintenance, and expand efforts to develop Incident and Emergency Action Plans (IEAPs)	USGS, NRCS, OCRA, IDNR, IWRC, IDHS, USACE	HSEP, OCRA, IWRC, FEMA, IDNR	Dam Failure
34	High	Lessen the impacts of disasters to new and existing infrastructure,	Retrofit critical and essential facilities and structures to	Retrofit state facilities to provide adequate capabilities in the event of disasters. Include green infrastructure to reduce unnecessary strain on resources.	INDOT, URC, NRCS, IDOA, IOT, IDOC, IDHS	FEMA, HSEP, existing state and federal funding	Communications System Failure, Public Utility Failure

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
		residents, and responders.	withstand disasters.	Reduce power losses to state facilities by inclusion of dual fuel generators or burying of utilities			
35	High	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Work with state agencies to complete the state recovery plan, continuity of government, and continuity of operations plans for all state agencies	State Personnel Department, IDOC, IDHS, Governor	HSEP, IDHS, existing state funding	Cyber Attack, Active Shooter, Arson, CBRNE Attack, Hostage Situation, Riot, Terrorism
36	High	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Retrofit critical and essential facilities and structures to withstand disasters.	Examine mitigation and prevention design in the restoration or construction of state facilities	INDOT, URC, IDOA, IOT, IDOC, IDHS	FEMA, HSEP, existing state and federal funding	Cyber Attack, Active Shooter, Arson, CBRNE Attack, Hostage Situation, Riot, Terrorism
37	High	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Indiana Department of Administration to review, update, and complete a comprehensive database containing information related to all state facilities and their dollar value. Once this information is updated, it will then be reviewed against the known hazards to determine what structures will be impacted by the hazards.	IDOA, IDHS, IDNR, INDOT	State funding	All Hazards
38	High	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Identify new partners to collaborate on the state hazard mitigation planning team.	Invite representatives from the solid earth sciences and engineering to join the Silver Jackets to better engage local universities on mitigation planning for solid earth natural disasters	Silver Jackets, IUPUI, Indiana University, Purdue University, Ball State, Indiana State University	Existing programs	Earthquakes, Landslides, Karst/Sinkholes
39	Medium	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Support compliance with the NFIP.	Develop a program to obtain elevation certificates for low-income neighborhoods to promote mitigation and flood insurance	IDNR, IDHS, USGS	CDBG, FEMA, FMA, River Basins, State funding	Flood
40	Medium	Lessen the impacts of disasters to new and existing infrastructure,	Evaluate and strengthen communication	Identify and develop database to document major landslide locations (particularly in southern and southeast	IDHS, INDOT, IUPUI, IDNR, USGS	FEMA, OCRA	Flood, Landslide

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
		residents, and responders.	and transportation emergency services.	Indiana); conduct a study to predict trigger points for damage, and create a GIS vulnerability layer of hot spots and areas of concern			
41	Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Convene a sub-committee of Silver Jackets to develop a good working definition of *resiliency*. Conduct a pilot outreach program to communicate that theme to local communities, focusing on physical risk, socioeconomic risk, and risk to community development	Silver Jackets, Indiana University, Purdue University, FEMA	FEMA, OCRA, IDHS	Flood
42	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Conduct a pilot project using terrestrial LiDAR data to assess slope failure and identify hot spots that may not be visible otherwise	Silver Jackets	FEMA, OCRA	Flood, Landslide
43	Medium	Lessen the impacts of disasters to new and existing infrastructure, residents and infrastructure.	Encourage the integration of Hazard Mitigation Planning into local Comprehensive Plans	Encourage local communities to construct resilient infrastructure by incorporation of mitigation practices into design and development planning for extending local infrastructure.	OCRA, IHCDA, RPCs, APA, IDHS, IDNR, FEMA, INDOT, REMCs, local building and engineer officials	Existing funding	Flood, Earthquake, Landslide, Karst/Sinkhole
44	Medium	Integrate Indiana's mitigation programs to maximize efficiency and leverage funding	Develop a program of affordable housing that is resilient to flooding.	Work with Special Needs agencies and the agencies and organizations that provide affordable housing to incorporate good mitigation strategies into the selection of new housing locations for their clients.	OCRA, FSSA, VA, Habitat for Humanity, VOAD	FEMA, existing funding, CDBG	Flood, Earthquake, Landslide, Karst/Sinkhole
45	Medium	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Encourage state and local governments to incorporate wind resistant, safe room, severe storms and lightning protection strategies when designing new government buildings and infrastructure.	DOA, INDOT, DNR, FSSA, BMV, ISP, IPSC.	Existing funding	Severe Storm and Tornado
46	Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Identify new partners to collaborate on the state hazard	Work with Special Needs agencies and the agencies and organizations that provide affordable housing to incorporate good mitigation strategies into the selection of new housing options for their clients.	OCRA, FSSA, VA, Habitat for Humanity, VOAD	FEMA, existing funding, CDBG	Severe Storm and Tornado

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
			mitigation planning team.				
47	Medium	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Evaluate and strengthen communication and transportation emergency services.	Invest in burying power lines to help rural electric cooperatives become more resilient	IDHS, REMCs, public power companies	FEMA	Severe Storm and Tornado
48	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Conduct a training program for county highway departments to educate on the best, most resourceful ways to prioritize and allocate project funding	INDOT, IDHS	FEMA, FHWA	Severe Storm and Tornado, Landslide
49	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Develop a statewide earthquake analysis and plan based on the most likely possible scenario – include mitigation strategies and secondary impacts that more northern areas of the state may experience	IDHS, IUPUI	IDHS, FEMA	Earthquake
50	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Convene a Seismic Council (sub-committee of Silver Jackets) to meet regularly and discuss issues, concerns, and opportunities	IDHS, NRCS, USGS, IGS	Existing programs	Earthquake
51	Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Work with CUSEC to further Indiana's Earthquake Mitigation Goals and National objectives for funding through NEHRP.	FEMA, CUSEC, IGS, PU, IDHS, INDOT	FEMA, NEHRP	Earthquake
52	Medium	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Create a media campaign that outlines the dangers of extreme temperatures, populations at risk, and actions to minimize exposure	ISDH, IDHS, FEMA, OFBCI, local universities	EMPG, HSEP, FEMA	Other Natural Hazards - Extreme Temps
53	Medium	Promote research education, and outreach to expand Indiana's knowledge about	Conduct new studies/research to profile hazards and	Convene a Drought Council (subcommittee of Silver Jackets) to meet regularly and discuss issues, concerns, and opportunities in design, training, and	INDOT, NRCS, USGS, IDHS, IGS, local universities	Existing programs	Drought

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
		disasters and their impacts.	promote mitigation.	exercising to reduce risk to responders and built environment			
54	Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state and local mitigation activities	Invite representatives from IDHS planning departments and local universities to participate as subcommittee of the Mitigation Council	IWRC, ISDH, local universities	FEMA, DHS, ICC, DHHS	Winter Storm, Drought, Extreme Temps, Wildfire, Disease Outbreak, Fluvial Erosion Hazard
55	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Increase outreach to elderly and disabled populations during extreme weather	IDHS, ISDH	FEMA, DHHS	Winter Storm, Drought, Extreme Temps
56	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Enhance statewide weather monitoring to better predict and communicate severe winter weather	IDHS, Silver Jackets	FEMA	Winter Storm
57	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Develop ordinances to prioritize controlled water use	Silver Jackets	OCRA, USDA	Drought
58	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Research historical occurrences and develop example case studies for training purposes	IUPUI, Silver Jackets	FEMA, NSF, NIH	Communications System Failure, Public Utility Failure, Air Transportation, Explosion
59	Medium	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Work with schools, university planners, and community organizations to facilitate the development of communities that are vulnerable to utility and communication failures. Develop plans to circumvent communications failures using existing lines of communication	IDHS, FEMA, URC, local universities, community organizations, local media	EMPG, HSEP, FEMA	Communications System Failure

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
60	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Ensure existing communications networks and information networks are resistant to compromise from outside sources through education of users, plans for continuity of operations, and secure systems to protect data	IOT, URC, IPSC, local universities	HSEP, DHS, DHHS, existing state and federal funding	Communications System Failure
61	Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Invite representatives from local universities, federal partners, and the planning, technical, and preparedness department of IDHS to participate as a subcommittee of the Mitigation Council	IDHS, ISDH, local universities	FEMA, DHS, DHHS	Dam/Levee Failure, Ground Failure, Structural Fire, Hazmat, Communications System Failure, Public Utility Failure, Air Transportation, Explosion
62	Medium	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Expand the "see something, say something" campaign to include specific threats found on social media and in workplace, schools, and at home	IDOE, ISP, IDHS, community organizations	DOJ, HSEP, FEMA	Cyber Attack, Active Shooter, Arson, CBRNE Attack, Hostage Situation, Riot, Terrorism
63	Medium	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Provide additional training for private industry and other businesses on human hazards	ISP, IDHS, IDOE	DOJ, DHS, HSEP	Cyber Attack, Active Shooter, Arson, CBRNE Attack, Hostage Situation, Riot, Terrorism
64	Medium	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Develop training program on impacts of human hazards on infrastructure and residents in Indiana. Continue exercise program development and mitigation opportunities for human hazards	IDHS, ISDH, IDOC, INDOT, IDOA	Existing programs	Cyber Attack, Active Shooter, Arson, CBRNE Attack, Hostage Situation, Riot, Terrorism
65	Medium	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Collaborate to ensure that prevention programs also include mitigation actions where possible	IDHS, ISDH	FEMA, DHS, DOJ, DHHS	Cyber Attack, Active Shooter, Arson, CBRNE Attack, Hostage

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
							Situation, Riot, Terrorism
66	Medium	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Convene a Solid Earth Hazard Council (sub-committee of Silver Jackets) to meet regularly and discuss issues, concerns, and opportunities to better engage local universities on mitigation planning for solid earth natural disasters	INDOT, NRCS, USGS, IDHS, IGS, local universities	Existing programs	Earthquake
67	Medium	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Encourage the integration of Hazard Mitigation Planning into local Comprehensive Plans	Develop property transfer laws to insure the extent of private water supply and private waste water systems are mapped, able to be assessed during damage reporting during extreme weather emergencies.	IDHS, IDNR, Local Governments, County EMAs, Local Assessors	IHCDA, State & Federal Funding	Drought, Flood, Severe Thunderstorm & Tornadoes
68	Low	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Increase use of Silver Jackets social media platforms to reach new audiences and investigate areas of opportunity to provide outreach to special needs populations statewide in areas of risk	Silver Jackets, IUPUI	FEMA, DHS, State funding	Flood, Earthquake, Landslide, Karst/Sinkhole
69	Low	Minimize the loss of life and injuries caused by disasters.	Develop public awareness and outreach programs.	Develop mobile applications to communicate risks to the public	IDHS, state universities	FEMA	Severe Storm and Tornado, Flood, Earthquake, Landslide, Karst/Sinkhole
70	Low	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Retrofit critical and essential facilities and structures to withstand disasters.	Coordinate with local jurisdictions to require appropriate seismic design and construction for new government-owned buildings	IDHS, IGS	FEMA	Earthquake
71	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Develop drought contingency plans to include residential and agricultural water delivery	Silver Jackets	OCRA, USDA	Drought
72	Low	Minimize the loss of life and injuries caused by disasters.	Improve emergency sheltering.	Provide heating/cooling shelters with backup generators	IDHS	FEMA	Extreme Temps

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
73	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Address wildfire vulnerability reduction in local zoning ordinances and land use plans	IDHS, IDNR, NRCS	USDA, NRCS	Wildfire
74	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Provide enhanced public awareness of open burn bans	IDHS, IDNR, NRCS	USDA, NRCS	Wildfire
75	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Add additional technological hazards to the SHMP	IDHS	Existing programs	Technological Hazards
76	Low	Integrate Indiana's mitigation policies and programs to maximize efficiency and leverage funding.	Ensure better coordination of federal, state, and local mitigation activities.	Prioritize municipal/county level urban forest (UF) inventory that includes risk assessment and the correlated UF management planning.	IDHS, IDNR, NRCS, INDOT, Local Governments, Local Schools, IUPUI, Silver Jackets	USDA, FEMA, IDNR, OCRA, IDHS, Regional Planning Groups	Drought, Flood, Public Utility Failure, Sever Thunderstorms & Tornadoes, Wildfire, Winter Storms
77	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Collaborate with relevant state agencies, universities, and national research organizations to monitor induced seismic activity in Indiana, and its association with wastewater injection.	IDHS, IDNR, IDOG, IGWS, USGS, FEMA, Indiana University, Purdue University	FEMA, USGS, existing state and federal funding	Earthquakes
78	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Strengthen and improve monitoring of earthquake activity in and around the state, including strong-motion seismographs to gather information about the engineering effects of future large earthquakes in and around the state.	IDHS, USGS, FEMA, Indiana University, Purdue University, CERI, St. Louis University	FEMA, USGS, NSF, existing state and federal funding	Earthquakes

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
79	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Conduct new studies to extend knowledge of large, prehistoric earthquake activity in and around the state	IDHS, USGS, FEMA, Indiana University, Purdue University, CERI, St. Louis University	FEMA, USGS, NSF, existing state and federal funding	Earthquakes
80	Low	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Improve data on and identify locations and effects of landslides in Indiana, both current and historical, including information on landslide losses	IGWS, IDHS, Indiana University, Purdue University	IGWS	Landslides
81	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Develop public awareness and outreach programs.	Develop and disseminate print and online information on landslide hazards relevant to homeowners and the business community in Indiana.	IDHS, INDOT, FEMA, Purdue University, Indiana University	FEMA, USGS, NSF, existing state and federal funding	Landslides
82	Low	Minimize the loss of life and injuries caused by disasters	Develop public awareness and outreach programs.	Encourage communities to work with interested property owners to reduce risk to or remove properties from areas of high risk, and institute programs to decrease landslide vulnerability across the state.	Local Governments, IDHS, DNR, FEMA, OCRA, IHCDA, Building trade Associations	FEMA, CDBG, Private Mortgage companies	Landslides
83	Low	Promote research education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Develop public awareness and outreach programs.	Develop and disseminate print and online information on karst/sinkhole hazards relevant to homeowners and the business community in Indiana.	IDHS, INDOT, FEMA, Purdue University, Indiana University	FEMA, USGS, NSF, existing state and federal funding	Karst/Sinkholes
84	Low	Minimize the loss of life and injuries caused by disasters	Develop public awareness and outreach programs.	Facilitate training programs that educate emergency responders on "Best Practices" for earthquake response	NOAA, ISP, EMA, IDHS, IDNR, CEO, Law Enforcement	Existing funding, FEMA, NOAA, FHWA, Local Government	Earthquakes
85	Low	Minimize the loss of life and injuries caused by disasters	Develop public awareness and outreach programs	Work with local communities, EMA Directors, and building officials to reduce	IDHS, IDNR, FEMA, NFIP,	FEMA, DNR, IHCDA, OCRA	Earthquakes, Landslides, Karst/Sinkholes

#	Priority	Goal	Objective	Strategy	Potential Collaborators	Potential Funders	Hazards Addressed
				earthquake and ground failure insurance costs and property losses	OCRA, IHCDA, CEO and APA.		
86	Low	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Retrofit critical and essential facilities and structures to withstand disasters.	Promote the research and information on retrofitting of existing structures	IDHS, IGWS	FEMA	Earthquakes, Landslides, Karst/Sinkholes
87	Low	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Retrofit critical and essential facilities and structures to withstand disasters.	Establish priorities for the retrofitting of existing state-level critical facilities and infrastructure (based upon the State of Indiana's risk and vulnerability assessment)	IDHS, Building Trades, IGWS	FEMA	Earthquakes, Landslides, Karst/Sinkholes
88	Low	Lessen the impacts of disasters to new and existing infrastructure, residents, and responders.	Retrofit critical and essential facilities and structures to withstand disasters.	Retrofit critical facilities/residential structures in high-risk areas	Local Governments, IDHS	FEMA	Earthquakes, Landslides, Karst/Sinkholes
89	Low	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Review and update existing, or create new, community plans, maps, and ordinances.	Promote land-use planning for geologically high-risk areas	IGWS, Indiana University, Purdue University	FEMA, IGWS	Earthquakes, Landslides, Karst/Sinkholes
90	Low	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Conduct new studies/research to profile hazards and promote mitigation.	Collect data on and identify the effects from karst and sinkholes; continue to update databases regarding Indiana's geologic hazards	IGWS, Indiana University, Purdue University, USGS	FEMA, IGWS	Karst/Sinkholes
91	Low	Promote research, education, and outreach to expand Indiana's knowledge about disasters and their impacts.	Improve education and training of emergency personnel and public officials.	Conduct outreach and training seminars for local jurisdictions to provide technical assistance regarding the proper enforcement of building codes	IDHS, Indiana University, Purdue University	FEMA	Earthquakes, Landslides, Karst/Sinkholes

10 Local Capabilities

10.1 Local Funding and Technical Assistance

IDHS supports the development of local mitigation plans through funding, technical assistance, and expertise. IDHS relies on ongoing partnerships with Indiana Silver Jackets, nonprofit entities, private contractors and academic institutions working with local jurisdictions to support education, outreach, and planning.

An example of strong local capability is within the City of Columbus in Bartholomew County. The Columbus Flood Risk Management Plan was completed in June of 2013 and addresses all aspects of the flooding risk in the community. The plan assesses the threat from local streams, provides the background information for the Flood Response & Evacuation Plan, evaluates opportunities to mitigate flooding risks for specific streets and neighborhoods, and identifies regulatory actions that could prevent the flooding risk from becoming worse. The Columbus Flood Risk Management Plan was recognized with the 2013 Excellence in Floodplain Management award from the Indiana Association for Floodplain and Stormwater Management (INAFSM). The plan is available online at http://www.columbus.in.gov/planning/flood.

Another example of strong local capability is demonstrated by the Town of Spencer and the City of Indianapolis, which both have developed flood response plans that leverage the USGS flood libraries.

Starting in 2016, IDHS worked in partnership with IDNR and OCRA to fund and develop 20 Flood Response Plans for communities throughout the state. These communities are: Alexandria, Anderson, Bloomington, Crawfordsville, Decatur, Edinburgh, Elnora, Elwood, Franklin, Greenfield, Lebanon, Martinsville, Nashville, New Castle, Noblesville, Portland, Princeton, Seymour, Vincennes, and Wabash.

One measure of the improved local capabilities is the status of the local planning effort and the ongoing activity to update the plans. In the past five years, 58 of Indiana's 92 counties have completed a MHMP update and most of the rest are in the process of completing their first five-year update. For 77 of these counties, IDHS partnered with The Polis Center at IUPUI to include Hazus level 2 analyses in their MHMP risk assessments. The level 2 analysis uses the county's local data to best estimate the potential physical, social, and economic losses of a disaster. These results better inform mitigation and planning strategies.

Local capabilities are enhanced by the Indiana Association of Regional Councils (IARC), a statewide association of regional planning organizations that promotes regional strategies and solutions to address local issues and supports grant writing.

IARC Regions (Figure 166):

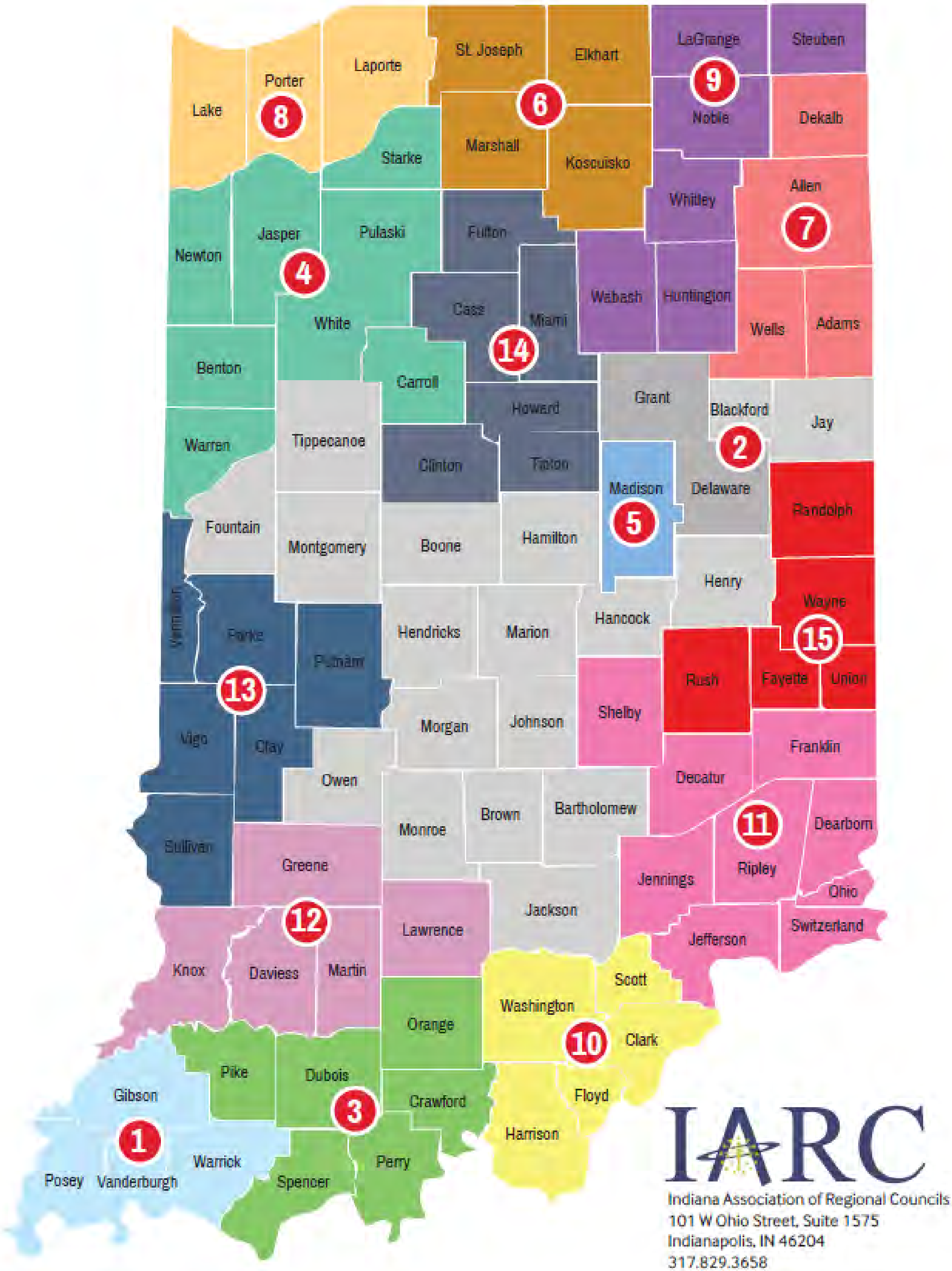
1. Economic Development Coalition of Southwest Indiana
2. East Central Indiana Regional Planning District
3. Indiana 15 Regional Planning Commission
4. Kankakee-Iroquois Regional Planning Commission

5. Madison County Council of Governments
6. Michiana Area Council of Governments
7. Northeastern Indiana Regional Coordinating Council
8. Northwestern Indiana Regional Planning Commission
9. Region III-A Economic Development District & Regional Planning Commission
10. River Hills Economic Development District & Regional Planning Commission
11. Southeastern Indiana Regional Planning Commission
12. Southern Indiana Development Commission
13. West Central Indiana Economic Development District
14. North Central Indiana regional Planning Council
15. Eastern Indiana Regional Planning Commission

10.2 Local Plan Integration

The current process of integrating local data and mitigation strategies into statewide planning efforts has been completed on an as-needed basis and as existing resources allow. One of the strategic priorities in 2019-2020 for IDHS is expanding mitigation and resiliency in the State. This increased focus will allow IDHS Mitigation to have a dedicated mitigation planner to perform the initial review of all county plans before submission to FEMA. This dedicated planner will assist the counties by providing technical support, training, and act as a liaison between the counties and subject matter experts. The planner will review local strategies to integrate into the State Multi-Hazard Mitigation Plan, and to generate reports on an as-needed basis. One of the priorities of the IDHS Mitigation program each year is to obtain grant funding to assist local jurisdictions in their planning efforts. All 92 counties have recently received FEMA grant funding to assist them financially in updating their local plans.

Figure 166. IARC Regions



10.3 Process of Prioritizing Local Mitigation

When prioritizing local mitigation activities, IDHS considers federal priorities for funding, priorities of the governor and legislature, and the cost-benefit of each proposed activity to ensure the greatest benefit for the funds expended. To this end, the state initially focused on the development of MHMPs in communities where population and growth were fueling rapid development. In response, many of these communities have developed strong, coordinated ordinances to discourage development in the floodplains. This has been relatively easy as these communities typically have large, open areas for residential and commercial growth.

The State has focused on these communities' legacy areas where development had taken place prior to the delineation of floodplains and flood risk. It will continue to be necessary to maintain a priority to assist these communities in reducing existing risk by providing technical assistance, funding when available and working to integrating risk reduction into their comprehensive planning efforts.

These areas also have the most Repetitive Loss and Severe Repetitive Loss properties in the State, which positions them as the areas of highest vulnerability. Current prioritization is based primarily on repetitive loss status, financial status of the community (small and impoverished communities have priority), availability of funding, and federal mandates. Communities with the greatest number of Repetitive Loss and Severe Repetitive Loss properties are the first priority of the State's planning and mitigation activities. Indiana has made significant strides in acquiring and demolishing more than 750 properties since 2008.

IDHS Mitigation is increasing its focus on non-flood related hazards through the development and funding of new projects for the state. These projects include actions to minimize the damages associated with severe weather and earthquakes. Going forward, the State Hazard Mitigation Officer will assess the need for projects minimizing the effects from other hazards identified in the plan.

10.4 Counties at Greatest Risk

While all Indiana counties are exposed to these risks, Table 57 identifies the top 5 counties within the state with the most flash flood, flood, tornadoes, high wind and thunderstorm wind events reported to NCDC from January 1, 2013 to October 31, 2018. It also includes the top 5 counties with the most repetitive loss and severe repetitive loss properties.

Table 57. Counties at Greatest Risk

Most Flash Floods	Most Floods	Most Tornadoes	Most High Wind & Thunderstorm Wind	Most RL Properties	Most SRL Properties
Ripley (29)	Gibson (75)	Tippecanoe (12)	Marion (90)	Lake (180)	Marion (34)
Marion (23)	Posey (49)	White (9)	Kosciusko (81)	Marion (171)	Carroll (30)
Clark (19)	Pike (35)	Howard (8)	St. Joseph (68)	Allen (119)	Clark (19)
Dubois (16)	Warrick (25)	Kosciusko (8)	Huntington (64)	Howard (75)	Allen (16)
Dearborn (15)	Ripley (18)	Hendricks (6)	Lake (60)	Vanderburgh (73)	Vanderburgh (13)

10.5 Policies Regulating Development

Indiana's Home Rule statute grants local government units "all the powers that they need for the effective operation of government as to local affairs" (IC 36-1-3-2). These government units include townships, cities, and counties. Planning and zoning fall within the local government unit's purview. As a result, planning and zoning fall to local governments in Indiana, resulting in a lack of uniformity from one jurisdiction to the next. Indiana law does require that, if a municipality wants to exercise zoning powers, a plan commission adopt a comprehensive plan.

However, Indiana law IC 36-1-3-8 (7) states that a unit does not have the "power to regulate conduct that is regulated by a state agency, except as expressly granted by statute". When a state law and a local ordinance govern the same activity, the ordinance yields to state law. Table 58 describes policies that regulate development in hazard-prone areas.

Table 58. Policies that Regulate Development in Hazard-Prone Areas

Policy Area	Description/Applicability	Effectiveness
Floodplain Management	IDNR, Division of Water coordinates with the NFIP; monitors compliance with state and local floodplain management standards; provides assistance in mitigation planning and techniques; identifies flood hazards. Pre- and -post disaster, local jurisdictions must comply with floodplain requirements regarding development in hazard-prone areas. The requirements include provisions for building and rebuilding (regardless of the nature of damage) in floodplains.	The Program outlines strict policies for new development in high-risk, hazard-prone areas. Structures must be elevated two (2) feet above the Base Flood Elevation of the floodplain. The local floodplain managers have reduced the number of damaged structures in hazard events through permitting and promotion of mitigation alternatives.
Coastal Erosion Management	The purpose of the Indiana Lake Michigan Coastal Program is to enhance the state's role in planning for and managing natural and cultural resources in the coastal region and to support partnerships between federal, state and local agencies and organizations. The Indiana Lake Michigan Coastal Program relies upon existing laws and programs as the basis for achieving its purpose. There are 3 coastal counties in Indiana.	Coastal grant programs are available to local jurisdictions. The NFIP has not mapped flood areas along coastlines, but it has been estimated that 25 percent of homes and other structures within 500 feet of the U.S. coastline and the shorelines of the Great Lakes will fall victim to the effects of erosion within the next 60 years.
Zoning	Zoning is a locally enacted law that regulates and controls the development and land use of private property. It prevents development in inappropriate places (e.g., flood plains, steep ravines, lands with underground caves, etc…) and by regulating the use of land to protect flood prone areas.	The State continues to promote the importance of zoning as an effective method to minimize damage and encourages local jurisdictions to adopt zoning ordinances. Zoning is still a voluntary program, and continues to meet resistance in smaller, rural communities.
Land-Use Planning	The land use plan lays out land development goals and priorities. The plan details how specific parcels of property will be used, allowing safe and coordinated development. Land use plans take into consideration the hazards associated with any give area in a jurisdiction.	Some Indiana Residents consider land use planning an encroachment on their personal property, but the process allows jurisdictions to identify site-specific hazards and avoid development that places people or property in harm's way. Still found mostly in larger cities and to some extent as economic development plans in smaller communities.

In 2017, Morgan County adopted a stricter building code in relation to development occurring in newly identified fluvial erosion hazard areas.

10.6 Status of Multi-Hazard Mitigation Plans

Table 59 lists the status of each county MHMP in Indiana as of December 31, 2018.

Table 59. County MHMP Status (As of 12/31/2018)

Counties	Expiration	Counties	Expiration	Counties	Expiration
Adams	10/26/2022	Hendricks	7/23/2014	Pike	9/12/2023
Allen	11/8/2022	Henry	10/29/2023	Porter	5/25/2016
Bartholomew	11/3/2022	Howard	8/14/2019	Posey	1/15/2023
Benton	12/22/2016	Huntington	12/17/2023	Pulaski	9/27/2016
Blackford	1/31/2017	Jackson	6/16/2021	Putnam	2/4/2023
Boone	9/12/2023	Jasper	7/15/2014	Randolph	11/20/2022
Brown	4/14/2022	Jay	2/16/2017	Ripley	9/12/2023
Carroll	1/31/2017	Jefferson	8/30/2022	Rush	11/20/2022
Cass	3/1/2017	Jennings	2/4/2023	St. Joseph	5/30/2023
Clark	10/6/2021	Johnson	6/16/2020	Scott	12/1/2021
Clay	2/6/2023	Knox	1/15/2023	Shelby	12/8/2022
Clinton	12/22/2016	Kosciusko	10/31/2016	Spencer	11/30/2017
Crawford	12/23/2020	LaGrange	12/5/2016	Starke	3/19/2015
Daviess	1/19/2017	Lake	9/29/2015	Steuben	4/1/2020
Dearborn	2/8/2021	LaPorte	5/10/2022	Sullivan	5/11/2016
Decatur	8/25/2014	Lawrence	1/4/2023	Switzerland	7/5/2022
DeKalb	11/18/2019	Madison	3/5/2023	Tippecanoe	5/10/2021
Delaware	11/13/2013	Marion	12/2/2018	Tipton	5/11/2016
Dubois	3/9/2016	Marshall	5/30/2023	Union	1/10/2023
Elkhart	6/20/2022	Martin	7/13/2014	Vanderburgh	8/23/2023
Fayette	8/24/2014	Miami	5/30/2023	Vermillion	3/23/2016
Floyd	3/21/2022	Monroe	9/12/2023	Vigo	4/28/2022
Fountain	1/19/2016	Montgomery	4/28/2022	Wabash	5/11/2016
Franklin	7/13/2014	Morgan	11/20/2022	Warren	5/11/2016
Fulton	1/31/2017	Newton	12/22/2016	Warrick	11/20/2022
Gibson	12/11/2020	Noble	3/5/2020	Washington	6/14/2018
Grant	10/17/2022	Ohio	6/17/2023	Wayne	12/8/2022
Greene	2/4/2023	Orange	10/2/2023	Wells	10/30/2020
Hamilton	6/16/2019	Owen	1/9/2022	White	12/22/2015
Hancock	12/1/2021	Parke	9/20/2023	Whitley	12/22/2016
Harrison	7/11/2021	Perry	2/9/2021		

10.7 Mitigation Strategies and Actions

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.

Each county and its participating communities share a common MHMP and worked closely to develop it. These communities work together with their city councils and their Emergency Management Agency

Director to insure that the hazards and mitigation actions included in their plan are accurate and addressed in their jurisdictions. The following table includes the top two to three mitigation strategies for each county with a current plan as of 12/31/2018.

Table 60. Local MHMP Mitigation Strategies

County	Hazard	Mitigation Strategy
Adams	Flood	Reduce flood insurance premiums through increased participation or advancement in the NFIP's CRS program
	Multiple	Investigate possible incentives for (private) buildings with safe rooms
	Multiple	Post information/warning signs in local parks and other public gathering places explaining what to do in case of a hazard event
Allen	Flood	Pursue additional buyouts in the City of Fort Wayne
	Multiple	Obtain 800mhz radios for emergency response
	Flood	Prepare a detailed Flood Response Plan (FRP) to improve response and reduce losses from a flood event
Bartholomew	Flood	Work with residential and critical facility property owners to buyout and mitigate properties subject to flooding
	Severe Weather	Increase awareness and participation in mass notification, social media, weather radios, etc.
Boone	Flood	Conduct a detailed floodplain study for Mann Ditch
	Multiple	Conduct a study to determine shelter capacity in the county
	Earthquake	Conduct a study to evaluate bridge structures, especially over Creek Road at SR 39 north
Brown	Multiple	Install back-up power generators in all essential facilities, including local fire stations, Brown County EOC, the YMCA shelter, and county/city offices
	Multiple	Establish Hilltop Christian Church Camp as a public shelter
	Flood	Develop and implement a process to prepare sandbags. Administration of this program should include determination of storage location and the purchase of movable barriers
Clark	Multiple	Harden existing critical facilities (EOC, Fire houses, schools, and churches)
	Multiple	Mass notification system
	Multiple	Siren/warning signal installations countywide, in particular along the riverfront
Clay	Multiple	Examine existing weather alert sires within the county, ensure there are sirens in state/local parks and reallocate use of sirens to heavily populated areas and schools
	Multiple	Provide key structures and residents with weather radios to warn of impending hazards
	Multiple	Ensure availability of back-up generators/ frequency for communications/ interoperability and for public facilities/shelters, utilities, EMS, firehouse
Crawford	Multiple	Construct a safe room in Crawford County High School
	Multiple	Improve reverse 911
	Multiple	Update/install warning sirens
Dearborn	Flood/ Ground Failure	Technical planning study for hillside development
	Multiple	Install reverse 911 system to serve entire county
	Earthquake	Provide education materials on earthquake emergency procedures
DeKalb	Multiple	Add safe rooms and/or shelters to mobile home parks
	Flood	Maintain channels and regulated drains to prevent localized flooding
	Multiple	Prohibit construction of critical facilities in known hazard areas

County	Hazard	Mitigation Strategy
Elkhart	Flood	Investigate property buyout programs, provide education to residents in prioritized areas, and remove structures from flood risk areas
	Severe Weather	Increase awareness and participation in mass notification, social media, weather radios, etc.
	Multiple	Increase development of pre-event plans to coordinate between event liaisons and responders
Floyd	Multiple	Erosion control on unstudied reaches of Jacobs Creek (need to extend limit of study on Jacobs Creek and Jay Run upstream to SR 111 due to development)
	Flood	Flood overtopping road at Oaks Rd and SR 64 (study needed to determine mitigation options)
	Flood	Flood study of Lazy Creek south of I64
Gibson	Multiple	Harden the EOC and several fire stations and add safe rooms
	Severe Weather	Create new tornado/severe thunderstorm shelters within Gibson County
	Severe Weather	Examine feasibility of purchasing a reverse 911 system for alerting Gibson County's residents during a tornado or severe thunderstorm event
Grant	Dam/Levee Failure	Review regular inspection reports and maintenance records of high hazard dams/encourage Wagner Lake Dam owners to develop an IEAP
	Multiple	Encourage additional participation in Severe Weather Awareness Week; develop education and outreach campaign; post information/warning signs in local parks and gathering places explaining what to do in case of a hazard event
Greene	Multiple	Purchase and implement reverse 911 warning system
	Multiple	Facilitate prompt and proper management of debris removal and response after storms
	Multiple	Purchase programmable weather radios
Hamilton	Dam/Levee	Management of High Hazard Dams and Levees; Ensure inspections are reported and required improvements and repairs are completed in a timely manner; Complete IEAP and inundation mapping; Inventory property owners in potential inundation areas provide annual alert of the risk associated with the dam or the levee
	Multiple	Emergency Preparedness and Warning; Purchase and utilize additional mobile message boards; Continue to provide weather radios; Appropriate mass notification system; Prepare plans for individual communities; Purchase/install outdoor warning sirens in rural areas; Adopt local ordinance requiring payment for additional outdoor warning sirens
Hancock	Flood	Evaluate and utilize flood forecasting capabilities including stream gages, flood forecast maps, and flood alerts
	Severe Weather	Implement recommendations of outdoor warning study, improve CERT program, and increase awareness for mass notification
	Multiple	Update and coordinate GIS layers with location and attributes of critical infrastructure, update HAZUS-MH with local data
Harrison	Multiple	Examine the feasibility of purchasing a reverse 911 system for alerting Harrison County's residence during a tornado or severe thunderstorm event
	Flood/Severe Weather	Update development standards to address street drainage issues
	Severe Weather	Secure funding to initiate a feasibility study for public shelters

County	Hazard	Mitigation Strategy
Henry	Multiple	Expand upon the CERT program already in place
	Multiple	Increase the range of sirens in Henry County and install new sirens in areas where they do not currently exist
	Severe Weather	Establish a countywide tie-down ordinance that would require all new modular homes to have tie-downs
Howard	Flood	Conduct detailed analysis of Zone A streams to determine floodplain boundaries and to mitigate areas with repetitive flooding. Prepare a detailed Flood response and Evacuation Plan
	Severe Weather	Implement recommendations of outdoor warning study, improve CERT program, and increase awareness for mass notification
	Multiple	Update and coordinate GIS layers with location and attributes of critical infrastructure, update HAZUS-MH with local data
Huntington	Flood	Establish a Flood Response and Evacuation Plan
	Flood	Institute a buy-out plan for homes along the Wabash River and Little Wabash River
	Multiple	Develop a public education program to inform residents of potential hazards and emergency plans
Jackson	Multiple	Bury power lines, trim trees from power lines
	Multiple	Ensure that police stations, fire stations, and schools have emergency generators
	Multiple	Secure funding to hire a part-time County Building Inspector
Jefferson	Multiple	Install safe rooms in schools
	Multiple	Update "special needs" population database & continually update
	Multiple	Increase public awareness of available shelters
Jennings	Dam Failure	Develop Emergency Action Plans for Country Squire Lake Dam & Patterson Pond Dam
	Multiple	Install additional warning sirens throughout the rural townships of Jennings County, in particular Montgomery Township
	Multiple	Implement a Reverse 911 system for hazardous notification to include evacuation and public safety information
Johnson	Multiple	Continue to add sirens throughout the county and create coordinated county-wide emergency and hazard warning system
	Earthquake	Conduct public awareness and information campaign on earthquake safety and preparedness
Knox	Flood	Update Flood Maps to DFIRM
	Flood	Improve current levee systems, certification of levees
	Hazmat	Train and equip emergency personnel
LaPorte	Flood	Inventory areas with repetitive flooding and prioritize for detailed study. Participate in the update of the Lake Michigan coastal flood hazard zone study
	Severe Weather	Work with all critical facilities to have a back-up generator in place and social media pages to push information out to our residents
	Multiple	Update and coordinate GIS layers with location and attributes of critical infrastructure, update HAZUS-MH with local data
Lawrence	Multiple	Upgrade police equipment countywide to include new radios, cameras, and new radio system with 800 trunk line system
	Flood	Address the wastewater infiltration concerns in Oolitic
	Flood	Develop an ordinance to ticket persons who drive through flood waters
Madison	Multiple	Coordinate communications and notifications between towns and agencies

County	Hazard	Mitigation Strategy
	Hazmat	Ensure that current facility maps and response plans are on file for all SARA Title III Facilities
	Flood	Provide the opportunity for staff members to become a Certified Floodplain Manager (CFM)
Marshall	Multiple	Implement school-wide programs to educate students on the hazards affecting the county and preparation/mitigation plans
	Multiple	Purchase generators to provide back-up power to schools and shelters
	Flood	Continued compliance of the NFIP, for all FNIP communities
Miami	Multiple	Establish a new shelter
	Multiple	Implement new plans for public education including distribution of literature regarding family safety measures
	Flood	Clean up and maintain the ditch adjacent to the town of Macy
Monroe	Multiple	Harden fire stations
	Flood	Continued compliance of the NFIP, for all NFIP communities
	Multiple	Maintain a system for clearing branches from power lines
Montgomery	Flood	Countywide mass notification system
	Severe Weather	Educate the public through public events, outreach programs, multilingual information, and encouragement of voluntary purchase of federally-subsidized flood insurance
	Multiple	GIS layers for public safety officials with fixed facilities, public gathering places, additional GIS training, purchase Pictometry imagery, vehicular modems, and other mobile software
Morgan	Flood	Institute buyout program for flood-prone land areas along Lingle Road in Whitaker and Countyline and Edgewood
	Flood	Purchase and set up permanent signage directing residents to shelters and warning of flash flooding areas
	Flood	Establish setback ordinances for future development
Noble	Hazmat	LEPC continues to have exercises; review site and vicinity plans for all reporting facilitates; increase personnel certified for OSHA Level III
	Multiple	Prohibit construction of critical facilities in known hazard areas, encourage back-up generators, ensure mobile homes are anchored, Investigate reciprocal agreements for damage assessment following hazard event, develop buyout/retrofit program, encourage new development to bury utility lines
Ohio	Multiple	Install back-up power generators for churches used as shelters
	Multiple	Continued compliance of the NFIP for all NFIP communities by prohibiting future development in the special flood hazard area
	Multiple	Develop activation plan for existing shelters
Orange	Fire	Install back-up power generators for churches used as shelters
	Multiple	Develop long-term strategies to educate residents on the hazards affecting their county
Owen	Multiple	Update and coordinate GIS layers with location and attributes of critical infrastructure; quantitatively estimate losses in scenarios; update Hazus-MH Earthquake model with local soil data for more accurate damage estimates
	Hazmat	Maintain LEPC reporting and training efforts as required through SARA Title III and ensure current facility maps/response plans are on file for Tier II facilities
Parke	Hazmat	Create new or revise existing plans to hazards that affect Parke County; implement county drills for hazards

County	Hazard	Mitigation Strategy
	Severe Weather	Establish new or improve upon existing shelters for hazards within the county
Perry	Dam	Conduct county-wide siren study
	Flood	Harden fire stations and sheriff's office
	Fire	Issue burn bans
Pike	Multiple	Develop emergency mass notification system
	Flood	Elevate County Road and Highway between Otwell and Washington
	Earthquake	Harden fire stations
Posey	Severe Weather	Distribute weather radios for public buildings and mobile homes
	Flood	Protect pump station from flooding
	Multiple	Construct safe room at community center
Putnam	Multiple	Provide key structures with weather radios to warn of impending hazards
	Flood	Secure funding to clean up log jams in streams
	Severe Weather	Examine existing weather alert sirens within county, ensure sirens in state/local parks, relocate sirens to heavily populated areas
Randolph	Flood	Establish plan to purchase repetitive loss and potentially unsafe properties
	Flood	Ensure that schools have access to emergency generators and safe rooms
	Dam/Levee	Provide educational information regarding low-head dams
Ripley	Storms	Develop infrastructure for emergency warnings
	Ground Failure	Determine structural stability of Highway 62 and make necessary improvements
	Flood	Continue compliance with the NFIP by restricting new development from the special flood hazard area
Rush	Flood	Repair or upgrade the Combined Sewer Overflow system
	Multiple	Supply critical facilities with emergency generators
	Multiple	Establish new storm shelters in mobile home parks
Scott	Severe Weather	Provide warning sirens for Austin and Unincorporated Scott County
	Multiple	Draft local enforceable drainage ordinances
	Multiple	Develop plan to improve emergency communications in Scott County, including school administrators
Shelby	Flood	Institute a plan for the voluntary buy-out of homes in flood-prone areas in southern Morristown
	Multiple	Acquire portable generators to be used throughout the county on an as-needed basis
	Multiple	Identify, establish and public new shelter locations
St. Joseph	Multiple	Establish siren maintenance and replacement program
	Multiple	Conduct training on reverse 911 and additional modem mass communication systems
	Flood	Install emergency culvert pipes
Steuben	Multiple	Require safe rooms in critical facilities and other critical locations in the county
	Flood	Develop voluntary structure buyout/retrofit program to include all structures within 100-year floodplain
	Multiple	Acquire reverse 911 warning system
Switzerland	Earthquake	Hardening of at-risk structures (Town Hall, 4-H Fairgrounds Shelter, Fire departments, municipal WWTP)
	Flood	Voluntary acquisition, demolition, & relocation of residences located in the floodplain

County	Hazard	Mitigation Strategy
	Multiple	Procure backup generators for select facilities
Tippecanoe	Flood	Seek grants to buy out homes located in the floodplain go help reduce risk to life and property damage for local residents
	Flood	Encourage the town of Clarks hill to join the NFIP
	Multiple	Require safe rooms in all new public facilities
Union	Flood	Reducing and eliminating chronic flooding hazards by cleaning out ditches throughout the county
	Severe Weather	Distribute emergency weather radios and publicize instructions
	Earthquake	Add inertial shut-off valves for all public facilities and key industry buildings in the county which have gas lines
Vanderburgh	Multiple	Develop dedicated website page for multi-hazard mitigation information
	Flood	Purchase and install stream gages and water table gages to provide flood warning
Vigo	Flood	Institute a plan to buy out buildings that are chronically affected by flood damage
	Multiple	Back-up generators for public facilities/shelters, utilities, EMS, firehouses
	Hazmat	Develop certified transportation routes for hazardous materials
Warrick	Earthquake	Add inertial shut-off valves for all public facilities and key industry buildings in the county which have gas lines
	Multiple	Secure the EOC or seek funding for a standalone hardened structure which would include a command center
	Flood	Purchase repetitive loss properties along Stromburg Ditch
Wayne	Flood	Institute a buy-out plan for repetitive loss properties
	Flood/Severe Weather	Complete a storm water drainage study for known problem areas
	Multiple	Upgrade the radio communications system throughout the county for all public safety services
Wells	Flood	Increase size of storm sewer to improve drainage
	Flood	Provide protective measures for sewage treatment plant
	Flood	Mobile home park relocation and flood insurance outreach on Eight Mile Creek located along N. 300W 90

11 State Capabilities

This section describes the State's pre- and post-disaster hazard mitigation policies, programs, and capabilities to mitigate Indiana hazards. It also includes an evaluation of the state laws, regulations, policies, and programs related to hazard mitigation and development in hazard-prone areas. Specific capabilities are also described within the context of mitigation goals and objectives and proposed mitigation strategies in Section 9 of this plan.

The major challenge to all State programs is the limited funding available. Funding for all state programs has been steadily decreasing, making it more challenging to implement mitigation activities. Limited funding has also restricted the ability of state agencies to expand their staffing to enable program expansion.

11.1 Laws, Regulations, and Programs

IDHS utilized a revised version of FEMA form 386-3 (part of the mitigation planning series) to help determine specific mitigation capabilities of Indiana's departments and agencies and identify the regulations and programs that support the mitigation process.

Indiana has a history of successfully implementing hazard mitigation through program development and project implementation. As previously stated, the agencies involved are active participants in the Silver Jackets and also the Indiana Association for Floodplain and Stormwater Management (INAFSM). INAFSM was founded in 1996 by professionals interested in and responsible for floodplain and stormwater management in the state of Indiana. Its members include federal, state, and local agency staff, engineers, consultants, planners, elected officials, members of academia, students, and floodplain residents.

Several state agencies promote programs that encompass pre- and post-disaster mitigation activities including the following.

11.1.1 Office of the Governor

Under Indiana Law, the governor is responsible for the coordination of all of Indiana's emergency/ disaster management system including mitigation programs.

The Office of the Governor's activities include the following.

> **Disaster Assistance Appropriations:** The Governor can request appropriations from the General Assembly for disaster assistance whenever he/she deems it is necessary for the protection of all citizens. The Authority of an Executive Order can establish and require that the state, its agencies and departments, and local communities adopt mitigation.
>
> **Executive Order for the Adoption of Mitigation Strategies:** The Authority of an Executive Order can establish and require that the state, its agencies and departments and local communities adopt mitigation strategies, and principles as part of their governing or regulatory functions.

11.1.2 Indiana Department of Homeland Security Agency

IDHS serves as administrator and coordinator of the State's mitigation projects that have been funded by the Federal government through FEMA under the Robert T. Stafford Act, Public Law 93-288. IDHS coordinates all situation and damage assessment operations in a disaster area. The agency routinely cooperates with federal, state and local governments to maintain and develop disaster preparedness, response, recovery and mitigation Plans. IDHS establishes and maintains an EOC to provide coordination and public information during emergencies and disasters.

IDHS's activities include the following.

Manages the State Hazard Mitigation Program: The mitigation staff's purpose is to promote mitigation statewide and to manage the FEMA mitigation Programs for Indiana.

Hazard Mitigation Grant Program (HMGP): IDHS administers this program, which is available after a Presidential Disaster Declaration. HMGP funds hazard mitigation plans and cost-effective projects that reduce or eliminate the effects of hazards and/or vulnerability to future disaster damage. Indiana has used HMGP funding for acquisition/demolition projects, elevation projects, installation of warning sirens, and mitigation planning.

Pre-Disaster Mitigation (PDM) Grant Program: IDHS administers funds from this annual, national competitive program. PDM funds hazard mitigation plans and cost-effective projects that reduce or eliminate the effects of hazards and /or vulnerability to future disaster damage. Indiana has used PDM funding for acquisition/demolition projects, residential and community safe rooms, and mitigation planning.

Flood Mitigation Assistance (FMA) Program: IDHS administers this program, which funds flood mitigation plans, provides technical assistance and funds construction projects that reduce flood risk to insured, repetitive loss properties. Indiana has used FMA funding for acquisition/demolition projects and mitigation planning.

Encourages and promotes jurisdiction participation in NFIP: IDHS requires good standing in the NFIP as a prerequisite to mitigation funding.

Education and Outreach: Mitigation Staff promotes pre- and post-disaster mitigation techniques, including retrofitting, NFIP, flood proofing, and construction of safe rooms, is imperative for prevention of damage from future events.

Indiana State Disaster Relief Fund: The fund is established to provide financial assistance to eligible entities for the costs of repairing, replacing, or restoring public facilities or individual residential real or personal property damaged or destroyed by a disaster and to assist eligible entities in paying for the response costs incurred by an eligible entity during a disaster. Eligible categories of work include:

- Debris Removal - deposited within the public right-of-way and equipment costs.
- Publicly Owned Transportation Systems -roads, streets, highways, bridges, and other public ways and their necessary appurtenances.
- Publicly Owned Buildings and Structures.
- Publicly Owned Water Control Facilities - dams, levees, dikes, ditches, and other drainage or flood control, or both, devices.

- Publicly Owned Recreation Facilities - parks, and recreation facilities.
- Publicly Owned Utilities: sanitary sewer systems, storm sewers, lift stations, or wastewater treatment facilities; and water treatment, water storage, or water distribution facilities.
- Other Infrastructure owned by or operated by or on behalf of an eligible applicant.

11.1.3 Indiana Department of Transportation

INDOT’s mission is to plan, build, maintain, and operate a superior transportation system enhancing safety, mobility, and economic growth.

Enhance Indiana’s Economic Competitiveness and Quality of Life

- Improve connectivity via multiple modes of transportation
- Increase understanding of Indiana's position as it relates to the autonomous/connected vehicle industry, and undertake initiatives to advance testing and research in the state
- Support and encourage local agencies in their efforts to develop and implement sustainable plans for their futures

Execute a 20-Year Road and Bridge Plan

- Deliver the Next Level Roads plan to improve pavement and bridge quality, safety and mobility
    - Priority given to construction zone safety for workers and motorists
    - Focus on engineering, education, enforcement and emergency response
- Identify continuous improvements of the Asset Management process
    - Strive for improved collaborations with all stakeholders – internal and external
- Convey Next Level construction projects through effective and efficient communication strategies

Develop INDOT’s 21st Century Workforce

- Provide more complete job-training capabilities across the agency
- Provide employees with tools and information needed to succeed
- Deliver enhanced leadership training opportunities

INDOT’s activities include:

Engineering and Design Practices: Provides technical assistance for relocation of critical facilities, relocation of bridges and upgrading of culverts.

Disaster Recovery and Repair: Clears and repairs roadways interrupted by flooding, tornados and landslides. Promotes and utilizes mitigation measures throughout engineering and design process to prevent future damage.

Education and Outreach: The INDOT provides information to citizens on safety and prevention techniques and promotes severe weather awareness.

11.1.4 Indiana Department of Natural Resources

The mission of IDNR is to protect, enhance, preserve, and wisely use natural, cultural, and recreational resources for the benefit of Indiana's citizens through professional leadership, management, and education.

To satisfy such a broad and diverse responsibility, the Department is divided into two distinct areas of responsibility: the Regulatory Management Team and the Land Management Team. The Regulatory Management Team consists of the Divisions of Water; Entomology and Plant Pathology; Historic Preservation and Archaeology; Reclamation; and Oil and Gas. Outdoor recreation and land management programs are housed within the Land Management Team. That unit consists of State Parks; Nature Preserves; Land Acquisition; Fish and Wildlife; Outdoor Recreation and Forestry.

Its activities include:

Floodplain Management Program (in accordance with IC 14-28-1 Flood Control Act and IC 14-28-3 Floodplain Management Act): IDNR, Division of Water coordinates with the NFIP; monitors compliance with state and local floodplain management standards; provides assistance in mitigation planning and identifies flood hazards.

Indiana Dam Safety Program (IC 14-27-7 Dams, Dikes and Levees Regulation Act): Inspection, enforcement and permitting programs for dam and levees, classifies hazards and develops standards for dams and levees.

Conducts Hydrological Studies: Maintains records of lake, stream and river levels necessary for proper identification of flooding hazards. Cooperates in USGS data-collection programs. Currently, more than 80 percent of the continuous hydrologic data-collection activity is maintained through efforts cooperatively funded by the IDNR and the USGS.

Protects Threatened or Endangered Species: Coordination early in project development determines potential effects on threatened or endangered species. Also coordinates with US Fish and Wildlife.

Indiana Historic Preservation Office (in accordance with Section 106 of the National Historic Preservation Act): FEMA, in coordination with the State Historic Preservation Officer (SHPO), ensures that the effects a proposed project may have on any district, site, building, structure or object that is included in or eligible for inclusion in the National Register of Historic Places are not adverse. If there are adverse effects, FEMA enters into consultation with the SHPO to avoid or mitigate effects to cultural resources and develop a project-specific agreement to identify the measures to mitigate the effects.

11.1.5 Indiana Geological & Water Survey

The mission of the Indiana Geological Survey is to provide geologic information and counsel that contribute to the wise stewardship of the energy, mineral, and water resources of the state. Since 1837, the health, safety, and welfare of Indiana's citizenry have benefited through a combination of Indiana Geological Survey activities.

Its activities include the following.

Consultation on geologic features and soil types, subsidence and slope stability: Carried out through a combination of the following activities: geologic sample and data collection and storage, information dissemination (in the form of published maps, reports and databases), educational outreach programs, focused research initiatives and cooperative investigations with governmental agencies, industries and educational organizations.

Focused research initiatives and cooperative investigations with governmental agencies, businesses and industries, and educational organizations

Geologic sample and data collection and archiving

Dissemination of information in many forms, including published maps, reports, databases, and educational outreach programs

11.1.6 Indiana Department of Environmental Management

IDEM's mission is to implement federal and state regulations to protect human health and the environment while allowing the environmentally sound operations of industrial, agricultural, commercial and government activities vital to a prosperous economy.

Air Quality Programs

- The Air Monitoring Branch serves the public and IDEM by overseeing all aspects of air quality monitoring in Indiana including the maintenance of Indiana's air monitoring network that measures regulated air pollutants covered by the Clean Air Act (CAA), the collection of air monitoring samples, and the handling and sharing of data collected from Indiana's air monitoring network.
- Air Compliance and Enforcement
- Air Monitoring
- Air Operations
- Air Permits
- Air Programs

Land Quality Programs

The Indiana landscape is an essential part of our environment, economy, and community. We must use it properly and preserve it for future generations of Hoosiers. The Office of Land Quality (OLQ) is primarily responsible for protecting this valuable resource. To achieve its goal, OLQ enforces regulations to make sure businesses are managing waste in safe ways. This includes animal farms, which can create large amounts of manure. Additionally, OLQ regulates storage tanks to minimize the possibility and impact of any underground leaks. And if the environment or public health is put at risk due to contamination, OLQ ensures that cleanups are prompt and effective.

- Animal farms
- Environmental clean up
- Storage Tanks
- Auto Salvage
- Coal Combustion Residuals.
- Industrial Waste

- Solid Waste
- Waste Tire Program

Water Quality Programs

The mission of the Indiana Department of Environmental Management (IDEM) is to implement federal and state regulations to protect human health and the environment while allowing the environmentally sound operations of industrial, agricultural, commercial and governmental activities vital to a prosperous economy. The mission of IDEM's Office of Water Quality (OWQ), under the oversight of the Assistant Commissioner of OWQ, is to concentrate on fulfilling IDEM's mission where water quality is concerned. More specifically, OWQ is responsible for protecting public health and the environment by assessing the quality of surface water and groundwater through biological and chemical testing; regulating and monitoring drinking water supplies (including wellhead protection), wastewater treatment facilities and the construction of such facilities; and, protecting wetlands for proper drainage, flood protection and wildlife habitat. OWQ serves the citizens of Indiana through fulfilling responsibilities as set forth in the Clean Water Act.

- Blue-Green Algae
- Hoosier Riverwatch
- Storm Water Permitting
- Watersheds and Nonpoint Source Water Pollution
- Wetlands, Lakes and Streams Regulation

Its activities include the following.

Consultation: Identifies disaster and environmental concerns and issues surrounding mitigation projects.

Technical Assistance: Provides technical assistance concerning Superfund sites. Incorporates mitigation objectives whenever possible.

11.1.7 Indiana State Department of Health

The Indiana State Department of Health serves to promote, protect, and improve the health and safety of all Hoosiers through the following:

- Drug Overdose Prevention
- Emergency Preparedness
- Epidemiology Resource Center
- Health and Human Services
- Health Care Regulation
- Laboratory Services
- Tobacco Prevention and Cessation
- Women, Infants & Children (WIC)
- Center for Deaf and Hard of Hearing Education

Its activities include the following:

Identifies and monitors issues that may affect the public health within the area of a disaster, i.e. well contamination, disease and vector control: Promote integration of public health and health care policy; strengthen partnerships with local health departments, collaborate with hospitals, providers, governmental agencies, businesses, insurance, industry, and other health care entities; and support locally-based responsibility for the health of the community.

11.1.8 Indiana Economic Development Corporation

Indiana Economic Development Corporation (IEDC) programs and initiatives offer business support and expertise to companies that are investing and creating jobs in Indiana. The agency strives to improve quality of place, infrastructure, available development sites and regulatory assistance to build economic strength and opportunity that grows and attracts new business and talent.

From decreasing permitting time, to streamlining application processes, pre-certifying shovel-ready sites and increasing access to training and skills, IEDC is focused on creating new high-wage, high-skill opportunities for the next generation of Hoosiers. It places special emphasis on the automotive, life sciences, energy, and national security industry sectors, and supports companies involved in advanced manufacturing, logistics, information technology and research and development.

Indiana also provides financial assistance to qualified high-tech firms and small businesses and offers a variety of programs to support new business start-ups and business expansion and growth.

Its activities include the following.

Provides funding under the Community Development Block Grant Program and Economic Development Program for infrastructure construction/improvement and commercial property acquisition/relocation in designated mitigation projects: Can supply matching funds to communities for acquisition/elevation projects under the Community Development Block Grant (CDBG) program. Provides technical assistance to communities through various programs.

11.1.9 Indiana Office of Community and Rural Affairs

OCRA works with local, state and national partners to provide resources and technical assistance to aid communities in shaping and achieving their vision for community and economic development.

Its activities include the following.

Funding for construction of housing through its low to moderate income housing, senior citizen housing, etc.: Provides funding for relocation of floodplain residents through purchase of new housing.

Community Development Block Grants: Provides federal funding to help rural communities with a variety of projects to include sewer and water systems, community centers, health and safety programs, and many others. These funds help communities improve their quality of life and ensure the health and safety of their citizens.

Over 40 loan, loan guarantee, and grant programs to finance housing, businesses, economic development, and community facilities and infrastructure. Eight key programs:

- **Business & Industry Loan Guarantees:** bolsters the availability of private credit by guaranteeing loans for rural businesses.

- **Water & Waste Disposal Loan & Grant Program:** provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas.
- **Single Family Housing Guaranteed Loan Program:** assists approved lenders in providing low- and moderate-income households the opportunity to own adequate, modest, decent, safe and sanitary dwellings as their primary residence in eligible rural areas. Eligible applicants may build, rehabilitate, improve or relocate a dwelling in an eligible rural area. The program provides a 90% loan note guarantee to approved lenders in order to reduce the risk of extending 100% loans to eligible rural homebuyers.
- **Multi-Family Housing Direct Loans:** provides competitive financing for affordable multi-family rental housing for low-income, elderly, or disabled individuals and families in eligible rural areas.
- **Community Facilities Guaranteed Loan Program:** provides loan guarantees to eligible private lenders to help build essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area, and does not include private, commercial or business undertakings.
- **Community Facilities Direct Loan & Grant Program:** provides affordable funding to develop essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area, and does not include private, commercial or business undertakings.
- **Single Family Housing Direct Home Loans:** assists low- and very-low-income applicants obtain decent, safe and sanitary housing in eligible rural areas by providing payment assistance to increase an applicant's repayment ability. Payment assistance is a type of subsidy that reduces the mortgage payment for a short time. The amount of assistance is determined by the adjusted family income.
- **Multi-Family Housing Loan Guarantees:** works with qualified private-sector lenders to provide financing to qualified borrowers to increase the supply of affordable rental housing for low- and moderate-income individuals and families in eligible rural areas and towns.

11.1.10 Indiana Finance Authority (IFA)

IFA's mission is to oversee State-related debt issuance and provide efficient and effective financing solutions to facilitate state, local government and business investment in Indiana.

Flood Control Revolving Fund: Created to provide local entities loans with low interest to pursue a relevant flood control program.

Program includes:

- Removal of obstructions and accumulated debris
- Clearing and straightening channels
- Channel widening
- Building or repairing levees or flood protective works

- Construction of bank protection works

This fund is also available to a conservancy district to pay for the costs of establishing a district and costs associated with preparing the district plan for any of the purposes for which a district can be established.

- Loans may not exceed $300,000 to any one local entity
- Loan term = 10 years; 3% interest rate
- Fund monies do not revert to the state general fund.
- Fund monies are awarded on a prioritized basis

11.1.11 USDA Rural Development Community Programs

This is a federal community program established to finance drinking water treatment systems and wastewater treatment systems in rural communities. Community Programs also funds essential community facilities like hospitals, day cares, emergency response and assisted living. Programs focused on individuals include:

- Farm Labor Housing Direct Loans & Grants
- Individual Water & Wastewater Grants
- Multi-Family Housing Direct Loans
- Single Family Housing Direct Home Loans
- Single Family Housing Guaranteed Loan Program
- Single Family Housing Repair Loans & Grants
- Value Added Producer Grants

12 Plan Maintenance, Monitoring, and Evaluation

12.1 Plan Maintenance

The State Hazard Mitigation Officer (SHMO) will maintain the plan after each declared disaster for the continued relevancy of its goals and objectives. They will also determine whether funded projects have been effective in achieving these goals, and whether the strategies and measures have been effective in reducing losses caused by hazards.

In the past decade, Indiana has experienced several significant disasters that have allowed IDHS to adjust its focus on mitigation with the cooperation of local jurisdictions, other state agencies, and federal agencies. To prioritize mitigation funding for each disaster, FEMA and IDHS Mitigation incorporate issues identified by state and local partners since the last disaster.

In 2013, flooding in the central and northeastern parts of the state—where the State focused significant mitigation funding during the late 1990s and from 2002 to 2007—resulted in significantly less damages than would have occurred before the mitigation projects were implemented. Flooding of this magnitude would have resulted in hundreds of homes and businesses being damaged in the past. Most communities had some smaller pockets of damaged homes, but the event did not result in a disaster declaration. In recent disasters, a year, or even three, is not a significant amount of time to judge climatological events.

12.2 Plan Monitoring and Evaluation

It is the responsibility of the State Hazard Mitigation Officer to monitor and evaluate the state hazard mitigation plan. An important time for plan monitoring is post-event. The purpose of monitoring the plan at that time is to review and evaluate how effective the overall strategies worked to achieve the goals of the State and local hazard mitigation plans. The SHMO will coordinate with federal and local officials to evaluate if the designated strategies have been effective in reducing losses. IDHS Mitigation will facilitate discussions to determine if new or further mitigation strategies or activities are needed.

When there are no declared disasters, the SHMO will annually review and update, if needed, the SHMP to include other natural and man-made hazards that threaten the citizens of Indiana and modify, add, or delete mitigation goals and projects.

Since the 2014 update, there have been no major changes to the system of tracking mitigation activities and goals. The process is documented through the use of tracking tools to monitor progress and, when necessary, follow up by IDHS Mitigation. These tracking spreadsheets are maintained on a common drive for all of the mitigation section staff to access. A quarterly project site inspection will be performed to verify the information received in the submitted quarterly reports by grant sub-recipients. A closeout site inspection will be performed in conjunction with the project grant closeout. In addition, a site inspection will be performed once every three years to verify the property information submitted by sub-recipients to fulfill their post-closeout monitoring requirement.

The monitoring of projects and the closeout of grant processes are covered at length in the 2014 State of Indiana Administrative Plan for Hazard Mitigation Grant Programs. IDHS Mitigation will be updating this document in 2019, as a result of disaster declaration DR-4363-IN, received on May 4th, 2018. This

Administrative Plan is meant to be a multi-grant program administration and grants management document. It is the means by which the IDHS's Mitigation Section operates (Standard Operation Plan). Additionally, all mitigation grants awarded require that the local jurisdictions sign a state and local agreement that outlines the reporting requirements, both fiscal and narrative, of project progress and closeout requirements. It includes maintenance and post closeout requirements for the local jurisdiction. The following table lists the status of current grant funded mitigation projects within the state.

Table 61. Status of Indiana Mitigation Activities (as of 1/31/2019)

Community	Description	Federal Award Amount	Federal Funding Source	Status		
				Completed	Ongoing	Awaiting Funding
Adams County	Planning	$16,738.03	PDMC 16	x		
Allen County	Planning	$16,738.03	PDMC 16	x		
Auburn	Acquisition/ Demolition	$134,737.50	PDMC 16		x	
Benton County	Planning	$19,583.20	HMGP 4173		x	
Blackford County	Planning	$16,738.03	PDMC 16		x	
Boone County	Planning	$16,656.06	PDMC 14	x		
Brazil	Acquisition/ Demolition	$1,342,307.00	HMGP 1997	x		
BSA Hoosier Trails Council (Jackson Co.)	Community Safe Room	$1,015,896.03	PDMC 17			x
Carroll County	Planning	$16,738.03	PDMC 16		x	
Cass County	Planning	$16,738.03	PDMC 16		x	
Clinton County	Planning	$19,583.20	HMGP 4173		x	
Crawford County	Planning	$19,564.00	PDMC 17		x	
Daviess County	Planning	$16,738.03	PDMC 16		x	
Decatur (City)	Acquisition/ Demolition	$362,498.00	HMGP 4173	x		
Decatur (City)	Acquisition/ Demolition	$428,156.25	PDMC 16		x	
Decatur (City)	Acquisition/ Demolition	$1,765,812.50	PDMC 17			x
Decatur County	Planning	$16,738.03	PDMC 16		x	
DeKalb County	Planning	$19,564.00	PDMC 17		x	
Delaware County	Planning	$16,738.03	PDMC 16		x	
Dubois County	Planning	$16,738.03	PDMC 16		x	
Evansville	Acquisition/ Demolition	$136,099.00	HMGP 1997	x		
Fayette County	Planning	$16,656.06	PDMC 14	x		
Ft. Wayne	Acquisition/ Demolition	$557,644.00	HMGP 4173	x		
Ft. Wayne	Acquisition/ Demolition	$862,946.25	PDMC 14	x		
Ft. Wayne	Acquisition/ Demolition	$248,703.75	PDMC 16		x	
Ft. Wayne	Acquisition/ Demolition	$1,122,208.50	PDMC 17			x
Fountain County	Planning	$16,738.03	PDMC 16		x	

Community	Description	Federal Award Amount	Federal Funding Source	Status Completed	Ongoing	Awaiting Funding
Franklin County	Planning	$19,583.20	HMGP 4173		x	
Fulton County	Planning	$16,738.03	PDMC 16		x	
Gibson County	Planning	$19,564.00	PDMC 17		x	
Grant County	Planning	$16,656.06	PDMC 14	x		
Greenwood	Acquisition/ Demolition	$973,121.31	PDMC 16		x	
Hamilton County	Planning	$19,564.00	PDMC 17		x	
Hancock County	Planning	$18,502.00	HMGP 4058	x		
Hendricks County	Planning	$19,564.00	PDMC 17		x	
Henry County	Planning	$16,656.06	PDMC 14	x		
Howard County	Planning	$19,564.00	PDMC 17		x	
Huntington County	Planning	$16,738.03	PDMC 16		x	
IN Residential Safe Room Program (Statewide)	Residential Safe Room	$189,890.21	PDMC 15		x	
Jasper County	Planning	$19,564.00	PDMC 17		x	
Jay County	Planning	$16,738.03	PDMC 16		x	
Johnson County	Planning	$19,564.00	PDMC 17		x	
Kosciusko County	Planning	$16,738.03	PDMC 16		x	
LaGrange County	Planning	$16,738.03	PDMC 16		x	
Lake County	Planning	$19,583.20	HMGP 4173		x	
Low Head Dam Initiative (Statewide)	Education/ Outreach	$69,940.00	HMGP 4173		x	
Madison County	Planning	$18,502.00	HMGP 4058	x		
Marion County	Planning	$19,564.00	PDMC 17		x	
Marshall County	Planning	$16,656.06	PDMC 14	x		
Martin County	Planning	$19,583.20	HMGP 4173		x	
Miami County	Planning	$16,656.06	PDMC 14	x		
Monroe County	Planning	$16,656.06	PDMC 14	x		
Morgan County	Acquisition/ Demolition	$285,253.00	HMGP 4058	x		
Newton County	Planning	$16,738.03	PDMC 16		x	
Noble County	Planning	$19,564.00	PDMC 17		x	
Ohio County	Planning	$16,656.06	PDMC 14	x		
Orange County	Planning	$16,656.06	PDMC 14	x		
Owen County	Planning	$16,656.06	PDMC 14	x		
Parke County	Planning	$16,656.06	PDMC 14	x		
Pike County	Planning	$16,656.06	PDMC 14	x		
Plymouth	Acquisition/ Demolition	$289,073.00	HMGP 1997	x		
Porter County	Planning	$16,738.03	PDMC 16		x	
Pulaski County	Planning	$16,738.03	PDMC 16		x	
Ripley County	Planning	$16,656.06	PDMC 14	x		
Salem Community Schools	Community Safe Room	$1,592,420.76	PDMC 14	x		
Spencer County	Planning	$16,738.03	PDMC 16		x	
St. Joseph County	Planning	$16,656.06	PDMC 14	x		
Starke County	Planning	$16,656.06	PDMC 14	x		

Community	Description	Federal Award Amount	Federal Funding Source	Completed	Status Ongoing	Awaiting Funding
Steuben County	Planning	$19,564.00	PDMC 17		x	
Sullivan County	Planning	$16,738.03	PDMC 16		x	
Tipton (City)	Acquisition/ Demolition	$672,221.00	HMGP 4058	x		
Tipton (City)	Acquisition/ Demolition	$307,305.00	HMGP 4173	x		
Tipton County	Planning	$16,738.03	PDMC 16		x	
Vanderburgh County	Planning	$16,738.03	PDMC 16	x		
Vermillion County	Planning	$16,738.03	PDMC 16		x	
Wabash County	Planning	$16,738.03	PDMC 16		x	
Warren County	Planning	$16,738.03	PDMC 16		x	
Washington County	Planning	$19,564.00	PDMC 17		x	
Wayne County	Planning	$18,502.00	HMGP 4058	x		
Wells County	Acquisition/ Demolition	$175,851.31	PDMC 16		x	
Wells County	Planning	$19,564.00	PDMC 17		x	
Whitley County	Planning	$16,738.03	PDMC 16		x	

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Appendix A – Meeting Minutes

10/10/2018

Attendees:

- Mary Moran – IDHS
- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Jim Sparks – Polis
- Kayla Kauffman – Polis
- Marianne Cardwell – Polis

Summary:

- The meeting started with introductions of all attendees.
- Schedule Discussion:
    - The team discussed the schedule for the plan and agreed to set internal deadlines and provide FEMA with the plan in sections to facilitate review. Marianne will provide a draft schedule, which Torrey will review prior to submission to Steve.
- The team reviewed the 2014 plan and discussed areas that should be expanded. IDHS expressed a desire for more detail in section 7 or possibly moving the information in that section to section 6.
- The team discussed the need for additional climate information in the plan. Polis staff shared that a National Weather Service representative who attended the LaGrange County Meeting 1 informed Polis staff of data availability in regards to future trends.
- After some discussion about Census data and vulnerable populations, Polis staff suggested having one of its own, Unai Miguel, do a brief presentation during the next meeting about the Census data available along with various models for identifying vulnerable populations. IDHS expressed interested.
- IDHS provided a climate contact: Melissa at Purdue. Torrey will make introductions via email.
- Torrey requested that he be copied on all emails related to the plan.
- A good contact for earthquakes is Michael Hamburger at IU Bloomington. The team agreed that his input should happen sooner rather than later to ensure that the models developed for the plan are up-to-date.
- IDHS mentioned that the Indiana State Hazard Planner, Allison Curry, will also be involved with earthquakes.
- IDHS suggested the input of Dave Smith, IDNR, for drought information.
- The Polis team will work on pros and cons of

Action Items:

- Polis:
    - Marianne to send Torrey a list of the information needed for section 1.
    - Marianne to verify Bing building numbers for Indiana.
    - Polis to break down data needs for sections 1 through 5 and provide the info to Torrey.
- IDHS:
    - IDHS to obtain individual and public assistance information for section 1.

10/10/18 State Hazard Mitigation

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Kayla Kauffman Polis 317-278-4965 kaykauff@iupui.edu
[illegible] Polis 317-278-2453 jisparks@iupui.edu

10/17/2018

Attendees:

- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Kayla Swoveland – Polis
- Jim Sparks – Polis
- Unai Miguel Andres- Polis

Summary:

- The meeting began with introducing Unai to the IDHS team
- Unai began his presentation for the team on the uses of SAVI & 211 data.
- After the SAVI & 211 presentation Jim & Kayla informed the IDHS team that the Polis team was still unsure of how to replicate the CAPI ranking for the state plan. The discussion went to potentially using information from SAVI & 211 to replicate the vulnerability ranking in a new way.
- Kayla & Jim agreed to reach out to John Buechler to ask about how CAPI was created during the last plan.
- The team decided that by the next meeting (10/24) we would determine when to host the meeting for the IDNR group.
- The team also talked about when to bring in the climate team and decided that, if possible, they would aim to engage that team on the 10/24 meeting date.
- Torey also reminded Jim that the quarterly county MHMP status report was needed.

Action Items:

- Polis:
    - Reach out to John Buechler about CAPI assessment in the 2014 plan
    - Submit quarterly report

10/17/18 State Hazard Mitigation

~~[illegible]~~

Kisha Morris	IDHS	317-238-1755	kmorris1@dhs.in.gov
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[illegible]	Polis	317-278-2433	jsparks@iupui.edu

10/24/2018

Attendees:

- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Kayla Kauffman – Polis
- Marianne Cardwell – Polis

Summary:

- Section 1 Plan Review:
    - Discussed 2014 plan disaster numbers, which seem to be exactly double of what they should be. Torrey agreed to review the numbers to make sure that the 2019 plan numbers are correct.
    - Marianne proposed a new chart format for figure 2. The team indicated a preference for the new format.
    - The team discussed how federal disaster declarations seem to be more difficult to obtain and that the federal government is emphasizing pre-disaster mitigation. Polis will include a paragraph about this in section 1 and change the HMGP chart to show this trend. Torrey will provide HMGP and PDM funds information to Polis.

  - The team agreed to set the range from 2008 to 2017.
  - Marianne indicated seeing references to appendices in the 2014 plan but not finding the appendices anywhere. IDHS suggested asking FEMA if they have it. Polis will contact Steve Greene.
- CAPI, established by FEMA region 5 and used in the 2014 state plan, is no longer in use. The team briefly discussed alternatives. Marianne will look at the Wisconsin plan to see what may have been used there.
- Focus Groups:
  - The team discussed the scheduling of various focus groups. Marianne will reach out to the climate team members to check on availability for the next meeting (10/31/18). Torrey will contact IDNR & INDOT for availability on either 11/7 or 11/14 meeting. Marianne will reach out to the earthquake team to see about a late November meeting (11/28).
- Marianne mentioned putting together a more detailed scope of work for the counties. Torrey requested a copy of it for reference.

Action Items:

- Polis:
  - Marianne to send out updated disaster declaration dollars that exclude 2018 disasters.
  - Marianne will add a paragraph to section 1 that discusses the rise in pre-disaster mitigation federal funds and the decrease in federal disaster declarations. Possibly mention the new Disaster Recovery Response Act.
  - Marianne to add a chart to section 1 that compares HMGP/PDM funds to obligated IA/PA funds.
  - Polis to change the decade range to 2008 through 2017 (excluding 2018).
  - Marianne to ask Steve Greene (FEMA) whether he has a copy of the 2014 state plan that includes appendices.
  - Marianne to make sure that DR-1766 is mentioned in section 1.
  - Marianne to report back on findings about new risk assessment index that FEMA may be developing.
  - Polis to check Wisconsin plan to see which vulnerability index they may have used.
  - Marianne to reach out to Purdue to see if the climate team is available to meet next Wednesday (10/31)
  - Marianne to reach out to IU earthquake team to see if they are available on Wednesday 11/28.
  - Marianne to send out new proposed scope of work to Torrey.
- IDHS:
  - Torrey will double-check the disaster declaration dollars to make sure that there are no errors.
  - Torrey to reach out to DNR and INDOT to see if they are available to attend on either 11/7 or 11/14.
  - Torrey to send out PDM & HMGP funding information.
  - Torrey to inquire about status of State Disaster Relief Fund funding information.

10/24/18 State Hazard Mitigation

~~Haz:~~

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Kayla Swoveland Polis 317-278-4965 KayKauff@iupui.edu

10/31/2018

Time: 9AM – 11AM

Attendees:

- In person:
  - Mary Moran – IDHS
  - Torrey Glover – IDHS
  - Kisha Morris – IDHS
  - Alicia Schoening – IDHS
  - Jim Sparks – Polis
  - Kayla Swoveland – Polis
  - Marianne Cardwell – Polis
- Via phone (1.669.900.6833, meeting ID 531-141-9779):
  - Crystal Pettet – NOAA
  - Sam Lashley – NOAA
  - Tom Reaugh – NOAA
  - David Smith – IDNR
  - Molly Woloszyn – NOAA
  - Beth Hall – University of Illinois
  - Dev Niyogi – Purdue University
  - Melissa Widhalm – Purdue University
  - Mike Timlin – University of Illinois

Summary:

- **Climate Discussion:**

- The meeting started with introductions of everyone attending the meeting, both in person and via phone.
- Marianne and Torrey explained the goal of the meeting.
- Dave recommends including record days, days above and below a certain temperature, heating and cooling days, trends, annual and extreme precipitation information, as well as numbers of days of sunshine.
- Mike said he had a lot of the information Dave listed, broken down by month. Mike will email Marianne the URL to the Midwest Climate Center site that lists this information.
- Beth mentioned that the University of Illinois (Illinois) has been looking at whether numbers have been updated in terms of the 100-year and 500-year flood thresholds as those were established decades ago. She asked whether Indiana had also done that. Dave said it's been done in certain locations but not for a larger region.
- Mary saw a presentation about shorter and more intense rain events that included information that would be good to include in the plan. Sam said that this was his presentation and he can provide the information to the team. He has the information on an annual basis but the next step includes breaking it down by month and even by county.
- Dev has a PhD student looking at trends of extreme precipitation. Her thesis is available online. Dev will provide the team the URL to the thesis.
- Melissa oversees reporting efforts at Purdue for the Indiana climate change assessment. The March '18 report (Indiana Past & Future Climate Report) has a lot of information that could be useful for the climate section of the plan. It also has an associated report with historic climate. She will send the links to the team. Melissa offered to help with the customization of the graphics for the plan. The report is a collaborative effort with Indiana University, Purdue, Notre Dame, and the Midwest regional Climate Center (MRCC). Further information is available at IndianaClimate.org. Beth & Sam recommend starting with this report.
- Sam indicated that the number of flooding events are increasing. He also has information on the number of events per county, starting in the late 1980s/early 90s. The number of events in Southern Indiana have increased. There is also a new report about tornado frequency. Tornado alley is moving east, which puts certain portions of Indiana at an increased risk. In terms of lake effect events, the science is still unclear how climate change will impact it. Sam added that there is more temperature variability in the winter months, which affects roads as was seen in early 2018). Sam will send this information to the team.
- Mary noted that Torrey is currently working on a safe room program for tornadoes and is very interested in the tornado information that Sam has.
- Dev asked how the plan will be used. Mary answered that the plan is the result of a federal requirements for building resilience. It is also needed for federal disaster assistance. All projects that the state thinks are priorities must be referenced in the plan to get funding.
- Dev worked with North Carolina after hurricane Floyd and with New York City on resiliency plans. One approach is to look at trends and parameters and changes in events. For example, if the ground is dry, it can absorb larger amounts of rainfall whereas if the ground is wet, just a little bit of rain can cause flooding. We should be looking at the combination of events that can cause issues. Mary indicated that the state if updating its Threat and Hazard Identification and Risk Assessment (THIRA), which looks at those types of circumstances.

- Dev said that much of what we know are from global models, which do not account for urban issues. Mary wants to include a section of the effect on cities. Dev indicated he can help with this.
- Mary is attending a meeting tomorrow (11/1/18) on THIRA and will share what she learns with the team.
- Dev has some drought information but it is not ready to publish. He is looking at water evaporation with Dave Smith. He has precipitation and evaporation maps he can provide.
- Molly mentioned that she focuses on drought, which she recommends be included in the plan, especially "flash droughts" and their agricultural impacts. Flash droughts can also have impacts at the municipal level as they have impact on water. Beth offered to help Molly with putting together this information.
- Tom suggested that the plan should include information about the different climate change forecasts that exist. It should also show how different areas of the state are impacted. He seconds the inclusion of drought information and can work with Molly and Beth. Tom will send information on different global projections.
- Alicia asked about pollution. Mary indicated that due to the compressed timeframe, we may not have the opportunity to discuss this in the plan.
- Torrey shared that we are on an accelerated timeframe, which means that the team will not be able to do everything that it had hoped to do. He would like to touch on water quality but there may not be time for it.
- Marianne suggested including ozone days, which was mentioned in passing earlier.
- Dave indicated that Melissa may have information on pollution. Melissa said she is releasing information on a rolling basis. She has had challenges with quantifying metrics related to health. She hopes to conduct more research in the future but recommends looking at the health report.
- Melissa recalled working on a report a couple of years ago with Lacey from the Polis Center but could not find the document. Jim indicated that Lacey no longer works for Polis; however, Mary has a copy of the report and will share it with the team.
- Dev recommends focusing on hydrographic and temperature extremes.
- Marianne asked about snow and thunderstorms and whether there are any expected changes for those. Mary suggested that we separate those different weather-related events in the plan vs. grouping them.

- **Core Team Discussion:**
  - Torrey has received the needed information for section 1 and will send it to Marianne.
  - The IDHS team indicated their approval of the proposed cover page. It was suggested that the attribution of the picture be moved to the acknowledgement section and that the picture include a location but to remove the description.
  - Torrey confirmed that the declaration dollars in the section 1 draft are correct.
  - Marianne confirmed that FEMA did not have the appendices mentioned in the 2014 plan.
  - The team discussion Section 5 of the plan. We will replace the "projects" section with the section 5.4 goals and their status. Torrey will write the new goals. Mary recommended including Governor Holcomb's 5 pillars into the goals. The team decided to move portions of the 2014 plan's section 5.2 to the flooding section. The plan should show a comparison of the 2014 and 2019 riskMAP status. It should also include statistics on the NFIP coverage percentage. IDHS has access to the database that includes that information. Mary will provide the information to Torrey.

- After review of the mitigation strategies in the 2014 plan, the team decided to combine the strategies into a single section within the plan, after the hazard identification section.
- Polis will combine all of the 2014 mitigation strategies into a single Excel spreadsheet and provide to Torrey.
- The team discussed repetitive loss data. Marianne will discuss with Jim what he had to do to obtain this information.
- IDHS will review the list of hazards on page 35 of the 2014 plan to ensure that this list is still correct.
- Alicia will dig up the information on the state-owned facilities.

Action Items:

- Polis:
    - Provide IDHS with a single Excel spreadsheet with the 2014 mitigation strategies.
    - Marianne to talk to Jim about what he had to do to get the repetitive loss information.
- IDHS:
    - Torrey to send the remaining section 1 information to Marianne.
    - Send Polis a copy of the 2011 plan.
    - Mary to provide Torrey with the NFIP data.
    - IDHS will review the list of hazards on page 35 of the 2014 plan to ensure that this list is still correct.
    - Alicia will dig up the information on the state-owned facilities.
- Climate Group:
    - Mike will email Marianne the URL to the Midwest Climate Center.
    - Sam will provide the team the presentation that Mary saw.
    - Dev will provide the team the URL to the extreme precipitation thesis.
    - Melissa will send the Indiana Past & Future Climate Report information to the team.
    - Sam will send tornado and flooding events information to the team.
    - Dev to help with the section on the effect of climate change on cities.
    - Dev to provide precipitation and evaporation maps.
    - Molly, Beth, and Tom to provide drought information.
    - Tom to provide information on different global projections.

10/31/18 State HAzard Mitigation

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Jim Sparks	Polis	317-278-2433	
Marianne Cardwell	Polis	317-274-2480	mcardwe@iu.edu

11/07/2018

Time: 9AM – 11AM

Attendees:

- Mary Moran – IDHS
- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Kayla Swoveland – Polis
- Marianne Cardwell – Polis

Summary:

- **County Plans:**
    - Alicia asked about the status of the Henry County invoices. Marianne will send this out.
    - Alicia asked for the Henry County in-kind match documentation. Kayla will send this out.
    - Polis asked about the contact information for Cass County. Alicia will reach out.
- **State Plan:**

  - The team discussed the documentation provided by the climate team and reviewed the proposed structure for section 2. Section 2.1 will discuss geography and topography of the state; Section 2.2 will discuss climate, including subsections on past & current climate and future climate; Section 2.3 will summarize natural hazards affecting the state. The rest of the sections will be similar to the 2014 plan.
  - Polis will include the effects of climate change on Indiana, including the impacts on agriculture, combined sewer overflows, roads, and pests.
  - Marianne asked about the status of the Section 1 data needs relating to the State Disaster Relief Fund. Torrey reached out to Manuela and if he does not hear back from her on Thursday, will inform Mary. Depending on when Polis receives the remaining information, the first section may not get finalized until next week.
  - The team discussed the Section 4 priority rankings. Mary explained that the state was to deliver the state THIRA to FEMA by December 1, 2018. Additionally, all district THIRAs should be done by that date. Mary recommends setting up a meeting with Torrey and the THIRA team to obtain the information needed for pages 36 to 39 (2014 plan) of section 4.
  - Critical facilities for section 4: Alicia has received information on accessing the list of critical assets using Falcon Viewer. However, she may need additional assistance to extract the necessary information. Kisha may be able to help. Kayla indicated that Polis already has a list that was put together with Burke earlier in 2018 but Polis would still like to have the state list to compare it to its list. Torrey requested that the hospitals be broken out from the care category. Mary indicated that EMS (Robin Stump) may have this information.
  - State-owned facilities for section 4: Alicia will reach out to Brian Renner at IDOA for the state-owned facilities. This data may be sensitive. Marianne indicated that at this time, Polis only needs a number to include in section 4. More detailed information may be needed in future sections.
- **Previous Action Items:**
  - Repetitive loss information: Marianne explained Steve Greene (FEMA) provided us with instructions on how to obtain the information. Jim Sparks sent the letter to Mary Beth Caruso, FEMA Region V Mitigation Division Director, on Monday. Jim has not yet heard back. Marianne will provide the letter to Torrey.
  - The team clarified that Mary needs to give Torrey the statistics on which counties have NFIP and which do not.
  - The team reviewed the hazards listed on page 35 of the 2014 plan. All hazard should be kept. Torrey requested that for the levee/dam failures section, a paragraph be added to indicate that failure could be due to natural events. Marianne asked if low-head dams should be included and the team agreed. Torrey will provide Polis information on low-head dam deaths and mitigation projects.
- Marianne asked the team whether IDHS would like to review the draft climate section prior to sharing with the climate team. Torrey requested doing so. Once the scope of the section is finalized and approved by IDHS, it will be shared with the climate team.
- Torrey will invite IDNR and INDOT today for the 11/14 meeting. Polis will send out an agenda/outline for that meeting to Torrey prior to the meeting.
- Polis staff inquired about the status of the contract. Mary and Torrey indicated that they are pushing to get it finalized as soon as possible.

Action Items:

- Polis:
    - Marianne to provide Alicia with the status of the Henry County invoices.
    - Kayla to provide Alicia with Henry County's in-kind match information.
    - Polis to include discussion of effects of climate change on Indiana.
    - Polis to add a paragraph indicating that levee/dam failures could be due to natural events.
    - Polis to add a section on low-head dams.
    - Polis to provide a draft climate section next week to Torrey.
    - Polis to provide Torrey with an agenda/outline for the INDOT/IDNR meeting prior to the meeting.
- IDHS:
    - Alicia to determine the right contact information for Cass County and will inquire at to the county's status.
    - Mary to set up a meeting with Torrey and the THIRA team.
    - Alicia to obtain the list of critical facilities and provide it to Polis.
    - IDHS to reach out to Robin Stump (EMS) for hospital information.
    - Alicia to obtain the number of state-owned facilities from Brian Renner at IDOA and provide that information to Polis.
    - Torrey to provide Polis information on low-head dam deaths and mitigation projects.
    - Torrey to review draft climate section prior to sending to the climate team for review.
    - Torrey to invite IDNR and INDOT today for the 11/14 meeting on 11/7.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 11/7/18

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
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MARY MORAN	IDHS	317-232-3831	mmoran@dhs.in.gov

11/14/2018 (AM)

Time: 9AM – 11AM

Attendees:

- Mary Moran – IDHS
- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Jamie Miller – IDNR
- Anita Nance – IDNR
- Kayla Swoveland – Polis
- Marianne Cardwell – Polis
- Matt Riggs – Polis
- Jim Sparks – Polis

Summary:

- **County Plans:**
  - Benton County: Marianne asked Alicia if the agreements between the county and the state were in order as the EMA Director, John Fields, had not seen the paperwork. Alicia indicated that it was and that the period of performance ends on 10/18/19
- **State Plan:**
  - The team agreed on the new look of the plan.
  - Section 1:
    - Marianne highlighted a few portions of section 1 that need IDHS' attention.
    - The team agreed to take out the reference to Appendix B in the first paragraph.
    - The team agreed to replace the most recent disaster to the 2018 disaster but mention in the text that the plan focuses on 2008 through 2017 disasters and does not include 2018.
    - Mary asked to restructure the types of assistance portion of the text as well as add information about the HUD Disaster Recovery Fund and the FEMA Hazard Mitigation Grant 406.
    - Mary will edit the paragraph following the types of assistance.
    - The last paragraph on page 2 needs updated numbers from INDOT.
    - Marianne will make the edits and send to the team for review.
    - Once reviewed and acceptable to all, Marianne will submit to FEMA, copying Torrey.
  - Section 2:
    - IDHS was happy with the new climate section draft that was provided earlier in the week.
    - Marianne will submit to the climate team for their feedback.
  - Plan restructure:
    - Marianne reviewed the proposed restructure of the plan, which would look as follows:
      1. Introduction
      2. State Profile
      3. Planning Process
      4. 2014 Strategies Progress
      5. Risk Assessment Overview
      6. Natural Hazards
      7. Technological Hazards
      8. Human Hazards
      9. Mitigation Strategies

10. Local Capabilities
11. State Capabilities
12. Plan maintenance, Monitoring, and Evaluation

- The team agreed with the new structure.
- Marianne will send out an updated schedule reflecting the new structure.

- IDNR Conversation:
    - The IDNR conversation started with the introduction of the participants and a brief overview of the plan and its benefits.
    - The team discussed points of contacts within IDNR:
        - Insurance programs: Anita
        - RiskMAP: Dave Kipe
        - State NFIP Coordinator: Darren Pearson
        - Dam Safety: Jamie or George Crosby
    - The team discussed potential datasets that could be helpful for the plan:
        - Dam inventory (Jamie): includes IEAP attribute indicating preparedness. 170 of the high hazard dams have IEAPs. These are only dams under the state's jurisdiction and does not include federally-regulated dams.
        - Low head dams (Jamie): there is an inventory of low-head dams but the dataset is not in good shape. The state is working on a living inventory of low-head dams. The plan should include information on how and who the state is building this inventory. The plan should also mention progress made to remove low head dams.
        - Bridges: INDOT may have an inventory. Bridges can cause issues with debris during flood events.
        - Landslide dataset: INDOT.
        - Flood boundary datasets (Dave Knipe): there are two major datasets:
            - Digital Regulatory Flood Boundaries, which are missing about 4 to 5 counties.
            - Best Available Data: includes digitized paper maps for the 4 to 5 missing counties. It also includes 10,000 miles of unmapped floodways. The plan should include a description of this.
        - Model library of flood boundaries: a statement should be included in the plan about this data.
        - Benchmarks
        - Division of water has an online research center application (Anita).
        - Wetlands (Chris Ritz at NRCS, possibly also Ashley Moore). A map of wetlands should be added to section 2.
        - Freshwater lakes (Jamie): a map of these should be included in section 2.
        - Flood erosion hazards (Matt Riggs first, then Bob Barr, Siavash): the FEH report should be included as an appendix.
        - The plan should include one or two paragraphs on the state's stream gage network and flood inundation mapper sites (Silver Jackets). A mitigation strategy should be added to expand the state's gage network in order to build the state's resilience.
        - Drought (Mark Basch and Dave Smith).
        - National levee inventory (Jamie or George Crosby).
        - Non-levee embankments: mention the examples of Morgan County (Matt) and Knox County (Anita).
        - Wildfires (Carrie Tauscher, state urban forester)

- 2014 Mitigation Strategies:
  - Marianne will share the spreadsheet with the team.
  - The team will need to update the status of the 2014 strategies and will need input on new strategies.
  - Mary asked Torrey to forward the spreadsheet to Ashley Moore for dissemination.
  - Marianne suggested hosting the spreadsheet online so there is one central location for all input.

Action Items:

- Polis:
  - Marianne to update Section 1 and submit to IDHS for review.
  - Marianne to submit Section 1 to FEMA upon review/approval from IDHS.
  - Marianne to submit Section 2 – Climate to the climate team for review.
  - Marianne to submit updated schedule to Torrey.
  - Matt to provide the FEH report.
  - Include 1 or 2 paragraphs on the state's stream gage network and flood inundation mapper sites relying on Silver Jackets as needed.
  - Add a mitigation strategy to expand the state's gage network in order to build the state's resilience.
  - Matt to provide language on NLE example in Morgan County.
  - Provide online 2014 mitigation strategies spreadsheet
- IDHS:
  - Review Section 1.
  - Mary to edit a paragraph in Section 1.
  - Torrey to forward the 2014 mitigation strategies spreadsheet to Ashley Moore for dissemination.
- IDNR:
  - Jamie Miller – provide the following datasets:
    - Dam inventory.
    - Existing low-head dams dataset.
    - Freshwater lakes
    - National levee inventory
  - Anita Nance – provide the following:
    - Division of Water online research application URL.
    - Language on NLE example in Knox County
  - Dave Knipe – provide the following:
    - Digital regulatory flood boundaries.
    - Best available data (flood boundary datasets).
  - Chris Ritz – provide the following dataset:
    - Wetlands.
  - Mark Basch or Dave Smith – provide information on:
    - Drought.
  - Carrie Tauscher – provide information on:
    - Wildfires
  - Unclear:
    - Model library of flood boundaries URL.
    - Benchmarks dataset.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 11/14/18

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Jamie Miller	DNR	317-234-1081	jmiller1@dnr.in.gov
Anita Nance	IDNR	317-234-1110	anance@dnr.in.gov

11/14/2018 (PM)

Time: 1PM – 3PM

Attendees:

- Mary Moran – IDHS
- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Allison Curry – IDHS
- Michael Hamburger – IU Bloomington
- Anna Jessee – IU
- Kayla Swoveland – Polis
- Marianne Cardwell – Polis
- Jim Sparks – Polis

Summary:

- This meeting focused on earthquakes and related natural hazards in Indiana. The conversation started with the introduction of the participants and a brief overview of the plan and its benefits.
- Marianne listed the three earthquake scenarios included in the 2014 state plan:
    - 6.8M in Mt. Carmel, KY
    - 7.7M in Barlow, KY
    - 500-year probabilistic scenario
- Kayla added that a 4th scenario is used in Polis' county plans, which is an annualized analysis.
- Allison is currently working on a Wabash Valley-specific earthquake plan with a magnitude greater than 7 where the whole fault is shifting.
- Michael suggests running some additional scenarios:
    - Moderate earthquake (5.8) anywhere in the state. This could be centered near the Fortville Fault near Indianapolis.
    - A Wabash Valley earthquake, possible a 6.2M near Darmstadt near Evansville.
    - Historic recording of 5 to 6 earthquakes in the 1930s in western Ohio.
    - Paleoseismic record.
- Mary supports Michael's recommendations.
- Michael encourages the team to run the probabilistic scenario as it is a good baseline for determining how hazardous each area is.
- Jim recommended we document in the plan which each scenario was chosen. The team agreed.
- Jim recommended a paragraph be included to point out that these earthquakes could happy anywhere.
- The 2014 plan focused on southwestern Indiana but the team recommends including additional areas.
- Jim noted that magnitude was not the only important parameter but that depth matters as well. Michael recommended that language be added that describes what matters, such as depth, fault type, orientation, etc.
- Mary wondered about soil types. Michael said that the shake maps he can create take soil types into consideration. Marianne noted that a soils map and a liquefaction map are included in the HAZUS analysis. Anna & Michael will provide the best soils & liquefaction datasets for Polis to use in its analyses.
- Mary noted that someone at INDOT is working on a GIS layer of roads that would be affected by landslides. Mary will look for the contact and data. She also mentioned that during the 2008 floods, there were many landslides. Michael indicated that he would be interested in a historical record of these and Mary said she would look for that information.

- Michael recommends that the plan mention paleoliquefaction, etc. The plan should include a map with paleoearthquakes besides just the recent ones. The map should also show data from surrounding states and not just Indiana.
- Michael mentioned that earthquakes can also be induced, mainly from gas/oil industry activities. Southwestern Indiana is most affected.
- Anna has a tool that provides regional estimates of landslides and liquefaction. This could turn into a sort of alert level.
- The team discussed the use of shake maps as inputs to HAZUS. Polis staff will discuss with Kevin Mickey and the team will try a shake map to test this out.
- Michael asked about whether the plan would analyze the impact of earthquakes on bridges, critical infrastructure, utility networks, etc. Due to time limitations, the plan may not include this, but the team will see if INDOT could support this effort. Some form of "shake cast" map for southwestern Indiana may be helpful. The plan should mention this information in a paragraph, including compounding effects of disasters, possibly leading to environmental consequences, such as pollution.
- Mary would like the plan to include information about confined feeding operations, coal ash sites, etc.
- Allie asked whether anyone has a dataset with unreinforced masonry buildings in the state. Mary will reach out to a contact at Purdue to see if such a dataset exists. Michael suggested using information such as building age and number of stories. Jim indicated that that Indiana Local Government Finance dataset includes this information and could be a potential source of information.
- Michael asked whether building codes reflected any of this information. Mary indicated she is working with the building commissioner's office. The goals for 2019 are to increase and enforce building codes. Marianne asked whether the state could require more stringent building codes and Mary indicated that there are state building codes but most are regulated at the county level. Michael requested information about this and Mary said she would provide it.
- Anna asked whether the plan would look at sinkholes. The plan is slated to include information about this and the county plans already do. Anna will provide her data layer of sinkholes.
- There is a need for public input during the process. Torrey will clarify with Steve when and how public input is needed.

Action Items:

- Polis:
    - Work with Kevin Mickey & Michael to ensure shake maps will work.
    - Include information about confined feeding operations and coal ash sites.
    - Look into using IDLG to identify structures in Indiana that would be more susceptible to earthquake damage.
- IDHS:
    - Mary to reach out to INDOT to find the GIS layer of roads affected by landslides.
    - Mary to find the 2008 flood-related landslide information and share with Michael.
    - Mary to reach out to Purdue to inquire about existence of unreinforced masonry buildings in Indiana.
    - Mary to provide information about building codes to Michael.
    - Torrey to reach out to Steve at FEMA to clarify the public input process.
- Michael Hamburger:
    - Provide suggested scenarios, including:
        - Location (latitude/longitude)
        - Magnitude
        - Depth

        - Description of why chosen
    - Provide a shake map for one of the scenarios for testing.
    - Language explaining what impacts the severity of an earthquake (magnitude, depth, fault type & orientation, etc.)
    - Dataset with paleoearthquake locations along with a paragraph.
    - Paragraph describing induced earthquakes.
- Anna Jessee:
    - Regional estimates of landslides and liquefaction.
    - Sinkhole dataset.
- Anna & Michael:
    - Provide Polis with the best soils and liquefaction GIS datasets.
    - Provide Polis with a “shake cast” map for SW IN.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 1/14/12

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Mariann Cardwell	Polis	317-274-2480	mcardwe@iu.edu
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Torrey Glover	IDHS	317-234-6556	tglover@dhs.in.gov
Michael Hamburger	IU - Bloomington	812-855-2934	hamburg@indiana.edu
Jim Sparks	Polis	317-560-9033	[illegible]
Allison Curry	IDHS	317-605-2996	acurry@dhs.IN.gov
Kayla Swoveland	Polis		KayKauff@iupui.edu

11/28/2018

Time: 9-11AM

Attendees:

- Mary Moran – IDHS
- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Allison Curry – IDHS
- Kayla Swoveland – Polis
- Marianne Cardwell – Polis

Summary:

- Section 1:
  - The team reviewed IDHS's comments on section 1. Marianne will update this section of the plan and provide to Torrey for a final review prior to submitting to Steve Greene.
- Section 2:
  - Marianne received comments from both Tom Reaugh and Melissa Widhalm on the new climate section. Melissa is currently reviewing an updated version.
  - Mary asked for a legend on the terrain map. If not possible, she suggested removing the map.
  - Torrey will provide Marianne with a scan of the annotated climate section. Marianne will update accordingly.
- Section 4:
  - The IDHS team will review the 2014 strategies and update them as a team to avoid overwriting each other's comments.
  - The IDHS team will write the section's introductory paragraph.
  - Marianne suggested including some kind of chart after the introductory paragraph to show overall progress. Mary suggested a map of projects or mitigation dollars spent in the state. Mary & Torrey will look at possible data from Falcon.
  - All language and strategies are due to Polis by Friday December 14 in order to finalize the section for submittal to Steve Greene by December 21.
- Section 5:
  - The team reviewed a draft of section 5.
  - The team agreed to keep the Most * Disaster entries. Mary will provide some language for 4363.
  - Marianne to update Table 1 as there were errors, along with separating out state from federal entries. Mary to look into the data that Manuela provided as there were some line items that may be incorrect.
  - The team discussed whether the state is doing a THIRA or a HIRA. Mary to confirm.
  - Mary noted that the new THIRA may be using different guidelines for hazard prioritization. She will confirm.
  - Alicia confirmed there are 174 hospitals in the state. Marianne will update Table 4 in Section 5 to indicate 174 hospitals but only 3,321 care facilities.
  - Marianne explained the use of Bing buildings for the analysis. She will work on Table 5 using the Bing buildings and also using just the IDLGF data and provide the numbers to the IDHS team.

- Section 6:
  - Marianne and Kayla discussed Polis' approach to the analysis for section 6, especially as it relates to flood, but also earthquakes.
  - The team agreed to show the flood information by IDHS District and counties instead of watersheds. Polis will also provide additional information, such as content loss, inventory loss, damage ratio, shelter, debris, displaced households, and direct economic loss.
  - Mary requested the addition of a paragraph explaining that our analysis is using Indiana-specific data, not out-of-the-box HAZUS data.
  - Marianne mentioned the possibility of using state LiDAR data for the flood analysis, but indicated that there may not be enough time to do so. Mary & Torrey agreed to skip the use of the LiDAR data until the next version of the plan when more detailed LiDAR will be available for the whole state.
- Section 9:
  - IDHS indicated that the Indiana University Environmental Resilience Institute may have new strategies to include in the plan. The team may want to meet with Institute staff to go over those strategies.
  - The 2019 strategies will need to have a column that indicates the hazard(s) they address. The list should be sorted by priority.

Action Items:

- Polis:
  - Marianne to submit updated section 1 to Torrey.
  - Marianne to submit IDHS-approved section 1 to Steve Greene.
  - Marianne to update table 1 in Section 5.
  - Marianne to update Table 4 in Section 5.
  - Marianne to provide Table 5 in Section 5 to the team based on 2 scenarios: Bing buildings with IDLGF data and just IDLGF data.
  - Marianne to add a paragraph to Section 6 explaining the use of Indiana-specific data with HAZUS.
- IDHS:
  - Torrey to review finalized Section 1.
  - Torrey to provide annotated climate section to Marianne.
  - Team to provide Marianne with the Section 4 introductory paragraph by Dec. 14.
  - Mary & Torrey will look at possible data for a section 4 progress map by Dec. 14.
  - IDHS to update 2014 strategies by Dec. 14.
  - Mary to look into Manuela's data for Section 5 Table 1.
  - Mary to provide language for Section 5 about disaster 4363.
  - Mary to confirm whether the state is doing a THIRA and a HIRA or just a THIRA.
  - Mary to confirm THIRA classifications (low/medium/high).
  - Mary to invite INDOT to one of the December meetings.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date:

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Kayla Sunderland	Polis		KayKauff@iupui.edu
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Allison Curry	IDHS	317-605-2996	acurry@dhs.IN.gov
Alicia Schoening	IDHS	317-234-8426	aschoening@dhs.in.gov
Kisha Morris	IDHS	317-238-1750	kmorris1@dhs.in.gov

12/05/2018

Time: 9-10AM

Attendees:

- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Kayla Swoveland – Polis
- Marianne Cardwell – Polis

Summary:

- The team discussed possible dates for meeting with INDOT. The week of January 7th worked for IDHS & Polis. Polis requested to move the usual Wednesday meeting to another day that week due to a tentative Meeting #1 with Warren County that day. IDHS will work with INDOT and send out the invitation.
- Torrey suggested inviting IU's Environment Resilience Institute (ERI) to discuss 2019 mitigation strategies. The team thought that January 16 would work well. Torrey will invite ERI staff.
- Marianne briefly discussed the Hazus earthquake training that Kevin Mickey did for Michael Hamburger and Anna Jessee, as well as the results of using a Shakemap for the analysis. Marianne will schedule a follow-up meeting with Kevin, Michael, and Anna to discuss the analysis results and decide of the way forward.
- Marianne discussed changing the information in section 2 related to GDP and primary industries within MSAs. IDHS agreed to use employment numbers instead of industry GDP.
- Marianne requested public assistance information, especially for LaGrange County. Torrey will contact the right person at IDHS to request that information.
- Torrey asked about the status of the contract paperwork at IU. Marianne will check on the status.
- Marianne indicated that due to a very busy week, Section 2 will not be ready for review by IDHS by the end of this week and will most likely provide the draft section early next week.
- Marianne went through the previous meeting's action items to inquire about their status.

Action Items:

- Polis:
    - Marianne to schedule a meeting with Michael, Anna, and Kevin to discuss the earthquake analysis.
    - Marianne to talk to inquire as to the status of the contract paperwork.
- IDHS:
    - Torrey to schedule a meeting with INDOT the week of 1/7/19.
    - Torrey to invite ERI staff for the 1/16/19 meeting.
    - Torrey to request public assistance information.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 12/5/18

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Marsanne Cardwell	Polis	317-274-2480	mcardwe@iu.edu
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Alicia Schoenig	IDHS	317-234-8426	aschoenig@dhs.in.gov

12/12/2018

Time: 9-11AM

Attendees:

- Torrey Glover – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Jim Sparks – Polis
- Kayla Swoveland – Polis
- Marianne Cardwell – Polis

Summary:

- Section 2:
    - The team briefly reviewed the draft version of section 2 that Marianne sent out on 12/11/18. A few items were noted and Marianne will fix those.
    - IDHS will provide comments to Section 2 by this Friday (12/14/18). Marianne will update the section as requested and provide a final copy to Torrey for review prior to submitting to Steve Greene.
- Section 5:
    - Marianne verified the numbers on Table 1 and they match the information provided by Manuela. IDHS will review the information in the table with Manuela and provide an update to Marianne early next week.
    - Marianne will sort Table 1 by date.
    - Marianne requested the language to include on page 2 for 4363.
    - Marianne requested an update on whether the state has done a new THIRA or HIRA.
    - Marianne requested an update on the language for Table 3.
    - Marianne reviewed the suggested additional language for section 5.4 and requested additional information from IDHS that would match the state's THIRA.
    - Jim pointed out that the parcel count in Table 6 is lower than expected and could be explained by government-owned parcels. Marianne will double-check the numbers.
    -
- Section 4:
    - Torrey indicated that IDHS will most likely provide the Section 4 language and content next week and that it is ok if the submittal to FEMA happens in January (vs. the planned December submittal).
- Sections 6 & 7:
    - Polis has started work on the flood analysis by working on the depth grids. Polis hopes to get most, if not all, of the depth grids created by the end of the year.
    - Michael Hamburger, Anna Jessee, Kevin Mickey and Marianne are meeting next week Monday to review the results of the Hazus earthquake analyses and determine which option the plan should include.
    - Marianne pointed out that the 2014 plan had very little for the hazmat section and asked if the state wanted to have more analysis in that section. Kayla suggested including a list of common chemicals that are transported through Indiana. Marianne suggested an ALOHA analysis & Kayla suggested running this analysis in 3 locations in the state. Marianne also suggested including information about the 50-mile radius around the nuclear facility in southwest Michigan.
    - Jim said that INDOT should have information on chemicals. The team will ask INDOT about chemicals going through the state.
    - Marianne asked if the state wanted to include anything specific in the tornado section. Kayla suggested including information about safe rooms. Torrey asked Kisha to send Polis the latest

tornado map. Jim mentioned that a GIS analyst at IDHS did a detailed analysis of a tornado in Clark County using IDLGF data. Kayla suggested creating hot spot maps for tornadoes of certain intensities.

- Torrey confirmed that the team will meet on January 7 with INDOT. The team will not meet that Wednesday (1/9/19).
- Marianne suggested an additional meeting with IDNR in late January or early February to discuss 2019 mitigation strategies. Torrey will suggest Tuesday 2/5 or Thursday 2/7 to IDNR. The team will not meet on 2/6 due to a conflict with Daviess County meeting #3.
- IU's Environmental Resilience Institute will participate in the January 16 meeting to discuss 2019 mitigation strategies.
- Marianne asked Torrey if he had clarified the need for public meetings with Steve. Torrey will follow up.
- Contract: the state has received IU's paperwork and the contract is currently in IDOA's hands.

Action Items:

- Polis:
  - Marianne to make updates to Section 2 as discussed during the meeting.
  - Marianne to provide Torrey an updated Section 2 for review prior to submitting to Steve.
  - Marianne to sort Section 5 Table 1 by date.
  - Marianne to double-check Section 5 Table 6 numbers.
  - Marianne to complete Section 5 Tables 5 & 6.
  - Marianne to ask INDOT on 1/7/19 about chemicals transported through the state.
- IDHS:
  - IDHS to review Section 2 and provide comments back to Marianne by Friday Dec. 14.
  - IDHS to provide disaster 4363 language for Section 5.
  - IDHS to confirm whether a new HIRA or THIRA was done.
  - IDHS to confirm language for Section 5 Table 3.
  - IDHS to provide additional THIRA language for Section 5.4
  - IDHS to provide Marianne with the Section 4 introductory paragraph by the week of Dec. 21.
  - IDHS to update 2014 strategies by the week of Dec. 21.
  - Mary & Torrey will look at possible data for a section 4 progress map by the week of Dec. 21.
  - IDHS to look into Manuela's data for Section 5 Table 1.
  - Torrey to determine what is needed in terms of public meetings for the state plan.
  - Kisha to send the latest tornado map to Polis.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date:

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Kayla Swanland	Polis		[illegible]
Kisha Morris	IDHS	317-238-1755	kmorris1@dhs.in.gov
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Jim SPARKS	Polis	317-278-2433	jisparks@iu.edu
Tarrey Glover	IDHS	317-234-6556	tglover@dhs.in.gov
Marsanne Cardwell	Polis	317-274-2480	mcardwe@iu.edu

12/19/2018

Time: 9-11AM

Attendees:

- Torrey Glover – IDHS
- Mary Moran – IDHS
- Kisha Morris – IDHS
- Alicia Schoening – IDHS
- Jim Sparks – Polis
- Kayla Swoveland – Polis
- Marianne Cardwell – Polis

Summary:

- Section 4:
    - Marianne inquired as to the status of IDHS' review of the 2014 mitigation strategies. IDHS stated that this will be completed in January.
- Section 5:
    - The team reviewed Section 5 and IDHS provided feedback on a number of items. Marianne will make the requested updates and provide to Torrey this afternoon. Torrey will review and let Marianne know if the section can be submitted to FEMA this week.
- Section 6:
    - The team reviewed the earthquake scenarios provided by Michael Hamburger (Indiana University). IDHS will review the proposed scenarios in more detail and confirm their usage in early January.
    - Marianne explained progress and remaining questions on using ShakeMaps instead of using arbitrary scenarios in Hazus along with Polis-provided soil and liquefaction data. Kevin Mickey will research this further and reach out to USGS & FEMA staff to inquire as to the right way to develop the ShakeMaps for use within Hazus. Mary stated a preference for using ShakeMaps.
    - Mary would like Polis to add text to emphasize that Hazus is a planning tool and not a response tool.
    - Marianne will reach out to Allison Curry to inquire about Indiana faults and historic earthquake maps.
    - Mary will look into the 2008 earthquake to provide historic information in the plan.
- The team agreed to cancel the January 2nd meeting as this is the first day back from the holidays.
- Contract: the state has send the contract to IU.

Action Items:

- Polis:
    - Marianne to make updates to Section 5 as discussed during the meeting.
    - Marianne to provide Torrey an updated Section 5 for review prior to submitting to Steve.
    - Marianne to reach out to Allison Curry to inquire about Indiana faults and earthquakes maps.
    - Polis to add language to the plan to emphasize that Hazus is a planning tool, not a response tool.
- IDHS:
    - IDHS to review Section 5 and provide comments back to Marianne by Friday Dec. 21.
    - IDHS to provide Marianne with the Section 4 introductory paragraph by the week of Dec. 21.
    - IDHS to update 2014 strategies by January 4.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 12/19/18

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Marianne Cardwell	Polis	317-274-2480	mcardwe@iu.edu
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Kisha Morris	IDHS	317-238-1755	Kmorris1@dhs.in.gov
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Mary Moran	IDHS	317-232-3831	mmoran@dhs.in.gov

01/07/2019

Time: 9:30-11AM

Attendees:

- Torrey Glover – IDHS
- Mary Moran – IDHS
- Alicia Schoening – IDHS
- Tom Vanderpool – INDOT
- Lyle Sadler – INDOT
- Jim Sparks – Polis
- Marianne Cardwell – Polis

Summary:

- IDHS & Polis met with INDOT representatives to obtain their input on the plan:
    - INDOT has a GIS layer that tracks about 200 known or potential landslides that can impact its infrastructure. INDOT will provide this information to Polis.
    - INDOT recently had its Infrastructure Protection Report updated. It lists structures, such as bridges, that need additional protection. The report looks at earthquakes. I-69 would be impacted by earthquakes and/or liquefaction. The report is confidential but INDOT will provide Polis with the title and executive summary so that it can be referenced in the plan.
    - INDOT has an underground coal mines layer which also includes quarries. INDOT is interested in where those intersect roads. Jim will reach out to Jeff Motz at INDOT for a copy of that layer.
    - Tom will meet with the INDOT hydrology section to see if the fluvial erosion hazard section needs to be updated.
    - In terms of earthquakes, there are 3 different design standards for corridors where the military could have convoys. INDOT took the middle design standard for I-69.
    - In terms of terrorism, additional bridges provide redundancy in case one bridge is destroyed.
    - INDOT inspects all airports, including pavement condition, encroachment, and airspace penetrations.
    - From a discussion about hazardous materials, Tom mentioned that the state police (motor carrier section) or DOA may manage a map of hazmat routes. The team should look into the shipment of radioactive materials as well.
    - In case of drought or wildfire, INDOT provides transportation of water for DNR to mitigate wildfires. Tom will write a paragraph on what INDOT almost did during the last significant drought in the state.
    - After storms, INDOT will take a dump truck with the necessary equipment to clear roads. There isn't much more that INDOT can do to prevent debris in the roads as these debris typically come from outside of the right-of-way. Tom will provide a map of priority routes.
    - INDOT is planning on improving its maintenance of right-of-ways in the future, including by recording videos from drones of right-of-ways to identify problem areas.
    - INDOT currently has 4 drones but may want to buy more for emergency response, right-of-way clearance, and flood documentation. This should be added to the list of future mitigation strategies and should include training.
    - INDOT would like to install additional stream gages for better tracking of rivers.
- Section 4:
    - IDHS is still working on this section and hopes to complete it by 1/18/19.
- Section 8:
    - The team reviewed the draft section 8. Alicia will provide additional information for the terrorism section, include language about the Fusion Center.

Action Items:

- Polis:
  - Reference the Infrastructure Protection Report in the plan.
  - Jim to reach out to Jeff Motz at INDOT for the following data layers: bridges, sinkholes, facilities inventory.
  - Polis to reach out to State Police and/or DOA to inquire about a map of hazmat routes.
  - Include a future strategy for acquisition of drones and related training, installation of additional stream gages.
  - Marianne to reach out to Matt Riggs (Polis) for the latest fluvial erosion/mobile streams map.
  - Jim to check with Matt Riggs (Polis) about transportation vulnerability studies at the county level.
  - Marianne to send out the 2014 mitigation strategies to INDOT.
- IDHS:
  - Provide section 4 to Polis by 1/18/19.
  - Alicia to provide additional information for Section 8’s terrorism portion, include language about the Fusion Center.
- INDOT:
  - Provide Polis with landslide GIS layer.
  - Provide Polis with title and executive summary of recent Infrastructure Protection Report.
  - Tom to meet with hydrology section to see if the fluvial erosion hazard section needs to be updated.
  - Tom to write a paragraph on what INDOT almost did during the last significant drought in the state.
  - Tom to provide a map of priority routes.
  - Review INDOT verbiage from 2014 plan (9.1.3).

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 1/9/19

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Marianne Cardwell	POLIS	317.274.2480	marcdwe@iu.edu
Lyle Sadler	INDOT	317-509-4714	lsadler@indot.in.gov
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Jim Sparks	Polis	317-278-2433	jsparks@iu.edu

01/16/2019

Time: 9:00-11AM

Attendees:

- Torrey Glover – IDHS
- Alicia Schoening – IDHS
- Kisha Morris – IDHS
- Marianne Cardwell – Polis
- Kayla Swoveland – Polis

Summary:

- The team reviewed last meeting's action items and provided an update on their status.
- Section 4:
    - IDHS is still working on this section and hopes to complete it by 1/18/19.
- Section 8:
    - The team reviewed Section 8 submitted to IDHS last week and provided comments.
    - IDHS has received information from the Fusion Center but will provide a summary of this information to Polis for inclusion in this section.
    - Polis shared statistics received from Tad Stahl at the State's IOT. The team agreed to include some of those statistics in the Cyber Attack subsection.
    - Torrey pointed out a sentence in the introduction that should be updated. Polis will update accordingly.
- Section 1:
    - The team reviewed Steve Greene's (FEMA) comments on Section 1.
    - Torrey will review the language on page 2 with Mary and others at the state.
    - Torrey will review the funding numbers on pages 3, 4.
    - Marianne will make the rest of the updates as requested by Steve, except for the first 12th comment. For those, she will explain why to Steve.
    - Marianne will update Table 2 by removing the November 2007 row and updating the table label.
- Section 2:
    - The team reviewed Steve Greene's comments on Section 2. The Section was accepted as is and does not require any changes.
    - Polis will make sure to address the impact of climate change on select hazards in Sections 6 and 7.
- Section 5:
    - The team reviewed Steve Greene's comments on Section 5.
    - When providing Steve with the updated section, Marianne will explain why 2018 data was not included.
    - Torrey will provide $ breakdown for Steve's 1st comment.
    - Torrey to provide additional information addressing the 2nd comment.
    - Polis to update the text as requested in the 3rd comment.
    - The team agreed to keep severe thunderstorms and tornadoes in the same subsection and Marianne will explain the reasoning to Steve when submitting the updated section.
    - Polis will fix the typo on page 3.

- Section 6:
    - The team went over select portions of Section 6 of the 2014 plan to discuss data needs and display options.
    - Polis will include the NFIP and RiskMAP information in the flood section of section 6.

- Torrey will provide Polis with the repetitive and severed repetitive loss information (counts by county and payments by county).
- Torrey will provide Polis with the buy-out information by county.
- Polis will change Table 21 and Figure 48 in the 2014 plan to show the data by county.
- Polis will reach out to Anita Vance and Darren Pearson for NFIP data.
- Polis will change the tornado scenario to the Evansville tornado of November 2005. Torrey will provide language on storm shelters based on Evansville and Washington County.

- Public Meetings:
  - The team discussed public meetings. Torrey will follow-up with Steve to confirm that public meetings are required. Marianne suggested the week of March 11 and March 18 as potential days for these public meetings.
  - The team discussed having from 1 to 3 meetings, but this will depend on Steve's input.
  - The team discussed potentially providing an online survey for the public to provide feedback on the plan. Polis will send an example to IDHS for review.
- 2019 Strategies:
  - The team discussed whether to have additional meetings with stakeholders for new strategies or whether to have an online form available to stakeholders. The consensus after discussion was to provide an online form to stakeholders, including Silver Jackets, review the feedback, and then schedule follow-up discussions as needed.
  - Torrey asked Marianne to present this to the Silver Jackets at tomorrow's meeting (January 17) or assist Mary if Mary can attend.
- Schedule:
  - Due to a conflict, the February 6 meeting is to be moved to February 5. Polis will reserve its large conference room in case no meeting rooms are available at the State.
  - Marianne indicated she will be out of the country Thursday March 27 through Friday April 5.
  - Due to large amounts of data processing, Polis requested to delay the submittal of Section 6 to later in February. IDHS agreed.

Action Items:

- Polis:
  - Update Section 8 and provide to IDHS for final review prior to submittal to FEMA.
  - Update Section 1 as requested by FEMA and confirmed by IDHS. Provide to IDHS for final review prior to submittal to FEMA.
  - Address impact of climate change on select hazards in sections 6 and 7.
  - Update Section 5 as requested by FEMA and confirmed by IDHS. Provide to IDHS for final review prior to submittal to FEMA. Explain to FEMA why 2018 data was not included. Also explain why severe thunderstorms and tornadoes will be kept together.
  - Include NFIP and RiskMAP information in section 6.
  - Change Table 21 and Figure 48 in the 2014 plan to show the data by county.
  - Reach out to Anita Vance and Darren Pearson for NFIP data.
  - Change the tornado scenario to the Evansville tornado of November 2005.
  - Send example survey to IDHS.
  - Move 2/6 meeting to 2/5.
- IDHS:
  - Provide Section 4 to Polis by 1/18/19.
  - Provide Fusion Center summary to Polis by 1/18/19.
  - Review a number of FEMA's comments in Section 1 and provide the information to Polis.

- Review a number of FEMA’s comments in Section 5 and provide the information to Polis.
- Provide Polis with repetitive and severed repetitive loss information (counts by county and payments by county).
- Provide Polis with buy-out information by county.
- Torrey will provide language on storm shelters based on Evansville and Washington County.
- Torrey to follow up with Steve to confirm public meeting requirements.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 1/16/19

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Marianne Cardwell	Polis	317-	mcardwe@iu.edu
Kayla Sweveland	Polis		KayKauff@iupui.edu
Torrey Glover	IDHS	317-234-6556	tglover@dhs.in.gov
Kisha Morris	IDHS	317-238-1755	kmorris1@dhs.in.gov
Alicia Schoening	IDHS	317-234-8426	aschoening@dhs.in.gov

01/23/2019

Time: 9:00-11AM

Attendees:

- Torrey Glover – IDHS
- Alicia Schoening – IDHS
- Kisha Morris – IDHS
- Marianne Cardwell – Polis
- Kayla Swoveland – Polis

Summary:

- The team reviewed last meeting's action items and provided an update on their status.
- Section 6:
    - NFIP repetitive loss data: Torrey provided Marianne with information on repetitive loss for the state, which comes straight from FEMA Region 5. Marianne to verify what information she still needs from Darren Pearson for Section 6.
    - Tornado: Kisha will send Polis a map of the Vanderburgh County tornado path.
- Section 7:
    - Low-head dams: Torrey indicated it was ok to condense the low-head dam information provided by Manuela.
    - Marianne asked if the plan should mention the North Indy levee work. IDHS agreed.
- Section 9:
    - The team discussed the online survey for obtaining new mitigation strategies. Since Google Forms is blocked for most state employees, Marianne working with IOT to redo the form in SurveyMonkey. IDHS will use just the SurveyMonkey version.
- Section 10:
    - The team reviewed the original section 8 (Local Capabilities to Mitigate Hazards) to identify changes or data needs.
    - Polis should remove the severe repetitive loss information from section 8.3.
    - Torrey to determine whether there are any rankings for communities & counties.
    - For section 8.4, replace CAPI rankings with something similar to at-risk populations. Polis to think of categories for the table.
    - Sections 8.5 & 8.6: new text should discuss funding mechanisms and include a summary of participating counties and their last update date. Torrey to provide language on funding mechanisms and Alicia to send list of counties and their status.
- Section 11:
    - The team reviewed the original section 9 (State Capabilities to Mitigate Hazards) to identify changes or data needs.
    - Torrey to ask Mary for contacts within departments listed in 2014 plan section 9 to update language for each agency. The deadline for the text update is 2/15/19.
    - Torrey to review section 9.2 and possibly send to various agencies within the state.
- Section 12:
    - The team reviewed the original section 10 (Plan Maintenance, Monitoring, and Evaluation) to identify changes or data needs.
    - Torrey to confirm the data in Table 51.
- State facilities: Torrey to follow-up with Mary on the two groups that would provide additional state facility information.
- 2/5 meeting to be held at state. Kisha to send Marianne room information.

Action Items:

- Polis:
    - Marianne to verify that the NFIP repetitive loss information she received from Torrey contains the necessary information.
    - Marianne to update Darren Pearson on needed NFIP information.
    - Marianne to condense low-head dam text.
    - Marianne to include North Indy levee work in Section 7.
    - Polis to remove severe repetitive loss information from section 8.3 (original).
    - Polis to come up with categories for the table in the original section 8.4.
- IDHS:
    - Kisha to send Polis map of Vanderburgh County tornado path.
    - Torrey to send SurveyMonkey information to plan participants.
    - Torrey to determine whether there are rankings for communities & counties.
    - Torrey to provide language on funding mechanisms.
    - Alicia to provide list of counties and their status.
    - Torrey to ask Mary for contacts within departments listed in 2014 plan section 9 to update language for each agency. The deadline for the text update is 2/15/19.
    - Torrey to review section 9.2.
    - Torrey to confirm the data in Table 51.
    - Torrey to follow-up with Mary on groups that would provide additional state facility information.
    - Kisha to send Marianne meeting room information for 2/5.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 1/23/19

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Marianne Cardwell	Polis	317-274-2480	mcardwe@iu.edu
Torrey Glover	IDHS	317-234-6556	tglover@dhs.in.gov
Kisha Morris	IDHS	317-238-1755	kmorris1@dhs.in.gov
Alicia Schoenig	IDHS	317-234-8426	aschoenig@dhs.in.gov
Kayla Swoveland	Polis		KayKauff@iupui.edu

01/30/2019

Time: 9:00-10AM (Virtual Call via Zoom)

Attendees:

- Torrey Glover – IDHS
- Mary Moran – IDHS
- Alicia Schoening – IDHS
- Kisha Morris – IDHS
- Marianne Cardwell – Polis
- Kayla Swoveland – Polis
- Jim Sparks – Polis

Summary:

- Today's meeting was held virtually due to sub-zero temperatures in Indianapolis and all participants working from home.
- The IDHS team was very busy this week working on grant applications and should have more time in the next week to focus on the state plan.
- The team reviewed last meeting's action items.
    - Mary & Torrey will look for the repetitive loss code meaning in the spreadsheet that Torrey sent to Marianne last week.
    - Torrey will send Marianne the buy-out information.
    - Torrey will send out the SurveyMonkey URL by Tuesday.
    - Torrey will look into potential rankings for the community listing in section 8 of the 2014 plan.
    - Alicia will redo the list of counties and status.
    - Mary will update Section 9 of the 2014 plan language.
    - Torrey & Mary will review the language in Section 9.2 of the 2014 plan with the relevant agencies.
    - Torrey will send out the new table that will replace Table 51 of the 2014 plan.
    - Mary found an email she had sent to Brian Renner in regards to state facilities and will follow up. Jim indicated that Mike Martin at IDNR may have some state facility information. Mary will reach out.
- Torrey will send feedback on the sections reviewed by Steve in the next couple of days.
- The team reviewed the draft Section 7 (Technological Hazards):
    - Marianne will add language to low-head dams to indicate that the number fluctuates as more are found or removed.
    - Marianne will update the legend of Figure 3 of Section 7 to say "Known" low head dams.
    - Marianne will add a map of non-levee embankments.
    - Marianne is expecting additional language from Michael Hamburger on the landslide section.
    - Marianne will add language about the 1963 Coliseum and 1968 Richmond explosions.
    - Torrey will provide any additional comments to Marianne, after which Marianne will resubmit to IDHS for final review prior to submittal to FEMA.
- The team discussed how to include the impact of climate on the hazards. Mary and Torrey will discuss and provide their feedback during the next meeting.
- Marianne indicated that 90% of the analysis for Section 6 (Natural Hazards) has been run and Polis has started working on the text. Due to the size of this section, the team agreed to review it in chunks.

- The team discussed how best to incorporate confined feeding operations and coal ash sites in the plan. After reviewing FEMA's requirements, Mary thinks that it may be best not to include it but to consider including it in the next version of the plan. Torrey will confirm.

Action Items:

- Polis:
  - Marianne will add language to low-head dams to indicate that the number fluctuates as more are found or removed.
  - Marianne will update the legend of Figure 3 of Section 7 to say "Known" low head dams.
  - Marianne will add a map of non-levee embankments to Section 7.
  - Marianne is expecting additional language from Michael Hamburger on the landslide section (Section 7).
  - Marianne will add language about the 1963 Coliseum and 1968 Richmond explosions to Section 7.
  - Marianne to submit Section 6 in chunks to IDHS for review.
- IDHS:
  - Mary & Torrey will look for the repetitive loss code meaning in the spreadsheet that Torrey sent to Marianne last week.
  - Torrey will send Marianne the buy-out information.
  - Torrey will send out the SurveyMonkey URL by Tuesday.
  - Torrey will look into potential rankings for the community listing in section 8 of the 2014 plan.
  - Alicia will redo the list of counties and status.
  - Mary will update Section 9 of the 2014 plan language.
  - Torrey & Mary will review the language in Section 9.2 of the 2014 plan with the relevant agencies.
  - Torrey will send out the new table that will replace Table 51 of the 2014 plan.
  - Mary will reach out to various state agencies for state-owned facilities.
  - Torrey will send feedback on the sections reviewed by Steve in the next couple of days.
  - Mary and Torrey will discuss inclusion of effects of climate change on hazards and provide their feedback during the next meeting.
  - Torrey will confirm whether to include a section on confined feeding operations and coal ash sites.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 1/30/19

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Marianne Cardwell	Polis	317-274-2480	mcardwe@iu.edu
Kayla Swoveland	Polis		KayKauff@iupui.edu
Torrey Glover	IDHS	317-234-6556	tglover@dhs.in.gov
Kisha Morris	IDHS	317-238-4755	kmorris1@dhs.in.gov
Alicia Schoening	IDHS	317-234-8426	aschoening@dhs.in.gov
MARY MORAN	IDHS	317-232-3831	mmoran@dhs.in.gov

02/05/2019

Time: 9:00-11AM

Attendees:

- Torrey Glover – IDHS
- Alicia Schoening – IDHS
- Kisha Morris – IDHS
- Marianne Cardwell – Polis
- Kayla Swoveland – Polis
- Jim Sparks – Polis

Summary:

- Section 7:
  - Torrey provided a couple of additional changes to Marianne's latest update. After making those changes, Marianne should submit the section to Steve and copy Torrey.
- IDHS requested that Polis send the IDHS team a list of prioritized action items.
- Section 4:
  - The team discussed the approach for section 4. IDHS is currently planning on writing a narrative for those 2014 strategies that have been completed, then indicate that strategies that are in process or have not yet been started are in the new strategy table.
  - Mary is currently writing the narratives for completed strategies.
- Section 6:
  - The team discussed the order of the natural hazards in Section 6. Marianne suggested include subsidence after earthquakes as it may flow better. The team also discussed moving extreme temperatures before drought. The IDHS team will discuss and follow-up with Polis.
  - Marianne will send a draft landslide section to Torrey.
  - Earthquakes – Jim suggested adding an additional secondary effect related to disruption of services. The team agreed.
  - Flood:
    - The team discussed whether or not to show a map showing $ loss and loss ratio by counties. The team agreed that Polis should map both and then the team can determine which one to include.
  - Summer storms:
    - This section should discuss derechos.
    - Kisha to find a representative image of derechos and provide a narrative to Polis.
  - Wildfire:
    - Kisha & Alicia have written event narratives that Torrey is currently reviewing. Torrey will send to Polis upon review.
    - The team discussed whether to include agricultural field fires. This could potentially be included in the drought section.
  - Marianne to ask Steve whether he would like section 6 provided to him in chunks for easier review.
- Section 9:
  - Torrey will send the SurveyMonkey survey today.
- Public Meetings:

- The team discussed public meetings and decided to have one in the morning and one in the afternoon (on the same day) at the state building the week of March 11.
- IDHS will reserve a room for the public meeting.

Action Items:

- Polis:
  - Marianne to finalize Section 7 draft and submit to FEMA.
  - Marianne to send prioritized action items list to IDHS.
  - Marianne to send the draft landslide section to Torrey.
  - Jim to write an additional earthquake secondary effect focused on disruption of services.
  - Kayla to create maps showing flood loss and loss ratio by county.
  - Marianne to ask Steve if he would prefer to receive Section 6 in smaller chunks.
- IDHS:
  - IDHS to confirm order of natural events in Section 6.
  - Kisha to write a derecho narrative and provide a representative image to Polis.
  - Torrey to provide reviewed wildfire event narratives to Polis.
  - Torrey to send the SurveyMonkey URL today.
  - IDHS to reserve a meeting room for a full day the week of March 11.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 2/5/19

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Marianne Cardwell	Polis	317-274-2480	mcardwe@iu.edu
Kayla Swoveland	Polis		kaykauff@iupui.edu
Jim Sparks	Polis	317-278-2433	jisparks@iu.edu
Torrey Glover	IDHS	317-234-6556	tglover@dhs.in.gov
Kisha Morris	IDHS	317-238-1755	kmorris2@dhs.in.gov
Alicia Schoening	IDHS	317-234-8426	aschoening@dhs.in.gov

02/13/2019

Time: 9:00-11AM

Attendees:

- Mary Morran – IDHS
- Torrey Glover – IDHS
- Alicia Schoening – IDHS
- Kisha Morris – IDHS
- Marianne Cardwell – Polis
- Kayla Swoveland – Polis

Summary:

- Sections 1 (Introduction) and 5 (Risk Assessment Overview): IDHS will provide information to finalize these sections (in response to Steve Greene's comments) after we have submitted the rest of the plan to Steve.
- Section 4 (2014 Strategies Progress): Mary is working on this section.
- Section 5 (Risk Assessment Overview):
  - Polis to add information about state facilities.
  - IDHS to send Polis information about IDHS facilities.
- Section 6.1 (Natural Hazards – Flood):
  - Mary will provide a map of the 2018 flood.
  - Polis will include language on Hazus analysis and user-defined buildings, along with how flood depth grids were created.
  - Polis to remove CAPI in 6.1.2, but add Hazus along with analysis of repetitive and severe repetitive losses.
  - Polis to relabel Hazus-related maps & tables to "Projected".
  - Torrey is still working on the buy-out information and will send it to use as soon as he'd been able to go through it.
- Section 6.3 (Earthquakes):
  - Polis to relabel Hazus-related maps & tables to "Projected".
  - Building code: Polis to remove yellow line on page 52.
  - Indy scenario: Polis to rephrase to Central Indiana as this is more appropriate.
  - Marianne to send updated version to Torrey for review prior to submitting to Steve.
- Section 6.6 (Winter Storm):
  - Polis to fix typos on page 2.
  - Marianne to update the dates at the bottom of page 2. Mary to send dates to Marianne.
  - Polis to add word on page 4.
  - Marianne to send updated version to Torrey for review prior to submitting to Steve.
- Section 6.7 (Ground Failure):
  - Marianne to fix Figure 12.
  - Marianne to send updated version to Torrey for review prior to submitting to Steve.
- Section 6.8 (Wildfire):
  - Mary may provide text from a California study on wildfires for 6.8.2. If no relevant text, remove this section.
  - Marianne to send updated version to Torrey for review prior to submitting to Steve.

- Section 6.9 (Disease Outbreak):
    - Marianne to remove 6.9.2.
    - Marianne to send updated version to Torrey for review prior to submitting to Steve.
- Section 9 (Mitigation Strategies):
    - 2019 mitigation strategies will indicate whether they were also in the 2014 plan.
    - The team may add language saying that these strategies are never completed and will always be ongoing.
- Public meetings:
    - The State will release two press releases. The first will inform the public that a draft plan and a public meeting will be held. The second release will provide a link to the plan (hosted on state website) and the survey for providing feedback.
    - This process should be described in Section 3 and can be edited after the meetings have taken place as needed.
    - Public meetings will be held at the State building at 10AM and 2PM on March 14. Torrey will put together the presentation and will present. The presentation should take approximately 15 minutes.

Action Items:

- Polis:
    - Include language on Hazus analysis and user-defined buildings, along with how flood depth grids were created.
    - Polis to remove CAPI in 6.1.2, but add Hazus along with analysis of repetitive and severe repetitive losses.
    - Polis to make requested changes to sections 6.3, 6.6, 6.7, 6.8 and 6.9, then provide to Torrey for final review prior to submitting to FEMA.
    - Polis to add information about state facilities in section 5.
- IDHS:
    - Mary to provide a map of the 2018 flood.
    - Mary to provide text from California study for wildfires.
    - Mary to send winter storm dates to Marianne.
    - IDHS to send Polis information about IDHS facilities.
- General:
    - Team to add language saying that mitigation strategies are never completed in Section 9.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 2/13/19

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
MARIANNE CARDWELL	Polis	317-274-2480	mcardwe@iu.edu
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Kisha Morris	IDHS	317-238-1755	kmorris1@dhs.in.gov
AliciA Schoening	IDHS	317-234-8426	aschoening@dhs.in.gov
MARY MORAN	IDHS	317-232-3831	mmoran@dhs.in.gov

02/20/2019

Time: 9:00-11AM

Attendees:

- Mary Morran – IDHS (via phone)
- Torrey Glover – IDHS
- Alicia Schoening – IDHS
- Kisha Morris – IDHS
- Marianne Cardwell – Polis
- Kayla Swoveland – Polis

Summary:

- Section 6:
    - The team's goal is to submit the rest of the subsections to Steve by the end of this week.
    - Subsection 6.4 – Extreme Temperatures:
        - IDHS provided input on a couple of changes that need to be made to this section, including confirming the source of a couple of statements made in the text. Marianne to follow-up with Torrey, make changes as necessary, and submit a final draft to Torrey for review prior to sending to FEMA.
    - Subsection 6.2 – Severe Weather:
        - Torrey to send additional language for the Palm Sunday tornado outbreak.
        - Kisha to send a tornado map of the super outbreak.
        - Marianne to update as necessary and submit a final draft to Torrey for review prior to sending to FEMA.
    - Subsection 6.1 – Flood:
        - IDHS is still reviewing and will provide feedback by Friday.
        - This section should include language on how the state deals with repetitive loss properties.
        - Marianne to update as necessary and submit a final draft to Torrey for review prior to sending to FEMA.
- Section 9 – Mitigation Strategies:
    - Marianne to reach out to IOT to obtain initial SurveyMonkey results by Tuesday so that the team can do an initial review during next week's meeting.
- Section 10 – Local Capabilities:
    - The team reviewed a draft of Section 10.
    - Mary will reach out to Ashley to see if there is an existing map that shows buyouts in the state.
    - Explain that the state used to focus almost exclusively on buyouts in the past, but that mitigation has changed in the past five years.
    - Both Polis & IDHS will look at the FEMA guide to see if local strategies need to be included in the plan.
    - Marianne to send an updated draft to IDHS.
- Section 11 – State Capabilities:
    - Torrey to inform Polis on the titles of sections 10 and 11 (ex: "Local Capabilities" vs. "Local Capabilities to Mitigate Hazards").
    - Polis to fix missing header/footer.

- Marianne to send an updated draft to IDHS.
- Section 12 – Plan Maintenance, Monitoring, and Evaluation:
  - Polis to fix missing header/footer.
  - Polis to review FEMA requirements and provide some suggestions by Friday for what to include in this section.
- Executive Summary:
  - Potentially mention at there is an increased awareness of the benefits of mitigation at the local level.
- Section 7 – Technological Hazards:
  - Marianne showed information received in the past week in regards to levees. Polis should wait until FEMA provides feedback on the section prior to including levee information. It could be added to the NLE map.
- Section 3:
  - The team looked over the list of plan participants. Polis to add Manuela to the list.
  - IDHS to review the list and provide additional names & correct any inaccurate titles for IDHS staff.
  - Marianne to reach out to other participants to confirm titles and agency names.
  - Marianne to send draft to IDHS.
- Section 4:
  - IDHS has completed the table and will be working on the introductory paragraph this week.
- Marianne stated that her goal was to submit everything but Section 9 to FEMA by the end of next week (3/1/19).
- Marianne to tell Michael Hamburger that we need strategies by this Friday.
- Meeting schedule:
  - Due to a conflict for Polis staff, move the 3/6 meeting to Monday 3/4 from 8:30AM to 11AM. Kisha to confirm room.
  - The team will also meet on Friday 3/8 from 9 to 11AM. Kisha to confirm room.
- Appendices:
  - Polis to confirm what needs to be included in the appendices.

Action Items:

- Polis:
  - Marianne to update Subsection 6.4 and send to Torrey for review.
  - Marianne to update Subsection 6.2 and send to Torrey for review.
  - Marianne to update Subsection 6.1 and send to Torrey for review.
  - Marianne to reach out to IOT for SuveyMonkey results by Tuesday.
  - Marianne to add Manuela to the list of plan participants and then share the spreadsheet with IDHS.
  - Marianne to send drafts of Sections 10, 11, 12, and 3 to IDHS for review.
  - Marianne to reach out to non-DHS plan participants to confirm titles & agency names.
  - Marianne to inform Michael Hamburger that strategies are needed by this Friday.
  - Marianne to send updated meeting invitations.
  - Polis to fix missing header/footer in Sections 11 & 12.
  - Polis to look at FEMA guide to see if local strategies need to be included in plan.
  - Polis to review FEMA requirements for Section 12 and provide suggestions of what to include by Friday 2/22/19.

- Polis to confirm what needs to be included in appendices.

- IDHS:
    - Torrey to send additional Palm Sunday tornado outbreak to Marianne.
    - Torrey to provide language on how the state deals with repetitive loss properties for Subsection 6.1.
    - Torrey to confirm titles of Sections 10 and 11.
    - Kisha to send super outbreak tornado map to Marianne.
    - Kisha to reserve meeting rooms for 3/6 & 3/8 meetings.
    - Mary to reach out to Ashley for a buy-out map.
    - IDHS to provide Subsection 6.1 feedback to Polis by Friday 2/22/19.
    - IDHS to add language to Section 10 discussed ow state used to focus almost exclusively on buyouts in the past but that it has changed in past 5 years.
    - IDHS to look at FEMA guide to see if local strategies need to be included in plan.
    - IDHS to review plan participants list and confirm titles of IDHS staff.
    - IDHS to provide language for Section 4.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING Date:

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Kayla Swoveland	Polis		KayKauf@iupui.edu
Marianne Cardwell	Polis		mcardwe@iu.edu
Torrey Glover	IDHS	317-234-6556	tglover@dhs.in.gov
Kisha Morris	IDHS	317-238-1755	Kmorris1@dhs.in.gov
Alicia Schoening	IDHS	317-234-8426	aschoening@dhs.in.gov
Mary Moran (via phone)	IDHS		

02/27/2019

Time: 9:00-11AM

Attendees:

- Mary Morran – IDHS
- Alicia Schoening – IDHS
- Kisha Morris – IDHS
- Jim Sparks – Polis
- Marianne Cardwell – Polis
- Kayla Swoveland – Polis

Summary:

- County plans:
    - Decatur: Polis has not heard back from Decatur in a month and asked IDHS whether they knew of any issues at the county. Kayla will send the list of information that Polis still needs to wrap up the plan to Alicia and Alicia will reach out.
    - Tipton: Alicia to reach out to Tipton County to explain how to do the drawdown of funds.
    - Clinton: Polis still has not heard back from Clinton County. The team agreed to give them a deadline of end of March to start working on the plan in order to get it done by end of October.
    - Jasper: Alicia will reach out to Jasper County.
- Section 4:
    - Mary has updated all of the 2014 strategies. Torrey will review and send to Marianne.
- Section 11:
    - Mary has reviewed and updated the draft. Torrey will review and send to Marianne.
- Section 10:
    - Indiana is a home rule state. The state can recommend but not mandate. Land use is determined at the local level, not the state level. EMAs are included in the process/discussions. Marianne to move the “Policies regulating development” paragraph from the 2014 plan (page 175) to Section 10.2 and reword/expand as necessary.
    - Mary & Torrey to review section 10.1.
- Section 12:
    - Torrey to provide updated table 46.
    - IDHS to provide feedback to Marianne.
- Section 3:
    - Jim to provide sentence thanking Silver Jackets for help with the plan. Marianne to add.
    - Mary to reach out to PIO to ensure all 92 EMAs are informed about the draft plan. She will also ask who gets the gov delivery info. Mary to provide language related to this. Marianne to add this to the press release information in Section 3.
- Section 1:
    - Marianne started updating this section based on Steve’s feedback. The team reviewed a few items that were not fixed. Mary provided info on two of them. Mary will look into the funding numbers discrepancy and get back to Marianne.
    - Marianne to send Steve’s email to Mary.
- 2019 Mitigation Strategies:
    - Marianne to forward Michael’s email to the team.

    - IDHS to review submitted strategies and identify the 2014 strategies that should be kept.
- IDHS and Polis to conduct crosswalks and provide results during Monday's meeting.
- Mary to confirm with Torrey that we will not submit remaining sections individually to FEMA but rather provide a full draft.

Action Items:

- Polis:
    - Kayla to send needed information from Decatur to Alicia.
    - Marianne to reach out to Clinton County and explain timeline.
    - Marianne to add home rule state language to section 10.2.
    - Jim to provide sentence to Marianne thanking Silver Jackets for help with the plan.
    - Marianne to add gov delivery info to section 3.
    - Marianne to make requested changes to section 1.
    - Marianne to forward Michael's email to the team.
    - Marianne to send Steve's email to Mary.
    - Polis to conduct crosswalk by Monday.
- IDHS:
    - Alicia to reach out to Decatur.
    - Alicia to reach out to Tipton County to explain funds drawdown procedure.
    - Alicia to reach out to Jasper County.
    - Torrey to review 2014 strategies and send Section 4 to Marianne for inclusion.
    - Torrey to review Mary's edits to section 11 and send to Marianne for inclusion.
    - Mary & Torrey to review section 10.1 and provide feedback to Marianne.
    - Mary to reach out to PIO to ensure all 92 EMAs are informed about the draft plan.
    - Mary to obtain list of recipients of gov delivery info from PIO.
    - Mary to provide language related to gov delivery to Marianne.
    - Mary to look into the Section 1 funding discrepancy and provide info to Marianne.
    - Mary to confirm with Torrey that we will not submit remaining sections individually to FEMA but rather provide a full draft.
    - IDHS to conduct crosswalk by Monday.
    - Torrey to provide updated table 46 (Section 12).
    - IDHS to provide Section 12 feedback to Marianne.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: [illegible]

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
[illegible]	Polis	[illegible]	[illegible]
Alicia Schoening	IDHS	317-234-8426	aschoening@dhs.in.gov
Kisha Morris	IDHS	317-238-1755	kmorris1@dhs.in.gov
MARY MORAN	IDHS	317-[illegible]	mmoran@dhs.in.gov
Jim Sparks	Polis	317-278-2433	jisparks@iupui.edu
Kayla Swoveland	Polis		kaykauff@iupui.edu

03/04/2019

Time: 8:30-11AM

Attendees:

- Mary Morran – IDHS
- Torrey Glover - IDHS
- Alicia Schoening – IDHS
- Marianne Cardwell – Polis
- Kayla Swoveland – Polis

Summary:

- The team reviewed FEMA's comments on Section 6.
    - General comments:
        - State-owned properties: the team discussed options for covering state-owned properties and decided to use the INDOT facility locations and provide an explanation that no statewide dataset was available for the team to use that covers all state-owned properties.
        - Local vulnerability: Marianne will add a paragraph to each natural hazard with a local and state perspective. The team reviewed rankings for each natural hazard. Marianne to review this ranking with figure 40.
        - Change in development: Marianne suggested doing what Polis does for the county plans, which includes querying the IDLGF data for new construction since the last plan. The team agreed to this approach. Polis will perform the query, create a hot-spot map and an overlay map with SFHA data. This information will be added to Section 10.4. The table in that section will get an additional column indicating the top 5 counties with changes.
    - Severe weather:
        - Comment 2: explain that the analysis was produced with better and more recent data.
        - Comment 3: Marianne to investigate.
    - Earthquakes: Marianne to either add a paragraph explaining what the columns mean or, provide different, more intuitive data that can be summed for all facilities.
    - Winter storm:
        - Comment 1: add "Enhanced".
        - Comment 2: add reference to the NCDC Climate Regions figure in the first sentence of the first paragraph under the table in 6.6.1.2.
    - Wildfire:
        - Comment 1: Mary to reach out to IDNR regarding this comment.
        - Comment 3: Marianne to remove the second sentence of 6.8.2 and replace it with the sentence from 6.5.1.
- Section 3:
    - Torrey to update subsection 3.3.
    - Torrey to provide reviewed section to Marianne by 3/5/19.
    - Marianne to change "17 agencies" to "multiple agencies".
- Section 4:
    - Torrey to send language to Marianne by 3/5/19.

- Mary to provide paragraph on how hazard mitigation is never completed.
- Section 9:
  - Marianne to request latest surveys from IOT.
  - Marianne to put together section 9, combining similar strategies for different hazards.
- Section 10:
  - Torrey to review and provide to Marianne by 3/7/19.
  - IDHS should note S13, S14, and S16 of the review guide when working on Section 10.
- Section 11:
  - Torrey will provide the reviewed section to Marianne today.
- Section 12:
  - Reference to ISHMC should be removed.
  - Marianne to remove sentences identified during the meeting.
  - Torrey to review section 12 and send to Marianne by 3/7/19.
- Executive summary:
  - Marianne to let FEMA know that this will be provided by end of March once all IDHS executives have had a chance to review the draft plan.

Action Items:

- Polis:
  - Polis to use INDOT facilities for state-owned properties analysis and include results in plan.
  - Marianne to add a paragraph to each natural hazard with a local and state perspective for vulnerability assessment.
  - Marianne to query IDLGF data to identify changes in development and add maps + text to Section 10.4.
  - Marianne to change facility damage tables for earthquakes.
  - Marianne to make identified changes or responses to severe weather.
  - Marianne to make identified changes to winter storm.
  - Marianne to make identified changes to wildfire.
  - Marianne to change 17 agencies to multiple agencies in section 3.
  - Marianne to request latest survey results from IOT.
  - Marianne to put together section 9 and provide to IDHS for review.
  - Marianne to remove sentences identified in section 12.
  - Marianne to let FEMA know that this will be provided by end of March once all IDHS executives have had a chance to review the draft plan.
- IDHS:
  - Mary to reach out to IDNR regarding comment 1 of wildfire subsection.
  - Mary to provide paragraph on how hazard mitigation is never completed for Section 4 by 3/5/19.
  - Torrey to update subsection 3.3 and provide language to Marianne by 3/5/19.
  - Torrey to provide Section 4 language to Marianne by 3/5/19.
  - Torrey to review and provide text for section 10 to Marianne by 3/7/19.
  - Torrey to provide reviewed section 11 to Marianne by 3/4/19.
  - Torrey to provide reviewed/edited section 12 to Marianne by 3/7/19.

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 3/6/19

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
MARIANNE CARDWELL	Polis	317-281-2990	mcardwe@iu.edu
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MARY MORAN	IDHS	317-232-3831	mmoran@dhs.in.gov
Torrey Glover	IDHS	317-234-6556	tglover@dhs.in.gov

03/14/2019 (10AM Public Meeting)

10 AM

Indiana Department of Homeland Security

2019 STATE MULTI-HAZARD MITIGATION PLAN PUBLIC MEETING

Name	Phone Number	Email	
Gregory Pipher		JPIPHER@DHS.IN.GOV	
Jim Sparks	317-278-2433	jisparks@iu.edu	
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Alicia Schoening	317-234-8426	cschoening@dhs.in.gov	

10AM

Indiana Department of Homeland Security

2019 STATE MULTI-HAZARD MITIGATION PLAN PUBLIC MEETING

Name	Phone Number	Email	
Jessica Kirkendall	812.854.3948	jessica.m.kirkendall.civ@mail.mil	
Xavier Nienaber	812-618-7281	xnienabe@outlook.com	
Fabian Bahena	812-858-3021	fabian.bahena@navy.mil	

03/14/2019 (2PM Public Meeting)

2PM

Indiana Department of Homeland Security
2019 STATE MULTI-HAZARD MITIGATION PLAN PUBLIC MEETING

Name	Phone Number	Email	
Alicia Schoening	317-234-8426	aschoening@dhs.in.gov	
Mary Moran	317-232-3831	mmoran@dhs.in.gov	
Jim Sparks	317-278-2433	jisparks@iu.edu	
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Marianne Cardwell		mcardwe@iu.edu	
Kayla Swoveland		kaykauff@iupui.edu	
Torrey Glover	317-234-6556	tglover@dhs.in.gov	

3/27/2019

Time: 9AM-10AM

Attendees:

- Mary Moran – IDHS
- Torrey Glover - IDHS
- Alicia Schoening – IDHS
- Jim Sparks – Polis
- Kayla Swoveland – Polis

Summary:

- The team reviewed comments provided by Michael Hamburger
  - In advance of the meeting, Marianne had gone through to mark which comments were easy fixes and which comments required discussion from the group.
  - The team spent the hour reviewing comments and making edits to the plan where needed.
- The team then decided to hold off on meeting on the 3rd of April unless comments on the plan were submitted by FEMA before said time.
- The next regularly scheduled meeting will be held on 4/10/19.

Action Items:

- Polis:
  - Make indicated edits to the state plan based on feedback from IDHS
- IDHS:
  - None

STATE OF INDIANA – STANDARD MULTI-HAZARD MITIGATION PLAN MEETING

Date: 3/27/19

NAME	ORGANIZATION	PHONE #	EMAIL ADDRESS
Kayla Swoveland	Polis Center		KayKauff@iupui.edu
Jim Sparks	Polis		jisparks@iu.edu
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Mary Moran	IDHS		mmoran@dhs.in.gov
Kisha Morris	IDHS		kmorris1@dhs.in.gov

4/10/2019

Time: 9AM-11:30AM

Attendees:

- Mary Moran – IDHS (via phone)
- Torrey Glover - IDHS
- Alicia Schoening – IDHS
- Kisha Morris – IDHS
- Marianne Cardwell - Polis
- Jim Sparks – Polis
- Kayla Swoveland – Polis

Summary:

- The team reviewed FEMA's comments and discussed responses and/or edits. Polis to update the plan to incorporate all changes discussed during the meeting.
- Torrey will send Polis his notes on the comments to incorporate into the response to FEMA.
- The team reviewed Michael Hamburger's suggested future strategies and made edits as deemed necessary. Polis to update the strategies accordingly.
- The team agreed to extract the top 2 or 3 mitigation strategies from each county plan that is active as of 12/31/2018. Polis will extract those from plans it wrote. IDHS will work with Burke to get strategies from plans it wrote. IDHS will get strategies from plans written by other contractors or counties.
- The team discussed submission to FEMA. The goal is to submit by Friday 4/12. Polis will make all changes discussed during the meeting and provide an interim copy to IDHS for review. In the meantime, IDHS will work on additional language and responses and provide those to Polis by Thursday. If time is available, IDHS will review the updated plan on Friday prior to Polis submitting to FEMA. If time is not available, Polis will submit the plan directly to FEMA.
- The team discussed the adoption of the plan. IDHS presented the draft plan to the governor's office and the governor is ready to adopt the plan as soon as it is approved pending adoption by FEMA.

Action Items:

- Polis:
    - Update the plan to incorporate all changes discussed during the meeting.
    - Write draft response to FEMA.
    - Update future strategies based on feedback during the meeting. Inform Torrey of final number of mitigation strategies to include in the executive summary.
    - Send IDHS list of counties for which it will extract strategies to confirm all counties are covered.
- IDHS:
    - Confirm counties for which strategies should be documented.
    - Provide Polis with new text or FEMA responses by COB Thursday.

State plan Meeting April 10th 2019

Kayla Swoveland	Polis	KayKauff@iupui.edu
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Appendix B – 2016 County HIRA

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Adams	Natural Hazards	Winter Weather	Ice Storms	4	3	2	3	3	3.3	CPRI information taken directly out of the 2011 Multi Hazard Mitigation Plan. Plan needs updating by February 217.
Adams	Natural Hazards	Disease	Animal Disease Outbreak	4	3	1	4	3	3.25	Adams County is very rural community and has a lot of agricultural income from both grain farming and animal production. In light of the bird flu outbreak in Clark county in 2015, Adams county could have a large incident.
Adams	Natural Hazards	Disease	Animal Disease Outbreak	4	3	1	4	3	3.25	Adams County is very rural community and has a lot of agricultural income
Adams	Natural Hazards	Flooding	Major Flood	4	3	1	4	3	3.25	CPRI information taken directly out of the 2011 Multi Hazard Mitigation Plan. Plan needs updating by February 2017. In 2015 Adams County had a 100 year flood event.
Adams	Technological Hazards	Infrastructure	Public Utility Failure	3	3	4	3	3	3.15	Infrastructure failure was not address in the 2011 MHMP but was in the 2005 MHMP. 2 Communications towers came down in the County last year due to high winds. January 2015 the City of Decatur had a water outage for several hours and a boil water advisory for a week during the coldest days of that year.
Adams	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	1	3	3.1	CPRI information taken directly out of the 2011 Multi Hazard Mitigation Plan. Plan needs updating by February 2017. Category: Hailstorms, thunderstorms, and windstorms.
Adams	Natural Hazards	Storms	Tornado EF0 - EF2	3	3	4	1	3	2.95	CPRI information taken directly out of the 2011 Multi Hazard Mitigation Plan. Plan needs updating by February 2017 .
Adams	Natural Hazards	Flooding	Major Flood	3	3	1	4	3	2.8	CPRI information taken directly out of the 2011 Multi Hazard Mitigation Plan. Plan needs updating by February 2017.
Adams	Natural Hazards	Flooding	Major Flood	3	3	1	4	3	2.8	CPRI information taken directly out of the 2011 Multi Hazard Mitigation Plan. Plan needs updating by February 2017. In 2015 Adams County had a 100 year flood event.
Adams	Technological Hazards	Infrastructure	Public Utility Failure	2	3	4	3	3	2.7	Infrastructure failure was not address in the 2011 MHMP but was in the 2005 MHMP. 2 Communications towers came down in the County last year due to high winds.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Adams	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	2	3	2.6	Type of Hazard; School/ workspace violence. CPRI information taken out of the 2011 Multi Hazard Mitigation Plan(MHMP) but updated for new county specific information. Plan needs updating by February 2017. Grant in process to update MHMP
Adams	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	3	4	2	3	2.6	CPRI information taken directly out of the 2011 Multi Hazard Mitigation Plan. Plan needs updating by February 2017.
Adams	Technological Hazards	Transportation	Pipeline Transportation Incident	2	3	4	2	3	2.6	This Type of hazard was not included in the 2011 MHMP but there have been several small incidents recently in the County with natural gas lines.
Adams	Natural Hazards	Weather Related	Drought	3	2	1	4	3	2.5	CPRI information taken out of the 2011 Multi Hazard Mitigation Plan but updated for new county specific information. Plan needs updating by February 2017.
Adams	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	2	4	1	3	2.2	CPRI information taken directly out of the 2011 Multi Hazard Mitigation Plan. Plan needs updating by February, 2017.
Allen	Man-Made Threats	Terrorist Attack	Explosive Attack	4	4	4	3	3	3.9	The Fort Wayne - Allen County Hazardous Devices Unit (bomb squad) maintains a steady operations tempo responding to confirmed and suspect explosive devices. The proliferation of "recipes" and "how-to's" online for explosives manufacturing makes this threat a viable option for many individuals. There is a growing nexus between drug and explosives manufacturing in the mid-west. Allen County is no exception to this national trend.
Allen	Man-Made Threats	Terrorist Attack	Conventional Attack	4	3	4	4	3	3.7	Conventional attack would include active shooter or active attacker scenarios on soft targets in Allen County. This is our most-likely attack type at this time. Attacks on soft targets using small arms, individual weapons, and improvised explosive devices is a reality that every community must recognize, plan for, train for and be alert for.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Allen	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	4	2	4	4	3	3.4	Active Attackers against soft targets are becoming commonplace across the US and are a key concern in Allen County. Radicalized individuals and Homegrown Violent Extremists represent our current number 1 threat and are cause for concern. Current threat levels and suspicious activity reporting suggests that this threat will continue to grow.
Allen	Man-Made Threats	Fire Incident	Arson	4	2	4	4	3	3.4	The City of Fort Wayne is currently experiencing a rash of arson fires in the NE quadrant of the city. Currently all are residential dwellings unoccupied and bank owned. The frequency and location suggests this threat will continue to escalate until the perpetrator(s) are caught.
Allen	Man-Made Threats	International Terrorism	International Terrorism	3	3	4	4	3	3.25	The direct and inspired threat from individuals and groups of individuals either directed or acting alone has risen significantly over the past 24 months. Fort Wayne/Allen County has had one subject arrested for material support to terrorism. The continue threat of Homegrown Violent Extremists is cause for concern and supported by suspicious activity reports and finished intelligence products from DHS/FBI.
Allen	Natural Hazards	Flooding	Flash Flood	4	3	1	4	3	3.25	Near-annual occurrence in Allen County. We experienced our second-largest flood along the St. Mary's River in 2015. The Maumee River as well as numerous drains, streams, and creeks all contribute to the frequency of flooding events in Allen County.
Allen	Man-Made Threats	Terrorist Attack	Conventional Attack	3	3	4	4	3	3.25	Attacks on soft targets using small arms, individual weapons, and improvised explosive devices is a reality that every community must recognize, plan for, train for and be alert for.
Allen	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	4	2	4	2	3	3.2	Allen County has over 300 fixed facilities which use Extremely Hazardous Substances (EHS) in their manufacturing processes. There are hundreds of other business

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										locations which use or store other toxic industrial chemicals and materials (TIC/TIMS). Allen County fire departments generally respond to several HazMat leaks or spills at fixed facilities each year.
Allen	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	2	4	2	3	3.2	Allen County first responders respond to dozens of accidents each year involving the release of hazardous materials in various forms and quantities. The LEPC transportation study identifies dozens of primary and secondary roads where hazardous materials are transported daily.
Allen	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	3	3	3.15	Domestic Terrorist threats are ongoing nation-wide. Allen County with a large metro area has a history of locals and travelers associated with groups known to express anti-government sentiment. The on-line [resist.com] white supremacy publication and White Aryan Resistance (WAR) movement is headquartered NW of Allen County. These groups have encouraged targeting of persons and events in Allen County.
Allen	Man-Made Threats	Terrorist Attack	Cyber Attack	2	4	4	4	3	3.1	Allen County and Fort Wayne serve as the economic hub for NE Indiana. Our collective businesses, utilities, and government services all rely upon unfettered access to online services for their daily operations. Our infrastructure inter-dependencies create a natural vulnerability to interruption or denial of service attacks. These attacks occur daily throughout the nation and world; they have occurred here in Allen County as well. This threat will increase.
Allen	Technological Hazards	Transportation	Highway Transportation Incident	4	2	4	1	3	3.1	
Allen	Natural Hazards	Storms	Derecho	3	3	2	4	3	2.95	Allen County has experienced two significant derechos in the past ten years. Another was forecast as a probability this year already.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Allen	Natural Hazards	Storms	Severe Thunderstorm	4	2	2	2	3	2.9	Severe thunderstorms occur weekly throughout the summer months in Allen County. Typically are limited in size, scope and damage unless accompanied by other natural hazards which are listed separately.
Allen	Man-Made Threats	Terrorist Attack	Explosive Attack	3	2	4	3	3	2.85	The Fort Wayne - Allen County Hazardous Devices Unit (bomb squad) maintains a steady operations tempo responding to confirmed and suspect explosive devices. The proliferation of "recipes" and "how-to's" online for explosives manufacturing makes this threat a viable option for many individuals. There is a growing nexus between drug and explosives manufacturing in the mid-west. Allen County is no exception to this national trend.
Allen	Technological Hazards	Fire Incident	Large Fire/Conflagration	3	2	4	3	3	2.85	
Allen	Natural Hazards	Weather Related	Drought	3	3	1	4	3	2.8	Allen County has experienced two droughts in the past five years. Being a large agricultural community, Allen County's economy is susceptible to these weather related threats. Oftentimes combined with early-summer flood events, these two natural hazards represent a significant threat to Allen County.
Allen	Natural Hazards	Winter Weather	Ice Storms	3	3	1	4	3	2.8	Freezing rain and accumulating ice are annual occurrences each winter. Generally these ice storms are short in duration and affect the morning commute and make travel hazardous. On average, about every 5 years we experience more significant ice storms which have downed tree branches and power lines resulting in power outages for up to week.
Allen	Natural Hazards	Disease	Human Disease Outbreak	3	3	1	4	3	2.8	
Allen	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	3	4	4	3	2.8	Allen County has ___ high hazard dams.
Allen	Technological Hazards	Infrastructure	Communication Failure	2	3	4	4	3	2.8	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Allen	Man-Made Threats	Police Incident	Hostage Situation	3	2	4	2	3	2.75	Hostage situations occur frequently in the Fort Wayne/Allen County area. Both City and County Police Departments have a robust capability to negotiate with and when needed, end a hostage situation. Normally associated with domestic responses, these hostage situations are within the normal scope of police work for this jurisdiction.
Allen	Natural Hazards	Winter Weather	Winter Storms	3	3	1	3	3	2.7	Heavy snow is routine weather for Allen County. Generally have at least one heavy winter storm each year resulting in travel hazards and increased need for government services. Allen County is located on the southern edge of the Great Lakes Snow Belt
Allen	Technological Hazards	Infrastructure	Public Utility Failure	2	3	4	3	3	2.7	
Allen	Technological Hazards	Transportation	Pipeline Transportation Incident	2	3	4	3	3	2.7	
Allen	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	4	4	4	3	2.65	An operational nuclear attack or improvised nuclear attack in Allen County is a scenario which has been exercises three time in three years with our federal and state partners. Each time using a 10kt model. Absent any specific and credible threat information, this is an ongoing national and international threat that we all plan for.
Allen	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	3	2.65	
Allen	Man-Made Threats	Terrorist Attack	Radiological Attack	2	2	4	4	3	2.5	International and domestic groups and individuals continue to seek ways to execute an attack in an urban area using an Improvised Nuclear Device, Radiological Dispersal Device, or Radiation Exposure Device. Allen County has source materials used in businesses and in-transit along the major highways and railways.
Allen	Man-Made Threats	Terrorist Attack	Conventional Attack	2	2	4	4	3	2.5	Attacks on soft targets using small arms, individual weapons, and improvised explosive devices is a reality that every

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										community must recognize, plan for, train for and be alert for.
Allen	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	4	3	2.5	The continued threat of terrorist attacks involving the use of chemical weapons or toxic industrial materials and chemicals remains a possibility in the U.S. including Allen County. This is a persistent threat that we must continue to plan and prepare for.
Allen	Natural Hazards	Other	Ground Failure	2	2	4	4	3	2.5	
Allen	Technological Hazards	Transportation	Commercial Air Transportation Incident	2	2	4	4	3	2.5	
Allen	Natural Hazards	Weather Related	Extreme Temperatures	3	2	1	3	3	2.4	Heat waves and high temperatures are a natural part of summer time in Allen County. Typically extreme heat and humidity conditions last only 1-3 days but require additional services for the homeless and vulnerable community members.
Allen	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	2	4	3	3	2.4	Sometimes earthquakes are felt in Allen County but damage has only historically occurred once each century. We are more-impacted by the after-effects of a southern earthquake on our dependent infrastructures, especially the power, fuel and transportation sectors.
Allen	Technological Hazards	Transportation	Rail Transportation Incident	2	2	4	3	3	2.4	
Allen	Technological Hazards	Fire Incident	Structural Collapse	2	2	4	3	3	2.4	
Allen	Technological Hazards	Fire Incident	Explosion	2	2	4	3	3	2.4	
Allen	Man-Made Threats	Terrorist Attack	Biological Attack	1	3	4	4	3	2.35	Unlikely but possible. This is a difficult attack method to successfully use on a large-scale, but should one become successful at introducing a biological source into our environment, the consequences would be serious. A near-term more-probable biological threat would be smaller-scale food poisoning-type scenarios. In either event, the long detect and diagnose

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										period leaves us vulnerable during a long-incubation period greatly extending the impacts of this event if carried out.
Allen	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	3	4	4	3	2.35	Although a possibility, this is an extremely technical and difficult attack to produce without the direct support of a foreign government. This affect would likely accompany a militarized nuclear attack on the U.S. If conducted would have significant impact on traditional communications and electronic devices and systems.
Allen	Man-Made Threats	Police Incident	Riot	2	2	3	4	3	2.35	Downtown Fort Wayne hosts planned and unplanned gatherings, protests, rallies, etc. on a near-weekly basis. While most of these events are peaceful, some do escalate towards illegal behavior and require LE attention. There is a national trend for violence at public gatherings accordingly local PD agencies continue to plan for an appropriate response to this emerging threat.
Allen	Natural Hazards	Disease	Animal Disease Outbreak	2	3	1	4	3	2.35	
Allen	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	3	4	4	3	2.35	Although a possibility, this is an extremely technical and difficult attack to produce without the direct support of a foreign government. This affect would likely accompany a militarized nuclear attack on the U.S. If conducted would have significant impact on traditional communications and electronic devices and systems.
Allen	Man-Made Threats	Police Incident	Other Violent Offenders	2	1	4	4	3	2.2	Used a catch-all category to include individuals who act out violently in the community with little to no warning. This includes individuals with mental or psychological problems as a result of medical conditions or illegal use of controlled substances.
Allen	Natural Hazards	Storms	Tornado EF0 - EF2	2	2	2	3	3	2.1	Allen County generally experiences at least one EF0 tornado each year. Most of these occur in the rural areas of the county and produce limited damage.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Allen	Natural Hazards	Other	Wild Fire	2	1	4	3	3	2.1	
Allen	Natural Hazards	Storms	Tornado EF3 - EF5	1	3	2	4	3	2.05	While possible, tornadoes of this magnitude have not been recorded in this area for over 50 years.
Allen	Natural Hazards	Flora and Fauna	Invasive Species - Insect	2	2	1	4	3	2.05	
Allen	Natural Hazards	Earthquake	Earthquake MMI V to VI	1	2	4	4	3	2.05	
Allen	Natural Hazards	Flora and Fauna	Invasive Species - Aquatic	2	1	2	4	3	1.9	
Allen	Natural Hazards	Flora and Fauna	Invasive Species - Plant	2	1	1	4	3	1.75	Occurs frequently with minimal large-scale impact in Allen County.
Allen	Natural Hazards	Storms	Tropical Cyclone Remnants	2	1	1	3	3	1.65	Has occurred once in the past ten years resulting in saturating rains and minor flash flooding.
Allen	Natural Hazards	Storms	Geomagnetic Storm	2	1	1	2	3	1.55	Most of these storms go completely un-noticed by the general public in Allen County. While they do occur with relative frequency, their limited direct impacts make them a minimal risk.
Allen	Technological Hazards	Transportation	Marine Transporation Incident	1	1	4	1	3	1.45	
Allen	Natural Hazards	Flora and Fauna	Invasive Species - Animal	1	1	1	4	3	1.3	
Allen	Natural Hazards	Storms	Seiche	1	1	1	1	3	1	Although possible in the small scale, Allen County does not have a history of experiencing these damaging waves on its lakes.
Clark	Natural Hazards	Flooding	Flash Flood	4	4	4	4	9	4	Clark County Has a history of Tornadoes...
Clark	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	
Clark	Natural Hazards	Flooding	Flash Flood	4	4	4	4	9	4	
Clark	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	Flooding is an ongoing problem in low lying areas, throughout Clark County.
Clark	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Clark	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	3	9	3.9	
Clark	Man-Made Threats	Terrorist Attack	Cyber Attack	4	3	4	3	9	3.6	
Clark	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	3	4	2	9	3.5	
Clark	Natural Hazards	Flooding	Flash Flood	4	3	4	2	9	3.5	Flooding/Flash Rains low lying areas of Clark County.
Clark	Natural Hazards	Flooding	Flash Flood	4	3	4	2	9	3.5	oijeowijfd
Clark	Man-Made Threats	Fire Incident	Arson	4	2	4	3	9	3.3	110 K persons within Clark County...Threat of arson, very real..
Clark	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	3	4	4	9	3.25	Based upon active shooter incidents in the U.S: we anticipate similar results, within Clark County, twice per year...ALICE & Active Shooter training.
Clark	Man-Made Threats	Fire Incident	Arson	2	4	4	4	9	3.1	Dry weather, lightening strikes, revenge, economic motive.
Clark	Natural Hazards	Winter Weather	Ice Storms	3	3	3	3	9	3	
Clark	Man-Made Threats	Police Incident	Other Violent Offenders	3	2	4	3	9	2.85	
Clark	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	3	4	3	9	2.7	
Clark	Man-Made Threats	Terrorist Attack	Explosive Attack	2	3	4	2	9	2.6	
Clark	Natural Hazards	Storms	Severe Thunderstorm	4	1	2	1	9	2.5	
Clark	Natural Hazards	Flooding	Major Flood	2	3	1	4	9	2.35	
Dearborn	Natural Hazards	Flooding	Flash Flood	4	2	4	2	9	3.2	
Dearborn	Natural Hazards	Storms	Tornado EF0 - EF2	2	4	4	4	9	3.1	
Dearborn	Natural Hazards	Storms	Tornado EF3 - EF5	2	4	4	4	9	3.1	
Dearborn	Natural Hazards	Winter Weather	Ice Storms	3	3	3	3	9	3	
Dearborn	Natural Hazards	Flooding	Major Flood	2	4	2	4	9	2.8	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Dearborn	Natural Hazards	Storms	Tornado EF0 - EF2	2	3	4	4	9	2.8	
Dearborn	Natural Hazards	Storms	Derecho	2	3	4	4	9	2.8	
Dearborn	Natural Hazards	Winter Weather	Winter Storms	3	2	3	3	9	2.7	
Dearborn	Natural Hazards	Storms	Severe Thunderstorm	3	2	4	1	9	2.65	
Dearborn	Natural Hazards	Weather Related	Extreme Temperatures	3	2	1	4	9	2.5	
Dearborn	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	2	4	3	9	2.4	
Dearborn	Natural Hazards	Weather Related	Drought	2	3	1	4	9	2.35	
Dearborn	Natural Hazards	Storms	Tropical Cyclone Remnants	1	2	2	2	9	1.55	
Dekalb	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	3	4	
Dekalb	Technological Hazards	Infrastructure	Communication Failure	4	4	4	3	3	3.9	
Dekalb	Natural Hazards	Flooding	Major Flood	4	3	4	4	3	3.7	
Dekalb	Man-Made Threats	Terrorist Attack	Cyber Attack	3	4	4	4	3	3.55	
Dekalb	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	4	4	4	3	3.55	
Dekalb	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	3	4	2	3	3.5	
Dekalb	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	4	3	4	2	3	3.5	
Dekalb	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	1	3	3.4	
Dekalb	Natural Hazards	Winter Weather	Winter Storms	4	3	2	3	3	3.3	
Dekalb	Natural Hazards	Flooding	Flash Flood	3	3	4	4	3	3.25	
Dekalb	Natural Hazards	Winter Weather	Ice Storms	4	3	2	2	3	3.2	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Dekalb	Natural Hazards	Storms	Tornado EF3 - EF5	2	4	4	4	3	3.1	
Dekalb	Natural Hazards	Disease	Human Disease Outbreak	2	3	4	4	3	2.8	
Dekalb	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	3	3	2.7	
Dekalb	Natural Hazards	Disease	Animal Disease Outbreak	2	3	3	4	3	2.65	
Dekalb	Natural Hazards	Weather Related	Drought	3	2	1	4	3	2.5	
Dekalb	Natural Hazards	Storms	Tornado EF0 - EF2	2	3	4	1	3	2.5	
Dekalb	Natural Hazards	Weather Related	Extreme Temperatures	3	1	2	3	3	2.25	
Delaware	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	6	4	
Delaware	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	6	4	
Delaware	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	6	4	
Delaware	Technological Hazards	Infrastructure	Public Utility Failure	4	3	4	3	6	3.6	Water main breaks- boil water order; electrical grid failure and waste water treatment failures
Delaware	Technological Hazards	Transportation	Highway Transporation Incident	4	2	4	4	6	3.4	Accident history on roadways or rail in County. County has history of multiple accidents on I-69, US 35, IN 28, IN167, IN 32 in County
Delaware	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	3	2	4	6	3.4	From historical data.
Delaware	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	3	6	3.3	City/County crime rates and history.
Delaware	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	3	6	3.3	
Delaware	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	6	3.25	City/County is always open to an attack of this nature and limited security at government offices make it even greater
Delaware	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	6	3.25	City/County is always open to an attack of this nature and limited security at government offices make it even greater .

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										Ball State University is in the county and has a host of international students studying locally who hail from conflict areas across the globe.
Delaware	Natural Hazards	Disease	Human Disease Outbreak	4	3	1	4	6	3.25	From state historical data with regard of IV drug use.
Delaware	Man-Made Threats	Fire Incident	Arson	4	2	4	2	6	3.2	City/County has history of fire events
Delaware	Natural Hazards	Storms	Severe Thunderstorm	4	1	4	4	6	3.1	History of weather in the County and in Indiana
Delaware	Technological Hazards	Transportation	Rail Transportation Incident	2	4	4	4	6	3.1	County has multiple railways and unit trains that are traveling inside the City of Muncie and County of Delaware.
Delaware	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	4	4	4	6	3.1	Indiana is on the Madrid fault line
Delaware	Technological Hazards	Infrastructure	Communication Failure	2	4	4	4	6	3.1	From historical data.
Delaware	Natural Hazards	Flooding	Flash Flood	3	3	4	2	6	3.05	City/County has history of flooding events
Delaware	Technological Hazards	Fire Incident	Structural Collapse	3	2	4	4	6	2.95	From historical data.
Delaware	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	6	2.8	City/County is always open to an attack of this nature and limited security at government offices make it even greater
Delaware	Technological Hazards	Infrastructure	Communication Failure	2	3	4	4	6	2.8	Computer systems can be hacked at anytime and mobile computers use unsecured WIFI at times out in the field by government workers. County needs to have an annex plan on this in the CEMP
Delaware	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	3	4	4	6	2.8	Tier II facilities based on types of Hazard Materials they store on site
Delaware	Natural Hazards	Storms	Tornado EF0 - EF2	2	3	4	4	6	2.8	From historical data.
Delaware	Natural Hazards	Winter Weather	Ice Storms	2	4	2	4	6	2.8	From historical data.
Delaware	Technological Hazards	Infrastructure	Public Utility Failure	2	3	4	4	6	2.8	From historical data.
Delaware	Natural Hazards	Flooding	Major Flood	1	4	4	4	6	2.65	From historical data.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Delaware	Natural Hazards	Disease	Human Disease Outbreak	3	2	1	4	6	2.5	From state historical data with regard of IV drug use.
Delaware	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	4	6	2.5	Pipelines are located in County
Delaware	Natural Hazards	Disease	Animal Disease Outbreak	2	2	4	4	6	2.5	Infectious disease outbreaks at local colleges. Can be catastrophic depending on the disease
Delaware	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	2	4	4	6	2.5	Limited security at county offices and some without security except for security doors.
Delaware	Natural Hazards	Weather Related	Drought	2	2	4	4	6	2.5	From historical data.
Delaware	Technological Hazards	Fire Incident	Explosion	2	2	4	4	6	2.5	From historical data.
Delaware	Natural Hazards	Disease	Animal Disease Outbreak	2	2	4	4	6	2.5	From state historical data.
Delaware	Man-Made Threats	Fire Incident	Arson	2	1	4	4	6	2.2	From historical data.
Delaware	Man-Made Threats	International Terrorism	International Terrorism	1	2	4	1	6	1.75	Explosives are obtainable if desired and can cause widespread damage
Delaware	Man-Made Threats	International Terrorism	International Terrorism	1	2	4	1	6	1.75	
Delaware	Technological Hazards	Transportation	Commercial Air Transportation Incident	1	1	4	4	6	1.75	From historical data from the regional airport authority.
Delaware	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	1	1	2	4	6	1.45	From historical data.
Delaware	Technological Hazards	Fire Incident	Large Fire/Conflagration	1	1	1	4	6	1.3	From historical data.
Dubois	Technological Hazards	Fire Incident	Structural Collapse	4	4	4	4	10	4	
Dubois	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	4	10	3.7	
Dubois	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	4	4	10	3.7	Based on Hazard Analysis & MHMP
Dubois	Natural Hazards	Storms	Derecho	4	3	4	4	10	3.7	
Dubois	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	4	3	4	3	10	3.6	Based on Hazard Analysis & MHMP

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Dubois	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	3	4	3	10	3.6	
Dubois	Natural Hazards	Earthquake	Earthquake MMI V to VI	3	4	4	4	10	3.55	Based on Hazard Analysis & MHMP
Dubois	Natural Hazards	Storms	Tornado EF3 - EF5	3	4	4	4	10	3.55	Based on Hazard Analysis & MHMP
Dubois	Natural Hazards	Flooding	Flash Flood	4	3	4	2	10	3.5	Based on Hazard Analysis & MHMP
Dubois	Natural Hazards	Winter Weather	Winter Storms	4	3	1	3	10	3.15	
Dubois	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	10	2.8	Based on Hazard Analysis & MHMP
Dubois	Natural Hazards	Disease	Human Disease Outbreak	2	3	4	4	10	2.8	Based on Hazard Analysis & MHMP
Dubois	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	4	10	2.8	Based on Hazard Analysis & MHMP
Dubois	Man-Made Threats	Police Incident	Hostage Situation	3	2	4	2	10	2.75	Based on Hazard Analysis & MHMP
Dubois	Man-Made Threats	Police Incident	Hostage Situation	3	2	4	2	10	2.75	
Dubois	Natural Hazards	Winter Weather	Ice Storms	2	3	4	3	10	2.7	Based on Hazard Analysis & MHMP
Dubois	Technological Hazards	Infrastructure	Communication Failure	2	3	4	2	10	2.6	
Dubois	Natural Hazards	Disease	Animal Disease Outbreak	2	3	1	4	10	2.35	Based on Hazard Analysis & MHMP
Dubois	Natural Hazards	Disease	Animal Disease Outbreak	2	3	1	4	10	2.35	
Dubois	Natural Hazards	Flooding	Major Flood	2	3	1	4	10	2.35	Based on Hazard Analysis & MHMP
Dubois	Natural Hazards	Weather Related	Drought	2	3	1	4	10	2.35	Based on Hazard Analysis & MHMP
Dubois	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	2	4	2	10	2.3	Based on Hazard Analysis & MHMP
Dubois	Man-Made Threats	Fire Incident	Arson	2	2	4	2	10	2.3	Based on Hazard Analysis & MHMP
Dubois	Man-Made Threats	Fire Incident	Arson	2	2	4	2	10	2.3	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Dubois	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	2	4	2	10	2.3	
Dubois	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	2	10	2.3	Based on Hazard Analysis & MHMP
Dubois	Natural Hazards	Weather Related	Extreme Temperatures	2	2	2	4	10	2.2	Based on Hazard Analysis & MHMP
Dubois	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	1	4	1	4	10	2.2	Based on Hazard Analysis & MHMP
Dubois	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	1	4	1	4	10	2.2	
Fayette	Natural Hazards	Disease	Animal Disease Outbreak	4	4	4	4	6	4	
Fayette	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	4	4	4	4	6	4	
Fayette	Natural Hazards	Flooding	Flash Flood	4	4	4	4	6	4	
Fayette	Natural Hazards	Storms	Severe Thunderstorm	4	4	4	3	6	3.9	
Fayette	Natural Hazards	Storms	Severe Thunderstorm	4	4	4	3	6	3.9	
Fayette	Man-Made Threats	Fire Incident	Arson	4	4	4	3	6	3.9	
Fayette	Man-Made Threats	Fire Incident	Arson	4	4	4	3	6	3.9	
Fayette	Natural Hazards	Earthquake	Earthquake MMI VII to X	4	4	4	1	6	3.7	
Fayette	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	3	4	4	6	3.7	
Fayette	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	4	3	4	3	6	3.6	
Fayette	Technological Hazards	Infrastructure	Communication Failure	4	3	4	3	6	3.6	
Fayette	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	4	3	4	2	6	3.5	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Fayette	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	4	2	6	3.5	
Fayette	Natural Hazards	Winter Weather	Winter Storms	4	3	2	4	6	3.4	
Fayette	Natural Hazards	Storms	Tornado EF3 - EF5	3	4	4	2	6	3.35	
Fayette	Technological Hazards	Dams and Levees	Major Levee Failure - (Non-accredited)	4	2	4	3	6	3.3	
Fayette	Natural Hazards	Winter Weather	Ice Storms	4	3	2	3	6	3.3	
Fayette	Technological Hazards	Infrastructure	Public Utility Failure	4	2	4	3	6	3.3	
Fayette	Natural Hazards	Weather Related	Extreme Temperatures	4	3	1	4	6	3.25	
Fayette	Natural Hazards	Flooding	Flash Flood	4	2	3	3	6	3.15	
Fayette	Technological Hazards	Fire Incident	Explosion	3	3	4	3	6	3.15	
Fayette	Natural Hazards	Disease	Human Disease Outbreak	2	4	4	4	6	3.1	
Fayette	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	4	4	3	6	3	
Fayette	Technological Hazards	Infrastructure	Public Utility Failure	2	4	4	3	6	3	
Fayette	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	3	6	2.7	
Fayette	Technological Hazards	Fire Incident	Structural Collapse	2	3	4	2	6	2.6	
Fayette	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	3	4	1	6	2.5	
Fayette	Man-Made Threats	Terrorist Attack	Biological Attack	2	2	4	3	6	2.4	
Fayette	Natural Hazards	Storms	Geomagnetic Storm	2	2	4	3	6	2.4	
Fayette	Natural Hazards	Weather Related	Drought	2	3	1	4	6	2.35	
Fayette	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	1	4	1	6	1.9	
Fayette	Man-Made Threats	International Terrorism	International Terrorism	1	2	2	3	6	1.65	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Floyd	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	
Floyd	Natural Hazards	Flooding	Flash Flood	4	4	4	4	9	4	
Floyd	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	
Floyd	Natural Hazards	Storms	Severe Thunderstorm	4	3	3	3	9	3.45	
Floyd	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	9	2.8	
Floyd	Man-Made Threats	Fire Incident	Arson	2	2	4	2	9	2.3	
Grant	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	6	4	
Grant	Man-Made Threats	Terrorist Attack	Chemical Attack	3	4	4	4	6	3.55	With 65 Tier II reporting facilities that are subject to this type of attack. Probability increases due to on hand stock of hazardous materials.
Grant	Man-Made Threats	Terrorist Attack	Cyber Attack	3	3	4	4	6	3.25	Local government systems are always at risk of potential Cyber attacks. Denial of Service and hacking are always potential threats.According to the FBI the District 6 Polycom program is trying to be hacked by an outside source
Grant	Natural Hazards	Flooding	Major Flood	4	3	1	3	6	3.15	The Mississinewa River is subject to flooding averaging at least once a year sometimes more. When flooding occurs a 200 + trailer park and two neighborhoods with special needs programs are cut off from transportation to and from.
Grant	Technological Hazards	Infrastructure	Public Utility Failure	3	3	4	3	6	3.15	Widespread extended outages from the public utility companies are fairly common usually due to severe/tornadic weather.
Grant	Natural Hazards	Flooding	Major Flood	4	3	1	3	6	3.15	The Mississinewa River is subject to flooding but severity is limited and duration generally lasts for a short period of time.
Grant	Man-Made Threats	Terrorist Attack	Radiological Attack	2	4	4	4	6	3.1	Terrorist groups are trying to gain the capability of making a dirty bomb. If this were to occur, it would be catastrophic for a wide area depending on where detonated.
Grant	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	1	6	3.1	Severe Thunderstorms occur frequently during the springtime and throughout the

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										year. Duration is generally short and warning time can range from negligible to several hours depending on the reliability of the weather forecast.
Grant	Technological Hazards	Transportation	Highway Transporation Incident	4	2	4	1	6	3.1	Highway incidents occur frequently within the county due to an Interstate and numerous State and County roads.
Grant	Man-Made Threats	Terrorist Attack	Conventional Attack	2	4	4	2	6	2.9	Grant County has not had any conventional terrorist attack. However gas pipelines and railroads could be potential targets.
Grant	Natural Hazards	Winter Weather	Winter Storms	4	2	1	3	6	2.85	Grant County has a history of a winter storm almost annually. Impact is generally limited as the warning time is several days to prepare.
Grant	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	6	2.8	City/County is always open to an attack of this nature and limited security at government offices make it even greater .
Grant	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	6	2.8	City/County is always open to an attack of this nature and limited security at government offices make it even greater . Indiana Wesleyan University and Taylor University reside in the county and has a host of international students studying locally who hail from areas susceptible to conflict from around the world.
Grant	Man-Made Threats	International Terrorism	International Terrorism	2	3	4	4	6	2.8	Indiana Wesleyan University and Taylor University reside in the county and has a host of international students studying locally who hail from areas susceptible to conflict from around the world.
Grant	Man-Made Threats	Terrorist Attack	Chemical Attack	2	3	4	4	6	2.8	Tier II facilities are subject to this type of attack. Probability increases due to on hand stock of hazardous materials but still remains overall low.
Grant	Man-Made Threats	Terrorist Attack	Biological Attack	1	4	4	4	6	2.65	Grant County has not had any incidents of this nature in the past and there is no Biological Agent storage facility in the area that would be susceptible to terrorist attack.
Grant	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	4	4	4	6	2.65	Unlikely to occur. However, this would be catastrophic to a wide area if this were to occur.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Grant	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	4	4	4	6	2.65	The threat of a nuclear attack is what prevents a nuclear attack. However, terrorist groups are trying to gain the capability of making a dirty bomb. If this were to occur, it would be catastrophic for a wide area depending on where detonated.
Grant	Man-Made Threats	Terrorist Attack	Radiological Attack	1	4	4	4	6	2.65	
Grant	Man-Made Threats	Terrorist Attack	Radiological Attack	1	4	4	4	6	2.65	Terrorist groups are trying to gain the capability of making a dirty bomb. If this were to occur, it would be catastrophic for a wide area depending on where detonated.
Grant	Natural Hazards	Storms	Tornado EF3 - EF5	2	3	4	1	6	2.5	According to the National Climatic Data Center only three tornadoes of this magnitude have been recorded in Grant County and none since 1967. Depending on location of a future event would determine severity.
Grant	Natural Hazards	Winter Weather	Ice Storms	3	2	1	3	6	2.4	Grant County has been affected by Ice Storms and Sleet in the past and the probability that this will occur again is likely.
Grant	Technological Hazards	Transportation	Rail Transportation Incident	2	2	4	3	6	2.4	Grant County has several railways that intersect within the county. The severity is determined on what the cargo is involved in the derailment or accident.
Grant	Natural Hazards	Flooding	Major Flood	3	2	1	3	6	2.4	The Mississinewa River is subject to flooding but severity is limited and duration generally lasts for a short period of time.
Grant	Man-Made Threats	Terrorist Attack	Explosive Attack	2	2	4	2	6	2.3	Grant County has not had any explosive attacks directly or indirectly linked to terrorist activities in the past. However with the growing attacks from terrorists around the world and domestic terrorists, the probability has grown.
Grant	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	2	4	2	6	2.3	There is always a possibility for an active attacker situation. The magnitude could range from limited to critical depending on target.
Grant	Man-Made Threats	Police Incident	Hostage Situation	2	2	4	2	6	2.3	Grant County has the potential for a hostage type situation as does any area where small to large groups of people

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										congregate in addition to a possible domestic hostage situations.
Grant	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	2	4	2	6	2.3	Grant County has an Interstate and several State Roads that run through the county. An incident is always a possibility.
Grant	Natural Hazards	Flooding	Flash Flood	2	2	3	3	6	2.25	Six flash floods have been reported since 1995 according to the National Climatic Data Center. The most recent occurring in 2014. Limited affected areas dependent on where heaviest amounts of rain fall.
Grant	Technological Hazards	Infrastructure	Communication Failure	1	3	4	3	6	2.25	There are redundant communication systems that the county utilizes. Failure of all is unlikely but the risk exists.
Grant	Man-Made Threats	Police Incident	Other Violent Offenders	2	2	4	1	6	2.2	Grant County does have gang activity and criminals involved in activities that have spilled over into the community but have limited impact other than those directly affected and generally last for short periods of time.
Grant	Natural Hazards	Storms	Tornado EF0 - EF2	2	2	4	1	6	2.2	According to the National Climatic Data Center 21 tornadoes of this magnitude have occurred since 1957. Depending on location will dictate severity.
Grant	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	1	6	2.2	Grant County has approximately 65 SARA Tier II reporting facilities. A spill at any of these facilities is always a possibility.
Grant	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	1	6	2.2	Grant County has approximately 75 SARA Tier II reporting facilities. A spill at any of these facilities is always a possibility.
Grant	Man-Made Threats	Terrorist Attack	Conventional Attack	1	3	4	2	6	2.15	Grant County has not had any conventional terrorist attack. However gas pipelines and railroads could be potential targets.
Grant	Technological Hazards	Transportation	Pipeline Transportation Incident	1	2	4	3	6	1.95	Two pipelines traverse Grant County.
Grant	Technological Hazards	Infrastructure	Public Utility Failure	1	2	4	3	6	1.95	Widespread extended outages from the public utility companies are unlikely but the risk is there.
Grant	Man-Made Threats	Fire Incident	Arson	2	1	4	1	6	1.9	Arson is always going to be a slight risk in every community. Depending on what

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										would be intentionally set on fire would determine the severity and duration.
Grant	Natural Hazards	Weather Related	Drought	1	3	1	4	6	1.9	Short periods of drought have had limited impacts on crops and maybe some residential wells. A long term drought seems unlikely to occur in this area.
Grant	Man-Made Threats	Terrorist Attack	Explosive Attack	1	2	4	2	6	1.85	Grant County has not had any explosive attacks directly or indirectly linked to terrorist activities in the past. The probability to happen is negligible.
Grant	Man-Made Threats	Terrorist Attack	Cyber Attack	1	2	4	2	6	1.85	Local government systems are always at risk of potential Cyber attacks. Denial of Service and hacking are always potential threats but generally larger municipalities are at greater risk.
Grant	Man-Made Threats	Police Incident	Riot	1	2	3	3	6	1.8	Rioting is always a potential under the right set of circumstances but seems unlikely in the current realm of things.
Grant	Natural Hazards	Earthquake	Earthquake MMI V to VI	1	2	4	1	6	1.75	There is a small risk of a major earthquake occurring in Indiana at a 6.0 or larger.
Grant	Natural Hazards	Earthquake	Earthquake MMI I to IV	1	1	4	1	6	1.45	Grant County has felt small earthquakes in the past. Damage has always been negligible.
Grant	Natural Hazards	Weather Related	Extreme Temperatures	1	1	1	4	6	1.3	Grant County has had one documented instance of a heat wave in 1995 that occurred over a several week stretch according to the National Climatic Data Center. Crops were affected in many counties.
Hancock	Man-Made Threats	International Terrorism	International Terrorism	4	4	4	3	5	3.9	
Hancock	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	4	3	4	1	5	3.4	
Hancock	Natural Hazards	Storms	Tornado EF3 - EF5	3	3	4	4	5	3.25	Hancock County has a history of tornadoes.
Hancock	Man-Made Threats	Police Incident	Hostage Situation	3	3	4	3	5	3.15	A hostage situation could happen anywhere fore almost and reason.
Hancock	Man-Made Threats	Police Incident	Hostage Situation	3	3	4	3	5	3.15	
Hancock	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	3	3	4	3	5	3.15	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Hancock	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	3	4	3	5	3.15	
Hancock	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	4	4	4	5	3.1	
Hancock	Technological Hazards	Transportation	Highway Transporation Incident	4	2	4	1	5	3.1	
Hancock	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	4	4	3	5	3	
Hancock	Natural Hazards	Flooding	Flash Flood	3	2	4	3	5	2.85	Hancock County has flash flooding incidents on a regular basis during the relevant season. Flooding across low lying roads is common.
Hancock	Natural Hazards	Winter Weather	Winter Storms	3	3	2	3	5	2.85	Hancock County has a history of common winter storms that result in power outages and road closures.
Hancock	Man-Made Threats	International Terrorism	International Terrorism	2	2	4	4	5	2.5	
Hancock	Technological Hazards	Transportation	Rail Transportation Incident	2	2	4	3	5	2.4	
Hancock	Man-Made Threats	Fire Incident	Arson	2	2	4	2	5	2.3	Arson is always a fire department concern.
Hancock	Technological Hazards	Infrastructure	Public Utility Failure	2	3	1	3	5	2.25	
Hancock	Technological Hazards	Infrastructure	Communication Failure	2	2	2	3	5	2.1	
Hancock	Man-Made Threats	Police Incident	Riot	2	2	2	2	5	2	With all the social and civil unrest it is small but there is a chance it could happen.
Hancock	Natural Hazards	Disease	Animal Disease Outbreak	1	2	3	4	5	1.9	
Hancock	Natural Hazards	Weather Related	Drought	2	1	1	4	5	1.75	
Harrison	Natural Hazards	Flooding	Flash Flood	4	3	4	2	9	3.5	
Harrison	Natural Hazards	Flooding	Flash Flood	4	3	4	2	9	3.5	
Hendricks	Natural Hazards	Flooding	Major Flood	2	3	3	4	5	2.65	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Hendricks	Natural Hazards	Flooding	Flash Flood	2	2	4	4	5	2.5	
Hendricks	Natural Hazards	Storms	Tornado EF3 - EF5	2	3	2	4	5	2.5	
Hendricks	Natural Hazards	Storms	Severe Thunderstorm	3	2	1	3	5	2.4	
Hendricks	Natural Hazards	Storms	Tornado EF3 - EF5	2	3	1	4	5	2.35	
Hendricks	Natural Hazards	Weather Related	Extreme Temperatures	2	2	2	3	5	2.1	
Hendricks	Natural Hazards	Weather Related	Drought	2	2	1	4	5	2.05	
Hendricks	Natural Hazards	Weather Related	Drought	2	2	1	4	5	2.05	
Hendricks	Natural Hazards	Storms	Tornado EF0 - EF2	2	2	1	3	5	1.95	
Hendricks	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	1	1	4	2	5	1.55	
Jackson	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	3	4	2	8	3.5	
Jackson	Technological Hazards	Transportation	Highway Transporation Incident	4	3	4	2	8	3.5	
Jackson	Technological Hazards	Fire Incident	Structural Collapse	3	4	4	3	8	3.45	
Jackson	Natural Hazards	Flooding	Flash Flood	4	2	4	2	8	3.2	
Jackson	Natural Hazards	Winter Weather	Winter Storms	3	3	4	3	8	3.15	
Jackson	Natural Hazards	Storms	Tornado EF0 - EF2	3	3	3	3	8	3	
Jackson	Natural Hazards	Storms	Severe Thunderstorm	4	2	3	1	8	2.95	
Jackson	Natural Hazards	Weather Related	Drought	3	3	2	4	8	2.95	
Jackson	Natural Hazards	Flooding	Major Flood	3	3	2	4	8	2.95	
Jackson	Natural Hazards	Winter Weather	Ice Storms	3	3	2	3	8	2.85	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Jackson	Technological Hazards	Infrastructure	Public Utility Failure	3	2	4	3	8	2.85	
Jackson	Man-Made Threats	Terrorist Attack	Cyber Attack	2	3	4	3	8	2.7	
Jackson	Natural Hazards	Storms	Tornado EF3 - EF5	2	3	4	3	8	2.7	
Jackson	Technological Hazards	Fire Incident	Explosion	2	3	4	3	8	2.7	
Jackson	Man-Made Threats	Fire Incident	Arson	3	2	4	1	8	2.65	
Jackson	Natural Hazards	Other	Ground Failure	2	2	4	4	8	2.5	
Jackson	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	2	4	3	8	2.4	
Jackson	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	3	8	2.4	
Jackson	Man-Made Threats	Terrorist Attack	Cyber Attack	2	2	4	3	8	2.4	
Jackson	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	3	8	2.4	
Jackson	Technological Hazards	Infrastructure	Communication Failure	2	2	4	3	8	2.4	
Jackson	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	3	8	2.4	
Jackson	Technological Hazards	Transportation	Rail Transportation Incident	2	2	4	3	8	2.4	
Jackson	Natural Hazards	Disease	Animal Disease Outbreak	2	3	1	4	8	2.35	
Jackson	Natural Hazards	Disease	Human Disease Outbreak	2	3	1	4	8	2.35	
Jackson	Natural Hazards	Disease	Animal Disease Outbreak	2	3	1	4	8	2.35	
Jackson	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	2	4	1	8	2.2	
Jackson	Man-Made Threats	Police Incident	Hostage Situation	2	2	4	1	8	2.2	
Jackson	Technological Hazards	Fire Incident	Explosion	2	2	4	1	8	2.2	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Jackson	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	2	3	2	8	2.15	
Jackson	Natural Hazards	Weather Related	Extreme Temperatures	2	2	1	4	8	2.05	
Jackson	Man-Made Threats	International Terrorism	International Terrorism	1	2	4	4	8	2.05	
Jackson	Man-Made Threats	Terrorist Attack	Biological Attack	1	2	2	3	8	1.65	
Jackson	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	1	2	1	4	8	1.6	
Jackson	Technological Hazards	Dams and Levees	High Hazard Dam - (State owned)	1	2	1	4	8	1.6	
Jackson	Man-Made Threats	Terrorist Attack	Explosive Attack	1	1	4	1	8	1.45	
Jasper	Natural Hazards	Flooding	Flash Flood	4	4	4	4	1	4	Carpenter Creek in southern Jasper Co. usually floods annually. This affects mobile home park and its 200 residents. At its worst, the mobile home park was evacuated and residents sheltered for up to two weeks.
Jasper	Natural Hazards	Winter Weather	Winter Storms	4	4	4	4	1	4	Jasper Co. is subject to heavy winter weather snow and ice storms. I-65 runs through Jasper Co. and has five exits with very limited food (restaurants) and sheltering (hotels) available along the exits.
Jefferson	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	
Jefferson	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	
Jefferson	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	
Jefferson	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	
Jefferson	Man-Made Threats	International Terrorism	International Terrorism	4	4	4	4	9	4	
Jefferson	Man-Made Threats	Terrorist Attack	Biological Attack	4	4	4	4	9	4	
Jefferson	Man-Made Threats	Terrorist Attack	Chemical Attack	4	4	4	4	9	4	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Jefferson	Man-Made Threats	Terrorist Attack	Conventional Attack	4	4	4	4	9	4	
Jefferson	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	9	4	
Jefferson	Man-Made Threats	Terrorist Attack	Cyber Attack	4	4	4	4	9	4	
Jefferson	Man-Made Threats	Terrorist Attack	Explosive Attack	4	4	4	4	9	4	
Jefferson	Natural Hazards	Flooding	Flash Flood	4	4	4	4	9	4	
Jefferson	Natural Hazards	Winter Weather	Ice Storms	4	3	4	3	9	3.6	
Jefferson	Natural Hazards	Winter Weather	Winter Storms	4	3	4	3	9	3.6	
Jefferson	Man-Made Threats	Fire Incident	Arson	4	3	4	3	9	3.6	
Jefferson	Technological Hazards	Infrastructure	Communication Failure	3	4	4	4	9	3.55	
Jefferson	Natural Hazards	Flooding	Flash Flood	3	4	4	4	9	3.55	
Jefferson	Natural Hazards	Flooding	Major Flood	3	4	4	4	9	3.55	
Jefferson	Technological Hazards	Transportation	Highway Transporation Incident	4	3	4	2	9	3.5	
Jefferson	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	2	9	3.5	
Jefferson	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	3	3	4	4	9	3.25	
Jefferson	Technological Hazards	Infrastructure	Public Utility Failure	3	3	4	4	9	3.25	
Jefferson	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	9	3.25	
Jefferson	Man-Made Threats	International Terrorism	International Terrorism	3	3	4	4	9	3.25	
Jefferson	Man-Made Threats	Terrorist Attack	Chemical Attack	3	3	4	4	9	3.25	
Jefferson	Natural Hazards	Storms	Tornado EF0 - EF2	3	3	4	4	9	3.25	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Jefferson	Man-Made Threats	Police Incident	Hostage Situation	4	2	4	2	9	3.2	
Jefferson	Technological Hazards	Fire Incident	Structural Collapse	3	3	4	3	9	3.15	
Jefferson	Technological Hazards	Transportation	Pipeline Transportation Incident	3	3	4	3	9	3.15	
Jefferson	Natural Hazards	Weather Related	Extreme Temperatures	3	3	4	3	9	3.15	
Jefferson	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	2	4	4	4	9	3.1	
Jefferson	Man-Made Threats	Terrorist Attack	Nuclear Attack	2	4	4	4	9	3.1	
Jefferson	Man-Made Threats	Terrorist Attack	Radiological Attack	2	4	4	4	9	3.1	
Jefferson	Natural Hazards	Storms	Tornado EF3 - EF5	2	4	4	4	9	3.1	
Jefferson	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	3	4	2	9	3.05	
Jefferson	Natural Hazards	Storms	Seiche	2	4	4	3	9	3	
Jefferson	Natural Hazards	Storms	Geomagnetic Storm	2	4	4	3	9	3	
Jefferson	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	4	9	2.8	
Jefferson	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	3	4	4	9	2.8	
Jefferson	Man-Made Threats	Terrorist Attack	Biological Attack	2	3	4	4	9	2.8	
Jefferson	Man-Made Threats	Terrorist Attack	Conventional Attack	2	3	4	4	9	2.8	
Jefferson	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	2	3	4	4	9	2.8	
Jefferson	Man-Made Threats	Police Incident	Riot	3	2	4	2	9	2.75	
Jefferson	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	2	2	3	9	2.55	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Jefferson	Natural Hazards	Weather Related	Drought	2	2	4	4	9	2.5	
Jefferson	Technological Hazards	Fire Incident	Explosion	2	2	4	3	9	2.4	
Jefferson	Natural Hazards	Disease	Animal Disease Outbreak	2	2	4	3	9	2.4	
Jefferson	Natural Hazards	Disease	Human Disease Outbreak	2	2	4	3	9	2.4	
Jefferson	Natural Hazards	Storms	Tropical Cyclone Remnants	2	2	4	3	9	2.4	
Jefferson	Natural Hazards	Storms	Derecho	2	2	4	3	9	2.4	
Jefferson	Man-Made Threats	Police Incident	Other Violent Offenders	2	2	4	2	9	2.3	
Johnson	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	4	3	3	4	5	3.55	County has history of dam failure in 2008
Johnson	Natural Hazards	Disease	Human Disease Outbreak	4	2	4	4	5	3.4	Mumps and Measles outbreaks at local colleges. Can be catastrophic depending on the disease
Johnson	Natural Hazards	Earthquake	Earthquake MMI I to IV	4	2	4	4	5	3.4	Indiana is on the Madrid fault line
Johnson	Natural Hazards	Earthquake	Earthquake MMI V to VI	4	2	4	4	5	3.4	Indiana is on the Madrid fault line
Johnson	Natural Hazards	Flooding	Flash Flood	4	2	4	4	5	3.4	county has history of flooding events especially 2008
Johnson	Technological Hazards	Infrastructure	Public Utility Failure	4	3	4	1	5	3.4	Water main breaks- boil water order; electrical grid failure and waste water treatment failures
Johnson	Man-Made Threats	Terrorist Attack	Conventional Attack	3	3	4	4	5	3.25	county is always open to an attack of this nature and limited security at government offices make it even greater
Johnson	Natural Hazards	Earthquake	Earthquake MMI VII to X	2	4	4	4	5	3.1	Indiana is on the Madrid fault line
Johnson	Natural Hazards	Storms	Tornado EF3 - EF5	2	4	4	4	5	3.1	History of weather in the County and in Indiana
Johnson	Technological Hazards	Fire Incident	Large Fire/Conflagration	4	2	4	1	5	3.1	Fire history in County
Johnson	Natural Hazards	Storms	Severe Thunderstorm	4	2	2	3	5	3	History of weather in County and in Indiana- County has need for more signage boards

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										and lighting to work during the night on storm related cleanup
Johnson	Technological Hazards	Dams and Levees	Major Levee Failure - (Non-accredited)	4	2	2	3	5	3	County has history of levee failure in 2008
Johnson	Natural Hazards	Storms	Severe Thunderstorm	4	2	2	3	5	3	History of weather in County and in Indiana
Johnson	Natural Hazards	Weather Related	Extreme Temperatures	4	2	1	4	5	2.95	History of weather in the County and in Indiana
Johnson	Technological Hazards	Infrastructure	Communication Failure	4	1	4	2	5	2.9	800 MHz radios, WIFI and TV outages are risk in county
Johnson	Technological Hazards	Dams and Levees	Major Levee Failure - (Accredited)	4	2	1	3	5	2.85	County has history of dam failure in 2008
Johnson	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	5	2.8	Limited security at county offices and some without security except for security doors.
Johnson	Man-Made Threats	Terrorist Attack	Conventional Attack	2	3	4	4	5	2.8	county is always open to an attack of this nature and limited security at government offices make it even greater
Johnson	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	3	4	4	5	2.8	Indiana is on the Madrid fault line
Johnson	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	1	4	1	5	2.8	Accident on roadways or rail in County
Johnson	Man-Made Threats	Terrorist Attack	Chemical Attack	3	2	4	2	5	2.75	Chemicals are easy to obtain at a low price and can be used anywhere
Johnson	Man-Made Threats	Terrorist Attack	Radiological Attack	1	4	4	4	5	2.65	
Johnson	Natural Hazards	Winter Weather	Winter Storms	3	2	2	3	5	2.55	History of events in County and Indiana
Johnson	Natural Hazards	Disease	Animal Disease Outbreak	2	2	4	4	5	2.5	Poultry outbreak in adjacent districts
Johnson	Natural Hazards	Storms	Tornado EF0 - EF2	2	2	4	4	5	2.5	History of weather in the County and Indiana- County is in need of signage boards and lighting sources to work during the night on storm issues for safety reasons
Johnson	Natural Hazards	Weather Related	Drought	3	2	1	4	5	2.5	History of drought in the County and in Indiana

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Johnson	Technological Hazards	Transportation	Commercial Air Transportation Incident	2	2	4	4	5	2.5	Flight patterns to Indianapolis Airport through county and has own Airport in Greenwood
Johnson	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	4	5	2.5	Pipelines are located in County
Johnson	Natural Hazards	Storms	Tornado EF0 - EF2	2	2	4	4	5	2.5	History of weather in the County and Indiana
Johnson	Natural Hazards	Winter Weather	Ice Storms	2	3	2	3	5	2.4	History of ice events in county and Indiana
Johnson	Man-Made Threats	Terrorist Attack	Explosive Attack	1	3	4	4	5	2.35	Explosives are obtainable if desired and can cause widespread damage
Johnson	Technological Hazards	Transportation	Highway Transporation Incident	2	2	4	2	5	2.3	County has history of multiple accidents on I-65 in County
Johnson	Technological Hazards	Transportation	Rail Transportation Incident	2	2	4	2	5	2.3	County has 2 railways on east and west side of County
Johnson	Technological Hazards	Fire Incident	Explosion	2	2	4	2	5	2.3	County has multiple companies that carry hazard materials on site
Johnson	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	1	5	2.2	Tier II facilities based on types of Hazard Materials they store on site
Johnson	Technological Hazards	Fire Incident	Structural Collapse	2	2	4	1	5	2.2	Older homes and businesses located throughout the County-County has shortfall of message sign boards and portable lighting to do search's at night
Johnson	Technological Hazards	Fire Incident	Structural Collapse	2	2	4	1	5	2.2	Older homes and businesses located throughout the County
Johnson	Man-Made Threats	Terrorist Attack	Biological Attack	1	3	4	2	5	2.15	County has written plans for exposure but feel little chance of occurring in county
Johnson	Man-Made Threats	Terrorist Attack	Cyber Attack	2	1	4	3	5	2.1	Computer systems can be hacked at anytime and mobile computers use unsecured WIFI at times out in the field by government workers. County needs to have an annex plan on this in the CEMP
Johnson	Man-Made Threats	Terrorist Attack	Cyber Attack	2	1	4	3	5	2.1	Computer systems can be hacked at anytime and mobile computers use unsecured WIFI at times out in the field by government workers.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Johnson	Natural Hazards	Flora and Fauna	Invasive Species - Insect	2	2	1	4	5	2.05	County trees have been found to have emerald ash bore in them
Kosciusko	Man-Made Threats	Fire Incident	Arson	4	2	4	2	2	3.2	
Kosciusko	Man-Made Threats	Fire Incident	Arson	3	2	4	2	2	2.75	
Kosciusko	Man-Made Threats	Terrorist Attack	Biological Attack	1	4	4	4	2	2.65	
Kosciusko	Man-Made Threats	Terrorist Attack	Chemical Attack	1	4	4	4	2	2.65	
LaPorte	Natural Hazards	Flooding	Flash Flood	4	4	4	4	1	4	
LaPorte	Technological Hazards	Transportation	Rail Transportation Incident	4	4	4	4	1	4	we have more then 100 Bakin Crude trains go through our county per day.
LaPorte	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	1	4	
LaPorte	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	4	4	4	3	1	3.9	several chemical plants in our county and one nuclear just east of our county
LaPorte	Natural Hazards	Flooding	Major Flood	4	4	3	3	1	3.75	
LaPorte	Natural Hazards	Storms	Severe Thunderstorm	4	4	3	2	1	3.65	Several disturbances of Thunderstorms and Wind move across our area on a regular basis from early Spring to as late a October. Tornadoes have been reported as early as May. Waves of Upper level features interact with surface fronts and plenty of moisture and instability to generate severe weather and heavy rains/flooding. Not to mention Lake Michigan creating havoc on a regular basis.
LaPorte	Natural Hazards	Winter Weather	Ice Storms	4	4	2	3	1	3.6	documented travel state of emergency's in the last 3 years resulting in major traffic hazards and at least one death. We have had to use fire stations and schools for emergency shelters from roads being blown shut. Also resulting in inadequate assistance being obtained.
LaPorte	Natural Hazards	Winter Weather	Ice Storms	4	4	2	3	1	3.6	documented travel state of emergency last 3 years

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
LaPorte	Natural Hazards	Winter Weather	Winter Storms	4	3	2	3	1	3.3	history of major snow events in the county
LaPorte	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	3	1	3.15	In our county is housed several chemical plants along with a through rout on rail for hazardous materials.
LaPorte	Man-Made Threats	International Terrorism	International Terrorism	2	4	4	4	1	3.1	several points of interest for facility attacks
LaPorte	Man-Made Threats	Terrorist Attack	Biological Attack	2	4	4	4	1	3.1	LaPorte County houses a power generation plant that could be a target for terrorist
LaPorte	Man-Made Threats	Police Incident	Hostage Situation	4	3	1	2	1	3.05	in our county is housed the Indiana State Prison along with Westvillie Correctional and the county jail
LaPorte	Natural Hazards	Disease	Human Disease Outbreak	3	3	2	4	1	2.95	
LaPorte	Natural Hazards	Flooding	Flash Flood	3	3	3	2	1	2.9	every year for the last at least 5 years we have had significant water damage in our county.
LaPorte	Natural Hazards	Flooding	Flash Flood	3	3	3	2	1	2.9	
LaPorte	Natural Hazards	Weather Related	Extreme Temperatures	3	3	1	4	1	2.8	
LaPorte	Natural Hazards	Weather Related	Extreme Temperatures	3	3	1	3	1	2.7	
LaPorte	Natural Hazards	Flooding	Flash Flood	3	2	3	2	1	2.6	
LaPorte	Man-Made Threats	Police Incident	Hostage Situation	3	3	1	2	1	2.6	
LaPorte	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	2	1	2.6	
LaPorte	Man-Made Threats	Fire Incident	Arson	2	2	4	4	1	2.5	
LaPorte	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	2	4	2	1	2.3	
LaPorte	Natural Hazards	Flooding	Major Flood	2	3	1	3	1	2.25	Coastal Storm / Seich; The second highest recorded Lake Michigan wave height 20.3 ft was recorded on Oct. 30th 2012 and is associated with the Super storm Sandy according to the national NOAA
Lawrence	Man-Made Threats	Fire Incident	Arson	4	4	4	4	8	4	The Northwest side of Lawrence County recently experienced a rash of arson fires. The fires were to vacant structures,

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										however neighboring structures and grasslands were at risk. Firefighters fighting the fire were also at risk. The Arsonist has been arrested and is awaiting trial at this time.
Lawrence	Technological Hazards	Transportation	Highway Transporation Incident	4	4	4	4	8	4	
Lawrence	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	4	4	4	8	3.55	A gentleman who was upset with the Veterans Service rammed his truck into the south entrance to the courthouse. If the truck would have been smaller like a S-10 it would have penetrated the doors and ended up in basement level of the courthouse. That would have blocked the only exit from that floor of the building. This circumstance and it affects of such incident have been addressed in the new 2016 Lawrence County Continuity of Government Plan.
Lawrence	Natural Hazards	Flooding	Flash Flood	4	2	4	3	8	3.3	Lawrence County has experienced many flash flooding events. These events usually result in culverts, bridges, and roadways washing out. We occasionally have water into homes or other structures if new construction has occurred changing the drainage pattern. It is common to have a 3 inch or more rain annually that results in flash flooding. Infrastructure Damage most of the time is able to be repaired in a 72 hour time period. Occasionally structures have to have more significant repair such as drying out thoroughly and replace of floor and wall surfaces. This sometimes has the owner displaced for 1 to 2 weeks. We have not had request for shelter for any of the flooding situations in the last 5 years. The inquires generally range in what kind of government assistance is available. We direct them to Red Cross and Salvation Army.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Lawrence	Technological Hazards	Infrastructure	Communication Failure	3	3	4	4	8	3.25	In the past Lawrence County has experienced bridge failures that have required closure and eventual replacement. The Lawrence County Jail and the Bedford North Lawrence High School have required remediation efforts due to the fact the building were sinking due to an unstable foundation. Karst topography and inadequate foundation packing have been the cause. We have also had multiple roads foundation wash out due from water scouring the earth below. This has resulted in road closures and repair.
Lawrence	Natural Hazards	Disease	Human Disease Outbreak	3	4	2	4	8	3.25	Lawrence County is beginning an needle exchange due to the high rate of Hepatitis C in Lawrence County Citizens. The jail population was tested and 75% were positive for Hepatitis C. Random testing of other residents have shown a high concentration of positive cases.
Lawrence	Technological Hazards	Transportation	Highway Transporation Incident	2	4	4	4	8	3.1	Lawrence County has had multiple bridge failures, due to flooding, heavy loads, or damage from the use of salt on icy roads. Roads have been scoured under the pavement from fast moving water making the roads hazardous and resulted in road closure.
Lawrence	Man-Made Threats	Police Incident	Riot	3	3	2	4	8	2.95	Lawrence County has experienced at least two riot type situations with employee strikes. The Visteon Plant on West 16th Street in Bedford union workers were on strike for at least a week. Outsiders joined the strikers and fights and personal attacks on law enforcement were the result. A car was also set on fire in the middle of 16th Street which is also known as US 50. Local police started training and obtained riot gear as the lack of a contract settlement seemed imminent. In hind site some law enforcement consider themselves to be very fortunate as it could have been much worse with the outside force influence.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										More recently there was an employee/union stike at Indiana Limestone at the SR 37 and Oolitic Main Street Intersection. The strike did experience some violence on vehicles however it was more verbal than physical.
Lawrence	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	2	4	2	4	8	2.8	Two times in the last ten years Lawrence County Officials have been called to the Lake Monroe Dam Office of the Army Corp of Engineers. Two different instances the lake pool was so high that water came across the emergency spillway. The last incident approximately 4 years ago resulted in road closure with pavement and a culvert being washed out. The road was reopened within 48 hours of the water receding. The incident however caused down stream flooding and multiple homes in the area were temporarily isolated. The only way to exit was to walk out through wooded hills many miles.
Lawrence	Man-Made Threats	International Terrorism	International Terrorism	2	3	4	4	8	2.8	We have not had any reports of International Terrorism Threats in our area. However in neighboring Monroe County which is more culturally diverse with Indiana University it is possible persons on a watch list have passed through our county.
Lawrence	Man-Made Threats	Terrorist Attack	Biological Attack	2	3	4	4	8	2.8	See Domestic Terrorism for details
Lawrence	Natural Hazards	Winter Weather	Ice Storms	2	3	4	4	8	2.8	Lawrence County has experienced minimal ice storms. Very little loss of power occurred, navigation by foot and vehicle were the main threat. There were additional medical emergencies with falls on the ice. There were some downed trees and tree limbs.
Lawrence	Natural Hazards	Winter Weather	Winter Storms	2	3	2	4	8	2.5	Lawrence County experienced a major blizzard in 1978. Many rural roads were closed for a week or longer. Heavy equipment was brought in to lift snow out of the way as it was too deep to plow. Some areas experienced power outages and

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										a transformer had to be brought in by helicopter. Businesses were generally closed and limited compared to today. People had to share food with neighbors and emergency responders. Lawrence County had another significant snow storm in 2003/2004 that resulted in 15+ inches of snow right at the Christmas holiday. The county highway and elected officials monitored the predicted storm and took mitigation steps to manage the storm and the snowfall did not reach levels where it could not be plowed off the highway. Business and industry ended with minimal interruption.
Lawrence	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	4	8	2.5	September 2016 a local gas station had a leak that permeated the city's sanitary sewer system. The local fire department had numerous calls throughout the week of gas fumes in residences and businesses. When fire officials checked with their meters it did not register or was very minimal. Fire officials knew something was occurring and collaborated with city utilities to track down the problem. In Friday Sept. 9th fire department was called to a rental home and the gas fumes were so great it did not register on the meter. Now the fire department had a location to backtrack from to find the source. The sanitary storm sewers were checked and there was a significant amount of gasoline running on top of the water in the sewer. It was determined that a local gasoline station who had recent work done on their underground tanks was the source. Emergency actions were taken, the public notified and extra fire personnel called in to respond to areas with gas fumes to determine concentration. IDEM responded and the owners of the gas station called in Indiana Spill Response and Recovery to

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										clear up the leak. A shelter led by the Red Cross was set up at the Local Boys and Girls Club for anyone who needed to evacuate their home. The resident of the rental home ended up staying in a local motel that was paid for by their landlord. We had one report of gasoline poisoning of a female from local hospital. EOC operations were set up at the Bedford Fire Department with Command established at the local gasoline station with the leak. Local police went door to door with flyers about what to do in case of gasoline odor in an area established by IDEM and the local Utility Manager. A tank was in place behind the service station with a vacuum truck for several weeks until the exact leak was found. Lawrence County has experienced other various spills such as gasoline and antifreeze. A farm implement accident with chemical spilling into a waterway and local fire department cleaned up the incident. A local quarry operation was allowing runoff into the waterway but quit once it was they were contacted of their error. Other various incidents such as paint spills on highway from a traffic incident have happened.
Lawrence	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	2	4	4	8	2.5	See details in fixed facility Hazardous Materials Incident
Madison	Man-Made Threats	Police Incident	Riot	4	4	4	4	6	4	Major law enforcement activity of this type we do not have the trained personnel or equipment available to handle this type of incident. We would require outside help. We are in need of training and purchase equipment. This may include a threat on out county wide PSAP,P25,county net work data storage, EOC critical facility location. Current funds are not available to provide a security fence around the facility. GAP

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										analysis shows a gated secure fence is need to properly secure this critical facility.
Madison	Natural Hazards	Flooding	Flash Flood	4	4	4	4	6	4	Madison County has a long history of flooding. Mitigation work has been done, however we still have several areas prone to flooding. We need to upgrade our EOC with state of the art equipment to help monitor and respond to such events. Additional mediation work may be done to help reduce impact to the citizens and infrastructure. Need computer work stations for fire and Le personnel to us that are assigned command and general staff positions,
Madison	Natural Hazards	Storms	Severe Thunderstorm	4	4	4	4	6	4	Every year Madison County has the threat of tornados. Madison County has suffered several damaging tornados over the years. Upgrades to our warning system by transitioning over to more modern technology and notification systems. Additional equipment is needed it he EOC for help monitor, track, and respond to incidents of this nature. We need a way to distribute power to critical facilities like fire, police and mayors office to keep continuity in line by providing power distribution boxes connected to out generators outside.
Madison	Natural Hazards	Storms	Severe Thunderstorm	4	4	4	4	6	4	Every year Madison County has the threat of tornados. Madison County has suffered several damaging tornados over the years. Upgrades to our warning system by transitioning over to more modern technology and notification systems. Additional equipment is needed it he EOC for help monitor, track, and respond to incidents of this nature.
Madison	Natural Hazards	Flooding	Flash Flood	4	4	4	4	6	4	Madison County has a long history of flooding. Mitigation work has been done, however we still have several areas prone to flooding. We need to upgrade our EOC with state of the art equipment to help monitor and respond to such events.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										Additional mediation work may be done to help reduce impact to the citizens and infrastructure
Madison	Natural Hazards	Winter Weather	Ice Storms	4	4	3	4	6	3.85	Ice storm are one of he most devastating impacts on Madison County. Response and recovery can take weeks and even months to recover from. Need additional equipment and supplies for operating shelters, temporary generators, enhancement of shelters operation, road clearing and EOC operation equipment. Need a way of providing power to shelters and local critical faculties to maintain a minimum power to critical equipment. Need power distribution boxes for our generators. Also need computer designed stations for each of the command general staff to use. Have computers and printers, need the work stations.
Madison	Natural Hazards	Winter Weather	Ice Storms	4	4	3	4	6	3.85	Ice storm are one of he most devastating impacts on Madison County. Response and recovery can take weeks and even months to recover from. Need additional equipment and supplies for operating shelters, temporary generators, enhancement of shelters operation, road clearing and EOC operation equipment.
Madison	Man-Made Threats	Fire Incident	Arson	4	3	4	4	6	3.7	Major fire can be handled in county with minimum outside county support. Some will be needed. Finical loss will be the major loss with this type of incident
Madison	Man-Made Threats	Police Incident	Riot	4	3	4	4	6	3.7	Major law enforcement activity of this type we do not have the trained personnel or equipment available to handle this type of incident. We would require outside help. We are in need of training and purchase equipment.
Madison	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	4	4	4	6	3.1	Earthquake will be a major disruption to our normal daily operations. EC upgrades are need to help with the damage assessment and recover efforts. Additional search and rescue teams would be needed as well as

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										hospital operations, transportation systems, debris management, and medical facilities. Temporary command post, EMS field operations, and general public information areas will be needed. With major power outages around we will need power distribution boxes connected to our current generators to provide emergency power to police, fire, municipal buildings and maybe field operations tents when buildings are unsafe. Need to update our Hazard Mitigation Plan. Also need computer work stations for fire & LE personnel to use that are assigned command and general staff positions in the EOC.
Madison	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	4	4	4	6	3.1	Earthquake will be a major disruption to our normal daily operations. EC upgrades are need to help with the damage assessment and recover efforts. Additional search and rescue teams would be needed as well as hospital operations, transportation systems, debris management, and medical facilities. Temporary command post, EMS field operations, and general public information areas will be needed.
Madison	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	4	4	4	6	3.1	Earthquake will be a major disruption to our normal daily operations. EC upgrades are need to help with the damage assessment and recover efforts. Additional search and rescue teams would be needed as well as hospital operations, transportation systems, debris management, and medical facilities. Temporary command post, EMS field operations, and general public information areas will be needed. With major power outages around we will need power distribution boxes connected to our current generators to provide emergency power to police, fire, municipal buildings and maybe field operations tents when buildings are unsafe.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Madison	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	4	4	4	6	3.1	Earthquake will be a major disruption to our normal daily operations. EC upgrades are need to help with the damage assessment and recover efforts. Additional search and rescue teams would be needed as well as hospital operations, transportation systems, debris management, and medical facilities. Temporary command post, EMS field operations, and general public information areas will be needed. With major power outages around we will need power distribution boxes connected to our current generators to provide emergency power to police, fire, municipal buildings and maybe field operations tents when buildings are unsafe. Need to update our Hazard Mitigation Plan
Madison	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	6	2.8	Domestic attack can be in several forms. All could be devastating to the county resources and economy . If the threat is by computer we have as much protection in pace as practice. If the threat is against the power grid or other utility it could take weeks to get back on line. If it is by other means we would respond appropriately and should be able to handle the situation locally. Need to update our Hazard Mitigation plan to new threat. Newly construction county wide PSAP.P25,County Net work servers storage , and EOC is critical infrastructure for our county. Gap analysis shows we should have a security fence around the facility. Current local construction funds do not include a security fence.
Madison	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	6	2.8	Domestic attack can be in several forms. All could be devastating to the county resources and economy . If the threat is by computer we have as much protection in pace as practice. If the threat is against the power grid or other utility it could take weeks to get back on line. If it is by other

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										means we would respond appropriately and should be able to handle the situation locally.
Madison	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	6	2.8	Domestic attack can be in several forms. All could be devastating to the county resources and economy . If the threat is by computer we have as much protection in pace as practice. If the threat is against the power grid or other utility it could take weeks to get back on line. If it is by other means we would respond appropriately and should be able to handle the situation locally. Need to update our Hazard Mitigation plan to new threats
Marion	Natural Hazards	Weather Related	Extreme Temperatures	4	2	4	3	5	3.3	
Marion	Man-Made Threats	Police Incident	Riot	2	2	3	2	5	2.15	
Marshall	Natural Hazards	Storms	Tornado EF0 - EF2	4	2	4	3	2	3.3	
Marshall	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	4	2	4	3	2	3.3	
Marshall	Natural Hazards	Storms	Tornado EF0 - EF2	4	2	4	3	2	3.3	Several EF-0 and EF-1 Tornadoes have occurred in Marshall County over the last ten years. The most recent event was July of 2014 when three tornadoes struck in or near the Plymouth area causing damage to numerous buildings, downing trees and leading to power outages that lasted four days.
Marshall	Man-Made Threats	Terrorist Attack	Cyber Attack	3	3	4	4	2	3.25	
Marshall	Man-Made Threats	Terrorist Attack	Cyber Attack	3	3	4	4	2	3.25	A cyber attack is becoming more and more likely to occur. The county does have an information technology department and they report being continuously bombarded by cyber threats. Software is used to minimize the impact, but successful attacks have occurred. No exercises have been conducted.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Marshall	Natural Hazards	Disease	Animal Disease Outbreak	3	3	4	4	2	3.25	Avian flu outbreak in Whitley County in 2015 and Dubois County in 2016.
Marshall	Natural Hazards	Disease	Animal Disease Outbreak	3	3	4	4	2	3.25	The avian flu outbreak in Whitley County in 2015 and Dubois County in 2016, have made us more concerned about the probability of an animal disease outbreak occurring in our county. We have several large confined feeding operations, dairy farms and duck producers located in Marshall County.
Marshall	Natural Hazards	Disease	Animal Disease Outbreak	3	3	4	4	2	3.25	Bird flu outbreak in Whitley County in 2015 and Dubois County in 2016.
Marshall	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	3	4	3	2	3.15	
Marshall	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	3	4	3	2	3.15	Two major interstates run through Marshall County (U.S. 30 and U.S. 31). Two separate incidents in 2007 lead to the evacuation of a strip mall, factories and homes.
Marshall	Natural Hazards	Storms	Tornado EF3 - EF5	2	4	4	4	2	3.1	
Marshall	Natural Hazards	Storms	Tornado EF3 - EF5	2	4	4	4	2	3.1	The Palm Sunday Tornado (F-3) occurred in April of 1965 and struck the northern portion of Marshall County near LaPaz .
Marshall	Technological Hazards	Transportation	Rail Transportation Incident	2	4	4	4	2	3.1	Unit trains of crude oil are being transported on two separate rail road systems through the county.
Marshall	Natural Hazards	Storms	Severe Thunderstorm	3	3	2	3	2	2.85	
Marshall	Natural Hazards	Weather Related	Extreme Temperatures	4	2	1	3	2	2.85	
Marshall	Natural Hazards	Winter Weather	Winter Storms	4	2	1	3	2	2.85	
Marshall	Natural Hazards	Winter Weather	Winter Storms	4	2	1	3	2	2.85	Numerous winter storms have occurred in Marshall County over the past 10 years. Blizzards occurred in 2007, 2011, 2014 and 2015. The 2007 Blizzard event was included as part of a federal disaster declaration for Indiana.
Marshall	Natural Hazards	Weather Related	Extreme Temperatures	4	2	1	3	2	2.85	Marshall County has experienced both extreme high and low temperatures. One

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										death was reported in July of 2011 related to the extreme heat.
Marshall	Natural Hazards	Storms	Severe Thunderstorm	3	3	2	3	2	2.85	Severe Thunderstorms have occurred in the past resulting in damage to homes and businesses. They have damaged or uprooted trees which have caused power outages and blocked roads.
Marshall	Natural Hazards	Disease	Human Disease Outbreak	2	3	4	4	2	2.8	
Marshall	Natural Hazards	Weather Related	Drought	3	3	1	4	2	2.8	
Marshall	Natural Hazards	Winter Weather	Ice Storms	3	3	1	4	2	2.8	
Marshall	Technological Hazards	Fire Incident	Structural Collapse	2	3	4	4	2	2.8	
Marshall	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	4	2	2.8	A functional active shooter exercise was conducted on March 11, 2016 in one of the government office buildings which contains several offices that are crucial to the continuity of local government. After the exercise, we identified significant gaps in our current security capabilities to be able to prevent, respond to, and recover from, an active shooter incident. Recommendations were made during an after action report to add physical protective measures such as a camera based security system and locking devices, in order to better protect the public and government employees from an active shooter.
Marshall	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	4	2	2.8	A functional active shooter exercise was conducted on March 11, 2016 in a government office building which contains several offices that are crucial to the continuity of local government. After the exercise, we identified significant gaps in our current capabilities to be able to prevent, respond to, and recover from, an active shooter incident. Recommendations were made during an after action report to add physical protective measures such as a

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										camera based security system and locking devices, in order to better protect the public and government employees from an active shooter.
Marshall	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	2	2.8	
Marshall	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	2	2.8	While the probability of a domestic terrorism event occurring in our community may be limited, we do have the Culver Military Academy where students from various countries are enrolled. We are also in close proximity to the University of Notre Dame and the AM General plants that produce vehicles for the military.
Marshall	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	2	2.8	
Marshall	Natural Hazards	Winter Weather	Ice Storms	3	3	1	4	2	2.8	Ice storm in December of 2015 caused power outages that lasted for several days, leaving people in cold houses and apartments.
Marshall	Natural Hazards	Disease	Human Disease Outbreak	2	3	4	4	2	2.8	A human disease outbreak is very possible. We had people that were infected with H1N1 back in 2009. We would be taxed to be able to provide adequate resources should a more significant disease outbreak occur.
Marshall	Technological Hazards	Fire Incident	Structural Collapse	2	3	4	4	2	2.8	A structural collapse has not occurred in Marshall County, but is possible and, depending on the structure, may be critical.
Marshall	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	4	2	2.8	A functional active shooter exercise was conducted on March 11, 2016, which included employees from the Marshall County Building and Marshall County Court House/Annex. After the exercise was concluded, an after action review was completed which indicated that this type of event, if it were to occur, would have a significant impact on our ability to provide crucial government services to the citizens of the community. Gaps in our current security measures were identified that included being able to quickly identify

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										threats and implement protective and response actions such as securing the office doors from the inside. The Marshall County Court House/Annex has two security personnel that monitor the entrance door to the building, but cannot adequately monitor other offices including the court rooms in the building. The Marshall County Building has no security personnel and is extremely vulnerable. A corrective action plan was developed which included recommendations to add a digital video security system and locking devices in both buildings and an additional security officer assigned to the county building.
Marshall	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	4	2	2.8	A functional active shooter exercise was conducted on March 11, 2016 which identified significant gaps in our current capabilities to be able to prevent, respond to and recover from an active shooter incident. Recommendations were made during an after action report to add physical protective measures such as a camera based security system and locking devices, to several government facilities in order to better protect employees and the public from an active shooter.
Marshall	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	2	2.8	We have had several bomb threats in the past including threats to the Courthouse and numerous school corporations.
Marshall	Natural Hazards	Weather Related	Drought	3	3	1	4	2	2.8	Droughts have occurred twice in Marshall County, once in October of 2010 and again in June of 2012. Burn bans were implemented in both events. The USDA declared Marshal County a national disaster area during the 2012 event.
Marshall	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	4	2	2.8	A functional active shooter exercise was conducted on March 11, 2016 which identified significant gaps in our current capabilities to be able to prevent, respond to and recover from an active shooter incident. Recommendations were made

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										during an after action report to add physical protective measures such as a camera based security system and locking devices, in order to better protect the public and government employees from an active shooter.
Marshall	Technological Hazards	Fire Incident	Explosion	2	3	4	3	2	2.7	
Marshall	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	3	4	3	2	2.7	
Marshall	Technological Hazards	Infrastructure	Communication Failure	2	3	4	3	2	2.7	
Marshall	Technological Hazards	Infrastructure	Public Utility Failure	2	3	4	3	2	2.7	
Marshall	Natural Hazards	Other	Wild Fire	2	3	4	3	2	2.7	Field fires occur quite frequently. If conditions are right, a field fire could become a significant event.
Marshall	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	3	4	3	2	2.7	We have had numerous incidents involving hazardous materials at fixed facilities that have occurred over the past ten years. The most recent event occurred in August of 2015 involving Anhydrous Ammonia and required the evacuation of a factory in close proximity to the one leaking.
Marshall	Technological Hazards	Infrastructure	Communication Failure	2	3	4	3	2	2.7	While a communications failure is possible, we have never had one occur.
Marshall	Technological Hazards	Infrastructure	Public Utility Failure	2	3	4	3	2	2.7	Numerous storm related power outages have occurred in the past ten years. Public utility failure for an extended period of time will have a critical impact on citizens.
Marshall	Technological Hazards	Fire Incident	Explosion	2	3	4	3	2	2.7	A fire will explosion occurred in December of 2011 at a factory in Bremen.
Marshall	Man-Made Threats	Terrorist Attack	Radiological Attack	1	4	4	4	2	2.65	
Marshall	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	4	4	4	2	2.65	
Marshall	Man-Made Threats	Terrorist Attack	Radiological Attack	1	4	4	4	2	2.65	A terrorist attack using radio active material is unlikely to occur in Marshall County, but may take place in other areas that would have could have an impact on us.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Marshall	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	2	2.65	
Marshall	Technological Hazards	Transportation	Commercial Air Transportation Incident	1	4	4	4	2	2.65	
Marshall	Man-Made Threats	International Terrorism	International Terrorism	1	4	4	4	2	2.65	While the probability of an international terrorism event occurring in our community may be unlikely, we do have the Culver Military Academy where students from various countries are enrolled. We are also in close proximity to the University of Notre Dame and the AM General plants that produce vehicles for the military.
Marshall	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	4	4	4	2	2.65	Unlikely to occur in Marshall County. But may occur in another area and have a significant impact on us.
Marshall	Man-Made Threats	Terrorist Attack	Radiological Attack	1	4	4	4	2	2.65	A terrorist attack using radio active material is unlikely to occur in Marshall County, but may take place in other areas that could have an impact on us.
Marshall	Man-Made Threats	International Terrorism	International Terrorism	1	4	4	4	2	2.65	
Marshall	Man-Made Threats	International Terrorism	International Terrorism	1	4	4	4	2	2.65	While the probability of an international terrorism event occurring in our community may be limited, we do have the Culver Military Academy where students from various countries are enrolled. We are also in close proximity to the University of Notre Dame and the AM General plants that produce vehicles for the military.
Marshall	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	2	2.65	Unlikely to occur, but could occur in other areas that may have an impact on Marshall County.
Marshall	Technological Hazards	Transportation	Commercial Air Transportation Incident	1	4	4	4	2	2.65	Marshall County is located in the commercial air travel routes to three major airports (South Bend International, Chicago O'Hare International and Chicago Midway International), an air transportation accident would be catastrophic, but would most likely impact only a small area of the county.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Marshall	Man-Made Threats	International Terrorism	International Terrorism	1	4	4	4	2	2.65	While the probability of an international terrorism event occurring in our community may be unlikely, we do have the Culver Military Academy where students from various countries are enrolled. We are also in close proximity to the University of Notre Dame as well as the AM General plants that produce vehicles for the military.
Marshall	Man-Made Threats	Terrorist Attack	Conventional Attack	2	3	4	2	2	2.6	
Marshall	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	2	2	2.6	
Marshall	Man-Made Threats	Terrorist Attack	Conventional Attack	2	3	4	2	2	2.6	Homegrown terrorists using conventional weapons is always a possibility.
Marshall	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	2	2	2.6	A mulch fire in June of 2013 at a pallet company burned for 3 days.
Marshall	Natural Hazards	Storms	Severe Thunderstorm	3	2	2	3	2	2.55	
Marshall	Natural Hazards	Flooding	Flash Flood	2	2	4	4	2	2.5	
Marshall	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	2	2	4	4	2	2.5	
Marshall	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	4	2	2.5	
Marshall	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	2	2	4	4	2	2.5	There are two high hazard DAMS located in Marshall County.
Marshall	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	4	2	2.5	Although we have not had a pipeline transportation incident occur, we do have several companies that operate pipelines that are located in Marshall County.
Marshall	Natural Hazards	Flooding	Flash Flood	2	2	4	4	2	2.5	Flash flooding incidents have occurred as recently as June of 2015. These events have been limited to certain areas, but have caused damage to homes, roads, and crops.
Marshall	Natural Hazards	Other	Wild Fire	2	2	4	3	2	2.4	
Marshall	Natural Hazards	Storms	Derecho	2	2	4	3	2	2.4	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Marshall	Man-Made Threats	Fire Incident	Arson	2	2	4	3	2	2.4	We have had large structure fires that were classified as suspicious in both 2008 and and 2013.
Marshall	Man-Made Threats	Police Incident	Hostage Situation	2	2	4	3	2	2.4	
Marshall	Man-Made Threats	Police Incident	Riot	2	2	4	3	2	2.4	
Marshall	Man-Made Threats	Police Incident	Hostage Situation	2	2	4	3	2	2.4	Only a very few hostage situations have been reported over the past several years. While possible, this type of incident would be limited to a small area and would be of limited duration.
Marshall	Man-Made Threats	Police Incident	Riot	2	2	4	3	2	2.4	No riots have occurred in Marshall County.
Marshall	Man-Made Threats	Fire Incident	Arson	2	2	4	3	2	2.4	
Marshall	Natural Hazards	Storms	Derecho	2	2	4	3	2	2.4	A Derecho event occurred in June of 2010 and caused damage in the Plymouth and Culver area. Power was out in the town of Culver for almost 3 days.
Marshall	Man-Made Threats	Fire Incident	Arson	2	2	4	3	2	2.4	We have had large structure fires that were classified as suspicious in both 2008 and and 2012.
Marshall	Man-Made Threats	Terrorist Attack	Chemical Attack	1	3	4	4	2	2.35	
Marshall	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	3	4	4	2	2.35	
Marshall	Man-Made Threats	Terrorist Attack	Explosive Attack	1	3	4	4	2	2.35	
Marshall	Natural Hazards	Earthquake	Earthquake MMI V to VI	1	3	4	4	2	2.35	
Marshall	Natural Hazards	Flooding	Major Flood	2	3	1	4	2	2.35	
Marshall	Natural Hazards	Storms	Geomagnetic Storm	2	3	1	4	2	2.35	
Marshall	Man-Made Threats	Terrorist Attack	Biological Attack	1	3	4	4	2	2.35	
Marshall	Man-Made Threats	Terrorist Attack	Biological Attack	1	3	4	4	2	2.35	A biological attack has never occurred and is highly unlikely to occur.
Marshall	Man-Made Threats	Terrorist Attack	Chemical Attack	1	3	4	4	2	2.35	Although unlikely to occur, chemicals are readily available and an attack would have a

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										significant impact on our community that would have long term psychological consequences.
Marshall	Man-Made Threats	Terrorist Attack	Biological Attack	1	3	4	4	2	2.35	
Marshall	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	3	4	4	2	2.35	Unlikely to occur in Marshall County.
Marshall	Man-Made Threats	Terrorist Attack	Explosive Attack	1	3	4	4	2	2.35	Unlikely to occur in Marshall County
Marshall	Natural Hazards	Storms	Geomagnetic Storm	2	3	1	4	2	2.35	Geomagnetic storms could disrupt communications equipment which would be problematic for emergency response personnel.
Marshall	Natural Hazards	Earthquake	Earthquake MMI V to VI	1	3	4	4	2	2.35	Unlikely to occur, but we may occur in other areas that could impact Marshall County.
Marshall	Natural Hazards	Flooding	Major Flood	2	3	1	4	2	2.35	There have been 5 major flooding events in the past 10 years that have occurred in Marshall County. Two events in 2008 were recognized as part of federal disaster declarations.
Marshall	Technological Hazards	Transportation	Highway Transporation Incident	2	2	4	2	2	2.3	
Marshall	Man-Made Threats	Police Incident	Other Violent Offenders	2	2	4	2	2	2.3	
Marshall	Man-Made Threats	Police Incident	Other Violent Offenders	2	2	4	2	2	2.3	Other violent offenses such as robberies and assaults . The impact is limited and the duration is typically less than 1 hr.
Marshall	Man-Made Threats	Police Incident	Other Violent Offenders	2	2	4	2	2	2.3	Other violent offenses such as robberies and assaults have occurred, but the impact is limited and the duration is typically less than 1 hr.
Marshall	Technological Hazards	Transportation	Highway Transporation Incident	2	2	4	2	2	2.3	Highway accidents occur quite frequently in Marshall County, but are limited to the specific site and are normally resolved in less than a day.
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Animal	2	2	1	4	2	2.05	
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Aquatic	2	2	1	4	2	2.05	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Insect	2	2	1	4	2	2.05	
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Insect	2	2	1	4	2	2.05	The Emerald Ash Bore is already present in Marshall County.
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Plant	2	2	1	4	2	2.05	
Marshall	Natural Hazards	Storms	Tropical Cyclone Remnants	2	2	1	4	2	2.05	
Marshall	Natural Hazards	Storms	Tropical Cyclone Remnants	2	2	1	4	2	2.05	Heavy rain and flooding are possible with remnants of tropical cyclone/storm.
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Animal	2	2	1	4	2	2.05	An invasive animal species is possible, but would have limited impact.
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Aquatic	2	2	1	4	2	2.05	Nuisance species such as zebra mussels are already found in lakes in Marshall County.
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Insect	2	2	1	4	2	2.05	The Emerald Ash Borer and Gypsy moth are already present in Marshall County.
Marshall	Natural Hazards	Flora and Fauna	Invasive Species - Plant	2	2	1	4	2	2.05	Purple Loosestrife is found in Marshall County and can impact the local native plants and the wildlife that depend on them.
Marshall	Natural Hazards	Other	Ground Failure	1	2	4	3	2	1.95	
Marshall	Natural Hazards	Other	Ground Failure	1	2	4	3	2	1.95	Marshall County topography is relatively flat making ground failure an unlikely event.
Marshall	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	1	4	1	2	1.9	Although we have had some people report feeling earthquakes that originated near Kokomo in 2010 and near Galesburg, MI, in 2015, no damage was reported.
Marshall	Natural Hazards	Earthquake	Earthquake MMI I to IV	1	1	4	1	2	1.45	
Marshall	Technological Hazards	Transportation	Marine Transportation Incident	1	1	4	1	2	1.45	
Marshall	Technological Hazards	Transportation	Marine Transporation Incident	1	1	4	1	2	1.45	We do not have commercial shipping in Marshall County.
Miami	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	3	4	
Miami	Natural Hazards	Flooding	Flash Flood	4	3	3	3	3	3.45	The Eel, Wabash, and Mississinewa Rivers have the same flood potential each year during heavy sustained rainfall upstream.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										Pipe Creek and Little Pipe Creeks regularly go out of bank during sustained local rainfall and/or flash flooding. Last year, Miami County received record rainfall and inflow amounts into the Mississinewa Reservior which saw the J.E. Roush, Salamonie, and Mississinewa dams all at or slightly above PEAK CAPACITY.
Miami	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	4	1	3	3.4	
Miami	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	1	3	3.1	
Miami	Natural Hazards	Winter Weather	Winter Storms	4	1	3	3	3	2.85	
Miami	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	3	4	1	3	2.5	Most Hazmat incidents in the county are due to transportation accidents. This is monitored and documented and responded to by the LEPC. However, Miami County does have a major Norfolk Southern railway going east and west through it that now has the Balken Crude Oil shipments going through the largest county incorporated area (City of Peru). Potential of Magnitude/Severity as well as Duration of event could reach level 4 if hazmat took place.
Miami	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	2	4	1	3	2.2	Miami County is known to be part of the Wabash Valley and New Madrid seismic zones.
Monroe	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	3	8	3.3	Based on MHMP threat assessment
Monroe	Technological Hazards	Transportation	Highway Transporation Incident	4	2	4	2	8	3.2	From LEPC ERP.
Monroe	Natural Hazards	Flooding	Flash Flood	3	3	4	3	8	3.15	Based on MHMP threat assessment
Monroe	Natural Hazards	Other	Ground Failure	3	2	4	4	8	2.95	Based on MHMP threat assessment
Monroe	Technological Hazards	Transportation	Rail Transportation Incident	3	2	4	4	8	2.95	From LEPC ERP. Information provided by Indiana Railroad. Plus AARs from two derailments in the county in the last 5 years.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Monroe	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	2	4	3	8	2.85	From LEPC ERP.
Monroe	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	3	4	4	8	2.8	Based MHMP threat assessment
Monroe	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	3	4	4	8	2.8	Based on MHMP threat assessment
Monroe	Technological Hazards	Infrastructure	Communication Failure	2	3	4	4	8	2.8	ESF 2 Communications primary and supporting agency evaluation.
Monroe	Technological Hazards	Transportation	Pipeline Transportation Incident	2	3	4	4	8	2.8	From LEPC ERP. Also from annual program with Pipeline Companies with infrastructure in Monroe County.
Monroe	Technological Hazards	Fire Incident	Explosion	2	3	4	4	8	2.8	Based on MHMP threat assessment
Monroe	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	4	8	2.8	Based on MHMP threat assessment
Monroe	Technological Hazards	Transportation	Marine Transporation Incident	3	2	4	2	8	2.75	From LEPC ERP.
Monroe	Natural Hazards	Storms	Derecho	2	3	4	3	8	2.7	Based on MHMP threat assessment
Monroe	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	3	4	3	8	2.7	From LEPC ERP.
Monroe	Technological Hazards	Fire Incident	Explosion	2	3	4	3	8	2.7	Fire service estimates.
Monroe	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	8	2.65	Based on MHMP threat assessment
Monroe	Natural Hazards	Winter Weather	Winter Storms	3	2	2	3	8	2.55	Based on MHMP threat assessment
Monroe	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	2	4	4	8	2.5	From historical data.
Monroe	Natural Hazards	Winter Weather	Ice Storms	2	3	2	4	8	2.5	Based on MHMP threat assessment
Monroe	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	2	4	4	8	2.5	Based on MHMP threat assessment
Monroe	Natural Hazards	Storms	Tornado EF0 - EF2	2	2	4	3	8	2.4	Based on MHMP threat assessment

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Monroe	Technological Hazards	Infrastructure	Public Utility Failure	2	2	4	3	8	2.4	ESF 11 Energy primary and support agency evaluation.
Monroe	Technological Hazards	Transportation	Commercial Air Transportation Incident	2	2	4	3	8	2.4	Monroe County airport and fire departments input.
Monroe	Technological Hazards	Fire Incident	Structural Collapse	2	2	4	3	8	2.4	Based on MHMP threat assessment
Monroe	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	2	4	3	8	2.4	Fire Service input.
Monroe	Natural Hazards	Storms	Tornado EF3 - EF5	1	3	4	4	8	2.35	Based on MHMP threat assessment
Monroe	Technological Hazards	Dams and Levees	High Hazard Dam - (State owned)	1	3	4	4	8	2.35	Based on MHMP threat assessment
Monroe	Man-Made Threats	Terrorist Attack	Biological Attack	1	3	4	4	8	2.35	DHS assessments
Monroe	Technological Hazards	Fire Incident	Structural Collapse	1	3	4	3	8	2.25	Discussion with BFD structural team input. Earthquake risk greatest possibility for collapse.
Monroe	Natural Hazards	Weather Related	Extreme Temperatures	2	2	2	4	8	2.2	Based on MHMP threat assessment
Monroe	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	1	3	3	4	8	2.2	Based on MHMP threat assessment
Monroe	Natural Hazards	Weather Related	Drought	2	2	1	4	8	2.05	Based on MHMP threat assessment
Monroe	Man-Made Threats	International Terrorism	International Terrorism	1	2	4	3	8	1.95	DHS threat information
Montgomery	Natural Hazards	Storms	Tornado EF0 - EF2	4	4	4	4	4	4	On August 24, 2016 at approx. 2:30 PM an EF-2 tornado ripped through 6.2 miles of Montgomery County, mainly Linnsburg and along US 136 East between Mace and New Ross. The storm caused damage to homes (several demolished), corn silos, trees, fiber optic lines, electrical lines, and major crop loss. The duration of the actual tornado was only a few minutes, but the response and recovery lasted for up to a week- 10 days. Electricity was knocked out for up to 12 hours at some homes. This tornado complex is the same one that hit Kokomo after traveling through Clinton County. Resources were taxed,

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Montgomery	Technological Hazards	Infrastructure	Public Utility Failure	4	4	4	3	4	3.9	Source: Montgomery County All-Hazards Mitigation Plan. Montgomery County has 20 Power Substations. Montgomery County receives electricity from many sources including Duke Energy, Parke County REMC, Public Service of Indiana, Tipmont REMC, Wabash Valley Power Associations. Crawfordsville Electric Light and Power is the source for the City of Crawfordsville and produces some of it's own electricity. Crawfordsville is unique in the fact that it still city owned.
Montgomery	Man-Made Threats	Police Incident	Other Violent Offenders	4	4	4	3	4	3.9	Source: Montgomery County EMA Event Action Plans: Montgomery County hosts several events that draw in up to 25,000 people. These are national events that tax our law enforcement resources and clog major state highways. Montgomery County does not own 1 portable lighted road sign to put in highways to help direct/divert traffic leaving our law enforcement partners on the State Highways and county roads to direct traffic.
Montgomery	Natural Hazards	Flooding	Major Flood	4	4	3	3	4	3.75	The Lafayette Avenue bridge was closed to vehicular traffic. Nearby softball diamonds were under water and the Creekside Restaurant was inaccessible. A local campground along Sugar Creek has had numerous evacuations with property damage to camping trailers due to flooding. March of 2013
Montgomery	Natural Hazards	Flooding	Major Flood	4	4	3	3	4	3.75	The Lafayette Avenue bridge was closed to vehicular traffic. Nearby softball diamonds were under water and the Creekside Restaurant was inaccessible. A local campground along Sugar Creek has had numerous evacuations with property damage to camping trailers due to flooding.
Montgomery	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	3	4	3.6	Several disturbances of Thunderstorm Wind move across our area on a regular basis from early Spring to as late as November. Tornadoes have been reported as early as

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										February. Waves of showers and thunderstorms moved across central Indiana on July 13 and into the early morning of July 14. Upper level features interacted with a surface front and plenty of moisture and instability to generate severe weather and heavy rains/flooding. Three tornadoes occurred in counties surrounding Montgomery Widespread tree and power line damage occurred across central Indiana, and some locations received over 4 inches of rain. A few locations had hail as well. The heavy rain led to flooding in many areas.
Montgomery	Technological Hazards	Infrastructure	Communication Failure	3	4	4	4	4	3.55	The Montgomery County Emergency Operations Center is the hub of resources for public safety entities. The operation center is crucial for restoration of critical infrastructure, communications, and other vital needs. The EOC is in need of upgrades to ensure it will be able to operate.
Montgomery	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	3	4	4	3	4	3.45	Source Montgomery County Mitigation Plan. Montgomery County is home of 51 Hazardous Material Handlers. A large amount of anhydrous ammonia moves through Montgomery County for farm access and cooling within factories.
Montgomery	Technological Hazards	Transportation	Rail Transportation Incident	2	4	4	4	4	3.1	Resource: CSX Commodities Flow Study and IDHS Bakken Crude by Rail Hazard Vulnerability Analysis. Montgomery County rated 1.67 in overall hazard score.
Montgomery	Technological Hazards	Transportation	Rail Transportation Incident	2	4	4	4	4	3.1	CSX Commodity Flow Study. Montgomery County rail carload % of total hazmat of 76.4% of hazard class 3 alcohols N.O.S.
Montgomery	Technological Hazards	Transportation	Commercial Air Transportation Incident	2	4	4	3	4	3	The City of Crawfordsville Municipal Airport is a public use airport located 4 miles south of the central business district of Crawfordsville. The Airport has a new runway extension addition of 5,502 feet long allowing corporate or commercial jets to land at our airport. Already the longer runway is having a simulative effect on local

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										businesses. After inquiring if the longer runway would be available, a local business scheduled the arrival of several big jets for a business conference. Air traffic numbers will rise along with the possibility of a hazard or incident.
Montgomery	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	3	4	4	4	2.8	Montgomery County hosts 10 DAMS. According to the Mitigation Hazard Plan, the Crawfordsville Community Sportmen's Club Lake Dam is not in compliance per the Indiana Department of Natural Resources. The lake was court ordered to be brought to a lower level by draining some of the water from it. The Sportmen's Club is a private dam and has very little money for completed work to bring this dam back into regulation status.
Newton	Natural Hazards	Disease	Animal Disease Outbreak	4	4	4	4	1	4	Heavily agriculture based industry, one of states largest dairy producers, hog operations and a large egg facility. During out breaks of mad cow diseases and now bird disease, has caused facilites to limit access to facilities. Plans are in place for the larger facilities, which with the assistance for BOAH can work with the smaller livestock operations. Now becoming the nations largest agritourism and farming educational. Bringing this a international agriculture view with the cooperative of the agriculture marketing groups.
Newton	Natural Hazards	Disease	Animal Disease Outbreak	4	4	4	4	1	4	
Newton	Natural Hazards	Disease	Animal Disease Outbreak	4	4	4	4	1	4	Heavily agriculture based industry, one of states largest dairy producers, hog operations and a large egg facility. During out breaks of mad cow diseases and now bird disease, has caused facilites to limit access to facilities. Plans are in place for the larger facilities, which with the assistance for BOAH can work with the smaller livestock operations. Now becoming the nations largest agritourism.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Newton	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	4	4	4	4	1	4	Mutiple 30,000 gallon LP and Anhydrous tanks through out the county. One 135,000 gallon tank of Aqueous Ammonnia. Plus Fertilizer facilites and multiple large farms with mixture of farming chemicals.
Newton	Technological Hazards	Transportation	Rail Transportation Incident	4	4	4	3	1	3.9	Train line carrying chemicals from commerical to industrial grade. Two tracks both going through larger communities of the county. Also a Amtrek route through the nothern part of the county.
Newton	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	4	1	3.7	Power lines and deris issues, since we are a lower populated county. some areas may not see service for several days.
Newton	Technological Hazards	Transportation	Highway Transporation Incident	4	3	4	3	1	3.6	Interstate, US highways and State Roads are heavily traveled routes for chemicals through the midwest states. Amtrak runs through the county besides the occassional car vs train. We did have a Amtrak vs Semi which was carrying Hazardous Materials. We lack resources in monitoring and assessment, due to our distance from resources.
Newton	Technological Hazards	Fire Incident	Explosion	3	4	4	4	1	3.55	Grain elevators in heavily populated area of the county. Should a grain dust explosion take place or fire on the grounds causing explosion. May not give enough time for evacuation.
Newton	Technological Hazards	Transportation	Commercial Air Transportation Incident	3	4	4	4	1	3.55	Airline holding pattern Newton County has had a commercial airline crash in farm field. We lack resources in monitoring and assessment, due to our distance from resources.
Newton	Technological Hazards	Transportation	Pipeline Transportation Incident	3	4	4	4	1	3.55	Two major pipelines plus several in adancent counties. Where the two pipelines cross is a facility to where Enterprise Products transfers contents to Kinder Morgan creating an additional risk with products.
Newton	Natural Hazards	Storms	Tornado EF3 - EF5	3	4	4	4	1	3.55	
Newton	Technological Hazards	Infrastructure	Public Utility Failure	3	4	4	3	1	3.45	Experienced large populated area of the county, however due massive spread of ice

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										storm, our county less populated went several days without primary utlity company able to handle our needs of power poles down and the county went over a month in some locations before power restored.
Newton	Natural Hazards	Flooding	Flash Flood	3	3	4	4	1	3.25	Flood affecting residential areas along the Kankakee and Iroquois Rivers, when we reach this state of threat, ususally due from numeous days of heavy rains.
Newton	Natural Hazards	Storms	Tornado EF0 - EF2	3	3	4	3	1	3.15	All Communities have been hit by this lower scale of a tornado, usually causes trees falling on building damages or some minor structural damages to homes and businesses.
Newton	Natural Hazards	Winter Weather	Winter Storms	3	3	4	3	1	3.15	Usually once a year experience winter weather event, causing resources to be exhausted, INDOT minimized and utilizing our highway crews, law enforcement, Fire and EMS personnel to be on not only working county roadways but state roads also due to limited state assigned resources.
Newton	Natural Hazards	Disease	Human Disease Outbreak	3	3	3	4	1	3.1	Heavily commuter based population. over 70% of working population works out side of Newton County. higher level education is an issue. Population will tavel and bring back diseases from higher populated areas. Northwest Indiana and Lafayette areas primarily.
Newton	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	3	1	2.7	Active Shooter within the schools or worship. Community is highly populated with sportsman and shooting enthusiast.
Newton	Man-Made Threats	Fire Incident	Arson	2	2	4	3	1	2.4	Fires in the subdivsion areas and in the state parks. The subdivision are usually built in heavily wooded areas, which allows for fuel loads from the years of leaves and many are heavily populated with pines. During drought times we have residential property at risk. Education on burning is the best prevention and clean property so dry leaves are not built up around homes.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Noble	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	4	4	4	3	3.1	This is based on a review of our 2015 Multi-Hazard Mitigation Plan (MHMP) along with real-world Incidents. this technological hazard has not only a potential life-safety impact but also an economic one. A large transportation incident depending on the location, could cause industry to shut down for and extended period of time.
Noble	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	4	4	4	3	3.1	This is based on our review of assessments in our Multi-Hazard Mitigation Plan (MHMP), exercisees and real-world incidents.
Noble	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	3	4	3	3	2.7	This is based on a review of our 2015 Multi-Hazard Mitigation Plan (MHMP) along with real-world Incidents. this technological hazard has not only a potential life-safety impact but also an economic one. A large fixed-facility incident depending on the location, would cause neighboring industries to shut down for an extended period of time.
Noble	Natural Hazards	Winter Weather	Winter Storms	2	4	2	3	3	2.7	This is based on a review of our 2015 Multi-Hazard Mitigation Plan (MHMP) along with real-world Incidents. this natural hazard has potentially both a life-safety and economic impact.
Noble	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	3	4	3	3	2.7	
Noble	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	3	4	3	3	2.7	This is based on a review of our 2015 Multi-Hazard Mitigation Plan (MHMP) along with real-world Incidents. this technological hazard has potentially both a life-safety and economic impact.
Noble	Natural Hazards	Storms	Severe Thunderstorm	2	4	2	1	3	2.5	This is based on a review of our 2015 Multi-Hazard Mitigation Plan (MHMP) along with real-world Incidents.
Noble	Natural Hazards	Earthquake	Earthquake MMI I to IV	1	3	4	4	3	2.35	This is based on a review of our Multi-Hazard Mitigation Plan (MHMP) and real-world events. While Noble County Is Not in an extreme-danger earthquake zone, the threat is that an earthquake in another area

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										could affect the power/gas/communications systems. While Noble County Might Not Have Physical Damage from the earthquake it would still be affected by these loss of service.
Noble	Natural Hazards	Storms	Tornado EF0 - EF2	1	3	4	3	3	2.25	This self-assessment is based on a review of our Multi-Hazard Mitigation Plan (MHMP) and real-world incidents. In 2016 noble County had its first tornado since 2001. The damage was significant to approximately a dozen structures but there were no injuries. The probability of another tornado is not high but it certainly is a possibility. For this reason we have included it in our self-assessment.
Noble	Natural Hazards	Earthquake	Earthquake MMI I to IV	1	2	4	4	3	2.05	This is based on a review of our Multi-Hazard Mitigation Plan (MHMP) and real-world events. While Noble County Is Not in an extreme-danger earthquake zone, the threat is that an earthquake in another area could affect the power/gas/communications systems. While Noble County Might Not Have Physical Damage from the earthquake it would still be affected by these loss of service.
Noble	Natural Hazards	Flooding	Major Flood	1	2	2	4	3	1.75	This is based on a review of our 2015 Multi-Hazard Mitigation Plan (MHMP) along with real-world Incidents.
Noble	Natural Hazards	Weather Related	Drought	1	2	1	4	3	1.6	This is based on a review of our Multi-Hazard Mitigation Plan (MHMP) and real-world events.
Noble	Natural Hazards	Weather Related	Extreme Temperatures	1	2	1	4	3	1.6	This is based on a review of our Multi-Hazard Mitigation Plan (MHMP) and real-world events.
Ohio	Natural Hazards	Flooding	Flash Flood	3	2	4	4	9	2.95	
Ohio	Natural Hazards	Winter Weather	Ice Storms	3	3	2	3	9	2.85	
Ohio	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	4	9	2.8	
Ohio	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	3	4	4	9	2.8	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Ohio	Natural Hazards	Storms	Severe Thunderstorm	4	2	1	2	9	2.75	
Ohio	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	1	3	4	2	9	2.15	
Ohio	Man-Made Threats	International Terrorism	International Terrorism	1	2	4	4	9	2.05	
Ohio	Man-Made Threats	Terrorist Attack	Chemical Attack	1	2	4	4	9	2.05	
Ohio	Man-Made Threats	Terrorist Attack	Conventional Attack	1	2	4	4	9	2.05	
Parke	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	7	4	
Perry	Natural Hazards	Flooding	Major Flood	4	3	2	4	10	3.4	Based on MHMP
Perry	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	4	1	10	3.4	Based on MHMP
Perry	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	4	1	10	3.4	
Perry	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	1	10	3.4	Based on MHMP
Perry	Natural Hazards	Earthquake	Earthquake MMI I to IV	3	3	4	4	10	3.25	Based on MHMP
Perry	Natural Hazards	Winter Weather	Winter Storms	4	1	3	3	10	2.85	Based on MHMP
Perry	Natural Hazards	Earthquake	Earthquake MMI I to IV	3	2	4	2	10	2.75	Based on MHMP
Perry	Natural Hazards	Storms	Severe Thunderstorm	3	2	4	1	10	2.65	Based on MHMP
Perry	Natural Hazards	Other	Wild Fire	3	2	4	1	10	2.65	Based on MHMP and Hoosier National Forest.
Perry	Natural Hazards	Other	Ground Failure	3	1	1	1	10	1.9	Based on MHMP
Perry	Natural Hazards	Weather Related	Drought	1	2	1	4	10	1.6	Based on MHMP
Perry	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	1	1	4	2	10	1.55	Based on MHMP
Pike	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	10	4	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Pike	Natural Hazards	Flooding	Flash Flood	4	4	4	4	10	4	
Pike	Natural Hazards	Storms	Tornado EF0 - EF2	4	4	4	4	10	4	
Pike	Natural Hazards	Storms	Tornado EF3 - EF5	4	4	4	4	10	4	
Pike	Technological Hazards	Fire Incident	Large Fire/Conflagration	4	4	4	4	10	4	
Pike	Man-Made Threats	Police Incident	Other Violent Offenders	4	4	4	2	10	3.8	
Pike	Technological Hazards	Fire Incident	Structural Collapse	4	4	4	2	10	3.8	
Pike	Technological Hazards	Transportation	Highway Transporation Incident	4	3	4	4	10	3.7	
Pike	Technological Hazards	Infrastructure	Communication Failure	4	4	4	1	10	3.7	
Pike	Natural Hazards	Earthquake	Earthquake MMI I to IV	3	4	4	4	10	3.55	
Pike	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	3	4	2	10	3.5	Local Law Enforcement and the Court System deal with Dissolutions daily knowing that the situation could become dangerous to everyone.
Pike	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	3	4	2	10	3.5	Local Law Enforcement and the Court System deal with Dissolutions daily.
Pike	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	3	4	2	10	3.5	
Pike	Natural Hazards	Weather Related	Extreme Temperatures	4	2	4	3	10	3.3	
Pike	Technological Hazards	Transportation	Rail Transportation Incident	3	3	4	3	10	3.15	
Pike	Man-Made Threats	Terrorist Attack	Biological Attack	2	4	4	4	10	3.1	
Pike	Natural Hazards	Disease	Animal Disease Outbreak	2	4	4	4	10	3.1	
Pike	Natural Hazards	Storms	Severe Thunderstorm	4	2	3	2	10	3.05	
Pike	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	3	4	2	10	3.05	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Pike	Natural Hazards	Winter Weather	Winter Storms	3	3	3	3	10	3	
Pike	Man-Made Threats	Police Incident	Other Violent Offenders	2	4	4	2	10	2.9	
Pike	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	3	2	3	10	2.85	We currently do not have any Hazmat technicians or DECON teams in the county. We have to rely on a team responding from another county.
Pike	Man-Made Threats	Terrorist Attack	Explosive Attack	2	3	4	4	10	2.8	
Pike	Natural Hazards	Flooding	Major Flood	2	3	4	4	10	2.8	
Pike	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	3	4	4	10	2.8	
Pike	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	2	4	2	10	2.75	
Pike	Technological Hazards	Infrastructure	Public Utility Failure	3	2	4	2	10	2.75	
Pike	Man-Made Threats	Police Incident	Riot	2	4	3	2	10	2.75	
Pike	Man-Made Threats	Fire Incident	Arson	3	2	4	2	10	2.75	
Pike	Natural Hazards	Other	Wild Fire	2	3	4	3	10	2.7	
Pike	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	10	2.65	
Pike	Technological Hazards	Fire Incident	Explosion	1	4	4	4	10	2.65	
Pike	Man-Made Threats	Police Incident	Hostage Situation	2	3	4	2	10	2.6	
Pike	Man-Made Threats	International Terrorism	International Terrorism	2	2	4	4	10	2.5	
Pike	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	4	10	2.5	
Pike	Man-Made Threats	Terrorist Attack	Conventional Attack	2	2	4	4	10	2.5	
Pike	Man-Made Threats	Terrorist Attack	Cyber Attack	2	2	4	4	10	2.5	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Pike	Natural Hazards	Disease	Human Disease Outbreak	2	2	4	4	10	2.5	
Pike	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	4	10	2.5	
Pike	Natural Hazards	Weather Related	Drought	2	2	3	4	10	2.35	
Pike	Technological Hazards	Dams and Levees	High Hazard Dam - (State owned)	2	3	1	4	10	2.35	
Pike	Technological Hazards	Dams and Levees	High Hazard Dam - (non-regulated state owned)	2	3	1	4	10	2.35	
Pike	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	2	3	1	4	10	2.35	
Pike	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	2	10	2.3	
Pike	Natural Hazards	Winter Weather	Ice Storms	2	2	3	3	10	2.25	
Pike	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	3	1	3	10	2.25	
Pike	Natural Hazards	Storms	Derecho	2	2	3	2	10	2.15	
Pike	Technological Hazards	Dams and Levees	Major Levee Failure - (Non-accredited)	1	3	3	3	10	2.1	
Pike	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	2	4	4	10	2.05	
Pike	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	2	4	4	10	2.05	
Pike	Man-Made Threats	Terrorist Attack	Radiological Attack	1	2	4	4	10	2.05	
Pike	Natural Hazards	Other	Ground Failure	1	2	4	4	10	2.05	
Pike	Natural Hazards	Flora and Fauna	Invasive Species - Animal	1	2	4	3	10	1.95	
Pike	Technological Hazards	Transportation	Commercial Air Transportation Incident	1	2	4	3	10	1.95	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Pike	Technological Hazards	Dams and Levees	Major Levee Failure - (Accredited)	1	3	1	4	10	1.9	
Pike	Natural Hazards	Flora and Fauna	Invasive Species - Insect	1	2	3	3	10	1.8	
Pike	Technological Hazards	Transportation	Marine Transporation Incident	1	1	4	2	10	1.55	
Pike	Natural Hazards	Storms	Tropical Cyclone Remnants	1	1	2	2	10	1.25	
Pike	Natural Hazards	Storms	Geomagnetic Storm	1	1	2	2	10	1.25	
Pike	Natural Hazards	Flora and Fauna	Invasive Species - Plant	1	1	1	3	10	1.2	
Pike	Natural Hazards	Storms	Seiche	1	1	2	1	10	1.15	
Pike	Natural Hazards	Flora and Fauna	Invasive Species - Aquatic	1	1	1	1	10	1	
Posey	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	2	10	3.2	
Posey	Technological Hazards	Fire Incident	Large Fire/Conflagration	3	3	4	3	10	3.15	
Posey	Natural Hazards	Storms	Tornado EF0 - EF2	3	3	4	2	10	3.05	
Posey	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	3	3	4	2	10	3.05	
Posey	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	3	4	2	10	3.05	
Posey	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	4	4	3	10	3	
Posey	Natural Hazards	Earthquake	Earthquake MMI VII to X	2	4	4	3	10	3	
Posey	Natural Hazards	Storms	Tornado EF3 - EF5	2	4	4	2	10	2.9	
Posey	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	2	10	2.6	
Posey	Natural Hazards	Flooding	Major Flood	3	2	1	4	10	2.5	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Pulaski	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	2	4	
Pulaski	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	4	4	4	2	3.1	
Pulaski	Natural Hazards	Storms	Tornado EF3 - EF5	2	4	4	4	2	3.1	
Pulaski	Man-Made Threats	Terrorist Attack	Cyber Attack	2	4	4	4	2	3.1	
Pulaski	Technological Hazards	Infrastructure	Communication Failure	2	4	4	3	2	3	
Pulaski	Natural Hazards	Winter Weather	Ice Storms	3	3	2	3	2	2.85	
Pulaski	Natural Hazards	Storms	Tornado EF0 - EF2	2	3	4	4	2	2.8	
Pulaski	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	3	4	3	2	2.7	
Pulaski	Natural Hazards	Flooding	Flash Flood	2	3	3	4	2	2.65	
Pulaski	Man-Made Threats	Terrorist Attack	Biological Attack	1	4	4	4	2	2.65	
Pulaski	Natural Hazards	Disease	Animal Disease Outbreak	2	3	3	4	2	2.65	
Pulaski	Natural Hazards	Winter Weather	Winter Storms	3	2	2	3	2	2.55	
Pulaski	Natural Hazards	Flooding	Major Flood	3	2	1	4	2	2.5	
Pulaski	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	4	2	2.5	Several local businesses use and store hazardous materials
Pulaski	Natural Hazards	Disease	Human Disease Outbreak	1	3	4	4	2	2.35	
Pulaski	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	2	4	2	2	2.3	Pulaski County as 2 US routes that are heavily traveled
Pulaski	Natural Hazards	Weather Related	Drought	2	2	1	4	2	2.05	
Randolph	Technological Hazards	Infrastructure	Communication Failure	4	3	4	3	6	3.6	Randolph County's communication infrastructure, like much of the United States, is old and need of repair/replacement especially in the

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										emergency services field. VHF voters and repeaters are aging and are in need of replacement, but budgets continue to push the short-term repair. Randolph County has experienced server crashes where email servers were lost and had to be replaced, with some offices being down for a week.
Randolph	Technological Hazards	Infrastructure	Communication Failure	4	3	4	3	6	3.6	Randolph County's communication infrastructure, like much of the United States, is old and need of repair/replacement especially in the emergency services field. VHF voters and repeaters are aging and are in need of replacement, but budgets continue to push the short-term repair. Randolph County has experienced server crashes where email servers were lost and had to be replaced, with some offices being down for a week.
Randolph	Man-Made Threats	Terrorist Attack	Cyber Attack	4	2	4	3	6	3.3	Cyber attacks have been occurring locally with great frequency. The attacks are mostly ransomware events where county computers are attacked for cash ransom. The severity is often limited to a few departments that open unknown emails that launch the attacks.
Randolph	Man-Made Threats	Terrorist Attack	Cyber Attack	4	2	4	3	6	3.3	Cyber attacks have been occurring locally with great frequency. The attacks are mostly ransomware events where county computers are attacked for cash ransom. The severity is often limited to a few departments that open unknown emails that launch the attacks.
Randolph	Natural Hazards	Flora and Fauna	Invasive Species - Insect	4	2	4	2	6	3.2	Randolph County has had multiple reports of bed bugs invading homes, emergency rooms, and ambulances that transport the sick/injured. We're also aware of the mosquito movement that is bringing the Zika Virus to the continental United States. Thus we rate invasive insects as high.
Randolph	Natural Hazards	Flora and Fauna	Invasive Species - Insect	4	2	4	2	6	3.2	Randolph County has had multiple reports of bed bugs invading homes, emergency rooms, and ambulances that transport the

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										sick/injured. We're also aware of the mosquito movement that is bringing the Zika Virus to the continental United States. Thus we rate invasive insects as high.
Randolph	Natural Hazards	Flooding	Flash Flood	4	2	3	3	6	3.15	Flash flooding occurs often in Randolph County. Typical flooding is to agricultural fields and across roadways that are known for flooding. There can be rescues related to this flooding but typically no injuries. Flooding typically reduces within 24 hours.
Randolph	Natural Hazards	Flooding	Flash Flood	4	2	3	3	6	3.15	Flash flooding occurs often in Randolph County. Typical flooding is to agricultural fields and across roadways that are known for flooding. There can be rescues related to this flooding but typically no injuries. Flooding typically reduces within 24 hours.
Randolph	Technological Hazards	Transportation	Highway Transporation Incident	3	3	4	2	6	3.05	Randolph County has been experiencing a higher than usual crash rate involving commercial motor vehicles and passenger vehicles. Several have resulted in fatal injuries to those involved. Any commercial vehicle incident involving hazardous materials typically result in a multi-hour event.
Randolph	Technological Hazards	Transportation	Highway Transporation Incident	3	3	4	2	6	3.05	Randolph County has been experiencing a higher than usual crash rate involving commercial motor vehicles and passenger vehicles. Several have resulted in fatal injuries to those involved. Any commercial vehicle incident involving hazardous materials typically result in a multi-hour event.
Randolph	Natural Hazards	Storms	Geomagnetic Storm	4	1	4	3	6	3	Geomagnetic storms have been occurring frequently, so much the IDHS places it in their daily report. While the probability is high, the severity is negligible.
Randolph	Natural Hazards	Storms	Geomagnetic Storm	4	1	4	3	6	3	Geomagnetic storms have been occurring frequently, so much the IDHS places it in their daily report. While the probability is high, the severity is negligible.
Randolph	Natural Hazards	Winter Weather	Ice Storms	3	2	4	4	6	2.95	The threat of ice storms occurs yearly during the winter. While they often are not

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										severe, they do pose a limited threat due to critical infrastructure failure; primarily power. The last ice storm had Randolph County without power for up to 5 days in certain locations.
Randolph	Natural Hazards	Winter Weather	Ice Storms	3	2	4	4	6	2.95	The threat of ice storms occur yearly during the winter. While they often are not severe, they do pose a limited threat due to critical infrastructure failure; primarily power. The last ice storm had Randolph County without power for up to 5 days in certain locations.
Randolph	Technological Hazards	Fire Incident	Large Fire/Conflagration	3	2	4	3	6	2.85	Randolph County cities and towns have buildings which are historical, and often share basements and other doors that connect buildings. As a result a fire in one building may take several buildings within a block. Randolph County has also had a history of large commercial fires that are difficult to extinguish due to the lack of aerial vehicles and the advance of fire prior to fire department arrival.
Randolph	Technological Hazards	Fire Incident	Large Fire/Conflagration	3	2	4	3	6	2.85	Randolph County cities and towns have buildings which are historical, and often share basements and other doors that connect buildings. As a result a fire in one building may take several buildings within a block. Randolph County has also had a history of large commercial fires that are difficult to extinguish due to the lack of aerial vehicles and the advance of fire prior to fire department arrival.
Randolph	Natural Hazards	Storms	Tornado EF3 - EF5	2	3	4	4	6	2.8	Tornadoes are a frequent occurrence in Indiana, and Randolph County has experienced EF3 and 4 tornadoes in the past. While they are possible, they are not as likely as the EF0 through 2 tornadoes.
Randolph	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	3	4	4	6	2.8	There are four known dams within Randolph County. Two are in waterways and two are on private property. Of the two on private property, there is one means in ingress and egress. Water flow does not place any residences under risk, but road

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										failure and closure could be classified as critical should an event occur.
Randolph	Technological Hazards	Transportation	Rail Transportation Incident	2	3	4	4	6	2.8	Randolph County has experienced two derailment incidents on CSX lines within the last year. Both were minor incidents (one was empty cars, and the other was one car off-railing). However, Randolph County does average 7-10 Bakken Crude Unit Trains per week, plus there is constant crude tanks with other hazardous materials shipped through Randolph County. Randolph County also has an Ethanol plant between Winchester and Union City that ships via rail. Recent exercises have demonstrated that if a hazardous materials rail incident were to occur within the county, most if not all of a city or town would be evacuated.
Randolph	Natural Hazards	Storms	Tornado EF3 - EF5	2	3	4	4	6	2.8	Tornadoes are a frequent occurrence in Indiana, and Randolph County has experienced EF3 and 4 tornadoes in the past. While they are possible, they are not as likely as the EF0 through 2 tornadoes.
Randolph	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	3	4	4	6	2.8	There are four known dams within Randolph County. Two are in waterways and two are on private property. Of the two on private property, there is one means in ingress and egress. Water flow does not place any residences under risk, but road failure and closure could be classified as critical should an event occur.
Randolph	Technological Hazards	Transportation	Rail Transportation Incident	2	3	4	4	6	2.8	Randolph County has experienced two derailment incidents on CSX lines within the last year. Both were minor incidents (one was empty cars, and the other was one car off-railing). However, Randolph County does average 7-10 Bakken Crude Unit Trains per week, plus there is constant crude tanks with other hazardous materials shipped through Randolph County. Randolph County also has an Ethanol plant between Winchester and Union City that ships via rail. Recent exercises have demonstrated

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										that if a hazardous materials rail incident were to occur within the county, most if not all of a city or town would be evacuated.
Randolph	Natural Hazards	Storms	Severe Thunderstorm	4	1	3	2	6	2.75	Severe thunderstorms are a frequent occurrence in the Midwest, and Randolph County is included. Damage is typically negligible with the exception of hail damage. A recent thunderstorm did extensive hail damage in Randolph County.
Randolph	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	3	2	4	2	6	2.75	Fixed facility hazardous material incidents are likely each year. Common reasons for incidents are human error or failure of seals/pipes that prevent the incidents. Randolph County LEPC receive at least one report per year of an incident at a fixed facility.
Randolph	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	2	4	2	6	2.75	Hazardous material transportation incidents are occurring each year. Common reasons for incidents are human error that results in traffic crashes or loss of cargo. Randolph County LEPC receive at least three reports of an incident this year.
Randolph	Natural Hazards	Storms	Severe Thunderstorm	4	1	3	2	6	2.75	Severe thunderstorms are a frequent occurrence in the Midwest, and Randolph County is included. Damage is typically negligible with the exception of hail damage. A recent thunderstorm did extensive hail damage in Randolph County.
Randolph	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	3	2	4	2	6	2.75	Fixed facility hazardous material incidents are likely each year. Common reasons for incidents are human error or failure of seals/pipes that prevent the incidents. Randolph County LEPC receive at least one report per year of an incident at a fixed facility.
Randolph	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	2	4	2	6	2.75	Hazardous material transportation incidents are occurring each year. Common reasons for incidents are human error that results in traffic crashes or loss of cargo. Randolph County LEPC receive at least three reports of an incident this year.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Randolph	Natural Hazards	Winter Weather	Winter Storms	4	1	2	3	6	2.7	The threat of winter storms occurs yearly during the winter. While they often are not severe, they do pose a limited threat due to critical infrastructure failure; primarily power or blocked roadways.
Randolph	Technological Hazards	Fire Incident	Explosion	2	3	4	3	6	2.7	Fire incidents causing explosions are a possibility in Randolph County. Randolph County is home to 26 hazardous material sites along with multiple family farms that store grains, all that can cause explosions should a fire occur.
Randolph	Natural Hazards	Winter Weather	Winter Storms	4	1	2	3	6	2.7	The threat of winter storms occur yearly during the winter. While they often are not severe, they do pose a limited threat due to critical infrastructure failure; primarily power or blocked roadways.
Randolph	Technological Hazards	Fire Incident	Explosion	2	3	4	3	6	2.7	Fire incidents causing explosions are a possibility in Randolph County. Randolph County is home to 26 hazardous material sites along with multiple family farms that store grains, all that can cause explosions should a fire occur.
Randolph	Man-Made Threats	Police Incident	Other Violent Offenders	3	2	4	1	6	2.65	Randolph County has a high alcohol and drug dependency problem. Law enforcement is battered often, we've had a recent back robbery, and a recent homicide where a man was battered to death. These attacks are limited in nature to a one-on-one incident
Randolph	Natural Hazards	Disease	Animal Disease Outbreak	3	2	2	4	6	2.65	Randolph County is home to several confined animal feeder operations. There have been recent avian virus outbreaks in Indiana where large quantities of turkeys were euthanized via foam. Due to our CAFO operations, animal disease outbreak is likely.
Randolph	Man-Made Threats	Police Incident	Other Violent Offenders	3	2	4	1	6	2.65	Randolph County has a high alcohol and drug dependency problem. Law enforcement is battered often, we've had a recent back robbery, and a recent homicide where a man was battered to death. These

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										attacks are limited in nature to a one-on-one incident
Randolph	Natural Hazards	Disease	Animal Disease Outbreak	3	2	2	4	6	2.65	Randolph County is home to several confined animal feeder operations. There have been recent avian virus outbreaks in Indiana where large quantities of turkeys were euthanized via foam. Due to our CAFO operations, animal disease outbreak is likely.
Randolph	Natural Hazards	Storms	Tornado EF0 - EF2	3	2	4	1	6	2.65	EF0 to 2 tornadoes are the most frequent tornadoes to occur within Randolph County. Their frequency is enough to say they are likely to occur, but they are limited in scope to their wind speeds.
Randolph	Natural Hazards	Flooding	Major Flood	3	2	2	3	6	2.55	Flooding occurs often in Randolph County. Typical flooding is to agricultural fields and across roadways that are known for flooding. There can be rescues related to this flooding but typically no injuries. Flooding typically occurs along the White River and the Mississinewa River. Most homes are well back from the rivers and rescues are rare.
Randolph	Technological Hazards	Transportation	Commercial Air Transportation Incident	1	4	4	3	6	2.55	Randolph County has not experienced a commercial aviation incident other than a crop-duster power failure that resulted in a successful emergency landing on a highway. Should a passenger incident occur, it's obvious it would be catastrophic and last multiple days.
Randolph	Natural Hazards	Flooding	Major Flood	3	2	2	3	6	2.55	Flooding occurs often in Randolph County. Typical flooding is to agricultural fields and across roadways that are known for flooding. There can be rescues related to this flooding but typically no injuries. Flooding typically occurs along the White River and the Mississinewa River. Most homes are well back from the rivers and rescues are rare.
Randolph	Technological Hazards	Transportation	Commercial Air Transportation Incident	1	4	4	3	6	2.55	Randolph County has not experienced a commercial aviation incident other than a crop-duster power failure that resulted in a

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										successful emergency landing on a highway. Should a passenger incident occur, it's obvious it would be catastrophic and last multiple days.
Randolph	Natural Hazards	Weather Related	Extreme Temperatures	3	2	1	4	6	2.5	Extreme temperatures occur yearly in Randolph County and tend to last a few days to a month. The magnitude is typically county-wide and often affects the young and elderly, and the poor without air conditioning.
Randolph	Natural Hazards	Weather Related	Extreme Temperatures	3	2	1	4	6	2.5	Extreme temperatures occur yearly in Randolph County and tend to last a few days to a month. The magnitude is typically county-wide and often affects the young and elderly, and the poor without air conditioning.
Randolph	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	2	6	2.45	Randolph County may experience earthquakes as we are near the New Madrid and Wabash Valley earthquake zones. The current multi-hazard mitigation plan shows Randolph County more susceptible of receiving damage from a Wabash Valley event than a New Madrid event. If this occurs, the earthquakes tend to range from 3 to 4 in magnitude.
Randolph	Technological Hazards	Infrastructure	Public Utility Failure	3	1	4	2	6	2.45	Randolph County has had frequent utility failures that seem to stem to power-related incidents. Most cause no damage and are taken care of within a few hours.
Randolph	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	2	6	2.45	Randolph County may experience earthquakes as we are near the New Madrid and Wabash Valley earthquake zones. The current multi-hazard mitigation plan shows Randolph County more susceptible of receiving damage from a Wabash Valley event than a New Madrid event. If this occurs, the earthquakes tend to range from 3 to 4 in magnitude.
Randolph	Technological Hazards	Infrastructure	Public Utility Failure	3	1	4	2	6	2.45	Randolph County has had frequent utility failures that seem to stem to power-related incidents. Most cause no damage and are taken care of within a few hours.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Randolph	Man-Made Threats	Fire Incident	Arson	2	2	4	2	6	2.3	Fire arson cases do occur within Randolph County, but they are not extensive in occurrence. Therefore we lowered the probability and raised the duration time.
Randolph	Man-Made Threats	Fire Incident	Arson	2	2	4	2	6	2.3	Fire arson cases do occur within Randolph County, but they are not extensive in occurrence. Therefore we lowered the probability and raised the duration time.
Randolph	Natural Hazards	Flora and Fauna	Invasive Species - Animal	2	1	4	4	6	2.2	Randolph County is aware that feral pigs have been progressing north from the southern Indiana and the United States. While we haven't received reports of feral pigs in Randolph County, we do know that they are possible at any time. There may be other invasive species of animals approaching Randolph County as well.
Randolph	Natural Hazards	Flora and Fauna	Invasive Species - Aquatic	2	1	4	4	6	2.2	Little is know about the possibility of an invasive aquatic species, thus we are rating low currently.
Randolph	Natural Hazards	Flora and Fauna	Invasive Species - Animal	2	1	4	4	6	2.2	Randolph County is aware that feral pigs have been progressing north from the southern Indiana and the United States. While we haven't received reports of feral pigs in Randolph County, we do know that they are possible at any time. There may be other invasive species of animals approaching Randolph County as well.
Randolph	Natural Hazards	Flora and Fauna	Invasive Species - Aquatic	2	1	4	4	6	2.2	Little is know about the possibility of an invasive aquatic species, thus we are rating low currently.
Randolph	Natural Hazards	Storms	Tropical Cyclone Remnants	3	1	1	3	6	2.1	Due to the increases in El Nino weather patterns, Indiana has been receiving more and more tropical storm remnants that push in from the Gulf of Mexico. The severity is minimal and similar to thunderstorms that last over several days time.
Randolph	Natural Hazards	Storms	Tropical Cyclone Remnants	3	1	1	3	6	2.1	Due to the increases in El Nino weather patterns, Indiana has been receiving more and more tropical storm remnants that push in from the Gulf of Mexico. The severity is minimal and similar to

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										thunderstorms that last over several days time.
Randolph	Man-Made Threats	International Terrorism	International Terrorism	1	3	4	1	6	2.05	Randolph County has little in the way of attractive targets for international terrorists. The probability is highly unlikely that an international terrorism event would occur here. We list the duration as six hours or less of response time, not recovery time.
Randolph	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	2	4	4	6	2.05	The likelihood of a nuclear arms attack occurring in Randolph County is highly unlikely. Randolph County is near to Air Force bases that may be targets of a nuclear events though.
Randolph	Man-Made Threats	Terrorist Attack	Radiological Attack	1	2	4	4	6	2.05	Our response is the same as the Nuclear Attack.
Randolph	Man-Made Threats	International Terrorism	International Terrorism	1	3	4	1	6	2.05	Randolph County has little in the way of attractive targets for international terrorists. The probability is highly unlikely that an international terrorism event would occur here. We list the duration as six hours or less of response time, not recovery time.
Randolph	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	2	4	4	6	2.05	The likelihood of a nuclear arms attack occurring in Randolph County is highly unlikely. Randolph County is near to Air Force bases that may be targets of a nuclear events though.
Randolph	Man-Made Threats	Terrorist Attack	Biological Attack	1	2	4	3	6	1.95	While the possibility exists for a biological attack, it being completed by an actual terrorist group is small. Past threats have been phony Anthrax scares.
Randolph	Man-Made Threats	Terrorist Attack	Chemical Attack	1	2	4	3	6	1.95	Our response is the same as the biological attack.
Randolph	Man-Made Threats	Terrorist Attack	Explosive Attack	1	2	4	3	6	1.95	The likelihood of an explosive attack occurring in Randolph County is highly unlikely. If it were to occur, it would more likely be a domestic violence incident or school-aged children experimenting with something seen from the internet.
Randolph	Man-Made Threats	Terrorist Attack	Biological Attack	1	2	4	3	6	1.95	While the possibility exists for a biological attack, it being completed by an actual terrorist group is small. Past threats have been phony Anthrax scares.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Randolph	Man-Made Threats	Terrorist Attack	Chemical Attack	1	2	4	3	6	1.95	Our response is the same as the biological attack.
Randolph	Man-Made Threats	Terrorist Attack	Explosive Attack	1	2	4	3	6	1.95	The likelihood of an explosive attack attack occurring in Randolph County is highly unlikely. If it were to occur, it would more likely be a domestic violence incident or school-aged children experimenting with something seen from the internet.
Randolph	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	1	4	1	6	1.9	Active attacker/shooter events are a possibility within Randolph County albeit on an infrequent time frame. Past events have involved more domestic disputes than attacks of workplace or schools.
Randolph	Man-Made Threats	Police Incident	Hostage Situation	2	1	4	1	6	1.9	Randolph County has had some incidents of barricaded or criminal confinement incidents in past years. Those incidents are typically domestic violence type disputes and not those which involve the public at large.
Randolph	Natural Hazards	Other	Wild Fire	2	1	4	1	6	1.9	The typical wildfire as seen in the western United States would not occur here as we do not have the quantity of forests here. However, there are large groves of forests and often harvest stubble which can present itself as a wildfire, but for short duration's.
Randolph	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	1	4	1	6	1.9	Active attacker/shooter events are a possibility within Randolph County albeit on an infrequent time frame. Past events have involved more domestic disputes than attacks of workplace or schools.
Randolph	Man-Made Threats	Police Incident	Hostage Situation	2	1	4	1	6	1.9	Randolph County has had some incidents of barricaded or criminal confinement incidents in past years. Those incidents are typically domestic violence type disputes and not those which involve the public at large.
Randolph	Natural Hazards	Other	Wild Fire	2	1	4	1	6	1.9	The typical wildfire as seen in the western United States would not occur here as we do not have the quantity of forests here. However, there are large groves of forests and often harvest stubble which can

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										present itself as a wildfire, but for short duration's.
Randolph	Man-Made Threats	Terrorist Attack	Conventional Attack	1	2	4	2	6	1.85	The likelihood of a conventional small arms attack occurring in Randolph County is highly unlikely.
Randolph	Natural Hazards	Earthquake	Earthquake MMI I to IV	1	2	4	2	6	1.85	Randolph County may experience earthquakes as we are near the New Madrid and Wabash Valley earthquake zones. The current multi-hazard mitigation plan shows Randolph County more susceptible of receiving damage from a Wabash Valley event than a New Madrid event. If this occurs, the earthquakes tend to range from 3 to 4 in magnitude.
Randolph	Natural Hazards	Earthquake	Earthquake MMI V to VI	1	2	4	2	6	1.85	Randolph County may experience earthquakes as we are near the New Madrid and Wabash Valley earthquake zones. The current multi-hazard mitigation plan shows Randolph County more susceptible of receiving damage from a Wabash Valley event than a New Madrid event. If this occurs, the earthquakes tend to range from 3 to 4 in magnitude.
Randolph	Technological Hazards	Transportation	Pipeline Transportation Incident	1	2	4	2	6	1.85	Pipeline events are a rare occurrence, and typically involve small natural gas feeder lines to residential structures. Causes are often persons failing to call 811 prior to digging or contractors not hand-digging around pipelines.
Randolph	Man-Made Threats	Terrorist Attack	Conventional Attack	1	2	4	2	6	1.85	The likelihood of a conventional small arms attack occurring in Randolph County is highly unlikely.
Randolph	Natural Hazards	Earthquake	Earthquake MMI I to IV	1	2	4	2	6	1.85	Randolph County may experience earthquakes as we are near the New Madrid and Wabash Valley earthquake zones. The current multi-hazard mitigation plan shows Randolph County more susceptible of receiving damage from a Wabash Valley event than a New Madrid event. If this occurs, the earthquakes tend to range from 3 to 4 in magnitude.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Randolph	Natural Hazards	Earthquake	Earthquake MMI V to VI	1	2	4	2	6	1.85	Randolph County may experience earthquakes as we are near the New Madrid and Wabash Valley earthquake zones. The current multi-hazard mitigation plan shows Randolph County more susceptible of receiving damage from a Wabash Valley event than a New Madrid event. If this occurs, the earthquakes tend to range from 3 to 4 in magnitude.
Randolph	Technological Hazards	Transportation	Pipeline Transportation Incident	1	2	4	2	6	1.85	Pipeline events are a rare occurrence, and typically involve small natural gas feeder lines to residential structures. Causes are often persons failing to call 811 prior to digging or contractors not hand-digging around pipelines.
Randolph	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	1	2	4	1	6	1.75	While the potential for domestic terrorism does exist, it would most-likely be a home-grown violent extremist that would cause an issue in Randolph County. We are unaware of any historical events
Randolph	Natural Hazards	Disease	Human Disease Outbreak	2	1	1	4	6	1.75	Randolph County has citizens and visitors that travel world-wide. Due to modern travel, our citizens and visitors are subject to possible exposure. Randolph County has exercised and planned for various pandemics and epidemics. Even with those practices, the events are still possible.
Randolph	Natural Hazards	Flora and Fauna	Invasive Species - Plant	2	1	1	4	6	1.75	Randolph County is aware of a creeping vine that has been consuming properties, albeit the current extent is minimal. Thus we are rating the events as possible.
Randolph	Natural Hazards	Other	Ground Failure	1	2	4	1	6	1.75	This event is typically non-occurring except the occasional sink-hole occurring due to a washout from water erosion.
Randolph	Natural Hazards	Weather Related	Drought	2	1	1	4	6	1.75	Drought has occurred within the last 10 years in Randolph County, and tend to last a season. The magnitude is typically county-wide but often the damage is limited to agriculture.
Randolph	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	1	2	4	1	6	1.75	While the potential for domestic terrorism does exist, it would most-likely be a home-grown violent extremist that would cause

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										an issue in Randolph County. We are unaware of any historical events
Randolph	Natural Hazards	Disease	Human Disease Outbreak	2	1	1	4	6	1.75	Randolph County has citizens and visitors that travel world-wide. Due to modern travel, our citizens and visitors are subject to possible exposure. Randolph County has exercised and planned for various pandemics and epidemics. Even with those practices, the events are still possible.
Randolph	Natural Hazards	Flora and Fauna	Invasive Species - Plant	2	1	1	4	6	1.75	Randolph County is aware of a creeping vine that has been consuming properties, albeit the current extent is minimal. Thus we are rating the events as possible.
Randolph	Natural Hazards	Other	Ground Failure	1	2	4	1	6	1.75	This event is typically non-occurring except the occasional sink-hole occurring due to a washout from water erosion.
Randolph	Natural Hazards	Weather Related	Drought	2	1	1	4	6	1.75	Drought has occurred within the last 10 years in Randolph County, and tend to last a season. The magnitude is typically county-wide but often the damage is limited to agriculture.
Randolph	Natural Hazards	Storms	Derecho	2	1	2	1	6	1.6	Derecho's have occurred within recent years within Randolph County. NWS technology usually allows for 12-24 hours warning of a possible event. The damage is often negligible and wide-spread and is short-lived within the County.
Randolph	Natural Hazards	Storms	Derecho	2	1	2	1	6	1.6	Derecho's have occurred within recent years within Randolph County. NWS technology usually allows for 12-24 hours warning of a possible event. The damage is often negligible and wide-spread and is short-lived within the County.
Randolph	Man-Made Threats	Police Incident	Riot	1	1	4	2	6	1.55	The likely-hood of a riot occurring in Randolph County is very unlikely. This writer cannot think of a riot occurring in his 30+ years of emergency services work. There are businesses though that are unionized and can strike locally. This is the most-likely scenario should a riot occur.
Randolph	Man-Made Threats	Police Incident	Riot	1	1	4	2	6	1.55	The likely-hood of a riot occurring in Randolph County is very unlikely. This writer

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										cannot think of a riot occurring in his 30+ years of emergency services work. There are businesses though that are unionized and can strike locally. This is the most-likely scenario should a riot occur.
Randolph	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	1	4	1	6	1.45	The likelihood of an EMP attack occurring in Randolph County is highly unlikely. We're more likely to receive damage from EMP's as a result of solar flaring.
Randolph	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	1	4	1	6	1.45	The likelihood of an EMP attack occurring in Randolph County is highly unlikely. We're more likely to receive damage from EMP's as a result of solar flaring.
Randolph	Technological Hazards	Dams and Levees	Major Levee Failure - (Non-accredited)	1	1	2	3	6	1.35	There are levee's along the Mississinewa and White Rivers. While these levee's have not failed, the water often overflows the levee's. Most residences and businesses are not at risk due to the high frequency of flooding along those rivers.
Randolph	Technological Hazards	Dams and Levees	Major Levee Failure - (Non-accredited)	1	1	2	3	6	1.35	There are levee's along the Mississinewa and White Rivers. While these levee's have not failed, the water often overflows the levee's. Most residences and businesses are not at risk due to the high frequency of flooding along those rivers.
Ripley	Man-Made Threats	Terrorist Attack	Cyber Attack	4	4	4	4	9	4	A common occurance and the effects can range from nusiance to disruptive. Threat: - Large international corporations located in the county. - Local company suffered a large breech in 2015. Challenges: - No real reporting criteria for this type of incident. - No baseline training or education level standard.
Ripley	Man-Made Threats	Terrorist Attack	Cyber Attack	4	4	4	4	9	4	This is a common occurance and the main weakness is identifying the attack has occured and then identifying what has been compromised. There is currently no real reporting criteria and to whom to do this. This has a direct effect on government and it's ability to provide services. The presence of large industry in the county makes them

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										a direct target for cyber-attacks. Recently a large health provider was effected by this.
Ripley	Man-Made Threats	Terrorist Attack	Cyber Attack	4	4	4	4	9	4	This is a common occurance and the main weakness is identifying the attack has occured and then identifying what has been compromised. There is currently no real reporting criteria and to whom to do this. This has a direct effect on government and it's ability to provide services. The presence of large industry in the county makes them a direct target for cyber-attacks. In 2-15 a large health provider was effected by this.
Ripley	Man-Made Threats	Terrorist Attack	Cyber Attack	4	4	4	4	9	4	This is a common occurance and the main weakness is identifying the attack has occured and then identifying what has been compromised. There is currently no real reporting criteria and to whom to do this. This has a direct effect on government and it's ability to provide services. The presence of large industry in the county makes them a direct target for cyber-attacks. In 2015 a large health provider was effected by this.
Ripley	Man-Made Threats	Terrorist Attack	Cyber Attack	4	4	4	4	9	4	A common occurance and the effects can range from nusiance to disruptive. Threat: - Large international corporations located in the county. - Local company suffered a large breech in 2015. Challenges: - No real reporting criteria for this type of incident which leads. - No baseline training or education level standard.
Ripley	Natural Hazards	Storms	Derecho	4	3	3	4	9	3.55	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Storms	Derecho	4	3	3	4	9	3.55	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Storms	Derecho	4	3	3	4	9	3.55	Reference: County Hazard Mitigation Plan and Reference County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC).

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Ripley	Natural Hazards	Storms	Derecho	4	3	3	4	9	3.55	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Storms	Severe Thunderstorm	4	3	3	3	9	3.45	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC). - 2015 July Storm caused $16,000+ in damage and overtime in the Town of Osgood. (Federal declaration)
Ripley	Natural Hazards	Storms	Severe Thunderstorm	4	3	3	3	9	3.45	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Storms	Severe Thunderstorm	4	3	3	3	9	3.45	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Storms	Severe Thunderstorm	4	3	3	3	9	3.45	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC). - 2015 July Storm caused $16,000+ in damage and overtime in the Town of Osgood.
Ripley	Natural Hazards	Flooding	Flash Flood	4	2	4	4	9	3.4	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC). - In 1980's a flash flood resulted in the death of two individuals. - Twice a year 10-20,000 people attend the NMLRA event in this area. - There is limited to no cell phone coverage in this area and limited evacuation routes.
Ripley	Natural Hazards	Flooding	Flash Flood	4	2	4	4	9	3.4	Reference County Hazard Mitigation Plan. The significant flood occured in Friendship that flooded the entire town was in the 1930's.
Ripley	Natural Hazards	Flooding	Flash Flood	4	2	4	4	9	3.4	Reference County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										(MRCC). The largest flood event that flooded the entire town of in Friendship occured was in the 1930's. Twice a year 10-20,000 people attend the NMLRA event in this area.
Ripley	Natural Hazards	Flooding	Flash Flood	4	2	4	4	9	3.4	Reference County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC). - In 1980's a flash flood resulted in the death of two individuals. - Twice a year 10-20,000 people attend the NMLRA event in this area. There is limited cell phone coverage in this area.
Ripley	Natural Hazards	Flooding	Flash Flood	4	2	4	4	9	3.4	Reference County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC). - In 1980's a flash flood resulted in the death of two individuals. - Twice a year 10-20,000 people attend the NMLRA event in this area. - There is limited to no cell phone coverage in this area and limited evacuation routes.
Ripley	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	3	9	3.3	A large part of Ripley County is economically depressed and has a significant transient population. - LEO has no secure channel and can be monitored by scanner.
Ripley	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	2	3	9	3.3	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC). - EF-0 and EF-1 event in 2014: 3 properties effected and 1 house destroyed.
Ripley	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	3	9	3.3	A large part of Ripley County is economically depressed and transient. There has been federal level raids conducted in the county for this type of activity.
Ripley	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	3	9	3.3	A large part of Ripley County is economically depressed and has a

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										significant transient population. A contributing risk factor is the lack of a secure LEO channel. All transmissions can be monitored by personal scanners and this has the potential to put responders at risk.
Ripley	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	2	3	9	3.3	Reference: County Hazard Mitigation Plan and NWS climateology data.The last F-0 and F-1 was 2014.
Ripley	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	2	3	9	3.3	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC). - EF-0 and F-1 was 2014.
Ripley	Man-Made Threats	Terrorist Attack	Conventional Attack	3	3	4	4	9	3.25	There has been incidents in adjoining counties and there has been weapons confiscated at the school and court system.
Ripley	Man-Made Threats	Terrorist Attack	Explosive Attack	3	3	4	4	9	3.25	An adjacent county that RC shares a border has had recent incidents. - There is a frequency of developing low yield explosive devices among teenagers and citizens. Local fire departments do respond to these events.
Ripley	Natural Hazards	Storms	Tornado EF3 - EF5	3	4	2	4	9	3.25	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC). - 2012 EF3 tornado struck Ripley County (Federal Declared Disaster)
Ripley	Natural Hazards	Winter Weather	Ice Storms	3	3	4	4	9	3.25	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Man-Made Threats	Terrorist Attack	Conventional Attack	3	3	4	4	9	3.25	The possibility is likely since there has been incidents in adjoining counties and there has been weapons confiscated at the school and court system.
Ripley	Man-Made Threats	Terrorist Attack	Explosive Attack	3	3	4	4	9	3.25	An event similiar to this is going on in an adjacent county. There is a frequency of developing low yield explosive devices among teenagers and citizens. Local fire departments d0 respond to these events. A planned attack with the intent to destroy

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										a government facility or a local based international corporation would present a financial challenge.
Ripley	Natural Hazards	Winter Weather	Ice Storms	3	3	4	4	9	3.25	County all hazard mitigation plan and NWS historical data.
Ripley	Man-Made Threats	Terrorist Attack	Explosive Attack	3	3	4	4	9	3.25	An event similiar to this is going on in an adjacent county. There is a frequency of developing low yield explosive devices among teenagers and citizens. Local fire departments do respond to these events. A planned attack with the intent to destroy a government facility or a local based international corporation would present a financial challenge.
Ripley	Man-Made Threats	Terrorist Attack	Explosive Attack	3	3	4	4	9	3.25	An event similiar to this is going on in an adjacent county. There is a frequency of developing low yield explosive devices among teenagers and citizens. Local fire departments do respond to these events. A planned attack with the intent to destroy a government facility or a local based international corporation would present challenges.
Ripley	Natural Hazards	Storms	Tornado EF3 - EF5	3	4	2	4	9	3.25	Reference: County Hazard Mitigation Plan and NWS climateology data. An EF3 tornado struck Ripley County in 2012.
Ripley	Natural Hazards	Winter Weather	Ice Storms	3	3	4	4	9	3.25	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Disease	Human Disease Outbreak	3	3	4	4	9	3.25	RCHD PH-HVA and D9 HVA
Ripley	Natural Hazards	Disease	Human Disease Outbreak	3	3	4	4	9	3.25	RCHD PH-HVA, D9 HVA
Ripley	Man-Made Threats	Terrorist Attack	Conventional Attack	3	3	4	4	9	3.25	There has been incidents in adjoining counties and there has been weapons confiscated at the school and court system.
Ripley	Man-Made Threats	Terrorist Attack	Explosive Attack	3	3	4	4	9	3.25	An adjacent county that RC shares a border has had recent incidents. - There is a frequency of developing low yield explosive devices among teenagers and citizens. Local fire departments do respond to these events.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Ripley	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	3	4	3	9	3.15	#NAME?
Ripley	Man-Made Threats	Police Incident	Hostage Situation	3	3	4	3	9	3.15	#NAME?
Ripley	Man-Made Threats	International Terrorism	International Terrorism	2	4	4	4	9	3.1	RC is the home of multiple high profile international industries. Due to their significant economic, social, and community benefits bring to the county any attack on these would be catastrophic and would have a long-term effect on the county.
Ripley	Man-Made Threats	International Terrorism	International Terrorism	2	4	4	4	9	3.1	There are multiple high profile international businesses that are active overseas and have a headquarters in Ripley County. Due to their significant economic, social, and community benefits bring to the county any attack on these would be catastrophic and would have a long-term effect on the county.
Ripley	Man-Made Threats	International Terrorism	International Terrorism	2	4	4	4	9	3.1	There are multiple high profile international businesses that are located in Ripley County. Due to their significant economic, social, and community benefits bring to the county any attack on these would be catastrophic and would have a long-term effect on the county.
Ripley	Man-Made Threats	International Terrorism	International Terrorism	2	4	4	4	9	3.1	There are multiple high profile international businesses located in Ripley County. Due to their significant economic, social, and community benefits bring to the county any attack on these would be catastrophic and would have a long-term effect on the county.
Ripley	Technological Hazards	Infrastructure	Communication Failure	3	3	4	2	9	3.05	
Ripley	Man-Made Threats	Fire Incident	Arson	3	2	4	4	9	2.95	There has been several incidents in the county resulting in convictions.
Ripley	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	2	4	4	9	2.95	We have had incidents in the county where violence against recognized law enforcement with weapons, vehicles, and active shooters. The benefit Ripley County has is an ISP post located in the capital.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Ripley	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	2	4	4	9	2.95	
Ripley	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	2	4	4	9	2.95	
Ripley	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	2	4	3	9	2.85	
Ripley	Man-Made Threats	Police Incident	Hostage Situation	3	2	4	3	9	2.85	There are low scale domestic hostage situations, but there has been no large scale hostage situation. A large scale hostage situation (school or event) is not likely but would present a challenge but the presence of an ISP post in the county can assist.
Ripley	Man-Made Threats	Police Incident	Hostage Situation	3	2	4	3	9	2.85	
Ripley	Natural Hazards	Weather Related	Extreme Temperatures	3	2	3	4	9	2.8	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	3	4	4	9	2.8	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	3	4	4	9	2.8	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	3	4	4	9	2.8	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Weather Related	Extreme Temperatures	3	2	3	4	9	2.8	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Disease	Animal Disease Outbreak	3	3	1	4	9	2.8	#NAME?
Ripley	Natural Hazards	Earthquake	Earthquake MMI I to IV	3	2	4	2	9	2.75	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Earthquake	Earthquake MMI I to IV	3	2	4	2	9	2.75	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Earthquake	Earthquake MMI I to IV	3	2	4	2	9	2.75	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and,

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										Midwestern Regional Climate Center (MRCC).
Ripley	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	3	9	2.7	- There is no identified militia, hate group, or religious group in RC. - There have been random (non-kinetic) contacts between LEO and souviergn citizens.
Ripley	Man-Made Threats	Terrorist Attack	Biological Attack	2	3	4	3	9	2.7	The primary biological threat in Ripley County is "worry" threat. "White powder" event that tests as negative for anthrax. - Still requires the same local response and cost. - 2003-2004 a local Industry recieved 34 "white powder" letters that all tested negative for anthrax.
Ripley	Natural Hazards	Storms	Geomagnetic Storm	3	2	3	3	9	2.7	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC). - Historically had minor VHF interference due to this event.
Ripley	Man-Made Threats	Terrorist Attack	Biological Attack	2	3	4	3	9	2.7	The primary biological threat in Ripley County is "worry" threat were an agency receives "white powder that is not a biological agent but requires the same response. This still results in cost, response and loss of manpower hours.
Ripley	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	3	9	2.7	This was assessed at this level since their has not been an event in this county. There is also no identified militia, hate group, other than souvern citizens. There has been one incident in Dewberry were self-identified KKK member and the ISP SWAT team was involved and this was 10 years ago.
Ripley	Man-Made Threats	Terrorist Attack	Biological Attack	2	3	4	3	9	2.7	The primary biological threat in Ripley County is "worry" threat. An agency receives "white powder that is not a biological agent but requires the same response. This still results in cost, responsder deployment, and a loss of manpower hours.
Ripley	Man-Made Threats	Terrorist Attack	Biological Attack	2	3	4	3	9	2.7	The primary biological threat in Ripley County is "worry" threat. An agency

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										receives "white powder that is not a biological agent but requires the same response. This still results in cost, responder deployment, and a loss of manpower hours.
Ripley	Natural Hazards	Storms	Geomagnetic Storm	3	2	3	3	9	2.7	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Man-Made Threats	Terrorist Attack	Biological Attack	2	3	4	3	9	2.7	The primary biological threat in Ripley County is "worry" threat. An agency receives "white powder" that tests as negative for anthrax. This still requires the same response and cost.
Ripley	Man-Made Threats	Terrorist Attack	Biological Attack	2	3	4	3	9	2.7	The primary biological threat in Ripley County is "worry" threat. An agency receives "white powder" that tests as negative for anthrax. This still requires the same response and cost. Between 2003-2004 a local Industry in Ripley County recieved 34 "white powder" letters that all tested negative for anthrax.
Ripley	Natural Hazards	Storms	Geomagnetic Storm	3	2	3	3	9	2.7	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Storms	Geomagnetic Storm	3	2	3	3	9	2.7	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC). - Historically had minor VHF interference due to this event.
Ripley	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	3	9	2.7	There is also no identified militia, hate group, other than random incidents between LEO and souvergn citizens. There has been one incident in Dewberry were self-identified KKK member and the ISP SWAT team was involved but this was 10 years ago.
Ripley	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	3	9	2.7	- There is no identified militia, hate group, or religious group in RC. - There have been random (non-kinetic) contacts between LEO and souviergn citizens. - 10 years ago there was one incident in Dewberry with a self-identified KKK member and the ISP

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Ripley	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	4	4	4	9	2.65	This would be a national level event and would not be localized to Ripley County. The effects of this would be catastrophic.
Ripley	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	9	2.65	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	4	4	4	9	2.65	This is a national event (large scale) and would not be localized to Ripley County. The effects of this would be catastrophic.
Ripley	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	9	2.65	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	9	2.65	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Earthquake	Earthquake MMI VII to X	1	4	4	4	9	2.65	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Winter Weather	Winter Storms	3	2	2	3	9	2.55	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Winter Weather	Winter Storms	3	2	2	3	9	2.55	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	4	9	2.5	The main chemical (release) threat in the county is the criminal theft of anhydrous ammonia. The thieves fail to close the valves. - CO-OP's and storage sites are located on main arteries, schools, and population centers.
Ripley	Natural Hazards	Flooding	Major Flood	2	2	4	4	9	2.5	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC). - The last major flood was in Friendship in the 1930's. - There have been 4 significant flooding events in this area.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Ripley	Natural Hazards	Storms	Tropical Cyclone Remnants	2	3	2	4	9	2.5	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC). - 2008 The remnants of Hurricane Ike struck Ripley County. (Federal declaration)
Ripley	Natural Hazards	Flooding	Major Flood	2	2	4	4	9	2.5	Reference: County Hazard Mitigation Plan and NWS climateology data. The last major flood was in Friendship in the 1930's.
Ripley	Natural Hazards	Flooding	Major Flood	2	2	4	4	9	2.5	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC). The last major flood was in Friendship in the 1930's.
Ripley	Natural Hazards	Flooding	Major Flood	2	2	4	4	9	2.5	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC). - The last major flood was in Friendship in the 1930's. - There have been 4 significant flooding events in this area.
Ripley	Natural Hazards	Storms	Tropical Cyclone Remnants	2	3	2	4	9	2.5	Reference: County Hazard Mitigation Plan and NWS climateology data. The remnants of Hurricane Ike struck Ripley County 2008.
Ripley	Natural Hazards	Flora and Fauna	Invasive Species - Insect	2	2	4	4	9	2.5	
Ripley	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	3	9	2.4	Ripley County has no identified threat for a chemical threat. If an event happened it would be limited and the duaration would less than a week. In the event it was an actual chemical (nerve agent, plague, or ect.) the effect would be much greater. The main chemical (release) threat in the county is the criminal theft of anhydrous ammonia and this is due to the thieves not closing the valves.
Ripley	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	3	9	2.4	The main chemical (release) threat in the county is the criminal theft of anhydrous ammonia and this is due to the thieves not closing the valves.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Ripley	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	3	9	2.4	The main chemical (release) threat in the county is the criminal theft of anhydrous ammonia. This is due to the thieves not closing the valves.
Ripley	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	3	9	2.4	The main chemical (release) threat in the county is the criminal theft of anhydrous ammonia. The thieves fail to close the valves. - CO-OP's and storage sites are located on main arteries, schools, and population centers.
Ripley	Man-Made Threats	Terrorist Attack	Chemical Attack	2	2	4	3	9	2.4	The main chemical (release) threat in the county is the criminal theft of anhydrous ammonia. The thieves fail to close the valves. - CO-OP's and storage sites are located on main arteries, schools, and population centers.
Ripley	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	4	2	4	9	2.35	This is a national level event (large scale) and the effects would be catastrophic. Ripley County has no strategic national asset located in the county.
Ripley	Man-Made Threats	Police Incident	Riot	2	2	3	3	9	2.25	The City of Batesville had strikes over 30 years ago. - LEO has no secure channel and can be monitored by scanner.
Ripley	Man-Made Threats	Police Incident	Riot	2	2	3	3	9	2.25	Ripley County has had strikes in Batesville but not within 30 years.
Ripley	Man-Made Threats	Police Incident	Riot	2	2	3	3	9	2.25	Ripley County has had strikes in Batesville but not within 30 years. The lack of a secure LEO channel could potentially compromise responder safety to this type of incident.
Ripley	Man-Made Threats	Police Incident	Riot	2	2	3	3	9	2.25	The City of Batesville had strikes over 30 years ago. The lack of a secure LEO channel could potentially compromise responder safety to this type of incident.
Ripley	Man-Made Threats	Terrorist Attack	Radiological Attack	1	2	4	4	9	2.05	The hospital has such material but at this time we have no threat of it being weaponized.
Ripley	Natural Hazards	Weather Related	Drought	2	2	1	4	9	2.05	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Weather Related	Drought	2	2	1	4	9	2.05	Reference: County Hazard Mitigation Plan and NWS climateology data.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Ripley	Natural Hazards	Flora and Fauna	Invasive Species - Animal	1	2	4	4	9	2.05	#NAME?
Ripley	Natural Hazards	Flora and Fauna	Invasive Species - Aquatic	2	2	1	4	9	2.05	
Ripley	Natural Hazards	Flora and Fauna	Invasive Species - Plant	2	2	1	4	9	2.05	
Ripley	Natural Hazards	Flora and Fauna	Invasive Species - Animal	2	2	1	4	9	2.05	Feral hogs
Ripley	Natural Hazards	Storms	Seiche	1	2	3	3	9	1.8	Reference: County Hazard Mitigation Plan, NOAA National Center for Environmental Information (NCEI), and Midwestern Regional Climate Center (MRCC).
Ripley	Natural Hazards	Storms	Seiche	1	2	3	3	9	1.8	Reference: County Hazard Mitigation Plan and NWS climateology data.
Ripley	Natural Hazards	Storms	Seiche	1	2	3	3	9	1.8	Reference: County Hazard Mitigation Plan and NOAA National Center for Environmental Information (NCEI) and, Midwestern Regional Climate Center (MRCC).
Ripley	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	1	1	1	1	9	1	No Federally owned dams in county
Rush	Man-Made Threats	Terrorist Attack	Cyber Attack	4	4	4	4	6	4	Based upon current events and collaboration from response agencies.
Rush	Man-Made Threats	Terrorist Attack	Cyber Attack	4	4	4	4	6	4	
Rush	Technological Hazards	Fire Incident	Structural Collapse	4	4	4	4	6	4	
Rush	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	4	3	4	3	6	3.6	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	4	3	4	3	6	3.6	
Rush	Man-Made Threats	International Terrorism	International Terrorism	3	4	4	4	6	3.55	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Terrorist Attack	Chemical Attack	3	4	4	4	6	3.55	Based upon current events and collaboration from response agencies. Lack

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										of necessary response equipment is a factor as well.
Rush	Man-Made Threats	International Terrorism	International Terrorism	3	4	4	4	6	3.55	
Rush	Man-Made Threats	Terrorist Attack	Chemical Attack	3	4	4	4	6	3.55	
Rush	Man-Made Threats	Police Incident	Hostage Situation	4	2	4	3	6	3.3	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Police Incident	Hostage Situation	4	2	4	3	6	3.3	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well. Law Enforcement has the training but are delayed in taking action while waiting for teams from outside agencies that are equipped to respond.
Rush	Man-Made Threats	Police Incident	Hostage Situation	4	2	4	3	6	3.3	
Rush	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	6	3.25	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	6	3.25	Based upon current events and collaboration from response agencies.
Rush	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	6	3.25	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well. Law Enforcement has the training but are delayed in taking action while waiting for teams from outside agencies that are equipped to respond.
Rush	Man-Made Threats	Terrorist Attack	Conventional Attack	3	3	4	4	6	3.25	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Terrorist Attack	Explosive Attack	3	3	4	4	6	3.25	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	6	3.25	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Rush	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	6	3.25	Based upon current events and collaboration from response agencies.
Rush	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	6	3.25	Based upon current events and collaboration from response agencies.
Rush	Man-Made Threats	Terrorist Attack	Conventional Attack	3	3	4	4	6	3.25	
Rush	Man-Made Threats	Terrorist Attack	Explosive Attack	3	3	4	4	6	3.25	
Rush	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	2	6	3.2	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	2	6	3.2	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well. Law Enforcement has the training but are delayed in taking action while waiting for teams from outside agencies that are equipped to respond.
Rush	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	2	6	3.2	
Rush	Technological Hazards	Infrastructure	Communication Failure	3	3	4	3	6	3.15	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Infrastructure	Communication Failure	3	3	4	3	6	3.15	Based upon current events and collaboration from response agencies. Communications problems have been identified through exercises and actual events. Lack of proper equipment and reception issues.
Rush	Technological Hazards	Infrastructure	Communication Failure	3	3	4	3	6	3.15	
Rush	Man-Made Threats	Terrorist Attack	Biological Attack	2	4	4	4	6	3.1	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	2	4	4	4	6	3.1	Based upon current events and collaboration from response agencies.
Rush	Man-Made Threats	Terrorist Attack	Nuclear Attack	2	4	4	4	6	3.1	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Rush	Man-Made Threats	Fire Incident	Arson	4	2	4	1	6	3.1	
Rush	Man-Made Threats	Terrorist Attack	Biological Attack	2	4	4	4	6	3.1	
Rush	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	2	4	4	4	6	3.1	
Rush	Man-Made Threats	Terrorist Attack	Nuclear Attack	2	4	4	4	6	3.1	
Rush	Natural Hazards	Disease	Animal Disease Outbreak	3	3	2	4	6	2.95	
Rush	Man-Made Threats	Terrorist Attack	Radiological Attack	2	3	4	4	6	2.8	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well.
Rush	Natural Hazards	Weather Related	Drought	3	3	1	4	6	2.8	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Transportation	Commercial Air Transportation Incident	2	3	4	4	6	2.8	Based upon current events and collaboration from response agencies.
Rush	Natural Hazards	Disease	Human Disease Outbreak	3	3	1	4	6	2.8	Based upon current events and collaboration from response agencies. Cases of HIV and Hepatitis have already increased in surrounding counties.
Rush	Natural Hazards	Disease	Animal Disease Outbreak	2	3	4	4	6	2.8	Based upon current events and collaboration from response agencies.
Rush	Man-Made Threats	Terrorist Attack	Radiological Attack	2	3	4	4	6	2.8	
Rush	Natural Hazards	Disease	Animal Disease Outbreak	2	3	4	4	6	2.8	
Rush	Natural Hazards	Disease	Human Disease Outbreak	3	3	1	4	6	2.8	
Rush	Natural Hazards	Weather Related	Drought	3	3	1	4	6	2.8	
Rush	Technological Hazards	Transportation	Commercial Air Transportation Incident	2	3	4	4	6	2.8	
Rush	Natural Hazards	Flooding	Flash Flood	3	2	4	2	6	2.75	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Infrastructure	Public Utility Failure	3	2	4	2	6	2.75	Based upon current events and collaboration from response agencies.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Rush	Natural Hazards	Flooding	Flash Flood	3	2	4	2	6	2.75	
Rush	Technological Hazards	Infrastructure	Public Utility Failure	3	2	4	2	6	2.75	
Rush	Technological Hazards	Fire Incident	Explosion	2	3	4	3	6	2.7	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	3	6	2.7	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Fire Incident	Explosion	2	3	4	3	6	2.7	
Rush	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	3	6	2.7	
Rush	Man-Made Threats	Fire Incident	Arson	3	2	4	1	6	2.65	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	2	4	1	6	2.65	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Transportation	Highway Transporation Incident	3	2	4	1	6	2.65	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	2	4	1	6	2.65	
Rush	Technological Hazards	Transportation	Highway Transporation Incident	3	2	4	1	6	2.65	
Rush	Natural Hazards	Flooding	Major Flood	2	3	3	3	6	2.55	Based upon current events and collaboration from response agencies.
Rush	Natural Hazards	Flooding	Major Flood	2	3	3	3	6	2.55	
Rush	Technological Hazards	Transportation	Rail Transportation Incident	2	2	4	4	6	2.5	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Transportation	Rail Transportation Incident	2	2	4	4	6	2.5	
Rush	Man-Made Threats	Police Incident	Riot	2	2	4	3	6	2.4	Based upon current events and collaboration from response agencies. Lack

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										of necessary response equipment is a factor as well.
Rush	Man-Made Threats	Police Incident	Riot	2	2	4	3	6	2.4	Based upon current events and collaboration from response agencies. Lack of necessary response equipment is a factor as well. Law Enforcement has the training but are delayed in taking action while waiting for teams from outside agencies that are equipped to respond.
Rush	Technological Hazards	Fire Incident	Structural Collapse	2	2	4	3	6	2.4	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Fire Incident	Structural Collapse	2	2	4	3	6	2.4	Based upon current events and collaboration from response agencies.
Rush	Man-Made Threats	Police Incident	Riot	2	2	4	3	6	2.4	
Rush	Technological Hazards	Fire Incident	Structural Collapse	2	2	4	3	6	2.4	
Rush	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	2	6	2.3	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	2	6	2.3	
Rush	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	1	6	2.2	Based upon current events and collaboration from response agencies.
Rush	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	2	4	1	6	2.2	Based upon current events and collaboration from response agencies.
Rush	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	1	6	2.2	
Rush	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	1	4	1	6	1.9	
Rush	Technological Hazards	Transportation	Marine Transporation Incident	1	1	4	4	6	1.75	
Rush	Technological Hazards	Transportation	Marine Transporation Incident	1	1	4	1	6	1.45	
Scott	Natural Hazards	Flooding	Flash Flood	4	4	4	4	9	4	Scott County covers app 192 sq miles of area and has an app 160 sq mile watershed

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										area. In addition to a large watershed area there is inadequate drainage systems in place
Scott	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	4	4	4	4	9	4	Scott County has 36 Dams and Levees, 5 of which are considered to be High in the Hazard Level. Those include Honeyrun Creek, Kimberlin Creek, Little York Off Stream, Lexington Town Creek, Quick Creek, all of which is a source of water supply. Failure could result in economic loss, environment damage, and disruption of lifeline facilities.
Scott	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	4	4	4	4	9	4	Scott County has 12 facilities that could produce hazardous materials that could affect the community as a whole.
Scott	Natural Hazards	Winter Weather	Winter Storms	4	4	4	4	9	4	2014-2015 Scott County has had 3 Heavy Snow storms with bitter cold fronts that caused EMA to open warming stations for 3 days.
Scott	Natural Hazards	Disease	Human Disease Outbreak	4	4	4	4	9	4	Scott County in 2015 has and continues to deal with the Largest HIV/HEP outbreak in the United States with a total of 185 confirmed HIV cases as of to date.
Scott	Natural Hazards	Flooding	Major Flood	4	4	4	4	9	4	2015 June and July. Scott County Declared Declaration of Disaster for 19 road closures due to heavy damage from Flash Floods. Flash Floods is a high risk for the county.
Scott	Natural Hazards	Earthquake	Earthquake MMI I to IV	4	4	4	4	9	4	Scott County sits on 2 active Earthquake Fault Lines. Earthquakes are a great possibility and would be catastrophic for Critical Infrastructures.
Scott	Technological Hazards	Infrastructure	Communication Failure	4	4	4	4	9	4	Scott Co now operates on VHF Digital Radio System due to the Statewide 800 MHZ failure during the 2012 Henryville Tornadoes. Radio Communications failed due to a tower being down in Henryville and this is Scott Co's only Statewide 800mhz radio tower repeater Also due to the location of the single tower covering a majority of Scott County there were many areas in the county that there is not the proper radio coverage.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Scott	Technological Hazards	Infrastructure	Communication Failure	4	4	4	4	9	4	Scott Co operate on Kenwood Digital Radios due to the 800 MHZ failure during the 2002 Henryville Tornados. Radio Communications failed due to a tower being down in Henryville and this is Scott Co's radio.
Scott	Technological Hazards	Transportation	Rail Transportation Incident	4	4	4	4	9	4	Scott Count has had 2 incidents within 6 months that a CSX railroad train has derailed within Scottsburg City Limits. Each of these incidents caused critical traffic issues within the county.
Scott	Natural Hazards	Flooding	Flash Flood	4	4	4	4	9	4	2015 June and July. Scott County Declared Declaration of Disaster for 19 road closures due to heavy damage from Flash Floods. Flash Floods is a high risk for the county.
Scott	Natural Hazards	Disease	Human Disease Outbreak	4	4	4	4	9	4	Scott County in 2015 had and continues to deal with the Largest HIV/HEP outbreak in the United States with a total of 185 confirmed HIV cases as of to date.
Scott	Natural Hazards	Flooding	Flash Flood	4	4	4	4	9	4	
Scott	Technological Hazards	Infrastructure	Communication Failure	4	4	4	4	9	4	Scott Co now operates on Kenwood Digital Radios due to the 800 MHZ failure during the 2002 Henryville Tornados. Radio Communications failed due to a tower being down in Henryville and this is Scott Co's radio tower repeater.
Scott	Natural Hazards	Storms	Tornado EF3 - EF5	4	4	4	4	9	4	During discussion with EMA,EMS,911,Fire, Local Officials, and School Officials, Scott County has currently had 13 Tornados, 28 fatalities, 304 injuries since 1961-2012. Making Scott County High Risk for Violent Tornados.
Scott	Natural Hazards	Winter Weather	Ice Storms	4	3	4	4	9	3.7	Committee Members met and discussed the possibilities of severe Ice Storms in Scott Co . Several Ice Storm had occurred in the past and the event was Critical due to the nature of the event. Several Communities lost power for 2 weeks.
Scott	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	4	9	3.7	Scott County is at high risk for severe thunderstorms with damaging winds, hail,

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										flooding, flash flooding, and lighting according to the MHMP.
Scott	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	4	9	3.7	Scott County is at high risk for sever thunderstorms with damaging winds, hail, flooding, flash flooding according to the MHMP.
Scott	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	4	4	9	3.7	Since 1950 Scott County has been stuck by at least 13 Tornados. Three of them fall in the Violent category.
Scott	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	4	4	9	3.7	Since 1950 Scott County has been struck by at least 13 Tornadoes. Three of them fall in the Violent category.
Scott	Man-Made Threats	Police Incident	Other Violent Offenders	3	4	4	4	9	3.55	EMA Director met with Scott Co EMS Director who stated concerns for lack of equipment during an event that CPR would need to be used for a long period of time. Due to the nature of the event and personnel available and the type of incident. EMS would like to have the Lucas CPR Device for it's life saving capabilities.
Scott	Man-Made Threats	Police Incident	Other Violent Offenders	3	4	4	4	9	3.55	EMA Director met with Scott Co EMS Director who stated concerns for lack of equipment during an event that CPR would need to be used for a long period of time. Due to the nature of the event and personnel available and the type of incident. EMS would like to have the Lucas CPR Device for it's life saving capabilities.
Scott	Technological Hazards	Infrastructure	Communication Failure	4	2	4	4	9	3.4	There are very little Cyber security precautions in place and due to the lack of a central network there is a lack of redundancy and safe data storage options for the county government.
Scott	Natural Hazards	Disease	Animal Disease Outbreak	3	3	4	4	9	3.25	Scott Co is at a possible risk for a animal disease outbreak due to being within close geographic area of affected Southern Indiana Counties.
Scott	Natural Hazards	Disease	Animal Disease Outbreak	3	3	4	4	9	3.25	Scott Co is at a possible risk for a animal disease outbreak due to outbreaks in other Southern Indiana Counties.
Scott	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	3	9	3.15	Scott County has 2 school districts, numerous religious centers, several

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										moderate size retail centers, and several community and county festivals. Any place where there is a large congregation of people has a risk for a active shooter/domestic terrorism incident.
Scott	Man-Made Threats	Police Incident	Other Violent Offenders	4	2	4	1	9	3.1	A large part of Scott County is economically depressed and the area has a heavy opioid dependency resulting in more visible violent crimes.
Scott	Man-Made Threats	Terrorist Attack	Cyber Attack	3	3	4	1	9	2.95	A cyber attack is becoming more and more likely to occur. The county does have an information technology specialist. Software and hardware is used to mitigate against attacks. No exercises have been conducted.
Scott	Man-Made Threats	Terrorist Attack	Cyber Attack	3	3	4	1	9	2.95	There are very little Cyber security precautions in place and due to the lack of a central network there is a lack of redundancy and safe data storage options for the county government.
Scott	Natural Hazards	Flora and Fauna	Invasive Species - Insect	4	2	1	4	9	2.95	Emerald Ash Borer beetle is located in Scott County and could possibly destroy many trees.
Scott	Natural Hazards	Flora and Fauna	Invasive Species - Plant	4	2	1	4	9	2.95	Kudzu Vine has been identified in Scott County by INDNR and this vine has the possibility to create serious damage to forests and harbor soybean pests and diseases.
Scott	Natural Hazards	Flora and Fauna	Invasive Species - Animal	4	2	1	4	9	2.95	Emerald Ash Borer beetle is located in Scott County and could possibly destroy many trees.
Scott	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	2	3	4	4	9	2.8	
Scott	Technological Hazards	Infrastructure	Public Utility Failure	2	3	4	3	9	2.7	Numerous storm related power outages have occurred in the past ten years. Public utility failure for an extended period of time will have a critical impact on citizens
Scott	Technological Hazards	Transportation	Highway Transporation Incident	2	3	3	4	9	2.65	Scott Co first responders and Scott Co Highway has determined that in such an event of a Technological Hazard it is possible for Scott Co to have transportation

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										issues that could last more than a week due to the lack resources.
Scott	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	4	4	4	9	2.65	This is considered a National level event and would not be localized to Scott County. The effects of this type of event would be catastrophic to all affected areas.
Scott	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	4	4	4	9	2.65	There are no strategic targets located in Scott County. The effects of this type of event would be catastrophic to all affected areas.
Scott	Technological Hazards	Transportation	Pipeline Transportation Incident	1	3	4	4	9	2.35	Scott County has numerous pipelines throughout the county and though an event is unlikely it could be catastrophic to the community. EMA and the regional Pipeline Emergency Group have met to discuss mitigation.
Scott	Natural Hazards	Storms	Tropical Cyclone Remnants	2	3	1	4	9	2.35	Heavy rain, high winds, and flooding are possible with remnants of tropical storm/hurricane. Hurricane Ike in 2008 left numerous homes damaged and damaged many public utilities leaving many citizens without utilities for an extended amount of time.
Scott	Technological Hazards	Transportation	Pipeline Transportation Incident	1	3	4	4	9	2.35	Scott County has numerous pipelines throughout the county and though an event is unlikely it could be catastrophic to the community.
Scott	Man-Made Threats	Terrorist Attack	Biological Attack	1	3	4	4	9	2.35	There are no critical targets in Scott County and this type of event would is highly unlikely, but could yield mass causalities.
Scott	Man-Made Threats	Terrorist Attack	Explosive Attack	1	3	4	4	9	2.35	There is an availability to locally source the materials and the neighboring jurisdiction had 2 explosive devices in the 2016 this is a threat to Scott County.
Scott	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	2	4	2	9	2.3	Scott County has app 14 miles of I-65, app 14 miles of US 31, and multiple state highways that dissect the county. There is a possibility of a HAZMAT transportation incident occurring due to the volume of materiel being transported along these routes. A HAZMAT incident would likely only affect a small portion of the community.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Scott	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	2	4	2	9	2.3	Scott County has app 14 miles of I-65 and app US 31 that dissect the county. There is a possibility of a HAZMAT transportation incident occurring due to the volume of materiel being transported along these routes. Though a HAZMAT incident would only affect a small portion of the community.
Scott	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	1	3	4	3	9	2.25	Scott County has 2 school districts, numerous religious centers, several moderate size retail centers, and several community and county festivals. Any place where there is a large congregation of people has a risk for a active shooter/domestic terrorism incident.
Scott	Natural Hazards	Weather Related	Extreme Temperatures	3	1	1	4	9	2.2	According to the 2016 MHMP Scott County is at risk for Extreme Heat and the risk is very likely.
Scott	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	2	4	1	9	2.2	Local Law Enforcement, Public Safety, and School officials have discussed that any school is a likely candidate for an active shooter situation. Local Law Enforcement have practiced drills for this scenario.
Scott	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	2	4	1	9	2.2	There is very minor security for the Scott County Government buildings. The only security measures are unmonitiored video and panic alarms.
Scott	Technological Hazards	Transportation	Commercial Air Transportation Incident	1	2	4	3	9	1.95	Even though an air event is unlikely Scott County is situated between two international airports in Louisville and Indianapolis. Louisville (SDF) has numerous airplanes that maintain a holding pattern above Scott County because of the level of air traffic caused by there being a major air shipping hub located at SDF.
Scott	Technological Hazards	Transportation	Commercial Air Transportation Incident	1	2	4	3	9	1.95	Even though an air event is unlikely Scott County is situated between two international airports in Louisville and Indianapolis. Louisville (SDF) has numerous airplanes that maintain a holding pattern above Scott County because of the level of

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										air traffic caused by there being a major air shipping hub located at SDF.
Scott	Natural Hazards	Other	Ground Failure	2	1	3	2	9	1.85	According to the MHMP Scott County risk include ground failure/landslide as one of the top 20 hazards of the county.
Scott	Natural Hazards	Weather Related	Drought	2	1	1	4	9	1.75	According to the MHMP Scott County identifies Drought as one of the 20 Hazards facing Scott County.
Shelby	Natural Hazards	Flooding	Flash Flood	4	2	4	3	5	3.3	The county experiences flash flooding on a consistent basis. Flooding across roads in low lying areas is common.
Shelby	Natural Hazards	Flooding	Major Flood	3	3	4	4	5	3.25	County has a history of flooding. Shelby County experienced significant flooding in 2008.
Shelby	Natural Hazards	Storms	Tornado EF3 - EF5	3	3	4	4	5	3.25	Shelby County has a history of tornadoes.
Shelby	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	1	5	3.1	Severe thunderstorms are always a risk in central Indiana.
Shelby	Natural Hazards	Winter Weather	Winter Storms	3	3	2	4	5	2.95	County has a history of Winter Storms. They have a huge impact on road conditions and power outages.
Shelby	Natural Hazards	Storms	Tornado EF0 - EF2	3	2	4	1	5	2.65	Shelby County has a history of tornadoes.
Shelby	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	2	5	2.6	Indiana Grand Casino, National Guard Armory, and Penske Logistics would be potential targets within the County. Government Facilities have low security on sight.
Shelby	Natural Hazards	Flora and Fauna	Invasive Species - Insect	3	2	1	4	5	2.5	Shelby County has confirmed cases of ash bores.
Shelby	Natural Hazards	Weather Related	Extreme Temperatures	3	2	1	3	5	2.4	Extreme temps are always a threat in central Indiana.
Shelby	Natural Hazards	Weather Related	Drought	2	3	1	4	5	2.35	Shelby County has a history of droughts affecting our agricultural community. The dry weather causes increase risk to our local fire departments.
Shelby	Natural Hazards	Weather Related	Drought	2	3	1	4	5	2.35	Shelby County has a history of droughts affecting our agricultural community.
Shelby	Man-Made Threats	Fire Incident	Arson	2	2	4	2	5	2.3	Always a concern for local fire departments.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Shelby	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	2	4	2	5	2.3	Local city and county law enforcement are aware of this as a possibility.
Shelby	Man-Made Threats	Police Incident	Hostage Situation	2	2	4	2	5	2.3	City and County have a past history of these types of events.
Shelby	Natural Hazards	Winter Weather	Ice Storms	2	2	2	3	5	2.1	Have a history of ice storms. Ice has impact on road conditions and power outages.
Spencer	Natural Hazards	Winter Weather	Ice Storms	4	4	4	4	10	4	
Spencer	Natural Hazards	Flooding	Flash Flood	4	4	4	4	10	4	
Spencer	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	4	10	3.7	Based on current MHMP
Spencer	Natural Hazards	Storms	Tornado EF3 - EF5	3	4	4	4	10	3.55	Based on current MHMP
Spencer	Natural Hazards	Winter Weather	Ice Storms	4	3	3	4	10	3.55	
Spencer	Natural Hazards	Storms	Derecho	4	3	3	3	10	3.45	Have experienced past events.
Spencer	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	3	10	3.3	
Spencer	Natural Hazards	Flooding	Major Flood	4	3	1	4	10	3.25	Based on current MHMP.
Spencer	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	10	3.25	Due to law enforcement depts. being spread throughout this rural county, and lack of county-wide training and equipment, we are very limited as to how we can respond to a domestic terrorist incident.
Spencer	Natural Hazards	Flooding	Flash Flood	4	2	4	2	10	3.2	Based on previous flash flooding events in the county.
Spencer	Natural Hazards	Weather Related	Extreme Temperatures	4	2	3	3	10	3.15	Specific population are affected more than others. Cooling or heating centers need to be established. There is a shortage of pet friendly centers. People do not want to leave their pets without a place for them to go.
Spencer	Man-Made Threats	Police Incident	Other Violent Offenders	2	4	4	3	10	3	Due to lack of county-wide training and equipment for officers and limited personnel, who are spread throughout the county, we are very limited in quick and adequate response.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Spencer	Natural Hazards	Flooding	Flash Flood	3	2	4	4	10	2.95	
Spencer	Natural Hazards	Winter Weather	Winter Storms	4	2	1	4	10	2.95	Based on current MHMP
Spencer	Natural Hazards	Weather Related	Drought	3	3	1	4	10	2.8	The most affected populations are agriculture farmers.
Spencer	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	4	10	2.8	Due to law enforcement depts. being spread throughout this rural county, and lack of county-wide training and equipment, we are very limited as to how we can respond to a domestic terrorist incident.
Spencer	Natural Hazards	Earthquake	Earthquake MMI V to VI	2	3	4	4	10	2.8	
Spencer	Man-Made Threats	Police Incident	Hostage Situation	3	2	4	2	10	2.75	There have been a few hostage experiences in the past.
Spencer	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	4	2	3	10	2.7	
Spencer	Natural Hazards	Other	Ground Failure	2	2	4	4	10	2.5	
Spencer	Natural Hazards	Disease	Human Disease Outbreak	3	2	1	4	10	2.5	
Spencer	Natural Hazards	Other	Wild Fire	2	2	4	3	10	2.4	
Spencer	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	2	4	3	10	2.4	Heavy transportation along 231 and I-64. No commodity study has been done at this time.
Spencer	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	2	2	4	3	10	2.4	Heavy transportation along 231 and 1-64. No commodity study has been done at this time.
Spencer	Man-Made Threats	International Terrorism	International Terrorism	1	3	4	4	10	2.35	
Spencer	Man-Made Threats	Police Incident	Riot	1	3	4	4	10	2.35	
Spencer	Man-Made Threats	Fire Incident	Arson	2	2	4	2	10	2.3	Based on MHMP
Spencer	Natural Hazards	Disease	Animal Disease Outbreak	2	2	1	4	10	2.05	Due to the recent Avion Flu outbreak we realize that it is a possibility in our area.
Spencer	Natural Hazards	Storms	Tropical Cyclone Remnants	2	2	2	2	10	2	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Spencer	Natural Hazards	Storms	Seiche	1	1	4	1	10	1.45	
Switzerland	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	2	9	3.2	Severe thunder storms happen quite offend in our county. Seven to nine months out of the year.
Switzerland	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	2	9	3.2	
Switzerland	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	2	4	4	4	9	3.1	The Markland Dam is within our county. The water on the upstream side is approximately 20ft. higher then the down stream side. There is also a hydro electric plant that uses the water for turn turbines.A breech in security or an earth quake may lead to transportation and electrical issues county wide.
Switzerland	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	3	1	2	9	3.05	Hazardous Material Incidents involving transportation vehicles is highly likely in our county. Several Semi-Trailer accidents happen annually hauling chemicals to neighboring plants in to Kentucky. Our county has limited resources to deal with any Haz-Mat incident. incident.
Switzerland	Natural Hazards	Storms	Tornado EF0 - EF2	3	2	3	3	9	2.7	Tornado chances are very high in our county.Indiana is ranked third in the united states for most tornado's. We have tornado warnings in the winter months.
Switzerland	Technological Hazards	Infrastructure	Communication Failure	3	3	1	2	9	2.6	The way our county is geographical laid out our county a communication failure pose a high threat in our county. the 450ft. elevation diference north to south in our county leads to many "dead zones" due to terrain obstructions. Backup and secondary systems need to be installed to make lessen the rick of communication failure within our county.
Switzerland	Natural Hazards	Flooding	Flash Flood	2	2	4	4	9	2.5	Flooding that occurred in the 1930"s and again in 1997 has forced most of the people out of the flood areas within our county.Many residents that live along creeks in the county would still be effected by flash flooding

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Switzerland	Natural Hazards	Flooding	Flash Flood	2	2	4	4	9	2.5	
Switzerland	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	4	1	2	9	2.45	Active Attacker situations are possible, Schools, Court House, and other County Offices would be most vulnerable to these attacks.Our local casino and our local festivals may also be vulnerable. The local law enforcement agencies have worked together for the past several years to train and prepare for the Active Shooter scenarios.
Switzerland	Natural Hazards	Flooding	Flash Flood	2	2	4	3	9	2.4	
Switzerland	Natural Hazards	Storms	Severe Thunderstorm	3	2	1	3	9	2.4	
Switzerland	Natural Hazards	Storms	Tornado EF3 - EF5	2	3	1	4	9	2.35	Back in the 1970's there was a EF- 3 tornado in the northern part of the county.
Switzerland	Technological Hazards	Infrastructure	Public Utility Failure	2	2	4	2	9	2.3	Most of the utility failures in the county involves power failure due to storms or traffic accidents involving a power poles. the other failure would be water line being broke due to construction or weather.
Switzerland	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	1	9	2.2	We do have under ground high pressure natural gas pipelines in the county.
Switzerland	Natural Hazards	Flooding	Flash Flood	2	2	3	2	9	2.15	
Switzerland	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	1	4	9	2.05	We do have under ground high pressure natural gas pipelines in the county.
Switzerland	Natural Hazards	Winter Weather	Winter Storms	2	2	1	4	9	2.05	In most winter months in the past 4 to 5 years we average around 1 to 2 winter storms that really produce heavy snow fall. Most of our snow fall is the 3 to 6 inch snow fall limits.
Switzerland	Technological Hazards	Transportation	Marine Transporation Incident	2	2	2	2	9	2	We have commerical river barge traffic that goes by are county. It goes threw the Markland Locks also. Some barges carry petroleum and chemical products in there cargo, in which could be a threat.
Switzerland	Natural Hazards	Winter Weather	Ice Storms	2	2	2	2	9	2	Where our county is located in the southern part of the state, we seem to have more

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										freezing rain events, or a mix of freezing rain and snow then central and northern parts of the state.
Switzerland	Natural Hazards	Other	Wild Fire	2	2	1	3	9	1.95	We have quite a few brush and grass fires every year. Especially in the early spring and fall months of the year. Due to our rugged terrain and rolling hills,and heavy wooded areas, wild fires do pose a threat to the county.
Switzerland	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	2	1	2	9	1.85	Domestic Terrorism is possible in our county due to the fact that we a large Casino and High Rise Hotel, and a major dam in the county.
Switzerland	Man-Made Threats	Police Incident	Hostage Situation	2	2	1	2	9	1.85	Hostage situation could happen under a family domestic situation, or possibly at the local casino.
Switzerland	Technological Hazards	Fire Incident	Structural Collapse	2	2	1	2	9	1.85	
Switzerland	Man-Made Threats	Fire Incident	Arson	2	2	1	2	9	1.85	Fire incidents by Arson, though possible are not a major threat within our county. Local fire departments have good equipment and training, and the the local water supply is ample to sustain firefighting operations for several hours.Our fire departments in the county have the ability to shuttle water from static water sources using water tankers
Switzerland	Man-Made Threats	Terrorist Attack	Biological Attack	1	1	1	4	9	1.3	
Switzerland	Man-Made Threats	International Terrorism	International Terrorism	1	1	1	1	9	1	International Terrorism is kind of unlikely in our conty.
Switzerland	Man-Made Threats	Police Incident	Riot	1	1	1	1	9	1	Very unlikely
Switzerland	Technological Hazards	Transportation	Rail Transportation Incident	1	1	1	1	9	1	There is no Railroads in our county.
Vigo	Natural Hazards	Flooding	Flash Flood	4	3	4	4	7	3.7	Historical Data
Vigo	Natural Hazards	Flooding	Flash Flood	4	3	4	4	7	3.7	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Vigo	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	3	3	4	4	7	3.25	ISU has students on national watch list. Federal Prison has potential for execution of high profile inmates. I 70 crossroads.
Vigo	Man-Made Threats	International Terrorism	International Terrorism	3	3	4	4	7	3.25	
Vigo	Man-Made Threats	Terrorist Attack	Chemical Attack	2	4	4	4	7	3.1	
Vigo	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	4	4	4	7	3.1	
Vigo	Man-Made Threats	Terrorist Attack	Cyber Attack	3	2	4	4	7	2.95	
Vigo	Natural Hazards	Weather Related	Drought	4	2	1	4	7	2.95	
Vigo	Man-Made Threats	Police Incident	Hostage Situation	4	1	4	2	7	2.9	
Vigo	Man-Made Threats	Police Incident	Other Violent Offenders	4	1	4	2	7	2.9	
Vigo	Man-Made Threats	Terrorist Attack	Conventional Attack	3	2	4	3	7	2.85	
Vigo	Man-Made Threats	Fire Incident	Arson	4	1	4	1	7	2.8	
Vigo	Man-Made Threats	Terrorist Attack	Biological Attack	2	2	4	4	7	2.5	
Vigo	Man-Made Threats	Terrorist Attack	Biological Attack	2	2	4	3	7	2.4	
Vigo	Man-Made Threats	Police Incident	Riot	2	2	3	3	7	2.25	
Wabash	Man-Made Threats	Fire Incident	Arson	4	3	4	2	3	3.5	This assessment is based on our current Wabash County Multi-Hazard Mitigation Plan
Wabash	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	2	3	3.5	This assessment is based on our current Wabash County Multi-Hazard Mitigation Plan
Wabash	Natural Hazards	Winter Weather	Winter Storms	3	3	3	4	3	3.1	This assessment is based on our current Wabash County Multi-Hazard Mitigation Plan
Wabash	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	3	3	3	4	3	3.1	This assessment is based on our current Wabash County Multi-Hazard Mitigation Plan

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Wabash	Natural Hazards	Earthquake	Earthquake MMI I to IV	2	3	4	4	3	2.8	This assessment is based on our current Wabash County Multi-Hazard Mitigation Plan
Wabash	Natural Hazards	Flooding	Flash Flood	3	2	3	3	3	2.7	This assessment is based on our current Wabash County Multi-Hazard Mitigation Plan
Wabash	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	3	3	2.7	This assessment is based on our current Wabash County Multi-Hazard Mitigation Plan
Wabash	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	3	4	3	3	2.7	
Warren	Natural Hazards	Other	Ground Failure	3	3	4	2	4	3.05	
Warrick	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	10	4	
Warrick	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	10	4	
Warrick	Technological Hazards	Infrastructure	Public Utility Failure	4	4	4	4	10	4	
Warrick	Natural Hazards	Storms	Tornado EF3 - EF5	4	4	4	4	10	4	Have experienced many past events. Again sheltering becomes an issue at times. especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go. Power outages normally occur with these events, debris management is a must. Our highway department is in dire need of a standby generator for there facility.
Warrick	Technological Hazards	Infrastructure	Communication Failure	4	4	4	3	10	3.9	We have experienced this scenario in the past.
Warrick	Natural Hazards	Storms	Tornado EF0 - EF2	4	3	4	4	10	3.7	Have experienced many past events. Again sheltering becomes an issue at times. especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go. Power outages normally occur with these event, debris management is a must. Our highway department is in dire need of standby generator for there facility.
Warrick	Natural Hazards	Storms	Derecho	4	3	4	4	10	3.7	Have experienced past events. Again sheltering becomes an issue at times. especially pet friendly shelters. Victims will NOT leave without their pets and a place for

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										them to go. Power outages normally occur with these events, debris management is a must. Our highway department is in dire need of a standby generator for there facility.
Warrick	Natural Hazards	Winter Weather	Winter Storms	4	3	3	4	10	3.55	Have experienced many past events. Again sheltering can become an issue. especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go. Power outages normally occur with these events, debris management is a must. Our highway department is in dire need of a standby generator for their facility.
Warrick	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	4	3	4	2	10	3.5	Evacuation and sheltering becomes an issue at times. Especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go.
Warrick	Natural Hazards	Other	Ground Failure	4	2	4	4	10	3.4	Ground failure occurs quite often in Warrick County. This is due to aging a banded shaft mines failures. These failures are normally contained to a confined area. It has in the past affected critical infrastructure (sewers, roads water).
Warrick	Natural Hazards	Winter Weather	Ice Storms	3	4	3	4	10	3.4	Have experienced many past events. Again sheltering becomes an issue at times. especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go. Power outages normally occur with these events, debris management is a must. Our highway department is in dire need of a standby generator for their facility.
Warrick	Natural Hazards	Earthquake	Earthquake MMI I to IV	4	2	4	4	10	3.4	
Warrick	Man-Made Threats	Fire Incident	Arson	4	2	4	3	10	3.3	
Warrick	Natural Hazards	Flooding	Flash Flood	4	2	4	3	10	3.3	We have had many occasions of flash flooding. Sheltering becomes an issue at times. especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go.

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Warrick	Natural Hazards	Flooding	Flash Flood	4	2	4	3	10	3.3	We have had many occasions of flash flooding.
Warrick	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	2	4	3	10	3.3	
Warrick	Natural Hazards	Earthquake	Earthquake MMI V to VI	3	3	4	4	10	3.25	Sheltering and mass care will be bug issues As well as infrastrucure
Warrick	Natural Hazards	Storms	Severe Thunderstorm	4	2	4	2	10	3.2	
Warrick	Technological Hazards	Transportation	Highway Transporation Incident	4	2	4	2	10	3.2	Evacuation and sheltering could becomes an issue at this type of event. Especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go.
Warrick	Natural Hazards	Weather Related	Extreme Temperatures	4	2	3	3	10	3.15	These periods affect the elderly, homeless and special needs population. Cooling centers need to be set up. Again pet friendly centers become an issue and must be factored in.
Warrick	Natural Hazards	Earthquake	Earthquake MMI VII to X	2	4	4	4	10	3.1	
Warrick	Technological Hazards	Transportation	Pipeline Transportation Incident	2	4	4	4	10	3.1	
Warrick	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	4	4	3	10	3	
Warrick	Natural Hazards	Flooding	Major Flood	3	3	2	4	10	2.95	Past issues with major flooding. Sheltering becomes an issue at times. especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go.
Warrick	Natural Hazards	Other	Wild Fire	3	2	4	3	10	2.85	These normally occur in old strip mine areas.
Warrick	Technological Hazards	Fire Incident	Explosion	3	2	4	3	10	2.85	
Warrick	Man-Made Threats	Police Incident	Other Violent Offenders	3	2	4	3	10	2.85	
Warrick	Natural Hazards	Disease	Human Disease Outbreak	3	3	1	4	10	2.8	
Warrick	Man-Made Threats	Terrorist Attack	Cyber Attack	2	3	4	4	10	2.8	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Warrick	Man-Made Threats	Police Incident	Hostage Situation	3	2	4	2	10	2.75	We have experienced hostage situations in the past. LE trains and exercises on a regular basis.
Warrick	Technological Hazards	Fire Incident	Large Fire/Conflagration	2	3	4	3	10	2.7	
Warrick	Man-Made Threats	Terrorist Attack	Biological Attack	1	4	4	4	10	2.65	
Warrick	Man-Made Threats	Terrorist Attack	Chemical Attack	1	4	4	4	10	2.65	
Warrick	Man-Made Threats	Terrorist Attack	Conventional Attack	1	4	4	4	10	2.65	
Warrick	Man-Made Threats	Terrorist Attack	Electromagnetic (EMP) Attack	1	4	4	4	10	2.65	
Warrick	Man-Made Threats	Terrorist Attack	Nuclear Attack	1	4	4	4	10	2.65	
Warrick	Man-Made Threats	Terrorist Attack	Radiological Attack	1	4	4	4	10	2.65	
Warrick	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	2	4	4	10	2.5	No high hazard dams. There are dams on that could effect limited areas if failure were to occur.
Warrick	Technological Hazards	Transportation	Marine Transporation Incident	2	2	4	4	10	2.5	Ohio river barge traffic as well as Interstate and state highways. Evacuation and sheltering could be an issue
Warrick	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	3	10	2.4	
Warrick	Man-Made Threats	Fire Incident	Arson	2	2	4	3	10	2.4	
Warrick	Technological Hazards	Transportation	Rail Transportation Incident	2	2	4	3	10	2.4	
Warrick	Technological Hazards	Transportation	Commercial Air Transportation Incident	2	2	4	3	10	2.4	
Warrick	Technological Hazards	Fire Incident	Structural Collapse	2	2	4	3	10	2.4	
Warrick	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	2	2	4	3	10	2.4	
Warrick	Natural Hazards	Storms	Tropical Cyclone Remnants	2	3	1	4	10	2.35	Have experienced past events. Again sheltering becomes an issue at times. especially pet friendly shelters. Victims will

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
										NOT leave without their pets and a place for them to go. Power outages normally occur with these events, debris management is a must. Our highway department is in dire need of a standby generator for there facility.
Warrick	Man-Made Threats	Terrorist Attack	Explosive Attack	1	3	4	4	10	2.35	
Warrick	Man-Made Threats	Police Incident	Riot	1	3	4	4	10	2.35	
Warrick	Natural Hazards	Weather Related	Drought	2	3	1	4	10	2.35	With past droughts it has been mainly an agriculture event
Warrick	Man-Made Threats	International Terrorism	International Terrorism	1	3	4	4	10	2.35	
Warrick	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	2	2	4	2	10	2.3	Evacuation and sheltering could become becomes an issue at times. Especially pet friendly shelters. Victims will NOT leave without their pets and a place for them to go.
Warrick	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	2	2	4	1	10	2.2	
Warrick	Natural Hazards	Disease	Animal Disease Outbreak	2	2	1	4	10	2.05	Currently working with animal control and county ag agent on planning and response.
Warrick	Technological Hazards	Dams and Levees	High Hazard Dam - (State owned)	1	2	4	4	10	2.05	No state owned high hazard dams in our county
Warrick	Natural Hazards	Flora and Fauna	Invasive Species - Insect	2	2	1	4	10	2.05	
Warrick	Technological Hazards	Dams and Levees	High Hazard Dam - (Federally owned)	1	2	4	4	10	2.05	No High Hazard Dams in our County (Federally Owned
Warrick	Natural Hazards	Storms	Geomagnetic Storm	2	2	1	2	10	1.85	
Warrick	Technological Hazards	Dams and Levees	High Hazard Dam - (non-regulated state owned)	1	1	4	4	10	1.75	No state owned in our County.
Warrick	Technological Hazards	Dams and Levees	Major Levee Failure - (Non-accredited)	1	1	4	3	10	1.65	
Warrick	Technological Hazards	Dams and Levees	Major Levee Failure - (Accredited)	1	1	4	2	10	1.55	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
Warrick	Natural Hazards	Storms	Seiche	1	1	4	1	10	1.45	
Warrick	Natural Hazards	Flora and Fauna	Invasive Species - Animal	1	1	1	4	10	1.3	
Warrick	Natural Hazards	Flora and Fauna	Invasive Species - Aquatic	1	1	1	4	10	1.3	
Warrick	Natural Hazards	Flora and Fauna	Invasive Species - Plant	1	1	1	4	10	1.3	
White	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	4	4	County CEMP Hazard Analysis
White	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	4	4	County CEMP Hazard Analysis
White	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	4	4	
White	Man-Made Threats	Domestic Terrorism	Domestic Terrorism	4	4	4	4	4	4	
White	Natural Hazards	Winter Weather	Winter Storms	4	4	2	3	4	3.6	Based on historical information the probability of winter storms storms is highly likely. Winter storms of varying magnitudes are expected to happen.
White	Technological Hazards	Infrastructure	Public Utility Failure	4	3	4	3	4	3.6	This is based upon personnel opinion and historical information and input from White County EMA. The storm in Brookston, IN took down several poles and wires. Brookston has their own utilities.
White	Natural Hazards	Winter Weather	Winter Storms	4	4	2	3	4	3.6	
White	Technological Hazards	Infrastructure	Public Utility Failure	4	3	4	3	4	3.6	
White	Technological Hazards	Infrastructure	Public Utility Failure	4	3	4	3	4	3.6	This is based upon personnel opinion and historical information and input from White County EMA. The storm in Brookston, IN took down several poles and wires.
White	Man-Made Threats	Terrorist Attack	Biological Attack	3	4	4	4	4	3.55	County CEMP Hazard Analysis
White	Man-Made Threats	Terrorist Attack	Biological Attack	3	4	4	4	4	3.55	
White	Natural Hazards	Flooding	Flash Flood	4	4	2	2	4	3.5	flash flooding could affect any location within this jurisdiction; therefore the entire couonty's population and building are vulnerable to a flash flood

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
White	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	2	4	3.5	In June of 2016 Brookston, IN in White County was hit by a severe storm which caused several trees to be blown down on every street in the town. NWS said that is was due to a down burst.
White	Natural Hazards	Storms	Derecho	4	3	4	2	4	3.5	When the storm hit Brookston IN it happened to be a derecho
White	Natural Hazards	Storms	Severe Thunderstorm	4	3	4	2	4	3.5	
White	Natural Hazards	Flooding	Flash Flood	4	4	2	2	4	3.5	
White	Natural Hazards	Storms	Derecho	4	3	4	2	4	3.5	
White	Natural Hazards	Flooding	Major Flood	4	3	3	3	4	3.45	based on historical information and the HAZUS-MH flooding analysis results, the probability of flooding is high likely. According to the CPRI flooding ranked as the number hazard in White County
White	Natural Hazards	Flooding	Major Flood	4	3	3	3	4	3.45	
White	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	3	3	4	3	4	3.15	There is the possibility of a major hazardous material event based on historical information
White	Technological Hazards	Hazardous Material	Hazardous Material - Transportation Incident	3	3	4	3	4	3.15	There is a possibility of a major hazardous material event based on historical information and input from White County EMA
White	Technological Hazards	Infrastructure	Communication Failure	3	3	4	3	4	3.15	County CEMP Hazard Analysis, supporting information is based upon personnel opinion and expertise coupled with community history. Rated as likely due to recent failures of 800 MHZ failures and recent failure due to storm activity
White	Technological Hazards	Transportation	Rail Transportation Incident	3	3	4	3	4	3.15	County CEMP Hazard Analysis
White	Technological Hazards	Hazardous Material	Hazardous Material - Fixed Facility	3	3	4	3	4	3.15	
White	Technological Hazards	Hazardous Material	Hazardous Material -	3	3	4	3	4	3.15	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
			Transportation Incident							
White	Technological Hazards	Infrastructure	Communication Failure	3	3	4	3	4	3.15	
White	Technological Hazards	Transportation	Rail Transportation Incident	3	3	4	3	4	3.15	
White	Man-Made Threats	Terrorist Attack	Chemical Attack	2	4	4	4	4	3.1	County CEMP Hazard Analysis
White	Natural Hazards	Disease	Human Disease Outbreak	3	4	1	4	4	3.1	County CEMP Hazard Analysis
White	Natural Hazards	Storms	Tornado EF3 - EF5	3	4	3	1	4	3.1	Tornadoes can occur within any area in the county; The entire county population and all buildings are vulnerable to tornadoes.
White	Man-Made Threats	Terrorist Attack	Chemical Attack	2	4	4	4	4	3.1	
White	Natural Hazards	Disease	Human Disease Outbreak	3	4	1	4	4	3.1	
White	Natural Hazards	Storms	Tornado EF3 - EF5	3	4	3	1	4	3.1	
White	Man-Made Threats	Fire Incident	Arson	3	3	4	2	4	3.05	County CEMP Hazard Analysis
White	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	3	4	2	4	3.05	Supporting information is based on personnel opinion and expertise coupled with past history of the county.
White	Technological Hazards	Transportation	Highway Transporation Incident	3	3	4	2	4	3.05	County CEMP Hazard Analysis
White	Man-Made Threats	Fire Incident	Arson	3	3	4	2	4	3.05	
White	Man-Made Threats	Police Incident	Active Attacker (Kinetic)	3	3	4	2	4	3.05	
White	Technological Hazards	Transportation	Highway Transporation Incident	3	3	4	2	4	3.05	
White	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	4	4	3	4	3	County CEMP Hazard Analysis
White	Technological Hazards	Dams and Levees	High Hazard Dam - (Privately/locally owned)	2	4	4	3	4	3	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
White	Man-Made Threats	Terrorist Attack	Explosive Attack	2	3	4	4	4	2.8	County CEMP Hazard Analysis
White	Man-Made Threats	Terrorist Attack	Radiological Attack	2	3	4	4	4	2.8	County CEMP Hazard Analysis
White	Man-Made Threats	Terrorist Attack	Explosive Attack	2	3	4	4	4	2.8	
White	Man-Made Threats	Terrorist Attack	Radiological Attack	2	3	4	4	4	2.8	
White	Technological Hazards	Fire Incident	Structural Collapse	2	3	4	3	4	2.7	County CEMP Hazard Analysis
White	Technological Hazards	Fire Incident	Structural Collapse	2	3	4	3	4	2.7	
White	Man-Made Threats	Police Incident	Hostage Situation	2	3	4	2	4	2.6	County CEMP Hazard Analysis
White	Technological Hazards	Fire Incident	Explosion	2	3	4	2	4	2.6	Based on historical information the probability is likely
White	Man-Made Threats	Police Incident	Hostage Situation	2	3	4	2	4	2.6	
White	Technological Hazards	Fire Incident	Explosion	2	3	4	2	4	2.6	
White	Man-Made Threats	International Terrorism	International Terrorism	2	2	4	4	4	2.5	County CEMP Hazard Analysis
White	Natural Hazards	Disease	Animal Disease Outbreak	2	3	2	4	4	2.5	County CEMP Hazard Analysis
White	Natural Hazards	Weather Related	Drought	2	3	2	4	4	2.5	County CEMP Hazard Analysis
White	Man-Made Threats	International Terrorism	International Terrorism	2	2	4	4	4	2.5	
White	Natural Hazards	Disease	Animal Disease Outbreak	2	3	2	4	4	2.5	
White	Natural Hazards	Weather Related	Drought	2	3	2	4	4	2.5	
White	Natural Hazards	Winter Weather	Ice Storms	2	3	2	3	4	2.4	Based on historical information the probability of ice storms is highly likely
White	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	3	4	2.4	County CEMP Hazard Analysis
White	Natural Hazards	Winter Weather	Ice Storms	2	3	2	3	4	2.4	

County	Category	Subcategory	Hazard	Probability	Severity	Warning	Duration	District	CPRI	Supplemental Information
White	Technological Hazards	Transportation	Pipeline Transportation Incident	2	2	4	3	4	2.4	
White	Natural Hazards	Earthquake	Earthquake MMI I to IV	1	3	4	1	4	2.05	Based on historical information as well as current USGS and IGS research and studies, earthquakes in White County are possible.
White	Natural Hazards	Earthquake	Earthquake MMI I to IV	1	3	4	1	4	2.05	
White	Natural Hazards	Flora and Fauna	Invasive Species - Animal	1	2	2	2	4	1.55	

Appendix C – State-Regulated High Hazard Dams

Dam Name	County Name	EAP	Completion
SADDLE LAKE DAM	Adams	NO	1938
CEDARVILLE DAM	Allen	YES	1953
FOXWOOD LAKE DAM	Allen	NO	2006
HURSHTOWN RESERVOIR DAM	Allen	YES	1971
KEKIONGA LAKE DAM	Allen	NO	1979
GRANDVIEW LAKE DAM	Bartholomew	YES	1965
GROUSE RIDGE LAKE DAM	Bartholomew	YES	1964
HARRISON LAKES NORTH DAM	Bartholomew	YES	1947
HARRISON LAKES SOUTH DAM	Bartholomew	YES	1947
HORSESHOE LAKE DAM	Bartholomew	NO	1965
INDIAN (EVERROAD) LAKE DAM	Bartholomew	YES	1957
SAWMILL LAKE DAM	Bartholomew	YES	1997
TERRACE LAKE DAM	Bartholomew	YES	1948
TIPTON LAKE EAST DAM	Bartholomew	YES	1982
TIPTON LAKE NORTH DAM	Bartholomew	YES	1982
TIPTON LAKE WEST DAM	Bartholomew	YES	1982
AUTUMN LAKE DAM	Brown	YES	1969
BAKER LAKE DAM	Brown	YES	1960
BEAR CREEK LAKE DAM	Brown	YES	1939
BERRY FARM LAKE DAM	Brown	YES	1965
BITTERSWEET LAKE DAM	Brown	YES	1964
CROOKED CREEK LAKE DAM	Brown	YES	1935
FOWLER LAKE DAM	Brown	NO	1977
GREEN LAKE DAM	Brown	YES	1964
LAKE LASALLE DAM	Brown	YES	1963
LEWIS LAKE DAM	Brown	YES	1974
LOG CABIN LAKE DAM	Brown	YES	1977
LOGTERMAN LAKE DAM	Brown	YES	1960
LUTHERAN HILLS CAMP LAKE DAMS	Brown	YES	1965
MAGNESS LAKE DAM #1	Brown	NO	1962
MILLER LAKE DAM	Brown	YES	1952
OGLE LAKE DAM	Brown	YES	1939
REVEREND FRAME LAKE DAM	Brown	NO	1975
ROGERS LAKE DAM	Brown	YES	1972
SOMERSET LAKE DAM	Brown	YES	1961
SPEEDWAY CONSERVATION CLUB DAM	Brown	YES	1952
STONER'S LONESOME LAKE DAM	Brown	YES	1999
STRAHL LAKE DAM	Brown	YES	1939
SWEETWATER LAKE DAM	Brown	YES	1965

Dam Name	County Name	EAP	Completion
TOUSLEY DAM	Brown	YES	1953
WILDCRAFT LOWER LAKE DAM	Brown	YES	1947
WRIGHT LAKE DAM	Brown	YES	1970
YARLING LAKE DAM	Brown	NO	1950
YELLOWWOOD LAKE DAM	Brown	YES	1939
LAKE PERRY DAM	Cass	NO	1969
RIDGEVIEW LAKE DAM	Cass	YES	1965
BORDEN LAKE DAM	Clark	NO	1971
DEAM LAKE DAM	Clark	YES	1964
HIDEAWAY LAKE DAM	Clark	NO	1954
MUDDY FORK STRUCTURE NO. 2	Clark	YES	1971
MUDDY FORK STRUCTURE NO. 3	Clark	NO	1973
MUDDY FORK STRUCTURE NO. 5	Clark	NO	1970
MUDDY FORK STRUCTURE NO. 6	Clark	YES	2004
SOUTHERN HILLS LAKE DAM	Clark	NO	1971
ENGLISH LAKE DAM	Crawford	NO	1966
HIDDEN VALLEY LAKE DAM	Dearborn	YES	1973
ORTWEIN DAM	Dearborn	NO	1989
CLOSSER LAKE DAM	Decatur	NO	1974
GREENSBURG UPLAND RESERVOIR	Decatur	NO	1990
PRAIRIE CREEK RESERVOIR DAM	Delaware	YES	1959
BEAVER CREEK LAKE DAM	Dubois	YES	1955
CARMICHAEL DAM	Dubois	NO	1965
FELMONT OIL CO. DAM	Dubois	NO	1963
HUNTINGBURG CITY LAKE DAM	Dubois	YES	1966
SCHNELLVILLE CONSERVATION CLUB LAKE DAM	Dubois	NO	1945
GOSHEN POND DAM	Elkhart	NO	1868
PATTISON LAKE DAM	Floyd	NO	1945
SYCAMORE RIDGE DAM	Floyd	NO	1964
OLLO LAKE DAM	Franklin	NO	1994
GIBSON GENERATING PLANT DAM	Gibson	YES	1973
MORIARITY LAKE DAM	Grant	NO	2000
WAGNER YOUTH CAMP LAKE DAM	Grant	NO	1948
BEECHWOOD LAKE DAM	Greene	NO	1957
MORSE RESERVOIR DAM	Hamilton	YES	1955
WOODLAND ADDITION LAKE DAM	Hamilton	NO	1973
SUGAR HILLS LAKE DAM	Hancock	NO	1972
PINESTONE LAKE DAM	Harrison	NO	1958
AVON TOWN HALL LAKE DAM	Hendricks	NO	1965
DANVILLE CONSERVATION CLUB DAM	Hendricks	NO	1945
FOREST LAKE DAM	Hendricks	NO	1965

Dam Name	County Name	EAP	Completion
JE-TO LAKE DAM	Hendricks	YES	1945
PRESTWICK LAKE DAM	Hendricks	YES	1981
PROCK LAKE DAM	Hendricks	NO	1979
GIBONEY LAKE DAM	Henry	NO	1965
LAKE HAVEN DAM	Henry	NO	1954
SUMMIT LAKE STATE PARK DAM	Henry	YES	1981
UPPER BIG BLUE RIVER STRUCTURE NO. 15	Henry	YES	1969
UPPER BIG BLUE RIVER STRUCTURE NO. 18	Henry	NO	1994
UPPER BIG BLUE RIVER STRUCTURE NO. 19	Henry	NO	1995
UPPER BIG BLUE RIVER STRUCTURE NO. 7-A	Henry	YES	1976
KOKOMO WATERWORKS OFF CHANNEL DAM	Howard	NO	1954
KOKOMO WATERWORKS RESERVOIR #2 DAM	Howard	YES	1957
BISHOP LAKE DAM	Jackson	NO	1968
CAMP PYOCA LAKE DAM	Jackson	NO	1950
HILLVIEW LAKE DAM	Jackson	NO	1961
KNOB LAKE DAM	Jackson	YES	1940
LAKE & FOREST CLUB DAM	Jackson	YES	1960
STARVE HOLLOW LAKE DAM	Jackson	YES	1938
R.M. SCHAHFER GENERATING STATION - FINAL SETTLING BASIN	Jasper	YES	1976
R.M. SCHAHFER GENERATING STATION - INTAKE SETTLING BASIN	Jasper	YES	1982
R.M. SCHAHFER GENERATING STATION - WASTE & RECYCLE BASIN	Jasper	YES	1982
PARADISE LAKE DAM	Jefferson	NO	1965
BRUSH CREEK DAM	Jennings	YES	1954
COUNTRY SQUIRE LAKE DAM	Jennings	NO	1967
HOOD LAKE DAM	Johnson	YES	1968
LAMB LAKE DAM	Johnson	NO	1937
LAMB LAKE ESTATES DAM	Johnson	NO	1972
LOWER PEOGA LAKE DAM	Johnson	YES	1946
NORTH LAKE CONSERVANCY DISTRICT DAM	Johnson	YES	1952
PRINCE'S EAST LAKE DAM	Johnson	YES	1953
ROGER YOUNG LAKE DAM	Johnson	YES	1976
UPPER PEOGA LAKE DAM	Johnson	YES	1946
WATER'S EDGE LAKE DAM	Johnson	YES	1940
WHITE LAKE CONSERVANCY DISTRICT DAM	Johnson	YES	1952
FLATBELLY LAKE DAM	Kosciusko	NO	1962
PAPAKEECHIE LAKE	Kosciusko	NO	1913
WEBSTER LAKE DAM - EAST	Kosciusko	YES	1835
WEBSTER LAKE DAM - WEST	Kosciusko	YES	1835
DOUBLETREE LAKE ESTATES DAM (NORTH)	Lake	NO	
LAKE DALECARLIA DAM (EAST)	Lake	YES	1929
LAKE DALECARLIA DAM (WEST)	Lake	YES	1929

Dam Name	County Name	EAP	Completion
LAKE GEORGE DAM	Lake	YES	1846
LAKE HILLS DAM	Lake	NO	1930
LAKE OF THE FOUR SEASONS (LOWER) C	Lake	YES	1966
LA LUMIERE DAM	LaPorte	NO	1940
ROC-MAR-TON LAKE DAM	Madison	NO	1929
CASTLEBROOK DAM	Marion	NO	1975
COLLEGE PARK LAKE DAM	Marion	YES	1969
EAGLE CREEK RESERVOIR DAM	Marion	YES	1967
GEIST RESERVOIR DAM	Marion	YES	1944
POGUES RUN DAM	Marion	YES	1998
LAKE LATONKA DAM	Marshall	NO	1964
ZEHNER MILL POND DAM	Marshall	NO	1933
WEST BOGGS CREEK STRUCTURE NO. 1	Martin	YES	1971
BRYANT CREEK LAKE DAM	Monroe	YES	1940
EGENOLF LAKE DAM	Monroe	YES	1964
GRIFFY RESERVOIR DAM	Monroe	YES	1924
LAKE LEMON DAM	Monroe	YES	1952
CRAWFORDSVILLE COMMUNITY SPORTSMENS CLUB LAKE DAM	Montgomery	NO	1950
LITTLE RACCOON DAM NO.8 - WAVELAND LAKE DAM	Montgomery	YES	1970
BAILEY LAKE DAM	Morgan	YES	1973
BRADFORD WOODS LAKE DAM	Morgan	YES	1960
FALCON CREST LAKE DAM	Morgan	YES	1992
HART LAKE DAM	Morgan	YES	1950
LAKE BODONA DAM	Morgan	YES	1945
LAKE DETURK DAM	Morgan	YES	1972
LAKE EDGEWOOD DAM	Morgan	YES	1959
NEBO LAKE DAM	Morgan	YES	1954
PAINTED HILLS LAKE DAM	Morgan	YES	1970
PATTON PARK LAKE DAM	Morgan	YES	1935
ST. JOHN COMMONS DAM	Morgan	YES	2002
UPPER SPRING LAKE DAM	Morgan	YES	1964
VAN ROOY LAKE DAM	Morgan	NO	1963
WHIPPOORWILL DAM	Morgan	YES	1945
WHIP-POOR-WILL DAM	Morgan	YES	1956
WILDWOOD CONSERVANCY DISTRICT DAM	Morgan	YES	1964
WILDWOOD SHORES LAKE DAM	Morgan	YES	1974
SYLVAN LAKE DAM	Noble	YES	1839
ORLEANS LAKE DAM	Orange	NO	1950
SVCD STRUCTURE NO. F-3 (GALLOWAY LAKE)	Orange	YES	1963
SVCD STRUCTURE NO. F-6 (COLLINS LAKE)	Orange	YES	1965
SVCD STRUCTURE NO. F-7 (TUCKER LAKE)	Orange	YES	1963

Dam Name	County Name	EAP	Completion
AMAZON LAKE DAM	Owen	YES	1975
DUGAN LAKE DAM	Owen	NO	1960
GRAYBROOK LAKE DAM	Owen	NO	1945
HOLLYBROOK LAKE DAM	Owen	NO	1940
JEFFRIES LAKE DAM	Parke	NO	1972
LITTLE RACCOON DAM NO. 1 - ALBRIGHT	Parke	NO	1973
LITTLE RACCOON DAM NO. 2C - ROCKVILLE DAM	Parke	YES	1971
LITTLE RACCOON DAM NO. 2D - DWYER DAM	Parke	NO	1975
LITTLE RACCOON DAM NO. 3 - EARL DAM	Parke	NO	1969
ROBERT CROWDER DAM	Parke	NO	1971
TAYLOR LAKE DAM	Parke	NO	1978
COLE LAKE DAM	Perry	NO	1994
MIDDLE FORK OF ANDERSON RIVER - NO. 7	Perry	NO	1970
PRIDES CREEK LAKE DAM	Pike	YES	1970
LAKE LOUISE DAM	Porter	YES	1974
LAKE OF THE FOUR SEASONS (DAM A)	Porter	YES	1966
LAKE OF THE FOUR SEASONS (DAM B)	Porter	YES	1966
LAKE OF THE WOODS DAM	Porter	YES	1937
PROFFITS DAM at LOOMIS LAKE	Porter	YES	1940
A.B. BROWN POWER PLANT	Posey	NO	1975
ALBIN LAKE DAM	Putnam	NO	1937
HERITAGE LAKE DAM	Putnam	NO	1971
LITTLE WALNUT CREEK CONSERVANCY DISTRICT - STRUCTURE 3	Putnam	NO	1971
LITTLE WALNUT CREEK CONSERVANCY DISTRICT - STRUCTURE 5	Putnam	NO	1972
LITTLE WALNUT CREEK CONSERVANCY DISTRICT STRUCTURE #4	Putnam	YES	1976
BISCHOFF RESERVOIR DAM	Ripley	NO	1959
CROSSTIE LAKE DAM	Ripley	NO	1964
INDIAN LAKES PRESERVE DAM	Ripley	NO	1973
LIBERTY PARK RESERVOIR DAM	Ripley	NO	
VERSAILLES LAKE DAM	Ripley	YES	1956
HARDY LAKE DAM	Scott	YES	1970
KLINGMAN LAKE DAM	Scott	NO	1958
SCOTTSBURG WATER SUPPLY RESERVOIR DAM	Scott	YES	1950
STUCKER FORK DAM NO. 8	Scott	YES	1974
STUCKER FORK DAM NO. 9	Scott	YES	1972
THOMAS J. MILLER LAKE DAM	Scott	NO	1973
CHRISTMAS LAKE DAM	Spencer	NO	1967
DALE LAKE DAM	Spencer	NO	1957
LAKE HOLLY DAM	Spencer	NO	1972
LAKE NOEL DAM	Spencer	NO	1972
LAKE RUDOLPH DAM	Spencer	NO	

Dam Name	County Name	EAP	Completion
LINCOLN LAKE DAM	Spencer	YES	1930
POTATO CREEK STATE PARK DAM	St. Joseph	YES	1977
KOONTZ LAKE DAM	Starke	YES	1849
HAMILTON LAKE-NORTH DAM	Steuben	YES	1832
HAMILTON LAKE-SOUTH DAM	Steuben	YES	1832
LAKE GEORGE DAM	Steuben	NO	1927
BUSSERON DAM NO. L-1	Sullivan	NO	1961
HOOSIER ENERGY RESERVOIR DAM	Sullivan	NO	1980
LAKE GENEVA DAM	Switzerland	NO	1944
TREECE LAKE DAM	Tippecanoe	NO	1974
AUTUMN WINDS DAM	Vanderburgh	NO	1930
BITTNER LAKE DAM	Vanderburgh	NO	1956
KAHRE LAKE DAM	Vanderburgh	NO	1968
LLOYD HAHN LAKE DAM	Vanderburgh	NO	1959
MATER DEI PROVINCIALATE DAM	Vanderburgh	NO	1944
NORTH LAKE ESTATES WEST LAKE DAM	Vanderburgh	NO	1950
SCHNACKE LAKE NUMBER 1 DAM	Vanderburgh	NO	1947
USI - REFLECTION LAKE DAM	Vanderburgh	YES	1970
USI STUDENT RESIDENCE COMPLEX LAKE DAM	Vanderburgh	YES	2004
DAISY LAKE DAM	Vigo	NO	1979
GRIGGS LAKE DAM	Vigo	NO	1964
HAWTHORN PARK DAM	Vigo	NO	1930
HULMAN LODGE DAM	Vigo	NO	1915
THOMPSON DITCH DAM	Vigo	NO	1977
CRYSTAL LAKE DAM	Washington	NO	1995
DELANEY CREEK DAM NO. 1	Washington	NO	1971
DELANEY CREEK DAM NO. 11	Washington	NO	1982
DELANEY CREEK DAM NO. 12	Washington	NO	1982
DELANEY CREEK DAM NO. 14	Washington	NO	1982
DELANEY CREEK DAM NO. 16	Washington	NO	1982
DELANEY CREEK DAM NO. 2	Washington	NO	1971
DELANEY CREEK DAM NO. 3	Washington	NO	1973
JORDAN LAKE DAM	Washington	NO	1978
LAKE SALINDA DAM	Washington	NO	1947
PEEK-A-BOO LAKE DAM	Washington	NO	1963
TWIN-RUSH CREEK DAM NO. 1	Washington	YES	1980
TWIN-RUSH CREEK DAM NO. 2	Washington	NO	1969
TWIN-RUSH CREEK DAM NO. 3	Washington	YES	1969
DAWN LAKE DAM	Wayne	YES	1964
MIDDLE FORK RESERVOIR DAM	Wayne	YES	1963