

## APPENDIX A:

### LOCAL MITIGATION PLAN REVIEW TOOL

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The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

<b>Jurisdiction:</b> Jackson County Indiana	<b>Title of Plan:</b> Jackson County Indiana MHMP Update	<b>Date of Plan:</b> August 2022
<b>Local Point of Contact:</b> Duane Davis		<b>Address:</b> 220 E Walnut Street Brownstown IN 47220
<b>Title:</b> EMA Director		
<b>Agency:</b> Jackson County EMA		
<b>Phone Number:</b> 812.358.6110		<b>E-Mail:</b> e.m.a@jacksoncounty.in.gov

<b>State Reviewer:</b>	<b>Title:</b>	<b>Date:</b>
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<b>FEMA Reviewer:</b>	<b>Title:</b>	<b>Date:</b>
<b>Date Received in FEMA Region</b> <i>(insert #)</i>		
<b>Plan Not Approved</b>		
<b>Plan Approvable Pending Adoption</b>		
<b>Plan Approved</b>		

## SECTION 1: REGULATION CHECKLIST

**INSTRUCTIONS:** The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval.

Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>				
<b>ELEMENT A. PLANNING PROCESS</b>				
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 1.3: Analysis Process, p.3			
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 1.3.1: Planning Committee and Section 1.3.3: Involvement of Other Interested Parties, p3-4			
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 1.3.2: Public Involvement, p4			
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 1.4: Plans, Studies, Reports, and Technical Information, p 4			
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 6.3 Continued Public Involvement, p82			
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 6.1 Monitoring, Evaluating, and Updating the Plan, p81			
<b>ELEMENT A: REQUIRED REVISIONS</b>				

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
<b>ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>				
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Sections 3.3.1 (p15) - 3.3.12 (p61)			
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Sections 3.3.1 (p15) - 3.3.12 (p61)			
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Sections 3.3.1 (p15) - 3.3.12 (p61)			
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 3.3.5, p32			
<b>ELEMENT B: REQUIRED REVISIONS</b>				
<b>ELEMENT C. MITIGATION STRATEGY</b>				
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 4.2.1 Existing Mitigation Practices, p69 and Table 29, p 70			
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 2.6 NFIP Participation, p9 and noted within Table 29, p 72			
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 4.1 Mitigation Goal, p 68			
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Table 29, p 72			
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Table 29, p 72 and Chapter 5 Implementation Plan, p 77			
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 6.2 Incorporation into Existing Planning Mechanisms, p82			
<b>ELEMENT C: REQUIRED REVISIONS</b>				

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
<b>ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION</b> (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 2.4, p 8 and throughout Section 3.3			
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Notations within measures in Section 4.2.1 Existing Mitigation Practices, p 69 and Table 29, p 72			
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	CPRI Tables within Section 3.3 reflect current priorities			
<b>ELEMENT D: REQUIRED REVISIONS</b>				
<b>ELEMENT E. PLAN ADOPTION</b>				
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Completed following FEMA conditional approval			
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Completed following FEMA conditional approval			
<b>ELEMENT E: REQUIRED REVISIONS</b>				
<b>ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)</b>				
F1.				
F2.				
<b>ELEMENT F: REQUIRED REVISIONS</b>				

**SECTION 3:**  
**MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)**

**INSTRUCTIONS:** For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were ‘Met’ or ‘Not Met,’ and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
1	Jackson County	County	Duane Davis	Found on Page 1 of Review Tool								
2	Brownstown	Town										
3	Crothersville	Town										
4	Medora	Town										
5	Seymour	City										
6												
7												
8												



## **APPENDIX 1: ACRONYMS**





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AEP	Annual Exceedance Probability
AHPS	Advanced Hydrologic Prediction Service
AICP	American Institute of Certified Planners
BRIC	Building Resilient Infrastructure and Communities
CBBEL	Christopher B. Burke Engineering, LLC
CFM	Certified Floodplain Manager
COAD	Community Organizations Active in Disaster
CPRI	Calculated Priority Risk Index
CRS	Community Rating System
DFIRMs	Digital Flood Insurance Rate Maps
DHS	Department of Homeland Security (US)
DMA	Disaster Mitigation Act
EHS	Extremely Hazardous Substance
EMA	Emergency Management Agency
EPCRA	Emergency Planning and Community Right to Know Act
ERP	Emergency Response Plan
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Act
FRP	Flood Response Plan
GIS	Geographic Information System
HAZUS-MH	Hazard US – Multi-Hazard
HMGP	Hazard Mitigation Grant Program
MHMP	Multi-Hazard Mitigation Plan
HMRT	Hazardous Materials Response Team
HUC	Hydrologic Unit Code
IDEM	Indiana Department of Environmental Management

IDHS	Indiana Department of Homeland Security
IDNR	Indiana Department of Natural Resources
IEAP	Incident and Emergency Action Plan
INAFSM	Indiana Association of Floodplain and Stormwater Managers
LEPC	Local Emergency Planning Commission
MHMP	Multi-Hazard Mitigation Plan
MPH	Miles Per Hour
MRCC	Midwestern Regional Climate Center
MSDS	Material Safety Data Sheet
NCDC	National Climatic Data Center
NFIP	National Flood Insurance Program
NLD	National Levee Database
NOAA	National Oceanic Atmospheric Administration
NRCS	National Resource Conservation Service
NWS	National Weather Service
OSHA	Occupational Safety and Health Administration
PDM	Pre-Disaster Mitigation
RFC	Repetitive Flood Claims
SARA	Superfund Amendment Reauthorization Act
SFHA	Special Flood Hazard Area
SRL	Severe Repetitive Loss
USDA	United States Department of Agriculture
US DHS	United States Department of Homeland Security
USGS	United States Geological Service
WCT	Wind Chill Temperature

**APPENDIX 2: PLANNING COMMITTEE MEETING AGENDAS  
AND SUMMARIES**

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**Jackson County Multi-Hazard Mitigation Plan Update**  
Project Team Meeting

Jackson Learning Center  
323 Dupont Drive  
Seymour IN 47274

November 3, 2021

1:00 pm

**AGENDA**

1. Welcome and Introductions
2. Approach for the MHMP Update/Meeting Purpose
3. Hazard Risk Assessment:
  - a) Review Hazard Data
  - b) Discuss Vulnerability to Hazards
  - c) Determine Probability & Severity
4. Next Steps
5. Adjournment

## **CALCULATED PRIORITY RISK INDEX**

The CPRI evaluates each hazard based on its probability of occurrence, severity, prior warning time, and duration. Thus, the CPRI provides a means to assess a hazard relative to others for a community. To determine the CPRI, a value of 1 through 4 is assigned to the categories for probability, magnitude/severity, warning time, and duration of event.

CPRI = Probability X 0.45 + Magnitude/Severity X 0.30 + Warning Time X 0.15 + Duration of Event X 0.10.

### **PROBABILITY**

1. Unlikely – event is possible within the next 10 years; up to 1 in 10 years chance of occurring (10%); historic events is less than or equal to 10% likely per year
2. Possible – event is possible within the next 5 years; up to 1 in 5 years chance of occurring (20%); historic events is greater than 10% but less than or equal to 20% likely per year
3. Likely – event if probable within the next 3 years; up to 1 in 3 years chance of occurring (33%); historic events greater than 20% but less than or equal to 33% likely per year
4. Highly Likely – event is probable within the calendar year; up to 1 in 1 year chance of occurring (100%); historic events greater than 33% likely per year

### **MAGNITUDE/SEVERITY**

1. Negligible – few injuries; shutdown of critical facilities and services for 24 hours or less; less than 10% of property is severely damaged; average response duration of less than 6 hours
2. Limited – few injuries; complete shutdown of critical facilities and services for more than 1 week; more than 10% of property is severely damaged; average response duration of less than 1 day
3. Significant – multiple injuries; complete shutdown of critical facilities and services for at least 2 weeks; more than 25% of property is severely damaged; average response duration of less than 1 week
4. Critical – multiple deaths; complete shutdown of critical facilities and services for 30+ days; more than 50% of property is severely damaged; average response duration time of less than 1 month

### **WARNING TIME**

1. >24 hrs
2. 12-24 hrs
3. 6-12 hrs
4. < 6 hrs

### **DURATION OF EVENT**

1. < 6 hrs
2. < 1 day
3. < 1 wk
4. > 1 wk

### **Assumptions for Estimating Potential Losses**

90% mean assessed value for structures (Jackson County GIS) x # structures x replacement

25% of structures=100% damage

35% of structures=50% damage

40% of structures=25% damage



**Jackson County Multi-Hazard Mitigation Plan Update**  
Project Team Meeting

Jackson Learning Center  
323 Dupont Drive  
Seymour IN 47274

November 3, 2021

1:00 pm

**SUMMARY**

**Project Team Members Present:**

Name	Office	Representing
Conner Barnette	Building Department	Jackson County
Mason Boicourt	Utilities Department	Crothersville
Nate Bryant	Emergency Medical Services	Jackson County
Duane Davis	Emergency Management Agency	Jackson County
Staci Eglen	Auditor's Office	Jackson County
Danieta Foster	Clerk-Treasurer	Crothersville
Jeremy Gray	Building Commission	Seymour
Katie Kaufman	Assessor's Office	Jackson County
Joe Kelly	Brownstown Police Department	Brownstown
Nick Klinger	Emergency Management Agency	Jackson County
Brian Lucas	Seymour Fire Department	Seymour
Jesse Minnick	Indiana Department of Homeland Security	
Jade Peters	Brownstown Central Community Schools	Brownstown
Marianne Stemm	Thrive Alliance	Jackson County
Keith Williams	Seymour Schools	Seymour
Marty Young	Brownstown Elementary School	Brownstown

**Others Present:**

Heather Buck, CBBEL

**1. Welcome and Introductions**

To begin, EMA Director Duane Davis thanked everyone for attending the meeting and asked those present to introduce themselves. Mr. Davis briefly explained the purpose of the meeting and the planning effort and introduced Heather Buck, CBBEL.

**2. Approach for the MHMP Update/Meeting Purpose**

Heather explained to the group that the MHMP Update is a requirement to be completed every five years. The overall approach, utilizing a larger Planning Committee similar to the previous approach was described. The meetings will follow steps to reach the end result of an updated MHMP for all incorporated communities within Jackson County.

**3. Hazard Risk Assessment:**

a) Review Hazard Data

The Committee reviewed the hazards to be studied as determined by Jackson County EMA and agreed that these are the hazards which most affect the County. Heather shared data that CBBEL had gathered from the Nation Climatic Data Center (NCDC),

local media outlets, and various agencies and offices since the 2015 MHMP was completed.

b) Discuss Vulnerability to Hazards

The Committee was engaged during the discussions regarding the hazards, specific events, and damages experienced. This information will be utilized to guide additional data collection for the MHMP Update, as well as enhance the discussion with the Planning Committee.

c) Determine Probability & Severity

The Committee, considering the data collected, their knowledge, and the prior discussions, determined the probability and severity of the hazards considered during this planning effort. This information will be utilized to determine the Calculated Priority Risk Index (CPRI) and will be reviewed by the Planning Committee.

**4. Critical Infrastructure**

Heather explained that the listing of Critical Infrastructure was partly provided by Jackson County, and partly obtained from state-wide databases as needed. The information was then categorized into sectors, mapped, and utilized to perform additional data analyses to prepare “what-if” scenarios.

**5. Next Steps**

The process was further explained to the Committee to include the next session, a public review period, and submission of the draft report for all Committee members, the public, and FEMA’s review and comment. It was also explained that it will be very important that all Committee members provide their information in a timely manner so that the draft MHMP Update can be prepared.

**6. Adjournment**

The first Committee session adjourned. An second session will be held to review the listing of the potential mitigation measures and provide a ranking of High, Moderate, or Low.

## **Jackson County Multi-Hazard Mitigation Plan Update**

Project Team Meeting

Jackson Learning Center  
323 Dupont Drive  
Seymour IN 47274

November 10, 2021

1:00 pm

1. Welcome and Introductions
2. Review of the approach for the MHMP Update
3. Review the Hazard Risk Assessment/CPRI
4. Review and Prioritize Proposed Mitigation Measures
5. Next Steps
6. Adjournment

## Jackson County Multi-Hazard Mitigation Plan Update

Project Team Meeting

Jackson Learning Center  
323 Dupont Drive  
Seymour IN 47274

November 10, 2021

1:00 pm

### SUMMARY

#### Project Team Members Present:

Name	Office	Representing
Conner Barnette	Building Department	Jackson County
Mason Boicourt	Utilities Department	Crothersville
Nate Bryant	Emergency Medical Services	Jackson County
Duane Davis	Emergency Management Agency	Jackson County
Staci Eglen	Auditor's Office	Jackson County
Debbie Hackman	Resident	Medora
Roger Jewell	Crothersville Wastewater Treatment	Crothersville
Katie Kaufman	Assessor's Office	Jackson County
Nick Klinger	Emergency Management Agency	Jackson County
Kendall Lambring	Salvation Army	Jackson County
Rick Meyer	Sheriff Department	Jackson County
Jesse Minnick	Indiana Department of Homeland Security	
Jade Peters	Brownstown Central Community Schools	Brownstown
Kelly Pifer	Department of Planning and Zoning	Seymour
Marianne Stemm	Thrive Alliance	Jackson County
Marty Young	Brownstown Elementary School	Brownstown

#### Others Present:

Heather Buck, CBBEL

#### 1. Welcome and Introductions

Heather and EMA Director Davis once again thanked everyone for attending. Introductions were made by those present.

#### 2. Review of the Approach for the MHMP Update

A brief review was provided for those committee members not present at the first session.

#### 3. Review the Hazard Risk Assessment/CPRI

The results of the completed CPRI were shared with those present. Utilizing the discussion from the previous Committee session, the "draft" CPRI was presented. Adjustments were made based on additional discussion with the Committee once they were able to see the final prioritizations.

#### 4. Review and Prioritize Proposed Mitigation Practices

Utilizing the mitigation practices described in the 2015 MHMP and information gathered through the planning process, a list of proposed mitigation practices was presented to the Committee for review and comment. Several members provided insight and input to wording and options for each proposed mitigation measure which was then ranked as High, Moderate, or Low in

implementation priority. It was explained that those practices ranked as High would have additional steps outlined within the MHMP Update to assist with the implementation process.

**5. Next Steps & Future Meetings**

It was explained that the next step in the process is to prepare the draft MHMP Update for review first by the EMA staff and then by the Planning Committee members. Comments accepted by the EMA will be incorporated into the plan. Once this has been completed, a public review period will be set and the draft will be submitted to FEMA and IDHS for review and comment.

**6. Adjournment**

The Committee adjourned



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### **APPENDIX 3: Public Participation and Involvement of Other Interested Parties**



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## **MEDIA RELEASE**

**For Immediate Release**

**Media Release Date:** July 21, 2022

**Contact:** Duane Davis, Jackson County Planning Department (812.358.6110)

### **Public Presentation of the Jackson County Multi-Hazard Mitigation Plan Update**

**Seymour, IN** (July 21, 2022) – Jackson County, in cooperation with Brownstown, Crothersville, Medora, and Seymour have prepared an update to the 2015 Multi-Hazard Mitigation Plan (MHMP) to address the risk and vulnerability of communities in the county which may be affected by known natural, man-made, and technological hazards.

The Disaster Mitigation Act of 2000 (DMA 2000) requires communities to update their MHMP every five years in order to be eligible for any future mitigation funding through the Indiana Department of Homeland Security and the Federal Emergency Management Agency. The intent of the MHMP is to plan for a disaster before it occurs in order to reduce the physical, social and economic impact of that disaster.

The draft Jackson County MHMP Update may be accessed at [www.jacksoncounty.in.gov](http://www.jacksoncounty.in.gov) at your convenience. Topics covered in the update include: an overview of the planning requirements; a summary of the risk assessment and vulnerability analysis; and proposed mitigation projects for prevention, property protection, natural resource protection, emergency services, structural control projects, and public information.

Comments will be accepted through Monday, August 1, 2022. Please submit comments to Duane Davis at 812.358.6110 or [e.m.a@jacksoncounty.in.gov](mailto:e.m.a@jacksoncounty.in.gov)

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# Jackson County Multi-Hazard Mitigation Plan 5-Year Update



Please take some time to  
review and provide  
comments on the

The 2022 Jackson  
County MHMP Update

This helps us create a better  
plan, prepare for hazards  
that may affect Jackson  
County and the  
communities, and  
become more resilient  
should an event occur.

Your time and efforts are  
appreciated!

The Jackson County Multi-Hazard Mitigation Plan (MHMP) Update is a multi-jurisdictional planning effort led by the Jackson County Emergency Management Agency. The previous MHMP, adopted in 2015 was the necessary first step of a multi-step process to implement programs, policies, and projects to mitigate the effect of hazards in Jackson County. A Federal Emergency Management Agency (FEMA) approved MHMP is required to be eligible for disaster mitigation funds.

FEMA also requires communities to update and resubmit the MHMP every five years to continue to be eligible for mitigation project grant funding. The intent of this current planning effort is to replicate the process of identifying the hazards and the social, physical, and economic impact that they affect Jackson County as well as to discuss mitigation measures implemented within the last five years.

A copy of the draft MHMP Update is available electronically through  
[www.jacksoncounty.in.gov](http://www.jacksoncounty.in.gov)

Comments will be accepted through August 1, 2022.

Any comments or questions should be directed to Duane Davis at  
812.358.6110 or [e.m.a@jacksoncounty.in.gov](mailto:e.m.a@jacksoncounty.in.gov)



## **APPENDIX 4: CRITICAL INFRASTRUCTURE BY COMMUNITY**

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Map ID	Airport	Community
1	Freeman Municipal Airport	Seymour

Map ID	Cellular Tower	Community
2	American Towers LLC	Jackson County
3	American Towers, LLC	Seymour
4	American Towers, LLC	Jackson County
5	AT&T	Jackson County
6	BK Media LLC	Jackson County
7	CCATT LLC	Seymour
8	CCATT LLC	Jackson County
9	CCATT LLC.	Jackson County
10	Comcast	Seymour
11	Comm. Enhancement	Brownstown
12	Crown Castle GT	Jackson County
13	Crown Castle GT Co	Jackson County
14	Crown Castle GT LLC	Jackson County
15	Crown Comm. Inc.	Jackson County
16	Horvath Towers, LLC	Seymour
17	John Paleski	Jackson County
18	Midland Media Inc	Jackson County
19	Midnight Hour Broad.	Seymour
20	Pinnacle Towers Acq.	Seymour
21	Pinnacle Towers LLC	Jackson County
22	SBA Monarch TowersII	Jackson County
23	SBA Towers II LLC	Seymour
24	SBA Towers III LLC	Jackson County
25	SBA Towers V, LLC.	Jackson County
26	Seymour Comm. School	Seymour
27	Seymour Comm. School	Seymour
28	Seymour Mun. Airport	Seymour
29	Seymour Police	Seymour
30	Skyway Towers, LLC	Jackson County
31	Southern Indiana RSA	Jackson County
32	SpectraSite Comm.	Jackson County
33	State of Indiana	Seymour
34	Susquehanna Radio Co	Jackson County

Map ID	Church	Community
35	Central Christian Church	Seymour

Map ID	Daycare	Community
36	ABC Daycare	Seymour
37	Brownstown Christian Church Daycare	Brownstown
38	Daytime Friends	Jackson County
39	God's Lil Blessings	Brownstown

Map ID	Daycare	Community
40	Happy Hearts Day Care	Seymour
41	Head Start - Seymour	Seymour
42	Kids Unique Daycare, LLC	Jackson County
43	Kidz R Kidz Daycare	Seymour
44	Laugh & Learn	Seymour
45	Little Angels Daycare Ministry	Seymour
46	Little Friends Daycare	Seymour
47	Little Hands Learning Center	Seymour
48	Miss Crystals'	Jackson County
49	Rainbow Childcare	Seymour
50	Rieckers Rascals	Seymour
51	St. Peters Luthern Childcare	Brownstown
52	Terri's Playhouse	Jackson County
53	Tiny Tots Playhouse	Seymour
54	Wild Kingdom Jungle House	Crothersville

Map ID	Electric Facilities	Community
55	Brownstown Substation	Jackson County
56	Crothersville Substation	Crothersville
57	Duke Energy	Seymour
58	Jackson County REMC	Jackson County
59	Medora Substation	Jackson County
60	Seymour 138 KV Substation	Seymour
61	Seymour Airport Rd. Substation	Seymour
62	Seymour Cummins Engine Substation	Seymour
63	Seymour Eastside Industrial Park Substation	Seymour
64	Seymour Obrien St. Substation	Seymour

Map ID	Dams	Community
d01	Baird Lake	Jackson County
d02	Berry Branch Lake Dam	Jackson County
d03	Bishop Lake Dam	Jackson County
d04	Burgess Lake	Jackson County
d05	C.J. Rust Lake Dam	Jackson County
d06	Camp Pyoca Lake Dam	Jackson County
d07	Charisma Lake Dam	Jackson County
d08	Fleetwood Farm Pond	Jackson County
d09	Glen Davidson	Jackson County
d10	Hillview Lake Dam	Jackson County
d11	Jordan	Jackson County
d12	Kenneth Layton Dam	Jackson County
d13	Knob Lake Dam	Jackson County
d14	Lake & Forest Club Dam	Jackson County
d15	Lake Tarzian Dam	Jackson County
d16	Lost Lake	Jackson County
d17	Morgan Packing Co. Dam (In-Channel)	Jackson County

Map ID	Dams	Community
d18	Moss Lake - Muscatatuck Wildlife Refuge	Jackson County
d19	Persimmon Lake Dam	Jackson County
d20	Richart Lake Dam - Muscatatuck Wildlife Refuge	Jackson County
d21	Seymour Water Co. Dam (In-Channel)	Jackson County
d22	Stanfield Lake Dam	Jackson County
d23	Starve Hollow Lake Dam	Jackson County
d24	Swan Pond	Jackson County
d25	Timber Lake Dam	Jackson County

Map ID	Fire Stations	Community
65	Brownstown Fire Dept	Brownstown
66	Carr Township Fire Department	Medora
67	Crothersville Vernon Township Volunteer Fire Dept.	Crothersville
68	Driftwood Vol. Fire Dept.	Jackson County
69	Grassy Fork Fire Department	Jackson County
70	Hamilton Fire Dept.	Jackson County
71	Jackson-Washington FD/ DuddleyTown	Jackson County
72	Jackson Washington Vol FD	Jackson County
73	Owen Township Vo. Fire Dept. #1	Jackson County
74	Owen Township Vol. Fire Dept. #2	Jackson County
75	Pershing Fire Dept	Jackson County
76	Reddington Vol. Fire Dept.	Jackson County
77	Seymour Fire Station #1	Seymour
78	Seymour Fire Station #2	Seymour
79	Seymour Fire Station #3	Seymour

Map ID	Government Facilities	Community
80	Brownstown Town Hall	Brownstown
81	Crothersville Town Hall	Crothersville
82	EMA Office	Brownstown
83	INDOT State Highway Dept.	Seymour
84	Jackson County Courthouse	Brownstown
85	Jackson County EMS Station	Seymour
86	Jackson County Highway Dept.	Jackson County
87	Jackson County Judicial Center	Brownstown
88	Jackson County Sheriff Dept	Jackson County
89	Medora Town Hall	Medora

Map ID	Medical Facilities	Community
90	Hoosier Christian Village	Brownstown
91	Schneck Medical Center	Seymour

Map ID	Military Installation	Community
92	Indiana National Guard Armory	Seymour

Map ID	Nursing Home	Community
93	Childrens Time	Crothersville
128	Hoosier Christian Village	Brownstown
129	Lutheran Community Home	Seymour
130	Covered Bridge Health Campus	Seymour
131	Autumn Trace Seymour Assisted Living	Seymour

Map ID	Police Station	Community
94	Brownstown Police Department	Brownstown
95	Crothersville Police Department	Crothersville
96	Seymour Police Department	Seymour

Map ID	Schools	Community
97	Brownstown Central Community School Corp	Brownstown
98	Brownstown Central Community School Corp Elem Scho	Brownstown
99	Brownstown Central Community School Corp High Scho	Brownstown
100	Brownstown Central Community School Corp Middle Sc	Brownstown
101	Cortland Elementary	Jackson County
102	Crothersville Community Schools	Crothersville
103	Emerson Elementary	Seymour
104	Immanuel Lutheran School	Seymour
105	Jackson Elementary	Seymour
106	Luthern Central School	Brownstown
107	Margaret R. Brown Elementary	Seymour
108	Medora Community School Corporation	Medora
109	Redding Elementary	Seymour
110	Seymour High School	Seymour
111	Seymour Middle School	Seymour
112	Seymour Middle School Sixth Grade Center	Seymour
113	St. Ambrose	Seymour
114	St. John's Sauers Lutheran School	Jackson County
115	Trinity Lutheran High School	Jackson County
116	Zion Lutheran School	Seymour

Map ID	Shelter	Community
117	Jackson County Homeless Shelter	Seymour

Map ID	Wastewater Treatment Plants	Community
118	Brownstown Sewer Dept.	Brownstown
119	Crothersville Sewage Plant	Jackson County
120	Medora Sewage Treatment Plant	Jackson County

Map ID	Water Company	Community
121	Crothersville Water Plant	Crothersville
122	Indiana American Water Co.	Jackson County

Map ID	Water Towers	Community
123	Brownstown Water Tower (East)	Brownstown
124	Brownstown Water Tower (West)	Brownstown
125	Crothersville Water Tower	Crothersville
126	Medora Water Tower	Medora
127	Seymour Water Tower	Seymour

Map ID	Large Employers	Community
e01	Aisin Drivetrain Inc	Crothersville
e02	Aisin USA Mfg. Inc	Seymour
e03	Applebee's	Seymour
e04	Avi Foodsystems Inc	Seymour
e05	Bob Poynter Chev Buick GMC	Seymour
e06	Brownstown Central High School	Brownstown
e07	Brownstown Electric Supply Co	Brown County
e08	Brownstown Elementary School	Brownstown
e09	Cerro Wire LLC	Crothersville
e10	Chili's Grill & Bar	Seymour
e11	City Of Seymour	Seymour
e12	Covered Bridge Health Campus	Seymour
e13	Cracker Barrel Old Country Str	Seymour
e14	Cummins Industrial Ctr	Seymour
e15	Dicksons Inc	Seymour
e16	Duke Energy	Seymour
e17	Excel Manufacturing	Seymour
e18	First Care Clinic	Seymour
e19	Help At Home National	Seymour
e20	Home Depot	Seymour
e21	Hoosier Christian Village	Brownstown
e22	Hukill Oil Co	Seymour
e23	Indiana Steel & Tube Inc	Brownstown
e24	J C Plus	Seymour
e25	J C Plus	Seymour
e26	Jackson County Rural Electric	Brown County
e27	Jackson Park Physicians Pc	Seymour
e28	Jay C Food Stores	Seymour
e29	Jay C Food Stores	Seymour
e30	Jayc	Seymour
e31	Jayc	Brownstown
e32	Kocolene Development Corp	Seymour
e33	Lutheran Community Home Inc	Seymour

Map ID	Large Employers	Community
e34	M R Brown Elementary School	Seymour
e35	Mc Donald's	Seymour
e36	Mc Donald's	Brownstown
e37	Mitchell & Stark Construction	Medora
e38	Pet Supplies Plus Distribution	Seymour
e39	Pines Restaurant	Brown County
e40	R R Donnelley	Seymour
e41	Redding Elementary School	Seymour
e42	Rose Acre Farms Inc	Seymour
e43	Rose Acre Farms Inc	Brown County
e44	Royalty Roofing	Seymour
e45	SAMTEC	Crothersville
e46	Schneck Medical Ctr	Seymour
e47	Schneck Medical Ctr Rehab Svc	Seymour
e48	Seymour-Jackson Elementary Sch	Seymour
e49	Seymour Community Sch Bus Garage	Seymour
e50	Seymour Community Sch Food Svc	Seymour
e51	Seymour Crossing	Seymour
e52	Seymour High School	Seymour
e53	Seymour Manufacturing Co Inc	Seymour
e54	Seymour Middle School	Seymour
e55	Seymour Tubing Inc	Seymour
e56	Silgan Plastics LLC	Seymour
e57	Steak 'n Shake	Seymour
e58	Todd's Transitional Housing	Seymour
e59	Travel Centers of America	Seymour
e60	Valero	Seymour
e61	Vallonia Elementary School	Brown County
e62	Walmart Distribution Ctr	Seymour
e63	Walmart Supercenter	Seymour

Map ID	Tier II Facilities	Community
t01	Aisin Chemical Indiana, LLC	Crothersville
t02	Aisin Drivetrain, Inc	Crothersville
t03	Aisin Plant II	Seymour
t04	AISIN U.S.A. Manufacturing, Inc.	Seymour
t05	Aquatic Control, Inc. - Seymour	Jackson County
t06	Brownstown	Brownstown
t07	Brownstown Substation	Jackson County
t08	Bundy Brothers & Sons Incorporated	Medora
t09	Cerro Wire & Cable Co., Inc.	Crothersville
t10	CORTLAND - USID74560	Jackson County
t11	Crothersville Substation	Crothersville
t12	Cummins Engine Company Industrial Center	Seymour
t13	Cummins Incorporated Machining Center	Seymour
t14	Egg Acres	Jackson County
t15	Enterprise Seymour Terminal	Jackson County

Map ID	Tier II Facilities	Community
t16	Frontier Communications-Brownstown - 945-50724-82359	Brownstown
t17	Frontier Communications - 945-50730-82365	Crothersville
t18	Frontier Communications-Seymour - 945-50793-82428	Seymour
t19	Hi Hill Ready Mix Company	Seymour
t20	HWRT Terminal Seymour LLC	Jackson County
t21	Indiana American Water Company Incorporated	Jackson County
t22	Irving Materials, Inc.	Seymour
t23	Jackson County Rural Electric	Jackson County
t24	Kova Fertilizer (Seymour)	Jackson County
t25	Kremers Urban Pharmaceuticals, Incorporated	Seymour
t26	Logistics Center 2	Seymour
t27	Medora Substation	Jackson County
t28	Nippon Steel Pipe America, Inc.	Seymour
t29	O & K American Corporation	Seymour
t30	Plant 2	Seymour
t31	Premier Ag	Crothersville
t32	Premier Ag Brownstown	Brownstown
t33	Premier Ag Cortland	Jackson County
t34	Rose Acre Hatchery	Jackson County
t35	Rose Acre Warehouse	Seymour
t36	Rose Acres Farms Bottorff Farm	Jackson County
t37	Rose Acres Farms Chickacres Breeder Farm	Jackson County
t38	Rose Acres Farms Cort Acre Egg Farm	Jackson County
t39	Rose Acres Farms Incorporated	Jackson County
t40	RR Donnelley & Sons Company	Seymour
t41	Ruler Logistics	Seymour
t42	Rumpke of Indiana LLC Medora Sanitary Landfill	Jackson County
t43	Sand Acre Pullets	Jackson County
t44	Seymour	Seymour
t45	Seymour 138 KV Substation	Seymour
t46	Seymour Airport Rd. Substation	Seymour
t47	Seymour Cummins Engine Substation	Seymour
t48	Seymour Eastside Industrial Park Substation	Seymour
t49	Seymour Engineering Manufacturing Interface	Seymour
t50	Seymour Hub site	Seymour
t51	Seymour Manufacturing Company Incorporated	Seymour
t52	Seymour Obrien St. Substation	Seymour
t53	Seymour Regen	Seymour
t54	Seymour Terminal	Jackson County
t55	Shelby County Coop - Brownstown	Jackson County
t56	Silgan Plastics Corporation	Seymour
t57	Speedway 5546	Seymour
t58	Suburban Propane Medora	Jackson County
t59	TA Seymour	Seymour
t60	The Andersons - Seymour	Seymour
t61	The Home Depot Store #2021	Seymour
t62	Valeo- Plant 4	Seymour
t63	Valeo Logistics Center	Seymour

Map ID	Tier II Facilities	Community
t64	Valero #11746	Seymour
t65	Walmart DC 6017	Seymour



**APPENDIX 5: USGS STREAM GAGE LOCATIONS,  
MAJOR WATERWAYS**

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Stream Gage Location	
Site Number	Site Name
03365500	East Fork White River near Seymour

Major Waterways		
Back Creek	Gum Lick Creek	Pruitt Branch
Ball Richard Ditch	Guthrie Creek	Retreat Ditch
Ballard Creek	Hall Sherman Ditch	Rider Ditch
Beatty Walker Ditch	Heddy Run	Runt Run
Bedel Ditch	Hinderlider Ditch	Sand Branch
Bee Creek	Horse Lick	Sand Creek
Blau Ditch	Hough Creek	Sandy Branch
Breitfield Ditch	Hunter Creek	Singer Ditch
Buck Branch	Indian Creek	Smallwood Ditch
Buck Creek	John McDonald Ditch	Smart Ditch
Callahan Branch	Kiper Creek	Snyder Ditch
Clear Spring Creek	Knob Creek	South Fork Creek
Combs Branch	Lewis Branch	South Fork Salt Creek
Combs Creek	Lincoln Back Branch	South Fork White Creek
Cooley Creek	Little Salt Creek	Spray Creek
Cross Branch	Luther McDonald Ditch	Starnes Branch
Delaney Creek	McHargue Ditch	Storm Creek
Dens Ford Ditch	McMillan Ditch	Stuckwisch Ditch
Dry Creek	Mill Creek	Sycamore Branch
East Arm	Mose Ray Branch	Thompson Slough
East Fork White Creek	Muscatatuck River	Tipton Creek
East Fork White River	Mutton Creek	Vernon Fork Muscatatuck River
Five Branch	Mutton Creek Ditch	Von Fange Ditch
Fleetwood Branch	Myers Branch	Wayman Ditch
Grassy Creek	Negro Creek	West Branch White Creek
Grassy Fork	Nehrt Ditch	White Creek
Greasy Creek	Pond Creek	Zollman Ditch

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## **APPENDIX 6: NCDC HAZARD DATA**

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The following data tables indicate those events that have impacted Jackson County and the communities within. Please note that these tables only provide the information for those incidents where deaths, injuries, or property and/or crop damages were reported through the NCDC for this planning period. For complete tables listing all incidents impacting Jackson County, please visit:

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=18%2CINDIANA>

<u>Location</u>	<u>Date</u>	<u>Type</u>	<u>Death</u>	<u>Injury</u>	<u>PrD</u>	<u>CrD</u>
<b>Totals:</b>			<b>0</b>	<b>0</b>	<b>\$172.0K</b>	<b>\$12.0K</b>
<u>SEYMOUR</u>	10/19/2016	Flood	0	0	\$30.0K	\$0.0K
<u>NEW FARMINGTON</u>	3/1/2017	Flood	0	0	\$1.0K	\$1.0K
<u>SEYMOUR</u>	4/29/2017	Flood	0	0	\$1.0K	\$0.0K
<u>MEDORA</u>	6/5/2019	Flash Flood	0	0	\$70.0K	\$5.0K
<u>UNIONTOWN</u>	6/5/2019	Flash Flood	0	0	\$50.0K	\$5.0K
<u>CORTLAND</u>	6/16/2019	Flash Flood	0	0	\$1.0K	\$1.0K
<u>FLEMING</u>	6/16/2019	Flash Flood	0	0	\$1.0K	\$0.0K
<u>MEDORA</u>	1/11/2020	Flood	0	0	\$15.0K	\$0.0K
<u>EWING</u>	8/10/2020	Flash Flood	0	0	\$3.0K	\$0.0K
<u>SHIELDS</u>	6/19/2021	Flash Flood	0	0	\$0.0K	\$0.0K
<b>Totals:</b>			<b>0</b>	<b>0</b>	<b>\$172.0K</b>	<b>\$12.0K</b>

<u>Location</u>	<u>Date</u>	<u>Type</u>	<u>Death</u>	<u>Injury</u>	<u>PrD</u>	<u>CrD</u>
<b>Totals:</b>			<b>0</b>	<b>0</b>	<b>\$76.0K</b>	<b>\$0.0K</b>
<u>JACKSON (ZONE)</u>	4/2/2016	High Wind	0	0	\$0.75K	\$0.0K
<u>EWING</u>	10/19/2016	Hail	0	0	\$30.0K	\$0.0K
<u>SEYMOUR</u>	3/1/2017	Thunderstorm Wind	0	0	\$10.0K	\$0.0K
<u>DUDLEYTOWN</u>	7/7/2017	Hail	0	0	\$10.0K	\$0.0K
<u>UNIONTOWN</u>	7/7/2017	Thunderstorm Wind	0	0	\$13.0K	\$0.0K
<u>UNIONTOWN</u>	7/7/2017	Hail	0	0	\$1.0K	\$0.0K
<u>EWING</u>	5/31/2018	Thunderstorm Wind	0	0	\$1.0K	\$0.0K
<u>SEYMOUR</u>	5/31/2018	Thunderstorm Wind	0	0	\$1.5K	\$0.0K
<u>BROWNSTOWN</u>	6/13/2018	Thunderstorm Wind	0	0	\$1.0K	\$0.0K
<u>FLEMING</u>	7/20/2018	Hail	0	0	\$1.0K	\$0.0K
<u>UNIONTOWN</u>	7/20/2018	Hail	0	0	\$1.0K	\$0.0K

<u>Location</u>	<u>Date</u>	<u>Type</u>	<u>Death</u>	<u>Injury</u>	<u>PrD</u>	<u>CrD</u>
<u>EWING</u>	3/14/2019	Hail	0	0	\$3.0K	\$0.0K
<u>SEYMOUR</u>	5/16/2019	Hail	0	0	\$35.0K	\$0.0K
<u>SEYMOUR</u>	6/16/2019	Hail	0	0	\$10.0K	\$0.0K
<u>JACKSON (ZONE)</u>	11/27/2019	High Wind	0	0	\$40.0K	\$0.0K
<u>ACME</u>	3/28/2020	Hail	0	0	\$15.0K	\$0.0K
<u>BOBTOWN</u>	3/28/2020	Thunderstorm Wind	0	0	\$0.5K	\$0.0K
<u>SEYMOUR</u>	7/11/2020	Thunderstorm Wind	0	0	\$1.0K	\$0.0K
<u>EWING</u>	8/10/2020	Thunderstorm Wind	0	0	\$1.0K	\$0.0K
<u>BOBTOWN</u>	6/18/2021	Hail	0	0	\$1.0K	\$0.0K
<u>UNIONTOWN</u>	6/18/2021	Hail	0	0	\$0.5K	\$0.0K
<u>ROCKFORD</u>	6/29/2021	Hail	0	0	\$1.0K	\$0.0K
<u>REDDINGTON</u>	6/29/2021	Thunderstorm Wind	0	0	\$0.25K	\$0.0K
<b>Totals:</b>			<b>0</b>	<b>0</b>	<b>\$76.0K</b>	<b>\$0.0K</b>

<u>Location</u>	<u>Date</u>	<u>Type</u>	<u>Death</u>	<u>Injury</u>	<u>PrD</u>	<u>CrD</u>
<b>Totals:</b>			<b>0</b>	<b>0</b>	<b>\$115.0K</b>	<b>\$0.0K</b>
<u>TAMPICO</u>	3/1/2017	Tornado – EF2	0	0	\$45.0K	\$0.00K
<u>SHIELDS</u>	3/14/2019	Tornado – EF1	0	0	\$70.0M	\$0.00K
<b>Totals:</b>			<b>0</b>	<b>0</b>	<b>\$115.0K</b>	<b>\$0.0K</b>



## **APPENDIX 7: POTENTIAL FUNDING SOURCES**

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### **Assistance to Firefighters Grant**

The Assistance to Firefighters Grant (AFG) is a competitive grant opportunity for local fire departments and Emergency Medical Service (EMS) organizations that are not affiliated with a hospital.

**Previous Activities Funded:** The AFG funds activities such as purchasing firefighting equipment, personal protection equipment, training, firefighting vehicles, and firefighter/first responder safety projects.

<https://www.fema.gov/grants/preparedness/firefighters>

### **Challenge 21, Floodplain**

Challenge 21, the Army Corps' flood hazard mitigation and riverine ecosystem restoration initiative, will focus on more sustainable approaches. Through its focus on non-structural alternatives to flood protection, it will, where appropriate, move families and businesses out of harm's way and strive to return the floodplains of rivers and creeks to a condition where they can naturally moderate floods as well as provide other benefits to communities and the environment. Watershed by watershed, Challenge 21 builds on existing programs and initiates and expands partnerships with other Federal agencies and non-Federal national and local entities. Key Federal partners include the FEMA, the Department of Agriculture, the Department of Interior and the EPA.

**Previous Activities Funded:** A project might include the relocation of threatened homes or businesses, conservation or restoration of wetlands and natural floodwater storage areas and planning for responses and solutions to potential future floods

[http://www.americanrivers.org/site/PageServer?pagename=AMR\\_content\\_d156](http://www.americanrivers.org/site/PageServer?pagename=AMR_content_d156)

### **Clean Water State Revolving Loan Fund**

Clean Water State Revolving Loan Fund (CWSRLF) programs operate much like environmental infrastructure banks that are capitalized with federal and state contributions. CWSRLF monies are loaned to communities and loan repayments are recycled back into the program to fund additional water quality protection projects. The revolving nature of these programs provides for an ongoing funding source that will last far into the future.

**Previous Activities Funded:** The CWSRF funds a broad range of projects—from wastewater systems and nonpoint source pollution control to estuary management and a range of projects focusing on water quality. Funding is typically directed to state-identified high priority projects based on several factors, including: public health protection; condition of impacted waters; and communities' regulatory compliance status.

<https://www.epa.gov/cwsrf>

### **Community Development Block Grants**

Communities receiving Community Development Block Grants (CDBG) funds from the State may use the funds for many kinds of community development activities including, but not limited to property acquisition, public services, planning activities, and community development activities.

**Previous Activities Funded:** Funds have been used in Indiana for purposes such as Public facility improvements, flood and drainage facilities, Fire stations and equipment, and various community related activities and facilities.

<https://www.in.gov/ocra/cdbg.htm>

### **Community Facilities Grants and Loans**

The Rural Development (RD) of the Department of Agriculture offers loans and grants to create jobs and support economic development and essential services such as housing; health care; first responder services and equipment; and water, electric and communications infrastructure.

**Previous Activities Funded:** Priority for funding will be given to those projects that will enhance public safety such as fire, police, rescue, and ambulance services, and projects for health care facilities. The fire service can use the funding for fire stations, fire trucks and rescue vehicles.

<https://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program>

### **Community Rating System**

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

**Previous Activities Funded:** While the CRS does not provide direct funding, reductions in insurance premiums can be significant for participants.

<https://www.fema.gov/flood-insurance/rules-legislation/community-rating-system>

### **Conservation Reserve Program**

The Conservation Reserve Program (CRP) is a voluntary program for agricultural landowners. Through CRP, landowners can receive annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland to reduce soil erosion, and potential flood loss and damage.

**Previous Activities Funded:** Filter Strip Establishment, Wetland Restoration, Riparian Buffer Establishment

<https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/>

### **Department of Interior Rural Fire Assistance Program**

The Department of Interior (DOI) Rural Fire Assistance Program is aimed at enhancing the fire protection capabilities of rural fire districts in the wildland urban interface. The rural fire department must serve a community with a population of 10,000 or less and must have a statewide agreement with the state forester who maintains cooperative agreements with the rural fire departments or volunteer fire departments or a cooperative fire agreement with an agency in the DOI.

**Previous Activities Funded:** The program assists with training, equipment purchase, and prevention activities, on a 90/10 cost-share basis.

<http://www.nifc.gov/rfa/steps.html>

### **Disposal of Federal Surplus Real Property for Parks, Recreation, and Historic Monuments**

Surplus real property may be conveyed for public park and recreation use at discounts up to 100 percent of fair market value and for historic purposes without monetary consideration. Property conveyed for park and recreation use or historic purposes must be used for these purposes in perpetuity or be reverted to Federal ownership.

**Previous Activities Funded:** Property, either real or land, varies with time with items available for public sale, lease or extended use in perpetuity.

[http://www.federalgrantswire.com/disposal\\_of\\_federal\\_surplus\\_real\\_property\\_for\\_parks\\_recreation\\_and\\_historic\\_monuments.html](http://www.federalgrantswire.com/disposal_of_federal_surplus_real_property_for_parks_recreation_and_historic_monuments.html)

### **Emergency Conservation Program**

The United States Department of Agriculture (USDA) Farm Service Agency's (FSA) Emergency Conservation Program (ECP) provides emergency funding and technical assistance for farmers and ranchers to rehabilitate farmland damaged by natural disasters and for carrying out emergency water conservation measures in periods of severe drought.

**Previous Activities Funded:** This assistance is in the form of a direct payment to affected eligible landowners and is administered through the Farm Service Agency.

<http://disaster.fsa.usda.gov/ecp.htm>

### **Environmental Quality Incentive Program**

The Environmental Quality Incentive Program (EQIP) offers contracts with a minimum term that ends one year after the implementation of the last scheduled practices and a maximum term of ten years. These contracts provide incentive payments and cost-shares to implement conservation practices. Persons who are engaged in livestock or agricultural production on eligible land may participate in the EQIP program. EQIP activities are carried out according to an environmental quality incentives program plan of operations developed in conjunction with the producer that identifies the appropriate conservation practice or practices to address the resource concerns. The practices are subject to Natural Resources Conservation Service (NRCS) technical standards adapted for local conditions. The local conservation district approves the plan.

**Previous Activities Funded:** Cost sharing may pay up to 75 percent of the costs of certain conservation practices, such as grassed waterways, filter strips, manure management facilities, capping abandoned wells, and other practices important to improving and maintaining the health of natural resources in the area.

<http://www.nrcs.usda.gov/programs/eqip/>

### **Emergency Rehabilitation of Flood Control Works**

Assistance does not extend to major improvements of flood control or federally authorized coastal protection structures, nor to reimbursement of individuals or communities for funds expended in repair or rehabilitation efforts.

**Previous Activities Funded:** Authorized assistance includes emergency repair or rehabilitation of flood control works damaged by flood, and restoration of federally authorized coastal protection structures damaged by extraordinary wind, wave, or water action.

[http://www.federalgrantswire.com/emergency\\_rehabilitation\\_of\\_flood\\_control\\_works\\_or\\_federally\\_authorized\\_coastal\\_protection\\_works.html](http://www.federalgrantswire.com/emergency_rehabilitation_of_flood_control_works_or_federally_authorized_coastal_protection_works.html)

### **Emergency Watershed Protection Program**

The Emergency Watershed Protection Program (EWPP) work is not limited to any one set of prescribed measures. A case by case investigation of the needed work is made by NRCS.

**Previous Activities Funded:** EWPP work can include: removing debris from stream channels, road culverts, and bridges; reshaping and protecting eroded banks; correcting damaged drainage facilities; repairing levees and structures; reseeding damaged areas; and purchasing floodplain easements.

<http://www.nrcs.usda.gov/programs/ewp/questions.html>

### **Farmland Protection Program**

The Farmland Protection Program provides funds to help purchase development rights to keep productive farmland in agricultural uses. To qualify, farmland must: be part of a pending offer from a State, tribe, or local farmland protection program; be privately owned; have a conservation plan; be large enough to sustain agricultural production; be accessible to markets for what the land produces; have adequate infrastructure and agricultural support services; and have surrounding parcels of land that can support long-term agricultural production. Depending on funding availability, proposals must be submitted by the government entities to the appropriate NRCS State Office during the application window.

**Previous Activities Funded:** Working through existing programs, USDA joins with State, tribal, or local governments to acquire conservation easements or other interests from landowners. USDA provides up to 50 percent of the fair market easement value.

<http://www.info.usda.gov/nrcs/fpcp/fpp.htm>

### **Fire Prevention & Safety Grant**

The purpose of these grants is to enhance the safety of the public and firefighters with respect to fire and fire-related hazards. The primary goal of the Assistance to Firefighters Grant (AFG) Program's Fire Prevention and Safety Grant (FP&S) is to reach high-risk target groups in order to mitigate the high incidences of death and injuries. Additionally for Fiscal Year (FY) 2005 Congress amended the authorization to include funding for Firefighter Safety Research and Development. This guidance provides details for applying for either of these financial assistance instruments. There is no cost share requirement for the FY 2005 Fire Prevention and Safety grants.

**Previous Activities Funded:** Grants have been awarded to assist with the costs associated with training, equipment, vehicles for fire departments and firefighter safety research.

<https://www.fema.gov/grants/preparedness/firefighters/safety-awards>

### **Flood Mitigation Assistance Program**

The Flood Mitigation Assistance (FMA) program provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). There are three types of grants available under FMA: Planning, Project, and Technical Assistance Grants. FMA Planning Grants are available to States and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project Grants. FMA Project Grants are available to States and NFIP participating communities to implement measures to reduce flood losses.

**Previous Activities Funded:** A few examples of eligible FMA projects include: the elevation, acquisition, and relocation of NFIP-insured structures.

<http://www.fema.gov/fima/mitgrant.shtm>

### *Hazards Mitigation Grant Program*

Authorized under Section 404 of the Stafford Act, the Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster declaration. The purpose of the program is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster.

**Previous Activities Funded:** Acquisition of hazard-prone property; stormwater management, elevation of flood-prone structures, and infrastructure protection measures are all considered eligible projects and have been funded in the past.

<http://www.fema.gov/fima/mitgrant.shtm>

### **Hazardous Materials Emergency Preparedness Grant**

The Hazardous Materials Emergency Preparedness (HMEP) grant program is intended to provide financial and technical assistance as well as national direction and guidance to enhance State, Territorial, Tribal, and local hazardous materials emergency planning and training. The HMEP Grant Program distributes fees collected from shippers and carriers of hazardous materials to emergency responders for hazmat training and to Local Emergency Planning Committees (LEPCs) for hazmat planning.

**Previous Activities Funded:** These grants have been used for developing, improving, and implementing emergency plans, and training public sector employees to respond safely and efficiently to accidents and incidents involving the transportation of hazardous materials.

<http://hazmat.dot.gov/training/state/hmep/hmep.htm>

### **Indiana Family and Social Services Administration**

The Family and Social Services Administration provides services to help keep children healthy and safe and help families to self-sufficient.

**Previous Activities Funded:** The agency may provide programs related to heating/cooling of residential buildings, temporary housing, and other important contacts in the event of an emergency or disaster.

<http://www.in.gov/fssa/families/>

### **Indiana Resource Conservation & Development Districts**

The purpose of the Resource Conservation and Development (RC&D) program is to accelerate the conservation, development and utilization of natural resources, improve the general level of economic activity, and to enhance the environment and standard of living in designated RC&D areas. It improves the capability of State, tribal and local units of government and local nonprofit organizations in rural areas to plan, develop and carry out programs for resource conservation and development. The program also establishes or improves coordination systems in rural areas.

**Previous Activities Funded:** Forestry projects, wetland development, Community training projects, and other projects related to community and natural resource enhancement and protection.

<http://www.in.nrcs.usda.gov/programs/RC&D/RC&Dhomepage.html>

### **Indiana Rural Development Council**

The Indiana Rural Development Council (IRDC) is a partnership of local, state, federal, profit and not-for-profit stakeholders that serve Indiana communities. The IRDC's purpose is to coordinate efforts of citizens and governments to meet the economic and social needs of rural Indiana.

**Previous Activities Funded:** These funds will be utilized to address a variety of rural issues in the areas of economic/community development, planning, leadership, infrastructure, health, telecommunication/education, workforce development, agriculture, and rural regional development initiatives.

<http://www.in.gov/irdc/index.html>

### **Indiana State Revolving Loan Fund**

The Indiana State Revolving Fund (SRF) Loan Program provides low-interest loans to Indiana communities for projects that improve wastewater and drinking water infrastructure. The Indiana Department of Environmental Management (IDEM) and the Indiana State Budget Agency work together to administer this program and to protect public health and the environment. Recently, SRF has implemented a program to fund nonpoint source projects, as well.

**Previous Activities Funded:** Activities include Treatment plant improvements and upgrades, Riparian Buffers and Conservation Easements, and Wetland protection and restoration measures.

<http://www.in.gov/idem/srf/factsht0704.doc>

### **Indiana Transportation Enhancements Program**

Transportation enhancements (TE) are transportation-related activities that are designed to strengthen the cultural, aesthetic, and environmental aspects of the Nation's inter-modal transportation system.

**Previous Activities Funded:** The transportation enhancements program provides for the implementation of a variety of non-traditional projects, with examples ranging from Acquisition of scenic easements, landscaping and scenic beautification, and to the mitigation of water pollution from highway runoff all of which could be utilized as measures to control or mitigate flood damage.

[http://www.enhancements.org/statecontacts\\_TE.asp](http://www.enhancements.org/statecontacts_TE.asp)

### **Land and Water Conservation Fund**

The Land and Water Conservation Fund (LWCF) program provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities. The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources across the United States.

**Previous Activities Funded:** Funds have been widely utilized for land acquisition, open space/greenspace development, which can include wetland development, critical seeding areas and other projects that can reduce the impacts of flooding.

<http://www.nps.gov/lwcf/>



### **Low Interest Loan Incentives**

Loan amounts up to \$700,000 with interest rates of 2.5 percent to 3.0 percent are available to cities, towns and counties. The loan pays for the cost of remediation and/or demolition at identified brownfield sites.

**Previous Activities Funded:** Eligible activities include: soil and groundwater cleanup, demolition activities, asbestos/lead paint abatement, and additional investigations.

<http://www.idfabrownfields.com/assistance.aspx#LILI>

### **National Flood Insurance Program**

The National Flood Insurance Program (NFIP) is a Federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the Federal Government that states if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the Federal Government will make flood insurance available within the community as a financial protection against flood losses.

**Previous Activities Funded:** Flood insurance is made available within the community as a financial protection against flood losses.

<http://www.fema.gov/nfip/intnfip.shtm>

### **Office for Domestic Preparedness Terrorism Formula Grants**

The Office for Domestic Preparedness (ODP) provides funding through the states awards to enhance the capacity of emergency responders to prevent, deter, or respond to terrorist incidents involving weapons of mass destruction. The funding is awarded to a point of contact in each state and then distributed within the state.

**Previous Activities Funded:** Activities have included training, technical assistance, equipment, planning and exercises related to domestic terrorism events.

<http://www.ojp.gov/state.htm>

### **Petroleum Remediation Grant Incentive**

Grant amounts up to \$250,000 per applicant and per funding round are available to cities, towns and counties. The grant pays for the cost of petroleum remediation at identified brownfield sites.

**Previous Activities Funded:** Eligible activities include: underground storage tank removal, Corrective Action Plan preparation, IDEM approved remediation and monitoring.

<http://www.idfabrownfields.com/assistance.aspx#PRGI>

<http://www.fema.gov/fima/mitgrant.shtm>

### **Public Assistance Grant Program**

FEMA's Public Assistance (PA) Grant Program allows State and Local governments and Non-Profit Organizations to respond to disasters, to recover from their impact and to mitigate impact from future disasters. The PA Program provides the basis for consistent training and credentialing of staff who administer the

program; more accessible and understandable guidance and policy for participating in the grant program; improved customer service through a more efficient grant delivery process, applicant-centered management, and better information exchange; and continuing performance evaluations and program improvements.

**Previous Activities Funded:** Debris removal from public roads and rights-of-way, Emergency protective measures including search and rescue, warning of hazards, and demolition of unsafe structures, Utility Distribution Systems, such as water treatment and delivery systems; and sewage collection and treatment facilities and public parks.

<http://www.fema.gov/rrr/pa/>

### **Purdue Cooperative Extension Service**

Purdue Cooperative Extension Service provides valuable educational materials and training programs to assist in the event of a disaster or emergency

Steve Cain  
Disaster Communication Specialist  
615 W. State Street  
Purdue University  
West Lafayette, IN 47907  
765-494-8410

**Previous Activities Funded:** Activities are educational in nature and not generally monetary offerings.

<http://www.ces.purdue.edu/eden/index.html>

### **Severe Repetitive Loss**

This purpose of this FEMA program is to reduce or eliminate claims under the NFIP. This program applies to residential properties covered under an NFIP flood insurance policy and has at least 4 NFIP claim payments over \$5,000 each and a cumulative amount exceeds \$20,000 OR for which 2 separate claims payments have been made with the cumulative amount of the building portion exceeding the market value of the building.

**Previous Activities Funded:** Acquisition and demolition or relocation of at risk structures and conversion of the land to open space; elevation of existing structures to at least the Base Flood Elevation (BFE); minor physical localized flood reduction projects; and dry floodproofing for historic properties only.

<http://www.fema.gov/government/grant/srl/index.shtm>

### **Staffing for Adequate Fire and Emergency Response Grants**

The purpose of the Staffing for Adequate Fire and Emergency Response (SAFER) grants is to award grants directly to volunteer, combination, and career fire departments to help the departments increase their cadre of firefighters. Ultimately, the goal is for SAFER grantees to enhance their ability to attain 24-hour staffing and thus assuring their communities have adequate protection from fire and fire-related hazards.

**Previous Activities Funded:** The SAFER grants have two activities that will help grantees attain this goal: 1) hiring of firefighters and 2) recruitment and retention of volunteer firefighters.

<http://www.firegrantsupport.com/safer/>

### **Volunteer Fire Assistance Program**

The purpose of the Volunteer Fire Assistance (VFA) Program, formerly known as the Rural Community Fire Protection (RCFP) Program, is to provide Federal financial, technical, and other assistance to State foresters to train, and equip fire departments in rural areas and rural communities to prevent and suppress fires. A rural community is defined as having 10,000 or less population. This 10,000-population limit for participation in the VFA Program facilitates distribution of available VFA funding to the most needy fire departments. The funding must be matched on a 50-50% basis by non-federal dollars or in-kind.

**Previous Activities Funded:** Purchase of Self-Contained Breathing Apparatus, Protective clothing, installation of dry hydrants, and training for volunteer fire fighters.

[www.fs.fed.us/fire/planning/vfa](http://www.fs.fed.us/fire/planning/vfa)

### **Weatherization Assistance Program**

Indiana's Weatherization Assistance Program provides residential energy conservation services to the low-income citizens of Indiana. Funding comes from federal sources and is allocated to Community Action Agencies (CAA) to provide services in each of Indiana's 92 counties. The CAAs use their own crews or private contractors to provide comprehensive energy conservation services.

**Previous Activities Funded:** A thorough evaluation of the structures, including the safe and efficient operation of the furnace and water heater, is included in the treatment of each home.

<http://www.in.gov/fssa/families/housing/wap.html>

### **Wetland Reserve Program**

The Wetlands Reserve Program (WRP) is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection.

**Previous Activities Funded:** The USDA Natural Resources Conservation Service (NRCS) provides technical and financial support to help landowners with their wetland restoration efforts.

<http://www.nrcs.usda.gov/programs/wrp/>

### **Wildlife Habitat Incentive Program**

The Wildlife Habitat Incentives Program (WHIP) is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Through WHIP USDA's Natural Resources Conservation Service provides both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP agreements between NRCS and the participant generally last from 5 to 10 years from the date the agreement is signed.

**Previous Activities Funded:** Development of areas primarily targeted for wildlife habitat also serve as beneficial areas for flood mitigation activities such as wetland construction/restoration, native grass plantings, and filter area establishment.

<http://www.nrcs.usda.gov/programs/whip/>

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## **APPENDIX 8: CRS CHECKLIST**

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CRS 10-Step Planning Process	Max. Points	Est. Points	Comments
<b>1. Organize and Prepare the Plan</b>	<b>15</b>	<b>13</b>	
Involvement of office responsible for community planning	4	4	Table 1-1 lists Planning Committee name, title, and department/agency represented
Planning committee of department staff	9	9	Table 1-1 lists Planning Committee name, title, and department/agency represented
Process formally created by the community's governing board	2	0	
<b>2. Involve the Public</b>	<b>120</b>	<b>60</b>	
Planning process conducted through a planning committee	60	30	Appendix 2 contains Planning Committee meeting agendas and summaries; Planning Committee reviewed draft MHMP, assisted with public review, and assisted with local adoption
Public meetings held at the beginning of the planning process	15	0	
Public meeting held on the draft plan	15	15	Full draft presented to the public; draft plan made available for public review on webpage, EMA office, Planning Office
Other public information activities to encourage input	30	15	Plan posted to website, press release; outreach flyer
<b>3. Coordinate with Other Agencies</b>	<b>35</b>	<b>25</b>	
Review of existing studies and plans ( <b>required</b> )	5	5	Conducted a Community Capability Assessment to better understand existing mitigation programs, policies, and projects
Coordinating with communities and other agencies	30	20	Appendix 3 includes the invitation sent to the surrounding County EMA Directors; IDNR, FEMA and IDHS involved in planning process
<b>4. Assess the Hazard</b>	<b>35</b>	<b>35</b>	
Map of known flood hazards	5	5	Exhibit illustrates FIRM floodplains as well as the location of critical facilities.
Description of known flood hazards	5	5	Section 3 discusses areas with a known localized flooding issue as well as floodplains; Table shows potential losses of structures located within floodplains
Discussion of past floods	5	5	Section provides an overview of the most recent floods of note as identified by the Planning Committee, local media sources, and NCDC data; Table shows Repetitive Loss numbers; Table shows flood insurance claims
Plan includes assessment of less frequent floods	10	10	Section 3 discusses areas with a known localized flooding issue as well as floodplains; Table shows potential losses of structures located within floodplains
Plan includes assessment of areas likely to flood	5	5	Section 3 discusses areas with a known localized flooding issue as well as floodplains; Table shows potential losses of structures located within floodplains
Describes other natural hazards (required DMA)	5	5	Section 3 includes information related to Drought, Earthquake; Extreme Temperature; Fire; Flood; Hailstorm, Thunderstorm, and Windstorm; Land Subsidence; Tornado; Winter Storm and Ice; Cyber-Attack; Dam Failure; Hazardous Materials
<b>5. Assess the Problem</b>	<b>52</b>	<b>34</b>	
Summary of hazard and impact on community ( <b>required</b> )	2	2	Section 3.0 includes a Vulnerability Assessment for each hazard (Drought, Earthquake; Extreme Temperature; Fire; Flood; Hailstorm, Thunderstorm, and Windstorm; Land Subsidence; Tornado; Winter Storm and Ice; Cyber-Attack; Dam Failure; Hazardous Materials) that specifies (where possible) the number of critical facilities that would be impacted
Impact on life, safety, health, procedures for warning and evacuation	5	5	Section 3.0 includes a Vulnerability Assessment for each hazard (Drought, Earthquake; Extreme Temperature; Fire; Flood; Hailstorm, Thunderstorm, and Windstorm; Land Subsidence; Tornado; Winter Storm and Ice; Cyber-Attack; Dam Failure; Hazardous Materials) that specifies (where possible) the number of critical facilities that would be impacted
Impact on public health including health hazards to floodwater/mold	5		
Impact on critical facilities and infrastructure	5	5	Section 3.0 includes a Vulnerability Assessment for each hazard (Drought, Earthquake; Extreme Temperature; Fire; Flood; Hailstorm, Thunderstorm, and Windstorm; Land Subsidence; Tornado; Winter Storm and Ice; Cyber-Attack; Dam Failure; Hazardous Materials) that specifies (where possible) the number of critical facilities that would be impacted

CRS 10-Step Planning Process	Max. Points	Est. Points	Comments
Impact on community's economy and tax base	5	0	
Number and types of buildings subject to the hazards	5	5	Section 3.0 includes a Vulnerability Assessment for each hazard (Drought, Earthquake; Extreme Temperature; Fire; Flood; Hailstorm, Thunderstorm, and Windstorm; Land Subsidence; Tornado; Winter Storm and Ice; Cyber-Attack; Dam Failure; Hazardous Materials) that specifies (where possible) the number of critical facilities that would be impacted
Review of all flood insurance claims	5	5	Table list flood insurance claims
Natural and beneficial function of natural areas	5	5	Section 3 discusses the natural and beneficial function of floodplains for flood storage
Development, redevelopment, and population trends	7	7	Section2 discusses population and demographics
6. Set Goals (required)	2	2	Section 4.1 list goal for MHMP - to reduce social, physical, and economic losses from hazards
7. Review Possible Activities	35	35	
Preventive activities	5	5	Section 4.2.1 discusses existing Mitigation Practices; Table 4-1 lists proposed Mitigation Practices for Preventive
Floodplain management regulatory/current and future conditions	5	5	Section 4.2.1 discusses existing Mitigation Practices; Table 4-1 lists proposed Mitigation Practices for Property Protection
Property protection activities	5	5	Section 4.2.1 discusses existing Mitigation Practices; Table 4-1 lists proposed Mitigation Practices for Property Protection
Natural resource protection activities	5	5	Section 4.2.1 discusses existing Mitigation Practices; Table 4-1 lists proposed Mitigation Practices for Natural Resource Protection
Emergency services activities	5	5	Section 4.2.1 discusses existing Mitigation Practices; Table 4-1 lists proposed Mitigation Practices for Emergency Services
Structural projects	5	5	Section 4.2.1 discusses existing Mitigation Practices; Table 4-1 lists proposed Mitigation Practices for Structural Projects
Public information activities	5	5	Section 4.2.1 discusses existing Mitigation Practices; Table 4-1 lists proposed Mitigation Practices for Public Information
8. Draft Action Plan	60	60	
Recommendations for activities 2 of 6 categories from #7 (prioritized)	10	0	
Recommendations for activities 3 of 6 categories from #7 (prioritized)	20	0	
Recommendations for activities 4 of 6 categories from #7 (prioritized)	30	0	
Recommendations for activities 5 of 6 categories from #7s (prioritized)	45	45	Table 4-1 lists and prioritizes proposed Mitigation Practices for all 6 possible activities (Prevention, Property Protection, Natural Resource Protection, Emergency Services, Structural Projects, and Public Information); Section 5.0 includes an Implementation Plan for High Priority Mitigation Practices
Post-disaster mitigation policies and procedures	10	10	Section 6.1 recommends the EMA Director reassemble the Planning Committee following a significant hazard incident to review the effectiveness of existing Mitigation Practices and make recommendations for improvement
Action items for mitigation other hazards	5	5	Table 4-1 includes Mitigation Practices for Drought, Earthquake; Extreme Temperature; Fire; Flood; Hailstorm, Thunderstorm, and Windstorm; Land Subsidence; Tornado; Winter Storm and Ice; Cyber-Attack; Dam Failure; Hazardous Materials Section 5.0 includes an Implementation Plan for High Priority Mitigation Practices
9. Adopt the Plan	2	2	
10. Implement, Evaluate and Revise	26	26	
Procedures to monitor and recommend revisions (required)	2	2	Section 6.1 includes a process to monitor, evaluate, and update the MHMP; effort to be led by EMA Director
Plan evaluated by same (or equally qualified) planning committee	24	24	Section 6.1 acknowledges that the successful implementation of the Mitigation Practices identified in this MHMP will require cooperation and participation of entire Planning Committee.
TOTAL	382	292	



## **APPENDIX 9: COMMUNITY CAPABILITY ASSESSMENT**

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Plans	Comprehensive Plan	Local Emergency Plan	Economic Development	Watershed Plan
Jackson County	2006	<b>Jackson County MHMP</b> – 2015 and 2022 serve as a multi-jurisdictional approach to emergency planning.	Jackson County Industrial Development Commission	
Town of Brownstown	<i>With Jackson County</i>			
Town of Crothersville	<i>With Jackson County</i>			
Town of Medora				
City of Seymour				

Ordinances	Zoning Ordinance	Subdivision Control Ordinance	Stormwater Ordinance	Burning Ordinance	Water Conservation Ordinance
Jackson County					
Town of Brownstown					
Town of Crothersville					
Town of Medora					
City of Seymour					

Programs	NFIP	CRS	Tree City	Storm Ready	Mutual Aid Agreements
Jackson County	180405#	No	No	Yes	Yes Fire, Police, EMS
Town of Brownstown	180317#	No	No	Yes	
Town of Crothersville	180378#	No	No	Yes	
Town of Medora	180098#	No	No	Yes	
City of Seymour	180099#	No	Yes	Yes	

Studies/Maps	FIRMs	Evacuation Routes	Vulnerable Populations	At-Risk Structures	River Basin Partnership
Jackson County	11/19/2014	HazMat			No
Town of Brownstown	11/19/2014	HazMat			No
Town of Crothersville	11/19/2014	HazMat			No
Town of Medora	11/19/2014	HazMat			No
City of Seymour	11/19/2014	HazMat; FRP			No

Staffing	Building/ Planning	GIS	Engineer / Surveyor	Street/ Highway	Floodplain Admin
Jackson County	Conner Barnette, Building Commissioner	Schneider provides contracted services	Daniel Blann, County Surveyor	Jerry Ault, Highway Superintendent	Conner Barnette, Building Commissioner
Town of Brownstown	Conner Barnette, Building Commissioner				
Town of Crothersville	Conner Barnette, Building Commissioner				
Town of Medora					
City of Seymour	Dave Neukam, Building Inspector		Bernard Hauersperger, City Engineer	Chad Dixon Director of Public Works	

## **APPENDIX 10: IMPLEMENTATION CHECKLIST**

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MITIGATION PRACTICE	HAZARD ADDRESSED	STATUS	PRIORITY	2027 STATUS
<b>Community Rating System</b> 1. Investigate potential to reduce flood insurance premiums through additional participation in the NFIP’s CRS Program.  <i>(Will assist with NFIP compliance)</i>	<input type="checkbox"/> Drought <input type="checkbox"/> Earthquake <input type="checkbox"/> Extreme Temperature <input type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input type="checkbox"/> Hail/Thunder/Wind <input type="checkbox"/> Landslide/Subsidence <input type="checkbox"/> Tornado <input type="checkbox"/> Winter Storm/Ice <input type="checkbox"/> Cyber-Attack <input type="checkbox"/> Dam Failure <input type="checkbox"/> HazMat Incident	<b>Ongoing –</b>  <b>Proposed Enhancement –</b> 1. Participation from Jackson County, Medora, and Seymour	High	
<b>Land Use Planning &amp; Zoning</b> 1. Incorporate hazard information, risk assessment, and hazard mitigation practices into the Comprehensive Land Use Plan and Development Review to better guide future growth and development	<input checked="" type="checkbox"/> Drought <input checked="" type="checkbox"/> Earthquake <input checked="" type="checkbox"/> Extreme Temperature <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input checked="" type="checkbox"/> Hail/Thunder/Wind <input checked="" type="checkbox"/> Landslide/Subsidence <input checked="" type="checkbox"/> Tornado <input checked="" type="checkbox"/> Winter Storm/Ice <input checked="" type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input checked="" type="checkbox"/> HazMat Incident	<b>Ongoing –</b> 1. Basic information has been included within the 2006 Jackson County Comprehensive Plan  <b>Proposed Enhancement –</b> 1. Update Comprehensive Plans and include information related to hazards, more definitively outline higher risk areas and those that should be avoided for future development	High	
<b>Power Backup Generators</b> 1. Inventory, prioritize, and retrofit public facilities and/or critical facilities with appropriate wiring and electrical capabilities for utilizing a large generator for power back up 2. Secure a fuel reserve, or ensure contractual emergency provisions so critical infrastructure may run on power backup for extended periods of time	<input type="checkbox"/> Drought <input checked="" type="checkbox"/> Earthquake <input checked="" type="checkbox"/> Extreme Temperature <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input checked="" type="checkbox"/> Hail/Thunder/Wind <input checked="" type="checkbox"/> Landslide/Subsidence <input checked="" type="checkbox"/> Tornado <input checked="" type="checkbox"/> Winter Storm/Ice <input checked="" type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input checked="" type="checkbox"/> HazMat Incident	<b>Ongoing –</b> 1. Many critical facilities have generators or have added since the last plan 2. Some communities have verbal agreements for fuel supplies  <b>Proposed Enhancements –</b> 1. Inventory generator capabilities and needs and prioritize within each community to determine needs for future purchases 2. Secure a fuel reserve via contract service agreement	High	
<b>Geographic Information Systems</b> 1. Train GIS staff in HAZUS-MH to quantitatively estimate losses in “what if scenarios” and continue to use the most recent GIS data in land use planning efforts	<input checked="" type="checkbox"/> Drought <input checked="" type="checkbox"/> Earthquake <input checked="" type="checkbox"/> Extreme Temperature <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input checked="" type="checkbox"/> Hail/Thunder/Wind <input checked="" type="checkbox"/> Landslide/Subsidence <input checked="" type="checkbox"/> Tornado <input checked="" type="checkbox"/> Winter Storm/Ice <input checked="" type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input checked="" type="checkbox"/> HazMat Incident	<b>Ongoing –</b>  <b>Proposed Enhancements –</b> 1. Provide training opportunities for GIS staff related to HAZUS-MH.	Low	

[illegible]





MITIGATION PRACTICE	HAZARD ADDRESSED	STATUS	PRIORITY	2027 STATUS
<p><b>Flood Studies and Protection</b></p> <p>1. Evaluate and utilize flood forecasting capabilities including stream gages, flood forecast maps, and flood alerts</p> <p>2. Conduct detailed flood protection studies for problem areas and/or areas with repetitive flooding problems <i>(2015 Measure)</i></p> <p>3. Conduct a detailed flooding and drainage study for the Town of Medora <i>(2015 Measure)</i></p> <p>4. Prepare a detailed Flood Response Plan to improve response and reduce losses from a flood event</p> <p><i>(Will assist with NFIP compliance)</i></p>	<div><input type="checkbox"/> Drought</div> <div><input type="checkbox"/> Earthquake</div> <div><input type="checkbox"/> Extreme Temperature</div> <div><input type="checkbox"/> Fire</div> <div><input checked="" type="checkbox"/> Flood</div> <div><input type="checkbox"/> Hail/Thunder/Wind</div> <div><input type="checkbox"/> Landslide/Subsidence</div> <div><input type="checkbox"/> Tornado</div> <div><input type="checkbox"/> Winter Storm/Ice</div> <div><input type="checkbox"/> Cyber-Attack</div> <div><input type="checkbox"/> Dam Failure</div> <div><input type="checkbox"/> HazMat Incident</div>	<p><b>Ongoing –</b></p> <p>1. Stream gage installed on East Fork White River</p> <p>2. Studies are completed as funding becomes available</p> <p>4. FRP developed for Seymour</p> <p><b>Proposed Enhancements –</b></p> <p>1. Determine methods for providing warning to Medora and Brownstown</p> <p>2. Prioritize listing of needed studies and continue to complete as funding becomes available focusing on areas around 235 and highways throughout the county and roads near Mill Creek, Pond Creek, Kiper Creek at CR890, southern Jackson County, Little Acres subdivision, Jonesville, and the junction of White River and Muscatatuck River</p> <p>3. Develop detailed plan for Town of Medora and implement recommendations as funding becomes available</p> <p>4. Prioritize areas in need of Flood Response Plan and develop team to prepare plan</p>	<p>High</p> <p><i>(flood forecasting, problem area studies)</i></p> <p>Low</p> <p><i>(FRP)</i></p>	

# JACKSON COUNTY MULTI-HAZARD MITIGATION PLAN

AUGUST 2022

**Prepared for:**

Jackson County Emergency Management Agency  
220 E Walnut St #101  
Brownstown, IN 47220

**Prepared by:**

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Burke Project No. 19.R20.0329.00000





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## EXECUTIVE SUMMARY

The Federal Emergency Management Agency (FEMA) defines the disaster life cycle as the process through which emergency managers respond to disasters when they occur; help people and institutions recover from them; reduce the risk of future losses; and prepare for emergencies and disasters. The Jackson County Multi-Hazard Mitigation Plan (MHMP) focuses on the mitigation phase of the disaster life cycle. According to FEMA, mitigation is most effective when it's based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs. The MHMP planning process identifies hazards, the extent that they affect the municipality, and formulates mitigation practices to ultimately reduce the social, physical, and economic impact of the hazards.

In order for National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must adopt either their own MHMP or participate in the development of a multi-jurisdictional MHMP. Further, it is required that local jurisdictions review, revise, and resubmit the MHMP every five years. As representatives from **Jackson County, Brownstown, Crothersville, Medora, and Seymour** have provided information, attended meetings, and participated in the planning process, the planning process used to update the Jackson County MHMP satisfies the requirements of a multi-jurisdictional plan.

During Planning Committee meetings, those in attendance revisited existing (in the 2015 MHMP) and identified new critical facilities and local hazards; reviewed the State's mitigation goals and updated the local mitigation goals and updated the local mitigation goals; reviewed the most recent local hazard data, vulnerability assessment, and maps; evaluated the effectiveness of existing mitigation measures and identified new mitigation projects; and reviewed materials for public participation. Meetings were also conducted with key groups such as city planners and various emergency responders and their information will continue to be incorporated into the MHMP update.

### Risk Assessment

The risk assessment conducted for the Jackson County MHMP is based on the methodology described in the Local Multi-Hazard Mitigation Planning Guidance published by FEMA in 2013 and is incorporated into the following sections:

1. **Hazard Identification** lists the natural, technological, and political hazards selected as having the greatest direct and indirect impact to the county as well as the system used to rank and prioritize the hazards.
2. **Hazard Profile** for each hazard, discusses the 1) historic data relevant to the municipalities where available; 2) vulnerability in terms of number and type of structures, repetitive loss properties (flood only), estimation of potential losses, and impacts based on an analysis of development trends; and 3) the relationship to other hazards identified.
3. **Hazard Summary** provides an overview of the risk assessment process; a table summarizing the relationship of the hazards; and a composite map to illustrate areas impacted by hazards.

When considering the hazards selected for study (drought; earthquake; extreme temperature; fire; flood; hail, thunder, wind; land subsidence; snow and ice storm; tornado; dam failure; and hazardous materials incidents) and the information obtained regarding the hazard profile and the hazard summary, the attached table identifies the hazards studied and ranking outcome. The ranking is completed utilizing the Calculated Risk Priority Index (CPRI), a tool by which individual hazards are evaluated and ranked according to an indexing system considering probability, magnitude, warning time, and duration for any hazard.

1. **Probability** is defined as the likelihood of the hazard occurring over a given period.

2. **Magnitude/Severity** is defined by the extent of the injuries, shutdown of critical infrastructure, the extent of property damage sustained, and the duration of the incident response.
3. **Warning Time** is defined as the length of time before the event occurs.
4. **Duration** is defined as the length of time that the actual event occurs. This does not include response or recovery efforts.













## **Mitigation Goals and Practices**

The overall goal of the Jackson County MHMP is to reduce the social, physical, and economic losses associated with hazard incidents through emergency services, natural resource protection, prevention, property protection, public information, and structural control mitigation practices.

As part of the planning process the Planning Committee discussed the strengths and weaknesses of existing mitigation practices and made recommendations for improvements, as well as suggested new practices. To provide further detail, information on the local status, local priority, benefit-cost ratio, project location, responsible entity, and potential funding source will be included with regard to each proposed practice. Those practices ranked by participants as a high priority are anticipated to be implemented within five years from the final Plan adoption and additional steps, or an implementation plan is included for each.

## **Plan Maintenance**

The successful implementation of the MHMP will require the participation and cooperation of the entire Planning Committee to successfully monitor, evaluate, and update the Jackson County MHMP. Local jurisdictions are required to update and resubmit the MHMP every five years. Information gathered following individual hazard incidents and annual meetings will be utilized along with updated vulnerability assessments to assess the risks associated with each hazard common in Jackson County.

Type of Hazard	List of Hazards	Weighted Average CPRI
Natural	Drought	
	Earthquake	
	Extreme Temperature	
	Fire	
	Flood	
	Hail/Thunder/Windstorm	
	Landslide/Subsidence	
	Tornado	
	Winter Storm/Ice	
Technological	Cyber-Attack	
	Dam Failure	
	Hazardous Materials Incident	

## CHAPTER 1: INTRODUCTION

### 1.1 DISASTER LIFE CYCLE

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

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



Figure 1 Disaster Life Cycle

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

### 1.2 PROJECT SCOPE & PURPOSE

#### REQUIREMENT §201.6(d)(3):

A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five (5) years in order to continue to be eligible for mitigation project grant funding.

A MHMP is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000). According to DMA 2000, the purpose of mitigation planning is for State, local, and Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those

hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of occurrences.

A FEMA-approved MHMP is required to apply for and/or receive project grants under the Building Resilient Infrastructure and Communities (BRIC), Hazard Mitigation Grant Program (HMGP), and Flood Mitigation Assistance (FMA). Although the Jackson County MHMP meets the requirements of DMA 2000 and eligibility requirements of these grant programs, additional detailed studies may need to be completed prior to applying for these grants.

For National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must adopt either their own MHMP or participate in the development of a multi-jurisdictional MHMP. The Indiana Department of Homeland Security (IDHS) and the United States Department of Homeland Security (US DHS)/FEMA Region V offices administer the MHMP program in Indiana. As noted above, it is required that local jurisdictions review, revise, and resubmit the MHMP every five years. MHMP updates must demonstrate that progress has been made in the last five years to fulfill the commitments outlined in the previously approved MHMP. The updated MHMP may validate the information in the previously approved Plan or may be a major plan rewrite. The updated MHMP is not intended to be an annex to the previously approved Plan; it stands on its own as a complete and current MHMP.

The Jackson County MHMP Update is a multi-jurisdictional planning effort led by the Jackson County Emergency Management Agency (EMA). This Plan was prepared in partnership with Jackson County, the towns of Brownstown, Crothersville, Medora, and Seymour. Representatives from these communities attended the Committee meetings, provided valuable information about their community, reviewed and commented on the draft MHMP, and assisted with local adoption of the approved Plan. As each of the communities had an equal opportunity for participation and representation in the planning process, the process used to update the Jackson County MHMP satisfies the requirements of DMA 2000 in which multi-jurisdictional plans may be accepted.

Throughout this Plan, activities that could count toward Community Rating System (CRS) points are identified with the NFIP/CRS logo. The CRS is a voluntary incentive program that recognizes and encourages community floodplain activities that exceed the minimum NFIP requirements. As a result, flood insurance premiums are discounted to reflect the reduced flood risk resulting from community actions that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote education and awareness of flood insurance. Savings in flood insurance premiums are proportional to the points assigned to various activities. A minimum of 500 points is necessary to enter the CRS program and receive a 5% flood insurance premium discount. This MHMP could contribute as many as 382 points toward participation in the CRS. At the time of this planning effort, none of the communities or Jackson County participate in the CRS program.

Funding to update the MHMP was made available through a FEMA/DHS PDM grant awarded to the Jackson County EMA and administered by IDHS. Jackson County provided the local 25% match required by the grant. Christopher B. Burke Engineering, LLC (Burke) was hired to facilitate the planning process and prepare the Jackson County MHMP under the direction of an American Institute of Certified Planners (AICP) certified planner.

## 1.3 ANALYSIS PROCESS

### REQUIREMENT §201.6(c)(1):

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

Preparation for the Jackson County MHMP Update began in 2018 when the County EMA submitted a PDM Grant application to IDHS. The grant request was approved by FEMA and grant funds were awarded in 2020.

Once the grant was awarded, the planning process to update the 2015 MHMP took 18 months. This included a review period by IDHS and FEMA for the draft MHMP Update, and time for Jackson County and communities to adopt the final MHMP Update.

### 1.3.1 Planning Committee

In June of 2021, the EMA compiled a list of Planning Committee members to guide the MHMP update planning process. These individuals were specifically invited to serve on the Committee because they were knowledgeable of local hazards; have been involved in hazard mitigation; have the tools necessary to reduce the impact of future hazard events; and/or served as a representative on the original Planning Committee in 2015. **Table 1** lists the individuals that actively participated on the Committee and the entity they represented.

Table 1: MHMP Update Committee

Name	Office	Representing
Conner Barnette	Building Department	Jackson County
Mason Boicourt	Utilities Department	Crothersville
Nate Bryant	Emergency Medical Services	Jackson County
Duane Davis	Emergency Management Agency	Jackson County
Staci Eglen	Auditor's Office	Jackson County
Danieta Foster	Clerk-Treasurer	Crothersville
Jeremy Gray	Building Commission	Seymour
Debbie Hackman	Resident	Medora
Tom Hanner	Brownstown Police Department	Brownstown
Roger Jewell	Crothersville Wastewater Treatment	Crothersville
Katie Kaufman	Assessor's Office	Jackson County
Joe Kelly	Brownstown Police Department	Brownstown
Nick Klinger	Emergency Management Agency	Jackson County
Kendall Lambring	Salvation Army	Jackson County
Brad Lucas	Seymour Fire Department	Seymour
Rick Meyer	Sheriff Department	Jackson County
Jesse Minnick	Indiana Department of Homeland Security	Indiana
Jade Peters	Brownstown Central Community Schools	Brownstown
Kelly Pifer	Department of Planning and Zoning	Seymour
Marianne Stemm	Thrive Alliance	Jackson County
Keith Williams	Seymour Schools	Seymour
Marty Young	Brownstown Elementary School	Brownstown

Members of the Committee participated in the MHMP Update as a Planning Committee member or through various other group meetings. During these meetings, the Committee:



- revisited existing (in the 2015 MHMP) and identified new critical infrastructure and local hazards
- reviewed the State’s mitigation goals and updated the local mitigation goals
- reviewed the most recent local hazard data, vulnerability assessment, and maps
- evaluated the effectiveness of existing mitigation measures and identified new mitigation projects
- reviewed materials for public participation.

A sign-in sheet recorded those present at each meeting to document participation. Meeting agendas and summaries are included in **Appendix 2**. Members of the Committee also reviewed a draft MHMP, provided comments and suggestions, and assisted with adoption of the Jackson County MHMP Update.

### 1.3.2 Public Involvement

A draft of the Jackson County MHMP update was posted to the Jackson County website ([www.jacksoncounty.in.gov](http://www.jacksoncounty.in.gov)) for public review and comment. A media release indicating the posting of the draft MHMP and the ability to comment was submitted for publishing to *The Seymour Tribune* in Seymour. Committee members were provided with an informational flyer regarding the same information to display in their respective offices and to provide to family, friends and colleagues. The media release, informational flyer, and any comments received are included in **Appendix 3**. Planning Committee members provided comments to assist with remaining gaps in the planning effort. Few comments were received from the public and were related to contact information and how this planning effort relates to others within the county.

### 1.3.3 Involvement of Other Interested Parties

Neighboring EMAs (Bartholomew and Brown to the North; Jennings to the East; Scott and Washington to the South; and Lawrence and Monroe to the West) were also invited to review and comment on the MHMP update. Comments received from neighboring EMAs were supportive in nature and did not identify needed corrections or information to be added. Information related to the planning process and the availability of the draft Jackson County MHMP was directly provided to such potentially interested parties via personal conversations, informational flyer, and email correspondence. Successful implementation and future updates of the Jackson County MHMP Update will rely on the partnership and coordination of efforts between such groups.

## 1.4 PLANS, STUDIES, REPORTS, AND TECHNICAL INFORMATION

### REQUIREMENT §201.6(c)(1):

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

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

For the purposes of this planning effort, the following materials (among others) were discussed and utilized:



- Jackson County MHMP, 2015
- Town of Crothersville Town Ordinances, 2017
- City of Seymour Ordinances, 2021
- Jackson County Comprehensive Plan, 2006
- Jackson County Planning and Zoning Code, 2020
- GIS data from county contacts

Planning and building ordinances and comprehensive planning efforts for many of the other communities do not exist or are not up to date. Several of the small communities are serviced by the county departments.

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

- Indiana Department of Natural Resources, Division of Water – *Flood insurance policies, claims, and payment information*
- Indiana Department of Natural Resources, Division of Water – *Dam records*
- FEMA, Region V – Repetitive loss structure counts and payments



The CRS program credits NFIP communities a maximum of 155 points for organizing a planning committee composed of staff from various departments; involving the public in the planning process; and coordinating among other agencies and departments to resolve common problems relating to flooding and other known natural hazards.

## CHAPTER 2: COMMUNITY INFORMATION

Although much of the information within this section is not required by DMA 2000, this section contains important background information about the physical, social, and economical composition of Jackson County necessary to better understand the Risk Assessment discussed in **Chapter 3**.

Jackson County, originally established in 1816, is named for Andrew Jackson, following his notable victory at the Battle of New Orleans in the war of 1812. Jackson County is the 14<sup>th</sup> of the 92 Indiana counties to be organized. The total area of Jackson County is approximately 513 square miles and the location of the county within the State of Indiana is identified in **Figure 2**.

### 2.1 POPULATION AND DEMOGRAPHICS



**Figure 2 Jackson County Location**

The most recent data for Jackson County estimates that the 2020 population was 44,222, which ranks 34<sup>th</sup> in the State. Of that total, the City of Seymour accounts for 20,096 or 45% of the county's population while the Town of Brownstown is the second largest community with 2,874 or 6.5% of the population.

In 2019, the median age of the population in the county was 39.3 years of age. The largest demographic age groups in the county are older adults (45-64) with a population of 11,510 and young adults (25-44 years) with a population of 11,133. School age children (5-17) are the third largest age group with a population of 7,816 individuals living in Jackson County. The approximate median household income in 2019 was reported to be \$59,472 while the poverty rate in the same year was reported at 10.1% county-wide. In total, 20.7% of households are married with children, and 31.7% of households are married without children.

Within the county, 87.3% of the adults older than 25, have reportedly completed a High School education. Further, 16.7% of those same adults have also completed a Bachelor of Arts or higher degree.

### 2.2 EMPLOYMENT

US Census data indicate that of the Jackson County workforce, 27.6% are employed in Manufacturing positions. Other Private and Government account for 15.2% and 12.5% respectively. The total resident labor force according to estimates in 2019 is 23,066 (with 1,650 unemployed) and a April 2021 unemployment rate of 3.3% which places Jackson County as 49<sup>th</sup> of 92 counties in the State. **Table 2** lists the ten largest employers within Jackson County as of 2020.

**Table 2: List of Major Employers**

Aisin USA Mfg.Inc. (Seymour)	Cummins Industrial Center (Seymour)
Schenck Medical Center (Seymour)	Walmart Supercenter (Seymour)
Valeo Sylvania LLC (Seymour)	Seymour Tubing Inc. (Seymour)
Walmart Distribution Center (Seymour)	Jay C Food Stores (Seymour)
Pet Supplies Plus Distribution Center (Seymour)	Silgan Plastics LLC (Seymour)

## 2.3 TRANSPORTATION AND COMMUTING PATTERNS

Several major transportation routes pass through Jackson County and the municipalities within. Interstate 65; US Highways 31 and 50; and State Roads 11, 39, 58, 135, 235, 250, and 258 serve as main routes between the various municipalities. CSX and Louisville and Indiana maintain rail lines which travel through the county in the northeast corner and along the southern border respectively. These transportation routes are identified in **Figure 3**, from the 2006 Jackson County Comprehensive Plan.

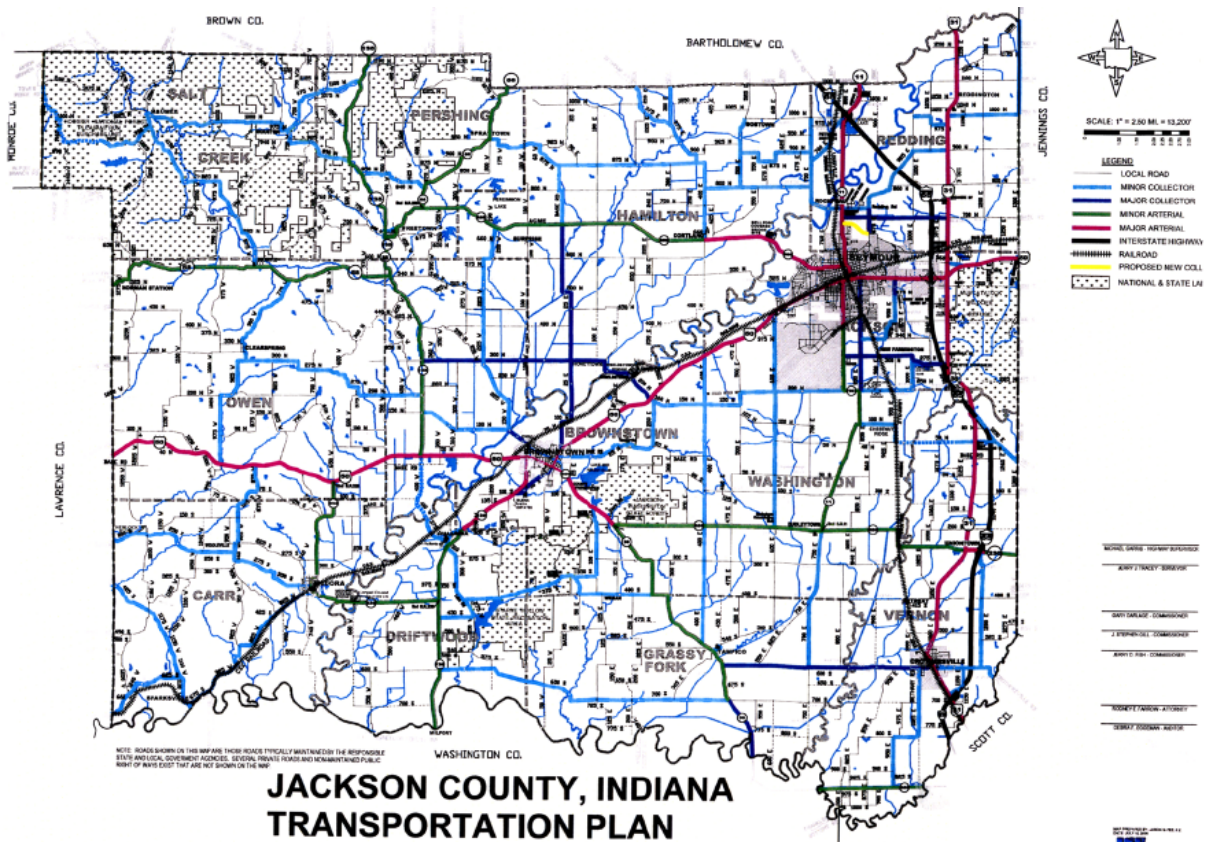


Figure 3 Jackson County Transportation Routes

According to STATSIndiana, just over 5,500 people commute into Jackson County daily. Approximately 35% of commuters travel from Jennings County. Further, approximately 4,300 Jackson County residents commute to other counties, with the majority traveling to Bartholomew County (67%).

**Figure 4** indicates the number of workers 16 and older who do not live within Jackson County but commute into the County for employment purposes. Similarly, **Figure 5** indicates the number of Jackson County residents 16 and older that commute out of the county for employment.

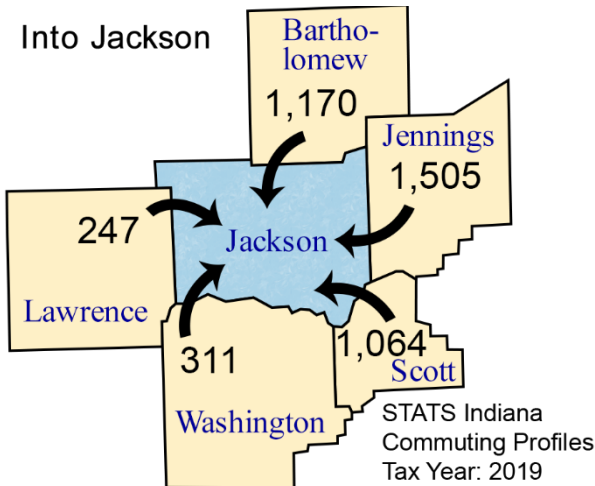


Figure 4 Workers into Jackson County

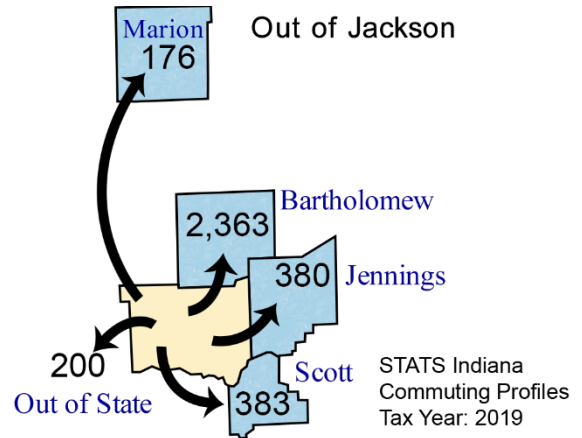


Figure 5 Workers out of Jackson County

## 2.4 CRITICAL AND NON-CRITICAL INFRASTRUCTURE

### REQUIREMENT §201.6(c)(2)(ii)(A):

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

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

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

The Jackson County EMA provided the listing and locations of the following 98 critical infrastructure points for the MHMP update:

- 1 Airport
- 1 Church
- 19 Daycare Centers
- 10 Electric Facilities
- 14 Dams
- 15 Fire Stations
- 10 Government Facilities
- 2 Medical Facilities
- 1 Military Installation
- 5 Nursing Homes
- 3 Police Stations
- 20 Schools
- 1 Shelters
- 3 Wastewater Treatment Plants
- 2 Water Companies
- 5 Water Towers

Information provided by the EMA, GIS Department, and the MHMP Planning Committee members was utilized to identify the types and locations of critical structures throughout Jackson County. Draft maps were provided to the EMA and Planning Committee for their review and all comments were incorporated into the maps and associated databases.

**Exhibit 1** illustrates the critical infrastructure identified throughout unincorporated Jackson County and the individual municipalities. **Appendix 4** lists the critical structures in Jackson County by community. Non-critical structures include residential, industrial, commercial, and other structures not meeting the definition of a critical facility and are not required for a community to function. The development of this MHMP focused only on critical structures; non-critical structures are neither mapped nor listed.

## 2.5 MAJOR WATERWAYS AND WATERSHEDS

According to the United States Geological Survey (USGS), there are 81 waterways in Jackson County, which are listed in **Appendix 5**. The county's main waterway is the East Fork White River, and the county lies within three 8-digit Hydrologic Unit Code (HUC) watersheds: Lower East Fork White River, Muscatatuck, and the Upper East Fork White River. These major waterways, and others, are identified on **Exhibit 2**.

## 2.6 NFIP PARTICIPATION

The NFIP is a FEMA program that enables property owners in participating communities to purchase insurance protection against losses from flooding. Jackson County and the towns of Brownstown, Crothersville, Medora, and Seymour participate in the NFIP. At the time of this planning effort, the Jackson County Building Commissioner is responsible for the administration of the floodplain program in the unincorporated areas of the County and similarly, the Building Commissioner is responsible for the program within the City of Seymour. The Clerk-Treasurers within the towns of Brownstown, Crothersville, and Medora are responsible for administering the floodplain program within the individual communities.

**Table 3** lists the NFIP number, effective map date, and the date each community joined the NFIP program.

**Table 3: NFIP Participation**

NFIP Community	NFIP Number	Effective Map Date	Join Date
Jackson County	180405	11/19/2014	01/05/1984
Town of Brownstown	180317	11/19/2014	01/03/1985
Town of Crothersville	180378	11/19/2014	01/03/1985
Town of Medora	180098	11/19/2014	01/05/1984
City of Seymour	180099	11/19/2014	11/02/1983

## 2.7 TOPOGRAPHY

Jackson County is bordered geographically to the west by Lawrence and Monroe Counties, to the east by Jennings County, to the north by Bartholomew and Brown Counties, and to the south by Scott and Washington Counties. The highest elevation within the county is known as the "Pinnacle" in Brownstown Hills at 966 ft above sea level. Conversely the lowest elevation is approximately 500 ft above sea level at the point where the East Fork of the White River leaves the county.

## 2.8 CLIMATE

The Midwestern Regional Climate Center (MRCC) provided climate data that includes information retrieved from a weather station located Seymour Indiana, identified as station USC00127935. The average annual precipitation is 47.41 inches per year, with the wettest month being May averaging 5.53 inches of precipitation and the driest month being February with an average of 2.72 inches of precipitation. The highest 1-day maximum precipitation was recorded in April of 1998 with 5.8 inches of rain. On average, there are 78.5 days of precipitation greater than or equal to 0.1 inch; 32.2 days with greater than or equal to 0.5 inch; and 13.1 days with greater than or equal to 1.0 inch of precipitation.

Studies have recently been completed by the Indiana Climate Change Impacts Assessment, which is overseen by Purdue University Climate Change Research Center and comprised of a Steering Committee and several topic-oriented Working Groups. These studies indicate that average annual precipitation for Indiana is increasing seasonally during the winter and spring. Conversely, summers and autumns are trending toward less precipitation. In addition, their report shows changes in rain intensity and duration, along with frost-free days and growing seasons. These changes in climate, especially in Indiana, will impact natural hazards and how municipalities prepare for them.



## CHAPTER 3: RISK ASSESSMENT

### REQUIREMENT §201.6(c)(2):

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

A risk assessment measures the potential loss from a hazard incident by assessing the vulnerability of buildings, infrastructure, and people in a community. It identifies the characteristics and potential consequences of hazards, how much of the community may be affected by a hazard, and the impact on community assets. The risk assessment conducted for Jackson County and the communities within is based on the methodology described in the Local Multi-Hazard Mitigation Planning Guidance published by FEMA in 2011 and is incorporated into the following sections:

**Section 3.1: Hazard Identification** lists the natural, technological, and political hazards selected by the Planning Committee as having the greatest direct and indirect impact to the county as well as the system used to rank and prioritize the hazards.

**Section 3.2: Hazard Profile** for each hazard, discusses 1) historic data relevant to the county where applicable; 2) vulnerability in terms of number and types of structures, repetitive loss properties (flood only), estimation of potential losses, and impact based on an analysis of development trends; and 3) the relationship to other hazards identified by the Planning Committee.

**Section 3.3: Hazard Summary** provides an overview of the risk assessment process; a comparative hazard ranking with other methodologies used by the Jackson County EMA; a table summarizing the relationship of the hazards; and a composite map to illustrate areas impacted by the hazards.

### 3.1 HAZARD IDENTIFICATION

#### 3.1.1 Hazard Selection

The MHMP Planning Committee reviewed the list of natural and technological hazards from the 2015 Jackson County MHMP and discussed recent events and the potential for future hazard events. The Committee identified those hazards that affected Jackson County and each community and selected the hazards to study in detail as part of this planning effort. As shown in **Table 4** these hazards include dam failure; drought; earthquake; extreme temperature; fire; flooding; hailstorms, thunderstorms, and windstorms; hazardous materials incident; land subsidence/landslides; snowstorms and ice storms; and tornado. All hazards studied within the 2015 Jackson County MHMP, are included in the update.

**Table 4: Hazard Identification**

Type of Hazard	List of Hazards	Detailed Study	
		2015 MHMP	MHMP UPDATE
Natural	Drought	No	Yes
	Earthquake	Yes	Yes
	Extreme Temperature	No	Yes
	Fire	No	Yes
	Flood	Yes	Yes
	Hail/Thunder/Wind	Yes	Yes
	Land Subsidence/Landslide	No	Yes
	Snow / Ice Storm	Yes	Yes
Technological	Tornado	Yes	Yes
	Cyber-Attack	No	Yes
	Dam Failure	Yes	Yes
	Hazardous Material Incident	Yes	Yes

## 3.2 HAZARD RANKING

The Planning Committee ranked the selected hazards in terms of importance and potential for disruption to the community using a modified version of the Calculated Priority Risk Index (CPRI). The CPRI, adapted from [MitigationPlan.com](http://MitigationPlan.com), is a tool by which individual hazards are evaluated and ranked according to an indexing system. The CPRI value (as modified by Burke) can be obtained by assigning varying degrees of risk probability, magnitude/severity, warning time, and the duration of the incident for each event, and then calculating as index value based on a weighted scheme. For ease of communications, simple graphical scales are used.

### 3.2.1 Probability



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

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

### 3.2.2 Magnitude / Severity



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

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



### 3.2.3 Warning Time



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

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

### 3.2.4 Duration



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

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

### 3.2.5 Calculating the CPRI



The following calculation illustrates how the index values are weighted and how the CPRI value is calculated.  $CPRI = Probability \times 0.45 + Magnitude/Severity \times 0.30 + Warning\ Time \times 0.15 + Duration \times 0.10$ .

For the purposes of this planning effort, the calculated risk is defined as:

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

The CPRI value provides a means to assess the impact of one hazard relative to other hazards within the community. A CPRI value for each hazard was determined for each community in Jackson County, and then a weighted CPRI value was computed based on the population size of each community. **Table 5** presents each community, population, and the weight applied to individual CPRI values to arrive at a combined value for the entire county. Weight was calculated based on the average percentage of each community's population in relation to the total population of the county. Thus, the results reflect the relative population influence of each community on the overall priority rank.

**Table 5: Determination of Weighted Value for Communities**

Community	Population (2020)	% of Total Population	Weighted Value
Jackson County	19,030	43.0%	0.43
Town of Brownstown	2,874	6.5%	0.06
Town of Crothersville	1,529	3.5%	0.03
Town of Medora	693	1.6%	0.02
City of Seymour	20,096	45.4%	0.45
<b>Total</b>	<b>44,222</b>	<b>100.0%</b>	<b>1.00</b>

### 3.3 HAZARD PROFILES

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

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

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

## NATURAL HAZARDS

### 3.3.1 Drought



#### Drought: Overview

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



Figure 6 Urban Drought Affects

reduced ground water or reservoir levels, and crop yields. Socioeconomic drought relates the lack of moisture to community functions in the full range of societal functions, including power generation, the local economy, and food source. **Figure 6** shows urban grassed areas affected by drought conditions.

There are four academic approaches to examining droughts; these are meteorological, hydrological, agricultural, and socio-economic. Meteorological drought is based on the degree, or measure, of dryness compared to a normal, or average amount of dryness, and the duration of the dry period. Hydrological drought is associated with the effects of periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply. Agricultural drought is related to agricultural impacts; and focuses on precipitation shortages, differences between actual and potential evapo-transpiration, soil water deficits,

#### Drought: Recent Occurrences

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: <ul style="list-style-type: none"> <li>▪ short-term dryness slowing planting, growth of crops or pastures</li> </ul> Coming out of drought: <ul style="list-style-type: none"> <li>▪ some lingering water deficits</li> <li>▪ pastures or crops not fully recovered</li> </ul>
D1	Moderate Drought	<ul style="list-style-type: none"> <li>▪ Some damage to crops, pastures</li> <li>▪ Streams, reservoirs, or wells low, some water shortages developing or imminent</li> <li>▪ Voluntary water-use restrictions requested</li> </ul>
D2	Severe Drought	<ul style="list-style-type: none"> <li>▪ Crop or pasture losses likely</li> <li>▪ Water shortages common</li> <li>▪ Water restrictions imposed</li> </ul>
D3	Extreme Drought	<ul style="list-style-type: none"> <li>▪ Major crop/pasture losses</li> <li>▪ Widespread water shortages or restrictions</li> </ul>
D4	Exceptional Drought	<ul style="list-style-type: none"> <li>▪ Exceptional and widespread crop/pasture losses</li> <li>▪ Shortages of water in reservoirs, streams, and wells creating water emergencies</li> </ul>

Figure 7 US Drought Monitor Severity Classification

Data gathered from the U.S. Drought Monitor indicated that between January 2016 and December 2021, there were 63 weeks where some portion of Jackson County was considered to be in “Abnormally Dry” or in a D0 drought status. For six weeks in October 2016 to January 2017, portions of Jackson County were categorized as D1 or a “Moderate Drought”. **Figure 7**, from the U.S. Drought Monitor, describes the rationale to classify the severity of droughts.

The National Climate Data Center (NCDC) does not report any events or property or crop losses within Jackson County during this planning period.

The Planning Committee, utilizing the CPRI, determined the overall risk of drought throughout Jackson County is “Elevated”.

The committee agreed that a drought is “Likely” (to occur within the next three years) and the magnitude of drought is anticipated to be “Limited” to “Significant”. The impact of drought was determined to be the same for all communities throughout the county and unincorporated area is anticipated to be impacted more severely due to the possible agricultural impacts and impacts to water wells. Further it is anticipated that with the enhanced weather forecasting abilities, the warning time for a drought is greater than 24 hours and the duration will be greater than one week. A summary is shown in **Table 6**.

**Table 6 CPRI for Drought**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Likely	Significant	> 24 Hours	> 1 Week	Elevated
Town of Brownstown	Likely	Limited	> 24 Hours	> 1 Week	Elevated
Town of Crothersville	Likely	Limited	> 24 Hours	> 1 Week	Elevated
Town of Medora	Likely	Limited	> 24 Hours	> 1 Week	Elevated
City of Seymour	Likely	Limited	> 24 Hours	> 1 Week	Elevated

According to the National Drought Mitigation Center, scientists have difficulty predicting droughts more than one month in advance due to the numerous variables such as precipitation, temperature, soil moisture, topography, and air-sea interactions. Further anomalies may also enter the equation and create more dramatic droughts or lessen the severity of droughts. Based on the previous occurrences of significant droughts and drought related impacts felt within Jackson County, the Committee estimated that the probability of a drought occurring in the area is “Likely”; or occurrence is probable within the next three years.

“Limited” to “Significant” damages are anticipated throughout the county as many municipalities rely on groundwater supplies for fire response efforts and face a higher risk during times of prolonged drought. Throughout the unincorporated areas of the county, increased crop and livestock damages would also be expected during a significant drought.

### **Drought: Assessing Vulnerability**

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

#### **Direct Effects:**

- Urban and developed areas may experience revenue losses from landscaping companies, golf courses, restrictions on industry cooling and processing demands, businesses dependent on crop yields; and increased potential for fires
- Rural areas within the county may experience revenue losses from reductions in livestock and crop yields as well as increased field fires
- Citizens served by drinking water wells may be impacted during low water periods and may require drilling of deeper wells or loss of water service for a period of time

#### **Indirect Effects:**

- Loss of income of employees from businesses and industry affected; loss of revenue to support services (food service, suppliers, etc.)

- Loss of revenue from recreational or tourism sectors associated with reservoirs, streams, and other open water venues
- Lower yields from domestic gardens increasing the demand on purchasing produce and increased domestic water usage for landscaping
- Increased demand on emergency responders and firefighting resources

### *Estimating Potential Losses*



**Figure 8 Crops Affected by Drought**

It is difficult to estimate the potential losses associated with a drought for Jackson County because of the nature and complexity of this hazard and the limited data on past occurrences. However, for the purpose of this MHMP update, a scenario was used to estimate the potential crop loss and associated revenue lost due to a drought similar to that experienced during the drought of record from 1988. In 2020, Jackson County produced approximately 10.3M bushels of corn and 3.6M bushels of soybeans, as reported by the United States Department of Agriculture (USDA) National Agricultural Statistics Service. Using national averages of \$4.45 per bushel of corn and \$11.40 per bushel of soybeans,

the estimated crop receipts for 2020 would be \$93.7M. Using the range of crop yield decreases reported in 1988 and 1989, just after the 1988 drought period (50%-86%) and assuming a typical year, economic losses could range between \$46.8M-\$80.6M; depending on the crop produced and the market demand. Effects of drought on corn crops can be seen in **Figure 8**.

To provide examples of previous drought impacts, Purdue Agriculture News reports that as of March 2013, Indiana producers received more than \$1.0B in crop insurance payments for 2012 corn, soybean, and wheat losses. This amount is nearly double that of the previous record, \$522M following 2008 losses, also due to drought. Also, according to a July 5, 2012 article in The Times (Noblesville, IN), “The effects of drought also could touch agricultural businesses, such as handlers and processors, equipment dealers, and see, fertilizer and pesticide providers”. Further, “...consumers are likely to see an increase in food prices of 2.5 percent to 3.5 percent into 2013”.

Additional losses associated with a prolonged drought are more difficult to quantify. Drought has lasting impacts on urban trees: death to all or portions of a tree, reduction in the tree’s ability to withstand insects and diseases, and interruption of normal growth patterns. Such effects on trees, especially urban trees can lead to additional impacts, both environmentally and monetarily in terms of the spread of Emerald Ash Borer insect and the weakening of tree limbs and trunks which may lead to increased damages during other hazard events such as wind and ice storms.

### *Future Considerations*

Advancements in plant hybrids and development have eased the impacts from short-lived droughts. Seeds and plants may be more tolerant of drier seasons and therefore fewer crop losses may be experienced.

As the municipal areas of the county continue to grow and expand, protocols may need to be developed which create a consistency throughout the communities and the unincorporated portions of the county for burn bans and water usage advisories.

According to the Indiana Climate Change Impacts Assessment, Indiana has experienced a rise in the average annual precipitation between 1895 and 2016; an increase of 5.7 inches for the area of Jackson County. This increase in precipitation may lessen the likelihood or overall impact of a drought in Jackson County. However, the assessment also notes seasonal shifts in precipitation which may lead to seasonal short-term droughts. In either scenario, changes in precipitation are not anticipated to relieve the area of a probability of a drought occurring.

Prior to municipalities expanding, provisions and considerations should be given regarding the potential additional demand for both water usage and fire response efforts. Following such expansion or development plans, alternative water sources should be explored. Since the previous MHMP was prepared, development has occurred on the borders of the incorporated communities within the central and eastern areas of the county. Much of the development has occurred near the City of Seymour along the I-65 corridor on the eastern side of the county. The remaining areas of the county remain largely unincorporated.

### **Drought: Relationship to Other Hazards**

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



### 3.3.2 Earthquake



#### Earthquake: Overview

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

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can move off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths, injuries, and extensive property damage.

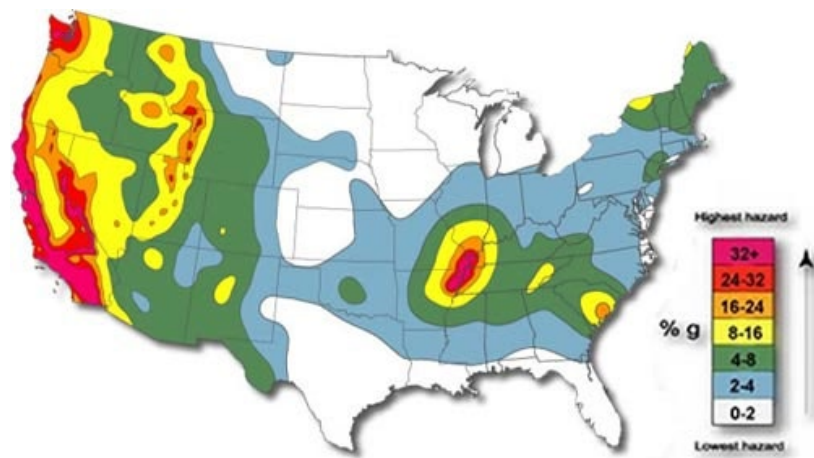


Figure 9 Earthquake Hazard Areas in the US

Earthquakes strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70-75 damaging earthquakes occur throughout the world. Estimates of losses from a future earthquake in the United States approach \$200B.

One method of measuring the magnitude or energy of an earthquake is the Richter Scale. This scale uses whole

numbers and decimal fractions whereby each increase of a whole number represents a release of 31 times more energy than the amount associated with the previous whole number on the scale. Scientists are currently studying the New Madrid fault area and have predicted that the chances of an earthquake in the M8.0 range occurring within the next 50 years are approximately 7%-10%. However, the chances of an earthquake at a M6.0 or greater, are at 90% within the next 50 years.

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

## Earthquake: Recent Occurrences

Indiana, as well as several other Midwestern states, lies in the most seismically active region east of the Rocky Mountains. Regarding Jackson County, the nearest areas of concern are the New Madrid Fault Zone and the Wabash Seismic Zone.

On June 17, 2021 an earthquake centered near Bloomington, Indiana in Parke County was felt as far north as Chicago, Illinois and as far east as Cincinnati, Ohio. With a magnitude of 3.8 several localized reports included descriptions of shaking buildings and feelings of tremors. No injuries or severe damages were reported due to this incident. As reported by the NBC 5 Chicago, “Once the earthquake was confirmed, officials said the 9-1-1 phone line “started ringing immediately.”” Previous to this event, the last earthquake to be felt in Indiana was a magnitude 5.1 centered in Sparta, North Carolina and the last event to actually occur within the state was a magnitude 2.3 earthquake centered in Haubstadt, IN on May 28, 2015. No injuries or damages were reported with either of these events.

An event occurred on December 30, 2010, when central Indiana experienced an earthquake with a magnitude of 3.8. This event was rare for this area in Indiana as it is only the 3rd earthquake of notable size to occur north of Indianapolis. Even rarer is the fact that scientists believe that the quake was centered in Greentown, Indiana approximately 13 miles southeast of Kokomo, Indiana. According to The Kokomo Tribune, “113 people called 911 in a 15-minute period after the quake, which was the first tremor centered in Indiana since 2004”. Further, a geophysicist from the USGS in Colorado stated, “It was considered a minor earthquake”, and “Maybe some things would be knocked off shelves, but as far as some significant damage, you probably wouldn’t expect it from a 3.8”.

A M5.8 centered in Mineral, Virginia affected much of the East Coast on August 23, 2011. According to USA Today, 10 nuclear power plants were shutdown of precautionary inspections following the quake, over 400 flights were delayed, and the Washington Monument was closed indefinitely pending detailed inspections by engineers.



Figure 10 Earthquake Damaged Porch

Based on historical earthquake data, local knowledge of previous earthquakes, results of HAZUS-MH scenarios, and that Jackson County has not been directly impacted by an earthquake, the Committee determined that the probability of an earthquake occurring in Jackson County or any of the communities is “Possible”. Should an earthquake occur, the impacts associated with this hazard are anticipated to be “Limited” to “Negligible” within all areas of the county. As with all earthquakes, it was determined that the residents of Jackson County would have little to no warning time (less than six hours) and that the duration of the event would be expected to also be less than six hours. A summary is shown in **Table 7**.



**Table 7 CPRI for Earthquake**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Possible	Negligible	< 6 Hours	< 6 Hours	Low
Town of Brownstown	Possible	Negligible	< 6 Hours	< 6 Hours	Low
Town of Crothersville	Possible	Limited	< 6 Hours	< 6 Hours	Elevated
Town of Medora	Possible	Negligible	< 6 Hours	< 6 Hours	Low
City of Seymour	Possible	Limited	< 6 Hours	< 6 Hours	Elevated

Per the Ohio Department of Natural Resources Division of Geological Survey, "...it is difficult to predict the maximum-size earthquake that could occur in the state and certainly impossible to predict when such an event would occur. In part, the size of an earthquake is a function of the area of a fault available for rupture. However, because all known earthquake-generating faults in Ohio are concealed beneath several thousand feet of Paleozoic sedimentary rock, it is difficult to directly determine the size of these faults." Further according to the Indiana Geological Survey, "...no one can say with any certainty when or if an earthquake strong enough to cause significant property damage, injury, or loss of life in Indiana will occur...we do indeed face the possibility of experiencing the potentially devastating effects of a major earthquake at some point in the future". The Committee felt that an earthquake occurring within or near to Jackson County is "Possible" to occur within the next five years.



**Figure 11 Minor Earthquake Damages**

### **Earthquake: Assessing Vulnerability**

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

#### **Direct Effects:**

- Urban areas may experience more damages due to the number of structures and critical infrastructure located in these areas
- Rural areas may experience losses associated with agricultural structures such as barns and silos
- Bridges, buried utilities, and other infrastructure may be affected throughout the county and municipalities

#### **Indirect Effects:**

- Provide emergency response personnel to assist in the areas with more damage
- Provide shelter for residents of areas with more damage
- Delays in delivery of goods or services originating from areas more affected by the earthquake

Types of loss caused by an earthquake could be physical, economic, or social in nature. Due to the unpredictability and broad impact regions associated with an earthquake, all critical and non-critical infrastructure are at risk of experiencing earthquake related damages. Damages to structures,

infrastructure, and even business interruptions can be expected following an earthquake. Examples of varying degrees of damages are shown in **Figure 10** and **Figure 11**.

#### *Estimating Potential Losses*

In order to determine the losses associated with an earthquake, the HAZUS-MH software was utilized in the Jackson County MHMP update to determine the potential impacts anticipated from an arbitrary earthquake scenario. This scenario placed a magnitude 5.0 within Jackson County located north of US 50 between Norman Road and Back Creek. This type of modeling is useful for planning efforts such as this.

Per the HAZUS-MH scenario noted above, total economic losses are anticipated to be near \$98.8M with moderate damages to approximately 535 buildings, of which most are anticipated to be single-family residential structures. The HAZUS-MH model computes anticipated economic losses for the hypothetical earthquake due to direct building losses and business interruption losses. Direct building losses are the costs to repair or to replace the damage caused to the building and contents, while the interruption losses are associated with the inability to operate a business due to the damage sustained. Business interruption losses also include the temporary living expenses for those people displaced from their homes.

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

#### *Future Considerations*

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

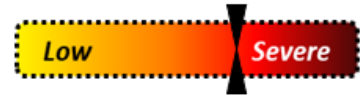
It can be anticipated that while all structures in Jackson County will remain at-risk to earthquake damages and effects, new construction or redevelopment may reduce the overall risks. As redevelopment occurs, the new construction may be significantly sturdier. Further, as blighted or abandoned areas are addressed, those communities and the county as a whole, are less susceptible to economic and physical damages associated with earthquakes.

#### **Earthquake: Relationship to Other Hazards**

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

### 3.3.3 Extreme Temperature

#### Extreme Temperatures: Overview



Extreme heat is defined as a temporary elevation of average daily temperatures that hover 10 degrees or more above the average high temperature for the region for the duration of several weeks. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a dome of high atmospheric pressure traps water-laden air near the ground. In a normal year, approximately 175 Americans die from extreme heat.

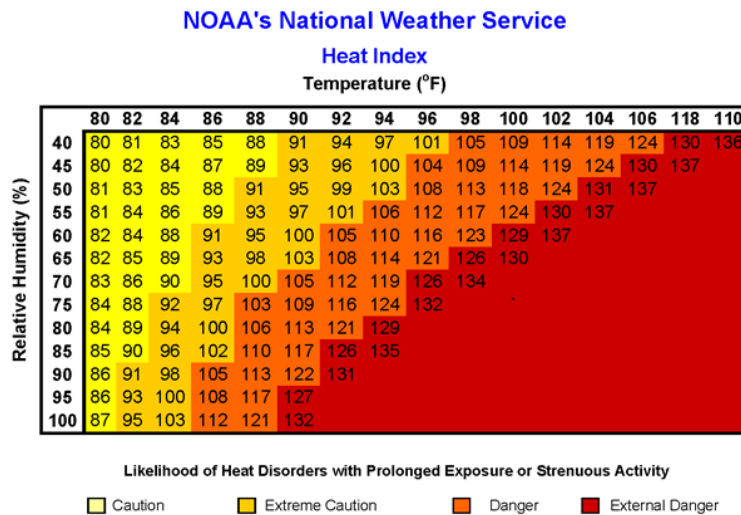


Figure 12 Heat Index Chart

According to the NWS, “The Heat Index or the “Apparent Temperature” is an accurate measure of how hot it really feels when the Relative Humidity is added to the actual air temperature”. To find the Heat Index Temperature, refer to the Heat Index Chart in **Figure 12**. As an example, if the air temperature is 96°F and the relative humidity is 65%, the heat index – how hot it feels – is 121°F. The Weather Service will initiate alert procedures when the Heat Index is expected to exceed 105°-110°F for at least two consecutive days.

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

As Figure 3-9 indicates, there are four cautionary categories associated with varying heat index temperatures.

- Caution: 80°-90°F: Fatigue is possible with prolonged exposure and physical activity
- Extreme Caution: 90°-95°F: Sunstroke, heat cramps, heat exhaustion may occur with prolonged physical activity
- Danger: 105°-130°F: Sunstroke, heat cramps, or heat exhaustion is likely
- Extreme Danger: >130°F: Heatstroke is imminent

Extreme cold is defined as a temporary, yet sustained, period of extremely low temperatures. Extremely low temperatures can occur in winter months when continental surface temperatures are at their lowest point and the North American Jet Stream pulls arctic air down into the continental United States. The jet stream is a current of fast-moving air found in the upper levels of the atmosphere. This rapid current is typically thousands of kilometers long, a few hundred kilometers wide, and only a few kilometers thick. Jet streams are usually found somewhere between 10-15 km (6-9 miles) above the Earth's surface. The position of this upper-level jet stream denotes the location of the strongest surface temperature contrast over the continent. The jet stream winds are strongest during the winter months when continental temperature extremes are greatest. When the jet stream pulls arctic cold air masses

over portions of the United States, temperatures can drop below 0° F for one week or more. Sustained extreme cold poses a physical danger to all individuals in a community and can affect infrastructure function as well.

## Wind chill is a guide to winter danger

### New wind chill chart

Frostbite occurs in 15 minutes or less

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

Figure 13 NWS Wind Chill Chart

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

## Extreme Temperature: Recent Occurrences

The effects of extreme temperatures extend across large regions, typically affecting several counties, or states, during a single event. According to the NCDC, there have been no extreme heat event or extreme cold events between October 2016 and July 2021. Local reports provide information regarding instances within this timeframe where temperatures have dipped below freezing for multiple days. When this happens, local groups mobilize to open the Jackson County Cold Night Out Shelters which provide a warm place where people gather and often receive a meal.

It is difficult to predict the probability that an extreme temperature event will affect Jackson County residents within any given year. However, based on historic knowledge and information provided by the community representatives, an extreme temperature event is “Likely” (possible within the next three years) to occur and if an event did occur, it would result in “Significant” magnitude. **Table 8** identifies the CPRI for extreme temperature events for all communities in Jackson County.

Table 8 CPRI for Extreme Temperatures

	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Jackson County	Possible	Significant	> 24 Hours	>1 Week	Elevated
Town of Brownstown	Possible	Significant	> 24 Hours	>1 Week	Elevated
Town of Crothersville	Possible	Significant	> 24 Hours	>1 Week	Elevated
Town of Medora	Possible	Significant	> 24 Hours	>1 Week	Elevated
City of Seymour	Possible	Significant	> 24 Hours	>1 Week	Elevated

As shown in the table, index values remain identical throughout each community due to the regional extent and diffuse severity of this hazard event. The anticipation of experiencing such damages is due to the amount of livestock and cropland within the county and the potential to realize impacts within the urban areas.

## Extreme Temperatures: Assessing Vulnerability

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

By assessing the demographics of Jackson County, a better understanding of the relative risk that extreme temperatures may pose to certain populations can be gained. In total, 17% of the county's population is over 65 years of age, nearly 7% of the population is below the age of 5, and approximately 10% of the population is considered to be living below the poverty line. People within these demographic categories are more susceptible to social or health related impacts associated with extreme heat.

<b>With Prolonged Exposure and/or Physical Activity</b>	
<b>Extreme Danger</b>	Heat stroke or sunstroke highly likely
<b>Danger</b>	Sunstroke, muscle cramps, and/or heat exhaustion likely
<b>Extreme Caution</b>	Sunstroke, muscle cramps, and/or heat exhaustion possible
<b>Caution</b>	Fatigue possible

**Figure 14 Danger Levels with Prolonged Heat Exposure**

Extreme heat can affect the proper function of organ and brain systems by elevating core body temperatures above normal levels. Elevated core body temperatures, usually in excess of 104°F are often exhibited as heat stroke. For weaker individuals, an overheated core body temperature places additional stress on the body, and without proper hydration, the normal mechanisms for dealing with heat, such as sweating in order to cool down, are ineffective. Examples of danger levels associated with prolonged heat exposure are identified in **Figure 14**.

Extreme cold may result in similar situations as body functions are impacted as the temperature of the body is reduced. Prolonged exposure to cold may result in hypothermia, frostbite, and even death if the body is not warmed.

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

### Direct Effects:

- Direct effects are primarily associated with health risks to the elderly, infants, people with chronic medical disorders, lower income families, outdoor workers, and athletes

### Indirect Effects:

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

### *Estimating Potential Losses*

It is difficult to estimate the potential losses due to extreme temperatures as damages are not typically associated with buildings but instead, with populations and persons.



This hazard is not typically as damaging to structures or critical infrastructure as it is to populations so monetary damages associated with the direct effects of the extreme temperature are not possible to estimate. Indirect effects would cause increased expenses to facilities such as healthcare or emergency services, manufacturing facilities where temperatures are normally elevated may need to alter work hours or experience loss of revenue if forced to limit production during the heat of the day, and energy suppliers may experience demand peaks during the hottest and/or coldest portions of the day.

#### *Future Considerations*

As more and more citizens are experiencing economic difficulties, local power suppliers along with charitable organizations have implemented programs to provide cooling and heating mechanisms to residents in need. Often, these programs are donation driven and the need for such assistance must be demonstrated. As susceptible populations increase, or as local economies are stressed, such programs may become more necessary to protect Jackson County's at-risk populations.

The Climate Change Assessment identifies several temperature related considerations of which communities should be aware and begin planning to avoid further impacts. For example, rising temperatures will increase the number of extreme heat days, thereby increasing the potential for heat related illnesses, potential hospitalizations, and medication costs to vulnerable populations. In addition, added days of extreme heat will impact agriculture, manufacturing, and potentially, water sources.

New construction associated with development of residential areas often brings upgraded and more efficient utilities such as central heating and air units further reducing vulnerabilities to the aging populations in those municipalities mentioned above. Conversely, new development associated with industrial or large commercial structures in the inner-urban centers often result in increased heat over time, which may cause additional stress to labor-related populations. Since the last planning effort, there has been significant residential and commercial development within the county. This actually decreases the overall vulnerability with the newer construction practices and open space requirements within neighborhoods.

#### **Extreme Temperatures: Relationship to Other Hazards**

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

### 3.3.4 Fire

#### Fire: Overview



**Figure 15 Wildfire in Forested Area**

A wildfire, also known as a forest fire, vegetation fire, or a bushfire, is an uncontrolled fire in wildland areas and is often caused by lightning; other common causes are human carelessness and arson. Small wildfires may be contained to areas less than one acre, whereas larger wildfires can extend to areas that cover several hundred or even thousand acres. Generally, ambient weather conditions determine the nature and severity of a wildfire event. Very low moisture and windy conditions can help to exacerbate combustion in forested or brush areas (Figure 15) and turn a small brush fire into

a major regional fire event in a very short period. Wildfires can be very devastating for residents and property owners.

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

Problems associated with structural fires are compounded when high-rise buildings catch fire. High-rise fires hinder the ability of rescue workers to fight the fire, reach impacted building occupants, and evacuate impacted occupants. Rescue efforts also become more complicated when handicapped or disabled persons are involved. Complications associated with high-rise fires typically increase as the height and occupancy levels of the buildings increase. Structural collapse is another concern associated with high-rise fires. Structural collapse often results in persons becoming trapped and severely injured. However, it is important to note that the concern associated with structural collapse, is not limited to high-rise buildings; the collapse of smaller residential buildings can also lead to severe injury and death.

Typically, a fire will incinerate all structures and objects in its path. A resident may lose all possessions and structures to a wildfire event. Additionally, combating a wildfire or a structure fire may be extremely dangerous. If weather conditions change suddenly, the wildfire may change course and overtake firefighters, causing severe injury or death. Fires can travel at speeds greater than 45 mph. Therefore, these hazard events can pose a serious threat to county residents and response agencies.

#### Fire: Recent Occurrences

Within the NCDC, there are no reports of wildfires occurring within Jackson County between January 1950 and July 2021. Within the same time parameter, there were only two reported events within the State of Indiana, both within Pike County and both within 2006. During each of these events over 350 acres were burned.

The NCDC does not report structure fires; therefore, local sources were utilized to provide historical information. According to FOX 59, ten fire departments were on the scene of a January 2019 fire at the Crane Hill Machine and Fabrication located between Seymour and Brownstown. (**Figure 16**). No injuries or fatalities were reported as a result of this event although US 50 was shut down for approximately five hours. Over 40 firefighters responded to the event and over 500,000 gallons of water was used in efforts to contain the blaze.



**Figure 16 Crane Hill Fire (WLKY)**

On October 30, 2020, shortly after 1:00 am, King's Trucking and Excavating in Seymour was engulfed in flames. Response efforts included responders from 11 area departments. No injuries were reported although the equipment stored within the building was destroyed.



**Figure 17 Travel America Fire**

In a similar regard, local outlets reported an event from July 2020 where the Travel America Travel Center near Interstate 65 and US 50 was destroyed. No one was injured in the fire and much of the damage was contained to one area, though the truck stop remained closed for 15 months. **Figure 17** shows firefighters during the event at Travel America.

Due to the expansive acreage of cropland and woods within Jackson County, and the potential for urban areas to be at risk due to abandoned homes, blighted areas, or industrial activities, the

Planning Committee determined the probability to be “Highly Likely” throughout the County. **Table 9** identifies the CPRI rankings for fire in Jackson County.



**Table 9 CPRI for Fire**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Highly Likely	Limited	< 6 Hours	< 1 Day	Severe
Town of Brownstown	Highly Likely	Limited	< 6 Hours	< 1 Day	Severe
Town of Crothersville	Highly Likely	Limited	< 6 Hours	< 1 Day	Severe
Town of Medora	Highly Likely	Limited	< 6 Hours	< 1 Day	Severe
City of Seymour	Highly Likely	Limited	< 6 Hours	< 1 Day	Severe

Information provided in **Table 10** highlights the number of fire runs for two of the Jackson County fire departments for the time period January 2019 through May 10 2022. Carr Township covers the Town of Medora as well as the remainder of the Township. Based on this information, annual damages to structures, contents, and vehicles may be significant for each municipality on an annual basis. Social losses, such as being unable to work following a residential structure fire or losses associated with a business fire should also be considered as an impact.

**Table 10 Jackson County Fire Runs**

	Carr Township	City of Seymour	Total
Fire	158	301	<b>459</b>
Rescue/EMS	634	6,043	<b>6,677</b>
Motor Vehicle Accident	0	93	<b>93</b>
Other	0	785	<b>785</b>
<b>TOTAL</b>	<b>792</b>	<b>7,222</b>	<b>8,014</b>

### Fire: Assessing Vulnerability

A fire typically affects a large regional area with potential for physical, economic, and/or social losses. Typically, a structural fire affects one or two structures, as one of the main functions of fire response is to prevent the fire from spreading to neighboring structures. This type of action works to reduce the magnitude and severity from “Limited” throughout the county and municipalities.

Much of the county is rural and agricultural in land use, which may be more susceptible to brush or crop fires, especially in times of drought. As most development has continued to occur within eastern Jackson County near Seymour since the last planning effort, vulnerabilities to this hazard have not shifted in location. Urbanized areas within Jackson County are susceptible to urban and industrial fires, while much of the remaining Jackson County remains vulnerable to field, crop, and woodland fires. **Figure 18**, from the Jackson County Visitor’s Bureau, identifies areas such as Hoosier National Forest, Muscatatuck National Wildlife Refuge, and Starve Hollow Nature Preserve. These areas are densely wooded and managed in natural ways which may make them more susceptible to fires.



Figure 18 Jackson County Outdoor Areas, *Jackson County Visitor's Bureau*

Direct and indirect effects of a such an event within Jackson County may include:

Direct Effects:

- Loss of structures
- Loss of production crop
- Loss of natural resources

Indirect Effects:

- Loss of revenue as businesses may be closed
- Increased emergency response times based on safety of roads
- Loss of income if dependent on crop production

*Estimating Potential Losses*

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

Monetary damages associated with the direct effects of the fires are difficult to estimate, other than utilizing historic information as provided. Indirect effects would cause increased efforts associated with emergency response services as wildfires are difficult to contain and may accelerate very quickly.

Further, multi-level business or residential structures place increased risks to those who work or live within those structures or nearby structures.

#### *Future Considerations*

As populations increase and communities continue to grow in size, the need to respond to fire will remain an important municipal effort. As new construction or re-development occurs, especially new or existing critical infrastructure, it is important to ensure that these new structures are equipped to deal with the potential risks associated with this hazard. Those may include increased risk for wooden or flammable outer structures and potential lengthy power outages.

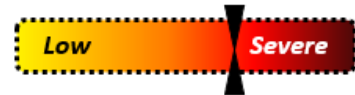
In addition, increased populations require increased housing. Many urban communities develop large multi-family residential structures, or apartment complexes, where structures are not only in close proximity to each other, but also contain a large number of citizens. As communities age, some structures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

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

#### **Fire: Relationship to Other Hazards**

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

### 3.3.5 Flood



#### Flood: Overview

Floods are the most common and widespread of all the natural disasters. Most communities in the United States have experienced some kind of flooding, after spring rains, heavy thunderstorms, or winter snow melts. A flood, as defined by the NFIP, is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from overflow of inland or tidal waters and unusual and rapid accumulation or runoff of surface waters from any sources, or a mudflow. Floods can be slow or fast rising but generally develop over a period of days.

Flooding and associated flood damages is most likely to occur during the spring because of heavy rains combined with melting snow. However, provided the right saturated conditions, intense rainfall of short duration during summer rainstorms are capable of producing damaging flash flood conditions.

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

#### Flood: Recent Occurrences

The NCDC indicates that between October 2016 and December 2021, there were four floods and six flash floods reported. In total, these ten events resulted in a reported \$172.0K in property damages and an additional \$12.0K in crop damages with no reported injuries or deaths.

The narrative report through NCDC regarding the June 2019 flash flood event detailed how areas around Medora and Uniontown were impacted for a combined total of \$120.0K in property damages and \$10.0K in crop damages. Near Medora, one road was completely washed out and the culvert was gone due to high volumes and velocities of water following the storm events. An additional road, CR 150 South, was also washed out near Uniontown resulting in the additional damages.

Two local reports provide additional information regarding flood events not reported through NCDC. February 2019 flooding resulted in nearly ten water rescues as the White River rose to within two feet of the record flood levels experienced in 2008. **Figure 19** shows the flooding in the fields and the airboat used to travel the river and rescue several people. More recently, flooding in March of 2021 a commercial vehicle driver ignored barricades, drove through floodwaters, and soon became stranded. This driver



Figure 19 Flooding in Jackson County Fields

was cited through a newer county ordinance designed to deter drivers from going around barricades indicating areas of high water.

Stream gages are utilized to monitor surface water elevations and/or discharges at key locations and time periods. Some such gages are further equipped with NWS' Advanced Hydrologic Prediction Service (AHPS) capabilities. These gages have the potential to provide valuable information regarding historical high and low water stages, hydrographs representing current and forecasted stages, and a map of the surrounding areas likely to be flooded. Within Jackson County, there is one active USGS stream gages with capabilities of issuing forecasts as needed during flood events, the East Fork White River near Seymour.

Any property having received two insurance claim payments for flood damages totaling at least \$1,000, paid by the NFIP within any 10-year period since 1978 is defined as a repetitive loss property. These properties are important to the NFIP because they account for approximately 1/3 of the country's flood insurance payments. According to FEMA Region V, there are a total of five single-family repetitive loss structures within the unincorporated areas of Jackson County; one single-family repetitive loss structure in Avon; and one additional single-family structure in Plainfield. A total of 14 losses and payments of \$190,489.54 are associated with these properties.

There have been a small number of claims made for damages associated with flooding in Jackson County. Within the unincorporated areas of the county, there have been 46 claims resulting in slightly over \$575.0K in payments. Further, within the Town of Medora, there were 21 payments totaling approximately \$240.0K. **Table 11** identifies the number of claims per community as well as payments made, as provided by IDNR. Information regarding the Town of Crothersville was not provided independently as they do not participate in the NFIP program individually and are included within the information for the unincorporated county.

**Table 11 Repetitive Properties, Claims, and Payments**

Community	# of Repetitive Loss Properties	Claims Since 1978	\$\$ Paid
Jackson County		46	\$577,860
Town of Brownstown		1	\$28,093
Town of Crothersville			
Town of Medora		21	\$240,100
City of Seymour		28	\$203,059
<b>TOTAL</b>		<b>96</b>	<b>\$1,049,112</b>

Mandatory flood insurance purchase requirements apply to structures in 1% annual chance of flooding delineated areas. Total flood insurance premiums for Jackson County and the communities is approximately \$233.0K. Total flood insurance coverage for Jackson County and the communities is nearly \$45.0M. **Table 12** further indicates the premiums and coverage totals for individual communities. Information regarding the Town of Crothersville was not provided independently and are included within the information for the unincorporated county.

**Table 12 Insurance Premiums and Coverage**

Community	Flood Insurance Premiums	Flood Insurance Coverage
Jackson County	\$45,580	\$10,685,600
Town of Brownstown	\$271	\$70,000
Town of Crothersville		
Town of Medora	\$31,505	\$3,710,000
City of Seymour	\$155,960	\$30,533,300
<b>TOTAL</b>	<b>\$233,316</b>	<b>\$44,998,900</b>

As determined by the Committee, the probability of a flood occurring throughout Jackson County ranges from “Unlikely” in Brownstown; “Possible” in Crothersville; “Likely” in Seymour; and “Highly Likely” in the unincorporated county and Medora. This is largely based on the presence or absence of rivers or water systems in or near the communities and issues associated with localized drainage. Impacts from such an event are anticipated to range from “Negligible” to “Significant”. The Committee also determined that the warning time would be 12-24 hours based on forecasting methods, local knowledge of stream activities, and the warning provided by gages upstream. Finally, the duration of such an event is anticipated to last less than one week in most areas and greater than one week within the unincorporated areas. A summary is shown in **Table 13**.

**Table 13 CPRI for Flood**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Highly Likely	Significant	12 - 24 hours	> 1 week	Severe
Town of Brownstown	Unlikely	Negligible	12 - 24 hours	< 1 week	Low
Town of Crothersville	Possible	Negligible	12 - 24 hours	< 1 week	Low
Town of Medora	Highly Likely	Significant	12 - 24 hours	< 1 week	Severe
City of Seymour	Likely	Limited	12 - 24 hours	< 1 week	Elevated

As mentioned within this section, there is a 1% chance each year that the regulatory flood elevation will be equaled or exceeded, and these types of events may occur more than once throughout each year. Further, based on information provided by the NCDC, and previous experiences, the Committee determined that flooding is “Unlikely” to “Highly Likely” throughout the county.

### **Flood: Assessing Vulnerability**

Flood events may affect large portions of Jackson County at one time as river systems and areas with poor drainage cover much of the county and several communities. In addition to riverine flooding or flooding in poorly drained areas, is the consideration of fluvial erosion hazard. This represents the risk associated with natural stream movements and losses associated with buildings and infrastructure. In some cases, this may be represented by a gradual movement of a stream across a farm field. In other, more extreme instances, homes or other infrastructure may actually be lost as steep riverbanks or bluffs sluff into the water below.

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

Direct Effects:



- Structural and content damages and/or loss of revenue for properties affected by increased water
- Increased costs associated with additional response personnel, evacuations, and sheltering needs

#### Indirect Effects:

- Increased response times for emergency personnel if roads are impassable
- Increased costs associated with personnel to carry out evacuations in needed areas
- Increased risk of explosions and other hazards associated with floating propane tanks or other debris
- Losses associated with missed work or school due to closures or recovery activities
- Cancellations of special events in impacted areas or water related activities that become too dangerous due to high water

In the time period since the last planning effort, development has occurred within the municipalities near the eastern side of the county. Other incorporated areas have also grown and what has occurred, has been directed away from various floodplains. This mitigation measure helps to reduce the county-wide flood risk and vulnerability. Structures have prevented from being built in the high-risk areas while growth has been directed to more appropriate areas, less at risk from riverine flooding.

#### *Estimating Potential Losses*

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

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

In the assessment, any structure listed as less than 400 ft<sup>2</sup> in area or classified in the Assessor's database as a non-habitable structure was assumed to be an outbuilding. It was assumed that a building was located on a parcel if the value listed in the "Assessed Value (Improvements)" showed a value greater than zero dollars. Parcels that intersected any portion of the FEMA flood zones were considered to be flood prone, and subsequently, further analyzed separately from parcels without structures. were excluded from the analysis. Structure values were calculated using:

Residential = Assessed Value x 0.5  
 Commercial = Assessed Value x 1.0  
 Industrial = Assessed Value x 1.5  
 Agricultural = Assessed Value x 1.0  
 Education = Assessed Value x 1.0  
 Government = Assessed Value x 1.0  
 Religious = Assessed Value x 1.0

In order to estimate anticipated damages associated with each flood zone in Jackson County and communities, it was estimated that 25% of structures in the flood zones would be destroyed, 35% of structures would be 50% damaged, and 40% of structures would be 25% damaged. **Table 14** identifies

the estimated losses associated with structures in the floodway, the 1% AEP (100-year floodplain), and the 0.2% AEP (500-year floodplain) areas by community within Jackson County.

**Table 14 Manual GIS Analysis Utilizing Best Available Data and Jackson County Building Inventory**

	Floodway		1%		0.02%		Approximate		Totals	
	#	\$	#	\$	#	\$	#	\$	#	\$
Jackson County	63	\$5.3M	203	\$16.6M	22	\$1.6M	417	\$30.3M	705	\$53.8M
Town of Brownstown	0	0	5	\$1.0M	3	\$0.2M	0	0	8	\$1.2M
Town of Crothersville	0	0	0	0	0	0	0	0	0	0
Town of Medora	71	\$7.6M	260	\$24.9M	7	\$0.7M	0	0	338	\$33.2M
City of Seymour	37	\$5.2M	306	\$32.3M	18	\$2.6M	0	0	361	\$40.1M
<b>Totals</b>	<b>171</b>	<b>\$18.1M</b>	<b>744</b>	<b>\$74.8M</b>	<b>50</b>	<b>\$5.1M</b>	<b>417</b>	<b>\$30.3M</b>		

Utilizing the same GIS information and process, critical infrastructure within each of the Special Flood Hazard Areas (SFHA) in Jackson County was assessed and are included in **Table 15**. These buildings are included in the overall number of structures and damage estimate information provided in Table 14.

**Table 15 Critical Infrastructure in SFHA in Jackson County**

Community	Floodway	1% AEP	0.2% AEP
Jackson County	Brownstown Substation Indiana American Water Jackson County Fairgrounds Seymour Water Company Dam	Hamilton Fire Department Cortland Elementary Kova Fertilizer Premier Ag – Cortland Shelby Coop-Brownstown	
Town of Brownstown			
Town of Crothersville			
Town of Medora	Medora Community School Corp Community Park	Medora Town Hall Carr Township Fire Department Medora Water Tower Bundy Brothers & Sons	
City of Seymour		Little Friends Daycare Seymour Airport Rd Substation Valeo Logistics Center Rose Acre Warehouse Kasting Park Covered Bridge Health Campus	

Utilizing the information in Table 14 regarding the number of structures within each flood hazard area, it is also important to note the number of flood insurance policies within each area in Jackson County. **Table 16** provides the comparison between the number of structures in the hazard areas and the number of flood insurance policies. It is also important to note that flood insurance is voluntary unless the property owner carries a federally subsidized mortgage; insurance coverage may be discontinued when the mortgage is completed.



**Table 16 Number of Structures in the Hazard Areas and Number of Flood Insurance Policies**

Community	# Structures in SFHA	# Policies
Jackson County	705	62
Town of Brownstown	8	1
Town of Crothersville	0	
Town of Medora	338	37
City of Seymour	361	119
<b>Total</b>	<b>1,412</b>	<b>219</b>

*Future Considerations*

As the municipalities within Jackson County continue to grow in population, it can be anticipated that the number of critical and non-critical infrastructure will also increase accordingly. Within Jackson County, it is discouraged for new schools, medical facilities, community centers, municipal buildings, and other critical infrastructure to be located within the 0.2% AEP (500-year) floodplain. New structures must also be protected to that level along with a flood-free access to reduce the risk of damages caused by flooding and to ensure that these critical infrastructures will be able to continue functioning during major flood events. Flooding due to poor drainage, low-lying land, or flash flooding is also an important consideration. It will be important for recognition of potential flood impacts to residents and businesses in these areas to be coupled with proper planning for future development and redevelopment of the flood zones. Since the previous planning effort, no development has occurred within the flood zones of Jackson County.

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

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

Despite these efforts, the overall vulnerability and monetary value of damages is expected to increase in the area unless additional measures, such as those discussed later in Chapter 4 of this report, are implemented.



**Figure 20 Fire Engine in Flood Waters**

Indirect effects of flooding may include increased emergency response times due to flooded or redirected streets (**Figure 20**), the danger of dislodged and floating propane tanks causing explosions, and the need for additional personnel to carry out the necessary evacuations. Additional effects may include sheltering needs for those evacuated, and the loss of income or revenue related to business interruptions. As many communities within Jackson County are closely tied to the river systems, special events occurring near

to or on these rivers and waterways may be cancelled or postponed during periods of flooding or high-water levels.

### **Flood: Relationship to Other Hazards**

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

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

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

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

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

### 3.3.6 Hailstorms, Thunderstorms, and Windstorms



#### Hailstorms, Thunderstorms, and Windstorms: Overview

Hail occurs when frozen water droplets form inside a thunderstorm cloud, and then grow into ice formations held aloft by powerful thunderstorm updrafts, and when the weight of the ice formations becomes too heavy, they fall to the ground as hail. Hail size ranges from smaller than a pea to as large as a softball, and can be very destructive to buildings, vehicles (**Figure 20**), and crops. Even small hail can cause significant damage to young and tender plants. Residents should take cover immediately in a hailstorm, and protect pets and livestock, which are particularly vulnerable to hail, and should be under shelter as well.

Thunderstorms are defined as strong storm systems produced by a cumulonimbus cloud, usually accompanied by thunder, lightning, gusty winds, and heavy rains. All thunderstorms are considered dangerous as lightening is one of the by-products of the initial storm. In the United States, on average, 300 people are injured, and 80 people are killed each year by lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms. Other associated dangers of thunderstorms included tornados, strong winds, hail, and flash flooding.

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

#### Hailstorm, Thunderstorm, and Windstorm: Recent Occurrences



**Figure 21 Damaging Hail on Vehicles**

In Jackson County, the NCDC has recorded 12 hailstorms and 10 thunderstorms/windstorms between October 2016 and July 2021. The largest recorded hailstone was 1.75 inch in diameter and occurred on July 20, 2018 near Uniontown. The average diameter hailstone occurring throughout Jackson County is approximately 1.0 inch.

Significant windstorms are characterized by the top wind speeds achieved during the incident, characteristically occur in conjunction with thunderstorms, and have historically occurred year-round with the greatest frequency and damage occurring in May, June, and July. Within Jackson County, NCDC reports 7 instances between October 2016 and July 2021 where top wind speeds were greater than 60 mph.

Total NCDC recorded damages for hailstorms, thunderstorms, and windstorms throughout Jackson County are \$76.0K in property damages, no additional crop damages, and no injuries or deaths associated with these events. Many event reports included in the NCDC did not provide descriptive information on the social, physical, and economic losses resulting from individual storms specific to Jackson County. Even in instances where monetary damages were reported, narrative descriptions of the event rarely extended beyond reports of damages to broken tree limbs, downed power lines, or roof damages.

During the August 10, 2020 event near Ewing, extreme winds impacted central Indiana with wind speeds up to 70 mph. In the region, over 100,000 people were reported without power and outages lasted several days. Within Jackson County, numerous trees and power lines were down resulting in power outages and significant clean ups with a reported \$15.0K in property damages. Appendix 6 provides the NCDC information regarding hailstorms, thunderstorms, and windstorms that have resulted in injuries, deaths, and monetary damages to property and/or crops.

According to the Institute for Business and Home Safety, central Indiana can expect to experience damaging hailstorms three to four times over 20 years; the average life of a residential roof. Further, thunderstorms and windstorms are considered a high frequency hazard and may occur numerous times per year.

The Committee determined the probability of a hailstorm, thunderstorm, or windstorm occurring anywhere throughout Jackson County is “Likely” and will typically affect broad portions of the county at one time resulting in potentially “Limited” damages. As advancements in technologies such as weather radar systems and broadcast alerts are continually made, the warning time for such incidents may increase. Currently, the Committee feels that the warning time is anticipated to be greater than 24 hours (for storms anticipated to result in damages) and the duration is also expected to last less than six hours.

Indicative of a regional hazard, the probability, magnitude, warning time, and duration of a hailstorm, thunderstorm, or windstorm are expected to be similar throughout the county. These events are highly unpredictable, and the occurrences are distributed through the county, sometimes impacting one community more often or more severely than another. Therefore, the CPRI values reflect the distributed risk and associated priority for a hailstorm, thunderstorm, or windstorm. A summary is provided in **Table 17**.

**Table 17 CPRI for Hailstorm, Thunderstorm, and Windstorm**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Likely	Limited	> 24 Hours	< 6 Hours	Elevated
Town of Brownstown	Likely	Limited	> 24 Hours	< 6 Hours	Elevated
Town of Crothersville	Likely	Limited	> 24 Hours	< 6 Hours	Elevated
Town of Medora	Likely	Limited	> 24 Hours	< 6 Hours	Elevated
City of Seymour	Likely	Limited	> 24 Hours	< 6 Hours	Elevated

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

### **Hailstorm, Thunderstorm, and Windstorm: Assessing Vulnerability**

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

#### Direct Effects:

- Damages to infrastructure (power lines)
- Damages to individual properties (homes, cars)

#### Indirect Effects:

- Downed power lines due to falling tree limbs
- Losses associated with power outages
- Damages sustained from blowing debris

#### *Estimating Potential Losses*



**Figure 22 Home Damaged During Windstorm**

Due to the unpredictability of this hazard all critical infrastructure and non-critical structures in Jackson County are at risk of damage including temporary or permanent loss of function. For hailstorms, thunderstorms, and windstorms, it is not possible to isolate specific critical infrastructure or non-critical structures that would be vulnerable to damages. However, areas where utility lines are above ground and areas where dead or dying trees have not been removed may be at a higher risk of property damages or power outages during hailstorms, thunderstorms, and windstorms. Additionally, mobile homes and accessory buildings such as

pole barns and sheds may also be at a higher risk of damages from hailstorms, thunderstorms, and windstorms if not properly anchored to the ground. Damages from falling limbs or uprooted trees such as that shown in **Figure 22**, are common.

#### *Future Considerations*

As the populations of the communities in Jackson County continue to grow, it can be anticipated that the number of critical and non-critical structures will also increase. To reduce the vulnerability for damages resulting from a hailstorm, thunderstorm, or windstorm, measures such as proper anchoring, enforcement of the International Building Codes, and burial of power lines should be completed. While measures can be taken to remove existing structures or prevent future structures from being built in known hazard areas such as floodplains and hazardous materials facility buffers, such measures are not applicable to hailstorms, thunderstorms, and windstorms due to the diffuse nature and regional impacts of this hazard.

Indirect effects resulting from a hailstorm, thunderstorm, or windstorm can include power outages caused by downed tree limbs or flying debris, damages resulting from prolonged power outages, and damages to structures or property as a result of debris.

#### **Hailstorm, Thunderstorm, and Windstorm: Relationship to Other Hazards**

Hailstorms, thunderstorms, and windstorms may be the precursor for other hazards. For example, hazardous materials incidents can be the result of a hailstorm, thunderstorm, or a windstorm. Material



storage containers can become damaged by high winds, debris, or even lightning, and can result in a spill or release of materials. With wind speeds greater than 58 mph, tankers and other transportation vehicles carrying hazardous materials are also at risk while on the road. High winds may also cause gaseous substances to travel farther distances at a much faster rate, increasing the evacuation area necessary to protect residents and visitors of Jackson County.

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

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

### 3.3.7 Landslide/Subsidence



#### Landslide/Subsidence: Overview

The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other contributing factors. For example, erosion by rivers, glaciers, or ocean waves can cause rock to fall. Rock and soil slopes may be weakened through saturation by snowmelt or heavy rains, earthquakes can create stresses that make weak slopes fail, and excess weight from accumulation of rain or snow, stockpiling of rock or ore, from waste piles, or man-made structures that may stress weak slopes to the point of collapse.

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

#### Landslide/Subsidence: Recent Occurrences

The potential for any of landslides or land subsidence within Jackson County was discussed by the Planning Committee. To the knowledge of the Planning Committee, there are no Karst areas or underground mining operations within Jackson County. In addition of this, to date, there has not been any landslides or subsidence events in Jackson County.

The Committee determined the probability of a landslide or subsidence occurring in Jackson County is “Unlikely” resulting in potentially “Negligible” damages. Currently, the Committee feels that the warning time is anticipated to be less than six hours. Similarly, the duration is expected to last less than six hours. These events are highly unpredictable and the risk, although very low according to the Committee, is distributed throughout the county. Therefore, the CPRI values reflect the distributed risk and associated priority for a landslide or subsidence event. A summary is provided in **Table 18**.

**Table 18 CPRI for Landslide/Land Subsidence**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Unlikely	Negligible	< 6 Hours	< 6 Hours	Low
Town of Brownstown	Unlikely	Negligible	< 6 Hours	< 6 Hours	Low
Town of Crothersville	Unlikely	Negligible	< 6 Hours	< 6 Hours	Low
Town of Medora	Unlikely	Negligible	< 6 Hours	< 6 Hours	Low
City of Seymour	Unlikely	Negligible	< 6 Hours	< 6 Hours	Low

## Landslide/Subsidence: Assessing Vulnerability

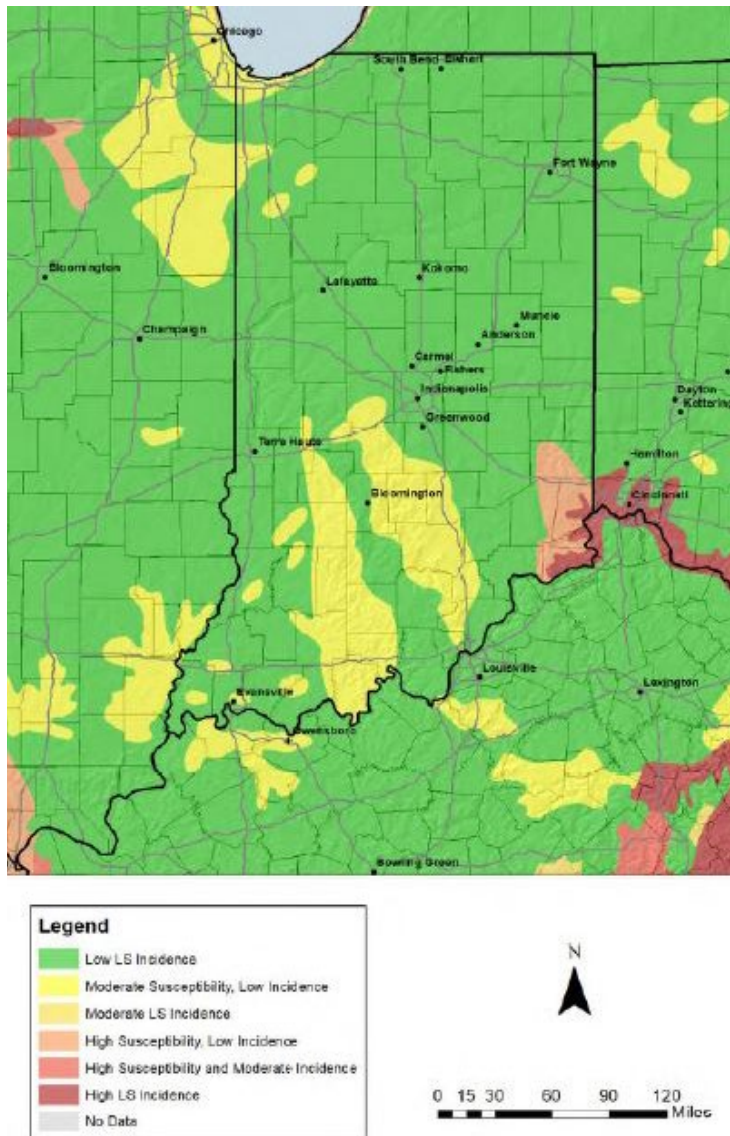


Figure 23 Indiana Landslide Susceptibility

Jackson County, without the presence of Karst geology or underground mines, is at a low risk of land subsidence or sink holes; “Unlikely” according to the Planning Committee with “Negligible” magnitude estimates. Fluvial erosion, or erosion and failures along water courses, were considered within the flood discussion.

The effects of a landslide or subsidence event may be minimal to extensive in nature and may affect small or broad ranges of land area. **Figure 23** identifies the landslide susceptibility throughout Indiana. Areas of low susceptibility are shown in green and areas with a moderate susceptibility, yet low incidence are identified in yellow. With the entirety of Jackson County having moderate susceptibility with a low incidence, it is anticipated that minimal losses will be realized.

Within Jackson County, direct and indirect effects may include:

### Direct Effects:

- Damages to infrastructure (power lines, roads, bridges)
- Damages to individual properties (homes, cars)

### Indirect Effects:

- Increased response time for emergency vehicles
- Losses associated with affected land (crop loss)
- Potential contamination of groundwater resources



### *Estimating Potential Losses*

Due to the unpredictability of this hazard critical infrastructure and non-critical structures in Jackson County are at very low risk of damage including temporary or permanent loss of function. For landslide and subsidence, it is difficult to isolate specific critical infrastructure or non-critical structures that would be more or less vulnerable to damages. As additional data becomes available risks and vulnerabilities will be reevaluated

### *Future Considerations*

As the populations of the communities in Jackson County continue to grow, it can be anticipated that the number of critical and non-critical structures will also increase. In order to reduce the vulnerability for damages resulting from a landslide or land subsidence, soils and mining GIS layers should be integrated into the building permit or approval process.

Indirect effects resulting from a landslide or land subsidence event can include power outages caused by downed tree limbs, increased response times for emergency personnel if transportation routes are damaged, and potentially shut down of businesses.

### **Landslide/Subsidence: Relationship to Other Hazards**

A landslide or a subsidence may be the precursor for other hazards. Depending on the location of the event, material storage containers can become damaged resulting in a spill or release of materials and potentially contaminating groundwater reserves. Dam failures may occur in much the same fashion if located in the potential hazard areas, or resulting from heavy saturation following a rainstorm, heavy snow, or rapid snow melt.

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

### 3.3.8 Tornado

#### Tornado: Overview



Tornadoes are defined as violently rotating columns of air extending from thunderstorms to the ground. Funnel clouds are rotating columns of air not in contact with the ground. However, the funnel cloud may reach the ground very quickly – becoming a tornado. If there is debris lifted and blown around by the “funnel cloud”, then it has reached the ground and is a tornado.

A tornado is generated when conditions in a strong cell are produced that exhibit a wall of cool air that overrides a layer of warm air. The underlying layer of warm air rapidly rises, while the layer of cool air drops – sparking the swirling action. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado season is generally April through June in Indiana, although tornadoes can occur at any time of year. Tornadoes tend to occur in the afternoons and evenings; over 80 percent of all tornadoes strike between 3:00 pm and 9:00 pm but can occur at any time of day or night as shown in **Figure 24** Tornadoes occur most frequently in the United States east of the Rocky Mountains. Tornadoes in Indiana generally come from the south through the east.



**Figure 24 Funnel Cloud During a Lightning Storm at Night**

While most tornadoes (69%) have winds of less than 100 mph, they can be much stronger. Although violent tornadoes (winds greater than 205 mph) account for only 2% of all tornadoes, they cause 70% of all tornado deaths. In 1931, a tornado in Minnesota lifted an 83-ton rail car with 117 passengers and carried it more than 80 feet. In another instance, a tornado in Oklahoma carried a motel sign 30 miles and dropped it in Arkansas. In 1975, a Mississippi tornado carried a home freezer more than a mile.

#### Tornado: Recent Occurrences

The classification of tornadoes utilizes the Enhanced Fujita Scale of tornado intensity and damages, described in **Table 19**. Tornado intensity ranges from low intensity (EF0) tornadoes with effective wind speeds of 65-85 mph to high intensity (EF5+) tornadoes with effective wind speeds of 200+ mph. According to the NCDC, Jackson County has experienced three tornadoes (1-EF1, 2-EF2), between October 2016 and July 2021.

**Table 19 Enhanced Fujita Scale of Tornado Intensity**

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

The NCDC reports approximately \$115.0K in property damages for two events which all occurred on March 1, 2017 and March 14, 2019. Damages sustained during the March 1, 2017 event near Tampico included the removal of a residential roof, an upheaval of a detached garage, and a 25-foot trailer flipped onto the side. Reported damages was \$45.0K with no injuries or deaths as the EF2 traveled along 12 miles between Medora and Crothersville. The 2019 event was reported near Shields and caused extensive damage to numerous trees and agricultural irrigation systems. A pole barn and grain silo were also destroyed resulting in \$70.0K damages.

The Committee estimated the probability of a tornado occurring in Jackson County would be “Likely” and the magnitude and severity of such an event to be “Negligible” to “Significant” throughout much of the county. As with many hazardous events, the Committee anticipated a short warning time of typically less than six hours, and a short duration, also less than six hours. The summary is shown in **Table 20**.

**Table 20 CPRI for Tornado**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Likely	Negligible	< 6 Hours	< 6 Hours	Elevated
Town of Brownstown	Likely	Significant	< 6 Hours	< 6 Hours	Elevated
Town of Crothersville	Likely	Significant	< 6 Hours	< 6 Hours	Elevated
Town of Medora	Likely	Significant	< 6 Hours	< 6 Hours	Elevated
City of Seymour	Likely	Significant	< 6 Hours	< 6 Hours	Elevated

The Indiana State Climate Office estimates that throughout Indiana, there is an average of 20 tornado touchdowns per year. Based on the number of tornado touchdowns previously reported through the NCDC and local weather agencies, the Committee determined the general probability of a future tornado occurring in Jackson County is “Likely” (within the next three years).

### **Tornado: Assessing Vulnerability**

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

Direct Effects:

- Damages to older construction structures, mobile homes, and accessory structures (pole barns, sheds, etc.)
- Damages to above ground utility lines and structures

Indirect Effects:

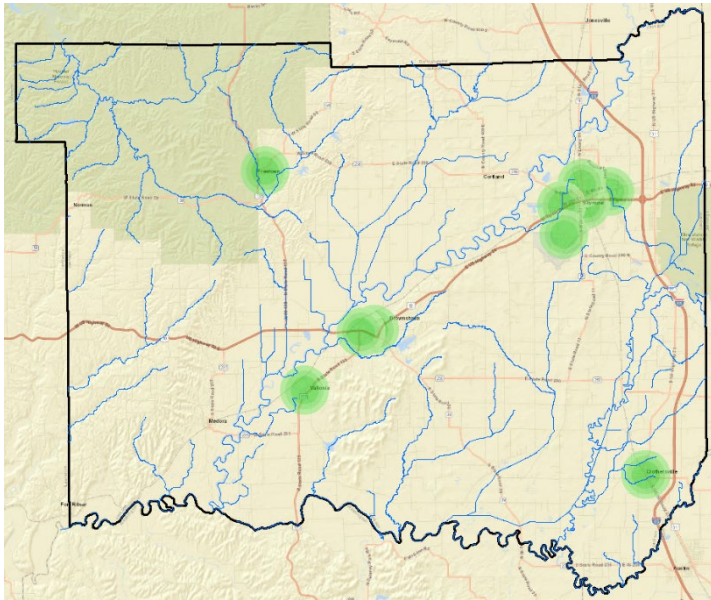
- Expenses related to debris clean-up and/or reconstruction
- Loss of revenue for affected businesses
- Loss of work if employers are affected

*Estimating Potential Losses*

Due to the unpredictability of this hazard, all critical and non-critical structures within the county are at risk of future damage or loss of function. Estimates of potential physical losses were determined through a hypothetical exercise where an EF2 intensity tornado traveled through portions of the county, Brownstown, and Seymour. This is intended to present a “what-if” scenario of a tornado incident and associated damages. Damage estimates were derived by assuming that 25% of all structures in the path of the tornado would be completely destroyed, 35% of the structures would be 50% damaged, and 40% of the structures would sustain 25% damage. These estimations were also determined utilizing three wind speed zones based on distance from the tornado path. Zone A is nearest the center of the tornado path, while Zone C is the farthest from the path and with a theoretically lower wind speed. **Table 21** provides summary data for the hypothetical tornado, which is identified on Exhibit 3.

**Table 21 Summary of Hypothetical Tornado Damages**

	Zone A		Zone B		Zone C		Total	
	#	\$	#	\$	#	\$	#	\$
County	122	\$8.6M	93	\$7.5M	68	\$6.1M	283	\$22.2M
Brownstown	87	\$8.1M	113	\$10.2M	107	\$9.5M	307	\$27.8M
Seymour	424	\$65.0M	378	\$59.2M	353	\$44.0M	1,155	\$168.2M
<b>Totals</b>	<b>633</b>	<b>\$81.7M</b>	<b>584</b>	<b>\$76.9M</b>	<b>528</b>	<b>\$59.6M</b>	<b>1,745</b>	<b>\$218.2M</b>



**Figure 25 Jackson County Outdoor Warning Sirens**

vulnerable in areas left uncovered by outdoor warning sirens. It is impossible to predict the path of a tornado and therefore all current and future development will continue to be at risk for damages. However, risk to the citizens of Jackson County has been lessened through participation in mass notification programs and outdoor warning siren activations.

There may also be indirect effects of a tornado event. For example, post-event clean-up may result in high expenses or inability to work for property owners that have experienced damages from either the tornado directly or by debris from high winds. Affected business owners may experience loss of revenue if they are unable to continue operations following the event. Similarly, if a business is affected and unable to operate, employees may experience a loss of wages during the period of recovery.

### **Tornado: Relationship to Other Hazards**

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

Tornadoes may also result in a dam failure as the increased wind speeds, and debris caused by the tornado, may directly impact the dam, or cause indirect damages through large debris or downed trees. In addition, tornadoes may lead to structural fires as the destruction path is sometimes long and broad, leading to an increased number of potentially damaged homes, exposed power lines, and large amounts of debris.

Within Jackson County, there are numerous events each year that draw thousands of guests. Due to this, it is imperative that the EMA place continued importance on the need to maintain, and as necessary, upgrade their outdoor warning siren coverage. Currently, much of the more populous areas of the county are covered by the audible ranges of the existing outdoor warning sirens. The existing siren locations and their audible coverage areas (green circles) are provided in **Figure 25**.

While it can be anticipated that new construction associated with development may be stronger than older or existing construction, most of Jackson County will remain

### 3.3.9 Winter Storm and Ice

#### Winter Storm & Ice: Overview



A winter storm can range from moderate snow over a few hours to blizzard conditions with high winds, ice storms, freezing rain or sleet, heavy snowfall with blinding wind-driven snow, and extremely cold temperatures that can last for several days. Some winter storms may be large enough to affect several states while others may affect only a single community. All winter storms are accompanied by cold temperatures and blowing snow, which can severely reduce visibility. A winter storm is defined as one that drops four or more inches of snow during a 12-hour period, or six or more inches during a 24-hour span. An ice storm occurs when freezing rain falls from clouds and freezes immediately on impact. All winter storms make driving and walking extremely hazardous. The aftermath of a winter storm can affect a community or region for days, weeks, and even months.



**Figure 26 Ice Covered Power Lines**

Storm effects such as extreme cold, flooding, and snow and ice accumulation (**Figure 26**) can cause hazardous conditions and hidden problems for people in the affected area. People can become stranded on the road or trapped at home, without utilities or other services, including food, water, and fuel supplies. The conditions may overwhelm the capabilities of a local jurisdiction. Winter storms are considered deceptive killers as they may indirectly cause transportation accidents, and injury and death resulting from exhaustion/overexertion, hypothermia and

frostbite from wind chill, and asphyxiation. House fires occur more frequently in the winter due to lack of proper safety precautions.

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

A winter storm watch indicates that severe winter weather may affect your area. A winter storm warning indicates that severe winter weather conditions are on the way. A blizzard warning means that large amounts of falling or blowing snow and sustained winds of at least 35 mph are expected for several hours. Winter storms are common in Jackson County and the surrounding region. Such conditions can result in substantial personal and property damage, even death.

#### Winter Storm & Ice: Recent Occurrences

Since October 2016, the NCDC has recorded two heavy snow events, one ice storm, and one winter storm. NCDC reported only \$10.0K in property damages, and no injuries or deaths associated with any of the events. Narrative descriptions indicated poor travel conditions, power outages and debris associated with similar events.



The most recently recorded winter storm event occurred on February 14, 2021. Snowfalls in the Brownstown area measured nine inches and travel warnings were issued throughout the county. Just one week prior, a heavy snow event impacted the same area dumping nearly six inches of snow. This resulted in school closures throughout the region. An ice storm occurred on November 14, 2018. During this event, an accumulation of 0.25 inches of ice impacted the area causing power outages to over 1,000 people and several street closures due to downed limbs and trees.

The probability, magnitude, warning times, and duration of a snowstorm or ice storm causing disruption to residents and businesses in Jackson County, as determined by the Planning Committee, is expected to be mostly consistent throughout the county and communities. It is “Likely” that this type of hazard will occur in this area and will typically affect the entire county, and possibly several surrounding counties at one time, resulting in primarily “Limited” damages due to the remoteness of some areas and the number of critical facilities in others. The warning time for severe temperatures or several inches of snow associated with a winter storm is usually greater than 24 hours while the duration of the incident is anticipated to be less than one week. A summary is shown in **Table 22**.

**Table 22 CPRI for Winter Storm and Ice**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Likely	Limited	> 24 Hours	< 1 Week	Elevated
Town of Brownstown	Likely	Limited	> 24 Hours	< 1 Week	Elevated
Town of Crothersville	Likely	Limited	> 24 Hours	< 1 Week	Elevated
Town of Medora	Likely	Limited	> 24 Hours	< 1 Week	Elevated
City of Seymour	Likely	Limited	> 24 Hours	< 1 Week	Elevated

The Planning Committee determined that the probability for a snowstorm or ice storm to occur in Jackson County and the communities within is “Likely” or will occur within the next three years. Based on historical data and the experience of the Planning Committee, snowstorms are common within Jackson County and will continue to be a regular occurrence.

### **Winter Storm & Ice: Assessing Vulnerability**

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

#### **Direct Effects:**

- More urban area employers may experience loss of production as employees may not be able to get to work
- Rural (County) roads may impassable
- Expenses related to snow removal or brine/sand applications

#### **Indirect Effects:**

- Loss of revenue as businesses are closed
- Increased emergency response times based on safety of roads
- Loss of income if unable to get to place of employment

### *Estimating Potential Losses*

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



**Figure 27 Travel Impacted During Snowstorm**

For planning purposes, information collected in snowstorms impacting other communities around the nation is also useful in assessing the potential social, physical, and economic impact that a winter storm could have on Jackson County communities. For example, a March 2003 snowstorm in Denver, Colorado dropped approximately 31 inches of snow and caused an estimated \$34M in total damages. In addition, a February 2003 winter storm dropped an estimated 15-20 inches of snow in parts of Ohio. The Federal and Ohio Emergency Management Agencies and U.S. Small Business Administration surveyed damaged areas and issued a preliminary assessment of \$17M in disaster related costs. These costs included snow and debris removal, emergency

loss prevention measures, and public utilities repair. The agencies found over 300 homes and businesses either damaged or destroyed in six counties. Snowstorms and blizzards also make road travel difficult and dangerous, as in **Figure 27**.

The Denver, Colorado area snowstorms from December 2006 through January 2007 surpassed the expenses and damages of the 2003 winter storms. In snow removal costs alone, it is estimated that over \$19M was spent throughout the area, with approximately \$6.4M of that allocated to clearing Denver International Airport. Additional economic expenses are realized when such a large storm closed local businesses and Denver International Airport for nearly 48 hours.

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

### *Future Considerations*

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



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

### Winter Storm & Ice: Relationship to Other Hazards



**Figure 28 Flooding Caused by Snow Melt**

Winter storms and ice storms can lead to flooding as the precipitation melts and enters local receiving waters. This increased volume of water on already saturated, or still frozen ground can quickly result in flood-related damages to structures and properties (**Figure 28**) as well as within the stream or river channel. The increased flooding may then lead to a dam or levee failure within the same area, further exacerbating the damages.

Hazardous materials incidents may be caused by poor road conditions during winter storms or ice storms. Many hazardous materials are transported by rail or by tanker over highways

and interstates. In the more rural areas of Jackson County, or where open areas are more susceptible to snow drifts on roads, the possibility of a traffic related hazardous materials incident may increase.

Power outages and other infrastructure failures may also occur during a winter storm. Weight from snow and ice accumulations can directly or indirectly cause power lines to fail. During extreme cold temperatures, power outages may prove deadly for certain populations such as the elderly or ill.

## TECHNOLOGICAL HAZARDS

### 3.3.10 Cyber-Attack



#### Cyber-Attack: Overview

A cyber-attack is an attempt to gain access to computers, networks, or data systems in an effort to gain control of the information or damage the systems. Attacks may range from a breach of an individual's data and/or identity theft to holding all county records for ransom to more malicious attacks on cyber controlled infrastructure such as water and electric supplies. Three reasons are suggested for engaging in a cyber-attack. Personal: such as disgruntled or former employees seeking revenge or retribution against a company; Criminal: seeking monetary gain through a theft of information or data; and Political: seeking attention for a certain cause.

Interconnectedness of systems is an important feature of today's world. Individuals and companies can access and share records nearly instantly and operational changes can be made within critical infrastructure systems to increase efficiency, change production, and avoid dangerous situations. All of this, however, also places these cyber systems, businesses, and individuals at a great risk. In October 2021, the Indiana Cybersecurity Council put forth the Indiana Cybersecurity Strategic Plan, the result of more than 250 members and 15 working committees. The overall plan contains 68 deliverables and 134 objectives related to increasing the security of Indiana's cyber infrastructure.

#### Cyber-Attack: Recent Occurrences

While many unsuccessful attacks may occur each day and go unnoticed, an October 2021 article in the Hospital Review noted there were a record number of attempts on Indiana hospitals since August 2021. Within the same time period, Eskenazi Health in Indianapolis experienced a network shutdown forcing hospital officials to divert their emergency department and, in the end, patient and employee data was stolen. In addition, Schneck Medical Center in Seymour experienced an IT outage for 10 days in September 2021 following an attack and Johnson Memorial Hospital in Franklin fell victim to ransomware and computer systems were taken offline.

Vigo County fell victim to cyber-attacks twice within a two-week period in 2019. The first attack affected the county's email and computer systems in many government-based offices, including those within the courthouse. Many systems were affected for two days while IT departments worked to restore data and function to those offices. The second attack focused on the county's Sheriff's Department and slowed functions of the jail processing, recordkeeping, and the computer aided dispatching used throughout the county.

In November 2016, Madison County's computer servers were attacked through ransomware (computer software designed to hold computer operations hostage until a ransom is paid). The county's voting records, and 911 systems were not affected as they were operating on separate servers, but most others were affected and essentially unusable. Following the incident, the County Commissioners agreed to pay the \$21K ransom to unlock the county's 600 computers and 75 servers back online. An additional \$200K was paid to contractors to then strengthen the IT systems within the county to help prevent a similar attack in the future.

Based on the information provided to them and their local knowledge, experience, and expertise, the Committee determined the probability of a cyber-attack is "Likely" throughout all areas of the county. The magnitude of such an attack is anticipated to be "Critical" regardless of the location and the warning time is anticipated to be less than six hours. The duration of such an incident is anticipated to last greater than one week.

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Likely	Critical	< 6 Hours	> 1 Week	Severe
Town of Brownstown	Likely	Critical	< 6 Hours	> 1 Week	Severe
Town of Crothersville	Likely	Critical	< 6 Hours	> 1 Week	Severe
Town of Medora	Likely	Critical	< 6 Hours	> 1 Week	Severe
City of Seymour	Likely	Critical	< 6 Hours	> 1 Week	Severe

## Cyber-Attack: Assessing Vulnerability

The actual magnitude and extent of damages due to a cyber-attack depend on several factors such as the type of breach, the systems affected, and the length of disruption. In addition, vulnerability may increase or decrease dependent upon which systems are impacted by the attack. For example, municipal offices such as planning and building may be impacted to a lesser overall extent than 911 or a water treatment facility.

Within Jackson County, direct and indirect effects from a cyber-attack may include:

Direct Effects:

- Loss of services coordinated or provided by computer-based systems
- Loss of access to data or records stored on servers
- Increased costs to strengthen computer-based systems

Indirect Effects:

- Loss of reputation and trust
- Increased risk to individuals such as employees or customers of affected servers and systems
- Increased costs associated with recovery measures

### *Estimating Potential Losses*

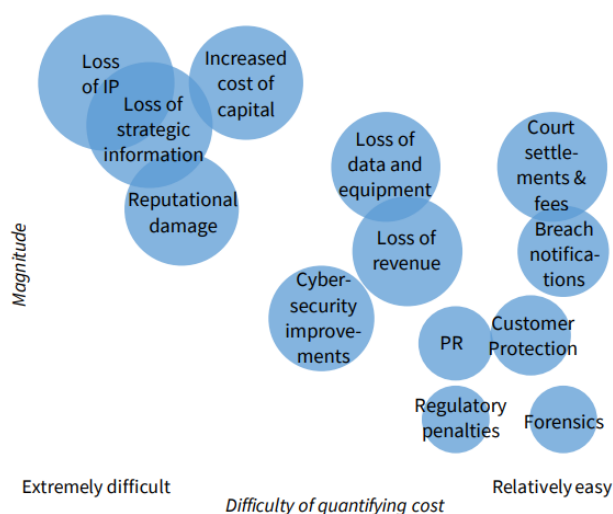


Figure 29 Cost Components of Cyber Attack, *FEMA*

Given the nature and complexity of a cyber-attack, it is difficult to limit potential losses to property and infrastructure as this type of hazard also affects personal information and may impact entire servers, companies, or providers at one time. As a result, all critical and non-critical structures and infrastructure are at risk from cyber-attacks. **Figure 29** helps to identify the magnitude of costs and the difficulty of quantifying the costs associated with cyber-attacks.

Risks to cyber-attacks are anticipated to continue to grow exponentially and impact all levels of device from

an individual computer to an international company's server. In 2018, approximately 12 billion data records were stolen through cyber-attacks. This number is expected to nearly triple to 33 billion by 2023. Between 2017 and 2018 the number of identity theft reports increased from 15 million to 60 million.

In 2020, an article published in *Cybercrime* magazine reported one cyber security company expected "global cybercrime costs to grow by 15 percent per year over the next five years, reaching \$10.5 trillion USD annually by 2025, up from \$3 trillion USD in 2015". Damages associated with cyber-attacks and cyber crime include theft of money, intellectual property, personal data; investigation costs, restoration of systems and data, and damages to personal or business related reputation.

More local considerations are presented in a September 2021 article in *Inside Indiana Business*, "Cybersecurity for Indiana's Cities and Towns". It is presented that the average ransom demanded was nearly \$840K and the cost of the average cyber breach ranges between \$665K to \$40.5M.

#### *Future Considerations*

Following the movement of nearly half the US labor force to a work-from-home status during the COVID-19 pandemic and potentially a hybrid working situation into 2022, it is expected that cyber security risks will continue to rise. The same article in *Cybercrime* magazine outlined that "roughly one million more people join the internet every day. We expect there will be 6 billion people connected to the internet interacting with data in 2022, up from 5 billion in 2020 – and more than 7.5 billion internet users in 2030".

With the number of users skyrocketing, so too will the interconnected devices, applications, networks, and services, all leading to an increase in vulnerabilities throughout municipal and private operations. As employees and devices are added to systems and networks, security assessments should be completed, and appropriate security measures should be budgeted and implemented to provide additional protection.

#### **Cyber-Attack: Relationship to Other Hazards**

Cyber-attacks are not anticipated to cause hazards considered to be natural such as blizzards or tornadoes and conversely, natural hazards are not expected to directly lead to a cyber-attack. However, vulnerabilities to cyber systems may exist following any natural hazard studied through this planning effort. For example, as infrastructure is impacted by natural hazards, chaos may ensue and municipal staff may not be as vigilant as under normal circumstances. Likewise, damaged infrastructure may include some of the safety measures installed to protect the cyber infrastructure within the county, making it easier for a cyber-attack to be successful.

### 3.3.11 Dam Failure

#### Dam Failure: Overview



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

A dam impounds water in the upstream area, referred to as the reservoir. The amount of water impounded is measured in acre-feet. An acre-foot is the volume of water that covers an acre of land to a depth of one foot. As a function of upstream topography, even a very small dam may impound or detain many acre-feet of water. Two factors influence the potential severity of a full or partial dam failure: the amount of water impounded, and the density, type, and value of development and infrastructure located downstream.

Of the approximately 80,000 dams identified nationwide in the National Inventory of Dams, the majority are privately owned. Each dam is assigned a downstream hazard classification based on the potential loss of life and damage to property should the dam fail. The three classifications are high, significant, and low. With changing demographics and land development in downstream areas, hazard classifications are updated continually. The following definitions of hazard classification currently apply to dams in Indiana:

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

A levee is a flood control structure designed to hold water away from a building. Levees protect buildings from flooding as well as from the force of water, from scour at the foundation, and from impacts of floating debris. The principle causes of levee failure are like those associated with dam failure and include overtopping, surface erosion, internal erosion, and slides within the levee embankment or the foundation walls. Levees are designed to protect against a particular flood level and may be overtopped in a more severe event. When a levee system fails or is overtopped, the result can be catastrophic and often more damaging than if the levee were not there, due to increased elevation differences and water velocity. The water flowing through the breach continues to erode the levee and increase the size of the breach until it is repaired or water levels on the two sides of the levee have equalized.

#### Dam Failure: Recent Occurrences

Within Jackson County, there are seven DNR-regulated High Hazard dams. There are five Significant Hazard dams, and 14 Low Hazard dams, shown on Exhibit 2. According to local information, there have been no dam failures within Jackson County.

According to the National Levee Database (NLD) managed by the USACE, there are no levee systems within Jackson County. Therefore, levees will not be considered as a hazard within this planning effort.

Based on the information provided to them and their local knowledge, experience, and expertise, the Committee determined the probability of a dam failure is “Unlikely” in those areas where a dam exists or in area anticipated to be directly impacted by a dam breach (the unincorporated areas). In areas of the county without a dam, or those not anticipated to be affected by a breach, the probability, according to the Planning Committee, was also determined to be “Unlikely”. With similar regard, the magnitude ranges from “Limited” (areas within the potential inundation area) to “Negligible” (areas not anticipated to be within the inundation area) damages. For a dam failure that occurs on a sunny day, the warning time is anticipated to be less than six hours; and the duration is anticipated to last less than six hours. **Table 23** provides a summary of the Planning Committee’s expectations during a dam failure.

**Table 23 CPRI for Dam Failure**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Unlikely	Limited	< 6 Hours	< 6 Hours	Low
Town of Brownstown	Unlikely	Negligible	> 24 Hours	< 6 Hours	Low
Town of Crothersville	Unlikely	Negligible	> 24 Hours	< 6 Hours	Low
Town of Medora	Unlikely	Negligible	> 24 Hours	< 6 Hours	Low
City of Seymour	Unlikely	Negligible	> 24 Hours	< 6 Hours	Low

### **Dam Failure: Assessing Vulnerability**

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

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

#### **Direct Effects:**

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

#### **Indirect Effects:**

- Loss of land in the immediate scour area
- Increased response times due to damaged or re-routed transportation routes and/or bridges

### *Estimating Potential Losses*

As of July 1, 2022, it is required that all High Hazard dams have Incident and Emergency Action Plans (IEAP) developed. These plans have detailed potential dam failure inundation areas identified along with at-risk structures identified. Five of the High Hazard dams within Jackson County have an IEAP developed: the Bishop Lake Dam, Camp Pyoca Dam, Knob Lake Dam, Lake and Forest Club Dam, and Starve Hollow Dam. Potential dam failure inundation areas were developed for these High Hazard dams through the IEAP effort to provide an example of at-risk areas and anticipated damages. The actual magnitude and extent of damages depend on the type of dam break, the volume of water



that is released, and the width of the floodplain valley to accommodate the dam break flood wave. The owners of the remaining two High Hazard Dams (Hillview Lake Dam and Timber Lake Dam) will be strongly encouraged to develop an IEAP with potential inundation mapping to better define the at-risk areas and populations.

These potential inundation areas were overlaid onto recent aerial photography to estimate the number of critical and non-critical structures potentially affected by a sunny-day dam failure. As with previous hazards, damage estimates were derived by assuming 25% of all structures would be completely destroyed, 35% would be 50% damaged, and the remaining 40% of structures would have only 25% in damages. **Table 24** provides overview information of each of the individual dam failures.

**Table 24 Jackson County Potential Dam Failure Impacts**

High Hazard Dam	Potential Damages	
	# Structures	\$ Damages
Bishop Lake Dam	5	\$0.4M
Camp Pyoca Dam	36	\$3.4M
Knob Lake Dam	0	0
Lake and Forest Dam	15	\$1.4M
Starve Hollow Dam	3	\$0.5M

Utilizing the same GIS process, **Table 25** identifies the critical infrastructure within each of the potential dam failure inundation areas in Jackson County. These buildings are included in the overall number of structures and damage estimates provided in Table 24.

**Table 25 Critical Infrastructure Impacted by Dam Failure**

High Hazard Dam	Critical Infrastructure
Bishop Lake Dam	<i>None</i>
Camp Pyoca Dam	World, Inc., Brownstown Substation
Knob Lake Dam	<i>None</i>
Lake and Forest Dam	Brownstown Substation, Jackson County Fairgrounds
Starve Hollow Dam	<i>None</i>

### *Future Considerations*

As areas near existing dams continue to grow in population, it can be anticipated that the number of critical and non-critical structures could also increase accordingly. Location of these new facilities should be carefully considered, and precautions should be taken to ensure that schools, medical facilities, municipal buildings, and other critical infrastructure are located outside of the delineated or estimated dam failure inundation areas. Also, flood-free access should be provided for these facilities. Large areas of new development have not yet occurred downstream of the high hazard dams in Jackson County. Until such development or re-development downstream of a dam is prohibited, those areas remain vulnerable to losses and damages associated with a failure of that structure.

It is also very important to all downstream communities and property owners that dam IEAPs are developed, kept up-to-date, and routinely exercised to ensure the greatest safety to those within the hazard area. This is a good suggestion even for Significant Hazard dams as well.

### **Dam Failure: Relationship to Other Hazards**

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



### 3.3.12 Hazardous Materials Incident

#### Hazardous Materials Incident: Overview



Hazardous materials are substances that pose a potential threat to life, health, property, and the environment if they are released. Examples of hazardous materials include corrosives, explosives, flammable materials, radioactive materials, poisons, oxidizers, and dangerous gases. Despite precautions taken to ensure careful handling during manufacture, transport, storage, use, and disposal, accidental releases are bound to occur. These releases create a serious hazard for workers, neighbors, and emergency response personnel. Emergency response may require fire, safety/law enforcement, search and rescue, and hazardous materials response units.



**Figure 30 Drums of Potentially Hazardous Waste**

As materials are mobilized for treatment, disposal, or transport to another facility, all infrastructure, facilities, and residences near the transportation routes are at an elevated risk of being affected by a hazardous materials release. Often these releases can cause serious harm to Jackson County and its residents if proper and immediate actions are not taken. Most releases are the result of human error or improper storage (**Figure 30**), and corrective actions to stabilize these incidents may not always be feasible or practical in nature.

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

#### Hazardous Materials Incident: Recent Occurrences

During conversations with Committee members and through information provided by local news outlets, it was noted that numerous small and moderately sized incidents involving manufacturing facilities and transportation routes have occurred since the development of the original MHMP. However, the number of facilities utilizing, storing, and/or manufacturing chemicals and the number of high-volume transportation routes increase the likelihood of an incident.

According to the Committee, the probability of a hazardous materials release or incident is “Possible” within many areas of the county due to the number of facilities and transportation routes within and through these municipalities. Representatives from Medora determined the probability of an incident within this community is “Unlikely” due to the fewer number of facilities and transportation routes within and near the town’s borders. “Negligible” damages are anticipated to result from an incident dependent upon the location of the event. As with hazards of this nature, a short warning time of less than six hours and a duration of less than one day to less than six hours is anticipated in the event of a hazardous materials incident. A summary is shown in **Table 26**.

**Table 26 CPRI For Hazardous Materials Incident**

	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI
Jackson County	Possible	Negligible	< 6 Hours	< 1 Day	Low
Town of Brownstown	Possible	Negligible	< 6 Hours	< 1 Day	Low
Town of Crothersville	Possible	Negligible	< 6 Hours	< 1 Day	Low
Town of Medora	Unlikely	Negligible	< 6 Hours	< 6 Hours	Low
City of Seymour	Possible	Negligible	< 6 Hours	< 1 Day	Low

Relatively small hazardous materials incidents have occurred throughout Jackson County in the past and may, according to the Committee, occur again. As the number of hazardous materials producers, users, and transporters increase within or surrounding Jackson County, it can be anticipated that the likelihood of a future incident will also increase.

### **Hazardous Materials Incident: Assessing Vulnerability**

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

#### **Direct Effects:**

- More densely populated areas with a larger number of structures, railroad crossings, and heavily traveled routes are more vulnerable
- Expense of reconstruction of affected structures

#### **Indirect Effects:**

- Loss of revenue or production while recovery and/or reconstruction occurs
- Anxiety or stress related to event
- Potential evacuation of neighboring structures or facilities



**Figure 31 Fuel Tanker Fire**

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

within their communities.

One local result of SARA Title III is the formation of the Local Emergency Planning Commission (LEPC). This commission has the responsibility for preparing and implementing emergency response

plans, cataloging Material Safety Data Sheets (MSDS), creating chemical inventories of local industries and businesses, and reporting materials necessary for compliance.

In Jackson County, nearly 70 facilities are subject to SARA Title III provisions due to the presence of listed hazardous materials in quantities at or above the minimum threshold established by the Act. These facilities are also required to create and distribute emergency plans and facility maps to local emergency responders such as the LEPC, fire departments, and police departments. With this knowledge on hand, emergency responders and other local government officials can be better prepared to plan for an emergency and the response it would require, and to better prevent serious effects to the community involved.

#### *Estimating Potential Losses*

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

#### *Future Considerations*

Additional facilities, both critical and non-critical in nature may be affected if a hazardous materials release were to occur along a transportation route. Several routes including railways, Interstate 65; US Highway 31, 50; State Routes 11, 39, 58, 135, 235, 250, and 258 are traveled by carriers of hazardous materials.

By restricting development within the known hazardous materials facility buffer zones, future losses associated with a hazardous materials release can be reduced. Critical infrastructure should be especially discouraged from being located within these areas. Further, by restricting construction in these zones, the number of potentially impacted residents may also be greatly reduced, lowering the risk for social losses, injuries, and potential deaths. Future construction of hazardous materials facilities should be located away from critical infrastructure such as schools, medical facilities, municipal buildings, and daycares. Such construction would likely reduce the risk to highly populated buildings and populations with special needs or considerations such as children, elderly, and medically unfit.

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

#### **Hazardous Materials Incident: Relationship to Other Hazards**

Dependent on the nature of the release, conditions may exist where an ignition source such as a fire or spark ignites a flammable or explosive substance. As the fire spreads throughout the facility or the area, structural and/or property damages will increase. Response times to a hazardous materials incident may be prolonged until all necessary information is collected detailing the type and amount of chemicals potentially involved in the incident. While this may increase structural losses, it may decrease the social losses such as injuries or even deaths.













### 3.4 HAZARD SUMMARY

For the development of this MHMP, the Committee utilized the CPRI method to prioritize the hazards they felt affected Jackson County. Hazards were assigned values based on the probability or likelihood of occurrence, the magnitude or severity of the incident, as well as warning time and duration of the incident itself. A weighted CPRI was calculated based on the percent of the county's population present in the individual communities.

**Table 27** summarizes the CPRI values for the various hazards studied within this MHMP. Hazards ranked as:



- “**Low**” included Dam Failure; Hazardous Materials Incident; Land Subsidence.
- “**Elevated**” included Drought; Earthquake; Extreme Temperature; Flood; Hail, Thunder, and Windstorm; Tornado; Winter Storm and Ice.
- “**Severe**” included Cyber-Attack; Fire

Table 27 Combined CPRI

Type of Hazard	List of Hazards	Weighted Average CPRI
Natural	Drought	
	Earthquake	
	Extreme Temperature	
	Fire	
	Flood	
	Hail/Thunder/Windstorm	
	Landslide/Subsidence	
	Tornado	
	Winter Storm/Ice	
Technological	Cyber Attack	
	Dam Failure	
	Hazardous Materials Incident	

It can be important to understand the cause-and-effect relationship between the hazards selected by the Committee. **Table 28** can be utilized to identify those relationships. For example, a winter storm (along the side of the table) can result in a flood (along the top of the table). In a similar fashion, a hazardous materials incident (along the top of the table) can be caused by an earthquake; flood; tornado; or a winter storm or ice storm (along the side of the table)

**Table 28 Hazard Relationship Table**

<div> <div>EFFECT</div> <div>  </div> </div> <div> <div>CAUSE</div> <div>  </div> </div>	Drought	Earthquake	Extreme Temperature	Fire	Flood	Hailstorm/ Thunderstorm/ Windstorm	Landslide / Subsidence	Tornado	Winter Storm / Ice	Cyber Attack	Dam Failure	Hazardous Materials
Drought												
Earthquake				X			X				X	X
Extreme Temperature												X
Fire												X
Flood							X				X	X
Hailstorm/ Thunderstorm / Windstorm				X	X		X				X	X
Landslide / Subsidence												X
Tornado				X							X	X
Winter Storm/ Ice					X						X	X
Cyber Attack				X								X
Dam Failure					X		X					X
Hazardous Materials				X								

As a method of better identifying the potential relationships between hazards, the community exhibits can be referenced to indicate the proximity of one or more known hazard areas such as the delineated floodplains and the locations of EHS facilities. For this reason, many of the communities in Jackson County may be impacted by more than one hazard at a time, depending on certain conditions. It can be anticipated that if a flood were to occur within these areas, there would be a potentially increased risk of a facility experiencing a hazardous materials incident. These areas may also be at a greater risk of a dam failure.

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

## CHAPTER 4: MITIGATION GOALS AND PRACTICES

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

### 4.1 MITIGATION GOAL

#### **REQUIREMENT §201.6(c)(3)(i):**

[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The Committee reviewed the mitigation goals as outlined within the 2015 Jackson County MHMP and determined that each of these remain valid and effective. In summary, the overall goal of the Jackson County MHMP is to reduce the social, physical, and economic losses associated with hazard incidents through emergency services, natural resource protection, prevention, property protection, public information, and structural control mitigation practices.

### 4.2 MITIGATION PRACTICES

#### **REQUIREMENT §201.6(c)(3)(ii):**

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

#### **REQUIREMENT §201.6(c)(3)(iii):**

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

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

A more recent (2017) study by the National Institute of Building Sciences, reviewed over 20 years of federally funded mitigation grants, not only from FEMA but also from the US Economic Development Administration (EDA) and the US Department of Housing and Urban Development (HUD). From this broadened review, it has been determined that for every \$1 spent on mitigation, \$6 are saved on disaster costs. In addition, by designing and construction buildings which exceed select items in the 2015 International Code, \$4 can be saved for every \$1 invested in those changes.



Six primary mitigation practices defined by FEMA are:

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

#### 4.2.1 Existing Mitigation Practices

As part of this planning effort, the Committee discussed the strengths and weaknesses of existing mitigation practices and made recommendations for improvements, as well as suggested new practices. The following is a summary of existing hazard mitigation practices within Jackson County. Mitigation measures that were included in the 2015 Jackson County MHMP are noted as such.

##### Emergency Services

- The County has developed a centralized system for testing the existing outdoor warning sirens.
- Stream gage is utilized for flood forecasting and flood warnings for various stream levels along the East Fork White River.
- Many communities have developed snow removal routes to keep primary streets clean during and after snowstorms.
- IEAPs have been developed, and are routinely reviewed, for the Bishop Lake, Camp Pyoca, Starve Hollow, Knob Lake, and Lake and Forest Club dams
- Training and table-top exercises are conducted by the LEPC and include response agencies such as police, fire, and local hospitals.
- Many response agencies have mobile data terminals and necessary software utilized by the vehicle fleet and dispatchers.

##### Natural Resource Protection

- Brownstown, Crothersville, Jackson County, Medora, and Seymour are in good standing with the NFIP Program and have flood protection ordinances which meets or exceeds the minimum requirements.
- Current facility maps and response plans are on file for all Tier II HazMat facilities

##### Prevention

- Jackson County utilizes GIS data collection and maintenance which may be used independently and collectively in land use planning decisions and can be utilized in HAZUS-MH “what-if” scenarios.
- The Jackson County LEPC provides routine training regarding the proper storage, transport, and disposal of hazardous materials.
- Information related to natural hazards has been incorporated into the Comprehensive Land Use Plan and other plans to better guide future growth and development

- Jackson County (Brownstown and Crothersville) Comprehensive Plan, 2006:
  - i. Environmental Goal to manage flood impacts through requiring new roads to be built above flood level; seeking help to elevate critical roads that flood; and to educate the public about flood emergency procedures

#### Property Protection

- Recommendations from completed flood protections studies are implemented as funding becomes available
- Drainage system maintenance, including repair and replacement of broken tiles and culverts occurs routinely throughout the county.

#### Public Information

- Outreach materials and hazard preparedness materials are routinely provided within offices and agencies throughout Jackson County, large public events, speaking opportunities within schools, etc. *(2015 Measure)*
- Social media outlets are used to disseminate hazard preparedness, warning, and recovery information as well as track damages and impacts *(2015 Measure)*
- The County utilizes a mass notification system during times of impending severe weather.
- The County EMA has agreements with some private businesses along Highway 50 to provide messages on permanent message boards.

#### Structural Control

- Stormwater conveyances and regulated drains are maintained on a routine basis to prevent localized flooding, increased erosion, and material deposition as a result of rainfall or snowmelt.
- Jackson County completed a cost-benefit study and then hired a full-time building inspector *(2015 Measure)*
- Jackson County adopted an ordinance requiring mobile homes to be properly tied down and inspected *(2015 Measure)*
- Inertial shut-off valves are required in new construction with gas lines *(2015 Measure)*

### 4.2.2 Proposed Mitigation Practices

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

- **Social** – mitigation projects will have community acceptance, they are compatible with present and future community values, and do not adversely affect one segment of the population.
- **Technical** – mitigation projects will be technically feasible, reduce losses in the long-term, and will not create more problems than they solve.
- **Administrative** – mitigation projects may require additional staff time, alternative sources of funding, and have some maintenance requirements.
- **Political** – mitigation projects will have political and public support.
- **Legal** – mitigation projects will be implemented through the laws, ordinances, and resolutions that are in place.

- **Economic** – mitigation projects can be funded in current or upcoming budget cycles.
- **Environmental** – mitigation projects may have negative consequences on environmental assets such as wetlands, threatened or endangered species, or other protected natural resources.

**Table 29** lists a summary of all proposed mitigation practices identified for all hazards, as well as information on the local status, local priority, benefit-cost ratio, project location, responsible entities, and potential funding sources, associated with each proposed practice. The proposed mitigation practices are listed in order of importance to Jackson County for implementation. Projects identified by the Committee to be of “high” local priority may be implemented within five years from final Plan adoption. Projects identified to be of “moderate” local priority may be implemented within 5-10 years from final Plan adoption, and projects identified by the Committee to be of “low” local priority may be implemented within 10+ years from final Plan adoptions. However, depending on availability of funding, some proposed mitigation projects may take longer to implement.

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

The update of this MHMP is a necessary step of a multi-step process to implement programs, policies, and projects to mitigate the effect of hazards in Jackson County. The intent of this planning effort was to identify the hazards and the extent to which they affect Jackson County and to determine what type of mitigation strategies or practices may be undertaken to mitigate for these hazards. A FEMA-approved MHMP is required to apply for and/or receive project grants under the HMGP, PDM, and FMA. Although this MHMP meets the requirements of DMA 2000 and eligibility requirements of these grant programs additional detailed studies may need to be completed prior to applying for these grants. **Section 5.0** of this plan includes an implementation plan for all high priority mitigation practices identified by the Committee.



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

### Table 29 Proposed Mitigation Measures

Mitigation Practice	Mitigation Strategy	Hazard Addressed	Status	Priority	Benefit-Cost Ratio	Responsible Entity	Funding Source
<b>Emergency Preparedness &amp; Warning</b> 1. Utilize a hazard broadcast system to distribute mass notifications to residents and visitors ( <i>2015 Measure</i> ) 2. Purchase additional mobile message boards to provide current hazard information 3. Improve outdoor warning siren coverage or complete software upgrades to alert populations of severe weather conditions 4. Investigate the most efficient and protected method to back up county and municipal records 5. Improve disaster preparedness and emergency response at the local level through the CERT or similar program focusing on youth 6. Create bilingual notifications and hazard preparedness materials 7. Designate a central point person for emergency information dissemination ( <i>2015 Measure</i> ) 8. Determine how to address services for special needs populations in an emergency ( <i>2015 Measure</i> )	<input checked="" type="checkbox"/> Emergency Services <input checked="" type="checkbox"/> Nat. Res. Protection <input checked="" type="checkbox"/> Prevention <input checked="" type="checkbox"/> Property Protection <input type="checkbox"/> Public Information <input type="checkbox"/> Structural Control	<input checked="" type="checkbox"/> Drought <input checked="" type="checkbox"/> Earthquake <input checked="" type="checkbox"/> Extreme Temperature <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input checked="" type="checkbox"/> Hail/Thunder/Wind <input checked="" type="checkbox"/> Landslide/Subsidence <input checked="" type="checkbox"/> Tornado <input checked="" type="checkbox"/> Winter Storm/Ice <input checked="" type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input checked="" type="checkbox"/> HazMat Incident	<p><b>Ongoing –</b></p> <ul style="list-style-type: none"> <li>1. Few county residents (approx. under 15%) subscribe to the existing program</li> <li>2. The county has access to mobile message boards through the District and County Highway has two mobile boards</li> <li>3. Jackson County has 10 outdoor warning sirens covering much of the populated areas.</li> <li>4. Some systems have manufacturer back-up provided</li> <li>6. A Public Information Officer (PIO) has been established for Jackson County, Sheriff Department, and Seymour Police</li> </ul> <p><b>Proposed Enhancements –</b></p> <ul style="list-style-type: none"> <li>1. Increase awareness and participation in hazard notification system</li> <li>2. Purchase message boards for use in Jackson County (Highway-2)</li> <li>3. Install additional siren in Brownstown (1) and replace the siren in Crothersville</li> <li>4. Determine back up methods and work with IT Department to install and train staff</li> <li>5. Investigate opportunities for youth involvement, implement program and provide training throughout the year</li> <li>6. Create alternate forms of printed and voiced messaging in Spanish in an attempt to reach additional residents</li> <li>7. Designate a PIO for Brownstown, Crothersville, and Medora</li> <li>8. Investigate and implement a program to include special needs populations in emergency planning</li> </ul>	<div>High</div> <i>(mass notifications, mobile message boards, sirens, records backup)</i> <div>Moderate</div> <i>(CERT, bilingual notifications, central point person, special needs)</i>	High	EMA  Town Councils: <i>Brownstown</i> <i>Crothersville</i> <i>Medora</i>  CERT Advisors  Special Needs Agencies	Existing Budgets  Grants





Mitigation Practice	Mitigation Strategy	Hazard Addressed	Status	Priority	Benefit-Cost Ratio	Responsible Entity	Funding Source
<b>Flood Studies and Protection</b> 1. Evaluate and utilize flood forecasting capabilities including stream gages, flood forecast maps, and flood alerts 2. Conduct detailed flood protection studies for problem areas and/or areas with repetitive flooding problems <i>(2015 Measure)</i> 3. Conduct a detailed flooding and drainage study for the Town of Medora <i>(2015 Measure)</i> 4. Update the Flood Plain Ordinance to prohibit new critical facilities from being built in the floodplain and adopt fluvial erosion hazard requirements. 5. Prepare a detailed Flood Response Plan to improve response and reduce losses from a flood event  <i>(Will assist with NFIP compliance)</i>	<input checked="" type="checkbox"/> Emergency Services <input checked="" type="checkbox"/> Nat. Res. Protection <input checked="" type="checkbox"/> Prevention <input checked="" type="checkbox"/> Property Protection <input checked="" type="checkbox"/> Public Information <input checked="" type="checkbox"/> Structural Control	<input type="checkbox"/> Drought <input type="checkbox"/> Earthquake <input type="checkbox"/> Extreme Temperature <input type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input type="checkbox"/> Hail/Thunder/Wind <input type="checkbox"/> Landslide/Subsidence <input type="checkbox"/> Tornado <input type="checkbox"/> Winter Storm/Ice <input type="checkbox"/> Cyber-Attack <input type="checkbox"/> Dam Failure <input type="checkbox"/> HazMat Incident	<b>Ongoing –</b> 1. Stream gage installed on East Fork White River 2. Studies are completed as funding becomes available 4. Ordinance deters new critical facilities but allows variances 5. Flood Response Plan developed for Seymour  <b>Proposed Enhancements –</b> 1. Determine methods for providing warning to Medora and Brownstown 2. Prioritize listing of needed studies and continue to complete as funding becomes available focusing on areas around 235 and highways throughout the county and roads near Mill Creek, Pond Creek, Kiper Creek at CR890, southern Jackson County, Little Acres subdivision, Jonesville, and the junction of White River and Muscatatuck River 3. Develop detailed plan for Town of Medora and implement recommendations as funding becomes available 4. Require new critical facilities to be located outside of known flood hazard areas only, including the 0.2% or 500-year flood zone. 5. Prioritize areas in need of Flood Response Plan and prepare plan	High <i>(flood forecasting, problem area studies)</i>          Moderate <i>(Flood Plain Ordinance)</i>          Low <i>(Flood Response Plan)</i>	Moderate	EMA   Floodplain Administrators <i>County, Brownstown, Crothersville, Medora, Seymour</i>   Highway Department	Existing Budget  Grant
<b>Community Rating System</b> 1. Investigate potential to reduce flood insurance premiums through additional participation in the NFIP’s CRS Program.  <i>(Will assist with NFIP compliance)</i>	<input checked="" type="checkbox"/> Emergency Services <input checked="" type="checkbox"/> Nat. Res. Protection <input checked="" type="checkbox"/> Prevention <input checked="" type="checkbox"/> Property Protection <input checked="" type="checkbox"/> Public Information <input checked="" type="checkbox"/> Structural Control	<input type="checkbox"/> Drought <input type="checkbox"/> Earthquake <input type="checkbox"/> Extreme Temperature <input type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input type="checkbox"/> Hail/Thunder/Wind <input type="checkbox"/> Landslide/Subsidence <input type="checkbox"/> Tornado <input type="checkbox"/> Winter Storm/Ice <input type="checkbox"/> Cyber-Attack <input type="checkbox"/> Dam Failure <input type="checkbox"/> HazMat Incident	<b>Ongoing –</b>  <b>Proposed Enhancement –</b> 1. Participation from Jackson County, Medora, and Seymour	High	Moderate	Floodplain Administrators <i>County, Medora, Seymour</i>	Existing Budget
<b>Land Use Planning &amp; Zoning</b> 1. Incorporate hazard information, risk assessment, and hazard mitigation practices into the Comprehensive Land Use Plan to better guide future growth and development	<input type="checkbox"/> Emergency Services <input checked="" type="checkbox"/> Nat. Res. Protection <input checked="" type="checkbox"/> Prevention <input checked="" type="checkbox"/> Property Protection <input checked="" type="checkbox"/> Public Information <input type="checkbox"/> Structural Control	<input checked="" type="checkbox"/> Drought <input checked="" type="checkbox"/> Earthquake <input checked="" type="checkbox"/> Extreme Temperature <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input checked="" type="checkbox"/> Hail/Thunder/Wind <input checked="" type="checkbox"/> Landslide/Subsidence <input checked="" type="checkbox"/> Tornado <input checked="" type="checkbox"/> Winter Storm/Ice <input checked="" type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input checked="" type="checkbox"/> HazMat Incident	<b>Ongoing –</b> 1. Basic information has been included within the 2006 Jackson County Comprehensive Plan  <b>Proposed Enhancement –</b> 1. Update Comprehensive Plans and include information related to hazards, more definitively outline higher risk areas and those that should be avoided for future development	High	Moderate	EMA  Planning / Building Department <i>County (Brownstown and Crothersville), Medora, Seymour</i>	Existing Budget

Mitigation Practice	Mitigation Strategy	Hazard Addressed	Status	Priority	Benefit-Cost Ratio	Responsible Entity	Funding Source
<b>Power Backup Generators</b> 1. Inventory, prioritize, and retrofit public facilities and/or critical facilities with appropriate wiring and electrical capabilities for utilizing a large generator for power back up 2. Secure a fuel reserve, or ensure contractual emergency provisions so critical infrastructure may run on power backup for extended periods of time	<input checked="" type="checkbox"/> Emergency Services <input type="checkbox"/> Nat. Res. Protection <input checked="" type="checkbox"/> Prevention <input checked="" type="checkbox"/> Property Protection <input type="checkbox"/> Public Information <input checked="" type="checkbox"/> Structural Control	<input type="checkbox"/> Drought <input checked="" type="checkbox"/> Earthquake <input checked="" type="checkbox"/> Extreme Temperature <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input checked="" type="checkbox"/> Hail/Thunder/Wind <input checked="" type="checkbox"/> Landslide/Subsidence <input checked="" type="checkbox"/> Tornado <input checked="" type="checkbox"/> Winter Storm/Ice <input checked="" type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input checked="" type="checkbox"/> HazMat Incident	<b>Ongoing –</b> 1. Many critical facilities have generators or have added since the last plan 2. Some communities have verbal agreements for fuel supplies  <b>Proposed Enhancements –</b> 1. Inventory generator capabilities and needs and prioritize within each community to determine needs for future purchases 2. Secure a fuel reserve via contract service agreement	High	Low	EMA  Community Contacts <i>County, Brownstown, Crothersville, Medora, Seymour</i>  Facility Owners	Existing Budget  Grant
<b>Safer Rooms and Community Shelters</b> 1. Continue to develop temporary and/or long-term shelter agreements within the County. Potential for tiered levels of shelters, domestic animal shelters, etc. 2. Clearly advertise location of safer areas and protocols for large gatherings of people	<input checked="" type="checkbox"/> Emergency Services <input type="checkbox"/> Nat. Res. Protection <input type="checkbox"/> Prevention <input type="checkbox"/> Property Protection <input checked="" type="checkbox"/> Public Information <input checked="" type="checkbox"/> Structural Control	<input type="checkbox"/> Drought <input checked="" type="checkbox"/> Earthquake <input checked="" type="checkbox"/> Extreme Temperature <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input checked="" type="checkbox"/> Hail/Thunder/Wind <input type="checkbox"/> Landslide/Subsidence <input checked="" type="checkbox"/> Tornado <input checked="" type="checkbox"/> Winter Storm/Ice <input type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input checked="" type="checkbox"/> HazMat Incident	<b>Ongoing –</b> 1. Shelters locations are spaced throughout the county as available and as needed  <b>Proposed Enhancement –</b> 1. Continue to evaluate shelter locations and needs throughout the county 2. Develop education materials, signage or announcements for large gatherings	Moderate	Low	EMA  Large Gathering Liaisons  Building Department <i>County (Brownstown and Crothersville), Medora, Seymour</i>  American Red Cross	Existing Budget
<b>Geographic Information Systems</b> 1. Train GIS staff in HAZUS-MH to quantitatively estimate losses in “what if scenarios” and continue to use the most recent GIS data in land use planning efforts	<input checked="" type="checkbox"/> Emergency Services <input checked="" type="checkbox"/> Nat. Res. Protection <input checked="" type="checkbox"/> Prevention <input checked="" type="checkbox"/> Property Protection <input type="checkbox"/> Public Information <input checked="" type="checkbox"/> Structural Control	<input checked="" type="checkbox"/> Drought <input checked="" type="checkbox"/> Earthquake <input checked="" type="checkbox"/> Extreme Temperature <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Flood <input checked="" type="checkbox"/> Hail/Thunder/Wind <input checked="" type="checkbox"/> Landslide/Subsidence <input checked="" type="checkbox"/> Tornado <input checked="" type="checkbox"/> Winter Storm/Ice <input checked="" type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input checked="" type="checkbox"/> HazMat Incident	<b>Ongoing –</b>  <b>Proposed Enhancements –</b> 1. Provide training opportunities for GIS staff related to HAZUS-MH.	Low	Moderate	GIS Department <i>County</i>  GIS Contract Service Provider	Existing Budget  Grant

Mitigation Practice	Mitigation Strategy	Hazard Addressed	Status	Priority	Benefit-Cost Ratio	Responsible Entity	Funding Source
<b>Management of Dams</b> 1. Review regular inspection reports and maintenance records of dams regardless of ownership	<input checked="" type="checkbox"/> Emergency Services <input type="checkbox"/> Nat. Res. Protection <input checked="" type="checkbox"/> Prevention <input checked="" type="checkbox"/> Property Protection <input type="checkbox"/> Public Information <input checked="" type="checkbox"/> Structural Control	<input type="checkbox"/> Drought <input type="checkbox"/> Earthquake <input type="checkbox"/> Extreme Temperature <input type="checkbox"/> Fire <input type="checkbox"/> Flood <input type="checkbox"/> Hail/Thunder/Wind <input type="checkbox"/> Landslide/Subsidence <input type="checkbox"/> Tornado <input type="checkbox"/> Winter Storm/Ice <input type="checkbox"/> Cyber-Attack <input checked="" type="checkbox"/> Dam Failure <input type="checkbox"/> HazMat Incident	<b>Ongoing –</b>  <b>Proposed Enhancements –</b> 1. Provide inspection reports and maintenance records to the EMA Director for review and overall hazard assessment	Low	Moderate	Dam Owners  IDNR  EMA	Existing Budget  Grant



## **CHAPTER 5: IMPLEMENTATION PLAN**

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

### **5.1 BUILDING PROTECTION**

Upgrade the Emergency Operations Center and the Training Facility at the Police Department

- Work with a liaison from each facility to determine exact needs
- Prioritize needs and secure funding through grants or general funds
- Secure materials needed for upgrades and improvements and implement changes at each facility

### **5.2 COMMUNITY RATING SYSTEM**

Investigate potential to reduce flood insurance premiums through participation in the NFIP's CRS Program

- Review guidance materials and gather supporting documentation
- Calculate credits and contact ISO representative
- Submit materials for entry to the CRS program
- Maintain and record information as necessary for annual recertification

### **5.3 EMERGENCY PREPAREDNESS AND WARNING**

Increase awareness and participation in the hazard broadcast system to distribute mass notifications to residents and visitors

- Develop outreach efforts designed to inform residents and visitors of the messaging available
- Post information on municipal and county websites
- Complete awareness campaign to encourage sign ups within each municipality
- Develop pre-scripted messages to utilize during hazard situation and provide for quick use and dissemination/posting

Purchase mobile message boards to provide current hazard information

- Inventory existing capabilities
- Determine needs based on areas where message boards need to be routinely deployed
- Secure funding and procure message boards
- Store message boards throughout the county

Improve outdoor warning siren coverage or complete software upgrades to alert populations of severe weather conditions

- Review existing outdoor warning siren coverage
- Prioritize areas in need of primary or additional coverage and needs for software or hardware upgrades
- Investigate potential funding sources and determine local level of interest
- Install additional outdoor warning sirens and make upgrades as feasible

Investigate the most efficient and protected method to back up county and municipal records

- Review current protocols and procedures for county and municipal backup of records
- Research options for additional securities, redundant systems, or enhanced protections
- Begin enhanced backup and protection of municipal records

## **5.4 EMERGENCY RESPONSE AND RECOVERY**

Inventory needs and prioritize purchases for mobile data terminals (along with associated hardware, software, and updates) to emergency response vehicles

- Work with municipal liaisons to inventory existing terminals, software, and accessories throughout all response agencies (fire, police/sheriff, EMS)
- Determine needs to adequately cover each community and to allow cross-communication between agency and between community
- Prioritize purchases, upgrades, or training and implement as feasible.

Establish procedures to notify the population in known hazard areas

- Review current procedures and revise as necessary
- Determine limits of additional populations potentially in need of evacuation, such as those listed above
- Determine protocols for when evacuations would be required and agency or municipal officials' roles and responsibilities during events
- Define evacuation routes, any facilities to where evacuated populations will be sent
- Provide information to affected populations, land and/or facility owners, and agency or municipal officials

## **5.5 FLOOD STUDIES AND PROTECTION**

Evaluate and utilize flood forecasting capabilities including stream gauges, flood forecasting maps, and flood alerts

- Work with municipal Floodplain Administrators to prioritize areas most at risk for flood damages
- Review existing flood forecasting capabilities for each municipality and surrounding area
- Prioritize additions and secure funding needed to increase forecasting capabilities
- Increase awareness of additional capabilities to officials and public

Conduct detailed flood protection studies for problem areas and/or areas with repetitive flooding problems

- Review listing of flood prone or problem areas and prioritize based on previous damages, at-risk populations, or potential for damage to critical infrastructure
- Develop a Floodplain Study Prioritization List for the County
- Secure funding, municipal bond, or funds from existing budgets to complete floodplain studies
- Update the Floodplain Study Prioritization List as projects or studies are completed

Conduct a detailed flood drainage study for the Town of Medora

- Work with municipal Floodplain Administrator to discuss issues and areas most at risk for flood damages
- Secure funding needed and develop Medora specific study
- Implement recommendations as feasible and as funding is obtained

## **5.6 LAND USE PLANNING & ZONING**

Incorporate hazard information, risk assessment, and hazard mitigation practices into the Comprehensive Plan to better guide future growth and development

- Review list of hazards applicable to individual communities
- Draft language and prepare exhibits to incorporate into the appropriate sections of the Jackson County Comprehensive Land Use Plan, individual municipalities' plans, neighborhood redevelopment plans, etc.
- Adopt amendments or new plans as developed

## **5.7 POWER BACK-UP GENERATORS**

Inventory, prioritize, and retrofit public facilities and/or critical facilities with appropriate wiring and electrical capabilities for utilizing a large generator for power back-up

- Utilize listing of critical facilities and coordinate with facility owners or operators
- Determine presence or absence of generator, fuel capacity, and fuel reserve
- Determine if additional needs are required to ensure compatibility with generator
- Secure or allocate funding to make necessary purchases or facility adjustments to ensure functioning generators are present and operable

Secure a fuel reserve, or ensure contractual emergency provisions so critical infrastructure may run on power backup for extended periods of time

- Determine where county and municipal vehicles (and generators) routinely receive fuel
- Review contract language to ensure municipal and critical facilities have ability to receive fuel prior to other clients
- If necessary, add such language to contracts

## 5.8 TRANSPORTATION

Require warnings (flashing lights, crossing arms, rumble strips, signage) at each intersection between rail and road to reduce the potential for train/vehicular crashes

- Inventory all rail and road intersections throughout Jackson County
- Determine most suitable warning method and prioritize intersection based on risk of incident
- Partner with rail companies to continue to upgrade and install warnings
- Determine if county or municipality will need to install any warnings (outside of rail right-of-way)

## CHAPTER 6: PLAN MAINTENANCE PROCESS

### 6.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

#### REQUIREMENT §201.6(c)(4)(i):

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

To effectively reduce social, physical, and economic losses in Jackson County, it is important that implementation of this MHMP be monitored, evaluated, and updated. The EMA Director is ultimately responsible for the MHMP. As illustrated in Section 4.2 Mitigation Practices, this Plan contains mitigation program, projects, and policies from multiple departments within each incorporated community. Depending on grant opportunities and fiscal resources, mitigation practices may be implemented independently, by individual communities, or through local partnerships. Therefore, the successful implementation of this MHMP will require the participation and cooperation of the entire Committee to successfully monitor, evaluate, and update the Jackson County MHMP.

The EMA Director will reconvene the MHMP Committee on an annual basis and following a significant hazard incident to determine whether:

- the nature, magnitude, and/or type of risk have changed
- the current resources are appropriate for implementation
- there are implementation problems, such as technical, political, legal, or coordination issues with other agencies
- the outcomes have occurred as expected
- the agencies and other partners participated as originally proposed

During the annual meetings the Implementation Checklist provided in **Appendix 6** will be helpful to track any progress, successes, and problems experienced.

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

DMA 2000 requires local jurisdictions to update and resubmit their MHMP within five years (from the date of FEMA approval) to continue to be eligible for mitigation project grant funding. In early 2027, the EMA Director will once again reconvene the MHMP Committee for a series of meetings designed to replicate the original planning process. Information gathered following individual hazard incidents and annual meetings will be utilized along with updated vulnerability assessments to assess the risks associated with each hazard common in Jackson County. These hazards, and associated mitigation goals and practices will be prioritized and detailed as in Section 3.0 this MHMP. Sections 4.0 and 5.0 will be updated to reflect any practices implemented within the interim as well as any additional practices discussed by the Committee during the update process.

Prior to submission of the updated MHMP, a public meeting will be held to present the information to residents of Jackson County and to provide them an opportunity for review and comment of the draft

MHMP. A media release will be issued providing information related to the update, the planning process, and details of the public meeting.

## 6.2 INCORPORATION INTO EXISTING PLANNING MECHANISMS

### **REQUIREMENT §201.6(c)(4)(ii):**

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

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

Based on added language within each of the Comprehensive Plan updates the appropriate Zoning Ordinances and Floodplain Management Ordinances within each community may also need to be amended.

## 6.3 CONTINUED PUBLIC INVOLVEMENT

### **REQUIREMENT §201.6(c)(4)(iii):**

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

Continued public involvement is critical to the successful implementation of the Jackson County MHMP. Comments gathered from the public on the MHMP will be received by the EMA Director and forwarded to the MHMP Committee for discussion. Education efforts for hazard mitigation will be the focus of the annual Severe Weather Awareness Week as well as incorporated into existing stormwater planning, land use planning, and special projects/studies efforts. Once adopted, a copy of this Plan will be available for the public to review in the EMA Office and the Jackson County website.

Updates or modifications to the Jackson County MHMP will require a public notice and/or meeting prior to submitting revisions to the individual jurisdictions for approval.



The CRS program credits NFIP communities a maximum of 37 points for adopting the Plan; establishing a procedure for implementation, review, and updating the Plan; and submitting an annual evaluation report.

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