Moniteau County Hazard Mitigation Plan 2022

The planning process for the update of the Moniteau County Hazard Mitigation Plan was led by the Mid-Missouri Regional Plan Commission through a contractual agreement with the MO State Emergency Management Agency and Moniteau County.

Mid-Missouri Regional Planning Commission
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MID-MO
Regional Planning Commission

U.S. Department of Homeland Security
FEMA Region 7
11224 Holmes Road
Kansas City, MO 64131

FEMA

July 26, 2022

Heidi Carver
State Hazard Mitigation Officer
State Emergency Management Agency
P. O. Box 116
Jefferson City, Missouri 65102

Reference: Approval of the Moniteau County Local Mitigation Plan

Dear Heidi Carver:

In accordance with applicable[1] laws, regulations and policy, the Risk Analysis Branch, Mitigation Division, Federal Emergency Management Agency (FEMA) has approved the Moniteau County local mitigation plan. The attached Local Mitigation Plan Review Tool lists participants receiving approval that have submitted required adoption documentation.

The approval period for this plan is from July 21, 2022, through July 20, 2027. The same official plan expiration date applies to all participating jurisdictions, regardless of adoption date.

An approved mitigation plan is one of the conditions for applying for and receiving FEMA mitigation grants from the following programs:

- Hazard Mitigation Grant Program
- Building Resilient Infrastructure and Communities
- Flood Mitigation Assistance

Having an approved mitigation plan does not mean that mitigation grant funding will be awarded. Specific application and eligibility requirements for the programs listed above can be found in each FEMA grant program's respective policies and annual Notice of Funding Opportunities, as applicable.

To avoid a lapse plan, the next plan update must be approved by FEMA before the end of the approval period. Remember to allow sufficient time to secure funding as well as for the update process, including the review and approval process. Please include time for any revisions, if needed, and for the jurisdictions to formally adopt the plan after the review, if not adopted prior to submission. This will enable you to remain eligible to apply for and receive funding from FEMA's mitigation grant programs with a mitigation plan requirement. Local governments, including special districts, with a plan status of "Approvable Pending Adoption" are not eligible for FEMA's mitigation grant programs with a mitigation plan requirement.

We look forward to discussing options for implementing this mitigation plan. If you should have any questions or concerns, please contact Joe Chandler, Planning Team Lead, at (816) 808-9016 or joe.chandler@fema.dhs.gov.

Sincerely,

LAURIE L BESTGEN Digitally signed by LAURIE L BESTGEN
Date: 2022.07.27 14:04:38 -05'00'

For Catherine R. Sanders
Director, Mitigation Division

Contributors

Moniteau County Hazard Mitigation Planning Committee

Jurisdictional Representatives

Participating Jurisdictions			
Name	**Title**	**Department**	**Jurisdiction**
Shawn Merrill	Chief	California Fire	California FPD
Brad Friedemeyer	Fire Chief	City of California	City of California
Kyle Wirts	Water Supervisor	City of California	City of California
Ralph Parris	Captain	City of California	City of California
Rich Green	Mayor	City of California	City of California
Tyler Dicus	Electric Supervisor	City of California	City of California
Vic Maurer	Street Supervisor	City of California	City of California
James Russell	Mayor	City of Jamestown	City of Jamestown
Sue Denny	Mayor	City of Lupus	City of Lupus
Aaron Fassler	Chief	City of Tipton	City of Tipton
Edward Wiecken	Chief	City Of Tipton	City Of Tipton
Nathan Bestgen	superintendent	Administration	Clarksburg C-2
David Franks	superintendent	High Point School	High Point School
Gretchen Guitard	superintendent	Jamestown C-I	Jamestown C-I
Lee Kempf	Administrator	Mid-MO Ambulance district	Mid-MO Ambulance district
Dwight Sanders	superintendent	Moniteau Co R-1 California School	Moniteau Co R-1 California School
Scott Harkins	Student Resource Officer	Moniteau Co R-1 California School	Moniteau Co R-1 California School
Clint Hoellering	1st District Commissioner	Moniteau County	Moniteau County
Mac Finley	Presiding Commissioner	Moniteau County	Moniteau County
Rick Messerli	2nd District Commissioner	Moniteau County	Moniteau County
Sarah Jones	County Treasurer	Moniteau County	Moniteau County
Kevin Wieberg	911 Director	Moniteau County 910	Moniteau County 911
Jordan Hoecker	superintendent	Moniteau County R-V Latham	Moniteau County R-V Latham
Toney Wheately	Sheriff	Moniteau County Sheriffs Department	Moniteau County Sheriffs Department

Aaron Fassler	Chief	Tipton Rural Fire District	Tipton Rural Fire District
Terry Robinson	superintendent	Tipton R-VI	Tipton R-VI

Stakeholder Representatives

Stakeholders			
Name	**Title**	**Department**	**Jurisdiction**
Christina McMillian	Safety Nurse	Burgers Smokehouse	Burgers Smokehouse
Heather Allen	EHS Manager	Cargill	Cargill
Shallie Witt	Health	Cargill	Cargill
Brenda Gerlach	Regional Coordinator	SEMA	SEMA

The Moniteau County Hazard Mitigation Plan was developed by the communities and citizens of Moniteau County, their elected officials, and public servants. The process was carried out by identifying the natural hazards that impact Moniteau County and its residents, assessing the probability of occurrence and severity posed by each hazard, identifying the most vulnerable areas, and evaluating all possible mitigation actions which might be effective. Potential mitigation actions were assessed and prioritized based on the perceived need, probable outcome, potential for being executed, and benefit related to cost.

Table of Contents

Executive Summary

Hazard mitigation focuses on anticipating and lowering risks to lives and property. Natural hazards are taking an increasing toll on lives and property in the United States. The number of FEMA declared Presidential Disasters across the nation has increased drastically over the past two decades. The year 2011 (when an EF-5 tornado devastated the Missouri town of Joplin) set a record with 242 disaster declarations. The cost of these disasters has also increased in recent years, in part because of increased population and a larger built environment but also because of the magnitude of many recent disasters. Hazard mitigation, the cornerstone of emergency management, seeks to address these issues.

Hazard mitigation can save lives and property; it also makes good economic sense. A 2005 study conducted by the National Institute of Building Science found that every dollar spent on mitigation activities saves four dollars in post-disaster recovery costs. Hazard mitigation is a good business practice for both the public and private sectors.

The Plan: The Moniteau County Natural Hazard Mitigation Plan is a multi-jurisdictional plan prepared and written that covers the following jurisdictions that participated in the planning process:

- Unincorporated Moniteau
- California
- Jamestown
- Lupus
- Tipton
- Clarksburg C-II
- High Point R-III
- Jamestown C-I
- Moniteau Co. R-I
- Moniteau Co. R-V
- Tipton R-VI
- 911 Dispatch District
- California FPD
- Tipton RFPD

Those who were invited but chose not to participate or did not meet the established requirements for official participation are as follows:

- Boone County
- Callaway County
- Cole County
- Cooper County
- Howard County
- Clarksburg

- Mid-MO Ambulance District
- Jamestown RFPD

The risk assessment (Chapter 3) profiles the natural hazards (dam failure, drought, earthquake, extreme temperatures, flood, levee failure, land subsidence/sinkhole, severe thunderstorm, severe winter weather, tornado, and wildfire) which threaten lives and/or property in some, or all, of the participating jurisdictions. All hazards were evaluated with regard to previous occurrence, probability and severity of future occurrence, existing mitigation strategies, and the potential impact on each jurisdiction.

2022 Mitigation Strategy: The current mitigation strategy, found in Chapter 4 of the plan, lays out a series of actions to be focused on during the coming five years. Each of the actions has been analyzed as to applicable jurisdiction(s), the agency or department which will lead the effort, and the means of implementing and financing the action. All of these decisions were made by jurisdictional representatives participating as members of the hazard mitigation planning committee.

The Moniteau County Natural Hazard Mitigation Plan will be formally adopted by each of the participating jurisdictions before a final draft is approved by FEMA. Participation in, and formal adoption of, the plan qualifies a jurisdiction to apply for Federal Emergency Management Agency (FEMA) pre-disaster mitigation grants and the mitigation portion of post-disaster mitigation grants.

While it is to be hoped that many of the mitigation actions in the strategy will have been completed before the next five-year update, as required by FEMA, nothing in the plan is legally binding on the participating jurisdictions. It will be evaluated and maintained on an annual basis prior to this update.

The 2022 county-wide mitigation strategy is shown in its entirety below, organized by the four major mitigation goals.

- Goal 1: Implement mitigation actions that improve the protection of human life, health, and safety from the adverse effects of disasters

- Goal 2: Implement mitigation actions that improve the continuity of government and essential services from the adverse effects of disasters

- Goal 3: Implement mitigation actions that improve the protection of public and private property from the adverse effects of disasters

- Goal 4: Implement mitigation actions that improve the protection of community tranquility from the adverse effects of disasters

Planning Process: A plan is only as good as the planning process which developed it. A thorough update of the plan was completed with the active participation of representatives from

Moniteau County jurisdictions and utility providers at regularly scheduled meetings over a six-month period. The draft plan was presented at 1 public meetings of the Moniteau County Commission, and published on the website of the Mid-MO Regional Planning Commission, to allow for input from the general public.

The plan will be evaluated and maintained on a yearly basis with the help of the planning committee; the next complete update will be undertaken in five years.

The ultimate test of a plan is the action taken on the roadmap presented. It is to be hoped that many of the mitigation actions in this plan will have been completed before the next five-year update. Action on the strategy in this plan will help to ensure a greater, and more cost-effective, level of protection for the citizens and property of Moniteau County and its jurisdictions.

The Moniteau County Natural Hazard Mitigation Plan can be found online at:
https://www.midmorpc.org/plans-publications-master/moniteau-hazard-mitigation-2022-draft

Prerequisites

44 CFR requirement 201.6(c)(5): The local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

The participating jurisdictions adopted the plan following FEMA's "approval pending adoption". Adoption resolutions and adoption letters (school districts and institutes of higher learning) are included in appendix A.

Chapter 1: Introduction and Planning Process

Chapter 1: Introduction and Planning Process

1.1 Purpose

The Moniteau County Hazard Mitigation Plan is designed as a resource for county and municipal governments, residents, developers, organizations, and others interested in controlling the potentially disastrous effects of natural hazards in Moniteau County. Each year natural hazards take a great toll in the United States. Moniteau County is not immune; it is subject to numerous natural hazards which can threaten life and property. A well-conceived mitigation strategy, developed through an inclusive and thoughtful planning process, is an important step in protecting citizens and reducing loss.

The Federal Emergency Management Agency (FEMA) defines mitigation as "sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects." A 2018 study by the Institute for Building Science found that $6 was saved in post-disaster response and recovery for every $1 spent on pre-disaster mitigation. The process for declaring Presidential Disasters was established with the passage of the Disaster Relief Act of 1974. In 1988, the Robert T. Stafford Disaster Relief and Emergency Assistance Act created the organizational framework through which funds and assistance would be provided after a Presidential Disaster Declaration; FEMA was designated to coordinate the relief efforts.

The Moniteau County Hazard Mitigation Plan was developed by the communities and citizens of Moniteau County, their elected officials and public servants in accordance with FEMA's Mitigation Planning regulations under Code of Federal Regulations (CFR), Title 44, Part 201.6, *Local Mitigation Plan*s. Relevant requirements from CFR §201.6 are highlighted throughout the plan.

Multiple jurisdictions within Moniteau County participated in the development of this plan. Having a current and approved hazard mitigation plan makes each of the participating jurisdictions eligible to apply for FEMA pre-disaster mitigation grants and the mitigation portion of post-disaster mitigation grants.

1.2 Background and Scope

In November 2003, a "current and approved" hazard mitigation plan became a FEMA eligibility requirement for local jurisdictions applying for pre-disaster mitigation grants and the mitigation portion of post-disaster grant funds. Due to this change in FEMA grant requirements, the Missouri State Emergency Management Agency (SEMA) contracted with the Missouri Council of Governments for the Regional Planning Commissions to direct hazard mitigation planning for interested counties within their respective regions. Moniteau County, a member of the Mid-Missouri Regional Planning Commission (Mid-MO RPC), contracted with the Mid-MO RPC to facilitate the development of a hazard mitigation plan for the county.

The Moniteau County Hazard Mitigation Plan 2017 was written to be a working document to guide participating jurisdictions in the county in mitigating potential natural hazards. To this effect, the plan has been publicly available on the website of the Mid-MO RPC (www.midmorpc.org) since it was approved and adopted in 2017.

The maintenance plan in the 2017 document calls for an annual monitoring and review of the plan to be facilitated by the Mid-MO RPC. This monitoring and review was carried out in 2021. Representatives from each of the participating jurisdictions and other interested parties were contacted by email to attend a plan monitoring meeting. seventeen representatives attended the meeting; discussion centered around funding and the need for participation in the Hazard Mitigation Planning process.

Prior to the meeting, a survey was sent out to all participating jurisdictions requesting an update of any progress on the mitigation strategy outlined in the 2017 plan and any other changes in their jurisdiction; response was received from four communities.

The jurisdictions participating in the 2022 plan update include:

- Unincorporated Moniteau
- California
- Jamestown
- Lupus
- Tipton
- Clarksburg C-II
- High Point R-III
- Jamestown C-I
- Moniteau Co. R-I
- Moniteau Co. R-V
- Tipton R-VI
- 911 Dispatch District
- California FPD
- Tipton RFPD

Those who were invited but chose not to participate or did not meet the established requirements for official participation are as follows:

- Boone County
- Callaway County
- Cole County
- Cooper County
- Howard County
- Mid-MO Ambulance
- Jamestown RFPD
- Clarksburg

All jurisdiction who participated in the 2017 update chose to participate in the 2022 update except for Clarksburg. The communities of Lupus and Tipton did not participate in the 2017 update but chose to participate in the 2022 update. The Fire Districts previously participated under the county but some chose to participate individually for this update.

Jurisdictions received email notifications of upcoming meetings and their corresponding agendas, along with any "homework" in the form of questionnaires or surveys. Meeting notices were also posted on the RPC website, meeting information was put on the RPC calendar that is emailed to the 6 county RPC region, as well as notices posted to the RPC Facebook page. Phone calls were also made by the planner and the County Office of Emergency Management to encourage participation.

1.3 Plan Organization

The plan is formatted into 5 Chapters with several sub-sections per section. The 2017 plan contained 6 sections. Planning Area Overview and Planning Area Assets and Capabilities were originally separate sections. For this plan the two sections were combined to match the updated outline for the local hazard mitigation plan released by the Missouri State Emergency Management Agency (SEMA) in 2017. The adjusted plan sections include:

- Chapter 1: Introduction and the Planning Process
- Chapter 2: Planning Area Overview, Assets, and Capabilities
- Chapter 3: Risk Assessment
- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Implementation and Maintenance
- Appendices

Table 1.1: Changes Made in Plan Update

Plan Section	Summary of Updates
Chapter 1 – Introduction and Planning Process	Updated members of the Mitigation Planning Committee (MPC) Updated chapter format
Chapter 2 – Planning Area Profile and Capabilities	Updated chapter format
Chapter 3 – Risk Assessment	Combined Extreme Heat and cold into one hazard: extreme temperatures Updated chapter format
Chapter 4 – Mitigation Strategy	Updated chapter format Changed action worksheet layout/info
Chapter 5 – Plan Implementation and Maintenance	Updated chapter format Added planning mechanisms for hazard mitigation

1.4 Planning Process

44 CFR Requirement 201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

A Hazard Mitigation Plan must be updated and adopted by the participating jurisdictions every five years to be considered current. The update of the Moniteau County Hazard Mitigation Plan was directed by the emergency management planner from Mid-MO RPC (Melissa Stafford) as specified in a Memorandum of Agreement (MOA) with the Missouri State Emergency Management Agency (SEMA). The roll of Mid-MO RPC in the planning process is to:

- Assist in establishing a Mitigation Planning Committee (MPC) as defined by the Disaster Mitigation Act (DMA),
- Organize Planning Committee Meetings locations and times
- Ensure the updated plan meets the DMA requirements as established by federal regulations and follows the most current planning guidance of the Federal Emergency Management Agency (FEMA),
- Facilitate the entire plan development process,
- Identify the data that MPC participants could provide and conduct the research and documentation necessary to augment that data,
- Assist in soliciting public input,
- Produce the draft and final plan update in a FEMA-approvable document and coordinate the Missouri State Emergency Management Agency (SEMA) and (FEMA) plan reviews.

The update process consisted of 3 planning committee meetings over the update period. Meeting announcements and sign-in sheets are included in Appendix A and B.

All hazard mitigation planning meetings were open to the public and public notice was provided in accordance with Missouri's "Sunshine Law" (Revised Statutes of Missouri 610.010, 610.020, 610.023, and 610.024.) Notice of each meeting was posted at the Mid-MO RPC in Ashland, and on the website of the Mid-MO RPC www.midmorpc.org). No public comment was received.

Table 1.2 Jurisdictional Representatives of Moniteau County Mitigation Planning Committee

Participating Jurisdictions			
Name	**Title**	**Department**	**Jurisdiction**
Shawn Merrill	Chief	California Fire	California FPD
Brad Friedemeyer	Fire Chief	City of California	City of California
Kyle Wirts	Water Supervisor	City of California	City of California
Ralph Parris	Captain	City of California	City of California
Rich Green	Mayor	City of California	City of California

Tyler Dicus	Electric Supervisor	City of California	City of California
Vic Maurer	Street Supervisor	City of California	City of California
James Russell	Mayor	City of Jamestown	City of Jamestown
Sue Denny	Mayor	City of Lupus	City of Lupus
Aaron Fassler	Chief	City of Tipton	City of Tipton
Edward Wiecken	Chief	City Of Tipton	City Of Tipton
Nathan Bestgen	superintendent	Administration	Clarksburg C-2
David Franks	superintendent	High Point School	High Point School
Gretchen Guitard	superintendent	Jamestown C-I	Jamestown C-I
Lee Kempf	Administrator	Mid-MO Ambulance district	Mid-MO Ambulance district
Dwight Sanders	superintendent	Moniteau Co R-1 California School	Moniteau Co R-1 California School
Scott Harkins	Student Resource Officer	Moniteau Co R-1 California School	Moniteau Co R-1 California School
Clint Hoellering	1st District Commissioner	Moniteau County	Moniteau County
Mac Finley	Presiding Commissioner	Moniteau County	Moniteau County
Rick Messerli	2nd District Commissioner	Moniteau County	Moniteau County
Sarah Jones	County Treasurer	Moniteau County	Moniteau County
Kevin Wieberg	911 Director	Moniteau County 910	Moniteau County 911
Jordan Hoecker	superintendent	Moniteau County R-V Latham	Moniteau County R-V Latham
Toney Wheately	Sheriff	Moniteau County Sheriffs Department	Moniteau County Sheriffs Department
Aaron Fassler	Chief	Tipton Rural Fire District	Tipton Rural Fire District
Terry Robinson	superintendent	Tipton R-VI	Tipton R-VI

Table 1.3 Stakeholder Representatives

Stakeholders			
Name	**Title**	**Department**	**Jurisdiction**
Christina McMillian	Safety Nurse	Burgers Smokehouse	Burgers Smokehouse
Heather Allen	EHS Manager	Cargill	Cargill
Shallie Witt	Health	Cargill	Cargill
Brenda Gerlach	Regional Coordinator	SEMA	SEMA

Table 1.4 MPC Capability with Six Mitigation Categories

Community Department/Office	Prevention	Structure and Infrastructure Projects		Natural Systems Protection	Education and Awareness Programs	Emergency Services
		Property Protection	Structural Flood Control Projects			
Moniteau County	X				X	X
California	X	X	X		X	X
Jamestown	X	X	X		X	X
Lupus	X	X	X		X	X
Tipton	X	X	X		X	X
Clarksburg C-II	X				X	
High Point R-III	X				X	
Jamestown C-I	X				X	
Moniteau Co. R-I	X				X	
Moniteau Co. R-V	X				X	
Tipton R-VI	X				X	
911 Dispatch	X				X	X
California FPD	X			X	X	X
Tipton RFPD	X			X	X	X

1.4.1 Multi-Jurisdictional Participation

44 CFR Requirement §201.6(a)(3): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.

Multiple jurisdictions within Moniteau County participated in the development of this plan. Having a current and approved hazard mitigation plan is a prerequisite for participating jurisdictions to be eligible to apply for FEMA pre-disaster mitigation grants and the mitigation portion of post disaster mitigation grants. Invitations to participate in the development of the plan were sent to commissioners, incorporated community leaders, public schools and colleges, special districts, and various other stakeholders multiple times throughout the update to encourage participation in some manner. Each jurisdiction who participated will have to adopt the updated plan.

- Participation in at least one meeting was required via in person or phone (group/individual meeting). Meeting participation could be in-person or by proxy.

- Each participating jurisdiction must provide sufficient information to support plan development by completion and return of surveys.

- For plan updates, eliminate from further consideration those actions from the previously approved plan that were not implemented because they were impractical, inappropriate, not cost-effective, or were otherwise not feasible.

- Review and comment on plan drafts

- Provide documentation to show time donated to the planning effort

- All participants should formally adopt the mitigation plan prior to submittal to SEMA and FEMA for final approval.

Table 1.5 Jurisdictional Participation in Planning Process

Jurisdiction	Kick-off Meeting	Meeting #2	Meeting #3	Meeting #4	individual meeting	Data Collection Questionnaire Response	Update/Develop Mitigation Actions	Adoption resolution
Moniteau Co	X	X				X	X	X
California	X	X				X	X	X
Jamestown		X				X	X	X
Lupus	X				X	X	X	X
Tipton	X	X				X	X	X
Clarksburg C-II	X	X				X	X	X
High Point R-III	X	X				X	X	X
Jamestown R-III	X	X				X	X	X
Moniteau Co R-I	X	X				X	X	X
Moniteau Co R-V	X					X	X	X
Tipton R-VI	X					X	X	X
911 Dispatch	X	X				X	X	X
California FD	X					X	X	X
Tipton RFPD	X	X				X	X	X

1.4.2 The Planning Steps

Surveys and questionnaires were important in getting first-hand information from jurisdictions. One-on-one time, public meetings, and many emails produced a wealth of information taken into the plan.

Development of the plan followed the 10-step planning process adapted from FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. The10-step process allowsthe plan to meet funding eligibility requirements of the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program as well as qualify for points under Activity 510 for Mitigation Plans, under the Community Rating System.

Table 1.6 County Mitigation Plan Update Process

Community Rating System (CRS) Planning Steps (Activity 510)	Local Mitigation Planning Handbook Tasks (44 CFR Part 201)
Step 1. Organize	Task 1: Determine the Planning Area and Resources
	Task 2: Build the Planning Team 44 CFR 201.6(c)(1)
Step 2. Involve the public	Task 3: Create an Outreach Strategy 44 CFR 201.6(b)(1)
Step 3. Coordinate	Task 4: Review Community Capabilities 44 CFR 201.6(b)(2) & (3)
Step 4. Assess the hazard	Task 5: Conduct a Risk Assessment 44 CFR 201.6(c)(2)(i) 44 CFR 201.6(c)(2)(ii) & (iii)
Step 5. Assess the problem	
Step 6. Set goals	Task 6: Develop a Mitigation Strategy 44 CFR 201.6(c)(3)(i); 44 CFR 201.6(c)(3)(ii); and 44 CFR 201.6(c)(3)(iii)
Step 7. Review possible activities	
Step 8. Draft an action plan	
Step 9. Adopt the plan	Task 8: Review and Adopt the Plan
Step 10. Implement, evaluate, revise	Task 7: Keep the Plan Current
	Task 9: Create a Safe and Resilient Community 44 CFR 201.6(c)(4)

Step 1. Organize

Contact lists were made for past participating jurisdictions as well as neighboring communities to Moniteau, and email notices were directly sent out to all jurisdictions and special districts in Moniteau County making sure to update contacts for positions who may have changed personnel. The notice consisted of a meeting announcement and short summary of what the meeting would be covering and its importance.

A kick-off meeting was hosted January 13, 2022 at the California City Hall. The foundation topic of this meeting was to outline the process of the hazard mitigation plan update and its importance. Surveys were passed out to each jurisdiction in attendance to identify what data the participants could provide. This meeting also served as an introduction to the types of hazards that would be included in the plan. Those in attendance were asked to sign in. Documentation can be found in the following appendices. They were instructed to either email the finished surveys to the lead planner or they had the option to return them in person at the next scheduled meeting. The date for the next meeting was set before everyone left the current meeting.

Meeting 2 took place on February 3, 2022 at the California City Hall. Anyone who wasn't at the first meeting was given a survey to fill out for their jurisdiction. Anyone done with their survey had the opportunity to turn it in if they had not emailed it prior to the meeting. Any suggested

updates were instructed to be brought forth by the next meeting. Area hazards were reviewed so that attendees could update their action mitigation list by the next meeting.

Meeting 3 took place February 17, 2022 at the at the California City Hall. Questions about action mitigation items were fielded and goals were finalized. Everyone was instructed to get their resolutions on the future agenda of their boards.

Table 1.7: Schedule of MPC Meetings

Meeting	Topic	Date
Kick-Off Meeting	• Importance of Hazard Mitigation Planning • Why the Plan needs updated and what is included • Planning process • How to Participate • Handed out questionnaires	1/13/2022
Meeting #2	• Return questionnaires • Discussed questions about the questionnaire • Discussed Risk Assessments • Reviewed Previous Action Items	2/7/2022
Meeting #3	• New Mitigation Actions • Goal Finalizing	2/17/2022

Step 2. Public Involvement

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

Each of the 3 meetings of the MPC were open to the public. It was advertised through the Mid-MO RPC (www.midmorpc.org) website, posted at the office, and included on the RPC Facebook page. The draft is available at the Mid-MO RPC website for anyone to review. Comments can be taken through email, phone, or in-person at the office. Individual invites and meeting notices were emailed to each jurisdiction for participation. Jurisdictions that did not show up or return email contact after the second meeting were called directly and educated on the importance of their participation. Anyone who did not come in-person to a meeting was emailed a survey to fill out for their jurisdiction. No public comments were received during the planning process. The needs and concerns of the public were considered based on the feedback given by jurisdictional representatives and their knowledge and interaction with the public outside the planning process.

Step 3. Coordinate

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Participants from all incorporated cities, towns, and villages were invited to every meeting, along with all school districts and colleges. Other invitees were emergency response agencies, county offices, etc. Once a draft of the plan was complete it was posted to the Mid-MO RPC website for review by all interested parties. Invitations were sent by email and notices were published to the RPC Facebook page and a calendar with meetings shared via email to jurisdictions and stakeholders throughout the 6 county RPC region.

Table 1.8: Invited Stakeholders

Stakeholder/Jurisdiction	Position/Department
Boone County	Presiding Commissioner
Cole County	Presiding Commissioner
Callaway County	Presiding Commissioner
Howard County	Presiding Commissioner
Cooper County	Presiding Commissioner
Mid-MO Ambulance	Director
Jamestown Fire	Chief
Moniteau Co Health Dept.	Administrator
Burgers	Safety Manager
Cargill Inc.	Manager
California Police	Chief
Public Water District #1	President
Public Water District #2	District Operator
St. Andrews School	Superintendent
SEMA	Coordinator

Coordination with FEMA Risk MAP Project

Figure 1.1 shows the status of Risk Mapping in Moniteau County. The northern boundary of Moniteau County is edged by the Missouri River which is prone to flooding. The risks of this will be more clearly defined in Section 3: Risk Assessment.

Figure 1.1 FEMA Risk Studies Tracker

Source: FEMA Mapping Information Studies Tracker

Integration of other data, reports, studies, and plans

Many existing plans, studies, and reports were consulted in the development of this plan. These include:

- *Atlas of Missouri Ecoregions*, Missouri Department of Conservation
- *Comprehensive Economic Development Strategy for the Mid-MO Region (2018),* Mid-MO Regional Planning Commission
- *Missouri State Hazard Mitigation Plan (2018),* Missouri State Emergency Management Agency (SEMA)
- *Missouri Weather Patterns and Their Impact on Agriculture, Grant L. Darkow, University Extension, University of Missouri-Columbia*
- *National Climate Assessment 2014,* U.S. Global Change Research Program (GlobalChange.gov)
- *Regional Transportation Plan (2016),* Mid-MO Regional Planning Commission
- Situation Reports (online), Missouri SEMA
- *Flood Insurance Rate Maps (FIRMs)*
- *State Department of Natural Resources (DNR) dam information*
- *The National Inventory of Dams*
- *United States Department of Agriculture – Census of Agriculture*
- *Corp of Engineers – National Levee Database*
- *Commodity Flow Study 2019*
- *Employment Wage Study 2020*

Step 4: Assess the Hazard
During meeting #2 risk assessment surveys were compiled and discussed. The risk of hazards were based on previous disasters, hazards that were identified in the State Hazard Mitigation Plan, and hazards from the previously approved hazard mitigation plan. Hazards were prioritized by their likelihood and severity of impacts by each jurisdiction, then totaled to rate each hazard on a whole. Additional details about the individual hazards can be found in the chapter on Risk Assessment.

Step 5: Assess the Problem
Assets for each jurisdiction were identified through the use of HAZUS, the data questionnaire, and Census. Losses were estimated by utilizing the HAZUS database and the 2018 State Hazard Mitigation Plan when needed.

Step 6: Set Goals
The goals set in the previous plan update were carried over for this plan. It was felt that the current set of goals were still relevant and necessary, when the Mitigation Actions List was discussed and updated. Those goals summarized are:

- Goal 1: Implement mitigation actions that improve the protection of human life, health, and safety from the adverse effects of disasters

- Goal 2: Implement mitigation actions that improve the continuity of government and essential services from the adverse effects of disasters

- Goal 3: Implement mitigation actions that improve the protection of public and private property from the adverse effects of disasters

- Goal 4: Implement mitigation actions that improve the protection of community tranquility from the adverse effects of disasters

Step 7: Review Possible Mitigation Actions and Activities
Mitigation Actions were discussed. Each action from the last update was reviewed and updated individually by the MPC. A link to the FEMA publication *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards* was provided prior to first meeting with the questionnaire to give everyone projects to think about for their jurisdiction. A focus for the MPC was the addition of safe rooms in schools and public places and additional sirens that may be needed to the Mitigation Action Plan across the county.

Step 8: Draft an Action Plan
Based on the response from the final MPC meeting an Action Plan was formed from any on-going and remaining actions identified as well as actions added to the list. Possible grant opportunities to assist in achieving the set goals and actions were also discussed at throughout the meetings. On-going efforts and mitigation achievements through projects and policy is a priority for stakeholders.

Step 9: Adopt the Plan
Throughout the whole update process it was reiterated in word and text that in order for participation in the plan to count a jurisdiction must participate by attending at least one meeting or returning the survey/questionnaire, and lastly by signing an adoption resolution of the plan that can be included in the draft to SEMA.

Step 10: Implement, Evaluate, and Revise the Plan
Plan implementation was discussed at the final meeting while discussing grant and partnership opportunities to move the actions on the mitigation list along. Future revisions will be discussed in more detail one-on-one with the participating jurisdictions. Further details regarding implementation, monitoring and maintenance can be found in chapter 5, Plan Maintenance Process.

Chapter 2: Planning Area Profile

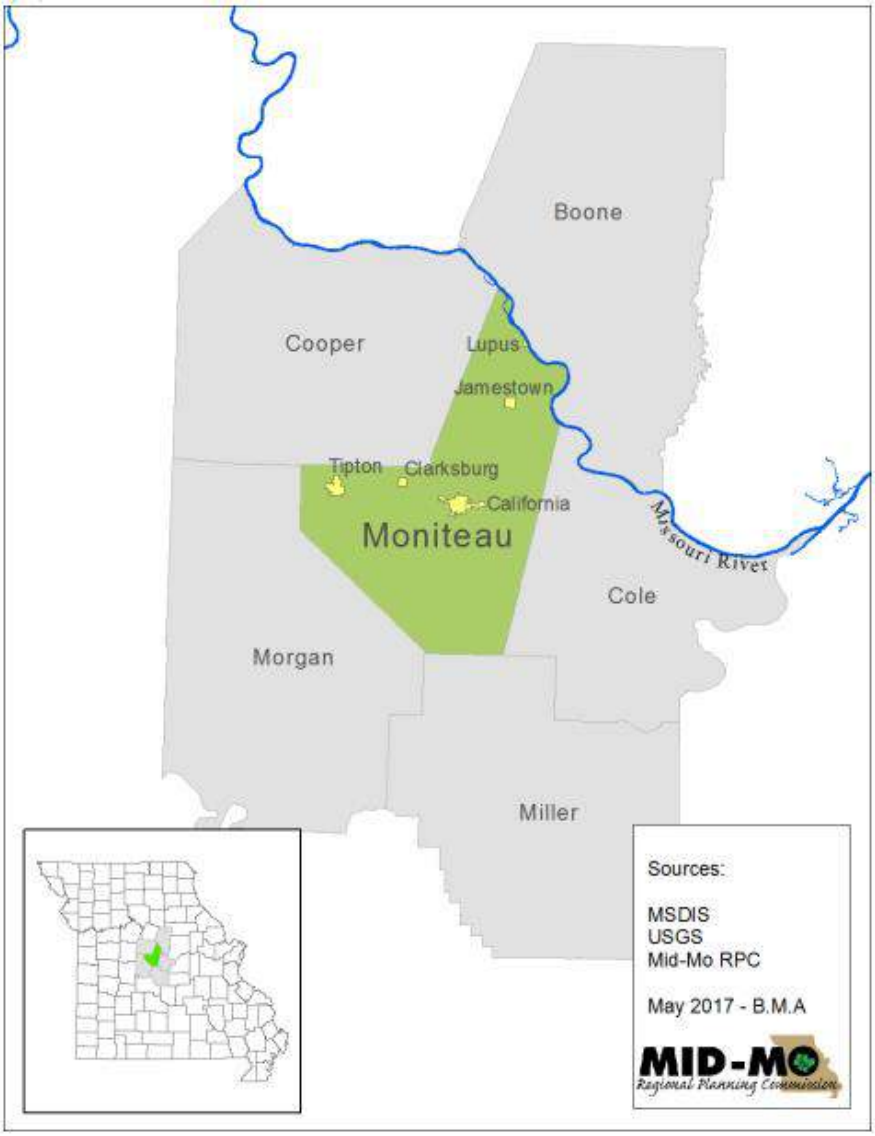
Chapter 2: Planning Area Profile

2.1 Moniteau County Planning Area Profile

Moniteau County is located in central Missouri with an area covering approximately 417 square miles. It is roughly midway between Kansas City to the west and St. Louis to the east.

The county is bordered on the north by Cooper County and the Missouri River, which separates it from Boone County. It is bordered on the east by Cole County, on the south by Miller County, and on the southwest and west by Morgan County.

Map 2.1



The 2020 Census indicated an overall population decrease in Moniteau County of 0.86% with an overall increase in housing units. The strongest growth was in California which saw over 5% increase in population and a 3.5% increase in housing.

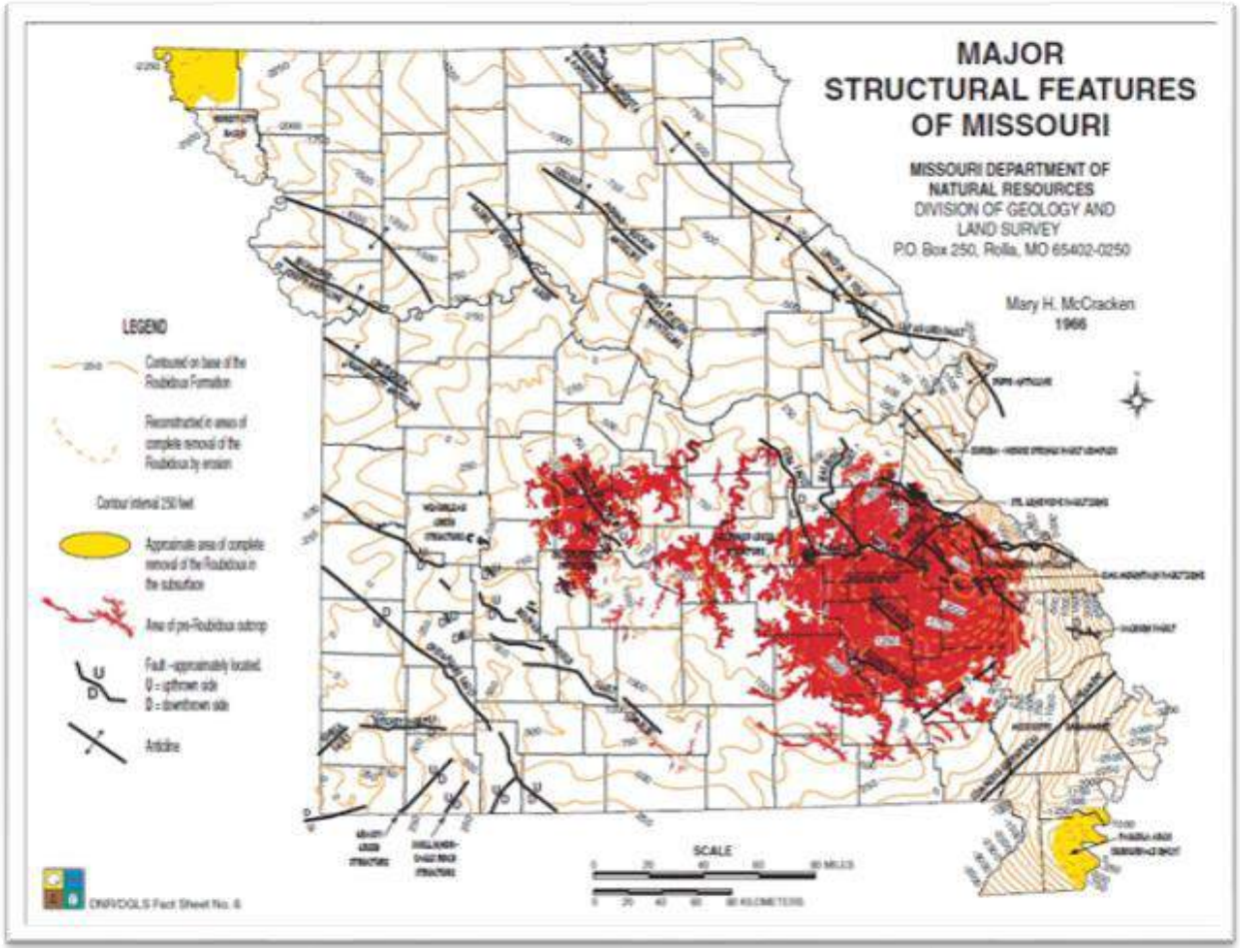
2019 ACS estimates that the median household income for Moniteau County to be $58,010 which is higher than the state median household income of $51,542, but is behind the National average of $68,703.

Median home prices in Moniteau County are estimated around $124,500 still fall short of the state median of $185,247 and the national price of $239,100.

2.1.1 Geography, Geology, and Topography

Geologically, a part of Moniteau County has been shaped by the Ozark uplift in the southeastern part of the state. This geology has implications for the hazards analyzed in this plan. Of particular concern is possible activity in the New Madrid Seismic Zone to the southeast.

Map 2.2



The entire county is located in the northern part of the Ozark Highlands. The ***Atlas of Missouri Ecoregions***, published by the Missouri Department of Conservation, describes the Ozark Highlands as

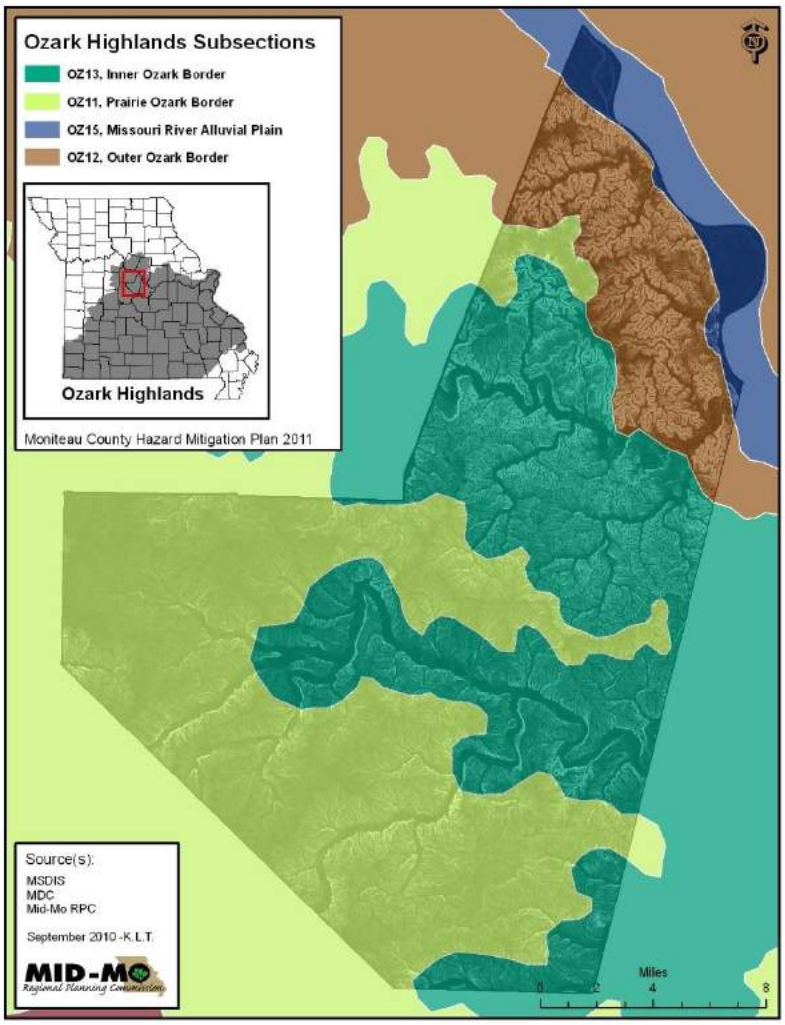
> "a distinctive biogeographic region that includes most of southern Missouri and much of northern Arkansas and small parts of Illinois, Oklahoma, and Kansas. Geologically, the Ozark Highlands is a low structural dome of essentially horizontally bedded strata that has been undergoing erosion and weathering for a quarter billion years into a thoroughly dissected plateau."

The Ozark Highlands is very diverse biologically and geographically with rugged hills, prairies, savannas, and open woodlands. The predominant underlying bedrock is carbonate (limestone

and dolomite), giving rise to karst topographic features such as caves, underground streams, and sinkholes.

The land in Moniteau County falls into four different subsections of the Ozark Highlands distinguished by differing landforms, soils, and vegetation (see Map 2.3). In turn, these subsections give rise to differences in land use patterns, conservation needs, and vulnerability to certain natural hazards.

Map 2.3



The following information summarized from the ***Atlas of Missouri Ecoregions*** gives brief descriptions of the land types found within the Ozark Highlands subsections in Moniteau County:

<u>Missouri River Alluvial Plain</u>
This subsection, consisting of the Missouri River channel and its adjoining alluvial plain, is found along the northeastern border of the county. Soils are deep and loamy and the area is subject to riverine flooding. Historically, the vegetation was typical bottomland species such as cottonwood, willow, sycamore, silver maple, elm, and hackberry. The area is primarily used for cropland.
Outer Ozark Border

The land is transitional between the Ozarks and the Dissected Till Plain. Local relief of 150 feet may reach 200 feet near the Missouri River. The uplands have a covering of loess over till; the loess may be quite deep in the blufflands. Deep ravines are found in some areas. Springs are saline and streams tend to be also. Historically, the area was oak forest. Currently, the area is predominantly pasture with cropland; second-growth forests and cedar thickets are found in isolated patches.

<u>Inner Ozark Border</u>
This subsection consists of dissected plains and hills with local reliefs averaging 100-150 feet. Historically, the area was largely oak savanna, woodland, and forest with frequent glades and

small prairie openings. Currently, the area consists of row crops, pasture, second growth forests, and overgrown glades.

Prairie Ozark Border

This subsection is a high, smooth plain with less than 100 feet of local relief. The underlying strata are limestone and dolomite and the area is blanketed with loess. This area is transitional between the wooded hills of the Ozarks and the open plains to the west; historically, it was mostly prairie with trees alongside streams. Currently, the land is mostly pasture with some significant tracts of cropland.

Missouri River Alluvial Plain

This subsection, consisting of the Missouri River channel and its adjoining alluvial plain, is found along the northern border of the county. Soils are deep and loamy and the area is subject to riverine flooding. Historically, the vegetation was typical bottomland species such as cottonwood, willow, sycamore, silver maple, elm, and hackberry.

The Missouri River's relationship to Moniteau County deserves special attention because the river is the defining physical feature in Mid-Missouri and defines the northern border of the county. It is the longest river in the country and drains approximately one sixth of the United States. The location of population centers close to the river in Moniteau County, which has meant significant flood damage in the county in the recent past.

Flood control structures, power plants, and other engineering projects have profoundly changed the course of the river since Lewis and Clark first traversed it in the early 1800s. In recent years debates over the future of the Missouri River have taken place among the seven states through which it runs. Commercial river traffic, recreational use, environmental concerns, managing river levels to comply with the needs of endangered species, and the preservation of sacred and historical sites along the river and floodplain are all issues which make the management of the river a sensitive balancing act.

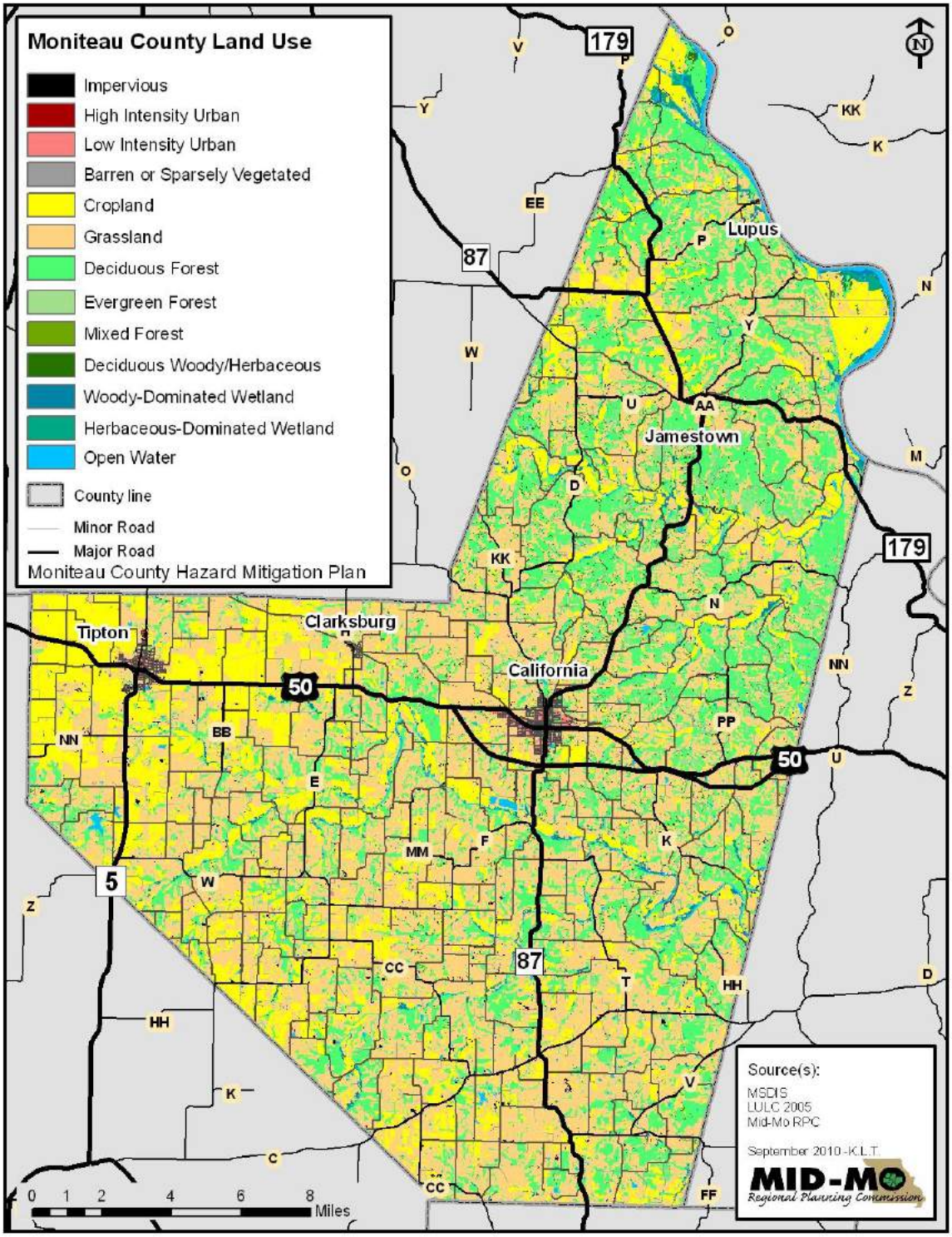
In both 1994 and 1995 the Missouri River was listed as one of the "10 Most Endangered Rivers in the Country" by American Rivers, a river conservation group (http://www.americanrivers.org/). This "Most Endangered" list does not reflect the rivers in the worst condition; rather, it seeks to highlight rivers "confronted by decisions in the coming year that could determine their future." The Missouri River was chosen for the list in the mid-1990s because of dam, channelization, navigation, and agricultural runoff issues.

The flooding of the river in 2011 brought the controversy over its management into sharp focus. Record snowfalls in the Rockies combined with heavy spring rains to result in record water releases from six reservoirs on the river. Flooding occurred along the river from Montana to Missouri. The U.S. Army Corps of Engineers came under sharp criticism for not releasing water earlier in the season so the reservoirs would be able to accommodate the snow melt and rains. Meetings were held throughout the Missouri River Basin where local frustration was voiced over species protection and recreation being prioritized over flood control in river management decisions.

2.1.2 Current Land Use

The land use map of Moniteau County (Map 2.4) shows clearly the amount of concentrated cropland and forest throughout the entire county.

Map 2.4



2.1.3 Climate

Moniteau County, like the rest of the state of Missouri, has variable weather patterns and extremes of temperature. With its central continental location, Missouri receives air masses bringing weather from all directions.

Warm humid air from the Gulf of Mexico can bring moisture year round and is the principal source of precipitation in the spring, summer, and fall; in contrast, air from other directions may be hot and dry (southwest), warm and dry (west), cold (northwest and north), cool and moist (northeast). The flow from the different source regions typically changes in a matter of days, giving rise to the commonly heard expression in Missouri, "If you don't like the weather, wait a day."

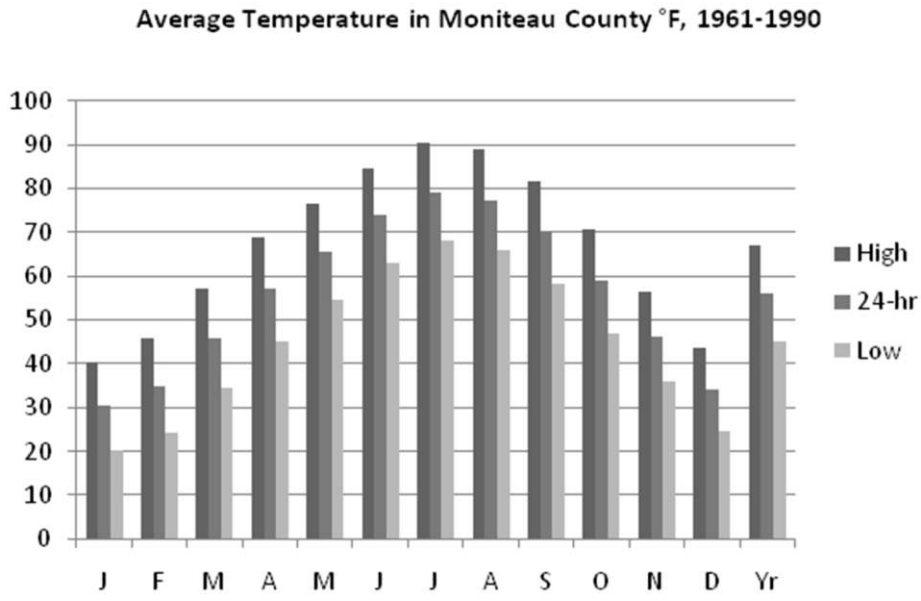
At times, the flow of air from one of the source regions will settle in and persist for weeks or months. These periods are associated with particular upper air flow patterns and associated surface conditions.

The ***Missouri State Hazard Mitigation Plan*** quotes Dr. Grant Darkow of the University of Missouri - Department of Atmospheric Science on the importance of understanding these weather patterns:

> "The persistence of these weather patterns and the possible resulting condition is the subject of several of the natural disasters discussed in this study. Specifically, floods, droughts, fires, heat waves, severe cold, and winter storms can be the result of the persistence of one of these weather patterns, whereas tornadoes can represent the outgrowth of rapid shifts in weather patterns. Knowing these patterns may assist in alerting disaster planners and the general public to the possibility of a developing emergency situation."

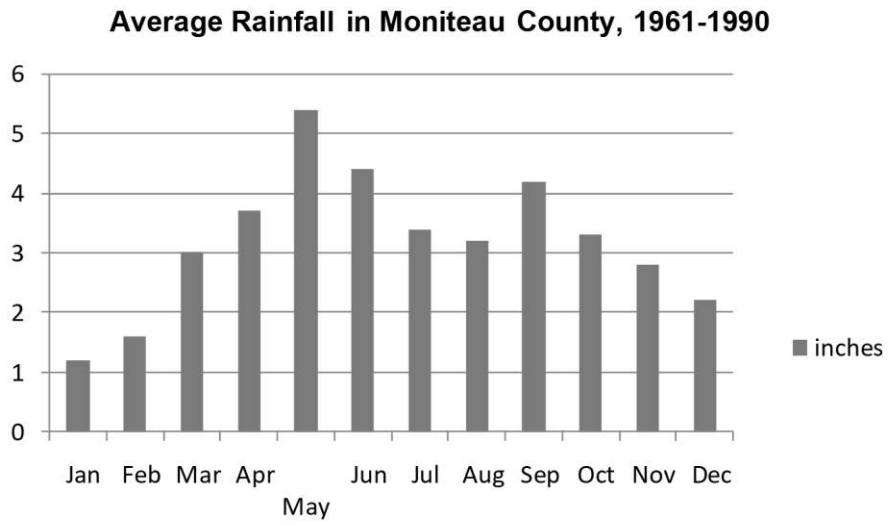
While Moniteau County does have extreme variations in weather at times, there is a relative pattern of temperature and rainfall consistent with a humid continental climate (see Figures 2.2.1 and 2.2.2). The data shown in the charts was collected at the California weather station in the years 1961-1990. The rainfall data showed an average of 38.3" of rainfall per year; average rainfall in this data set is defined as including precipitation of any form.

Figure 2.1



Source: http://www.worldclimate.com/cgi-bin/grid.pl?gr=N38W092

Figure 2.2



Source: Source: http://www.worldclimate.com/cgi-bin/data.pl?ref=N38W092+2300+231189C

2.1.4 Population/Demographics

There are five incorporated communities in Moniteau County: California (the county seat), Clarksburg, Jamestown, Lupus, and Tipton.

In Moniteau County, the 2020 census showed a slight decrease in overall population despite some increases in California and unincorporated Moniteau. There was 0.17% decrease in housing units overall, but there showed a growth in available units in places where a growth in population was had.

Table 2.1 Moniteau County Population 2010-2020 by Jurisdiction

Jurisdiction	2020 Population	2010 Population	2019 Annual Population Estimate or ACS Population	# Change (2010-2020)	% Change (2010-2020)
Moniteau County	7,443	7,314	7,611	129	1.7%
California	4,498	4,278	4,405	220	5.14%
Jamestown	330	386	443	-56	-14.5%
Lupus	28	33	25	-5	-15%
Tipton	2,920	3,262	3,372	-342	-10.5
Total	15,473	15,607	16,046	-134	-0.86%

Source: U.S. Bureau of the Census, Decennial Census, annual population estimates/ 5-Year American Community Survey 2019; *population includes the portions of these cities in adjacent counties

Some sectors of the population are more vulnerable in general to the threat of hazardous events. Children need the help and guidance of adults, especially in the extraordinary circumstances, and this is also true for some older citizens. Approximately 25% of the county's population is under the age of 18; approximately 16% is 65 years and older, according to 2019 estimates from the American Community Survey of the U.S. Census Bureau.

The University of South Carolina developed an index to evaluate and rank the ability to respond to, cope with, recover from, and adapt to disasters. The index synthesizes 29 socioeconomic variables which research literature suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards. Moniteau was given a Medium Low SOVI Index Ranking within the state of Missouri.

Table 2.2 Unemployment, Poverty, Education, and Language Percentage Demographics, Moniteau County, Missouri

Jurisdiction	Total in Labor Force	Percent of Population Unemployed	Percent of Families Below the Poverty Level	Percentage of Population (High School graduate)	Percentage of Population (Bachelor's degree or higher)	Percentage of population with spoken language other than English
Moniteau County	7,265	2.5%	7.8%	31.3%	2.5%	9.6%
California	2,268	3.9%	9.5%	44.6%	0%	12.1%
Jamestown	219	3.6%	8.5%	15.2%	0%	5%
Lupus	13	0%	0%	0%	0%	0%
Tipton	988	2.3%	13.3%	31.1%	16.3%	2%
Missouri	3,062,657	5.8%	10.3%	89.2%	28.2%	6%

United States	162,184,235	6.6%	10.5%	87.3%	30.9%	21.3%

Source: U.S. Census, 2019 American Community Survey, 5-year Estimates

2.1.5 History

Archaeological findings in Moniteau County indicate a long period of occupation of the land prior to the settlement of white people from Kentucky and Louisiana. The name "Moniteau" itself is a French spelling of the native people's name for the Great Spirit or Deity.

The area was part of the Louisiana Purchase of 1803 and originally part of Howard County, the "Mother of Counties," out of which many central Missouri counties were carved.

Settlers from Kentucky and Tennessee began arriving somewhere around 1812-1816. They found the land rich for farming and the weather "reasonable". Moniteau County was organized as a county in 1845. Plentiful lead and coal deposits brought mining companies and miners in the mid-to-late 1800s.

Moniteau County has been subject to many natural hazards in the past. Floods, droughts, windstorms, hail, tornadoes, severe winter weather, and extreme heat have all taken their tolls.

Historical accounts further back than this plan will cover tell of a "cyclone" which "created havoc" north of Clarksburg in April of 1880; the cyclone (tornado) demolished every house in the town of Barnettsville, killed many people and seriously injured thirty others. A relief committee was organized in High Point after the storm. In July of 1881, another windstorm did a lot of damage in Linn Township.

A destructive hailstorm in April of 1887 destroyed eighty lights in the Aurora school building, forty in the courthouse, and some in all the public and private buildings.

2.1.6 Occupations

Moniteau County is within the designated Jefferson City, Mo Metropolitan Statistical Area (MSA), according to the U.S. Census Bureau. Metropolitan statistical areas are geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. A metro area consists of a core urban area of 50,000 or more population, the county or counties containing the core urban area, and adjacent counties which have a high degree of social and economic integration with the urban core (as measured by commuting to work).

Jefferson City (Cole County) is the urban core for this metro area which includes Cole, Callaway, Osage and Moniteau Counties. The MSA designation is indicative of growth in Jefferson City area; prior to the year 2000, Jefferson's City population was below 50,000 so it would not have qualified as a core area.

Jefferson City is the capital of the State of Missouri and has jobs that are often more lucrative than those in the other counties of the MSA. A large number of residents of Moniteau County actually work in Jefferson City/Cole County.

Table 2.3 Occupation Statistics, Moniteau County, Missouri

Place	Management, Business, Science, and Arts Occupations	Service Occupations	Sales and Office Occupations	Natural Resources, Construction, and Maintenance Occupations	Production, Transportation, and Material Moving Occupations
Moniteau County	2,325	906	1,529	956	1,228
California	659	213	577	205	478
Jamestown	58	19	49	10	68
Lupus	7	0	2	4	0
Tipton	308	138	186	87	202

Source: U.S. Census, 2019 American Community Survey, 5-year Estimates.

2.1.7 Agriculture

Agriculture is a much more important component of the economy in Moniteau County than the number of workers employed in the sector would indicate. There are 242,946 acres in farmland in the county according to the 2017 Census of Agriculture from the U.S. Department of Agriculture (USDA). This farmland comprises over 90.5% of the land area of the county, which is up from nearly 88% in the 2012 census.

Corn, soybeans and hay are the major crops in the county; cattle and poultry are the main livestock. The total market value for all agricultural products (crops and livestock) sold in 2017 was $123,047,000. Moniteau County ranks high within the State of Missouri for the value of its agricultural production, most notably for cattle and calves.

Table 2.4 Agricultural Overview, Moniteau County	2012	2017	Change
Approximate land area (acres)	268,160	268,160	-
Land in farms (acres)	235,204	242,946	7,742
Percentage in farms	87.7%	90.5%	2.7%
Number of farms	1,061	1,138	77
Average size of farm (acres)	216	213	-3
Estimated market value of land and buildings	634,520,007	576,944,378	-57,575,629
Average value per farm	582,663	506,981	-75,682
Average value per acre	2,698	2,375	-323
Total sales	173,480,000	123,047,000	-50,433,000
Average sales per farm	159,302	108,126	-50,176
Source: USDA Census of Agriculture 2017			

2.1.8 FEMA Hazard Mitigation Assistance (HMA) Grants in Planning Area

There has been one hazard mitigation assistance grants in the planning area. This grant went to construct a Tornado Safe Room for the Moniteau Co. R-V school located in the unincorporated community of Latham.

Table 2.5 FEMA HMA Grants in County 1993-2022

Disaster Declaration	Project Type	Sub-Grantee	Date Approved	Project Total
DR-1961	Safe Room	R-V Latham	7/9/2014	185093
Total				**185093**

2.1.9 FEMA Public Assistance (PA) Grants in Planning Area

There has been over $600,000 in Public Assistance (PA) grants awarded in Moniteau County. Below is $614,289.88 in projects that have varied in size and location through the county.

Table 2.6 FEMA PA Grants in County from 1973-2021

Disaster Number	Applicant	Project Type	Project Size	Project Amount
1736	TIPTON, CITY OF	Debris Removal	Small	8207.61
1736	MONITEAU (COUNTY)	Protective Measures	Small	21221.49
1736	TIPTON, CITY OF	Protective Measures	Small	4215.35
1736	TIPTON, CITY OF	Protective Measures	Small	1069.13
1736	CALIFORNIA	Protective Measures	Small	18672.79
1736	MONITEAU COUNTY R-1 SCHOOL DISTRICT	Protective Measures	Small	8261.59
1736	MONITEAU COUNTY R-1 SCHOOL DISTRICT	Debris Removal	Small	5039.09
1736	CALIFORNIA	Debris Removal	Large	72305.66
1736	CALIFORNIA	Public Utilities	Large	70657.5
1736	MONITEAU COUNTY R-1 SCHOOL DISTRICT	Public Buildings	Small	1000
1736	MONITEAU (COUNTY)	Debris Removal	Small	28233.6
1736	MONITEAU (COUNTY)	Debris Removal	Large	34049.32
1961	MONITEAU COUNTY COMMISSION	Protective Measures	Small	32797.57
1961	TIPTON, CITY OF	Protective Measures	Small	10174.13
1961	CALIFORNIA	Protective Measures	Small	27890.81

1961	MID-MO AMBULANCE DISTRICT	Protective Measures	Small	1083.75
4238	TIPTON, CITY OF	Roads and Bridges	Small	11783.56
4238	MONITEAU (COUNTY)	Roads and Bridges	Small	22156.6
4238	MONITEAU (COUNTY)	Roads and Bridges	Small	7608.26
4238	MONITEAU (COUNTY)	Roads and Bridges	Large	227862.07
4490	TIPTON R-VI SCHOOL DISTRICT	Protective Measures	Small	0

2.2 Jurisdictional Profiles and Mitigation Capabilities

The following is the individual profiles for each participating jurisdiction. Information regarding previous mitigation initiatives and ongoing efforts can be found in the summary tables below. These tables indicate specific capabilities of each jurisdiction that relate to their ability to implement mitigation opportunities. Unincorporated Moniteau County is profiled first, followed by the incorporated communities, special districts, the public schools, and higher education.

2.2.1 Unincorporated Moniteau County

Moniteau County is governed by an elected three-member Board of Commissioners composed of a Presiding Commissioner, a Northern (District 1) Commissioner, and a Southern (District 2) Commissioner. The Commission carries out the following responsibilities:

- establishes Moniteau County policy
- approves and adopts the annual budget for all County operations
- approves actual expenditures for each department
- supervises the operations of County departments
- ensures County-wide compliance with numerous statutory requirements
- acts as liaison with County boards, commissions, and other local and regional governmental entities

Moniteau County has the following departments and offices:

- Assessor
- Auditor
- Collector
- County Clerk
- Emergency Management
- Prosecuting Attorney
- Public Administrator
- Recorder
- Roads and Bridges Department
- Sheriff
- Treasurer

Capabilities	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
City Emergency Operations Plan	No
County Emergency Operations Plan	Yes
Local Recovery Plan	No
County Recovery Plan	No
City Mitigation Plan	No
County Mitigation Plan	2017
Debris Management Plan	No
Economic Development Plan	Yes
Transportation Plan	Regional-2016
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No

Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	Yes
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Stormwater Ordinance	No
Drainage Ordinance	No
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Seismic Construction Ordinance	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
Hazard Awareness Program	No
National Flood Insurance Program (NFIP)	Yes
NFIP Community Rating System (CRS) program	No
National Weather Service (NWS) Storm Ready	No
Firewise Community Certification	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	N/A

Capabilities	Status Including Date of Document or Policy
Economic Development Program	Yes
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	No
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No

Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	Yes
Emergency Management Director	Yes
NFIP Floodplain Administrator	Yes
Emergency Response Team	Yes
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	N/A
Sanitation Department	No
Transportation Department	Yes
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	Yes
Local Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.	Yes

Capabilities	Status Including Date of Document or Policy
Local Funding Availability	
Apply for Community Development Block Grants	Yes
Fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	No
impact fees for new development	Yes
Ability to incur debt through general obligation bonds	N/A
Ability to incur debt through special tax bonds	N/A
Ability to incur debt through private activities	No
Withhold spending in hazard prone areas	N/A

2.2.2 California

The City of California is governed by a Mayor and Board of Aldermen. The city has a City Clerk and a total staff of 40+. The Board of Public Works (Water, Sewer, Electric, Sanitation), the Street Department and the Parks Department make up the public works services in the city.

Water for the city is provided by five deep wells; the city has two storage tanks. Currently, there is no backup power at the wells. The city also sells water to PWSD #2 which supplies water to some of the surrounding unincorporated area. There are plans for a new booster pump at windmill Ridge.

There are 3 warning sirens located in California; these are activated by the MCED and are tested monthly.

The City of California owns and maintains Proctor Lake Park in the southern part of the City. This 7-8 acre reservoir, which drains 315 acres, is contained by a 20 foot high dam. The dam has a federal classification of low hazard and state classification of 3.

The lake is populated with bass, sunfish, and catfish and provided with a dock. The City also maintains sand volleyball court, tennis courts, playground, walking trail, disc golf course, picnic tables, pavilions, and restrooms at the park.

California is a member of the NFIP and development in the 100-year floodplain would be regulated by the city's floodplain ordinance. There has been some residential growth around town but none in floodplain. Plans to replace the wastewater treatment plant with larger more modern facility to keep up with growth are set for the next coming years, as well as expansion of services on the west side of city. A stormwater project has been submitted with the county and awaits approval.

Capabilities	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	n/a
Builder's Plan	n/a
Capital Improvement Plan	n/a
City Emergency Operations Plan	Jan 2014
County Emergency Operations Plan	n/a
Local Recovery Plan	n/a
County Recovery Plan	n/a
City Mitigation Plan	n/a
County Mitigation Plan	n/a
Debris Management Plan	n/a
Economic Development Plan	n/a
Transportation Plan	Regional-2016
Land-use Plan	n/a
Flood Mitigation Assistance (FMA) Plan	n/a

Watershed Plan	n/a
Firewise or other fire mitigation plan	n/a
School Mitigation Plan	n/a
Critical Facilities Plan (Mitigation/Response/Recovery)	n/a
Policies/Ordinance	
Zoning Ordinance	n/a
Building Code	n/a
Floodplain Ordinance	2011
Subdivision Ordinance	April 1981
Tree Trimming Ordinance	Sep 2005
Nuisance Ordinance	Dec 2017
Stormwater Ordinance	1975
Drainage Ordinance	n/a
Site Plan Review Requirements	n/a
Historic Preservation Ordinance	Feb
Landscape Ordinance	n/a
Seismic Construction Ordinance	n/a
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	n/a
Hazard Awareness Program	n/a
National Flood Insurance Program (NFIP)	Yes
NFIP Community Rating System (CRS) program	n/a
National Weather Service (NWS) Storm Ready	n/a
Firewise Community Certification	n/a
Building Code Effectiveness Grading (BCEGs)	n/a
ISO Fire Rating	5

Capabilities	Status Including Date of Document or Policy
Economic Development Program	n/a
Land Use Program	n/a
Public Education/Awareness	n/a
Property Acquisition	n/a
Planning/Zoning Boards	n/a
Stream Maintenance Program	n/a
Tree Trimming Program	n/a
Engineering Studies for Streams (Local/County/Regional)	n/a
Mutual Aid Agreements	Yes, Fire
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	N/A
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No

Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	Yes
Staff/Department	
Building Code Official	Yes
Building Inspector	Yes
Mapping Specialist (GIS)	Yes
Engineer	Yes
Development Planner	No
Public Works Official	Yes
Emergency Management Director	Yes
NFIP Floodplain Administrator	Yes
Emergency Response Team	Yes
Hazardous Materials Expert	No
Local Emergency Planning Committee	N/A
County Emergency Management Commission	Yes
Sanitation Department	Yes
Transportation Department	Yes
Economic Development Department	N/A
Housing Department	N/A
Historic Preservation	N/A
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	Yes
Local Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	Yes
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.	Yes

Capabilities	Status Including Date of Document or Policy
Local Funding Availability	
Apply for Community Development Block Grants	N/A
Fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
impact fees for new development	n/a
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	n/a
Ability to incur debt through private activities	n/a
Withhold spending in hazard prone areas	n/a

2.2.3 Jamestown

The City of Jamestown is governed by a Mayor and City Council consisting of 4 alderman.

Jamestown has one outdoor warning siren that was installed since the last update.

Since the last update a treatment plant has been constructed east of town. City officials are aware of the existence of 100-year floodplain in this area but the treatment pools are located outside of the floodplain and should not be at risk.

The main economic development issue facing Jamestown is the distance from major highways and railways. Hwy 179 that is the most direct route from Jefferson City to Jamestown can flood in major rain events making the commute for those working in the state capital considerably longer during those time. It is expected that the upgrade of the wastewater treatment system with additional lines will help bring small businesses to the city.

Capabilities	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	n/a
Capital Improvement Plan	n/a
City Emergency Operations Plan	Yes
County Emergency Operations Plan	Yes
Local Recovery Plan	No
County Recovery Plan	Yes
City Mitigation Plan	No
County Mitigation Plan	Yes
Debris Management Plan	No
Economic Development Plan	No
Transportation Plan	Regional-2016
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	Np
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes
Policies/Ordinance	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	Yes
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes

Stormwater Ordinance	No
Drainage Ordinance	No
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Seismic Construction Ordinance	No
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	No
Hazard Awareness Program	No
National Flood Insurance Program (NFIP)	Yes
NFIP Community Rating System (CRS) program	No
National Weather Service (NWS) Storm Ready	No
Firewise Community Certification	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	N/A

Capabilities	Status Including Date of Document or Policy
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes, Fire
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	Yes
Emergency Management Director	Yes

NFIP Floodplain Administrator	Yes
Emergency Response Team	Yes
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	N/A
Sanitation Department	Yes – Contracted
Transportation Department	No
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	No
Local Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.	Yes

Capabilities	Status Including Date of Document or Policy
Local Funding Availability	
Apply for Community Development Block Grants	Yes
Fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
impact fees for new development	No
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Withhold spending in hazard prone areas	No

2.2.4 Lupus

Lupus is a very small town without any businesses. There is not currently any development taking place nor any foreseeable development in the future.

The one building owned by the City of Lupus is the Town Hall which is cinderblock construction on a concrete pad. Though not shown in the HAZUS data, there is one church in Lupus.

Capabilities	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	n/a see Moniteau County plan
Builder's Plan	n/a
Capital Improvement Plan	n/a
City Emergency Operations Plan	n/a
County Emergency Operations Plan	n/a
Local Recovery Plan	n/a
County Recovery Plan	n/a
City Mitigation Plan	n/a
County Mitigation Plan	n/a
Debris Management Plan	n/a
Economic Development Plan	n/a
Transportation Plan	Regional-2016
Land-use Plan	n/a
Flood Mitigation Assistance (FMA) Plan	n/a
Watershed Plan	n/a
Firewise or other fire mitigation plan	n/a
School Mitigation Plan	n/a
Critical Facilities Plan (Mitigation/Response/Recovery)	n/a
Policies/Ordinance	
Zoning Ordinance	n/a
Building Code	n/a
Floodplain Ordinance	February 2011
Subdivision Ordinance	n/a
Tree Trimming Ordinance	n/a
Nuisance Ordinance	n/a
Stormwater Ordinance	n/a
Drainage Ordinance	n/a
Site Plan Review Requirements	n/a
Historic Preservation Ordinance	n/a
Landscape Ordinance	n/a
Seismic Construction Ordinance	n/a
Program	
Zoning/Land Use Restrictions	flood plain ordinance February 2011
Codes Building Site/Design	n/a

Hazard Awareness Program	n/a
National Flood Insurance Program (NFIP)	joined NFIP before 1993
NFIP Community Rating System (CRS) program	n/a
National Weather Service (NWS) Storm Ready	n/a
Firewise Community Certification	n/a
Building Code Effectiveness Grading (BCEGs)	n/a
ISO Fire Rating	n/a

Capabilities	Status Including Date of Document or Policy
Economic Development Program	n/a
Land Use Program	n/a
Public Education/Awareness	n/a
Property Acquisition	n/a
Planning/Zoning Boards	n/a
Stream Maintenance Program	n/a
Tree Trimming Program	n/a
Engineering Studies for Streams (Local/County/Regional)	n/a
Mutual Aid Agreements	n/a
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	
Hazard Analysis/Risk Assessment (County)	
Flood Insurance Maps	
FEMA Flood Insurance Study (Detailed)	
Evacuation Route Map	
Critical Facilities Inventory	
Vulnerable Population Inventory	
Land Use Map	
Staff/Department	
Building Code Official	
Building Inspector	
Mapping Specialist (GIS)	
Engineer	
Development Planner	
Public Works Official	
Emergency Management Director	
NFIP Floodplain Administrator	Yes
Emergency Response Team	
Hazardous Materials Expert	
Local Emergency Planning Committee	
County Emergency Management Commission	
Sanitation Department	
Transportation Department	
Economic Development Department	
Housing Department	

Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	No
Local Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.	No

Capabilities	Status Including Date of Document or Policy
Local Funding Availability	
Apply for Community Development Block Grants	Applied and received 1998
Fund projects through Capital Improvements funding	n/a
Authority to levy taxes for a specific purpose	n/a
Fees for water, sewer, gas, or electric services	n/a
impact fees for new development	n/a
Ability to incur debt through general obligation bonds	n/a
Ability to incur debt through special tax bonds	n/a
Ability to incur debt through private activities	n/a
Withhold spending in hazard prone areas	n/a

2.2.5 Tipton

There are 2 warning sirens located in Tipton. One is located at City Hall and is activated by the City Marshal or a Police Officer; it is tested periodically. The other is located at the Fire Station and is activated by Moniteau County Emergency Dispatch (MCED); it is tested monthly.

The Public Works Department oversees the water and sewer systems and the streets. The city well has a generator for backup power.

The City of Tipton owns and maintains Tipton Park Lake in the southern part of the city. This 6 acre reservoir is on the site of an old lagoon and is not very deep.

The lake is populated with bass, sunfish, and catfish. The City also maintains a paved walking trail, restrooms, pavilions, playground, basketball court, horseshoe pits, baseball field, parking lots, barbecue pits and picnic tables.
Tipton has acquired the Fairgrounds from the Agricultural and Mechanical Society (A&M Society) and is using it for rodeos, fairs, and rentals. The city is looking for possible ways to increase its use.

The city is considering expanding the Park and Recreation Department. There has been discussion regarding building a swimming pool and recreation center but this is on hold (as of fall 2011) due to economic conditions.

The MO Department of Transportation (MoDOT) has considered an expansion of U.S. Highway 50 (which runs directly through Tipton) from a 2-lane to 4-lane road between California to the east and Sedalia to the west. This potential project has been put on hold due to economic conditions. Should this project be revived, the City of Tipton would probably annex more land to the south of the current city limits. Faster commute times would be likely to bring more residents to the city.

Capabilities	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	Adopted Sept. 8, 2016
Builder's Plan	
Capital Improvement Plan	
City Emergency Operations Plan	X
County Emergency Operations Plan	X
Local Recovery Plan	
County Recovery Plan	
City Mitigation Plan	
County Mitigation Plan	
Debris Management Plan	
Economic Development Plan	
Transportation Plan	Regional-2016
Land-use Plan	

Flood Mitigation Assistance (FMA) Plan	
Watershed Plan	
Firewise or other fire mitigation plan	
School Mitigation Plan	
Critical Facilities Plan (Mitigation/Response/Recovery)	
Policies/Ordinance	
Zoning Ordinance	
Building Code	
Floodplain Ordinance	X 2010
Subdivision Ordinance	
Tree Trimming Ordinance	
Nuisance Ordinance	X
Stormwater Ordinance	
Drainage Ordinance	
Site Plan Review Requirements	
Historic Preservation Ordinance	
Landscape Ordinance	
Seismic Construction Ordinance	
Program	
Zoning/Land Use Restrictions	
Codes Building Site/Design	
Hazard Awareness Program	
National Flood Insurance Program (NFIP)	X
NFIP Community Rating System (CRS) program	
National Weather Service (NWS) Storm Ready	
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	
ISO Fire Rating	X

Capabilities	Status Including Date of Document or Policy
Economic Development Program	X multi-jurisdictional efforts - MRED
Land Use Program	
Public Education/Awareness	
Property Acquisition	
Planning/Zoning Boards	
Stream Maintenance Program	
Tree Trimming Program	
Engineering Studies for Streams (Local/County/Regional)	
Mutual Aid Agreements	X
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	
Hazard Analysis/Risk Assessment (County)	
Flood Insurance Maps	X
FEMA Flood Insurance Study (Detailed)	

Evacuation Route Map	
Critical Facilities Inventory	X
Vulnerable Population Inventory	
Land Use Map	
Staff/Department	
Building Code Official	
Building Inspector	As needed
Mapping Specialist (GIS)	
Engineer	
Development Planner	
Public Works Official	X
Emergency Management Director	X
NFIP Floodplain Administrator	X
Emergency Response Team	
Hazardous Materials Expert	
Local Emergency Planning Committee	
County Emergency Management Commission	
Sanitation Department	
Transportation Department	
Economic Development Department	
Housing Department	
Historic Preservation	
Non-Governmental Organizations (NGOs)	
American Red Cross	
Salvation Army	
Veterans Groups	
Local Environmental Organization	
Homeowner Associations	
Neighborhood Associations	
Chamber of Commerce	X
Community Organizations (Lions, Kiwanis, etc.	

Capabilities	Status Including Date of Document or Policy
Local Funding Availability	
Apply for Community Development Block Grants	X
Fund projects through Capital Improvements funding	X
Authority to levy taxes for a specific purpose	X
Fees for water, sewer, gas, or electric services	X
impact fees for new development	
Ability to incur debt through general obligation bonds	X
Ability to incur debt through special tax bonds	X
Ability to incur debt through private activities	

Withhold spending in hazard prone areas	

Table 2.7 Mitigation Capabilities Summary Table

CAPABILITIES	Uninc. Moniteau	California	Jamestown	Lupus	Tipton
Planning Capabilities					
Comprehensive Plan	No	No	No	No	No
Builder's Plan	No	No	No	No	No
Capital Improvement Plan	No	No	No	1/2021	No
Local Emergency Plan	No	Yes	Yes	11/2020	No
County Emergency Plan	Yes	Yes	Yes	Yes	Yes
Local Recovery Plan	No	No	No	N/A	No
County Recovery Plan	No	No	No	No	No
Local Mitigation Plan	No	No	No	No	No
County Mitigation Plan	2017	2017	2017	2017	2017
Local Mitigation Plan (PDM)	No	N/A	N/A	N/A	N/A
County Mitigation Plan (PDM)	No	N/A	N/A	N/A	N/A
Debris Management Plan	No	No	No	No	No
Economic Development Plan	No	No	No	No	No
Transportation Plan	2016	Yes	Yes	No	Yes
Land-use Plan	No	No	No	No	No
Flood Mitigation Assistance (FMA) Plan	No	No	No	No	No
Watershed Plan	No	No	No	No	No
Firewise or other fire mitigation plan	No	No	No	No	No
School Mitigation Plan	No	No	No	No	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No	No	No	No	No
Policies/Ordinance					
Zoning Ordinance	No	Yes	Yes	N/A	No
Building Code	No	Yes	No	No	IBC
Floodplain Ordinance	Yes	Yes	Yes	No	Yes

CAPABILITIES	Uninc. Moniteau	California	Jamestown	Lupus	Tipton
Subdivision Ordinance	No	Yes	No	N/A	No
Tree Trimming Ordinance	No	No	No	N/A	No
Nuisance Ordinance	No	Yes	No	9/2003	Yes
Storm Water Ordinance	No	No	No	Yes	Yes
Drainage Ordinance	No	No	No	Yes	No
Site Plan Review Requirements	No	No	No	No	No
Historic Preservation Ordinance	No	Yes	No	No	No
Landscape Ordinance	No	No	No	No	No
Iowa Wetlands and Riparian Areas Conservation Plan	No	No	No	No	No
Program					
Zoning/Land Use Restrictions	No	Yes	Yes	N/A	No
Codes Building Site/Design	No	No	No	N/A	IBC
National Flood Insurance Program (NFIP) Participant	Yes	Yes	Yes	No	Yes
NFIP Community Rating System (CRS) Participating Community	No	No	No	N/A	No
Hazard Awareness Program	No	Yes	No	N/A	No
National Weather Service (NWS) Storm Ready	No	Yes	No	Yes	No
Building Code Effectiveness Grading (BCEGs)	No	No	No	N/A	No
ISO Fire Rating	N/A	7	N/A	5	5
Economic Development Program	Yes	No	No	N/A	No
Land Use Program	No	Yes	No	N/A	No
Public Education/Awareness	No	Yes	No	Yes	No
Property Acquisition	No	No	No	N/A	No
Planning/Zoning Boards	No	Yes	Yes	N/A	No
Stream Maintenance Program	No	No	No	N/A	No

CAPABILITIES	Uninc. Moniteau	California	Jamestown	Lupus	Tipton
Tree Trimming Program	No	No	No	No	No
Engineering Studies for Streams (Local/County/Regional)	No	No	No	N/A	No
Mutual Aid Agreements	Yes	No	Yes	Yes	No
Studies/Reports/Maps					
Hazard Analysis/Risk Assessment (Local)	No	No	No	No	No
Hazard Analysis/Risk Assessment (County)	Yes	No	No	No	No
Flood Insurance Maps	No	N/A	N/A	N/A	N/A
FEMA Flood Insurance Study (Detailed)	No	N/A	N/A	N/A	N/A
Evacuation Route Map	No	No	No	No	No
Critical Facilities Inventory	No	Yes	No	Yes	No
Vulnerable Population Inventory	No	No	No	No	No
Land Use Map	No	Yes	No	No	No
Staff/Department					
Building Code Official	No	No	No	No	Yes
Building Inspector	No	No	No	No	Yes
Mapping Specialist (GIS)	No	Yes	No	No	No
Engineer	No	No	No	No	No
Development Planner	No	No	No	No	No
Public Works Official	Yes	No	Yes	No	Yes
Emergency Management Coordinator	Yes	Yes	County	Yes	Yes
NFIP Floodplain Administrator	Yes	Yes	Yes	No	Yes
Emergency Response Team	Yes	No	No	No	Yes
Hazardous Materials Expert	No	No	No	Yes	No
Local Emergency Planning Committee	Yes	Yes	No	Yes	No

CAPABILITIES	Uninc. Moniteau	California	Jamestown	Lupus	Tipton
County Emergency Management Commission	No	Yes	Yes	Yes	Yes
Sanitation Department	No	Yes	No	No	Yes
Transportation Department	Yes	No	No	No	No
Economic Development Department	No	No	No	Yes	Yes
Housing Department	No	No	No	No	No
Historic Preservation	No	Yes	No	No	No
Non-Governmental Organizations (NGOs)					
American Red Cross	No	Yes	No	No	No
Salvation Army	No	No	No	No	No
Veterans Groups	Yes	No	No	No	No
Environmental Organization	No	No	No	No	No
Homeowner Associations	No	No	No	No	No
Neighborhood Associations	No	No	No	No	No
Chamber of Commerce	Yes	No	No	Yes	No
Community Organizations (Lions, Kiwanis, etc.	Yes	Yes	Yes	No	No
Financial Resources					
Apply for Community Development Block Grants	Yes	Yes	Yes	Yes	Yes
Fund projects through Capital Improvements funding	Yes	Yes	Yes	No	Yes
Authority to levy taxes for specific purposes	Yes	Yes	No	Yes	Yes
Fees for water, sewer, gas, or electric services	No	Yes	Yes	Yes	Yes
Impact fees for new development	Yes	No	No	No	No
Incur debt through general obligation bonds	Yes	Yes	Yes	Yes	Yes
Incur debt through special tax bonds	Yes	Yes	Yes	Yes	Yes

CAPABILITIES	Uninc. Moniteau	California	Jamestown	Lupus	Tipton
Incur debt through private activities	No	No	No	No	No
Withhold spending in hazard prone areas	No	Yes	No	No	Yes

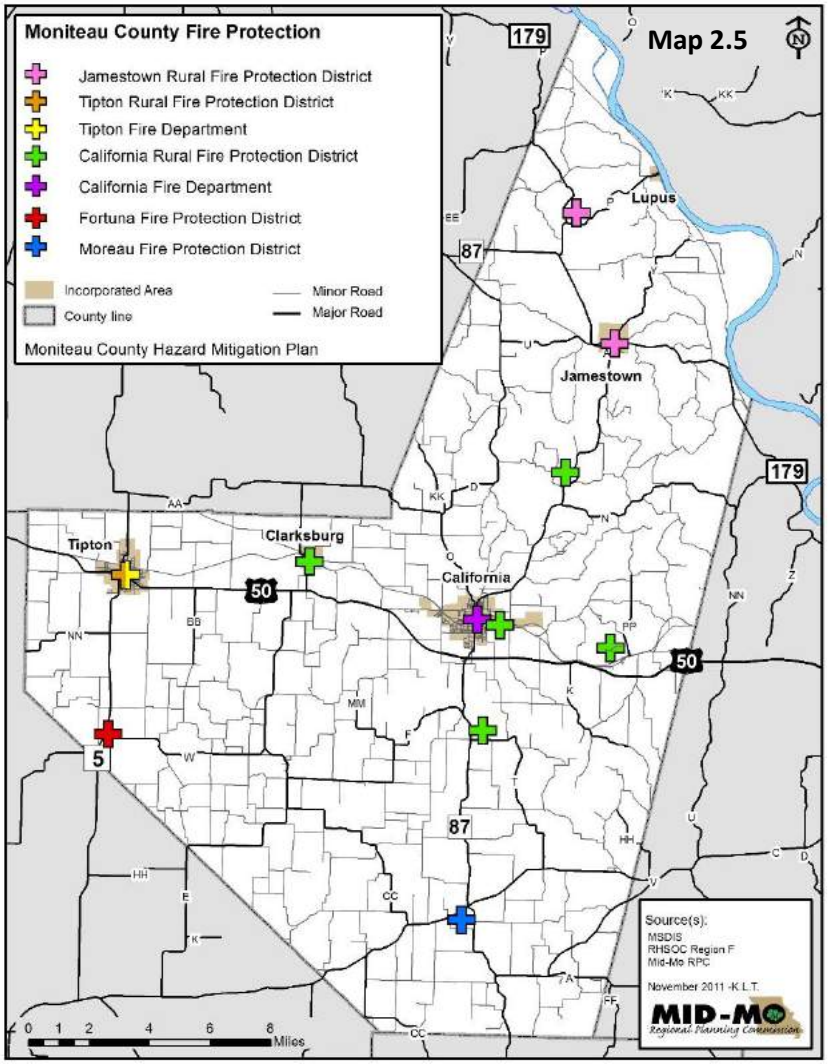
Source: Data Collection Questionnaire, 2022

2.3 Special District

There are numerous special districts in the planning area which are vital to the health and safety of the population. In addition to providing basic services, personnel of the special districts possess a wealth of knowledge and experience valuable for hazard mitigation planning.

2.3.1 Fire Protection Districts

There are six fire protection districts/departments located in the Planning Area which respond to fires, accidents, and other emergencies within the Planning Area. The districts/departments are also responsible for search and rescue operations and first aid. The majority tend to participate in hazard mitigation through the county and others choose to participate more directly. The following districts chose to participate as their district as not as part of the county.



Mutual aid agreements exist between all the districts/departments and also with those in surrounding counties through the statewide mutual aid agreement; Moniteau County is located in Region F.

The fire districts have been proactive in public education campaigns, updating training, and general outreach efforts to ensure the community at large is safe. The fire districts/departments are key players in hazard mitigation and preparedness activities.

The California Fire Department is a mostly volunteer fire department. They have one career firefighter and one station located within the City of California.

The California Rural Fire Protection District is a volunteer district governed by a board. They have 5 stations and around two-dozen volunteer firefighters.

Name of Asset	Location
Station 1	California
Station 2	McGirk
Station 3	Cleaver
Station 4	Rt T & 87
Station 5	Clarksburg

Fortuna Fire Protection District has one station located in Fortuna that is manned by volunteers.

Jamestown Rural Fire Protection District has two stations that cover the Jamestown and Lupus regions on the northern portion of Moniteau.

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) ($)	Contents Value ($)
Fire Station	355 West Row St	7200	500,000	500,000

Tipton Fire Department has a shared station with the Tipton Rural Fire Protection District that is located within the City of Tipton. They share volunteer but each have their own equipment and board. Their general ISO rating is 5/9

The following fire districts/departments from outside the Planning Area respond to fires in small geographic areas within the Planning Area:

- Moreau Fire Protection District, which mostly serves areas within Miller and Morgan Counties, has a fire station in Moniteau County at High Point (an unincorporated area).
- Regional West Fire Protection District serves a small area north and east of McGirk in Moniteau County.
- Russellville Fire Department, located in neighboring Cole County, serves a small area of southeast Moniteau County

2.3.2 Non-Governmental and Volunteer Organizations

After the floods in 1993 the non-profit agencies in Missouri organized the **Missouri Volunteers Against Disaster (MOVOAD).** The main goal of MOVOAD is to increase cooperation, coordination, communication, education, and to pass local, county and state disaster legislation. Their mission is to bring together National Voluntary Organizations Active in Disaster to foster

more effective service through mitigation and response for the benefit of people affected (imperiled and impacted) by disaster through:

1. Cooperation: To create a climate of cooperation at all levels (including grass roots) to provide information.

2. Coordination: To coordinate policy among member organizations and to serve as a liaison, advocate and national voice.

3. Communication: To disseminate information through the newsletter, the director, research and demonstration, case study and critique.

4. Education: To increase mutual awareness and understanding of each organization.

5. Convention Mechanisms: To arrange for such meetings and conferences as necessary to accomplish the purpose of MOVOAD.

6. Legislation: To encourage effective disaster relief legislation and policy.

Organizations in Moniteau County such as the American Red Cross, church agencies, and other non-profits are active in supporting the work of MOVOAD. This collaborative effort ensures that Moniteau County non-profits are well prepared to respond to a natural disaster. Through their legislative efforts, they also work to help make Missouri and Moniteau County as disaster resistant as possible.

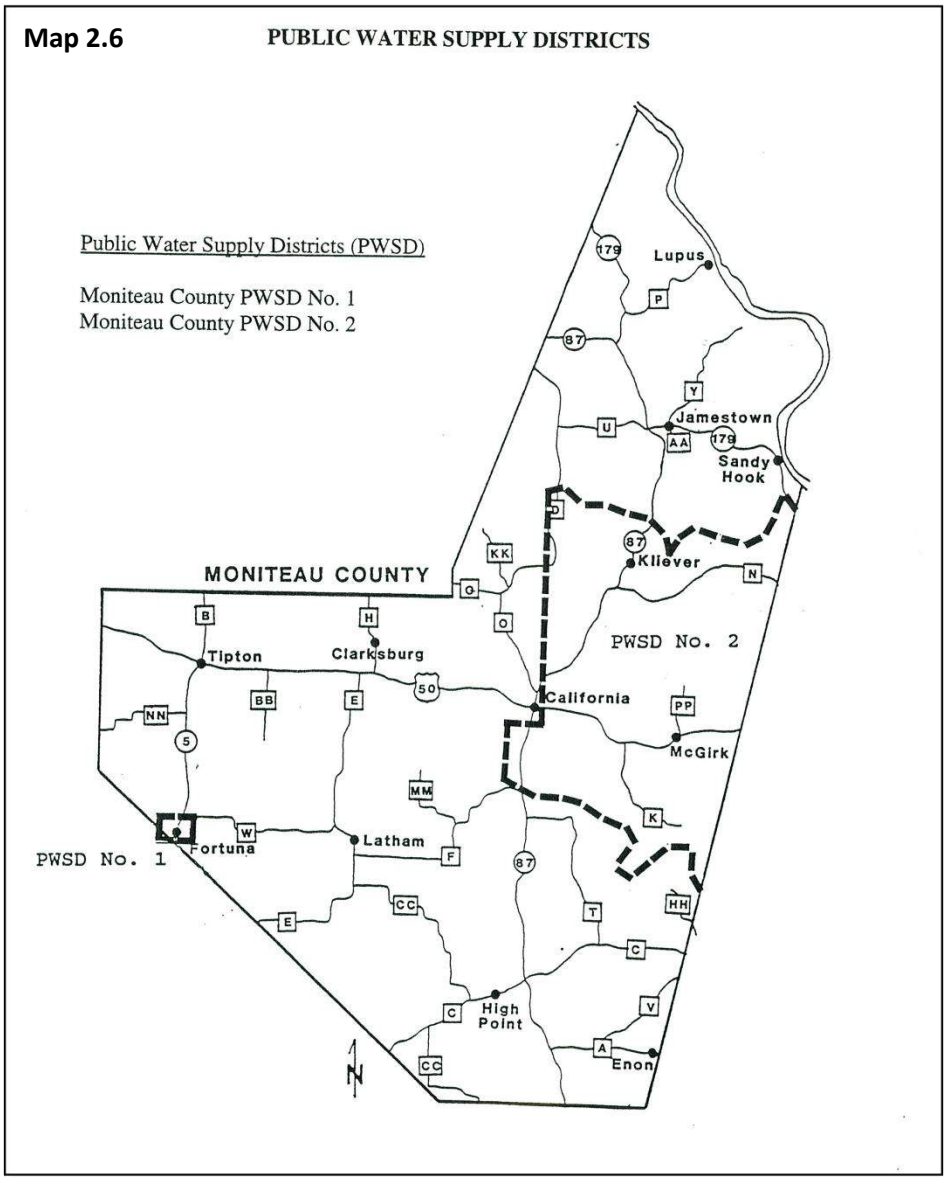
2.3.3 Public Water Supply Districts

There are two Public Water Supply Districts (PWSDs) in the Planning Area (see Figure 2.9.8). The Water Districts are responsible for distributing water in areas not served by a municipality or private water provider. Each water district is composed of an elected board. The districts are responsible for developing new water supply infrastructure and maintaining existing infrastructure.

- Moniteau Co. PWSD #1 serves the unincorporated area of Fortuna.

- Moniteau Co. PWSD #2 serves an unincorporated part of the county near the City of California. PWSD #2 does not have its own wells; it buys its water from the City of California.

Map 2.6 **PUBLIC WATER SUPPLY DISTRICTS**



In addition to the PWSDs, the private company Hickory Hills Water & Sewer serves Latham, an unincorporated area west of the City of California, and each of the incorporated cities in the Planning Area has its own wells to provide water.

Interconnection of water supplies is an important mitigation technique to ensure adequate supply should damage to infrastructure or contamination occur during a natural hazard event. In addition, interconnection can be helpful in times of drought and fire. Currently there are no interconnections between the water suppliers in the Planning Area which would provide this type of backup in emergencies.

2.3.4 911 Dispatch District

The Moniteau County Emergency Dispatch District is governed by a 7-member Board of Directors. They function out of the 911 Dispatch Center and handle the 911 calls for the Moniteau County area.

Staff/Department	Positions	Full Time or Part Time?
Communication Operators	8	Full time
Communication Operators	4	Part Time
Sign Installers	2	Part Time

GIS / Addressor	1	Full Time
Administration	2	Full Time

2.3.5 Ambulance Districts

The Mid-MO Ambulance District provides ambulance service to the entire planning area. They take part in education campaigns on Covid and Cardiac events as well as take part in producing EMT classes.

2.3.6 Levee Districts

There are two major levees in the Planning Area. The Plowboy Bend Levee is located south of Lupus and the Overton-Wooldridge Levee is located primarily in Cooper County to the north of the Planning Area; approximately one-third of the levee is located in the Planning Area, though. The levee districts did not participate in the plan.

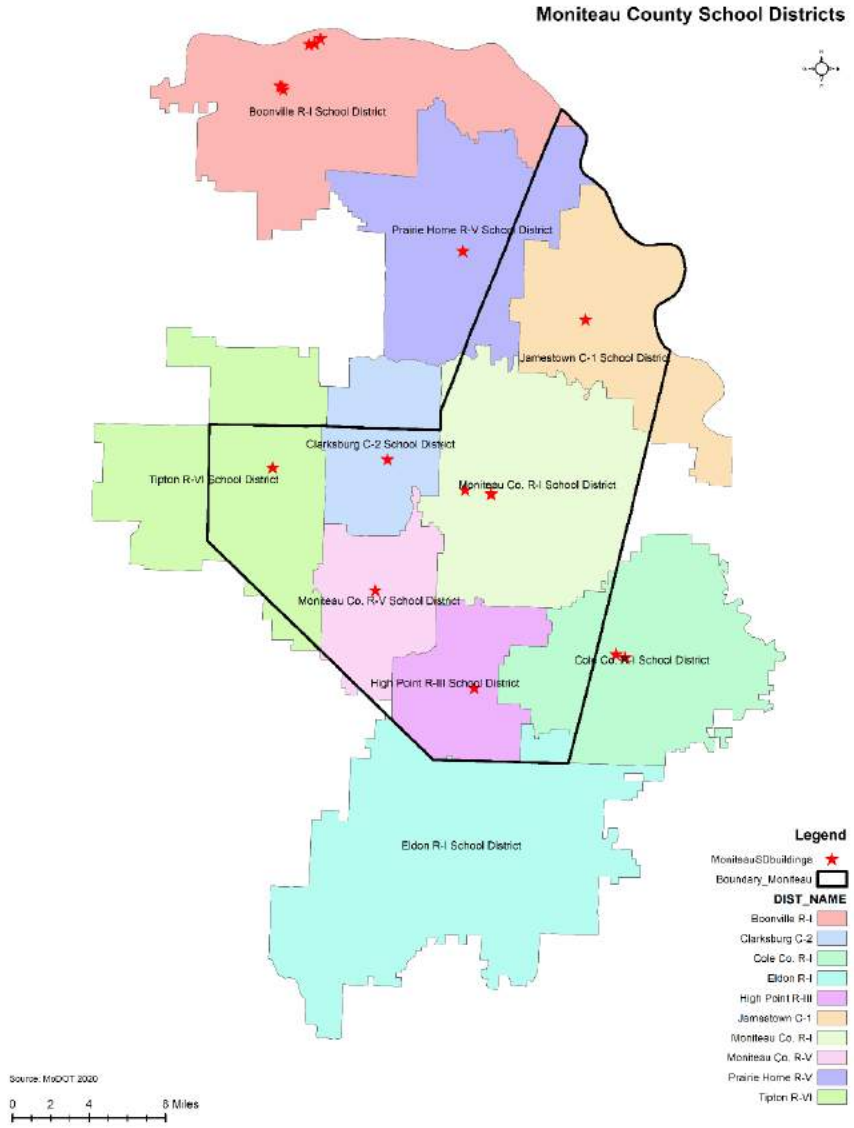
2.4 Public School district Profile and Mitigation Capabilities

The following six public school districts are located in the Planning Area:

- Clarksburg C-2
- High Point R-III
- Jamestown C-I
- Moniteau Co. R-I
- Moniteau Co. R-V
- Tipton R-VI.

Each district has an elected School Board, a Superintendent, and several administrative staff.

Map 2.7



2.4.1 Clarksburg C-2

Clarksburg C-II School District has one school in the City of Clarksburg: Clarksburg Elementary (K-8).

The school district has preliminary plans for a building project with a three-phase operation. This was scheduled to start sometime before 2015 but plans have been placed on hold due to the economic downturn.

The plan is to construct a new school building on the current school grounds; it will include all the classrooms on one level. The older two-story structure will be destroyed after the new school is completed.

The school district would like to build a tornado saferoom and additional classrooms if funding would become available.

District Name	Building Name	Building Enrolment
Clarksburg C-2	Clarksburg Elementary	50

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) ($)	Contents Value ($)
Clarksburg School Building	401 S Hwy H Clarksburg	26,058	4,345,922	100,000

2.4.2 High Point R-III

High Point R-III School District has one school in the unincorporated town of High Point in Moniteau County: High Point Elementary (K-8).

There are currently plans to put a new roof on the school. The school district is currently awaiting approval of a FEMA grant to pay for an 1,800sqft saferoom.

District Name	Building Name	Building Enrolment
High Point R-III	High Point Elementary	73

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) ($)	Contents Value ($)
Elementary/Jr High	60909 Hwy C	20,465	3,271,389	447,676
Maintenance	60909 Hwy C	720	15,640	3,140

Concession	60909 Hwy C	400	8,687	2,356

Planning Elements	Yes/No
Master Plan	Yes
Capital Improvement Plan	No
School Emergency Plan Shelter in place protocols Evacuation protocols	Yes
Weapons Policy	Yes

Personnel Resources	Yes/No
Full-time building official (i.e. Principal)	Yes
Emergency Manager	No
Grant Writer	No
Public Information Officer	No

Financial Resources	Accessible/Eligible to Use (Y/N)
Capital improvements project funding	Yes
Local funds	Yes
General obligation bonds	No
Special tax bonds	No
Private activities/donations	No
State and federal funds	Yes

2.4.3 Jamestown C-I

Jamestown C-I School District has two schools in the City of Jamestown: Moniteau Co. Elementary (K-6) and Moniteau Co. High School (7-12).

Since the last update HVAC was installed in the gym. Enrollment has remained steady and is expected to remain so.

District Name	Building Name	Building Enrolment
Jamestown C-I	Jamestown C-I High	113
	Jamestown C-I Elementary	87

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) ($)	Contents Value ($)

Main School Building	222 School St. Jamestown	53,852	11,439,699	1,734,811
Bus Barn	222 School St. Jamestown	3,840	187,463	16,108

Planning Elements	Yes/No	Comments
Master Plan	Yes	2017
Capital Improvement Plan	Yes	2021
School Emergency Plan Shelter in place protocols Evacuation protocols	Yes	2021
Weapons Policy	Yes	2021

Personnel Resources	Yes/No
Full-time building official (i.e. Principal)	Yes
Emergency Manager	No
Grant Writer	No
Public Information Officer	No

Financial Resources	Accessible/Eligible to Use (Y/N)
Capital improvements project funding	Yes
Local funds	Yes
General obligation bonds	Yes
Special tax bonds	No
Private activities/donations	Yes
State and federal funds	Yes

2.4.4 Moniteau Co. R-I

Moniteau Co. R-I School District has three schools in the City of California: California Elementary (Pre-K-4), California Middle School (5-8), and California High School (9-12).

The district provides annual training and drills for storm/tornado, fire, earthquake, railroad crossing, and intruder events.

There are fire extinguishers strategically placed in all buildings as well as pull stations and sprinkler systems in some of the newer constructed areas. There are also damage resistant window film on some windows at the middle school with plans to do so on some windows in the other buildings. In addition, each building has a pull-down security door or multiple doors that prevent fire from spreading beyond those locations.

District Name	Building Name	Building Enrolment
Moniteau Co. R-I	California High	425
	California Middle	333
	California elementary	637

In 2014 turf football and baseball fields were added at the high school, an addition to the Agriculture Building was constructed, as well as an addition to the weight room/locker room.

In 2021, an older section of the elementary school was demolished and an addition that connects the elementary and middle school were built.

Planning Elements	Yes/No	Comments
Master Plan	N/A	
Capital Improvement Plan	Yes	Prior to our Bond Issue in 2020 but district needs are reviewed annually
School Emergency Plan Shelter in place protocols Evacuation protocols	Yes	Reviewed annually before each new school year begins
Weapons Policy	Yes	Policy JFCJ—Weapons in School—Adopted 2005

Personnel Resources	Yes/No	Department/Position
Full-time building official (i.e. Principal)	Yes	
Emergency Manager	Yes	School Resource Officers
Grant Writer	No	Several staff members write grants throughout the district but no one is dedicated to just grant writing
Public Information Officer	Yes	Superintendent

Financial Resources	Accessible/Eligible to Use (Y/N)
Capital improvements project funding	Yes
Local funds	Yes
General obligation bonds	Yes
Special tax bonds	N/A
Private activities/donations	Yes
State and federal funds	Yes

Name	Address	Property Value	Content Value	Total Insured Value
Middle School	211 South Owen St.	9983718.98	2132836.14	12116555.12
Elementary School	205 South Owen St.	15712668.71	3324566.53	19037235.24

Maintenance/concession stand	Riley Field	270621.54	52414.09	323035.63
Press Box	Riley Field	20358.21	9531.25	29889.46
High School	Hwy 50W 1501 W. Buchanan	14286746.37	2843398.69	17130145.06
VoAg/2nd Arts Shop	Hwy 50W 1501 W. Buchanan	1443065.15	474145.87	1917211.02
Maintenance Warehouse/Storage	Hwy 50 W #3 Prairie St.	281769.24	335774.09	617543.33
Horticulture/Greenhouse Center	1501 W. Buchanan	412494.64	47148.41	459643.05
Fitness Center	1501 W. Buchanan	1253994.24	176008.19	1430002.43
Modular Classroom, Satellite	1501 West Buchanan	62437.34	7857.32	70294.66
Concession Stand #2	Softball Field at HS	3993.28	1404.17	5397.45
California Performing Arts Center	1501 W. Buchanan St.	4062835.74	468469.25	4531304.99
Concession Stand/Restrooms	1501 W. Buchanan St.	327397.26	35812.24	363209.50
Ticket Booth	1501 W. Buchanan St.	29655.54	0.00	29655.54
Football Stadium complex with 300 sq ft. Press Box/2000 seat bleachers	1501 W. Buchanan St.	1940623.05	1390.63	1942013.68
Softball/Baseball Complex w/scoreboard, sound system, dugout equip, etc.	1501 W. Buchanan St.	711733.17	37097.90	748831.07
22 New Instructional Spaces	211 S. Owen St.	6291734.00	0.00	6291734.00
Elem & MS Renovations	212 S. Owen St.	941880.00	0.00	941880.00
Total				**67985581.23**

2.4.5 Moniteau Co. R-V

Moniteau Co. R-V School District has one school in the unincorporated town of Latham in Moniteau County: Latham Elementary (K-8). A fire destroyed the Latham Elementary School building in December 2010. Classes are now being held in 6 mobile classrooms, 2 of which are owned by the district and 4 of which are rented. The district is expecting a decline in students.

In the fall of 2011, the district submitted an application to the Hazard Mitigation Grant Program (HMGP) for a stand-alone safe room to be built near the school. Since the last update that structure has been finished and is 1,000 square feet which can accommodate approximately 65 students, 20 staff members, and 90 town residents living within five minutes walking distance.

District Name	Building Name	Building Enrolment
Moniteau Co. R-V	Latham Elementary	39

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) ($)	Contents Value ($)
Mobile Classrooms	156 School St	1440	62,733	18,971
Storage Shed		240	5,164	1,570
Storage and Restroom		1200	42,998	55,004
Latham School Building		7500	1,596,691	430,158
Gym		5400	526,286	61,450
Tornado Saferoom		1000	240,211	30,271

Planning Elements	Yes/No	Comments
Master Plan	No	
Capital Improvement Plan	Yes	2021
School Emergency Plan Shelter in place protocols Evacuation protocols	Yes	2013
Weapons Policy	Yes	2013

Personnel Resources	Yes/No
Full-time building official (i.e. Principal)	Yes
Emergency Manager	No
Grant Writer	No
Public Information Officer	No

Financial Resources	Accessible/Eligible to Use (Y/N)
Capital improvements project funding	Yes
Local funds	Yes
General obligation bonds	No
Special tax bonds	No
Private activities/donations	No
State and federal funds	Yes

2.4.6 Tipton R-VI

Tipton R-VI School District has two schools in the City of Tipton: Tipton Elementary (K-6) and Tipton High School (7-12). They have recently went through a major security renovation in the last couple of years but do not have any further planned construction at this time.

District Name	Building Name	Building Enrolment
Tipton R-VI	Tipton High	230
	Tipton Middle School	131
	Tipton Elementary	266

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) ($)	Contents Value ($)
Main Building	305 Hwy 50	97000	18,123,623	2,396,017
Admin Building	334 Hwy 50	6300	891,851	133,288
Greenhouse	208 Randolph	1800	104,678	6,835
Vocational Building	208 Randolph	7796	1,128,931	253,111
Field House	226 Randolph	4800	705,068	34,575
Old Admin Building	305 Hwy 50	2524	326,571	49,504

Planning Elements	Yes/No	Comments
Master Plan	N/A	
Capital Improvement Plan	Yes	2021
School Emergency Plan Shelter in place protocols Evacuation protocols	Yes	2021
Weapons Policy	Yes	2021

Personnel Resources	Yes/No
Full-time building official (i.e. Principal)	Yes
Emergency Manager	Yes
Grant Writer	Yes
Public Information Officer	Yes

Financial Resources	Accessible/Eligible to Use (Y/N)
Capital improvements project funding	Yes

Local funds	Yes
General obligation bonds	Yes
Special tax bonds	N/A
Private activities/donations	Yes
State and federal funds	Yes

Table 2.8 Summary of Mitigation Capabilities- Moniteau County School Districts

Capability	Clarksburg SD	High Point SD	Jamestown SD	Moniteau R-I	Moniteau R-V	Tipton SD
Planning Elements						
Master Plan/ Date	Yes	Yes	Yes	N/A	No	No
Capital Improvement Plan/Date	Yes	No	Yes	Yes	Yes	Yes
School Emergency Plan / Date	Yes	Yes	Yes	Yes	Yes	Yes
Weapons Policy/Date	Yes	Yes	Yes	Yes	Yes	Yes
Personnel Resources						
Full-Time Building Official (Principal)	Yes	Yes	Yes	Yes	Yes	Yes
Emergency Manager	Yes	No	No	Yes	No	Yes
Grant Writer	No	No	No	No	No	Yes
Public Information Officer	Yes	No	No	Yes	No	Yes
Financial Resources						
Capital Improvements Project Funding	Yes	Yes	Yes	Yes	Yes	Yes
Local Funds	Yes	Yes	Yes	Yes	Yes	Yes
General Obligation Bonds	Yes	No	Yes	Yes	No	Yes
Special Tax Bonds	No	No	No	N/A	No	N/A
Private Activities/Donations	No	No	Yes	Yes	No	Yes
State and Federal Funds/Grants	Yes	Yes	Yes	Yes	Yes	Yes
Other						
Public Education Programs	Yes	Yes	Yes	Yes	Yes	Yes
Privately or Self- Insured?	Self	Self	Self	Self	Self	Self
Fire Evacuation Training	Yes	Yes	Yes	Yes	Yes	Yes
Tornado Sheltering Exercises	Yes	Yes	Yes	Yes	Yes	Yes
Public Address/Emergency Alert System	Yes	Yes	Yes	Yes	Yes	Yes
NOAA Weather Radios	Yes	No	Yes	Yes	Yes	Yes
Lock-Down Security Training	Yes	Yes	Yes	Yes	Yes	Yes
Mitigation Programs	Yes	No	Yes	No	No	No
Tornado Shelter/Saferoom	Yes	Yes	Yes	Yes	Yes	Yes

Campus Police	No	No	No	Yes	No	No

Source: Data Collection Questionnaire, 2022

Chapter 3: Hazards Risk Assessment

Chapter 3: Hazard Risk Assessment

44 CFR Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses

Risk assessment is a process of estimating the potential for injury, death, property damage, or economic loss which may result from a hazard. A risk assessment is only as valuable as the thoroughness and accuracy of the information on which it is based. As will be seen, there is a great variation between hazards in the amount and reliability of the data available for analysis.

This chapter is divided into four main parts:

- **Section 3.1 Hazard Identification** identifies the hazards that threaten the planning area and provides a factual basis for elimination of hazards from further consideration;

- **Section 3.2 Assets at Risk** provides the planning area's total exposure to natural hazards, considering critical facilities and other community assets at risk;

- **Section 3.3 Land Use and Development** discusses development that has occurred since the last plan update and any increased or decreased risk that resulted. This section also discusses areas of planned future development and any implications on risk/vulnerability;

- **Section 3.4 Hazard Profiles and Vulnerability Analysis** provides more detailed information about the hazards impacting the planning area. For each hazard, there are three sections: 1) Hazard Profile provides a general description and discusses the threat to the planning area, the geographic location at risk, potential Strength/Magnitude/Extent, previous occurrences of hazard events, probability of future occurrence, risk summary by jurisdiction, impact of future development on the risk; 2) Vulnerability Assessment further defines and quantifies populations, buildings, cr itical facilities, and other community/school or special district assets at risk to natural hazards; and 3) Problem Statement briefly summarizes the problem and develops possible solutions.

3.1 HAZARD IDENTIFICATION

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

As part of the planning process each jurisdiction was asked to evaluate the probability and potential severity of each hazard addressed in this plan. The following natural hazards have been identified as posing potential risk to all, or portions, of the planning area:

- Flood (includes riverine flooding, flash flooding, and storm water flooding)
- Levee Failure
- Dam Failure
- Earthquake
- Land Subsidence/Sinkhole
- Severe Thunderstorms (includes High Winds, Hail, and Lightning)
- Tornado
- Severe Winter Weather (Snow, Ice, and Extreme Cold)
- Drought
- Extreme Temperatures
- Wildfire

3.1.1 Review of Existing Mitigation Plans

There are certain other natural hazards which FEMA requires to be addressed in Hazard Mitigation Plans if they are applicable to the planning area. Avalanches and volcanoes have not been included in this plan as they do not pose a threat due to Moniteau County's topography and geology. Coastal erosion, coastal storms, hurricanes, and tsunamis do not pose a threat to the county due to its inland location.

The Missouri State Hazard Mitigation Plan (2018) indicates that expansive soils, landslides, and rockfalls are recognized as hazards in Missouri but occur infrequently and with minimal impact. For this reason, those hazards were not profiled in the state plan nor will they be profiled in the Cooper County Plan.

3.1.2 Review Disaster Declaration History

Severe storms and flooding are the most common events to warrant a disaster declaration in Moniteau County. In the event of flooding the declaration is brought on by mounting costs due to widespread water damage and the closure or destruction of several homes and businesses that impact the local economy of the affected area.

Table 3.1 FEMA Disaster Declarations that included Moniteau County, Missouri 1973-Present

Year of declaration date	Declaration Title	Disaster number	Assistance Type
1973	Heavy Rains, Tornadoes & Flooding	372	IA/PA

	Severe Storms & Flooding	407	IA/PA
1976	Drought	3017	PA
1986	Severe Storms & Flooding	779	IA
1990	Severe Storms & Flooding	867	IA/PA
1993	Severe Storms & Flooding	995	IA/PA
1995	severe storms, tornadoes, hail, flooding	1054	IA/PA
1998	sever storms, flooding & tornadoes	1253	PA
2003	Severe storms, tornadoes, & flooding	1463	IA
2005	Hurricane Katrina Evacuation	3232	PA
2007	severe winter storms	1736	PA
	severe winter storms	3281	PA
2008	Severe Storms & Flooding	1749	PA
2009	severe winter storm	3303	PA
2011	flooding	3325	PA
	severe winter storm	3317	PA
	severe winter storm and snowstorm	1961	PA
2015	severe storms, tornadoes, straight-line winds, & flooding	4238	PA
2016	severe stroms, tornadoes, straight-line winds & flooding	3374	PA
2020	COVID-19	3482	PA
	COVID-19 Pandemic	4490	IA/PA
2021	severe storms, straight-line winds, tornadoes & flooding	4612	PA

3.1.3 Research Additional Sources

Sources utilized for information regarding past disaster incidents and research in the planning area include:

- Missouri Hazard Mitigation Plans (2013 and 2018)
- Previously approved Moniteau County Hazard Mitigation Plan (2017)
- Federal Emergency Management Agency (FEMA)
- Missouri Department of Natural Resources

- National Drought Mitigation Center Drought Reporter
- US Department of Agriculture's Ag Census
- Data Collection Questionnaires completed by each jurisdiction
- State of Missouri GIS data
- Hazards US (Hazus)
- Missouri Department of Transportation
- County Emergency Management
- County Flood Insurance Rate Map, FEMA
- U.S. Army Corps of Engineers
- United States Geological Survey (USGS)
- National Oceanic and Atmospheric Administration's (NOAA) Nation Centers for Environmental Information (NCEI)

Note that the only centralized source of data for many of the weather-related hazards is the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI). The NCEI documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. Some information appearing in the NCEI may be provided by or gathered from sources outside the National Weather Service (NWS), such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. An effort is made to use the best available information but because of time and resource constraints, information from these sources may be unverified by the NWS.

The NCEI damage amounts are estimates received from a variety of sources, including those listed above in the Data Sources section. Damages reported are in dollar values as they existed at the time of the storm event. They do not represent current dollar values.

The database currently contains data from January 1950 to March 2018. Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type.

Note that injuries and deaths caused by a storm event are reported on an area-wide basis. When reviewing a table resulting from an NCEI search by county, the death or injury listed in connection with that county search did not necessarily occur in that county.

Table 3.2 Hazards Identified for Each Jurisdiction

Jurisdiction	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding (River and Flash)	Land Subsidence/Sinkholes	Levee Failure	Severe Winter Weather	Thunderstorm/Lightning/ Hail/High Wind	Tornado	Wildfire
Moniteau County	x	x	x	x	x	x	x	x	x	x	x
California	x	x	x	x	x			x	x	x	x
Jamestown		x	x	x	x	x		x	x	x	x
Lupus		x	x	x	x			x	x	x	x
Tipton		x	x	x	x			x	x	x	x
Schools and Special Districts											
Clarksburg C-2		x	x	x	x			x	x	x	x
High Point R-III		x	x	x	x			x	x	x	x
Jamestown C-1		x	x	x	x			x	x	x	x
Moniteau R-I		x	x	x	x			x	x	x	x
Moniteau R-V		X	X	X	X	x		X	X	X	X
Tipton R-VI		X	X	X	X			X	X	X	X
911 Dispatch District	X	X	X	X	X	X	X	X	X	X	X
California FPD	X		X	X	X			X	X	X	X
Tipton RFPD		X	X	X	X			X	X	X	X

3.1.5 Multi-Jurisdictional Risk Assessment

The 2022 Moniteau County Hazard Mitigation plan is an update of an earlier plan. The hazard profiles that follow are assessed on a county-wide basis but each jurisdiction will have unique levels of impact based on population and geographical location. California is the urban center of the planning area, with a variety of development and infrastructure. It also serves as the county seat. Other areas of the county are rural with little population or infrastructure to be damaged in the event of a natural hazard.

The planning area is subject to various natural hazards such as dam failure, drought, earthquake, extreme temperature, flooding, levee failure, wildland fire, severe winter weather, sinkholes/land subsidence, and thunderstorms and lighting. Each natural hazard poses different levels of risk depending on the jurisdiction and each will be discussed further in detail later in this section.

3.2 ASSETS AT RISK

This section assesses the planning area population, structures, critical facilities and infrastructure, and other important assets that may be at risk to hazards. Since the last update the area has experienced some growth in population creating a need for more housing units and infrastructure such as roads, sewers, water, and electricity to provide those homes with necessary amenities. This has expanded the number of connections and structures at risk of failure during a hazard event along with an expanded population at risk. The inventory of assets for each jurisdiction was derived from census block exposure data out of HAZUS, Missouri GIS Database, and local jurisdiction data questionnaires.

3.2.1 Total Exposure of Population and Structures

Unincorporated County and Incorporated Cities
The following tables provide population data based on the 2020 Census. Building counts and building exposure values are based on data developed by the State of Missouri Geographic Information Systems (GIS) database. Content exposure values were calculated by factoring a multiplier to the building exposure values based on usage type. The multipliers were derived from the Hazus and are defined below. Land values have been excluded from consideration due to the fact that land remains following disasters and any market devaluations are often short term and difficult to quantify. State and Federal assistance programs do not generally address loss of land outside that of crop insurance. The total valuation of buildings is based on county assessor's data which may not be current and government-owned properties are usually taxed differently or not at all. This may cause some inaccuracies in the representation of true value. Public school district assets and special districts are included in the total exposure tables assets by community or county.

The following tables provide a look at population, building and content exposure by jurisdiction, as well as a look at exposure by usage type and building counts per each jurisdiction. The exposure and building information for each school district is also included.

Table 3.3 Maximum Population and Building Exposure by Jurisdiction

Jurisdiction	2020 Census	Building Count	Building Exposure ($)	Contents Exposure ($)	Total Exposure ($)
Moniteau County	7,443	3217	764553	456032	1220585
California	4,498	1,889	439272	297486	736758
Jamestown	330	202	46409	26530	72939
Lupus	28	24	5073	2742	7815
Tipton	2,920	1053	300910	204774	505684
Total	15,473	6385	1556217	987564	2543781

Source: U.S. Bureau of the Census, Annual population estimates/ 5-Year American Community Survey 2019; Building Count and Building Exposure, Missouri GIS Database from SEMA Mitigation Management; Contents Exposure derived by applying multiplier to Building Exposure based on Hazus MH 2.1 standard c ontents multipliers per usage type as follows: Residential (50%), Commercial (100%), Industrial (150%), Agricultural (100 %). For purposes of these calculations, government, school, and utility were calculated at the commercial contents rate.

Table 3.4 Building Values/Exposure by Usage Type

Jurisdiction	Residential	Commercial	Industrial	Agricultural	Total
Moniteau County	748160	40485	40893	17983	847521
California	310663	62339	24326	1354	3194655
Jamestown	39753	4136	300	701	44890
Lupus	4661	330	82	0	5073
Tipton	216644	38288	24497	3393	282822
Total	1319881	145578	90098	23431	1578988

Source: Missouri GIS Database, SEMA Mitigation Management Section

Table 3.5 Building Counts by Usage Type

Jurisdiction	Residential Counts	Commercial Counts	Industrial Counts	Agricultural Counts	Total
Moniteau County	2969	100	47	82	3196
California	1700	128	24	7	1859
Jamestown	185	10	1	2	198
Lupus	23	1	0	0	24
Tipton	960	52	18	5	1035
Total	5837	291	90	96	6314

Source: Missouri GIS Database, SEMA Mitigation Management Section; Public School Districts and Special Districts

While school's total assets are included in the tables above, additional information gathered through the data questionnaires and school websites allow for further discussion. The table below shows enrollment and building information, including counts and replacement cost (exposure).

Table 3.6 Population and Building Exposure by Jurisdiction-Public School Districts

Public School District	Enrollment	Building Count	Building Exposure ($)	Contents Exposure ($)	Total Exposure ($)
Clarksburg SD	50	1	4,345,922	100,000	4,445,922
High Point SD	73	3	3,295,716	453,172	3,748,888
Jamestown SD	210	2	11,627,162.52	1,750,919.74	13,378,082.26
Moniteau R-I	1,392	18	58,037,726.46	9,947,854.77	67,985,581.23
Moniteau R-V	39	6	2,474,085.93	597,426.85	3,071,512.78
Tipton SD	620	6	21,280,722	2,873,330	24,154,052

Source: Total Exposure amounts come from the completed Data Collection Questionnaires from Public School Districts. In general, the school districts obtain this information from their insurance coverage amounts.

Table 3.7 Inventory of Critical/Essential Facilities and Infrastructure by Jurisdiction

Jurisdiction	Airport Facility	Bus Facility	Childcare Facility	Communications Tower	Electric Power Facility	Emergency Operations	Fire Service (station)	Government	Housing	Shelters	Hospital/Health Care	Military	Natural Gas Facility	Nursing Homes	Police Station	Potable Water Facility	Rail	Sanitary Pump Stations	School Facilities	Stormwater Pump Stations	Wastewater Facility	TOTAL
Moniteau County	0	0	3	0	0	1	5	1	2969	0	1	0	0	2	1	2	0	0	2	0	0	2987
California	0	0	4	0	5	1	1	8	1700	0	1	0	0	4	1	2	0	6	2	0	2	1737
Jamestown	0	0	1	1	0	1	1	1	185	0	0	0	0	1	1	1	0	1	1	0	1	196
Lupus	0	0	0	0	0	0	1	1	23	0	0	0	0	0	0	0	1	0	0	0	0	26
Tipton	0	0	1	0	0	1	1	1	960	0	1	0	0	2	2	1	0	1	2	1	1	975
Total	0	0	9	1	5	49	9	12	5837	0	3	0	0	9	5	6	1	8	7	1	4	5966

Source: Missouri 2018 State Hazard Mitigation Plan and Hazard Mitigation Viewer; Data Collection Questionnaires; Hazus, etc.

3.2.2 Critical and Essential Facilities and Infrastructure

There are four main types of facilities of concern in a hazard event. Critical Facility, essential facility, high potential loss facility, and transportation and lifeline facilities. These facilities are defined by FEMA as "… all manmade structures or other improvements that, because of their function, size, service area, or uniqueness, have the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if they are destroyed, damaged, or if their functionality is impaired."

Critical facilities commonly include all public and private facilities that a community considers essential for the delivery of vital services and for the protection of the community. The adverse effects of damaged critical facilities can extend far beyond direct physical damage. Damaged gas lines could lead to loss of life if people cannot get heat to their homes during an extreme cold event. Internet is a deeply integrated asset into the functions of many essential facilities. As such, a major fiberoptic line in the County could impact far and wide if it were to be damaged. Disruption of health care, fire, and police services can impair search and rescue, emergency medical care, and even access to damaged areas.

Medical Facilities
Some critical facilities, such as hospitals and care centers, house vulnerable populations. There are not any hospitals in the Planning Area, but there are a number of care centers. The Moniteau County Emergency Operations Plan clearly outlines procedures to ensure that these facilities are warned of impending hazard events in a timely manner. Both Moniteau Care Center and California Care Center in California are equipped with their own backup generators in case of power failure.

Emergency Management
The Emergency Management Director (EMD) is responsible for all aspects of emergency management in the Planning Area, including mitigation. The EMD is responsible for the Emergency Operations Plan for Moniteau County which covers many areas relevant to mitigation

Water Supply

Table 3.8			
District	**# of Wells**	**# of Tanks**	**Area Served**
Moniteau Co. PWDS #1	-	-	Fortuna (unincorp.)
Moniteau Co. PWDS #2	0	-	California area (unincorp.)
City of California	5	2	California
City of Clarksburg	2	1	Clarksburg
City of Jamestown	2	1	Jamestown

City of Tipton	4	2	Tipton
Hickory Hills Water & Sewer	-	-	Latham (unincorp.)

The City of Lupus has a system of 6 shared wells set up by private arrangement and owned in common; the well arrangement is written into property abstracts. The water quality in each well was tested before an elevation project in the 1990's and found to be excellent.

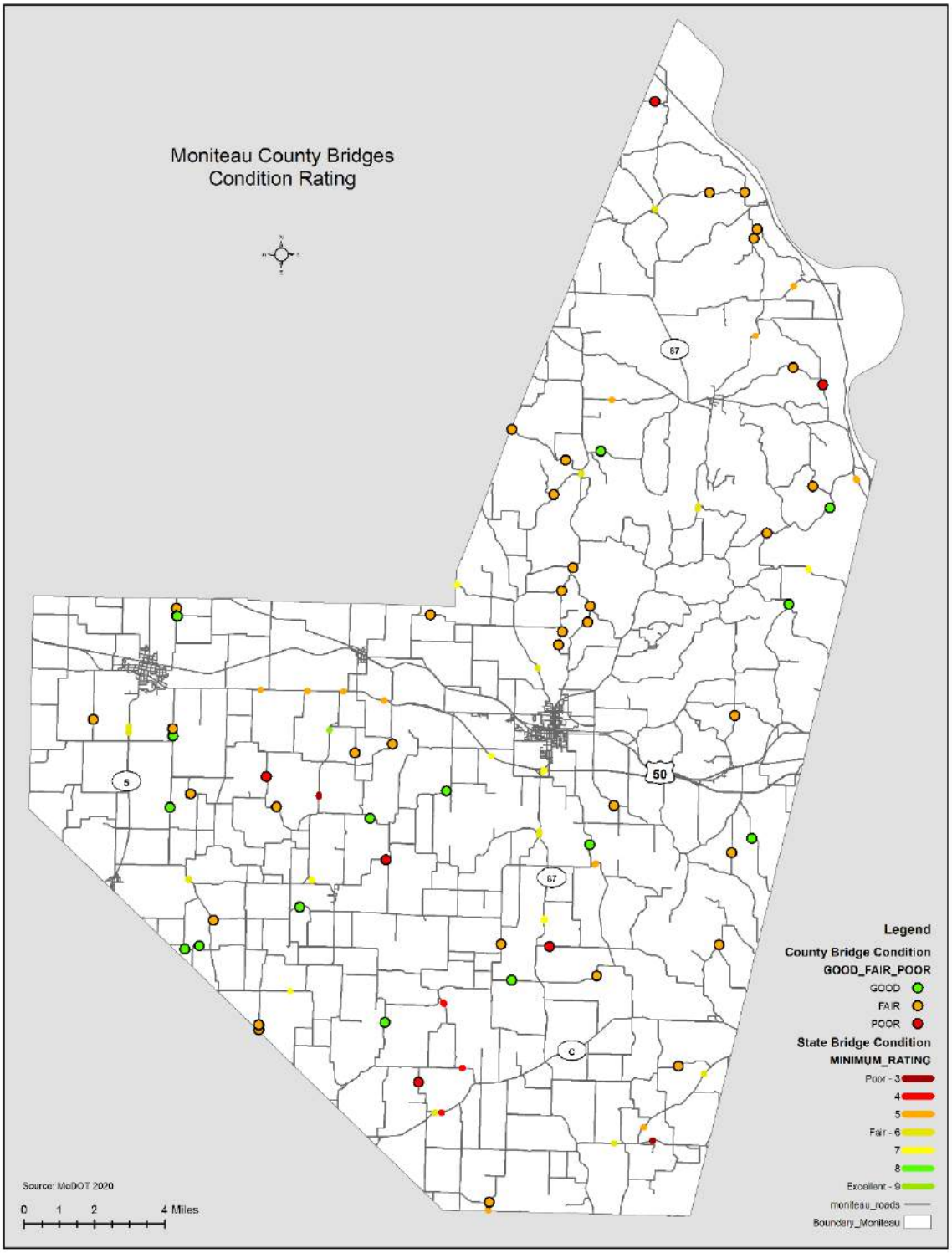
Transportation
Moniteau County, like most of the rural United States, is heavily dependent upon roads and personal vehicles. Roads are the dominant arteries for the county, moving most goods and services. The Missouri Department of Transportation (MoDOT) maintains the state and federal roads in the county. Moniteau County Public Works takes care of the remaining roads while the incorporated communities maintain their roads.

Roadways
The most trafficked roads in Moniteau County are U.S. Highway 50 and State Highway 87/179. These roads serve state traffic in addition to the local populations. As many as 4,900 vehicles travel U.S. Hwy 50 from California to Jefferson City each day; 4,500 vehicles travel from California to Tipton daily. As many as 1,500 vehicles travel north/south on Highway 87/179 daily. Much of the traffic on these roads is attributable to the county's citizens that work and conduct business in neighboring Cole and Boone Counties.

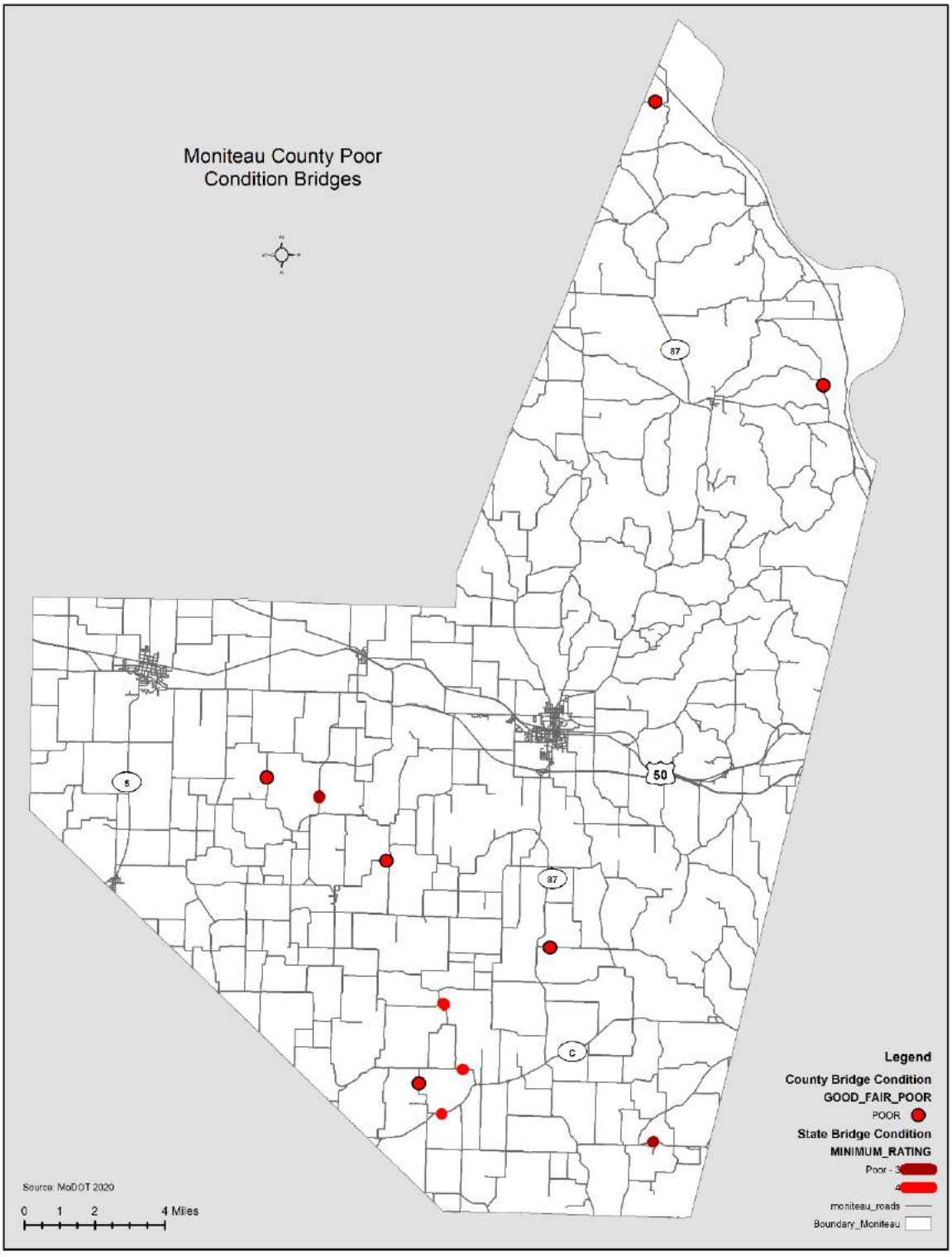
Bridges
Bridge conditions are described using a "scour index". This index rates bridges on their vulnerability to scour during a flood and is based on a scale of 0 to 9. Zero are failed bridges. Bridge with a scour index of 9 are new bridges. An index rating of 1 to 3 are in critical condition. A rating of 4 is poor. Anything 5 and higher are fair to excellent.

In 2019 legislation passed the Governor's Focus on Bridges program. There will be one critical bridges replaced in Moniteau County through this program.

Map 3.1 Moniteau County Bridges



Map 3.2 Moniteau County Structurally Deficient Bridges



Public Transportation
OATS, Inc., a private not-for-profit corporation, is the predominant provider of public transportation in Moniteau County. The organization was founded by a group of seniors in 1971 as transportation for older citizens. Its current mission is to "provide reliable transportation for transportation disadvantaged Missourians so they can live independently in their own communities." OATS serves a wide diversity of citizens in 87 Missouri counties.
Within Moniteau County, OATS provides transportation to the City of California from other parts of the county. OATS also provides transportation from Moniteau County to Jefferson City in Cole County, Columbia in Boone County, and Boonville in Cooper County. OATS predominantly serves the elderly and disabled, but will serve anyone needing transportation.

Airports
Moniteau County does not have an airport. The Jefferson City Municipal Airport is about 30 miles from the City of California, just north of the Missouri River in the Callaway County section of Jefferson City. A wide variety of military, state government, corporate, and general aviation aircraft operate out of the airport but there are no scheduled commercial airline flights. The nearest airport with commercial service is the Columbia Regional Airport (Boone County), located about 40 miles from the City of California.
Airports in St. Louis to the east and Kansas City to the west provide national and international service; both airports are located approximately 140-150 miles from the county seat of California.

Railroads
Rail Freight
Union Pacific Railroad has a large freight presence in Moniteau County. Freight rail is a potential source of human made disaster.
Passenger Rail
The nearest Amtrak passenger rail connection is at Jefferson City (Cole County), approximately 25 miles from California.

3.2.3 Other Assets

Assessing the vulnerability of the planning area to disaster also requires data on the natural, historic, cultural, and economic assets of the area. These types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy. Knowing about these resources in advance allows for consideration immediately following a hazard event, which is when the potential for damages is higher. The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources. The presence of natural resources can reduce the impacts of future natural hazards, such as wetlands and riparian habitats which help absorb floodwaters.

Losses to economic assets like these (e.g., major employers or primary economic sectors) could have severe impacts on a community and its ability to recover from disaster.

Threatened and Endangered Species
There are 10 plant and animal species listed as threatened or endangered that are known or are believed to occur in Moniteau County.

Table 3.9 Threatened and Endangered Species in Moniteau County

Common Name	Scientific Name	Status
Topeka shiner (fish)	Notropis topeka	Endangered
Indiana Bat (mammal)	Myotis sodalist	Endangered
Gray Bat (mammal)	Myotis grisescens	Endangered
Northern Long Eared Bat (mammal)	Myotis septentrionalis	Threatened
Running Buffalo Clover (plant)	Trifolium stoloniferum	Endangered
Pallid Sturgeon (fish)	Scaphirhynchus albus	Endangered
Monarch Butterfly (insect)	Danaus Plexippus	Candidate
Regal Fritillary (insect)	Speyeria Idalia	Under Review
Least Tern (bird)	Sterna Antillarum	Recover
Red Knot (bird)	Calidris Canutus Rufa	Threatened

Source: U.S. Fish and Wildlife Service, http://ecos.fws.gov/ecp/report/species-listings-by-current-range-county

Public Land

There are 5 areas in Moniteau County that are owned and managed by state and federal agencies.

Table 3.10 State or Federal Public Land		
Name	**Address**	**City**
Manito Lake Conservation Area	S. Hwy 5 to East Manito Rd	Tipton
Marion Bottoms Conservation Area	Mo-179 to Moniteau Creek Rd	Marion
Plowboy Bend Conservation Area	Rt Y to Riverbottom Rd	Jamestown
Prairie Home Conservation Area	Cedron Rd	Prairie Home
Roger V. And Viola Wachal Smith Conservation Area	Bird Haven Rd	Centertown
Source: Missouri Department of Conservation (MDC), Missouri Spatial Data Server(MSDIS)		

Moniteau County Properties on the National Register of Historic Places
There are 11 sites located in Moniteau County that are registered on the National Register of Historic Places. This registry is an official list of registered cultural resources that are worth preserving. The National Historic Preservation Act of 1966 authorized such a list as part of a national program. The program is administered by the National Parks Service and acts as a resource to coordinate public and private efforts to find, evaluate, and preserve historically and archeologically significant sites. Properties on the list include districts, buildings, structures, and sites that have significance through history, culture, architecture, archeology, and engineering. Table 3.10 is a list of historic sites located in Moniteau County.

Table 3.11 Moniteau County Properties on the National Register of Historic Places

Property	Address	City	Date Listed
Blessed Virgin Mary Parish District	Cedron Road/Zey Lane	Jamestown	2/5/14
Bruce Farmstead Historic District	Rt A/Rock Enon Creek	Near Russellville	1/7/92
Finke Opera House	312 High St	California	3/22/04
Gray-Wood Buildings	401-407 High St	California	1/19/84
Geiger Archaeological Site	Restricted	N/A	7/29/69
Harrison School	235 Howard St	Tipton	2/1/21
High Point Historic District	MO-C	High Point	1/26/05
Maclay Mansion	209 Howard St	Tipton	2/26/79
Moniteau Co Courthouse	Public Square	California	10/15/70
Old Barnhill Building	301 High St	California	4/12/82
Old California City Hall/Fire Station	101 High St	California	4/12/82

Source: Missouri Department of Natural Resources – Missouri National Register Listings by County http://dnr.mo.gov/shpo/mnrlist.htm

Moniteau County is a rural county that borders a Metropolitan Statistical Area (Jefferson City in Cole County). MSAs are geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. The major employers for the planning region are shown in Table 3.11. The majority of large employers are located in or near California, or within easy access of a major area road.

Table 3.12

Major Employers in Moniteau County

Employer	Employees	Employer	Employees
Sydenstricker Nobbee	20	Willowfork Pallet Factory	20
Co-Mo electric	100	Mo Dept. Of Corrections	200
Burger's Smokehouse		Cargill	
Tana Wire Marker		Arkansas Valley Feather	
Rackers		AeroSonics	
Mo-Wood		California Manufacturing	
Martin Energy Group			

Source: Data Provided by City Questionnaires, 2022

Moniteau County is a heavy agriculture area. There are 1,138 farms listed in the 2017 Ag Census. Those farms do not usually employ several people though. The average size of a farm in Moniteau County is 213 acres and employs less than 10 people.

Table 3.13 Agriculture Employment

Employment Information	Farms	Workers	$1,000 Payroll
Hired Farm Labor	248	621	3,810
Farms with One Worker	111	111	-
Farms with two Workers	82	164	-
Farms with Three or Four Workers	19	65	-
Farms with Five to Nine Workers	32	186	-
Farms with 10 Workers or More	4	95	-
Reported only workers working 150 days or more	55	117	1,802
Reported only workers working less than 150 days	173	355	888
Reported Both	20	149	1,121
Unpaid Workers	535	1,247	-

Source: 2017 Ag Census

3.3 Land Use and Development

3.3.1 Development Since Previous Plan Update

Moniteau County as a whole has shown a slight decline in growth. Communities with the largest growth were the jurisdictions of California and unincorporated Moniteau, while other jurisdictions showed a loss in population at the 2020 census. California is the location of several large employers for the county and sits within easy driving distance of Jefferson City, which is another large employment hub for the area.

Table 3.14 Moniteau County Population 2010-2020 by Jurisdiction

Jurisdiction	2020 Population	2010 Population	2019 Annual Population Estimate or ACS Population	# Change (2010-2020)	% Change (2010-2020)
Moniteau County	7,443	7,314	7,611	129	1.7%
California	4,498	4,278	4,405	220	5.14%
Clarksburg	254	334	190	-80	-24%
Jamestown	330	386	443	-56	-14.5%
Lupus	28	33	25	-5	-15%
Tipton	2,920	3,262	3,372	-342	-10.5
Total	15,473	15,607	16,046	-134	-0.86%

Source: U.S. Bureau of the Census, Decennial Census, annual population estimates/ 5-Year American Community Survey 2019; *population includes the portions of these cities in adjacent counties

Growth translates into a need for more housing, and the expansion of local emergency capabilities to keep up with demand and added fuel to the system. While the 2020 Census showed growth in unincorporated Moniteau, but a decline in housing numbers, this can be caused by once vacant houses being torn down. The heightened growth for some jurisdictions such as California means higher need for housing and services.

Table 3.15 Change in Housing Units, 2010-2020

Jurisdiction	Housing Units 2020	Housing Units 2010	2010-2020 # Change	2010-2020 % Change
Unincorporated	2,910	2,915	-5	-0.17%
California	1,976	1,909	67	3.5%
Clarksburg	121	143	-22	-15.38%
Jamestown	170	187	-17	-9.1%
Lupus	22	23	-1	-4.35%
Tipton	981	999	-18	-1.8%
Total	6,180	6,176	4	0.06%

Source: U.S. Bureau of the Census, Decennial Census, American Community Survey 5-year Estimates; Population Statistics are for entire incorporated areas as reported by the U.S. Census Bureau

3.3.2 Future Land Use and Development

The population is expected to remain stable in Moniteau County. It's unknown how the pandemic will impact the long-term growth of rural communities. The California area has access to the four-lane portion of US50 making it an attractive area for businesses who need to frequently ship goods. Talk of expanding the four lanes to Tipton has been discussed in needs discussions with MoDOT. Expanding US50 to four-lanes all the way to US65 would open the whole central corridor of Moniteau County up to development. Rail access in California and Tipton offer other shipping options but rail spurs have been noted as a need in order to take full advantage of that shipping option. Moniteau has high-speed internet through Co-MO Connect which is attractive to teleworkers and businesses with heavy online sales. This could attract residents in the future looking to buy where the cost of living is lower while still being able to work remotely.

School District's Future Development

Enrollment is expected to stay stable within the planning area school districts. General updates are anticipated at some of the area schools but no major expansion is planned at this time. All schools would like to have a FEMA rated storm shelter but few have the funds to take on such a pricey project for their district.

Special District's Future Development

With growth comes the need for upgraded equipment and additional stations to ensure that response time to new subdivisions remains acceptable. Currently no more fire stations are expected to be built but personnel are always a need and will continue to be. As population needs change or shift development will be reassessed.

3.4 Hazard Profiles, Vulnerability, and Problem Statements

A Risk Assessment has been conducted for each hazard identified as affecting the planning area. The remainder of this section includes these risk assessments which are discussed in alphabetical order and organized according to the following outline:

Hazard Profiles

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Hazard Description – This section consists of a general description of the hazard and the types of impacts it may have on a community or school/special district.

Geographic Location – This section describes the geographic areas in the planning area thar are affected by the hazard. For some hazards, the entire planning area is a risk.

Strength/Magnitude/Extent - The extent of the hazard refers to the strength or magnitude of that hazard which can be expected in the planning area; extent is an attribute of the hazard alone and does not include its effect on humans or the built environment.

Previous Occurrences – This includes available information on historic incidents and their impacts. Historic event records form a solid basis for probability calculations.

Probability of Future Events (Natural Hazards) - The probability of future events is, for the most part, based on historical data while also taking into account the expected impact of climate change. It is assigned based on the following scale which was slightly modified from that found in the *Missouri State Hazard Mitigation Plan* (2018):

- Low – The hazard has little or no chance of happening (less than 1 percent chance of occurrence in any given year)
- Moderate – The hazard has a reasonable probability of occurring (between 1 and 10 percent chance of occurrence in any given year).
- High – The probability is considered sufficiently high to assume that the event will occur (between 10 and 100 percent chance of occurrence in any given year).

  In the case of earthquakes, projections made by the USGS have also been taken into account in assessing the probability.

Analysis of Risk - Presented by the hazard, including a **measure of severity** for each participating jurisdiction. The **measure of severity** is an estimate of the deaths, injuries, or damage (property or environmental) that could result from the hazard. It is also broadly based on the scale found in the Missouri State Hazard Mitigation Plan (2018):

Low – Few or minor damage or injuries are likely.

Moderate – Personal injuries and/or damage to property or the environment are expected.

High – Major injuries and/or death and/or major damage will likely occur.

Changing Future Conditions Considerations – This discusses the potential future impacts climate change could have on natural hazard events and their effects on the planning area.

VULNERABILITY ASSESSMENTS

Requirement §201.6(c)(2)(ii) :[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

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.

Requirement §201.6(c)(2)(ii)(B) :[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Requirement §201.6(c)(2)(ii): (As of October 1, 2008) [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged in floods.

A jurisdiction's vulnerability to a hazard is connected to the extent of that hazard, the probability of future events, the estimated measure of severity, and mitigation measures already in place for that hazard.

In many cases, the potential severity of the hazard event contributes the greatest weight to the vulnerability rating. In some cases, however, a low severity event with high frequency can cause economic strain which translates into a higher vulnerability.

Existing Mitigation/Operating Assumptions: Both the measure of severity and overall vulnerability are greatly impacted by the mitigation already in place in the planning area; this existing mitigation is taken as an operating assumption when evaluating the vulnerability to a particular hazard. The following mitigation activities are applicable to many or all hazards:

- The majority of jurisdictions have adopted some building codes even though the county has not.

- Resources for the public on retrofitting and protecting buildings are available through the Office of Emergency Management.

- Cooperative agreements are in place between utility providers in the county.

- Agreements are in place with local shelters in the county.

- General evacuation procedures are included in the Office of Emergency Management's (OEM) Emergency Operation Plan.

- Evacuation routes are in place in all school districts in the county.

- Buses in all school districts have two-way radios on board.

Other current mitigation activities are aimed at mitigating the effects of a specific hazard and are described under the specific hazard profile.

Within the Vulnerability Assessment, the following sub-headings will be addressed:

- **Vulnerability Overview** – This is an overall summary of each jurisdiction's vulnerability to the identified hazards. It identifies structures, systems, populations or other community assets that are susceptible to damage and loss for hazard events.

- **Potential Losses to Existing Development/life** – Covers how impacts and potential impacts of the hazard has consequences on existing jurisdictional assets such as buildings, critical facilities, life, etc.

- **Previous and Future Development -** This section goes over how changes in development have impacted the jurisdiction's vulnerability to the hazard.

- **Hazard Summary by Jurisdiction** – Hazards vary by jurisdiction and this section will provide an overview of such variations.

Problem Statements

The problem statement consists of a brief summary of the problems created by the hazard in the planning area, and possible ways to resolve those problems.

3.4.1 Flooding (Riverine and Flash)

DESCRIPTION OF HAZARD

Flooding is defined as partial or complete inundation of usually dry areas. **Riverine flooding** refers to when a river or creek overflows its normal boundaries. The relatively flat areas adjacent to rivers and stream banks which are inundated at times of high water are called floodplains. The term base flood, or 100-year flood, is the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year, based upon historical records.

The planning area is at great risk for riverine flooding. Major waterways include the Missouri River to the north, the Moreau River running through the center, and various other creeks and branches. Flooding could potentially occur anywhere along these waterways.

The Missouri River, which forms the northern border of Moniteau County, is the longest river in the United States. The Missouri River drains approximately one-sixth of the area of the continental United States, according to the USGS. It drains over half the state of Missouri as it flows eastward to join the Mississippi River at St. Louis. Since Moniteau County is located less than 200 miles upstream from the mouth of this 2,540-mile river, it is obvious that flooding of the Missouri River is a major concern for the county.

In addition to the threat of riverine flooding, when a river or creek overflows its normal boundaries, the planning area is also susceptible to **flash flooding.** NOAA defines a flash flood as "an event that occurs within 6 hours following the end of the causative event (such as rains, ice jams, or dam breaks)…" Flash floods develop quickly and are responsible for more flood related deaths than any other type of flooding. The textual descriptions for flash flooding events in the NOAA database indicate that flash flooding in the planning area is usually triggered by 2-5 inches of rainfall within a "short period".

In some cases, however, flooding may not be directly attributable to a river, stream or lake overflowing its banks. It may simply be the combination of excessive rainfall and/or snowmelt, saturated ground, and inadequate drainage. With no place else to go, water will find the lowest elevations, areas that are often not in a floodplain. This type of flooding, often referred to as **sheet flooding**, is becoming increasingly prevalent as development outstrips the ability of the drainage infrastructure to properly carry and disburse the water flow.

FEMA defines sheet flooding as "a type of flood hazard with flooding depths of 1 to 3 feet that occurs in areas of sloping land."

Local **storm water flooding** can result when tremendous flow of water occurs due to large rain events. Local flooding can create public safety issues due to flooded roadways and drainage structures.

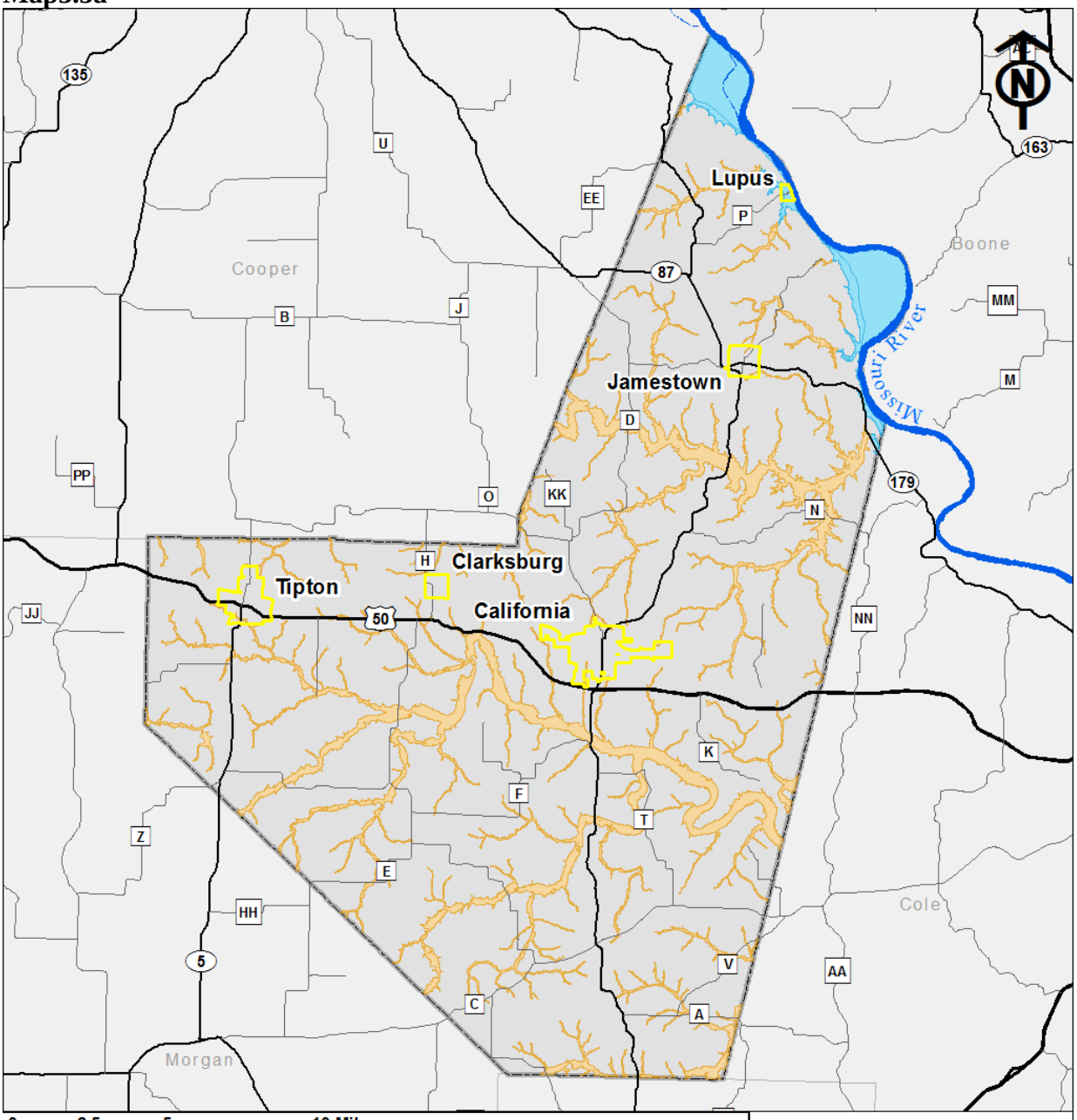
Most flooding in Moniteau County occurs in spring and summer but floods can occur in any season.

Location
The entire planning area is at risk from some type of flooding. The northern border of Moniteau County is defined by the Missouri River. The North Moreau, South Moreau, and Moniteau Creeks, which flow through Moniteau County, all drain into the Missouri River.

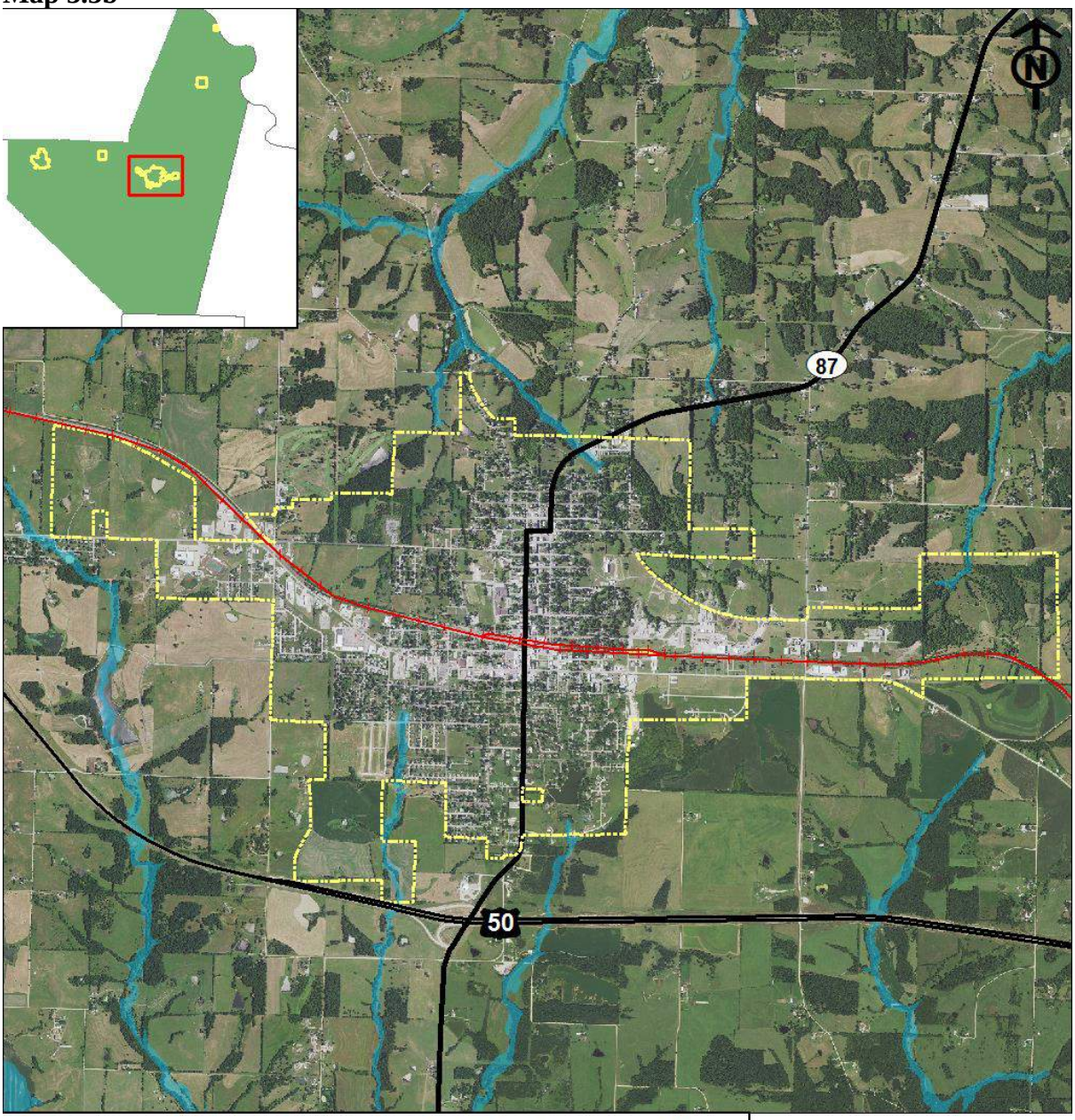
The current Flood Insurance Rate Map (FIRM) for Moniteau County is dated March 3, 2011; it shows the flood zones for these jurisdictions at greater risk. Flood zones are geographic areas defined according to varying levels of flood risk; each zone reflects the severity or type of flooding in the area.

The FIRMs for the participating jurisdictions at greater risk are included (see figures 3.3a through 3.3e).

Map3.3a


Lupus
Jamestown
Clarksburg
Tipton
California
Cooper
Boone
Cole
Morgan
Missouri River
135
163
87
50
179
5
U
EE
P
B
J
MM
M
D
PP
O
KK
N
H
JJ
NN
K
F
T
Z
E
HH
V
AA
C
A
0
2.5
5
10 Miles
FEMA FIRM High Risk Flood Zones
Zone AE
- 1% annual probability of flood with base flood elevation (BFE) calculations
Zone A
- 1% annual probability of flood without base flood elevation (BFE) calculations
Sources:
MSDIS
Mid-Mo RPC
FEMA Flood Map Service Center
June 2017 - B.M.A
MID-MO
Regional Planning Commission

Map 3.3b



California FEMA FIRM Flood Zones

Zone A

- 1% annual probability of flooding without base flood elevation (BFE) calculations

Rail

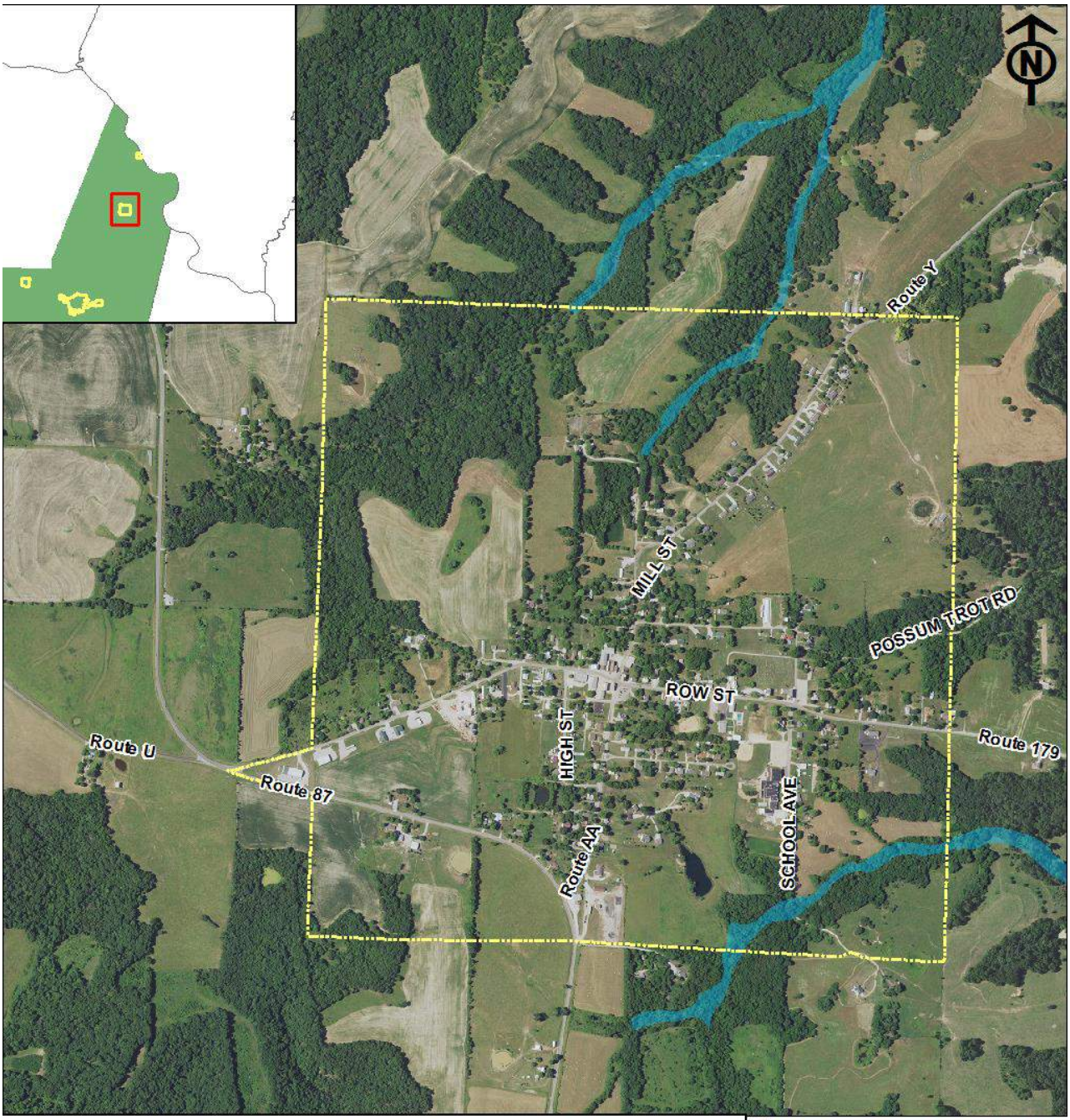
Road

Sources:

MSDIS
Mid-Mo RPC
FEMA Flood Map Service Center
June 2017 - B.M.A

MID-MO Regional Planning Commission

Map 3.3c



Jamestown FEMA FIRM Flood Zones

Zone A

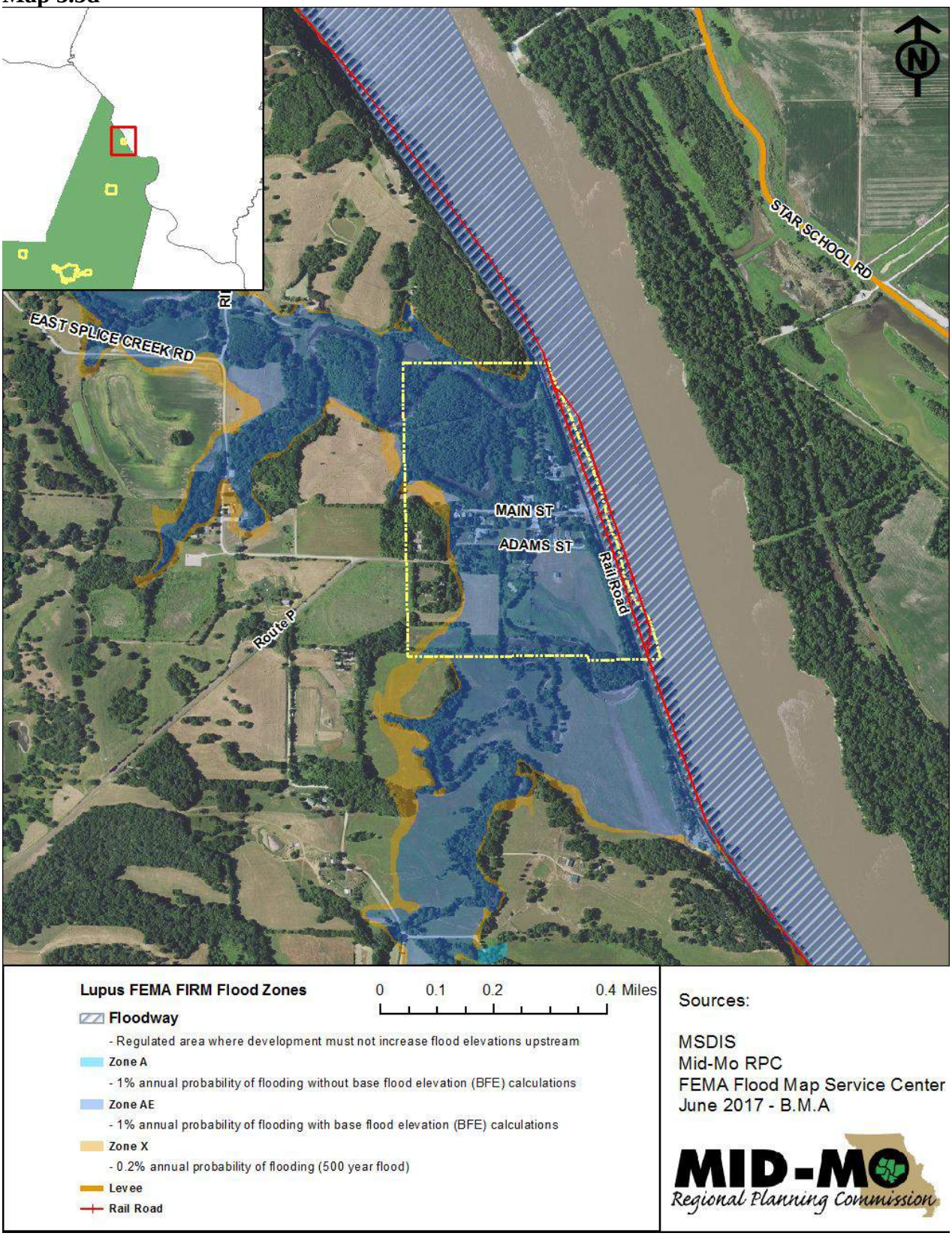
- 1% annual probability of flooding without base flood elevation (BFE) calculations

Sources:

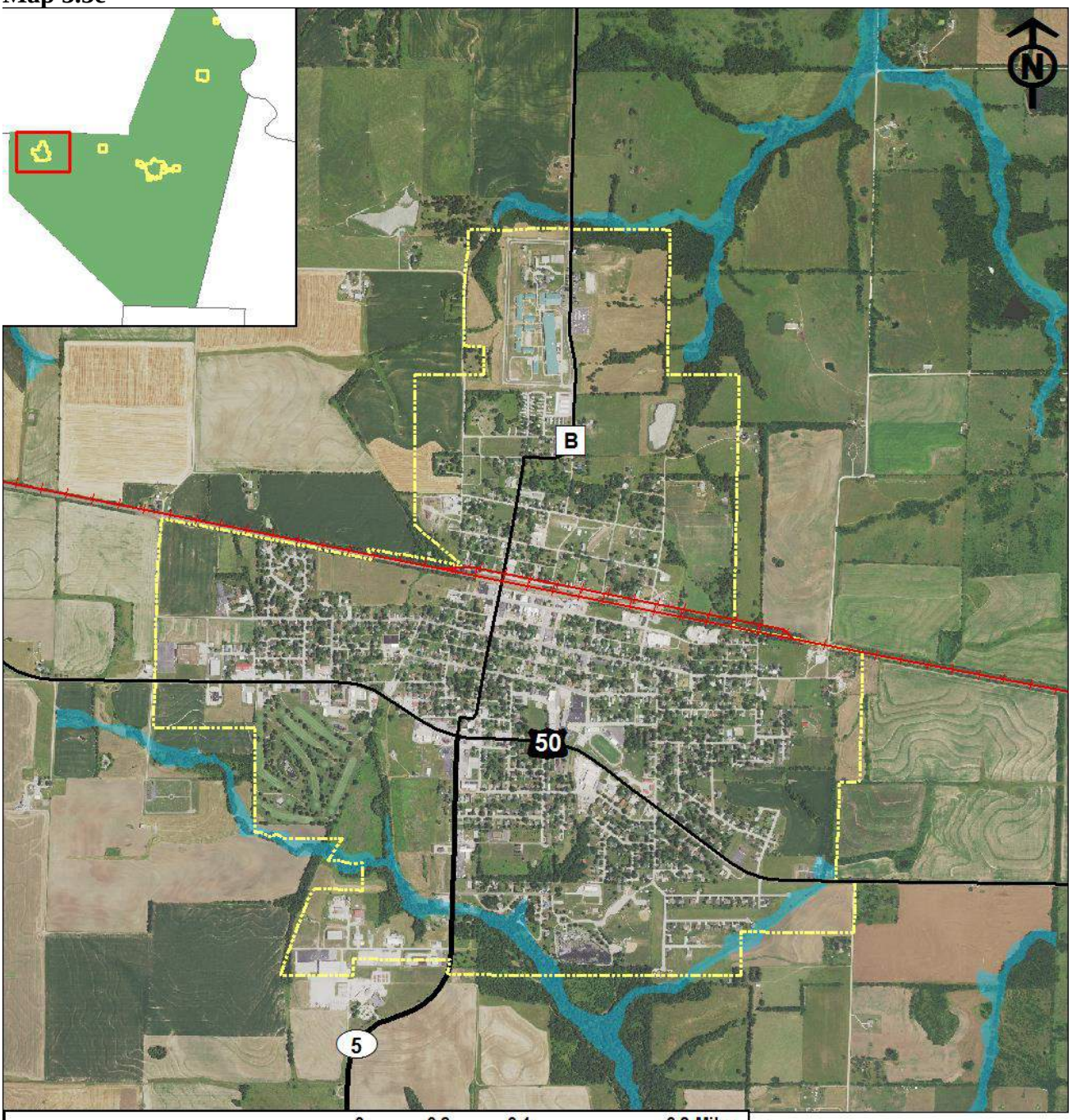
MSDIS
Mid-Mo RPC
FEMA Flood Map Service Center
June 2017 - B.M.A

MID-MO Regional Planning Commission

Map 3.3d


EAST SPLICE CREEK RD
STAR SCHOOL RD
MAIN ST
ADAMS ST
Rail Road
Route P
Lupus FEMA FIRM Flood Zones
0 0.1 0.2 0.4 Miles
Floodway
- Regulated area where development must not increase flood elevations upstream
Zone A
- 1% annual probability of flooding without base flood elevation (BFE) calculations
Zone AE
- 1% annual probability of flooding with base flood elevation (BFE) calculations
Zone X
- 0.2% annual probability of flooding (500 year flood)
Levee
Rail Road
Sources:
MSDIS
Mid-Mo RPC
FEMA Flood Map Service Center
June 2017 - B.M.A
MID-MO
Regional Planning Commission

Map 3.3e


N
B
50
5
0
0.2
0.4
0.8 Miles
Tipton FEMA FIRM Flood Zones
Zone A
- 1% annual probability of flooding without base flood elevation (BFE) calculations
Rail
Sources:
MSDIS
Mid-Mo RPC
FEMA Flood Map Service Center
June 2017 - B.M.A
MID-MO
Regional Planning Commission

Map 3.4 Low Water Crossings

Extent
There are characteristic differences between riverine flooding and small stream/flash flooding in the planning area; these differences involve both the speed of onset and duration of flooding events.

Riverine flooding –

- Speed of onset - Riverine flooding is a hazard that allows for mitigation, preparation, and potential evacuation because of the relatively long speed of onset.

- Duration - An examination of the NOAA data for riverine flooding from January 1996, through December 2020, indicates an average duration of approximately 3.9 days per event (Table 3.15).

Small Stream and Flash Flooding –

- Speed on Onset - In contrast to riverine flooding, small stream flooding and flash flooding occur very quickly with heavy rains.

- Duration - Small stream flooding in the planning area usually takes place within the span of one day, according to the NOAA data (Table 3.15). The data of reported events in the NOAA database indicates an average duration of 4.7 hours.

Location	Date	Event Type	River	Duration (days)
MONITEAU (ZONE)	6/4/2001	Flood	Missouri	9
MONITEAU (ZONE)	6/6/2001	Flood	Missouri	1
LUPUS	5/8/2007	Flood	Missouri	10
CLARKSBURG	9/13/2008	Flood	Moreau	1
LUPUS	6/9/2010	Flood	Missouri	20

Location	Date	Event Type	Duration (hours)
MONITEAU (ZONE)	5/27/2000	Flash Flood	3.5
NORTH PORTION	8/7/2000	Flash Flood	5
MONITEAU (ZONE)	5/9/2002	Flash Flood	2.5
MONITEAU (ZONE)	5/12/2002	Flash Flood	3.5
MONITEAU (ZONE)	7/18/2003	Flash Flood	2
MONITEAU (ZONE)	1/12/2005	Flash Flood	24
CALIFORNIA	8/26/2005	Flash Flood	3
NORTHWEST PORTION	6/11/2006	Flash Flood	9
SANDY HOOK	5/6/2007	Flash Flood	3.5
TIPTON	4/10/2008	Flash Flood	5
BACON	4/29/2009	Flash Flood	4
MC GIRK	7/28/2009	Flash Flood	5

TIPTON	10/30/2009	Flash Flood	5
CALIFORNIA	4/23/2010	Flash Flood	5
LUPUS	7/26/2010	Flash Flood	1
TIPTON	4/3/2014	Flash Flood	5
LUPUS	7/31/2016	Flash Flood	1
LUPUS	8/1/2016	Flash Flood	4.5
TIPTON	4/29/2017	Flash Flood	5

Strength/Magnitude/Extent

According to the 2018 State Hazard Mitigation Plan, Missouri has a long history of flooding. Flooding along Missouri's major rivers generally results in slow-moving disasters. Since river crest levels are forecast several days in advance communities in these active areas are given time to take protective measures against heightened water levels through means of evacuation and/or sandbagging efforts. Flash-flooding by contrast is a rapid rise of flood waters and has a history of causing a higher number of deaths and property damage.

Table 3.16 NFIP Participation in Moniteau

Community ID #	Community Name	NFIP Participant (Y/N/Sanctioned)	Current Effective Map Date	Regular-Emergency Program Entry Date
290237	Moniteau County	Yes	3/3/2011	10/17/1986
290238	California	Yes	3/3/2011	8/24/1984
-	Clarksburg	No	N/A	N/A
290581	Jamestown	Yes	3/3/2011	8/24/1984
290239	Lupus	Yes	3/3/2011	1/3/1986
290640	Tipton	Yes	3/3/2011	3/3/2011

Clarksburg is the only community that does not participate in NFIP due to not having any floodplain within or near their city boundaries.

Table 3.17: NFIP Policy and Claim Statistics

Community Name	Policies in force	Insurance in Force	Closed Losses	Total Payments
Moniteau County	5	$505,100	8	$124,452
Lupus	6	$748,900	21	$180,535
Total	11	$1,254,000	29	$304,987

Source: NFIP Community Status Book, [09/24/19]; BureauNet, http://bsa.nfipstat.fema.gov/reports/reports.html; *Closed Losses are those flood insurance claims that resulted in payment. Loss statistics as of 09/30/22.

Repetitive Loss/Severe Repetitive Loss Properties

Properties with at least two flood insurance payments of $1,000 or more in a 10-year period are categorized as Repetitive Loss Properties. Due to federal restrictions on data sharing, the state was unable to provide full Repetitive Loss data or current Severe Repetitive Loss data. This also

impacts information on Property Type and whether the properties are mitigated or non-mitigated.

Severe Repetitive Loss (SRL): A SRL property is defined as a single family property that is covered under flood insurance by the NFIP; and has (1) incurred flood-related damage for which four or more separate claims payments have been paid under flood insurance coverage with the amount of each claim payment exceeding $5,000 and with cumulative amounts of payments exceeding $20,000; or (2) for which at least two separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property. A single-family property can consist of one-to-four residences. Moniteau County does not have any repetitive loss or severe repetitive loss properties.

Previous Occurrences

Lupus and the unincorporated areas near the Missouri River experienced extensive losses during the Missouri River floods of 1993 and 1995. The devastating losses in those floods led the citizens of Lupus to apply for and receive mitigation funds to elevate homes in the town in 1997 and 1998. A total of $233,035 was spent on the project which elevated 11 structures. The project was funded by grants from FEMA's Flood Mitigation Assistance (FMA) program, the Community Development Block Grant (CDBG) Program and Interfaith and from private funds from several property owners.

In the summer of 2011, the Missouri River flooded again, this time stemming not from significant precipitation in the Mid-Missouri Region but from high precipitation and snow melt in Montana and North Dakota. Higher than normal rain and snow in the winter and spring of 2011 caused wide scale flooding in several states, including North Dakota, South Dakota, Nebraska, Iowa, Kansas, and Missouri. According to the National Weather Service, the Upper Missouri River Valley received more rainfall in the month of May than it does in an entire year.

High water levels in the Missouri River in the summer of 2011 resulted in MO Highway 179 at Sandy Hook being closed for most of the summer.

In addition to the river floods of 1993, 1995, and 2011, data from NOAA indicates numerous other flooding events in Moniteau County since 1993.

Flash flooding can be particularly hazardous in that there may be very little warning for travelers. Data indicates that flash flooding from 1993-1995 caused $500,000 in property damage, including $60,000 damage to county roads. For some unknown reason, the Missouri River flood of 1995 is not included in the NOAA data.

Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
MONITEAU (ZONE)	5/27/2000	Flash Flood	0	0	0	0
NORTH PORTION	8/7/2000	Flash Flood	0	0	0	0
MONITEAU (ZONE)	5/9/2002	Flash Flood	0	0	0	0
MONITEAU (ZONE)	5/12/2002	Flash Flood	0	0	0	0

MONITEAU (ZONE)	7/18/2003	Flash Flood	0	0	0	0
MONITEAU (ZONE)	1/12/2005	Flash Flood	0	0	0	0
CALIFORNIA	8/26/2005	Flash Flood	0	0	0	0
NORTHWEST PORTION	6/11/2006	Flash Flood	0	0	0	0
SANDY HOOK	5/6/2007	Flash Flood	0	0	0	0
TIPTON	4/10/2008	Flash Flood	0	0	1000	0
BACON	4/29/2009	Flash Flood	0	0	0	0
MC GIRK	7/28/2009	Flash Flood	0	0	0	0
TIPTON	10/30/2009	Flash Flood	0	0	0	0
CALIFORNIA	4/23/2010	Flash Flood	0	0	0	0
LUPUS	7/26/2010	Flash Flood	0	0	0	0
TIPTON	4/3/2014	Flash Flood	0	0	0	0
LUPUS	7/31/2016	Flash Flood	0	0	0	0
LUPUS	8/1/2016	Flash Flood	0	0	0	0
TIPTON	4/29/2017	Flash Flood	0	0	0	0
Total			**0**	**0**	**1000**	**0**

Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
MONITEAU (ZONE)	6/4/2001	Flood	0	0	0	0
MONITEAU (ZONE)	6/6/2001	Flood	0	0	0	0
LUPUS	5/8/2007	Flood	0	0	5000	5000
CLARKSBURG	9/13/2008	Flood	0	0	0	0
LUPUS	6/9/2010	Flood	0	0	0	0
Total			**0**	**0**	**5000**	**5000**

Probability of Future Events

Table 3.18

Probability of Future Flooding Events

EF-Scale	# of years with flood event (2000-2020)	Probability	Probability Rating
River flood	12	57%	High
Flash flood	14	67%	High

Probability

Probability: High – Moniteau County
Low – Lupus, California, Jamestown, Tipton

While there is a High Probability of Flood in some jurisdictions of the Planning Area, for the most part the flooding is more of an inconvenience than a serious problem at this point. The successful elevation project in Lupus mitigated the most serious flooding in the Planning Area. The one exception to this would be the toll that flooding takes on the County roads and bridges.

CHANGING FUTURE CONDITIONS CONSIDERATIONS

As precipitation is projected to increase, and in more extreme events, the risk of flooding could increase. This risk can be exacerbated by more and more construction that adds more impermeable surfaces that give large quantities of water nowhere to go.

Vulnerability Overview

Vulnerable Jurisdictions: Moniteau County (unincorporated),
California, Jamestown, Lupus, Tipton, Jamestown C-I School District

Clarksburg C-II School District, High Point R-III School District, Moniteau Co. R-I School District, Moniteau Co. R-V School District and Tipton R-VI School District are not vulnerable to flooding.

Potential Impact – Life

All types of flooding present a threat to human life. Small stream/urban stream flooding and flash flooding are particularly hazardous due to their quick onset. It is an ongoing struggle to educate the public concerning the very real hazard presented by flooded low water crossings and other flash flooding situations.

In addition to the risk of drowning, exposure to flood waters can result in infection or injury from sewage, agricultural runoff, and industrial chemicals. Flooded buildings present health risks from mold, chemicals, and electrical hazards.

Flooding also poses a threat to the livelihood of those farming in low lands; this is especially a problem near the Missouri River. When the river level is high for an extended period, water will seep up through the soil and cause additional flooding to that already caused by heavy rains. Standing water in fields may prevent planting at the optimal time for a successful harvest or damage/destroy crops during the growing season.

Potential Impact on Existing Structures

An NFIP policy does not necessarily equate to location in the 100-year floodplain. However, most of the City of Lupus is located in the 100-year floodplain and, in that case, the figures may give some rough idea of level of concern regarding property and flooding.

There are no people living in the unincorporated areas of the 100-year floodplain of the Missouri River, according to the Moniteau County Assessor's Office. A few very old buildings still exist there. Other structures not within designated floodplains are also vulnerable to the effects of flash flooding brought on by storm water or sheet flooding.

It can be said with certainty that there are not fire stations, schools, nursing homes, hospitals, prisons, government centers, or police stations in the 100-year floodplain.

Potential Losses to Previous and Future Development

There is a high level of awareness in the planning area regarding the dangers and potential of flooding. Participation in the NFIP by Moniteau County and the vulnerable communities means that floodplain ordinances are in place regulating development in the floodplain. It is also important that development projects are closely monitored to ensure compliance with all storm water requirements and regulations in order to minimize increases to flash flooding from development. This is increasingly crucial as it is now known that climate change is causing an increase in the type of heavy downpours which trigger flash flooding.

Hazard Summary by Jurisdiction

The Missouri River floods of 1993 and 1995 were devastating events for many parts of the Midwest United States. Changes in river management, including major wetland restoration projects along the river's long course and the buyout of properties in the river floodplain have all helped to mitigate risk associated with riverine flooding in the planning area**.**

The greatest impact of flooding in the unincorporated areas of the County is the toll it takes on the County roads and bridges. There is a continual need for repair of roads and culverts due to flooding of the many branches and creeks throughout the County.

The main flooding issue the City of California faces is flash flooding at about eight to ten areas of the city; the flooding usually lasts no more than an hour. These areas, for the most part, are not associated with the designated 100-year floodplain, but instead are caused by stormwater runoff.

Clarksburg does not participate in NFIP because they do not have any floodplain in or near their city limits and do not cite issued with flash flooding either.

Jamestown is located on high ground and does not experience any significant flooding problems. While Jamestown has a small amount of 100-year floodplain at the edges of the city, these areas are undeveloped and unlikely to be developed.

While the elevation project has put the homes of Lupus out of flooding danger, there is still the potential for the disruption of normal activity when flood threatens. Vehicles and other personal property must be moved to higher ground or higher locations within basements to avoid possible flooding; residents must access and leave their homes by boat.

The City of Tipton has some small problems with flash flooding in the areas of West Morgan Street (located west of Route B) and Claremont Avenue/Meadow Lane area (east side of town). The flash flood water recedes fairly quickly. Neither of these flash flooding areas are in the 100-year floodplain. There are very few structures located in the 100-year flood plain in the city.

The Jamestown C-I School District is vulnerable to flooding due to a bus route which travels on Highway 179. When the highway is closed at Sandy Hook due to flooding of the Missouri River, the bus must be rerouted. This is the district's longest bus route even before rerouting; it transports students from neighboring Cole County attending school in the district.

SUMMARY OF VULNERABILITY

Large-scale floods, such as the 1993 flood, are devastating events for entire regions of the country. Not only was Mid-Missouri impacted, but the entire Midwest suffered large losses in life, property, and crop damage, which carried over to the rest of the United States. Transit routes were disrupted, people lost jobs, and crops never made it to market. Small-scale floods or flash flooding can impact a neighborhood or a city but are limited in their spatial extent.

The entire planning area is at risk from some type of flooding. The most common types of flooding in the area are flash and sheet flooding associated with heavy downpours. This type of flooding can impact a neighborhood or a city but are limited in their spatial extent. Flash flooding is of particular concern in the unincorporated parts of Moniteau County, where roads can become impassable. Climate change is causing an increase in heavy downpours, and this will, in turn, most likely increase the frequency and/or severity of flash flooding.

Flooding of the Missouri River and the Moreau River (and their branches) is a potential problem for the areas near those rivers and branches.

NFIP membership, floodplain regulations, and a high awareness of the threat of potential flooding all act to help mitigate the vulnerability to this hazard.

Problem Statement

Flooding and flash flooding are frequent occurrences in the planning area that pose a threat to life, livelihood, property, and infrastructure. Risk to these things vary across the planning area with highest risk being to lands and jurisdictions along the Missouri River, Moreau River, and creeks and streams that feed them. While not all jurisdictions in the planning area are part of the NFIP, all jurisdictions can be impacted by flash flooding in one way or another. As a result of past events ordinances and guidance has been put in place to help control development in hazard areas. Proper stormwater handling, warning systems, elevated low-water crossings, and river bank restoration are all actions to aid in reduction of flood damage in the planning area.

3.4.2 Levee Failure

DESCRIPTION OF HAZARD

A levee is defined by the National Flood Insurance Program as "a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding."

Federally authorized levees are typically designed and built by the US Army Corps of Engineers in cooperation with a local sponsor then turned over to a local sponsor to operate and maintain.

Non-federal levees are designed, built, and managed by a non-federal entity.

There is no single agency with responsibility for levee oversight. The Corps of Engineers has specific and limited responsibilities for approximately 2,000 levees nationwide through their Levee Program.

The responsibilities of local levee owners or sponsors are broad and may include levee safety; land use planning and development; building codes; and operations, maintenance, repair, rehabilitation, and replacement of the levee. The certification of levees for FEMA's National Flood Insurance Program is also the responsibility of the local levee owners or sponsors.

Federally authorized and some non-federal levees may be eligible for Corps of Engineers rehabilitation assistance funding.

This assessment discusses the major levees in the planning area; these levees are owned and operated by levee districts. There are also several privately owned levees which are maintained by their owners; official data on the locations of these private levees is not available.

The USACE notes that there is a "large universe of private and other non Corps levees that have not been inventoried or inspected/assessed. We don't know the size of this universe, where the levees are located, their condition, or the consequences of failure, loss of life being of paramount concern."

Levee failure, according to FEMA, can occur by the following means:

- **Overtopping -** When a large flood occurs, water can flow over a levee. The stress exerted by the flowing water can cause rapid erosion.
- **Piping -** Levees are often built over old stream beds. Flood waters will follow these sub grade channels causing a levee to erode internally thereby allowing flood waters to rupture the levee structure.
- **Seepage and Saturation** - If flood waters sit up against a levee for a long period, the levee may become saturated and eventually collapse.
- **Erosion -** Most levees are constructed of sand or soil which erodes easily under high-velocity flood waters.

- **Structural Failures -** Lack of regular maintenance is a key reason levees fail at gates, walls, or closure sites.

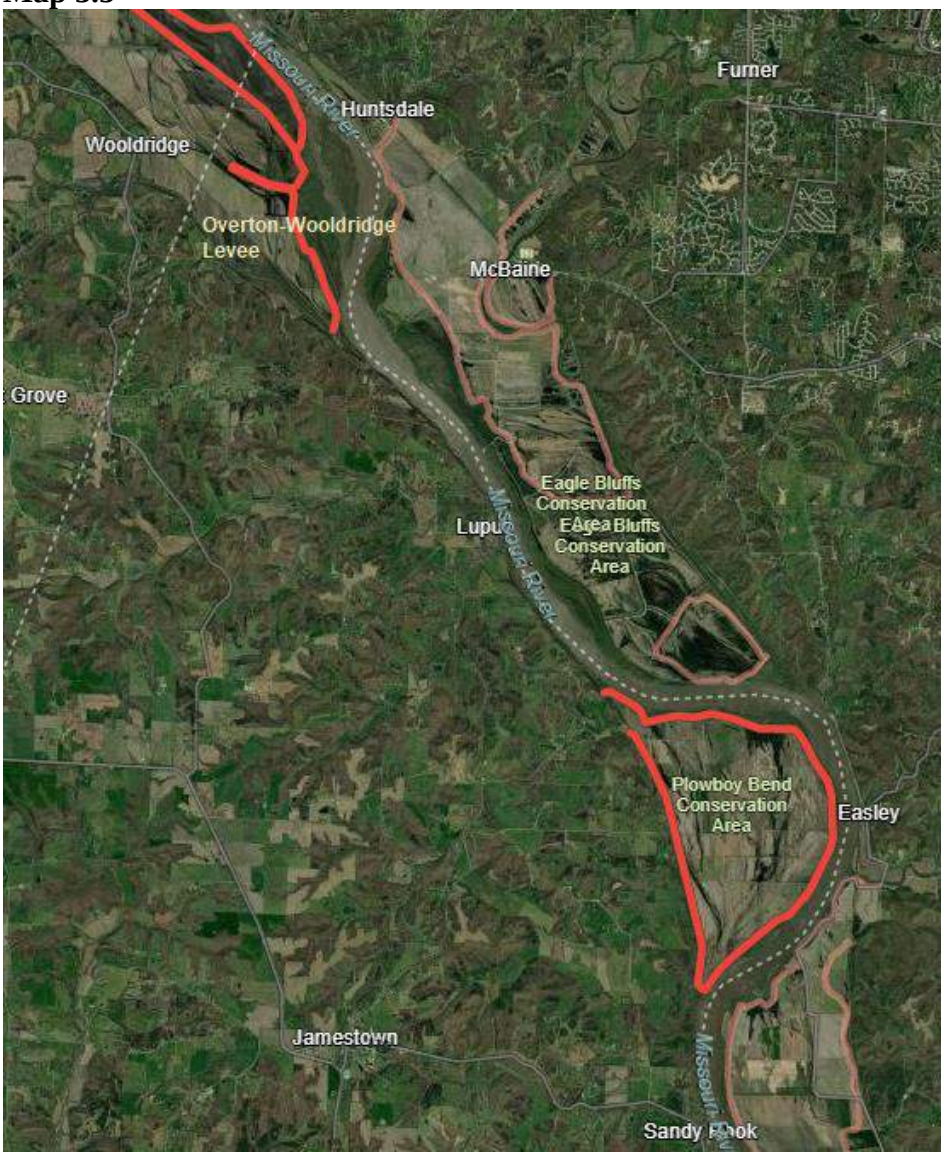
Location

There are two major levees in the Planning Area (see Figure 3.2.9A):

- The Plowboy Bend Levee is located south of Lupus.

- The Overton-Wooldridge Levee is located primarily in Cooper County to the north of the Planning Area; approximately one-third of the levee is located in the Planning Area.

Map 3.5



Other privately owned levees exist in the Planning Area along Moniteau and Moreau Creeks but official data on their locations is not available. Vulnerability assessments are not being completed for these private levees due to the lack of official data on their locations.

The lack of information and condition of these private levees is an area for concern.

> "Operations and Maintenance is important to levee safety, but it is not the only factor that affects risk and reliability of a levee, and should not be represented as such. It is important to note, there is still a large universe of private and other non Corps levees that have not been inventoried or inspected/assessed. We don't know the size of this universe, where the levees are located, their condition, or the consequences of failure, loss of life being of paramount concern."
>
> – US Army Corps of Engineers

Both of the levees managed by the levee districts are agricultural levees and part of the U.S. Army Corps of Engineers Rehabilitation Program. They are currently eligible for levee rehabilitation assistance should they receive damage during a flood event. The levee must maintain a *minimally acceptable* standard to remain eligible for the assistance. According to the USACE, "The rating is based on the levee inspection checklist, which includes 125 specific items dealing with operation and maintenance of levee embankments, floodwalls, interior drainage, pump stations, and channels."

Levee System Inspection Ratings	
Acceptable	All inspection items are rated as Acceptable.
Minimally Acceptable	One or more inspection items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable inspection items would not prevent the segment/system from performing as intended during the next flood event.
Unacceptable	One or more inspection items are rated as Unacceptable and would prevent the segment/system from performing as intended, or a serious deficiency noted in past inspections (previous Unacceptable items in a Minimally Acceptable overall rating) has not been corrected within the established timeframe, not to exceed two years.

The levee ratings from the most recent inspections, along with other information, are shown in Table 3.22.

Table 3.19 Major Levees in Planning Area

Levee Name	Segment Length	Levee Acreage	Inspection Date	Rating
Plowboy Bend	8.78	2,700	10/27/2016	Low
Overton-Wooldridge	1.5	262	2/5/2015	Low

Sources: USACE National Levee Database: USACE Levee Inspection Reports

Extent/Magnitude/Severity

Levee failure is typically an additional or secondary impact of another disaster such as flooding or earthquake. Levee failure often occurs during a flood event, causing destruction in addition to what would have been caused by flooding alone. A breech on an agricultural levee can not only cause immediate crop loss but sand and silt brought in from a levee break can impact the growing medium for years to come.

Regular maintenance and inspection of the levees is critical. For the major levees in the planning area, the potential of major failure is connected to flooding of the Missouri River, a hazard with a longer speed of onset than many other hazards. This longer speed of onset allows time to mitigate and prepare for potential failure as flooding threatens.

Previous Occurrences
Both levees in the Planning Area failed during the flood of 1993.

The 1993 breach of the Plowboy Bend Levee resulted in a lot of property damage to buildings and irrigation systems. The buildings have been taken down since that time and the irrigations systems are no longer in use.

Plowboy Bend Levee had never failed previous to the flood of 1993 nor has it failed since. During the extended flooding of the Missouri River in 2011, there was seepage under the levee which resulted in a loss of the majority of crops in the protected area. (The levee district does not have a pumping station.) There was minimal damage to the levee structure itself.

During the Missouri River flooding in 2011, the Overton-Wooldridge Levee also experienced seepage under the levee which resulted in both agricultural losses and pumping expenses. (For more information, see the Cooper County, Mo Natural Hazard Mitigation Plan.)

In 2019 near historic flood levels scoured and damaged levees across the whole region.

Probability of Future Events

Probability: Moderate
There haven't been any levee breeches in the planning area in the last 20 years. With regular maintenance the probability of a levee break is low but with the high rate of flooding along the Missouri river the potential for a break is never zero.

Changing Future Conditions Considerations

As precipitation is projected to increase, and in more extreme events, the risk of flooding could increase. Prolonged elevated water levels can make maintenance and repairs difficult to accomplish only increasing the risk for a break through scouring and seepage.

VULNERABILITY

Vulnerability Overview

Portions of unincorporated Moniteau County are vulnerable to Levee issues. The portions at risk though are mostly all agriculture land where risk to life is low. Failure or overtopping of a levee can damage or kill crops being grown in the fertile lowland areas and also contaminate soil with sand and other things washed in from the Missouri River which can create significant long-term impacts for farmers.

The Plowboy Bend Levee has an interesting structure; it almost entirely surrounds the area of land which it protects. The west side of the levee runs on the river side of the railroad tracks. This effectively forms a chute which channels hill water coming down a drainage ditch from the higher topography to the north; the hill water discharges into the river at the southernmost end of the levee. Without this part of the levee, the hill water would flood the protected area in the bend of the river.

It should be noted that in addition to the protected area inside the levee, this levee also protects part of Missouri Highland Farm, a blueberry picking outlet located to the north. Should the levee breach, part of the farm would be at risk from water backing up the drainage ditch. The area at risk includes the office/shop of the farm.

The levee at its northern end crosses the railroad tracks. When the river reaches 31 feet at the Boonville Gage, the Levee District sandbags across the railroad tracks. At this river stage, the tracks are underwater in other areas so rail traffic has already been stopped.

Severity: Moderate – Moniteau County (unincorporated)
Not applicable – All other participating jurisdictions

Potential Losses – Life

Levee failure presents a flooding threat to life. The longer period of onset associated with failure of levees along the Missouri River would minimize the threat of actual drowning; however, drowning could still occur. The greater threat from levee failure would be exposure to flood waters with possible resulting infection or injury from sewage, agricultural runoff, and industrial chemicals. Flooded buildings present health risks from mold, chemicals and electrical hazards.

Potential Losses to Existing Development

Structures in Moniteau County that would be vulnerable to the effects of levee failure would include those that lie in areas in or near the Missouri River floodplain and its tributaries. Since the 1993 Flood, many structures have been relocated, bought out, abandoned, elevated, or remodeled; this has reduced the amount of vulnerable structures and people in areas where levees could potentially fail.

Impact to Previous and Future Development

Impact on future development is directly related to floodplain management and regulations set forth by the county and individual communities through levee management and regulations which are not clearly defined. It is important to note that levees in Moniteau County are located in designated floodplains. This means that all new construction in these areas fall under Moniteau County's floodplain regulations and must adhere to that coding. The US Army Corps of Engineers oversees the inspection of Plow Boy Levee and the Overton-Wooldridge Levee District; it is up to the owner or sponsor to inspect and fix their levees.

SUMMARY OF VULNERABILITY

Jurisdictions: Moniteau County

The two main levees in the planning area (Overton-Wooldridge Levee District and Plow Boy Levee) are addressed in this plan. Vulnerability assessments are not being completed for the private levees in the planning area due to the lack of official data on their locations.

The Overton-Wooldridge Levee District and Plow Boy levees in the planning area are agricultural levees. Agricultural levees are usually built to withstand a 50-year flood, but these three levees fall well below that protection level at 10- to 25-year flood event levels. The Village of Wooldridge Levee is not part of the USACE Levee Rehabilitation Program and does not have an inspection report. It has been estimated by the Wooldridge Board of Trustees that there are approximately 12 to 15 residences that are protected by the levee.

The risk of flooding from levee failure remains. The warning time afforded by a hazard such as levee failure, which has a long period of onset, will allow for preparations and evacuations to take place, should the need arise.

Problem Statement

Levee failure is not a common occurrence in the planning area. The last instance of levee failure in the planning area was in 1993 when records were set across the state for flooding levels. Levee failure is usually a slow process that gives people time to evacuate areas at risk. Keeping up with maintenance and frequent inspections are actions of mitigation to help prevent such breakages that could lead to property damage and crop loss.

3.4.3 Dam Failure

DESCRIPTION OF HAZARD

A dam is defined by the National Dam Safety Act as an artificial barrier which impounds or diverts water and is:

1. more than 6 feet high and stores 50 acre feet or more or
2. 25 feet or more high and stores more than 15 acre feet.

Based on this definition, there are over 80,000 dams in the United States. Over 95% are non-federal, with most being owned by state governments, municipalities, watershed districts, industries, lake associations, land developers, and private citizens.

Dam owners have primary responsibility for the safe design, operation and maintenance of their dams. They also have responsibility for providing early warning of problems at the dam, for developing an effective emergency action plan, and for coordinating that plan with local officials. The State has ultimate responsibility for public safety, and many states regulate construction, modification, maintenance, and operation of dams, and also ensure a dam safety program.

Dam construction varies widely throughout the state. A majority of dams are of earthen construction. Missouri's mining industry has produced numerous tailing dams for the surface disposal of mine waste. These dams are made from mining material deposited in slurry form in an impoundment. Other types of earthen dams are reinforced with a core of concrete and/or asphalt. The largest dams in the state are built of reinforced concrete, and are used for hydroelectric power.

Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, affecting both life and property. Dam failure can be caused by any of the following:

1. Overtopping: Inadequate spillway design, debris blockage of spillways or settlement of the dam crest.
2. Piping: Internal erosion caused by embankment leakage, foundation leakage and deterioration of pertinent structures appended to the dam.
3. Erosion: Inadequate spillway capacity causing overtopping of the dam, flow erosion, and inadequate slope protection.
4. Structural Failure: Caused by an earthquake, slope instability or faulty construction.

Dam Hazard Classification - Dams in Missouri have been classified according to both a federal and state system with regards to potential hazard posed.

The **federal classification system** is based upon the probable loss of human life and the impact on economic, environmental and lifeline interests from dam failure. It should be noted that there is always the possibility of loss of human life when a dam fails; this classification system does not account for the possibility of people occasionally passing through an inundation area which

is usually unoccupied (e.g. occasional recreational users, daytime user of downstream lands, etc.)

The **state classification system** is based upon the type and number of structures downstream from a dam. An inventory of all the dams of the state was done in the late 1970s and early 1980s, according to Glenn Lloyd, Civil Engineer and Dam Safety Inspector with the Dam Safety Program of the MO Department of Natural Resources (DNR). All of the known dams were classified by the state at that time.

A summary of the federal and state classification systems, how the two systems relate to each other, and inspection requirements for regulated dams is shown in Table 3.23

Table 3.20 MoDNR Dam Hazard Classification Definitions

Hazard Class	Definition
Class I	10 or more permanent dwellings; or any public building
Class II	1-9 permanent dwellings; or 1 or more campgrounds with permanent water, sewer and electrical services; or one or more industrial buildings
Class III	Everything else

Source: Missouri Department of Natural Resources, http://dnr.mo.gov/env/wrc/docs/rules_reg_94.pdf

Table 3.21 NID Dam Hazard Classification Definitions

Hazard Class	Definition
Low Hazard	No probable loss of human life; low economic and/or environmental loss; loss principally limited to owner's property
Significant Hazard	No probable loss of human life but potential economic loss, environmental damage, disruption of lifeline facilities or other impact of concern
High Hazard	Probable loss of human life

Source: National Inventory of Dams

Dam Regulation in Missouri

Pursuant to Chapter 236 of the Revised Statutes of Missouri, a dam must be 35 feet or higher to be state regulated; regulation makes a dam subject to permit and inspection requirements. For regulated dams, the state classification system dictates the required inspection cycle. According to the Association of State Dam Safety Officials, 5,113 dams in Missouri have been classified and only 685 are regulated by the state.

The inspection cycle for regulated dams allows for a regulated dam's classification to be updated when appropriate. Classification is a dynamic system; development can easily change the situation downstream. A regulated dam in Missouri would have its classification appraised at least once every 5 years.

In addition, the DNR database of dams in Missouri reflects only the known dams; a dam less than 35 feet in height which was built since the inventory was taken over 30 years ago may not appear in the database.

There are currently 18 dams in Moniteau County according to the Department of Natural Resources database and NID. Of these, only 2 are regulated by the state but NID shows 6 high hazard dams of the 18 total dams.

Table 3.22	Hazard Categories of Moniteau County Dams			
Hazard Category	**Regulated Dams**	**Unregulated Dams**	**All County Dams**	**Percentage of Total Dams**
High	2	4	6	32%
Significant	0	13	13	68%
Low				
Total	2	17	19	100%

Note that one of the unregulated high hazard dams is dry and thus not a threat at the present time.

One must use caution in assuming the classifications of non-regulated dams are currently accurate. It is very probable that, for most of the non-regulated dams, the classification does not take into account over 30 years of development and change in Moniteau County.

Again, it is important to note that, according to information from Missouri DNR, much of this data, perhaps most of it, for the unregulated dams has not been updated since the dam survey was first conducted in the late 1970s and early 1980s. The heights of the unregulated dams may be, in some cases, the only currently reliable information.

Location

The dams in the planning area are located in unincorporated Moniteau County and California. It must be remembered that, according to information from Missouri DNR, much of this data, perhaps most of it, for the unregulated dams have not been updated since the dam survey was first conducted in the late 1970s and early 1980s. The heights of the unregulated dams may be, in some cases, the only currently reliable information.

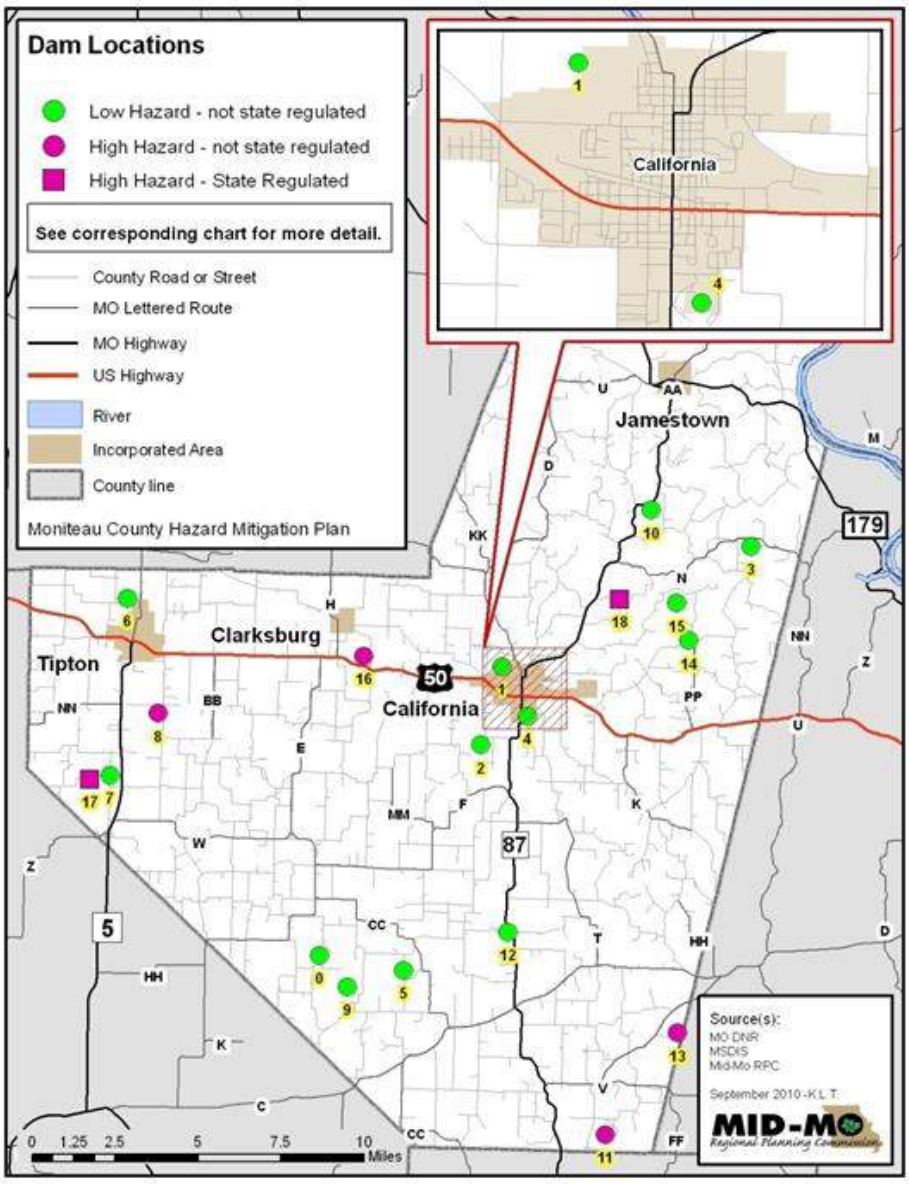
Table 3.23 High Hazard Dams in Moniteau County

Dam Name	Emergency Action Plan (EAP)AP	Dam Height (Ft)	Normal Storage (Acre-Ft)	Last Inspection Date	River	Nearest Downstream City	Distance To Nearest City (Miles)	Dam Owner
Manito Dam	No	43	77	N/A	Little Moniteau	Fortuna	>1	Dept. of Conservation
Lake Imhoff Dam	No	45	26	N/A	Little Richland Cr	California	>1	Robert Imhoff

Keane Lake Dam	No	25	54	N/A	N/A	Clarksburg	<1	John Keane
Bond Lake Dam	No	25	107	N/A	N/A	Olean	>1	Wyeth Bond
Washburn Lake	No	18	24	N/A	N/A	Enon	>1	BJ Washburn
Knipp Lake Dam	No	18	106	N/A	Willow Fork	Fortuna	>1	Norbert Knipp

Sources: Missouri Department of Natural Resources, https://dnr.mo.gov/geology/wrc/dam-safety/damsinmissouri.htm and National Inventory of Dams, http://nid.usace.army.mil/cm_apex/f?p=838:12.

Map 3.6 Moniteau County Dams



Strength/Magnitude/Extent

The speed of onset of a dam failure can vary considerably. In most cases, regular inspections, either formal or informal, will promote a longer period of onset and allow for possible

mitigation. Unfortunately, the current lack of required dam inspections increases the likelihood of dam conditions being ignored by owners – a situation which promotes a quicker speed of onset and an increased threat from the hazard.

The extent of hazard which a dam failure poses is also influenced by the reservoir size.

Previous Occurrences

While there have been no dam failures in Moniteau County, the issue was highlighted in the mid-Missouri region by a dam failure in neighboring Boone County in 2008 and a near failure in Cole County in 2009.

The Moon Valley Lake Dam in Columbia (Boone County) failed in March 2008. This 18-foot high unregulated dam had been built in 1964; it drained 2,100 acres and had a 13-acre reservoir, according to the DNR database. Moon Valley Lake Dam was classified as high hazard, but there was no loss of life with the dam failure. This may be partially attributable to the fact that Moon Valley Lake was silted in and the main release from the dam failure was silt which went down the Hominy Branch into the Hinkson Creek. The added silt has caused greater flooding problems on the Hinkson Creek since the time of the dam failure. The City of Columbia estimated the cost of removing the sediment and stabilizing about 2,000 feet of the stream bank to be in the vicinity of $400,000.

Failure of the Renn's Lake Dam in Jefferson City (Cole County) was averted in late October/early November 2009 through the work of emergency crews and volunteers who relieved pressure on the earthen dam by pumping thousands of gallons of water from 7-acre Renn's Lake. The 30-foot high unregulated dam, built in 1950, had been weakened by the growth of trees; heavy rainfall caused a 15-foot section to erode. Renn's Lake is located immediately to the west of U.S. Highway 54 and the failure of the dam would have threatened the highway.

All of these dam failures indicated that this is a serious problem which needs attention. Many of Missouri's smaller dams are becoming a greater hazard as they continue to age and deteriorate. While hundreds of them need to be rehabilitated, lack of available funding and often questions of ownership loom as obstacles difficult to overcome.

Probability of Future Events

Probability: Low
Severity: Low

There have been zero failures in Moniteau County in the last 20 years of Dams. Lack of regulation and aging systems could impact this at any point though.

Changing Future Conditions

The future of climate change on dam failure is largely tied to future precipitation events. Since

precipitation is predicted to increase in the future with potential for more vigorous rainfall events, this creates an elevated risk of flooding and pressure on dams and spillways to handle the extra water amounts. This elevated pressure brings about the importance for regular inspections and maintenance, as well as the need for engineering with higher flood levels in mind.

VULNERABILITY

Vulnerability Overview

A dam failure in Moniteau County could range from very minimal environmental damage to a significant loss of life and infrastructure. All impacts are dependent upon several variables: water, debris, people, and structures.

Inundation information is not available for any of the dams in the Planning Area at the present time, so it is not possible to know the exact extent of the area that would be impacted by dam failure. The inundation studies currently being conducted in the State will provide better information in the future for the two state regulated dams (Manito Dam and Lake Imhoff Dam).

Without inundation studies, the main predictable impact of failure at a dam in the Planning Area would appear to be the flooding of agricultural fields. In the case of a few of the high hazard dams, there is the possibility of flooding of one or two structures and/or roadways

Potential Impact – Life

There is the very real danger of injury or loss of life with a dam failure event. This threat is recognized and built into the dam classification system.

Potential Impact - Existing Structures

Proctor Park Lake Dam, located in the southern part of California, is located in an open flat area. While there are houses within a half mile of the dam, it was the assessment of city personnel that a failure at the dam would not cause significant damage to any existing structures. Due to the topography surrounding the lake, and the relative shallowness of the lake, a failure would most probably result in a wide area of very shallow water.

Potential Impact of Future Development

It would be wise to consider the potential threat of Dam Failure when development is under consideration in the Planning Area. If development occurs without knowledge of potential problems presented by dams upstream, structures and lives can be put in jeopardy.
There are currently no planning and zoning regulations in Moniteau County or its incorporated communities other than floodplain regulations; public sentiment indicates that this will be true for the foreseeable future. Therefore, there is no legal means to control development to lessen the threat of flooding from Dam Failure.

Lacking legal power, public education can be used to help raise awareness of the issue so that is taken into consideration when purchasing or developing property. The inundation studies and development of EAPs for the two state regulated dams in the Planning Area will provide

information helpful for making informed decision in the area of those dams, if this information is readily available and the public is aware of its existence.

There are at least 17 unregulated dams in the Planning Area without required inundation studies or EAPs. While many of these dams probably pose little threat to life or livelihood, developers and buyers would be wise to look upstream before development or purchase.

SUMMARY OF VULNERABILITY

State-regulated dams are inspected, according to classification, through the Dam Safety Program of the DNR. According to the Missouri DNR, dam owners with dams over 35 feet in height are required to complete an Emergency Action Plan (EAP). The Dam and Reservoir Safety Program coordinates with dam owners, county Emergency Management Directors, and other state and federal agencies to develop plans for all regulated dams. An EAP must include the following criteria:

- Guidance for evaluating emergency situations occurring at a dam.
- Notification charts and emergency contact information.
- A list of residents, businesses, and entities within the downstream inundation zone.
- A list of resources available for responding to a dam emergency.
- An inundation zone map (estimated boundary of the maximum water elevation resulting from a dam breach).
- Basic physical and geographical data for the regulated dam.

The Moniteau County emergency management director can provide critical emergency contact information and assistance in identifying structures located within the downstream inundation area. A template for creating an EAP is available through the Missouri DNR Dam Safety website.

Hazard Summary by Jurisdiction

There are no dams lying upstream from any school district structures.

Most of the dams in the planning area are located in unincorporated Moniteau County. The results of a dam failure could range from very minimal environmental damage to a significant loss of life and infrastructure. All impacts are dependent upon several variables: water, debris, people, and structures. A dam failure would include the breach of a dam wall or embankment allowing the water and debris to flow downstream from the dam.

The dam inventory for the state of Missouri was compiled in the late 1970s and early 1980s. The state has classified two of Moniteau County's dams as "High Hazard". State-regulated dams are classified by what lies downstream of the dam and what will be impacted by the failure of that dam. Unregulated dams received their classifications nearly 30 years ago or more and development that occurs downstream is not monitored by any agency; this potentially puts the public at risk. Also, development upstream that might increase the contents held by the dam can cause failure. Because there is no entity in charge of unregulated dams, the original classifications for these dams may not be correct. Some dams may not exist anymore while others may pose a greater downstream threat than their classifications indicate.

Problem Statement

Much like flash flooding, the risk in a dam failure to life and property comes from the sudden rush of water downstream. Development in the inundation zone of a high hazard dam poses a risk to life and structure.

3.4.4 Earthquakes

DESCRIPTION OF HAZARD

The United States Geological Society (USGS) describes an earthquake as "a sudden movement of the earth's crust caused by the release of stress accumulated along geologic faults or by volcanic activity." Earthquakes can be one of the most destructive forces of nature causing death, destruction of property, and billions of dollars of damage.

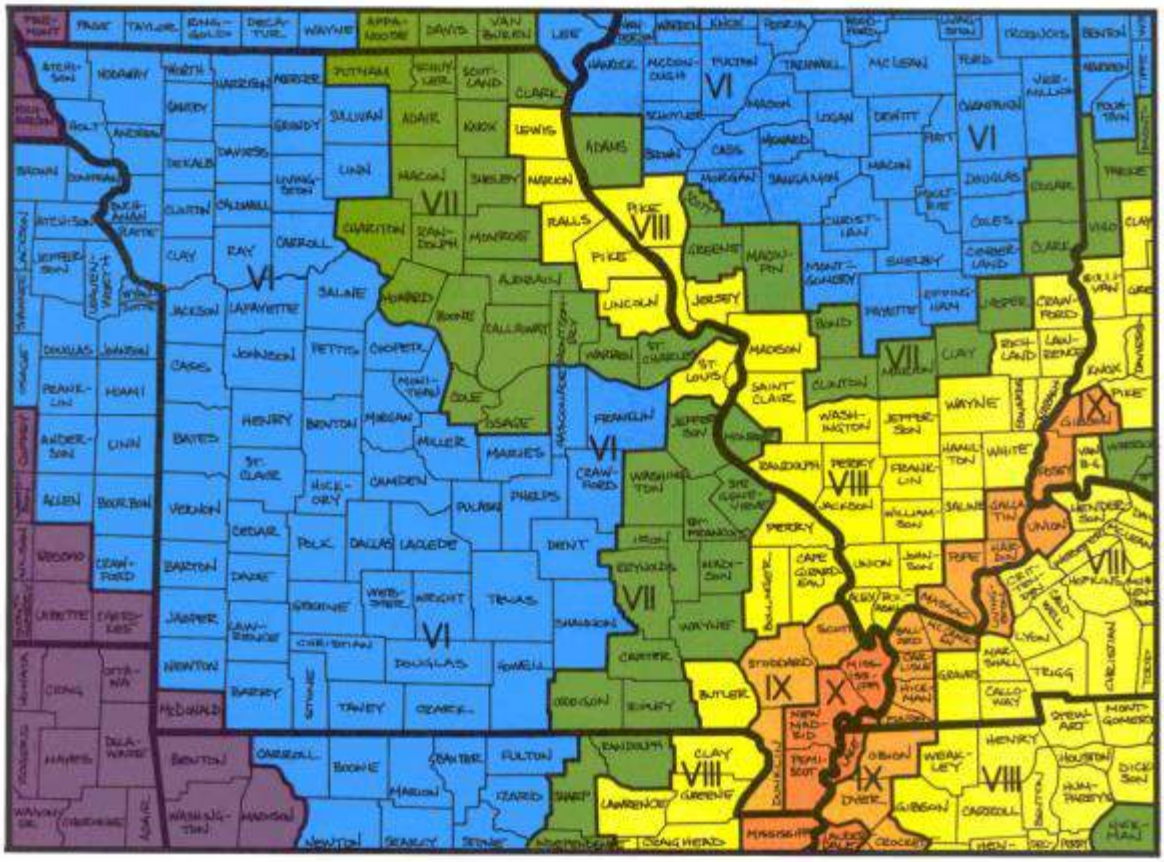
The New Madrid Seismic Zone (NMSZ), which runs through southeastern Missouri, is the most active seismic zone east of the Rocky Mountains. Any hazard mitigation planning in Missouri must, of necessity, take possible earthquakes into account.

Missouri and much of the Midwest can feel earthquakes from very far away because the geology of the area is more amenable to ground shaking than the California State geology. New Madrid earthquakes can cover up to twenty times the area of typical State of California earthquakes because of this differing geology.

Location

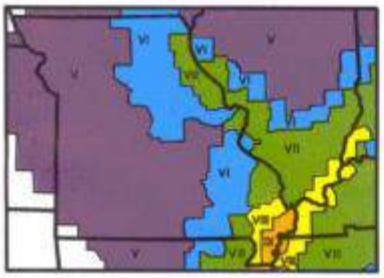
The entire planning area is at risk for the effects of an earthquake along the New Madrid Seismic Zone. Areas close to the Missouri River may be particularly vulnerable. The soil, or alluvium, along river channels is especially vulnerable to liquefaction from earthquake waves; river alluvium also tends to amplify the waves.

Figure 3.1 Earthquake Intensity Zones



This map shows the highest projected Modified Mercalli intensities by county from a potential magnitude – 7.6 earthquake whose epicenter could be anywhere along the length of the New Madrid seismic zone.

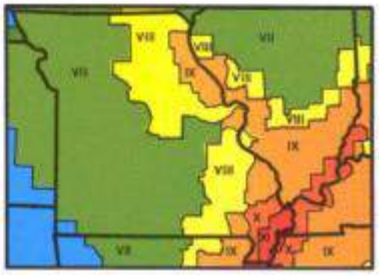
6.7



This map shows the highest projected Modified Mercalli intensities by county from a potential magnitude – 6.7 earthquake whose epicenter could be anywhere along the length of the New Madrid seismic zone.

7.6

8.6



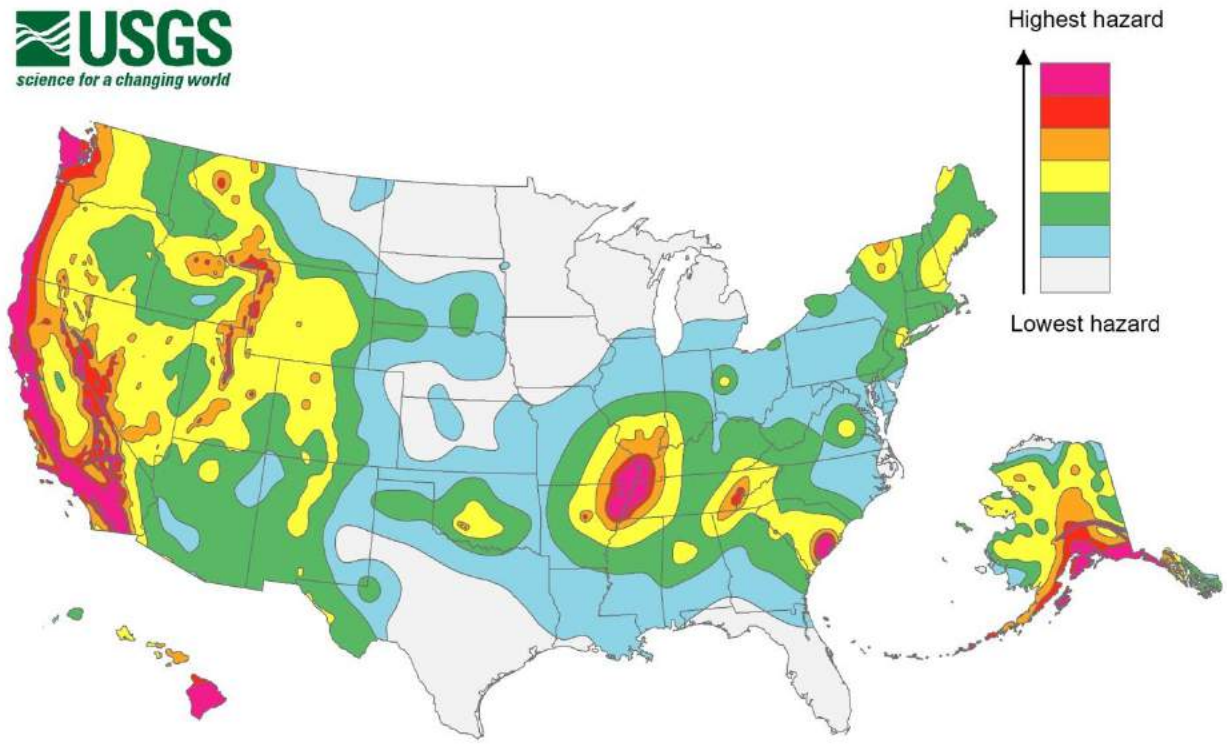
This map shows the highest projected Modified Mercalli intensities by county from a potential magnitude – 8.6 earthquake whose epicenter could be anywhere along the length of the New Madrid seismic zone.

Table 3.24 Modified Mercalli Intensity Scale

Figure 4.38 Modified Mercalli Intensity Scale	
I. Instrumental	Not felt by many people unless in favorable conditions.
II. Feeble	Felt only by a few people at best, especially on the upper floors of buildings. Delicately suspended objects may swing.
III. Slight	Felt quite noticeably by people indoors, especially on the upper floors of buildings. Many do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.
IV. Moderate	Felt indoors by many people, outdoors by few people during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rock noticeably. Dishes and windows rattle alarmingly.
V. Rather Strong	Felt outside by most, may not be felt by some outside in non-favourable conditions. Dishes and windows may break and large bells will ring. Vibrations like large train passing close to house.
VI. Strong	Felt by all; many frightened and run outdoors, walk unsteadily. Windows, dishes, glassware broken; books fall off shelves; some heavy furniture moved or overturned; a few instances of fallen plaster. Damage slight.
VII. Very Strong	Difficult to stand; furniture broken; damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by people driving motor cars.
VIII. Destructive	Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture moved.
IX. Ruinous	General panic; damage considerable in specially designed structures, well designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X. Disastrous	Some well built wooden structures destroyed; most masonry and frame structures destroyed with foundation. Rails bent.
XI. Very Disastrous	Few, if any masonry structures remain standing. Bridges destroyed. Rails bent greatly.
XII. Catastrophic	Total damage - Almost everything is destroyed. Lines of sight and level distorted. Objects thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move position.
Source: http://en.wikipedia.org/wiki/Mercalli_intensity_scale	

The below map shows the seismic hazards across the United States. The planning area located in the center of the United States is included in zone VII, which is displayed in green.

Map 3.7 Earthquake Risk Zones



Source: United States Geological Survey at https://earthquake.usgs.gov/hazards/hazmaps/conterminous/2014/images/HazardMap2014_lg.jpg

Strength/Magnitude/Extent

The extent or severity of earthquakes is generally measured in two ways: 1) the Richter Magnitude Scale is a measure of earthquake magnitude; and 2) the Modified Mercalli Intensity Scale is a measure of earthquake severity. The two scales are defined as follows.

Richter Magnitude Scale

The magnitude of an earthquake is measured using a logarithm of the maximum extent of waves recorded by seismographs. Adjustments are made to reflect the variation in the distance between the various seismographs and the epicenter of the e arthquakes. On the Richter Scale, magnitude is expressed in whole numbers and decimal fracti ons

Modified Mercalli Intensity Scale

The intensity of an earthquake is measured by the effect of the earthquake on the earth's surface. The intensity scale is based on the responses to the quake, such as people awakening, movement of furniture, damage to chimneys, etc. The intensity scale currently used in the United States is the Modified Mercalli (MM) Intensity Scale. It was deve loped in 1931 and is composed of 12 increasing levels of intensity.

Earthquakes along the New Madrid Seismic Zone with magnitudes around 6.0 or greater would be of concern for the planning area.

Previous Occurrences

Historical quakes along the New Madrid Seismic Zone in southeastern Missouri have been some of the largest in U.S. history since European settlement. The Great New Madrid Earthquake of 1811-1812 was a series of over 2000 quakes, which caused destruction over a very large area. According to information from Missouri SEMA's Earthquake Program, some of the quakes measured at least 7.6 in magnitude, and five of them measured 8.0 or more.

The 1811-1812 quakes changed the course of the Mississippi River. Some of the shocks were felt as far away as Washington D.C. and Boston.

The first federal disaster relief act was a result of the Great New Madrid Earthquake of 1811-1812. President James Madison signed an act into law that issued "New Madrid Certificates" for government lands in other territories to residents of New Madrid County who wanted to leave the area.

Probability of Future Events - Moderate

It is difficult to predict the probability of an earthquake occurring along the New Madrid Seismic Zone which would be significant enough to affect the planning area. The following information from MO DNR helps to illustrate why this is difficult:

> The active faults in the NMSZ are poorly understood because they are not expressed at the ground surface where they can be easily studied. The faults are hidden beneath 100- to 200-foot thick layers of soft river deposited soils called alluvium.
>
> Microseismic earthquakes (magnitude less than 1.0 to about 2.0), measured by seismographs but not felt by humans, occur on average every other day in the NMSZ (more than 200 per year).
>
> Active faults that have generated dangerous earthquakes in historic times or the recent geologic past (the last 10,000 years) are not always microseismically active. In fact, in some settings these quiet faults are considered the most dangerous ones because high built up stress has locked the two sides of the fault together thereby preventing the microseismic earthquakes. This is thought to happen as a prelude to a major rupture of the fault. It is not known if faults of this type exist in the NMSZ. If they do exist there is no easy way to locate them.

If one looks strictly at the historical record for earthquakes of 6.5 magnitude or greater, there have been 2 years (1811 and 1812) out of the last 204 years in which such earthquakes have occurred. This equals less than 1% probability in any given year (Probability= 2/204*100=

0.98%). However, there were many serious quakes in just the two years of 1811 and 1812, according to MO DNR.

In 2002, U.S. Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis released the following expectations for earthquakes in the NMSZ in following 50 years:

- 25-40% percent chance of a magnitude 6.0 and greater earthquake.
- 7 -10% chance of a magnitude 7.5 - 8.0 quake (magnitudes similar to those in 1811-1812)

According to information provided by MO SEMA, the above expectations can be translated into the following likelihoods for a given year in the 50-year period:

- 1.0-1.6% likelihood of a magnitude 6.0 and greater earthquake
- 0.28-0.40% likelihood of a magnitude 7.5-8.0 earthquake

Since a magnitude 6.0 earthquake would affect the planning area the probability has been determined to be moderate.

VULNERABILITY

Vulnerability Overview

Severity: High

Potential Impact - Existing Structures

The intensity of an earthquake refers to the potentially damaging effects of a quake at any particular site. An earthquake of a specific magnitude will have different intensities depending on a location's distance from the epicenter of the quake, intervening soil type, and other factors.

The pertinent information for Moniteau County is summarized in Table 3.27.

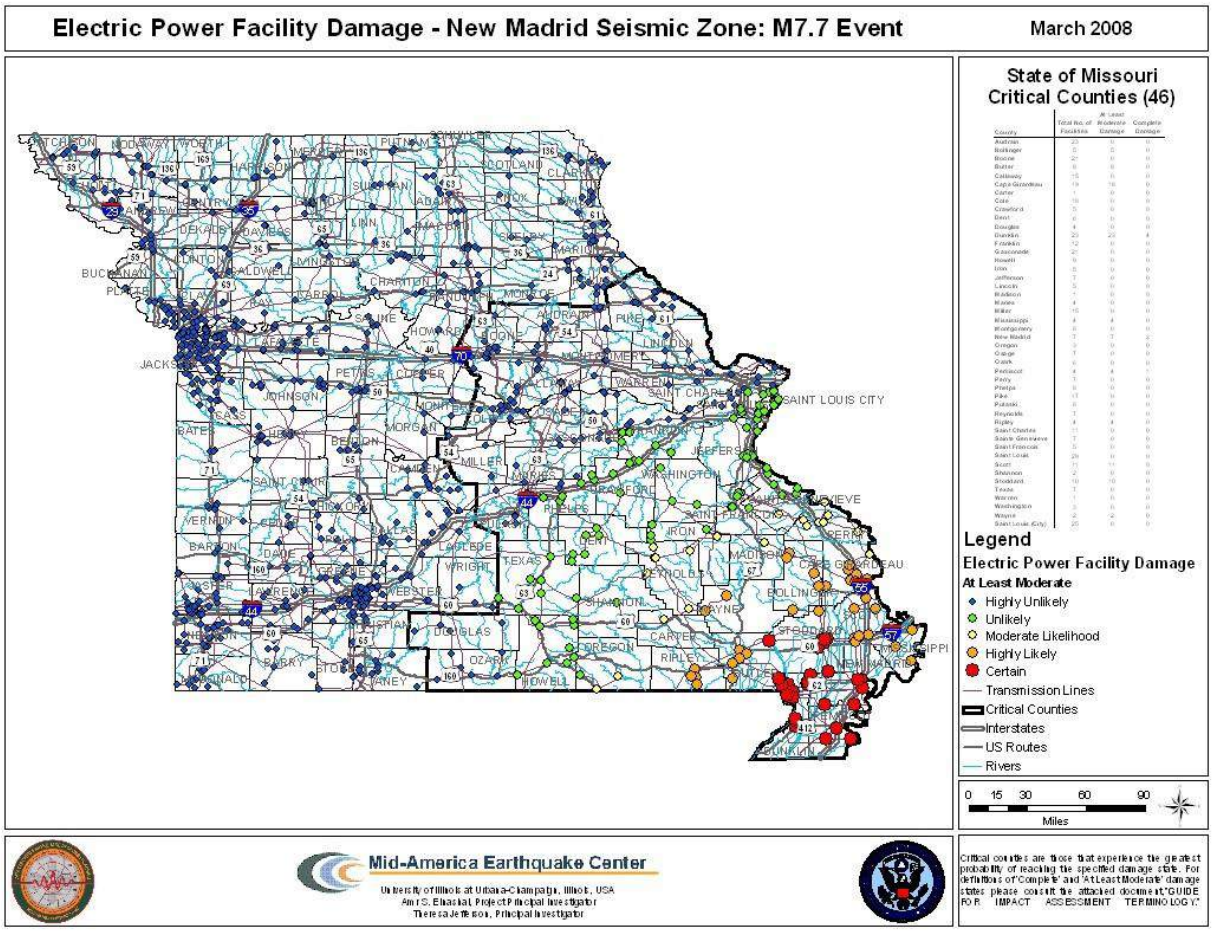
Table 3.25
Projected Earthquake Hazard for Moniteau County

Magnitude at NMSZ	Probability of Occurrence (2002 -2052)	Intensity (MMI)	Expected Damage
6.7	25-40%	V	Minimal to none
7.6	7-10%	VI	Slight

In 2008, the Mid-America Earthquake Center mapped the expected probability of at least moderate damage to electric power facilities from a 7.7 magnitude earthquake in the NMSZ;

such damage was considered “highly unlikely” in the planning area. This correlates well with the projected damage to *poorly* built structures from a 7.6 magnitude quake.

Map 3.8 Electric Facility Damage Rate



Missouri State Hazard Mitigation Plan (2018) Analysis: Specific modeling of damage and loss from earthquake scenarios has been conducted for the state using HAZUS 2.1 software; the findings are included in the *Missouri State Hazard Mitigation Plan (2018)*. (HAZUS software is used by FEMA to compare relative risk from earthquakes and other natural hazards.)

The following analyses were done:

1. Annualized Loss Scenario based on eight earthquake return periods (100, 200, 500, 750, 1000, 1500, 2000, and 2500 years)

2. 2% Probability of Exceedance in 50 Years Scenario – a “worst case scenario”

The analyses used demographic data based on the 2010 Census; site-specific essential facility data was based on the 2011 HSIP inventory data.

The analyses for Moniteau County are discussed in the following pages.

Annualized Loss Scenario

The *MO State Hazard Mitigation Plan (2018)* explains the annualized loss scenario as follows:

HAZUS defines annualized loss as the expected value of loss in any one year. The software develops annualized loss estimates by aggregating the losses and their exceedance probabilities from the eight return periods. Annualized loss is the maximum potential annual dollar loss resulting from various return periods averaged on a 'per year' basis. It is the summation of all HAZUS-supplied return periods multiplied by the return period probability (as a weighted calculation).

The results of the modeling for Moniteau County are shown in Table 3.26.

Table 3.26 Hazus-MH Earthquake Loss Estimate: Annualized Loss Scenario

County	Total Losses, in $ Thousands	Loss Per Capita, in $ Thousands	Loss Ratio, in $ Per Million
Moniteau	32	0.0020	21

While Moniteau County has among the lowest loss ratios in the state, it's estimated building damage in actual dollars ranks 75th. (For a comparison, the modeling estimates the loss ratio in $ per million for St. Louis County (ranked #1) at $150 and in the City of St. Louis (ranked #2) at $235.

In Moniteau County, there is the potential for building damage even at a considerable distance from the New Madrid Fault. However, the percentage of buildings sustaining damage and/or the level of damage sustained would be much lower than in a county adjacent to the fault. The loss ratio reflects this and gives an indication of both the potential economic impact of an earthquake and the difficulty of recovery in the county.

2% Probability of Exceedance in 50 Years Scenario

This analysis models a worst case scenario using a level of ground shaking recognized in earthquake design. The *MO State Hazard Mitigation Plan (2018)* gives the following explanation of the modeling:

The methodology is based on probabilistic seismic hazard shaking grids developed by the U.S. Geological Survey (USGS) for the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of peak ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively that have a 2% probability of exceedance in the next 50 years. The International Building Code uses this level of ground shaking for building design in seismic areas. This scenario used a 7.7 driving magnitude in HAZUS-MH, which is the magnitude used for typical New Madrid fault planning scenarios in Missouri. While the 2% probability of exceedance in the next 50 years ground motion maps incorporate the shaking potential from all faults with earthquake potential in and around Missouri, the most severe shaking is predominately generated by the New Madrid Fault.

Table 3.27 HAZUS-MH Earthquake Loss Estimation 2% Probability of Exceedance in 50 Years Scenario Direct Economic Losses

County	Cost Structural Damage	Cost Non-Structural Damage	Cost Content Damage	Inventory Loss	Loss Ratio	Relocation Loss	Capital Related Loss	Wage Losses	Rental Income Loss	Total Loss
Moniteau	$4,192	$10,239	$3,495	$120	0.96	$2,489	$454	$625	$883	$22,496

The modeling suggests that damages from a worst-case scenario earthquake in the NMSZ (7.7 magnitude) would be greater in Moniteau County than the Modified Mercalli map of Missouri suggests. Caution indicates that mitigation and preparedness be focused on the most conservative estimates (in this case, those that predict greater injury and damage) unless these have been shown to be incorrect.

Even a significant earthquake event in the NMSZ that does not cause great damage in Moniteau County could still possibly cause cascading economic losses in the county. There is the potential for disruption of road and rail traffic to the eastern part of the state, including the metropolitan area of St. Louis. Regions of the state outside of the severely damaged areas would probably be called upon for emergency and recovery assistance.

Potential Impact - Life

The potential for loss of life goes up as the magnitude of the earthquake goes up. Areas with a high rate of older or historical structures with construction methods not designed to withstand such an event pose a higher risk for loss of lives that work or live within such buildings.

The potential for “emotional aftershocks” also exists with any earthquake event. Major earthquake events require mental health services for people dealing with loss, stress, anxiety, fear, and other difficult emotions. Even a smaller quake, however, has the potential for emotional repercussions; the sudden movement of something experienced as stable for one’s entire life (the earth itself) can be very traumatic.

Potential Impact - Future Development

The standards followed in new construction will impact vulnerability to earthquake damage; the building codes in place in Moniteau County and the incorporated communities contain a basic level of seismic safety. Building new structures according to even more stringent earthquake-resistant codes would lessen the potential damage should an earthquake occur; however, this type of mitigation activity may not be cost effective for many communities.

Hazard Summary by Jurisdiction

Personnel of the Moniteau County Emergency Management Agency are well-trained and well-equipped to respond to disasters of all types.

School Districts The Revised Statutes of Missouri, Section 160.451, require that, "The governing body of each school district which can be expected to experience an intensity of ground shaking equivalent to a Modified Mercalli of VII or above from an earthquake occurring along the New Madrid Fault with a potential magnitude of 7.6 on the Richter Scale shall establish an earthquake emergency procedure system in every school building under its jurisdiction."

The educational institutions in Moniteau County are not subject to these statutory requirements because the county is categorized as a VI in the Modified Mercalli Intensity Scale.

County Bridges All county bridges are inspected by MoDOT on a two-year cycle; if an earthquake impacted the planning area, MoDOT would be in charge of county bridge inspection post-earthquake.

SAVE Coalition This is a program of the Missouri State Emergency Management Agency. According to the SEMA website:

> The Missouri Structural Assessment and Visual Evaluation (SAVE) Coalition is a group of volunteer engineers, architects, building inspectors, and other trained professionals that assists the Missouri State Emergency Management Agency with building damage inspections. After a disaster, SAVE volunteers are trained to move quickly to determine which buildings are safe to use and which should be evacuated.

Problem Statement

The entire planning area is vulnerable to the risk of damage from an earthquake in the New Madrid Seismic Zone (NMSZ) located in southeastern Missouri.

Studies and predictions indicate that there would be significant damage to poorly built structures in the planning area from a 7.6 magnitude (Richter) quake in the NMSZ. In addition to structural damage, and possible injury/loss of life, the planning area could be affected by an influx of people needing sheltering, disruption of the flow of goods, calls for assistance from other areas, and the psychological traumatization of the population.

There is extensive ongoing education and preparation in the planning area for the possibility of an earthquake event. Encouraging new construction buildings and infrastructure to be rated for earthquakes and taking on hardening efforts on existing structures can help minimize damage.

3.4.5 Land Subsidence/Sinkholes

HAZARD PROFILE

DESCRIPTION OF HAZARD

The *Missouri State Hazard Mitigation Plan (2018)* gives the following information about Land Subsidence and Sinkholes:

> "Sinkholes can be natural or artificial, and can develop in several different ways and vary in size and shape.
>
> Natural sinkholes develop in areas where the rock below the surface is limestone, carbonate rock (as found in Missouri), salt beds or any type of rock that can naturally be dissolved by groundwater circulating through it. This process of the dissolution of rock is known as the karst process. As the rock dissolves, spaces and caverns develop which potentially lead to sinkholes forming above these voids. Natural sinkholes can vary from a few square feet in area to hundreds of acres and can be from one foot deep to hundreds of feet deep. Naturally occurring sinkholes are typically permanent and have flood risk associated with them which need to be assessed.
>
> Artificial sinkholes are created by man-made events. Examples of artificial sinkholes include groundwater pumping, water main and sewer collapses and even mine collapses. Artificial sinkholes can also be linked to land-use and development practices. Unlike natural sinkholes, artificial sinkholes typically are not permanent and do not have flood risk associated with them. In most cases, if an artificial sinkhole is created, the issues causing the sinkhole are dealt with and the sinkhole filled in."

Location

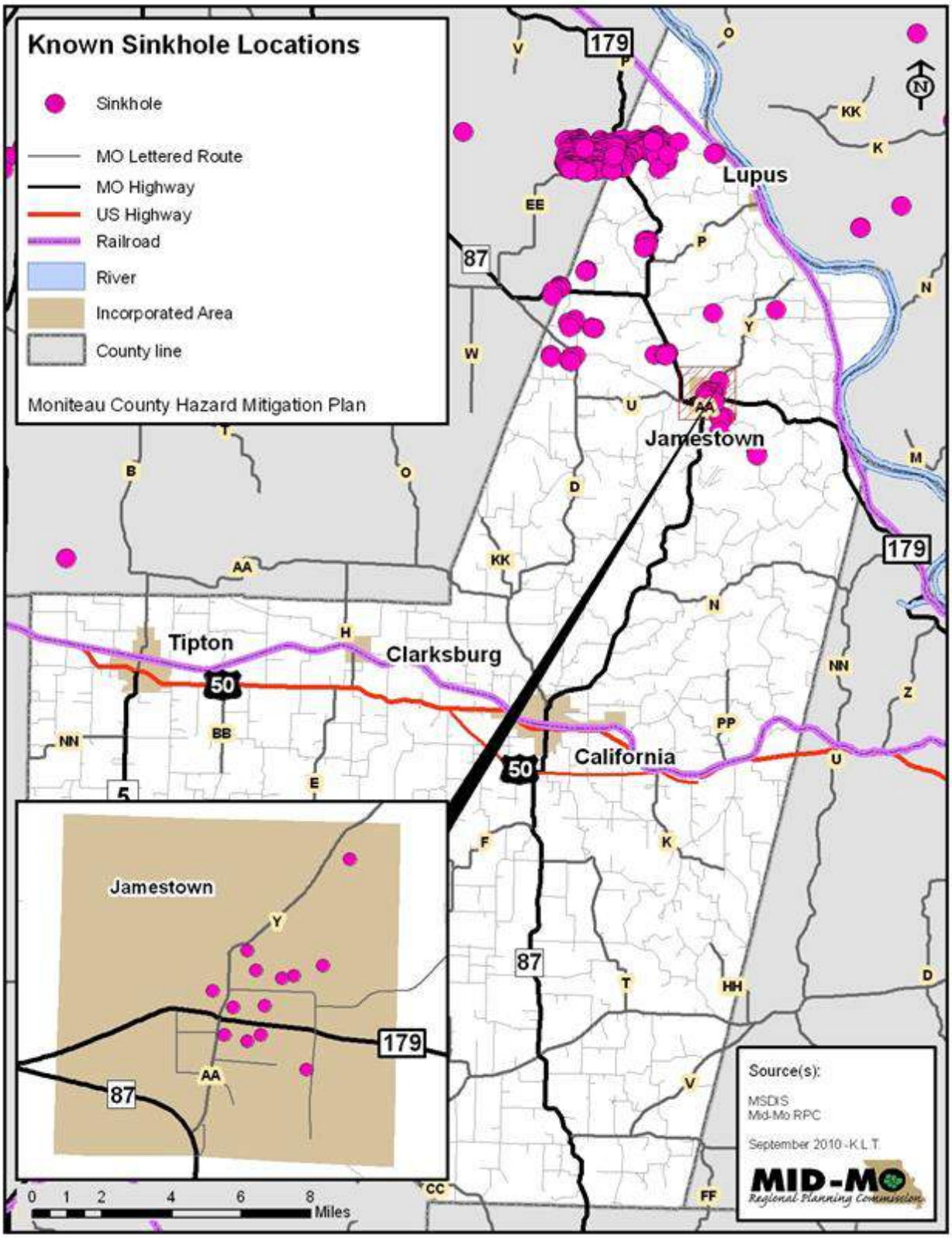
There are both sinkholes and abandoned underground mines in the Planning Area.

All of the "known or probable" sinkholes are located in the northern part of unincorporated Moniteau County and in the City of Jamestown.

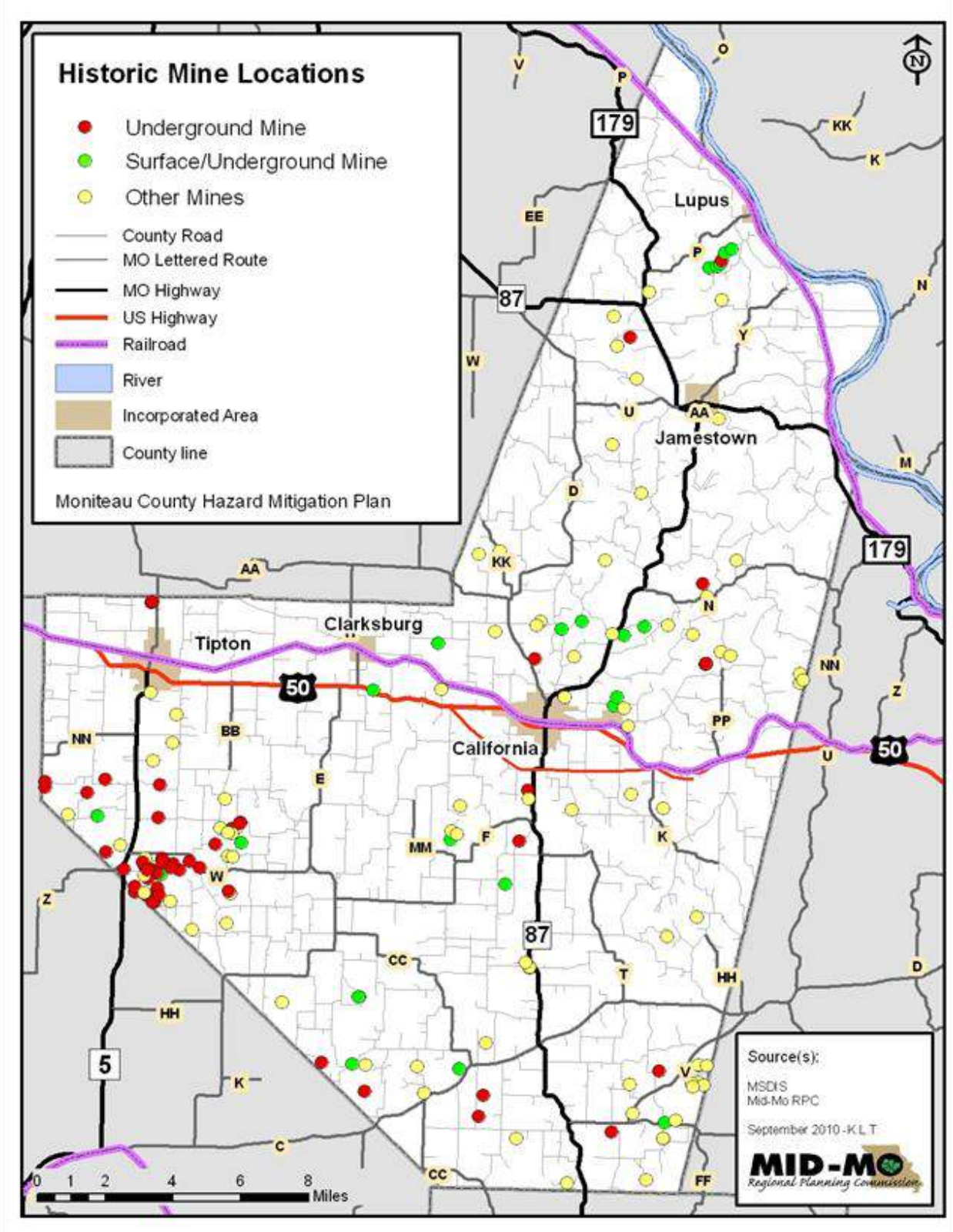
This data was compiled by the Missouri Department of Natural Resources (MoDNR), Division of Geology and Land Survey, Geological Survey Program, Environmental Geology Section. Aerial photography was used to identify locations of obvious or probable sinkholes that had not already been reported to the department.

Large scale commercial mining began in the mid-1800s. Large deposits of coal were discovered near Latham (southwest of California); at the time of discovery, the deposits were among the largest known. Mining continued in this area until 1945.

Map 3.9


Known Sinkhole Locations
Sinkhole
MO Lettered Route
MO Highway
US Highway
Railroad
River
Incorporated Area
County line
Moniteau County Hazard Mitigation Plan
Lupus
Jamestown
Tipton
Clarksburg
California
179
87
50
5
Source(s):
MSDIS
Mid-Mo RPC
September 2010 - K.L.T.
MID-MO
Regional Planning Commission
0 1 2 4 6 8
Miles

Map 3.10


Historic Mine Locations
Underground Mine
Surface/Underground Mine
Other Mines
County Road
MO Lettered Route
MO Highway
US Highway
Railroad
River
Incorporated Area
County line
Moniteau County Hazard Mitigation Plan
Lupus
Jamestown
Tipton
Clarksburg
California
179
50
87
5
Source(s):
MSDIS
Mid-Mo RPC
September 2010 - K L T
MID-MO
Regional Planning Commission
0 1 2 4 6 8
Miles

Strength/Magnitude/Extent

Sinkholes can vary "from a few feet to hundreds of acres and from less than one to more than 100 feet deep," according to the USGS.

There have been 15,891 sinkholes identified in Missouri. One hundred and sixty sinkhole collapses examined by the Missouri Department of Natural Resources between 1970 and 2007 were less than 10 feet in diameter and less than 10 feet deep. However, there were also some very large collapses within the state: one collapse drained a lake near St. Louis; one drained a sewage lagoon in West Plains; and one swallowed a garage with a car in it in Nixa.

Previous Occurrences

There have been no *recorded* recent occurrences of sinkhole collapse in Moniteau County. Just because no occurrences have been recorded does not mean that they have not happened. There are a significant number of sinkholes around Jamestown and previous occurrences of sinkhole development in other parts of Missouri with similar geologic features are a source of concern.

Probability and Severity of Future Events
Probability - low
Severity - low

There have been no recorded sinkhole collapses in the recent history in Moniteau County. The majority of known sinkholes are located in unincorporated areas of the county except those found inside the city limits of Jamestown. Those within city limits do not currently threaten any structures of important infrastructure.

CHANGING FUTURE CONDITIONS CONSIDERATIONS

With expected rainfall events to happen more frequently and with higher intensity with climate change, instances of sinkhole collapse could go up in the planning area due to erosion from flooding and severe runoff exposing depressions below. Periods of rain followed by drought also elevate potential for sinkholes to open up with the fluctuating water table. There is also the opportunity for aging infrastructure such as water and sewer lines located underground to collapse as they get weaker with age or vehicle travel becomes more-heavy.

VULNERABILITY
Vulnerability Overview
Severity: Low to High

It is very difficult to predict the severity of a sinkhole collapse due to their great variance in size, varying speeds of collapse onset, and proximity to the built environment. The severity of a sinkhole collapse will also be greater if contamination occurs.

Potential Impact – Life

Sinkhole collapse poses a potential threat to human life; there have been numerous news stories in recent years of collapsing sinkholes swallowing up people. In 2013, a man hunting in southern Missouri lost his life when he stepped in a sinkhole that had possibly opened up due to recent heavy rain.

Sinkhole collapse potentially poses a threat to public health via contamination of the water supply. According to information from the Missouri DNR, a 1978 sinkhole collapse in southern Missouri drained the West Plains lagoon, resulting in sewage draining directly into underground water sources. More than 800 local residents reported illness, and Mammoth Spring in Arkansas was contaminated.

Potential Impact - Existing Structure

Sinkholes vary in size and can potentially cause damage to roads, water/sewer lines, buildings, and lagoons. It is difficult to determine the potential impact of land subsidence and sinkholes on existing structures for a number of reasons:

> There is a lack of data on historic damages caused by land subsidence and sinkhole collapse in Missouri.
>
> Even with the mapping of known and possible sinkhole locations, it is difficult to predict where a sinkhole will collapse and if the collapse will be significant enough to damage any structures in the vicinity.

Because sinkhole collapse is not predictable, there is no direct way to assess a cost impact for this hazard. Vulnerable structures, roads, or property could potentially be impacted by a sudden and usually localized drop in elevation. The resulting damage incurred from the sinkhole could result in broken roads, building collapse, compromises to water sources, environmental impacts, and/or loss of life. While loss of life could occur, it would most likely be minimal.

Potential Impact - Future Development

It is difficult to assess the effects of sinkholes on future development because sinkhole development is unpredictable and few sinkhole areas have been identified in the planning area. However, it should be noted that future development can affect the impact of this hazard. Construction of septic tanks, lagoons, and structures can cause shifts in soil and may plug or disturb karst areas, allowing for the formation of a sinkhole. Also, soil disturbance can cause the drainage pattern to change, which may lead to blockage of a sinkhole and potentially cause flooding.

Hazard Summary by Jurisdiction

Land subsidence and sinkhole collapse are not of great concern in the planning area. Jamestown and the Jamestown C-1 school district are predominantly at risk if a known sinkhole decided to expand into a structure or road. The majority of sinkhole areas in the planning area are in unincorporated Moniteau County. It is important to note the potential for future sinkhole

development near these areas and in other areas that presently do not have developed sinkholes. Gradual or sudden land subsidence is a key sign of sinkhole formation.

Problem Statement

Moniteau County and its jurisdictions are all vulnerable to land subsidence/sinkholes to some extent.

Sinkhole collapse in karst areas poses the threat of contamination of the groundwater over a wide region. By keeping infrastructure properly maintained and tracking new collapse occurrences jurisdictions can more easily discourage land disturbance near potential problem areas.

3.4.6 Drought

DESCRIPTION OF HAZARD

The National Weather Service defines a drought as "a period of abnormally dry weather which persists long enough to produce a serious hydrologic imbalance (for example crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency, and the duration and the size of the affected area."

Droughts occur either through a lack of precipitation (supply droughts) or through overuse of water which outpaces what the surrounding environment can naturally support (water use droughts). Water use droughts can theoretically happen anywhere but are generally seen in arid climates, not humid places such as Missouri. At the present time, Missouri is most vulnerable to supply droughts brought on by a lack of precipitation.

The period of lack of precipitation needed to produce a supply drought will vary between regions and the particular manifestations of a drought are influenced by many factors. As an aid to analysis and discussion, the research literature has defined different categories of drought. The most common type of drought in Mid-Missouri is the agricultural drought.

There are four types of drought conditions relevant to Missouri, according to the State Plan, which are as follows.

- Meteorological drought is defined in terms of the basis of the degree of dryness (in comparison to some "normal" or average amount) and the duration of the dry period. A meteorological drought must be considered as region-specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region.

- Hydrological drought is associated with the effects of periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply (e.g., streamflow, reservoir and lake levels, ground water). The frequency and severity of hydrological drought is often defined on a watershed or river basin scale. Although all droughts originate with a deficiency of precipitation, hydrologists are more concerned with how this deficiency plays out through the hydrologic system. Hydrological droughts are usually out of phase with or lag the occurrence of meteorological and agricultural droughts. It takes longer for precipitation deficiencies to show up in components of the hydrological system such as soil moisture, streamflow, and ground water and reservoir levels. As a result, these impacts also are out of phase with impacts in other economic sectors.

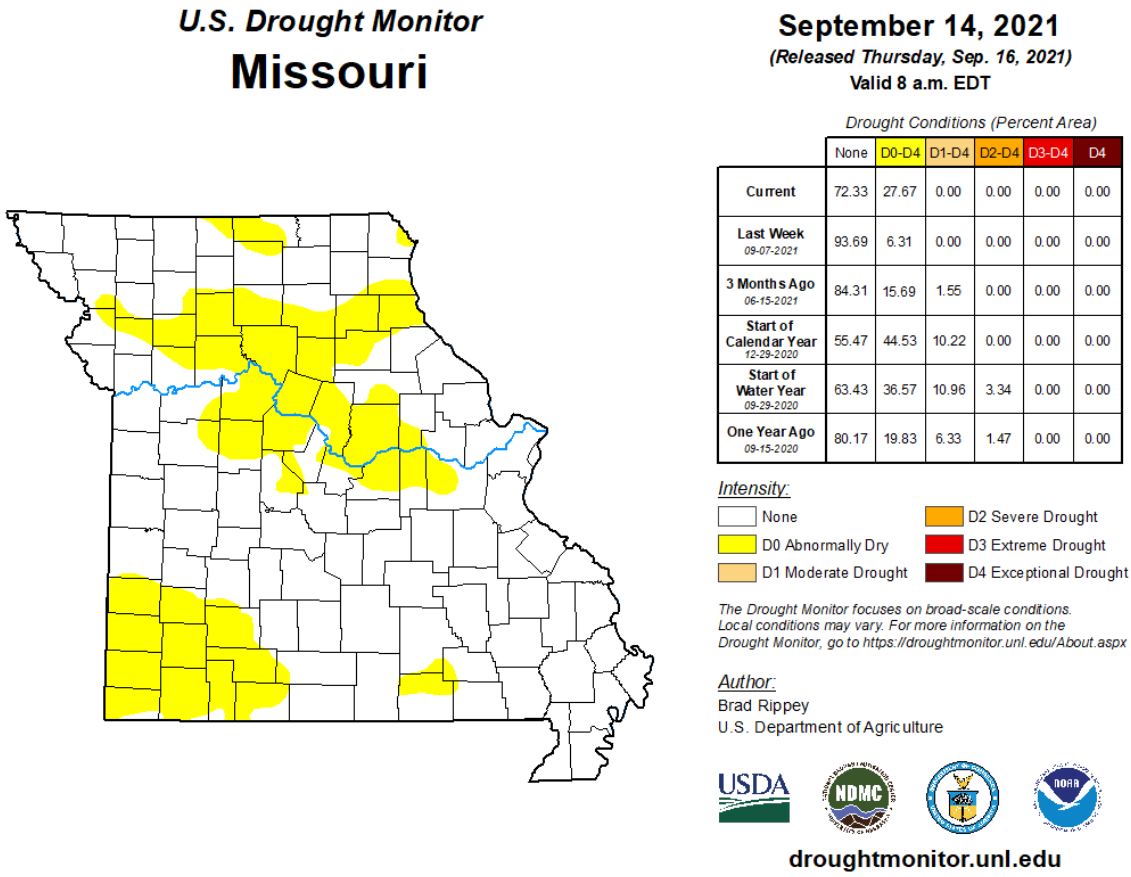
- Agricultural drought focus is on soil moisture deficiencies, differences between actual and potential evaporation, reduced ground water or reservoir levels, etc. Plant demand for water depends on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth, and the physical and biological properties of the soil. This is Missouri's most common form of drought.

Socioeconomic drought refers to when physical water shortage begins to affect people.

Location

The entire planning area is potentially at risk for drought. However, since agricultural drought is most common in Missouri, the unincorporated agricultural areas of Moniteau County are most at risk. Drought can mean crop failure in these areas and the resulting immediate, and potentially severe, economic loss.

Map 3.11 Missouri Drought Monitor



Strength/Magnitude/Extent

Numerous indices have been developed to measure drought severity; each tool has its strengths and weaknesses.

Palmer Drought Severity Index: One of the oldest and most widely used indices is the Palmer Drought Severity Index (PDSI, Table 3.28), which is published jointly by NOAA and the U.S. Department of Agriculture (USDA).

Table 3.28

Palmer Drought Severity Index (PDSI)

Score	Description	Score	Description
Greater than 4	Extreme moist spell	0 to -0.4	Near normal conditions
3.0 to 3.9	Very moist spell	-0.5 to -0.9	Incipient drought
2.0 to 2.9	Unusual moist spell	-1.0 to -1.9	Mild drought
1.0 to 1.9	Moist spell	-2.0 to -2.9	Moderate drought
0.5 to 0.9	Incipient moist spell	-3.0 to -3.9	Severe drought
0.4 to 0	Near normal conditions	**Below -4.0**	Extreme drought

According to the National Integrated Drought Information System (NIDIS), the PDSI "…uses temperature and precipitation data to calculate water supply and demand, incorporates soil moisture, and is considered most effective for unirrigated cropland. It primarily reflects long-term drought and has been used extensively to initiate drought relief."

Missouri is divided into six regions of similar climactic conditions for PDSI reporting; Moniteau County is located in the West Central Region.

Standardized Precipitation Index: A newer index currently being used by The National Drought Mitigation Center (NDMC) is the Standardized Precipitation Index (SPI). This index is based on the probability of precipitation; the time scale used in the probability estimates can be varied and makes the tool very flexible. The SPI is able to identify emerging droughts months sooner than is possible with the PDSI.

The NDMC uses the PDSI, SPI, and three other indicators to classify the severity of droughts throughout the country on a 5-point scale ranging from DO Abnormally Dry to D4 Exceptional Drought for reports on the U.S. Drought Monitor (Table 3.36).

Based on the Drought Severity Classification from the NDMC, Moniteau County is subject to droughts ranging from D1 (Moderate Drought) to D4 (Exceptional Drought). The most common droughts are in the D1-D2 range.

Table 3.29

U.S. Drought Monitor - Drought Severity Classification

Category	Description	Ranges					
		Possible Impacts	Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Short and Long-term Drought Indicator Blends (Percentiles)
D0	**Abnormally Dry**	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	21-30
D1	**Moderate Drought**	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	11-20
D2	**Severe Drought**	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9	6-10	6-10	-1.3 to -1.5	6-10
D3	**Extreme Drought**	Major crop/pasture losses; widespread water shortages or restrictions	**-4.0 to -4.9**	**3-5**	**3-5**	**-1.6 to -1.9**	**3-5**
D4	**Exceptional Drought**	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	**-5.0 or less**	**0-2**	**0-2**	**-2.0 or less**	**0-2**

Source: http://droughtmonitor.unl.edu

Previous Occurrences

The Dust Bowl years of the 1930s and early 1940s were dry in Missouri but not as dry as the period from 1953 through 1957. A major nationwide drought in the late 1980s resulted in low water and decreased barge traffic on the Mississippi River and the Missouri River. The fall of 1999 was another serious drought period in the state; in October of that year, all counties in Missouri were declared agricultural disaster areas by the USDA.

The drought that affected the entire state in the summer of 2012 was the worst drought in 30 years, according to the *MO State Hazard Mitigation Plan (2013)*. The planning area and the surrounding region suffered agricultural losses.

Even though Moniteau County averages between 38 to 42 inches of precipitation per year, it has been subject to droughts in the past.

Moniteau County was in a D4 Drought Advisory in 2012. In August and September of 2018 the county saw D3 drought levels.

Probability of Future Events

In the 10-year period 2010-2019, there were 4 years without any level of drought in the planning area, according to the U.S. Drought Monitor. Based on this data, the calculated probability of having at least a Moderate (D1) drought in a year is 40%. (Probability calculation: 1 - (4/10*100) = 40)

The probability of occurrence of the maximum drought severity in any given year, based on the 2010 to 2020 data, has also been calculated (Table 3.30).

Table 3.30

Probability of Maximum Future Drought Events

Severity Scale	Drought Description	# of years with drought event (2010-2019)	Probability	Probability Rating
D1	Moderate	6	60%	High
D2	Severe	4	40%	High
D3	Extreme	2	20%	High
D4	Exceptional	1	10%	Low

Changing Future Conditions Considerations

Droughts are naturally occurring events in the planning area. While overall precipitation is predicted to rise with climate change the intensity of rainfall events at a given time could mean less rainfall at other times throughout the season leading to more frequent droughts and crop failures. Raising global temperatures could lead to more severe droughts.

VULNERABILITY

Vulnerability Overview

Severity

Moderate – Moniteau County (unincorporated)
Low - all other participating jurisdictions

The primary effect of drought in the planning area is on the economic livelihood of those in the agricultural sector. According to the *2017 US Census of Agriculture*, 90.5% of Moniteau County land use is tied to farming activities. In 2017 the market value of Moniteau County farm products was estimated at more than $120 Million.

Potential Impact – Life

Both crops and livestock are at risk from drought. During the Exceptional Drought conditions in 2012, there were large sell-offs of livestock in the mid-Missouri region.

The psychological and economic stresses involved for those working directly in the agricultural sector can be great in times of drought. Uncertainty, high stress and fear are not compatible with optimal health.

Potential Impact - Existing Structures

Excessive drought can cause damage to roads, streets, water mains, and building foundations. Missouri American Water thought that the 2012 drought played a role in the 29 main breaks of cast iron pipe in August of that year; the number of breaks was higher than would have been expected. However, drought damage to infrastructure is not a major concern in the planning area, due to the soil types.
The arid conditions created by drought also pose an increased risk of fire and wildfire and thus to structures.

Drought can also have far-reaching economic consequences beyond the agricultural sector; businesses dependent upon that sector can suffer serious losses. A severe drought can affect the economics of an entire region.

Potential Impact on Future Development

Future development in the county can be at risk from the effects of drought. Good land management techniques are crucial in mitigating future impacts.

Drought is primarily an issue of water supply for the rural and agricultural parts of the planning area. The majority of the land in Moniteau County is agricultural, and agriculture plays an important role in the life and economy of the area. This makes drought mitigation an especially important concern as population increases. Good land management techniques are crucial in mitigating future impacts. Good land management techniques and the interconnection of water supplies will become increasingly important in mitigating the impacts of drought as growth occurs.

Hazard Summary by Jurisdiction

All jurisdictions in the planning area can be impacted by drought. Incorporated cities may see a drain on their water supply in times of extreme drought and wear on roads under cracking and shrinking dry ground can become damaged. The largest impact to drought though comes to unincorporated Moniteau County due to the agriculture-based nature of its economy and land usage. Crop losses deal large economic blows and the potential for wildfire pose a risk to those living nearby.

Problem Statement

Drought of some degree is a common occurrence in the planning area. The unincorporated agricultural areas of Moniteau County are the most vulnerable but all jurisdictions are potentially vulnerable to cascading economic effects during extended and serious drought conditions. In addition to damage to crops, produce, livestock, soil and the resulting economic consequences, the arid conditions created by drought pose an increased risk of fire. There is also the risk of damage to infrastructure from drought; while this has possibly contributed to some pipe breakage in the planning area, it is not seen as a major problem due to the soil types.

Drought conditions are carefully monitored at the state and national levels; state law requires the Missouri Department of Natural Resources to implement a drought response system to ensure the quantity and quality of available water resources.

Based on 2000-2020 data from the NDMC, the planning area is subject to droughts ranging from Moderate Drought (D1) to Exceptional Drought (D4); the most common droughts are D1 (Moderate Drought).

The planning area has decent interconnections, and backup for, water systems although there is still some room for improvement in this area. The Missouri Rural Water Association can assist with backup generators when needed and available.

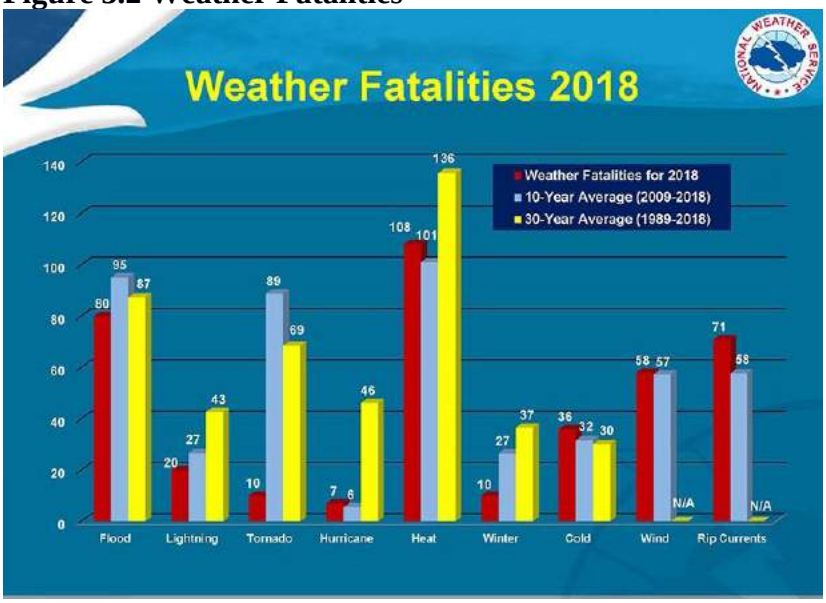
3.4.7 Extreme Temperatures

HAZARD PROFILE

DESCRIPTION OF HAZARD

Extreme temperature events, both hot and cold, can impact human health and mortality, natural ecosystems, agriculture, and other economic sector. Extreme heat is the number one weather-related killer in the United States, according to the National Weather Service (Figure 3.2). In contrast to the visible, destructive, and violent nature of floods, hurricanes, and tornadoes, extreme heat is a silent killer.

Figure 3.2 Weather Fatalities



As can be seen in the NWS graph, there are no 30-year averages for heat fatalities or a number of other weather-related fatalities. Fatality data on these hazards began to be recorded more recently than fatalities from the more dramatic causes of death such as flood, lightning, tornado, and hurricane.

As the data shows, extreme heat resulted in an average of 101 deaths per year when looked at over a 10-year period; this is 6 more deaths per year than the number cause by flood, the next most frequent cause of death.

Extreme cold often accompanies severe winter storms and can lead to hypothermia and frostbite in people without adequate clothing protection. Cold can also cause issues with power sources by freezing fuel lines and overwhelming heating systems. It can also freeze and bust pipes in homes and businesses.

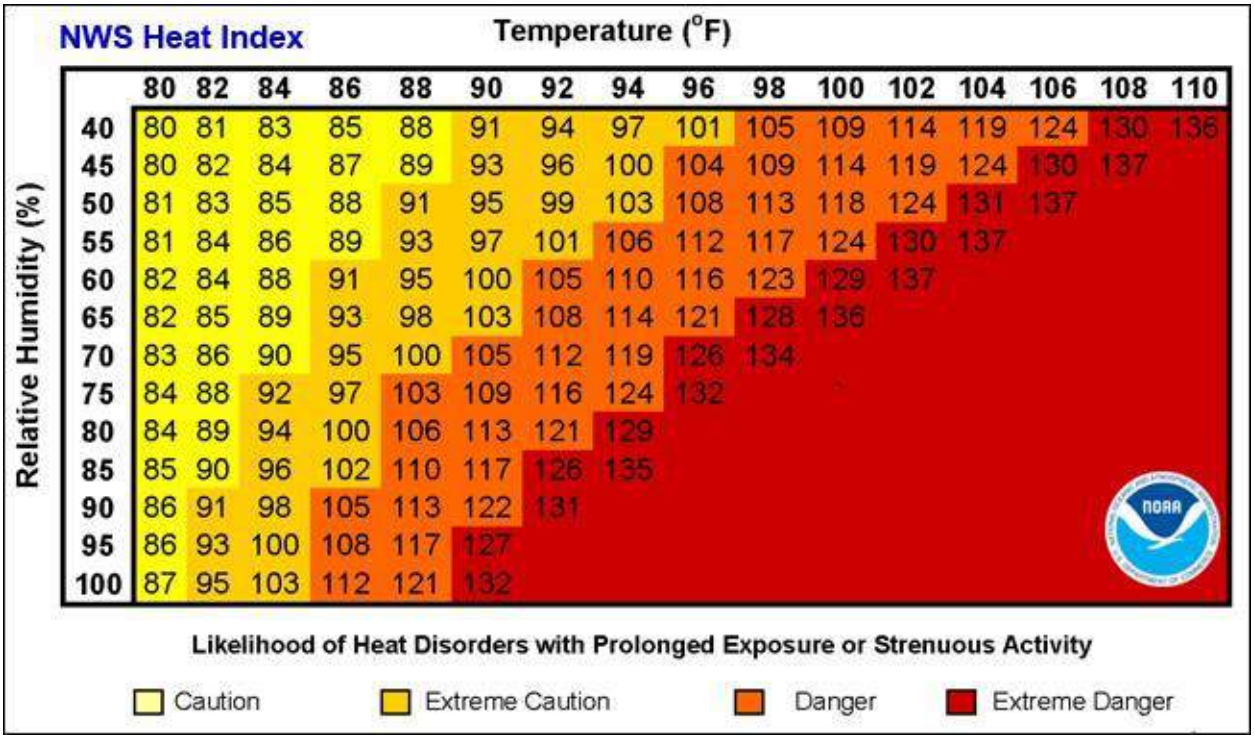
Geographic Location

The entire planning area is at risk from extreme temperature events.

Strength/Magnitude/Extent

The planning area routinely experiences prolonged periods with temperatures in the 90s and 100s (Figure 3.3). The duration of these periods of extreme heat can range from just one day to weeks. The National Weather Service (NWS) has an alert system in place to alert people when the Heat Index is expected to have a significant impact on public safety. The severity decides whether an advisory or a warning is issued.

Figure 3.3 Heat Index Guide



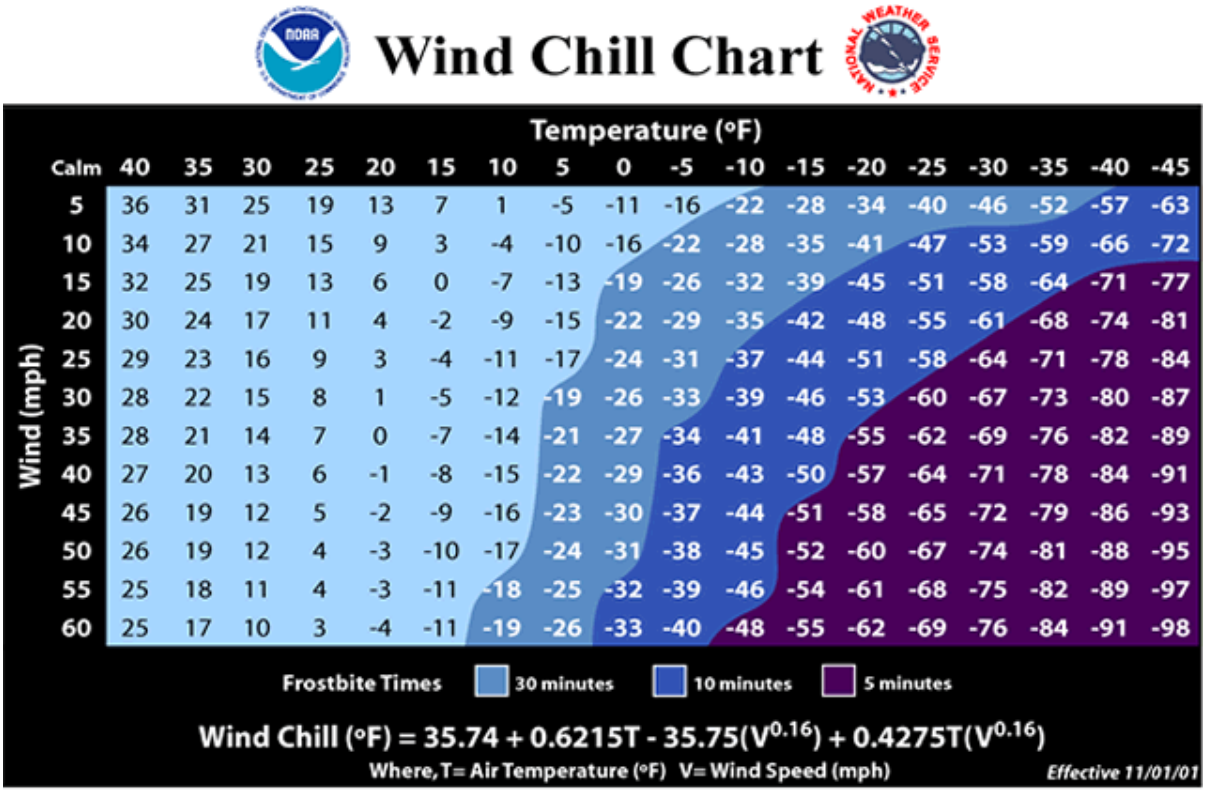
Source: National Weather Service (NWS) https://www.weather.gov/safety/heat-index
Note: Exposure to direct sun can increase Heat Index values by as much as 15*F. The shaded zone above 105*F corresponds to a HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

Similar to heat index the NWS also has an index for wind chill. It uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. Based on estimated temperatures advisories or warnings maybe issued.

Wind Chill Advisory	Combination of low temperatures and strong winds will result in wind chill readings of –20 degrees F or lower
Wind Chill Warning	Wind chill temperatures of –35 degrees F or lower are expected. This is a life-threatening situation.

The figure below shows wind chill temperatures which are based on the rate of heat loss from exposed skin caused by wind and cold. When wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure 3.4



Previous Occurrences

Table 3.31: NCEI Moniteau County Extreme Temperature Events Summary, 2000-2020

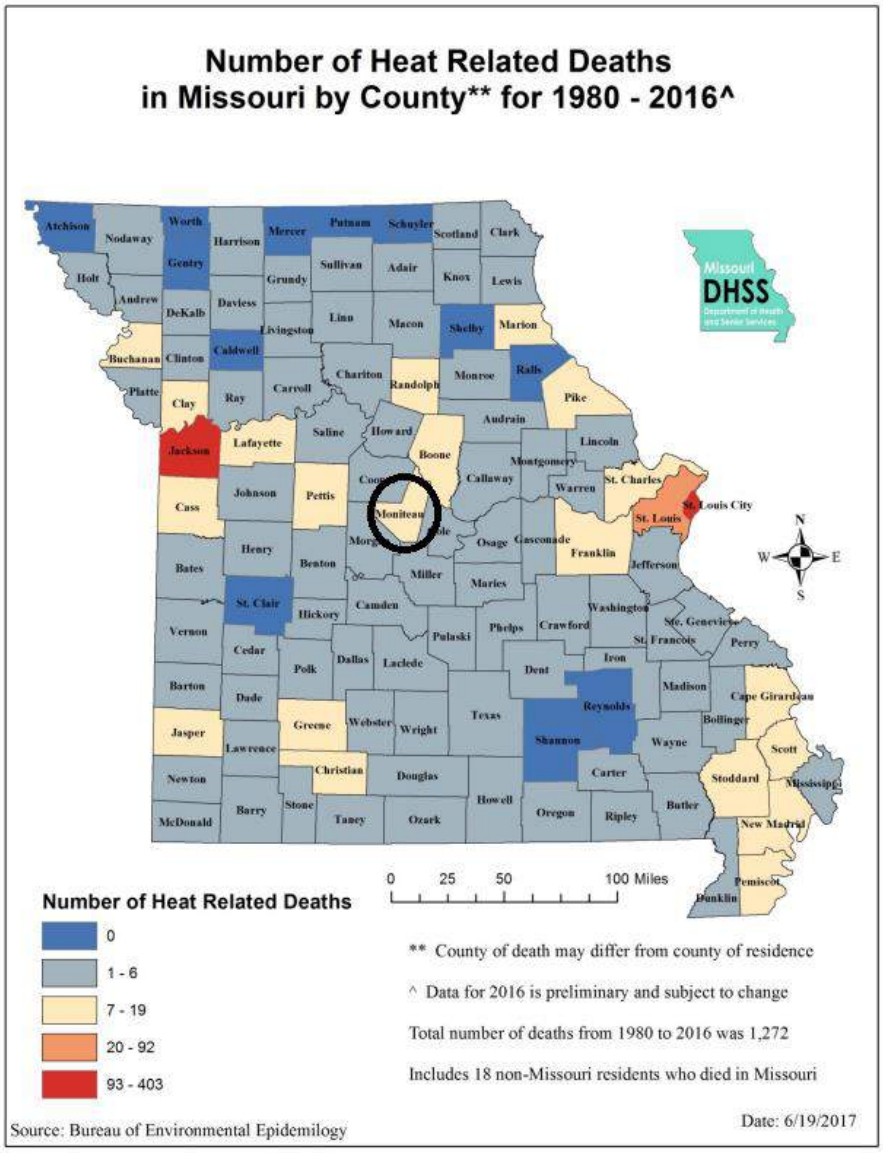
Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
MONITEAU (ZONE)	12/16/2000	Extreme Cold/Wind Chill	0	0	0	0
MONITEAU (ZONE)	7/7/2001	Heat	0	0	0	0

MONITEAU (ZONE)	7/17/2001	Heat	0	0	0	0
MONITEAU (ZONE)	7/21/2001	Heat	0	0	0	0
MONITEAU (ZONE)	7/29/2001	Heat	0	0	0	0
MONITEAU (ZONE)	8/1/2001	Heat	0	0	0	0
MONITEAU (ZONE)	8/7/2001	Heat	0	0	0	0
MONITEAU (ZONE)	8/21/2001	Heat	0	0	0	0
MONITEAU (ZONE)	7/8/2002	Heat	0	0	0	0
MONITEAU (ZONE)	7/20/2002	Heat	0	0	0	0
MONITEAU (ZONE)	7/26/2002	Heat	0	0	0	0
MONITEAU (ZONE)	8/1/2002	Heat	0	0	0	0
MONITEAU (ZONE)	8/15/2003	Heat	0	0	0	0
MONITEAU (ZONE)	8/24/2003	Heat	0	0	0	0
MONITEAU (ZONE)	7/20/2004	Heat	0	0	0	0
MONITEAU (ZONE)	7/20/2005	Heat	0	0	0	0
MONITEAU (ZONE)	7/17/2006	Heat	0	0	0	0
MONITEAU (ZONE)	7/29/2006	Heat	0	0	0	0
MONITEAU (ZONE)	8/1/2006	Heat	0	0	0	0
MONITEAU (ZONE)	8/5/2007	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	6/21/2009	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	6/18/2010	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/14/2010	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/17/2010	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/22/2010	Excessive Heat	0	0	0	0

MONITEAU (ZONE)	8/2/2010	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	8/8/2010	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/1/2011	Heat	0	0	0	0
MONITEAU (ZONE)	7/10/2011	Heat	0	0	0	0
MONITEAU (ZONE)	7/17/2011	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	8/1/2011	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	8/6/2011	Heat	0	0	0	0
MONITEAU (ZONE)	8/31/2011	Heat	0	0	0	0
MONITEAU (ZONE)	9/1/2011	Heat	0	0	0	0
MONITEAU (ZONE)	6/27/2012	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/1/2012	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/16/2012	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/22/2012	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/31/2012	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	8/1/2012	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	8/31/2013	Heat	0	0	0	0
MONITEAU (ZONE)	9/1/2013	Heat	0	0	0	0
MONITEAU (ZONE)	8/20/2014	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/12/2015	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/17/2015	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/25/2015	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	6/15/2016	Heat	0	0	0	0
MONITEAU (ZONE)	6/22/2016	Heat	0	0	0	0

MONITEAU (ZONE)	7/18/2016	Excessive Heat	0	0	0	0
MONITEAU (ZONE)	7/18/2017	Excessive Heat	0	0	0	0
Total			**0**	**0**	**0**	**0**

Map 3.12 Missouri Heat Related Deaths



Source: https://health.mo.gov/living/healthcondiseases/hyperthermia/pdf/stat-report.pdf

Probability of Future Occurrence

– High for all participating jurisdictions

- NOAA data dating back to 2000 indicates 4 years without extreme temperature events. In most years during that period, there were multiple extreme heat events. Based on this historical data, the calculated probability of an extreme temperature event in any year is 81%. (Probability calculation: 1- (4/21) = 0.81)

The chances of an extreme heat event are much higher and happen much more frequently than extreme cold but cool snaps that may not bother humans can bother crops.

VULNERABILITY
VULNERABILITY OVERVIEW

Measure of Severity - Moderate for all participating jurisdictions

Potential Impact – Life

Extreme temperatures kill by overloading a body's capacity to regulate its internal temperature. The human body cools itself by perspiring; the evaporation of perspiration carries excess heat from the body. High humidity often accompanies heat in Missouri and increases the danger to warm-blooded humans and animals. High humidity makes it difficult for perspiration to evaporate and thus interferes with this natural cooling mechanism. The body attempts to heat itself through shivering when faced with cold.

The Heat Index devised by the NWS (Table 3.32) is a measure of how hot it really feels. The Heat Index takes into account both air temperature and relative humidity. It also gives an indication of the added risk presented by high humidity to bodies attempting to cool. One known death occurred in the planning area in August 2002. when a 59-year-old Boone County man died from heat exhaustion after collapsing while doing yard work.

Table 3.32 Typical Health Impacts of Extreme Heat

Heat Index (HI)	Disorder
80-90° F (HI)	Fatigue possible with prolonged exposure and/or physical activity
90-105° F (HI)	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105-130° F (HI)	Heatstroke/sunstroke highly likely with continued exposure

Source: National Weather Service Heat Index Program, www.weather.gov/os/heat/index.shtml

Many factors, such as age, general level of health, outdoor activity level, and availability of adequate shelter and clothing, affect the actual risk level. The elderly in general are vulnerable to the effects of extreme temperatures. Hypothermia sets in when internal body temperatures fall below 95 F. While this is most likely to occur when temperatures outside are extremely cold it is possible to happen slowly at temperatures as high as 40 F if the exposure is prolonged and exacerbated by chill caused by sweat, rain, or submersion into cold water.

Extreme temperature events can also result in livestock deaths and fish kills; drought in conjunction with extreme heat exacerbates the situation. Strenuous outdoor activity in extreme cold can also be life threatening. Frostbite can lead to the loss of limbs and hypothermia can result in death.

Potential Impact - Existing Structures

While illness and loss of life are of the most concern with extreme heat, structural impacts may also occur. Structural impacts depend on the length of the period of extreme heat and exacerbating factors such as concurrent drought. Road damage and electrical infrastructure damage may occur with intense and prolonged heat.

Potential Impact - Future Development

Thoughtful future development has the potential to include mitigation for extreme heat in its design. This is true on all levels ranging from actions by individual homeowners to larger redevelopment projects planned by cities. Properly placed shade trees can contribute greatly to lowering inside temperatures and the load placed on cooling systems. Planning for adequate green space as cities infill allows for air movement and shaded locations.

Hazard Summary by Jurisdiction

Those at greatest risk for temperature-related illness and deaths include children under 5 years of age and people over the age of 65. To determine jurisdictions within the planning area with populations more vulnerable to extreme temperatures, demographic data was obtained from the 2019 American Community Survey estimates for populations 5-years-old and younger, as well as ages 65 and older. Since students and faculty of school districts are not typically part of the vulnerable age groups they have been left out of the following table.

Table 3.33: Moniteau County Population by Age

Jurisdiction	Population Under 5 yrs	Population 65 yrs and over
Unincorporated Moniteau	1,058	2,501
California	235	767
Jamestown	27	71
Lupus	0	7
Tipton	197	517

Source: American Community Survey 5-year Estimates 2019

All jurisdictions are vulnerable to the effects of extreme heat. Extreme heat is already responsible for more weather-related deaths than any other hazard in the country; it is also one of the hazards shown to be increasing with changes in the climate.

Heat stroke and loss of life are the most significant consequences of extreme heat. While heat-related illness and death can occur due to exposure to intense heat in just one afternoon, heat stress on the body has a cumulative effect. The persistence of a heat wave increases the danger.

California, the major population center in the planning area, is equipped with cooling centers to help protect those most vulnerable. Warnings regarding the dangers of extreme heat are widely broadcast during times of threat.

The Missouri State High School Activities Association (MSHSAA) provides coaches with educational pamphlets on the dangers of excessive heat. Schools in the planning area have air conditioning in their main buildings and many of their detached buildings, but warnings should be taken into consideration for outdoor sports and practices. Many schools in the planning area are closed for summer session during the hotter portions of the summer season.

The Missouri Department of Health and Senior Services announces statewide hot weather health alerts.

The National Weather Service (NWS) has devised a method to warn of advancing heat waves up to seven days in advance. The new Mean Heat Index is a measure of how hot the temperatures actually feel to a person over the course of a full 24 hours. It differs from the traditional Heat Index in that it is an average of the Heat Index from the hottest and coldest times of each day. The National Weather Service initiates alert procedures when the Heat Index is expected to exceed 105°- 110°F for at least two consecutive days. (The exact Heat Index temperature used depends on specifics of the local climate.)

PROBLEM STATEMENT

All jurisdictions are vulnerable to the effects of extreme temperatures. Extreme heat is already responsible for more weather-related deaths than any other hazard in the country; it is also one of the hazards shown to be increasing with changes in the climate.

Heat stroke and loss of life are the most significant consequences of extreme heat. While heat-related illness and death can occur due to exposure to intense heat in just one afternoon, heat stress on the body has a cumulative effect. The persistence of a heat wave increases the danger.

The elderly in general are vulnerable to the effects of extreme temperatures; the 2019 estimates show 2,501 citizens in Moniteau County (15.6% of the population) as 65 years and older. However, any residents without access to air conditioning, or shade and water if outside, are very vulnerable to this hazard. Likewise, frostbite and hypothermia can set in for those who cannot afford to heat their homes or who must be out in extremely cold temperatures. Older structures with less insulation may be at risk for frozen pipes. Outreach to raise awareness amongst the most vulnerable populations and educating those about whzere warming and cooling centers are located can help mitigate the potential loss of life that can come with extreme temperatures.
In addition to the human toll, prolonged extreme temperatures can result in livestock deaths, fish kills, and infrastructure damage; drought in conjunction with extreme heat exacerbates the situation. Winter weather can also take a toll on crops in the area. Unseasonable cold snaps and late frosts can kill and damage crops costing thousands of dollars in insurance claims.

3.4.8 Severe Thunderstorms, Including High Winds, Hail, and Lightning

DESCRIPTION OF HAZARD

A thunderstorm is a rainstorm with thunder and lightning present. Warm, humid climates, such as that in mid-Missouri, are favorable for the formation of thunderstorms. Thunderstorms can occur during any season in Missouri but they are more frequent in the spring and summer.

The average Missourian is well aware of the hazards of the thunderstorm season; these include heavy rains and, potentially, strong winds, tornadoes, hail, and lightning strikes. The effects of heavy rains will be considered in the section on flood (Section 3.4.1) and tornadoes are covered in Section 3.4.10.

Thunderstorms can range in complexity from single cell storms through multicell cluster storms, multicell line storms (squall lines), and on to supercell storms. A single cell thunderstorm typically lasts 20-30 minutes but when numerous cells are generated, as in a multicell storm, the thunderstorm can last for hours. Supercell storms include rotation and are responsible for the generation of severe tornadoes.

Severe and damaging winds in the planning area are usually, but not always, associated with thunderstorms. Thunderstorm winds can reach speeds up to 100 mph and produce damage paths for hundreds of miles. According to the National Oceanic and Atmospheric Administration (NOAA), property and crop damage from thunderstorm winds is more common, and can be more severe, than damage from tornadoes. Thunderstorm wind damage accounts for half of all the NOAA reports of severe weather events in the lower 48 states.

Thunderstorm winds are often called "straight-line" winds to distinguish them from tornadoes, which have a rotational element. The following are the distinctions made between different thunderstorm winds:

- Gust front - Gusty winds out ahead of a thunderstorm; characterized by a wind shift and temperature drop.
- Downbursts – A strong downdraft with a width of greater than 2.5 miles which results in an outward burst of damaging winds near the ground; may possibly produce damage similar to that of a strong tornado.
- Microbursts – A small concentrated downburst with a width less than 2.5 miles; generally short-lived, lasting only 5-10 minutes, with maximum wind speeds up to 168 mph.

A derecho is a widespread, massive, and violent thunderstorm wind event producing straight-line winds in excess of 70 mph and moving quickly over large areas. These are not common events, however, in the spring of 2009, a massive derecho almost as large as the state of Missouri caused extensive damage in southern Missouri and Illinois.

Much of the damage caused by high winds occurs because of falling trees; people, buildings, and vehicles may be damaged by falling trunks and branches. Power lines may be blown or knocked down and people left without electricity. In some cases, roofs are directly blown off buildings and windows are shattered.

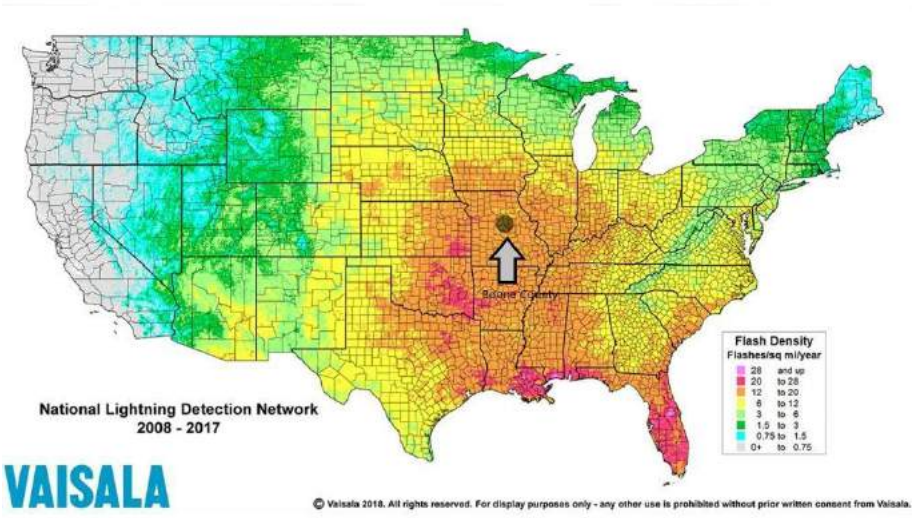
Hail is formed when updrafts in thunderstorms carry raindrops up to very high and cold areas where they freeze into ice. Hail, especially large sized hail, can cause severe damage and presents a threat to automobiles, airplanes, roofs, crops, livestock, and even humans.

Lightning, a massive electrical discharge, is produced by all thunderstorms. The electrical discharge can be within a cloud, between clouds, or between a cloud and the ground.

Location

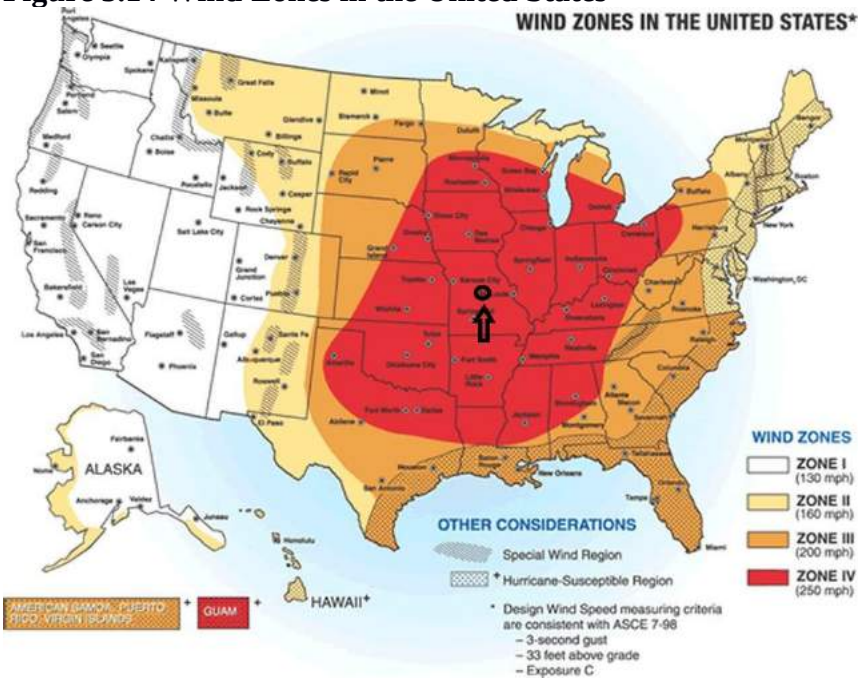
The entire planning area is at risk from severe thunderstorms and all the related threats accompanying them. Although these events occur similarly throughout the planning area damages are more likely to occur in more densely developed areas and areas with older homes. Moniteau County is located in central Missouri and has a medium flash density of 6-12 Flashes/square mile/year.

Figure 3.13: Location and Frequency of Lightning in Missouri



The Planning area is in a high wind zone according to FEMA. All of the planning area is located in Zone IV and can see winds of 250 mph.

Figure 3.14 Wind Zones in the United States



Strength/Magnitude/Extent

The National Weather Service considers a thunderstorm "severe" when it includes one or more of the following: winds gusting in excess of 57.5 mph, hail at least 0.75 inch in diameter, or a tornado. The NOAA database records thunderstorm events which fall into this severe classification.

Based on information provided by the Tornado and Storm Research Organization (TORRO), Table 3.34 below describes typical damage impacts of the various sizes of hail.

Table 3.34: Hail Damage by Size

Intensity Category	Diameter (mm)	Diameter (Inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
Damaging				
Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	21-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and
				plastic structures, paint and wood scored
Severe	31-40	1.2-1.6	Pigeon's egg >	Widespread glass damage, vehicle bodywork damage
			squash ball	

Destructive	41-50	1.6-2.0	Golf ball >	Wholesale destruction of glass, damage to tiled roofs,
			Pullet's egg	significant risk of injuries
Destructive	51-60	2.0-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	61-75	2.4-3.0	Tennis ball >	Severe roof damage, risk of serious injuries
			cricket ball	
Destructive	76-90	3.0-3.5	Large orange	Severe damage to aircraft bodywork
			> Soft ball	
Super	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even
Hailstorms				fatal injuries to persons caught in the open
Super	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even
Hailstorms				fatal injuries to persons caught in the open

Source: Tornado and Storm Research Organization (TORRO), Department of Geography, Oxford Brookes University
Notes: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity. http://www.torro.org.uk/site/hscale.php

According to information from NOAA, a lightning bolt can contain 100 million to 1 billion volts of electricity and billions of watts of energy. This energy can heat the air around the lightning 18,000 to 60,000 °F.

Previous Occurrences

The NCEI is limited in its reporting of lightning due to the fact that only lightning events that result in fatality, injury and/or property and crop damage are in the NCEI. There were no direct reports of lighting or hail for the review period in the planning area. There were also no reports of crop damage due to thunderstorms, although wind is often associated with thunderstorms. The table below summarize past crop damages as indicated by crop insurance claims and give insight into the magnitude of the impact on the planning area's agricultural economy.

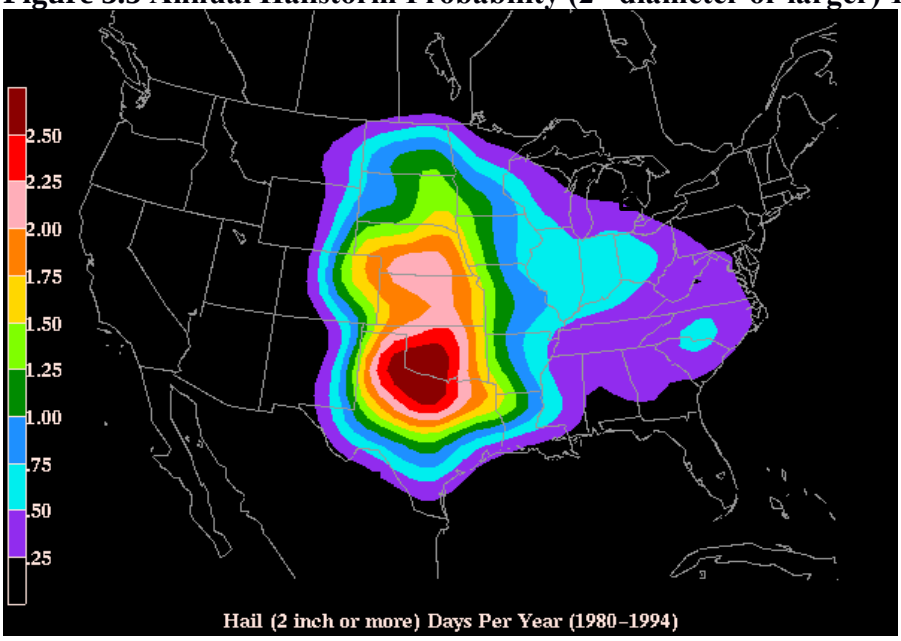
Table 3.35 Crop Insurance Claims Paid in Moniteau County from High Winds, 2010-2020

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2013	Soybeans	Hot Wind	575

Probability of Future Occurrences

High for damaging winds and hail– All participating jurisdictions

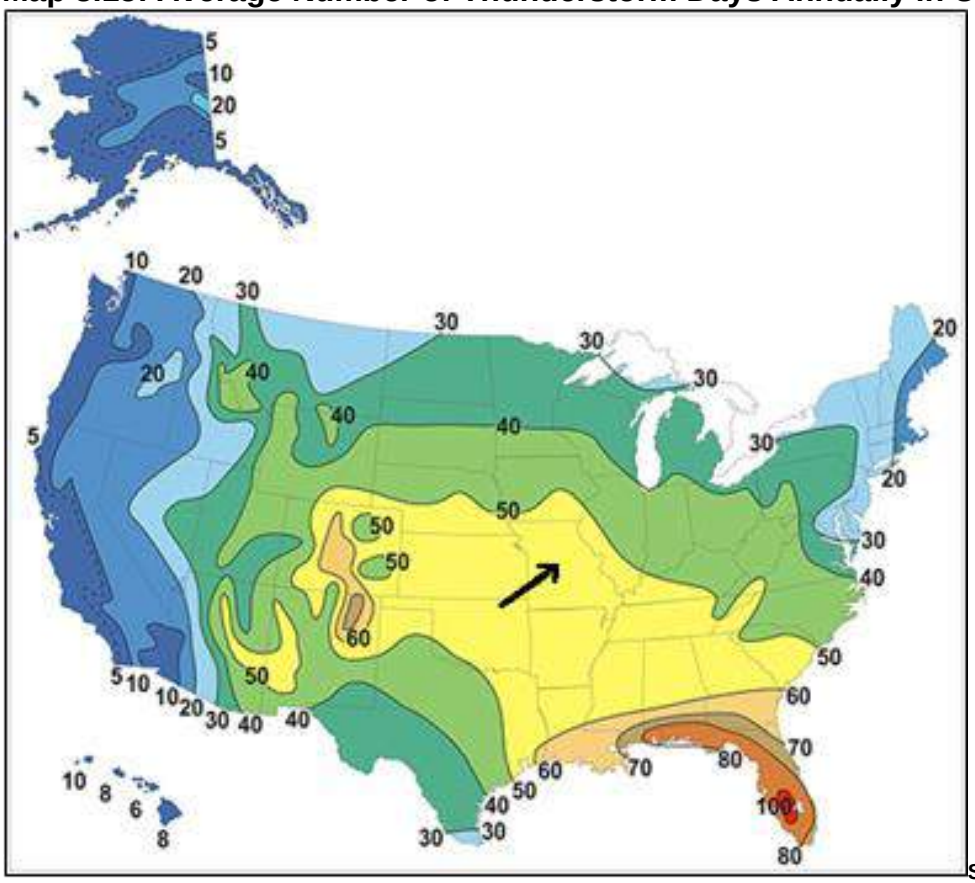
Figure 3.5 Annual Hailstorm Probability (2" diameter or larger) 1980-1994



Source: NSSL, http://www.nssl.noaa.gov/users/brooks/public_html/bighail.gif

National Weather Service data indicates an average 50-60 thunderstorm days per year in Missouri (Map 3.15).

Map 3.15: Average Number of Thunderstorm Days Annually in U.S.



Source: NOAA

Data from NOAA for the recent 10-year period (2010-2020) indicates 29 thunderstorm wind events in Moniteau County. There were no years in this period when an event was not reported. Based on this data, the calculated probability of a future severe thunderstorm wind event in any given year is 100 percent.

Data from NOAA for the same 10-year period indicates 15 reported severe hail events in the planning area (Figure 4.14). There were 3 years without severe hail events in the planning area during this period. Based on this data, the calculated probability of a future severe hail event in any given year is 30 percent.

CHANGING FUTURE CONDITIONS CONSIDERATIONS

According to the State Hazard Mitigation Plan 2018, "Predicted increases in temperature could help create atmospheric conditions that are fertile breeding grounds for severe thunderstorms and tornadoes in Missouri." These changing conditions will affect the entire planning area and should be considered when building new structures.

VULNERABILITY

Vulnerability Overview

Measure of Severity –

Moderate to high for damaging winds, hail, and lightning – all participating jurisdictions.

Potential Impact - Life

Severe thunderstorms and their related hazards pose a threat to people and animals. Windblown debris, falling trees, falling branches, and lightning are very dangerous to those who are exposed. Excessive damage to utilities can leave people without electricity for long periods – an especially dangerous situation for vulnerable populations.

Hail also presents a potential bodily threat. In 2000, a man in Texas died from softball-size hail. According to NOAA's National Severe Storms Laboratory, a 3.25-inch hailstone weighing 1.5 pounds has an estimated falling velocity of about 106 miles per hour.

The only injury from thunderstorm-related events reported in the recent 10-year period for the planning area was a man struck by lightning in June of 2008.

Potential Impact - Existing Structures

There is a wide range of possible impact from severe thunderstorms. Non-permanent and wood-framed structures are very vulnerable to destruction. While high winds are the force behind damage, it is the windblown debris and falling trees and branches that cause the most damage. Lightning can cause costly disruptions to electrical systems.

NOAA data, from which the annualized losses are calculated, vastly underestimates the cost of these hazards in the planning area. Local information indicates that many instances of property damage are not reflected in the NOAA data.

NOAA data only indicates damage from one hailstorm event in 2009 costing around $10,000 in damages, common knowledge would indicate that this is not accurate. A huge storm in the spring of 2006 caused massive hail damage across the mid-Missouri region. Information from neighboring Boone County indicates that there was over $1 million in hail damage incurred by that county's buildings for the year 2006. Many private homes throughout the region received new roofs because of hailstorm damage that year.

While hailstorms of the magnitude that caused such damage in 2006 do not occur every year in Moniteau County, hail is a costly hazard for the planning area.

Potential Impact - Future Development

A larger population and more extensive built environment increase the risk of injury, loss of life, and damage from severe thunderstorms.

It would be wise to consider mitigation strategies for severe thunderstorms during the planning phase of any new development. The type of construction affects vulnerability to damaging winds, hail, lightning, and tornadoes. Design and construction choices and the inclusion of hardened areas for safe rooms can save lives.

Hazard Summary by Jurisdiction

There are a variety of strategies in place in the planning area by which the public can be informed of severe weather conditions resulting from thunderstorms.
Moniteau County has been recognized by the National Weather Service as a StormReady® Community. In order to become recognized as StormReady®, the Emergency Management Agency is evaluated on its abilities to do the following:

- receive real-time weather information from the NWS
- disseminate the information to the public
- transmit real-time information to the NWS
- educate the public regarding weather hazards/protection

Warning Systems The following warning systems are used in the county:

- Local television weather reports
- Local radio weather reports
- 9-1-1 call center and Public Emergency Broadcast Center
- Outdoor warning sirens

Safe Rooms Hannah Cole Elementary School in Boonville was built in 2016 with a safe room built to FEMA standards incorporated into its gymnasium.

Mobile Homes The State of Missouri regulates manufactured housing and modular units through the Missouri Public Service Commission. This includes enforcing tie down and anchoring requirements.

Shelters There are numerous Red Cross Certified Shelters in the planning area should sheltering become necessary.

Insurance Industry The insurance industry is heavily invested in finding mitigation strategies for hail damage as it is one of the most-costly hazards for the industry.

High insurance claims for hail damage, especially in the Midwestern states, are one reason for an increase in insurance premiums. The type of roofing material used in construction can greatly affect vulnerability to hail. In an effort to have a multifaceted approach to the problem of high damages and increasing premiums, the industry has supported research and testing standards in roofing materials.

Problem Statement

Severe thunderstorms with damaging winds, hail, and lightning are common, dangerous, and often costly occurrences in the planning area. These weather events can be expected almost every year and every jurisdiction is highly vulnerable to these hazards.

Both human life and the built environment are at risk; the impact on the built environment has been quite costly in the past and this can be expected to continue into the future.

Public awareness education, excellent weather coverage by the local media, an excellent outdoor warning system, and regular emergency exercises in the schools help mitigate the risk to human life. However, there is a great need throughout the planning area for more safe rooms to protect from high wind events; this is especially true in the schools. Additional generators and power transfer hookups are needed in case of widespread and/or lengthy power outages. These identified needs have been targeted for action in the mitigation strategy but funding remains an issue for the costly safe rooms and generators/power transfer hookups.

3.4.9 Severe Winter Weather

Hazard Profile

Hazard Description

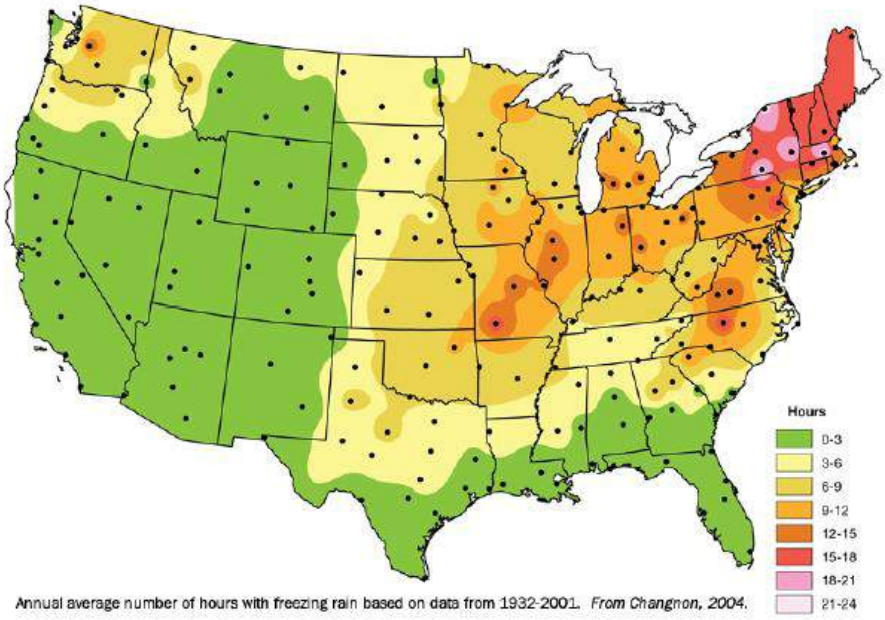
Winter storms in central Missouri contain ice, snow, severe cold, sleet, and wind; each of these associated factors has the potential to disrupt life in the region by making normal activity difficult and/or dangerous. The National Weather Service describes different types of winter storm events as follows:

- Blizzard – Winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less than ¼ mile for at least three hours.
- Blowing Snow – Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- Snow Squalls – Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- Snow Showers – Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- Freezing Rain – Measurable rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Most freezing-rain events are short lived and occur near sunrise between the months of December and March.
- Sleet – Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects.

Location

The entire planning area is at risk from severe winter weather. This includes heavy snow, ice, and freezing rain. The planning area falls in the 9-12 hours a year average for freezing rain.

Figure 3.16. NWS Statewide Average Number of Hours per Year with Freezing Rain



Source: https://mrcc.illinois.edu/living_wx/icestorms/

Strength/Magnitude/Extent

The entire planning area is at risk for a variety of winter weather. There are various levels of alerts for various conditions of winter weather. The National Weather Service may issue any of the following as conditions warrant.

Table 3.36	
National Weather Service Winter Warnings	
Winter Weather Advisory	Winter weather conditions are expected to cause significant inconveniences and may be hazardous. If caution is exercised, these situations should not become life-threatening. The greatest hazard is often to motorists.
Winter Storm Watch	Severe winter conditions, such as heavy snow and/or ice, are possible within the next day or two.
Winter Storm Warning	Severe winter conditions have begun or are about to begin in your area.
Blizzard Warning	Snow and strong winds will combine to produce a blinding snow (near zero visibility), deep drifts, and life-threatening wind chill. Seek refuge immediately.
Ice storm Warning	Dangerous accumulations of ice are expected with generally over one quarter inch of ice on exposed surfaces. Travel is impacted, and widespread downed trees and power lines often result.

As the duration of a winter weather event goes longer, the potential for increased severity also rises. Prolonged events tax resources for residents and businesses.

Previous Occurrences

Severe winter weather presents a risk to both life and property in the planning area. Some of the damage is direct but some comes in the form of economic losses due to closed businesses and schools and slowed or halted transportation.

Table 3.37: NCEI Moniteau County Winter Weather Events Summary, 2000-2020

Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
MONITEAU (ZONE)	1/27/2000	Winter Storm	0	0	0	0
MONITEAU (ZONE)	3/2/2002	Winter Storm	0	0	0	0
MONITEAU (ZONE)	12/4/2002	Winter Storm	0	0	0	0
MONITEAU (ZONE)	12/24/2002	Winter Storm	0	0	0	0
MONITEAU (ZONE)	1/1/2003	Winter Storm	0	0	0	0
MONITEAU (ZONE)	2/23/2003	Winter Storm	0	0	0	0
MONITEAU (ZONE)	12/13/2003	Winter Storm	0	0	0	0
MONITEAU (ZONE)	1/25/2004	Winter Storm	0	0	0	0
MONITEAU (ZONE)	11/24/2004	Winter Storm	0	0	0	0
MONITEAU (ZONE)	12/8/2005	Winter Storm	0	0	0	0
MONITEAU (ZONE)	11/29/2006	Winter Storm	0	0	200000	0
MONITEAU (ZONE)	12/1/2006	Winter Storm	0	0	0	0
MONITEAU (ZONE)	2/11/2008	Winter Weather	0	0	0	0
MONITEAU (ZONE)	2/23/2008	Winter Weather	0	0	0	0
MONITEAU (ZONE)	1/6/2010	Winter Weather	0	0	0	0
MONITEAU (ZONE)	1/31/2011	Winter Storm	0	0	0	0
MONITEAU (ZONE)	2/1/2011	Winter Storm	0	0	0	0
MONITEAU (ZONE)	12/21/2013	Winter Storm	0	0	0	0
MONITEAU (ZONE)	1/5/2014	Winter Storm	0	0	0	0
MONITEAU (ZONE)	2/4/2014	Winter Storm	0	0	0	0
Total			**0**	**0**	**200000**	**0**

Table 3.38 Crop Insurance Claims Paid in Moniteau County as a Result of Cold Conditions and Snow 2010-2020

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2010	Wheat	Cold	24
2010	Wheat	Cold	20
2010	Wheat	Cold	4
2010	Wheat	Cold	47
2010	Wheat	Cold	530
2010	Wheat	Cold	1495

2010	Wheat	Cold	8157
2010	Wheat	Cold	1170
2010	Wheat	Cold	224
2010	Wheat	Cold	194
2010	Wheat	Cold	93
2010	Corn	Cold	7005
2011	Wheat	Cold	1196
2011	Corn	Cold	127
2011	Soybeans	Cold	1121
2011	Soybeans	Cold	1832
2012	Wheat	Cold	863
2012	Soybeans	Freeze	363
2013	Wheat	Cold	498
2013	Wheat	Cold	499
2013	Wheat	Cold	3501
2013	Wheat	Cold	3412
2013	Corn	Cold	6382
2013	Soybeans	Cold	1371
2014	Wheat	Cold	9884
2014	Wheat	Cold	19033
2014	Wheat	Cold	87
2014	Wheat	Cold	7948
2014	Wheat	Cold	16651
2014	Grain Sorghum	Cold	419
2014	All Other Crops	Cold	677
2014	All Other Crops	Cold	944
2014	All Other Crops	Cold	1081
2015	Wheat	Freeze	677
2015	Wheat	Cold	1305
2015	Soybean	Cold	358
2015	All Other Crops	Cold	328
2017	Corn	Cold	16086
2019	Wheat	Cold	340
2019	Soybeans	Frost	1493
2020	Wheat	Frost	289
2020	Wheat	Cold	730
2020	Corn	Cold	24466
2020	Soybeans	Cold	194
2020	Soybeans	Cold	452
Total			**143270**

Probability of Future Occurrence

The historical data indicates there were 6 years without a severe winter weather event in the period 2010-2020, a 10-year period; most years witnessed multiple events. Based on this historical data, the calculated probability of a severe winter weather event in any year is 40%. (Probability calculation: 1- (6/10) = .40)

Changing Future Conditions Considerations

As temperatures rise and shorten the winter season there could be ecological impacts to plant and animal species that could cause them to shift their native territory. An increase in precipitation events throughout the winter months and a general saturation of the ground could increase the likelihood of flooding events and freezing rain or ice storm events in the planning area.

Vulnerability

Vulnerability Overview
Measure of Severity - Moderate for all participating jurisdictions.

Severe winter weather presents a risk to both life and property in the planning area. Some of the damage is direct, but some comes in the form of economic losses due to closed businesses and schools and slowed or halted transportation.

Potential Impact – Life

Many deaths and injuries from winter storms are a result of traffic accidents caused by a combination of poor driving surfaces and speeds too fast for the conditions. Accidents during winter storms can be particularly devastating because of multiple car involvement. Response times for emergency vehicles may also be slowed by poor road conditions.

Strenuous outdoor activity in extreme cold can also be life threatening. The elderly are especially vulnerable to excessive and/or prolonged cold (or heat). The 2019 ACS estimates over 15% of the population as 65 years and older in Moniteau County.

Severe winter weather may require that people without power be sheltered and fed.

Potential Impact - Existing Structures

Much of the property damage that occurs from severe winter weather is due to some type of utility failure:

> Power Lines - Ice storms often adversely impact consistent power supplies. Ice buildup on wires can cause them to fall; downed tree limbs can knock out power lines. Prolonged power outages can be a threat for those relying on electricity for heat. This is a particular concern for more vulnerable populations such as the elderly.

Water Lines - Winter storms and the associated cold weather can be problematic for water lines, especially if a rapid freeze/thaw cycle is involved. As the ground freezes and thaws, pipes can shift and sometimes break, causing a lack of potable water. Broken pipes can cause extensive and expensive damage to property. Frozen and burst water pipes are a real concern for the homeowner.

Severe winter weather can be expected in Moniteau County nearly every year. The county has been included in five disaster declarations for severe winter weather since 2002. A winter storm that brought up to three-fourths of an inch of ice in December 2007 caused widespread power outages, leaving an estimated 165,000 residents without power in Cooper County and the surrounding counties of Bates, Chariton, Howard, Johnson, Pettis, and Saline. Most recently, in 2011, a series of storms blanketed the region in near record amounts of snow and created blizzard conditions across a large portion of the state. Snow fall on February 1, 2011, caused the closure of Interstate 70 from Kansas City to St. Louis. Expenses from these storms are in excess of $14 million, according to SEMA.

Potential Impact - Future Development

There is no known future development that will have a particular impact on the vulnerability to severe weather. However, as with many non-locale specific hazards, growth and development increase the size of the population and the assets at risk. However, there is still a need for more backup generators and transfer switches in the planning area. This is a difficult issue as the expense is great and the funding possibilities are limited. In addition, there is a need to find reliable transportation for vulnerable populations in need of transfer to shelters.

Hazard Summary by Jurisdiction

Moniteau County and California Public Works Departments both have snowplowing plans which prioritize critical roads and streets for plowing. Both Public Works Departments maintain stocks of chemicals and fuel at appropriate levels for responding to severe winter weather events. The key is all streets are cleared during a snow event. Depending on the scope of a forecasted snow event, the snow plowing crews are worked in 8 to 12 hour shifts with regular public works department staff being augmented by employees from other departments and/or temp hire employees.

Utility Companies

Utility companies in Moniteau County have policies regarding tree trimming and brush removal around power lines. Consistent maintenance of trees and brush around utility lines limits the possibility of power outages during a severe winter storm. Maintenance also makes financial sense because repairing fallen utility lines and poles is costly and dangerous.

National Weather Service and Local Media

The Kansas City Office of the National Weather Service coordinates with local jurisdictions and media outlets to disperse information regarding severe winter storm watches and warnings. Early warning allows the public to prepare for a severe storm. If a storm reaches catastrophic proportions and officials need to communicate directly with the public, the Emergency Alert System exists to spread that information.

PROBLEM STATEMENT

Severe winter weather is one of the most common and costly natural hazards to affect the planning area. In addition, climate data indicates that winter storms are increasing due to changes in the climate. All participating jurisdictions are vulnerable to this hazard.

Some of the worst problems from severe winter weather occur when ice storms affect the area; widespread and lengthy power outages can occur. In addition, traffic accidents are a major source of injuries during severe winter weather.

The further encouragement and effort toward moving utility lines underground will help limit damage to essential utilities during severe winter weather.

3.4.10 Tornado

Hazard Profile

Description of Hazard

A tornado is a violently rotating column of air which is usually generated by a supercell thunderstorm. The movement speed of a tornado is typically around 10-20 mph but can range from almost stationary to more than 60 mph, according to NOAA's National Severe Storms Laboratory. They often travel from southwest to northeast but can move in any direction.

Tornadoes occur most frequently in late afternoon and early evening but can occur at any time; they tend to dissipate as fast as they form. Unlike a hurricane, which can last for multiple hours, tornadoes are often in one place for no more than a few minutes. The seasonal, temporal, and spatial uncertainties surrounding thunderstorms and tornadoes make widespread and year-round preparedness essential.

Location

The entire planning area is at risk from tornadoes. All of Missouri is located in the zone known as Tornado Ally where the occurrence of tornadoes of varying intensities are common.

Strength/Magnitude/Extent

The Enhanced Fujita or EF-Scale (Table 3.39) is currently used in the United States to classify tornadoes. It is based on engineering studies of the wind effects on 28 different types of structures (buildings, towers, poles, trees). This indirect measurement of speed is used because it is currently not possible to measure ground-level speeds in strong tornadoes; the winds destroy the instruments needed for measurement.

In addition to estimated wind speeds, averaged data from tornadoes can give an idea of the length and width of tornadoes in the different classifications.

Table 3.39 Enhanced F Scale for Tornado Damage

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest ¼-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Source: The National Weather Service, www.spc.noaa.gov/faq/tornado/ef-scale.html

The EF-Scale has been in use since February 1, 2007. It uses the same ratings as the original Fujita Scale (F-Scale) which it replaced, but the wind speeds have been adjusted to reflect current knowledge and give a more realistic estimate of wind speeds for all tornadoes, including historical ones in the NOAA database. The ratings of tornadoes prior to 2007 were not changed in the NOAA database with the adoption of the EF-Scale.
There continue to be limitations even with the EF-Scale since the scale is based on sustained damage. The table below list damage summaries for their respective EF rating.

Table 3.40 Enhanced Fujita Scale with Potential Damage

Enhanced Fujita Scale			
Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
EF0	65-85	53.5%	Light. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e. those that remain in open fields) are always rated EF0).
EF1	86-110	31.6%	Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass br oken.
EF2	111-135	10.7%	Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobi le homes complete destroyed; large trees snapped or uprooted; l ight object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildin gs such as shopping malls; trains overturned; trees debarked; heavy ca rs lifted off the ground and thrown; structures with weak founda tions blown away some distance.
EF4	166-200	0.7%	Devastating. Well-constructed houses and whole frame houses completely levelled; cars thrown and small missiles generated.
EF5	>200	<0.1%	Explosive. Strong frame houses levelled off foundations and s wept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have sign ificant structural deformation; incredible phenomena will occur.

Source: NOAA Storm Prediction Center, http://www.spc.noaa.gov/efscale/ef-scale.html

Another issue with tornadoes is speed of onset. Technological advances, such as Doppler radar, computer modeling, and Emergency Warning Systems, have increased the amount of time the general public has to respond to a tornado. Despite these advances, tornadoes can still strike an area with little warning. Often people have no more than a few minutes to get to safety. Being able to quickly get to a safe place is absolutely imperative in order to prevent loss of life.

The planning area has experienced 18 tornado events since October 1966, as officially recorded by NOAA.

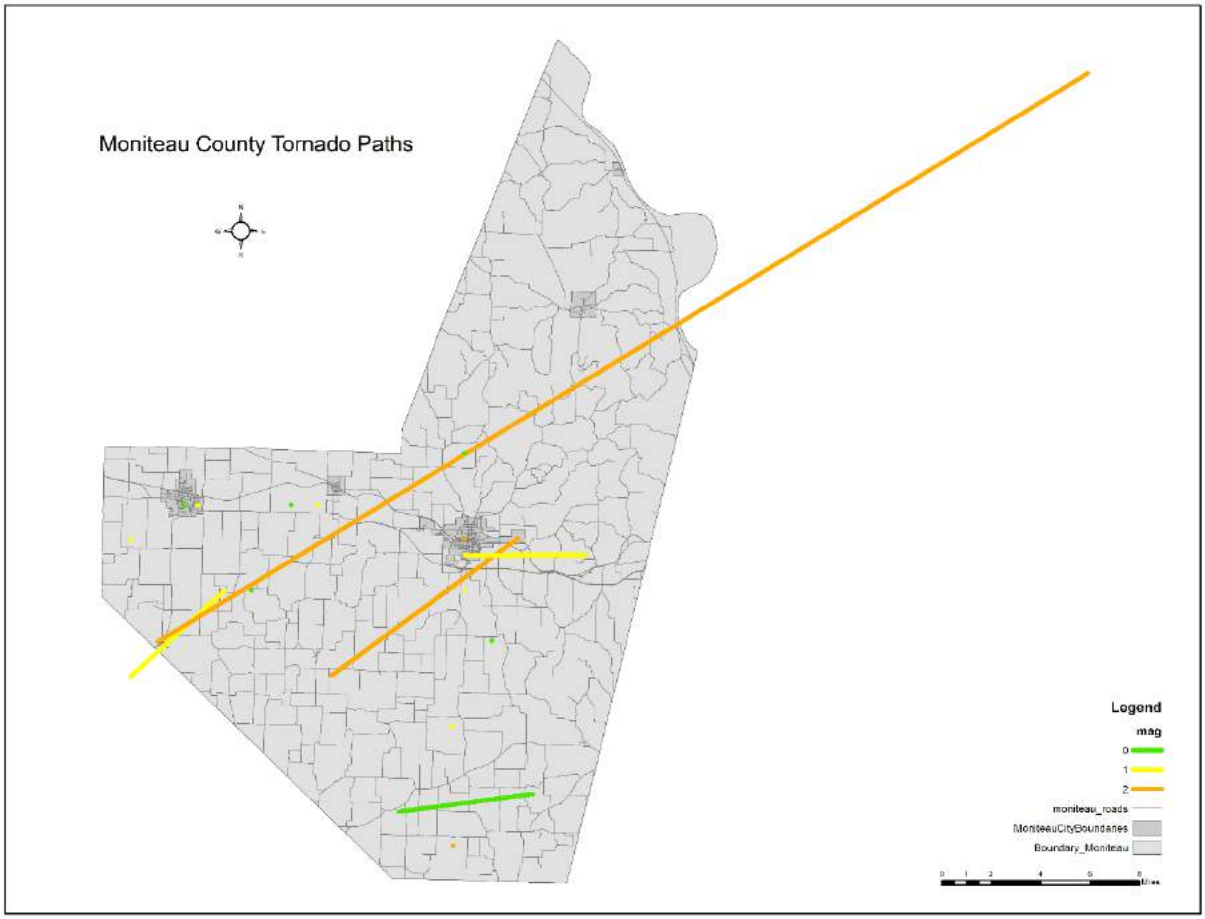
The historical record in the planning area over this 50-year period indicates tornadoes in the EF0 to EF2 range. While history is informative, it is not necessarily predictive of the future; there is the possibility that the planning area could experience a tornado above the EF2 level in the future.

In addition, many historical tornadoes may have been stronger than the data indicates. According to the NOAA website, "Because the only way we can compare all tornadoes is by whatever damage they caused, and EF5/F5 damage is only possible when tornadoes hit well-built structures, the true 'violence' of most historical tornadoes is unknown—especially before the middle to late 20th century."

Table 3.41 Recorded Tornadoes in Moniteau County, 1966 – Present

Location	Date	Event Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
MONITEAU CO.	5/26/1955	Tornado	F1	0	0	2500	0
MONITEAU CO.	3/5/1961	Tornado	F1	0	0	2500	0
MONITEAU CO.	3/5/1961	Tornado	F1	0	0	2500	0
MONITEAU CO.	5/4/1963	Tornado	F1	0	0	25000	0
MONITEAU CO.	10/14/1966	Tornado	F2	0	0	25000	0
MONITEAU CO.	10/14/1966	Tornado	F2	0	0	25000	0
MONITEAU CO.	10/24/1967	Tornado	F2	0	0	2500	0
MONITEAU CO.	9/7/1972	Tornado	F0	0	0	2500	0
MONITEAU CO.	8/13/1974	Tornado	F0	0	0	25000	0
MONITEAU CO.	8/13/1974	Tornado	F0	0	0	25000	0
MONITEAU CO.	5/12/1980	Tornado	F2	0	0	25000	0
MONITEAU CO.	3/15/1982	Tornado	F1	0	0	250000	0
MONITEAU CO.	5/14/1982	Tornado	F1	0	0	30	0
MONITEAU CO.	4/3/1984	Tornado	F0	0	0	0	0
MONITEAU CO.	6/7/1990	Tornado	F1	0	0	0	0
MONITEAU CO.	6/7/1990	Tornado	F1	0	0	0	0
MONITEAU CO.	6/7/1990	Tornado	F1	0	0	25000	0
MONITEAU CO.	6/7/1990	Tornado	F2	0	0	25000000	0
MONITEAU CO.	11/27/1990	Tornado	F1	0	0	25000	0
CALIFORNIA	4/10/2001	Tornado	F0	0	0	0	0
Total				**0**	**0**	**25462530**	**0**

Map 3.17 Moniteau County Map of Historic Tornado Events



Probability of Future Occurrence

High - all participating jurisdictions

For the period from October 1966 through December 2020, a period of approximately 50 years, the NOAA database reports 12 years with at least one tornado event in the planning area. Based on this historical data, the calculated probability of a future tornado event of any magnitude in a year is about 24 percent.

The probabilities of occurrence of the different magnitudes of tornadoes in any given year, based on historical data, have also been calculated (Table 3.46). While the calculated probabilities for an EF3, EF4, or EF5 tornado are 0 percent, this does not mean tornadoes of these magnitudes could not occur in the planning area; it just means they have not occurred in the historical record.

Table 3.42			
Probability of Future Tornado Events			
EF-Scale	**# of years with tornado event (1955-2020)**	**Probability**	**Probability Rating**
All	14	28%	High
EF0	4	8%	High
EF1	6	12%	Moderate
EF2	4	8%	Moderate
EF3	0	0%	Low
EF4	0	0%	Low
EF5	0	0%	Low

Changing Future Conditions Considerations

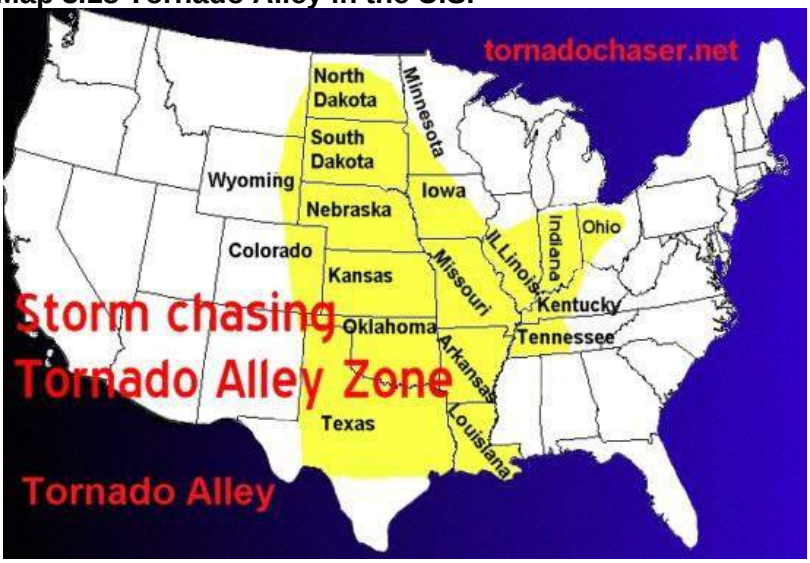
It is not confidently known how the change in climate could impact the frequency or severity of future tornadic activity. While the activity zone has not expanded according to the State Hazard Mitigation Plan 2018 the number or tornados has gone up since the 1950s. More studies will be needed to know the true impact over time.

Vulnerability

Vulnerability Overview

The entire planning area is highly vulnerable to the potentially devastating impact of tornadoes. Their random nature and potentially quick speed of onset pose particular risks for human life. Tornadoes of the magnitude known to historically occur in the area can wreak extensive and costly structural damage. The destructive effects of a tornado depend on the strength of the winds, proximity to people and structures, the strength of structures, and how well a person is sheltered. They are obviously a hazard with the potential to cause both great loss of life and catastrophic destruction. The whole planning area is located in “Tornado Ally” where historically dangerous and destructive tornados occur frequently.

Map 3.18 Tornado Alley in the U.S.



Source: http://www.tornadochaser.net/tornalley.html

Potential Losses to Existing Development

The destructive effects of a tornado depend on the strength of the winds, proximity to people and structures, the strength of structures, and how well a person is sheltered. They are obviously a hazard with the potential to cause both great loss of life and catastrophic destruction.

Potential Impact - Life

While tornadoes can strike anywhere, there is a greater chance of injury and loss of life (and destruction of property) in population centers. This is especially true of a tornado with a large path.

There have been no reported injuries associated with recorded tornadoes in the planning area.

Potential Impact - Existing Structures

Tornadoes cause the most-costly physical destruction when they touch ground in urban areas. High winds affect all structure types differently; non-permanent and wood-framed structures are especially vulnerable to destruction.

In addition to a direct hit on a building by a tornado, damage to trees poses a serious threat. People, buildings, power lines, and vehicles are all at risk from falling branches, uprooted trees, and windblown debris.

Potential Impact - Future Development

A larger population and more extensive built environment increase the risk of injury, loss of life, and damage from tornadoes.

There has been growth in population and housing in certain parts of the planning area in recent years. While Census figures indicate an overall population decline in the planning area (Moniteau County) between 2010 and 2020, the population growth in California was the greatest. Housing units in the planning area increased by 0.06% percent during this period.

It would be wise to consider mitigation strategies for tornadoes and other high-wind situations during the planning phase of any new development. The type of construction greatly affects vulnerability to tornadoes and high winds. Design and construction choices and the inclusion of hardened areas for safe rooms can save lives.

Hazard Summary by Jurisdiction

There are a variety of strategies in place in the planning area by which the public can be informed of severe weather conditions resulting from thunderstorms.

Moniteau County has been recognized by the National Weather Service as a StormReady® Community. In order to become recognized as StormReady®, the Emergency Management Agency is evaluated on its abilities to do the following:

- receive real-time weather information from the NWS
- disseminate that information to the public
- transmit real-time information to the NWS
- educate the public regarding weather hazards/protection

Warning Systems The following warning systems are used in the county:

- Local television weather reports
- Local radio weather reports
- 9-1-1 call center and Public Emergency Broadcast Center
- Outdoor warning sirens

Safe Rooms Moniteau Co. R-V has used Hazard Mitigation funding to construct a FEMA rated storm shelter. Other schools in the planning area have desire for similar storm shelters but funding is a struggle to put together.

Mobile Homes The State of Missouri regulates manufactured housing and modular units through the Missouri Public Service Commission. This includes enforcing tie down and anchoring requirements.

Shelters There are numerous Red Cross Certified Shelters in the planning area should sheltering become necessary.

Problem Statement

The entire planning area is highly vulnerable to the potentially devastating impact of tornadoes. Their random nature and potentially quick speed of onset pose particular risks for human life. Tornadoes of the magnitude known to historically occur in the area can wreak extensive and costly structural damage. Public awareness education, excellent weather coverage by the local

media, an excellent outdoor warning system, and regular emergency exercises in the schools help mitigate the risk to human life. However, there is a great need throughout the planning area for more safe rooms to protect from high wind events; this is especially true in the schools. Additionally, more vigorous promotion of NOAA radio use would help protect the general public. Additional generators and power transfer hookups are needed in case of widespread and/or lengthy power outages. All of these identified needs have been targeted for action in the mitigation strategy; funding remains an issue for the more costly safe rooms and generators/power transfer hookups.

3.4.11 WILDFIRE

HAZARD PROFILE

DESCRIPTION OF HAZARD

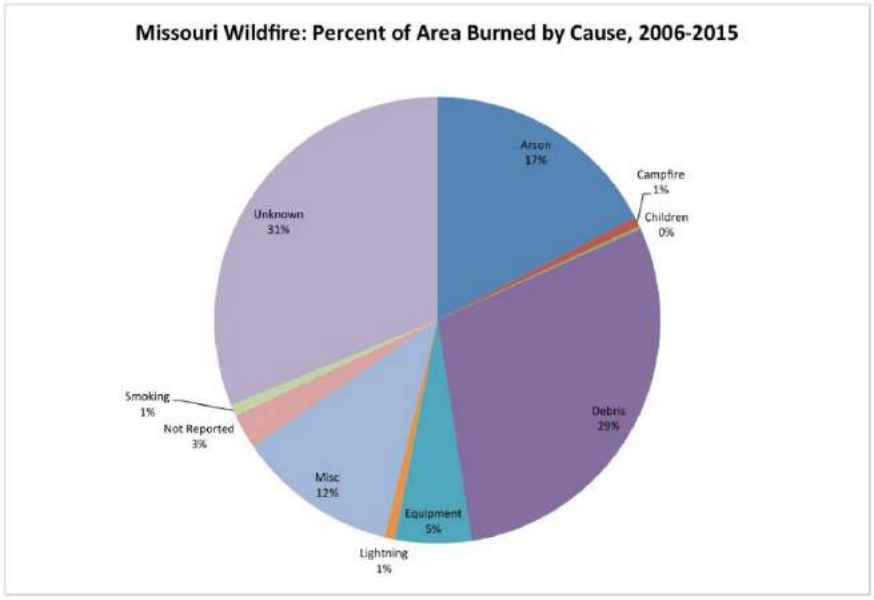
Large and widespread wildfires, such as occur in the western United States, have not been a problem in Moniteau County in recent history. However, smaller wildfires/natural cover fires occur every year.

These fires may take place at any time of the year but the majority occur during the spring fire season (February 15 - May 10). Spring is the time of the year when rural residents burn garden spots and brush piles. Many landowners also believe it is necessary to burn the woods in the spring to grow more grass, kill ticks, and get rid of brush. These factors, combined with low humidity and high winds, result in higher fire danger at this time of year. The spring fire season abates with the growth of the new season's grasses and other green vegetation.

Numerous fires also occur in October and November due to the dryness associated with fall in Missouri. Many rural residents use this time of year to burn leaves and debris thus raising the possibility of a fire which burns out of control.

The major causes of wildfires in Missouri are various human activities, according to statistics from the Missouri Department of Conservation (Figure 3.3).

Figure 3.6: Missouri Wildfire Source



Source: Missouri Department of Conservation

Location

The rural areas of Moniteau County and the rural/urban interfaces are most at risk from wildfires. Debris burning is consistently the number one cause of wildfires in Missouri. Fires caused by lightning are rare despite 50 to 70 thunderstorm days per year.

Wildland Urban Interfaces (WUI) are those areas where "… structures and other human development meet or intermingle with undeveloped wildland", according to Federal Register. There is a higher risk scenario for wildfire in these areas because of the proximity of high fuel loads on wildland to urban structures.

According to this federal report, the specific interface definitions used are:

- Interface Community

Structures directly abut wildland fuels. There is a clear line of demarcation between wildland fuels and residential, business, and public structures. Wildland fuels do not generally continue into the developed area. The development density for an interface community is usually three or more structures per acre, with shared municipal services.

- Intermix Community

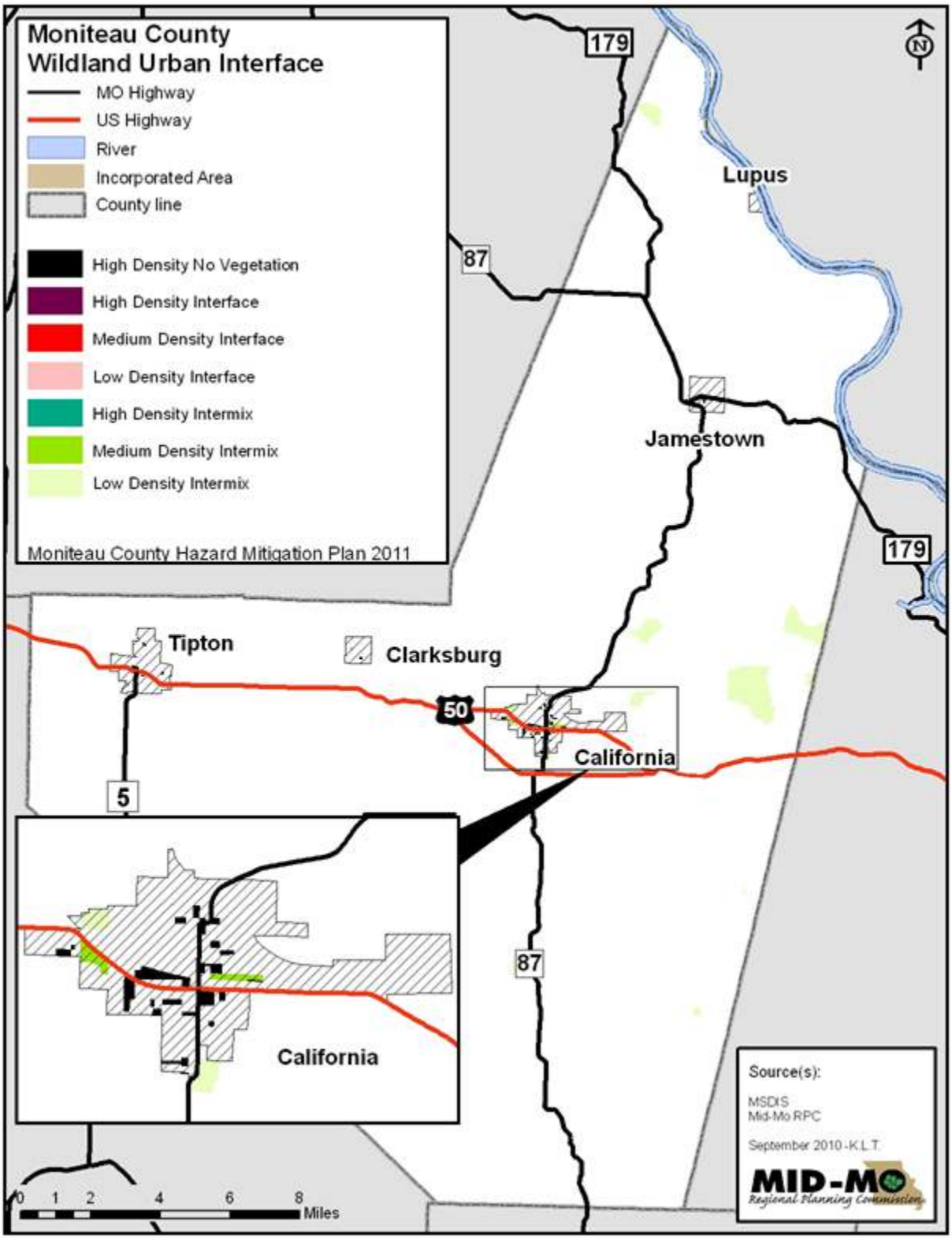
Structures are scattered throughout a wildland area. There is no clear line of demarcation; wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres.

- Occluded Community

Often found within a city, structures abut an island of wildland fuels (e.g. park or open space). There is a clear line of demarcation between structures and wildland fuels. The development density is usually similar to those found in the interface community, but the occluded area is usually less than 1,000 acres in size.

While the mapping data would indicate that the City of California is more at risk from Wildfire than the other incorporated communities, personnel at the planning meetings did not accept this assessment. Their local knowledge gives the perspective that there is wildland/urban interface equal to that of California's in the other incorporated communities and California is no more at risk than any of the other communities.

Map 3.19



Strength/Magnitude/Extent

Most fires in the planning area are brush fires which are usually dealt with in less than a few hours.

Previous Occurrences

The late 1970s and early 1980s there were many wildfire across the state of Missouri. However, large and widespread wildfires, such as occur in the western United States, have not been a problem in the planning area in recent history.

Probability and Severity of Future Occurrences

Probability: low
Severity: low

The probability of wildfires increases during conditions of excessive heat, dryness, and drought. The probability is also higher in spring and late fall. The Missouri State Hazard Mitigation Plan points out that the probability of wildfires may increase to high during conditions of excessive heat, dryness, and drought. The probability is also higher in spring and late fall.

Changing Future Conditions Considerations

Raising temperatures and more sporadic rains with longer periods of dry between rain events could affect vegetation and the number of days prescribed burns can safely be performed. With increased rainfall can be expected to come an abundance of plant growth that won't be able to be renewed with less prescribed burns making more fuel for fires that potentially get out of control. An increase in droughts and dry vegetation not only in the forest but around homes in the form of depleted landscaping material creates heightened risk for structures to overtaken by wildfires.

VULNERABILITY

Vulnerability Overview

Potential Impact - Existing Structures

While wildfires in the central Missouri area have the potential to destroy buildings, data from the entire Mid-Missouri RPC region indicates that this is more the exception than the rule. Wildfires are usually quickly suppressed, and the damage to the built environment is minimal.

Potential Impact - Future Development

Potential impacts of this hazard on future development are not quantifiable with the resources available.

Hazard Summary by Jurisdiction

Wildfires in Moniteau County tend to be limited in their spatial extent, thus minimizing their impact. According to the Missouri Department of Conservation, 49 percent of all wildfires in Missouri result from debris burning that gets out of hand and starts a wildfire. People and structures in the path of a wildfire are all at risk of minimum to extensive damage. Wildfire is defined as an uncontrolled fire that destroys forests and many other types of vegetation, as well as animal species.

While wildfires occur on a regular basis, they are usually easily suppressed by a quick response from the fire districts and thus limited in their spread and destruction.

The use of Red Flag Days by fire and public works departments notifies the public of heightened fire risk. Emergency response systems**,** well-trained fire departments, and numerous county roads improve response times to fire events, thus decreasing the chances of fire spread.

Problem Statement

Wildfire is not a major threat in the planning area; however, all participating jurisdictions are potentially vulnerable. The threat is greatest in unincorporated Moniteau County but jurisdictions with or near significant Wildland Urban Interface also have a heightened risk.

While wildfires occur on a regular basis, they are usually easily suppressed by a quick response from the fire districts and thus limited in their spread and destruction.

Chapter 4: Mitigation Strategy

Chapter 4: Mitigation Strategy

44 CFR Requirement §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section presents the mitigation strategy updated by the Mitigation Planning Committee based on the updated risk assessment. The following definitions are taken from FEMA's *Local Hazard Mitigation Review Guide* (October 1, 2012)

- **Mitigation Goals** are general guidelines that explain what you want to achieve. Goals are long-term policy statements and global visions that support the mitigation strategy. The goals address the risk of hazards identified in the plan.
- **Mitigation Actions** are specific actions, projects, activities, or processes taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan's mission and goals.

The original Project Steering Committee (2003-2004) was charged with developing a comprehensive range of mitigation actions to promote the agreed upon mitigation goals. Objectives were defined under each goal and the mitigation actions were then developed to promote each objective. The following six categories of mitigation were considered in developing the mitigation actions:

- **Prevention tools -** regulatory methods such as planning and zoning, building regulations, open space planning, land development regulations, and storm water management.

- **Property protection measures -** acquisition of land, relocation of buildings, modifying at-risk structures, and flood proofing at-risk structures.

- **Natural resource protection** - erosion and sediment control or wetlands protection.

- **Emergency services measures** – warning systems, response capacity, critical facilities protection, and health and safety maintenance.

- **Structural mitigation** - reservoirs, levees, diversions, channel modifications and storm sewers.

- **Public information** - providing hazard maps and information, outreach programs, real estate disclosure, technical assistance and education.

4.1 Goals

44 CFR 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 four county hazard mitigation goals for the Moniteau County Hazard Mitigation Plan (2022) are:

- Goal 1: Implement mitigation actions that improve the protection of human life, health, and safety from the adverse effects of disasters
- Goal 2: Implement mitigation actions that improve the continuity of government and essential services from the adverse effects of disasters
- Goal 3: Implement mitigation actions that improve the protection of public and private property from the adverse effects of disasters
- Goal 4: Implement mitigation actions that improve the protection of community tranquility from the adverse effects of disasters

4.2 Identification and Analysis of Mitigation Actions

44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Update of Mitigation Actions

The Planning Committee were given lists of their previous action items at meeting #2 to be reviewed and evaluated. They were encouraged to revie w the details of the risk assessment vulnerability analysis specific to their jurisdiction.

They were also provided a link to the FEMA's publication, *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013).*

This document was developed by FEMA as a resource for identification of a range of potential m itigation actions for reducing risk to natural hazards and disasters. In order to ensure that there was a comprehensive mitigation approach to each hazard the MPC reviewed the following information:

- A list of actions proposed in the previous mitigation plan, the current State Plan, and approved plans in surrounding counties,
- Key issues from the risk assessments, including the problem statements concluding each hazard profile and vulnerability analysis,
- State priorities established for HMA grants, and

- Public input during meetings, responses to data collection questionnaires, and other efforts to involve the public in the plan development process.

Meeting #2 of the 2022 update, the actions in the plan were reviewed by the planning committee and categorized as follows:

- Completed with a description of the progress.
- Remove-some uncompleted actions were removed from the strategy action plan for various reasons.
- On-going with a description of the progress.

Many of the 2016 actions were kept in the 2021 strategy action plan either because they have not yet been completed or because they are ongoing actions which the committee wanted to highlight in the overall plan.

Table 4.1 Action Status Summary

Jurisdiction	Completed Actions	Continuing Actions (ongoing or modify)	Deleted Actions
Moniteau County	**1**	**4**	**15**
California	**1**	**5**	**2**
Jamestown	**0**	**2**	**2**
Lupus	**0**	**2**	**3**
Tipton	**0**	**2**	**3**
Clarksburg C-II	**0**	**2**	**5**
High Point R-III	**0**	**2**	**7**
Jamestown C-I	**0**	**1**	**8**
Moniteau Co. R-I	**0**	**2**	**7**
Moniteau Co. R-V	**1**	**1**	**8**
Tipton R-VI	**0**	**2**	**7**
911 Dispatch District	**N/A**	**N/A**	**N/A**
California RFPD	**N/A**	**N/A**	**N/A**
Tipton RFPD	**N/A**	**N/A**	**N/A**

Entities showing N/A did not participate or provide action items in the last update, thus not having any to look back on.

Table 4.2 Summary of Completed and Deleted Actions from the Previous Plan

Completed Actions	Completion Details (date, amount, funding source)
Identify Low-Water Crossings	RPC located in 2017
Upgrade Stormwater	California did upgrades since last update
Build tornado saferoom	Latham School 2012
Deleted Actions	**Deleted Details**
Keep staff updated on Earthquake safety	Required activity
Review school disaster plans	Required activity
Maintain emergency preparedness plans	Not mitigating anything

Conduct Emergency exercises	Not mitigating anything
Alternative placement sites	Doesn't require funding
Additional water source for school	Not feasible
Provide educational material on excessive heat exposure	Not mitigating anything
Encourage safe driving	Not natural hazard relevant
Encourage county jurisdictions to participate in NFIP	Already do
Ensure evacuation routes are adequate	Part of EOP
Review LEOP with facilities	Part of EOP
With agencies and their fuel supplies	Doesn't need funding
Continue to work with Red Cross	Doesn't need funding
Each community will be contacted to determine if there is a cooling center.	Doesn't need funding
Review access to critical facilities	Doesn't require funding
Identify, review, and implement mechanisms to foster collaboration among jurisdictions, agencies, and special districts.	Doesn't require funding
Create a communications plan for advisories	Doesn't require funding
Remove vegetation and combustible material from critical infrastructure	Utilities handles this
Maintain file of EAPs for high hazard dams	Doesn't require funding
Promote the use of texting alerts for severe weather	Doesn't require funding

Source: Previously approved County Hazard Mitigation Plan; Data Collection Questionnaires.

4.3 Implementation of Mitigation Actions

44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include an action strategy describing how the actions identified in paragraph (c)(2)(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 benefits review of the proposed projects and their associated costs.

Jurisdictional MPC members were encouraged to meet with members of their community to finalize actions to be submitted for the updated mitigation strategy. The Disaster Mitigation Act requires benefit-cost review as the primary method by which mitigation projects should be prioritized. The committee was asked to take this into account when discussing actions for their jurisdiction. It was decided that projects will be prioritized by when and where damage occurs, available funding, and political will. Details of projects at the planning stage are not in-depth benefit/cost reviews and further details will be refined as there is project development.

STAPLEE AND BENEFIT/COST REVIEWS

STAPLEE Review – FEMA's STAPLEE methodology was used to assess the costs and benefits, overall feasibility of mitigation actions, and other issues impacting project. During the prioritization process, the jurisdictions used worksheets to assign scores. The worksheets posed questions based on the STAPLEE elements as well as the potential mitigation effectiveness of each action. The following questions were asked for each proposed action.

S: Is the action socially acceptable?
T: Is the action technically feasible and potentially successful?
A: Does the jurisdiction have the administrative capability to successfully implement this action?
P: Is the action politically acceptable?
L: Does the jurisdiction have the legal authority to implement the action?
E: Is the action economically beneficial?
E: Will the project have an environmental impact that is either beneficial or neutral? (score "3" if positive and "2" if neutral)

Will the implemented action result in lives saved?
Will the implanted action result in a reduction of disaster damage?

Table 4.3 Blank STAPLEE Worksheet

STAPLEE Worksheet		
Name of Jurisdiction:		
Action or Project		
Action/Project Number:	Insert a unique action number for this action for future tracking purposes. This can be a combination of the jurisdiction name, followed by the goal number and action number (i.e. Joplin1.1)	
Name of Action or Project:		
Mitigation Category:	Prevention; Structure and Infrastructure Projects; Natural Systems Protection; Education and Outreach; Emergency Services	
STAPLEE Criteria	**Evaluation Rating** Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	**Score**
S: Is it **Socially** Acceptable		
T: Is it **Technically** feasible and potentially successful?		
A: Does the jurisdiction have the **Administrative** capacity to execute this action?		
P: Is it **Politically** acceptable?		
L: Is there **Legal** authority to implement?		
E: Is it **Economically** beneficial?		
E: Will the project have either a neutral or positive impact on the natural **Environment**?		
Will historic structures be saved or protected?		
Could it be implemented quickly?		
	STAPLEE SCORE	
Mitigation Effectiveness Criteria	**Evaluation Rating**	**Score**

Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	
MITIGATION EFFECTIVENESS SCORE		
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		

☐ **High Priority (30+ points)**	☐ ☐ **Medium Priority (25 - 29 points)**	☐ **Low Priority (<25 points)**

Completed by
(Name, Title, Phone Number) _____

After the actions were evaluated, the following formula was used to calculate the percentage of points scored out of points available for each individual action: % score = (total points/total of applicable criteria) * 100

Benefit/Cost Review

The benefit of each action was evaluated by awarding two (3) points for each of the following *avoided* damages (12 points maximum = highest benefit):

- Injuries and/or casualties (IC)
- Property damages (PD)
- Loss-of-function (LF) – includes loss of utility services, impact of road/bridge closures, loss of income, cost of displacement
- Emergency management costs/community costs (EMCC)

The cost of each action was according to the following scale (-4 points maximum = highest cost):

- Already in place or easily put into work program (-1)
- Low/moderate cost – could be worked into operating budget (-2)
- Moderate/high cost –help with funding possibly needed depending on specifics of project (-3)
- High cost – outside help with funding definitely needed (-4)

Prioritization

The Planning Committee reviewed the % STAPLEE score and benefit/cost review for all of the actions and prioritized them according to the following scale:

- High – Work should begin as soon as possible; action should be accomplished in the next 5 years
- Medium – Work could begin within the next 5 years, if time and resources allow
- Low – Long-range goal, if time and resources allow; work within the next 5 years is possible but not probable

It was understood that some of these priorities might be changed by the individual jurisdictions due to funding or staffing constraints as they developed their plans for action implementation.

It should be noted that a number of high priority actions scored somewhat low on both the STAPLEE review and the benefit/cost review due to their high cost which figures into both reviews. These actions remain a high priority with the hope that funding will become available. The mitigation actions suggested for the specific participating jurisdictions were handed over to the representatives or governing bodies of those jurisdictions for implementation and administration decisions.

It was recognized that participating jurisdictions might choose to either change the prioritization of or exclude some suggested mitigation actions based on current specifics of time, resources, and capabilities. In addition, new mitigation actions might be added based on specific issues.

The mitigation actions for which each participating jurisdiction is the lead are shown in the following pages. The Moniteau County Office of Emergency Management is the lead on many actions which mitigate hazards for the entire planning area.

Moniteau County

Action Worksheet	
Name of Jurisdiction	Moniteau County
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	Losses from flooding
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**1.1.1**
Name of Action or Project	NFIP Continued Compliance
Action or Project Description	Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping.
Estimated Cost	Little or no cost (<$10,000)
Benefits	Ensure future development is in a safe area.
Plan for Implementation	
Responsible Organization / Department	Floodplain Administrator
Action / Project Staplee Score / Priority	High
Timeline for Completion	Continued/2025
Potential Funding Source	City General revenue
Local Planning Mechanism to be Used	Floodplain ordinance
Action Status	
Status	In Progress
Report on Progress	Ongoing

Action Worksheet	
Name of Jurisdiction	County of Moniteau
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	power outage
Action or Project	
Applicable Goal Statement	1
Action/Prj. #	**1**.1.2
Name of Action or Project	Critical Infrastructure Backup power / capability
Action or Project Description	Ensure seamless procedure of providing emergency power to identified public shelters and critical public infrastructure.
Estimated Cost	$100,000 to $500,000
Benefits	I/C, LP, EMCC
Plan for Implementation	
Responsible Organization / Department	EMD / County Commission
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	local, state, federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	KEEP - Ongoing
Report on Progress	not able to move forwards due to funding

Action Worksheet	
Name of Jurisdiction	County of Moniteau
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorms
Problem Being Mitigated	lack of ability to notify citizens in efficient manner
Action or Project	
Applicable Goal Statement	Goal 1- implement mitigation actions that improve the protection of human life, health, and safety from the adverse effects of disasters
Action/Prj. #	**1**.1.3
Name of Action or Project	Public Education/ Participation in County Emergency Alert System
Action or Project Description	Public education to better assist in notifying in case of severe weather, tornado, or any event or disaster when mass notification is required.
Estimated Cost	Little or no cost
Benefits	I/C, LP, EMCC
Plan for Implementation	
Responsible Organization / Department	EMD
Action / Project Staplee Score / Priority	High
Timeline for Completion	2-3 years
Potential Funding Source	local, state, federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	KEEP - Modify
Report on Progress	now have platform working on public awareness and enrollment

Action Worksheet	
Name of Jurisdiction	County of Moniteau
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	there currently is not warning of possible bridge flooding during flash flooding events
Action or Project	
Applicable Goal Statement	1
Action/Prj. #	**1**.1.4
Name of Action or Project	low water crossing signs
Action or Project Description	Post low-water crossing signsage throughout the county for hazardous low-water crossings. Provide warning to motoring public of flooded areas to prevent or mitigate motorists entering flood are.
Estimated Cost	$10,000 to $50,000
Benefits	I/C, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Moniteau County Road Department
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	local, state, federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	KEEP - Ongoing
Report on Progress	had to wait for the GIS program to be put in place now working through funding needs

Action Worksheet	
Name of Jurisdiction	County of Moniteau
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	currently do not have adequate facility to operate as an emergency operation center.
Action or Project	
Applicable Goal Statement	Goal 3 - Implement mitigation actions that improve the continuity of government and essential services from the adverse effects of disasters
Action/Prj. #	**1**.1.5
Name of Action or Project	Emergency Operation Center
Action or Project Description	Construct an addition to the current very small 911 center that will be the Emergency Operations Center that can operate in the event of a disaster.
Estimated Cost	Over $1,000,000
Benefits	LF, EMCC
Plan for Implementation	
Responsible Organization / Department	EMD
Action / Project Staplee Score / Priority	Medium
Timeline for Completion	3-5 years
Potential Funding Source	local, state and federal
Local Planning Mechanism to be Used	EOP, HMP
Action Status	
Status	New
Report on Progress	Not Started

Action Worksheet	
Name of Jurisdiction	County of Moniteau
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	Loss of life due to lack of warning
Action or Project	
Applicable Goal Statement	1
Action/Prj. #	**1**.1.6
Name of Action or Project	Weather Alert Radios
Action or Project Description	Assist in public notification for tornados or destructive thunderstorms. This is assists in notifying citizens while indoors and does not rely on cellular or internet service.
Estimated Cost	$10,000 to $50,000
Benefits	
Plan for Implementation	
Responsible Organization / Department	EMD / County Commission
Action / Project Staplee Score / Priority	Medium
Timeline for Completion	3-5 years
Potential Funding Source	
Local Planning Mechanism to be Used	
Action Status	
Status	New
Report on Progress	Not Started

California

Action Worksheet	
Name of Jurisdiction	California
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	Losses from flooding
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**1.1.1**
Name of Action or Project	NFIP Continued Compliance
Action or Project Description	Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping.
Estimated Cost	Little or no cost (<$10,000)
Benefits	Ensure future development is in a safe area.
Plan for Implementation	
Responsible Organization / Department	Floodplain Administrator
Action / Project Staplee Score / Priority	High
Timeline for Completion	Continued/2025
Potential Funding Source	City General revenue
Local Planning Mechanism to be Used	Floodplain ordinance
Action Status	
Status	In Progress
Report on Progress	Ongoing

Action Worksheet	
Name of Jurisdiction	City of California
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	roadways and property flooding
Action or Project	
Applicable Goal Statement	Goal 3
Action/Prj. #	**2.1.1**
Name of Action or Project	Stormwater management system
Action or Project Description	Improve development of Stormwater system to assist in localize flooding due to rain water runoff
Estimated Cost	$100,000 to $500,000
Benefits	I/C, PD, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Street Supervisor
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, State, Federal
Local Planning Mechanism to be Used	Stormwater management Plan, HMP
Action Status	
Status	KEEP - Modify
Report on Progress	Mid-MO Regional Planning Commission completed a storm water plan for California. There has not been movement on this issue other than regular maintenance due to funding restrictions. Updating verbiage from plan to the actual system

Action Worksheet	
Name of Jurisdiction	City of California
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorms
Problem Being Mitigated	power outages
Action or Project	
Applicable Goal Statement	Goal 2
Action/Prj. #	**2.1.2**
Name of Action or Project	Electrical Loop feed
Action or Project Description	Construct loop feed in electrical distribution system from generator to main infrastructures to mitigate extent of outages
Estimated Cost	$500,000 to $1,000,000
Benefits	I/C, PD, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Electric Supervisor
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, State, Federal
Local Planning Mechanism to be Used	EOP, HMP
Action Status	
Status	KEEP - Ongoing
Report on Progress	This project was started by California, but after bidding out the construction, the city found the cost to exceed their available resources. This is continuously under consideration, but until there are funds, it is not a financial priority of the city

Action Worksheet	
Name of Jurisdiction	City of California
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	outdoor hazard vulnerable to severe thunderstorms and tornadoes
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**2.1.3**
Name of Action or Project	Outdoor Sirens
Action or Project Description	Upgrade and add new early warning weather sirens throughout the jurisdiction.
Estimated Cost	$100,000 to $500,000
Benefits	I/C, PD, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Fire Chief/City Administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	EOP, HMP
Action Status	
Status	KEEP - Ongoing
Report on Progress	Sirens tested and maintained on an ongoing basis, 20+ years old

Jamestown

Action Worksheet	
Name of Jurisdiction	Jamestown
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	Losses from flooding
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**1.1.1**
Name of Action or Project	NFIP Continued Compliance
Action or Project Description	Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping.
Estimated Cost	Little or no cost (<$10,000)
Benefits	Ensure future development is in a safe area.
Plan for Implementation	
Responsible Organization / Department	Floodplain Administrator
Action / Project Staplee Score / Priority	High
Timeline for Completion	Continued/2025
Potential Funding Source	City General revenue
Local Planning Mechanism to be Used	Floodplain ordinance
Action Status	
Status	In Progress
Report on Progress	Ongoing

Action Worksheet	
Name of Jurisdiction	Jamestown
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	Losses from flooding
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**3.1.1**
Name of Action or Project	infrastructure flood protection
Action or Project Description	Seek funding to protect infrastructure from flood damage and loss of use through protective and capacity expansion means.
Estimated Cost	>$500,000
Benefits	I/C, PD, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Public Works
Action / Project Staplee Score / Priority	High
Timeline for Completion	Continued/2025
Potential Funding Source	City General revenue, HMGP, BRIC
Local Planning Mechanism to be Used	Floodplain ordinance
Action Status	
Status	In Progress
Report on Progress	Ongoing

Action Worksheet	
Name of Jurisdiction	Jamestown
Risk / Vulnerability	
Hazard(s) Addressed	Severe Winter Weather
Problem Being Mitigated	Loss of power to critical infrastructure during severe weather
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**1.1.2**
Name of Action or Project	Generator
Action or Project Description	Equip building with Generators for use in power outages to maintain government business
Estimated Cost	$50,000 to $100,000
Benefits	LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Jamestown Board of alderman
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local. State, Federal
Local Planning Mechanism to be Used	LEOP, HMP, comp plan
Action Status	
Status	New
Report on Progress	

Lupus

Action Worksheet	
Name of Jurisdiction	Lupus
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	Losses from flooding
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**1.1.1**
Name of Action or Project	NFIP Continued Compliance
Action or Project Description	Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping.
Estimated Cost	Little or no cost (<$10,000)
Benefits	Ensure future development is in a safe area.
Plan for Implementation	
Responsible Organization / Department	Floodplain Administrator
Action / Project Staplee Score / Priority	High
Timeline for Completion	Continued/2025
Potential Funding Source	City General revenue
Local Planning Mechanism to be Used	Floodplain ordinance
Action Status	
Status	In Progress
Report on Progress	Ongoing

Action Worksheet	
Name of Jurisdiction	Lupus
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	Early Warning
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**2.1.3**
Name of Action or Project	Outdoor warning siren
Action or Project Description	Upgrade early warning weather warning systems. Continue to implement the plan as resources become available
Estimated Cost	$50,000 to $100,000
Benefits	I/C, EMCC
Plan for Implementation	
Responsible Organization / Department	Lupus administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	local, Federal, State
Local Planning Mechanism to be Used	HMP
Action Status	
Status	KEEP - Modify
Report on Progress	Haven't had funds to complete this item. Would like to keep it moving forward.

Action Worksheet	
Name of Jurisdiction	Lupus
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	potential contamination of community water supply
Action or Project	
Applicable Goal Statement	Goal 2
Action/Prj. #	**5.1.1**
Name of Action or Project	Flood proofing wells
Action or Project Description	Flood proof 6 community shared well to two feet above the BFE of 563.
Estimated Cost	$50,000 to $100,000
Benefits	I/C, PD, LF
Plan for Implementation	
Responsible Organization / Department	Lupus public works
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, Federal, State
Local Planning Mechanism to be Used	Lupus flood Mitigation Assistance Basic Plan, HMP
Action Status	
Status	New
Report on Progress	Not started

Tipton

Action Worksheet	
Name of Jurisdiction	Tipton
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	Losses from flooding
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**1.1.1**
Name of Action or Project	NFIP Continued Compliance
Action or Project Description	Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping.
Estimated Cost	Little or no cost (<$10,000)
Benefits	Ensure future development is in a safe area.
Plan for Implementation	
Responsible Organization / Department	Floodplain Administrator
Action / Project Staplee Score / Priority	High
Timeline for Completion	Continued/2025
Potential Funding Source	City General revenue
Local Planning Mechanism to be Used	Floodplain ordinance
Action Status	
Status	In Progress
Report on Progress	Ongoing

Action Worksheet	
Name of Jurisdiction	City of Tipton
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	Provide public with warning in case of severe/disastrous weather
Action or Project	
Applicable Goal Statement	1
Action/Prj. #	**2.1.3**
Name of Action or Project	Outdoor warning siren
Action or Project Description	Replace siren and add additional siren(s) for city of Tipton
Estimated Cost	$50,000 to $100,000
Benefits	I/C, PD, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	City of Tipton, EMA
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local, State, Federal
Local Planning Mechanism to be Used	LEOP, HMP
Action Status	
Status	New
Report on Progress	Not Started

Action Worksheet	
Name of Jurisdiction	City of Tipton
Risk / Vulnerability	
Hazard(s) Addressed	Severe Winter Weather
Problem Being Mitigated	Loss of power to critical infrastructure during severe weather
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**1.1.2**
Name of Action or Project	Generator
Action or Project Description	Equip building with Generators for use in power outages to maintain government business
Estimated Cost	$50,000 to $100,000
Benefits	LF, EMCC
Plan for Implementation	
Responsible Organization / Department	City of Tipton administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local. State, Federal
Local Planning Mechanism to be Used	LEOP, HMP
Action Status	
Status	New
Report on Progress	

Action Worksheet	
Name of Jurisdiction	City of Tipton
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	Flooding of Critical Infrastructure
Action or Project	
Applicable Goal Statement	2
Action/Prj. #	**6.1.1**
Name of Action or Project	Waste Water Treatment Plant Protection
Action or Project Description	To lessen the effects of flooding, the property would need to be diked
Estimated Cost	$500,000 to $1,000,000
Benefits	I/C, PD, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	City of Tipton, Waste Water Treatment plant
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, State, Federal
Local Planning Mechanism to be Used	LEOP, HMP
Action Status	
Status	KEEP - Ongoing
Report on Progress	Have not had the funding opportunity to work on this

Clarksburg C-II

Action Worksheet	
Name of Jurisdiction	Clarksburg C2 School District
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorm
Problem Being Mitigated	Lack of the ability to communicate during severe weather.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.1**
Name of Action or Project	Two Way Radio
Action or Project Description	Acquire Two-way Radio to Improve Communication
Estimated Cost	$50,000 to $100,000
Benefits	IC, LF,EMCC
Plan for Implementation	
Responsible Organization / Department	Clarksburg C2 School Board
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	KEEP - Modify
Report on Progress	Ongoing due to lack of funding. Modifying to meet new guidance material

Action Worksheet	
Name of Jurisdiction	Clarksburg C2 School District
Risk / Vulnerability	
Hazard(s) Addressed	Tornado
Problem Being Mitigated	Lack of appropriate safety structure.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.2**
Name of Action or Project	Tornado Safe Room
Action or Project Description	Build Tornado Saferoom
Estimated Cost	Over $1,000,000
Benefits	IC, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Clarksburg C2 School Board/administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	KEEP - Ongoing
Report on Progress	In application process for a hazard mitigation grant

Action Worksheet	
Name of Jurisdiction	Clarksburg C2 School District
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorms
Problem Being Mitigated	inadequate system of internal communication during threat of event
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.3**
Name of Action or Project	sound/phone system
Action or Project Description	The current system does not offer a safe way to communicate with staff in other rooms or building to building. The new system offers fiberoptic communication that allows for staff to office communication as well as sound alerts and/or silent alerts.
Estimated Cost	$100,000 to $500,000
Benefits	safer school facility, life preservation
Plan for Implementation	
Responsible Organization / Department	Administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	local, state, federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	New
Report on Progress	

Action Worksheet	
Name of Jurisdiction	Clarksburg C2 School District
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorms
Problem Being Mitigated	lack of ability to resume as quickly as possible after emergency
Action or Project	
Applicable Goal Statement	Goal 2
Action/Prj. #	**7.1.4**
Name of Action or Project	COOP plan
Action or Project Description	The school district will develop an emergency plan to ensure regular activities resume after an emergency as quickly as possible.
Estimated Cost	Less than $10,000
Benefits	Minimize loss of life, damages, resume activities quickly.
Plan for Implementation	
Responsible Organization / Department	Administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	local, State, Federal
Local Planning Mechanism to be Used	HMP, COOP
Action Status	
Status	New
Report on Progress	

Hight Point R-III

Action Worksheet	
Name of Jurisdiction	High Point R-III School District
Risk / Vulnerability	
Hazard(s) Addressed	Tornado
Problem Being Mitigated	Lack of appropriate safety structure.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.2**
Name of Action or Project	Tornado Safe Room
Action or Project Description	Build Tornado Saferoom
Estimated Cost	Over $1,000,000
Benefits	IC, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	High Point R-III School Board
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	KEEP - Ongoing
Report on Progress	In application process for a hazard mitigation grant

Action Worksheet	
Name of Jurisdiction	High Point R-3
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	Loss of life or injuries to students and faculty.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.1**
Name of Action or Project	radios
Action or Project Description	Acquire and maintain radio system for the school. We currently have some radios but many are getting old and will need replaced.
Estimated Cost	Less than $10,000
Benefits	The benefit of this project is to allow easy communication to all in the school. This will allow early warning for all types of emergency situations.
Plan for Implementation	
Responsible Organization / Department	HIgh Point R-3 administration FEMA
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local funding
Local Planning Mechanism to be Used	
Action Status	
Status	KEEP - Modify
Report on Progress	Radios are located in all our rooms at High Point. The initial action was to include all Moniteau County schools, but we are now just making sure our school is taken care of.

Jamestown C-I

Action Worksheet	
Name of Jurisdiction	Jamestown C-I School District
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorm
Problem Being Mitigated	Lack of the ability to communicate during severe weather.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.1**
Name of Action or Project	Two Way Radio
Action or Project Description	Acquire Two-way Radio to Improve Communication
Estimated Cost	$50,000 to $100,000
Benefits	IC, LF,EMCC
Plan for Implementation	
Responsible Organization / Department	Jamestown C-I administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	KEEP - Modify
Report on Progress	Ongoing due to lack of funding. Modifying to meet new guidance material

Action Worksheet	
Name of Jurisdiction	Jamestown C-I School District
Risk / Vulnerability	
Hazard(s) Addressed	Tornado
Problem Being Mitigated	Lack of appropriate safety structure.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.2**
Name of Action or Project	Tornado Safe Room
Action or Project Description	Build Tornado Saferoom
Estimated Cost	Over $1,000,000
Benefits	IC, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Jamestown C-I School Board
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	New
Report on Progress	Not Started

Moniteau Co. R-I

Action Worksheet	
Name of Jurisdiction	Moniteau Co. R-I School District
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorm
Problem Being Mitigated	Lack of the ability to communicate during severe weather.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.1**
Name of Action or Project	Two Way Radio
Action or Project Description	Acquire Two-way Radio to Improve Communication
Estimated Cost	$50,000 to $100,000
Benefits	IC, LF,EMCC
Plan for Implementation	
Responsible Organization / Department	School Personnel, Administration, School Board
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP, Communication Policy
Action Status	
Status	KEEP - Modify
Report on Progress	Ongoing due to lack of funding. Modifying to meet new guidance material

Action Worksheet	
Name of Jurisdiction	Moniteau Co. R-I School District
Risk / Vulnerability	
Hazard(s) Addressed	Tornado
Problem Being Mitigated	Lack of appropriate safety structure.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.2**
Name of Action or Project	Tornado Safe Room
Action or Project Description	Build Tornado Saferoom
Estimated Cost	Over $1,000,000
Benefits	IC, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP, Board of Education, LEOP
Action Status	
Status	New
Report on Progress	Not Started

Moniteau Co. R-V

Action Worksheet	
Name of Jurisdiction	Moniteau Co. R-V School District
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorm
Problem Being Mitigated	Lack of the ability to communicate during severe weather.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.1**
Name of Action or Project	Two Way Radio
Action or Project Description	Acquire Two-way Radio to Improve Communication
Estimated Cost	$50,000 to $100,000
Benefits	IC, LF,EMCC
Plan for Implementation	
Responsible Organization / Department	School Personnel, Administration, School Board
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP, Communication Policy
Action Status	
Status	KEEP - Modify
Report on Progress	Ongoing due to lack of funding. Modifying to meet new guidance material

Tipton. R-VI

Action Worksheet	
Name of Jurisdiction	Tipton R-VI School District
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	Communication equipment and training gaps
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**12.1.1**
Name of Action or Project	Update Emergency Communications
Action or Project Description	Provide training, venues for input, practice and procedures for use of new notification system
Estimated Cost	Less than $10,000
Benefits	quicker response time and coordination of emergency efforts
Plan for Implementation	
Responsible Organization / Department	Tipton R-VI School Administration Team
Action / Project Staplee Score / Priority	high
Timeline for Completion	1 year
Potential Funding Source	Bond issue passed in 2021, local funds
Local Planning Mechanism to be Used	Feedback from faculty and staff, faculty meetings, administrative meetings and board meetings
Action Status	
Status	KEEP - Not Started
Report on Progress	

Action Worksheet	
Name of Jurisdiction	Tipton R-VI School District
Risk / Vulnerability	
Hazard(s) Addressed	Tornado
Problem Being Mitigated	Lack of appropriate safety structure.
Action or Project	
Applicable Goal Statement	Goal 1
Action/Prj. #	**7.1.2**
Name of Action or Project	Tornado Safe Room
Action or Project Description	Build Tornado Saferoom
Estimated Cost	Over $1,000,000
Benefits	IC, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	Administration
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	Local, State and Federal
Local Planning Mechanism to be Used	HMP, Board of Education, LEOP
Action Status	
Status	New
Report on Progress	Not Started

911 Dispatching District

Action Worksheet	
Name of Jurisdiction	Moniteau 911
Risk / Vulnerability	
Hazard(s) Addressed	Tornadoes
Problem Being Mitigated	911 center not functioning to current standards. Not enough space to handle current call load
Action or Project	
Applicable Goal Statement	Goal 2 - Implement mitigation actions that improve the continuity of government and essential services from the adverse effects of disasters
Action/Prj. #	**13.1.1**
Name of Action or Project	911 Center
Action or Project Description	Building a new 911 center as the old is small and outdated not functioning to the needed capability. Ensuring resilient 911center that can operate in the event of a disaster.
Estimated Cost	Over $1,000,000
Benefits	I/C, PD, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	911 Director
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	local, state, federal
Local Planning Mechanism to be Used	EOP, HMP
Action Status	
Status	New
Report on Progress	

Action Worksheet	
Name of Jurisdiction	Moniteau 911
Risk / Vulnerability	
Hazard(s) Addressed	Flooding (Riverine and Flash)
Problem Being Mitigated	Flooding of low water bridges delays emergency response
Action or Project	
Applicable Goal Statement	1
Action/Prj. #	**13.1.2**
Name of Action or Project	GIS mapping of critical infrastructure
Action or Project Description	Identification and planning purposes to easily identify low water crossings. This would also provide quick reference in the event of a disaster to compare location of infrastructure as it coincides with disaster areas. Rerouting emergency vehicles during flooding events to prevent loss of life.
Estimated Cost	$10,000 to $50,000
Benefits	I/C, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	911 GIS / Moniteau Road Dept / Moniteau Assessors Office
Action / Project Staplee Score / Priority	High
Timeline for Completion	2-3 years
Potential Funding Source	local, state, federal
Local Planning Mechanism to be Used	EOP, HMP
Action Status	
Status	New
Report on Progress	

California Fire Protection District

Action Worksheet	
Name of Jurisdiction	California FPD
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorms
Problem Being Mitigated	power outage
Action or Project	
Applicable Goal Statement	Goal 2
Action/Prj. #	**1.1.2**
Name of Action or Project	Generator
Action or Project Description	we are a fire department that needs to function properly during power outages. A generator will ensure continuity of operations
Estimated Cost	$100,000 to $500,000
Benefits	LF
Plan for Implementation	
Responsible Organization / Department	California RFD board
Action / Project Staplee Score / Priority	High
Timeline for Completion	More than 5 years
Potential Funding Source	Local, State, Federal
Local Planning Mechanism to be Used	EOP, HMP
Action Status	
Status	New
Report on Progress	

Action Worksheet	
Name of Jurisdiction	California FPD
Risk / Vulnerability	
Hazard(s) Addressed	Wildfire
Problem Being Mitigated	planning mechanisms to prevent wildfires
Action or Project	
Applicable Goal Statement	Goal 3
Action/Prj. #	**14.1.1**
Name of Action or Project	Community Wildfire Protection Plan
Action or Project Description	to hire a plan writer and create a community wildfire protection plan and joining the Firewise Communities program through national wildlife coordinating group
Estimated Cost	Less than $10,000
Benefits	I/C, PD, LF, EMCC
Plan for Implementation	
Responsible Organization / Department	California RFD chief
Action / Project Staplee Score / Priority	HIGH
Timeline for Completion	3-5 years
Potential Funding Source	Local, State, Federal
Local Planning Mechanism to be Used	EOP, HMP
Action Status	
Status	New
Report on Progress	

Tipton Rural Fire Protection District

Action Worksheet	
Name of Jurisdiction	Tipton RFPD
Risk / Vulnerability	
Hazard(s) Addressed	Severe Thunderstorms
Problem Being Mitigated	loss of life due to storms
Action or Project	
Applicable Goal Statement	1
Action/Prj. #	**1.1.6**
Name of Action or Project	Weather Radios
Action or Project Description	would like to work toward getting weather radios for the residence of the jurisdiction to aware them of severe threats as they come about, even more so with national weather services raising their criteria for severe thunderstorms
Estimated Cost	$10,000 to $50,000
Benefits	I/C, EMCC
Plan for Implementation	
Responsible Organization / Department	Tipton RFD board
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	local, state, and federal
Local Planning Mechanism to be Used	HMP
Action Status	
Status	New
Report on Progress	

Action Worksheet	
Name of Jurisdiction	Tipton RFPD
Risk / Vulnerability	
Hazard(s) Addressed	Wildfire
Problem Being Mitigated	loss of property
Action or Project	
Applicable Goal Statement	3
Action/Prj. #	**16.1.1**
Name of Action or Project	Turbodraft
Action or Project Description	this item would be utilized to prevent the loss of property due to wildfires
Estimated Cost	Less than $10,000
Benefits	I/C, LD, EMCC
Plan for Implementation	
Responsible Organization / Department	Tipton RFD board
Action / Project Staplee Score / Priority	High
Timeline for Completion	3-5 years
Potential Funding Source	local, state, and federal
Local Planning Mechanism to be Used	EOP, HMP
Action Status	
Status	New
Report on Progress	

Table 4.4 Mitigation Action Matrix

#	Action	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
	Prevention Public Education						
2.1.3	Upgrade Warning Sirens	H	1	T, TS	X	X	
1.1.6	Purchase Weather Radios	H	1	T, TS, FL	X	X	
7.1.3	Phone/PA System Upgrade	H	1	TS, T	X	X	
1.1.3	Public Education/Participation in Alert System	H	1	All	X	X	
7.1.1	Two-Way Radios	H	1	All	X		
	Structure and Infrastructure Projects						
7.1.2	Build Safe Rooms	**H**	1	T,TS	X	X	
1.1.4	Low Water Crossing Sign	**H**	1	FL	X		
2.1.2	Electrical Loop Feed	**H**	2	T, TS, WW	X		
3.1.1	Infrastructure Flood Protection	**H**	2	FL	X		X
5.1.1	Flood Proofing Wells	**H**	2	FL	X		X
6.1.1	Waste Water Treatment Plant Protection	**H**	2	FL	X		X
13.1.2	GIS mapping of critical infrastructure	**H**	1	All	X		
	Natural Systems Protection						
1.1.1	Enforce NFIP	H	2	FL	X	X	X
2.1.1	Upgrade Stormwater System	**H**	3	FL	X	X	X
16.1.1	Turbodraft	**H**	3	WF	X	X	
	Emergency Services						
1.1.2	Backup Generators	**H**	3	WW, T, TS	X	X	

1.1.5	Construct Emergency Operation Center	**M**	2	All	X	X	
13.1.1	Construct new 911 Center	**H**	2	All	X	X	
14.1.1	Community Wildfire Protection Plan	**H**	3	WF	X	X	
	Education and Outreach						
7.1.4	School COOP Plans	H	2	All	X	X	
12.1.1	Provide training on notification systems	**H**	1	All	X	X	

Chapter 5: PLAN MAINTENANCE PROCESS

CHAPTER 5: PLAN MAINTENANCE PROCESS

This chapter provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

5.1 Monitoring, Evaluating, and Updating the Plan

44 CFR Requirement 201.6(c)(4): 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.

5.1.1 Responsibility for Plan Maintenance

The Moniteau County Hazard Mitigation Plan will be monitored and evaluated on a yearly basis following its approval and adoption. These evaluations will begin approximately one year after the final approval of the plan and continue until the next 5-yearupdate begins.

The monitoring and evaluation with be facilitated through the Mid-MO Regional Planning Commission. It will consist of the following:

1. A meeting of the Hazard Mitigation Planning Committee convened by planners at the Mid- MO Regional Planning Commission to discuss any general hazard mitigation issues

2. A survey emailed to all participating jurisdictions on such topics as changes/developments in the jurisdictions and implementation of mitigation actions.

3. A yearly addendum to the plan summarizing information from the planning meeting and the Surveys

4. Entry of any direct changes to the plan in the “Log of Changes Made to the Plan following Approval”

5.1.2 Plan Maintenance Schedule

The MPC agrees to meet annually or after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. The Moniteau County Emergency Management Director will be responsible for initiating the plan reviews and will invite members of the MPC to the meeting.

In coordination with all participating jurisdictions, the Emergency Management Director will be responsible for initiating a five-year written update of the plan to be submitted to the Missouri State Emergency Management Agency (SEMA) and FEMA Region VII per Requirement

§201.6(c)(4)(i) of the Disaster Mitigation Act of 2000, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

5.1.3 Plan Maintenance Process

Progress on the proposed actions can be monitored by evaluating changes in vulnerabilities identified in the plan. The MPC during the annual meeting should review changes in vulnerability identified as follows:

- Decreased vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions,
- Increased vulnerability due to hazard events, and/or
- Increased vulnerability as a result of new development (and/or annexation).

Future 5-year updates to this plan will include the following activities:

- Consideration of changes in vulnerability due to action implementation,
- Documentation of success stories where mitigation efforts have proven effective,
- Documentation of unsuccessful mitigation actions and why the actions were not effective,
- Documentation of previously overlooked hazard events that may have occurred since the previous plan approval,
- Incorporation of new data or studies with information on hazard risks,
- Incorporation of new capabilities or changes in capabilities,
- Incorporation of growth data and changes to inventories, and
- Incorporation of ideas for new actions and changes in action prioritization.

In order to best evaluate any changes in vulnerability as a result of plan implementation, the participating jurisdictions will adopt the following process:

- Each proposed action in the plan identified an individual, office, or agency responsible for action implementation. This entity will track and report on an annual basis to the jurisdictional MPC member on action status. The entity will provide input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing risk.
- If the action does not meet identified objectives, the jurisdictional MPC member will determine necessary remedial action, making any required modifications to the plan.

Changes will be made to the plan to remedy actions that have failed or are not considered feasible. Feasibility will be determined after a review of action consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring of this plan. Updating of the plan will be accomplished by written changes and submissions, as the MPC deems appropriate and necessary. Changes will be approved by the Moniteau County Commission and the governing boards of the other participating jurisdictions.

5.2: Incorporation into Existing Planning Mechanisms

44 CFR 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 comprehensive or capital improvement plans, when appropriate.

Where possible, plan participants, including school and special districts, will use existing plans and/or programs to implement hazard mitigation actions. Based on the capability assessments of the participating jurisdictions, communities in Moniteau County will continue to plan and implement programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implem enting actions, where possible, through the following plans:

- Ordinances of participating jurisdictions;
- Moniteau County Emergency Operations Plan;
- Capital improvement plans and budgets;
- Other community plans within the County, such as water conservation plans, storm water management plans, and parks and recreation plans;
- School and Special District Plans and budgets; and
- Other plans and policies outlined in the capability assessment sections for each jurisdiction in Chapter 2 of this plan.

The MPC members involved in updating these existing planning mechanisms will be responsible for integrating the findings and actions of the mitigation plan, as appropriate. The MPC is also re sponsible for monitoring this integration and incorporation of the appropriate information into the five-year update of the multi-jurisdictional hazard mitigation plan.

Additionally, after the annual review of the Hazard Mitigation Plan, the Moniteau County Emergeny Management Director will provide the updated Mitigation Strategy with current status of each mitigation action to the County (Boards of Supervisors or Commissions) as well as all Mayors, City Clerks, and School District Superintendents. The Emergency Manager Director will request that the mitigation strategy be incorporated, where appropriate, in other planning mechanisms.

Table 5.1 below lists the planning mechanisms by jurisdiction into which the Hazard Mitigation Plan will be integrated.

Table 5.1 Planning Mechanisms Identified for Integration of Hazard Mitigation Plan

Jurisdiction	Planning Mechanisms	Integration Process for Previous Plan	Integration Process for Current Plan
Moniteau County	County Emergency Operations Plan, Comprehensive Economic Development	Attended transportation meetings about road flooding. Annual budget process. Floodplain	Annual budget process.

	Strategy, Zoning ordinances	ordinances, building codes	
California	Comprehensive Plan, Transportation Improvement Plan, Emergency Operations Plan, Comprehensive Economic Development Strategy	Attended transportation meetings. Annual budget process. Floodplain ordinances, building codes	Comprehensive Plan update, annual budget process,
Clarksburg	Regional Transportation Plan	Annual Budget Process	Annual Budget process, capital improvement process
Jamestown	Regional Transportation Plan, zoning ordinances	Annual budget process, zoning ordinances	Annual Budget process, Capital Improvement Process
Lupus	Regional Transportation Plan, zoning ordinances	Annual budget process, building codes	Annual Budget process, Capital Improvement Process
Tipton	Comprehensive Plan, Zoning ordinances, Regional Transportation Plan	Attended transportation meetings about road flooding. Annual budget process	Comprehensive plan update, annual budget process
Clarksburg School District	Clarksburg SD Planning committee & board of education	Annual Budget process, updated policy, system testing	Attended meetings. Safety committee annual budget meeting, building policy updates, staff training
High Point School District	High Point SD Planning Committee & Board of Education	Annual Budget process, updated policy, system testing	Attended 1 meeting. Safety committee annual budget meeting, building policy updates, staff training
Jamestown School District	Jamestown Planning Committee & Board of Education	Policy updated, staff training, notification system upgrade	Attended 1 meeting. Long-Range Plan update.
Moniteau Co. R-I	Moniteau R-I Planning Committee & Board of Education	Policy updated, staff training, notification system upgrade	Attended 1 meeting Long-Range Plan update
Moniteau Co. R-V	Moniteau R-V planning committee & Board of Education	Policy updated, staff training, notification system upgrade	Safety committee annual budget meeting, building policy updates, staff training
Tipton R-VI	Tipton SD Planning Committee & Board of Education	Updated policy, notification system upgrade	Phone/Email meeting. PHSD Planning Committee &

			Planning/Facilities Documents
Tipton Rural FPD	Standard Operating Procedures, HMP, EOP	Did not participate	Standard Operating Procedure update, EOP, Fire Board, Annual Budget Review
California RFPD	Standard Operating Procedures, HMP, EOP	Did not participate	Standard Operating Procedure update, EOP, Fire Board, Annual Budget Review
911 Dispatch District	Operating Procedure, facilities plan	Did not participate	Facilities plan, oversight board

5.3: Continued Public Involvement

44 CFR 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.

The hazard mitigation plan update process provides an opportunity to publicize success stories resulting from the plan's implementation and seek additional public comment. Information about the annual reviews will be posted on the Moniteau County website following each annual review of the mitigation plan and will solicit comments from the public based on the annual review. When the MPC reconvenes for the five-year update, it will coordinate with all stakeholders participating in the planning process. Included in this group will be those who joined the MPC after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be actively solicited, at a minimum, through available website postings and press releases to local media outlets, primarily newspapers.

Appendix A: Resolutions

MONITEAU COUNTY, Missouri

RESOLUTION NO. 2022-04

A RESOLUTION OF THE MONITEAU COUNTY ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION *PLAN*

WHEREAS the Moniteau County recognizes the threat that natural hazards pose to people and property within the Moniteau County and

WHEREAS the Moniteau County has participated in the preparation of a multi- hazard mitigation plan, hereby known as the Moniteau County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Moniteau County from the impacts of future hazards and disasters; and

WHEREAS the Moniteau County recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the Moniteau County will endeavor to integrate the *Plan* into the comprehensive planning process and

WHEREAS adoption by the Moniteau County demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*

NOW THEREFORE, BE IT RESOLVED BY THE MONITEU COUNTY, in the State of Missouri, THAT:

In accordance with Moniteau County Commissioners, the Moniteau County adopts the final FEMA-*approved plan*.

ADOPTED by a vote of 2 in favor and 0 against, and 0 abstaining, this 12th day of April, 2022.

By (Sig): Mac Finley

Print name: Mac Finley Moniteau County Commissioner

ATTEST:

By (Sig.): Roberta E Elliott County Clerk

Print name: Roberta Elliott

RESOLUTION NO. 2022-054

A RESOLUTION OF THE CITY OF CALIFORNIA, MISSOURI ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS the City of California, Missouri recognizes the threat that natural hazards pose to people and property within the City of California, Missouri; and

WHEREAS the City of California, Missouri has participated in the preparation of a multi-hazard mitigation plan, hereby known as the Moniteau County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the Plan, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of California, Missouri from the impacts of future hazards and disasters; and

WHEREAS the City of California, Missouri recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the City of California, Missouri will endeavor to integrate the Plan into the comprehensive planning process and

WHEREAS adoption by the City of California, Missouri demonstrates their commitment to hazard mitigation and achieving the goals outlined in the Plan

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF ALDERMEN OF THE CITY OF CALIFORNIA, MISSOURI, in the State of Missouri, THAT:

In accordance with Missouri law and the ordinances of the City, The City of California, Missouri adopts the final FEMA-approved plan.

ADOPTED by a vote of 6 in favor and 0 against, and 0 abstaining, this 7th day of March, 2022

By: Richard G Green

Richard G. Green, Mayor, City of California, Missouri

ATTEST:

By (Sig.): Sandra S. Ratcliff

Print name: Sandra S. Ratcliff

APPROVED AS TO FORM:

By (Sig.): A M Perry City Attorney

CITY OF JAMESTOWN, MISSOURI

RESOLUTION NO. 3-07-22-A

A RESOLUTION OF THE CITY OF JAMESTOWN, MISSOURI ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS the City of Jamestown, Missouri recognizes the threat that natural hazards pose to people and property within the City of Jamestown, Missouri; and

WHEREAS the City of Jamestown, Missouri has participated in the preparation of a multi-hazard mitigation plan, hereby known as the Moniteau County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Jamestown, Missouri from the impacts of future hazards and disasters; and

WHEREAS the City of Jamestown, Missouri recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the City of Jamestown, Missouri will endeavor to integrate the *Plan* into the comprehensive planning process and

WHEREAS adoption by the City of Jamestown demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF JAMESTOWN in the State of Missouri, THAT:

In accordance with the approval by the City Council, the City of Jamestown, Missouri adopts the final FEMA-*approved plan*.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 7th day of March, 2022

By (Sig): [signature]
Print name: James Russell

ATTEST:
By (Sig.): [signature]
Print name: NANCY McCARTY

APPROVED AS TO FORM:
By (Sig.): [signature]
Print name: Charissa Mayes

Village of Lupus, Missouri

RESOLUTION NO. 2022-1

A RESOLUTION OF THE VILLAGE OF LUPUS ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION *PLAN*

WHEREAS the Village of Lupus recognizes the threat that natural hazards pose to people and property within the (*local governing body/school district*); and

WHEREAS the Village of Lupus has participated in the preparation of a multi- hazard mitigation plan, hereby known as the Moniteau County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Village of Lupus from the impacts of future hazards and disasters; and

WHEREAS the Village of Lupus recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the Village of Lupus will endeavor to integrate the *Plan* into the comprehensive planning process and

WHEREAS adoption by the Village of Lupus demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*

NOW THEREFORE, BE IT RESOLVED BY THE VILLAGE OF LUPUS, in the State of Missouri, THAT:

In accordance with Resolution 2022-1, the Village of Lupus adopts the final FEMA-*approved plan*.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, this 14th day of March, 2022.

By (Sig): _____

Print name: Sue Denny

ATTEST:

By (Sig.): _____

Print name: James Christie

APPROVED AS TO FORM:

By (Sig.): _____

Print name: Andrew Karte

RESOLUTION 22-02

A RESOLUTION OF THE CITY OF TIPTON, MISSOURI ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN.

WHEREAS, the City of Tipton recognizes the threat that natural hazards pose to people and property within the city; and

WHEREAS, the City of Tipton has participated in the preparation of a multi-hazard mitigation plan, hereby known as the Moniteau County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the "Plan", in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City from the impacts of future hazards and disasters; and

WHEREAS, the City recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the City will endeavor to integrate the Plan into the comprehensive planning process; and

WHEREAS, adoption by the City demonstrates their commitment to hazard mitigation and achieving the goals outlined in the Plan.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TIPTON, MISSOURI, AS FOLLOWS: the City Council hereby adopts the final Moniteau County Hazard Multi-Jurisdictional Mitigation Plan approved by FEMA.

Adopted this 7th day of March 2022.

Joe Lutz, Mayor

ATTEST:

Jennifer Schmidt, City Clerk

Home of the Bulldogs!

Clarksburg CII School District
401 South Highway H
Clarksburg MO 65025

Nathan Bestgen Superintendent

To Whom IT May Concern:

The Moniteau County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F.R.201.6.

Clarksburg C-2 School District has participated in the preparation of, and reviewed, the Moniteau County Natural Hazard Mitigation Plan.

Clarksburg C2 School District adopts the Moniteau County Natural Hazard Mitigation Plan as the jurisdiction's Hazard Plan and resolves to execute the actions in the plan.

Sincerely,

Nathan Bestgen

Mr. Nathan Bestgen,
Superintendent
3/21/22

Phone: 573-787-3511
Fax: 573-787-3667
E-mail:
nbestgen@Clarksburg.k12.mo.us

County of Moniteau
High Point R-III School District

60909 Highway C, PO Box 34, High Point, MO 65042
Phone (660) 489-2213 Fax (660) 489-2412

David Franks, Superintendent
Yolanda Fisher, Secretary to the Superintendent

Nicole Hallford, Board President
Will Wright, Board Vice President

April 5, 2022

To Whom It May Concern:

The Moniteau County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F. R. 201.6.

The High Point R-3 School District has participated in the preparation of this Moniteau County Natural Mitigation Plan.

The High Point R-3 School District officially adopts the Moniteau County Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the Plan.

Sincerely,

David Franks

David Franks, Superintendent
High Point R-3 School District

California R-1 Schools

REORGANIZED SCHOOL DISTRICT NO. 1
OF MONITEAU COUNTY
211 S. Owen Street, Suite B
California, MO 65018
Phone 573-796-2145
Fax 573-796-6123

March 8, 2022

To Whom It May Concern:

The Moniteau County Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with the Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. 201.6.

Moniteau County R-I School District has participated in the preparation of, and reviewed, the Moniteau County Hazard Mitigation Plan.

Moniteau County R-I School District adopts the Moniteau County Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the Plan.

Sincerely,

Dwight Sanders, Superintendent
Moniteau County R-I Schools (California)

"EQUIPPING TODAY'S CHILDREN FOR TOMORROW'S CHALLENGES"
AN EQUAL OPPORTUNITY EMPLOYER

California Elementary School
101 S. Owen St.
California, MO 65018
(573)796-2161
Fax (573) 796-8650

California Middle School
211 S. Owen St.
California, MO 65018
(573)796-2146
Fax (573) 796-8257

California High School
1501 W. Buchanan
California, MO 65018
(573)796-4911
Fax (573) 796-4503

Superintendent's Office
211 S. Owen St., Ste. B
California, MO 65018
(573)796-2145
Fax (573) 796-6123

Jamestown C-1 School District, Missouri RESOLUTION

A RESOLUTION OF THE *Jamestown C-1 School District* ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS the *Jamestown C-1 School District* recognizes the threat that natural hazards pose to people and property within the *Jamestown C-1 School District*; and

WHEREAS the *Jamestown C-1 School District* has participated in the preparation of a multi- hazard mitigation plan, hereby known as the Moniteau County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan,* in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the *Jamestown C-1 School District* from the impacts of future hazards and disasters; and

WHEREAS the *Jamestown C-1 School District* recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the *Jamestown C-1 School District* will endeavor to integrate the *Plan* into the comprehensive planning process and

WHEREAS adoption by the *Jamestown C-1 School District* demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*

NOW THEREFORE, BE IT RESOLVED BY THE *Jamestown C-1 School District* in the State of Missouri, THAT:

In accordance with 44 C.F.R. 201.6, the *Jamestown C-1 School District*, the final FEMA-approved plan.

ADOPTED by a vote of 6 in favor and 0 against, and 0 abstaining, this 10th day of March, 2022.

By (Sig): Gretchen Guitard

Print name: Gretchen Guitard

LATHAM ELEMENTARY

Phone: 660-458-6271
Fax: 660-458-6604
jhoecker@lathambraves.com
Principal: Jordan Hoecker

PO Box 367
156 School Street
Latham MO 65050

March 15, 2022

To whom it may concern:

The Moniteau County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44.C.F.R.21.6.

The Moniteau County R-V School District has participated in the preparation of, and reviews, the Moniteau County Natural Hazard Mitigation Plan.

The Moniteau County R-V School District adopts the Moniteau County Natural Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the plan.

Jordan Hoecker
Superintendent
#ALWAYSBRAVE

Resolution 3/16/2021: Adoption of the Moniteau County, Missouri Multi-Jurisdictional Local Hazard Mitigation Plan

Whereas, the **Tipton R-VI School District** is seeking FEMA approval of a hazard mitigation plan and recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

Whereas, an adopted Moniteau County, Missouri Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre-and post-disaster mitigation grant programs; And

Whereas, the **Tipton R-VI School District** fully participated in the hazard mitigation planning process to prepare this Moniteau County, Missouri Multi-Jurisdictional Local Hazard Mitigation Plan; and

Whereas, the Missouri State Emergency Management Agency and the Federal Emergency Management Agency Region VII officials will review the "Moniteau County, Missouri Multi-Jurisdictional Local Hazard Mitigation Plan," and approved it as to form and content; and

Whereas, the **Tipton R-VI School District** desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Moniteau County, Missouri Multi-Jurisdictional Local Hazard Mitigation Plan; and

Whereas, adoption by the governing body for the **Tipton R-VI School District** demonstrates the jurisdictions' commitment to fulfilling the mitigation goals outlined in this Moniteau County, Missouri Multi-Jurisdictional Local Hazard Mitigation Plan; and

Whereas, adoption of this legitimizes the plan and authorizes responsible agencies to carry out responsibilities under the plan;

Now, therefore, be it resolved, that the Tipton R-VI School District has
The "Moniteau County, Missouri Multi-Jurisdictional Local Hazard Mitigation Plan" was adopted as an official plan.

APPROVAL

Resolution 3/16/2022: Adoption of the Moniteau County, Missouri Multi-Jurisdictional Local Hazard Mitigation Plan

Date: 3/16/2022

In accordance with Tipton R-VI School District Board Policy, the **Tipton R-VI School Board** adopts the final FEMA-*approved plan*.

ADOPTED by a vote of 7 in favor and 0 against, and 0 abstaining, this 16th day of March 16, 2022.

By (Sig): _____

Print name: Mr. Clint Miller - Board President

By (Sig): _____

Print name: Dr. Terry Robinson - Superintendent

ATTEST:

By (Sig.): Leslie Rumans

Print name: Ms. Leslie Rumans - Board Secretary

California Rural Fire Protection District, Missouri
RESOLUTION NO.

A RESOLUTION OF THE California Rural Fire Protection District ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION Plan

WHEREAS the California Rural Fire Protection District recognizes the threat that natural hazards pose to people and property within the California Rural Fire Protection District; and
WHEREAS the California Rural Fire Protection District has participated in the preparation of the multi-hazard mitigation plan, hereby known as the Moniteau County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the Plan, in accordance with the disaster Mitigation Act of 2000; and

WHEREAS the Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the California Rural Fire Protection District from the impacts of future hazards and disasters; and

WHEREAS the California Rural Fire Protection District recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the California Rural Fire Protection District will endeavor to integrate the Plan into the comprehensive planning process and

WHEREAS adoption by the California Rural Fire Protection District demonstrates their commitment to hazard mitigation and achieving the goals outline in the Plan.

NOW THEREFORE, BE IT RESOLVED BY THE California Rural Fire Protection District, in the State of Missouri, THAT:
In accordance with California Rural Fire Protection District, the California Rural Fire Protection District adopts the final FEMA-approved plan.

ADOPTED by a vote of 4 in favor and 0 against, and abstaining, this 6 day of April, 2022.

By (sig): Craig Ash Print name: Craig Ash
ATTEST:

By (sig): Shelly Hampton Print name: Shelly Hampton
APPROVED AS TO FORM:

By (sig): Craig Ash Print name: Craig Ash

RESOLUTION 22-01

A RESOLUTION OF THE TIPTON RURAL FIRE PROTECTION DISTRICT, MISSOURI ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN.

WHEREAS, the Tipton Rural Fire Protection District recognizes the threat that natural hazards pose to people and property within the city; and

WHEREAS, the Tipton Rural Fire Protection District has participated in the preparation of a multi-hazard mitigation plan, hereby known as the Moniteau County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the "Plan", in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Fire District from the impacts of future hazards and disasters; and

WHEREAS, the District recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the Fire District will endeavor to integrate the Plan into the comprehensive planning process; and

WHEREAS, adoption by the Fire District demonstrates their commitment to hazard mitigation and achieving the goals outlined in the Plan.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE TIPTON RURAL FIRE PROTECTION DISTRICT, MISSOURI, AS FOLLOWS: the Board of Directors hereby adopts the final Moniteau County Hazard Multi-Jurisdictional Mitigation Plan approved by FEMA.

Adopted this 15th day of March 2022.

David Tuttle

David Tuttle, District Board President

ATTEST:

Scott Hirst

Scott Hirst, District Board Secretary

MONITEAU COUNTY EMERGENCY DISPATCH

A RESOLUTION OF THE MONITEAU COUNTY EMERGENCY DISPATCH ADOPTING THE MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION *PLAN*

WHEREAS MONITEAU COUNTY EMERGENCY DISPATCH recognizes the threat that natural hazards pose to people and property within the district of MONITEAU COUNTY EMERGENCY; and

WHEREAS the MONITEAU COUNTY EMERGENCY DISPATCH has participated in the preparation of a multi- hazard mitigation plan, hereby known as the MONITEAU County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan,* in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property within the district of MONITEAU COUNTY EMERGENCY DISPATCH from the impacts of future hazards and disasters; and

WHEREAS MONITEAU COUNTY EMERGENCY DISPATCH recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the MONITEAU COUNTY EMERGENCY DISPATCH will endeavor to integrate the *Plan* into the comprehensive planning process and

WHEREAS adoption by MONITEAU COUNTY EMERGENCY DISPATCH demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*

NOW THEREFORE, BE IT RESOLVED BY MONITEAU COUNTY EMERGENCY DISPATCH, in the State of Missouri, THAT:

In accordance with applicable statues of the State of Missouri the MONITEAU COUNTY EMERGENCY DISPATCH Board of Directors adopts the final FEMA-*approved plan.*

ADOPTED by a vote of 6 in favor and 0 against, and 0 abstaining, this 8 day of March, 2022.

By (Sig): Mike Volkart

Title: Vice-Chairman

Print name: Mike Volkart

ATTEST:

By (Sig.): Chris Allee

Print name: Chris Allee

PO BOX 87 CALIFORNIA, MO 65018 □ 604 N OAK ST CALIFORNIA, MO □ WWW.MONITEAU911.COM
EMAIL: ADMINISTRATOR@MONITEAU911.COM [redacted] 73.796.8416 □ **FAX:** 573.796.4519

Appendix B: Sign-in Sheets

Moniteau Co HMP planning

1-5-2021 meeting 9:30 – 11:00 am

Sign-in sheet

Name	Signature	Phone number	Email address
Melissa Stafford	Melissa Stafford	573-353-1007	melissastafford@midmorpc.org
Kevin Wieberg		573-796-8416	administrator@moniteau911.com
Mac Finley	Mac Finley	573-796-2213	monitcocmm@yahoo.com

MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET

Project:	Moniteau County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	January 13, 2022 1:00pm – 4:00pm
Facilitator:	Melissa Stafford, Regional Planner & Procurement Officer Mid-Missouri Regional Planning Commission	**Place/Room:**	California City Hall, Public meeting room 500 S Oak St. California, MO 65018

Name	Title	Department/Agency	Email	Phone #	Signature
Victor Maurer	Street Sanitation	Superintendent City of Calif.	streetdept@cityofcaliforniamo.net	230-6513	[signature]
Kevin Wieberg	EMD	Moniteau County	Kwieberg@moniteau911.com	573 619 2802	[signature]
Kevin Wieberg	911 Director	"	"	"	[signature]
Dwight Sanders	California Superintendent		dwight.sanders@californiak12.org	796 2145	[signature]
Sue Denny	Mayor	Lupus	denny2386@gmail.com	573-291-2925	[signature]
Brenda Gerlach	Regional Coord.	SEMA	sema.dps.mo.gov brenda.gerlach@	573/644-3728	[signature]
[signature]	~~EMS~~ Administrator	Mid-MO Amb. Dist	[illegible]@gmail.com	573-357-5416	[signature]
Christina McMillian	Safety Company Nurse	Burger's Smokehouse	cmcmillian@smokehouse.com	573-796-3134	[signature]
Aaron Fassler	Fire Chief	City of Tipton	tiptonfire@yahoo.com	660 433-2323 City Hall	[signature]

Please add distance driving by your name

MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET

Project:	Moniteau County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	January 13, 2022 1:00pm – 4:00pm
Facilitator:	Melissa Stafford, Regional Planner & Procurement Officer Mid-Missouri Regional Planning Commission	**Place/Room:**	California City Hall, Public meeting room 500 S Oak St. California, MO 65018

Name	Title	Department/Agency	Email	Phone #	Signature
Melissa Stafford	Regional Planner	Mid-Mo RPC		573-353-1007	Melissa Stafford
Aaron Fassler	FIRE CHIEF	~~CITY OF TIPTON FIRE DEPT.~~ TIPTON RURAL FIRE	trfirechief@yahoo.com	6604736611	Aaron Fassler
Terry Robinson 10mi.	Superintendent TIPTON R VI	SCHOOL DISTRICT	robinsont@tiptonk12.mo.us	660 433 5520	
Nathan Bostyen	Superintendent Clarksburg C-2	School District	nbostyen@clarksburg.k12.mo.us	573-787-3511	Nath Bost
Sarah Jones	Moniteau County Treasurer	Moniteau County	moniteau.treasurer@gmail.com	573-796-4608	Sarah Jones
Brad Friedmeyer	Fire Chief	California City	cfd821@cityofcalifornia.net	5736408822	
Tony Wheatley	Sheriff	Moniteau County	Sheriff@moniteaucounty.org	573-569-1529	
Jordan Hoecker	Supt.	Moniteau R-V	jhoecker@lathambraves.com	660-458-6271	
Tyler Dicus	Electric Supt	City of California	t.dicus@cityofcalifornia.net	573-680-8023	TYLR
Rick Messenl.	Commissioner	Moniteau Co		573 619 5532	

Please add driving distance by name

MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET

Project:	Moniteau County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	January 13, 2022 1:00pm – 4:00pm
Facilitator:	Melissa Stafford, Regional Planner & Procurement Officer Mid-Missouri Regional Planning Commission	**Place/Room:**	California City Hall, Public meeting room 500 S Oak St. California, MO 65018

Name	Title	Department/Agency	Email	Phone #	Signature
Gretchen Guidard	Supt.	Jamestown	guidardg@jamestown.k12.mo.us	660 874 2411	
Mac Finley	Presiding Commissioner	County	monitcoomn@yahoo	573 796 2213	
Rick Messerli	Dist 2 Commissioner		MONIT.	573-469-2139	
Rich Green	Mayor California	City	r.green@cityofcalifornia.net		
Shawn Merrill	Crf PD Chief	California Fire	1ofPd267@hotmail.com	573 216 2065	
Kyle Wirts	Water Super	City	k.wirts@cityofcalifornia.net	573-690-7579	
Ralph Parris	Captain Police Dept.	California City	r.parris@cityofcalifornia.net	573-796-2518	
Heather Allen	EHS Manager Cargill	Cargill	heather_allen@cargill.com	660-287 7705	
Clint Hoelting	Commissioner	Moniteau	—	573-694-8503	
David Franks	Superintendent	High Point Schools	~~franksd~~ franksd@highpoint.k12.mo.us	660-489-2213	

Please Print

MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
~~KICKOFF~~ MEETING—SIGN-IN SHEET #2 meeting

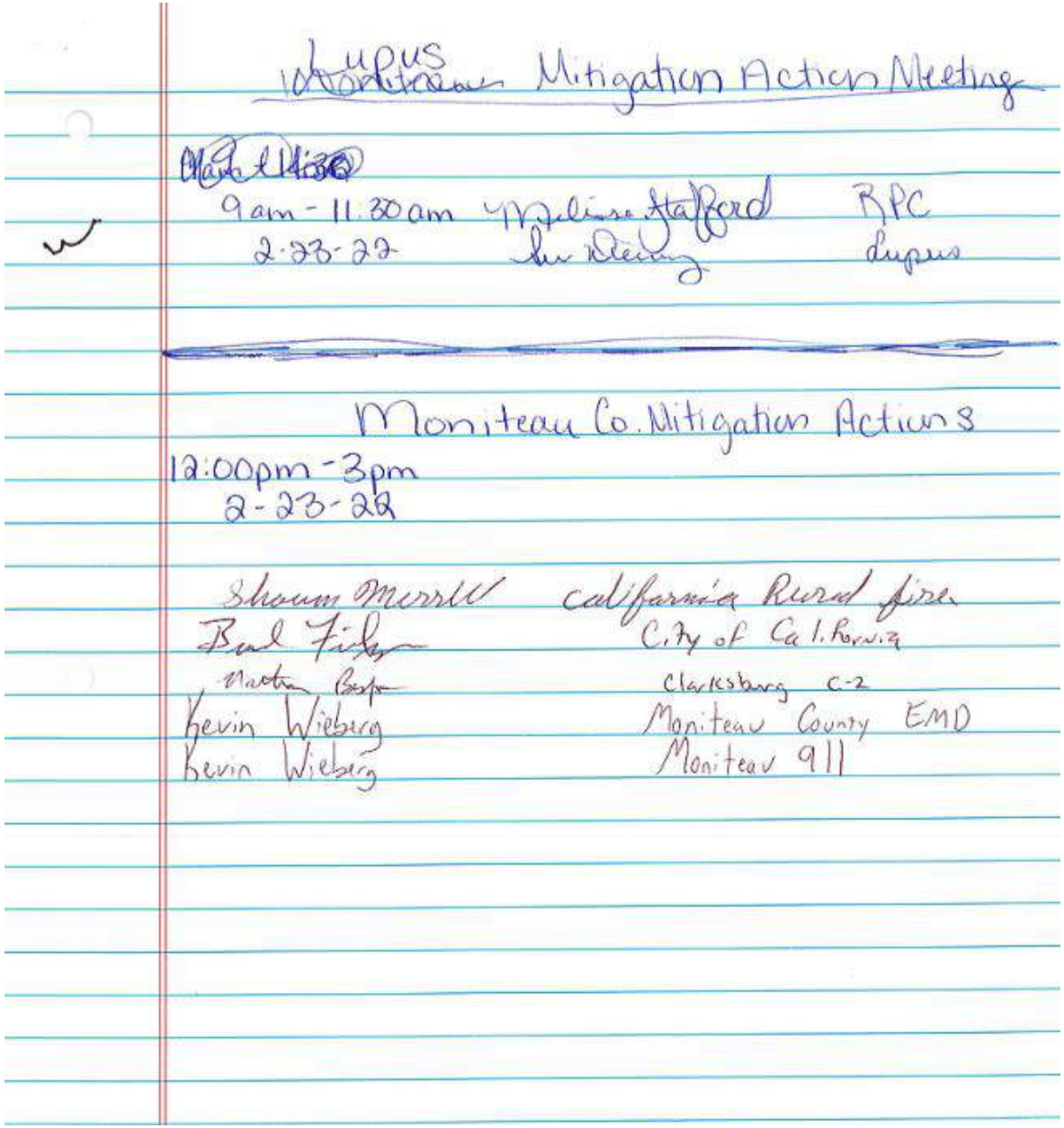
Project:	Moniteau County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	February 7, 2022 1:00pm – 4:00pm
Facilitator:	Melissa Stafford, Regional Planner & Procurement Officer Mid-Missouri Regional Planning Commission	**Place/Room:**	California City Hall, Public meeting room 500 S Oak St. California, MO 65018

Name	Title	Department/Agency	Email	Phone #	Signature
Melissa Stafford	Regional Planner	Midmo RPC	melissastafford@urchvill	573-353-1007	Melissa Stafford
Gretchen Leitard	Supt	Jamestown C-1	gwitardgt jamestown.k12.mo.us		Gretchen Leitard
Rick Messerli	Commissioner	Moniteau Co		469-2139	Rick Messerli
David Franks	Supt.	High Point	dfranks@highpointR3.ca	87[illegible]-6318	David Franks
Clint Haelleing	Commissioner	Moniteau Co.		573-694-3503	Clint Haelleing
Sarah Jones	County Treasurer	Moniteau County	moniteautreasurer@gmail.com	573-796-4608	Sarah Jones
Shallie Witt	Cargill Health	Cargill	Shallie_Witte Cargill.com	573 680-2877	Shallie Witt
Edward Wrecken	Police Chief	City of Tipton	chief@tiptonmo.us	660-433-2323	Edward Wrecken
Heather Allen	Cargill Fits Manager	Cargill	heather_allen@cargill.com	660 287 7705	Heather Allen
AARON FASSLER	FIRE CHIEF	TIPTON RURAL FIRE DISTRICT	trfpdchief@yahoo.com	660 473 6611	Aaron Fassler

MONITEAU COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET

Project:	Moniteau County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	February 7, 2022 1:00pm – 4:00pm
Facilitator:	Melissa Stafford, Regional Planner & Procurement Officer Mid-Missouri Regional Planning Commission	**Place/Room:**	California City Hall, Public meeting room 500 S Oak St. California, MO 65018

Name	Title	Department/Agency	Email	Phone #	Signature
Scott Harkins	Corp/SRO	Moniteau Co SD California R-I	scotharkins@californiak12.org	573-796-2525	
Kevin Wieberg	911 Director	Moniteau 911	Kwieberg@moniteau911.com	573 619-2802	
Kevin Wieberg	EMD	County of Moniteau	"	"	
Mac Finley	Presiding Commissioner	"	moncommcmw@yahoo.com	573 291-4187	
Brad Friedmeyer	EM/Fire Chief City of California	City of California		573 680 8022	
[illegible]	[illegible]	California Schools	[illegible]	796-2145	
James Russell	Supt. Schools MAYOR	CITY OF JAMESTOWN			
[illegible]	STREET/SANIT. SUPERVISOR	CITY OF CALIF	STREETDEPT@CITYOFCALIFORNIA.NET	230-6513	



LUPUS Mitigation Action Meeting

9am - 11:30am
2-23-22

Melissa Halford — RPC
Lupus

Moniteau Co. Mitigation Actions

12:00pm - 3pm
2-23-22

Shawn Merrill — California Rural Fire
Bud Fish — City of California
Clarksburg C-2
Kevin Wieberg — Moniteau County EMD
Kevin Wieberg — Moniteau 911

Appendix C – Questionnaires