

LINN COUNTY

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN



DAILY NEWS
**NATURAL
DISASTER!**



Linn County
Brookfield
Linneus
Marceline
Purdin
Brookfield R-III
Bucklin R-II
Meadville R-IV

CONTRIBUTORS

Linn County Hazard Mitigation Planning Committee

Jurisdictional Representatives

Name	Title	Department	Jurisdiction
Josh Muck	Commissioner – Dist. 2	County Government	Linn County
Nelson Dinsmore	Commissioner - Presiding	County Government	Linn County
Glen Murrain	Commissioner – Dist. 1	County Government	Linn County
Suzan Stephenson	County Clerk	County	Linn County
Mike Kahn	Superintendent	School District	Bucklin R-II
Eric Hoyt	Superintendent	School District	Brookfield R-III
Jeff Haley	Superintendent	School District	Meadville R-V
Michael Miller	Employee	Township	Grantsville Township
Michael Smith	Fire District Representative	Fire District	Laclede Fire Department
Burnie Hicks	City Representative	Administration	City of Brookfield
Matt Bowen	Ambulance	Emergency Services	Linn County Ambulance
Denise Wallace	City Clerk	Administration	City of Purdin
Lindsay Krampleman	City Clerk	Administration	City of Marceline
Deetta Jones	City Clerk	Administration	City of Browning
Lewain Cooley	City Clerk	Administration	City of Linneus

Stakeholder Representatives

Name	Title	Department	Jurisdiction
Josh Muck	Commissioner – Dist. 2	County Government	Linn County
Nelson Dinsmore	Commissioner - Presiding	County Government	Linn County
Glen Murrain	Commissioner – Dist. 1	County Government	Linn County
Suzan Stephenson	County Clerk	County	Linn County
Mike Kahn	Superintendent	School District	Bucklin R-II
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EXECUTIVE SUMMARY

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Linn County and participating jurisdictions and school/special districts developed this multi-jurisdictional local hazard mitigation plan update to reduce future losses from hazard events to the County and its communities and school/special districts. This plan is an update of the previous plan that was approved by FEMA on [insert date]. The plan and the update were prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 to result in eligibility for the Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance Grant Programs.

The County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan that covers the following jurisdictions that participated in the planning process:

- Unincorporated Linn County
- City of Brookfield
- City of Browning
- City of Bucklin
- City of Laclede
- City of Linneus
- City of Marceline
- City of Meadville
- City of Purdin
- Brookfield R-III
- Bucklin R-II
- Linn County R-I
- Marceline R-V
- Meadville R-IV

School District Linn County R-I and Bucklin R-II was invited to participate in the planning process but did not meet all of the established requirements for official participation. When the future five-year update is developed for this plan, this school district will be invited again to participate.

Linn County and the entities listed above followed a plan update process using a methodology in accordance with FEMA guidance, which began with the formation of a Mitigation Planning Committee (MPC) comprised of representatives from Linn County and participating jurisdictions. The MPC updated the risk assessment that identified and profiled hazards that pose a risk to Linn County and analyzed jurisdictional vulnerability to these hazards. The MPC also examined the capabilities in place to mitigate the hazard damages, with emphasis on changes that have occurred since the previously approved plan was adopted. The MPC determined that the planning area is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Riverine and flash flooding, winter storms, severe thunderstorms (hail, lightning, high winds), and tornados are among the hazards that historically have had a significant impact.

Based upon the risk assessment, the MPC updated goals for reducing risk from hazards. The goals are listed below:

- Goal 1: Eliminate loss of life, minimize injuries and reduce property damage caused by tornadoes, severe thunderstorms including high winds, hail, and lightning.
- Goal 2: Minimize property damage due to flooding, levee failure, and dam failure; including high hazard potential dams (HHPD).
- Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures, and wildfire.
- Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather.
- Goal 5: Minimize injuries and property damage due to seismic and/or geological events.

To advance the identified goals, the MPC developed recommended mitigation actions, as summarized in the table on the following pages. The MPC developed an implementation plan for each action, which identifies priority level, background information, ideas for implementation, responsible agency, timeline, cost estimate, potential funding sources, and more. These additional details are provided in Chapter 4.

Table I. Mitigation Action Matrix

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
Structure and Infrastructure Projects								
County 2025.4	Snow removal	Linn Co.	High	4	Severe winter weather	X	X	
County 2025.7	Structure grants for road and bridge upgrades	Linn Co.	High	2	Flooding	X		
County 2025.8	Flood risk reduction projects	Linn Co.	High	2	Flooding	X		
County 2025.9	Upgraded road tubes	Linn Co.	High	2	Flooding	X		
County 2025.11	Critical facilities backups	Linn Co	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
County 2025.12	Debris removal	Linn Co	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X		
County 2025.13	Warning sirens	Linn Co.	High	1	Tornado	X	X	
County 2025.14	Tree trimming maintenance	Linn Co.	High	1,4	Severe thunderstorms, Severe winter weather, Tornado	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CB 2025.4	Critical facilities backups	Brookfield	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CB 2025.5	Debris removal	Brookfield	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CB 2025.6	Storm shelters/Safe rooms	Brookfield	High	1	Severe thunderstorms, tornado		X	
CBR 2025.4	Critical facilities backups	Browning	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CBR 2025.5	Debris removal	Browning	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CBR 2025.6	Storm shelters/Safe rooms	Browning	High	1	Severe thunderstorms, tornado		X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CLI 2025.3	Critical facilities backups	Linneus	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CLI 2025.3	Debris removal	Linneus	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CLI 2025.5	Storm shelters/Safe rooms	Linneus	High	1	Severe thunderstorms, tornado		X	
CM 2025.4	Critical facilities backups	Marceline	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CM 2025.5	Debris removal	Marceline	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CM 2025.6	Storm shelters/Safe rooms	Marceline	High	1	Severe thunderstorms, tornado		X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CP 2025.4	Critical facilities backups	Purdin	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CP 2025.5	Debris removal	Purdin	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CP 2025.6	Storm shelters/Safe rooms	Purdin	High	1	Severe thunderstorms, tornado		X	
BSD 2025.2	Storm shelters/Safe rooms	Brookfield R-III	High	1	Severe thunderstorms, tornado		X	
BSD 2025.3	Generators	Brookfield R-III	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
BUSD 2025.3	Generators	Bucklin R-II	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
MSD 2025.2	Storm shelters/Safe rooms	Marceline R-V	High	1	Severe thunderstorms, tornado		X	
MSD 2025.3	Generators	Marceline R-V	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
MESD 2025.2	Storm shelters/Safe rooms	Meadville R-IV	High	1	Severe thunderstorms, tornado		X	
MESD 2025.3	Generators	Meadville R-IV	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
Natural Systems Protection								
County 2025.12	Debris removal	Linn Co	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X		
County 2025.14	Tree trimming maintenance	Linn Co.	High	1,4	Severe thunderstorms, Severe winter weather, Tornado	X	X	
County 2025.15	Drought and Wildfire education	Linn Co.	Medium	3	Drought. Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CB 2025.5	Debris removal	Brookfield	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CB 2025.8	Drought and Wildfire education	Brookfield	Medium	3	Drought. Wildfire	X	X	
CBR 2025.5	Debris removal	Browning	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CBR 2025.7	Drought and Wildfire education	Browning	Medium	3	Drought. Wildfire	X	X	
CLI 2025.4	Debris removal	Linneus	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CLI 2025.7	Drought and Wildfire education	Linneus.	Medium	3	Drought. Wildfire	X	X	
CM 2025.5	Debris removal	Marceline	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CM 2025.7	Drought and Wildfire education	Marceline	Medium	3	Drought. Wildfire	X	X	
CM 2025.8	NFIP Participation	Marceline	Medium	2	Flooding	X	X	X
CP 2025.5	Debris removal	Purdin	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CP 2025.7	Drought and Wildfire education	Purdin.	Medium	3	Drought, Wildfire	X	X	
BSD 2025.4	Drought and Wildfire education	Brookfield R-III.	Medium	3	Drought, Wildfire	X	X	
MSD 2025.4	Drought and Wildfire education	Marceline R-V	Medium	3	Drought, Wildfire	X	X	
MESD 2025.4	Drought and Wildfire education	Meadville R-IV	Medium	3	Drought, Wildfire	X	X	
Planning and Regulation								
County 2025.1	County-wide inventory of safe rooms and shelters	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X		
County 2025.6	Countywide disaster exercises and drills	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
County 2025.15	Creation of a county-level municipality steering committee	Linn Co	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CM 2025.8	NFIP Participation	Marceline	Medium	2	Flooding	X	X	X

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
Education and Outreach								
County 2025.1	County-wide inventory of safe rooms and shelters	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X		
County 2025.2	Safety audits and self-inspection training for critical facilities	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
County 2025.3	Public mitigation education	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
County 2025.5	Weather Alerts	Linn Co.	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
County 2025.15	Creation of a county-level municipality steering committee	Linn Co	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
County 2025.15	Drought and Wildfire education	Linn Co.	Medium	3	Drought, Wildfire	X	X	
CB 2025.1	Mitigation education for developers	Brookfield	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CB 2025.2	Mitigation education	Brookfield	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CB 2025.3	Weather Alerts	Brookfield	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CB 2025.7	Weather spotter training	Brookfield	High	1	Severe thunderstorm, Tornado	X	X	
CB 2025.8	Drought and Wildfire education	Brookfield.	Medium	3	Drought. Wildfire	X	X	
CBR 2025.2	Mitigation education	Browning	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CBR 2025.3	Weather Alerts	Browning	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CBR 2025.7	Drought and Wildfire education	Browning.	Medium	3	Drought. Wildfire	X	X	
CLI 2025.1	Mitigation education	Linneus	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CLI 2025.2	Weather Alerts	Linneus	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CLI 2025.6	Vulnerable population identification	Linneus	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Sink holes, Levee Failure, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	
CLI 2025.7	Drought and Wildfire education	Linneus.	Medium	3	Drought, Wildfire	X	X	
CM 2025.1	Mitigation education for developers	Marceline	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CM 2025.2	Mitigation education	Marceline	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CM 2025.3	Weather Alerts	Marceline	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CM 2025.7	Drought and Wildfire education	Marceline.	Medium	3	Drought, Wildfire	X	X	
CP 2025.1	Mitigation education for developers	Purdin	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CP 2025.2	Mitigation education	Purdin	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CP 2025.3	Weather Alerts	Purdin	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CP 2025.7	Drought and Wildfire education	Purdin	Medium	3	Drought, Wildfire	X	X	
BSD 2025.1	Mitigation education	Brookfield R-III	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
BSD 2025.4	Drought and Wildfire education	Brookfield R-III	Medium	3	Drought, Wildfire	X	X	
BUSD 2025.1	Mitigation education	Bucklin R-II	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
MSD 2025.1	Mitigation education	Marceline R-V	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
MSD 2025.4	Drought and Wildfire education	Marceline R-V.	Medium	3	Drought, Wildfire	X	X	
MESD 2025.1	Mitigation education	Meadville R-IV	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
MESD 2025.4	Drought and Wildfire education	Meadville R-IV	Medium	3	Drought, Wildfire	X	X	

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.

This plan has been reviewed by and adopted with resolutions or other documentation of adoption by all participating jurisdictions and schools/special districts. The documentation of each adoption is included in Appendix D, and a model resolution is included on the following page.

The jurisdictions listed in the Executive Summary participated in the development of this plan and have adopted the multi-jurisdictional plan.

Model Resolution

(LOCAL GOVERNING BODY/SCHOOL DISTRICT), Missouri RESOLUTION NO. _____

A RESOLUTION OF THE (LOCAL GOVERNING BODY /SCHOOL DISTRICT) ADOPTING THE (PLAN NAME)

WHEREAS the (local governing body/school district) recognizes the threat that natural hazards pose to people and property within (local government); and

WHEREAS the (local government/school district) has prepared a multi-hazard mitigation plan, hereby known as (title and date of mitigation plan) in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS (title and date of mitigation plan) identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in (local government/school district) from the impacts of future hazards and disasters; and

WHEREAS adoption by the (local governing body/school district) demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Plan.

NOW THEREFORE, BE IT RESOLVED BY THE (LOCAL GOVERNMENT/SCHOOL DISTRICT), in the State of Missouri, THAT:

Section 1. In accordance with (local rule for adopting resolutions), the (local governing body/school district) adopts the (title and date of mitigation plan). While content related to (local government/school district) may require revisions to meet the plan approval requirements, changes occurring after adoption will not require (local government/school district) to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

ADOPTED by a vote of _____ in favor and __ against, and __ abstaining, this _____ day of _____, _____.

By (Sig): _____
Print name: _____

ATTEST:
By (Sig.): _____
Print name: _____

APPROVED AS TO FORM:
By (Sig.): _____
Print name: _____

1 INTRODUCTION AND PLANNING PROCESS

1	INTRODUCTION AND PLANNING PROCESS	1.1
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1.1 PURPOSE

Hazard mitigation is defined as “any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards”. While natural hazards will continue to occur and at their worst will result in death and destruction of both property and infrastructure, this plan was undertaken to minimize the impact that these hazards will have on the people and property of Linn County. Linn County and the participating jurisdictions and school districts developed this multi-jurisdictional local hazard mitigation plan update to reduce future losses from inevitable hazardous events.

The jurisdictions participating in this plan are the unincorporated areas of Linn County, Brookfield, Linneus, Marceline, Purdin, Brookfield R-III, Bucklin R-II, Marceline R-V, and Meadville R-IV. The jurisdictions participating in this plan understand that adopting the plan is a prerequisite for mitigation grant eligibility and understand that failure to adopt this plan will make them ineligible for mitigation grants.

The following legislation gives FEMA authority to require these plans: Robert T Stafford Disaster and Emergency Act (Public Law 93-288) as amended by the Disaster Mitigation Act of 2000 (Public Law 106-390), The implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007.

The following publications from FEMA were used as guidance in the development of this hazard mitigation plan for Linn County. FEMA’s Local Mitigation Planning Handbook, May 2023, FEMA’s Local Mitigation Plan Review Guide, October 1, 2011, and the Local Mitigation Planning Policy Guide April 19, 2023. The previous Linn County Hazard Mitigation Plan, which was approved on May 20, 2021, was also used in the development of this update.

1.2 BACKGROUND AND SCOPE

The Linn County Hazard Mitigation Plan is the update of a plan that was approved on May 20, 2021. Hazard Mitigation Plans must be renewed every five years and then must be adopted by the participating jurisdictions within the plan. Both the plan and the update were prepared pursuant to the requirements of the Disaster Mitigation Act of 2000. This plan once completed and adopted will result in eligibility for the Federal Emergency Management Agency (FEMA)

Hazard Mitigation Assistance Grant Programs.

The following local governments and school districts participated in both the original plan as well as the plan updates. This will allow them to adopt the plan and secure eligibility for Hazard Mitigation Grant Funding.

- Linn County
- The City of Brookfield
- The City of Browning
- The City of Linneus
- The City of Purdin
- The City of Marceline
- Brookfield R-III
- Bucklin R-II
- Marceline R-V
- Meadville R-IV

Linn County and the participating entities listed above developed a Multi-Jurisdictional Hazard Mitigation Plan that was approved by FEMA in May of 2021 (hereafter referred to as the 2021 Hazard Mitigation Plan). This current planning effort serves to update that previously approved plan.

The information that is contained in the Linn County Hazard Mitigation Plan will be used to help guide and coordinate mitigation activities for local land use policy and decisions in the future.

1.3 PLAN ORGANIZATION

The latest (2026) updated version of the Linn County Hazard Mitigation Plan involves review, evaluation, and amendment of the existing plan. It addresses the same natural hazards that were addressed in the original plan, with changes outlined in the table below (See Table 1.1 below). Following is a breakdown of the organization of the 2025 Linn County Hazard Mitigation Plan Update.

- **Chapter 1: Introduction and Planning Process**
This section of the plan provides an introduction to the multi-jurisdictional planning process and a detailed look at the participation of the local jurisdictions and school districts. It also detailed the purpose of local hazard mitigation planning and outlined the requirements enacted by the Federal Emergency Management Agency.
- **Chapter 2: Planning Area Profile and Capabilities**
This section of the plan provides general background information and demographic statistics for Linn County and its various jurisdictions as well as the disaster response and recovery capabilities found in the county. This section identifies key personnel, organizational leaders, and outlines existing emergency plans. Additionally, it provides a brief assessment of each municipality's readiness regarding hazard mitigation.
- **Chapter 3: Risk Assessment**
This section of the plan, the risk assessment, identifies and explores the types of natural hazards that pose a risk to the county, and the likelihood that each hazard will occur. It provides a profile of identified hazards and explains the impact to the County and the various jurisdictions should such hazards occur.

- Chapter 4: Mitigation Strategy
This section of the plan presents the multi-jurisdiction mitigation strategies in response to the risk assessment. This chapter outlines the overall goals to reduce a disaster’s impact, specific objectives toward achieving those goals, and implementation plans for the county to complete.
- Chapter 5: Plan Implementation and Maintenance
The final chapter outlines the Hazard Mitigation Plan maintenance procedures.
- Appendix A: Sources
- Appendix B: Planning Documentation & Invitations
- Appendix C: Questionnaires, Surveys, Public Comment, and STAPLEE Worksheets
- Appendix D: List of Critical Facilities (Redacted from Public View)
- Appendix E: Resolutions of Adoptions

The following table identifies significant changes in the 2026 update of the Hazard Mitigation Plan for Linn County.

Table 1.1. Changes Made in Plan Update

Plan Section	Summary of Updates
Executive Summary	<ul style="list-style-type: none"> • Added Mitigation Action Matrix Table • Revised the executive summary and resolution to match order of template • Updated goals from previous plan to better reflect hazards mitigated by current proposed actions
Chapter 1 - Introduction and Planning Process	<ul style="list-style-type: none"> • Updated members of the Mitigation Planning Committee (MPC) and participating jurisdictions formally adopted the MPC.
Chapter 2 - Planning Area Profile and Capabilities	<ul style="list-style-type: none"> • Changes include updating maps, identifying most current state plan, and updating demographic data using 2020 Census and American Community Survey Information • Inviting neighboring jurisdictions to participate. • Updated charts, graphs, tables, maps, and other information where necessary
Chapter 3 - Risk Assessment	<ul style="list-style-type: none"> • Combined extreme heat and extreme cold into one hazard: extreme temperatures. • Updated section with current Census information, agricultural summary, and confirming that current data is correct. • Incorporated information from the current 2023 Missouri State Hazard Mitigation Plan • Previous events updated for each hazard
Chapter 4 - Mitigation Strategy	<ul style="list-style-type: none"> • 2021 mitigation goals and strategies reviewed by planning committee and updated • The mitigation category of each action was added to the action worksheets

<p>Chapter 5 - Plan Implementation and Maintenance</p>	<ul style="list-style-type: none"> Updated the MPC meeting for evaluating and updating the plan to annually
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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.

Linn County, Missouri contracted with the Green Hills Regional Planning Commission (GHRPC) to facilitate and coordinate the update of the multi-jurisdictional, local hazard mitigation plan. In fulfillment of the role, GHRPC:

- Assisted in establishing a Mitigation Planning Committee (MPC) as defined by the Disaster Mitigation Act (DMA),
- Assessed whether there was adherence to the process set forth in the previously approved plan for maintenance (example, did the MPC meet regularly as specified in the previously approved plan), and explain how adherence occurred, and/or why it did not occur,
- Ensured 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),
- Facilitated the entire plan development process,
- Identified the data that MPC participants could provide and conduct the research and documentation necessary to augment that data,
- Assisted in soliciting public input,
- Produced the draft and final plan update in a FEMA-approvable document and coordinate the Missouri State Emergency Management Agency (SEMA) and (FEMA) plan reviews.

This plan was developed after the release of *FEMA’s Local Mitigation Planning Policy Guide, Effective 2025*.

The following table (**Table 1.2**) shows the MPC members and the entities they represent, along with their titles. Each of the following representatives participated directly with the development of the plan. They attended the meetings and actively participated in the development of the plan. The MPC was comprised of representatives from each jurisdiction on a voluntary basis rather than as an official act by any of the jurisdictions. Each member of the MPC was actively involved in the meetings and the decisions for the Hazard Mitigation Plan. These members were either present at the public meetings or met individually with the GHRPC staff member in charge of developing the plan. All jurisdictions met their responsibilities for the planning process by:

- Attending at least one meeting
- Completing the Data Questionnaire to the best of their ability
- Reviewing and returning the Action Worksheets
- Returning the Adoption Resolution (Found in Appendix E)

Table 1.2. Jurisdictional Representatives of Linn County Mitigation Planning Committee

Name	Title	Department	Jurisdiction
Josh Muck	Commissioner – Dist. 2	County Government	Linn County
Nelson Dinsmore	Commissioner - Presiding	County Government	Linn County
Glen Murrain	Commissioner – Dist. 1	County Government	Linn County
Suzan Stephenson	County Clerk	County	Linn County
Mike Kahn	Superintendent	School District	Bucklin R-II
Eric Hoyt	Superintendent	School District	Brookfield R-III
Jeff Haley	Superintendent	School District	Meadville R-V
Michael Miller	Employee	Township	Grantsville Township
Michael Smith	Fire District Representative	Fire District	Laclede Fire Department
Burnie Hicks	City Representative	Administration	City of Brookfield
Matt Bowen	Ambulance	Emergency Services	Linn County Ambulance
Denise Wallace	City Clerk	Administration	City of Purdin
Lindsay Krampleman	City Clerk	Administration	City of Marceline
Lawain Cooley	City Clerk	Administration	City of Linneus
Deetta Jones	City Clerk	Administration	City of Browning

Table 1.3. MPC Capability with Six Mitigation Categories

Community Department/Office	Preventive Measures	Structure and Infrastructure Projects		Natural Resource Protection	Public Information	Emergency Services
		Property Protection	Structural Flood Control Projects			
Linn County Commission	✓	✓	✓	✓	✓	
Linn County Ambulance	✓				✓	✓
City of Purdin	✓	✓			✓	
City of Linneus	✓	✓				
City of Brookfield	✓	✓	✓	✓	✓	
City of Browning	✓	✓	✓	✓	✓	
City of Marceline	✓	✓	✓	✓		
Bucklin R-II	✓				✓	
Brookfield R-III	✓				✓	
Meadville R-V	✓				✓	
Grantsville Township		✓	✓	✓		
Laclede Fire Dept.	✓	✓			✓	✓

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.

The Disaster Mitigation Act requires that each jurisdiction participate in the planning process and officially adopt the plan. Minimum criteria for participation were determined at the planning meeting that each jurisdiction must attend one meeting to be considered a “participant.” These plan participation requirements include:

- Designation of a representative to serve on the MPC;

- Participation in at least one meeting, including planning, MPC meetings, by either direct participation or authorized representation, or one-on-one with planning staff;
- Provision of sufficient information to support plan development by completion and return of Data Collection Questionnaires and validating/correcting critical facility inventories;
- Provision of progress reports on mitigation actions from the previously approved plan and identified additional mitigation actions for the plan;
- 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;
- Actively solicit input from the public, local officials, and other interested parties about the planning process and provide an opportunity for them to comment on the plan;
- Provide documentation to show time donated to the planning effort; and
- Formally adopt the mitigation plan.

Data for the plan was gathered in part through a series of meetings held within Linn County. The planning process for the Linn County Hazard Mitigation Plan began during the summer of 2025, with discussions involving elected officials, community members, and other interested parties, and the planning committee was formed. (See Table 1.2 and Table 1.4).

Participants that were involved were asked to identify critical infrastructure, rank the likelihood of disaster occurrence, perform a susceptibility analysis based on these factors, and determine appropriate mitigation strategies for each individual disaster. This data was recorded and assimilated into this plan by GHRPC staff. The MPC membership showed a range of knowledge and abilities to address the mitigation categories shown in Table 1.3.

In accordance with Missouri’s “sunshine law” (RSMo 610.010, 610.020, 610.023, and 610.024), the public was notified each time the plan was presented for review. Input from each public official (city and county) was solicited by email or mailing an explanatory letter with notice of the posted draft on the Green Hills Planning Commission’s website. These were disbursed on a schedule that allowed officials sufficient time to review the draft prior to the next public County Commission or City Council meeting. Participation was solicited by letter or email from each of the following jurisdictions:

- Linn County
- City of Brookfield
- City of Browning
- City of Linneus
- City of Marcelline
- City of Purdin
- Brookfield R-III
- Bucklin R-II
- Marcelline R-V
- Meadville R-IV

Table 1.4. Jurisdictional Participation in Planning Process

Jurisdiction	Kick-off Meeting	Meeting #2	Meeting #3	Data Collection Questionnaire Response	Update/Develop Mitigation Actions
Linn County	X	X	X	X	X
City of Brookfield	X			X	X

City of Browning	X			X	X
City of Linneus	Phone Call			X	X
City of Marceline			X	X	X
City of Purdin	Special one-on-one meeting			X	X
Brookfield R-III	X			X	X
Bucklin R-II	X			X	X
Marceline R-V	Phone call			X	X
Meadville R-IV	X			X	X

1.4.2 The Planning Steps

The sources utilized for the plan and development process used the following: FEMA’s Local Mitigation Planning Handbook (May 2023), Local Mitigation Plan Review Guide (October 1, 2011), Local Mitigation Planning Policy Guide (April 19, 2023), and Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials (March 1, 2013). The United States Census Bureau, the United States Geological Society, the United States Army Corps of Engineers, the Missouri Department of Natural Resources, the Missouri Department of Conservation, the Center for Agriculture, Resources and Environmental Systems at the University of Missouri-Columbia, Linn County HAZUS data, the National Climatic Data Center, and the Missouri State Hazard Mitigation Plan provided additional information regarding severe thunderstorm and winter weather, wildfire, tornado, earthquake, and flood hazards effecting Linn County. Other sources utilized for this plan are included in Section 3.

The development of this plan update followed the 10-step planning process adapted from FEMA’s Community Rating System (CRS) and Flood Mitigation Assistance programs, so to ensure funding eligibility requirements for the Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities, Community Rating System, and Flood Mitigation Assistance Program.

Table 1.5. County Mitigation Plan Update Process

Community Rating System (CRS) Planning Steps (Activity 510)	Local Mitigation Planning Handbook (2023) 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 5: Review Community Capabilities 44 CFR 201.6(b)(2) & (3)
Step 4. Assess the hazard	Task 4: 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 the Planning Team
(Handbook Tasks 1, 2, and 5)

- The first meeting in Linn County: City of Linneus
 - City of Linneus; August 12th, 2025, at 109 N. High St. from 1:30-3:00pm.
 - The meeting focused on hazard mitigation planning. Attendees talked about the existing plan, which needs updated every five years, and the requirements for getting HMGP grants. The planning process involved a series of meetings, 3 in person and 3 online. These meetings will cover how to identify hazards, assess risks, discuss ways to reduce those risks, and then decide which actions they are going to take. To participate, jurisdictions need to fill out a questionnaire, attend at least one meeting, offer suggestions, develop actions, and take part in the planning process. The meeting also covered how to reach out to GHRPC and identify hazards. The meeting wrapped up with a Q&A session before ending.
 - Virtual Meeting #1: August 13th from 10:00am-12:00pm.
- The second “Meeting #2” occurred in the City of Linneus as followed:
 - City of Linneus; August 25th, 2025, at 109 N. High St. from 1:30pm-3:00pm.
 - The meeting met to discuss hazard mitigation planning, required for HMGP Grants and updated every 5 years. The process includes identifying hazards, assessing risks, developing mitigation strategies, and prioritizing actions through meetings and surveys. Jurisdictions must complete questionnaires, attend meetings, provide suggestions, and adopt the plan. Outreach involved contacting stakeholders and distributing hazard identification worksheets before opening the floor for questions.
 - Virtual Meeting #2: August 26th from 10:00am-12:00pm.
- The third “Meeting #3” occurred in the City of Linneus as followed:
 - City of Linneus; September 30th, 2025, at 109 N. High St. from 1:30pm-3:00pm.
 - The meeting covered hazard mitigation planning, which needs updating every 5 years for HMGP Grants. The planning process includes three in-person and three virtual meetings, focusing on hazard identification, risk assessment, mitigation strategies, and action prioritization. To participate, jurisdictions must complete a questionnaire, attend at least one meeting, provide suggestions, develop actions for each hazard, and adopt the plan.
 - Virtual Meeting #3: October 1st from 10:00am-12:00pm.

Table 1.6. Schedule of MPC Meetings

Meeting	Topic	Date
Kick-off Meeting/ Meeting #1	Outreach & Hazard Identification	Aug. 12, 2025 & Aug. 13, 3035

Planning Meeting #2	Risk Assessment & Mitigation Strategies	Aug. 25, 2025 & Aug. 26, 2025
Planning Meeting #3	Action Prioritization, Adopting the Plan, & Plan Maintenance	Sept. 30, 2025 & Oct. 1, 2025

Step 2: Plan for Public Involvement
(Handbook Task 3)

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.

During each of the planning meetings attendees were provided with time to comment on plan development.

- Meeting #1 provided attendees with the opportunity to provide information about hazards, previous events, and considerations of vulnerabilities to natural hazards.
- Meeting #2 specifically addressed the vulnerabilities of the participating jurisdictions and discussion about addressing said vulnerabilities. Additionally, meeting #2 also addressed which hazards would pose the most risk in terms of frequency, past damage, and specific risks posed to participating jurisdictions.
- Finally, meeting #3 provided opportunity for jurisdictions to discuss hazards, potential projects, and create new actions with the intent of mitigating future damages.

A Survey Monkey public survey was created to solicit public comments. The link and the QR code were made available to all jurisdictions, published on social media, and published on the flyers that were sent to all jurisdictions. The MPC was made aware of the survey results at the 3rd meeting and were encouraged to consider the results for inclusion in the plan. (Survey Results can be found in Appendix B).

The draft of the Linn County Hazard Mitigation Plan was published on Green Hills Regional Planning Commission’s website on October 3, 2025. Contact information was provided to any individual that wanted to make a comment on the plan and the ability to make a comment was enabled on the GHRPC website.

All participating jurisdictions were made aware that the plan was available for public comment, and were provided with, at minimum, 30 days to review and/or comment on the plan. The availability of the plan for public comment or review was advertised on local social media pages. All participants were also advised in person or via email of the review period.

The public survey received 16 responses. The results of the survey can be found in the Appendix B. The plan was available for public comment after being published on GHRPC website for 30 days. Notice of the plan was published on community and GHRPC Facebook pages and a press release was issued in local outlets. (See Appendix B for documentation) The plan was published to the Green Hills Regional Planning Commission on January 1, 2026. The plan was made available for public comment from January 1 to February 2, 2026. There were no comments received on the plan.

Step 3: Coordinate with Other Departments and Agencies and Incorporate Existing Information
(Handbook Task 2)

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.

In the interest of involving stakeholders throughout the planning area, the following organizations and businesses were invited to participate in the hazard mitigation planning process for Linn County.

- Neighboring Communities:
 - City of New Cambria
 - City of Wheeling
- Local and regional agencies involved in hazard mitigation activities
 - Brookfield Fire Department
 - Brookfield Rural Fire
 - Browning City Fire Department
 - Browning Municipal Rural Fire Department
 - Bucklin Volunteer Fire Department
 - Laclede Community Fire Protection
 - Linneus Fire Protection District
 - Marceline Fire Department
 - Marceline Rural Fire Protection Association
 - Meadville Fire Department
 - Meadville Rural Fire
 - Shelby Rural Volunteer Fire Department
 - Linn County Ambulance District
 - Linn County Sheriff
 - Complete Family Medicine
 - Meadville Medical Clinic
 - Compass Health Network
 - Community Medical Associates
 - Pershing Memorial Hospital
 - Saint Francis Hospital Heliport
 - Public Water Supply District 3
 - Bucklin City Water Department
 - Marceline Water Department
 - Brookfield Water Department
- Agencies with the authority to regulate development:

- City of Brookfield
- City of Browning
- City of Bucklin
- City of Laclede
- City of Linneus
- City of Marceline
- City of Meadville
- City of Purdin
- Brookfield Emergency Coordinator
- Linn County Emergency Manager
- Marceline Emergency Coordinator
- Meadville Emergency Coordinator
- Brookfield Floodplain
- Browning Floodplain
- Linneus Floodplain
- Marceline Floodplain
- Businesses & Academia
 - Brookfield R-III
 - Bucklin R-II
 - Linn County R-I
 - Marceline R-V
 - Meadville R-IV
 - Walsworth Publishing
 - Apex Plastics
 - Southeastern Grain Company
 - Yamel Equipment & Trucking
 - Green Hills Recyclers
 - Brookfield Fabricating
- Other Private and Non-Profit interests, including underserved/vulnerable populations
 - Brookfield Senior Center
 - Marceline Senior Center
 - Life Care Center
 - McLarney Manor
 - Bristol Manor
 - Serve Link Home Care
 - Ministries in Linn County Food Bank

In addition to the invitations sent out to various stakeholders throughout the planning area, meeting notices were provided to all jurisdictions as well as flyers and social media posts that were used to promote the meetings. The information was also made available on GHRPC's website and Facebook page. A copy of the address labels, invitations, flyers, and social media posts can be found in Appendix B of the plan.

Additionally, the neighboring communities, located outside of the county, but with populations and structures located within Linn County were also invited to attend. (Please see Appendix B

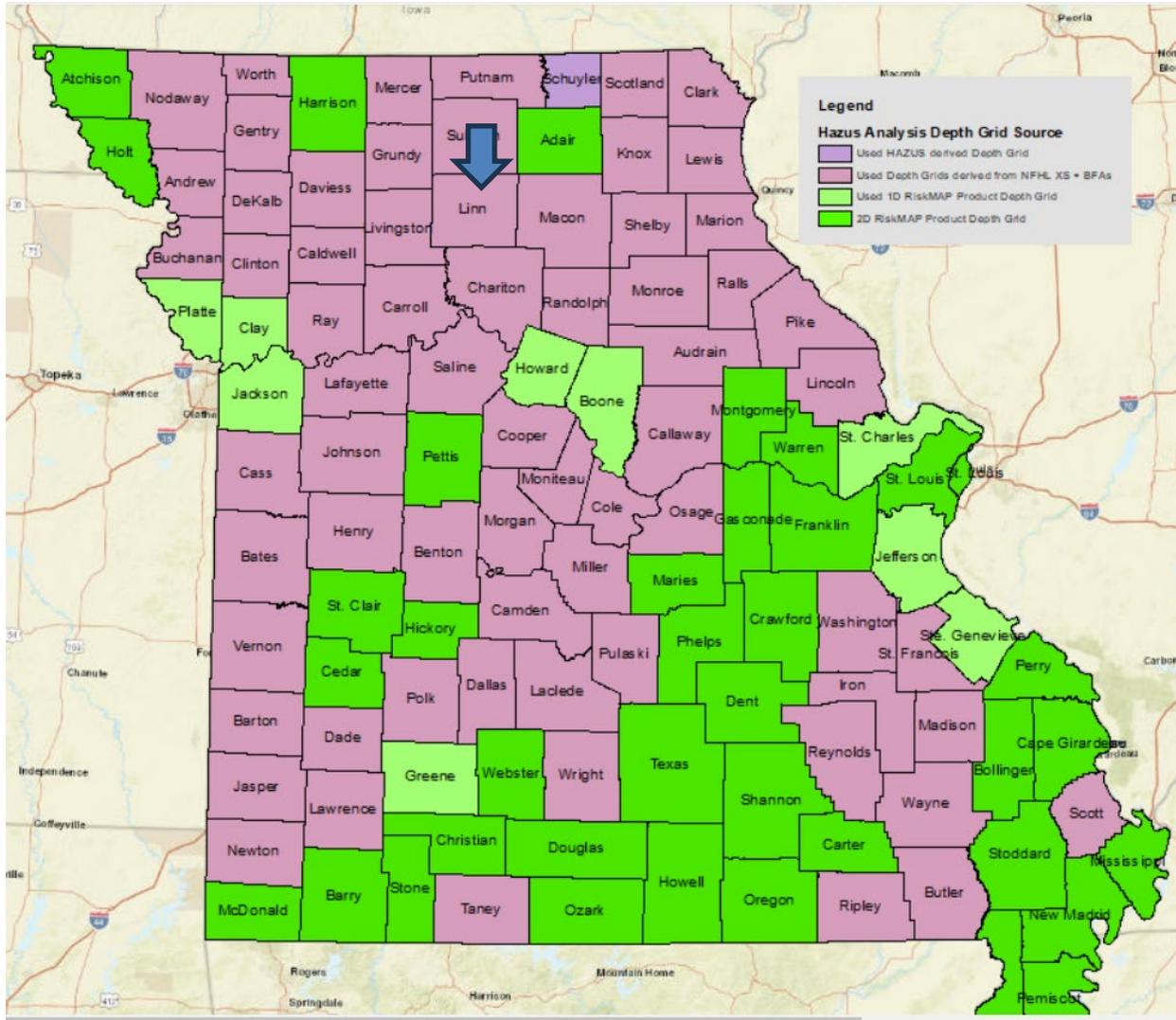
for a complete list of people and organizations invited to attend, envelop scans, and social media posts from GHRPC’s Facebook account).

There are a few organizations that are multijurisdictional in nature whose interests relate to hazard mitigation planning in Linn County. These groups were included in the invitation list for the meetings. Ideally, national organizations like the Red Cross should come to the table for this exercise, but Linn County is too small to have a local chapter. Additionally, in small communities, local officials wear many hats out of necessity. A volunteer firefighter might also be a city clerk, or an alderman may also serve on the school board.

In the interest of involving stakeholders throughout the planning area, invitations, flyers, and the QR Code for the public survey were sent to the following organizations and businesses inviting them to participate in the hazard mitigation planning process for Linn County, by either attending the meetings and/or completing the survey.

Coordination with FEMA Risk MAP Project

Figure 1.1. RiskMAP Study Status Map



Integration of Other Data, Reports, Studies, and Plans

- In order to complete the Linn County Hazard Mitigation Plan the following sources were implemented: the 2023 Missouri State Hazard Mitigation Plan, Hazard Mitigation Plans from areas near the planning area, the University of Missouri Extension Reports, Flood Insurance Studies (FIS), Flood Insurance Rate Maps (FIRMs), State Department of Natural Resources (DNR) dam information, the National Inventory of Dams (NID), dam inspection reports, state fire reports, Wildland/Urban Interface and Intermix areas from the SILVIS Lab - Department of Forest Ecology and Management - University of Wisconsin, local comprehensive plans, economic development plans, capital improvement plans, US Department of Agriculture’s (USDA) Risk Management Agency Crop Insurance Statistics, and local budgets.
- Relevant data from the above-mentioned sources was included in the plan where applicable. These sources were used to identify risks, previous losses, vulnerabilities, and provide additional information in the “risk assessment” for potential hazards. (See chapter 3)

Step 4: Assess the Hazard: Identify and Profile Hazards (Handbook Task 4)

- To adequately assess the issues, resources available on the Internet, existing reports and plans, information provided by jurisdictions on the Data Questionnaires, and HAZUS Data was utilized to compile information about each identified hazard. Each of the hazards was revised to include the most recent location data, previous occurrences, probability of future occurrence, and magnitude/severity. Losses were estimated using a combination of resources, including HAZUS data and information available from local resources. The data collection questionnaires, the 2023 Missouri State Hazard Mitigation Plan, and the 2021 Linn County Hazard Mitigation Plan were also utilized to assess the hazards.
- Meeting #1 discussed the hazards present in each jurisdiction. The MPC determined that the hazards included in the Linn County Hazard Mitigation Plan would be natural hazards only.
- During Meeting #3 the MPC was asked to review the completed data collection questionnaires, the survey results, and additional information provided by plan participants. Any additional information provided through the questionnaires was incorporated into the plan.

Step 5: Assess the Problem: Identify Assets and Estimate Losses (Handbook Task 4)

- During Meeting #2 the participants and GHRPC staff rated hazards on frequency and degree of impact. This risk assessment was used to determine which hazards had the most impact in terms of financial losses, frequency of occurrences, injuries, and/or deaths related to the hazards.
- Also, during Meeting #2 each jurisdiction was asked to provide information about vulnerable assets to said jurisdiction. Included were people, structures, economic assets, natural, historic, and cultural resources, critical facilities and infrastructure, community activities, and other assets.
- In cases where vulnerability estimates were unavailable, data from the 2023 Missouri State Hazard Mitigation Plan was utilized as the best and most recent data available. SEMA was also able to share some preliminary data from the 2023 State Plan update.
- The following information was used to determine the assets and estimate losses in Linn County: census, GIS data, HAZUS, and the Data Collection Questionnaire.
- Losses were estimated using the Missouri State Hazard Mitigation Plan and available HAZUS data for Linn County.

Step 6: Set Goals (Handbook Task 6)

At the 2nd planning meeting the MPC reviewed the goals of the previously approved plan, they made the determination to update the goals to better address the specific hazards to the region and make implementation and planning more efficient. The goals can be found in Section 4 of the Linn County Hazard Mitigation Plan. They were listed as follows:

- Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorms/high winds, hail, and lightning.

- Goal 2: Minimize property damage due to flooding, levee failure, and dam failure.
- Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures, and wildfire.
- Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather.
- Goal 5: Minimize injuries and property damage due to seismic and/or geological events.

Step 7: Review Possible Mitigation Actions and Activities ***(Handbook Task 6)***

At the #3 Meeting the MPC reviewed the mitigation strategy from the previously approved plan and the updated risk assessment and proposed new actions, if any.

- Each jurisdiction was provided with a Previous Actions Worksheet. This allowed them to report on progress made on previous actions, and determine which actions would be retained, modified, or deleted. MPC members were encouraged to continue forward only those actions that substantively addressed long-term risks identified in the risk assessment.
- Each jurisdiction was made aware that they were required to have at least one mitigation action for each identified hazard.
- The FEMA publication *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013)* was made available to the planning committee. It was suggested that this would be a valuable resource in guiding the planning activities to mitigate hazards in the planning area.
- Participants were encouraged to focus on long-term mitigation solutions and consideration was given to the potential cost of each project in relation to the anticipated future cost savings.
- The Linn County Hazard Mitigation Planning Committee utilized the STAPLEE method for evaluating the priority and effectiveness of each action. The completed STAPLEE worksheets can be found in Appendix C.

Step 8: Draft an Action Plan ***(Handbook Task 6)***

The action worksheets, including the plan for implementation, submitted by each jurisdiction for the updated Mitigation Strategy are included in Chapter 4.

Step 9: Adopt the Plan ***(Handbook Task 8)***

Each jurisdiction was made aware that they must adopt the plan prior to submission to SEMA. Each jurisdiction will document the adoption of the plan. This documentation can be found in Appendix E.

Step 10: Implement, Evaluate, and Revise the Plan ***(Handbook Tasks 7 & 9)***

At the 3rd planning meeting, where actions were scored and decided upon, the MPC along with the GHRPC Planner agreed to meet at least annually to determine if actions were

ongoing or completed. It was determined that the Hazard Mitigation Committee would utilize the existing emergency committee meetings once annually to discuss any needed updates, changes, or progress on the plan's actions. It was determined that at these meetings, any amendments that were needed in the plan would be discussed and undertaken if necessary. There is more detailed information about the strategy for plan maintenance in Chapter 5 of the Linn County Hazard Mitigation Plan.

2 PLANNING AREA PROFILE AND CAPABILITIES

2	PLANNING AREA PROFILE AND CAPABILITIES	2.1
2.1	<i>Linn County Planning Area Profile</i>	2.1
2.1.1	Geography, Geology and Topography	2.3
2.1.2	Climate	2.4
2.1.3	Population/Demographics	2.5
2.1.4	History.....	2.6
2.1.5	Occupations	2.7
2.1.6	Agriculture	2.8
2.1.7	FEMA Hazard Mitigation Assistance (HMA) Grants in Planning Area.....	2.8
2.1.8	FEMA Public Assistance (PA) Grants in Planning Area	2.8
2.2	<i>Jurisdictional Profiles and Mitigation Capabilities.....</i>	2.13
2.2.1	Unincorporated Linn County	2.13
2.2.2	City of Brookfield	2.16
2.2.3	City of Browning	2.18
2.2.4	City of Linneus.....	2.21
2.2.5	City of Marcelline.....	2.24
2.2.6	City of Purdin	2.27
2.2.7	Summary of Jurisdictional Capabilities	2.30
2.2.8	School District Profiles and Mitigation Capabilities	2.34

2.1 LINN COUNTY PLANNING AREA PROFILE

According to the US Census, the population estimate for Linn County as of American Community Survey for 2023 is 11,850 persons compared to the 2010 Census population of 12,761; a -7.2% decrease estimate in the Thirteen-year period. The decrease in population falls far behind the growth estimate for the State of Missouri for the same time period 3.4% and the Nation at 10.1%. According to the 2023 American Community Survey Estimates, Linn County has experienced a 13.9% decrease in population since the 2000 Census of 13,754.

Figure 2.1. Maps of Linn County

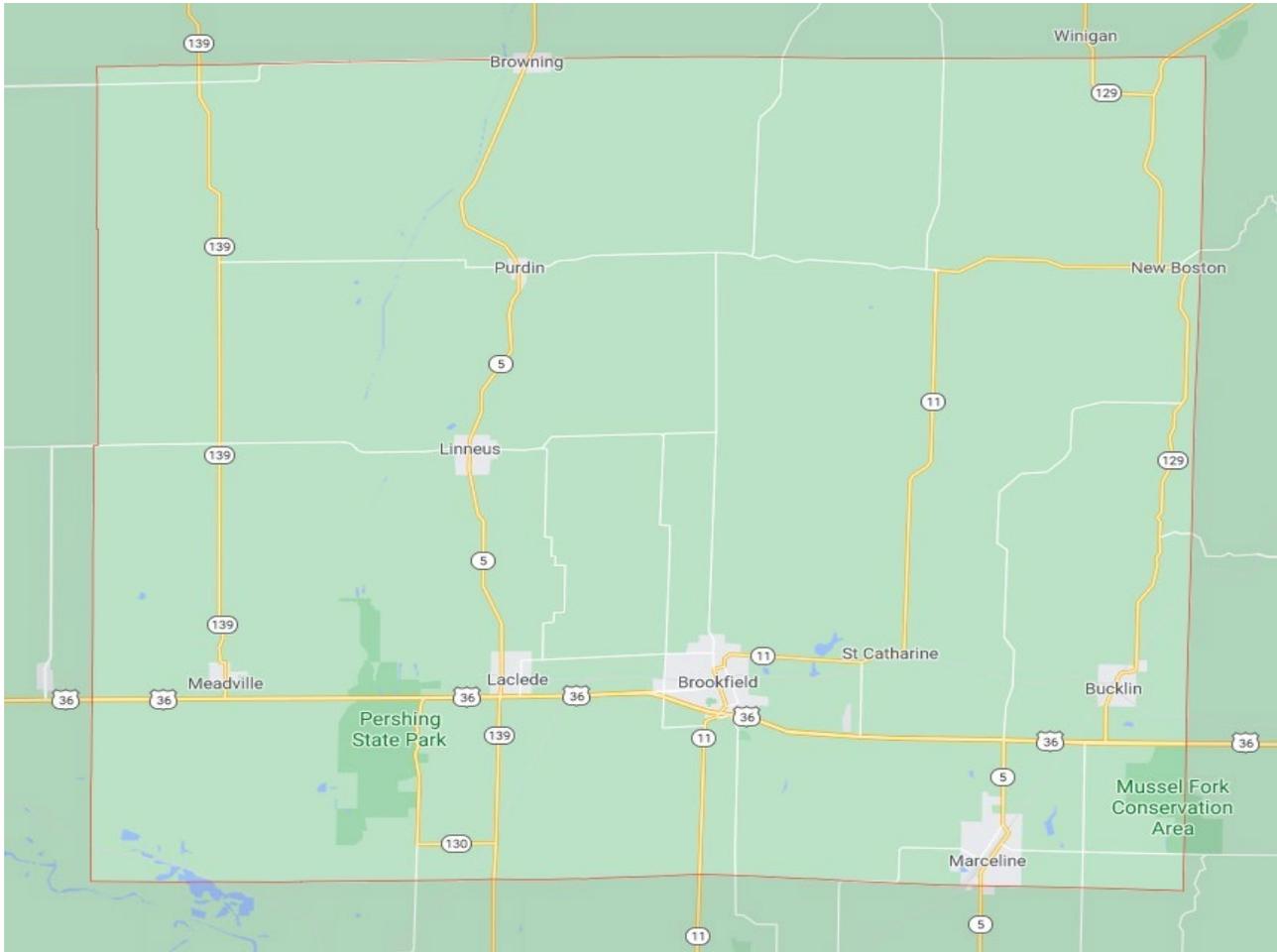


Figure 2.2 Map of Linn County (In Red)



2.1.1 Geography, Geology and Topography

Linn County has a total of 616 square miles of land and approximately 5.8 square miles of water, as reported by the U.S. Census Bureau. The County is a mix of residents living in unincorporated and incorporated areas. The City of Brookfield is the largest with a population of 4,128, the City of Marceline has a population of 2,269, the City of Meadville has a population of 493, the City of Bucklin has a population of 383, the City of Laclede has a population of 249, the City of Browning has a population of 260, the City of Linneus has a population of 187, and the City of Purdin has a population of 75 according to the 2023 Population Estimates Program from the U.S. Census Bureau. The remaining residents of Linn County live in unincorporated areas.

The county is rural and agriculture is the main enterprise in the county. Crops and pasture make up the bulk of the land cover, but there are some forested areas on the floodplains along major creeks and rivers.

The Lower Grand River Watershed runs north and south down the county. Badger Creek flows diagonally through the north side of Linn County and crosses over into the northeast side of the County into Macon County. Winnegan Creek runs from north to south down the eastern portion of the county, running into East Yellow Creek about halfway to the southern border. East Yellow Creek runs north and south in the eastern third of the County on the west side of Winnegan Creek. Long Branch runs from the middle eastern border of the county, diagonally south where it meets East Yellow Creek south of the point where Winnegan Creek joins East Yellow Creek and north of where Sights Branch filters into East Yellow Creek. Van Dorsen Creek runs on the east side of Bucklin and continues south across the north border of Chariton County west of Clarks Creek, which runs on the southwest corner of Bucklin and continues south in Chariton County.

West Yellow Creek runs from the north to south just east of the middle section of the County south and on the east side of Brookfield at the point where it meets Long Branch Creek and continues south into Chariton County. Turkey Creek begins in the middle of the county and runs south on the east side of Laclede, continuing into Chariton County. East Locust Creeks runs from the northern portion of the county, southwestern where it meets West Locust Creek, picking up Lick Branch to the

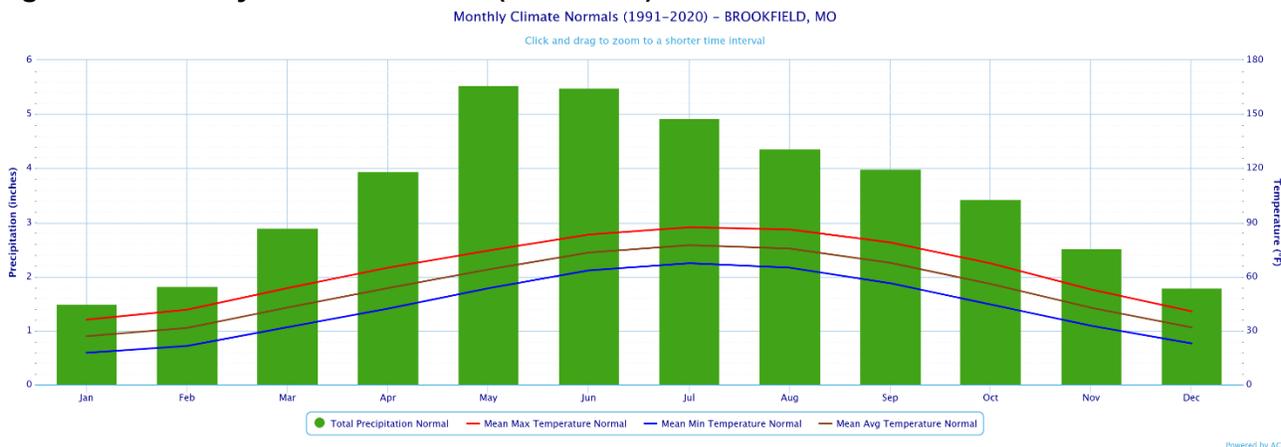
South, then Kemper Branch and finally Strawberry Branch as it runs south into Chariton County. Muddy Creek runs between Turkey Creek and East Locust Creek east of Linneus and continues south into Chariton County. Coon Creek runs on the far western side of the county from the northern County line, where it is joined by Patterson Branch, Parson Creek, Lousy Creek and Lewis Creek in the southwestern corner of the County line just west of Meadville.

There are five soil associations found in Linn County. The Portage-Fatima-Vesser Association occurs on broad floodplains along Locust Creek, covering approximately 11% of the County and is comprised of deep, nearly level, very poorly to moderately well-drained soils formed alluvium.

The Vessel-Blackboard-Fatima Association covers approximately 7% of the County and is comprised of deep, nearly level, poorly and moderately drained soils formed in alluvium on flood plains. The Lagonda-Armstrong-Grundy Association makes up about 15% of the County and is comprised of deep, very gently to strongly sloping, somewhat poorly drained soils that formed in loess, Pedi-sediments and glacial till, found on uplands. The Armstrong-Purdin Association makes up about 62% of the county and is comprised of deep, gently sloping to moderately steep, somewhat poorly drained and moderately well-drained soils that formed in glacial till and found on uplands. The Winnegan-Keswick Association makes up about 5% of the County and is comprised of deep, moderately sloping to steep, moderately well drained soils that formed in glacial tills on uplands.

2.1.2 Climate

Figure 2.2 Monthly Climate normals (1991-2020) Brookfield



Source: <https://xmacis.rcc-acis.org/> NOAA Data – June 2025

Table 2.1. Brookfield monthly climate normals 1991-2020

Month	Total Precipitation Normal (inches)	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	1.50	36.1	17.7	26.9
February	1.82	41.6	21.5	31.5
March	2.90	53.6	31.9	42.8
April	3.95	64.9	42.2	53.6
May	5.53	74.4	53.5	63.9
June	5.49	83.3	63.4	73.3
July	4.92	87.3	67.4	77.4

August	4.37	86.1	64.9	75.5
September	3.99	78.9	56.3	67.6
October	3.43	67.3	44.5	55.9
November	2.52	52.8	32.7	42.7
December	1.80	40.7	22.9	31.8
Annual	42.22	63.9	43.2	53.6

Source: <https://xmacis.rcc-acis.org/> NOAA Data – June 2025

2.1.3 Population/Demographics

As of the 2020 census, Linn County, Missouri, had a population of 11,874, with a slight projected decrease to 11,721 by 2025. The county's demographics are predominantly White, with approximately 92.86% identifying as White (Non-Hispanic) in 2020, followed by smaller percentages of Black or African American, Native American, Asian, and those of two or more races. Hispanic or Latino residents make up about 2.43% of the population. The median age in Linn County is around 42.4 years, which is higher than the state and national averages, indicating a relatively older population. The median household income was reported at \$61,975 in 2023, and a significant majority of residents own their homes.

Table 2.2. Linn County Population 2010-2020 by Jurisdiction

Jurisdiction	2010 Population	2020 Population	2023 Annual Population Estimate or ACS Population	# Change (2010-2023)	% Change (2010-2023)
Linn County	12,762	11,874	11,850	-912	-7.1%
Linn County,	3,979	3,866	3,806	-173	-4.3%
City of Brookfield	4,542	4,111	4,128	-414	-9.1%
City of Browning	265	219	260	-5	-1.8%
City of Bucklin	467	413	383	-84	-17.9%
City of Laclede	345	305	249	-96	-27.8%
City of Linneus	278	281	187	-91	-32.7%
City of Marceline	2,234	2,123	2,269	+35	+1.5%
City of Meadville	462	415	493	+31	+6.7%
City of Purdin	190	141	75	-115	-60.9%

Source: U.S. Bureau of the Census, Decennial Census, annual population estimates/ 5-Year American Community Survey 2023;
*population includes the portions of these cities in adjacent counties

Table 2.3. Population of Linn County under 5 and over 65

Jurisdiction	Population Under 5	% Population Under 5	Population 65 and over	% Population 65 and over
Linn County	701	5.9%	2633	22.2%
City of Brookfield	244	5.9%	940	22.9%
City of Browning	15	6.8%	35	16.0%
City of Bucklin	19	4.6%	124	30.0%
City of Laclede	14	4.6%	77	25.2%
City of Linneus	23	8.2%	51	18.1%
City of Marceline	145	6.8%	419	19.7%
City of Meadville	27	6.5%	68	16.4%
City of Purdin	4	2.8%	27	17.7%

Source: U.S. Census Bureau, Profile of General Population and Housing Characteristics (DP1)

Table 2.4. Population under five and over sixty-five

Jurisdiction	Population Under 5	% Population Under 5	Population 65 and over	% Population 65 and over
Linn County	701	5.9%	2633	22.2%
City of Brookfield	244	5.9%	940	22.9%
City of Browning	15	6.8%	35	16.0%
City of Bucklin	19	4.6%	124	30.0%
City of Laclede	14	4.6%	77	25.2%
City of Linneus	23	8.2%	51	18.1%
City of Marceline	145	6.8%	419	19.7%
City of Meadville	27	6.5%	68	16.4%
City of Purdin	4	2.8%	27	17.7%

Source: U.S. Census Bureau, Profile of General Population and Housing Characteristics (DP1)

Table 2.5. Unemployment, Poverty, Education, and Language Percentage Demographics, Linn 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
Linn County	5,765	2.6%	16.2%	66.1%	20.1%	2.8%
Brookfield	1,992	2.8%	19.9%	63.1%	14.9%	0.8%
Browning	102	2.0%	38.0%	61.1%	1.1%	6.7%
Bucklin	131	3.1%	27.2%	68.4%	15.1%	1.1%
Laclede	116	6.0%	7.2%	66.6%	11.5%	0.8%
Linneus	83	2.4%	19.8%	64.7%	5.8%	8.4%
Marceline	1,084	3.6%	24.0%	63.8%	16.9%	0.8%
Meadville	247	0.0%	2.2%	61.4%	22.5%	2.0%
Purdin	30	0.0%	22.7%	60.0%	0.0%	0.0%
Missouri	3,180,243	3.4%	12.0%	92.0%	33.2%	7.0%
Nation	171,742,922	4.3%	12.5%	89.8%	36.2%	22.5%

Source: U.S. Census, 2023 American Community Survey, 5-year Estimates.

2.1.4 History

Linn County Missouri; organized on January 6, 1837 from Chariton County, was named for Lewis F Linn; US Senator (November 5, 1796 – October 3, 1843). The County Seat is Linneus, Missouri. The first settler is not recorded until 1832. At that time Linn County was a part of Chariton County which is among the oldest counties in the State having been organized in 1820.

From the year 1820 to the year 1830 this portion of the State of Missouri was known to the people of Missouri--those of Howard and Chariton Counties, especially--as the "Locust Creek Country". Among the Howard County hunters who visited the "Locust Creek Country" were James Pendleton and Joseph Newton, who lived near Fayette, and who came here with their brothers solely to hunt. But they were greatly pleased with the country and at last determined to locate. Accordingly, in the fall of 1831, they came to Section 14, Township 58, Range 21, where now is the southwest corner of Locust Creek Township, and located a claim. Together they built a cabin

and fenced five or six acres of ground that fall. Then they went back to Howard County and returned the next spring with their families. Pendleton and Newton were not only the first white settlers in Locust Creek Township, but the first in Linn County.

Sometime in 1832 Silas and Peter Fore came to Section 29, Township 59, Range 20, about two miles northeast of Linneus. The act of the Legislature organizing Linn County directed the courts should be held at the house of Silas Fore. It is found that James Pendleton and William Howell raised the first two cabins in the township; that the Bowyers, Newtons, etc., followed closely; that John Holland settled first on the site of Linneus and that the old town of Linneus was the gift of "Jack Holland" and wife for a permanent county seat; that from the "Black Hawk War" Linn County seemed to grow and prosper. So much so that her people were ready in the winter of 1836-37 to be cut loose from Chariton County. On January 6, 1837, the Governor approved the bill, passed by the Legislature, and Linn County from that day received recognition.

A settlement sprang up on Parsons' Creek, in what is now Jackson Township in 1838, some settlers dating earlier. The Kirbys, Singletons and others came from Kentucky. It may be mentioned here that Linn' County was principally settled by Kentuckians.

The first mill erected in the county was a horse-mill by William and Jesse Bowyers, on the east side of Locust Creek, west of the fairgrounds about the year 1834.

In the year 1867 there was a discussion of a proposition to organize a new county to be called Grant, and to be composed of portions of Linn, Macon, and Chariton Counties. The scheme had many advocates, but failed, and never made sufficient headway to be of serious consequence. Bucklin was proposed for the county seat of "Grant County" should it ever be organized.

Linn County had two railroad divisions; Brookfield, on the Chicago, Burlington and Quincy railroad and Marceline, on the Atchison, Topeka & Santa Fe railroad. This assured commercial progress of these two areas.

Browning, located partly in Linn and partly in Sullivan Counties, was considered a "good trading point". The plat was filed and recorded November 20, 1872. Bucklin located in east Linn and at the junction of the "Burlington" and the "Santa Fe" enjoyed steady growth and good mercantile establishments. The plat was filed and recorded January 1, 1855.

Laclede, at the Junction of the old Hannibal & St. Joseph Railroad and the Burlington & Southwestern, was often remarked as being the most beautiful in Linn County for a town. The plat was filed and recorded August 20, 1853.

Meadville, located west of Laclede, was formerly known as "Bottsville" in honor of its founder. It always enjoyed good trade. The plat was filed and recorded on February 27th, 1860. Purdin, located north of Linneus and on the railroad enjoyed extensive trade. The plat was filed and recorded on May 28th, 1873. Linneus, the County Seat, was laid out December 2, 1839. Linneus was incorporated as a town March 2, 1856, and as a city March 7, 1863.

2.1.5 Occupations

Linn County, Missouri, has a diverse occupational landscape, but its economic backbone is firmly rooted in manufacturing and agriculture. Manufacturing is a significant employer, with a higher percentage of the private sector workforce engaged in this industry compared to the state and national averages. Beyond these core sectors, healthcare and social assistance also represent a

substantial portion of employment, followed by public administration. Other notable job groups include office and administrative support, and production occupations. While agriculture remains deeply ingrained in the county's identity, many families involved in farming also hold full-time jobs in other industries, reflecting a mixed economic environment.

Table 2.6. Occupation Statistics, Linn 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
Linn County	1,693	928	1,168	706	1,112
Brookfield	400	348	596	182	410
Browning	24	48	6	3	19
Bucklin	48	37	8	6	28
Laclede	28	25	25	11	20
Linneus	12	19	16	24	10
Marceline	299	163	137	152	294
Meadville	97	52	47	23	28
Purdin	15	5	6	2	2

Source: U.S. Census, 2023 American Community Survey, 5-year Estimates.

2.1.6 Agriculture

The Linn County Profile of the 2022 Census of Agriculture indicated that the county has a total of 957 farms with a total of 326,008 acres. The average farm size is 340 acres, which is 49 acres above the State average of 291 acres. Land use on Linn County farms breaks out as cropland with 59%, pastureland with 24%, woodland at 10% and all other use types makeup the remaining 7% of use. The top crop for Linn County is soybeans with 78,049 acres planted. Hay and all other forage is the second crop producer with 43,692 planted, followed by 29,940 planted acres of corn, and 5,751 acres of wheat planted. The average sales per farm is \$125,619 with crop sales making up 74% and livestock, poultry and products making up the other 26% of the sales.

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

While there have been Disaster Declarations for Linn County, there is no record of Hazard Mitigation Grants. As of June 2025, there is no record of FEMA Hazard Mitigation Grants awarded in the Linn County planning area

2.1.8 FEMA Public Assistance (PA) Grants in Planning Area

In the last 25 years, 2000-2025, 13 different federally declared disasters have impacted Linn County resulting in \$5,274,527.31 in impacts to the county. On average since 2000 Linn County has had a federally declared disaster every 1.8 years.

Roads and Bridges were the commonly damaged items with 138 projects, which lead to \$2,811,826.21 or more than 53% of the total in damages. Emergency Protective Measures was the second highest category with 15 projects totaling \$213,280.52

Table 2.7. FEMA PA Grants in Linn County from 1993-2024

Disaster Declaration	Project Type	Project Size	Project Total
1403	Emergency Work Donated Resources	Small	\$3,480.00
1403	Emergency Protective Measures	Small	\$1,892.96
1403	Debris Removal	Small	\$43,839.00
1403	Debris Removal	Small	\$33,498.04
1403	Debris Removal	Small	\$6,137.85
1403	Utilities	Large	\$127,115.92
1403	Emergency Protective Measures	Small	\$6,990.73
1403	Emergency Protective Measures	Small	\$2,293.94
1403	Debris Removal	Small	\$6,170.98
1412	Roads and Bridges	Small	\$5,897.76
1412	Roads and Bridges	Small	\$11,668.67
1412	Emergency Protective Measures	Small	\$3,149.38
1412	Roads and Bridges	Small	\$4,045.72
1412	Roads and Bridges	Small	\$8,058.61
1412	Roads and Bridges	Small	\$14,966.41
1412	Debris Removal	Small	\$8,000.00
1412	Roads and Bridges	Small	\$14,244.10
1412	Roads and Bridges	Small	\$4,893.26
1412	Roads and Bridges	Small	\$10,578.44
1412	Roads and Bridges	Small	\$1,035.00
1412	Roads and Bridges	Small	\$10,055.35
1412	Roads and Bridges	Small	\$15,176.85
1412	Roads and Bridges	Small	\$6,927.48
1412	Roads and Bridges	Small	\$16,054.33
1412	Roads and Bridges	Small	\$10,060.60
1412	Roads and Bridges	Small	\$18,743.71
1412	Roads and Bridges	Small	\$11,024.31
1412	Utilities	Small	\$8,500.00
1412	Roads and Bridges	Small	\$11,697.21
1412	Roads and Bridges	Small	\$9,747.32
1412	Roads and Bridges	Small	\$7,577.00
1412	Roads and Bridges	Small	\$16,506.95
1412	Roads and Bridges	Small	\$8,643.95
1412	Roads and Bridges	Small	\$5,323.76
1708	Roads and Bridges	Small	\$18,743.50
1708	Roads and Bridges	Small	\$8,064.60
1708	Roads and Bridges	Small	\$4,216.80
1708	Roads and Bridges	Small	\$7,460.08
1708	Roads and Bridges	Small	\$4,863.10
1708	Roads and Bridges	Small	\$5,536.21
1708	Roads and Bridges	Small	\$1,095.25
1708	Roads and Bridges	Small	\$9,148.00
1708	Roads and Bridges	Small	\$2,568.39
1708	Roads and Bridges	Small	\$4,560.27
1708	Roads and Bridges	Small	\$3,289.31
1708	Roads and Bridges	Small	\$6,313.48
1708	Roads and Bridges	Small	\$3,572.84
1708	Roads and Bridges	Small	\$11,142.00
1708	Roads and Bridges	Small	\$5,407.00

1708	Roads and Bridges	Small	\$4,535.64
1708	Roads and Bridges	Small	\$14,272.19
1708	Roads and Bridges	Small	\$3,900.78
1708	Roads and Bridges	Small	\$3,619.75
1708	Roads and Bridges	Small	\$2,896.41
1708	Roads and Bridges	Small	\$5,021.40
1708	Roads and Bridges	Small	\$9,501.25
1708	Roads and Bridges	Small	\$4,286.64
1708	Roads and Bridges	Small	\$3,883.00
1708	Roads and Bridges	Small	\$3,217.00
1708	Roads and Bridges	Small	\$2,017.35
1708	Roads and Bridges	Small	\$4,264.00
1708	Roads and Bridges	Small	\$4,133.00
1708	Roads and Bridges	Small	\$24,073.60
1708	Roads and Bridges	Small	\$39,466.00
1708	Roads and Bridges	Small	\$4,600.00
1708	Roads and Bridges	Small	\$8,026.31
1708	Roads and Bridges	Small	\$8,459.97
1708	Roads and Bridges	Small	\$6,076.75
1708	Roads and Bridges	Small	\$2,464.52
1708	Roads and Bridges	Small	\$4,065.50
1773	Roads and Bridges	Small	\$9,272.32
1773	Roads and Bridges	Small	\$15,941.40
1773	Roads and Bridges	Small	\$12,970.75
1773	Roads and Bridges	Small	\$16,223.48
1773	Water Control Facilities	Small	\$2,000.00
1773	Roads and Bridges	Small	\$44,681.37
1773	Roads and Bridges	Small	\$11,266.50
1773	Roads and Bridges	Small	\$42,769.26
1773	Roads and Bridges	Small	\$19,157.64
1773	Emergency Protective Measures	Small	\$1,521.16
1773	Roads and Bridges	Small	\$5,913.90
1773	Roads and Bridges	Small	\$3,942.50
1773	Utilities	Small	\$26,825.29
1773	Roads and Bridges	Small	\$2,539.72
1773	Roads and Bridges	Small	\$15,996.33
1773	Roads and Bridges	Small	\$11,643.48
1773	Roads and Bridges	Small	\$6,383.56
1773	Roads and Bridges	Small	\$30,527.99
1773	Roads and Bridges	Small	\$16,487.19
1773	Roads and Bridges	Small	\$19,507.43
1773	Roads and Bridges	Small	\$18,809.33
1773	Roads and Bridges	Large	\$65,956.21
1773	Roads and Bridges	Small	\$35,624.05
1773	Roads and Bridges	Small	\$39,491.32
1773	Utilities	Small	\$21,011.32
1773	Utilities	Small	\$1,120.74
1773	Roads and Bridges	Small	\$7,071.60
1773	Roads and Bridges	Small	\$17,313.74
1773	Roads and Bridges	Small	\$10,435.35
1773	Roads and Bridges	Small	\$15,277.71
1809	Water Control Facilities	Large	\$1,500,766.68
1809	Emergency Protective Measures	Small	\$16,636.21
1809	Buildings and Equipment	Small	\$1,000.00
1809	Utilities	Small	\$34,107.98
1809	Emergency Protective Measures	Small	\$20,000.00
1847	Roads and Bridges	Small	\$10,132.59
1847	Roads and Bridges	Small	\$6,853.14
1934	Roads and Bridges	Small	\$20,621.62

1934	Roads and Bridges	Small	\$31,077.16
1934	Utilities	Small	\$10,672.42
1934	Roads and Bridges	Small	\$2,892.00
1934	Roads and Bridges	Small	\$29,155.47
1934	Roads and Bridges	Small	\$5,024.19
1934	Roads and Bridges	Small	\$11,798.23
1934	Roads and Bridges	Small	\$14,518.59
1934	Roads and Bridges	Small	\$8,995.82
1934	Roads and Bridges	Small	\$28,928.95
1934	Roads and Bridges	Small	\$50,868.26
1934	Roads and Bridges	Small	\$32,411.40
1934	Roads and Bridges	Small	\$52,917.74
1934	Utilities	Small	\$5,760.00
1934	Roads and Bridges	Small	\$9,158.56
1934	Roads and Bridges	Small	\$41,859.87
1934	Roads and Bridges	Small	\$50,827.68
1934	Roads and Bridges	Small	\$6,765.55
1934	Roads and Bridges	Small	\$4,435.80
1934	Roads and Bridges	Small	\$4,126.77
1961	Emergency Protective Measures	Small	\$29,658.81
1961	Emergency Protective Measures	Small	\$3,548.52
1961	Roads and Bridges	Small	\$2,322.98
1961	Emergency Work Donated Resources	Small	\$626.56
1961	Emergency Work Donated Resources	Small	\$1,396.65
1961	Emergency Protective Measures	Small	\$1,519.00
1961	Emergency Work Donated Resources	Small	\$2,329.99
1961	Emergency Protective Measures	Small	\$1,468.50
1961	Emergency Protective Measures	Small	\$2,216.25
1961	Emergency Work Donated Resources	Small	\$340.00
1961	Emergency Protective Measures	Large	\$107,478.57
1961	Emergency Work Donated Resources	Small	\$14,167.94
1961	Emergency Protective Measures	Small	\$13,702.74
1961	Roads and Bridges	Small	\$4,965.81
1961	Emergency Protective Measures	Small	\$1,203.75
4200	Roads and Bridges	Small	\$6,808.58
4200	Roads and Bridges	Small	\$52,320.79
4200	Utilities	Small	\$37,146.86
4200	Roads and Bridges	Small	\$24,896.20
4200	Roads and Bridges	Small	\$114,253.64
4200	Roads and Bridges	Small	\$31,851.09
4200	Roads and Bridges	Small	\$35,294.65
4200	Roads and Bridges	Small	\$116,691.96
4200	Roads and Bridges	Small	\$38,358.21
4200	Roads and Bridges	Small	\$86,902.54
4200	Roads and Bridges	Small	\$30,839.60
4200	Roads and Bridges	Small	\$19,984.63
4200	Roads and Bridges	Small	\$8,760.04
4200	Roads and Bridges	Small	\$22,165.50
4200	Roads and Bridges	Small	\$22,212.65
4200	Roads and Bridges	Small	\$69,465.80
4200	Parks, Recreational Facilities, and Other Items	Small	\$45,283.68
4200	Roads and Bridges	Small	\$77,047.11
4200	Roads and Bridges	Small	\$4,776.63
4200	Roads and Bridges	Small	\$16,905.67
4200	Roads and Bridges	Small	\$7,044.47
4238	Public Buildings	Small	\$40,616.33
4238	Public Utilities	Small	\$32,200.00
4238	Roads and Bridges	Small	\$48,141.38
4238	Roads and Bridges	Small	\$29,539.41

4238	Roads and Bridges	Small	\$36,355.09
4238	Roads and Bridges	Small	\$10,284.18
4238	Recreational or Other	Small	\$32,150.00
4238	Roads and Bridges	Small	\$84,382.24
4238	Roads and Bridges	Small	\$7,266.66
4238	Roads and Bridges	Small	\$25,706.65
4238	Roads and Bridges	Small	\$81,216.91
4238	Roads and Bridges	Small	\$36,298.37
4238	Roads and Bridges	Small	\$115,119.29
4238	Roads and Bridges	Small	\$9,683.04
4238	Roads and Bridges	Small	\$18,355.60
4238	Protective Measures	Small	\$20,821.51
4238	Debris Removal	Small	\$28,470.00
4238	Roads and Bridges	Small	\$66,852.94
4238	Public Buildings	Large	\$153,864.84
4238	Roads and Bridges	Small	\$48,493.70
Total			\$5,274,527.31

Source: Federal Emergency Management Agency – June 2025

2.2 JURISDICTIONAL PROFILES AND MITIGATION CAPABILITIES

Linn County, Missouri, faces a range of natural hazards common to the Midwest, with severe storms being the most frequent and impactful. This includes a significant risk of tornadoes, as Missouri is part of "Tornado Alley," and the county has experienced documented tornado events in recent history. Flooding is also a recurring concern, often associated with heavy rainfall from severe storms, and the county has numerous dams for flood risk reduction.

Beyond immediate severe weather, drought is another significant hazard, potentially impacting the predominantly agricultural economy. While less common, winter storms can bring heavy snow and ice, causing disruptions and power outages. Finally, while the risk is considered very low, Linn County is situated within a region that has experienced earthquakes, though the likelihood of a major seismic event directly affecting the county is minimal compared to other hazards. Heat waves are also a periodic concern, especially during summer months, leading to high heat index values.

2.2.1 Unincorporated Linn County

Linn County is situated in the north-central part of Missouri, strategically located within the state. Its county seat is Linneus, though Brookfield is the largest city. The county shares borders with Sullivan County to the north, Adair County to the northeast, Macon County to the east, Chariton County to the south, Livingston County to the west, and Grundy County to the northwest. Major transportation routes, including U.S. Highway 36, traverse the county, connecting it to larger regional networks. This central location in northern Missouri makes it accessible while retaining its rural, agricultural character.

Linn County, Missouri, operates with a set of elected officials who form the core of its local government, each responsible for specific aspects of county administration. Key elected positions include the County Clerk, who serves as the chief election official and maintains records of County Commission proceedings, payroll, and liquor licenses. The Sheriff is the county's chief law enforcement officer, overseeing deputies, conducting investigations, enforcing laws, and managing inmate transport. The Assessor is tasked with valuing all real and personal property within the county for tax purposes, conducting biennial reassessments to ensure equitable taxation. Other important elected offices include the Collector/Treasurer, responsible for collecting taxes and serving as the custodian of all county funds, carefully accounting for revenues and expenditures.

Further elected roles that ensure the county's functionality include the Presiding Commissioner and two District Commissioners, who collectively form the County Commission, the governing body responsible for county policy and budget. The Prosecuting Attorney handles criminal cases and legal matters for the county, while the Circuit Clerk maintains court records and authenticates court orders. The Recorder of Deeds is crucial for maintaining public property records, including deeds, mortgages, and liens. Finally, the Public Administrator acts as a court-appointed representative for individuals unable to care for themselves or their property, such as deceased persons or incapacitated individuals, when no other competent person is available. These interconnected offices and departments work together to provide essential services and uphold the legal and administrative framework of Linn County.

Mitigation Initiatives/Capabilities

The County has few ordinances in place. The County does have an Emergency Management Director (EMD) and has a Local Emergency Planning committee (LEPC). The EMD plans and

directs disaster responses or crisis management activities, provides disaster preparedness training, and prepares emergency plans and procedures for natural disasters. The County has a County Emergency Plan, County Mitigation Plan, and Mutual Aid Agreements. Agriculture makes up the majority of the county.

The County has had limited mitigation activities due to limited capabilities. The County expanding its mitigation capabilities is unlikely, due to limited capabilities, both financially and in terms of staff availability.

Table 2.8. Unincorporated Linn County Mitigation Capabilities

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	N/A
County Emergency Operations Plan	Yes, 2018
Local Recovery Plan	N/A
County Recovery Plan	Yes – part of Emergency Operations Plan
City Mitigation Plan	N/A
County Mitigation Plan	Yes – 2021
Debris Management Plan	N/A
Economic Development Plan	N/A
Transportation Plan	Member of MODOT TAC
Land-use Plan	N/A
Flood Mitigation Assistance (FMA) Plan	N/A
Watershed Plan	Yes – East Yellow Creek
Firewise or other fire mitigation plan	N/A
School Mitigation Plan	N/A
Critical Facilities Plan	Yes – part of Emergency Operations Plan
Policies/Ordinance	
Zoning Ordinance	N/A
Building Code	N/A
Floodplain Ordinance	N/A
Subdivision Ordinance	N/A
Tree Trimming Ordinance	N/A
Nuisance Ordinance	N/A
Stormwater Ordinance	N/A
Drainage Ordinance	N/A
Seismic Construction Ordinance	N/A
Site Plan Review Requirements	N/A
Historic Preservation Ordinance	N/A
Landscape Ordinance	N/A
Debris Management Plan	N/A
Program	
Zoning/Land Use Restrictions	N/A
Codes Building Site/Design	N/A
Hazard Awareness Program	N/A
National Flood Insurance Program (NFIP)	N/A
NFIP Community Rating System (CRS) program	N/A

Capabilities	Status, Including Date of Document or Policy
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
Economic Development Program	Yes – Enhanced Enterprise Zone
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 – Sheriff, Hazmat, Fire Districts
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	N/A
Hazard Analysis/Risk Assessment (County)	N/A
Flood Insurance Maps	N/A
FEMA Flood Insurance Study (Detailed)	N/A
Evacuation Route Map	N/A
Critical Facilities Inventory	Yes – LEPC
Vulnerable Population Inventory	N/A
Land Use Map	N/A
Staff/Department	
Building Code Official	N/A
Building Inspector	N/A
Mapping Specialist (GIS)	Yes – Contracted
Engineer	N/A
Development Planner	N/A
Public Works Official	N/A
Emergency Management Director	Yes
NFIP Floodplain Administrator	N/A
Emergency Response Team	Yes
Hazardous Materials Expert	Yes
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	N/A
Transportation Department	Yes – Coordinate w/MODOT TAC
Economic Development Department	N/A
Housing Department	N/A
Historic Preservation	N/A
Non-Governmental Organizations (NGOs)	
American Red Cross	Yes
Salvation Army	N/A
Veterans Groups	Yes – VFW, American Legion
Local Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	Yes – Brookfield, Marceline
Community Organizations (Lions, Kiwanis, etc.)	Yes – Knights of Columbus, Historical Society, Beta Sigma Phi, Odd Fellows, Elks, Masons, Kiwanis, Rotary, 4-H, Ducks Unlimited

Capabilities	Status, Including Date of Document or Policy
Local Funding Availability	
Apply for Community Development Block Grants	Yes – Partner with GHRPC
Fund projects through Capital	Yes – Road & Bridge
Authority to levy taxes for a specific purpose	Yes – With voter approval
Fees for water, sewer, gas, or electric services	N/A
Impact fees for new development	Yes – Enterprise incentive
Ability to incur debt through general obligation bonds	Yes – With voter approval
Ability to incur debt through special tax bonds	Yes – With voter approval
Ability to incur debt through private activities	N/A
Withhold spending in hazard prone areas	N/A

Source: Data Collection Questionnaire, 11/2025

2.2.2 City of Brookfield

Brookfield, Missouri, is strategically located in the north-central part of the state, within Linn County. It serves as the largest city in the county and a significant hub for commerce, industry, education, and healthcare for Linn County and surrounding rural areas. Its location is particularly notable due to the intersection of U.S. Highways 36 and 11, with Highway 36 being a major four-lane transportation corridor connecting Kansas to the Illinois state line. This accessibility, combined with its historical ties to the Hannibal and St. Joseph Railroad, has shaped Brookfield's development as a central point in the region.

Brookfield, Missouri, traces its origins to 1859, when it was surveyed by John Wood Brooks, a Boston native and civil engineer for the Hannibal and St. Joseph Railroad. The town's very layout, with streets named John, Wood, Brooks, and Boston, serves as a direct nod to its founder and his hometown. Its strategic location along the first railroad built across Missouri, completed in February 1859, was the driving force behind its early development. Originally a swampy area known as "The Scatters," Brookfield quickly transformed into a vital railroad hub, serving as the division headquarters with a roundhouse, hotel, and dining room, attracting settlers and businesses. Incorporated in 1865, Brookfield steadily grew, becoming a center of commerce and community in Linn County.

Mitigation Initiatives/Capabilities

The City of Brookfield has ordinances related to zoning, building codes, flood plain management, storm water, drainage and a debris management plan. The city enforces a nuisance ordinance through a full-time staff position, flood plain administration is handled through a part-time position. Zoning is regulated through a planning and zoning board.

The city does have an Emergency Management Director (EMD), It follows the county emergency plan. The city has participated in the County Emergency Plan, County Mitigation Plan, and Mutual Aid Agreements processes.

The city of Brookfield has had limited mitigation activities due to limited capabilities. The city expanding its mitigation capabilities is unlikely due to limited capabilities, both financially and in terms of staff availability.

Table 2.9. Brookfield Mitigation Capabilities

Capability	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	Yes
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	Yes, adoption of the county plan
County Emergency Plan	Yes
Local Recovery Plan	Yes, adoption of the county plan
County Recovery Plan	Yes
Local Mitigation Plan	No
County Mitigation Plan	No
Economic Development Plan	No
Transportation Plan	No
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	Yes
Building Code	Yes
Floodplain Ordinance	Yes
Subdivision Ordinance	Yes
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Storm Water Ordinance	Yes
Drainage Ordinance	Yes
Seismic Construction Ordinance	Yes
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	Yes
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	No
NFIP Community Rating System (CRS) Participating Community	Yes
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	Yes – 6
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	Yes, weather spotter training, education through social media
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes
Evacuation Route Map	No

Capability	Status, Including Date of Document or Policy
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	Yes, full-time
Building Inspector	Yes, full-time
Mapping Specialist (GIS)	Yes, contracted
Engineer	Yes, contracted
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	Yes, full-time
NFIP Floodplain Administrator	Yes, part-time
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Yes, contracted
Transportation Department	Yes, full-time
Economic Development Department	Yes, full-time
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	Yes, 3
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes, Ducks Unlimited, Kiwanis, Boy Scouts, Girl Scouts, Brookfield Area Growth Partnership, Ministerial Alliance, Eagles, Shriners, Knights of Columbus, 4-H, Masons, Rotary, Whitetail Unlimited, Elks, Lions
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to 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, water and sewer
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes, with voter approval
Ability to incur debt through special tax bonds	Yes, with voter approval
Ability to incur debt through private activities	Yes, with voter approval
Ability to withhold spending in hazard prone areas	Yes

Source: Data Collection Questionnaire, 1/2026

Additional Questions

The city operates with a mayor and 4 councilmen. The community has 6 outdoor warning sirens, activated by 911 dispatch. Other warning systems like Cable Override or Reverse 911 are not used. There are FEMA-compliant tornado shelters located at 116 W Brooks St, but they are small and not ADA compliant. No new development is planned for hazard areas, including the floodplain.

2.2.3 City of Browning

Browning, Missouri, is a small, rural community located in north-central Missouri. What makes its location particularly noteworthy is that it straddles the county line, with parts of the town lying in both Linn County and Sullivan County. It is situated along Missouri Route 5, a state highway that provides local connectivity, and Locust Creek flows along its western edge. This setting places Browning within a largely agricultural landscape, typical of this region of Missouri.

As of the 2020 census, Browning had a population of 219 residents, reflecting a continued trend of slight population decline over the past few decades. Demographically, Browning is a predominantly White community, with over 90% of its residents identifying as White. The median age in Browning tends to be higher than the state average, indicating an older population. The median household income is considerably lower than both state and national averages, and a significant portion of its families face poverty. This demographic profile is characteristic of many small, rural towns in the Midwest that have experienced economic shifts and out-migration over time.

Browning, Missouri, was officially laid out and platted in 1872, owing its existence and name to its connection with the railroad. The community was specifically named in honor of the family of J. A. Browning, a railroad employee, highlighting the significant role the railway played in its founding and early growth. A post office was established in Browning the following year, in 1873, further solidifying its status as a developing settlement. Like many towns across the Midwest, Browning's development was closely tied to the expansion of rail lines, which facilitated trade, transportation, and the influx of new residents, shaping its initial trajectory as a rural service center.

Mitigation Initiatives/Capabilities

The City of Browning has ordinances related to zoning, building codes, flood plain management, storm water, and drainage. The city enforces a nuisance ordinance through a contracted provider, the green hills regional planning commission. Flood plain management is handled by the city mayor and clerk. While they have a zoning ordinance, they lack the capability to enforce due to limited resources and staffing.

The city does not have an Emergency Management Director (EMD), it has a local emergency plan and It follows the county emergency plan. The city has participated in the County Emergency Plan, County Mitigation Plan, and Mutual Aid Agreements processes.

The city of Browning has had limited mitigation activities due to limited capabilities. The city expanding its mitigation capabilities is unlikely due to limited capabilities, both financially and in terms of staff availability.

Table 2.10. Browning Mitigation Capabilities

Capability	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	Yes
County Emergency Plan	Yes
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	No
County Mitigation Plan	Yes

Capability	Status, Including Date of Document or Policy
Economic Development Plan	No
Transportation Plan	No
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	Yes
Building Code	Yes
Floodplain Ordinance	Yes
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	Yes
Drainage Ordinance	Yes
Seismic Construction Ordinance	No
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	Yes
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	Yes
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
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes
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)	Yes
Engineer	No
Development Planner	No
Public Works Official	No

Capability	Status, Including Date of Document or Policy
Emergency Management Coordinator	No
NFIP Floodplain Administrator	Yes
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	Yes
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	Yes
Salvation Army	No
Veterans Groups	Yes, American Legion
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	Yes, Browning betterment association.
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
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	No
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

Source: Data Collection Questionnaire, 1/2026

2.2.4 City of Linneus

Linneus, Missouri, holds the distinction of being the county seat of Linn County, centrally located within the north-central region of the state. Its position along Missouri Route 5 connects it to other communities in the area. The town itself is relatively small, encompassing just over one square mile, and is surrounded by agricultural landscapes typical of rural Missouri. Historically, its designation as the county seat in 1839 (originally named Linnville before being changed to Linneus in honor of Carl Linnaeus) marked its importance as a hub for county administration and services.

As of the 2020 census, Linneus had a population of 281 residents, a slight increase from 278 in 2010 but a significant decrease from its historical peak. The demographics are predominantly White, with over 90% of the population identifying as such. The median age in Linneus tends to be higher than the state average, indicating an older population profile. While data varies, recent

estimates suggest a median household income lower than the state and national averages, and a portion of its families live below the poverty line, reflecting the economic challenges that often affect small, rural communities.

Linneus, Missouri, has a rich history rooted in its founding as the county seat of Linn County. Established in 1839, the town was originally named Linnville, but its name was changed the following year, in 1840, to Linneus, in honor of the renowned Swedish botanist Carl Linnaeus. The first settler, Colonel John Holland, arrived in 1834, and his cabin served as an early center for community life, including holding court and school classes. As the county seat, Linneus quickly became a hub for governmental and commercial activity, with a post office operating since 1840. The Linn County Courthouse and the Linn County Jail and Sheriff's Residence, both significant historical structures, are listed on the National Register of Historic Places, testifying to the town's enduring role in the region.

Mitigation Initiatives/Capabilities

The City of Linneus has ordinances related to zoning, flood plain management, storm water, and drainage. Flood plain management is handled by the city mayor and clerk.

The city does not have an Emergency Management Director (EMD), It follows the county emergency plan. The city has participated in the County Emergency Plan, County Mitigation Plan, and Mutual Aid Agreements processes.

The city of Linneus has had limited mitigation activities due to limited capabilities. The city expanding its mitigation capabilities is unlikely due to limited capabilities, both financially and in terms of staff availability.

Table 2.11. Linneus Mitigation Capabilities

Capability	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	Yes – See Linn County Hazard Mitigation Plan
Local Recovery Plan	No
County Recovery Plan	Yes – See Linn County Hazard Mitigation Plan
Local Mitigation Plan	No
County Mitigation Plan	Yes – See Linn County Hazard Mitigation Plan
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No, Ordinance B-151 prohibits building and development in the floodplain of Linneus
Watershed Plan	N/A
Firewise or other fire mitigation plan	Linneus Fire Protection District
School Mitigation Plan	N/A
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	
Zoning Ordinance	B-151 prohibits development in the floodplain
Building Code	No
Floodplain Ordinance	Yes, B-151 prohibits development in the floodplain
Subdivision Ordinance	No
Tree Trimming Ordinance	No

Capability	Status, Including Date of Document or Policy
Nuisance Ordinance	No
Storm Water Ordinance	Yes
Drainage Ordinance	Yes
Seismic Construction Ordinance	N/A
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	Yes
Debris Management Plan	Vegetation debris is disposed of and burned at the City brush pile
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	No
NFIP Community Rating System (CRS) Participating Community	No, the city does not currently participate in the NFIP. The City enforces compliance with the NFIP with floodplain ordinances, but does not have adequate resources to support enforcement.
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	Residents follow individual storm readiness protocol
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	N/A
ISO Fire Rating	ISO 6
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	County Courthouse
Planning/Zoning Boards	City Council
Stream Maintenance Program	City Utility Department yearly maintenance plan
Tree Trimming Program	City Utility Department yearly maintenance plan
Engineering Studies for Streams (Local/County/Regional)	City Utility Department yearly maintenance plan
Mutual Aid Agreements	None at this time, local individual volunteerism
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	See Linn County Hazard Mitigation Plan
Flood Insurance Maps	See Linn County Hazard Mitigation Plan
FEMA Flood Insurance Study (Detailed)	See Linn County Hazard Mitigation Plan
Evacuation Route Map	See Linn County Hazard Mitigation Plan
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, Duane Davis, Utilities Superintendent, Full time
Emergency Management Coordinator	No
NFIP Floodplain Administrator	No
Emergency Response Team	Linneus Fire Protection District
Hazardous Materials Expert	Linneus Fire Protection District
Local Emergency Planning Committee	Linneus Fire Protection District
County Emergency Management Commission	Linneus Fire Protection District
Sanitation Department	City Utility Department
Transportation Department	N/A
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	

Capability	Status, Including Date of Document or Policy
American Red Cross	No local Red Cross agency located near by
Salvation Army	No local Salvation Army office located near by
Veterans Groups	None available locally
Environmental Organization	None available locally
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	Located in Brookfield, MO
Community Organizations (Lions, Kiwanis, etc.)	No
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes, through Green Hills Planning Commission
Ability to fund projects through Capital Improvements funding	N/A
Authority to levy taxes for a specific purpose	Yes, with City Council and resident voter approval
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Ability to incur debt through general obligation bonds	No
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

Source: Data Collection Questionnaire, 10/2025

2.2.5 City of Marceline

Marceline, Missouri, is a city primarily located in the southeastern part of Linn County, though it also extends into Chariton County. It holds a significant place on the map due to its historical connection with the Atchison, Topeka, and Santa Fe Railway, which played a crucial role in its founding and development as a division point between Chicago and Kansas City. Marceline is situated roughly 3 miles south of U.S. Highway 36, a major east-west thoroughfare in northern Missouri, providing good connectivity to the wider region. Its rural setting is characterized by the agricultural landscapes of north-central Missouri.

As of the 2020 census, Marceline had a population of 2,123, and recent estimates suggest a slight decline. The demographics of Marceline are predominantly White, with over 90% of residents identifying as such. The median age in Marceline is around 35-37 years, which is somewhat younger than the median age for Linn County as a whole but still indicative of a relatively stable population. While the median household income of around \$55,000 is lower than the national average, it's generally comparable to other rural communities in the state. A notable aspect of Marceline's demographics is its historical ties to Walt Disney, who spent part of his childhood there, contributing to its unique cultural identity.

Marceline, Missouri, was founded in 1888 by the Atchison, Topeka, and Santa Fe Railway. It was established as a crucial division point on the railroad's new Kansas City-Chicago route, strategically chosen due to its location and rich coal deposits that fueled the locomotives. The town's name, "Marceline," was given at the request of a railway director, honoring his wife, Marcelina. This strong connection to the railroad shaped its early boom-town growth, attracting workers and businesses, and quickly establishing it as a thriving hub of activity with various industries, shops, and social institutions. Most famously, Marceline served as the boyhood home of Walt Disney from 1906 to 1911, and his cherished memories of the town and its "Main Street" would later inspire the iconic Main Street, U.S.A. at Disneyland.

Mitigation Initiatives/Capabilities

The City of Marceline has ordinances related to zoning, Building codes, nuisances, storm water, and drainage. Flood plain management is handled by a staff member. Zoning regulations are enforced by a full-time staff member and a zoning board.

The city does have an Emergency Management Director (EMD), It follows the county emergency plan. The city has participated in the County Emergency Plan, County Mitigation Plan, and Mutual Aid Agreements processes.

The city of Marceline has had limited mitigation activities due to limited capabilities. The city expanding its mitigation capabilities is unlikely due to limited capabilities, both financially and in terms of staff availability.

Table 2.12. Marceline Mitigation Capabilities

Capability	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	Yes
County Mitigation Plan	Yes
Economic Development Plan	No
Transportation Plan	No
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	Yes, Ordinance #6.404
Building Code	Yes, 2018
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Storm Water Ordinance	No
Drainage Ordinance	No
Seismic Construction Ordinance	No
Site Plan Review Requirements	Yes, Ordinance # 4.612
Historic Preservation Ordinance	Yes, Ordinance # 19-08.06
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	Yes
National Weather Service (NWS) Storm Ready	Yes

Capability	Status, Including Date of Document or Policy
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	Yes
ISO Fire Rating	Yes, 6
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	Yes
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes
Evacuation Route Map	Yes, Included in LEOP
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	Yes
Building Inspector	Yes
Mapping Specialist (GIS)	Yes
Engineer	Yes
Development Planner	No
Public Works Official	Yes
Emergency Management Coordinator	Yes
NFIP Floodplain Administrator	Yes
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	Yes
Economic Development Department	Yes, Board
Housing Department	Yes, Board
Historic Preservation	Yes, Board
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to 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	Yes

Capability	Status, Including Date of Document or Policy
Ability to withhold spending in hazard prone areas	Unknown

Source: Data Collection Questionnaire, 1/2026

2.2.6 City of Purdin

Purdin, Missouri, is a small city situated in the northwestern part of Linn County. It's located within the rural landscape of north-central Missouri, characteristic of many small towns in the region. Its modest size, with a total area of approximately 0.31 square miles, means it's a tightly-knit community. While not directly on a major interstate, its location within Linn County connects it to other small towns and agricultural areas in the surrounding vicinity.

As of the 2020 census, Purdin had a population of 141 residents, indicating a continuing trend of population decline from previous decades. Demographically, Purdin is a predominantly White community, with over 99% of its population identifying as White in the 2010 census data. The median age in Purdin is generally lower than the overall Linn County average, but it still represents a mature population. Median household income varies by data source, but it appears to be lower than both state and national averages, and a significant percentage of its families live in poverty, reflecting the economic challenges common in very small rural towns.

Purdin, Missouri, was platted in 1873 and named after its founder, Allen W. Purdin. A post office was established in 1877, solidifying the community's presence. The town grew with the arrival of the railroad in the 1880s, which facilitated the shipping of livestock to major cities like Chicago and St. Louis, particularly booming in the 1940s. The Purdin Mercantile, established in 1895, became a significant local business, expanding to include various services and even hosting free movie shows in the mid-20th century. While the last train ran in the early 1980s, Purdin has continued to exist as a small community in Linn County.

Mitigation Initiatives/Capabilities

The City of Purdin has little if any ordinances and none related to zoning, flood plain management, storm water, or drainage.

The city does not have an Emergency Management Director (EMD), It follows the county emergency plan. The city has participated in the County Emergency Plan, County Mitigation Plan, and Mutual Aid Agreements processes.

The city of Purdin has had limited mitigation activities due to limited capabilities. The city expanding its mitigation capabilities is unlikely due to limited capabilities, both financially and in terms of staff availability.

Table 2.13. Purdin Mitigation Capabilities

Capability	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No

Capability	Status, Including Date of Document or Policy
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	No
County Mitigation Plan	No
Economic Development Plan	No
Transportation Plan	No
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	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
Seismic Construction Ordinance	No
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	No
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	No
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	No
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

Capability	Status, Including Date of Document or Policy
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	Yes, Part Time
NFIP Floodplain Administrator	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No
Sanitation Department	No
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
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	No
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	No
Fees for water, sewer, gas, or electric services	Yes, Sewer
Impact fees for new development	No
Ability to incur debt through general obligation bonds	No
Ability to incur debt through special tax bonds	No
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

Source: Data Collection Questionnaire, 1/2026

2.2.7 Summary of Jurisdictional Capabilities

Table 2.14.

Mitigation Capabilities Summary Table

CAPABILITIES	Uninc. Linn County	City of Brookfield	City of Browning	City of Linneus	City of Marceline	City of Purdin
Planning Capabilities						
Comprehensive Plan	N/A	Yes	No	No	No	No
Builder's Plan	N/A	No	No	No	No	No
Capital Improvement Plan	N/A	No	No	No	No	No
City Emergency Operations Plan	N/A	Yes	Yes	No	No	No
County Emergency Operations Plan	Yes	Yes	Yes	Yes	No	No
Local Recovery Plan	N/A	Yes	No	No	No	No
County Recovery Plan	Yes	Yes	No	Yes	No	No
City Mitigation Plan	N/A	No	No	No	Yes	No
County Mitigation Plan	Yes	No	Yes	Yes	Yes	No
Economic Development Plan	N/A	No	No	No	No	No
Transportation Plan	Yes	No	No	No	No	No
Land-use Plan	N/A	No	No	No	No	No
Flood Mitigation Assistance (FMA) Plan	N/A	No	No	No	No	No
Watershed Plan	Yes	No	No	N/A	No	No
Firewise or other fire mitigation plan	N/A	No	No	Yes	No	No
School Mitigation Plan	N/A	No	No	N/A	No	No
Critical Facilities Plan	Yes	No	No	No	No	No
Policies/Ordinance						
Zoning Ordinance	N/A	Yes	Yes	Yes	Yes	No
Building Code	N/A	Yes	Yes	No	Yes	No
Floodplain Ordinance	N/A	Yes	Yes	Yes	No	No
Subdivision Ordinance	N/A	Yes	No	No	No	No
Tree Trimming Ordinance	N/A	No	No	No	No	No
Nuisance Ordinance	N/A	Yes	No	No	Yes	No
Stormwater Ordinance	N/A	Yes	Yes	Yes	No	No
Drainage Ordinance	N/A	Yes	Yes	Yes	No	No
Seismic Construction Ordinance	N/A	Yes	No	N/A	No	No
Site Plan Review Requirements	N/A	Yes	No	No	Yes	No
Historic Preservation Ordinance	N/A	No	No	No	Yes	No
Landscape Ordinance	N/A	No	No	Yes	No	No
Debris Management Plan	N/A	Yes	No	Yes	No	No

CAPABILITIES	Uninc. Linn County	City of Brookfield	City of Browning	City of Linneus	City of Marceline	City of Purdin
Program						
Zoning/Land Use Restrictions	N/A	Yes	Yes	No	Yes	No
Codes Building Site/Design	N/A	Yes	Yes	No	Yes	No
National Flood Insurance Program (NFIP)	N/A	No	Yes	No	Yes	No
NFIP Community Rating System (CRS) program	N/A	Yes	No	No.	No	No
Hazard Awareness Program	N/A	No	No	No	Yes	No
National Weather Service (NWS) Storm Ready	N/A	No	Yes	No	Yes	No
Firewise Community Certification	N/A	No	No	No		
Building Code Effectiveness Grading (BCEGs)	N/A	No	No	N/A	Yes	No
ISO Fire Rating	N/A	Yes – 6	Yes	ISO 6	Yes, 6	No
Economic Development Program	Yes	No	No	No	Yes	No
Land Use Program	N/A	No	No	No	Yes	No
Public Education/Awareness	N/A	Yes	No	No	Yes	No
Property Acquisition	N/A	No	No	Yes	No	No
Planning/Zoning Boards	N/A	Yes	No	City Council	Yes	No
Stream Maintenance Program	N/A	No	No	Yes	No	No
Tree Trimming Program	N/A	No	No	Yes	Yes	No
Engineering Studies for Streams (Local/County/Regional)	N/A	No	No	Yes	No	No
Mutual Aid Agreements	Yes	Yes	Yes	None	Yes	No
Studies/Reports/Maps						
Hazard Analysis/Risk Assessment (Local)	N/A	No	No	No	No	No
Hazard Analysis/Risk Assessment (County)	N/A	Yes	No	Yes	No	No
Flood Insurance Maps	N/A	Yes	Yes	Yes	Yes	No
FEMA Flood Insurance Study (Detailed)	N/A	Yes	Yes	Yes	Yes	No
Evacuation Route Map	N/A	No	No	Yes	Yes	No
Critical Facilities Inventory	Yes	Yes	No	No	No	No
Vulnerable Population Inventory	N/A	No	No	No	No	No
Land Use Map	N/A	No	No	No	No	No
Staff/Department						
Building Code Official	N/A	Yes	No	No	No	No

CAPABILITIES	Uninc. Linn County	City of Brookfield	City of Browning	City of Linneus	City of Marceline	City of Purdin
Building Inspector	N/A	Yes	No	No	No	No
Mapping Specialist (GIS)	Yes	Yes	Yes	No	No	No
Engineer	N/A	Yes	No	No	No	No
Development Planner	N/A	No	No	No	No	No
Public Works Official	N/A	No	No	Yes	Yes	No
Emergency Management Director	Yes	Yes	No	No	No	Yes
NFIP Floodplain Administrator	N/A	Yes	Yes	No	No	No
Emergency Response Team	Yes	No	No	Yes	Yes	No
Hazardous Materials Expert	Yes	No	No	Yes	Yes	No
Local Emergency Planning Committee	Yes	Yes	No	Yes	Yes	No
County Emergency Management Commission	Yes	Yes	No	Yes	Yes	No
Sanitation Department	N/A	Yes	No	Yes	Yes	No
Transportation Department	Yes	Yes	No	N/A	N/A	No
Economic Development Department	N/A	Yes	No	No	No	No
Housing Department	N/A	No	Yes	No	No	No
Historic Preservation	N/A	No	No	No	No	No
Non-Governmental Organizations (NGOs)						
American Red Cross	Yes	No	Yes	No	No	No
Salvation Army	N/A	No	No	No	No	No
Veterans Groups	Yes	Yes	Yes	None	None	No
Local Environmental Organization	No	No	No	None	None	No
Homeowner Associations	No	Yes	No	No	No	No
Neighborhood Associations	No	No	No	No	No	No
Chamber of Commerce	Yes	Yes	No	No	None	No
Community Organizations (Lions, Kiwanis, etc.)	Yes	Yes	Yes.	No	No	No
Financial Resources						
Apply for Community Development Block Grants	Yes	Yes	Yes	Yes	Yes	Yes
Fund projects through Capital Improvements funding	Yes	Yes	No	N/A	N/A	No
Authority to levy taxes for a specific purpose	Yes	Yes	Yes	Yes	Yes	No
Fees for water, sewer, gas, or electric services	N/A	Yes	Yes	Yes	Yes	Yes, Sewer
Impact fees for new development	Yes	Yes	No	No	No	No
Ability to incur debt through general obligation bonds	Yes	Yes	No	No	No	No

CAPABILITIES	Uninc. Linn County	City of Brookfield	City of Browning	City of Linneus	City of Marceline	City of Purdin
Ability to incur debt through special tax bonds	Yes	Yes	Yes	Yes	Yes	No
Ability to incur debt through private activities	N/A	Yes	No	No	No	No
Withhold spending in hazard prone areas	N/A	Yes	No	No	No	No

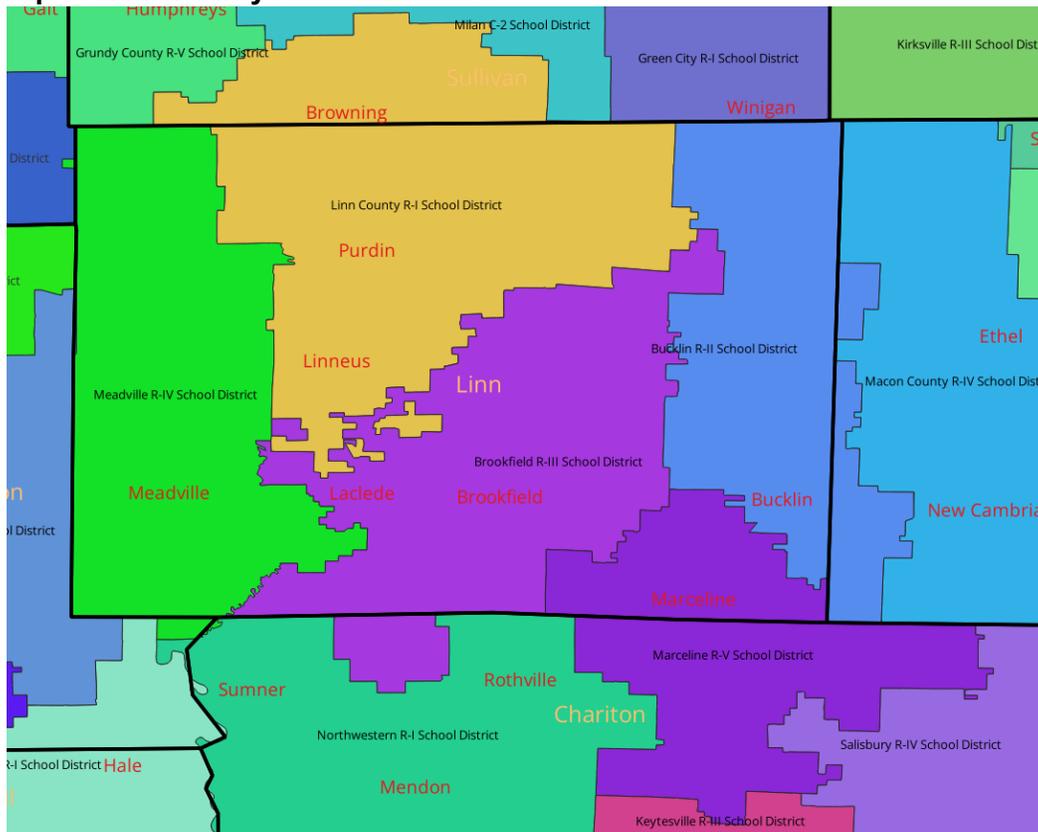
2.2.8 School District Profiles and Mitigation Capabilities

Linn County, Missouri, is home to several public-school districts, each serving its local communities. These districts generally provide education from pre-kindergarten through 12th grade, with varying student populations and facilities. Historically, schools in the county emerged early on, often as private subscriptions or small community efforts, evolving significantly with state legislation, particularly with the School District Reorganization Law of 1948 which led to the consolidation of many smaller, rural schools into larger districts.

Among the notable districts are Brookfield R-III, Bucklin R-II, Linn County R-I (serving areas including Browning, Linneus, and Purdin), Meadville R-IV, and Marceline R-V. Brookfield R-III, for instance, operates multiple schools, including elementary, middle, and high schools, and has been recognized as an A+ School. Bucklin R-II, while smaller, has a long history dating back to 1858 and continues to serve Bucklin and New Boston. Similarly, Marceline R-V has a rich educational past, with its first school established in 1887 and a continuous development of its facilities and programs.

Consolidation has been a recurring theme in Linn County's educational landscape, driven by factors like population shifts and the desire for improved resources. Linn County R-I, for example, was formed from the consolidation of multiple smaller schools in 1950 and further reorganized in 1965 and 1966 to bring together schools from towns like Linneus, Browning, Purdin, and Shelby into one cohesive district. These ongoing reorganizations aim to provide more comprehensive educational opportunities for students across the county.

Figure 2.3 Map of Linn County School Districts



Source: Missouri DESE GIS layer

Table 2.15. Linn County School Districts Buildings and Enrollment Data, 2025-2026

District Name	Building Name	Building Enrolment
Brookfield R-III		924
	Elementary	417
	Middle	237
	High	270
Marceline R-V		652
	Elementary	309
	High	343
Meadville R-IV		230
	Elementary	129
	High School	101

Source: Missouri DESE – January 2026

Brookfield R-III

Brookfield R-III School District is located at 124a Pershing Road, Brookfield Missouri. The following table provides enrollment information

Table 2.16. Brookfield R-III School District enrollment 2025-2026

District Name	Building Name	Building Enrolment
Brookfield R-III		924
	Elementary	417
	Middle	237
	High	270

Source: Missouri DESE – January 2026

The school conducts severe weather and evacuation drills. Each school building is equipped with a PA system, for inside and outside of the buildings, used for emergency announcements and staff also receive alerts through internal radio and phone systems. Both school buildings have a designated interior shelter area, while they do not meet FEMA standards, they do meet the state safety standards.

The school conducts regular roof inspections and maintenance to prevent wind and water damage due to natural hazards.

Brookfield R-III is governed by a Board of Education consisting of the Board President and six elected board members.

Brookfield R-III has done little to expand mitigation capabilities since the last plan update due to limited capabilities and has little planned in the way of expanding mitigation capabilities due to limited budget and resources.

Table 2.17. Brookfield R-III School District – Brookfield, MO mitigation capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Elements	
Master Plan	Yes 7/2025
Capital Improvement Plan	Yes 7/2025
Emergency Plan	Yes 7/2025
Weapons Policy	Yes 7/2025
Personnel Resources	

Full-Time Building Official	Yes
Emergency Manager	Yes – Safety Coordinator
Grant Writer	No
Public Information Officer	Yes
Financial Resources	
Capital improvements Project fund	Yes
Local Funds	Yes
General Obligation Bond	Yes
Special Tax Bonds	No
Private Activities/Donations	Yes
State and Federal Funds	Yes

Source: Local data collection – January 2026

Marceline R-V

Marceline R-V R-V School District has facilities located at 314 East Santa Fe, Marceline Missouri. The following table provides enrollment information

Table 2.18. Marceline R-V Enrollment data 2025-2026

District Name	Building Name	Building Enrolment
Marceline R-V		652
	Elementary	309
	High	343

Source: Missouri DESE – January 2026

The school conducts severe weather and evacuation drills. Each school building is equipped with a PA system used for emergency announcements. The school buildings have a designated interior shelter area, while they do not meet FEMA standards, they do meet the state safety standards. The buildings are also equipped with a NOAA weather radio.

The school conducts regular roof inspections and maintenance to prevent wind and water damage due to natural hazards.

Marceline R-V is governed by a Board of Education consisting of the Board President and six elected board members.

Marceline R-V has done little to expand mitigation capabilities since the last plan update due to limited capabilities and has little planned in the way of expanding mitigation capabilities due to limited budget and resources.

Table 2.19. Marceline R-V Marceline Missouri mitigation capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Elements	

Master Plan	Yes 2025
Capital Improvement Plan	No
Emergency Plan	Yes 2025
Weapons Policy	Yes 2025
Personnel Resources	
Full-Time Building Official	Yes
Emergency Manager	Yes
Grant Writer	Yes
Public Information Officer	Yes
Financial Resources	
Capital improvements Project fund	Yes
Local Funds	Yes
General Obligation Bond	Yes
Special Tax Bonds	Yes
Private Activities/Donations	Yes
State and Federal Funds	Yes

Source: Local data collection – January 2026

Meadville R-IV

Meadville R-IV School District has facilities located at 101 W Crandall, Meadville, Missouri. The following table provides enrollment information

Table 2.20. Meadville R-IV Enrollment 2025-2026

District Name	Building Name	Building Enrolment
Meadville R-IV		230
	Elementary	129
	High School	101

Source: Missouri DESE – January 2026

The school conducts severe weather and evacuation drills. Each school building is equipped with a PA system used for emergency announcements. The school building have a designated interior shelter area, while they do not meet FEMA standards, they do meet the state safety standards. The building are also equipped with a NOAA weather radio.

The school conducts regular roof inspections and maintenance to prevent wind and water damage due to natural hazards.

Meadville R-IV is governed by a Board of Education consisting of the Board President and six elected board members.

Meadville R-IV has done little to expand mitigation capabilities since the last plan update due to limited capabilities and has little planned in the way of expanding mitigation capabilities due to limited budget and resources.

Table 2.21. Meadville R-IV Meadville, Missouri

Capabilities	Status, Including Date of Document or Policy
--------------	--

Planning Elements	
Master Plan	Yes
Capital Improvement Plan	Yes
Emergency Plan	Yes
Weapons Policy	Yes
Personnel Resources	
Full-Time Building Official	Yes superintendent
Emergency Manager	Yes
Grant Writer	No
Public Information Officer	No
Financial Resources	
Capital improvements Project fund	Yes
Local Funds	Yes
General Obligation Bond	Yes
Special Tax Bonds	No
Private Activities/Donations	No
State and Federal Funds	Yes

Source: Local data collection – January 2026

Table 2.22. Summary of Mitigation Capabilities Linn County Schools

Capability	Brookfield	Marceline	Meadville
Planning Elements			
Master Plan/ Date	Yes 7/2025	Yes 2025	Yes
Capital Improvement Plan/Date	Yes 7/2025	No	Yes
School Emergency Plan / Date	Yes 7/2025	Yes 2025	Yes
Weapons Policy/Date	Yes 7/2025	Yes 2025	Yes
Personnel Resources			
Full-Time Building Official	Yes	Yes	Yes
Emergency Manager	Yes – Safety Coordinator	Yes	Yes
Grant Writer	No	Yes	No
Public Information Officer	Yes	Yes	No
Financial Resources			
Capital Improvements Project Funding	Yes	Yes	Yes
Local Funds	Yes	Yes	Yes
General Obligation Bonds	Yes	Yes	Yes
Special Tax Bonds	No	Yes	No
Private Activities/Donations	Yes	Yes	No
State and Federal Funds/Grants	Yes	Yes	Yes
Other			
Public Education Programs	No	NA	NA
Privately or Self- Insured?	Private	NA	NA
Fire Evacuation Training	Yes	Yes	Yes
Tornado Sheltering Exercises	Yes	Yes	Yes
Public Address/Emergency Alert System	Yes	Yes	Yes
NOAA Weather Radios	Yes	Yes	Yes
Lock-Down Security Training	Yes	Yes	Yes
Mitigation Programs	No	No	No
Tornado Shelter/Saferoom	Not FEMA	Yes, not FEMA	Yes (Not constructed in accordance with FEMA standards)
Campus Police	No	No	No

Source: Data Collection Questionnaire, 1/2026

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The goal of the risk assessment is to estimate the potential loss in the planning area, including loss of life, personal injury, property damage, and economic loss, from a hazard event. The risk assessment process allows communities and school/special districts in the planning area to better understand their potential risk to the identified hazards. It will provide a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

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, critical facilities, and other community/school or special district assets at risk to natural hazards;
 - 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.

Natural hazards can be complex, occurring with a wide range of intensities. Some events are instantaneous and offer no window of warning, such as earthquakes. Some offer a short warning in which to alert the public to take actions, such as tornadoes or severe thunderstorms. Others occur less frequently and are typically more expensive, with some warning time to allow the public time to prepare for, such as flooding. The Linn County Hazard Mitigation Planning Committee has determined that natural hazards will be the sole focus of the plan. To that purpose, man-made phenomena such as war, chemical contamination, and other man-made hazards will be excluded from the plan.

Happenings such as those listed below, which occur in a populated area, are referred to as hazardous events. It is not until significant property damage and loss of life result from a natural hazard that the phenomena are classified as a natural disaster.

3.1.1 Review of Existing Mitigation Plans

The Hazard Mitigation Planning Committee (HMPC) reviewed data and discussed the impacts of each hazard of prime concern that are included and profiled in the most recent State of Missouri Hazard Mitigation Plan (2023) and the most recent county Multi-Jurisdictional Local Hazard Mitigation Plan. The natural hazards of prime concern for Missouri and the county were:

- Flooding (Riverine & Flash)
- Dam Failure
- Earthquake
- Drought
- Extreme Temperatures
- Severe Thunderstorms
- Severe Winter Weather
- Tornadoes
- Wildfires

There are currently no levees or sinkholes in the planning area, and thus these hazards have been excluded from the plan.

- Levee Failure
- Land subsistence and sinkholes

3.1.2 Review Disaster Declaration History

When the HMPC was identifying hazards that affected Linn County the committee considered previous events that triggered federal and/or state disaster declarations. Federal and/or state

declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government’s capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. If the disaster is so severe that both the local and state governments’ capacities are exceeded; a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance. Missouri State of Emergencies are Executive Orders (E.O.) signed by the Governor. For disasters, a State of Emergency could lead to a Federal Disaster Declaration. Since the last plan update, no non-federally declared events resulted in a significant event impacting the planning area.

Table 3.1. FEMA Disaster Declarations that included Linn County, Missouri, 1965-Present

Disaster Number	Description	Declaration Date Incident Period	Individual Assistance Public Assistance
995	Flooding, Severe Storm	Jun 10, 1993 - Oct 25, 1993	IA PA
1054	Severe Storm, Tornadoes, Hail, Flooding	May 13, 1995 - Jun 23, 1995	IA PA
1253	Severe Storms, Flooding and Tornadoes	Oct 4, 1998 - Oct 11, 1998	PA
1403	Ice Storm	Jan 29, 2002 - Feb 13, 2002	IA PA
1412	Severe Storms and Tornadoes	Apr 24, 2002 - Jun 10, 2002	IA PA
1524	Severe Storms, Tornadoes, and Flooding	May 18, 2004 - May 31, 2004	IA PA
1708	Severe Storms and Flooding	May 5, 2007 - May 18, 2007	PA
1736	Severe Winter Storms	Dec 6, 2007 - Dec 15, 2007	PA
1773	Severe Storms and Flooding	June 1, 2008 - August 13, 2008	IA PA
1809	Severe Storms, Flooding, and a Tornado	Sep 11, 2008 - Sep 24, 2008	IA PA
1934	Severe Storms, Flooding, and Tornadoes	June 12, 2010 - July 31, 2010	PA
1961	Severe Winter Storm and Snowstorm	Jan 31, 2011 - Feb 5, 2011	PA
3017	Drought	Sep 24, 1976	PA
3232	Hurricane Katrina Evacuation	Aug 29, 2005 - Oct 1, 2005	PA
3281	Severe Winter Storms	Dec 8, 2007 - Dec 15, 2007	PA
3303	Severe Winter Storm	Jan 26, 2009 - Jan 28, 2009	PA
3317	Severe Winter Storm	Jan 31, 2011 - Feb 5, 2011	PA
4200	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	Sep 9, 2014 - Sep 10, 2014	PA
4238	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	May 15, 2015 - July 27, 2015	PA
4451	Severe Storms, Tornadoes, and Flooding	Apr 29, 2019 - Jul 6, 2019	PA
4490	Covid-19 Pandemic	Jan 20, 2020 - May 11, 2023	IA PA

Source: Federal Emergency Management Agency,

3.1.3 Research Additional Sources

Additional sources of data on locations and past impacts of hazards in the planning area:

- Missouri Hazard Mitigation Plans (2010, 2013, 2018, and 2023)
- Previously approved Linn County Hazard Mitigation Plan May 20, 2021
- Federal Emergency Management Agency (FEMA)
- Missouri Department of Natural Resources
- National Drought Mitigation Center Drought Reporter
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics
- National Agricultural Statistics Service (Agriculture production/losses)
- Data Collection Questionnaires completed by each jurisdiction
- State of Missouri GIS data
- Environmental Protection Agency
- Flood Insurance Administration
- Hazards US (Hazus)
- Missouri Department of Transportation
- Missouri Division of Fire Marshal Safety
- Missouri Public Service Commission
- National Fire Incident Reporting System (NFIRS)
- National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI);
- County and local Comprehensive Plans to the extent available
- County Emergency Management
- County Flood Insurance Rate Map, FEMA
- Flood Insurance Study, FEMA
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin
- U.S. Army Corps of Engineers
- U.S. Department of Transportation
- United States Geological Survey (USGS)
- Various articles and publications available on the internet; any such articles or publications will be cited in the plan where applicable.

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). Although it is usually the best and most current source, there are limitations to the data which should be noted. 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. In addition, it is a partial record of other significant meteorological events, such as record maximum or minimum temperatures or precipitation that occurs in connection with another event. 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. Those using information from NCEI should be cautious as the NWS does not guarantee the accuracy or validity of the information.

The NCEI damage amounts are estimates received from a variety of sources, including those listed above in the Data Sources section. For damage amounts, the NWS makes a best guess using all available data at the time of the publication. Property and crop damage figures should be considered as a broad estimate. 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 2014, as entered by the NWS. Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type. The following timelines show the different time spans for each period of unique data collection and processing procedures.

1. Tornado: From 1950 through 1954, only tornado events were recorded.
2. Tornado, Thunderstorm Wind and Hail: From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornado, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.
3. All Event Types (48 from Directive 10-1605): From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

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.

3.1.5 Hazards Excluded and Why

Landslides and land subsidence/sinkholes, according to the USGS website, are not likely to occur in Linn County due to the type of soil and substructure in Northern Missouri. There are no known instances of sinkholes in Linn County at this time and therefore this hazard was excluded from the plan.

Levee Failure was excluded from the plan.

Fires: Urban/Structural were not included in the Linn County plan. The rural nature of the County led to the decision to exclude this type of hazard.

Coastal Storms – Hurricanes and Tsunamis were excluded, for obvious reasons.

3.1.4 Hazards Identified

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	
Linn County	X	X	X	X	X	X	X	X	X	X	X	
Cities												
City of Brookfield	-	X	X	X	X	X	X	X	-	X	X	
City of Browning	X	X	X	X	X	X	-	X	-	X	X	
City of Bucklin	X	X	X	X	X	X	X	X	X	X	X	
City of Laclede												
City of Linneus												
City of Marceline												
City of Meadville												
City of Purdin												
School Districts												
Brookfield R-II												
Bucklin R-II												
Linn County R-I												
Marceline R-V												
Meadville R-IV												
Special Districts												

3.1.5 Multi-Jurisdictional Risk Assessment

Each hazard has a profile in which the risks are assessed on a planning area wide basis. Some hazards, like flooding, vary in risk across the planning area. Discussions of these variations are included in each profile as they apply.

The planning area is fairly uniform in terms of climate, topography, and building construction characteristics. Cities and towns have greater population and structure density and therefore have greater vulnerability to weather-related hazards. There is little variation in development trends across the planning area, as the area as a whole and each of its communities has lost population over the last five years. The county is overwhelmingly rural; with the primary vulnerable assets being crops and livestock. These matters are discussed in greater detail in the vulnerability sections of each hazard.

The structure of this multi-jurisdictional plan has been developed to update the previous plan. Each hazard has a profile in which the risks are assessed on an area wide basis of the planning area. Some hazards vary in risk across the planning area. The discussions of the variations have been included in each profile. The hazards that vary across the planning area in terms of risk include dam failure, flash flood, river flood, and grass or wildland fire. The differences in risks within each jurisdiction have been detailed in each hazard profile under a separate heading. The unincorporated areas of the County have experienced limited damage from winter storms, tornadoes, thunderstorms, extreme temperatures, drought, dam failure, and wildfire.

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. If there have changes in the planning area since the previously approved plan was adopted, summarize them and how they impact the risk. Any assets identified in this section MUST have actions considered and discussed in Chapter 4 (Risk Assessment). Actions do not necessarily need to be created, but consideration must be given to mitigating risk to these assets, and that consideration must be documented in the plan narrative.

3.2.1 Total Exposure of Population and Structures

This section assesses the planning area population, structures, critical facilities and infrastructure, and other important assets that may be at risk from hazards. If there have been any changes in the planning area since the previously approved plan was adopted, these changes are summarized, and any new risks assessed.

Unincorporated County and Incorporated Cities

In the following three tables, population data is based on 2010 Census Bureau data. Building counts and building exposure values are based on parcel data developed by the State of Missouri Geographic Information Systems (GIS) database. This data, organized by County, is available on Google Drive through the link provided on the previous page. Contents 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 in Table 3.3. Land values have been purposely excluded from consideration because land remains following disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Another reason for excluding land values is that state and federal disaster assistance programs generally do not address loss of land (other than crop insurance). It should be noted that the total valuation of

buildings is based on county assessors' data which may not be current. In addition, government-owned properties are usually taxed differently or not at all, and so may not be an accurate representation of true value. Note that public school district assets and special districts assets are included in the total exposure tables assets by community and county.

Table 3.3 shows the total population, building count, estimated value of buildings, estimated value of contents and estimated total exposure to parcels for the unincorporated county and each incorporated city. For multi-county communities, the population and building data may include data on assets located outside the planning area. **Table 3.4** that follows provides the building value exposures for the county and each city in the planning area broken down by usage type. Finally, **Table 3.5** provides the building count total for the county and each city in the planning area broken out by building usage types (residential, commercial, industrial, and agricultural).

Table 3.3. Maximum Population and Building Exposure by Jurisdiction

Jurisdiction	2023 Annual Population Estimate	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
City of Brookfield	4,128	2,475	\$333,681	\$197,907	\$531,588
City of Browning	260	148	\$21,765	\$16,393	\$38,158
City of Bucklin	383	323	\$41,072	\$20,857	\$61,929
City of Laclede	249	280	\$28,192	\$15,890	\$44,082
City of Linneus	187	205	\$25,426	\$15,379	40,805
City of Marceline	2269	1,200	\$169,311	\$94,508	\$263,819
City of Meadville	493	258	\$33,739	\$17,706	\$51,445
City of Purdin	75	115	\$15,069	\$8,944	\$24,013
Unincorporated Linn County	3806	9,965	\$310,817	\$147,988	\$458,805
Totals	11,850	14,977	\$979,202	\$535,633	\$1,514,835

Source: U.S. Bureau of the Census, Annual population estimates/ 5-Year American Community Survey 2023; Building Count and Building Exposure, Missouri GIS Database from SEMA Mitigation Management; Contents Exposure derived by applying multiplier to Building Exposure based on Hazus 6.0 standard contents 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	Agricultural	Commercial	Education	Government	Industrial	Residential	Total
City of Brookfield	\$364	\$89,917	\$10,286	\$3,009	\$32,900	\$395,113	\$531,588
City of Browning	\$0	\$4,019	\$0	\$860	\$10,728	\$22,552	\$38,158
City of Bucklin	\$163	\$8,037	\$3,429	\$430	\$0	\$49,870	\$61,929
City of Laclede	\$283	\$4,019	\$0	\$2,579	\$715	\$36,486	\$44,082
City of Linneus	\$86	\$9,544	\$0	\$1,290	\$0	\$29,886	\$40,805
City of Marceline	\$64	\$51,238	\$10,286	\$860	\$5,006	\$196,365	\$263,819
City of Meadville	\$137	\$10,047	\$3,429	\$430	\$0	\$37,403	\$51,445
City of Purdin	\$13	\$3,516	\$0	\$2,149	\$0	\$18,335	\$24,013
Unincorporated Linn	\$33,424	\$30,140	\$3,429	\$4,728	\$5,722	\$381,362	\$458,805
Totals	\$34,542	\$210,477	\$30,857	\$16,334	\$55,071	\$1,167,55	\$1,514,835

Source: Missouri GIS Database, SEMA Mitigation Management Section

Table 3.5. Building Counts by Usage Type

Jurisdiction	Agricultural Counts	Commercial Counts	Education Counts	Government Counts	Industrial Counts	Residential Counts	Total
City of Brookfield	85	179	3	7	46	2,155	2,475
City of Browning	0	8	0	2	15	123	148
City of Bucklin	38	16	1	1	0	272	328
City of Laclede	66	8	0	6	1	199	280
City of Linneus	20	19	0	3	0	163	205
City of Marceline	15	102	3	2	7	1,071	1,200
City of Meadville	32	20	1	1	0	204	258
City of Purdin	3	7	0	5	0	100	115
Unincorporated Linn County	7,805	60	1	11	8	2,080	9,965
Totals	8,066	419	9	38	77	6,368	14,977

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

Even though schools and special districts' total assets are included in the tables above, additional discussion is needed, based on the data that is available from the districts' completion of the Data Collection Questionnaire and district-maintained websites. The number of enrolled students at the participating public-school districts is provided in Table 3.6 below. Additional information includes the number of buildings, building values (building exposure) and contents value (contents exposure). These numbers will represent the total enrollment and building count for the public school districts regardless of the county in which they are located.

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

Public School District	Enrolment	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
Brookfield R-III	891	3			
Bucklin R-II	112	2			
Linn County R-1	172	2			
Marceline R-V	675	2			
Meadville R-IV	226	2			
Total:	2076				

Source: [MCDS Portal | Missouri Department of Elementary and Secondary Education - MCDS \(mo.gov\)](#), select the file for the most recent year called "20xx Building Enrollment PK-12", filter the spreadsheet by selecting only the public school districts in the planning area. The Building Exposure, Contents Exposure, and 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.

3.2.2 Critical and Essential Facilities and Infrastructure

This section will include information from the Data Collection Questionnaire and other sources concerning the vulnerability of participating jurisdictions' critical, essential, high potential loss, and transportation/lifeline facilities to identified hazards. Definitions of each of these types of facilities are provided below.

- **Critical Facility:** Those facilities that are essential in providing utility or direction either during the response to an emergency or during the recovery operation.
- **Essential Facility:** Those facilities that, if damaged, would have devastating impacts on disaster response and/or recovery.
- **High Potential Loss Facilities:** Those facilities that would have a high loss or impact on the community.

- **Transportation and lifeline facilities:** Those facilities and infrastructure critical to transportation, communications, and necessary utilities.

Table 3.7 includes a summary of the inventory of critical and essential facilities and infrastructure in the planning area. The list was compiled from the Data Collection Questionnaire as well as the following sources:

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

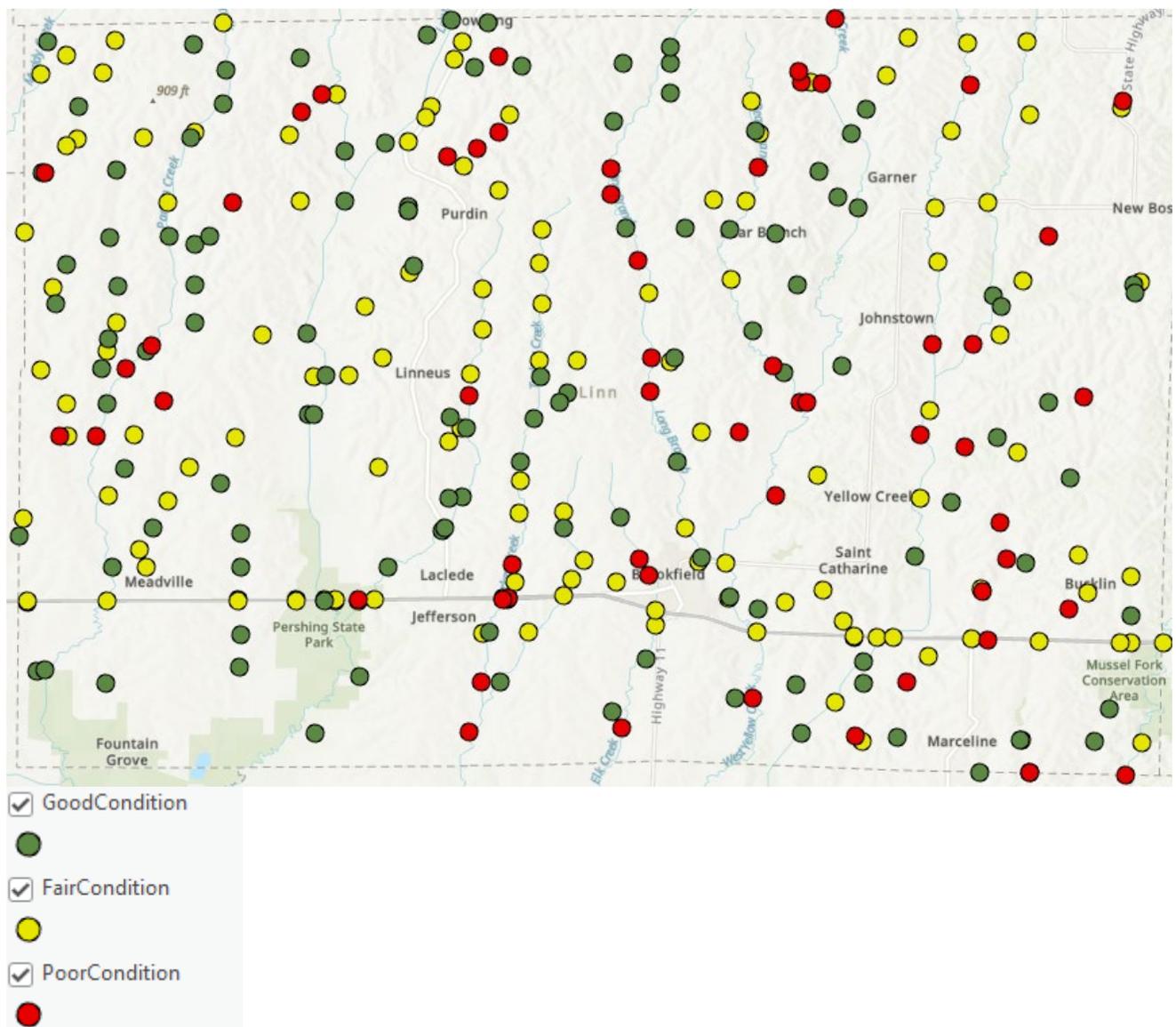
Jurisdiction	Airport Facility	Bus Facility	Childcare Facility	Communications Tower	Electric Power Facility	Emergency Operations	Fire Service	Government	Housing	Shelters	Highway Bridge	Hospital/Health Care	Military	Natural Gas Facility	Nursing Homes	Police Station	Potable Water Facility	Rail	Sanitary Pump Stations	School Facilities	Stormwater Pump Stations	Tier II Chemical Facility	Wastewater Facility	TOTAL
Linn County	-	-	-	-	5	1	1	1	-	-	36	-	-	-	-	-	3	3	-	4	-	4	-	58
City of Brookfield	2	-	6	-	1	1	2	1	-	1	3	4	1	3	3	1	1	-	6	8	1	16	1	61
City of Browning	-	-	-	-	1	-	2	1	-	2	1	-	-	-	-	-	-	1	-	-	-	4	1	13
City of Bucklin	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-	-	1	-	1	4	-	2	1	15
City of Laclede	-	-	-	-	1	-	1	1	-	1	-	-	-	1	-	-	1	-	1	-	-	-	1	8
City of Linneus	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	1	1	-	-	-	-	1	1	8
City of Marceline	1	-	4	-	1	1	2	1	-	-	1	5	-	1	2	1	1	2	1	9	1	6	1	41
City of Meadville	-	-	1	-	1	1	1	1	-	1	-	1	-	1	-	-	-	-	-	10	-	2	1	21
City of Purdin	-	-	-	-	1	-	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	5
Totals	3	0	11	0	13	6	12	9	0	5	42	10	0	8	5	3	8	6	9	35	2	36	7	230

Source: Missouri 2023 State Hazard Mitigation Plan and Hazard Mitigation Viewer; Data Collection Questionnaires; Hazus, etc.

The term “scour critical” refers to one of the database elements in the National Bridge Inventory. This element is quantified using a “scour index”, which is a number indicating the vulnerability of a bridge to scour during a flood. Bridges with a scour index between 1 and 3 are considered “scour critical”, or a bridge with a foundation determined to be unstable for the observed or evaluated scour condition.

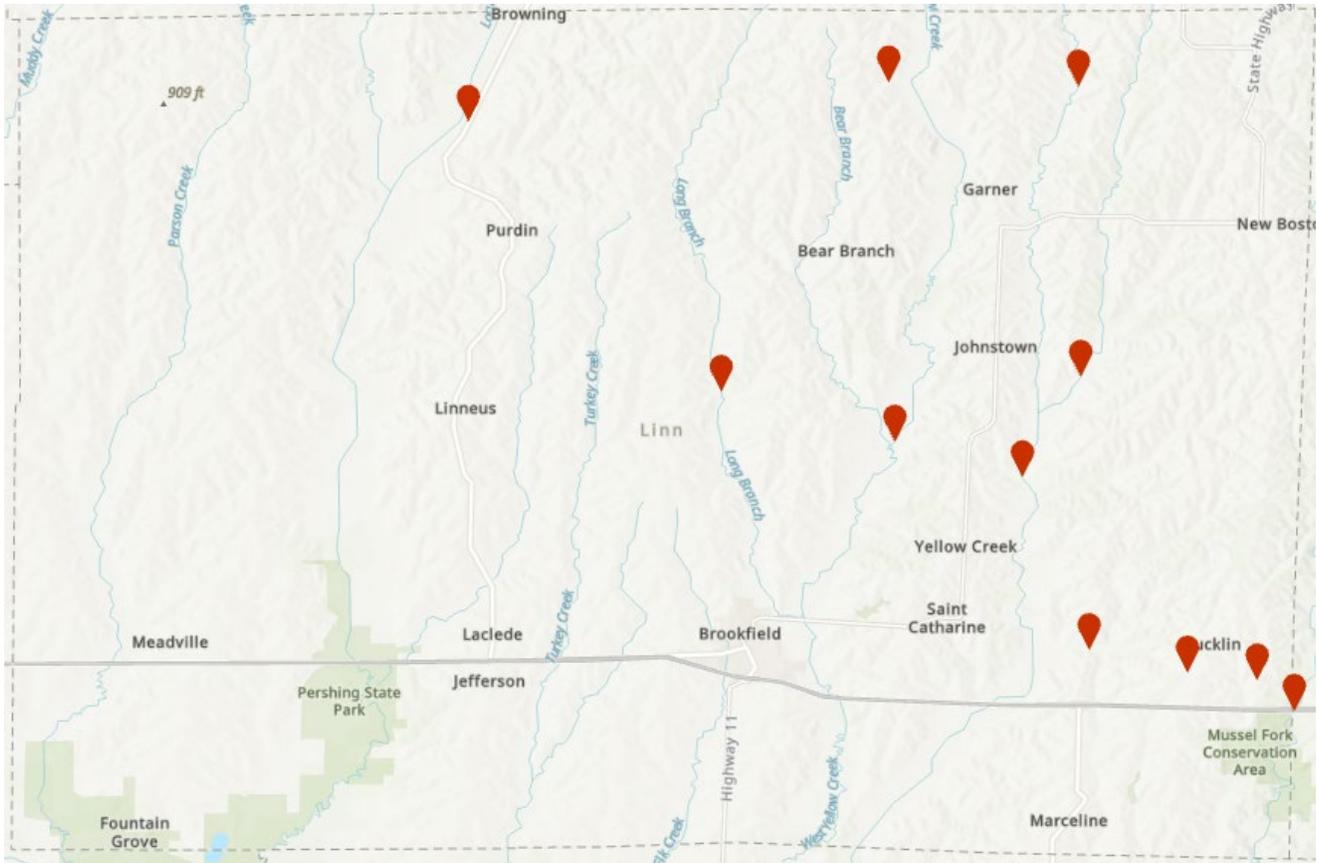
The following figures provide a map of existing bridges in Linn County (Figure 3.1). Figure 3.2 shows the location of scour critical bridges are located within the planning area. There are 11 bridges rated as scour critical, all lie in the unincorporated Linn County, there are none located inside incorporated city limits within the county.

Figure 3.1. Linn County Bridges



Source: ArcPRO GIS Map Created from National Bridge Inventory Database

Figure 3.2. Linn County Structurally Deficient Bridges



Source: ArcPRO GIS Map Created from National Bridge Inventory Database

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. This information is important for many reasons.

- 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.

Table 3.8. Threatened and Endangered Species in Linn County

Common Name	Scientific Name	Status
Mammals		
Gray Bat	Myotis grisescens	Endangered
Indiana Bat	Myotis sodalis	Endangered
Northern Long-eared Bat	Myotis septentrionalis	Endangered
Tricolored Bat	Perimyotis subflavus	Proposed Endangered
Fishes		
Pallid Sturgeon	Scaphirhynchus albus	Endangered
Insects		
Monarch Butterfly	Danaus plexippus	Proposed Threatened
Western Regal Fritillary	Argynnis idalia occidentalis	Proposed Threatened
Flowering Plants		
Eastern Prairie Fringed Orchid	Platanthera leucophaea	Threatened
Mead's Milkweed	Asclepias meadii	Threatened
Western Prairie Fringed Orchid	Platanthera praeclara	Threatened
Critical habitats		
There are no critical habitats at this location.		

Source: U.S. Fish and Wildlife Service, [Listed Species \(fws.gov\)](https://www.fws.gov/); also <https://ecos.fws.gov/ipac/>

Table 3.9. Parks in Linn County

Park / Conservation Area	Address	City
Locust Creek Covered Bridge State Historic Site	29277 Highway 130	Laclede, MO 64651-7124
Gen. John J. Pershing Boyhood Home State Historic Site	905 Pershing Way	Laclede, MO 64651-0141
Pershing State Park	29277 Highway 130	Laclede, MO 64651-7124

Source: <http://www.mostateparks.com>
Missouri département of conservation

Historic Resources: The National Register of Historic Places is the official list of registered cultural resources worthy of preservation. It was authorized under the National Historic Preservation Act of 1966 as part of a national program. The purpose of the program is to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. The National Register is administered by the National Park Service under the Secretary of the Interior. Properties listed in the National Register include districts, sites, buildings, structures and objects that are significant in American history, architecture, archeology, engineering, and culture.

Table 3.10. Linn County Properties on the National Register of Historic Places

Property	Address	City	Date Listed
Christian Church	116 West Gracia Avenue	Marceline	3/20/2025
Lincoln School	210 West Wells	Marceline	3/20/2025
Linn County Courthouse	108 High St.	Linneus	10/14/1999
Linn County Jail and Sheriff's Residence	102 N. Main St.	Linneus	1/16/2001
Locust Creek Covered Bridge	3 mi. W of Laclede off U.S. 36	Laclede	5/19/1970
Marceline Masonic Lodge #481	201 N. Main Street USA	Marceline	3/20/2025

Marceline Mercantile & Supply Company	125 E. California	Marceline	3/19/2025
Pershing, Gen. John J., Boyhood Home	State and Worlow Sts.	Laclede	5/21/1969
Plum Grove School	County Rd. 350, 3/8 mi. N of jct. with	Laclede	10/22/1994
Uptown Theatre	104 North Main St. U.S.A. (North Kansas Ave.)	Marceline	7/3/2023

Source: National Register of Historic Places – Spreadsheet of NRHP Listed Properties
<https://www.nps.gov/subjects/nationalregister/data-downloads.htm>

Table 3.11. Major Non-Government Employers in Linn County

Employer Name	Main Locations	Product or Service	Employees

Source: Data Collection Questionnaires; local Economic Development Commissions

Agriculture: The following information was obtained from the 2022 Census of Agriculture for Linn County.

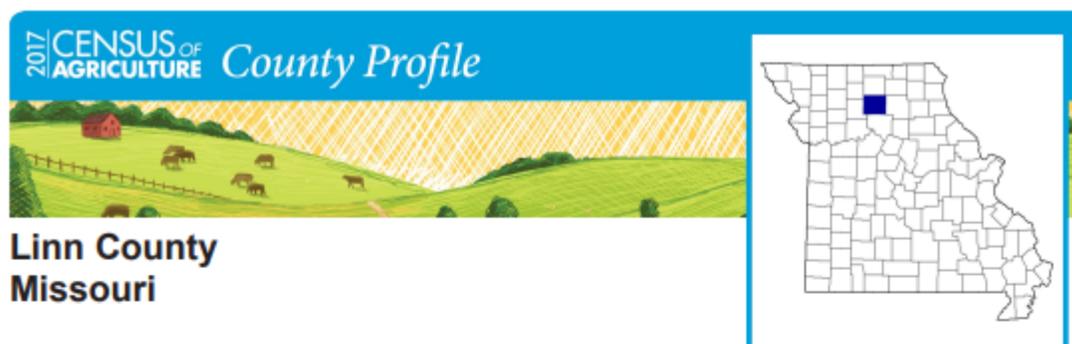
Insert more agricultural data.

Table 3.12. Agriculture-Related Jobs in Linn County

Grundy County Farm statistics	
Total Number of Farms	558
Total Producers	618
Producers Whose Primary Occupation is Farming	169

Source: Linn County census of agriculture

Figure 3.3. 2022 Census of Agriculture for Linn County (pg. 1)



Linn County Missouri

Total and Per Farm Overview, 2017 and change since 2012

	2017	% change since 2012
Number of farms	994	-4
Land in farms (acres)	330,563	-1
Average size of farm (acres)	333	+3
Total	(\$)	
Market value of products sold	76,353,000	+15
Government payments	7,019,000	+6
Farm-related income	7,886,000	-24
Total farm production expenses	69,455,000	+3
Net cash farm income	21,802,000	+34
Per farm average	(\$)	
Market value of products sold	76,813	+20
Government payments (average per farm receiving)	12,601	+34
Farm-related income	13,957	-25
Total farm production expenses	69,875	+8
Net cash farm income	21,933	+40

1 Percent of state agriculture sales

Share of Sales by Type (%)

Crops	60
Livestock, poultry, and products	40

Land in Farms by Use (%) *

Cropland	63
Pastureland	24
Woodland	9
Other	4

Acres irrigated: 1,312

(Z)% of land in farms

Land Use Practices (% of farms)

No till	21
Reduced till	13
Intensive till	5
Cover crop	9

Farms by Value of Sales

	Number	Percent of Total *
Less than \$2,500	371	37
\$2,500 to \$4,999	59	6
\$5,000 to \$9,999	58	6
\$10,000 to \$24,999	108	11
\$25,000 to \$49,999	108	11
\$50,000 to \$99,999	98	10
\$100,000 or more	192	19

Farms by Size

	Number	Percent of Total *
1 to 9 acres	33	3
10 to 49 acres	203	20
50 to 179 acres	292	29
180 to 499 acres	275	28
500 to 999 acres	114	11
1,000 + acres	77	8



United States Department of Agriculture
National Agricultural Statistics Service

www.nass.usda.gov/AgCensus

Figure 3.4. 2022 Census of Agriculture for Linn County (pg. 2)

Market Value of Agricultural Products Sold

	Sales (\$1,000)	Rank in State ^b	Counties Producing Item	Rank in U.S. ^b	Counties Producing Item
Total	76,353	61	114	1,399	3,077
Crops	45,555	51	114	1,152	3,073
Grains, oilseeds, dry beans, dry peas	42,736	49	112	832	2,916
Tobacco	-	-	4	-	323
Cotton and cottonseed	-	-	5	-	647
Vegetables, melons, potatoes, sweet potatoes	(D)	100	113	(D)	2,821
Fruits, tree nuts, berries	(D)	(D)	111	(D)	2,748
Nursery, greenhouse, floriculture, sod	(D)	(D)	108	(D)	2,601
Cultivated Christmas trees, short rotation woody crops	(D)	21	37	(D)	1,384
Other crops and hay	2,445	32	114	1,040	3,040
Livestock, poultry, and products	30,798	51	114	1,315	3,073
Poultry and eggs	15	92	112	1,657	3,007
Cattle and calves	25,315	23	113	628	3,055
Milk from cows	3,359	24	97	713	1,892
Hogs and pigs	(D)	60	111	601	2,856
Sheep, goats, wool, mohair, milk	(D)	1	111	151	2,984
Horses, ponies, mules, burros, donkeys	14	96	113	2,248	2,970
Aquaculture	-	-	43	-	1,251
Other animals and animal products	2	86	111	1,709	2,878

Total Producers ^c	1,715	Percent of farms that:	Top Crops in Acres ^d
Sex		Have internet access	69
Male	1,059		
Female	656		
Age		Farm organically	1
<35	150		
35 – 64	956		
65 and older	609		
Race		Sell directly to consumers	3
American Indian/Alaska Native	7		
Asian	3		
Black or African American	-		
Native Hawaiian/Pacific Islander	-		
White	1,695	Hire farm labor	22
More than one race	10		
Other characteristics		Are family farms	94
Hispanic, Latino, Spanish origin	5		
With military service	167		
New and beginning farmers	388		
			Livestock Inventory (Dec 31, 2017)
			Broilers and other meat-type chickens
			150
			Cattle and calves
			54,512
			Goats
			398
			Hogs and pigs
			581
			Horses and ponies
			399
			Layers
			1,489
			Pullets
			158
			Sheep and lambs
			1,685
			Turkeys
			102

See 2017 Census of Agriculture, U.S. Summary and State Data, for complete footnotes, explanations, definitions, commodity descriptions, and methodology.
^a May not add to 100% due to rounding. ^b Among counties whose rank can be displayed. ^c Data collected for a maximum of four producers per farm.
^d Crop commodity names may be shortened; see full names at www.nass.usda.gov/go/cropnames.pdf. * Position below the line does not indicate rank.
(D) Withheld to avoid disclosing data for individual operations. (NA) Not available. (Z) Less than half of the unit shown. (-) Represents zero.

USDA is an equal opportunity provider, employer, and lender.

3.3 LAND USE AND DEVELOPMENT

3.3.1 Development Since Previous Plan Update

The population data listed below shows a significant and steady loss of population in all jurisdictions within Linn County. Most significant however, is that the population of the entire planning area has declined over 14% since the 2010 Census and the most recent ACS 5-year survey.

Table 3.13. County Population Growth, 2010-2023 in Linn County

Jurisdiction	Total Population 2010	Total Population 2023	2010-2023 # Change	2000-2023 % Change
Linn County	3,979	3,735	-235	-5.9%
City of Brookfield	4,542	4,128	-414	-13.44%
City of Browning	265	260	-5	-17.98%
City of Bucklin	467	408	-59	-22.14%
City of Laclede	345	249	-96	-27.83%
City of Linneus	278	187	-91	-49.32%
City of Marceline	2,233	2,269	36	-11.2%
City of Meadville	462	415	-47	-9.19%
City of Purdin	190	140	-50	-37.22%
Total	12,761	11,791	-970	-14.27%

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

Population growth or decline is generally accompanied by increases or decreases in the number of housing units. The following table provides the change in numbers of housing units in the planning area from 2010 to 2022. The American Community Survey 2022 5-year Estimates was used as the most recent data available. This information was compared to the 2010 decennial census to show the change in both number (#) and percent (%).

Table 3.14. Change in Housing Units, 2010-2023 in Linn County

Jurisdiction	Housing Units 2010	Housing Units 2023	2010-2023 # Change	2010-2023 % Change
Linn County	2,490	1,996	-494	-19.84%
City of Brookfield	2,058	2,042	-16	-0.78%
City of Browning	144	163	19	13.19
City of Bucklin	228	242	14	6.14%
City of Laclede	153	109	-44	-28.76%
City of Linneus	114	126	12	10.5%
City of Marceline	1,110	1,020	-90	-8.11%
City of Meadville	185	202	17	9.19%
City of Purdin	72	79	7	9.72%
Total	6,554	5,979	-575	-8.77%

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 of Linn County and participating jurisdictions has been declining steadily for at least the last ten years. Due to lack of population growth, there has been little in the way of new developments. No new development is expected to occur in known hazard areas, and no new facilities or infrastructure is planned for construction within the next five years.

City A

City B

City C

School District's Future Development

In this section, summarize future development trends for the participating school districts. Include information on any proposed construction, bonds, renovation, student growth or decline, employment growth or decline, and facilities improvement plans.

Special District's Future Development

In this section summarize future development for the participating special districts. Include information on any proposed construction, bonds, renovation, service district growth or decline, employment growth or decline, and facilities improvement plans.

3.4 HAZARD PROFILES, VULNERABILITY, AND PROBLEM STATEMENTS

Each hazard will be analyzed individually in a hazard profile. The profile will consist of a general hazard description, location, strength/magnitude/extent, previous events, future probability, a discussion of risk variations between jurisdictions, and how anticipated development could impact risk. At the end of each hazard profile will be a vulnerability assessment, followed by a summary problem statement.

Hazard Profiles

The level of information presented in the profiles will vary by hazard based on the information available. With each update of this plan, new information will be incorporated to provide better evaluation and prioritization of the hazards that affect the planning area. Detailed profiles for each of the identified hazards and the impact of Climate Change” to Changing Future Conditions Considerations in all of the hazard profiles.

Include information categorized as follows:

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 that are affected by the hazard. Where available, use maps to indicate the specific locations of the planning area that are vulnerable to the subject hazard. For some hazards, the entire planning area is at risk.

Strength/Magnitude/Extent: This includes information about the strength, magnitude, and extent of a hazard. For some hazards, this is accomplished with a description of a value on an established scientific scale or measurement system, such as an EF2 tornado on the Enhanced Fujita Scale. This section should also include information on the typical or expected strength/magnitude/extent of the hazard in the planning area. Strength, magnitude, and extent can also include the speed of onset and the duration of hazard events. Describing the strength/magnitude/extent of a hazard is not the same as describing its potential impacts on a community. Strength/magnitude/extent defines the characteristics of the hazard regardless of the people and property it affects.

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

Probability of Future Occurrence: The frequency of recorded past events is used to estimate the likelihood of future occurrences. Probability can be determined by dividing the number of recorded events by the number of years of available data and multiplying by 100. This gives the percentage chance of the event happening in any given year. For events occurring more than once annually, the probability should be reported as 100% in any given year, with a statement of the average number of events annually. For hazards such as drought that may have gradual onset and extended duration, probability can be based on the number of months in drought in a given time-period and expressed as the probability for any given month to be in drought.

Changing Future Conditions Considerations: *OPTIONAL*

In addition to the probability of future occurrence, changing future conditions should also be considered, including the effects of long-term changes in weather patterns and climate on the identified hazards. NOAA has a new tool that can provide useful information for this purpose.

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.

Following the hazard profile for each hazard will be the vulnerability assessment. The vulnerability assessment further defines and quantifies populations, buildings, critical facilities, and other community assets at risk to damage from natural hazards. The vulnerability assessments should be based on the best available data. The vulnerability assessments can also be based on data that was collected for the 2023 State Hazard Mitigation Plan Update. With the 2023 Hazard Mitigation Plan Update, SEMA is pleased to provide online access to the risk assessment data and associated mapping for the 114 counties in the State, including the independent City of St. Louis. Through the web-based Missouri Hazard Mitigation Viewer, local planners or other interested parties can obtain all State Plan datasets. This effort removes from local mitigation planners a barrier to performing all the needed local risk assessments by providing the data developed during the 2023 State Plan Update.

The Missouri Hazard Mitigation Viewer includes a Map Viewer with a legend of clearly labeled features, a north arrow, a base map that is either aerial imagery or a street map, risk assessment data symbolized the same as in the 2023 State Plan for easy reference, search and query capabilities, ability to zoom to county level data and capability to download PDF format maps. The Missouri Hazard Mitigation Viewer can be found at this link:

<http://bit.ly/MoHazardMitigationPlanViewer2023>.

The vulnerability assessments in the Linn County plan will also be based on:

- Written descriptions of assets and risks provided by participating jurisdictions;
- Existing plans and reports;
- Personal interviews with planning committee members and other stakeholders; and
- Other sources as cited.

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

- **Vulnerability Overview:**
The plan must provide an overall summary of each jurisdiction’s vulnerability to the identified hazards. The overall summary of vulnerability identifies structures, systems, populations or other community assets as defined by the community that are susceptible to damage and loss for hazard events.
- **Potential Losses to Existing Development:**
(including types and numbers, of buildings, critical facilities, etc.) For each participating jurisdiction, the plan must describe the potential impacts of the hazard. Impact means the consequences of the effect of the hazard on the jurisdiction and its assets. Assets are determined by the community and include, for example, people, structures, facilities, systems, capabilities, and/or activities that have value to the community. For example, impacts could be described by referencing historical disaster impacts and/or an estimate of potential future losses.
- **Previous and Future Development:**
This section will include information on how changes in development have impacted the community’s vulnerability to this hazard. Describe how any changes in development that occurred in known hazard prone areas since the previous plan have increased or decreased the community’s vulnerability. Describe any anticipated future development in the county, and how that would impact hazard risk in the planning area.
- **Hazard Summary by Jurisdiction:**
For hazard risks that vary by jurisdiction, this section will provide an overview of the variation and the factual basis for that variation.

Problem Statements

Each hazard analysis must conclude with a brief summary of the problems created by the hazard in the planning area, and possible ways to resolve those problems. Include jurisdiction-specific information in those cases where the risk varies across the planning area. The focus of the problem statements sub-section is to synthesize the “problems” revealed through the risk assessment and then through the process of updating the mitigation strategy, develop mitigation actions that are aimed at “solving” the identified problems. Problem statements should be as specific as possible relating to specific jurisdictions as well as specific assets or areas of the planning area that are problematic. This will in turn prompt development of specific mitigation actions.

3.4.1 Flooding (Riverine and Flash)

Hazard Profile

Hazard Description

A flood is partial or complete inundation of normally dry land areas. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt, or ice. There are several types of riverine floods, including headwater, backwater, interior drainage, and flash flooding. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice melt. The areas adjacent to rivers and stream banks that carry excess floodwater during rapid runoff are called floodplains. A floodplain is defined as the lowland and relatively flat area adjoining a river or stream. The terms “base flood” and “100- year flood” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year. Floodplains are part of a larger entity called a basin, which is defined as all the land drained by a river and its branches.

Flooding caused by dam and levee failure is discussed in Section 3.____ and Section 3.____ respectively. It will not be addressed in this section.

A flash flood occurs when water levels rise at an extremely fast rate as a result of intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Flash flooding can happen in Special Flood Hazard Areas (SFHAs) as delineated by the National Flood Insurance Program (NFIP) and can also happen in areas not associated with floodplains.

Ice jam flooding is a form of flash flooding that occurs when ice breaks up in moving waterways, and then stacks on itself where channels narrow. This creates a natural dam, often causing flooding within minutes of the dam formation.

In some cases, flooding may not be directly attributable to a river, stream, or lake overflowing its banks. Rather, it may simply be the combination of excessive rainfall or snowmelt, saturated ground, and inadequate drainage. With no place to go, the 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.

Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. Flash flooding is a dangerous form of flooding which can reach full peak in only a few minutes. Rapid onset allows little or no time for protective measures. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding can result in higher loss of life, both human and animal, than slower developing river and stream flooding.

In certain areas, aging storm sewer systems are not designed to carry the capacity currently needed to handle the increased storm runoff. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns. This combined with rainfall trends and rainfall extremes all demonstrate the high probability, yet generally unpredictable nature of flash flooding in the planning area.

Although flash floods are somewhat unpredictable, there are factors that can point to the likelihood of flash floods occurring. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. This, along with knowledge of the watershed characteristics, modeling techniques, monitoring, and advanced warning systems has increased the warning time for flash floods.

Geographic Location

Riverine flooding is most likely to occur in Special Flood Hazard Areas (SFHAs). Flash flooding occurs in SFHAs and those locations in the planning area that are low-lying. They also occur in areas without adequate drainage to carry away the amount of water that falls during intense rainfall events.

Riverine flooding is most likely to occur in SFHAs. The following maps are from the most recent information from FEMA's National Flood Layer of Linn County. The following key is the flood map key for all jurisdictions flood maps.

Figure 3.5. Flood Map Key

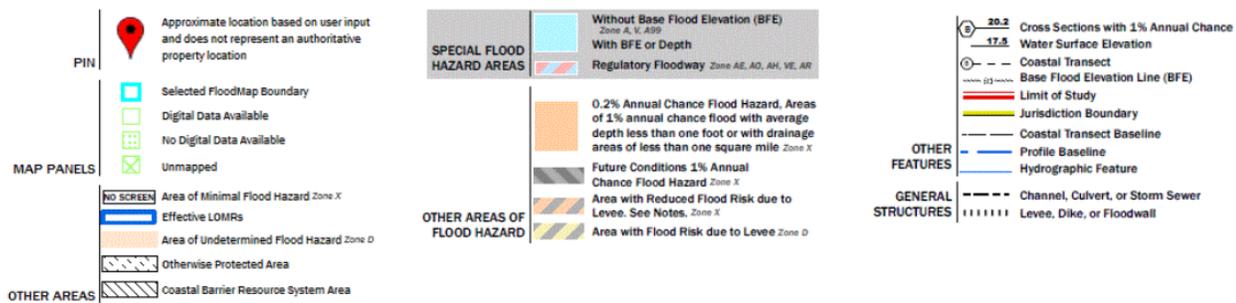


Figure 3.6. City of Linneus (County Seat)

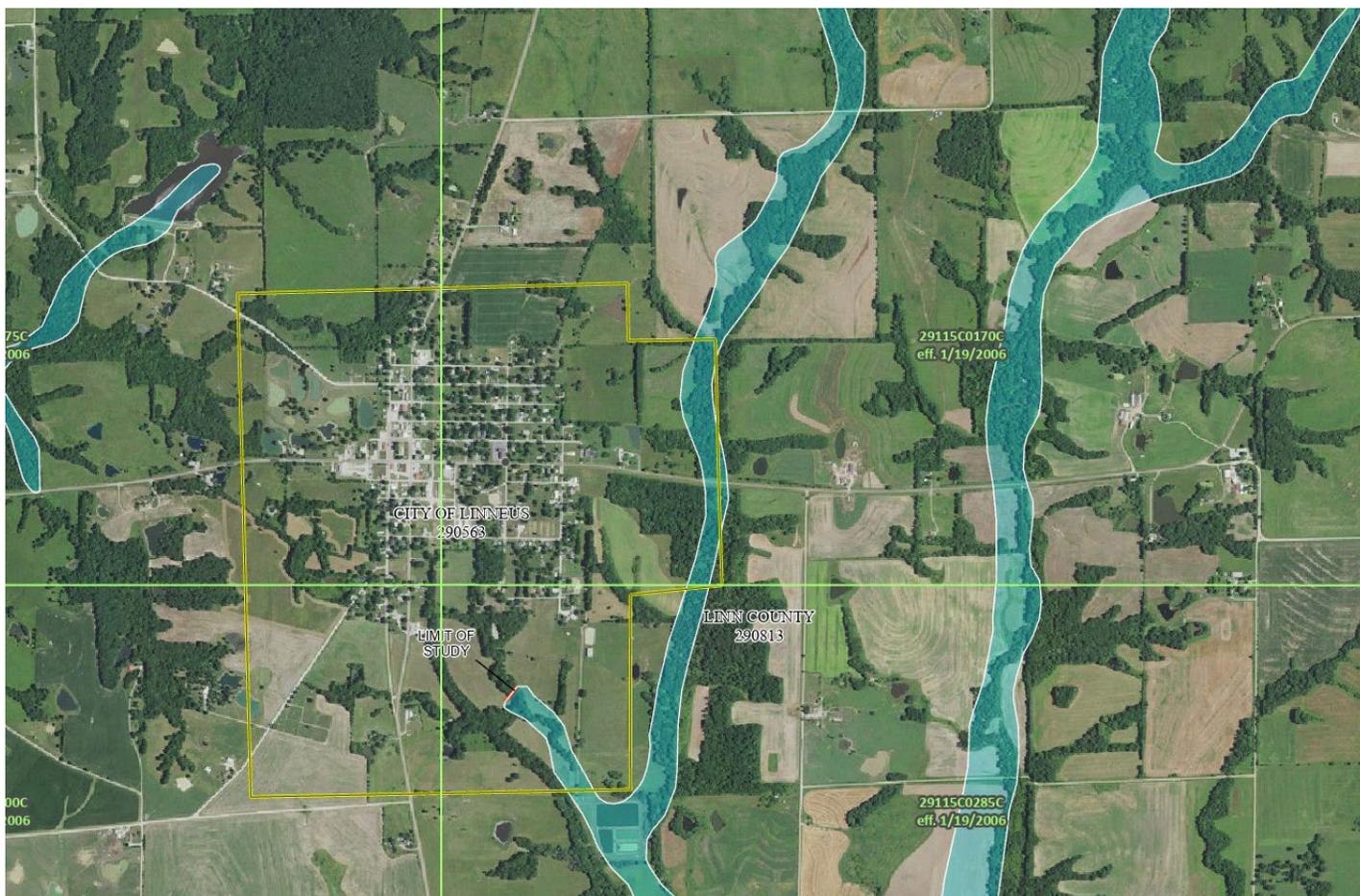


Figure 3.7. City of Brookfield (North)

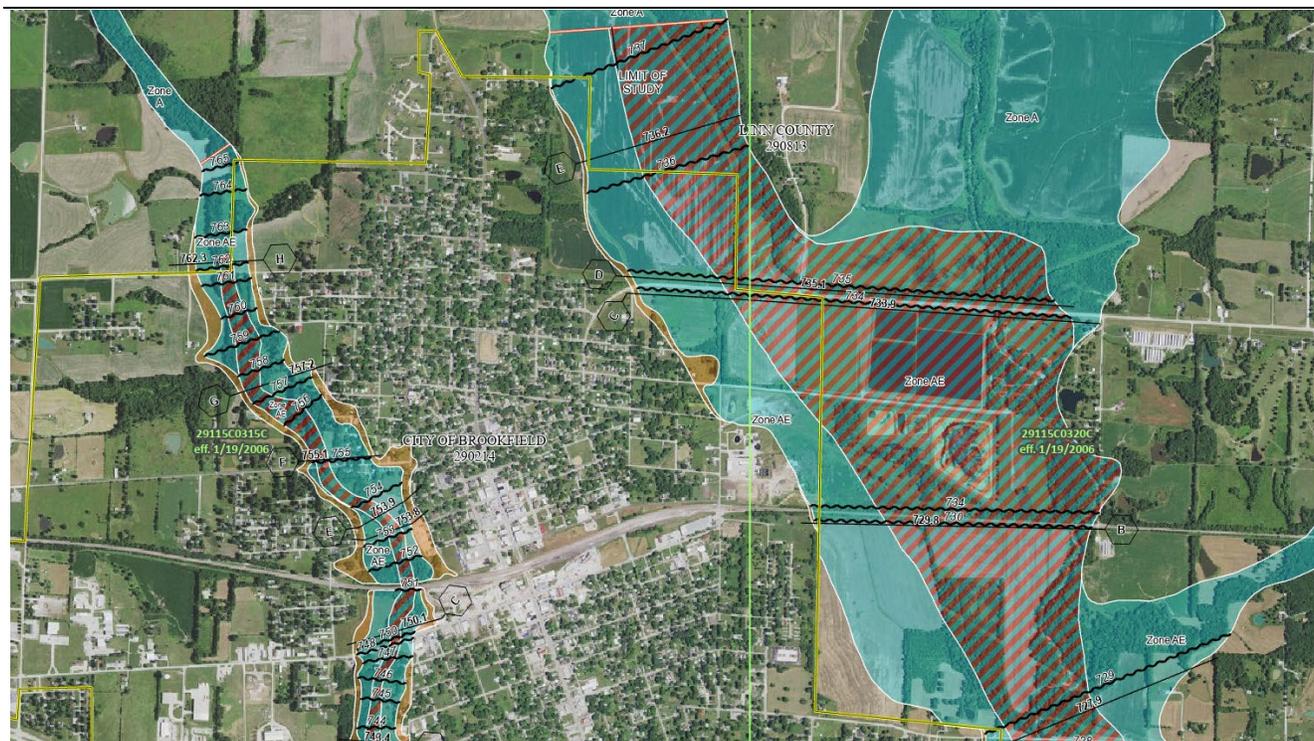


Figure 3.8. City of Brookfield (South)

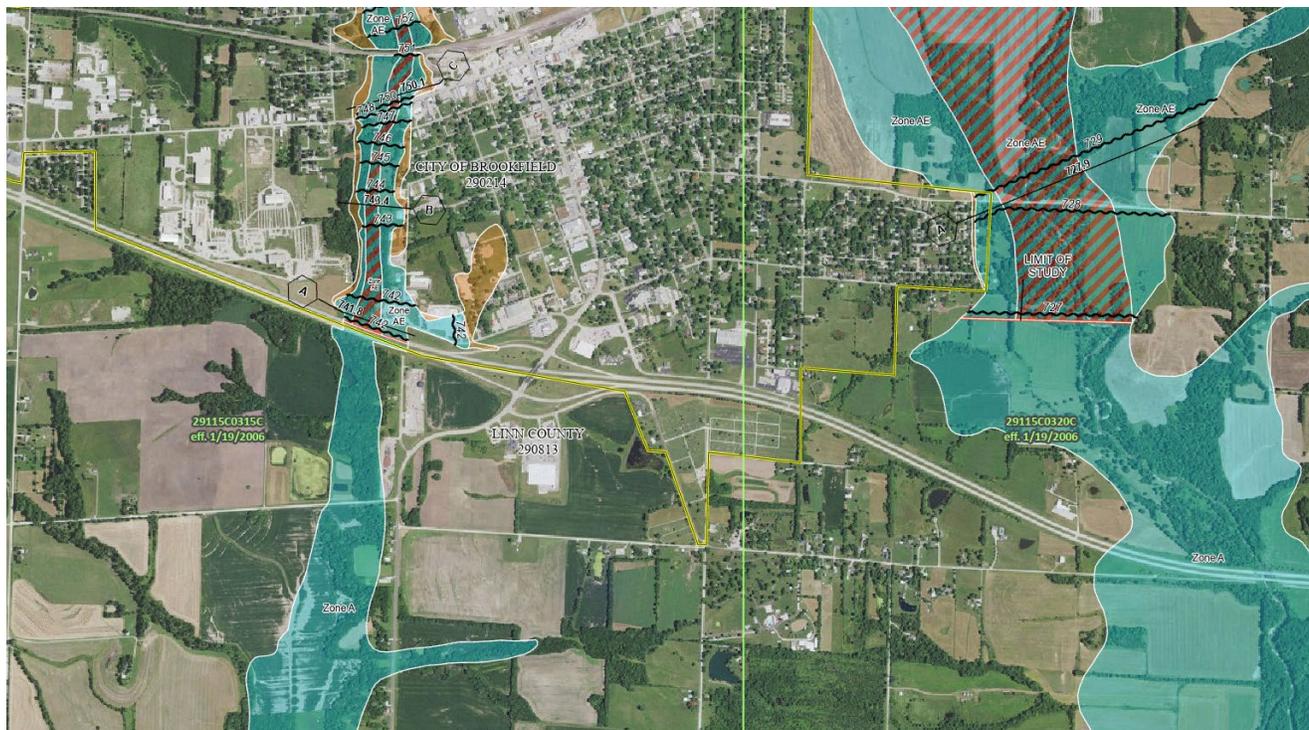


Figure 3.9. City of Browning

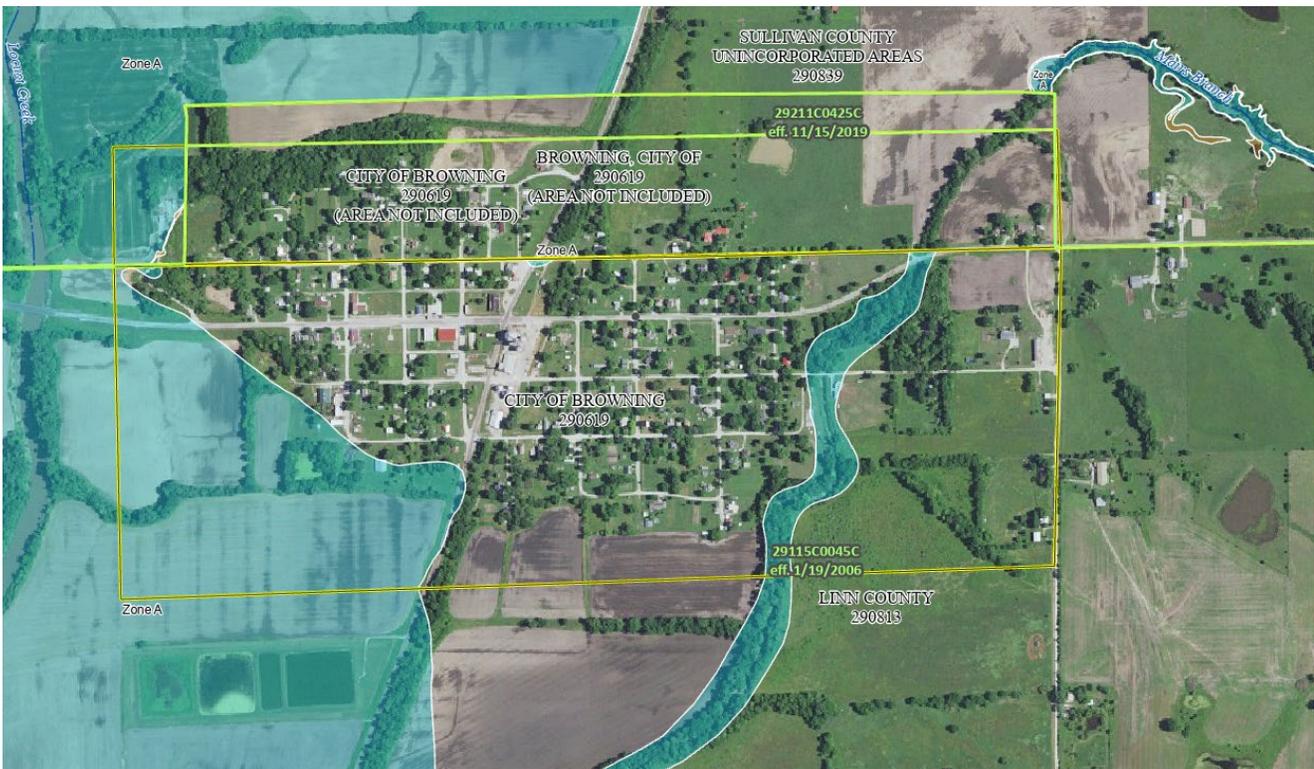


Figure 3.10. City of Bucklin

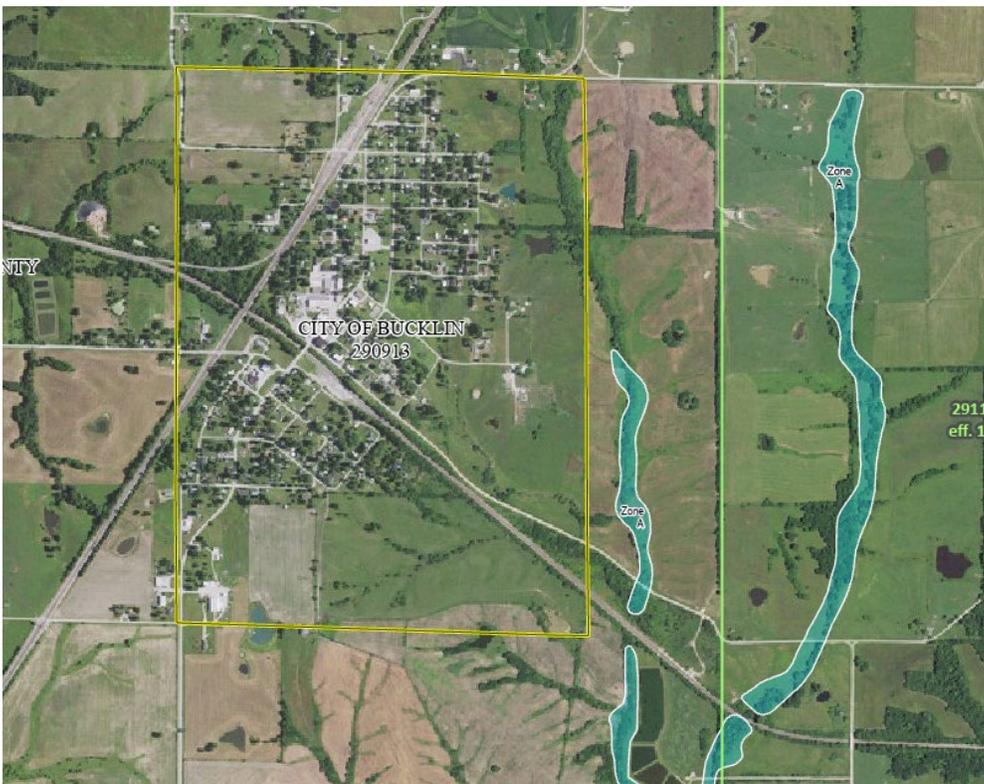


Figure 3.11. City of Laclede



Figure 3.12. City of Marceline



Figure 3.13. City of Meadville



Figure 3.14. City of Purdin

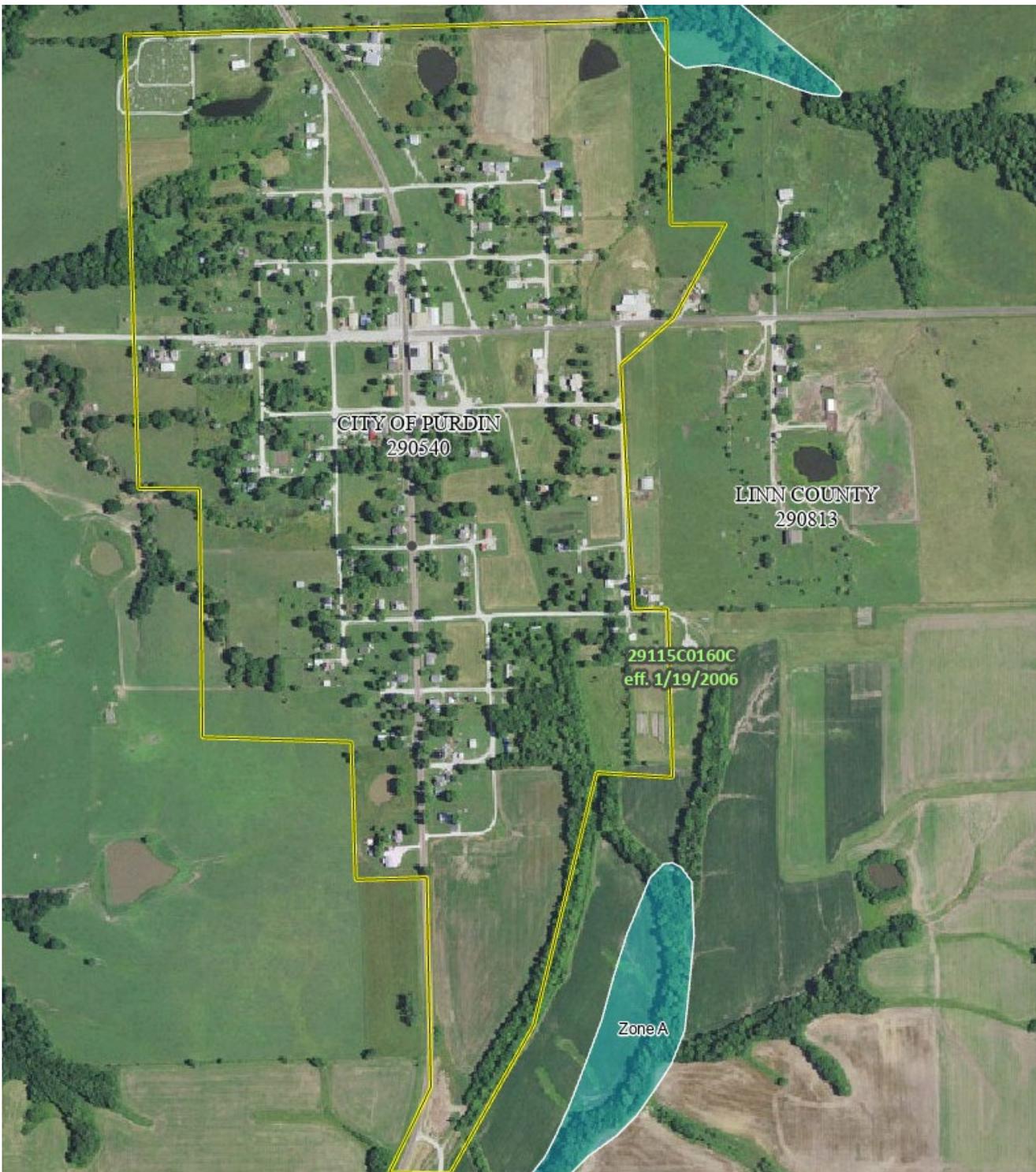


Table 3.15. Linn County NCEI Flood Events by Location, 2004-2025

Location	# of Events
Unincorporated Linn County	2
-Unincorporated County (unspecified)- 0 flood events	
-Unincorporated County (Shelby)-2 flood events	

City of Linneus	1
-City of Linneus (unspecified)- 1 flood events	
City of Marceline	1
-City of Marceline (unspecified)- 1 flood events	

Source: National Centers for Environmental Information, 7/22/2025

Flash flooding occurs in SFHAs and those locations in the planning area that are low-lying. They also occur in areas without adequate drainage to carry away the amount of water that falls during intense rainfall events. The following table provides the locations and frequency of events from 2004 to 2025. Also included in the “Previous Occurrences” section, is a table that contains the event narratives from the NCEI database, which provides additional information about the past flash flood events in the planning area.

Table 3.16. Linn County NCEI Flash Flood Events by Location, 2004-2025

Location	# of Events
Unincorporated Linn County	2
-Unincorporated County (unspecified)- 0 flood events	
-Unincorporated County (Shelby)- 1 flood events	
-Unincorporated County (Hecla)- 1 flood events	5
City of Brookfield	
-Brookfield (unspecified)- 4 flood events	
-Brookfield Troutman Airport 1 flood events	1
City of Bucklin	
-City of Bucklin (unspecified)- 1 flood events	1
City of Linneus	
-City of Linneus (unspecified)- 1 flood events	3
City of Meadville	
-City of Meadville (unspecified)- 3 flood events	3
City of Purdin	
-City of Purdin (unspecified)- 3 flood events	

Source: National Centers for Environmental Information, 7/22/2025

Strength/Magnitude/Extent

Missouri has a long and active history of flooding over the past century, according to the 2023 State Hazard Mitigation Plan. Flooding along Missouri’s major rivers generally result in slow-moving disasters. River crest levels are forecast several days in advance, allowing communities downstream sufficient time to take protective measures, such as sandbagging and evacuations. Nevertheless, floods exact a heavy toll in terms of human suffering and losses to public and private property. By contrast, flash flood events in recent years have caused a higher number of deaths and major property damage in many areas of Missouri.

According to the U.S. Geological Survey, two critical factors affect flooding due to rainfall: rainfall duration and rainfall intensity – the rate at which it rains. These factors contribute to a flood’s height, water velocity and other properties that reveal its magnitude.

When roads and bridges are inundated by water, damage can occur as the water scours materials around bridge abutments and gravel roads. Floodwaters have been known to cause erosion undermining roadbeds. In some instances, steep slopes that are saturated with water may cause mud or rockslides onto roadways. These types of damage can cause costly repairs for state, county, and city road and bridge maintenance departments. When sewer back-up occurs, this can result in costly clean-up for home and business owners as well and could present a health hazard.

National Flood Insurance Program (NFIP) Participation

Provide a table (**Table 3.17**) with details on NFIP participation in regards to ordinance and enforcement. Provide a (**Table 3.18**) with details on NFIP participation for the communities in the planning area. Provide another table (**Table 3.19**) with the number of policies in force, amount of insurance in force, number of closed losses, and total payments for each jurisdiction, where applicable. Identify the time period represented by the data. Be sure to note if any of the communities in the planning area are sanctioned. Sanctioned communities are those communities that are not currently participating in the NFIP and where a Flood Hazard Boundary Map or Flood Insurance Rate Map has been issued. FIRMettes for NFIP-participating jurisdictions MUST be included here ([Reference PRT A4-a](#)). Along with the FIRMettes, include narrative that explains how hazard risks may differ across the planning area and between participating jurisdictions. The plan MUST specify the unique and varied risk information for each applicable jurisdiction, which could include addressing properties at risk of flooding that may not be NFIP insured or in the Special Flood Hazard Area (SFHA), or describing which areas are most susceptible to flooding ([Reference PRT B1-f](#)).

Table 3.17. NFIP Participation in Linn County – Ordinance and Enforcement Information

Community ID #	Community Name	NFIP Participant (Y/N/Sanctioned)	Adoption Date of Current Flood Damage Prevention Ordinance	Floodplain Administrator and/or Agency
290813	Linn County	No	n/a	n/a
290214	City of Brookfield	Yes		
290215	City of Marceline	Yes		
290563	City of Linneus	Yes		
290540	City of Purdin	No	n/a	n/a
290557	City of Laclede	No	n/a	n/a
290566	City of Meadville	No	n/a	n/a

Source: NFIP Community Status Book, 7/22/2025; PIVOT (information from STATE) [Community Status Book | FEMA.gov](#); M= No elevation determined – all Zone A, C, and X; NSFHA = No Special Flood Hazard Area; E=Emergency Program

Table 3.18. NFIP Participation in Linn County- Mapping Information

Community ID #	Community Name	Current Effective Map Date	Regular- Emergency Program Entry Date
290813	Linn County	1/19/2006	12/15/1984
290214	City of Brookfield	1/19/2006	7/16/1990
290215	City of Marceline	1/19/2006	9/18/1985
290563	City of Linneus	1/19/2006	9/10/1984
290540	City of Purdin	1/19/2006	1/19/2007
290557	City of Laclede	1/19/2006	6/25/1977
290566	City of Meadville	1/19/2006	4/25/1976

Source: NFIP Community Status Book, 7/22/2025; PIVOT (information from STATE) [Community Status Book | FEMA.gov](#); M= No elevation determined – all Zone A, C, and X; NSFHA = No Special Flood Hazard Area; E=Emergency Program

Substantial Improvement/Substantial Damage information ([Reference PRT C2-a](#)) and other NFIP-participant criteria that MUST be included, as follows:

- The following information MUST be provided for each NFIP participant:
 1. Adoption of minimum NFIP floodplain management criteria by local regulation (Cite Local Regulation, Adoption Date)
 2. Adoption of latest FIRM, if applicable (Include the Date)

3. Implement and enforce local floodplain management regulations (Name the representative, his/her **agency, title, and phone number**)
4. Appoint a designee to implement NFIP commitments/requirements (Name the representative, his/her agency, title, and phone number, if different than above)
5. Describe how substantial improvement/substantial damage provisions are implemented after an event (Cite Local Regulation, Adoption Date, and **reference** the specific Local Regulation as included in Appendix A.)

- If a community with a FIRM doesn't participate, **MUST** describe why
- If there is no existing Local Regulation, **MUST** create an Action Worksheet in Chapter 4 (or Appendix C) and **reference** the newly created action here.

Table 3.19. NFIP Policy and Claim Statistics as of Date

Community Name	Policies in Force	Insurance in Force	Closed Losses	Total Payments
Laclede	0	0	0	0
Linn County	0	0	0	0
City of Linneus	0	0	0	0
City of Meadville	0	0	0	0
City of Marceline	0	0	3	\$3,204.65
City of Purdin	0	0	0	0
City of Brookfield	5	\$713,000.00	20	\$189,857

Source: NFIP Community Status Book, 7/25/2022; PIVOT (information from STATE), [Community Status Book | FEMA.gov](https://www.fema.gov/community-status-book)
 *Closed Losses are those flood insurance claims that resulted in payment. Loss statistics are for current as of 7/11/2025

As of the previous table and information obtained from SEMA, the city of Marceline had 3 closed losses totaling \$3,204.65. However, the City of Brookfield is the only city with policies currently in force, and has paid substantially more than Marceline, for a total of \$189,857. The total insurance in force for Linn County is \$713,00 as of 7/25/2025.

The jurisdictions that participate in the NFIP have adopted Floodplain Ordinances that establish regulations for construction, development, and substantial improvements within floodplain areas. These regulations mandate the acquisition of floodplain development permits and elevation certificates to ensure that all projects comply with these standards. Records and documentation for all floodplain development is kept in adherence to FEMA regulations, and the designated floodplain administrator of each jurisdiction maintains these records.

Substantial Improvements/Substantial Damage Provisions are implemented after an event through the Floodplain Ordinance of participating jurisdictions. Each jurisdiction that participates in the NFIP has addressed the specific requirements of FEMA regarding substantial damage/substantial improvement provisions and development in SFHA. The Floodplain Ordinances that were made available for inclusion in this plan can be found in Appendix E.

Of the jurisdictions in Linn County only the City of Brookfield, the City of Linneus, and the City of Marceline participate in the NFIP.

Repetitive Loss/Severe Repetitive Loss Properties

Repetitive Loss Properties are those properties with at least two flood insurance payments of \$1,000 or more in a 10-year period. According to the Flood Insurance Administration, jurisdictions included in the planning area have a combined total of 4 repetitive loss properties. As of July 11, 2025, 0 properties have been mitigated, leaving 4 un-mitigated repetitive loss properties.

Table 3.20. Linn County Repetitive Loss Properties

Jurisdiction	# of Properties	Type of Property	# Mitigated	Building Payments	Content Payments	Total Payments	Average Payment	# of Losses
Brookfield	4	Residential	0	\$66,071.34	\$33,616.92	\$99,688.26	\$24,922.07	11

Source: Flood Insurance Administration as of 7/2025

Severe Repetitive Loss (SRL): A SRL property is defined it as a single family property (consisting of one-to-four residences) 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 such claims 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.

There are currently no Severe Repetitive Loss (SRL) properties in Linn County. This information was obtained from SEMA on 7/11/2025.

Previous Occurrences

Flood events, as reported in the NOAA (National Oceanic and Atmospheric Administration) storm events database were reviewed. There has been a total of 11 flash flood events in the planning area between the years 2005 to 2025; there were a total of 4 flood events during this same time frame. (See below tables for events and narratives).

Table 3.21. NCEI Linn County Flash Flood Events Summary, 2005-2025

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2005	1	0	0	0	0
2008	4	0	0	0	0
2009	2	0	0	0	0
2010	1	0	0	0	0
2014	1	0	0	0	0
2015	2	0	0	0	0

Source: NCEI, data accessed 7/21/2025

The following table provides additional information on the flash floods that have been reported in the planning area between 2005 and 2025.

Table 3.22. Flash Flood Event Narratives from NCEI Database

Begin Date	Event Narrative
5/22/2005	Heavy rain caused Route C to close due to high water flowing over the road.
6/24/2008	Significant water was flowing across Highway 5, 2 miles south of Purdin.
6/25/2008	Highway 5 north of Linneus was closed due to heavy rains.
6/25/2008	Highway 139 north of Meadville was closed due to flooding.
6/25/2008	Several locations on Route C east of Purdin had water over the road.
8/17/2009	High water was reported over several roads, making them impassable.
8/17/2009	State Route WW was closed near Mussel Fork Creek, due to flooding.
5/12/2010	Numerous streets around Meadville were reported under water.
9/10/2014	State route C was closed near Shelby due to flooding along West Yellow Creek.
6/22/2015	Flooding was reported along Route C, east of Purdin.
7/19/2015	Flooding was reported along route 11.

Table 3.23. NCEI Linn County Riverine Flood Events Summary, 2005-2025

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2008	1	0	0	0	0
2017	1	0	0	0	0
2019	1	0	0	0	0
2020	1	0	0	0	0

Source: NCEI, July 21, 2025

The following table contains information that was obtained from the NCEI database.

Table 3.24. NCEI Event Narratives 2005-2025

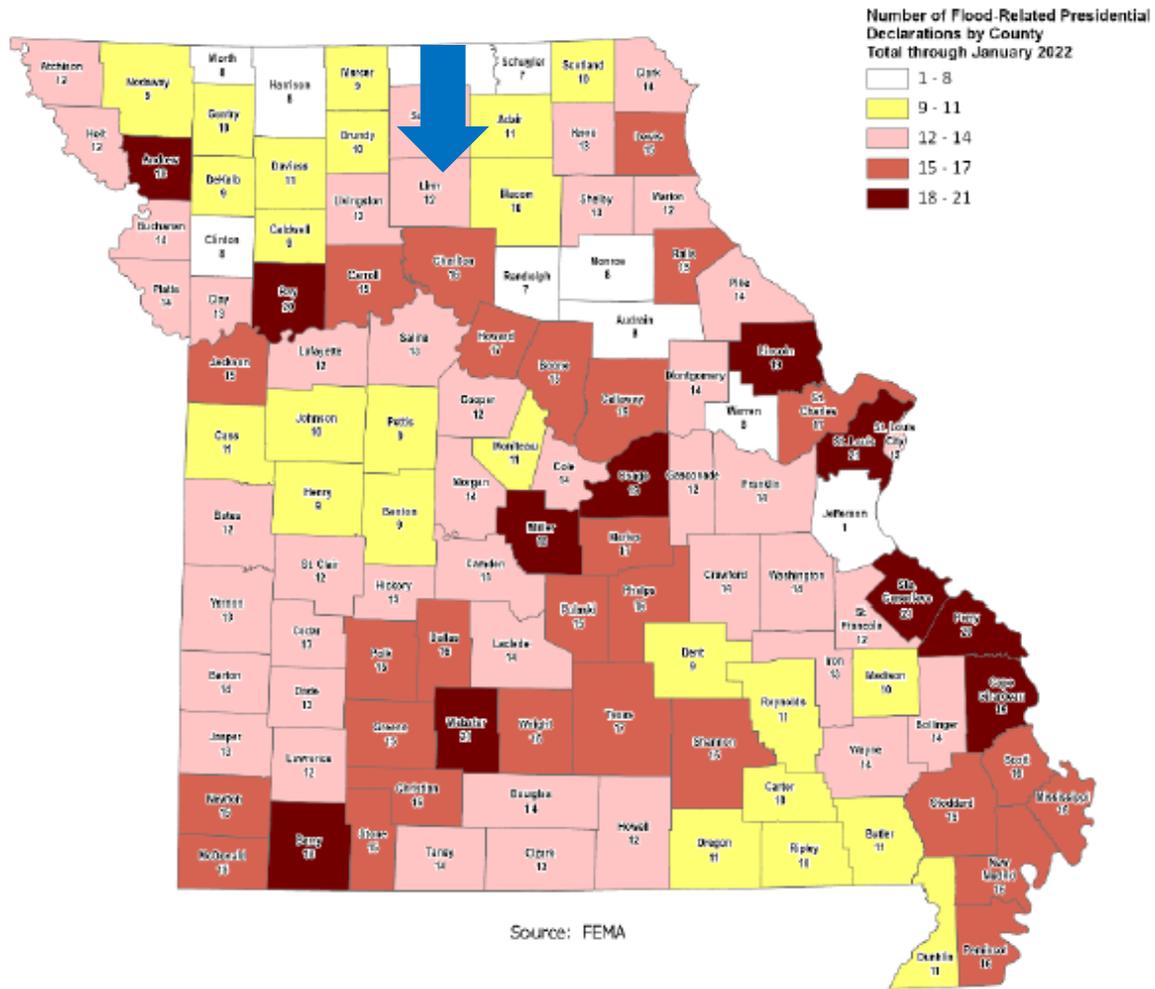
Begin Date	Event Narrative
6/25/2008	Route WW in Marceline was closed due to water over the road.
4/5/2017	State Route C was closed due to flooding along West Yellow Creek.
5/21/2019	Route B was closed in both directions near Linneus.
6/9/2020	State Route C was closed near West Yellow Creek due to flooding.

Source: NCEI, July 21, 2025

Table 3.25. Flood Disaster Declarations in Linn County (1973-2025)

Disaster Number	Declaration Date	Incident Subcategory	Information
995	7/9/1993	Flood	Severe Storms & Flooding
1054	6/2/1995	Severe Storm	Severe Storms, Tornadoes, Hail, & Flooding
1253	10/14/1998	Severe Storm	Severe Storms, Flooding, & Tornadoes
1403			
1412	5/6/2002	Severe Storm	Severe Storms, Tornadoes, & Flooding
1524	6/11/2004	Severe Storm	Severe Storms, Tornadoes, & Flooding
1708	5/5/2007	Severe Storm	Severe Storms & Flooding
1773	6/25/2008	Severe Storm	Severe Storms & Flooding
1809	11/13/2008	Severe Storm	Severe Storms, Flooding, & A Tornado
1934	8/17/2010	Severe Storm	Severe Storms, Flooding, & Tornadoes
4238	8/7/2015	Severe Storm	Severe Storms, Tornadoes, Straight-Line Winds, & Flooding
4451	7/9/2019	Severe Storm	Severe Storms, Tornadoes, & Flooding

Figure 3.15. Flood-Related Presidential Declarations for Linn County



Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.26. Crop Loss Data for Linn County 2014-2024

Crop Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	Corn	Flood	\$175,055.00
	Grain Sorghum		\$1,122.00
	Soybeans		\$1,273,787.10
2015	Corn	Flood	\$139,524.00
	Soybeans		\$107,743.95
	Wheat		\$17,185.00
2016	Corn	Flood	\$1,881.00
	Soybeans		\$20,236.57
2017	Corn	Flood	\$18,713.00
	Soybeans		\$51,662.00
2018	Corn	Flood	\$33,263.68
	Soybeans		\$18,824.00
2019	Corn	Flood	\$616,483.50
	Soybeans		\$99,886.00

	Wheat		\$1,237.00
2020	Corn	Flood	\$89,648.00
	Soybeans		\$567.00
2021	Corn	Flood	\$783,609.45
	Soybeans		\$396,006.00
2022	Corn	Flood	\$115,686.00
	Soybeans		\$2,502.00
2023	Soybeans	Flood	\$35,756.00
2024	Corn	Flood	\$41,752.00
	Soybeans		\$16,109.00
Total			\$4,058,238.25

Source: USDA Risk Management Agency <http://www.rma.usda.gov/data/cause>

Probability of Future Occurrence

The probability calculations for both flash and riverine flooding are listed below. The calculations provide the average annual chance of both types of floods based on past occurrences.

$$\text{Probability of Flash Flood} = \frac{11}{20} = 0.55 = 55\% \text{ probability}$$

$$\text{Probability of Riverine Flood} = \frac{4}{20} = 0.20 = 20\% \text{ probability}$$

Changing Future Conditions Considerations

According to the 2023 Missouri State Hazard Mitigation Plan, “frequency of floods in Missouri is likely to increase,” and “over the last half century, average annual precipitation in most of the Midwest has increased by 5 to 10 percent.” Missouri has experienced above average precipitation since 1990. It is likely that the frequency and intensity of rainfall events will increase. As the number of these heavy rain events increases, more flooding and pooling water is to be expected.

The expected increases in rainfall frequency and intensity are also likely to put additional stress on natural hydrological systems and community stormwater systems. Heavier snowfalls in the winter will lead to intensified spring flooding, and groundwater levels will remain high.

These changes in climate patterns could potentially lead to the development of compounding events that could interact and cause extreme conditions. Other environmental impacts of flooding could include erosion, surface and groundwater contamination, and reduced water quality.

Vulnerability

Vulnerability Overview

Flooding presents a danger to life and property, often resulting in injuries, and in some cases, fatalities. Floodwaters themselves can interact with hazardous materials. Hazardous materials stored in large containers could break loose or puncture as a result of flood activity. Examples are bulk propane tanks. When this happens, the evacuation of citizens is necessary.

Public health concerns may result from flooding, requiring disease and injury surveillance. Community sanitation to evaluate flood-affected food supplies may also be necessary. Private water and sewage sanitation could be impacted, and vector control (for mosquitoes and other entomology concerns) may be necessary.

When roads and bridges are inundated by water, damage can occur as the water scours materials around bridge abutments and gravel roads. Floodwater can also cause erosion undermining roadbeds. In some instances, steep slopes that are saturated with water may cause mud or rockslides onto roadways. These damages can cause costly repairs for state, county, and city road and bridge maintenance departments. When sewer back-up occurs, this can result in costly clean-up for home and business owners as well as present a health hazard.

Scour critical bridges were discussed in Section 3.2.2 Critical and Essential Facilities and Infrastructure. This section identifies the bridges and their corresponding conditions in Linn County as well as specifically identifying bridges that are considered scour critical.

Potential Losses to Existing Development

The 2023 Missouri Hazard Mitigation Plan used HAZUS data to analyze the county’s vulnerability to flooding. A summary of the information is in the following tables. This information is based on an estimate of damage that could potentially occur during a 1-percent annual chance flood event.

Table 3.27. HAZUS Estimates of Potential Losses for Linn County

Data From State Plan	Linn County
Countywide Building Exposure	\$1,886,629,207
Structural Damage	\$8,227,183
Loss Ratio	0.44%
Contents Loss	\$6,036,348
Inventory Loss	\$204,251
Total Direct Loss	\$14,467,782
Total Income Loss	\$19,452
Total Direct & Income Loss	\$14,487,235
#HAZUS Building Risk	13
# Substantially Damaged	0
# Displaced People	277
# Shelter Needs	61

Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.28. HAZUS Estimates of Potential Loss by Building Type for Linn County

Residential		Agriculture		Commercial		Education		Government		Industrial	
#	\$	#	\$	#	\$	#	\$	#	\$	#	\$
53	\$12,140,214	111	\$12,140,214	00	\$15,993,357	0	\$0	1	\$736,791	0	\$0

Source: 2023 Missouri State Hazard Mitigation Plan

Impact of Previous and Future Development

Any future development in floodplains would increase risk in those areas. For the 3 communities participating in the National Flood Insurance Program, enforcement of the floodplain management regulations will ensure mitigation of future construction in those areas. However, even if structures are mitigated, evacuation may still be necessary due to rising waters. In addition, floods that exceed mitigated levels may still cause damage. There is no future development planned in floodplains in Linn County at this time.

Hazard Summary by Jurisdiction

Be sure to discuss how vulnerability varies by jurisdiction. The overall summary of vulnerability for each jurisdiction should identify structures, systems, populations or other community assets as defined by the community that are susceptible to damage and loss from flooding. Reference the floodplain maps in the “Geographic Location” section and summarize differences in risk by jurisdiction. Reference the previous table (**Table 3.15**) that showed events by location. Include school and special districts assets located in floodplains or data from the Data Collection Questionnaire indicating heightened risk for any school or special district asset. List each jurisdiction, including any participating school/special districts in a separate heading and discuss each jurisdiction’s overall vulnerability separately.

County A –

City A –

School District A –

Problem Statement

Local governments should make a strong effort to improve emergency warning systems to ensure future deaths and injuries do not occur. Local governments should consider making improvements to roads and low water crossings that consistently flood by placing them on a hazard mitigation projects list and actively seek funding to successfully complete the projects.

3.4.2 Dam Failure

Hazard Profile

Hazard Description

A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams are typically constructed of earth, rock, concrete, or mine tailings. 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.

Table 3.29. MoDNR Dam Hazard Classification Definitions

Hazard Class	Definition
Class I	The area downstream from the dam that would be affected by inundation contains ten (10) or more permanent dwellings or any public building. Inspection of these dams must every two years.
Class II	The area downstream from the dam that would be affected by inundation contains one (1) to nine (9) permanent dwellings, or one (1) or more campgrounds with permanent water, sewer, and electrical services or one (1) or more industrial buildings. Inspection of these dams must occur once every three years.
Class III	The area downstream from the dam that would be affected by inundation does not contain any of the structures identified for Class 1 or Class 2 dams. Inspection of these dams must occur once every five years.

Source: Missouri Department of Natural Resources, <https://dnr.mo.gov/document-search/frequently-asked-dam-reservoir-questions-pub1351/pub1351>

Table 3.30. NID Dam Hazard Classification Definitions

Hazard Class	Definition
Low Hazard	Loss of at least one human life is likely if the dam fails.
Significant Hazard	Possible loss of human life and likely significant property or environmental destruction
High Hazard	Equal or exceed 25 feet in height and exceed 15 acre-feet storage; Equal or exceed 50-acre feet storage and exceed 6 feet in height; Do not meet the criteria for high or significant hazard.

Source: National Inventory of Dams

Geographic Location

Dams Located Within the Planning Area

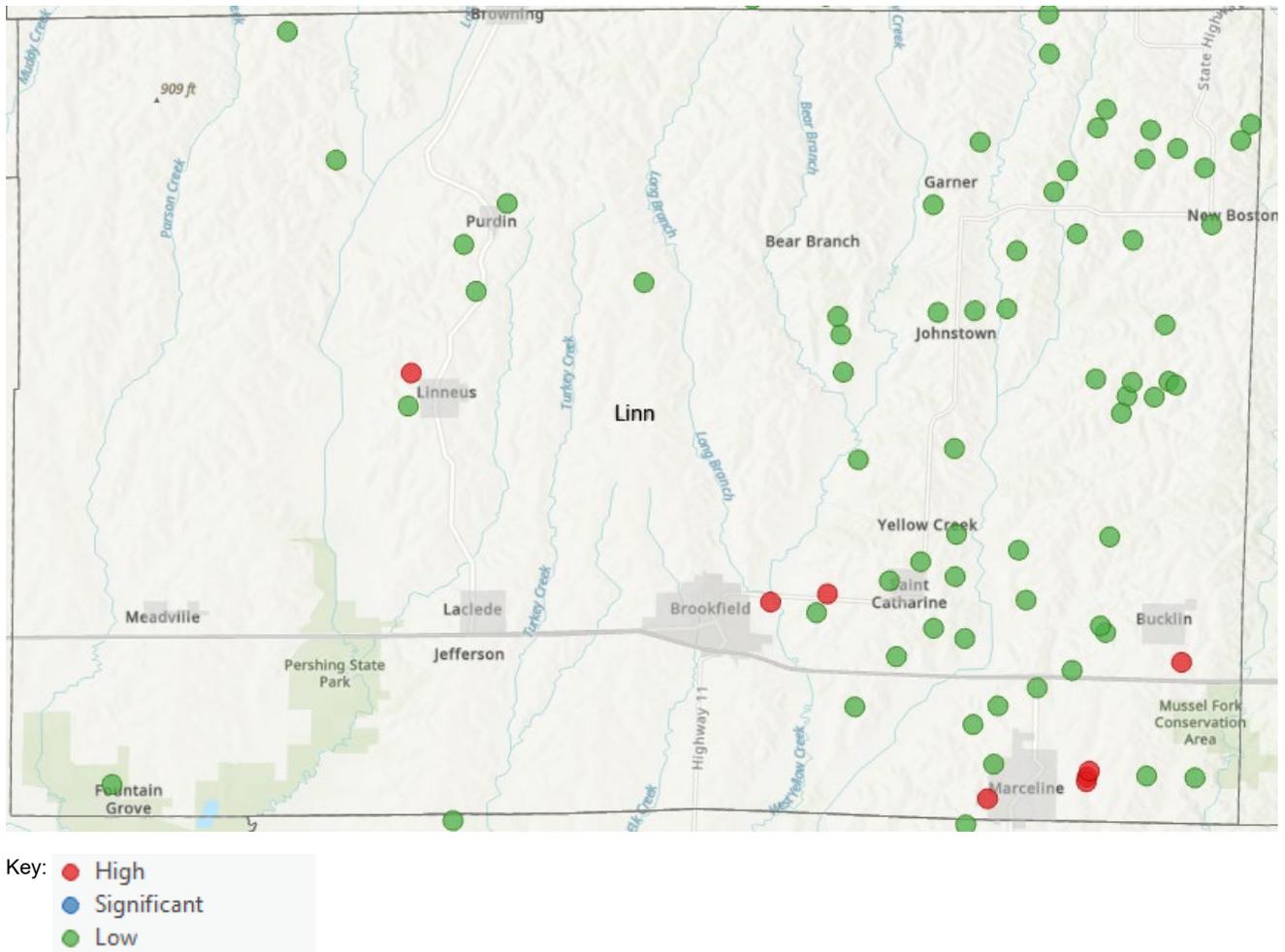
The following tables provide the names, locations, and other pertinent information for high hazard dams within the planning area.

Table 3.31. High Hazard Dams in the Linn County Planning Area

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
Tarpening Lake Dam	Not Required	24	82		TR-CLARKS CREEK	KEYTESVILLE	22	GIL GALLAGHER
Tarpening Lake Dam South West	Not Required	30	120		TR-CLARKS CREEK	KEYTESVILLE	22	DWAYNE TARPENING
Marceline City Reservoir Dam	Not Required	24	975		CLARKS CREEK	KEYTESVILLE	22	CITY OF MARCELINE,MO
Brookfield Reservoir Dam	Not Required	13	63		WEST YELLOW CREEK-OFFSTREAM	BROOKFIELD	0	CITY OF BROOKFIELD
Linneus Lake Dam	Not Required	30	170		TR-LOCUST CREEK	LINNEUS	1	CITY OF LINNEUS
Bucklin City Lake Dam	Not Required	30	125		TR-VAN DORSEN CREEK	KEYTESVILLE	26	CITY OF BUCKLIN,MO
Santa Fe Country Club	Not Required	25	122	5/6/80	TR-EAST YELLOW CREEK	MARCELINE	1	CITY OF MARCELINE
Brookfield Dam	Yes	43	1365	7/15/21	TR WEST YELLOW CREEK	BROOKFIELD	1	GIL GALLAGHER

Sources: Missouri Department of Natural Resources GIS, <https://gis-modnr.opendata.arcgis.com/pages/dnr-missouri-geological-survey> and National Inventory of Dams, <https://nid.sec.usace.army.mil/#/>. Contact the MoDNR Dam and Reservoir Safety Program at 800-361-4827 to request the inundation maps for your county to show geographic locations at risk, extent of failure and to perform GIS analysis of those assets at risk to dam failure.

Figure 3.16. High Hazard Dam Locations in Linn County.



Source: U.S. Army Corps of Engineers, Missouri Department of Natural Resources

Upstream Dams Outside the Planning Area

According to data from the Missouri DNR dam safety program, there are no dams upstream from Linn County pose a risk for flooding in the event of a breach.

Strength/Magnitude/Extent

The strength/magnitude of dam failure would be similar in some cases to flood events (see the flood hazard vulnerability analysis and discussion). The strength/magnitude/extent of dam failure is related to the volume of water behind the dam as well as the potential speed of onset, depth, and velocity. Note that for this reason, dam failures could flood areas outside of mapped flood hazards.

Previous Occurrences

There have been no reports of dam incidents or dam failures in Linn County.

Probability of Future Occurrence

Stanford University's National Performance of Dams Program lists no known instances of dam failures, or incidents in Linn County. Based on this information it is likely that the chances of a dam incident are less than 5% in any calendar year.

Changing Future Conditions Considerations

According to the 2023 Missouri State hazard mitigation plan "Studies have been conducted to investigate the impact of climate change scenarios on dam safety. Dam failure is already tied to flooding and the increased pressure flooding places on dams. The impacts of changing future conditions on dam failure will most likely be those related to changes in precipitation and flood likelihood. Changing future conditions projections suggest that precipitation may increase and occur in more extreme events, which may increase risk of flooding, putting stress on dams and increasing likelihood of dam failure"

Vulnerability

Vulnerability Overview

According to the US Army Corps of Engineers (USACE) National Inventory of Dams (NID) there are a total of 71 dams located in the planning area. There are 8 high hazard dams, No significant hazard dams, and 63 low hazard dams in Linn County.

There are currently some structures of both agricultural and residential varieties. The 2023 Missouri State Hazard Mitigation Plan contains the following information about the vulnerability of Linn County to dam failure.

Table 3.32. Number and Types of Dams in Linn County

Numbers and Types of Dams in Linn County															
Count of NID Dams				Count of State Regulated Dams				Count of Federally Regulated Dams				Count of Un-Regulated Dams			
H	S	L	Total	1	2	3	Total	H	S	L	Total	H	S	L	Total
8		63	71	1	0	0	1	0	0	0	0	7	0	63	70

Source: 2023 Missouri State Hazard Mitigation Plan

Potential Losses to Existing Development: (including types and numbers, of buildings, critical facilities, etc.)

Table 3.33. Estimated Number and Values of Structures & Population Vulnerable to Failure of State-Regulated Dams with Available Inundation Areas

Type of Structure	Value of Structures	Number of Structures	Population
Agriculture	\$8,453,634	31	0
Commercial	\$726,971	1	0
Residential	\$2,061,546	9	23
Total	\$11,242,151	41	23

Source: 2023 Missouri State Hazard Mitigation Plan

Impact of Previous and Future Development

Any growth within Linn County, downstream from a known dam, would lead to increased risks and potential losses due to an incident. As of June 2025, there were no known plans for large scale development in at risk areas.

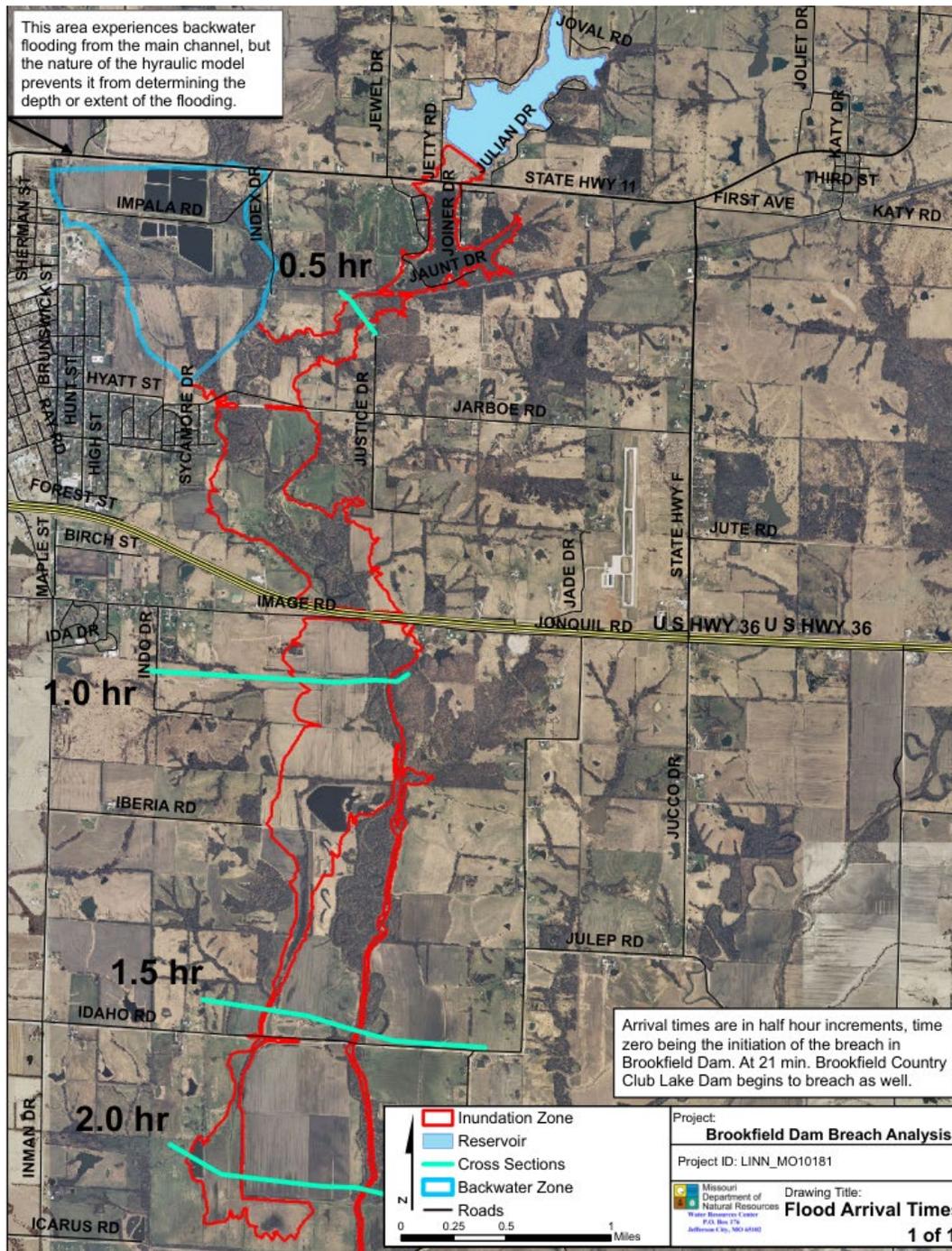
Hazard Summary by Jurisdiction

The vast majority of Linn County is not in danger of being inundated due to a breach in a dam. No further analysis of dam failure hazard will be conducted for this plan update. It will be helpful for residents near the high hazard dams to get familiarized with the dam’s Emergency Action Plan (EAP) and work closely with County EOP & participate in dam emergency exercises.

Brookfield

As shown by the figure below, a breach of the Brookfield Lake dam may threaten the eastern edges of the community of Brookfield, future development in these areas could be at risk.

Figure 3.17. Brookfield dam breach map



Source: Missouri DNR dam safety program – June 2025

Problem Statement

Some entities in Linn County that own and control dams do not properly inspect and maintain them to ensure the safety of people and property that lie within the inundation area of a dam breach. Jurisdictions and residents should be informed of the proper way to inspect a dam and look for initial problems.

3.4.3 Earthquakes

Hazard Profile

Hazard Description

An earthquake is a sudden motion or trembling that is caused by a release of energy accumulated within or along the edge of the earth's tectonic plates. Earthquakes occur primarily along fault zones and tears in the earth's crust. Along these faults and tears in the crust, stresses can build until one side of the fault slips, generating compressive and shear energy that produces the shaking and damage to the built environment. Heaviest damage generally occurs nearest the earthquake epicenter, which is that point on the earth's surface directly above the point of fault movement. The composition of geologic materials between these points is a major factor in transmitting the energy to buildings and other structures on the earth's surface.

Missouri holds the record for the most devastating earthquake in the history of post-settlement North America. The New Madrid 1811-1812 earthquake series included five earthquakes of magnitude 8.0 (Modified Mercalli Intensity Scale) or higher occurring in the period December 16, 1811, through February 7, 1812. These earthquakes affected an estimated 600,000 square kilometers. Movement was felt as far away as Quebec, and damage was reported in Charleston, South Carolina, and Washington D.C.

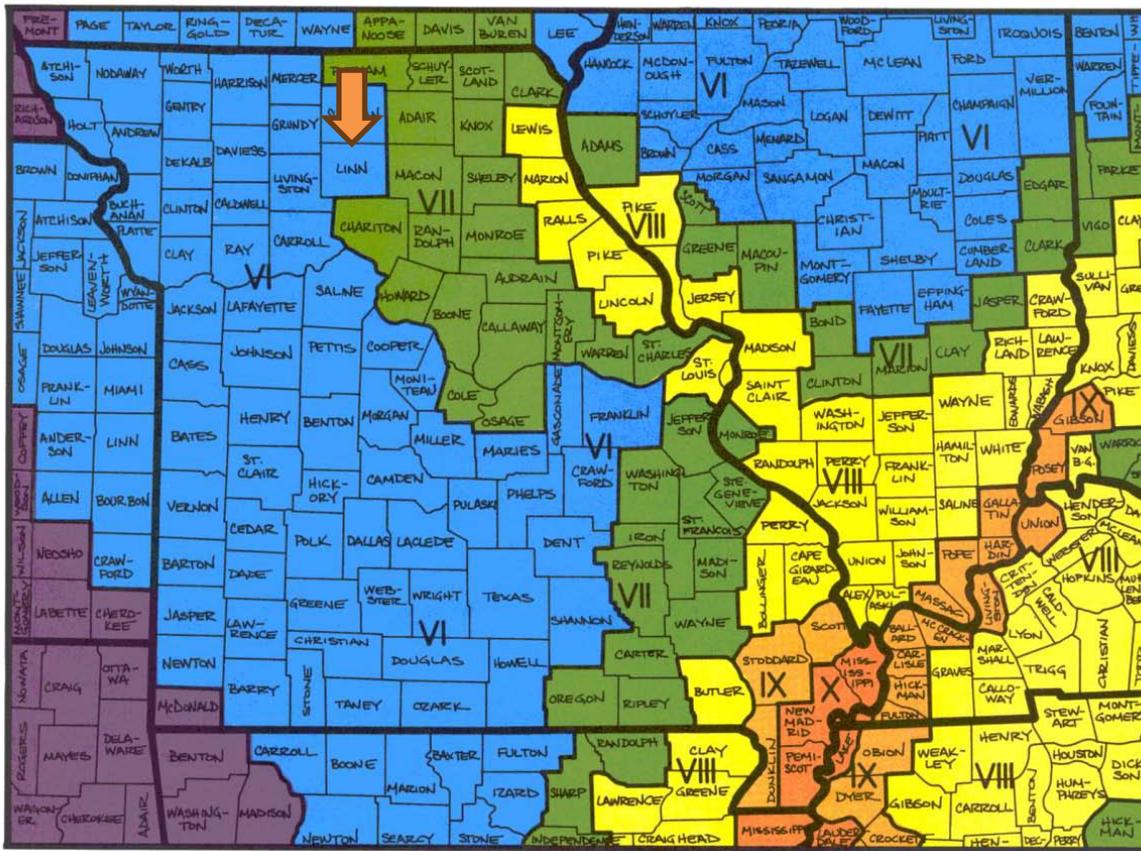
Geographic Location

Seismic activity on the New Madrid Seismic Zone of Southeastern Missouri is very significant both historically and at present. On December 16, 1811, and January 23 and February 7, 1812, three earthquakes struck the central US with magnitudes estimated to be 7.5-8.0. These earthquakes caused violent ground cracking and volcano-like eruptions of sediment over an area of more than 10,500 km², and uplift of a 50 km by 23 km zone (the Lake County uplift). The shaking was felt over a total area of over 10 million km². This is the largest felt area of any historical earthquake. Of all the historical earthquakes that have occurred in the US, an 1811-style event would do the most damage if it occurred today.

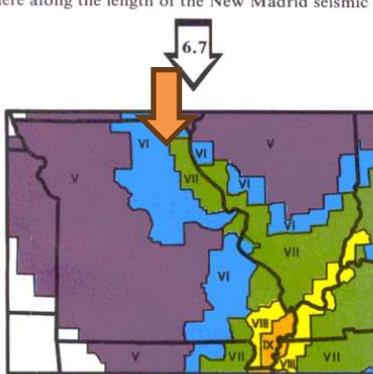
If an 1811 earthquake occurred in Linn County the earthquake intensity would not vary across the county. The damage resulting from an earthquake would depend upon the quality of the construction of the buildings. There would be slight to moderate damage in well-built ordinary structures and considerable damage in poorly built or badly designed structures. Some chimneys would be broken.

The following map (Figure 3.32) 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. The secondary maps in Figure show the same regional intensities for 6.7 and 8.6 earthquakes, respectively.

Figure 3.18. Impact Zones for Earthquake Along the New Madrid Fault

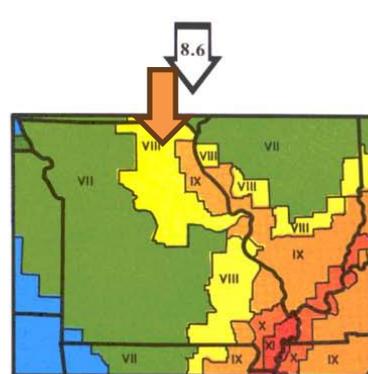


This map shows the highest projected Modified Mercalli intensities by county from a potential magnitude - 7.6 earthquake whose epicenter could be anywhere along the length of the New Madrid seismic zone.



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.

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.



Source: https://sema.dps.mo.gov/docs/EQ_Map.pdf

Figure 3.19. Projected Earthquake Intensities

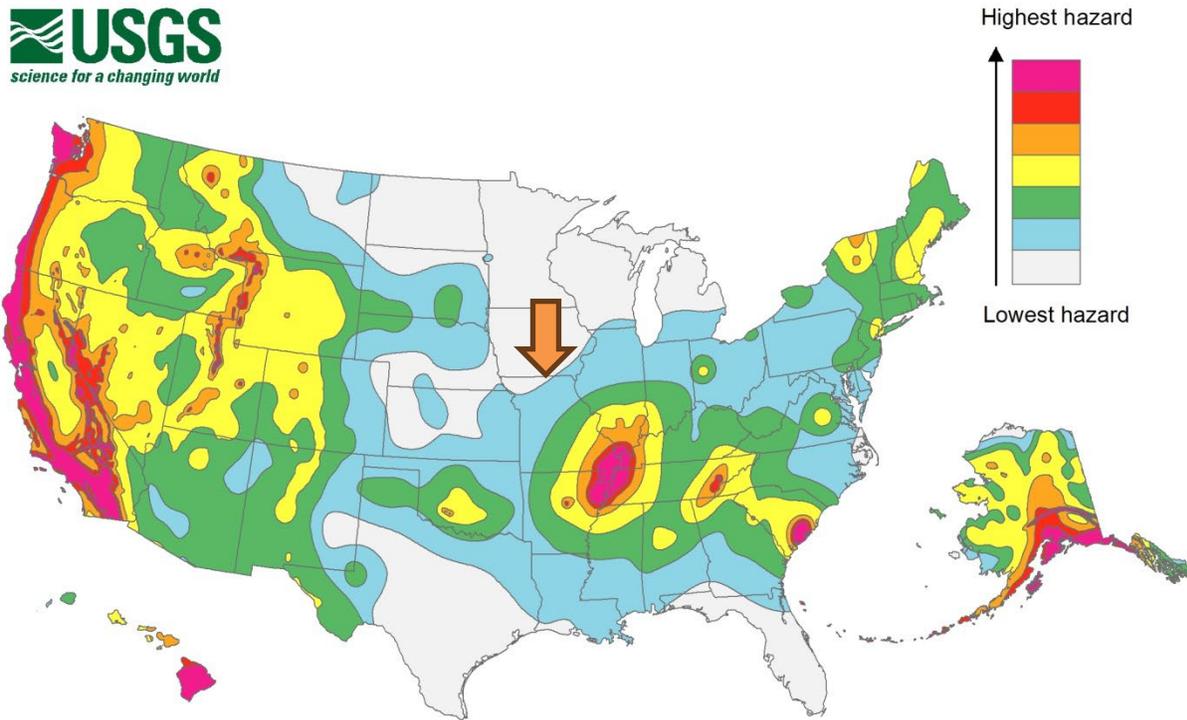
MODIFIED MERCALLI INTENSITY SCALE

I	People do not feel any Earth movement.	IX	Most buildings suffer damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks conspicuously. Reservoirs suffer severe damage.
II	A few people might notice movement.	X	Well-built wooden structures are severely damaged and some destroyed. Most masonry and frame structures are destroyed, including their foundations. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, and lakes. Railroad tracks are bent slightly. Cracks are opened in cement pavements and asphalt road surfaces.
III	Many people indoors feel movement. Hanging objects swing.	XI	Few if any masonry structures remain standing. Large, well-built bridges are destroyed. Wood frame structures are severely damaged, especially near epicenters. Buried pipelines are rendered completely useless. Railroad tracks are badly bent. Water mixed with sand, and mud is ejected in large amounts.
IV	Most people indoors feel movement. Dishes, windows, and doors rattle. Walls and frames of structures creak. Liquids in open vessels are slightly disturbed. Parked cars rock.	XII	Damage is total, and nearly all works of construction are damaged greatly or destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move. Lakes are dammed, waterfalls formed and rivers are deflected.
V	Almost everyone feels movement. Most people are awakened. Doors swing open or closed. Dishes are broken. Pictures on the wall move. Windows crack in some cases. Small objects move or are turned over. Liquids might spill out of open containers.		
VI	Everyone feels movement. Poorly built buildings are damaged slightly. Considerable quantities of dishes and glassware, and some windows are broken. People have trouble walking. Pictures fall off walls. Objects fall from shelves. Plaster in walls might crack. Some furniture is overturned. Small bells in churches, chapels and schools ring.		
VII	People have difficulty standing. Considerable damage in poorly built or badly designed buildings, adobe houses, old walls, spires and others. Damage is slight to moderate in well-built buildings. Numerous windows are broken. Weak chimneys break at roof lines. Cornices from towers and high buildings fall. Loose bricks fall from buildings. Heavy furniture is overturned and damaged. Some sand and gravel stream banks cave in.		
VIII	Drivers have trouble steering. Poorly built structures suffer severe damage. Ordinary substantial buildings partially collapse. Damage slight in structures especially built to withstand earthquakes. Tree branches break. Houses not bolted down might shift on their foundations. Tall structures such as towers and chimneys might twist and fall. Temporary or permanent changes in springs and wells. Sand and mud is ejected in small amounts.		

Intensity is a numerical index describing the effects of an earthquake on the surface of the Earth, on man, and on structures built by man. The intensities shown in these maps are the highest likely under the most adverse geologic conditions. There will actually be a range in intensities within any small area such as a town or county, with the highest intensity generally occurring at only a few sites. Earthquakes of all three magnitudes represented in these maps occurred during the 1811 - 1812 "New Madrid earthquakes." The isoseismal patterns shown here, however, were simulated based on actual patterns of somewhat smaller but damaging earthquakes that occurred in the New Madrid seismic zone in 1843 and 1895.

Prepared and distributed by
THE MISSOURI STATE
EMERGENCY MANAGEMENT AGENCY
P.O. BOX 116
JEFFERSON CITY, MO 65102
Telephone: 573-526-9100

Figure 3.20. United States Seismic Hazard Map



Source: United States Geological Survey at <https://www.usgs.gov/programs/earthquake-hazards/hazards>

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 Richter Magnitude Scale was developed in 1935 as a device to compare the size of earthquakes. 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 earthquakes. On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, comparing a 5.3 and a 6.3 earthquake shows that the 6.3 quake is ten times bigger in magnitude. Each whole number increase in magnitude represents a tenfold increase in measured amplitude because of the logarithm. Each whole number step in the magnitude scale represents a release of approximately 31 times more energy.

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 developed in 1931 and is composed of 12 increasing levels of intensity. They range from imperceptible shaking to catastrophic destruction, and each of the twelve levels is denoted by a Roman numeral. The scale does not have a mathematical basis, but is based on observed effects. Its use gives the laymen a more meaningful idea of the severity.

Previous Occurrences

There have been 0 earthquakes in Linn County since 1931. This information was found at homefacts.com and was also listed in the previous Hazard Mitigation Plan for Linn County.

Probability of Future Occurrence

According to homefacts.com there is a very low risk level for Linn County experiencing an earthquake. The probability of this hazard occurring is 0.14% within the next 50 years.

2% Probability of Exceedance

The State Hazard Mitigation Plan ran a scenario, based on an event with a 2% probability of exceedance in 50 years, to determine the worst-case scenario. This scenario was equivalent to the 2,000-year earthquake scenario in HAZUS-MH. This methodology is based on the probabilistic hazard shaking grids that were developed by the US 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 seconds and 0.1 seconds, respectively, which have a 2% probability of exceedance in the next 50 years. The most severe shaking is around the New Madrid Fault in Missouri. The following figure represents the potential for damage in areas with soil types that are potentially susceptible to liquefaction.

Figure 3.21. HAZUS-MH Earthquake 2% Probability of Exceedance in 50 years – Ground Shaking and Liquefaction Potential

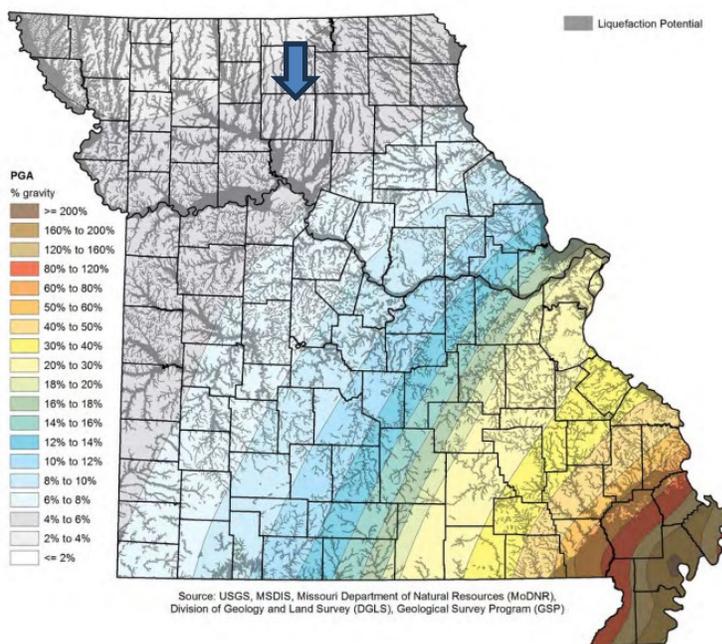


Table 3.34. HAZUS-MH Earthquake Loss Estimation 2% Probability of Exceedance in 50 Years Scenario Direct Economic Losses Results for Linn County (in \$ thousands)

Cost Structural Damage	Cost Non-structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total Loss
\$1,848	\$3,661	\$1,086	\$29	0.36	\$1,145	\$298	\$411	\$419	\$8,898

Source: 2023 Missouri State Hazard Mitigation Plan

Changing Future Conditions Considerations *OPTIONAL*

According to the Missouri Hazard Mitigation Plan 2023, scientists are beginning to believe that there may be a link between earthquakes and changing climate conditions. A change in the size of ice caps and sea-levels, this redistribution of weight over fault lines could potentially have an influence on earthquake occurrences. At this time, this is only conjecture, so recent earthquakes should not be linked with climate change. The Missouri HMP does state that early research indicated that more intense earthquakes and tsunamis may eventually be added to the adverse consequences that are caused by changing future conditions.

Vulnerability

Vulnerability Overview

The 2023 Missouri State Hazard Mitigation Plan provided an earthquake loss estimation for each county. The annualized loss scenario from the 2023 State Hazard Mitigation Plan is provided in the following tables. The Hazus building inventory counts are based on the 2020 census data and primarily 2022 economic values. Population counts are 2019 estimates from the U.S. Census Bureau.

Table 3.35. HAZUS Earthquake Loss Estimation: Annualized Loss Scenario for Linn County

Total Losses (in \$ Thousands)	Loss Per Capita (in \$ Thousands)	Annualized Loss Ratio (In \$ per Million)
\$11	\$0.0009	\$7

Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.36. Earthquake Coverage in Linn County, Missouri

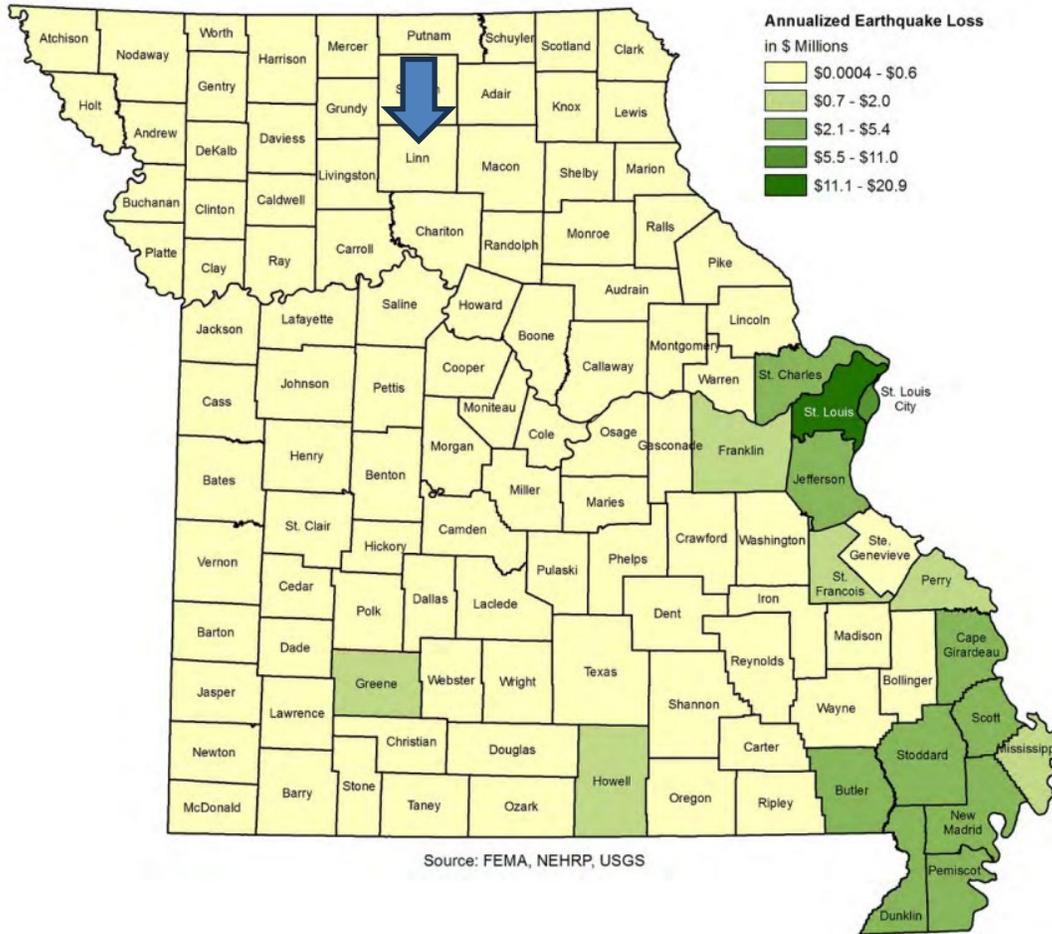
Earthquake Exposures	Homeowners, Farm, Mobile Home Exposures	% With Earthquake Endorsement	Average Premium, All Earthquake	Average Premium, \$110k-\$140k Coverage
389	2,722	14.3%	\$77	\$60

Source: Missouri Department of Commerce & Insurance "Overview of Residential Earthquake Insurance 2022"

Potential Losses to Existing Development

The 2023 Missouri State Hazard Mitigation Plan lists the estimated losses that would be suffered in Linn County with an earthquake event. The following figure and table summarize this information.

Figure 3.22. HAZUS-MH Earthquake Loss Estimation: Annualized Loss Scenario – Direct Economic Losses to Buildings



Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.37. FEMA National Risk Index Loss Estimation: Annualized Loss Scenario for Linn County

Annualized Frequency	Expected Annual Loss Buildings (in \$ Thousands)	Expected Annual Loss-Fatalities	Expected Annual Loss-Population Equivalence	Expected Annual Loss- Total	Expected Annual Loss Rating
0.00033	\$11	0.00008	\$590	\$12,089	Very Low

Source: 2023 Missouri State Hazard Mitigation Plan

Impact of Previous and Future Development

Any future development in Linn County is not expected to increase the risk other than contributing to the overall exposure of what could become damaged in the event of an earthquake event.

Hazard Summary by Jurisdiction

The intensity of an earthquake is not likely to vary greatly throughout the planning area, and the risk will be the same throughout the county. However, damages could differ if there are structural variations in the planning area-built environment. The impact of an earthquake is likely to be higher on homes built before 1939 and on mobile homes. The following table lists the percentage of homes built prior to 1939 in the planning area as well as percentage of mobile homes.

Table 3.38. Percentage of Homes Built Prior to 1939 in Linn County

Jurisdiction	Mobile Home	% Mobile Home	Homes Built Before 1939	% Homes Built Before 1939
Linn County	283	5.9%	804	16.7%
City of Brookfield	49	2.8%	334	19.0%
City of Browning	5	4.8%	31	29.8%
City of Bucklin	14	7.6%	42	22.8%
City of Laclede	21	21.0%	25	25.0%
City of Linneus	17	21.3%	21	26.3%
City of Marceline	18	2.2%	139	17.1%
City of Meadville	13	7.5%	34	19.5%
City of Purdin	0	0.0%	10	27.8%

Source: Census Bureau; 2022 Community Survey

Problem Statement

Although Linn County is not located in an area that will likely see catastrophic damage from an earthquake, the county will be impacted by the loss of communications, transportation, the disruption of roads, rail and pipelines, water transportation, and the area will see a significant amount of refugees fleeing from Southern Missouri if a quake hits that area. Education is minimal for earthquakes due to the low likelihood of impact. There is one Emergency Management Director for the county that knows where all the generators and emergency buildings are. Not all citizens utilize social media and texting. An emergency plan for earthquakes should be made available to all residents and state what would happen in the event of an earthquake with details for communication and transportation. Owners of buildings and homes need to be aware of the plan in case damage is sustained to their property. Residents should be made aware of where the generators and emergency buildings are located. Utilization of social media and texting needs to be encouraged.

3.4.4 Drought

Hazard Profile

Hazard Description

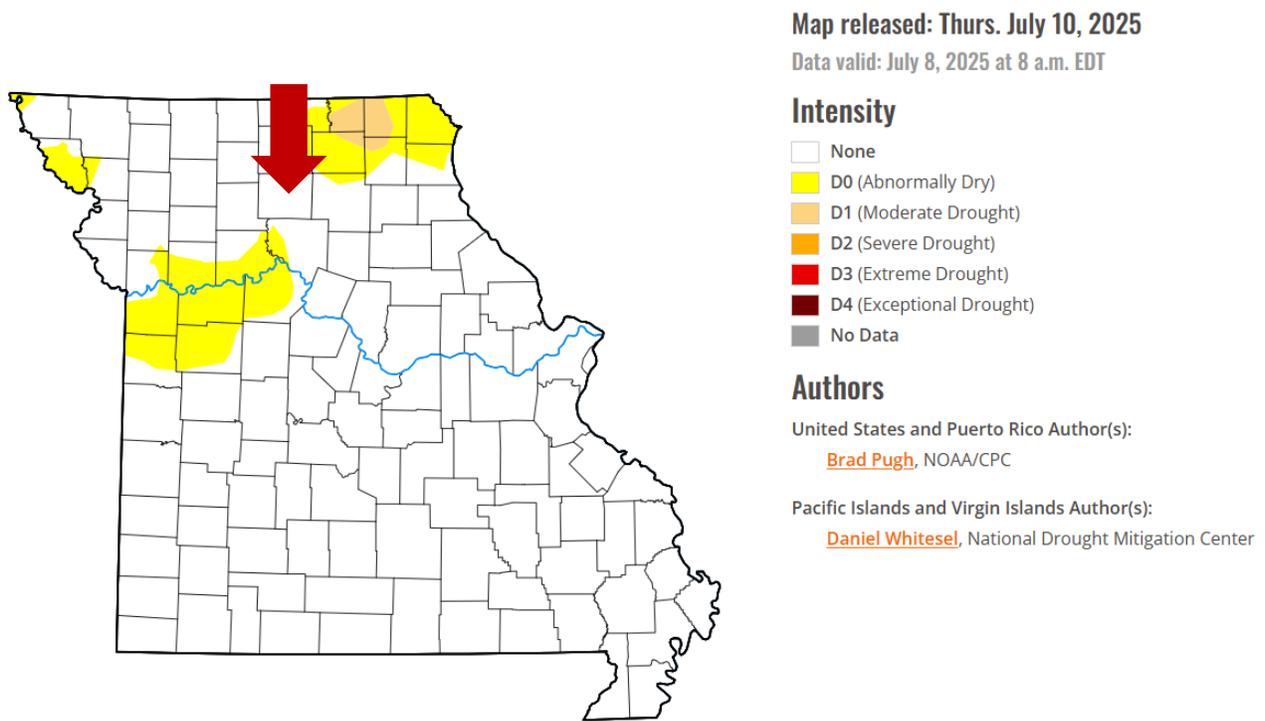
Drought is generally defined as a condition of moisture levels significantly below normal for an extended period of time over a large area that adversely affects plants, animal life, and humans. A drought period can last for months, years, or even decades. There are four types of drought conditions relevant 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.
- Socioeconomic drought refers to when physical water shortage begins to affect people.

Geographic Location

Because of the broad scope of drought, all of Linn County, with the exception of the school districts, is susceptible to this hazard. Agricultural land is extremely vulnerable to drought impacts. According to the most recent census of agriculture 82.8% of Linn County is made up of cropland, making the impacts of drought one that is acutely felt by residents of Linn County.

Figure 3.23. U.S. Drought Monitor Map of Missouri on July 10, 2025



Source: U.S. Drought Monitor, <https://droughtmonitor.unl.edu/Maps/MapArchive.aspx>

Strength/Magnitude/Extent

The Palmer Drought Indices measure dryness based on recent precipitation and temperature. The indices are based on a “supply-and-demand model” of soil moisture. Calculation of supply is relatively straightforward, using temperature and the amount of moisture in the soil. However, demand is more complicated as it depends on a variety of factors, such as evapotranspiration and recharge rates. These rates are harder to calculate. Palmer tried to overcome these difficulties by developing an algorithm that approximated these rates and based the algorithm on the most readily available data — precipitation and temperature.

The Palmer Index has proven most effective in identifying long-term drought of more than several months. However, the Palmer Index has been less effective in determining conditions over a matter of weeks. It uses a “0” as normal, and drought is shown in terms of negative numbers; for example, negative 2 is moderate drought, negative 3 is severe drought, and negative 4 is extreme drought. Palmer’s algorithm also is used to describe wet spells, using corresponding positive numbers.

Palmer also developed a formula for standardizing drought calculations for each individual location based on the variability of precipitation and temperature at that location. The Palmer index can therefore be applied to any site for which sufficient precipitation and temperature data is available.

Figure 3.24.

Drought Severity Classification

Category	Description	Possible Impacts	Palmer Drought Index
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less

Previous Occurrences

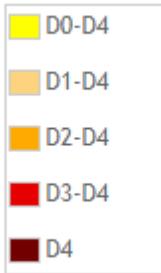
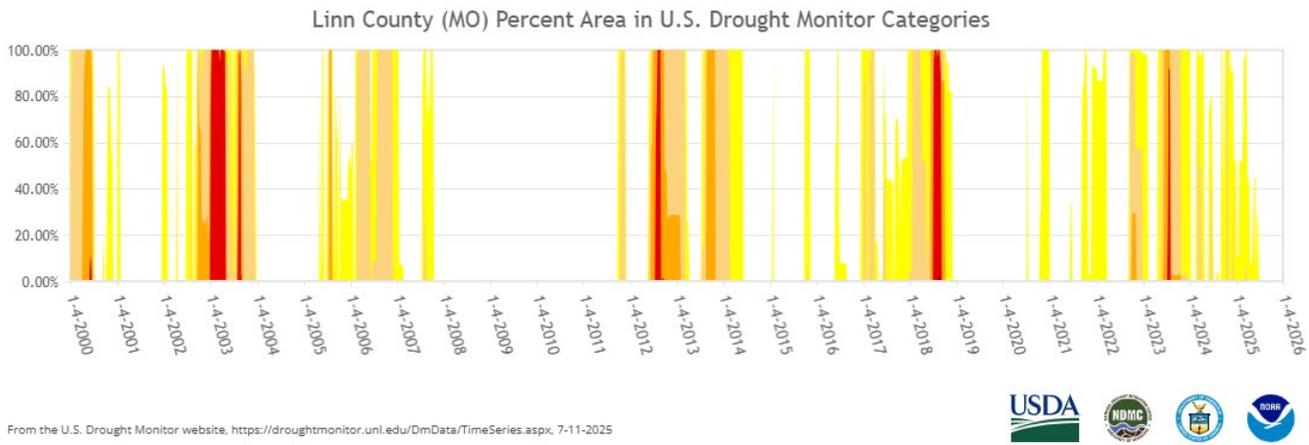
According to the NCEI database, Linn County has experienced drought conditions on numerous occasions. The following information provides the date the individual drought conditions were declared or continued, and a narrative about the event.

Table 3.39. Previous Occurrences of Drought in Linn County 2003-2024

Begin Date	Episode Narrative
7/1/2012	Dry conditions, which started in the spring, intensified during the month of July. Drought conditions expanded across Missouri, with D2 conditions at the beginning of the month, increasing to D3 conditions by the end of the month. Most locations by the end of the month had yearly rainfall deficits of 10 to 15 inches.
8/1/2012	Dry conditions, which started in the spring, intensified during the month of August. Drought D2 and D3 conditions at the beginning of the month increased to D3 and D4 conditions by the end of the month. Most locations by the end month continued yearly rainfall deficits in the 10-to-15-inch range.
9/1/2012	The remnants of Hurricane Isaac brought some much-needed relief to drought conditions across the area, on the 1st of September. This helped improve drought conditions from D4 and D3 to D3 and D2. Rainfall totals with the remnants of Isaac, ranged from around one inch near the Iowa border, to around 7 inches in the Kansas City Metropolitan area.
10/1/2012	The drought continued across west central and northwest Missouri through the month of October, with slight improvement noted, especially across north central and central portions of the state. Rainfall deficits for the year were in the 10-to-15-inch range.
11/1/2012	The drought continued across the area during the month of November. Slight improvement was noted, with D1 to D2 conditions prevailing. Rainfall deficits were generally in the 10-to-16-inch range for the year.

12/1/2012	Slight improvements in the drought conditions were observed across northwest and west central Missouri. However, D1 to D2 conditions, moderate to severe drought conditions, still prevailed across the area.
1/1/2013	There have been several storm systems that have impacted the region in the last half of January. Most of the precipitation from these systems has fallen along and southeast of a Kansas City to Kirksville line. This has resulted in some improvement to the drought across portions of central to northern and northeastern Missouri. However, western and far northwestern Missouri remain in a severe drought (D2).
8/27/2013	A persistent upper-level ridge of high pressure centered over the lower Missouri Valley, in late August, caused D2 drought conditions to redevelop across portions of north central Missouri. Several locations, including Kirksville, reported only a trace of rainfall for the month of August.
9/1/2013	Severe drought D2 conditions persisted across most of northern Missouri during the month of September.
10/1/2013	Severe D2 drought conditions continued in the month of October across north central Missouri.
6/1/2018	Starting at the very end of May and going into June, the US Drought Monitor at the University of Nebraska declared portions of Missouri in a D2 or worse drought. While impacts from this drought would be felt through the summer, it's unclear if any drought impacts were felt through the month of June.
7/1/2018	The anomalously dry period that plagued the region during the summer of 2018 continued into and through July. Most areas were about 2 inches short of normal precipitation for the month of July. Most of northern Missouri, north of the Missouri River, came up between 4 and 5 inches short of normal. This combined with the dry June has caused the drought across the region to worsen.
8/1/2018	Precipitation picked up during August, especially in some of the hardest hit drought areas, but in a lot of cases the damage had already been done, and while the rain did pick back up the ground soil was so parched that it made hardly a dent in the drought across northern Missouri.
9/1/2018	While much of the area saw some relief from the drought, many counties remained in D2-D4 status through the month of September. While the full scope of drought impacts is unknown, many farmers took losses on their hay and corn, opting to bale it for livestock or knock it down.
10/1/2018	After a very dry summer, exceptional drought (D4) conditions were experienced area-wide, resulting in heavy losses for local farmers. Things changed in October when widespread heavy rain effectively ended that drought. Widespread 6 to 9 inches of rain fell, with some locations receiving over a foot of rain over the 4-day stretch from October 6 through October 9. By October 9th, the drought was effectively ended by the UNL drought monitor.
10/11/2022	Significant precipitation deficits over the summer months and continuing into fall led to severe drought developing across portions of Missouri by October 11th.
11/1/2022	Significant precipitation deficits yielded D2 drought conditions continuing into November before improving to D1 or better by November 15th.
6/13/2023	Narrative to follow.
7/1/2023	After another month of below average precipitation, the area saw generally worsening drought conditions across central and northern Missouri.
8/1/2023	Several counties in Missouri began August within severe (D2) to extreme (D3) drought but improved to D1 or better by early to mid-August thanks to well targeted rains.

Figure 3.25. Percent of Linn County in Drought 2000-2025



Source: US Drought Monitor; www.droughtmonitor.unl.edu

Probability of Future Occurrence

To determine the frequency of previous droughts in Linn County the data was taken from droughtmonitor.unl.edu. A search was conducted on the frequency of drought and the drought classifications for the time period of 1/4/2000 through 7/8/2025. This time frame encompasses a total of 306 months, and this figure was used in the probability calculations. The following table provides a breakdown of the information that was gathered for Linn County.

Table 3.40. Linn County and Weeks Spent by Drought Classification 2000-2025

Linn County	D0	D1	D2	D3	D4
Weeks at this Designation	605	335	136	46	3
Months at this Designation	151.25	83.75	34	11.5	0.75

Source: US Drought Monitor

The probability of Linn County experiencing drought, by severity, is calculated by dividing the number of months in drought at that designation by the total number of months and multiplied by 100 for the average percentage probability of drought in the planning area in any given month.

$$Probability\ of\ D0\ Drought = \frac{151.25}{306} = .494 = 49.4\% \text{ probability}$$

$$\text{Probability of D1 Drought} = \frac{83.75}{306} = .274 = 27.4\% \text{ probability}$$

$$\text{Probability of D2 Drought} = \frac{34}{306} = .111 = 11.1\% \text{ probability}$$

$$\text{Probability of D3 Drought} = \frac{11.5}{306} = .038 = 3.8\% \text{ probability}$$

$$\text{Probability of D4 Drought} = \frac{0.75}{306} = .002 = .2\% \text{ probability}$$

While the severity of the drought will vary, Linn County is likely to experience drought and should take steps to lessen the severity of the occurrence with measures intended to conserve water usage.

Vulnerability

Vulnerability Overview

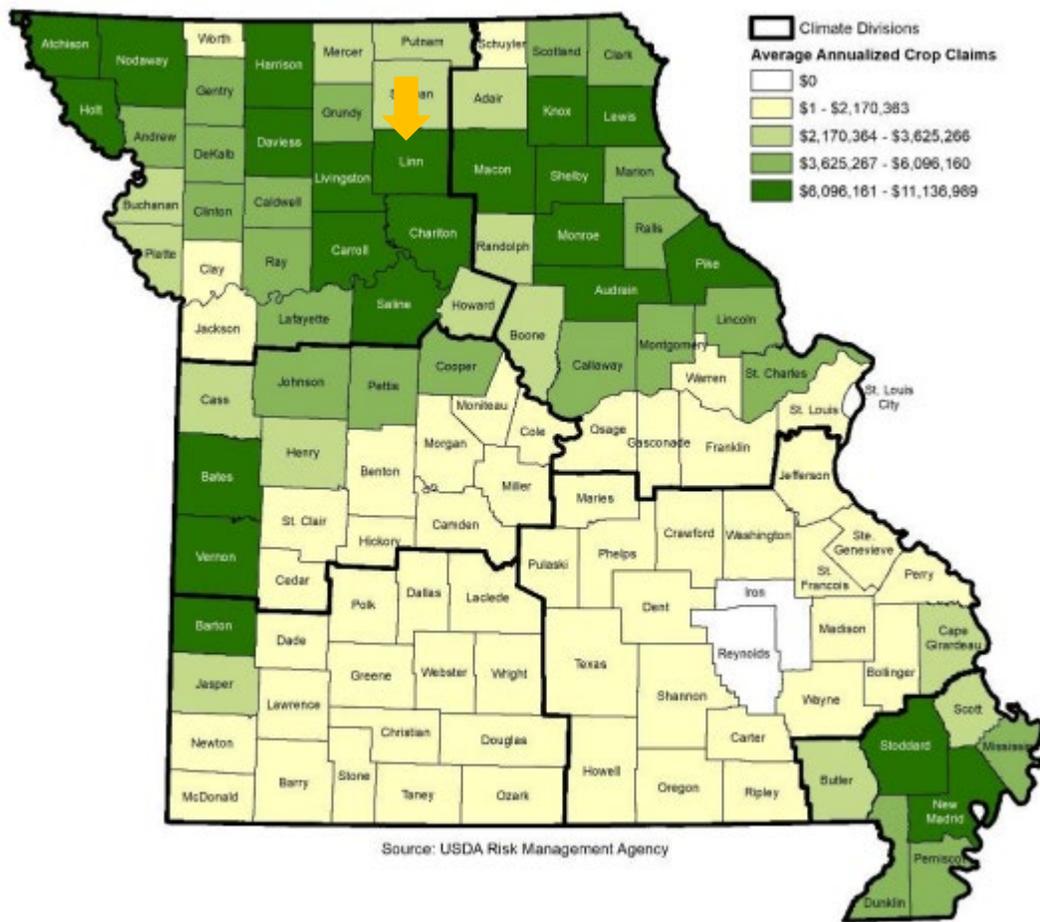
The following table contains the data for crop loss claims due to drought that have been paid in Linn County from 2011-2024.

Table 3.41. Crop Loss Payments from 2013-2024 in Linn County

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	Corn	Drought	\$24,450.00
	Soybeans		\$1,221.00
	Wheat		\$37,255.50
2015	Soybeans	Drought	\$74,832.00
2016	Corn	Drought	\$46.00
	Soybeans		\$61,817.50
	Wheat		\$51,894.58
2017	Corn	Drought	\$50,061.65
	Soybeans		\$496,610.08
2018	Corn	Drought	\$3,591,498.21
	Soybeans		\$3,202,771.94
	Wheat		\$19,540.13
2019	No Claim		\$0
2020	Corn	Drought	\$173,595.50
	Soybeans		\$712,994.00
2021	Corn	Drought	\$440,505.80
	Soybeans		\$546,246.60
2022	Corn	Drought	\$126,846.00
	Soybeans		\$614,574.00
2023	Corn	Drought	\$81,668.50
	Soybeans		\$566,371.47
	Wheat		\$846,455.70
2024	Corn	Drought	\$122,067.50
	Soybeans		\$494,117.11
Total			\$12,337,440.77

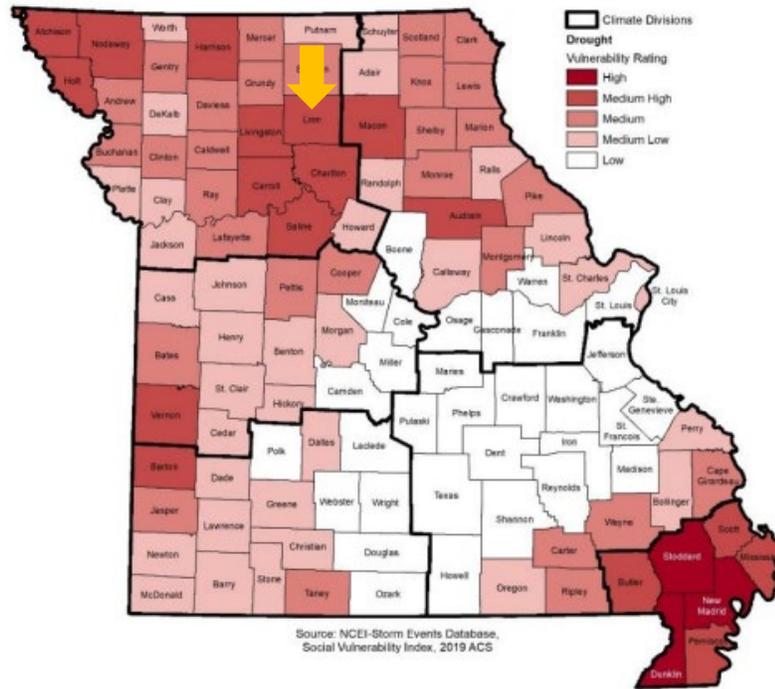
Source: USDA Risk Management Agency <http://www.rma.usda.gov/data/cause>

Figure 3.26. Annualized Drought Crop Insurance Claims Paid 2013-2021



Source: 2023 Missouri State Hazard Mitigation Plan

Figure 3.27. Drought Vulnerability in Missouri by County



Source: 2023 Missouri State Hazard Mitigation Plan

As per the previous figure, Linn County in Missouri has a Medium-High Drought Vulnerability Rating per the 2023 Missouri State Hazard Mitigation Plan. The method used to determine vulnerability to drought across Missouri was a statistical analysis of data from several sources: USDA Risk Management Agency’s insured crop losses as a result of drought (2021-2022), USDA crop exposure by county, the calculated Social Vulnerability Index for Missouri Counties from the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina, and storm events data (1996-December 31, 2021) and probability of severe drought based on historic Palmer Drought Severity Index. The USDA crop exposure by county is from the 2017 Agricultural Census and assumes that the larger the exposure, the greater potential for loss and impact on the local economy.

From the statistical data collected, four factors were considered in determining overall vulnerability to drought as follows: social vulnerability, crop exposure ratio, annualized crop claims paid, and likelihood of occurrence. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. Once the ranges were determined and applied to all factors considered in the analysis, the ratings were combined to determine an overall vulnerability rating for drought. These rating values correspond to the following descriptive terms:

1. Low
2. Medium-low
3. Medium
4. Medium-High
5. High

The following table utilizes these factors in determining the vulnerability rating of Linn County to

drought, according to the 2023 Missouri State Hazard Mitigation Plan.

Table 3.42. Vulnerability of Linn County to Drought

SOVI Index Rating	USDA RMA Total Drought Crop Claims	Average Annualized Crop Claims	USDA Claims Rating	2017 Crop Exposure	Crop Exposure Rating	Likelihood of Severe Drought	Drought Occurrence	Total Rating	Total Rating (text) Drought
4	\$69,704,863	\$	5	\$98,313,000	4	0.42	2	15	Medium High

Source: 2023 Missouri State Hazard Mitigation Plan

Potential Losses to Existing Development

The National Drought Monitor Center at the University of Nebraska at Lincoln summarized the potential impacts of drought as follows: Drought can create economic impacts on agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and disease to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn place both human and wildlife populations at higher levels of risk. Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Finally, while drought is rarely a direct cause of death, the associated heat, dust and stress can all contribute to increased mortality.

Although it is difficult to quantify many of the potential losses that may occur due to drought, agriculture losses are direct economic costs that can be easily quantified by examining previous insurance claims in the county. Linn County’s crop exposure is high, with approximately 82.9% of the county’s total land area in use for agriculture. Over the past 11 years Linn County has experienced an average of \$1,121,585.52 in crop losses annually due to drought conditions.

Impact of Previous and Future Development

Increases in acreage planted with crops would increase the exposure to drought-related agricultural losses. In addition, increases in population impose additional strains on water supply systems to meet the growing demand for treated water, and these strains could prove impactful during times of drought.

Changing Future Conditions Considerations *OPTIONAL*

A new analysis, performed for the Natural Resources Defense Council, examined the effects of climate change on water supply and demand in the contiguous United States. The study found that more than 1,100 counties will face higher risks of water shortages by mid-century as a result of climate change. Two of the principal reasons for the projected water constraints are shifts in precipitation and potential evapotranspiration (PET). Climate models project decreases in precipitation in many regions of the U.S., including areas that may currently be described as

experiencing water shortages of some degree.

Future drought conditions in Linn County, Missouri, are expected to have significant impacts across agriculture, water availability, and the local economy. Linn County is heavily reliant on agriculture, with major crops including soybeans, corn, and hay, and livestock such as cattle and sheep. While current data (as of mid-2025) shows no active drought affecting crops or livestock in Linn County the broader climate trends suggest increasing vulnerability. Corn and hay production are projected to decline across Missouri as they are more reliant on adequate moisture. Livestock inventories, especially beef and dairy cows, are expected to decrease due to feed and water stress.

Hazard Summary by Jurisdiction

Drought has the potential to impact all of Linn County, with the possible exception of the school districts. But the ways in which the impacts will be experienced vary. As discussed in the previous occurrences and vulnerability sections, most of the damages seen historically as a result of drought in Linn County affect agriculture. Therefore, the magnitude of the impacts of drought may be greater in rural parts of the county, which have large areas of crops and wildlife. In areas with greater building density, there is more exposure to potential shrinking and expanding soil problems around foundations as a result of drought. If drought conditions are severe and prolonged, water supplies could also be affected.

Problem Statement

Linn County and participating jurisdictions have a high level of crop exposure. Possible solutions include encouraging farmers to purchase crop insurance and educating farmers on drought-resistant farming practices. Additionally, in a prolonged drought livestock populations could be adversely affected, if water supplies became scarce.

The water supply of participating jurisdictions could be impacted by severe or prolonged drought. Possible solutions include the development of agreements with neighboring communities for a secondary water source and review of local ordinance/regulation for inclusion of water use restrictions during periods of drought.

3.4.5 Extreme Temperatures

Hazard Profile

Hazard Description

Extreme temperature events, both hot and cold, can impact human health and mortality, natural ecosystems, agriculture and other economic sectors. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index chart shown in Figure 3.11 uses both of these factors to produce a guide for the apparent temperature or relative intensity of heat conditions.

Extreme cold often accompanies severe winter storms and can lead to hypothermia and frostbite in people without adequate clothing protection. Cold can cause fuel to congeal in storage tanks and supply lines, stopping electric generators. Cold temperatures can also overpower a building's heating system and cause water and sewer pipes to freeze and rupture. Extreme cold also increases the likelihood for ice jams on flat rivers or streams. When combined with high winds from winter storms, extreme cold becomes extreme wind chill, which is hazardous to health and safety. The National Institute on Aging estimates that more than 2.5 million Americans are elderly and especially vulnerable to hypothermia, with the isolated elders being most at risk. About 10 percent of people over the age of 65 have some kind of bodily temperature-regulating defect, and 3-4 percent of all hospital patients over 65 are hypothermic.

Also at risk, are those without shelter, those who are stranded, or who live in a home that is poorly insulated or without heat. Other impacts of extreme cold include asphyxiation (unconsciousness or death from a lack of oxygen) from toxic fumes from emergency heaters; household fires, which can be caused by fireplaces and emergency heaters; and frozen/burst pipes.

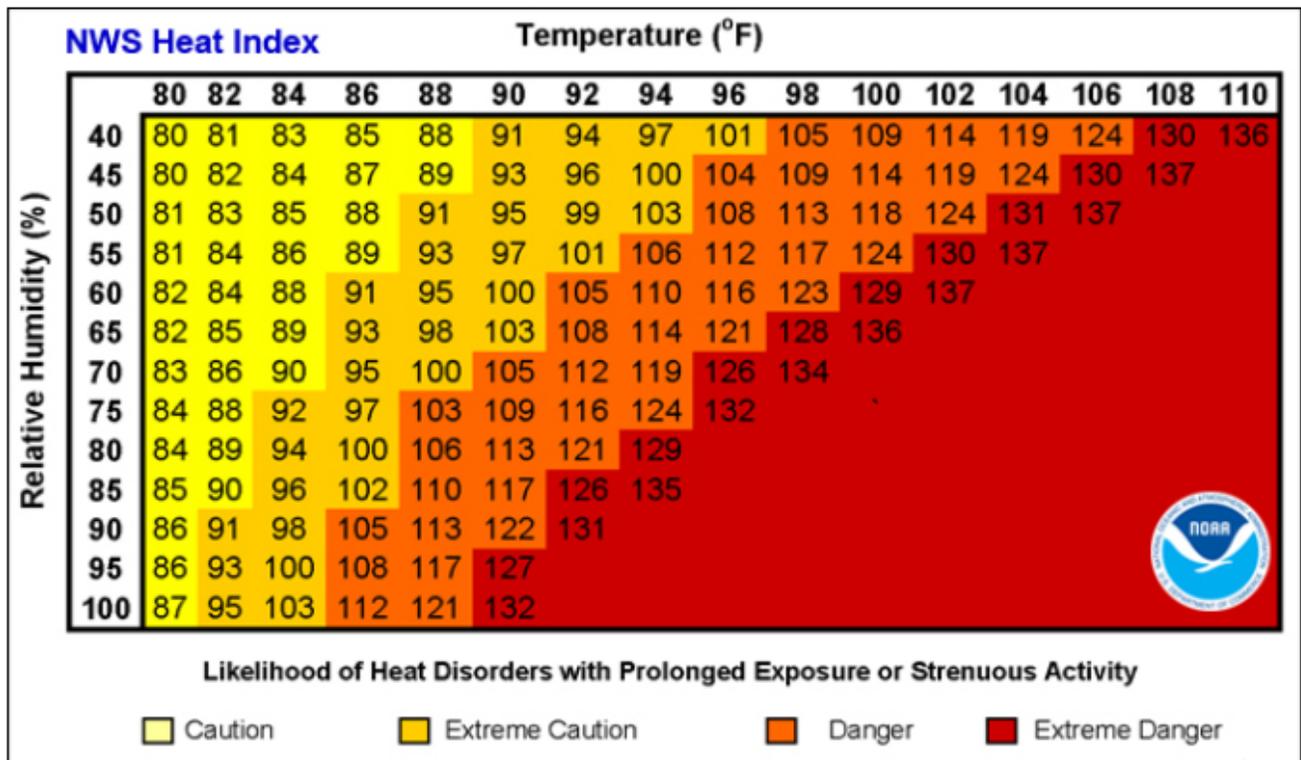
Geographic Location

Extreme temperatures cover large spans of areas and will affect the county in the same way no matter where in the county.

Strength/Magnitude/Extent

The National Weather Service (NWS) has an alert system in place (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for issuing excessive heat alerts is when for two or more consecutive days: (1) when the maximum daytime Heat Index is expected to equal or exceed 105 degrees Fahrenheit (°F); and the night time minimum Heat Index is 80°F or above. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees.

Figure 3.28. Heat Index (HI) Chart

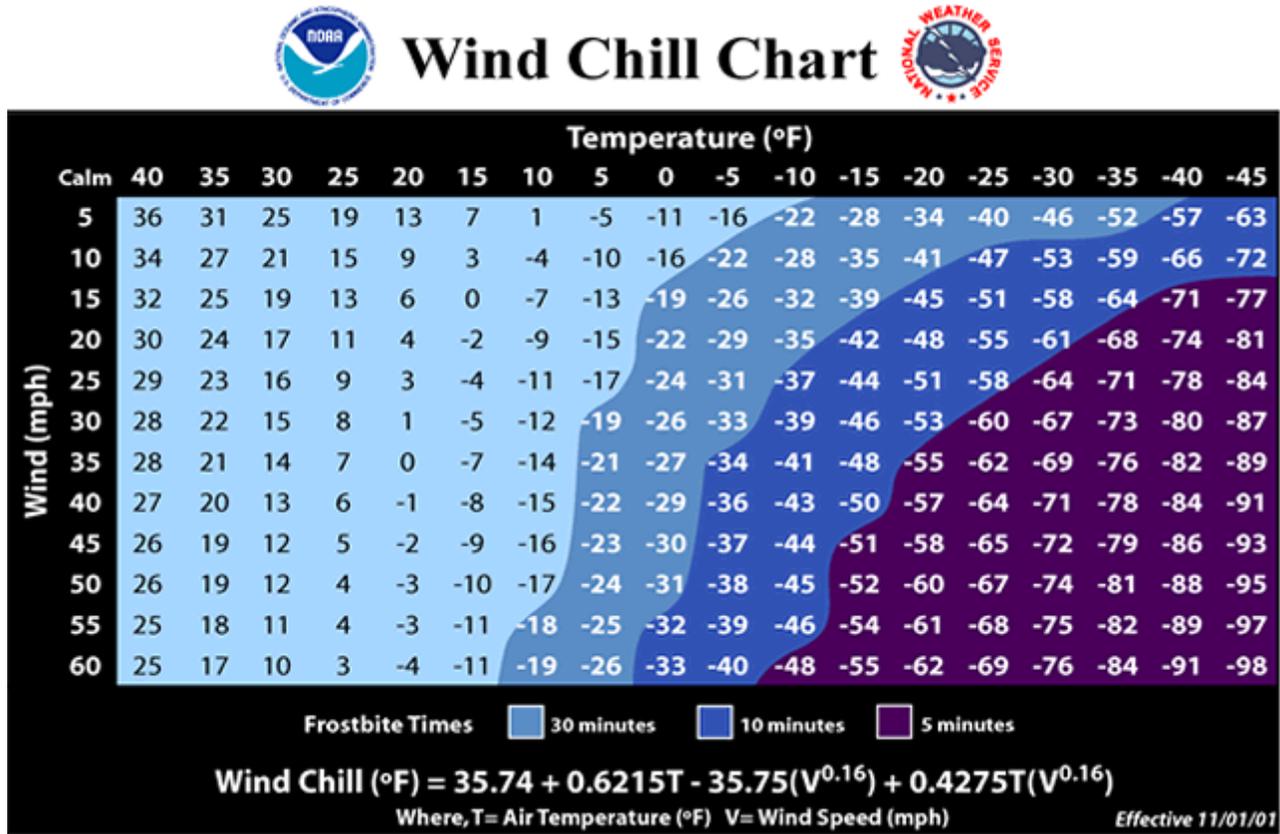


Source: National Weather Service (NWS); <https://www.weather.gov/safety/heat-index>

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.

The NWS Wind Chill Temperature (WCT) index 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. The figure below presents wind chill temperatures which are based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure 3.29. Wind Chill Chart



Source: <https://www.weather.gov/safety/cold-wind-chill-chart>

Previous Occurrences

Extreme Heat

There are 5 reported incidents of extreme heat reported over the last 20 years from the county.

Table 3.43. Extreme heat reports 2004-2024

Year	Reports	Deaths	Injuries
2005	1	0	0
2006	3	0	0
2007	1	0	0
2012	1	0	0
2023	1	0	0

Source: NCEI Storm reports data – June 2025

Table 3.44. Crop Insurance Claims Paid Linn County 2014-2024 – Heat

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014		No Claim	\$0
2015		No Claim	\$0
2016		No Claim	\$0
2017		No Claim	\$0
2018		No Claim	\$0

2019	Corn	Heat	\$22,599.00
	Soybeans		\$2,831.00
2020	Corn	Heat	\$3,229.00
2021	No Claim		\$0
2022	Soybeans	Heat	\$32,393.00
2023	Corn	Heat	\$893.00
2024	Soybeans	Heat	\$58,761.00
Total			\$120,706.00

Source: USDA Risk Management Agency <http://www.rma.usda.gov/data/cause>

2005

7-21-2005 Excessive Heat

Oppressive heat and humidity prevailed across the area from July 21st to July 25th. Afternoon heat indices reached from 105 to 110 degrees. Kansas City International heat index reached 114 degrees on July 22nd and St. Joseph topped out at 113 degrees on July 22nd.

2006

Excessive Heat 7-16-2006 through 7-20-2006

Oppressive heat and humidity combined to produce afternoon and early evening heat indices from 105 to 115 degrees, from July 16th through July 20th. The highest computed heat index reached 121 degrees at Amity Missouri. Three males and one female died of heat related causes in Jackson County.

Excessive Heat 7-29-2006 through 8-1-2006

Oppressive heat and humidity combined to produce heat indices from 105 to 115 degrees, from July 29th through July 31st.

2007

Excessive Heat 8-6-2007

An upper level ridge of high pressure, persisted across the area from August 6th through August 17th. The combination of heat and humidity, produced heat index readings in the 105 to 115 degree range.

2012

Excessive Heat 7-18-2012

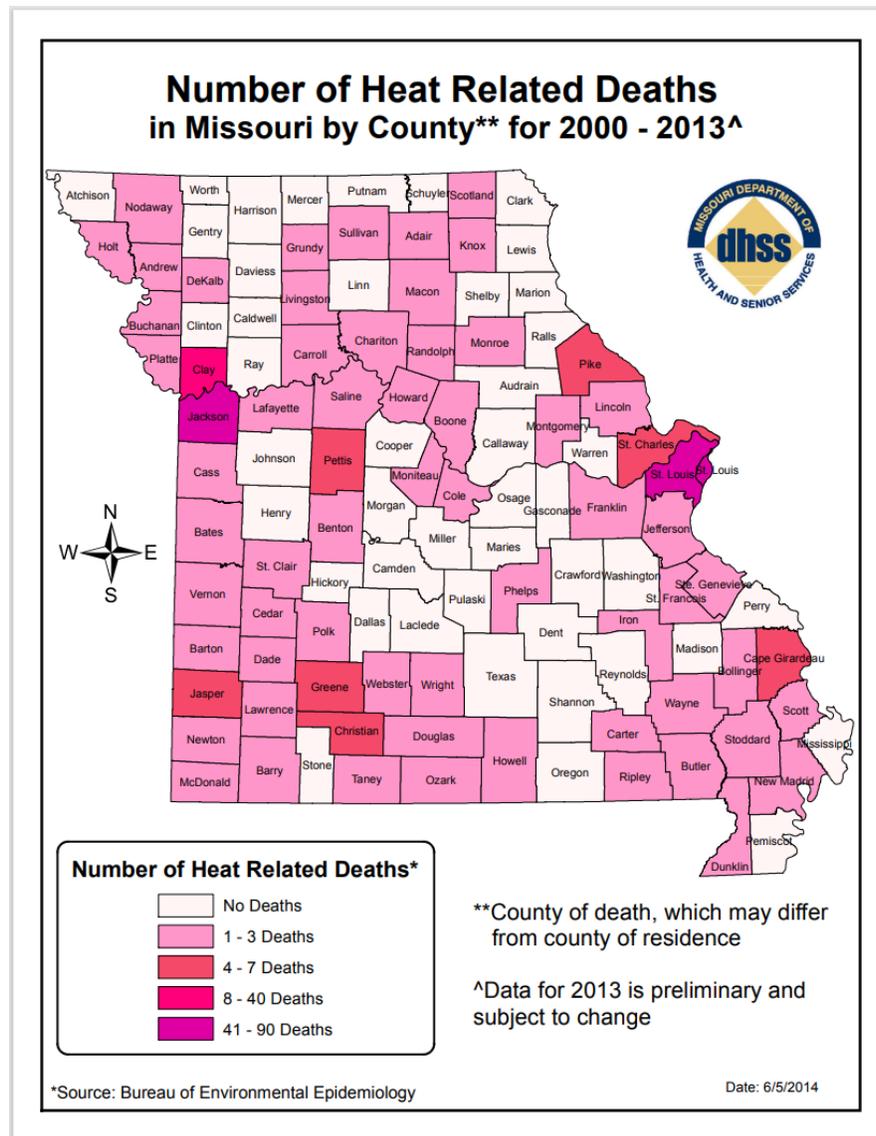
High temperatures in the 100 to 110 degree range, combined with humidity, produced afternoon and early evening heat indices in the 100 to 110 degree range. Overnight low temperatures were in the 70s to lower 80s.

2023

Excessive Heat 8-19-2023 through 8-25-2023

Max heat indices during the afternoons of August 19th through August 25th, 2023 primarily ranged from the 110 to 120 degree range.

Figure 3.30. Heat Related Deaths in Missouri 2000-2013



Source: 2023 Missouri hazard mitigation plan

Extreme Cold

There have been 6 reported incidents of extreme cold over the last 20 years.

Table 3.45. Extreme cold reports 2004-2024

Year	Reports	Deaths	Injuries
2014	1	0	0
2021	3	0	0
2022	1	0	0

Source: NCEI Storm reports data – June 2025

Table 3.46. Crop Insurance Claims Paid in Linn County 2014-2024 – Extreme Cold

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	Wheat	Cold Winter	\$183,664.50
2015	Wheat	Cold Winter	\$37,350.88
2016	No Claim		\$0
2017	No Claim		\$0
2018	Wheat	Cold Winter	\$11,617.00
2019	Wheat	Cold Winter	\$54,658.26
2020	Wheat	Cold Winter	\$10,146.00
2021	Wheat	Cold Winter	\$14,473.00
2022	No Claim		\$0
2023	Wheat	Cold Winter	\$1,969.00
2024	No Claim		\$0
Total			\$313,878.64

Source: USDA Risk Management Agency <http://www.rma.usda.gov/data/cause>

2014

Extreme Cold 1-6-2014

A polar plunge of arctic air slammed into Kansas, bringing wind chill values to around 30 degrees below zero for the morning of January 6.

2021

Extreme Cold 2-14-2021 through 2-16-2021

In the first night of bitter cold across the area, temperatures dropped well below zero and with winds around 10-20 mph wind chills overnight going into Sunday morning dropped to around 20 to 30 below.

2022

Extreme Cold 12-22-2022 & 12-23-2022

An arctic air mass sent temperatures below zero along with strong winds. Minimum wind chills across the region generally ranged from -30 to -40 degrees between roughly 10 am on 12/22 to noon on 12/23.

Extreme temperatures can cause stress to crops and animals. According to USDA Risk Management Agency, losses to insurable crops during the 10-year time period from 2014 to 2024 were \$434,584.64. Extreme heat can also strain electricity delivery infrastructure overloaded during peak use of air conditioning during extreme heat events. Another type of infrastructure damage from extreme heat is road damage. When asphalt is exposed to prolonged extreme heat, it can cause buckling of asphalt-paved roads, driveways, and parking lots.

From 1988-2011, there were 3,496 fatalities in the U.S. attributed to summer heat. This translates to an annual national average of 146 deaths. During the same period, ___ deaths were recorded in the planning area, according to NCEI data. The National Weather Service stated that among natural hazards, no other natural disaster—not lightning, hurricanes, tornadoes, floods, or earthquakes—causes more deaths.

Probability of Future Occurrence

Over the last 20 years, Linn County has experienced 5 instances of extreme heat. Based on this historical data, the calculated probability of an event is:

$$\text{Probability of Extreme Heat} = \frac{5}{20} = 0.25 = 25\%$$

There is a 25% likelihood of Linn County experiencing extreme heat in any given year.

Over the last 20 years, Linn County has experienced 6 instances of extreme cold conditions. Based on this historical data, the calculated probability of an extreme cold event is:

$$\text{Probability of Extreme Cold} = \frac{6}{20} = .030 = 30\%$$

There is a 30% likelihood of Linn County experiencing extreme cold in any given year.

Changing Future Conditions Considerations

The impacts of extreme temperatures are experienced more acutely by the elderly and other vulnerable populations. Recent trends in the population of Linn County would suggest that there will continue to be an increase in the number of elderly residents.

High temperatures are often higher in urban areas, of which Linn County has none. There is a higher demand for electricity as people try and keep cool. This increased demand adds strain to electricity supply and could potentially lead to an increase in the number of power outages.

Additionally, air quality and water quality can be adversely affected by an increase in temperatures. Linn County is mostly agricultural, and the strain placed on crops and livestock could increase along with the temperature.

Vulnerability

Vulnerability Overview

Those at greatest risk for heat-related illnesses include infants and children up to five years of age, people 65 years of age and older, people who are overweight, and people who are ill or on certain medications. However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather. In agricultural areas, the exposure of farm workers, as well as livestock, to extreme temperatures is a major concern.

The National Institute on Aging estimates that more than 49 million Americans over the age of 65 are particularly vulnerable to hypothermia, with isolated elders being most at risk. For an older person, a body temperature of 95° or lower can cause many health problems, such as heart attack, kidney problems, liver damage or worse. (See Table 3.57)

Also, at risk are those without shelter, those who are stranded, and those who live in a home that is poorly insulated or without heat. Other impacts of extreme cold include asphyxiation (unconsciousness or death from a lack of oxygen) from toxic fumes from emergency heaters; household fires, which can be caused by fireplaces and emergency heaters; and frozen/burst pipes.

Table 3.47. Linn County Population Under Age 5 and Over Age 65, 2023 Census Data

Jurisdiction	Population Under 5	% Population Under 5	Population 65 and over	% Population 65 and over
Linn County	701	5.9%	2633	22.2%

City of Brookfield	244	5.9%	940	22.9%
City of Browning	15	6.8%	35	16.0%
City of Bucklin	19	4.6%	124	30.0%
City of Laclede	14	4.6%	77	25.2%
City of Linneus	23	8.2%	51	18.1%
City of Marceline	145	6.8%	419	19.7%
City of Meadville	27	6.5%	68	16.4%
City of Purdin	4	2.8%	27	17.7%

Source: U.S. Census Bureau, Profile of General Population and Housing Characteristics (DP1)

Extreme heat and extreme cold events are common occurrences in Missouri. The method used to determine vulnerability to extreme temperatures across Missouri was statistical analysis of data from several sources: National Centers for Environmental Information (NCEI) storm events data (1996 to December 31, 2021), total population and percentage of population over 65 data from the U.S. Census (2019), and the calculated Social Vulnerability Index for Missouri counties from the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina.

From the statistical data collected, four factors were considered in determining overall vulnerability to extreme temperatures as follows: total population, percentage of population over 65, likelihood of occurrence, and social vulnerability. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. Once the individual ratings were determined for the above factors, a combined vulnerability rating was computed for extreme heat and extreme cold. These rating values correspond to the following descriptive terms:

- 1) Low
- 2) Medium-Low
- 3) Medium
- 4) Medium-High
- 5) High

Table 3.48. Likelihood of Occurrence and Overall Vulnerability Rating for Extreme Temperatures

Heat					Cold				
Total Events	Likelihood of Occurrence	Likelihood Rating	Total Vulnerability	Total Vulnerability Description	Total Events	Likelihood of Occurrence	Likelihood Rating	Total Vulnerability	Total Vulnerability Description
16	0.62	1	9	Medium	7	0.28	2	10	Medium High

Source: 2023 Missouri State Hazard Mitigation Plan

The table below lists typical symptoms and health impacts due to exposure to extreme heat. Exposures to extreme cold temperatures can result in frostbite and hypothermia.

Table 3.49. 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

Table 3.50. Possible Health Impacts of Extreme Cold

Wind Chill	Risk Factor	Possible Health Risks
50 to -18 F	Low	Little risk if dressed properly
-18 to -35 F	Moderate	Frostbite in 30 Min.
-35 to -55 F	High	Frostbite in 10 Min.
Below -55 F	Extreme	Frostbite in less than 5 Min.

Source: National Weather Service

Potential Losses to Existing Development

Over the past 10 years extreme temperatures have led to \$434,584.64 in documented losses, converted to an annualized basis this would yield \$43,458.46 in losses. It should be noted that 7 out of the previous 10 years had a claim.

Impact of Previous and Future Development

Population growth can result in increases in the age-groups that are most vulnerable to extreme temperatures. Population growth also increases the strain on electricity infrastructure, as more electricity is needed to accommodate the growing population.

Hazard Summary by Jurisdiction

Problem Statement

Extreme heat could lead to increased use of water increasing stress on the public water supply systems, as well as increasing the risk to the health of residents who lack proper cooling systems. Heat will also increase demand for electricity and could lead to possible power outages.

Extreme cold will cause schools to alter class times and in some cases suspend classes all together, cold temperatures may also lead to frozen pipes and increases in electrical demand.

3.4.6 Severe Thunderstorms Including High Winds, Hail, and Lightning

Hazard Profile

Hazard Description

Thunderstorms

A thunderstorm is defined as a storm that contains lightning and thunder which is caused by unstable atmospheric conditions. When cold upper air sinks and warm moist air rises, storm clouds or 'thunderheads' develop resulting in thunderstorms. This can occur singularly, as well as in clusters or lines. The National Weather Service defines a thunderstorm as "severe" if it includes hail that is one inch or more, or wind gusts that are at 58 miles per hour or higher. At any given moment across the world, there are about 1,800 thunderstorms occurring. Severe thunderstorms most often occur in Missouri in the spring and summer, during the afternoon and evenings, but can occur at any time. Other hazards associated with thunderstorms are heavy rains resulting in flooding (discussed separately in **Section 3.41**) and tornadoes (discussed separately in **Section 3.48**).

High Winds

A severe thunderstorm can produce winds causing as much damage as a weak tornado. The damaging winds of thunderstorms include downbursts, microbursts, and straight-line winds. Downbursts are localized currents of air blasting down from a thunderstorm, which induce an outward burst of damaging wind on or near the ground. Microbursts are minimized downbursts covering an area of less than 2.5 miles across. They include a strong wind shear (a rapid change in the direction of wind over a short distance) near the surface. Microbursts may or may not include precipitation and can produce winds at speeds of more than 150 miles per hour. Damaging straight-line winds are high winds across a wide area that can reach speeds of 140 miles per hour.

Lightning

All thunderstorms produce lightning which can strike outside of the area where it is raining and is has been known to fall more than 10 miles away from the rainfall area. Thunder is simply the sound that lightning makes. Lightning is a huge discharge of electricity that shoots through the air causing vibrations and creating the sound of thunder.

Hail

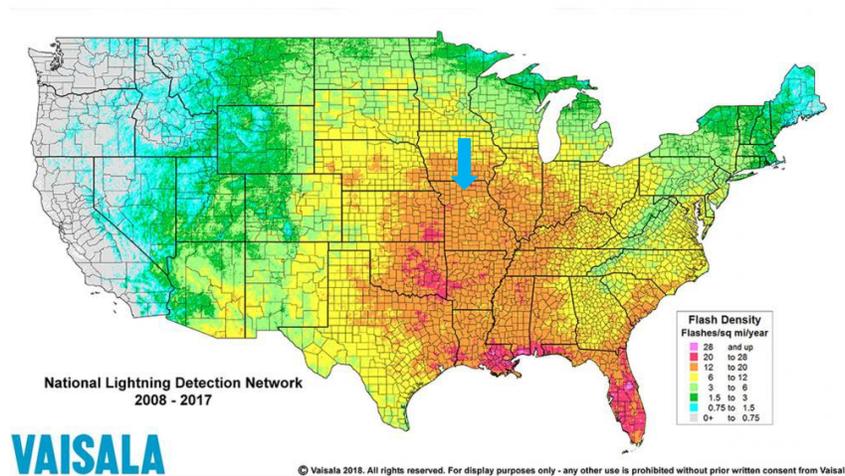
According to the National Oceanic and Atmospheric Administration (NOAA), hail is precipitation that is formed when thunderstorm updrafts carry raindrops upward into extremely cold atmosphere causing them to freeze. The raindrops form into small frozen droplets. They continue to grow as they come into contact with super-cooled water which will freeze in contact with the frozen rain droplet. This frozen droplet can continue to grow and form hail. As long as the updraft forces can support or suspend the weight of the hailstone, hail can continue to grow before it hits the earth.

At the time when the updraft can no longer support the hailstone, it will fall to the earth. For example, a ¼" diameter or pea sized hail requires updrafts of 24 miles per hour, while a 2 ¾" diameter or baseball sized hail requires an updraft of 81 miles per hour. According to the NOAA, the largest hailstone in diameter recorded in the United States was found in Vivian, South Dakota on July 23, 2010. It was eight inches in diameter, almost the size of a soccer ball. Soccer-ball-sized hail is the exception, but even small pea-sized hail can do damage.

Geographic Location

Thunderstorms/high winds/hail/lightning events are an area-wide hazard that can happen anywhere in the county. Although these events occur similarly throughout the planning area, they are more frequently reported in more urbanized areas. In addition, damages are more likely to occur in more densely developed urban areas. The majority of Linn County is rural. According to the following table, the flash density of lightning in Linn County is categorized as 12-20 flashes/square mile/year.

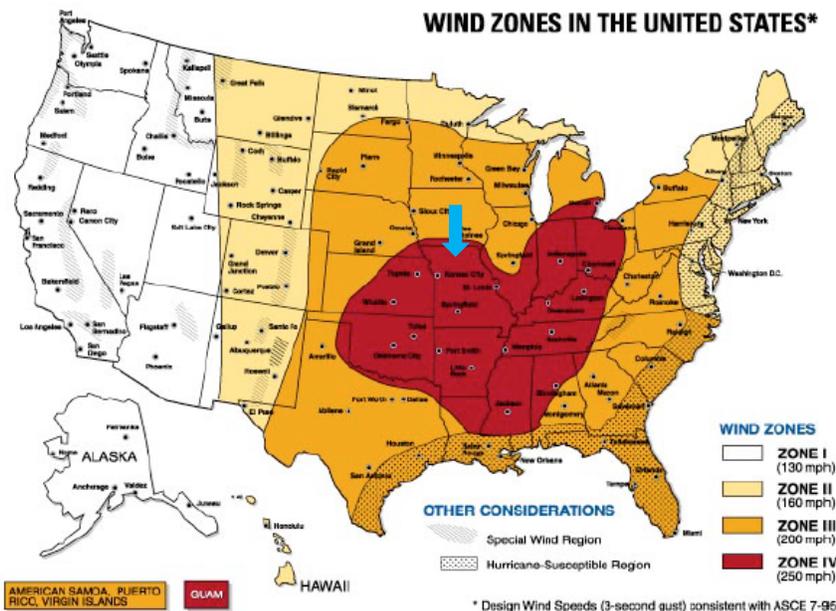
Figure 3.31. Location and Frequency of Lightning in Missouri



Source: National Weather Service, <http://www.vaisala.com/en/products/thunderstormandlightningdetectionsystems/Pages/NLDN.aspx>. Note: indicate location of planning area with a colored square or arrow.

Linn County, indicated with an arrow in the following figure, is entirely within Zone 4. This information indicates that Linn County could sustain wind speeds of up to 250 miles per hour.

Figure 3.32. Wind Zones in the United States



Source: FEMA 320, Taking Shelter from the Storm, 3rd edition, https://www.fema.gov/pdf/library/ism2_s1.pdf

Strength/Magnitude/Extent

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

Table 3.51. Tornado and Storm Research Organization Hailstorm Intensity Scale

Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
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 > squash ball	Widespread glass damage, vehicle bodywork damage
Destructive	41-50	1.6-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, 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 > cricket ball	Severe roof damage, risk of serious injuries
Destructive	76-90	3.0-3.5	Large orange > Soft ball	Severe damage to aircraft bodywork
Super Hailstorms	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even 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>

Straight-line winds are defined as any thunderstorm wind that is not associated with rotation (i.e., is

not a tornado). It is these winds, which can exceed 100 miles per hour, which represent the most common type of severe weather. They are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks like tornadoes, the associated wind damage can be extensive and affect entire (and multiple) counties. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase.

The onset of thunderstorms with lightning, high wind, and hail is generally rapid. Duration is less than six hours and warning time is generally six to twelve hours. Nationwide, lightning kills 75 to 100 people each year. Lightning strikes can also start structural and wildland fires, as well as damage electrical systems and equipment.

Previous Occurrences

“Limitations to the use of NCEI reported lightning events include the fact that only lightning events that result in fatality, injury and/or property and crop damage are in the NCEI.

The tables below summarize past crop damages as indicated by crop insurance claims. The tables illustrate the magnitude of the impact on the planning area’s agricultural economy.

The economy in Linn County is largely agricultural in nature. The following crop insurance claims paid due to the hazards associated with severe storms, specifically high winds and hail, have had a significant impact on the planning area, between 2014 and 2024.

Table 3.52. Crop Insurance Claims Paid in Linn County from Thunderstorms, 2014-2024

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2013		No Claims	
2014		No Claims	
2015		No Claims	
2016		No Claims	
2017		No Claims	
2018		No Claims	
2019		No Claims	
2020		No Claims	
2021		No Claims	
2022		No Claims	
2023		No Claims	
2024		No Claims	
Total		\$0	

Source: USDA Risk Management Agency, Insurance Claims, <https://www.rma.usda.gov/tools-reports/summary-business/cause-loss>.

Table 3.53. Crop Insurance Claims Paid Due to High Wind Linn County 2014-2024

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014		No Claim	\$0
2015		No Claim	\$0
2016	Corn	Wind	\$169,973.20
2017		No Claim	\$0
2018	Corn	Wind	\$9,727.80
2019		No Claim	\$0
2020		No Claim	\$0
2021	Soybeans	Wind	\$2,820.00
2022		No Claim	\$0
2023	Wheat	Wind	\$13,406.00
2024	Corn	Wind	\$77,064.00

Total		\$272,991.00
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Source: USDA Risk Management Agency <http://www.rma.usda.gov/data/cause>

Table 3.54. Crop Insurance Claims Paid Due to Lightning Linn County 2014-2024

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014		No Claim	\$0
2015		No Claim	\$0
2016		No Claim	\$0
2017		No Claim	\$0
2018		No Claim	\$0
2019		No Claim	\$0
2020		No Claim	\$0
2021	Corn	Lightning	\$13,787.00
2022		No Claim	\$0
2023	Soybeans	Lightning	\$4,818.00
2024		No Claim	\$0
Total			\$18,605.00

Source: USDA Risk Management Agency <http://www.rma.usda.gov/data/cause>

Table 3.55. Crop Insurance Claims Paid in Linn County from Hail, (2014-2024)

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014		No Claim	\$0
2015		No Claim	\$0
2016		No Claim	\$0
2017		No Claim	\$0
2018	Corn	Hail	\$23,020.00
	Wheat		\$2,817.00
2019		No Claim	\$0
2020		No Claim	\$0
2021		No Claim	\$0
2022		No Claim	\$0
2023	Corn	Hail	\$20,528.53
	Soybeans		\$162,593.50
2024		No Claim	\$0
Total			\$208,959.03

USDA Risk Management Agency, Insurance Claims, <https://www.rma.usda.gov/tools-reports/summary-business/cause-loss>

Table 3.56. NCEI Reported Thunderstorm Events and Damages in Linn County (2005-2025)

Date	Event Type	Magnitude	Deaths/Injuries	Property Damage (\$)	Crop Damage (\$)
8/19/2005	Thunderstorm Wind	52	0	0	0
3/12/2006	Hail	0.88	0	0	0
4/2/2006	Hail	1	0	0	0
4/15/2006	Hail	0.88	0	0	0
4/18/2006	Hail	1	0	0	0
4/18/2006	Hail	1.75	0	0	0
4/18/2006	Hail	1	0	0	0
4/18/2006	Hail	0.75	0	0	0
4/18/2006	Hail	1	0	0	0
4/18/2006	Hail	0.75	0	0	0
4/18/2006	Hail	0.75	0	0	0
6/6/2006	Thunderstorm Wind	52	0	0	0

6/6/2006	Hail	1	0	0	0
6/6/2006	Thunderstorm Wind	52	0	0	0
7/13/2006	Thunderstorm Wind	52	0	0	0
7/13/2006	Thunderstorm Wind	52	0	0	0
7/13/2006	Thunderstorm Wind	52	0	0	0
7/17/2006	Hail	1.75	0	0	0
7/17/2006	Hail	1.25	0	0	0
7/27/2006	Hail	1	0	0	0
4/24/2007	Thunderstorm Wind	70	0	0	0
6/7/2007	Hail	0.75	0	0	0
7/14/2007	Hail	1	0	0	0
7/14/2007	Thunderstorm Wind	52	0	0	0
7/14/2007	Hail	0.75	0	0	0
7/14/2007	Thunderstorm Wind	61	0	0	0
8/12/2007	Thunderstorm Wind	52	0	0	0
5/2/2008	Thunderstorm Wind	52	0	0	0
6/24/2008	Thunderstorm Wind	52	0	0	0
6/25/2008	Heavy Rain		0	0	0
7/2/2008	Hail	0.75	0	0	0
8/28/2008	Thunderstorm Wind	52	0	0	0
2/26/2009	Hail	0.75	0	0	0
3/24/2009	Hail	1.25	0	0	0
3/24/2009	Hail	1	0	0	0
3/24/2009	Hail	0.88	0	0	0
5/13/2009	Thunderstorm Wind	61	0	15000	0
5/13/2009	Hail	1	0	0	0
5/13/2009	Hail	1	0	0	0
5/13/2009	Hail	0.88	0	0	0
6/22/2009	Thunderstorm Wind	61	0	15000	0
4/4/2010	Hail	0.75	0	0	0
5/12/2010	Hail	0.75	0	0	0
6/5/2010	Hail	0.75	0	0	0
6/27/2010	Hail	1	0	0	0
8/13/2010	Thunderstorm Wind	52	0	0	0
5/21/2011	Hail	0.88	0	0	0
5/25/2011	Thunderstorm Wind	52	0	0	0
6/9/2011	Hail	0.88	0	0	0
6/9/2011	Hail	1.25	0	0	0
6/9/2011	Hail	1	0	0	0
6/9/2011	Hail	2.75	0	0	0
6/9/2011	Hail	0.75	0	0	0
6/9/2011	Hail	1.75	0	0	0
6/13/2011	Hail	0.75	0	0	0
6/14/2011	Hail	1	0	0	0
6/14/2011	Hail	1.75	0	0	0
6/14/2011	Thunderstorm Wind	52	0	0	0

6/26/2011	Thunderstorm Wind	52	0	0	0
6/26/2011	Thunderstorm Wind	61	0	1000	0
6/26/2011	Thunderstorm Wind	52	0	0	0
2/28/2012	Thunderstorm Wind	87	0	50000	0
2/28/2012	Thunderstorm Wind	50	0	0	0
5/15/2013	Thunderstorm Wind	52	0	1000	0
5/19/2013	Thunderstorm Wind	52	0	0	0
6/15/2013	Thunderstorm Wind	61	0	1000	0
10/30/2013	Thunderstorm Wind	52	0	0	0
10/30/2013	Hail	0.75	0	0	0
10/30/2013	Thunderstorm Wind	52	0	0	0
10/30/2013	Hail	0.88	0	0	0
4/27/2014	Thunderstorm Wind	50	0	0	0
4/27/2014	Thunderstorm Wind	55	0	0	0
4/27/2014	Thunderstorm Wind	55	0	0	0
5/10/2014	Hail	1.75	0	0	0
6/5/2014	Thunderstorm Wind	52	0	0	0
7/7/2014	Thunderstorm Wind	61	0	0	0
6/25/2015	Thunderstorm Wind	52	0	0	0
6/25/2015	Thunderstorm Wind	56	0	0	0
6/25/2015	Thunderstorm Wind	52	0	0	0
6/25/2015	Thunderstorm Wind	61	0	0	0
7/6/2016	Thunderstorm Wind	52	0	0	0
7/7/2016	Thunderstorm Wind	61	0	0	0
7/7/2016	Thunderstorm Wind	65	0	0	0
9/19/2016	Thunderstorm Wind	52	0	0	0
3/6/2017	Thunderstorm Wind	52	0	0	0
3/6/2017	Hail	0.88	0	0	0
6/17/2017	Hail	1	0	0	0
9/16/2017	Thunderstorm Wind	52	0	0	0
4/7/2019	Hail	1	0	0	0
4/7/2019	Hail	1	0	0	0
6/21/2019	Thunderstorm Wind	61	0	0	0
6/21/2019	Thunderstorm Wind	61	0	0	0
6/21/2019	Thunderstorm Wind	52	0	0	0

8/29/2019	Thunderstorm Wind	56	0	0	0
5/14/2020	Hail	1	0	0	0
5/14/2020	Hail	1.25	0	0	0
8/12/2021	Thunderstorm Wind	52	0	0	0
12/15/2021	High Wind	56	0	0	0
12/15/2021	Thunderstorm Wind	65	0	0	0
3/31/2023	Hail	1	0	0	0
3/31/2023	Hail	1.5	0	0	0
3/31/2023	Hail	1	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	84	0	0	0
5/6/2023	Thunderstorm Wind	74	0	0	0
5/6/2023	Thunderstorm Wind	74	0	0	0
5/6/2023	Thunderstorm Wind	87	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	76	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
5/6/2023	Thunderstorm Wind	70	0	0	0
6/2/2023	Thunderstorm Wind	52	0	0	0
7/29/2023	Thunderstorm Wind	52	0	0	0
7/29/2023	Thunderstorm Wind	52	0	0	0
8/11/2023	Thunderstorm Wind	56	0	0	0
8/11/2023	Hail	1.5	0	0	0
3/12/2024	Hail	1	0	0	0
6/26/2024	Thunderstorm Wind	52	0	0	0
6/26/2024	Thunderstorm Wind	52	0	0	0
10/30/2024	Thunderstorm Wind	52	0	0	0

Source: NCEI Database

Table 3.57. NCEI Thunderstorm Event Narratives for Linn County (2015-2025)

Begin Date	Event Narrative
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8/19/2005	10-inch tree limb downed.
7/13/2006	Large branches down on street.
7/13/2006	Six-inch diameter tree limbs snapped off.
4/24/2007	Trees up to 3 feet in diameter blown over.
7/14/2007	Thunderstorm wind gusts to 60 mph, caused 4-to-6-inch diameter tree branches to snap off on Route P.
6/24/2008	A tree twenty-three inches in diameter was blown down.
6/25/2008	Heavy rains of 8.48 inches, was reported at the DCP gage in Linneus, with 7.10 inches in the past 4 hours.
8/28/2008	Trees were reported down.
5/13/2009	A trailer was reported to be destroyed, due to thunderstorm winds estimated up to 70 mph.
6/22/2009	Fifteen power poles were reported down.
8/13/2010	A tree was blown over with thunderstorm wind gusts estimated to 60 mph.
5/25/2011	An eight inch in diameter tree branch was blown down. Thunderstorm wind gusts were estimated up to 60 mph.
6/14/2011	Several trees were reported blocking Highway 11. Thunderstorm wind gusts were estimated up to 60 mph.
6/26/2011	Thunderstorm wind gusts were estimated up to 60 mph.
6/26/2011	Numerous trees were reported down with one building damaged. Thunderstorm wind gusts were estimated up to 70 mph.
6/26/2011	High voltage power lines were reported down. Thunderstorms wind gusts were estimated up to 60 mph.
2/28/2012	Thunderstorm straight line wind gusts were estimated from 80 to 100 mph. One residential building, just west of Highway 5, had its roof taken off. The residents were not home at the time. Many large trees were reported down, along with several barb wired fences.
2/28/2012	A thunderstorm wind gust was measured at 58 mph.
5/15/2013	Thunderstorm wind gusts were estimated up to 60 mph. A pole barn was blown apart and several large trees were either snapped or blown down. Several trees had limbs up to 8 inches in diameter snapped off. The damage was observed east of Highway 139, and just off Highway D.
5/19/2013	Several trees and tree limbs were reported down across Brookfield. Thunderstorm wind gusts were estimated up to 60 mph.
6/15/2013	Thunderstorm wind gusts were estimated up to 70 mph. A pole barn was reported blown apart and several large trees were snapped or blown over. Several eight inch diameter tree limbs were also reported snapped off.
10/30/2013	Thunderstorm wind gusts were estimated up to 60 mph, with a large tree reported down in a yard.
10/30/2013	A thunderstorm wind gust was estimated up to 60 mph.
4/27/2014	Several 8-to-10-inch diameter tree limbs down.
4/27/2014	Road signs blown down and a tin roof blown from a shed.
4/27/2014	Power lines were blown down.
5/10/2014	Golf ball sized hail broke windows near Browning.
6/5/2014	A carport was blown down and large pieces of sheet metal blown around.
7/7/2014	Public reported a 70-mph wind gust near Marceline, Missouri.
6/25/2015	Numerous 6-to-10-inch tree limbs were laying across Highway 36 near Meadville.
6/25/2015	Several tree limbs around 18 inches in diameter were broken from 60 to 70 mph winds.
6/25/2015	Several broken tree branches were caused by 60 mph winds through Brookfield.
6/25/2015	Several power lines and tree limbs were down near Marceline due to strong winds.
7/6/2016	A cattle barn and some trees were blown down.
7/7/2016	Numerous trees of unknown size or condition were down across the area. A few powerlines were down as well.
7/7/2016	Multiple tree branches of a maple tree ranging from 5 to 12 inches in diameter were broken.
9/19/2016	Several trees of unknown size and condition were down near Princeton.

3/6/2017	A trained spotter in Marceline reported a 60-mph wind gust.
9/16/2017	A pole barn was damaged near Purdin.
6/21/2019	Fire and rescue estimated 70 mph wind in Meadville.
6/21/2019	Several large tree limbs 1 to 2 feet in diameter were broken.
6/21/2019	Some 60 mph winds were estimated near Marceline.
8/29/2019	Several large tree limbs and a few trees were down across portions of Linn County near Marceline.
5/14/2020	This report was received via social media.
8/12/2021	Tree limbs were down, and power outages were reported in Marceline.
12/15/2021	Through the afternoon on December 15th strong wind caused sustained winds in the 40 to 50 mph range, with frequent gusts well over 60 mph. While most ASOS and AWOS stations recorded gusts around 65 mph, there were several reports of higher winds and damage representative of around 70 mph, such as tree damage and powerlines down. This all preceded strong thunderstorms that also caused strong winds and scattered damage across the area.
12/15/2021	Most of the roof to an automotive repair facility was blown off.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	In the city of Linneus, widespread trees were snapped. An old brick structure also had its roof ripped off, causing some damage to the exterior facade.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely as a result of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County. At this location six consecutive power poles were snapped.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	Missouri Mesonet reported wind of 87 mph.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
5/6/2023	About a mile to two miles south of the main tornado circulation widespread unidirectional wind damage occurred, likely because of a strong rear flank downdraft. This RFD wind was responsible for numerous damaged residences and outbuildings across Linn County.
6/2/2023	Large tree branches were downed in Marceline.
7/29/2023	Tree and powerlines down in Brookfield.
7/29/2023	Estimated 60 mph winds in Marceline.

8/11/2023	Wind driven hail damaged siding and large tree limbed were downed.
8/11/2023	Ping pong ball hail was reported west of Purdin.
3/12/2024	Quarter sized hail just southeast of Browning in far northern Linn County.
6/26/2024	Downed power lines near Glade Road.
6/26/2024	Downed power lines near Glade Road.
10/30/2024	Sixty mph wind gusts reported in Meadville.

Probability of Future Occurrence

$$Probability\ of\ Thunderstorm = \frac{\#\ of\ events}{Years} = \frac{70}{20} = 3.5 = 350\%$$

This calculation indicates the planning area of Linn County could expect to experience an average of 3.5 thunderstorms annually.

$$Probability\ of\ Thunderstorm\ with\ High\ or\ Excessive\ Winds = \frac{\#\ of\ events}{Years} = \frac{71}{20} = 3.55 = 355\%$$

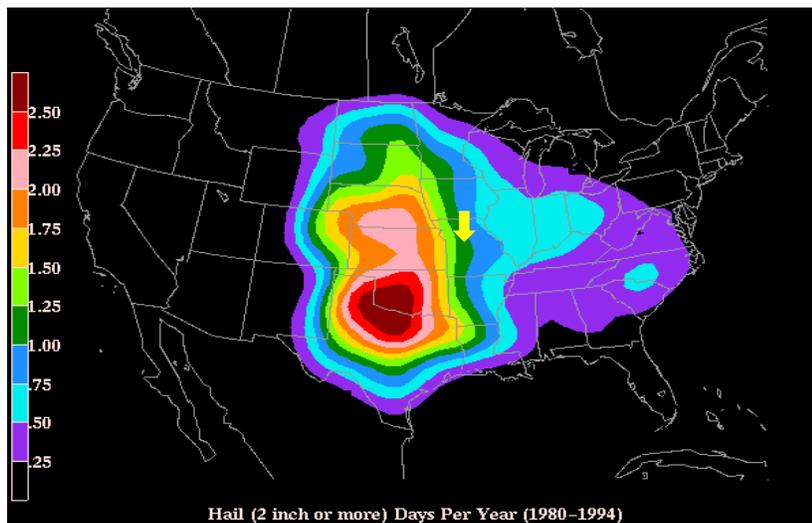
This calculation indicates the planning area of Linn County could expect to experience a Thunderstorms with high winds on average of 3.55 times annually.

$$Probability\ of\ Thunderstorm\ with\ Hail = \frac{\#\ of\ events}{Years} = \frac{53}{20} = 2.65 = 265\%$$

This calculation indicates the planning area of Linn County could expect to experience a Thunderstorm with Hail on average 2.65 times per year.

The figure below shows the annual hailstorm probability in Linn County for hail stones larger than 2 inches in diameter from 1980 through 1994. Linn County, indicated by an arrow, experienced between 1 and 1.25 days per year where the size of the hailstones were 2 inches in diameter.

Figure 3.33. Annual Hailstorm Probability (2" diameter or larger), U 1980- 1994



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

Changing Future Conditions Considerations

As temperatures increase with changing conditions, the severity of storms is likely to increase, as warm air is the key component of thunderstorms. Due to higher levels of convection, there could be a higher frequency and severity of storm events.

Vulnerability

Vulnerability Overview

Severe thunderstorm losses are usually attributed to the associated hazards of hail, downburst winds, lightning and heavy rains. Losses due to hail and high wind are typically insured losses that are localized and do not result in presidential disaster declarations. However, in some cases, impacts are severe and widespread and assistance outside state capabilities is necessary. Hail and wind also can have devastating impacts on crops. Severe thunderstorms/heavy rains that lead to flooding are discussed in the flooding hazard profile. Hailstorms cause damage to property, crops, and the environment, and can injure and even kill livestock. In the United States, hail causes more than \$1 billion in damage to property and crops each year. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are also commonly damaged by hail. Hail has been known to cause injury to humans, occasionally fatal injury.

In general, assets in the County vulnerable to thunderstorms with lightning, high winds, and hail include people, crops, vehicles, and built structures. Although this hazard results in high annual losses, private property insurance and crop insurance usually cover the majority of losses. Considering insurance coverage as a recovery capability, the overall impact on jurisdictions is reduced.

Most lightning damages occur to electronic equipment located inside buildings. But structural damage can also occur when a lightning strike causes a building fire. In addition, lightning strikes can cause damages to crops, if fields or forested lands are set on fire. Communications equipment and warning transmitters and receivers can also be knocked out by lightning strikes.

<http://www.vaisala.com/en/products/thunderstormandlightningdetectionsystems/Pages/NLDN.aspx> and <http://www.lightningsafety.noaa.gov/>

The method used to determine vulnerability to severe thunderstorms across Missouri was statistical analysis of data from several sources: National Centers for Environmental Information (NCEI) storm events data (1996 to December 31, 2021), HAZUS Building Exposure Value data, housing density and mobile home data from the U.S. Census (2019), and the calculated Social Vulnerability Index for Missouri Counties from the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina.

From the statistical data collected, six factors were considered in determining overall vulnerability to lightning as follows: housing density, building exposure, percentage of mobile homes, social vulnerability, likelihood of occurrence, and average annual property loss. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. Once the ranges were determined and applied to all factors considered in the analysis for wind, hail, and lightning, they were rated individually and factored together to determine an overall vulnerability rating for thunderstorms. This vulnerability rating was taken from the 2023 Missouri State Hazard Mitigation Plan.

These rating values correspond to the following descriptive terms:

- 1) Low
- 2) Medium-Low
- 3) Medium
- 4) Medium-High

5) High

Table 3.58. Housing Density, Building Exposure, SOVI, and Mobile Home Data for Linn County

Total Building Exposure (HAZUS)	Building Exposure Rating	Housing Density	Housing Density Rating	SOVI Rating	SOVI Ranking Rating	Percent Mobile Homes	Percent Mobile Homes Rating
\$1,622,177,000	0	10.37	1	Medium High	4	6.1	3

Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.59. High Wind, Hail, and Lightning Events, Likelihood of Occurrence, and Associated Ratings for Linn County

High Wind			Hail			Lightning		
Total Number of Events	Likelihood of Occurrence	Likelihood of Occurrence Rating	Total Number of Events	Likelihood of Occurrence	Likelihood of Occurrence Rating	Total Number of Events	Likelihood of Occurrence	Likelihood of Occurrence Rating
67	2.58	1	81	3.12	1	0	0.00	1

Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.60. Annualized Property Loss and Associated Ratings for Linn County

High Wind		Hail		Lightning	
Total Annualized Property Loss	Total Annualized Property Loss Rating	Total Annualized Property Loss	Total Annualized Property Loss Rating	Total Annualized Property Loss	Total Annualized Property Loss Rating
\$5,154	1	\$57,692	2	\$0	1

Source: 2023 Missouri State Hazard Mitigation Plan

Potential Losses to Existing Development

According to historical loss data reported for thunderstorm wind, high wind, hail, and lightning by NCEI, from 2014-2025, 125 severe weather events impacted Linn County and caused an estimated \$83,000 in property damage with no reported crop damage. Based on this estimate Linn County experiences an average annual property loss of approximately \$4,150.

The USDA reported crop losses due to high winds, lightning, and hail. According to the USDA there were \$500,555.03 in crop insurance claims recorded from 2014 to 2024. Based on these figures, Linn County can expect to experience an average annual crop loss of \$50,055.50.

Previous and Future Development

Any additional development that occurs in Linn County will result in increased exposure and thus

increased vulnerability to severe thunderstorms and their associated wind, hail, and lightning.

Hazard Summary by Jurisdiction

Thunderstorms, high winds, lightning, and hail events are area-wide and expected to occur uniformly across the planning area. However, the magnitude of impacts may vary by jurisdiction based on the physical vulnerability of structures.

The following table details the percentage of housing built before 1939 and the percentage of manufactured housing units in each jurisdiction, as both characteristics may indicate increased vulnerability to severe thunderstorms.

Table 3.61. Linn County Mobile Home and Homes Build Prior to 1939

Jurisdiction	Mobile Home	% Mobile Home	Homes Built Before 1939	% Homes Built Before 1939
Linn County	283	5.9%	804	16.7%
City of Brookfield	49	2.8%	334	19.0%
City of Browning	5	4.8%	31	29.8%
City of Bucklin	14	7.6%	42	22.8%
City of Laclede	21	21.0%	25	25.0%
City of Linneus	17	21.3%	21	26.3%
City of Marceline	18	2.2%	139	17.1%
City of Meadville	13	7.5%	34	19.5%
City of Purdin	0	0.0%	10	27.8%

Source: U.S. Census Bureau, Physical Housing Characteristics for Occupied Housing Units (S2501)

Problem Statement

Severe thunderstorms and associated hazards such as lightning can result in power outages and damage to equipment resulting in operational capacity, such as at water treatment plants. Severe storms may also knock out communications system to critical facilities such as schools, strong winds may lead to structural damage and loss of residents and facilities.

3.4.7 Severe Winter Weather

Hazard Profile

Hazard Description

A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. The National Weather Service describes different types of winter storm events as follows.

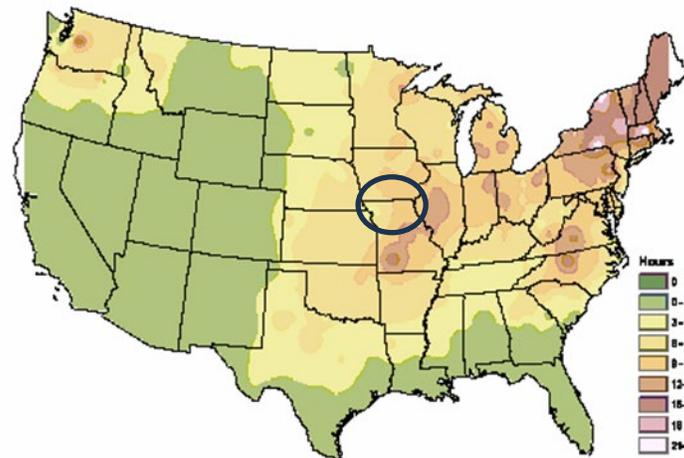
- **Blizzard**—Winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less than $\frac{1}{4}$ mile for at least three hours.
- **Blowing Snow**—Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow 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.

Geographic Location

A major winter storm usually affects a large area uniformly. While there might be slight variations in impact across a county, the effects are generally consistent throughout the region.

The figure below shows the NWS estimated hours of freezing rain across the United States.

Figure 3.34. NWS Statewide Average Number of Hours per Year with Freezing Rain



Source: American Meteorological Society. "Freezing Rain Events in the United States." <http://ams.confex.com/ams/pdfpapers/71872.pdf>

Strength/Magnitude/Extent

Severe winter storms include heavy snowfall, ice, and strong winds which can push the wind chill well below zero degrees in the planning area.

For severe weather conditions, the National Weather Service issues some or all of the following products as conditions warrant across the State of Missouri. NWS local offices in Missouri may collaborate with local partners to determine when an alert should be issued for a local area.

- 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. Often the greatest hazard is 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.
- Blizzard Warning — Snow and strong winds will combine to produce a blinding snow (near zero visibility), deep drifts, and life-threatening wind chill.
- 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.
- 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.

Previous Occurrences

Table 3.62. NCEI winter storm reports 1994-2024

Blizzard			
Date	Deaths	Injuries	Damage
2/1/2011	0	0	0
11/25/2018	0	0	0
Total: 2	0	0	0
Heavy Snow			
1/27/1997	0	0	0
11/30/2006	0	0	0
12/1/2006	0	0	0
1/20/2007	0	0	0
12/21/2013	0	0	0
2/4/2014	0	0	0
1/31/2015	0	0	0
2/1/2015	0	0	0
Total: 8	0	0	\$0
Ice Storm			
1/4/1998	0	0	0
1/5/2005	0	0	0
11/29/2006	0	0	0
12/1/2007	0	0	0
12/10/2007	0	0	\$5,000
12/18/2008	0	0	0
1/15/2017	0	0	0
2/7/2019	0	0	0
Total: 8	0	0	\$5,000
Winter Storm			
12/11/2000	0	0	0
1/28/2001	0	0	0
2/9/2001	0	0	0
1/30/2002	0	0	\$100,000
3/2/2002	0	0	0
12/10/2003	0	0	0
1/6/2010	0	0	0
2/21/2010	0	0	0
2/24/2011	0	0	0
2/21/2013	0	0	0
2/25/2013	0	0	0
3/23/2013	0	0	0
12/27/2015	0	0	0
1/11/2019	0	0	0
1/10/2020	0	0	0
1/1/2021	0	0	0
1/14/2022	0	0	0
Total: 17	0	0	0
Total: 33	0	0	\$105,000

Source: NWS NCEI Data accessed July 2025

Table 3.63. NCEI Winter storm summaries 2004-2024

Begin Date	Event Narrative
1/20/2006	No Narrative
11/29/2006	Up to 1/2 inch of ice across the county.
11/30/2006	Around 1 inch of snow in the northwest corner of the county, ranging to 10 inches in the southeast corner.
12/1/2006	See November 2006 Storm Data.

2/12/2007	Four to six inches of snow fell across the county.
12/1/2007	One quarter of an inch was reported across the county.
12/10/2007	One quarter to three quarters of an inch of ice was reported across the county. Many tree branches and power lines were reported down.
12/18/2008	One half inch of ice was reported.
1/6/2010	Up to 3 inches of snow was reported across the county. Strong gusty northwest winds caused blowing and drifting snow.
2/7/2010	Brookfield had 5 inches of snow.
2/21/2010	Brookfield measured 10 inches of snow. Blowing and drifting snow caused hazardous driving conditions.
1/10/2011	Snowfall amounts of 4 to 6 inches were reported across the county.
2/1/2011	Blizzard conditions were observed across the county, with frequent wind gusts up to 45 mph, visibilities less than 1/4 of a mile, and heavy snow of up to 16 inches, measured in Meadville. Travel was nearly impossible, with the blowing and drifting snow, and the very low visibilities.
2/24/2011	The combination of up to 5 inches of snow, and blowing and drifting snow, led to hazardous driving conditions across the county.
1/11/2012	The town of Brookfield reported 2.3 inches of snow.
1/27/2012	Two inches of snow was measured in La Plata.
1/27/2012	The observer in Brookfield reported 1.0 inches of snow.
2/13/2012	The observer in Linneus measured 1.8 inches of snow. The observer in Brookfield measured 3.0 inches of snow.
2/21/2013	Brookfield measured ten inches of snow.
2/25/2013	Twelve inches of snow was measured in Brookfield.
3/23/2013	Seven inches of snow was measured in Brookfield.
5/2/2013	Brookfield measured 5.0 inches of snow.
12/21/2013	Light to moderate snow picked up during the afternoon hours on December 21. Preceding the snow freezing rain produced some minor icing in and around the area. Once the snow began it quickly accumulated between 5 and 7 inches across the area. The highest amount received came from Princeton, Missouri where 6 to 7 inches of snow fell. While there were several vehicles spin-out across the area, and despite the ice accumulation the widespread effects were rather minimal.
2/4/2014	A major winter storm trekked through Kansas and Missouri on February 4 and 5. By the time the storm finished it dropped around a foot of snow across the entire area.
1/31/2015	Light snow fell for a long duration across northern Missouri through the evening and overnight hours on January 1 through the early morning hours on February 2. Strong winds moved into the area while the snow was falling and caused visibility problems and drifting on the roads. Generally, 7 to 9 inches fell across the county with the highest reported total from the county coming from Brookfield, where 8 inches fell. Numerous vehicle accidents occurred due to the poor driving conditions, but no serious injuries were reported.
2/1/2015	Light snow fell for a long duration across northern Missouri through the evening and overnight hours on January 1 through the early morning hours on February 2. Strong winds moved into the area while the snow was falling and caused visibility problems and drifting on the roads. Generally, 7 to 9 inches fell across the county with the highest reported total from the county coming from Brookfield, where 8 inches fell. Numerous vehicle accidents occurred due to the poor driving conditions, but no serious injuries were reported.
1/15/2017	To finish off a prolonged freezing rain event across northeast Kansas and northwest Missouri light rain lifted north into far northern Missouri causing ice to accumulate through the day on

	Sunday and overnight into Monday morning. Several trained weather spotters from across northern Missouri reported a quarter inch of ice on all surfaces. Several area roads were ice covered through the day on Sunday and into Monday morning before temperatures warmed above freezing Monday morning.
11/25/2018	Blizzard conditions started after a few hours of light to moderately falling snow. Once the heavy snow arrived winds gusted up to 45 mph for nearly 4 hours, creating whiteout conditions, officially measured by the ASOS at nearby KIRKas sub-quarter mile for that duration. Despite the heavy impacts from this system affecting Thanksgiving weekend return traffic, no serious injuries occurred from this event.
1/11/2019	Between 12 and 18 inches of snow fell across Linn County, with most of it falling over the course of the first 12 hours. Light snow continued into the next day (January 12), but it was fairly light and only accounted for 1 to 2 inches.
2/7/2019	While light freezing drizzle occurred off and on February 5, the bulk of the freezing rain fell during the overnight period on February 6 into February 7. Over the course of the event, Linn County received approximately a quarter inch of ice accumulation. Numerous vehicle accidents occurred area-wide and minor tree damage occurred.
1/10/2020	Freezing rain occurred through much of the night going into January 11 and caused around a quarter to one-third inch accumulation. This occurred prior to about 2 to 3 inches of snow falling. This resulted in several auto accidents.
1/1/2021	Light to moderate freezing rain formed early morning on New Year's Day. This freezing rain quickly accreted between a quarter to half inch before sunrise. Shortly after sunrise the freezing rain switched to light snow, which persisted for the bulk of the remaining daytime hours. The snow did not accumulate more than 1 to 3 inches, but on top of the ice accretion created winter storm conditions. Mostly scattered power outages and vehicle accidents were the impacts, but being a holiday, road traffic was likely light.
1/14/2022	Several reports from across the area indicated around 6 inches of snow in Linn County.

Source: NCEI Storm events database, accessed July 2025

Table 3.64. Crop Insurance Claims Paid in Linn County as a Result of Cold Conditions and Winter Weather

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	Wheat	Cold Winter	\$183,664.50
		Freeze	\$57,524.00
2015	Wheat	Cold Winter	\$37,350.88
2016	No Claim		\$0
2017	No Claim		\$0
2018	Wheat	Cold Winter	\$11,617.00
2019	Wheat	Cold Winter	\$54,658.26
2020	Wheat	Cold Winter	\$10,146.00
2021	Wheat	Cold Winter	\$14,473.00
2022	No Claim		\$0
2023	Wheat	Cold Winter	\$1,969.00
2024	No Claim		\$0
Total			\$371,402.64

Source: USDA Risk Management Agency <http://www.rma.usda.gov/data/cause>

Probability of Future Occurrence

Over the last 20 years Linn County has experienced 33 winter weather events. Since one storm will generally include more than one type of event the probability of future occurrence was calculated as follows:

$$\text{Probability of Winter Weather Event} = \frac{\# \text{ of events}}{\text{Years}} = \frac{33}{20} = 1.65 = 165\%$$

This calculation lets us know that Linn County, Missouri will experience on average, 1.65 winter weather events annually.

Changing Future Conditions Considerations

With higher average temperatures occurring across the globe due to climate change, one might assume that winters would be milder. However, with the increase in the atmosphere's water-holding capacity, there is an increased likelihood of heavy snow events. Changes in the jet stream patterns can also result in allowing pools of very cold air to sink further south than usual. In summation, the changing climate could result in more severe storms, both in duration and amount of precipitation.

Vulnerability

Vulnerability Overview

Heavy snow can bring a community to a standstill by inhibiting transportation (in whiteout conditions), weighing down utility lines, and by causing structural collapse in buildings not designed to withstand the weight of the snow. Repair and snow removal costs can be significant. Ice buildup can collapse utility lines and communication towers, as well as make transportation difficult and hazardous. Ice can also become a problem on roadways if the air temperature is high enough that precipitation falls as freezing rain rather than snow.

Buildings with overhanging tree limbs are more vulnerable to damage during winter storms when limbs fall. Businesses experience loss of income as a result of closure during power outages. In general, heavy winter storms increase wear and tear on roadways though the cost of such damage is difficult to determine. Businesses can experience loss of income because of closure during winter storms.

Overhead power lines and infrastructure are also vulnerable to damage from winter storms. In particular ice accumulation during winter storm events damage power lines due to the ice weight on the lines and equipment. Damage also occurs to lines and equipment from falling trees and tree limbs weighed down by ice. Potential losses could include cost of repair or replacement of damaged facilities and lost economic opportunities for businesses.

Secondary effects from loss of power could include burst water pipes in homes without electricity during winter storms. Public safety hazards include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables associated with this hazard. Standard values for loss of service for utilities reported in FEMA's BCA Toolkit 6.0 Release Notes, the economic impact as a result of loss of power is \$174 per person per day of lost service.

From the 2023 Missouri Hazard Mitigation Plan, the method used to determine vulnerability to severe winter weather across Missouri was statistical analysis of data from several sources: National Centers for Environmental Information (NCEI) storm events data (1996 to December 31, 2021), HAZUS Building Exposure Value Data, housing density data from the US Census, and the calculated Social Vulnerability Index for Missouri Counties from the Hazard and Vulnerability Research Institute in the Department of Geography at the University of South Carolina.

From the statistical data collected, five factors were considered in determining overall vulnerability to

severe winter weather as follows: housing density, building exposure, social vulnerability, likelihood of occurrence, and average annual property loss. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. These rating values correspond to the following descriptive terms:

1. Low
2. Low-medium
3. Medium
4. Medium-high
5. High

Once the individual ratings were determined for the above factors, a combined vulnerability rating was computed for severe winter weather events. The following table provides the calculated ranges applied to determine overall vulnerability of Missouri counties to severe winter weather.

Table 3.65. Ranges for Severe Winter Weather Combined Vulnerability Rating

	Low (1)	Low-Medium (2)	Medium (3)	Medium-High (4)	High (5)
Severe Winter Weather Combined Vulnerability	7-8	8-10	10-12	12-15	15-22

Source: 2023 Missouri State Hazard Mitigation Plan

The figures that follow provide the mapped results for Linn County.

Table 3.66. Housing Density, Building Exposure, and SOVI Data for Linn County

	Total Building Exposure (HAZUS)	Building Exposure Rating	Housing Density	Housing Density Rating	SOVI Ranking	SOVI Rating
Linn County	\$1,622,177,000	1	10.37	1	Medium High	4

Source: 2023 Missouri State Hazard Mitigation Plan

The following information was taken from the 2023 Missouri State Hazard Mitigation Plan. It includes the factors considered for severe winter weather exposure for Linn County.

The following table was sourced from the 2023 Missouri State Hazard Mitigation Plan and provides the additional data obtained from the National Centers for Environmental Information to complete the overall vulnerability analysis and the total overall vulnerability rating for severe winter weather. The total number of winter weather events include blizzard, heavy snow, ice storm, winter storm, and winter weather events.

Table 3.67. Additional Statistical Data Compiled for Vulnerability Analysis for Linn County

Total # of Winter Weather Events	Likelihood of Occurrence	Likelihood of Occurrence Rating	Total Annualized Property Loss	Total Annualized Property Loss Rating	Overall Vulnerability Rating	Overall Vulnerability Rating Description
41	1.58	2	\$4,038	1	9	Medium Low

Source: 2023 Missouri Hazard Mitigation Plan

Table 3.68. Annualized Severe Winter Weather Damages in Linn County

Annualized Blizzard Property Loss (\$)	Annualized Heavy Snow Property Loss (\$)	Annualized Ice Storm Property Loss (\$)	Annualized Winter Storm Property Loss (\$)	Annualized Winter Weather Property Loss (\$)	Total Annualized Winter Weather Property Loss (\$)
\$0	\$0	\$192	\$3,846	\$0	\$4,038

Source: 2023 Missouri Hazard Mitigation Plan

Potential Losses to Existing Development

The next severe winter storm will most likely close schools and businesses for multiple days and make roadways hazardous for travel. Heavy ice accumulation may damage electrical infrastructures causing prolonged power outages for large portions of the region. In addition, freezing temperatures make water lines vulnerable to freezing. Fallen tree limbs also pose a threat to various structures/infrastructures across the country.

Some winter storms, most notably ice storms, can and do cause significant damage and disruption to infrastructure, often leading to hundreds of thousands, if not millions of damages.

The most significant damage occurred in 2002 when an ice storm caused over \$100,000 in damage, Major ice storms in the past have led to long duration power outages and costly repairs.

Crop losses have totaled \$371,02.64 due to winter storm conditions over the last 10 years, calculated to an annualized basis the estimated cost would be \$37,140.26.

Previous and Future Development

Future development could potentially increase vulnerability to this hazard by increasing demand on the utilities and increasing the exposure of infrastructure networks. At this time, there is little expected in the way of new development that would lead to an increased risk to the planning area.

Hazard Summary by Jurisdiction

The hazards from a winter storm event would be the same across the entire county and there is little if any variation from jurisdiction to jurisdiction, the only noteworthy exception would be school districts which are prone to prolonged closures due to winter storm impacts.

Problem Statement

Linn County is expected to experience at least one severe winter weather event annually. The county has a low-medium vulnerability rating. Jurisdictions should enhance their weather monitoring to be better prepared for severe weather hazards. If jurisdictions monitor winter weather, they can dispatch road crews to prepare for the hazard. County and city crews can also trim trees along power lines to minimize the potential for outages due to snow and ice. Citizens should also be educated about the benefits of being proactive to alleviate property damage as well as preparing for power outages. Education needs to occur to ensure all residents are aware of the shelters in the County, residents are educated on emergency supplies to have and the utilization of social media and texting increases.

3.4.8 Tornado

Hazard Profile

Hazard Description

Essentially, tornadoes are a vortex storm with two components of winds. The first is the rotational winds that can measure up to 500 miles per hour, and the second is an uplifting current of great strength. The dynamic strength of both these currents can cause vacuums that can overpressure structures from the inside.

Although tornadoes have been documented in all 50 states, most of them occur in the central United States. The unique geography of the central United States allows for the development of thunderstorms that spawn tornadoes. The jet stream, which is a high-velocity stream of air, determines which area of the central United States will be prone to tornado development. The jet stream normally separates the cold air of the north from the warm air of the south. During the winter, the jet stream flows west to east from Texas to the Carolina coast. As the sun “moves” north, so does the jet stream, which at summer solstice flows from Canada across Lake Superior to Maine. During its move northward in the spring and its recession south during the fall, the jet stream crosses Missouri, causing the large thunderstorms that breed tornadoes.

Tornadoes spawn from the largest thunderstorms. The associated cumulonimbus clouds can reach heights of up to 55,000 feet above ground level and are commonly formed when Gulf air is warmed by solar heating. The moist, warm air is overridden by the dry cool air provided by the jet stream. This cold air presses down on the warm air, preventing it from rising, but only temporarily. Soon, the warm air forces its way through the cool air and the cool air moves downward past the rising warm air. This air movement, along with the deflection of the earth’s surface, can cause the air masses to start rotating. This rotational movement around the location of the breakthrough forms a vortex, or funnel. If the newly created funnel stays in the sky, it is referred to as a funnel cloud. However, if it touches the ground, the funnel officially becomes a tornado.

A typical tornado can be described as a funnel-shaped cloud that is “anchored” to a cloud, usually a cumulonimbus that is also in contact with the earth’s surface. This contact on average lasts 30 minutes and covers an average distance of 15 miles. The width of the tornado (and its path of

destruction) is usually about 300 yards. However, tornadoes can stay on the ground for upward of 300 miles and can be up to a mile wide. The National Weather Service, in reviewing tornadoes occurring in Missouri between 1950 and 1996, calculated the mean path length at 2.27 miles and the mean path area at 0.14 square miles.

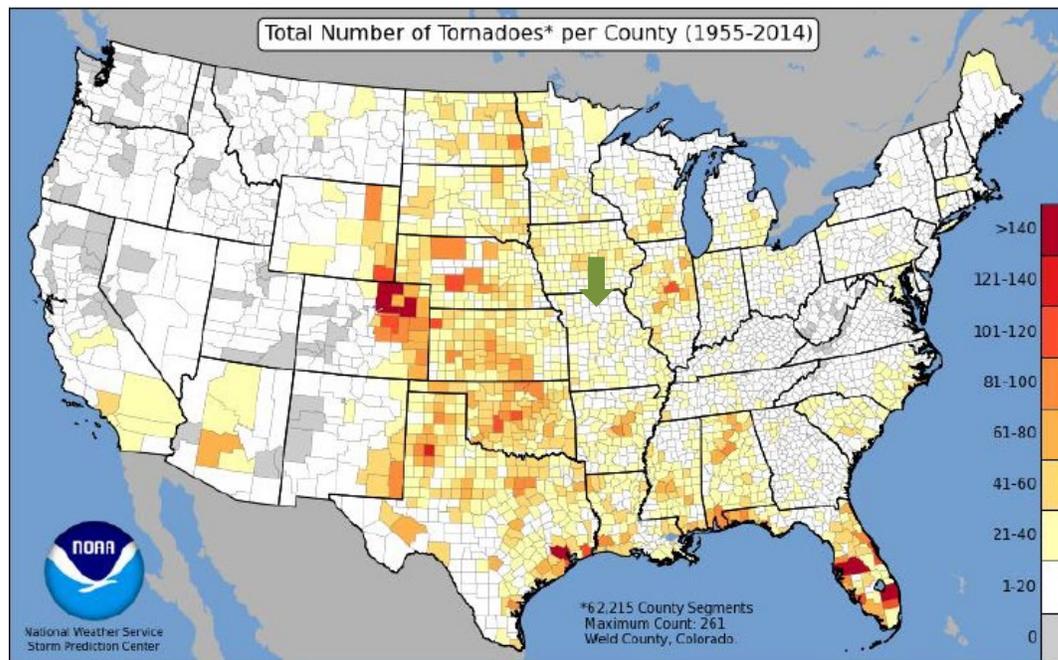
The average forward speed of a tornado is 30 miles per hour but may vary from nearly stationary to 70 miles per hour. The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Tornadoes are most likely to occur in the afternoon and evening but have been known to occur at all hours of the day and night.

Geographic Location

Linn County, nestled in the heart of Tornado Alley, is susceptible to the effects of tornadoes. While no specific region within the county is inherently more or less prone to these events, the data presented in the tables and figures below illustrate areas that have historically experienced tornado impacts.

The following map was obtained from the 2023 Missouri State Hazard Mitigation Plan and shows the total number of tornadoes per county. Linn County (indicated with an arrow) shows the total number of tornadoes within the planning area as between 1-20.

Figure 3.35. Tornado Activity in the United States 1955-2014



Source: NOAA Tornado Activity in the United States

Strength/Magnitude/Extent

Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour, and damage paths can be more than one mile wide and 50 miles long. Tornadoes have been known to lift and move objects weighing

more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes also can generate a tremendous amount of flying debris or “missiles,” which often become airborne shrapnel that causes additional damage. If wind speeds are high enough, missiles can be thrown at a building with enough force to penetrate windows, roofs, and walls. However, the less spectacular damage is much more common.

Tornado magnitude is classified according to the EF- Scale (or the Enhance Fujita Scale, based on the original Fujita Scale developed by Dr. Theodore Fujita, a renowned severe storm researcher). The EF- Scale (see table below) attempts to rank tornadoes according to wind speed based on the damage caused. This update to the original F Scale was implemented in the U.S. on February 1, 2007.

Table 3.69. 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 wind speeds for the EF scale and damage descriptions are based on information on the NOAA Storm Prediction Center as listed in the table below. The damage descriptions are summaries. For the actual EF scale it is necessary to look up the damage indicator (type of structure damaged) and refer to the degrees of damage associated with that indicator. Information on the Enhanced Fujita Scale’s damage indicators and degrees of damage is located online at www.spc.noaa.gov/efscale/ef-scale.html.

Table 3.70. 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 broken.
EF2	111-135	10.7%	Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes complete destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some
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 swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur.
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Source: NOAA Storm Prediction Center, <http://www.spc.noaa.gov/efscale/ef-scale.html>

Enhanced weather forecasting has provided the ability to predict severe weather likely to produce tornadoes days in advance. Tornado watches can be delivered to those in the path of these storms several hours in advance. Lead time for actual tornado warnings is about 30 minutes. Tornadoes have been known to change paths very rapidly, thus limiting the time in which to take shelter. Tornadoes may not be visible on the ground if they occur after sundown or due to blowing dust or driving rain and hail.

Previous Occurrences

There are limitations to the use of NCEI tornado data that must be noted. For example, one tornado may contain multiple segments as it moves geographically. A tornado that crosses a county line or state line is considered a separate segment for the purposes of reporting to the NCEI. Also, a tornado that lifts off the ground for less than 5 minutes or 2.5 miles is considered a separate segment. If the tornado lifts off the ground for greater than 5 minutes or 2.5 miles, it is considered a separate tornado. Tornadoes reported in Storm Data and the Storm Events Database are in segments.

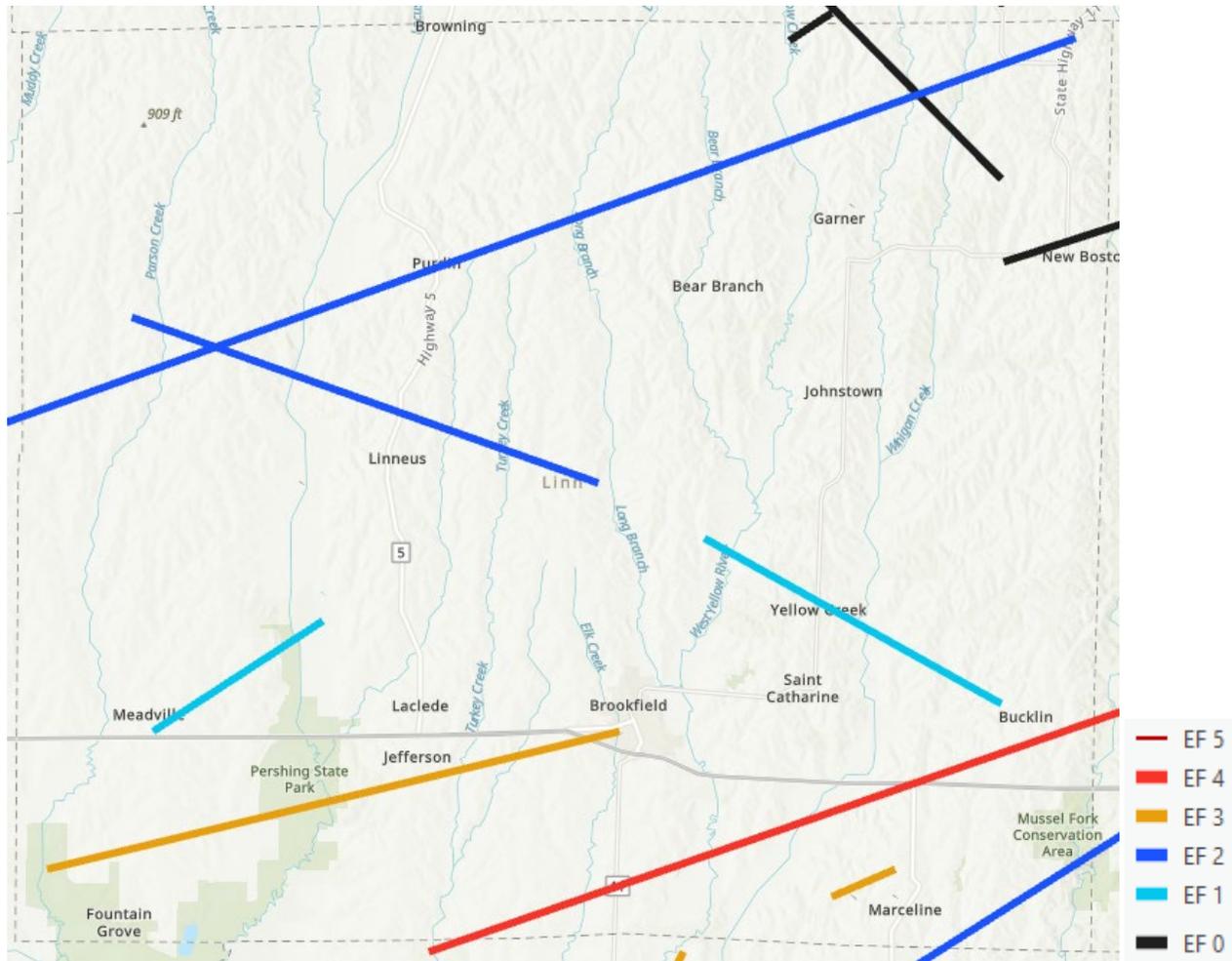
Table 3.71. Recorded Tornadoes in Linn County 1993 – Present

Date	Begin Location	EF Scale	Deaths	Injuries	Property Damage	Crop Damage
5/26/1955	Not Listed	F1	0	0	2500	0
5/26/1955	Not Listed	F0	0	0	0	0
5/19/1960	Not Listed	F1	0	0	2500	0
4/21/1967	Not Listed	F4	0	2	250000	0
5/5/1971	Not Listed	F3	0	12	2500000	0
4/23/1975	Not Listed	F3	0	0	250000	0
4/23/1975	Not Listed	F3	0	2	250000	0
5/16/1982	Not Listed	F1	0	0	30	0
5/24/1989	Not Listed	F0	0	0	0	0
7/4/1995	Linneus	F0	0	0	8000	0
5/10/2003	Linneus	F0	0	0	0	0
5/24/2004	Meadville	F1	0	0	200000	0
7/21/2008	North Salem	EF0	0	0	0	0
6/14/2011	New Boston	EF0	0	0	0	0
10/24/2021	Hecla	EF2	0	0	250000	0
5/6/2023	Hecla	EF2	0	0	0	0
5/6/2023	St. Catharine	EF1	0	0	0	0
8/11/2023	North Salem	EF0	0	0	0	0
4/27/2024	Brookfield Airport	EFU	0	0	0	0
Total			0	16	\$3,713,030	\$0

Source: National Centers for Environmental Information, <http://www.NCEI.noaa.gov/stormevents/>

Note: "Yes" indicates NCEI data included damage in the narrative but listed no damage figures

Figure 3.36. Linn County Map of Historic Tornado Events



Tornadopath.com/Missouri/linn

There were 19 events listed as a tornado in the NCEI storm database for Linn County. The events listed as wind events were included in the plan under severe storms. The narratives obtained from the NCEI Storm Database are listed below.

Table 3.72. Event Narratives for Linn County Tornado Events (1995-2025)

Date	Event Narrative
7/4/1995	The Missouri Highway Patrol reported a tornado on the ground north of Linneus. The landmark Little Red School House in Linn County was leveled.
5/10/2003	Brief tornado touchdown in open country.
5/24/2004	Brief tornado touchdown noted near Meadville.
7/21/2008	An EFO tornado entered Linn County from Sullivan County at 19:30CST, near the town of New Salem. The tornado dissipated at 19:40CST 2.5 miles northwest of New Boston. Only tree damage in rural areas were observed.
6/14/2011	At 21:53CST an EF0 tornado touched down 1 mile west of New Boston. The tornado tracked east-northeast for 2 miles, before exiting Linn County 1 mile east-northeast of New Boston at 21:55CST. Only tree damage was observed.
10/24/2021	This is a continuation of the tornado that came out of Livingston County. The tornado continued across the entirety of Linn County. For the most part the tornado

	impacted mainly rural areas of the county, but the tornado did brush by the south side of Purdin, Missouri, causing EF-2 damage to residences near Highway 5. The tornado was well reported by chasers as it approached the northeast corner of Linn County. The tornado was reported dissipated as the storm crossed into Macon and Adair Counties. This was corroborated on the survey with the last damage point in the far northeast corner of Linn County.
5/6/2023	After creating a brief tornado in the city of Trenton, the supercell went on to produce a more massive and long-lived tornado across central Linn County. No incorporated cities were directly impacted by the tornado, but several residences across the county were damaged. The most extensive residential damage occurred just north of Linneus as the storm crossed Highway 5. The tornado eventually dissipated east of Linneus before producing again as it approached Bucklin. One notable aspect of this event was the extreme rear flank downdraft, which produced some more extensive damage. This damage was determined to be straight line winds due to being 1-2 miles away from the main tornado circulation.
5/6/2023	After the large tornado across central Linn County there was a brief interruption in the damage path. The next tornado formed a few miles southeast of where the larger tornado circulation became discontinuous. This tornado did some minor damage to residences and outbuildings between Linneus and Bucklin. Some of the more extensive damage occurred from rear-flank downdraft winds 1-2 miles south of the main tornado circulation.
8/11/2023	A brief EF-0 tornado began just south of Highway O in far northern Linn County just south of the Linn and Sullivan County line. The tornado initially damaged some trees and small outbuildings before moving to the east and damaging the roof, siding, and garage doors of a newly built barndominium type building on the north side of Highway O just west of the Highway O and Highway V intersection. The tornado traveled just over a mile and was on the ground for about 3 minutes. Thanks to the Linn County EM for their assistance on the survey.
4/27/2024	Trained spotter reported a very brief tornado west of Brookfield that coincided with an area of rotation on radar. No damage was found, so rated as a no track EF unknown tornado.

Source: NCEI Weather Database

Probability of Future Occurrence

Based on the following calculation, Linn County has a 25% chance of experiencing a tornado event, regardless of magnitude, in any given year.

$$Probability\ of\ Tornado\ Incident = \frac{8}{32} = 0.25$$

Changing Future Conditions Considerations

According to the Missouri State Hazard Mitigation Plan, scientists do not know how the frequency and severity of tornadoes will change. Research published in 2015 suggests that changes in heat and moisture content in the atmosphere, brought on by a warming world, could be playing a role in making tornado outbreaks more common and severe in the US. The research concluded that the number of days with large outbreaks has been increasing since the 1950's and that densely concentrated tornado outbreaks are on the rise. It is notable that the research shows that the area of tornado activity is not expanding, but rather the areas already subject to tornado activity are seeing more densely packed tornadoes. Because Chariton County experiences approximately one tornado every four years, and based on the research, the frequency of such events could increase in the future.

Vulnerability

Vulnerability Overview

The 2023 Missouri State Hazard Mitigation Plan provided the following vulnerability analysis of Chariton County to tornadoes. The method used to determine vulnerability to tornadoes across Missouri was statistical analysis of data from several sources: HAZUS building exposure value data, population density and mobile home data from the U.S. Census (2019), the calculated Social Vulnerability Index for Missouri Counties from the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina, and storm events data (1950 to December 31, 2021) from the National Centers for Environmental Information (NCEI). It is important to realize that one limitation to the NCEI data is that many tornadoes that might have occurred in uninhabited areas, as well as some in inhabited areas, may not have been reported.

The incompleteness of the data suggests that it is not appropriate for use in parametric modeling. In addition, NOAA data cannot show a realistic frequency distribution of different Fujita scale tornado events, except for recent years. Thus, a parametric model based on a combination of many physical aspects of the tornado to predict future expected losses was not used. The statistical model used for this analysis was probabilistic based purely on tornado frequency and historic losses. It is based on past experience and forecasts the expected results for the immediate or extended future.

From the statistical data collected, six factors were considered in determining overall vulnerability to tornadoes as follows: building exposure, population density, social vulnerability, percentage of mobile homes, likelihood of occurrence, and annual property loss. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. Once the ranges were determined and applied to all factors considered in the analysis, the ratings were combed to determine an overall vulnerability rating for tornadoes. These rating values correspond to the following descriptive terms:

- 1) Low
- 2) Medium-Low
- 3) Medium
- 4) Medium-High
- 5) High

Table 3.73. Likelihood of Occurrence, Annual Property Loss, and Overall Vulnerability Rating for Linn County by Tornadoes

Total Number of Tornadoes	14
Likelihood of Occurrence	0.194
Likelihood of Occurrence Rating	1
Total Annualized Property Loss	\$51,459
Total Annualized Property Loss Rating	1
Overall Vulnerability Rating	11
Overall Vulnerability Rating Description	Medium-Low

Source: 2023 Missouri State Hazard Mitigation Plan

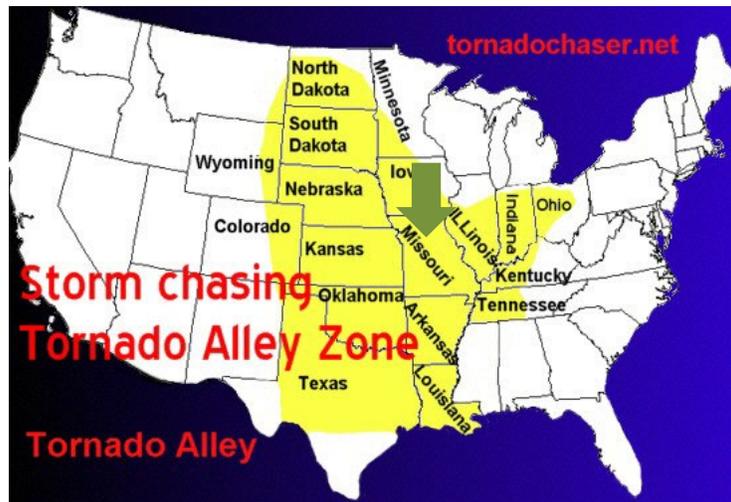
Table 3.74. Tornado Vulnerability Rating for Linn County

Vulnerability	Data for Linn County
Total Building Exposure	\$1,622,177,000
Exposure Rating	1
Population Density	19.36
Population Density Rating	1
SOVI Index Ranking	Medium High
SOVI Rating	4
Percent of Mobile Homes	6.1%
Mobile Home Rating	3%

Source: 2023 Missouri State Hazard Mitigation Plan

Linn County, Missouri, faces significant vulnerability to tornadoes due to its location within "Tornado Alley," a region where atmospheric conditions frequently align to produce severe storms. The county's largely rural character, with a dispersed population of around 11,900 people, means that direct impacts on homes and agricultural infrastructure can have a substantial effect on individual livelihoods and the local economy.

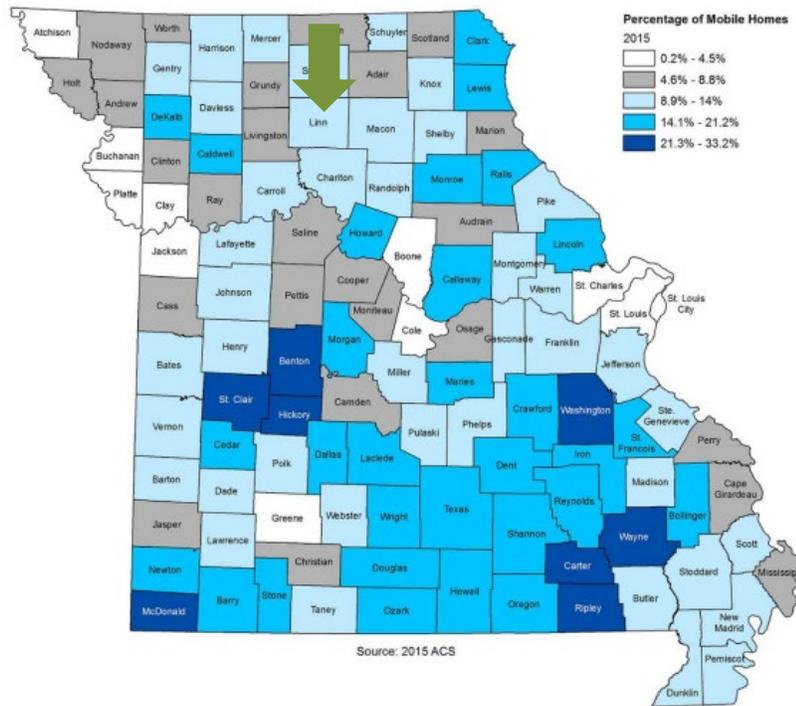
Figure 3.37. Tornado Alley in the U.S.



Source: <http://www.tornadochaser.net/tornalley.html>

Another factor to consider when determining vulnerability to Tornadoes is the number of mobile homes in a county. Mobile homes are especially vulnerable to this hazard, as they are not built to provide adequate shelter from tornadoes, rather citizens that dwell in mobile homes must typically seek shelter elsewhere.

Figure 3.38. Percent of Mobile Homes Per County in Missouri



Source: 2023 Missouri Hazard Mitigation Plan

Potential Losses to Existing Development

Over the past 32 years, historical tornado events in Linn County, Missouri, have resulted in at least \$458,000 in documented damage. This equates to an annualized figure of approximately \$14,312.50. It is important to note that data from the National Centers for Environmental Information (NCEI) often does not fully capture all damage costs, meaning the actual financial impact may be higher than these figures indicate.

Previous and Future Development

Vulnerability to tornadoes is anticipated to remain the same. Future development for public buildings such as schools, government offices, as well as buildings with high occupancy and campgrounds should consider including a tornado safe room to protect occupants in the event of a tornado.

Hazard Summary by Jurisdiction

While the physical hazards of a tornado remain consistent throughout the county, the scale of its impact—measured by potential casualties and property damage—varies significantly depending on the population density of the affected community.

A tornado event could occur anywhere in the planning area, but some jurisdictions would suffer heavier damages because of the age of the housing, the increased density of buildings and infrastructure, or the high concentration of mobile homes.

It is generally accepted that mobile homes are highly vulnerable to damage or devastation by tornadoes. The following table illustrates the number and percentage of mobile homes in each jurisdiction. Homes build prior to 1939 are also listed below. The older homes in the planning area

might be more vulnerable to risk.

Table 3.75. Mobile Homes and Homes Built Prior to 1939 in Linn County

Jurisdiction	Mobile Home	% Mobile Home	Homes Built Before 1939	% Homes Built Before 1939
Linn County	283	5.9%	804	16.7%
City of Brookfield	49	2.8%	334	19.0%
City of Browning	5	4.8%	31	29.8%
City of Bucklin	14	7.6%	42	22.8%
City of Laclede	21	21.0%	25	25.0%
City of Linneus	17	21.3%	21	26.3%
City of Marceline	18	2.2%	139	17.1%
City of Meadville	13	7.5%	34	19.5%
City of Purdin	0	0.0%	10	27.8%

Source: U.S. Census Bureau, Physical Housing Characteristics for Occupied Housing Units (S2501)

Problem Statement

Linn County has inadequate tornado shelters throughout the county, not everyone utilizes social media and/or texting, the rural areas do not have warning sirens, lack of awareness for available shelters and more education needs to occur. Possible solutions include promoting the use of NOAA weather radios and conducting public education and outreach activities to increase awareness of tornado risk.

3.4.9 Wildfire

Hazard Profile

Hazard Description

The fire incident types for wildfires include: 1) natural vegetation fire, 2) outside rubbish fire, 3) special outside fire, and 4) cultivated vegetation, crop fire.

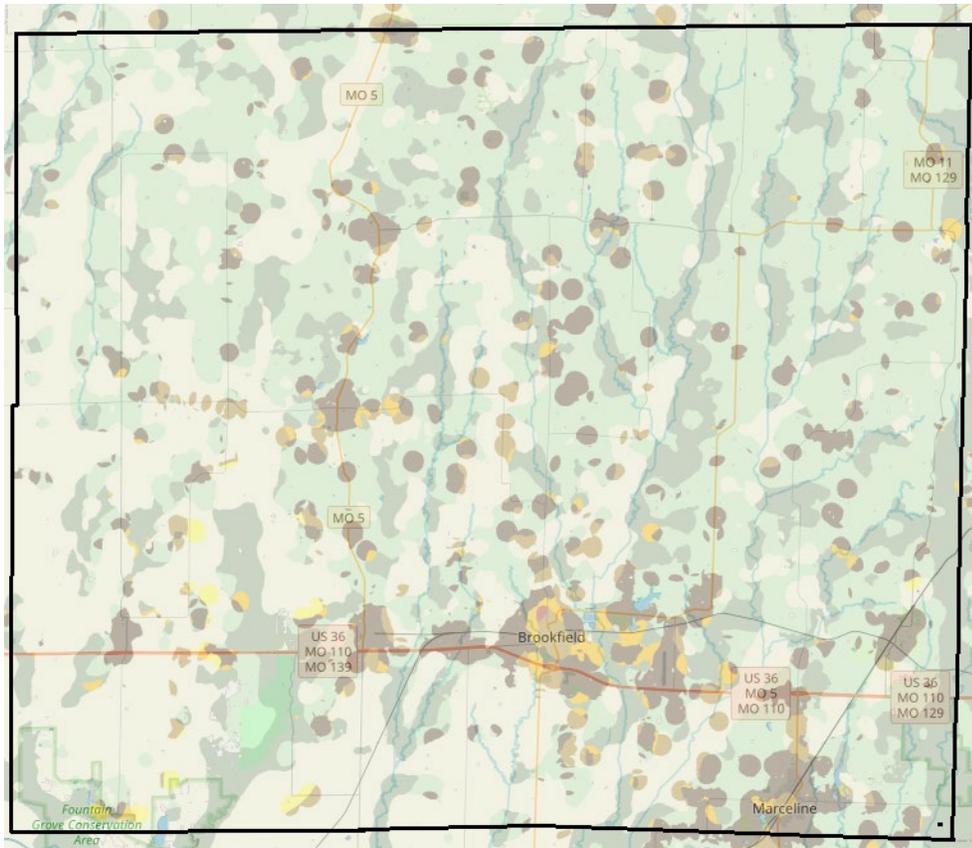
The Forestry Division of the Missouri Department of Conservation (MDC) is responsible for protecting privately owned and state-owned forests and grasslands from wildfires. To accomplish this task, eight forestry regions have been established in Missouri for fire suppression. The Forestry Division works closely with volunteer fire departments and federal partners to assist with fire suppression activities. Currently, more than 900 rural fire departments in Missouri have mutual aid agreements with the Forestry Division to obtain assistance in wildfire protection if needed.

Most of Missouri fires occur during the spring season between February and May. The length and severity of wildland fires depend largely on weather conditions. Spring in Missouri is usually characterized by low humidity and high winds. These conditions result in higher fire danger. In addition, due to the recent lack of moisture throughout many areas of the state, conditions are likely to increase the risk of wildfires. Drought conditions can also hamper firefighting efforts, as decreasing water supplies may not prove adequate for firefighting. It is common for rural residents burn their garden spots, brush piles, and other areas in the spring. Some landowners also believe it is necessary to burn their forests in the spring to promote grass growth, kill ticks, and reduce brush. Therefore, spring months are the most dangerous for wildfires. The second most critical period of the year is fall. Depending on the weather conditions, a sizeable number of fires may occur between mid-October and late November.

Geographic Location

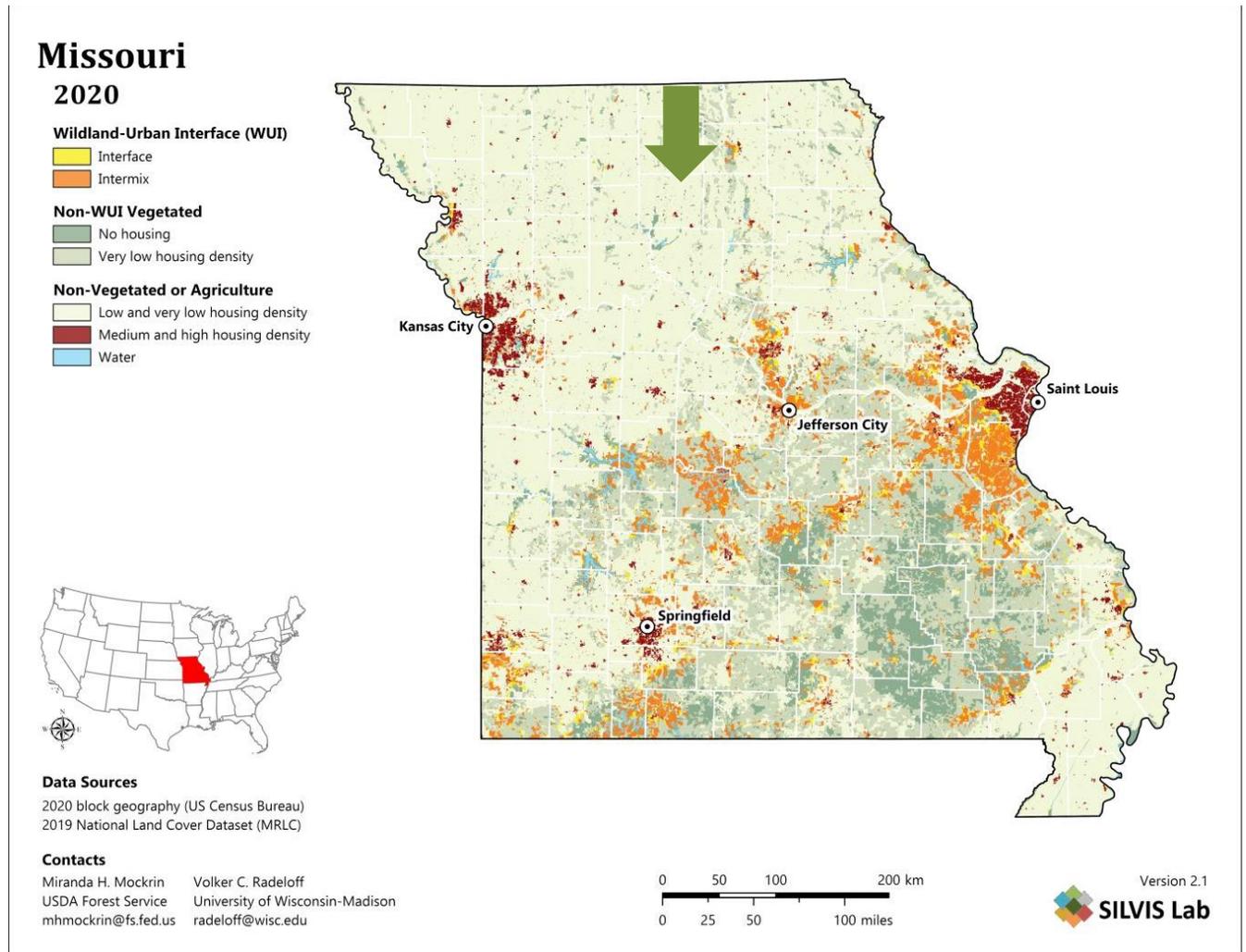
While all of Linn County is at risk for the possibility of wildfires, areas with a higher Wildland Urban interface (WUI) are more susceptible to losses from a wildfire situation.

Figure 3.39. University of Wisconsin Wildland Urban Map showing Linn County



Source: University of Wisconsin Global Wildland-Urban Interface (WUI) – 2020 accessed June 2025

Table 3.76. Wildfire Urban Interface (WUI) Areas, 2020



Source: 2023 Missouri state hazard mitigation plan

Strength/Magnitude/Extent

Wildfires damage the environment, killing some plants and occasionally animals. Firefighters have been injured or killed, and structures can be damaged or destroyed. The loss of plants can heighten the risk of soil erosion and landslides. Although Missouri wildfires are not the size and intensity of those in the Western United States, they could impact recreation and tourism in and near the fires.

Wildland fires in Missouri have been mostly a result of human activity rather than lightning or some other natural event. Wildfires in Missouri are usually surface fires, burning the dead leaves on the ground or dried grasses. They do sometimes “torch” or “crown” out in certain dense evergreen stands like eastern red cedar and shortleaf pine. However, Missouri does not have the extensive stands of evergreens found in the western US that fuel the large fire storms seen on television news stories.

While very unusual, crown fires can and do occur in Missouri native hardwood forests during prolonged periods of drought combined with extreme heat, low relative humidity, and high wind. Tornadoes, high winds, wet snow and ice storms in recent years have placed a large amount of

woody material on the forest floor that causes wildfires to burn hotter and longer. These conditions also make it more difficult for fire fighters suppress fires safely.

Often wildfires in Missouri go unnoticed by the general public because the sensational fire behavior that captures the attention of television viewers is rare in the state. Yet, from the standpoint of destroying homes and other property, Missouri wildfires can be quite destructive.

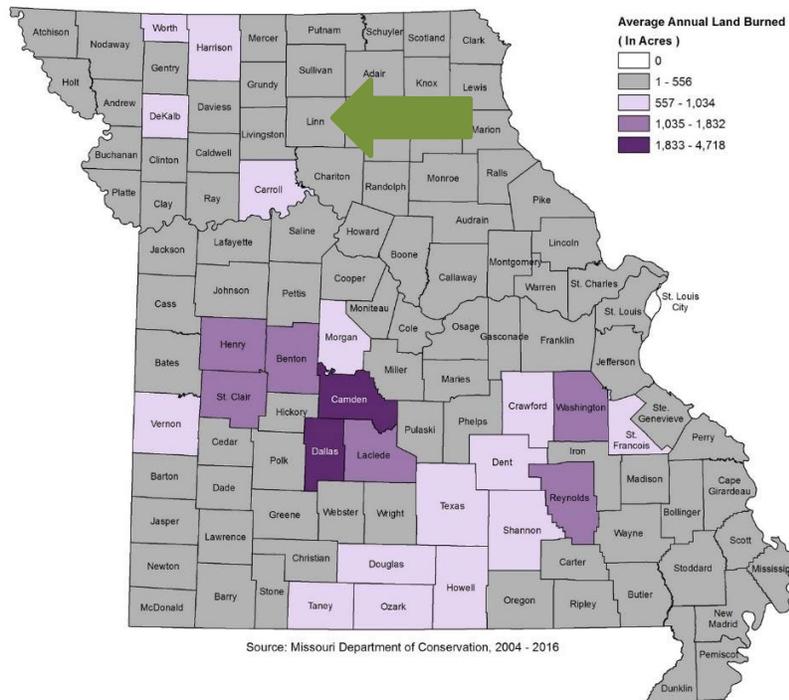
Previous Occurrences

Table 3.77. Counts of fires reported by year

Year	Number of Fires Reported	Acreage Burned
2015	22	352
2016	4	8
2017	16	246
2018	17	771.60
2019	2	424.92
2020	5	10.548
2021	3	99.345
2022	5	77.352
2023	6	144.568
2024	3	537.396
Total	83	2,671.729

Source: Missouri department of conservation wildfire reporting system

Figure 3.40. Average Annual Acreage Burned



Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.78. Causes of Fire by type and count

Cause	Number of fires
Unknown	27
Miscellaneous	27
Debris	11
Campfire	5
Equipment	3
Smoking	2
Arson	2
Not reported	2
Children	1
Railroad	1
Power line	1
Fireworks	1
Lightning	1

Source: Missouri department of conservation wildfire reporting system.

Probability of Future Occurrence

The probability of wildfire occurring in Chariton County is calculated as follows:

$$\text{Probability of Wildland Fire Incident} = \frac{83}{10} = 8.30 = 830\%$$

The planning area is likely to have approximately 8.3 wildfires per year, and based on previous calculations the average acres burned per fire would be approximately 32 acres.

Changing Future Conditions Considerations

Higher temperatures and changes in rainfall are unlikely to substantially reduce forest cover in Missouri, although the composition of trees in the forests may change. More droughts would reduce forest productivity, and changing future conditions are also likely to increase the damage from insects and diseases. But longer growing seasons and increased carbon dioxide concentrations could more than offset the losses from those factors. Forests cover about one-third of the state dominated by oak and hickory trees. As the climate changes, the abundance of pines in Missouri's forests is likely to increase, while the population of hickory trees is likely to decrease.

Higher temperatures will also reduce the number of days prescribed burning can be performed. Reduction of prescribed burning will allow for growth of understory vegetation – providing fuel for destructive wildfires. Drought is also anticipated to increase in frequency and intensity during summer months under projected future scenarios. Drought can lead to dead or dying vegetation and landscaping material close to structures which creates fodder for wildfires within both the urban and rural settings.

Vulnerability

Vulnerability Overview

Potential Losses to Existing Development

Table 3.79. Estimated numbers and Values of Structures and Population Vulnerable to Wildfire in Linn County

Type of Property	Number of Structures	Value of Structures	Population
Residential	37	\$7,074,641	87
Agriculture	65	\$124,233	0
Total	63	\$7,198,874.00	87

Source: 2023 Missouri state hazard mitigation plan

Table 3.80. Statistical Data for Wildfire Hazard in Linn County

Number of Wildfires 2015-2025	Likelihood of Occurrence (#/year)	Total Acres Burned	Average Annual Acreage Burned
83	8	2671.729	267

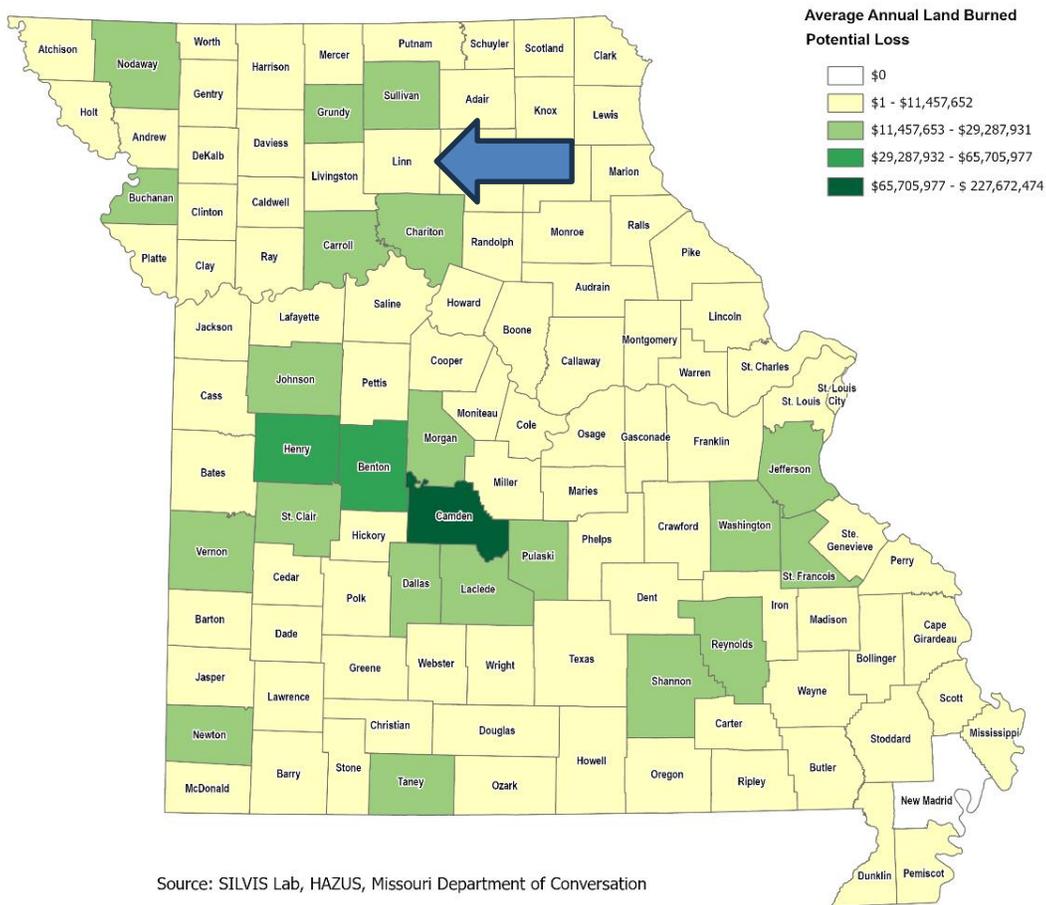
Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.81. Wildfire Potential Loss Estimates in Linn County

Total WUI Acreage	Total Structure Value Within WUI	Average Value/Acre within WUI	Average Annual Acreage Burned	Potential Loss
998	\$7,198,874	\$7,213	267	\$1,916,157

Source: 2023 Missouri State Hazard Mitigation Plan

Figure 3.41. Wildfire Potential Loss Estimate



Impact of Previous and Future Development

Future and previous development in the wildland-urban interface would increase vulnerability to the hazard. There are no known developments within the county that would increase the vulnerability to wildfire.

Hazard Summary by Jurisdiction

The rural jurisdictions in the planning area are all surrounded by undeveloped agricultural land and face the possibility of a wildfire event. The school districts are mostly located in a rural area and do not face danger of wildfire due to barriers in place around the schools. Future wildfires in Grundy County should have a negligible adverse impact on the community, as it would affect a small percentage of the population. Nonetheless, homes and businesses located in unincorporated areas are at higher risk from wildfires due to proximity to wood and distance from fire services. Variations in both structural/urban and wildfires are not able to be determined at this time due to lack of data. However, both fire types are expected to occur on an annual basis across the county.

Problem Statement

Residents do not comply with burn bans, education is not readily available for the levels of burn bans, many residents lack education in fire safety, and not all residents utilize social media and texting. Education should occur on the dangers of not complying with burn bans, more education for fire safety, and utilization of social media and texting for early warning.

Due to the region's high drought risk they may be more susceptible to fires. The plan could address this potential for high crop losses during drought and lessen the risk of wildfires during drought

4 MITIGATION STRATEGY

4	MITIGATION STRATEGY	4.1
4.1	<i>Goals.....</i>	4.1
4.2	<i>Identification and Analysis of Mitigation Actions.....</i>	4.1
4.3	<i>Implementation of Mitigation Actions</i>	4.9

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 (MPC) based on the [updated] risk assessment. The mitigation strategy was developed through a collaborative group process. The process included review of [updated] general goal statements to guide the jurisdictions in lessening disaster impacts as well as specific mitigation actions to directly reduce vulnerability to hazards and losses. The following definitions are taken from FEMA’s *Local Mitigation Planning Policy Guide (2023)*

- **Goals** are broad, long-term policy and vision statements that explain what is to be achieved by implementing the mitigation strategy.
- A **mitigation action** is a measure, project, plan or activity proposed to reduce current and future vulnerabilities described in the risk assessment.

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.

This planning effort is an update to Linn County’s existing hazard mitigation plan approved by FEMA in 2021. Therefore, the goals from the 2021 Linn County Hazard Mitigation Plan were reviewed to see if they were still valid, feasible, practical, and applicable to the defined hazard impacts. The MPC conducted a discussion session during their second meeting to review and update the plan goals. To ensure that the goals developed for this update were comprehensive and supported State goals, the 2023 State Hazard Mitigation Plan goals were reviewed. The MPC also reviewed the goals from current surrounding county plans.

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.

During the second MPC meeting, the results of the risk assessment update were provided to the MPC members for review and the key issues were identified for specific hazards. Changes in risk since adoption of the previously approved plan were discussed. Actions from the previous plan included completed actions, on-going actions, and actions upon which progress had not been made. The MPC discussed SEMA’s identified funding priorities and the types of mitigation actions generally recognized by FEMA.

The MPC included problem statements in the plan update at the end of each hazard profile. The problem statements summarize the risk to the planning area presented by each hazard and include possible methods to reduce that risk. Use of the problem statements allowed the MPC to recognize new and innovative strategies for mitigating risks in the planning area.

The focus of Meeting #3 was update of the mitigation strategy. For a comprehensive range of mitigation actions to be considered, the MPC reviewed the following information during Meeting #3:

- A list of actions proposed in the previous mitigation plan, the current 2023 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.

For Meeting #3, individual jurisdictions, including school and special districts, developed final mitigation strategy for submission to the MPC. They were encouraged to review 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 mitigation actions for reducing risk to natural hazards and disasters.

The MPC reviewed the actions from the previously approved plan for progress made since the plan had been adopted, using worksheets included in Appendix C of this plan. Prior to Meeting #3, the list of actions for each jurisdiction was emailed to that jurisdiction’s MPC representative along with the worksheets. Each jurisdiction was instructed to provide information regarding the “Action Status” with one of the following status choices:

- Completed, with a description of the progress;
- Ongoing, with a description of the progress made to date; or
- Not Yet Started, with a discussion of the reasons for lack of progress.

Additionally, the future inclusion of each mitigation action in the plan update was identified as either keep, delete, or modify. Based on the status updates, there were 38 completed actions, 56 continuing actions (either ongoing or modified), and 32 deleted actions.

Table 4.1 provides a summary of the action statuses for each participating jurisdiction:

Table 4.1. Action Status Summary

Jurisdiction	Completed Actions	Continuing Actions (ongoing or modify)	Deleted Actions
Linn County	3	14	8
Brookfield	4	7	4

Browning	4	7	4
Linneus	4	4	3
Marceline	4	6	4
Purdin	3	6	5
Brookfield R-III	4	3	1
Bucklin R-II	4	3	1
Marceline R-V	4	3	1
Meadville R-IV	4	3	1
Total	38	56	32

Table 4.2 provides a summary of the completed and deleted actions from the previous plan.

Table 4.2. Summary of Completed and Deleted Actions from the Previous Plan

Completed Actions	Completion Details (date, amount, funding source)
County 2020.15 Mutual aid agreements	Agreements are in place
County 2020.16 Public review of hazard mitigation plans	Completed as part of the planning process
County 2020.17 Plan reassessment	Completed as part of the planning process
CB - 2020.4 Accessible contact information	Information posted online
CB - 2020.15 Participation in nfip (national floodplain insurance program)	Completed with local funding on an annual basis.
CBR - 2020.4 Accessible contact information	Information posted online
CBR - 2020.7 Mutual aid agreements	Agreements are in place
CBR - 2020.8 Representative for county hazard mitigation steering committee	Completed as part of the planning process
CBR - 2020.15 Participation in nfip (national floodplain insurance program)	Completed annually using local funds
CLI - 2020.3 Accessible contact information	Information on file at city hall and published online
CLI - 2020.6 Mutual aid agreements	Agreements are in place
CLI - 2020.8 Representative for county hazard mitigation steering committee	Completed as part of the 2025 plan update process
CLI - 2020.14 Participation in nfip (national floodplain insurance program)	Completed annually using local funding
CM - 2020.4 Accessible contact information	Information on file at city hall and published online
CM - 2020.7 Mutual aid agreements	Agreements are in place
CM - 2020.9 Representative for county hazard mitigation steering committee	Completed as part of the 2025 plan update process
CM - 2020.15 Participation in nfip (national floodplain insurance program)	Completed annually using local funding
CP - 2020.4 Accessible contact information	Information posted online
CP - 2020.7 Mutual aid agreements	Agreements are in place
CP - 2020.9 Representative for county hazard mitigation steering committee	Completed as part of the planning process
BSD - 2020.1 Emergency action and disaster plan	Completed using district funds as required by state.

BSD - 2020.3 Mutual aid agreements	Agreements in place with other districts and agencies
BSD - 2020.5 Plan reassessment	Completed as part of the 2025 planning process
BSD - 2020.6 Representative for county hazard mitigation steering committee	Completed as part of the 2025 planning process
MSD - 2020.1 Emergency action and disaster plan	Completed using district funds as required by state.
MSD - 2020.3 Mutual aid agreements	Agreements in place with other districts and agencies
MSD - 2020.5 Plan reassessment	Completed as part of the 2025 planning process
MSD - 2020.6 Representative for county hazard mitigation steering committee	Completed as part of the 2025 planning process
MESD - 2020.1 Emergency action and disaster plan	Completed using district funds as required by state.
MESD - 2020.3 Mutual aid agreements	Agreements in place with other districts and agencies
MESD - 2020.5 Plan reassessment	Completed as part of the 2025 planning process
MESD - 2020.6 Representative for county hazard mitigation steering	Completed as part of the 2025 planning process
Deleted Actions	Reason for Deletion
County 2020.6 Public education event for early warning systems	Combined with other actions
County 2020.9 Hazard audits of vulnerable structures by government experts	Not politically popular
County 2020.11 Weather spotter training	Not a mitigation action, Not a county function.
County 2020.13 Construction upgrades to protect infrastructure	Combined with other actions
County 2020.21 Pandemic personal protective equipment (ppe)	Hazard no longer covered in the plan
County 2020.22 Pandemic response / disease prevention and management	Hazard no longer covered in the plan
County 2020.23 Economic stabilization during pandemic	Hazard no longer covered in the plan
County 2020.25 Survey flood plain areas	Does not participate in the NFIP, not a politically popular action
County 2020.26 Hazard education for those involved in land development	Action covered by previous actions
Construction upgrades to protect infrastructure	Action covered by previous actions
CB - 2020.11 Pandemic response / disease prevention and management	Hazard no longer covered in the plan
CB - 2020.12 Economic stabilization during pandemic	Hazard no longer covered in the plan
CB - 2020.13 Pandemic personal protective equipment (ppe)	Hazard no longer covered in the plan
CBR - 2020.11 Pandemic response / disease prevention and management	Hazard no longer covered in the plan
CBR - 2020.10 Weather spotter training	Not a city function, not a mitigation action
CBR - 2020.12 Economic stabilization during pandemic	Hazard no longer covered in the plan
CBR - 2020.13 Pandemic personal protective equipment (ppe)	Hazard no longer covered in the plan
CBU - 2020.1 Mitigation education	Jurisdiction did not participate
CBU - 2020.2	Jurisdiction did not participate

Weather alerts	
CBU - 2020.3 Accessible contact information	Jurisdiction did not participate
CBU - 2020.4 Critical facilities back-up	Jurisdiction did not participate
CBU - 2020.5 Debris removal	Jurisdiction did not participate
CBU - 2021.6 Mutual aid agreements	Jurisdiction did not participate
CBU - 2020.7 Pandemic personal protective equipment (ppe)	Jurisdiction did not participate
CBU - 2020.8 Representative for county hazard mitigation steering committee	Jurisdiction did not participate
CBU - 2020.9 Storm shelters	Jurisdiction did not participate
CBU - 2020.10 Weather spotter training	Jurisdiction did not participate
CBU - 2020.11 Vulnerable population identification	Jurisdiction did not participate
CBU - 2020.12 Economic stabilization during pandemic	Jurisdiction did not participate
CBU - 2020.13 Pandemic response / disease prevention and management	Jurisdiction did not participate
CL - 2020.1 Mitigation education	Jurisdiction did not participate
CL - 2020.2 Weather alerts	Jurisdiction did not participate
CL - 2020.3 Accessible contact information	Jurisdiction did not participate
CL - 2020.4 Critical facilities back-up	Jurisdiction did not participate
CL - 2020.5 Debris removal	Jurisdiction did not participate
CL - 2020.6 Mutual aid agreements	Jurisdiction did not participate
CL - 2020.7 Vulnerable population identification	Jurisdiction did not participate
CL - 2020.8 Representative for county hazard mitigation steering committee	Jurisdiction did not participate
CL - 2020.9 Storm shelters	Jurisdiction did not participate
CL - 2020.10 Weather spotter training	Jurisdiction did not participate
CL - 2020.11 Pandemic personal protective equipment (ppe)	Jurisdiction did not participate
CL - 2020.12 Economic stabilization during pandemic	Jurisdiction did not participate
CL - 2020.13 Pandemic response / disease prevention and management	Jurisdiction did not participate
CLI - 2020.7 Pandemic personal protective equipment (ppe)	Hazard no longer covered in the plan
CLI - 2020.10 Weather spotter training	Not a city function, defer to fire department
CLI - 2020.11 Pandemic response / disease prevention and management	Hazard no longer covered in the plan
CLI - 2020.12 Economic stabilization during pandemic	Hazard no longer covered in the plan
CM - 2020.8 Pandemic personal protective equipment (ppe)	Hazard no longer covered in the plan

CM - 2020.11 Pandemic response / disease prevention and management	Hazard no longer covered in the plan
CM - 2020.12 Economic stabilization during pandemic	Hazard no longer covered in the plan
CM - 2020.14 Weather spotter training	Not a mitigation action
CME - 2020.1 Hazard education for those involved in land development	Jurisdiction did not participate
CME - 2020.2 Mitigation education	Jurisdiction did not participate
CME - 2020.3 Weather alerts	Jurisdiction did not participate
CME - 2020.4 Accessible contact information	Jurisdiction did not participate
CME - 2020.5 Critical facilities back-up	Jurisdiction did not participate
CME - 2020.6 Debris removal	Jurisdiction did not participate
CME - 2020.7 Mutual aid agreements	Jurisdiction did not participate
CME - 2020.8 Weather spotter training	Jurisdiction did not participate
CME - 2020.8 Weather spotter training	Jurisdiction did not participate
CME - 2020.9 Representative for county hazard mitigation steering committee	Jurisdiction did not participate
CME - 2020.10 Storm shelters	Jurisdiction did not participate
CME - 2020.11 Pandemic personal protective equipment (ppe)	Jurisdiction did not participate
CME - 2020.12 Pandemic response / disease prevention and management	Jurisdiction did not participate
CME - 2020.13 Economic stabilization during pandemic	Jurisdiction did not participate
CP - 2020.8 Weather spotter training	Not a city function
CP - 2020.11 Pandemic personal protective equipment (ppe)	Hazard no longer covered in the plan
CP - 2020.12 Pandemic response / disease prevention and management	Hazard no longer covered in the plan
CP - 2020.13 Economic stabilization during pandemic	Hazard no longer covered in the plan
CP - 2020.14 Vulnerable population identification	No capacity to perform
BSD - 2020.4 Pandemic personal protective equipment (ppe)	Hazard no longer covered by plan.
BUSD - 2020.4 Pandemic personal protective equipment (ppe)	Hazard no longer covered by plan.
MSD - 2020.4 Pandemic personal protective equipment (ppe)	Hazard no longer covered by plan.
MESD - 2020.4 Pandemic personal protective equipment (ppe)	Hazard no longer covered by plan.

Source: Previously approved County Hazard Mitigation Plan; Data Collection Questionnaires.

Table 4.3. Summary of actions from 2021 plan

Status	Action from Previous Plan	
Continued	County 2020.1	County - wide inventory of emergency shelters and safe rooms
Continued	County 2020.2	Safety audit and self-inspection training for critical facilities
Continued	County 2020.3	Mitigation education
Continued	County 2020.4	Snow removal
Continued/Modified	County 2020.5	Weather alerts
Deleted	County 2020.6	Public education event for early warning systems
Continued	County 2020.7	County-wide disaster drills and exercises
Continued	County 2020.8	Structure grants for road and bridge upgrades
Deleted	County 2020.9	Hazard audits of vulnerable structures by government experts
Continued	County 2020.10	Flood risk reduction projects
Deleted	County 2020.11	Weather spotter training
Continued	County 2020.12	Critical facilities back-up
Deleted	County 2020.13	Construction upgrades to protect infrastructure
Continued	County 2020.14	Debris removal
Completed	County 2020.15	Mutual aid agreements
Completed	County 2020.16	Public review of hazard mitigation plans
Completed	County 2020.17	Plan reassessment
Continued	County 2020.18	Storm shelters
Continued	County 2020.19	Installation of warning siren
Continued	County 2020.20	Tree trimming maintenance
Deleted	County 2020.21	Pandemic personal protective equipment (ppe)
Deleted	County 2020.22	Pandemic response / disease prevention and management
Deleted	County 2020.23	Economic stabilization during pandemic
Continued	County 2020.24	Creation of a county-level municipality steering committee
Deleted	County 2020.25	Survey flood plain areas
Deleted	County 2020.26	Hazard education for those involved in land development
Continued	CB - 2020.1	Hazard education for those involved in land development
Continued	CB - 2020.2	Mitigation education
Continued	CB - 2020.3	Weather alerts
Completed	CB - 2020.4	Accessible contact information
Continued	CB - 2020.5	Critical facilities back-up
Continued	CB - 2020.6	Debris removal
Completed	CB - 2020.7	Mutual aid agreements
Completed	CB - 2020.8	Representative for county hazard mitigation steering committee
Continued	CB - 2020.9	Storm shelters
Continued	CB - 2020.10	Weather spotter training
Deleted	CB - 2020.11	Pandemic response / disease prevention and management
Deleted	CB - 2020.12	Economic stabilization during pandemic
Deleted	CB - 2020.13	Pandemic personal protective equipment (ppe)
Completed	CB - 2020.15	Participation in nfip (national floodplain insurance program)
Continued	CBR - 2020.1	Hazard education for those involved in land development
Continued	CBR - 2020.2	Mitigation education
Continued	CBR - 2020.3	Weather alerts
Completed	CBR - 2020.4	Accessible contact information
Continued	CBR - 2020.5	Critical facilities back-up
Continued	CBR - 2020.6	Debris removal
Completed	CBR - 2020.7	Mutual aid agreements
Completed	CBR - 2020.8	Representative for county hazard mitigation steering committee
Continued	CBR - 2020.9	Storm shelters
Deleted	CBR - 2020.10	Weather spotter training
Deleted	CBR - 2020.11	Pandemic response / disease prevention and management
Deleted	CBR - 2020.12	Economic stabilization during pandemic
Deleted	CBR - 2020.13	Pandemic personal protective equipment (ppe)

Completed	CBR - 2020.15	Participation in nfip (national floodplain insurance program)
Deleted	CBU - 2020.1	Mitigation education
Deleted	CBU - 2020.2	Weather alerts
Deleted	CBU - 2020.3	Accessible contact information
Deleted	CBU - 2020.4	Critical facilities back-up
Deleted	CBU - 2020.5	Debris removal
Deleted	CBU - 2021.6	Mutual aid agreements
Deleted	CBU - 2020.7	Pandemic personal protective equipment (ppe)
Deleted	CBU - 2020.8	Representative for county hazard mitigation steering committee
Deleted	CBU - 2020.9	Storm shelters
Deleted	CBU - 2020.10	Weather spotter training
Deleted	CBU - 2020.11	Vulnerable population identification
Deleted	CBU - 2020.12	Economic stabilization during pandemic
Deleted	CBU - 2020.13	Pandemic response / disease prevention and management
Deleted	CL - 2020.1	Mitigation education
Deleted	CL - 2020.2	Weather alerts
Deleted	CL - 2020.3	Accessible contact information
Deleted	CL - 2020.4	Critical facilities back-up
Deleted	CL - 2020.5	Debris removal
Deleted	CL - 2020.6	Mutual aid agreements
Deleted	CL - 2020.7	Vulnerable population identification
Deleted	CL - 2020.8	Representative for county hazard mitigation steering committee
Deleted	CL - 2020.9	Storm shelters
Deleted	CL - 2020.10	Weather spotter training
Deleted	CL - 2020.11	Pandemic personal protective equipment (ppe)
Deleted	CL - 2020.12	Economic stabilization during pandemic
Deleted	CL - 2020.13	Pandemic response / disease prevention and management
Continued	CLI - 2020.1	Mitigation education
Continued	CLI - 2020.2	Weather alerts
Completed	CLI - 2020.3	Accessible contact information
Continued	CLI - 2020.4	Critical facilities back-up
Continued	CLI - 2020.5	Debris removal
Completed	CLI - 2020.6	Mutual aid agreements
Deleted	CLI - 2020.7	Pandemic personal protective equipment (ppe)
Completed	CLI - 2020.8	Representative for county hazard mitigation steering committee
Continued	CLI - 2020.9	Storm shelters
Deleted	CLI - 2020.10	Weather spotter training
Deleted	CLI - 2020.11	Pandemic response / disease prevention and management
Deleted	CLI - 2020.12	Economic stabilization during pandemic
Continued	CLI - 2020.13	Vulnerable population identification
Completed	CLI - 2020.14	Participation in nfip (national floodplain insurance program)
Continued	CM - 2020.1	Hazard education for those involved in land development
Continued	CM - 2021.2	Mitigation education
Continued	CM - 2020.3	Weather alerts
Completed	CM - 2020.4	Accessible contact information
Continued	CM - 2020.5	Critical facilities back-up
Continued	CM - 2020.6	Debris removal
Completed	CM - 2020.7	Mutual aid agreements
Deleted	CM - 2020.8	Pandemic personal protective equipment (ppe)
Completed	CM - 2020.9	Representative for county hazard mitigation steering committee
Continued	CM - 2020.10	Storm shelters
Deleted	CM - 2020.11	Pandemic response / disease prevention and management
Deleted	CM - 2020.12	Economic stabilization during pandemic
Deleted	CM - 2020.14	Weather spotter training
Completed	CM - 2020.15	Participation in nfip (national floodplain insurance program)
Deleted	CME - 2020.1	Hazard education for those involved in land development

Deleted	CME - 2020.2	Mitigation education
Deleted	CME - 2020.3	Weather alerts
Deleted	CME - 2020.4	Accessible contact information
Deleted	CME - 2020.5	Critical facilities back-up
Deleted	CME - 2020.6	Debris removal
Deleted	CME - 2020.7	Mutual aid agreements
Deleted	CME - 2020.8	Weather spotter training
Deleted	CME - 2020.9	Representative for county hazard mitigation steering committee
Deleted	CME - 2020.10	Storm shelters
Deleted	CME - 2020.11	Pandemic personal protective equipment (ppe)
Deleted	CME - 2020.12	Pandemic response / disease prevention and management
Deleted	CME - 2020.13	Economic stabilization during pandemic
Completed	BSD - 2020.1	Emergency action and disaster plan
Continued	CP - 2020.1	Hazard education for those involved in land development
Continued	CP - 2020.2	Mitigation education
Continued	CP - 2020.3	Weather alerts
Completed	CP - 2020.4	Accessible contact information
Continued	CP - 2020.5	Critical facilities back-up
Continued	CP - 2020.6	Debris removal
Completed	CP - 2020.7	Mutual aid agreements
Deleted	CP - 2020.8	Weather spotter training
Completed	CP - 2020.9	Representative for county hazard mitigation steering committee
Continued	CP - 2020.10	Storm shelters
Deleted	CP - 2020.11	Pandemic personal protective equipment (ppe)
Deleted	CP - 2020.12	Pandemic response / disease prevention and management
Deleted	CP - 2020.13	Economic stabilization during pandemic
Deleted	CP - 2020.14	Vulnerable population identification
Continued	BSD - 2020.2	Mitigation education
Completed	BSD - 2020.3	Mutual aid agreements
Deleted	BSD - 2020.4	Pandemic personal protective equipment (ppe)
Completed	BSD - 2020.5	Plan reassessment
Completed	BSD - 2020.6	Representative for county hazard mitigation steering committee
Continued	BSD - 2020.7	Storm shelter / safe room
Continued	BSD - 2020.8	Generator
Completed	MSD - 2020.1	Emergency action and disaster plan
Continued	MSD - 2020.2	Mitigation education
Completed	MSD - 2020.3	Mutual aid agreements
Deleted	MSD - 2020.4	Pandemic personal protective equipment (ppe)
Completed	MSD - 2020.5	Plan reassessment
Completed	MSD - 2020.6	Representative for county hazard mitigation steering committee
Continued	MSD - 2020.7	Storm shelter / safe room
Continued	MSD - 2020.8	Generator
Completed	MSD - 2020.1	Emergency action and disaster plan
Continued	MESD - 2020.2	Mitigation education
Completed	MESD - 2020.3	Mutual aid agreements
Deleted	MESD - 2020.4	Pandemic personal protective equipment (ppe)
Completed	MESD - 2020.5	Plan reassessment
Completed	MESD - 2020.6	Representative for county hazard mitigation steering committee
Continued	MESD - 2020.7	Storm shelter / safe room
Continued	MESD - 2020.8	Generator

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 others in their community to finalize the actions to be submitted for the updated mitigation strategy. Throughout the MPC consideration and discussion, emphasis was placed on the importance of a benefit-cost analysis in determining project priority. The Disaster Mitigation Act requires benefit-cost review as the primary method by which mitigation projects should be prioritized. The MPC decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the 2023 Missouri State Hazard Mitigation Plan. The benefit/cost review at the planning stage primarily consisted of a qualitative analysis and was not the detailed process required grant funding application. For each action, the plan sets forth a narrative describing the types of benefits that could be realized from action implementation. The cost was estimated as closely as possible, with further refinement to be supplied as project development occurs.

FEMA's STAPLEE methodology was used to assess the costs and benefits, overall feasibility of mitigation actions, and other issues impacting project^{7(a)}. 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. Scores were based on the responses to the questions as follows:

Definitely YES = 3 points

Maybe YES = 2 points

Probably NO = 1 points

Definitely NO = 0 points

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?

The final scores are listed below in the analysis of each action. The worksheets are attached to this plan as Appendix C. The STAPLEE final score for each action, absent other considerations, such as a localized need for a project, determined the priority. Low priority action items were those that had a total score of between 0 and 24. Moderate priority actions were those scoring between 25 and 29. High priority actions scored 30 or above. A blank STAPLEE worksheet is shown in Figure 4.1

Figure 4.1. 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		Score
Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0		
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)		
<input type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)

Completed by
(Name, Title, Phone Number) _____

ACTION WORKSHEET

Action Worksheet	
Name of Jurisdiction:	
Risk / Vulnerability	
Hazard(s) Addressed:	List the hazard or hazards that will be addressed by this action
Problem being Mitigated:	Provide a brief description of the problem that the action will address. Utilize the problem statement developed in the risk assessment.
Action or Project	
Applicable Goal Statement:	Choose the goal statement that applies to this action
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
Action or Project Description:	Describe the action or project.
Estimated Cost:	Provide an estimate of the cost to implement this action. This can be accomplished with a range of estimated costs.
Benefits:	Provide a narrative describing the losses that will be avoided by implementing this action. If dollar amounts of avoided losses are known, include them as well.
Plan for Implementation	
Responsible Organization/Department:	Which organization will be responsible for tracking this action? Be specific to include the specific department or position within a department.
Supporting Organization/Department:	Which organization/department will assist in implementation of this action?
Action/Project Priority:	Include the STAPLEE score and Priority (H, M, L)
Timeline for Completion:	How many months/years to complete.
Potential Fund Sources:	List specific funding sources that may be used to pay for the implementation of the action.
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	Indicate status as New, Continuing Not Started, or Continuing in Progress)
Report of Progress:	For Continuing actions only, indicate the report on progress. If the action is not started, indicate any barriers encountered to initiate the action. If the action is in progress, indicate the activity that has occurred to date.

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of readily available, organized and useful information on available shelters and safe rooms.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	County 2025.1
Name of Action or Project:	County-wide inventory of emergency shelters and safe rooms
Mitigation Category:	Planning and regulation, Education and outreach
Action or Project Description:	<ol style="list-style-type: none"> 1. Appoint a shelter coordinator 2. Work with representatives from each community to develop a list of shelters and safe rooms, which can include: <ul style="list-style-type: none"> • Shelter/Safe Room location • Contact Information • Facility Information • Capacity • Amenities, such as showers, bathrooms, segregated spaces, stored supplies • Whether site has generator or capacity to interface with a portable generator
Estimated Cost:	\$0
Benefits:	This could establish an inventory from which the County can work to identify its comprehensive needs for shelter throughout its jurisdictions.
Plan for Implementation	
Responsible Organization/Department:	County Emergency Management,
Supporting Organization/Department:	City governments and school districts
Action/Project Priority:	High
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	Emergency management
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On-going

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of education at critical facilities on preparation for hazard impacts and mitigation.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	County 2025.2
Name of Action or Project:	Safety audit and self-inspection and training for critical facilities
Mitigation Category:	Education and outreach
Action or Project Description:	<ol style="list-style-type: none"> 1. Emergency Management will arrange for training on <i>safety audits and hazard mitigation</i> for facilities using federal and state training resources and grant funding. 2. Emergency Management will provide opportunities for training to administrators and employees of critical facilities <i>to develop self-inspection processes</i> to ensure that the building infrastructure is earthquake, flood and tornado resistant. 3. Emergency services will engage local government, utility and response agency experts to participate in this process and build rapport between agencies.
Estimated Cost:	\$500
Benefits:	Low cost. Increased collaboration between agencies for natural disaster planning and education. Ongoing preparation through regular self-inspection and audits by critical facilities.
Plan for Implementation	
Responsible Organization/Department:	County EMD
Supporting Organization/Department:	SEMA/FEMA, Red Cross
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On going on a yearly basis

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	County 2025.3
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the citizens of Linn County to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and included in the County's routine mailings, and/or posted to various social and regular media outlets.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	County Emergency Management
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Winter Weather
Problem being Mitigated:	The electrical grid and transportation system are most affected by severe winter weather, including heavy amounts of snow.
Action or Project	
Applicable Goal Statement:	Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather
Action/Project Number:	County 2025.4
Name of Action or Project:	Snow removal
Mitigation Category:	Structure and infrastructure
Action or Project Description:	Annually assess the previous year's snow removal efforts and develop a mitigation strategy, and plan to address gaps in staffing and infrastructure such as heated sidewalks and automatic deicing of bridges
Estimated Cost:	\$1,000 - \$5,000
Benefits:	Providing more staffing and upgraded infrastructure will result in quicker response to a snow event reducing the overall risk to life and property due to adverse winter weather conditions.
Plan for Implementation	
Responsible Organization/Department:	County Officials
Supporting Organization/Department:	County Maintenance Crews, Utility Crews
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Completed as needed to ensure public safety

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	, Flooding, Dam failure, Extreme temperatures, Severe Thunderstorm, Severe Winter Weather, Tornadoes, Wildfires
Problem being Mitigated:	All citizens should have sufficient access to advance and emergency weather information in times of severe weather.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather
Action/Project Number:	County 2025.5
Name of Action or Project:	Weather alerts & Education
Mitigation Category:	Education and outreach
Action or Project Description:	Expand as needed or able, the distribution methods of severe weather alerts to the public. Local governments should encourage residents to purchase weather radios or receive mobile phone alerts to ensure that everyone has sufficient access to information in times of severe weather.
Estimated Cost:	\$5,000
Benefits:	Reach more residents during severe weather, increasing potential to save lives and property.
Plan for Implementation	
Responsible Organization/Department:	County Officials
Supporting Organization/Department:	County EMD, Fire Department
Action/Project Priority:	High
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	On-going

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Efficiency, Timing, and Effectiveness of Warning, Response, and Recovery Efforts
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	County 2025.6
Name of Action or Project:	County-wide disaster drills and exercises
Mitigation Category:	Planning and Regulation
Action or Project Description:	<ol style="list-style-type: none"> 1. Emergency Management will coordinate with local response agencies and facilities to plan and execute tabletop and full-scale exercise to address above goal. 2. They will design and implement county-wide drills involving agencies, public and private entities, including schools, businesses and nursing facilities. 3. They will publicize county-wide or city-wide drills.
Estimated Cost:	\$1000
Benefits:	Improves efficiency, timing and effectiveness of the disaster preparedness programming in Harrison County
Plan for Implementation	
Responsible Organization/Department:	County Emergency Management
Supporting Organization/Department:	Police, Fire, EMS, Businesses and Schools, Nursing Facilities
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	Emergency Management Grant Funding
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Conducted last exercise in 2025

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Emergency response is affected by problematic transportation routes, improving infrastructure will mitigate damage caused by natural disasters and improve emergency response times, mitigating loss of life.
Action or Project	
Applicable Goal Statement:	Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.
Action/Project Number:	County 2025.7
Name of Action or Project:	Structure grants for road and bridge upgrades
Mitigation Category:	Structure and Infrastructure projects
Action or Project Description:	<ul style="list-style-type: none"> Structure grants proposals for road/bridge upgrades so that hazard mitigation concerns are also met, and address mitigation needs in transportation planning via the local Transportation Advisory Committee and its needs assessments, which form the basis of MoDOT's 5-year plans. The County Commission shall present local transportation concerns to the regional transportation advisory committee, where they can be incorporated into MoDOT's planning structure. The County and City will also seek CDBG and MoDOT grant funding to address specific issues as they are discovered.
Estimated Cost:	\$100
Benefits:	The cost of participating in planning and applying for grant funds is considered to be minimal compared to the potential benefits.
Plan for Implementation	
Responsible Organization/Department:	County Commissioners
Supporting Organization/Department:	MoDOT; CDBG
Action/Project Priority:	High
Timeline for Completion:	2025
Potential Fund Sources:	MoDOT; CDBG
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Emergency response is affected by problematic transportation routes, improving infrastructure will mitigate damage caused by natural disasters and improve emergency response times, mitigating loss of life.
Action or Project	
Applicable Goal Statement:	Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.
Action/Project Number:	County 2025.8
Name of Action or Project:	Flood risk reduction projects
Mitigation Category:	Structure and Infrastructure projects
Action or Project Description:	County officials will develop a plan to identify possible projects to reduce the likelihood of flooding events and losses from future flooding events.
Estimated Cost:	\$5,000
Benefits:	The cost of participating in planning and applying for grant funds is considered to be minimal compared to the potential benefits.
Plan for Implementation	
Responsible Organization/Department:	County Commissioners
Supporting Organization/Department:	GHRPC
Action/Project Priority:	High
Timeline for Completion:	2025
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Emergency response is affected by problematic transportation routes, improving infrastructure will mitigate damage caused by natural disasters and improve emergency response times, mitigating loss of life.
Action or Project	
Applicable Goal Statement:	Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.
Action/Project Number:	County 2025.9
Name of Action or Project:	Upgraded culverts
Mitigation Category:	Structure and Infrastructure projects
Action or Project Description:	County officials will develop a plan to identify roadway culverts and drainage systems that either, underperforming or are aged out and in need of replacement and will begin the process to replace the culverts to handle larger storm flows
Estimated Cost:	\$500,000
Benefits:	Reduce long term costs due to repetitive damages
Plan for Implementation	
Responsible Organization/Department:	County Commissioners
Supporting Organization/Department:	GHRPC
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General revenue, MoDOT, CDBG, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	New
Report of Progress:	Awaiting funding as a new project

Action Worksheet	
Name of Jurisdiction:	Linn county
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Facilities with auxiliary power supplies should be available to residents affected by power outages.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	County 2025.10
Name of Action or Project:	Critical facilities back-up
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Equip critical facilities with transfer switches and/or generators to ensure no loss of functions in the event of power outages due to natural disaster.
Estimated Cost:	\$5,000
Benefits:	Critical facilities, such as shelters, can continue to operate in the event of a disaster, reducing risks to life and property.
Plan for Implementation	
Responsible Organization/Department:	County Commission, County EMD
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 year
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Transportation routes can be disrupted by debris caused by natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	County 2025.11
Name of Action or Project:	Debris removal
Mitigation Category:	Structure and Infrastructure Projects, Natural systems protection
Action or Project Description:	Mitigate the risk to life and property by ensuring that debris does not interfere with draining systems thus increasing the risk for losses due to flooding.
Estimated Cost:	\$500,000
Benefits:	Frequent removal of debris will help clear roadways and drainage systems. Reducing the likelihood of future flooding events..
Plan for Implementation	
Responsible Organization/Department:	Road and Bridge Department, EMD
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Transportation budget, FEMA Recovery funds, Emergency budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On going as needed

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Severe thunderstorm, Tornado
Problem being Mitigated:	Early Warning Sirens
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	County 2025.12
Name of Action or Project:	Warning siren coverage
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Installation of early warning sirens
Estimated Cost:	\$100,000
Benefits:	With adequate time for warning of storms, residents are able to seek cover to help minimize the loss of life.
Plan for Implementation	
Responsible Organization/Department:	County EMD
Supporting Organization/Department:	County Commission
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Hazard Mitigation Grant Funds, Capital projects
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	The electrical grid and transportation system are most affected by severe weather and reduce the risk of wildfire.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather
Action/Project Number:	County 2025.13
Name of Action or Project:	Tree trimming & brush cutting
Mitigation Category:	Structure and Infrastructure, Natural systems protection
Action or Project Description:	Prioritize tree trimming and maintenance along utility lines to reduce the long term risk.
Estimated Cost:	\$5,000
Benefits:	Frequent maintenance of trees will help keep access clear along roadways and electrical lines. Emergency services can response quicker to emergencies. Regular clearing of brush mitigates the risk of wildfire.
Plan for Implementation	
Responsible Organization/Department:	County Officials
Supporting Organization/Department:	County Maintenance Crews
Action/Project Priority:	Low
Timeline for Completion:	1-5 years
Potential Fund Sources:	Transportation budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	As needed

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of an ongoing county-wide committee to coordinate emergency preparedness and hazard mitigation planning with active representatives from each jurisdiction in the County.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	County 2025.14
Name of Action or Project:	Creation of a county-level municipality steering committee
Mitigation Category:	Education and Outreach, Planning and regulation
Action or Project Description:	This Steering Committee will meet quarterly to assist the County to: <ol style="list-style-type: none"> 1. Forecast County emergency preparedness needs for: <ol style="list-style-type: none"> a. Protection of Life, Health and Safety b. Protection of Continuity of Government and Essential Services c. Protection of Public and Private Property, and d. Protection of Community Tranquility. 2. Inform County officials of potential problematic areas. 3. Educate the public on emergency preparedness and hazard mitigation. 4. Review existing planning documents during annual review. 5. Identify funding sources and partner agencies for emergency preparedness and mitigation projects.
Estimated Cost:	\$0
Benefits:	The County will benefit from proactive identification and planning for potential problems as well as increased coordination with partner agencies and potential grant sources to identify assistance and funding to address identified problems in advance of a natural hazard event.
Plan for Implementation	
Responsible Organization/Department:	County Commission, County EMD
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	Continued
Report of Progress:	In development

Action Worksheet	
Name of Jurisdiction:	Linn County
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	County 2025.15
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	County commission
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	City of Brookfield
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CB 2025.1
Name of Action or Project:	Mitigation education for developers
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide mitigation education, information and resources related to all natural disasters to the developers by including information from state and FEMA publications during the permitting process pertaining to hazards impacting the area of development.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Brookfield
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CB 2025.2
Name of Action or Project:	Mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the citizens of Brookfield to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and included in the city's routine mailings, and/or posted to various social and regular media outlets.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Brookfield
Risk / Vulnerability	
Hazard(s) Addressed:	, Flooding, Dam failure, Extreme temperatures, Severe Thunderstorm, Severe Winter Weather, Tornadoes, Wildfires
Problem being Mitigated:	All citizens should have sufficient access to advance and emergency weather information in times of severe weather.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather
Action/Project Number:	CB 2025.3
Name of Action or Project:	Weather alerts & Education
Mitigation Category:	Education and outreach
Action or Project Description:	Maintain or expand as needed or able, the distribution methods of severe weather alerts for the general public. Local governments should encourage residents to purchase weather radios or receive mobile phone alerts to ensure that everyone has sufficient access to information in times of severe weather.
Estimated Cost:	\$5,000
Benefits:	Reach more residents during severe weather, increasing potential to save lives and property.
Plan for Implementation	
Responsible Organization/Department:	City Officials
Supporting Organization/Department:	County EMD, Fire Department
Action/Project Priority:	High
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	General revenue, Emergency management budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	On-going

Action Worksheet	
Name of Jurisdiction:	City of Brookfield
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Facilities with auxiliary power supplies should be available to residents affected by power outages.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	CB 2025.4
Name of Action or Project:	Critical facilities back-up
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Equip critical facilities with transfer switches and/or generators to ensure no loss of functions in the event of power outages due to natural disaster.
Estimated Cost:	\$5,000
Benefits:	Critical facilities, such as shelters, can continue to operate in the event of a disaster, reducing risks to life and property.
Plan for Implementation	
Responsible Organization/Department:	City Council, City EMD
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 year
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Brookfield
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Transportation routes can be disrupted by debris caused by natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CB 2025.5
Name of Action or Project:	Debris removal
Mitigation Category:	Structure and Infrastructure Projects, Natural systems protection
Action or Project Description:	Mitigate the risk to life and property by ensuring that debris does not interfere with draining systems thus increasing the risk for losses due to flooding.
Estimated Cost:	\$500,000
Benefits:	Frequent removal of debris will help clear roadways and drainage systems. Reducing the likelihood of future flooding events..
Plan for Implementation	
Responsible Organization/Department:	Street department
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Transportation budget, FEMA Recovery funds, Emergency budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On going as needed

Action Worksheet	
Name of Jurisdiction:	City of Brookfield
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornadoes
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornadoes. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	CB 2025.6
Name of Action or Project:	Storm shelters/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	City Council
Supporting Organization/Department:	County Commissioners, Local Police Departments, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	HMGP, Capital projects budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Brookfield
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms and Tornadoes
Problem being Mitigated:	Early warning of wind hazards, including severe thunderstorms and tornadoes, can reduce the number of residents at risk of injury or death.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	CB 2021.7
Name of Action or Project:	Weather spotter training
Mitigation Category:	Education and Outreach
Action or Project Description:	Make weather spotter training courses available for interested local citizens at local fire and police departments.
Estimated Cost:	\$500
Benefits:	Weather spotter trainings will educate interested citizens or staff to provide the City of Bethany early warning of severe weather for increased reaction time to take shelter.
Plan for Implementation	
Responsible Organization/Department:	City Officials
Supporting Organization/Department:	Police Departments, County EMD, National Weather Service SKYWARN Storm Spotters Educators, Local Fire District
Action/Project Priority:	High
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On-going

Action Worksheet	
Name of Jurisdiction:	City of Brookfield
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	CB 2025.8
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	Mayor, Council
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	City of Browning
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CBR 2025.1
Name of Action or Project:	Mitigation education for developers
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide mitigation education, information and resources related to all natural disasters to the developers by including information from state and FEMA publications during the permitting process pertaining to hazards impacting the area of development.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Browning
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CBR 2025.2
Name of Action or Project:	Mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the citizens of Browning to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and included in the city's routine mailings, and/or posted to various social and regular media outlets.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Browning
Risk / Vulnerability	
Hazard(s) Addressed:	, Flooding, Dam failure, Extreme temperatures, Severe Thunderstorm, Severe Winter Weather, Tornadoes, Wildfires
Problem being Mitigated:	All citizens should have sufficient access to advance and emergency weather information in times of severe weather.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather
Action/Project Number:	CBR 2025.3
Name of Action or Project:	Weather alerts & Education
Mitigation Category:	Education and outreach
Action or Project Description:	Maintain or expand as needed or able, the distribution methods of severe weather alerts to the general public. Local governments should encourage residents to purchase weather radios or receive mobile phone alerts to ensure that everyone has sufficient access to information in times of severe weather.
Estimated Cost:	\$5,000
Benefits:	Reach more residents during severe weather, increasing potential to save lives and property.
Plan for Implementation	
Responsible Organization/Department:	City Officials
Supporting Organization/Department:	County EMD, Fire Department
Action/Project Priority:	High
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	On-going

Action Worksheet	
Name of Jurisdiction:	City of Browning
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Facilities with auxiliary power supplies should be available to residents affected by power outages.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	CBR 2025.4
Name of Action or Project:	Critical facilities back-up
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Equip critical facilities with transfer switches and/or generators to ensure no loss of functions in the event of power outages due to natural disaster.
Estimated Cost:	\$500,000
Benefits:	Critical facilities, such as shelters, can continue to operate in the event of a disaster, reducing risks to life and property.
Plan for Implementation	
Responsible Organization/Department:	City Council, City EMD
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 year
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Browning
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Transportation routes can be disrupted by debris caused by natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CBR 2025.5
Name of Action or Project:	Debris removal
Mitigation Category:	Structure and Infrastructure Projects, Natural systems protection
Action or Project Description:	Mitigate the risk to life and property by ensuring that debris does not interfere with draining systems thus increasing the risk for losses due to flooding.
Estimated Cost:	\$500,000
Benefits:	Frequent removal of debris will help clear roadways and drainage systems. Reducing the likelihood of future flooding events..
Plan for Implementation	
Responsible Organization/Department:	Street department
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Transportation budget, FEMA Recovery funds, Emergency budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On going as needed

Action Worksheet	
Name of Jurisdiction:	City of Browning
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornadoes
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornadoes. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	CBR 2025.6
Name of Action or Project:	Storm shelters/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	City Council
Supporting Organization/Department:	County Commissioners, Local Police Departments, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	HMGP, Capital projects budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Browning
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	CBR 2025.7
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	Mayor, Council
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	City of Linneus
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CLI 2025.1
Name of Action or Project:	Mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the citizens of Liunneus to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and included in the city's routine mailings, and/or posted to various social and regular media outlets.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Linneus
Risk / Vulnerability	
Hazard(s) Addressed:	, Flooding, Dam failure, Extreme temperatures, Severe Thunderstorm, Severe Winter Weather, Tornadoes, Wildfires
Problem being Mitigated:	All citizens should have sufficient access to advance and emergency weather information in times of severe weather.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather
Action/Project Number:	CLI 2025.2
Name of Action or Project:	Weather alerts & Education
Mitigation Category:	Education and outreach
Action or Project Description:	Maintain or expand as needed or able, the distribution methods of severe weather alerts to the general public. Local governments should encourage residents to purchase weather radios or receive mobile phone alerts to ensure that everyone has sufficient access to information in times of severe weather.
Estimated Cost:	\$5,000
Benefits:	Reach more residents during severe weather, increasing potential to save lives and property.
Plan for Implementation	
Responsible Organization/Department:	City Officials
Supporting Organization/Department:	County EMD, Fire Department
Action/Project Priority:	High
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	On-going

Action Worksheet	
Name of Jurisdiction:	City of Linneus
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Facilities with auxiliary power supplies should be available to residents affected by power outages.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	CLI 2025.3
Name of Action or Project:	Critical facilities back-up
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Equip critical facilities with transfer switches and/or generators to ensure no loss of functions in the event of power outages due to natural disaster.
Estimated Cost:	\$500,000
Benefits:	Critical facilities, such as shelters, can continue to operate in the event of a disaster, reducing risks to life and property.
Plan for Implementation	
Responsible Organization/Department:	City Council, City EMD
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 year
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Linneus
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Transportation routes can be disrupted by debris caused by natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CLI 2025.4
Name of Action or Project:	Debris removal
Mitigation Category:	Structure and Infrastructure Projects, Natural systems protection
Action or Project Description:	Mitigate the risk to life and property by ensuring that debris does not interfere with draining systems thus increasing the risk for losses due to flooding.
Estimated Cost:	\$500,000
Benefits:	Frequent removal of debris will help clear roadways and drainage systems. Reducing the likelihood of future flooding events..
Plan for Implementation	
Responsible Organization/Department:	Street department
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Transportation budget, FEMA Recovery funds, Emergency budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On going as needed

Action Worksheet	
Name of Jurisdiction:	City of Linneus
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornados
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornados. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	CLI 2025.5
Name of Action or Project:	Storm shelters/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	City Council
Supporting Organization/Department:	County Commissioners, Local Police Departments, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	HMGP, Capital projects budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Linneus
Risk / Vulnerability	
Hazard(s) Addressed:	Extreme Temperatures
Problem being Mitigated:	Extreme temperatures (severe heat and severe cold) present hardship and high risk for injury or death to county citizens, especially the very young and old.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	CLI 2025.6
Name of Action or Project:	Vulnerable population identification
Mitigation Category:	Emergency Services
Action or Project Description:	Identify and maintain list of local vulnerable populations that are the most susceptible to extreme heat and cold to ensure that local public safety officials confirm their well-being during episodes of extreme temperature, reducing the risk of loss of life due to hazardous conditions and natural hazards.
Estimated Cost:	\$500
Benefits:	Lives could be saved through identification of vulnerable populations for well-being checks during natural hazards.
Plan for Implementation	
Responsible Organization/Department:	City Officials
Supporting Organization/Department:	County EMD, County Health Department, Coordination with Senior Centers, DHHS, local doctor's offices, County Sheriff's Department, Fire District, Ambulance District
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continued
Report of Progress:	Limited progress

Action Worksheet	
Name of Jurisdiction:	City of Linneus
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	CLI 2025.7
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	County commission
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CM 2025.1
Name of Action or Project:	Mitigation education for developers
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide mitigation education, information and resources related to all natural disasters to the developers by including information from state and FEMA publications during the permitting process pertaining to hazards impacting the area of development.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CM 2025.2
Name of Action or Project:	Mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the citizens of Marceline to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and included in the city's routine mailings, and/or posted to various social and regular media outlets.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam failure, Extreme temperatures, Severe Thunderstorm, Severe Winter Weather, Tornadoes, Wildfires
Problem being Mitigated:	All citizens should have sufficient access to advance and emergency weather information in times of severe weather.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather
Action/Project Number:	CM 2025.3
Name of Action or Project:	Weather alerts & Education
Mitigation Category:	Education and outreach
Action or Project Description:	Maintain or expand as needed or able, the distribution methods of severe weather alerts to the general public. Local governments should encourage residents to purchase weather radios or receive mobile phone alerts to ensure that everyone has sufficient access to information in times of severe weather.
Estimated Cost:	\$5,000
Benefits:	Reach more residents during severe weather, increasing potential to save lives and property.
Plan for Implementation	
Responsible Organization/Department:	City Officials
Supporting Organization/Department:	County EMD, Fire Department
Action/Project Priority:	High
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	On-going

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Facilities with auxiliary power supplies should be available to residents affected by power outages.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	CM 2025.4
Name of Action or Project:	Critical facilities back-up
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Equip critical facilities with transfer switches and/or generators to ensure no loss of functions in the event of power outages due to natural disaster.
Estimated Cost:	\$500,000
Benefits:	Critical facilities, such as shelters, can continue to operate in the event of a disaster, reducing risks to life and property.
Plan for Implementation	
Responsible Organization/Department:	City Council, City EMD
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 year
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Transportation routes can be disrupted by debris caused by natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CM 2025.5
Name of Action or Project:	Debris removal
Mitigation Category:	Structure and Infrastructure Projects, Natural systems protection
Action or Project Description:	Mitigate the risk to life and property by ensuring that debris does not interfere with draining systems thus increasing the risk for losses due to flooding.
Estimated Cost:	\$500,000
Benefits:	Frequent removal of debris will help clear roadways and drainage systems. Reducing the likelihood of future flooding events..
Plan for Implementation	
Responsible Organization/Department:	Street department
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Transportation budget, FEMA Recovery funds, Emergency budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On going as needed

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornadoes
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornadoes. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	CM 2025.6
Name of Action or Project:	Storm shelters/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	City Council
Supporting Organization/Department:	County Commissioners, Local Police Departments, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	HMGP, Capital projects budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	CM 2025.7
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	County commission
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Unregulated development within the flood plain.
Action or Project	
Applicable Goal Statement:	Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.
Action/Project Number:	CM 2025.8
Name of Action or Project:	Participation in the national flood insurance program (NFIP)
Mitigation Category:	Planning and regulation, Education and outreach
Action or Project Description:	Continue City of Marceline's participation and good standing in the National Flood Insurance Program. Develop policies in Keytesville to comply with NFIP standards by: <ol style="list-style-type: none"> 1. Adopting NFIP minimum floodplain management criteria via local regulation 2. Adopting the latest effective Flood Insurance Rate Map (FIRM) 3. Implement and enforce local floodplain management regulations to regulate and permit development in SFHA's, if applicable 4. Develop ordinance to address the requirements of the NFIP 5. Develop procedure to implement the substantial improvement/substantial damage provisions of floodplain management after an event
Estimated Cost:	\$500
Benefits:	Protection of life and reduction of damages due to accessibility to NFIP insurance, and prevention of future damages by compliance with NFIP regulations.
Plan for Implementation	
Responsible Organization/Department:	City flood plain administrator
Supporting Organization/Department:	
Action/Project Priority:	Medium
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	General revenue, planning and zoning
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Continued

Action Worksheet	
Name of Jurisdiction:	City of Purdin
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CP 2025.1
Name of Action or Project:	Mitigation education for developers
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide mitigation education, information and resources related to all natural disasters to the developers by including information from state and FEMA publications during the permitting process pertaining to hazards impacting the area of development.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Purdin
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CP 2025.2
Name of Action or Project:	Mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the citizens of Purdin to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and included in the city's routine mailings, and/or posted to various social and regular media outlets.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of how to prepare for natural disasters potentially affecting the community.
Plan for Implementation	
Responsible Organization/Department:	City government
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Will continue to conduct mitigation education yearly

Action Worksheet	
Name of Jurisdiction:	City of Purdin
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam failure, Extreme temperatures, Severe Thunderstorm, Severe Winter Weather, Tornadoes, Wildfires
Problem being Mitigated:	All citizens should have sufficient access to advance and emergency weather information in times of severe weather.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather
Action/Project Number:	CP 2025.3
Name of Action or Project:	Weather alerts & Education
Mitigation Category:	Education and outreach
Action or Project Description:	Maintain or expand as needed or able, the distribution methods of severe weather alerts to the general public. Local governments should encourage residents to purchase weather radios or receive mobile phone alerts to ensure that everyone has sufficient access to information in times of severe weather.
Estimated Cost:	\$5,000
Benefits:	Reach more residents during severe weather, increasing potential to save lives and property.
Plan for Implementation	
Responsible Organization/Department:	City Officials
Supporting Organization/Department:	County EMD, Fire Department
Action/Project Priority:	High
Timeline for Completion:	1 – 5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	On-going

Action Worksheet	
Name of Jurisdiction:	City of Purdin
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Facilities with auxiliary power supplies should be available to residents affected by power outages.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	CP 2025.4
Name of Action or Project:	Critical facilities back-up
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Equip critical facilities with transfer switches and/or generators to ensure no loss of functions in the event of power outages due to natural disaster.
Estimated Cost:	\$500,000
Benefits:	Critical facilities, such as shelters, can continue to operate in the event of a disaster, reducing risks to life and property.
Plan for Implementation	
Responsible Organization/Department:	City Council, City EMD
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 year
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Purdin
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Transportation routes can be disrupted by debris caused by natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	CP 2025.5
Name of Action or Project:	Debris removal
Mitigation Category:	Structure and Infrastructure Projects, Natural systems protection
Action or Project Description:	Mitigate the risk to life and property by ensuring that debris does not interfere with draining systems thus increasing the risk for losses due to flooding.
Estimated Cost:	\$500,000
Benefits:	Frequent removal of debris will help clear roadways and drainage systems. Reducing the likelihood of future flooding events..
Plan for Implementation	
Responsible Organization/Department:	Street department
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Transportation budget, FEMA Recovery funds, Emergency budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	On going as needed

Action Worksheet	
Name of Jurisdiction:	City of Purdin
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornadoes
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornadoes. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	CP 2025.6
Name of Action or Project:	Storm shelters/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	City Council
Supporting Organization/Department:	County Commissioners, Local Police Departments, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	HMGP, Capital projects budget
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Marceline
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	CM 2025.7
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	Mayor, Council
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	Brookfield R-III
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	BSD 2025.1
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the students' families to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and posted to the district social media page.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of natural disasters and how to prepare for natural disasters potentially affecting the County.
Plan for Implementation	
Responsible Organization/Department:	School board
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	Brookfield R-III
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornado
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornados. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	BSD 2025.2
Name of Action or Project:	Storm shelter/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	School Board
Supporting Organization/Department:	County Commissioners, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Capital projects budget, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Brookfield R-III
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Loss of power threatening student safety and property during an extreme event.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	MSD 2025.3
Name of Action or Project:	Generators
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Install backup generators or transfer switch to allow for the safe use of backup power ensuring public safety and property during power outages due to extreme events
Estimated Cost:	\$1,000,000
Benefits:	Critical facilities, such as schools, can continue to operate in the event of a disaster.
Plan for Implementation	
Responsible Organization/Department:	School Board
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 to 5 years
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Brookfield R-III
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	BSD 2025.4
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	School Board, Staff
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	Bucklin R-II
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	BUSD 2025.1
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the students' families to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and posted to the district social media page.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of natural disasters and how to prepare for natural disasters potentially affecting the County.
Plan for Implementation	
Responsible Organization/Department:	School board
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	Bucklin R-II
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornado
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornados. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	BUSD 2025.2
Name of Action or Project:	Storm shelter/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	School Board
Supporting Organization/Department:	County Commissioners, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Capital projects budget, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Bucklin R-II
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Loss of power threatening student safety and property during an extreme event.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	BUSD 2025.3
Name of Action or Project:	Generators
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Install backup generators or transfer switch to allow for the safe use of backup power ensuring public safety and property during power outages due to extreme events
Estimated Cost:	\$1,000,000
Benefits:	Critical facilities, such as schools, can continue to operate in the event of a disaster.
Plan for Implementation	
Responsible Organization/Department:	School Board
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 to 5 years
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Marceline R-V
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	MSD 2025.1
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the students' families to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and posted to the district social media page.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of natural disasters and how to prepare for natural disasters potentially affecting the County.
Plan for Implementation	
Responsible Organization/Department:	School board
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	Marceline R-V
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornado
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornados. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	MSD 2025.2
Name of Action or Project:	Storm shelter/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	School Board
Supporting Organization/Department:	County Commissioners, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Capital projects budget, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Marceline R-V
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Loss of power threatening student safety and property during an extreme event.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	MSD 2025.3
Name of Action or Project:	Generators
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Install backup generators or transfer switch to allow for the safe use of backup power ensuring public safety and property during power outages due to extreme events
Estimated Cost:	\$1,000,000
Benefits:	Critical facilities, such as schools, can continue to operate in the event of a disaster.
Plan for Implementation	
Responsible Organization/Department:	School Board
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 to 5 years
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Marceline R-V
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	MSD 2025.4
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	School Board, Staff
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	Meadville R-IV
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
Problem being Mitigated:	Lack of public knowledge about natural disasters.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning. Goal 2: Minimize property damage due to flooding, levee failure or dam incidents. Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather Goal 5: Minimize injuries and property damage due to seismic and/or geological events.
Action/Project Number:	MESD 2025.1
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide education to the students' families to reduce risk to life and property due to natural hazards in the region. The information regarding these mitigation measures would be obtained from FEMA's website and posted to the district social media page.
Estimated Cost:	\$500
Benefits:	The general population will increase understanding of natural disasters and how to prepare for natural disasters potentially affecting the County.
Plan for Implementation	
Responsible Organization/Department:	School board
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	New
Report of Progress:	New Project

Action Worksheet	
Name of Jurisdiction:	Meadville R-IV
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Thunderstorms, Tornado
Problem being Mitigated:	FEMA-approved storm shelters have proven effective in mitigating the loss of property and life during tornados. A community-wide shelter program should be adopted for residents who may not have adequate shelter in their homes to minimize the potential for loss of life. School safe rooms can protect students from injury during a thunderstorm, tornado or natural wind event/disaster.
Action or Project	
Applicable Goal Statement:	Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.
Action/Project Number:	MESD 2025.2
Name of Action or Project:	Storm shelter/safe room
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Utilize grant funds and local resources to construct or install storm shelters in locations with insufficient protection including, but not limited to, schools, local recreation areas, and public facilities.
Estimated Cost:	\$2M
Benefits:	Storm shelters can protect the lives of individuals in a thunderstorm, tornado or hazardous wind event who may not have other options for sufficient shelter.
Plan for Implementation	
Responsible Organization/Department:	School Board
Supporting Organization/Department:	County Commissioners, GHRPC, County EMD
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Capital projects budget, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Meadville R-IV
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado
Problem being Mitigated:	Loss of power threatening student safety and property during an extreme event.
Action or Project	
Applicable Goal Statement:	<p>Goal 1: Eliminate loss of life, minimize injuries, and reduce property damage caused by tornadoes, severe thunderstorm high winds, hail and lightning.</p> <p>Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire</p> <p>Goal 4: Maintain public services, protect life, and minimize the risk of property damage caused by severe winter weather</p> <p>Goal 5: Minimize injuries and property damage due to seismic and/or geological events.</p>
Action/Project Number:	MESD 2025.3
Name of Action or Project:	Generators
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Install backup generators or transfer switch to allow for the safe use of backup power ensuring public safety and property during power outages due to extreme events
Estimated Cost:	\$1,000,000
Benefits:	Critical facilities, such as schools, can continue to operate in the event of a disaster.
Plan for Implementation	
Responsible Organization/Department:	School Board
Supporting Organization/Department:	
Action/Project Priority:	HIGH
Timeline for Completion:	1 to 5 years
Potential Fund Sources:	General Revenue, Capital projects, HMGP
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	Continued/Modified
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	Meadville R-IV
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Wildfire
Problem being Mitigated:	Reduce the strain on existing water supplies and vulnerability to wildfires during periods of drought.
Action or Project	
Applicable Goal Statement:	Goal 3: Minimize the impact to natural and human resources caused by drought, extreme temperatures and wildfire
Action/Project Number:	MESD 2025.4
Name of Action or Project:	Educate on best practices during drought
Mitigation Category:	Education and Outreach, Natural systems protection
Action or Project Description:	Provide education, and information to the citizens to reduce risk to agricultural assets and risk of wildfire during periods of drought. Provide educational and informational materials about best practices in water conservation, how to reduce fire danger and the spread of fires, and how to reduce the potential for wildfires.
Estimated Cost:	\$100
Benefits:	Citizens would have the best information about best practices of water usage during periods of drought.
Plan for Implementation	
Responsible Organization/Department:	School Board, Staff
Supporting Organization/Department:	Hazard Mitigation Planning Committees
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	General revenue
Local Planning Mechanisms to be Used in Implementation, if any:	None
Progress Report	
Action Status:	New
Report of Progress:	New Project

Table 4.4. Mitigation Action Matrix

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
Structure and Infrastructure Projects								
County 2025.4	Snow removal	Linn Co.	High	4	Severe winter weather	X	X	
County 2025.7	Structure grants for road and bridge upgrades	Linn Co.	High	2	Flooding	X		
County 2025.8	Flood risk reduction projects	Linn Co.	High	2	Flooding	X		
County 2025.9	Upgraded road tubes	Linn Co.	High	2	Flooding	X		
County 2025.11	Critical facilities backups	Linn Co	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
County 2025.12	Debris removal	Linn Co	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X		
County 2025.13	Warning sirens	Linn Co.	High	1	Tornado	X	X	
County 2025.14	Tree trimming maintenance	Linn Co.	High	1,4	Severe thunderstorms, Severe winter weather, Tornado	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CB 2025.4	Critical facilities backups	Brookfield	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CB 2025.5	Debris removal	Brookfield	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CB 2025.6	Storm shelters/Safe rooms	Brookfield	High	1	Severe thunderstorms, tornado		X	
CBR 2025.4	Critical facilities backups	Browning	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CBR 2025.5	Debris removal	Browning	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CBR 2025.6	Storm shelters/Safe rooms	Browning	High	1	Severe thunderstorms, tornado		X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CLI 2025.3	Critical facilities backups	Linneus	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CLI 2025.3	Debris removal	Linneus	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CLI 2025.5	Storm shelters/Safe rooms	Linneus	High	1	Severe thunderstorms, tornado		X	
CM 2025.4	Critical facilities backups	Marceline	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CM 2025.5	Debris removal	Marceline	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CM 2025.6	Storm shelters/Safe rooms	Marceline	High	1	Severe thunderstorms, tornado		X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CP 2025.4	Critical facilities backups	Purdin	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
CP 2025.5	Debris removal	Purdin	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CP 2025.6	Storm shelters/Safe rooms	Purdin	High	1	Severe thunderstorms, tornado		X	
BSD 2025.2	Storm shelters/Safe rooms	Brookfield R-III	High	1	Severe thunderstorms, tornado		X	
BSD 2025.3	Generators	Brookfield R-III	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
BUSD 2025.3	Generators	Bucklin R-II	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
MSD 2025.2	Storm shelters/Safe rooms	Marceline R-V	High	1	Severe thunderstorms, tornado		X	
MSD 2025.3	Generators	Marceline R-V	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
MESD 2025.2	Storm shelters/Safe rooms	Meadville R-IV	High	1	Severe thunderstorms, tornado		X	
MESD 2025.3	Generators	Meadville R-IV	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	X		
Natural Systems Protection								
County 2025.12	Debris removal	Linn Co	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X		
County 2025.14	Tree trimming maintenance	Linn Co.	High	1,4	Severe thunderstorms, Severe winter weather, Tornado	X	X	
County 2025.15	Drought and Wildfire education	Linn Co.	Medium	3	Drought, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CB 2025.5	Debris removal	Brookfield	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CB 2025.8	Drought and Wildfire education	Brookfield	Medium	3	Drought, Wildfire	X	X	
CBR 2025.5	Debris removal	Browning	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CBR 2025.7	Drought and Wildfire education	Browning	Medium	3	Drought, Wildfire	X	X	
CLI 2025.4	Debris removal	Linneus	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CLI 2025.7	Drought and Wildfire education	Linneus.	Medium	3	Drought, Wildfire	X	X	
CM 2025.5	Debris removal	Marceline	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	
CM 2025.7	Drought and Wildfire education	Marceline	Medium	3	Drought, Wildfire	X	X	
CM 2025.8	NFIP Participation	Marceline	Medium	2	Flooding	X	X	X
CP 2025.5	Debris removal	Purdin	High	1,2,4,5	Flooding, Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CP 2025.7	Drought and Wildfire education	Purdin.	Medium	3	Drought, Wildfire	X	X	
BSD 2025.4	Drought and Wildfire education	Brookfield R-III.	Medium	3	Drought, Wildfire	X	X	
MSD 2025.4	Drought and Wildfire education	Marceline R-V	Medium	3	Drought, Wildfire	X	X	
MESD 2025.4	Drought and Wildfire education	Meadville R-IV	Medium	3	Drought, Wildfire	X	X	
Planning and Regulation								
County 2025.1	County-wide inventory of safe rooms and shelters	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X		
County 2025.6	Countywide disaster exercises and drills	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
County 2025.15	Creation of a county-level municipality steering committee	Linn Co	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CM 2025.8	NFIP Participation	Marceline	Medium	2	Flooding	X	X	X

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
Education and Outreach								
County 2025.1	County-wide inventory of safe rooms and shelters	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X		
County 2025.2	Safety audits and self-inspection training for critical facilities	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
County 2025.3	Public mitigation education	Linn Co.	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
County 2025.5	Weather Alerts	Linn Co.	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
County 2025.15	Creation of a county-level municipality steering committee	Linn Co	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
County 2025.15	Drought and Wildfire education	Linn Co.	Medium	3	Drought, Wildfire	X	X	
CB 2025.1	Mitigation education for developers	Brookfield	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CB 2025.2	Mitigation education	Brookfield	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CB 2025.3	Weather Alerts	Brookfield	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CB 2025.7	Weather spotter training	Brookfield	High	1	Severe thunderstorm, Tornado	X	X	
CB 2025.8	Drought and Wildfire education	Brookfield.	Medium	3	Drought. Wildfire	X	X	
CBR 2025.2	Mitigation education	Browning	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CBR 2025.3	Weather Alerts	Browning	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CBR 2025.7	Drought and Wildfire education	Browning.	Medium	3	Drought. Wildfire	X	X	
CLI 2025.1	Mitigation education	Linneus	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CLI 2025.2	Weather Alerts	Linneus	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CLI 2025.6	Vulnerable population identification	Linneus	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Sink holes, Levee Failure, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	
CLI 2025.7	Drought and Wildfire education	Linneus.	Medium	3	Drought, Wildfire	X	X	
CM 2025.1	Mitigation education for developers	Marceline	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CM 2025.2	Mitigation education	Marceline	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CM 2025.3	Weather Alerts	Marceline	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CM 2025.7	Drought and Wildfire education	Marceline.	Medium	3	Drought. Wildfire	X	X	
CP 2025.1	Mitigation education for developers	Purdin	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CP 2025.2	Mitigation education	Purdin	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CP 2025.3	Weather Alerts	Purdin	High	1,2,3,4,5	Flooding, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
CP 2025.7	Drought and Wildfire education	Purdin	Medium	3	Drought. Wildfire	X	X	
BSD 2025.1	Mitigation education	Brookfield R-III	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
BSD 2025.4	Drought and Wildfire education	Brookfield R-III	Medium	3	Drought, Wildfire	X	X	
BUSD 2025.1	Mitigation education	Bucklin R-II	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
MSD 2025.1	Mitigation education	Marceline R-V	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
MSD 2025.4	Drought and Wildfire education	Marceline R-V.	Medium	3	Drought, Wildfire	X	X	
MESD 2025.1	Mitigation education	Meadville R-IV	High	1,2,3,4,5	Flooding, Dam Failure, Earthquakes, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	X	X	
MESD 2025.4	Drought and Wildfire education	Meadville R-IV	Medium	3	Drought, Wildfire	X	X	

5 PLAN MAINTENANCE PROCESS

5 PLAN MAINTENANCE PROCESS	5.1
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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 State Emergency Management Agency (SEMA) requires that Hazard Mitigation Plans be reviewed periodically, at least annually, to ensure that goals and objectives are being considered. Revisions to the actions or strategies may be required, as well as acknowledging completed successful mitigations. This section of the Linn County Multi-jurisdictional Hazard Mitigation Plan provides the process to review, revise, and update the plan.

The maintenance of the plan shall be delegated to the County Emergency Management Committee. They meet quarterly and following any disaster declarations, and will invite members of the MPC to attend these meetings to discuss the plan progress and determine if any updates or amendments need to be considered.

Maintenance shall involve agreement of the participating jurisdictions, including school and special districts, to:

- Meet annually, and after a disaster event, to monitor and evaluate the implementation of the plan;
- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high priority, low- or no-cost recommended actions;
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan’s recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Keep the concept of mitigation in the forefront of community decision making by

identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;

- Report on plan progress and recommended changes to the County Commissioners and governing bodies of participating jurisdictions; and
- Inform and solicit input from the public.

The Linn County Emergency Management Committee is an advisory body and can only make recommendations to county, city, town, or district elected officials. Its primary duty is to coordinate emergency departments within the county. It will attempt to see the plan successfully carried out and to report to the community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information in areas accessible to the public.

5.1.2 Plan Maintenance Schedule

The MPC and the County Emergency Manager agree to meet annually and after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. The Linn County Emergency Management Director and GHRPC will be responsible for initiating the plan reviews and will invite members of the MPC and other interested parties 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

There were no changes made in the Linn County Hazard Mitigation Plan due to changes in priorities of any jurisdiction that participated in the development of the plan.

There were no changes made in the plan due to changes in priorities of any jurisdiction that participated in the development of the plan. The plan MUST describe the process for evaluating the plan for effectiveness, including evaluation criteria, when it will be evaluated for effectiveness, and who will be responsible for this evaluation.

The plan must identify how, when and by whom the plan will be assessed for effectiveness at achieving its stated purpose and goals (evaluating). Progress on the proposed actions can be monitored by evaluating changes in vulnerabilities identified in the plan. The MPC (and the Linn County Emergency Committee) 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.
- If new actions are identified to implement mitigation activities, the jurisdictional MPC member will take necessary actions to amend the plan. GHRPC staff currently handles such requests.

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 in cooperation with the Linn County Emergency Committee deems appropriate and necessary. Changes will be approved by the Linn County Commissioners 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.

Prior to the development of this plan, the participating jurisdictions did not integrate information from the previous hazard mitigation plan into other planning mechanisms. The participating jurisdictions will attempt to remedy this lack of integration moving forward by applying the identified hazard mitigation actions into updates of other planning mechanisms.

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 Linn 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 implementing actions, where possible, through the following plans:

- General or master plans of participating jurisdictions;
- Ordinances of participating jurisdictions;
- Linn 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 responsible 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 Linn County Emergency Management Director will provide the updated Mitigation Strategy with current status of each mitigation action to the County Commissioners as well as all Mayors, City Clerks, and School District Superintendents. The Emergency Management 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
Linn County	Transportation Advisory Committee (TAC)	Member of TAC attended all planning meetings and identified actions relating to transportation infrastructure were included in annual update to Unfunded Needs List and the State Transportation Improvement Plan, and the Regional Transportation Plan	Member of TAC attended all planning meetings and identified actions relating to transportation infrastructure were included in annual update to unfunded needs list, the State Transportation Improvement Plan, and the Regional Transportation Plan
	Linn County Emergency Plan	The Commissioners attended all planning meetings and identified actions relating to infrastructure were included in annual update to Comprehensive Plan	The Commissioners and EMD attended all planning meetings. Identified new actions or ongoing actions relating to infrastructure will be included in annual update to Comprehensive Plan
	CEDS, LEPC, Council Budgeting Session	Annual review, county emergency plan review	Annual CEDS review, County Emergency Plan Review
City of Linneus	Local Budget, CEDS, Emergency Plan, City Ordinances	Annual review	Annual CEDS review, Emergency Plan Review, Regional Transportation Plan
City of Purdin	Local Budget, CEDS, Emergency Plan, City Ordinances, Floodplain Ordinance	Annual Review	Annual CEDS review, Emergency Plan Review, Regional Transportation Plan
City of Brookfield	Local Budget, CEDS,	Annual Review	Annual CEDS review,

	Emergency Plan, City Ordinances		Emergency Plan Review, Regional Transportation Plan
Brookfield R-III	Master Plan, Capital Improvement Plan, Emergency Plan, Weapons Policy	Annual Review	Annual Review of Master Plan, Capital Improvement Plan, Emergency Plan, Weapons Policy
Marceline R-V	Master Plan, Emergency Plan, Weapons Policy	Annual Review	Annual Review of Master Plan, Emergency Plan, Weapons Policy
Meadville R-IV	Master Plan, Capital Improvement Plan, Emergency Plan, Weapons Policy	Annual Review	Annual Review of Master Plan, Capital Improvement Plan, Emergency Plan, Weapons Policy

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 in the local newspaper, as well as on the Linn County website following each annual review of the mitigation plan and will solicit comments from the public based on the annual review.

The Linn County emergency management director and the MPC will be responsible for publicizing success stories if mitigation activities are completed by issuing press releases and publicizing information on the Linn County and/or Jurisdiction’s website.

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.