

SULLIVAN COUNTY

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

DAILY NEWS
**NATURAL
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CONTRIBUTORS

Sullivan County Hazard Mitigation Planning Committee

Jurisdictional Representatives

Name	Title	Department	Agency/Organization
Chris May	Presiding	County Commission	Sullivan County
Mindy Chapman	City Government	Administration	City of Newtown
Phyllis Blondefield	Chairman	City Government	Village of Pollock
Crystal Bupp	City Administrator	City Government	City of Milan
Laurie Stafford	City Clerk	City Government	Village of Humphreys
Rachel Hale	City Clerk	City Government	City of Green City
Stephanie Hubbard	Superintendent	Administration	Newtown Harris R-III
Shannon Bain	Principal	Administration	Newtown Harris R-III

Stakeholder Representatives

Name	Department	Jurisdiction
Kris Good	ARGS Ham Radio	Sullivan County
Cindy Allen	Sheriff's Office	Sullivan County
Joshua Bennett	Administration	Sullivan County Memorial Hospital
Laden DeJones	Green Castle Fire	Green Castle
Mindy Chapman	City Government	City of Newtown
Phyllis Blondefield	City Government	City of Pollock
Terry C. Purcy	Medicine Creek Fire Department	Medicine Creek Fire Department
Zachary Hoover	Fire Department	City of Milan
Robert Trenty	Smithfield Foods	Sullivan County
Mike Katil	Smithfield Foods	Sullivan County
Wanda Macgruder	Sullivan County Health Department	Sullivan County
DeEtta Jones	City Government	City of Browning
Amy Peterson	City Government	Newtown
Colby Leslie	City Government	Green City
Bobby Williams	Public Water	Sullivan County
Laurie Stafford	City Government	Village of Humphreys
Rachel Hale	City Government	Green City
Staphanie Hubbard	City Government	Newtown Harris
Shannon Bain	City Government	Newtown Harris
Kelly Bicknell	City Government	Green City
Kelly Cochran	City Government	Green City
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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. Sullivan 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 Sullivan County
- City of Milan
- City of Green City
- City of Green Castle
- City of Newtown
- Village of Humphreys
- Village of Pollock
- Milan C-2
- Green City R-I
- Newtown Harris R-III

School Districts Milan C-2 and Green City R-I were invited to participate in the planning process but did not meet all the established requirements for official participation. When the future five-

year update is developed for this plan, these school districts will be invited again to participate.

Sullivan 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 Sullivan County and participating jurisdictions. The MPC updated the risk assessment that identified and profiled hazards that pose a risk to Sullivan 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 2025.2	Maintain transportation infrastructure	Sullivan Co	High	2	Flooding	x		
County 2025.3	Generators	Sullivan Co	Low	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
County 2025.4	Debris Removal	Sullivan Co	Low	1,4,5	Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	x		
County 2025.5	Outdoor warning siren	Sullivan Co	High	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Tornado, Wildfire	x	x	
CGCA 2025.2	Maintain transportation infrastructure	Greencastle	High	2	Flooding	x		
CGCA 2025.3	Generators	Greencastle	Low	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CGCA 2025.4	Outdoor warning siren	Greencastle	High	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Tornado, Wildfire	x	x	
CGCA 2025.5	Storm shelters and safe rooms	Greencastle	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CGC 2025.2	Maintain transportation infrastructure	Green City	Medium	2	Flooding	x		
CGC 2025.3	Generators	Green City	High	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CGC 2025.4	Install/upgrade warning siren, Weather radios, emergency alert systems	Green City	High	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Tornado, Wildfire	x	x	
CGC 2025.5	Storm shelters and safe rooms	Green City	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CGC 2025.6	Flood studies and flood reduction projects	Green City	High	2	Flooding	x	x	
CGC 2025.7	Routine dam inspections	Green City	High	2	Dam failure	x	x	
CM 2025.3	Generators	Milan	High	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CM 2025.3	Maintain & Upgrade transportation infrastructure	Milan	Medium	2	Flooding	x	x	
CM 2025.4	Storm shelters and safe rooms	Milan	High	1,3,4,5	Extreme Temperatures, 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
CM 2025.5	Install/upgrade warning siren, Weather radios, emergency alert systems	Milan	Medium	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Tornado, Wildfire	x	x	
GCSD 2025.2	Storm shelters and safe rooms	Green City R-I	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
GCSD 2025.3	Generators	Green City R-I	High	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
MSD 2025.2	Storm shelters and safe rooms	Milan C-2	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
MSD 2025.3	Generators	Milan C-2	High	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
Natural Systems Protection								
County 2025.4	Debris Removal	Sullivan Co	Low	1,4,5	Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	x		
CGC 2025.7	Routine dam inspections	Green City	High	2	Dam failure	x	x	
CM 2025.7	Participation in the NFIP	Milan	High	2	Flooding	x	x	x
Planning and Regulation								
CGC 2025.6	Flood studies and flood reduction projects	Green City	High	2	Flooding	x	x	
CGC 2025.7	Routine dam inspections	Green City	High	2	Dam failure	x	x	
CM 2025.7	Participation in the NFIP	Milan	High	2	Flooding	x	x	x
Education and Outreach								
County 2025.1	Mitigation education	Sullivan Co	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x
County 2025.6	N.O.A.A. Weather Radios	Sullivan Co.	High	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	
CGCA 2025.1	Mitigation education	Greencastle	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x
CGC 2025.1	Mitigation education	Green City	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CM 2025.1	Mitigation education	Milan	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x
GCSD 2025.1	Mitigation education	Green City R-I	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x
MSD 2025.1	Mitigation education	Milan C-2	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	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 E, 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

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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 Sullivan County. Sullivan 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 Sullivan County, 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 Sullivan 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 Sullivan 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 Sullivan County Hazard Mitigation Plan is the update of a plan that was approved June 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.

- Sullivan County
- City of Milan
- City of Green City
- City of Green Castle
- City of Newtown
- Village of Humphreys
- Village of Pollock
- Newtown Harris R-III

Sullivan 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 Sullivan 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

This latest (2026) updated version of the Sullivan County Hazard Mitigation Plan involved 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 2026 Sullivan 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 Sullivan 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, Floodplain Ordinances, Dam Inspection Report

The following table (Table 1.1) below identifies significant changes in the 2025 update of the Hazard Mitigation Plan for Sullivan County.

Table 1.1. Changes Made in Plan Update

Plan Section	Summary of Updates
Executive Summary	• 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	• Updated members of the Mitigation Planning Committee (MPC) and participating jurisdictions formally adopted the MPC.
Chapter 2 - Planning Area Profile and Capabilities	• 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	• 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	• 2020 mitigation goals and strategies reviewed by planning committee and updated • The mitigation category of each action was added to the action worksheets

Chapter 5 - Plan Implementation and Maintenance	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.

Sullivan County, Missouri contracted with 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 coordinated with 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 April 19, 2023*.

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 in 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 Sullivan Mitigation Planning Committee

Name	Title	Department	Agency/Organization
Chris May	Presiding	County Commission	Sullivan County
Mindy Chapman	City Government	Administration	City of Newtown
Phyllis Blondefield	Chairman	City Government	Village of Pollock
Crystal Bupp	City Administrator	City Government	City of Milan
Laurie Stafford	City Clerk	City Government	Village of Humphreys
Rachel Hale	City Clerk	City Government	City of Green City
Stephanie Hubbard	Superintendent	Administration	Newtown Harris R-III
Shannon Bain	Principal	Administration	Newtown Harris R-III

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			
County Zoning Administrator	✓	✓		✓	✓	
County Floodplain Manager						
County Public Works						
Building Permits						

Table 1.4. Participants of the Sullivan County Hazard Mitigation Plan

Name	Department	Jurisdiction
Kris Good	ARGS Ham Radio	Sullivan County
Cindy Allen	Sheriff's Office	Sullivan County
Joshua Bennett	Administration	Sullivan County Memorial Hospital
Laden DeJones	Green Castle Fire	Green Castle
Mindy Chapman	City Government	City of Newtown
Phyllis Blondefield	City Government	City of Pollock
Terry C. Purcy	Medicine Creek Fire Department	Medicine Creek Fire Department
Zachary Hoover	Fire Department	City of Milan
Robert Trenty	Smithfield Foods	Sullivan County
Mike Katil	Smithfield Foods	Sullivan County
Wanda Macgruder	Sullivan County Health Department	Sullivan County
DeEtta Jones	City Government	City of Browning
Amy Peterson	City Government	Newtown
Colby Leslie	City Government	Green City
Bobby Williams	Public Water	Sullivan County
Laurie Stafford	City Government	Village of Humphreys
Rachel Hale	City Government	Green City
Staphanie Hubbard	City Government	Newtown Harris
Shannon Bain	City Government	Newtown Harris
Kelly Bicknell	City Government	Green City
Kelly Cochran	City Government	Green City
Crystal Bupp	City Government	Milan
Michael Williams	County Government	Sullivan County
Rye Paige	County Government	Sullivan County

Chris May	County Government	Sullivan County
Rachael Hall	County Government	Sullivan County

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;
- 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 this plan was gathered in part through a series of meetings held within Sullivan County. The planning process for the Sullivan County Hazard Mitigation Plan began during the summer of 2025, with discussions involving elected officials, school districts, health and emergency service providers, community members, and other interested parties, and the planning committee was formed. (See Table 1.2 and Table 1.3)

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 1.4.

GHRPC staff and County officials engaged in extensive outreach. There were invitations sent throughout the county to churches, civic organizations, health departments, clinics, and various organizations throughout the county. Sullivan County is a rural county with several small jurisdictions. These jurisdictions lack the resources to send paid staff members to meetings, and in some cases lack resources to attend virtual meetings. Additionally, the lack of available funding to provide local match for mitigation grant funding is an impediment to participation within some of the jurisdictions. GHRPC staff also engaged in repeated contact with all jurisdictions in the county, this included emails, phone calls, and in-person attempts to contact staff of jurisdictions within the county.

All documentation of the planning process, including outreach contacts, meeting sign-in sheets, social media postings, flyers, and meeting minutes can be found in Appendix B.

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:

- Sullivan County
- City of Milan
- City of Green City
- City of Green Castle
- City of Newtown
- Village of Pollock
- Village of Humphreys
- Milan C-2 School District
- Green City R-I School District
- Newtown Harris R-III School District

Finally, city and county officials were encouraged to invite others from any county, state, or federal agency as well as local businesses that had an interest in contributing to the planning process. Input from the public was solicited through reminders at public gatherings, press releases, letters to various businesses and community organizations, and a Public Survey. The surrounding jurisdictions were invited to review the county’s plan draft via the GHRPC website. The plan draft was available for review for 30 days. The plan was published on GHRPC’s website on 11/20/2025. A press release was sent out to the news agencies in the area regarding the plan’s availability for review and/or comment.

Table 1.5 below shows the representation of each participating jurisdiction at the planning meetings, the provision of responses to the Data Collection Questionnaire, and update or development of mitigation actions. Sign-in sheets and other documentation for participation are in Appendix B.

Table 1.5. Jurisdictional Participation in Planning Process

Jurisdiction	Kick-off Meeting	Meeting #2	Meeting #3	Data Collection Questionnaire Response	Update/Develop Mitigation Actions

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, Sullivan 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 Sullivan 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 1.6. 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 initial “Meeting #1” in Sullivan County occurred as follows:
 - 109 N. Main Street Milan Courthouse: August 14th, 2025, from 3pm-3:45pm.

- Virtual meeting: August 15th, 2025, from 3pm-4pm
- The meeting #1 focused on hazard mitigation planning. Participating jurisdictions need to complete a questionnaire, attend at least one meeting, provide suggestions for the plan, and adopt the plan. The GHRPC has been reaching out to stakeholders. The planning process includes 3 in person and 3 virtual meetings. This first meeting focused on outreach and hazard identification. Attendees received a “Hazard Identification for Harrison County” worksheet.
- The meeting addressed Hazard Mitigation Planning, in which there is an existing plan, needs updates every 5 years, planning is a requirement for HMGP grants. To be a participating jurisdiction, you need to complete a questionnaire, attend meetings, provide suggestions, and review and adopt the plan. The meeting was then opened for questions.
- The data collection questionnaire was distributed to each of the attendees at meeting #1.
- Meeting attendees were encouraged to post flyers about upcoming meetings and the public opinion survey.
- Planning Meeting #2
 - September 2, 2025, in person, 109 N Main St. Milan, MO 3-4:30pm
 - September 3, 2025, virtual 10-10:30am
- Both meetings discussed the Sullivan County Hazard Mitigation Plan Update, provided a brief overview of what had been discussed at Meeting #1, specifically the purpose of the hazard mitigation plan, requirements for eligibility, and hazards identified in Sullivan County.
- Attendees discussed and ranked regional hazards, identified vulnerable assets using a worksheet, and reviewed mitigation strategies including prevention, protection, mitigation, response, and recovery. The meeting included introductions, explanations of asset categories, and concluded with a Q&A before adjourning at 11:30am.
- Planning Meeting #3
 - October 15, 2025, 217 E 2nd St. in Milan, Missouri. 3-4:30pm
 - October 16, 2025, virtual Meeting from 10 – 10:30am
- The focus of Meeting #3, both in-person and virtual, was action prioritization and plan maintenance.
- Attendees were given STAPLEE worksheets for each action in their jurisdiction. Once attendees completed STAPLEE worksheets for the actions, they were encouraged to discuss hazards that had not been mitigated and new actions were discussed if desired.
- The following information about the public meetings and the location in the appendix of this plan can be found as follows:
 - The outreach efforts, including envelope scans and address labels; Facebook posts, meeting flyers, survey monkey QR code can be found in Appendix B.
 - Meeting information such as agendas, meeting minutes, and sign-in sheets, and other documentation relating to the planning process can be found in Appendix B.
 - Other products of the public meetings such as hazard identification, risk assessment products, and vulnerable asset identification worksheets can be

found in Appendix B.

- The Data Collection Questionnaires, STAPLEE worksheets, Survey, and Survey Results can be found in Appendix C.
- Any public comments made during this period of planning or after plan was published on GHRPC's website on November 20, 2025, and until submission to SEMA on December 20, 2025, can be found in Appendix C.
- During the planning process, in addition to the public meetings, there were also numerous phone calls, emails, and in person conversations with jurisdictions to help with plan requirements, to answer questions, to encourage participation, and to confirm meeting times.

Table 1.7. Schedule of MPC Meetings

Meeting	Topic	Date
Kick-off Meeting/ Meeting #1	Outreach and Hazard Identification	August 14, 2025 & August 15, 2025
Planning Meeting #2	Risk Assessment and Mitigation Strategies	September 2, 2025 & September 3, 2025
Planning Meeting #3	Action Prioritization, Adopting the Plan, & Plan Maintenance	October 15, 2025 & October 16, 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.

- Prior to the kick-off meetings scheduled in Sullivan County, the GHRPC staff produced social media posts with meeting times and locations, flyers for distribution throughout the county, and this information was sent to all jurisdictions which were encouraged to publish and display the information about the hazard mitigation plan and the meeting times. The meetings were also advertised on the GHRPC website and Facebook pages, and the Facebook post was also forwarded to all jurisdictions within Sullivan County. (Copies of the Facebook post, flyer, and QR code for the public opinion survey can be found in Appendix B).
- Prior to the kick-off meeting scheduled in Sullivan County invitation letters were sent out to all jurisdictions in the planning area, civic organizations, food pantries, churches, emergency services, and special districts. (Please see Appendix B for a complete list).
- Additionally, the neighboring communities, located outside of the county, but with populations and structures located within Sullivan County were also invited to attend. (Please see Appendix B for a complete list of people and organizations invited to attend).
- All meetings, both in person and virtual, were public meetings and information about the meetings was distributed throughout the county. During the planning process, prior to the publication of the plan draft, there was opportunity for any citizen of Sullivan County to attend the meetings and/or make comment.
- The initial meetings for the Hazard Mitigation Plan for Sullivan County were conducted in

person with representatives from the County. At the Kick-off meeting in Gallatin, the FEMA requirements for public participation were mentioned. All people attending were asked to complete the survey and share with others located in the county. Printed flyers were distributed with information about upcoming meetings and a link to the public opinion survey.

- The Hazard Mitigation Committee also agreed to mention the upcoming meetings at their respective churches, civic organizations, meetings, and in passing when speaking with people from the community.
- The draft of the plan was made available to the public and members of the planning committee; there was a draft of the plan on the GHRPC website. The plan was made available for review from August 29, 2025, to September 30, 2025. The availability of this plan for public review was advertised on local social media pages and press releases were sent to news outlets in Sullivan County.
- All available information about the public meetings, attendance, press releases, paperwork completed at meetings, public surveys, questionnaires, agendas, power point presentation, and all other available documentation can be found in the Appendices as follows:
 - Planning Documentation & Invitations: Appendix B
 - Press Release regarding public comment on the plan draft: Appendix B
 - Questionnaires & Completed Surveys: Appendix C
 - Action Plans/STAPLEE Worksheets: Appendix C
- Both at the public meetings, virtual and in-person, no public comment was made regarding the plan.
- In the public opinion survey, there was a comment about affordability and availability of emergency services in the planning area.
- During the publication of the plan draft there were no comments made prior to the submission of the plan to SEMA.
- There were 16 responses to the public opinion survey. The data collected is listed below and the full survey results can be found in Appendix C.

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.

There are few organizations that are multijurisdictional in nature whose interests' interface with hazard mitigation planning in Putnam County. These groups were included in the emailed invitation to the Meeting #1 in Unionville, Missouri at the Putnam County Courthouse. In small communities, local officials wear multiple hats out of necessity. The agencies and interest groups who were invited to take part in the hazard mitigation plan update are listed below.

- Neighboring Communities:
 - City of Laredo

- City of Novinger
 - City of Browning
- Local and Regional agencies involved in hazard mitigation activities:
 - Green Castle Community Fire District
 - Green City Fire/Rescue
 - Green City Rural Fire Department
 - Medicine Creek Fire Protection District
 - Milan Fire Department
 - Milan Rural Fire Department
 - Winigan Rural Fire Department
 - Sullivan County Ambulance District
 - Sullivan County Sheriff
 - Newtown Physician Clinic
 - Lee Clinic
 - Sullivan County Memorial Physicians
 - Northeast Family Health
 - Sullivan County Hospital
- Agencies with the authority to regulate development:
 - City of Milan
 - City of Green Castle
 - City of Green City
 - City of Newtown
 - Village of Humphreys
 - Village of Pollock
 - Greencastle Emergency Coordinator
 - Newtown Emergency Coordinator
 - Osgood Emergency Coordinator
 - Sullivan County Emergency Manager
 - Milan Floodplain Administrator
- Businesses & Academia
 - Milan C-2
 - Green City R-I
 - Newtown Harris R-III
 - Sullivan County Water Supply #1
 - Sullivan County Farm Supply
 - Smithfield's Farmland foods
 - Simmons Animal Nutrition
 - MFA Agri Servies
 - High Hopes Employment Services
 - Mideast Fabrication
- Other Private and non-profit interest, including underserved/vulnerable populations
 - Sullivan County Food Pantry
 - Stover's Residential Care Facility
 - Milan Health Care Facility

- Rolling Hills Assisted Living
- Sullivan County Memorial Hospital
- Sullivan County Senior Center
- Milan Christian Church
- St Mary's Catholic Church
- Bread of Life Christian Fellowship
- Peace Lutheran Church

The Data Collection Questionnaires that all participants completed were the basis for data incorporated into the plan. These documents provided a wealth of information on the capabilities of participants, their experience with administering FEMA projects, their critical facilities, and many more items relevant to the plan.

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. This information was also made available on GHRPCs 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.

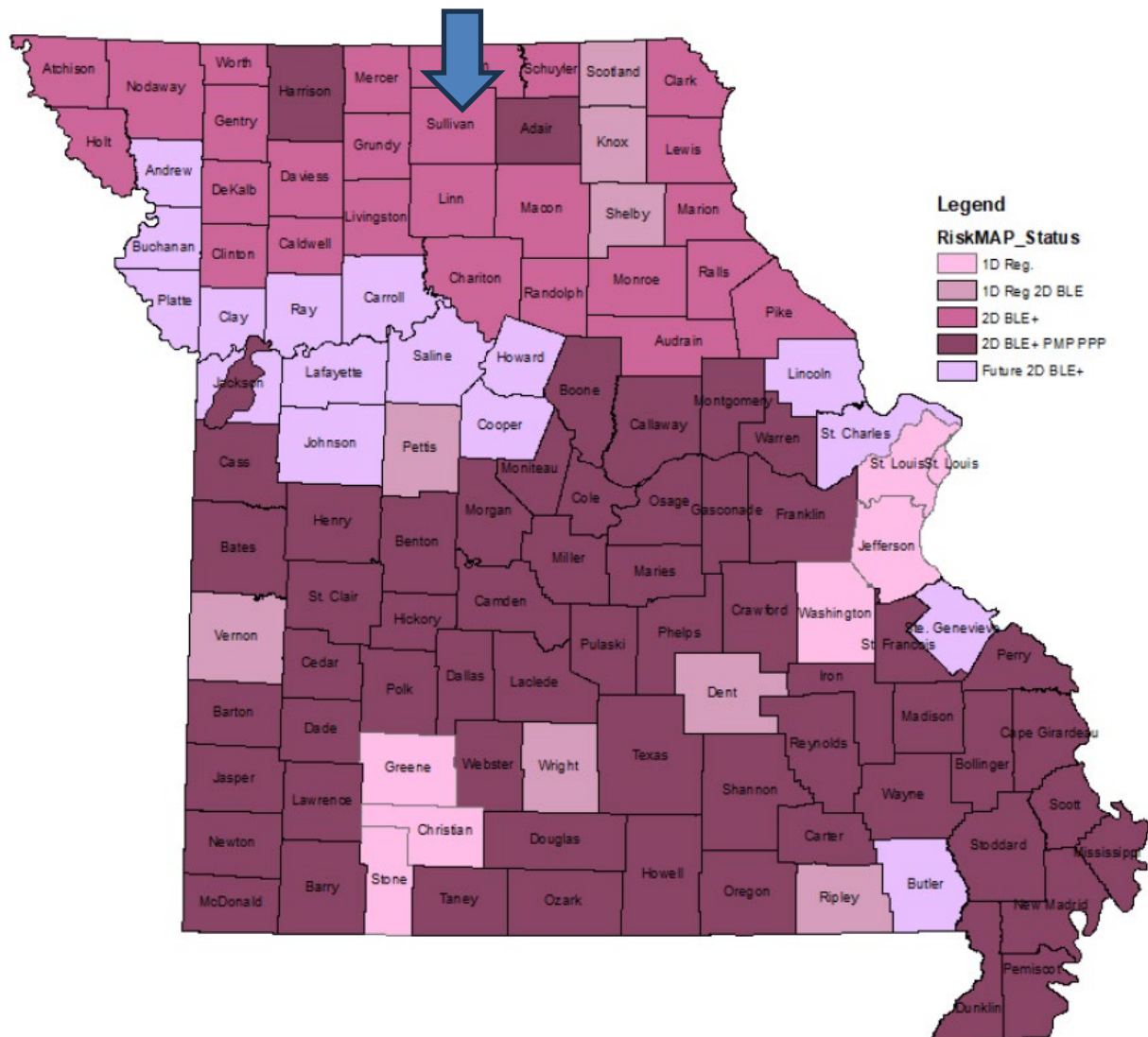
A Survey Monkey public survey was created to solicit public comments. The link and the QR code were made available to all jurisdictions, published on social media, and published on the flyers that were sent to all jurisdictions.

The draft of the Sullivan County Hazard Mitigation Plan was published on Green Hills Regional Planning Commission's website on August 29, 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.

Coordination with FEMA Risk MAP Project

- At the beginning of the planning process, check the Risk MAP Study Status Map located at:
<http://fema.maps.arcgis.com/apps/webappviewer/index.html?id=48cfac9a9ffb4003b565aaccf464d0ac> .
- Describe the flood risk products that were used as best available data to inform the flood risk assessment. This may include preliminary or effective regulatory products and/or non-regulatory products.
- Describe efforts to coordinate with any FEMA RiskMap Projects that are underway in the planning area simultaneous with this plan update.
- Talk about discussions with the RiskMAP Projects contractors, including dates for conference calls or meetings, referencing documentation in the appendix.
- Describe any data or mitigation action ideas that were exchanged.
- Insert in the plan the state map (**Figure 1.1**) showing locations of RiskMAP projects including deployed watersheds, outlining the planning area or indicating in text status of planning area relative to any Risk MAP projects

Figure 1.1. RiskMAP Study Status Map



Source: 2023 Missouri State Hazard Mitigation Plan

According to the Missouri State Hazard Mitigation Plan, a Statewide Needs Assessment was conducted, and the above figure summarizes the mapping status of each county. Sullivan County is classified as a county in the discovery phase with 2D BLE models under development that are planned to move forward with regulatory mapping using 2D results. Shown in the above figure with a blue arrow.

Integration of Other Data, Reports, Studies, and Plans

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

The most current data, reports, studies, and plans were reviewed in order to input the data that mostly represents the current view of Putnam County and its local jurisdictions.

The resources used were:

- Current Missouri State Hazard Mitigation Plan (2023)
- Flood Insurance Rate Maps (FIRMs)
- Missouri Department of Natural Resources (DNR)
- National Inventory of Dams (NID)
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics
- 2020 and 2023 Census
- 2021 Sullivan County Hazard Mitigation Plan

Relevant information from the above-listed sources was reviewed by the Mitigation Planning Committee as appropriate and included in the update of the Putnam County Hazard Mitigation Plan. Additional resources are listed in Appendix A and cited in the plan where appropriate.

- During Meeting #1 the MPC identified and profiled their hazards. The process of identifying hazards at this meeting included:
 - previous disaster declarations in the county
 - hazards in the most recent State Hazard Mitigation Plan
 - hazards identified in the previously approved hazard mitigation plan.
 - Anecdotal accounts of specific occurrences in the jurisdictions
- The MPC reviewed each jurisdiction's completed Data Collection Questionnaire to incorporate additional risk assessment information.
- The MPC reviewed and incorporated data from existing plans, studies, reports, and technical information as well as information available through internet research and GIS analysis.
- The Risk Assessment chapter of the plan provides additional detail on conclusions drawn from the data reviewed.

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

- 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 Sullivan 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 Sullivan County.
- At the 2nd meeting, the initial draft of the risk assessment was available, chapter 3 of the plan.
- The MPC performed a risk assessment using data from Chapter 3 of the plan. Jurisdictions attending the meeting were encouraged to identify vulnerabilities that may have been overlooked or that they concluded were important. See appendix B for the vulnerability assessment worksheets.

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 Chapter 4 of the Sullivan 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)***

- The 3rd Planning Meeting was when the MPC reviewed the mitigation strategy from the previously approved plan. Each jurisdiction was aware that they must have at least one action plan for each hazard included in the plan.
- The jurisdictions determined which actions would be retained, modified, or deleted from the previous plan. The individual jurisdictions provided information on any progress made on the actions from the previous plan, and if they were still feasible.
- MPC members were encouraged to continue forward only those actions that substantively addressed long-term risks identified in the risk assessment.
- 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 Sullivan County Hazard Mitigation Planning Committee utilized the STAPLEE method for evaluating the priority and effectiveness of each action.

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 is 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

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 schedule annual meetings 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. It was also determined that any jurisdiction would use this annual meeting to develop NOIs for SEMA if desired. There is more detailed information about the strategy for plan maintenance in Chapter 5 of the Sullivan County Hazard Mitigation Plan.

2 PLANNING AREA PROFILE AND CAPABILITIES

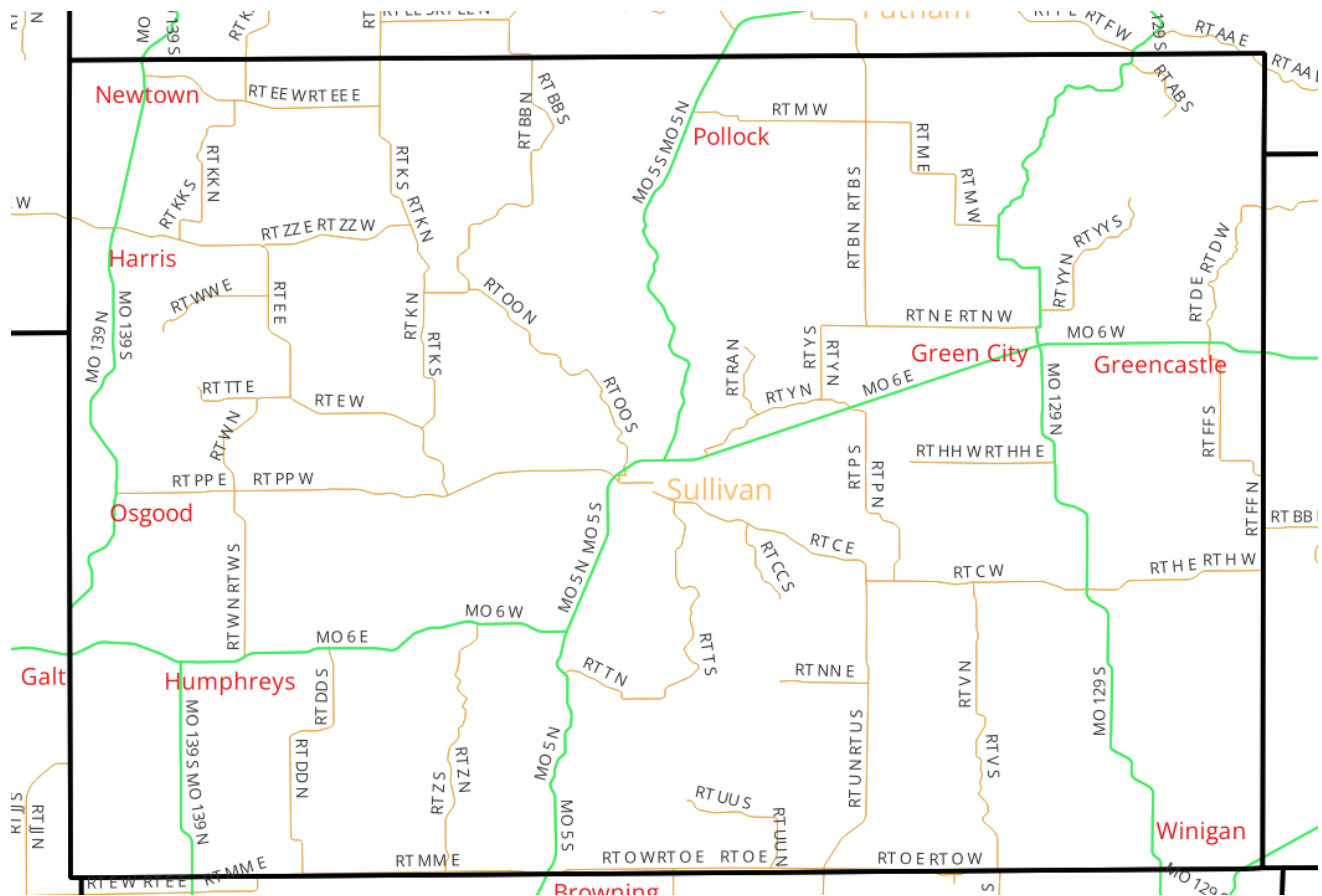
2	PLANNING AREA PROFILE AND CAPABILITIES.....	2.1
2.1	<i>Sullivan County Planning Area Profile.....</i>	2.1
2.1	Geography, Geology and Topography.....	2.2
2.2	Climate	2.3
2.3	Population/Demographics	2.4
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2.6	FEMA Hazard Mitigation Assistance (HMA) Grants in Planning Area	2.8
2.7	FEMA Public Assistance (PA) Grants in Planning Area	2.8
2.2	<i>Jurisdictional Profiles and Mitigation Capabilities.....</i>	2.15
2.2.1	Unincorporated Sullivan County	2.15
2.2.2	Green City	2.18
2.2.3	Greencastle	2.20
2.2.4	Village of Harris.....	2.23
2.2.5	Village of Humphreys.....	2.26
2.2.6	City of Milan.....	2.28
2.2.7	City of Newtown	2.31
2.2.8	Village of Pollock.....	2.34
2.2.9	Summary of Jurisdictional Capabilities	2.37
2.2.10	Special District	Error! Bookmark not defined.
2.2.11	School District Profiles and Mitigation Capabilities	2.41
	<i>Green City R-I.....</i>	2.41
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	<i>Newtown-Harris R-III</i>	2.43

2.1 SULLIVAN COUNTY PLANNING AREA PROFILE

Sullivan County, located in northern Missouri, is a rural county with a strong agricultural foundation, particularly in livestock raising and feeding. With a population of just under 6,000, its county seat and largest city is Milan. Beyond agriculture, the local economy is supported by manufacturing, healthcare, and retail trade. Historically organized in 1845 and named after General John Sullivan, the county's landscape features rolling terrain and numerous creeks, making it ideal for farming, and it is notable for having one of the highest Hispanic or Latino populations in Missouri.

Sullivan County is situated in the northern part of Missouri, centrally located within the state's northern tier. It is bordered by Putnam County to the north, Adair County to the east, Linn County to the south, and Grundy and Mercer Counties to the west. Its county seat, Milan, is positioned roughly in the geographical center of the county, serving as a hub for the surrounding rural areas. This northern placement within Missouri means it shares characteristics with the broader North Missouri region, known for its agricultural landscapes and distinct four-season climate.

Figure 2.1. Maps of Sullivan County



2.1 Geography, Geology and Topography

Sullivan County, Missouri, encompasses 652 square miles in the northern part of the state, characterized by its rolling topography. The landscape is quite diverse, ranging from fertile bottomlands along its various creeks to undulating prairie and broken hillsides. Major waterways such as Medicine, Locust, East Locust, Yellow, and Spring Creeks flow generally north to south, providing ample water resources that are crucial for the county's dominant agricultural industry, particularly livestock. The highest point in the county, approximately 1,060 feet above sea level, is found near its northern border with Putnam County, while the lowest point, around 740 feet, lies where Locust Creek exits the county to the south.

Geologically, Sullivan County is situated within the broader North American Craton. The bedrock consists primarily of sedimentary rocks, including limestone, dolomite, sandstone, and shale, deposited over millions of years by ancient seas that periodically covered Missouri during the

Paleozoic Era. While specific detailed geological surveys for the entire county might be limited, general regional geology indicates that these formations are common. The surface is often covered by layers of dirt and sediment, with coal thought to underlie about half the county, though little mining has occurred. Limestone is also found in significant quantities along streams, mainly used for local construction purposes.

Sullivan County, Missouri, is largely defined by its numerous creeks and their associated watersheds, which are integral to its agricultural landscape and water resources. Prominent among these are Locust Creek and East Locust Creek, both significant tributaries that flow generally southward through the county. The East Locust Creek Watershed, in particular, has been a focus of major development, including the Roy Blunt Reservoir, a multi-purpose project designed to provide water supply for a broader regional population, offer flood risk reduction, and create recreational opportunities. These waterways, along with others like Medicine, Yellow, and Spring Creeks, form the drainage network that supports the county's farming and livestock operations, ultimately contributing to the larger Grand River watershed system in northern Missouri.

2.2 Climate

Sullivan County, Missouri experiences a humid continental climate, characterized by distinct four seasons with significant temperature variations throughout the year. Summers are typically hot and humid, with average high temperatures in July reaching the upper 80s Fahrenheit and lows in the upper 60s. Winters are cold, with average high temperatures in January in the low 40s and average lows in the low 20s. Spring and autumn offer milder temperatures, though rapid weather changes are common during these transitional periods.

The county receives a substantial amount of precipitation annually, averaging around 40-42 inches per year. Rainfall is generally well-distributed throughout the year, with the wettest months typically being May and June due to spring and early summer thunderstorms. While snowfall does occur in winter, it is usually not excessively heavy. Sullivan County is susceptible to various weather phenomena common to the Midwest, including thunderstorms, occasional severe weather, and periods of both drought and heavy rainfall.

Figure 2.2 NOAA climate summary for Green City Missouri

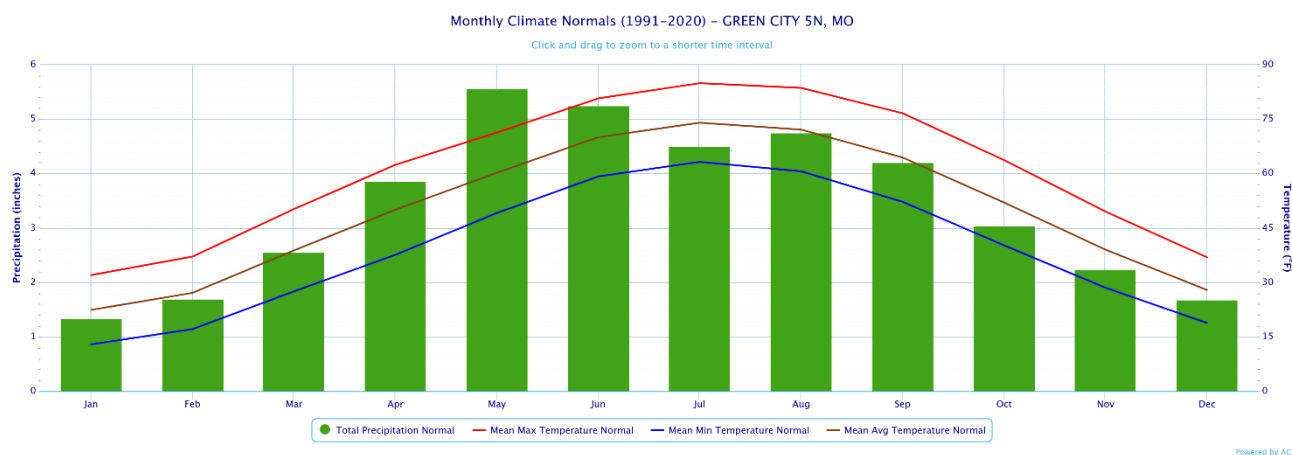


Table 2.1. Green City NOAA Climate normals

Month	Total Precipitation Normal (inches)	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	1.34	32.0	12.9	22.4
February	1.70	37.1	17.1	27.1
March	2.56	50.2	27.5	38.8
April	3.87	62.4	37.6	50.0
May	5.57	71.3	49.1	60.2
June	5.25	80.7	59.2	70.0
July	4.51	84.9	63.2	74.0
August	4.75	83.6	60.6	72.1
September	4.21	76.6	52.2	64.4
October	3.04	63.7	40.2	52.0
November	2.25	49.5	28.5	39.0
December	1.69	36.9	18.8	27.9
Annual	40.74	60.7	38.9	49.

Source: NOAA NCDC Data 1990-2020

2.3 Population/Demographics

Sullivan County, Missouri, is a rural area that has experienced a steady population decline over the past century, reaching an estimated 5,759 residents in 2025. This represents a significant decrease from its peak of over 20,000 residents in 1900, largely due to shifts in agricultural practices and overall rural depopulation trends. The median age in Sullivan County is 44.2 years, notably higher than both the Missouri and national averages, indicating an older population demographic.

In terms of ethnic diversity, Sullivan County is predominantly White (around 83% non-Hispanic White). However, it stands out in Missouri for having a comparatively higher percentage of Hispanic or Latino residents, with approximately 18% of the population identifying as such, making it one of the most heavily Hispanic/Latino counties in the state. The median household income was about \$55,500 in 2023, which is below the state and national averages, and the county's poverty rate of

around 14.7% is higher than the state average.

Table 2.2. Sullivan County Population 2010-2020 by Jurisdiction

Jurisdiction	2010 Population	2020 Population	2023 Annual Population Estimate or ACS Population	# Change (2010-2023)	% Change (2010-2023)
Sullivan County	6,714	5,999	5903	-811	-12.1%
Sullivan County Unincorporated	2,432	3,106	2,877	445	-18.3%
City of Milan	1,960	1,819	1,883	-77	-3.9%
City of Green City	657	602	560	-97	-14.8%
City of Green Castle	275	224	331	56	-8.5%
City of Newtown	183	113	112	-71	-38.8%
Village of Humphreys	118	89	121	3	2.5%
Village of Pollock	89	46	19	-70	-78.7%

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 Sullivan County under 5 and over 65

Jurisdiction	Population Under 5	% Population Under 5	Population 65 and over	% Population 65 and over
Sullivan County	377	6.3%	1204	20.1%
City of Milan	157	8.6%	226	12.4%
City of Green City	35	5.8%	144	23.9%
City of Green Castle	19	8.5%	57	25.4%
City of Newtown	4	3.5%	28	24.8%
Village of Harris	3	4.6%	16	24.6%
Village of Humphreys	4	4.5%	6	6.7%
Village of Pollock	0	0%	13	28.3%

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

The University of South Carolina developed an index to evaluate and rank the ability to respond to, cope with, recover from, and adapt to disasters. The index synthesizes 29 socioeconomic variables which research literature suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards. SoVI ® data sources include primarily those from the United States Census Bureau.

To visually compare the SoVI® scores at a state and national level, they are mapped using quantiles. Scores in the top 20% of the United States are more vulnerable counties (red) and scores in the bottom 20% of the United States indicate the least vulnerable counties (blue). A low SoVI score number means that the county is more resilient to hazard events, and a high SoVI score number means the county is less resilient. Putnam County has a medium SoVI score.

Figure 2.3 below shows the SoVI scores for Putnam County from 2010 - 2014 at both the state and national levels. Daviess County has a medium SoVI score of as compared to the other counties in the state and as compared to other counties in the United States. As you can see, the score remained the same regardless of comparison level.

Figure 2.3 Social Vulnerability to Environmental Hazards, State of Missouri

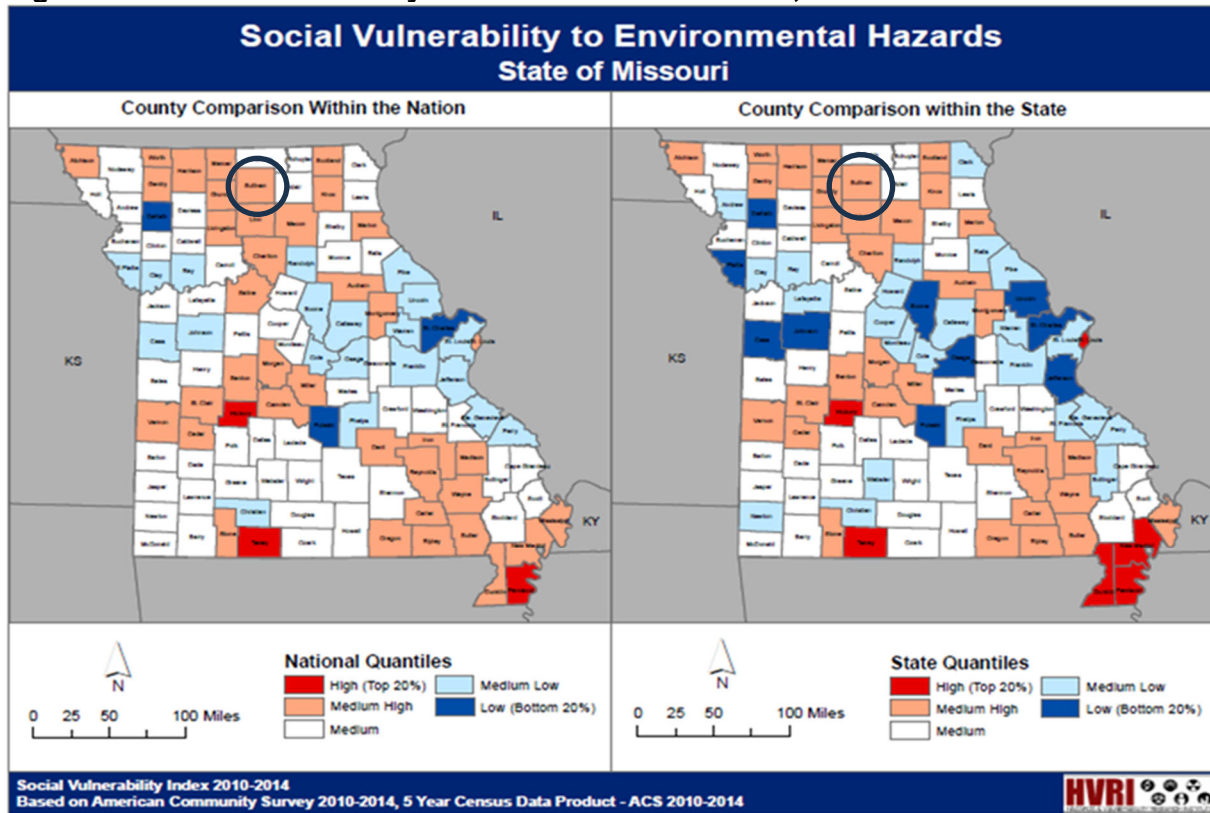


Table 2.4. Unemployment, Poverty, Education, and Language Percentage Demographics, Sullivan County, Missouri

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
Sullivan County	2,673	1.3%	14.7%	46.9%	9.1%	16.5%
City of Milan	884	3.2%	12.5%	44.0%	8.9%	43.7%
City of Green City	198	0.0%	28.9%	52.4%	2.7%	11.2%
City of Green Castle	146	0.7%	10.6%	65.7%	4.0%	0.3%
City of Newtown	53	0.0%	9.8%	46.1%	15.8%	5.4%
Village of Humphreys	38	0.0%	43.8%	45.0%	24.0%	0.0%
Village of Pollock	7	0.0%	52.6%	70.0%	0.05	0.0%
State of Missouri	3,195,524	2.2%	12.0%	29.4%	20.2%	7.0%
Nationwide	173,038,975	2.7%	12.5%	25.9%	21.8%	22.5%

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

2.4 Occupations

Sullivan County, Missouri, has a relatively small labor force, with around 2,610 employees as of

2023, reflecting a slight decline of about -1.1% from the previous year. The county's economy is primarily driven by three key sectors: Manufacturing, which is the largest employer with approximately 678 people, followed by Health Care & Social Assistance (356 people), and Retail Trade (310 people). While agriculture remains a foundational element of the county's identity, these other industries represent the most common formal employment opportunities for residents.

Looking at specific occupations, the most prevalent job groups among Sullivan County residents are Production Occupations (538 people), reflecting the strong manufacturing presence, followed by Management Occupations (235 people), and Sales & Related Occupations (215 people). The unemployment rate in Sullivan County has generally been low, at 3.3% as of April 2025, which is lower than the long-term average. The median household income in 2023 was approximately \$55,500, with higher-paying industries typically including Utilities, Information, and Finance & Insurance.

Table 2.5. Occupation Statistics, Sullivan 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
Sullivan County	688	415	397	330	777
City of Milan	169	163	76	89	336
City of Green City	22	35	26	27	88
City of Green Castle	49	21	23	14	37
City of Newtown	16	1	3	20	13
Village of Humphreys	0	6	0	12	20
Village of Pollock	1	0	3	3	0

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

2.5 Agriculture

The 2022 Census of Agriculture for Sullivan County, Missouri, reveals a robust and highly productive agricultural sector, despite a slight decrease in the number of farms. The county reported 642 farms, a slight reduction from 2017, but the total land in farms increased by 3% to 318,779 acres, leading to a larger average farm size of 497 acres. The market value of agricultural products sold in Sullivan County reached an impressive \$183,587,000, representing a 3% increase since 2017. This strong revenue highlights the county's significant contribution to Missouri's overall agricultural output.

A key finding from the 2022 Census is the overwhelming dominance of livestock, poultry, and related products, which accounted for a substantial 78% of the county's total agricultural sales. Crops, while still important, made up the remaining 22%. Specifically, Sullivan County had nearly 37,000 head of cattle and calves and over 121,000 hogs and pigs. Forage (hay/haylage) was the top crop by acreage at over 53,000 acres, followed by soybeans and corn for grain. The census also provided insights into the demographics of farm operators, with 1,080 producers, indicating a multi-operator structure for many farms. The average age of producers in Sullivan County aligns with national trends, showing an aging farming population but also the presence of new and beginning farmers.

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

Table 2.6. FEMA HMA Grants in Sullivan County from 1993-2025

Disaster Declaration	Project Type	Sub-Grantee	Date Approved	Project Total
PDMC-PJ-07-MO-2005-023	402.1: Infrastructure Protective Measures (Roads and Bridges)	Sullivan County Commission	2005-09-07	\$449,787
Total				\$449,787

Source: Federal Emergency Management Agency, [Date](#)

2.7 FEMA Public Assistance (PA) Grants in Planning Area

In the last 25 years, 2000-2025, 13 different federally declared disasters have impacted Sullivan County resulting in \$6,740,684.30 in impacts to the county.

On average since 2000 Sullivan County has had a federally declared disaster every 2 years.

Roads and Bridges were the commonly damaged items with 286 projects, which lead to \$5,038,774.18 in damages. Utilities sustained the second highest level of damage with 26 projects totaling \$1,309,556.34 in damages.

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

Disaster Declaration	Project Type	Project Size	Project Total
1412	Roads and Bridges	Small	\$15,228.30
1412	Roads and Bridges	Small	\$29,444.53
1412	Roads and Bridges	Large	\$75,830.28
1412	Roads and Bridges	Small	\$33,745.92
1412	Roads and Bridges	Small	\$9,245.15
1412	Roads and Bridges	Small	\$11,173.68
1412	Utilities	Small	\$43,898.20
1412	Roads and Bridges	Small	\$25,200.01
1412	Roads and Bridges	Small	\$4,124.53
1412	Roads and Bridges	Small	\$34,012.00
1412	Roads and Bridges	Small	\$17,041.00
1708	Roads and Bridges	Small	\$14,204.80
1708	Roads and Bridges	Small	\$7,997.50
1708	Roads and Bridges	Small	\$7,454.04
1708	Roads and Bridges	Small	\$11,855.00
1708	Roads and Bridges	Small	\$4,454.21
1708	Roads and Bridges	Small	\$21,796.25
1708	Roads and Bridges	Small	\$11,299.75
1708	Roads and Bridges	Small	\$10,206.50

1708	Roads and Bridges	Small	\$5,048.00
1708	Roads and Bridges	Small	\$4,614.00
1708	Roads and Bridges	Small	\$23,036.30
1708	Roads and Bridges	Small	\$8,889.95
1708	Roads and Bridges	Small	\$54,571.70
1708	Roads and Bridges	Small	\$7,346.00
1708	Roads and Bridges	Small	\$26,905.88
1708	Roads and Bridges	Small	\$6,962.50
1708	Roads and Bridges	Small	\$23,962.35
1708	Roads and Bridges	Small	\$8,837.30
1708	Roads and Bridges	Small	\$17,933.85
1708	Roads and Bridges	Small	\$10,668.50
1708	Roads and Bridges	Small	\$25,467.00
1708	Roads and Bridges	Small	\$7,085.50
1708	Roads and Bridges	Small	\$16,316.00
1708	Roads and Bridges	Small	\$19,557.45
1708	Roads and Bridges	Small	\$14,522.00
1708	Roads and Bridges	Small	\$16,333.80
1708	Roads and Bridges	Small	\$16,570.40
1708	Roads and Bridges	Small	\$6,231.10
1736	Utilities	Small	\$5,477.88
1736	Roads and Bridges	Small	\$10,202.37
1736	Roads and Bridges	Small	\$3,291.03
1736	Debris Removal	Small	\$5,562.92
1736	Roads and Bridges	Small	\$17,588.44
1736	Debris Removal	Small	\$2,312.68
1736	Roads and Bridges	Small	\$3,014.91
1736	Roads and Bridges	Small	\$12,717.00
1736	Roads and Bridges	Small	\$3,965.56
1736	Roads and Bridges	Small	\$7,963.40
1736	Roads and Bridges	Small	\$7,591.64
1736	Roads and Bridges	Small	\$4,632.85
1736	Emergency Protective Measures	Small	\$4,212.96
1736	Roads and Bridges	Small	\$2,371.31
1736	Roads and Bridges	Small	\$1,260.68
1736	Roads and Bridges	Small	\$3,193.26
1736	Roads and Bridges	Small	\$5,236.52
1736	Debris Removal	Small	\$8,108.00
1736	Emergency Protective Measures	Small	\$5,624.14
1736	Debris Removal	Small	\$3,000.00
1736	Roads and Bridges	Small	\$3,404.49
1736	Roads and Bridges	Small	\$1,763.78
1773	Roads and Bridges	Small	\$4,634.04
1773	Roads and Bridges	Small	\$4,957.20
1773	Roads and Bridges	Small	\$17,509.71
1773	Roads and Bridges	Small	\$13,823.79
1773	Roads and Bridges	Small	\$23,052.71
1773	Water Control Facilities	Small	\$8,704.50
1773	Roads and Bridges	Small	\$5,724.28
1773	Roads and Bridges	Small	\$8,553.85
1773	Roads and Bridges	Small	\$4,040.00
1773	Roads and Bridges	Small	\$9,861.59
1773	Roads and Bridges	Small	\$29,176.77
1773	Roads and Bridges	Small	\$60,693.17
1773	Roads and Bridges	Small	\$12,138.59
1773	Roads and Bridges	Small	\$10,048.54
1773	Roads and Bridges	Small	\$3,141.84
1773	Roads and Bridges	Small	\$9,850.77
1773	Roads and Bridges	Small	\$5,872.54

1773	Utilities	Small	\$32,767.97
1773	Roads and Bridges	Small	\$10,498.54
1773	Roads and Bridges	Small	\$19,755.72
1773	Roads and Bridges	Small	\$5,033.72
1773	Roads and Bridges	Small	\$15,047.28
1773	Roads and Bridges	Small	\$33,504.64
1773	Roads and Bridges	Small	\$14,724.56
1773	Roads and Bridges	Small	\$7,789.89
1773	Utilities	Small	\$50,798.18
1773	Utilities	Small	\$53,949.22
1773	Roads and Bridges	Small	\$4,140.48
1773	Roads and Bridges	Small	\$27,725.32
1773	Utilities	Small	\$8,892.60
1773	Roads and Bridges	Small	\$23,858.13
1773	Roads and Bridges	Small	\$4,978.12
1773	Roads and Bridges	Small	\$16,717.82
1773	Roads and Bridges	Small	\$13,436.63
1773	Roads and Bridges	Small	\$6,608.26
1773	Roads and Bridges	Small	\$24,484.12
1773	Roads and Bridges	Small	\$5,690.20
1773	Roads and Bridges	Small	\$15,888.51
1773	Roads and Bridges	Small	\$18,839.74
1773	Roads and Bridges	Small	\$20,463.12
1773	Roads and Bridges	Small	\$1,760.58
1773	Roads and Bridges	Small	\$15,098.78
1773	Roads and Bridges	Small	\$8,844.50
1773	Roads and Bridges	Small	\$22,943.23
1773	Roads and Bridges	Small	\$26,372.07
1773	Roads and Bridges	Small	\$15,040.05
1773	Utilities	Small	\$2,974.25
1773	Roads and Bridges	Small	\$9,672.73
1773	Debris Removal	Small	\$12,241.82
1773	Roads and Bridges	Small	\$3,811.74
1773	Emergency Protective Measures	Small	\$1,794.10
1773	Roads and Bridges	Small	\$8,472.36
1773	Roads and Bridges	Small	\$7,147.96
1773	Roads and Bridges	Small	\$1,735.80
1773	Roads and Bridges	Small	\$11,455.97
1773	Roads and Bridges	Small	\$19,921.57
1773	Roads and Bridges	Small	\$27,344.80
1773	Roads and Bridges	Small	\$24,752.70
1773	Water Control Facilities	Small	\$4,074.50
1773	Utilities	Small	\$2,492.00
1773	Roads and Bridges	Small	\$15,242.92
1773	Roads and Bridges	Small	\$2,002.23
1773	Roads and Bridges	Small	\$21,856.01
1773	Roads and Bridges	Small	\$9,391.00
1773	Roads and Bridges	Small	\$23,240.79
1773	Roads and Bridges	Small	\$6,521.84
1773	Roads and Bridges	Small	\$4,219.73
1773	Roads and Bridges	Small	\$9,517.55
1773	Utilities	Small	\$2,572.50
1773	Utilities	Small	\$5,683.33
1773	Roads and Bridges	Small	\$10,260.76
1773	Roads and Bridges	Small	\$1,680.11
1773	Roads and Bridges	Small	\$3,383.98
1773	Roads and Bridges	Small	\$3,196.00
1773	Roads and Bridges	Small	\$15,143.45
1773	Roads and Bridges	Small	\$2,110.26

1773	Roads and Bridges	Small	\$1,003.61
1773	Roads and Bridges	Small	\$7,325.90
1773	Utilities	Small	\$21,499.32
1773	Utilities	Small	\$22,763.77
1773	Roads and Bridges	Small	\$37,203.90
1773	Roads and Bridges	Small	\$21,282.80
1773	Roads and Bridges	Small	\$28,646.17
1773	Roads and Bridges	Small	\$17,230.11
1773	Roads and Bridges	Small	\$25,457.00
1773	Roads and Bridges	Small	\$11,446.73
1773	Roads and Bridges	Small	\$8,594.77
1773	Roads and Bridges	Small	\$5,853.80
1773	Roads and Bridges	Small	\$7,103.57
1773	Roads and Bridges	Small	\$7,732.19
1773	Roads and Bridges	Small	\$13,011.31
1773	Roads and Bridges	Small	\$11,717.61
1773	Roads and Bridges	Small	\$11,165.83
1809	Roads and Bridges	Small	\$4,368.24
1809	Parks, Recreational Facilities, and Other	Small	\$5,836.16
1809	Roads and Bridges	Small	\$12,002.29
1809	Roads and Bridges	Small	\$5,087.08
1809	Roads and Bridges	Small	\$19,494.03
1809	Roads and Bridges	Small	\$2,325.76
1809	Utilities	Small	\$24,763.78
1809	Roads and Bridges	Small	\$5,813.36
1809	Debris Removal	Small	\$2,374.50
1809	Roads and Bridges	Small	\$14,229.85
1809	Roads and Bridges	Large	\$82,239.80
1809	Roads and Bridges	Small	\$14,414.48
1809	Roads and Bridges	Small	\$15,181.04
1809	Roads and Bridges	Small	\$2,402.21
1809	Roads and Bridges	Small	\$4,064.98
1809	Roads and Bridges	Small	\$5,300.70
1809	Roads and Bridges	Small	\$4,795.62
1847	Roads and Bridges	Small	\$3,337.88
1847	Roads and Bridges	Small	\$10,009.52
1847	Roads and Bridges	Small	\$7,830.00
1847	Roads and Bridges	Small	\$5,128.06
1847	Roads and Bridges	Small	\$15,548.15
1847	Roads and Bridges	Small	\$13,620.65
1847	Roads and Bridges	Small	\$7,078.08
1847	Utilities	Large	\$79,305.35
1847	Roads and Bridges	Small	\$36,531.64
1847	Roads and Bridges	Small	\$5,124.00
1847	Roads and Bridges	Small	\$10,650.94
1847	Debris Removal	Small	\$9,486.00
1847	Roads and Bridges	Small	\$19,360.30
1847	Roads and Bridges	Small	\$38,157.48
1847	Utilities	Small	\$50,358.01
1847	Roads and Bridges	Small	\$5,974.00
1847	Roads and Bridges	Small	\$37,582.82
1847	Roads and Bridges	Small	\$47,696.92
1934	Roads and Bridges	Small	\$2,411.11
1934	Roads and Bridges	Small	\$2,097.19
1934	Roads and Bridges	Small	\$2,053.03
1934	Roads and Bridges	Small	\$1,783.62
1934	Roads and Bridges	Small	\$8,602.80
1934	Roads and Bridges	Small	\$5,553.27
1934	Roads and Bridges	Small	\$11,925.41

1934	Roads and Bridges	Small	\$3,555.79
1934	Roads and Bridges	Small	\$41,513.91
1934	Roads and Bridges	Small	\$18,361.43
1934	Roads and Bridges	Small	\$15,454.82
1934	Roads and Bridges	Small	\$4,265.65
1934	Roads and Bridges	Small	\$3,047.27
1934	Roads and Bridges	Small	\$2,450.56
1934	Roads and Bridges	Small	\$3,399.94
1934	Roads and Bridges	Small	\$2,594.89
1934	Roads and Bridges	Small	\$19,901.32
1934	Roads and Bridges	Small	\$33,356.82
1934	Roads and Bridges	Small	\$11,889.80
1934	Roads and Bridges	Small	\$17,242.90
1934	Utilities	Large	\$287,419.52
1934	Debris Removal	Small	\$1,096.00
1934	Roads and Bridges	Small	\$7,357.99
1934	Roads and Bridges	Small	\$3,477.15
1934	Roads and Bridges	Small	\$9,594.20
1934	Roads and Bridges	Small	\$2,733.57
1934	Roads and Bridges	Small	\$3,858.54
1934	Roads and Bridges	Small	\$3,910.17
1934	Roads and Bridges	Small	\$6,440.15
1934	Roads and Bridges	Small	\$11,732.43
1934	Roads and Bridges	Small	\$6,212.61
1934	Roads and Bridges	Small	\$6,684.20
1934	Roads and Bridges	Small	\$4,660.00
1934	Roads and Bridges	Small	\$9,011.56
1934	Roads and Bridges	Small	\$12,384.71
1934	Roads and Bridges	Small	\$26,736.00
1934	Roads and Bridges	Small	\$12,307.50
1934	Roads and Bridges	Small	\$5,321.79
1934	Roads and Bridges	Small	\$12,144.94
1934	Roads and Bridges	Small	\$30,924.71
1934	Roads and Bridges	Small	\$2,703.90
1934	Roads and Bridges	Small	\$5,354.42
1934	Roads and Bridges	Small	\$56,574.77
1934	Roads and Bridges	Small	\$21,807.42
1934	Roads and Bridges	Small	\$6,822.46
1934	Roads and Bridges	Small	\$36,861.63
1934	Roads and Bridges	Small	\$12,190.53
1934	Roads and Bridges	Small	\$2,382.08
1934	Roads and Bridges	Small	\$5,500.00
1934	Roads and Bridges	Small	\$5,868.28
1934	Roads and Bridges	Small	\$2,958.42
1934	Roads and Bridges	Small	\$11,293.30
1934	Roads and Bridges	Small	\$2,100.00
1934	Roads and Bridges	Small	\$3,709.21
1934	Roads and Bridges	Small	\$23,929.93
1934	Debris Removal	Small	\$2,304.00
1934	Roads and Bridges	Small	\$1,630.45
1934	Roads and Bridges	Small	\$12,860.92
1934	Roads and Bridges	Small	\$7,562.98
1934	Roads and Bridges	Small	\$4,991.00
1934	Roads and Bridges	Large	\$69,540.20
1934	Roads and Bridges	Small	\$4,285.07
1934	Roads and Bridges	Small	\$7,733.17
1934	Roads and Bridges	Small	\$6,166.53
1934	Roads and Bridges	Small	\$16,505.93
1934	Roads and Bridges	Small	\$46,605.56

1934	Roads and Bridges	Small	\$5,102.55
1934	Roads and Bridges	Small	\$2,309.53
1934	Roads and Bridges	Small	\$2,680.21
1934	Roads and Bridges	Small	\$2,242.91
1934	Roads and Bridges	Small	\$12,183.26
1934	Roads and Bridges	Small	\$3,322.76
1934	Roads and Bridges	Small	\$14,424.37
1934	Roads and Bridges	Small	\$4,150.97
1934	Roads and Bridges	Small	\$13,775.04
1934	Roads and Bridges	Small	\$23,549.54
1934	Roads and Bridges	Small	\$7,946.91
1934	Roads and Bridges	Small	\$3,537.66
1961	Emergency Protective Measures	Small	\$3,070.00
1961	Emergency Protective Measures	Small	\$3,862.55
1961	Emergency Protective Measures	Small	\$2,338.50
1961	Emergency Protective Measures	Small	\$9,126.76
1961	Roads and Bridges	Small	\$4,021.20
1961	Roads and Bridges	Small	\$3,212.07
1961	Emergency Protective Measures	Small	\$9,986.11
1961	Roads and Bridges	Small	\$5,783.83
1961	Roads and Bridges	Small	\$5,535.74
1961	Emergency Protective Measures	Small	\$7,575.00
1961	Roads and Bridges	Small	\$5,649.25
1961	Emergency Work Donated Resources	Small	\$260.00
1961	Emergency Protective Measures	Small	\$20,502.34
1961	Emergency Work Donated Resources	Small	\$730.67
1961	Roads and Bridges	Small	\$2,096.82
1961	Emergency Protective Measures	Small	\$2,901.32
1961	Emergency Protective Measures	Small	\$2,386.50
1961	Emergency Protective Measures	Small	\$52,392.22
1961	Emergency Protective Measures	Small	\$9,788.10
1961	Emergency Protective Measures	Small	\$8,178.49
1961	Roads and Bridges	Small	\$6,613.16
4130	Roads and Bridges	Large	\$92,139.86
4130	Roads and Bridges	Small	\$5,968.90
4130	Roads and Bridges	Small	\$34,232.22
4130	Debris Removal	Small	\$1,082.50
4130	Roads and Bridges	Small	\$54,765.01
4130	Roads and Bridges	Small	\$7,206.54
4130	Roads and Bridges	Small	\$5,074.90
4130	Utilities	Large	\$107,921.35
4130	Roads and Bridges	Small	\$20,255.67
4130	Debris Removal	Small	\$1,560.00
4130	Roads and Bridges	Small	\$9,711.00
1934	Roads and Bridges	Small	\$3,709.21
4130	Roads and Bridges	Small	\$2,392.80
4130	Roads and Bridges	Small	\$14,785.88
4130	Roads and Bridges	Small	\$1,722.95
4200	Roads and Bridges	Small	\$3,824.19
4200	Roads and Bridges	Small	\$114,413.34
4200	Roads and Bridges	Small	\$31,597.82
4200	Roads and Bridges	Small	\$56,800.46
4200	Roads and Bridges	Small	\$33,423.32
4200	Roads and Bridges	Small	\$40,708.05
4200	Utilities	Small	\$106,647.18
4200	Roads and Bridges	Small	\$45,059.98
4200	Roads and Bridges	Small	\$15,743.82
4200	Roads and Bridges	Small	\$64,697.70
4200	Roads and Bridges	Small	\$6,298.54

4200	Roads and Bridges	Small	\$32,290.97
4238	Roads and Bridges	Small	\$90,141.16
4238	Roads and Bridges	Small	\$86,929.63
4238	Public Utilities	Small	\$108,104.00
4238	Roads and Bridges	Large	\$47,169.29
4238	Roads and Bridges	Small	\$94,526.21
4238	Roads and Bridges	Small	\$99,461.98
4238	Roads and Bridges	Small	\$107,252.72
4238	Roads and Bridges	Large	\$80,877.13
4238	Roads and Bridges	Small	\$106,425.76
4238	Roads and Bridges	Small	\$100,762.60
4238	Public Utilities	Small	\$1,000.00
4238	Roads and Bridges	Small	\$99,380.59
4238	Roads and Bridges	Small	\$45,414.65
4451	Roads and Bridges	Small	\$23,544.67
4451	Utilities	Small	\$60,051.56
4451	Roads and Bridges	Small	\$4,368.57
4451	Roads and Bridges	Small	\$4,335.86
4451	Roads and Bridges	Small	\$61,850.32
4451	Management Costs	Small	\$1,348.88
4451	Utilities	Small	\$112,701.34
4451	Parks, Recreational Facilities, and Other	Small	\$15,484.94
4451	Water Control Facilities	Small	\$55,113.50
4451	Roads and Bridges	Small	\$26,761.08
4451	Roads and Bridges	Small	\$8,606.29
4451	Utilities	Small	\$15,105.49
4451	Management Costs	Small	\$251.14
4451	Utilities	Small	\$22,641.60
4451	Utilities	Small	\$32,900.31
4451	Roads and Bridges	Small	\$22,148.76
4451	Utilities	Small	\$122,170.39
4451	Utilities	Small	\$6,234.44
4451	Management Costs	Small	\$6,137.71
4451	Roads and Bridges	Small	\$5,738.19
4451	Management Costs	Small	\$5,649.38
4451	Management Costs	Small	\$582.73
4451	Roads and Bridges	Small	\$28,655.51
4451	Emergency Protective Measures	Small	\$10,052.83
4451	Utilities	Small	\$27,566.80
4490	Emergency Protective Measures	Small	\$4,340.20
4490	Emergency Protective Measures	Small	\$6,091.61
4130	Roads and Bridges	Small	\$2,392.80
Total			\$6,740,684.30

Source: Federal Emergency Management Agency – June 2025

2.2 JURISDICTIONAL PROFILES AND MITIGATION CAPABILITIES

2.2.1 Unincorporated Sullivan County

Sullivan County is in the northern part of Missouri, centrally positioned within the state's northern tier. Its history traces back to being part of the vast Louisiana Purchase in 1803, with the first permanent American settlements appearing around 1836. Initially part of Chariton County, it was officially organized as Sullivan County on February 14, 1845, named in honor of Revolutionary War General John Sullivan. The county seat, Milan, was strategically established near its geographical center, serving as a hub for the primarily agricultural community that would face significant challenges, including the divisions of the Civil War, before flourishing with the arrival of the railroad in the late 19th century.

Sullivan County, Missouri, operates under a traditional county government structure, with key political offices largely focused on local administration and services. The primary governing body is the County Commission, which typically consists of a Presiding Commissioner and two Associate Commissioners representing different districts within the county. These elected officials are responsible for legislative decisions, overseeing county finances, and managing various county departments to ensure the smooth operation of local government. Other crucial elected countywide officials include the County Clerk, who handles records and elections; the Assessor, responsible for property valuation; and the Collector/Treasurer, who manages county funds and tax collection.

Beyond the commission and core administrative roles, Sullivan County has several other essential political offices and departments that serve the public. These include the Prosecuting Attorney, who handles legal matters and criminal prosecution for the county; the Sheriff, responsible for law enforcement and maintaining public safety; and the Circuit Clerk, who manages court records and judicial administration. Additionally, departments like the Public Administrator, Recorder of Deeds, and Coroner provide specialized services vital to the community's well-being and legal framework. These offices, along with departments like the Health Department, work collaboratively to deliver a wide range of services, from public health initiatives to maintaining official records and ensuring justice.

Mitigation Initiatives/Capabilities

The County has few ordinances in place.

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 Sullivan County Mitigation Capabilities

Capabilities	Status, <i>Including Date of Document or Policy</i>
Planning Capabilities	
Comprehensive Plan	
Builder's Plan	
Capital Improvement Plan	
City Emergency Operations Plan	

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

Capabilities	Status, Including Date of Document or Policy
National Weather Service (NWS) Storm Ready	
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	
ISO Fire Rating	
Economic Development Program	
Land Use Program	
Public Education/Awareness	
Property Acquisition	
Planning/Zoning Boards	
Stream Maintenance Program	
Tree Trimming Program	
Engineering Studies for Streams (Local/County/Regional)	
Mutual Aid Agreements	
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	
Hazard Analysis/Risk Assessment (County)	
Flood Insurance Maps	
FEMA Flood Insurance Study (Detailed)	
Evacuation Route Map	
Critical Facilities Inventory	
Vulnerable Population Inventory	
Land Use Map	
Staff/Department	
Building Code Official	
Building Inspector	
Mapping Specialist (GIS)	
Engineer	
Development Planner	
Public Works Official	
Emergency Management Director	
NFIP Floodplain Administrator	
Emergency Response Team	
Hazardous Materials Expert	
Local Emergency Planning Committee	
County Emergency Management Commission	
Sanitation Department	
Transportation Department	
Economic Development Department	
Housing Department	
Historic Preservation	
Non-Governmental Organizations (NGOs)	
American Red Cross	
Salvation Army	
Veterans Groups	
Local Environmental Organization	
Homeowner Associations	
Neighborhood Associations	
Chamber of Commerce	
Community Organizations (Lions, Kiwanis, etc.)	

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

Source: Data Collection Questionnaire, [Date](#)

2.2.2 Green City

Green City, Missouri, is a small town nestled in the northern part of Sullivan County, approximately 15 miles northeast of the county seat, Milan. Its location in this rural section of North Missouri places it amidst the rolling agricultural landscapes characteristic of the region. The town's grid pattern of streets is set at a diagonal to the roughly northeast-to-southwest alignment of the railroad tracks, reflecting their origins as a railroad town. While geographically small, its position within Sullivan County made it a vital point for trade and transportation in its early days.

The history of Green City begins in April 1880, when Sullivan County farmer Henry Pfeiffer commissioned surveyor Thomas J. Dockery to lay out the town in what was then a cornfield. The driving force behind its establishment was the Quincy, Missouri & Pacific Railroad, which laid tracks through the area in the early 1880s. A rail depot, built through local donations, quickly became the economic heart of the burgeoning community. Businesses, including a store and warehouse, soon followed, and S.H. Davis became the first postmaster, even moving a small building from the nearby village of Kiddville to serve as the first post office. Green City was officially incorporated on February 10, 1882.

Green City's early history was marked by rapid development, including the establishment of the Green City College in 1885, which provided both college preparatory and four-year collegiate programs. The town, like many in rural Missouri, faced challenges such as natural disasters, including a large tornado in 1918 that narrowly missed the town but devastated surrounding rural areas. A significant fire in 1931 destroyed much of the east side of the town square. Notably, the town also gained a footnote in American criminal history with the apprehension of notorious bank robber and "gangster" Fred "Killer" Burke near Green City in March 1933, after he had been living there under an assumed name. Though the railroad depot ceased operations in 1950, Green City continues today as a close-knit rural community.

Mitigation Initiatives/Capabilities

The city has a few ordinances in place, those ordinances address planning and zoning, along with dangerous and dilapidated buildings through building codes.

The city 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 2.9. Green City Mitigation Capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
City Emergency Operations Plan	No
County Emergency Operations Plan	Yes
Local Recovery Plan	No
County Recovery Plan	No
City Mitigation Plan	No
County Mitigation Plan	Yes
Debris Management 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	No
Policies/Ordinance	
Zoning Ordinance	Yes, 7/23
Building Code	Yes, 7/23
Floodplain Ordinance	No
Subdivision Ordinance	Yes, 7/23
Tree Trimming Ordinance	Yes, 7/23
Nuisance Ordinance	No
Stormwater Ordinance	No
Drainage Ordinance	No
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	Yes, 7/23
Seismic Construction Ordinance	No
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	No
Hazard Awareness Program	No
National Flood Insurance Program (NFIP)	No
NFIP Community Rating System (CRS) program	No
National Weather Service (NWS) Storm Ready	No
Firewise Community Certification	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	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	Yes
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Director	No
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
Local Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes
Local Funding Availability	
Apply for Community Development Block	Yes
Fund projects through Capital	Unknown
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Unknown
Ability to incur debt through general obligation bonds	Unknown
Ability to incur debt through special tax bonds	Unknown
Ability to incur debt through private activities	No
Withhold spending in hazard prone areas	No

Source: Data Collection Questionnaire, 11/2025

2.2.3 Greencastle

Greencastle, Missouri, is a small municipality located in the central-eastern part of Sullivan County, approximately 10 miles east of the county seat, Milan, and a short distance west of the Adair County line. Situated within the typical rolling agricultural terrain of North Missouri, its precise location was influenced by early settlement patterns and, significantly, the eventual arrival of railroad infrastructure. This positioning allowed Greencastle to serve as a local service center for the surrounding farming community.

The history of Greencastle predates its formal incorporation, with the first permanent home built around 1853 by Marion Sanders. A Methodist Episcopal Church was organized as early as 1845 just south of the town's later site. The town's plat was officially surveyed on March 12, 1857, and it quickly established essential services like a post office and the first general store. Greencastle was formally incorporated on August 8, 1881, reflecting its growing status as a community.

A pivotal moment in Greencastle's development was the construction of a depot for the Quincy, Missouri, and Pacific Railroad in 1883. The railroad transformed Greencastle into a transportation hub, facilitating the shipment of agricultural products and the influx of goods, and spurring further economic activity, including the establishment of a gristmill in 1879 and a creamery in 1885. While it experienced a population peak in the early 20th century, like many rural towns, Greencastle has seen its population decline in later decades, but it continues to function as a small, close-knit community in Sullivan County.

Mitigation Initiatives/Capabilities

The city has a few ordinances in place

The city 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 2.10. Greencastle Mitigation Capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	County plan
Builder's Plan	No
Capital Improvement Plan	No
City Emergency Operations Plan	Yes
County Emergency Operations Plan	Yes
Local Recovery Plan	No
County Recovery Plan	No
City Mitigation Plan	No
County Mitigation Plan	Yes
Debris Management Plan	No
Economic Development Plan	County
Transportation Plan	No
Land-use Plan	NA
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	MDC
School Mitigation Plan	NA

Critical Facilities Plan	NA
Policies/Ordinance	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	Yes
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Stormwater Ordinance	No
Drainage Ordinance	No
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	Yes
Seismic Construction Ordinance	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	Yes
Hazard Awareness Program	Under county plan
National Flood Insurance Program (NFIP)	Under county plan
NFIP Community Rating System (CRS) program	No
National Weather Service (NWS) Storm Ready	Yes
Firewise Community Certification	No
Building Code Effectiveness Grading (BCEGs)	N/a
ISO Fire Rating	6
Economic Development Program	Green hills programs as available
Land Use Program	N/a
Public Education/Awareness	Yes
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes, water/sewer
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	Yes- county plan
Flood Insurance Maps	County plan
FEMA Flood Insurance Study (Detailed)	County plan
Evacuation Route Map	County plan
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	N/a
Building Inspector	N/a
Mapping Specialist (GIS)	N/a
Engineer	No
Development Planner	No
Public Works Official	Yes- water/sewer part time
Emergency Management Director	Yes- fire chief- part time
NFIP Floodplain Administrator	No
Emergency Response Team	No

Hazardous Materials Expert	No
Local Emergency Planning Committee	County organization
County Emergency Management Commission	County
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	Yes
Salvation Army	Yes
Veterans Groups	No
Local Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	Lions club
Local Funding Availability	
Apply for Community Development Block	Yes
Fund projects through Capital	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Withhold spending in hazard prone areas	No

Source: Local questionnaire 11/25

2.2.4 Village of Harris

Harris, Missouri, is located in the northwestern part of Sullivan County, in the northern region of the state. Situated at approximately 40°18'22"N latitude and 93°21'01"W longitude, it lies on Missouri Route 139, just west of Medicine Creek. This rural village is surrounded by agricultural land and is about 4.5 miles south of Newtown and approximately seven miles north of Osgood, placing it within a quiet, predominantly farming area of northern Missouri.

Harris, Missouri, was officially laid out in 1887, establishing its presence in northwestern Sullivan County. The community was named in honor of A.W. Harris, an early settler whose contributions likely played a role in the town's formation. Coinciding with its platting, a post office was also established in Harris in 1887, a crucial development for any burgeoning rural settlement as it facilitated communication and commerce, connecting the nascent community to the wider world. Like many small towns in the region, its initial purpose was to serve the surrounding agricultural community, providing a hub for goods, services, and social interaction.

Throughout its history, Harris has remained a small, rural village, reflecting the broader demographic and economic trends of northern Missouri. While specific major historical events are not widely documented, its continued existence speaks to the enduring nature of these small, close-knit communities. The history of Harris is largely intertwined with the agricultural heritage of Sullivan County and the daily lives of its residents, who have sustained the town through generations of farming and local enterprise.

Mitigation Initiatives/Capabilities

The village has few ordinances in place.

The village 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 2.11. Harris Mitigation Capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	
Builder's Plan	
Capital Improvement Plan	
City Emergency Operations Plan	
County Emergency Operations Plan	
Local Recovery Plan	
County Recovery Plan	
City Mitigation Plan	
County Mitigation Plan	
Debris Management Plan	
Economic Development Plan	
Transportation Plan	
Land-use Plan	
Flood Mitigation Assistance (FMA) Plan	
Watershed Plan	
Firewise or other fire mitigation plan	
School Mitigation Plan	
Critical Facilities Plan	
Policies/Ordinance	
Zoning Ordinance	
Building Code	
Floodplain Ordinance	
Subdivision Ordinance	
Tree Trimming Ordinance	
Nuisance Ordinance	
Stormwater Ordinance	
Drainage Ordinance	
Site Plan Review Requirements	
Historic Preservation Ordinance	
Landscape Ordinance	
Seismic Construction Ordinance	
Program	
Zoning/Land Use Restrictions	
Codes Building Site/Design	
Hazard Awareness Program	
National Flood Insurance Program (NFIP)	
NFIP Community Rating System (CRS) program	
National Weather Service (NWS) Storm Ready	
Firewise Community Certification	

Building Code Effectiveness Grading (BCEGs)	
ISO Fire Rating	
Economic Development Program	
Land Use Program	
Public Education/Awareness	
Property Acquisition	
Planning/Zoning Boards	
Stream Maintenance Program	
Tree Trimming Program	
Engineering Studies for Streams (Local/County/Regional)	
Mutual Aid Agreements	
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	
Hazard Analysis/Risk Assessment (County)	
Flood Insurance Maps	
FEMA Flood Insurance Study (Detailed)	
Evacuation Route Map	
Critical Facilities Inventory	
Vulnerable Population Inventory	
Land Use Map	
Staff/Department	
Building Code Official	
Building Inspector	
Mapping Specialist (GIS)	
Engineer	
Development Planner	
Public Works Official	
Emergency Management Director	
NFIP Floodplain Administrator	
Emergency Response Team	
Hazardous Materials Expert	
Local Emergency Planning Committee	
County Emergency Management Commission	
Sanitation Department	
Transportation Department	
Economic Development Department	
Housing Department	
Historic Preservation	
Non-Governmental Organizations (NGOs)	
American Red Cross	
Salvation Army	
Veterans Groups	
Local Environmental Organization	
Homeowner Associations	
Neighborhood Associations	
Chamber of Commerce	
Community Organizations (Lions, Kiwanis, etc.)	
Local Funding Availability	
Apply for Community Development Block	
Fund projects through Capital	
Authority to levy taxes for a specific purpose	
Fees for water, sewer, gas, or electric services	
Impact fees for new development	

Ability to incur debt through general obligation bonds	
Ability to incur debt through special tax bonds	
Ability to incur debt through private activities	
Withhold spending in hazard prone areas	

Source: Data Collection Questionnaire, [Date](#)

2.2.5 Village of Humphreys

The Village of Humphreys, Missouri, is situated in the southwestern part of Sullivan County, in northern Missouri. It is located at the intersection of Missouri State Routes 6 and 139, which are key routes for the area. Geographically, Humphreys lies at approximately 40°07'31"N latitude and 93°19'10"W longitude. This puts it in a rural setting, with the community of Galt about four miles to the west in neighboring Grundy County, and Medicine Creek and Muddy Creek flowing nearby to the west and east, respectively.

The Village of Humphreys, Missouri, was first surveyed in April 1881 by G.M. Garvey for the Stringer family, and was initially known as Haley City. When established, it comprised seventeen blocks with 246 lots, with further additions made in early 1882. It was during the spring of 1882 that the town's name was changed to Humphreys. The community experienced rapid early growth, largely due to its strategic location on the Quincy, Missouri & Pacific Railroad, with the train depot being constructed in August 1881, connecting the nascent village to broader trade and transportation networks.

A post office was established in Humphreys in 1881, operating continuously since its inception, which further solidified the village's role as a local service center. Like many rural towns in Sullivan County, its history is closely tied to agriculture and the railroad, which were vital for economic development in the late 19th and early 20th centuries. While Humphreys has remained a small village, its establishment and early growth reflect the typical pattern of settlement in northern Missouri, driven by the expansion of railroads and the need for local hubs to support farming communities.

Mitigation Initiatives/Capabilities

The village has a few ordinances in place, those ordinances address planning and zoning, along with dangerous and dilapidated buildings through building codes.

The village 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 2.12. Humphreys Mitigation Capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	
Builder's Plan	
Capital Improvement Plan	
City Emergency Operations Plan	
County Emergency Operations Plan	
Local Recovery Plan	
County Recovery Plan	
City Mitigation Plan	
County Mitigation Plan	
Debris Management Plan	
Economic Development Plan	
Transportation Plan	
Land-use Plan	
Flood Mitigation Assistance (FMA) Plan	
Watershed Plan	
Firewise or other fire mitigation plan	
School Mitigation Plan	
Critical Facilities Plan	
Policies/Ordinance	
Zoning Ordinance	
Building Code	
Floodplain Ordinance	
Subdivision Ordinance	
Tree Trimming Ordinance	
Nuisance Ordinance	
Stormwater Ordinance	
Drainage Ordinance	
Site Plan Review Requirements	
Historic Preservation Ordinance	
Landscape Ordinance	
Seismic Construction Ordinance	
Program	
Zoning/Land Use Restrictions	
Codes Building Site/Design	
Hazard Awareness Program	
National Flood Insurance Program (NFIP)	
NFIP Community Rating System (CRS) program	
National Weather Service (NWS) Storm Ready	
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	
ISO Fire Rating	
Economic Development Program	
Land Use Program	
Public Education/Awareness	
Property Acquisition	
Planning/Zoning Boards	
Stream Maintenance Program	
Tree Trimming Program	
Engineering Studies for Streams (Local/County/Regional)	
Mutual Aid Agreements	

Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	
Hazard Analysis/Risk Assessment (County)	
Flood Insurance Maps	
FEMA Flood Insurance Study (Detailed)	
Evacuation Route Map	
Critical Facilities Inventory	
Vulnerable Population Inventory	
Land Use Map	
Staff/Department	
Building Code Official	
Building Inspector	
Mapping Specialist (GIS)	
Engineer	
Development Planner	
Public Works Official	
Emergency Management Director	
NFIP Floodplain Administrator	
Emergency Response Team	
Hazardous Materials Expert	
Local Emergency Planning Committee	
County Emergency Management Commission	
Sanitation Department	
Transportation Department	
Economic Development Department	
Housing Department	
Historic Preservation	
Non-Governmental Organizations (NGOs)	
American Red Cross	
Salvation Army	
Veterans Groups	
Local Environmental Organization	
Homeowner Associations	
Neighborhood Associations	
Chamber of Commerce	
Community Organizations (Lions, Kiwanis, etc.)	
Local Funding Availability	
Apply for Community Development Block	
Fund projects through Capital	
Authority to levy taxes for a specific purpose	
Fees for water, sewer, gas, or electric services	
Impact fees for new development	
Ability to incur debt through general obligation bonds	
Ability to incur debt through special tax bonds	
Ability to incur debt through private activities	
Withhold spending in hazard prone areas	

Source: Data Collection Questionnaire, [Data](#)

2.2.6 City of Milan

Milan, Missouri, serves as the county seat of Sullivan County, located in the north-central part of

the state. It is strategically positioned at the intersection of Missouri Routes 5 and 6, making it a central point for travel within the county. The city is situated at approximately 40°12'12"N latitude and 93°07'28"W longitude. Locust Creek flows past the west side of the city, and the Locust Creek Conservation Area is located a few miles to the southwest, highlighting its setting within a predominantly rural and agricultural region of northern Missouri.

Milan, the county seat of Sullivan County, Missouri, was laid out in 1845 and is believed to be named after Milan, Italy. Its strategic importance was recognized early on, leading to the establishment of a post office in 1847. The town's early growth was intrinsically linked to its role as the administrative center of Sullivan County; the first county courts met in Milan at the home of A.C. Hill in May 1845. The first courthouse was erected in 1847, solidifying its status as the hub for local governance and legal proceedings.

Milan has experienced several significant historical developments, including its official incorporation by the state legislature on February 9, 1859. The town also saw the construction of a second courthouse, the first brick structure in Milan, between 1857 and 1858, built on the site of an old V-shaped Indian mound which was leveled for the public square. This second courthouse was unfortunately destroyed by fire in 1908, leading to the construction of the present Art Deco-style courthouse in 1939. Over the years, Milan has maintained its role as a vital service and commercial center for the surrounding agricultural community, with its history reflecting the broader trends of rural development in northern Missouri.

Mitigation Initiatives/Capabilities

The city has a few ordinances in place, those ordinances address planning and zoning, along with dangerous and dilapidated buildings through building codes.

The city 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 2.13. Milan Mitigation Capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	
Builder's Plan	
Capital Improvement Plan	
City Emergency Operations Plan	
County Emergency Operations Plan	
Local Recovery Plan	
County Recovery Plan	
City Mitigation Plan	
County Mitigation Plan	
Debris Management Plan	
Economic Development Plan	
Transportation Plan	
Land-use Plan	
Flood Mitigation Assistance (FMA) Plan	
Watershed Plan	
Firewise or other fire mitigation plan	
School Mitigation Plan	

Critical Facilities Plan	
Policies/Ordinance	
Zoning Ordinance	
Building Code	
Floodplain Ordinance	
Subdivision Ordinance	
Tree Trimming Ordinance	
Nuisance Ordinance	
Stormwater Ordinance	
Drainage Ordinance	
Site Plan Review Requirements	
Historic Preservation Ordinance	
Landscape Ordinance	
Seismic Construction Ordinance	
Program	
Zoning/Land Use Restrictions	
Codes Building Site/Design	
Hazard Awareness Program	
National Flood Insurance Program (NFIP)	
NFIP Community Rating System (CRS) program	
National Weather Service (NWS) Storm Ready	
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	
ISO Fire Rating	
Economic Development Program	
Land Use Program	
Public Education/Awareness	
Property Acquisition	
Planning/Zoning Boards	
Stream Maintenance Program	
Tree Trimming Program	
Engineering Studies for Streams (Local/County/Regional)	
Mutual Aid Agreements	
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	
Hazard Analysis/Risk Assessment (County)	
Flood Insurance Maps	
FEMA Flood Insurance Study (Detailed)	
Evacuation Route Map	
Critical Facilities Inventory	
Vulnerable Population Inventory	
Land Use Map	
Staff/Department	
Building Code Official	
Building Inspector	
Mapping Specialist (GIS)	
Engineer	
Development Planner	
Public Works Official	
Emergency Management Director	
NFIP Floodplain Administrator	
Emergency Response Team	

Hazardous Materials Expert	
Local Emergency Planning Committee	
County Emergency Management Commission	
Sanitation Department	
Transportation Department	
Economic Development Department	
Housing Department	
Historic Preservation	
Non-Governmental Organizations (NGOs)	
American Red Cross	
Salvation Army	
Veterans Groups	
Local Environmental Organization	
Homeowner Associations	
Neighborhood Associations	
Chamber of Commerce	
Community Organizations (Lions, Kiwanis, etc.)	
Local Funding Availability	
Apply for Community Development Block	
Fund projects through Capital	
Authority to levy taxes for a specific purpose	
Fees for water, sewer, gas, or electric services	
Impact fees for new development	
Ability to incur debt through general obligation bonds	
Ability to incur debt through special tax bonds	
Ability to incur debt through private activities	
Withhold spending in hazard prone areas	

Source: Data Collection Questionnaire, [Date](#)

2.2.7 City of Newtown

Newtown, Missouri, is situated in Sullivan County, in the northern part of the state. It is specifically located in the northeastern portion of Sullivan County, near the border with Adair County. This rural community lies within the geographic coordinates of approximately 40.23° N latitude and 93.18° W longitude, placing it in an area characterized by rolling hills and agricultural landscapes typical of northern Missouri.

The village's location offers a quiet, small-town atmosphere, far removed from major urban centers. It is accessible via local and state routes, with Missouri Route P passing through or near the community. Its position in northern Missouri means it is part of a region known for farming and is relatively close to larger towns such as Milan (the Sullivan County seat) to the west and Kirksville to the southeast, which provides some essential services and amenities not found directly in Newtown.

Newtown, Missouri, was platted in 1858, establishing its roots as a small community in Sullivan County. While details about its early development are somewhat limited, its founding in the mid-19th century places it within a period of significant westward expansion and settlement in Missouri. A post office was established in Newtown in 1887, indicating a growing and somewhat organized community that required such a service. Like many small towns in rural Missouri, its initial growth was likely tied to agriculture and the needs of local farmers.

One notable event in Newtown's history occurred on April 27, 1899, when the town was severely impacted by a tornado. This devastating storm reportedly destroyed the town and resulted in 20 fatalities, highlighting the vulnerability of early settlements to natural disasters. Despite such setbacks, the community persevered. Over the decades, Newtown's population has fluctuated, reflecting broader demographic trends in rural America, including periods of growth and decline. Its history, while not marked by grand national events, is a testament to the resilience of small-town life in the heartland.

Mitigation Initiatives/Capabilities

The city has a few ordinances in place, those ordinances address planning and zoning, along with dangerous and dilapidated buildings through building codes.

The city 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 2.14. Newtown Mitigation Capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	
Builder's Plan	
Capital Improvement Plan	
City Emergency Operations Plan	
County Emergency Operations Plan	
Local Recovery Plan	
County Recovery Plan	
City Mitigation Plan	
County Mitigation Plan	
Debris Management Plan	
Economic Development Plan	
Transportation Plan	
Land-use Plan	
Flood Mitigation Assistance (FMA) Plan	
Watershed Plan	
Firewise or other fire mitigation plan	
School Mitigation Plan	
Critical Facilities Plan	
Policies/Ordinance	
Zoning Ordinance	
Building Code	
Floodplain Ordinance	
Subdivision Ordinance	
Tree Trimming Ordinance	
Nuisance Ordinance	
Stormwater Ordinance	
Drainage Ordinance	
Site Plan Review Requirements	
Historic Preservation Ordinance	
Landscape Ordinance	
Seismic Construction Ordinance	

Program	
Zoning/Land Use Restrictions	
Codes Building Site/Design	
Hazard Awareness Program	
National Flood Insurance Program (NFIP)	
NFIP Community Rating System (CRS) program	
National Weather Service (NWS) Storm Ready	
Firewise Community Certification	
Building Code Effectiveness Grading (BCEGs)	
ISO Fire Rating	
Economic Development Program	
Land Use Program	
Public Education/Awareness	
Property Acquisition	
Planning/Zoning Boards	
Stream Maintenance Program	
Tree Trimming Program	
Engineering Studies for Streams (Local/County/Regional)	
Mutual Aid Agreements	
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	
Hazard Analysis/Risk Assessment (County)	
Flood Insurance Maps	
FEMA Flood Insurance Study (Detailed)	
Evacuation Route Map	
Critical Facilities Inventory	
Vulnerable Population Inventory	
Land Use Map	
Staff/Department	
Building Code Official	
Building Inspector	
Mapping Specialist (GIS)	
Engineer	
Development Planner	
Public Works Official	
Emergency Management Director	
NFIP Floodplain Administrator	
Emergency Response Team	
Hazardous Materials Expert	
Local Emergency Planning Committee	
County Emergency Management Commission	
Sanitation Department	
Transportation Department	
Economic Development Department	
Housing Department	
Historic Preservation	
Non-Governmental Organizations (NGOs)	
American Red Cross	
Salvation Army	
Veterans Groups	
Local Environmental Organization	
Homeowner Associations	

Neighborhood Associations	
Chamber of Commerce	
Community Organizations (Lions, Kiwanis, etc.)	
Local Funding Availability	
Apply for Community Development Block	
Fund projects through Capital	
Authority to levy taxes for a specific purpose	
Fees for water, sewer, gas, or electric services	
Impact fees for new development	
Ability to incur debt through general obligation bonds	
Ability to incur debt through special tax bonds	
Ability to incur debt through private activities	
Withhold spending in hazard prone areas	

Source: Data Collection Questionnaire, [Date](#)

2.2.8 Village of Pollock

Pollock, Missouri, is a village located in the north-central part of Sullivan County, in northern Missouri. Its geographic coordinates are approximately 40°21'30"N latitude and 93°05'01"W longitude. The community is situated on Missouri Route M, about one mile east of Missouri Route 5, and is roughly two miles south of the Sullivan-Putnam county line. A section of the Burlington and Quincy Railroad also passes by the west side of the town, contributing to its rural, agricultural setting.

Pollock, Missouri, was established in July 1873 by H.F. Warner and William Lane, initially comprising thirty-two blocks. Its founding came during a period of significant expansion in northern Missouri, driven largely by agricultural development and the burgeoning railroad industry. The strategic location near a section of the Burlington and Quincy Railroad likely played a crucial role in its establishment, as rail access was vital for transporting goods and connecting to larger markets. In 1876, the town expanded with an additional fourteen blocks to the south through what was known as Godfrey's Addition, indicating early growth and a hopeful outlook for the community.

Like many small towns in Sullivan County, Pollock's history is deeply intertwined with the rural landscape and the lives of its inhabitants who primarily engaged in farming. While no single dramatic event defines its past, its continued existence for over 150 years speaks to the resilience of these small, close-knit communities. The village has maintained its quiet, rural character, serving as a local hub for residents in the surrounding agricultural areas throughout its history.

Mitigation Initiatives/Capabilities

The village has a few ordinances in place, mainly dealing with dangerous and dilapidated buildings through building codes.

The village 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 2.15. Pollock Mitigation Capabilities

Capabilities	Status, Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
City Emergency Operations Plan	No
County Emergency Operations Plan	Yes
Local Recovery Plan	No
County Recovery Plan	No
City Mitigation Plan	No
County Mitigation Plan	Yes
Debris Management 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	NA
Critical Facilities Plan	No
Policies/Ordinance	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes, 2014
Stormwater Ordinance	No
Drainage Ordinance	No
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Seismic Construction Ordinance	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	Yes, 2025
Hazard Awareness Program	No
National Flood Insurance Program (NFIP)	No
NFIP Community Rating System (CRS) program	No
National Weather Service (NWS) Storm Ready	No
Firewise Community Certification	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	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	Code enforcement
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Director	No
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
Local Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	No
Local Funding Availability	
Apply for Community Development Block	Yes
Fund projects through Capital	No
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	No
Impact fees for new development	No
Ability to incur debt through general obligation bonds	Yes, maybe
Ability to incur debt through special tax bonds	Yes, maybe
Ability to incur debt through private activities	No
Withhold spending in hazard prone areas	No

Source: Data Collection Questionnaire, [Data](#)

2.2.9 Summary of Jurisdictional Capabilities

Table 2.16. Mitigation Capabilities Summary Table

CAPABILITIES	Uninc. Sullivan County	City of Green City	City of Greencastle	Village of Harris	Village of Humphreys	City of Milan	City of Newtown	Village of Pollock
Planning Capabilities								
Comprehensive Plan		No	Yes					No
Builder's Plan		No	No					No
Capital Improvement Plan		No	No					No
City Emergency Operations Plan		No	Yes					No
County Emergency Operations Plan		Yes	Yes					Yes
Local Recovery Plan		No	No					No
County Recovery Plan		No	No					No
City Mitigation Plan		No	No					No
County Mitigation Plan		Yes	Yes					Yes
Debris Management Plan		No	No					No
Economic Development Plan		No	Yes					No
Transportation Plan		No	No					No
Land-use Plan		No	NA					No
Flood Mitigation Assistance (FMA) Plan		No	No					No
Watershed Plan		No	No					No
Firewise or other fire mitigation plan		No	MDC					No
School Mitigation Plan		No	NA					NA
Critical Facilities Plan		No	NA					No
Policies/Ordinance								
Zoning Ordinance		Yes	No					No
Building Code		Yes	No					No
Floodplain Ordinance		No	No					No
Subdivision Ordinance		Yes	Yes					No
Tree Trimming Ordinance		Yes	No					No
Nuisance Ordinance		No	Yes					Yes
Stormwater Ordinance		No	No					No
Drainage Ordinance		No	No					No
Site Plan Review Requirements		No	No					No
Historic Preservation Ordinance		No	No					No
Landscape Ordinance		Yes	Yes					No
Seismic Construction Ordinance		No	No					No

CAPABILITIES	Uninc. Sullivan County	City of Green City	City of Greencastle	Village of Harris	Village of Humphreys	City of Milan	City of Newtown	Village of Pollock
Program								
Zoning/Land Use Restrictions		Yes	No					No
Codes Building Site/Design		No	Yes					Yes, 2025
Hazard Awareness Program		No	Yes					No
National Flood Insurance Program (NFIP)		No	Yes					No
NFIP Community Rating System (CRS) program		No	No					No
National Weather Service (NWS) Storm Ready		No	Yes					No
Firewise Community Certification		No	No					No
Building Code Effectiveness Grading (BCEGs)		No	N/a					No
ISO Fire Rating		No	6					No
Economic Development Program		No	Yes					No
Land Use Program		No	N/a					No
Public Education/Awareness		No	Yes					No
Property Acquisition		No	No					No
Planning/Zoning Boards		No	No					No
Stream Maintenance Program		No	No					No
Tree Trimming Program		No	No					No
Engineering Studies for Streams (Local/County/Regional)		No	Yes					No
Mutual Aid Agreements		No	Yes					No
Studies/Reports/Maps								
Hazard Analysis/Risk Assessment (Local)		No	No					No
Hazard Analysis/Risk Assessment (County)		No	Yes					No
Flood Insurance Maps		No	Yes					No
FEMA Flood Insurance Study (Detailed)		No	Yes					No
Evacuation Route Map		No	Yes					No
Critical Facilities Inventory		No	No					No
Vulnerable Population Inventory		No	No					No
Land Use Map		No	No					No
Staff/Department								
Building Code Official		Yes	N/a					Yes

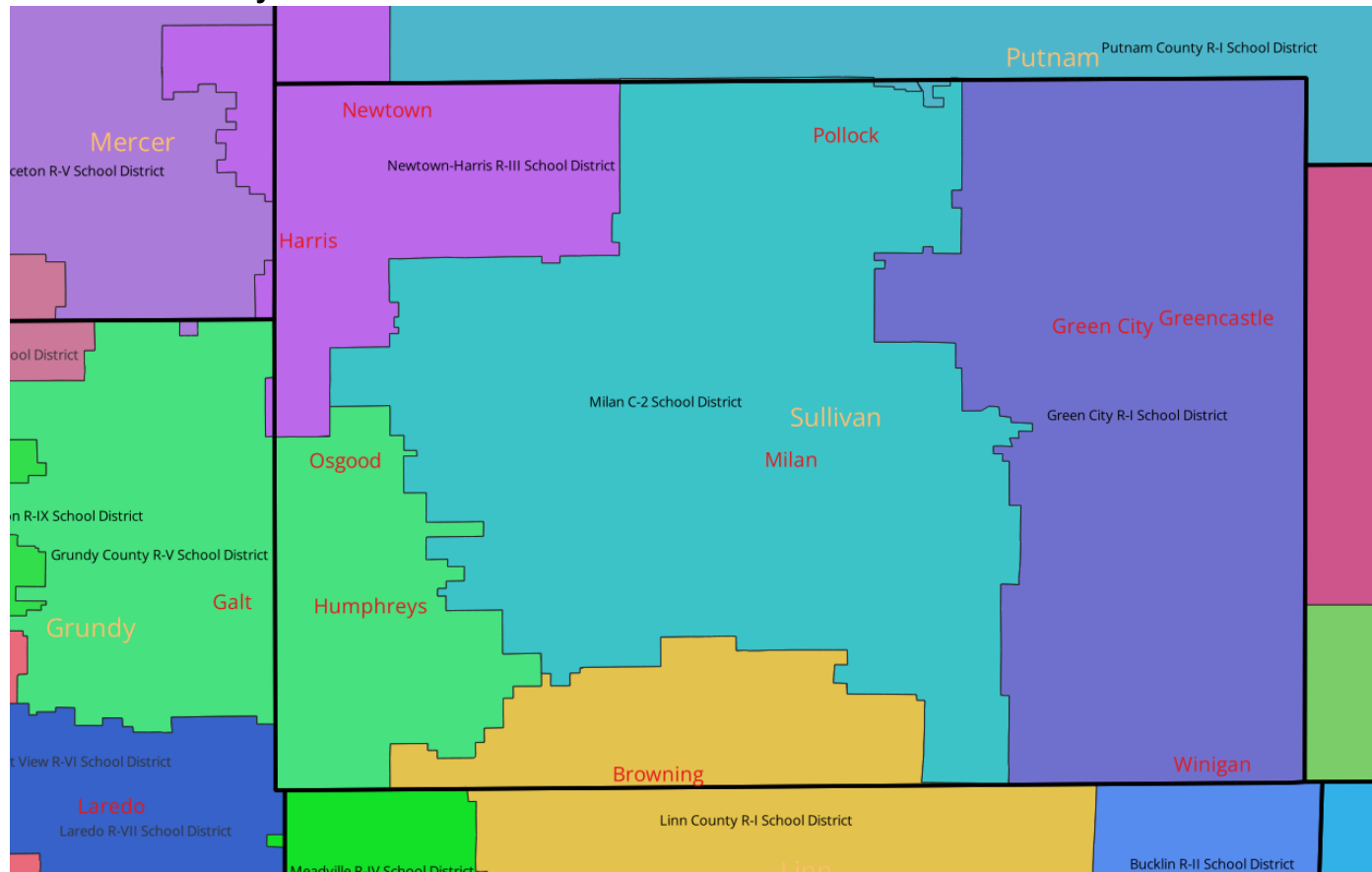
CAPABILITIES	Uninc. Sullivan County	City of Green City	City of Greencastle	Village of Harris	Village of Humphreys	City of Milan	City of Newtown	Village of Pollock
Building Inspector		No	N/a					No
Mapping Specialist (GIS)		No	N/a					No
Engineer		No	No					No
Development Planner		No	No					No
Public Works Official		No	Yes					No
Emergency Management Director		No	Yes					No
NFIP Floodplain Administrator		No	No					No
Emergency Response Team		No	No					No
Hazardous Materials Expert		No	No					No
Local Emergency Planning Committee		No	Yes					No
County Emergency Management Commission		No	No					No
Sanitation Department		No	No					No
Transportation Department		No	No					No
Economic Development Department		No	No					No
Housing Department		No	No					No
Historic Preservation		No	No					No
Non-Governmental Organizations (NGOs)								
American Red Cross		No	Yes					No
Salvation Army		No	Yes					No
Veterans Groups		No	No					No
Local Environmental Organization		No	No					No
Homeowner Associations		No	No					No
Neighborhood Associations		No	No					No
Chamber of Commerce		Yes	No					No
Community Organizations (Lions, Kiwanis, etc.)		Yes	Yes					No
Financial Resources								
Apply for Community Development Block Grants		Yes	Yes					Yes
Fund projects through Capital Improvements funding		Unknown	Yes					No
Authority to levy taxes for a specific purpose		Yes	Yes					Yes
Fees for water, sewer, gas, or electric services		Yes	Yes					No
Impact fees for new development		Unknown	No					No

CAPABILITIES	Uninc. Sullivan County	City of Green City	City of Greencastle	Village of Harris	Village of Humphreys	City of Milan	City of Newtown	Village of Pollock
Ability to incur debt through general obligation bonds		Unknown	Yes					Maybe
Ability to incur debt through special tax bonds		Unknown	Yes					Maybe
Ability to incur debt through private activities		No	No					No
Withhold spending in hazard prone areas		No	No					No

Source: Local questionnaires

2.2.10 School District Profiles and Mitigation Capabilities

Figure 2.4 Map of Sullivan County School districts



Source : Missouri DESE GIS layer – 11/2025

GREEN CITY R-I

301 N East St.
Green City, MO 63545

The school conducts severe weather and evacuation drills. Each school building is equipped with a PA system used for emergency announcements and staff also receive alerts through internal radio and phone systems.

The district is governed by a Board of Education consisting of seven board members.

The district 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.

Enrollment					
	Schools	Cert. Staff	Resident	Non-Res.	Total
Elementary Schools	1	18	132	0	132
High Schools	1	21	132	0	132
Total:		39	264	0	264

Source: Missouri DESE School directory – 11/2025

MILAN C-2

373 S Market St.
Milan, MO 63556

The school conducts severe weather and evacuation drills. Each school building is equipped with a PA system used for emergency announcements and staff also receive alerts through internal radio and phone systems.

The district is governed by a Board of Education consisting of seven board members.

The district 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.

Enrollment					
	Schools	Cert. Staff	Resident	Non-Res.	Total
Elementary Schools	1	35	368	0	368
High Schools	1	34	263	0	263

Total:		69	631	0	631
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Source: Missouri DESE School directory – 11/2025

NEWTOWN-HARRIS R-III

306 N Main St.
Newtown, MO, 64667

The school conducts severe weather and evacuation drills. Each school building is equipped with a PA system used for emergency announcements and staff also receive alerts through internal radio and phone systems.

The district is governed by a Board of Education consisting of seven board members.

The district 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.

Enrollment					
	Schools	Cert. Staff	Resident	Non-Res.	Total
Elementary Schools	1	11	41	0	41
High Schools	1	11	36	0	36
Total:		22	77	0	77

Source: Missouri DESE School directory – 11/2025

Table 2.17. Summary of Mitigation Capabilities, Sullivan County Schools

Capability	Green City R-I	Milan C-2	Newtown-Harris R-III
Planning Elements			
Master Plan			No
Capital Improvement Plan			Yes – 9/2025
Emergency Plan			Yes – 9/2025
Weapons Policy			Yes – 3/2010
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			No
Special Tax Bonds			No
Private Activities/Donations			Yes
State and Federal Funds			Yes
Other			

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

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.

A Multi-Jurisdictional Local Hazard Mitigation Plan was adopted in 2021. This risk assessment is an update to the risk assessment previously prepared.

The risk assessment for Sullivan County and participating jurisdictions followed the methodology described in the 2023 FEMA *Local Mitigation Planning Policy Guide*, which outlines the following risk assessment requirements:

1. Description of all natural hazards that can affect the jurisdictions.
2. Inclusion of information on location for each identified hazard.
3. Provision of the extent of the hazards that can affect the planning area.
4. Inclusion of information on previous hazard events for each hazard that affects the planning area.

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; and
3. Problem Statement briefly summarizes the problem and develops possible solutions.

3.1 HAZARD IDENTIFICATION

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

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 Sullivan 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 MPC previously developed a multi-jurisdictional Hazard Mitigation Plan Update approved in 2021. Grundy County.

Levee failure was excluded from the mitigation planning process as there are no mapped levees nor associated levee protected areas within or immediately upstream of Grundy County. Sinkholes were excluded from the plan as there are no known sinkholes in Grundy County.

3.1.2 Review Disaster Declaration History

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, There have been no federally declared disasters since the last plan update

Use this past Public Assistance and Disaster Declaration data when considering Mitigation Actions for the Mitigation Strategy.

Disaster 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.

FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs of major disaster declarations. Determinations for declaration type are based on scale and type of damages and institutions or industrial sectors affected.

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

Disaster Number	Description	Declaration Date Incident Period	Individual Assistance (IA) Public Assistance (PA)
372	Severe Storm	4/19/1973	N/A
995	Flood	6/10/1993-10/25/1993	IA & PA
1054	Severe Storm	5/13/1995-6/23/1995	N/A
1403	Severe Ice Storm	1/29/2002-2/13/2002	IA & PA
1412	Severe Storm	4/24/2002-6/10/2002	PA
1524	Severe Storm	5/18/2004-5/31/2004	IA
1708	Severe Storm	5/5/2007-5/18/2007	IA & PA
1736	Missouri Severe Winter Storms	12/8/2007 – 12/15/2007	PA
1773	Severe Storm	6/1/2008-8/13/2008	IA & PA
1809	Severe Storm	9/11/2008-9/24/2008	IA & PA
1934	Severe Storm	6/12/2010-7/31/2012	IA & PA
1961	Severe Storm	1/31/2011-2/5/2011	IA & PA
3017	Drought	9/24/1976	PA
3232	Hurricane Katrina Evacuation	8/29/2005-10/1/2005	PA
3281	Severe Ice Storm	12/8/2007-12/15/2007	IA & PA
3303	Severe Ice Storm	1/26/2009-1/28/2009	IA & PA
3317	Severe Storm	1/31/2011-2/5/2011	IA & PA
4200	Severe Storms, Tornadoes, Straight-Line Wind, Flooding	9/9/2014-9/11/2014	PA
4238	Severe Storm	5/15/2015-7/27/2015	IA & PA
4451	Severe Storm	4/29/2019-7/5/2019	IA & PA
4490	Biological	1/20/2020-5/11/2023	IA & PA

Source: Federal Emergency Management Agency,
<https://www.fema.gov/data-visualization-summary-disaster-declarations-and-grants>

3.1.3 Research Additional Sources

List the 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 planning area Hazard Mitigation Plan (May 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);
- Sullivan County and local Comprehensive Plans to the extent available
- Sullivan County Emergency Management
- Sullivan 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.

3.1.4 Hazards Identified

After reviewing the hazards in the 2023 Missouri State Hazard Mitigation Plan as well as the disaster declaration history, the HMPC agreed on 9 natural hazards that significantly affect the planning area. These hazards are listed below in Table 3.2 with an “X” indicating the affected jurisdictions. Each of these hazards is profiled in further detail in the next section.

Table 3.2. Hazards Identified for Each Jurisdiction

Jurisdiction	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding (River and Flash)	Severe Winter Weather	Thunderstorm/Lightning/ Hail/High Wind	Tornado	Wildfire
Sullivan County	x	x	x	x	x	x	x	x	x
City of Milan	-	x	x	x	x	x	-	x	x
City of Green City	x	x	x	x	x	x	-	x	x
City of Green Castle	x	x	x	x	x	x	x	x	x
City of Newtown									
Village of Humphreys									
Village of Pollock									
Milan C-2			x	x	x	x	x	x	
Green City R-I									
Newtown Harris R-III			x	x	x	x	x	x	

3.1.5 Multi-Jurisdictional Risk Assessment

For this multi-jurisdictional plan, the risks are assessed for each jurisdiction where they deviate from the risks facing the entire planning area. The planning area is fairly uniform, in terms of climate and topography, as well as building construction characteristics. Accordingly, the geographic areas of occurrence for weather-related hazards do not vary greatly across the planning area for most hazards. Milan is slightly more urbanized within the planning area and has more assets that are vulnerable to the weather-related hazards and varied development trends impact the future vulnerability. Similarly, more rural areas have more assets (crops/livestock) that are vulnerable to animal/plant/crop disease. These differences are discussed in greater detail in the vulnerability sections of each hazard.

The hazards that vary across the planning area in terms of risk include dam failure, flash flood, and grass or wildland fire. The difference in hazards is explained in each hazard profile under a separate heading.

3.2 ASSETS AT RISK

This section assesses the population, structures, critical facilities and infrastructure, and other important assets in the planning area that may be at risk to natural hazards. **Table 3.3** shows the total population, building count, estimated value of buildings, estimated value of contents and estimated total exposure to parcels by jurisdiction.

3.2.1 Total Exposure of Population and Structures

For the 2023 State Plan, SEMA utilized a structure inventory dataset developed by the University of Missouri GIS Department (MSDIS) to determine the number of structures exposed to risks. MSDIS created a point and/or footprint dataset for every roof line in every county in the state of Missouri. This dataset is attributed with the type of structure such as Residential, Commercial, etc. This dataset, along with additional State Mitigation Planning Resources, is available on Google Drive in both GIS and Excel format and organized by County:

Unincorporated County and Incorporated Cities

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 (\$ Values in Thousands)

Jurisdiction	2023 Annual Population Estimate	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
Unincorporated Sullivan County	2,877	6545	\$190,724.78	\$109,753	\$300,478
City of Milan	1,883	747	\$108,135.30	\$63,497	\$171,632
City of Green City	560	324	\$40,952.19	\$22,001	\$62,953
City of Green Castle	331	102	\$13,529.31	\$7,961	\$21,490
City of Harris	0	39	\$4,298.24	\$2,254	\$6,552
City of Newtown	112	99	\$10,298.19	\$5,023	\$15,321
Village of Humphreys	121	63	\$9,759.75	\$3,808	\$13,568
Village of Pollock	19	46	\$5,588.26	\$3,012	\$8,600
Total	5,903	8019	\$383,286.02	\$217,309.00	\$609,762

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 (\$ Values in 1,000s)

Jurisdiction	Agricultural	Commercial	Education	Government	Industrial	Residential	Grand Total
Sullivan County	\$10,672.92	\$9,612.88	\$0	\$644.79	\$14,598.50	\$155,195.71	\$190,724.78
City of Milan	\$0	\$16,167.11	\$7,503.89	\$2,579.14	\$3,808.30	\$78,076.85	\$108,135.30
City of Green City	\$26.90	\$3,932.54	\$1,500.78	\$644.79	\$0	\$34,847.18	\$40,952.19
City of Greencastle	\$0	\$1,747.80	\$0	\$644.79	\$0	\$11,136.73	\$13,529.31
City of Newtown	\$62.08	\$1,310.85	\$1,500.78	\$0	\$0	\$7,424.49	\$10,298.19
Village of Humphreys	\$16.55	\$873.90	\$3,001.56	\$0	\$0	\$5,867.74	\$9,759.75

Village of Pollock	\$2.07	\$436.95	\$0	\$0	\$0	\$5,149.24	\$5,588.26
Total	\$10,795.00	\$34,300.50	\$13,507.00	\$4,513.50	\$18,406.80	\$307,876.67	\$389,399.47

Source: Missouri GIS Database, SEMA Mitigation Management Section

Table 3.5. Building Counts by Usage Type

Jurisdiction	Agriculture Counts	Commercial Counts	Education Counts	Government Counts	Industrial Counts	Residential Counts	Total
City of Milan	0	74	5	4	12	652	747
City of Green City	13	18	1	1	0	291	324
City of Greencastle	0	8	0	1	0	93	102
City of Newtown	30	6	1	0	0	62	99
Village of Humphreys	8	4	2	0	0	49	63
Village of Pollock	1	2	0	0	0	43	46
Unincorporated Sullivan County	5,158	44	0	1	46	1,296	6,545
Totals	5,217	157	9	7	58	2,571	8,019

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 (\$)
Green city R-I	264	1			
Milan C-2	631	1			
Newtown-Harris R-III	77	1			

Source: [MCDS Portal | Missouri Department of Elementary and Secondary Education - MCDS \(mo.gov\)](#).

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 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:

- Interview with County Emergency Management Director
- Interview with City Government Employees
- HAZUS
- Data Collection Questionnaires

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
Sullivan County																								
City of Milan																								

City of Green City																							
City of Green Castle																							
City of Harris																							
City of Newtown																							
Village of Humphreys																							
Village of Pollock																							
Totals																							

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

Bridges: Insert a map that shows the locations of bridges in the planning area included in the National Bridge Inventory data set. This data can be found within Hazus or can be requested from the Missouri Department of Transportation. Identify on the map which of the bridges is “scour critical.” Define “scour critical.”

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.

Set forth in the plan the number of scour critical bridges identified in the planning area. Include information about whether any are located within corporate city limits. See 2023 State Plan for discussion and map of state-owned scour-critical bridges. An MS Excel Spreadsheet can be downloaded from the National Bridge Inventory to provide the numbers of bridges by state and county, including the number in each deficiency category. See <http://www.fhwa.dot.gov/bridge/nbi/no10/county.cfm>

Figure 3.1. County A Bridges

[Insert Map]

An interactive website developed by Transportation for America allows users to locate and map structurally deficient bridges in their area. Transportation for America is an alliance of elected, business, and civic leaders from communities across the country, united to ensure that states and the federal government step up to invest in smart, homegrown, locally-driven transportation solutions. To use the interactive map, click the following link: <http://t4america.org/maps-tools/bridges/>

Information obtained from this tool can either be described in text or provided as a screen shot of the map below.

Figure 3.2. County A Structurally Deficient Bridges

[Insert Map]

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.

Include in the plan specific natural, historic, cultural, and economic assets in the planning area, which could include the following:

Threatened and Endangered Species: Insert a table (**Table 3.8**) showing Federally Threatened, Endangered, Proposed and Candidate Species in the county.

Table 3.8. Threatened and Endangered Species in Sullivan 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		
Topeka Shiner	Notropis topeka (=tristis)	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/species); also <https://ecos.fws.gov/ipac/>

Natural Resources: The Missouri Department of Conservation (MDC) provides a database of lands the MDC owns, leases, or manages for public use. The following table provides a list of the names and locations of parks and conservation areas in Grundy County.

Table 3.9. Parks in Sullivan County

Park / Conservation Area	Address	City
Rocky Ford Access	North of browning on Vernon Rd.	Browning
Locust Creek Conservation Area	South of Milan off highway 5	Milan
Elmwood Lake	North of Milan off highway 5	Milan
Sears Community Lake	Northeast of Milan off route RA	Milan
Union Ridge Conservation Area	North of Greencastle off route D	Greencastle
Dark Hollow Natural Area	North of Green City off highway 129	Green City
Morris Prairie CA	South of Unionville off route F	Unionville

Source: Missouri state parks website, online search engines – July 2025.

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. Sullivan County Properties on the National Register of Historic Places

Property	Address	City	Date Listed
Camp Ground Church and Cemetery	W of Milan	Milan	9/23/1985
Green City Presbyterian Church	One East St.	Green City	2/10/2000
Green City Railroad Depot	202 Lincoln St.	Green City	1/15/1999
Henry Cemetery	E side of MO Z, approx 1 mi. S of	Reger	12/28/2005
Milan Railroad Depot	Jct. of E. Third St. and Short St.	Milan	1/4/1996
Quincy, Omaha and Kansas City Railroad	117 N. Water St.	Milan	1/7/1992

Source: National Register of Historic Places – Spreadsheet of NRHP Listed Properties

<https://www.nps.gov/subjects/nationalregister/data-downloads.htm>

Economic Resources: Insert a table showing major non-government employers in the planning area (Table 3.11).

Table 3.11. Major Non-Government Employers in Sullivan County

Employer Name	Main Locations	Product or Service	Employees

Source: Data Collection Questionnaires; local Economic Development Commissions

Agriculture: Agriculture plays an important role in the economy of Sullivan County. While exact employment numbers are not broken out by sector at the county level, the high number of farms (642) and the large share of land in agriculture (92%) suggest that a significant portion of the local workforce is tied to agriculture, either directly or indirectly.

Agriculture in Sullivan County is a cornerstone of the local economy as a major source of employment and business activity. It also is a driver of economic resilience and rural development.

Table 3.12. Economic Contribution of Missouri Agriculture and Forestry for Sullivan County

	Added Value (in \$million)	Output (in \$million)	Jobs Supported	Household Income Generated
Sullivan County	\$405.5	\$1,280.1	3,924	\$269.6 Million

Source: Missouri Department of agriculture

Table 3.13. Top crops in Sullivan County

Sullivan	Forage	Soybeans	Corn	Wheat	Corn for Silage
Acres	53,552	42,173	14,942	1,246	450

Source: 2022 USDA Census of Agriculture

Table 3.14. Top livestock by inventory in Sullivan County

Sullivan	Hogs and	Cattle and	Horses,	Other animals	Poultry and	Sheep,
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County	Pigs	Calves	Ponies, & Mules		Eggs	goats, & wool
# Present	121,549	20,602	82	3	Not disclosed	Not disclosed



Total and Per Farm Overview, 2022 and change since 2017

	2022	% change since 2017
Number of farms	642	-4
Land in farms (acres)	318,779	+3
Average size of farm (acres)	497	+7
Total	(\$)	
Market value of products sold	183,587,000	+3
Government payments	3,960,000	-21
Farm-related income	6,300,000	-5
Total farm production expenses	155,693,000	+12
Net cash farm income	38,154,000	-26
Per farm average	(\$)	
Market value of products sold	285,960	+8
Government payments ^a	13,562	+5
Farm-related income ^a	19,385	+4
Total farm production expenses	242,512	+17
Net cash farm income	59,430	-22

1 Percent of state agriculture sales

Share of Sales by Type (%)

Crops	22
Livestock, poultry, and products	78

Land in Farms by Use (acres)

Cropland	156,632
Pastureland	99,860
Woodland	34,898
Other	27,389

Acres irrigated: 24

(Z)% of land in farms

Land Use Practices (% of farms)

No till	18
Reduced till	10
Intensive till	7
Cover crop	3

Farms by Value of Sales

	Number	Percent of Total ^b
Less than \$2,500	245	38
\$2,500 to \$4,999	32	5
\$5,000 to \$9,999	50	8
\$10,000 to \$24,999	62	10
\$25,000 to \$49,999	82	13
\$50,000 to \$99,999	56	9
\$100,000 or more	115	18

Farms by Size

	Number	Percent of Total ^b
1 to 9 acres	16	2
10 to 49 acres	80	12
50 to 179 acres	207	32
180 to 499 acres	167	26
500 to 999 acres	78	12
1,000+ acres	94	15

Market Value of Agricultural Products Sold

	Sales (\$1,000)	Rank in State ^c	Counties Producing Item	Rank in U.S. ^c	Counties Producing Item
Total	183,587	27	114	911	3,078
Crops	41,264	63	114	1,422	3,074
Grains, oilseeds, dry beans, dry peas	33,528	64	109	1,104	2,917
Tobacco	-	-	2	-	267
Cotton and cottonseed	-	-	7	-	647
Vegetables, melons, potatoes, sweet potatoes	(D)	5	112	(D)	2,831
Fruits, tree nuts, berries	(D)	(D)	(D)	(D)	2,711
Nursery, greenhouse, floriculture, sod	(D)	(D)	(D)	(D)	0
Cultivated Christmas trees, short rotation woody crops	-	-	-	-	4
Other crops and hay	5,921	-	-	-	5
Livestock, poultry, and products	142,322				6
Poultry and eggs	(D)	-	-	-	7
Cattle and calves	20,602	-	-	-	7
Milk from cows	-	-	-	-	0
Hogs and pigs	121,549	-	-	-	4
Sheep, goats, wool, mohair, milk	(D)	-	-	-	7
Horses, ponies, mules, burros, donkeys	82	-	-	-	7
Aquaculture	-	-	-	-	0
Other animals and animal products	3	-	-	-	9

- Add a comment
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Producers ^d	1,080	Percent of farms that:	Top Crops in Acres ^e
Sex			
Male	693	Have internet access	67
Female	387		
Age		Farm organically	-
<35	62		
35 - 64	555	Sell directly to consumers	(Z)
65 and older	463		
Race		Hire farm labor	19
American Indian/Alaska Native	-		
Asian	-	Are family farms	95
Black or African American	-		
Native Hawaiian/Pacific Islander	2		
White	1,066		
More than one race	12		
Other characteristics			Livestock Inventory (Dec 31, 2022)
Hispanic, Latino, Spanish origin	13		Broilers and other meat-type chickens (D)
With military service	83		Cattle and calves 36,999
New and beginning farmers	244		Goats 99
			Hogs and pigs 231,284
			Horses and ponies 234
			Layers 426
			Pullets (D)
			Sheep and lambs (D)
			Turkeys 18

3.3 LAND USE AND DEVELOPMENT

3.3.1 Development Since Previous Plan Update

Table 3.15. County Population Growth, 2010-2023

Jurisdiction	2010 Population	2020 Population	2023 Annual Population Estimate or ACS Population	# Change (2010-2023)	% Change (2010-2023)
Sullivan County	6,714	5,999	5903	-811	-12.1%
Sullivan County Unincorporated	2,432	3,106	2,877	445	-18.3%
City of Milan	1,960	1,819	1,883	-77	-3.9%
City of Green City	657	602	560	-97	-14.8%
City of Greencastle	275	224	331	56	-8.5%
City of Newtown	183	113	112	-71	-38.8%
Village of Humphreys	118	89	121	3	2.5%
Village of Pollock	89	46	19	-70	-78.7%

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

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 2023. This table includes the most recent data available, the American Community Survey 5-year Estimates.

Table 3.16. Change in Housing Units, 2010-2023

Jurisdiction	Housing Units 2010	Housing Units 2023	2010-2023 # Change	2010-2023 % Change
Unincorporated Sullivan County	1,534	1,388	-146	-9.5%
City of Milan	845	797	-48	-5.68%
City of Green City	283	307	24	8.48%
City of Greencastle	365	362	-3	-0.82%
City of Newtown	127	42	-85	-66%
Village of Humphreys	164	118	-46	-28.05%
Village of Pollock	46	18	-26	-60.87%
Total:	3,364	3,032	-332	-9.87%

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

Vulnerability to hazards will be affected based on population and where new housing units have been built. Due to lack of expected growth in population, vulnerability is not expected to increase. The lack of city and county building ordinances is appealing to residential builders, however, the county is rural and its location has not been a popular area for development. The rural area is mostly comprised of farmland, and the value of the farmland exceeds the attraction for new residential development. However, vulnerability is a concern as the population ages in rural Sullivan County, since the farmers in the area are aging and land sales for anything other than agricultural uses is not on an upward trend.

3.3.2 Future Land Use and Development^{5(e)}

The population of Sullivan County and participating jurisdiction has been declining steadily for at least the last ten years. Due to a lack of population, there has been little in the way of new developments.

A large reservoir is currently under construction north of Milan in rural Sullivan County, it is unknown at this time, what If any long term growth may stem from this lake development.

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 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 percent 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:**

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. NOAA Climate Explorer, <https://toolkit.climate.gov/tools/climate-explorer>

Vulnerability Assessments

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 damages 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 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.
- **Vulnerability Overview:**

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:**

For each participating jurisdiction, the plan must describe the potential impacts of the hazard. Impact means the consequences of 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 other sections of this plan. 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 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 water moves 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.

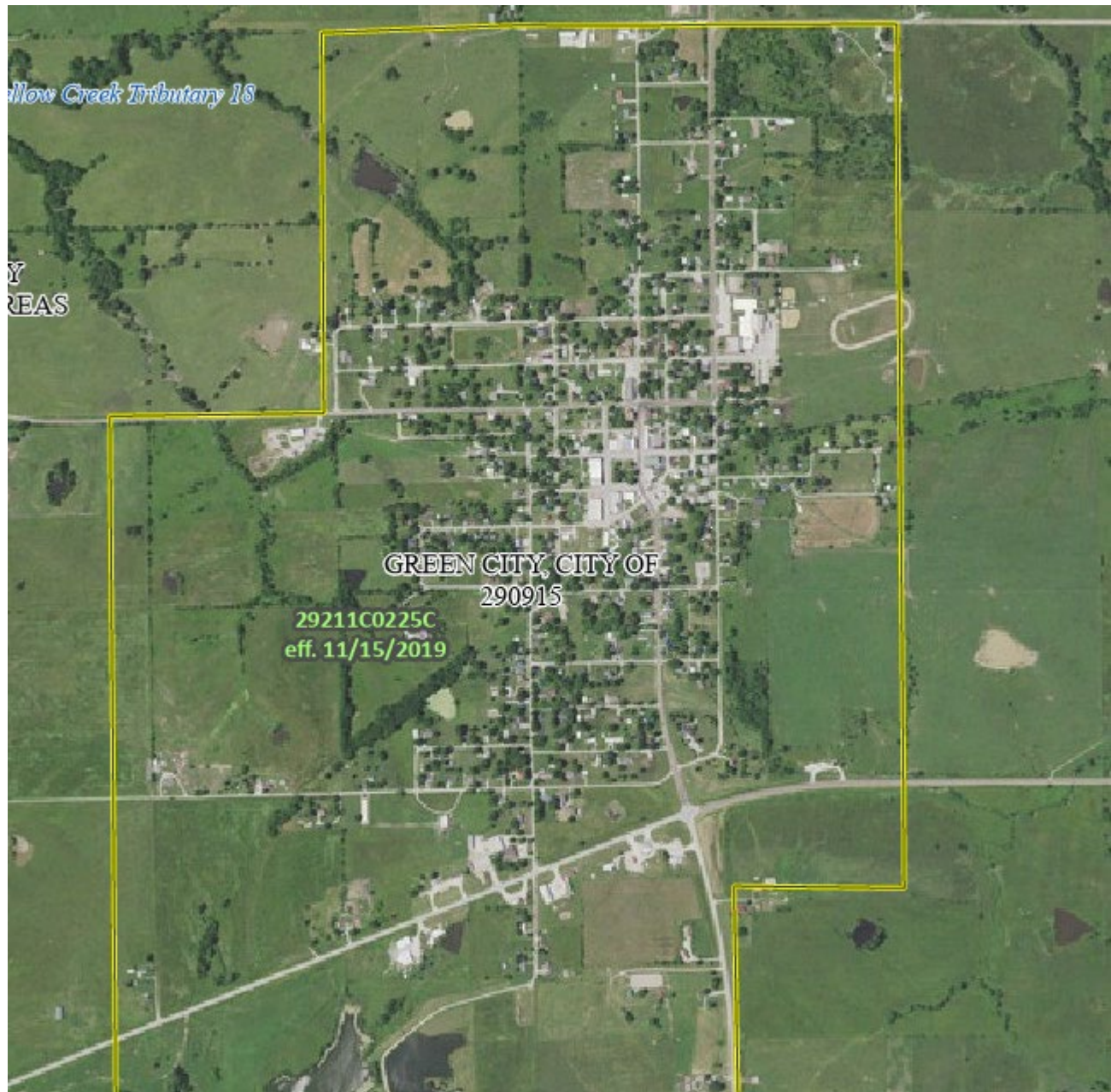
Geographic Location^{4(a)(1)}

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 Harrison County. The following key is the flood map key for all jurisdictions flood maps.

PIN		Approximate location based on user input and does not represent an authoritative property location
		Selected FloodMap Boundary
		Digital Data Available
		No Digital Data Available
		Unmapped
MAP PANELS		
		Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
		Otherwise Protected Area
OTHER AREAS		Coastal Barrier Resource System Area

Figure 3.3. Green City FIRM Map



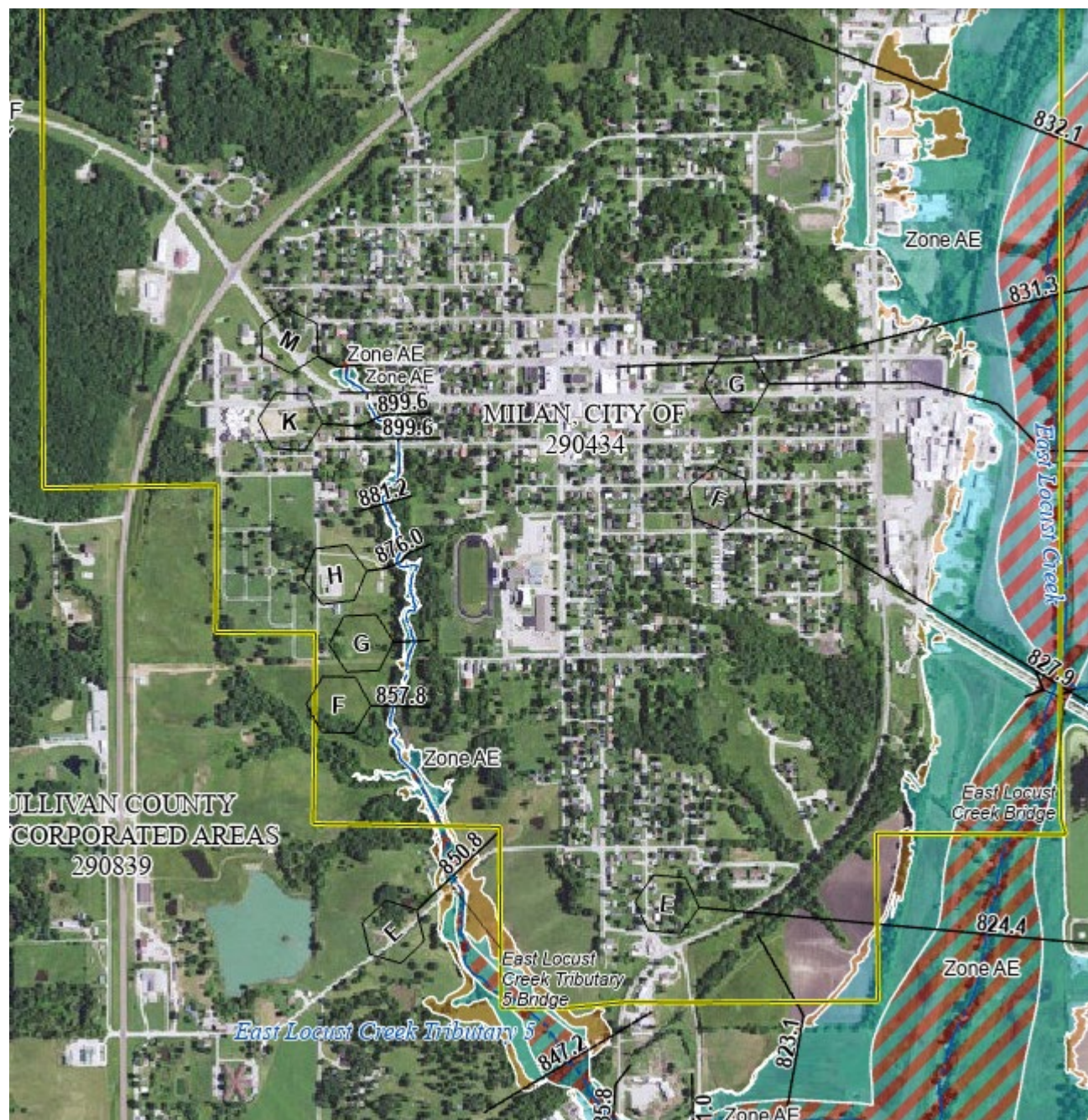
Source: FEMA's national flood hazard layer

Figure 3.4. Greencastle FIRM Map



Source: FEMA's national flood hazard layer

Figure 3.5. Milan FIRM Map



Source: FEMA's national flood hazard layer

Table 3.17. Sullivan County NCEI Flood Events by Location, 2004-2024

Location	# of Events
Unincorporated Sullivan County	2
- Reger	2

Osgood	1
- Osgood	1

Source: National Centers for Environmental Information, 9-2025

Table 3.18. Sullivan County NCEI Flash Flood Events by Location, 2004-2024

Location	# of Events
Unincorporated Sullivan County	3
- Reger	2
- Wintersville	1
Milan	1
- Milan	2
Humphyres	1
- Humphyres	1

Source: National Centers for Environmental Information, 9-2025

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 results 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.

National Flood Insurance Program (NFIP) Participation^{5(c)}

The following table lists the participants in the NFIP. Participation in the NFIP has the goal of reducing the impact of flooding on private and public structures. The NFIP does so by providing affordable insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. The jurisdictions that participate in the NFIP in Harrison County are listed below, the floodplain ordinance of each jurisdiction that participated can be found in Appendix E, if they were provided for inclusion in the plan.

- City of Milan

Table 3.19. NFIP Participation in Sullivan 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
290434A	Milan	Yes		Crystal Bupp City Administrator

Source: NFIP Community Status Book, [Date](#); 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 3.20. NFIP Participation in Sullivan County Mapping Information

Community ID #	Community Name	Current Effective Map Date	Regular- Emergency Program Entry Date
290434A	Milan	11/15/2019	Regular- 07/04/88

Source: NFIP Community Status Book, [Date](#); 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 3.21. NFIP Policy and Claim Statistics as of Date

Community Name	Policies in Force	Insurance in Force	Closed Losses	Total Payments

Source: NFIP Community Status Book, [\[insert date\]](#); PIVOT (information from STATE), [Community Status Book | FEMA.gov](#)
 *Closed Losses are those flood insurance claims that resulted in payment. Loss statistics are for current as of [\(date of report from SEMA\)](#).

Name the community(ies) with the most in insurance payments and how much those payments were.

Repetitive Loss/Severe Repetitive Loss Properties^{5(c)}

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 ___ repetitive loss properties. As of [\[insert date\]](#), ___ properties have been mitigated, leaving ___ un-mitigated repetitive loss properties.

Insert a table (**Table 3.22**) providing a summary of the repetitive loss properties in the

planning area. RL/SRL data is obtained by contacting SEMA. (Reference PRT B2-c). In the “Type of Property” column state whether the property is residential, commercial, institutional, etc. Additionally, describe how the substantial improvement/substantial damage provisions of the flood damage prevention ordinance are implemented after a hazard event. Note, the State of Missouri has developed a Substantial Damage Management Plan Template documents for communities to utilize. It can be found at this link: <https://sema.dps.mo.gov/programs/floodplain/>

Table 3.22. Sullivan County Repetitive Loss Properties

Jurisdiction	# of Properties	Type of Property	# Mitigated	Building Payments	Content Payments	Total Payments	Average Payment	# of Losses
None listed								

Source: State of Missouri emergency management agency – 9/2025

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.

State how many validated Severe Repetitive Loss property(ies) are in the county, and the community in which each is located as well as a summary of the structure types (residential, commercial, etc.). Specify whether the property has been mitigated, and the total paid in NFIP insurance for this property with the total number of losses.

Previous Occurrences^{4(a)(3)}

List presidential flooding disaster declarations that included the planning area, and discuss their impact.

Use NCEI information for the last 20 years for both flash and river flooding and insert tables (Table 3.23 and Table 3.24).

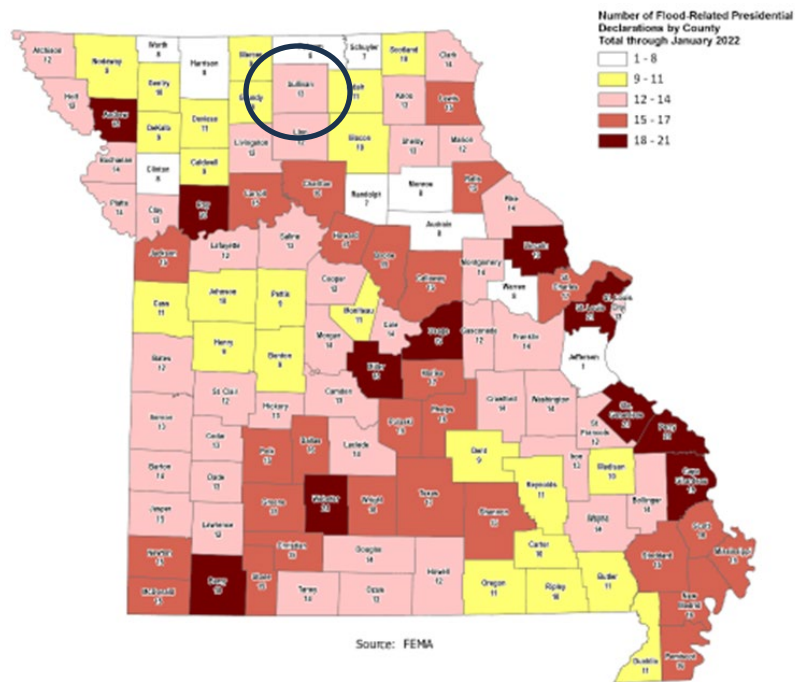


Table 3.23. NCEI Sullivan County Flash Flood Events Summary, 2004-2024

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2004	2	0	0	100,000	0
2008	2	0	0	1,000	0
2009	2	0	0	0	0
Total:	6	0	0	101,000	0

Source: NCEI, data accessed 11/2025

Include relevant information from FEMA Data Visualization Tool, <https://www.fema.gov/data-visualization-floods-data-visualization> including previous Public Assistance provided to various jurisdictions in the planning area. Review of previous Public Assistance grants may reveal repetitive damage sites which should be considered for mitigation.

Table 3.24. NCEI Sullivan County Riverine Flood Events Summary, 2004-2024

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2017	1	0	0	0	0
2019	1	0	0	0	0
2020	1	0	0	0	0
Total:	3	0	0	0	0

Source: NCEI, Date

Probability of Future Occurrence

The probability of future flood events was calculated by the following formulas:

$$\text{Probability of Flash Flood} = \frac{(6 \text{ flash flood events})}{20 \text{ years}} = 0.30 \text{ occurrences per year}$$

The probability of a flash flood occurring in the planning area is 30% during any given year.

$$\text{Probability of Flood} = \frac{3 \text{ flood events}}{20 \text{ years}} = 0.15 \text{ occurrences per year}$$

The probability of a flood occurring in the planning area is 15% during any given year.

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, 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. Floodwaters can also cause erosion undermining road beds. In some instances, steep slopes that are saturated with water may cause mud or rock slides 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.

Refer back to the section of the plan where scour critical bridges were identified.

Potential Losses to Existing Development

Summarize estimated losses for each jurisdiction from Hazus data or other analyses that were conducted. Be sure to describe the methodology used.

Discuss critical facilities that are vulnerable.

Impact of Previous and Future Development

Describe how future development could impact flash and riverine flooding in the planning area. Discuss development in low-lying areas near rivers and streams or where interior drainage systems are not adequate to provide drainage during heavy rainfall events. Future development would also increase impervious surfaces causing additional water run-off and drainage problems during heavy rainfall events.

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 3.17**) 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

Summarize the risks presented in the preceding flood analysis. Be sure to point out un-mitigated repetitive loss properties, vulnerable critical facilities, repetitively damaged infrastructure sites, identified areas prone to flash flooding and any other details such as frequently flooded neighborhoods/areas. Be as specific as possible. But do not list addresses or specific home/business owners. Include a brief discussion of possible solutions, which could be brought forward into the strategy section in later analysis. For example:

- The City B Police Station is located within the SFHA and has been damaged by recent flood events. Possible solutions include relocating of the police station and updating the local ordinance to require critical facilities to be located outside the SFHA.

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:

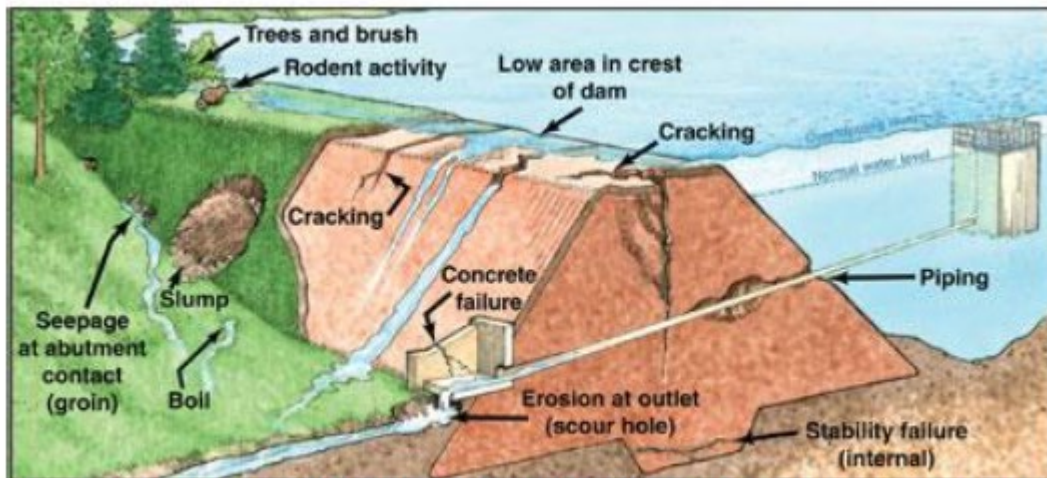
Overtopping: Inadequate spillway design, debris blockage of spillways or settlement of the dam crest.

Piping: Internal erosion caused by embankment leakage, foundation leakage and deterioration of pertinent structures appended to the dam.

Erosion: Inadequate spillway capacity causing overtopping of the dam, flow erosion, and inadequate slope protection.

Structural Failure: Caused by an earthquake, slope instability or faulty construction.

Figure 3.6. Causes of Dam Failure



Source: United States Forest Service: <https://www.fs.fed.us/eng/pubs/htmlpubs/htm12732805/page02.htm>

Table 3.25. 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 3.26. 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.

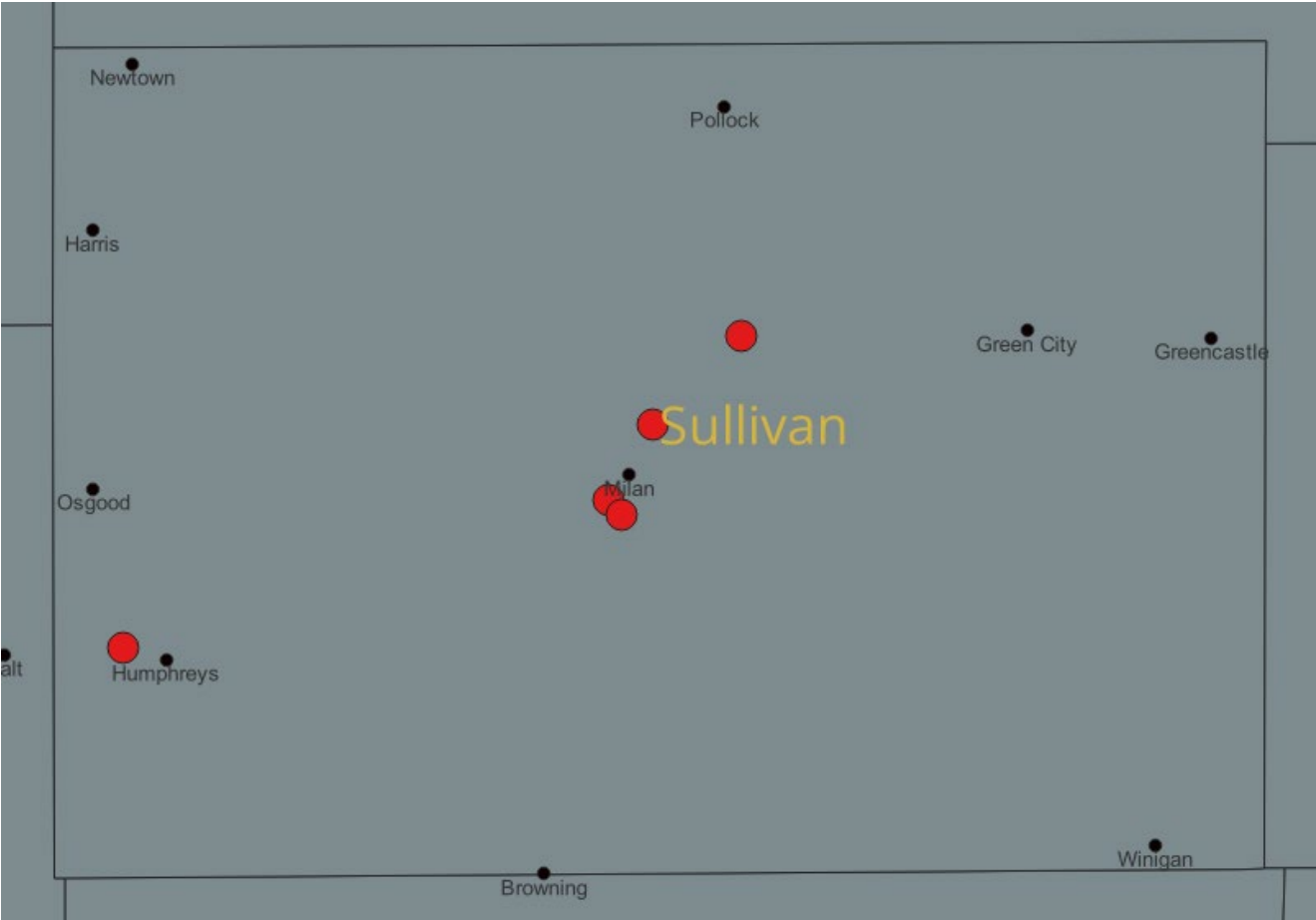
Table 3.27. High Hazard Dams in the Sullivan County Planning Area

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
Rusk Lake Dam		25	75	unknown	TR-MEDICINE CREEK	LAREDO	0	STRONG & STEWART FARMS
Elmwood City Lake Dam		47	2445	3/8/22	ELMWOOD BRANCH	MILAN	2	CITY OF MILAN
Sears Community Lake Dam		33	168	unknown	TR-EAST LOCUST CREEK	MILAN	3	MO DEPT OF CONSERVATION
Eddy's Lake Dam		30	70	1/21/81	TR-LOCUST CREEK	MILAN	0	H.Q. EDDY
Lake Lu Juan Dam (Shatto lake dam)		49	630	3/3/22	TR-EAST LOCUST CREEK	MILAN	0.1	FLESHMAN ENTERPRISES, INC

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-

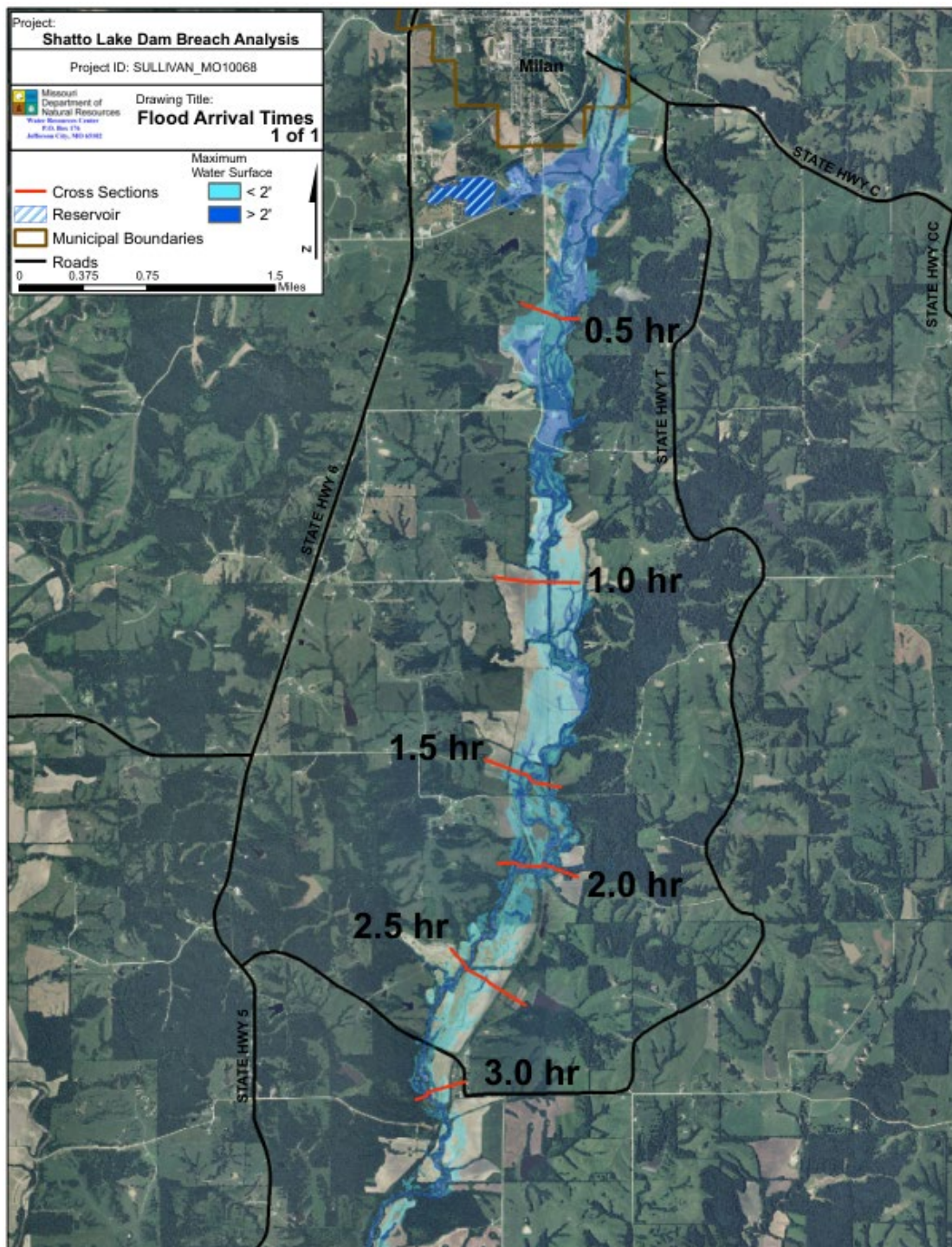
4827 to request the inundation maps for your county to show geographic locations at risk, extent of failure and to perform GIS analysis of those assets at risk to dam failure.

Figure 3.7. High Hazard Dam Locations in Sullivan County



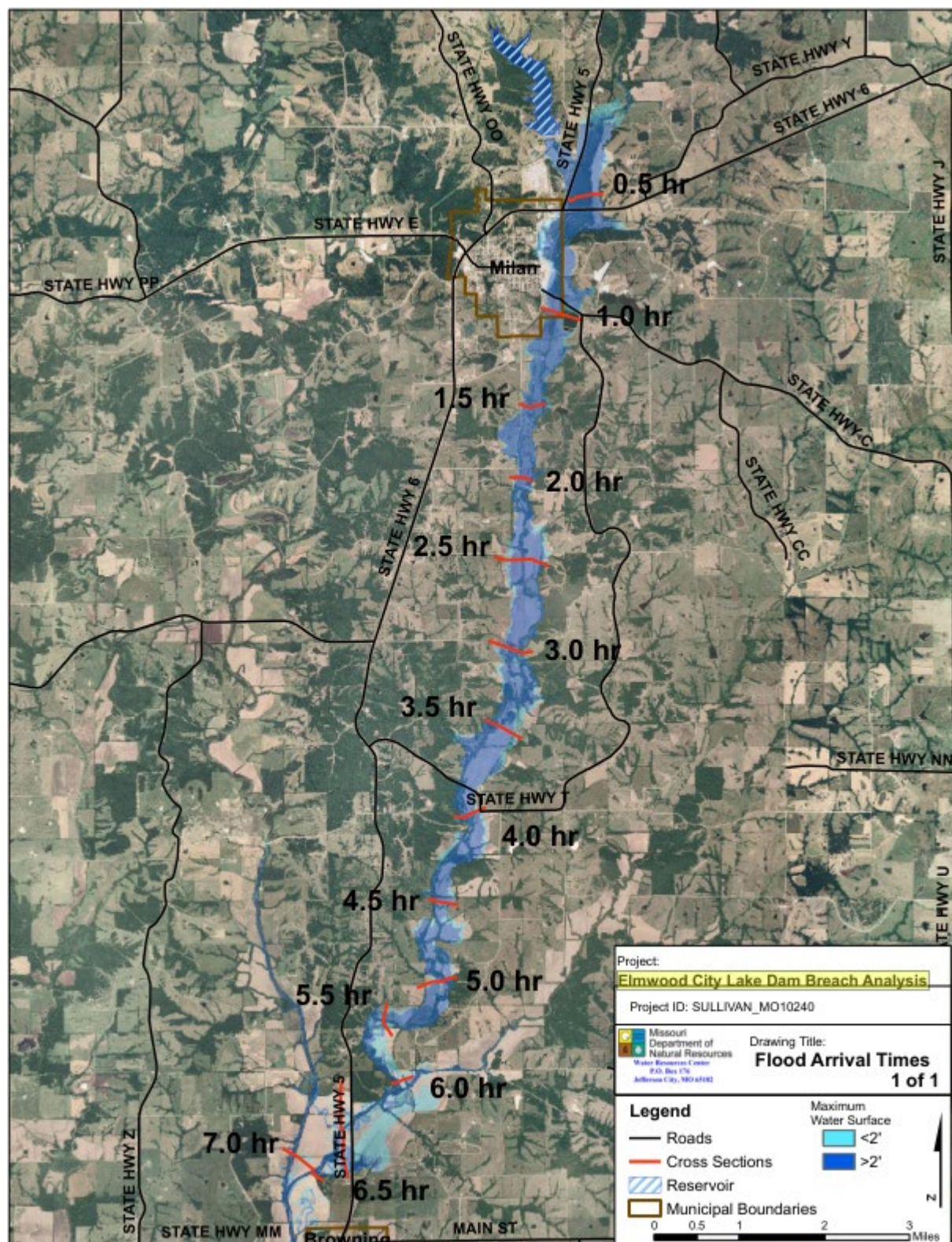
Source: National inventory of dams – June 2025

Figure 3.8. Lake Lu Juan Dam (Shatto Lake Dam) Breach Analysis



Source: Missouri DNR – June 2025 Note : Missouri DNR and the NID have two different names for this dam.

Figure 3.9. Elmwood City Lake Dam Breach Analysis



Source: Missouri DNR – June 2025

Upstream Dams Outside the Planning Area

According to the Missouri Department of natural resources dam safety program, There are no dams upstream from Sullivan county that would likely pose a threat in the event of a dam incident.

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

Information from Stanford University's National Performance of Dams Program shows no known instance of dam incidents have been reported in Sullivan County.

Probability of Future Occurrence

There are currently two regulated high hazard dams in Sullivan County. There are no USACE-regulated dams in the planning area. According to the information from Stanford University's National Performance of Dams Program database there are no known incidents.

It should be considered that within Missouri historical dam failures and incidents include events from all hazard classes and all dams; regulated or not. Failures and incidents for regulated dams that have higher inspection frequencies should be less probable. The non-regulated dams do not have a regular inspection schedule nor requirement.

If we base the probability upon past events:

$$Probability\ of\ Dam\ Failure = \frac{0}{20}$$

With no previous occurrences of dam failure, the probability of such an event occurring is unlikely in the planning area.

However, if we consider the instances of dam incidents:

$$Probability\ of\ Dam\ Incident = \frac{0}{20} = 0.00$$

The probability of the planning area experiencing any type of dam incident, if based on past occurrences, would be less than 5% in any given 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 179 dams located in the planning area. There are 5 high hazard dams, 2 significant hazard dams, and 172 low hazard dams in Sullivan County.

Within Sullivan County, 2 of the 5 high hazard dams are state regulated. Elmwood city Lake Dam, and Lake Lu Juan (Shatto Lake) Dam. Elmwood city lake dam was last inspected in March of 2022 and was rated as satisfactory. The Lake Lu Juan (Shatto Lake) dam was inspected in March of 2022 and is currently listed as Not rated by the national inventory of dams.

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 Grundy County to dam failure.

Table 3.28. Number and Types of Dams in Sullivan County

Numbers and Types of Dams in Sullivan 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
5	2	172	179	1	1	3	5	0	0	0	0	3	2	169	174

Source: 2023 Missouri hazard mitigation plan

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

Table 3.29. 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	\$0	0	0
Residential	\$0	0	0
Total	\$0	0	0

Source: 2023 Missouri State Hazard Mitigation Plan

Impact of Previous and Future Development

Any growth within Sullivan County, downstream from a known dam, would lead to increased risks and potential losses due to an incident. As of June 2025, Sullivan County is in the process of constructing a large reservoir and dam north of Milan, this project will likely have an impact on future planning for dam incidents.

Hazard Summary by Jurisdiction

The largest part of Sullivan County is subject to a low risk for hazards from a dam incident, as found in data from the 2023 Missouri state hazard mitigation plan. As noted above, a large dam is being constructed north of Milan and will result in changes to this analysis upon completion of the project.

Problem Statement

Some entities in Sullivan 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.

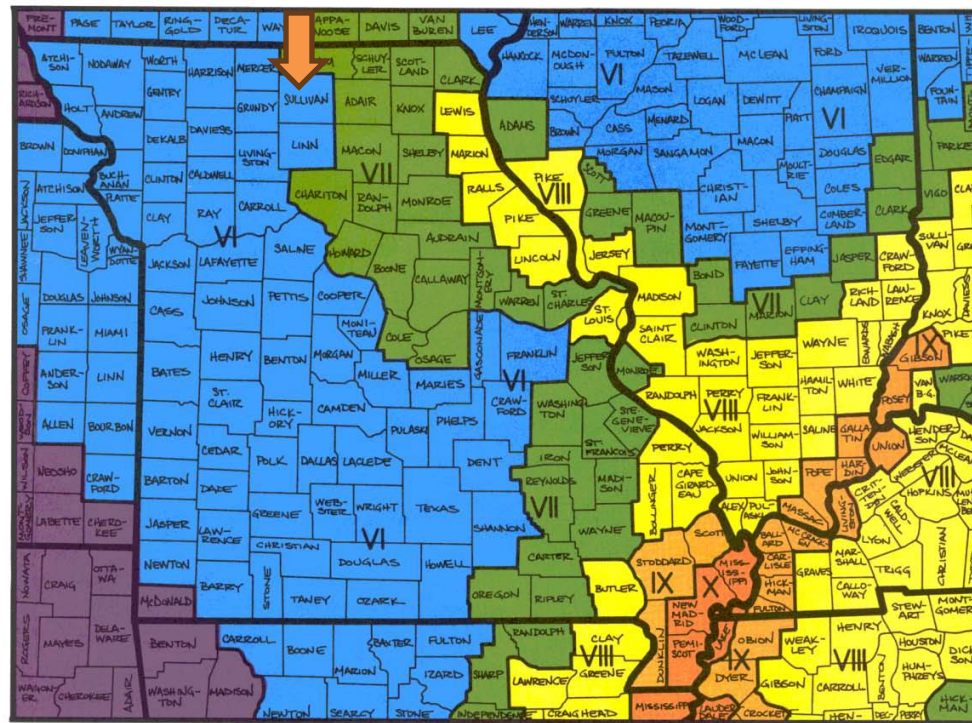
Geographic Location

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.

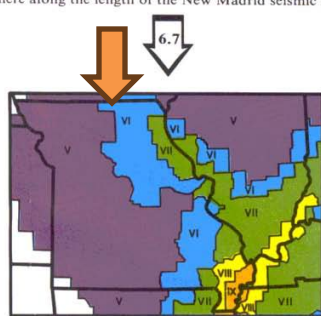
If an 1811 earthquake occurred in Sullivan County the earthquake intensity would not vary across the county. The damages resulting from an earthquake would depend upon the quality of the construction of the buildings. There would be slight to moderate damage in well-built ordinary structures and considerable 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 earthquake, respectively.

Figure 3.10. Impact Zones for Earthquake Along the New Madrid Fault

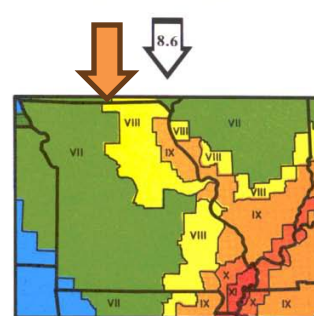


This map shows the highest projected Modified Mercalli intensities by county from a potential magnitude - 7.6 earthquake whose epicenter could be anywhere along the length of the New Madrid seismic zone.



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 3.11. Projected Earthquake Intensities

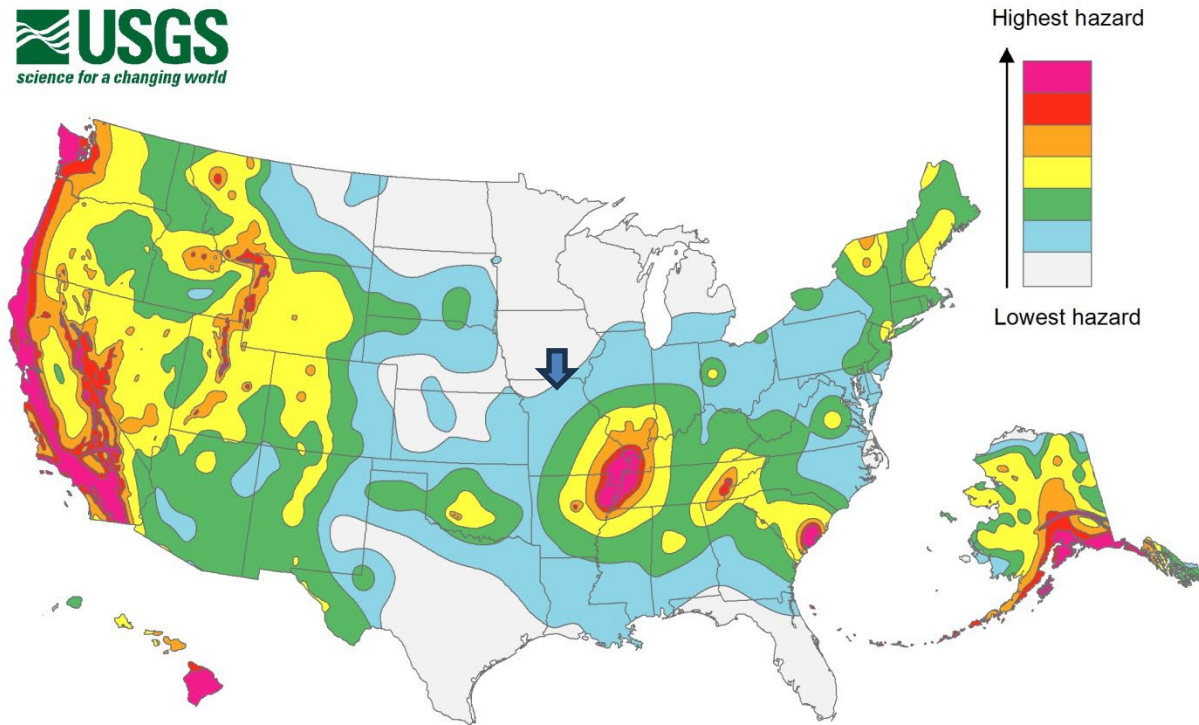
MODIFIED MERCALLI INTENSITY SCALE

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.

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Figure 3.12. United States Seismic Hazard Map



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

Strength/Magnitude/Extent

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

Richter Magnitude Scale

The 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 Sullivan County since 1931. This information was found at homefacts.com and was also listed in the previous Hazard Mitigation Plan for Sullivan County.

Probability of Future Occurrence

According to homefacts.com there is a “very low” risk level for Sullivan County experiencing an earthquake. The probability of this hazard occurring is 0.13% 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 3.13. HAZUS-MH Earthquake 2% Probability of Exceedance in 50 years – Ground

Shaking and Liquefaction Potential

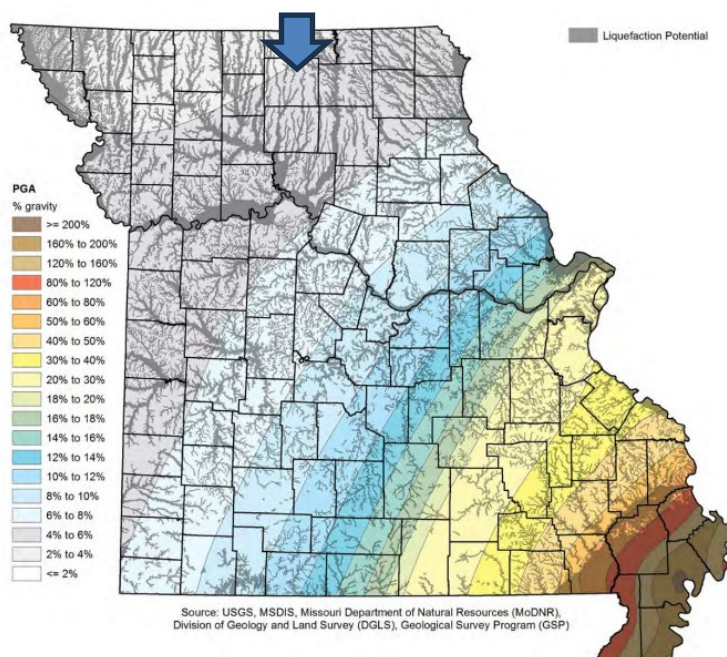


Table 3.30. HAZUS-MH Earthquake Loss Estimation 2% Probability of Exceedance in 50 Years Scenario Direct Economic Losses Results for Sullivan County (in \$ thousands)

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
\$613	\$1,168	\$326	\$13	0.29	\$401	\$80	\$139	\$145	\$2,886

Source: 2023 Missouri State Hazard Mitigation Plan

Changing Future Conditions Considerations and the Impact of Climate Change

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 table.

Table 3.31. HAZUS Earthquake Loss Estimation: Annualized Loss Scenario for Sullivan County

Total Losses (in \$ Thousands)	Loss Per Capita (in \$ Thousands)	Annualized Loss Ratio (In \$ per Million)
\$3	\$0.0005	\$5

Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.32. Earthquake Coverage in Sullivan County, Missouri

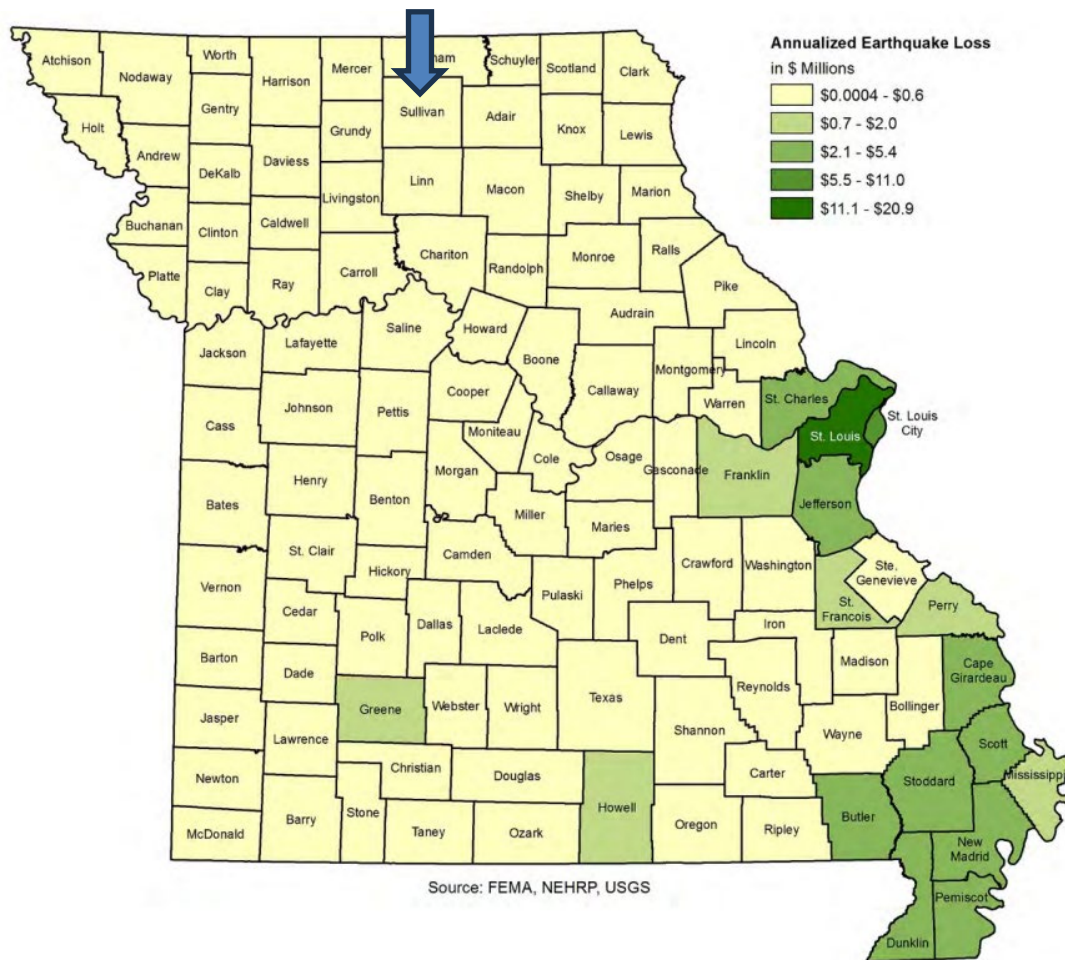
Earthquake Exposures	Homeowners, Farm, Mobile Home Exposures	% With Earthquake Endorsement	Average Premium, All Earthquake	Average Premium, \$110k-\$140k Coverage
67	2,179	3.1%	\$76	\$61

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 Sullivan County with an earthquake event. The following figure and table summarize this information.

Figure 3.14. HAZUS-MH Earthquake Loss Estimation: Annualized Loss Scenario – Direct Economic Losses to Buildings



Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.33. FEMA National Risk Index Loss Estimation: Annualized Loss Scenario for Sullivan 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
0.00024	\$3	0.00003	\$192	\$3,333	Very Low

Source: 2023 Missouri State Hazard Mitigation Plan

Impact of Previous and Future Development

Any future development in Sullivan 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 3.34. Percentage of Homes Built Prior to 1939 in Sullivan County

Jurisdiction	Mobile Homes	% Of Mobile Homes	Homes Built Prior to 1939	% Of Homes Built Prior to 1939
Sullivan County	219	10.7%	325	15.9%
City of Milan	94	14.2%	72	10.9%
City of Green City	3	1.3%	21	20.2%
City of Green Castle	20	19.2%	47	21.1%
City of Newtown	1	2.4%	21	50.0%
Village of Harris	3	10.7%	13	46.4%
Village of Humphreys	1	2.8%	5	13.9%
Village of Pollock	0	0.0%	4	57.1%

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

Problem Statement

Although Sullivan 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

Include discussion of the fact that the entire planning area is at risk to drought. Drought most directly impacts the agricultural sector, so include the percentage of surface land in the county used for agriculture purposes. Give information on whether or not farming is concentrated in any geographical area. Is the conversion of farmland to development occurring in the planning area, lessening the impact of drought on agriculture?

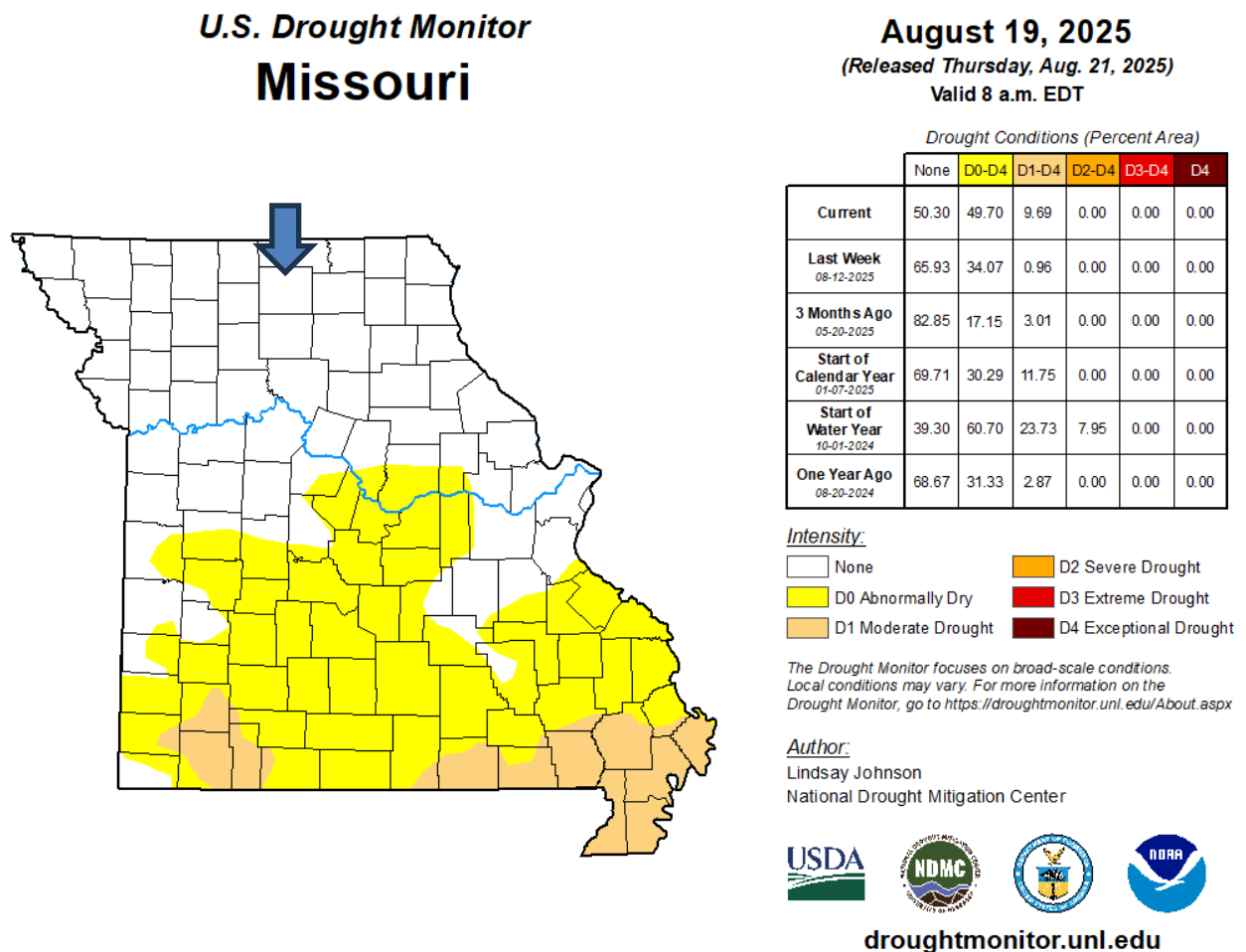
The following resources provide information on agriculture at the county level:

- http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Missouri/
- https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Missouri/

A recent map from the U.S. Drought Monitor can be inserted as an example of the geographic area

that could be in drought at any given moment in time. Remember that it is only a snapshot of conditions at a given moment in time. Either use an arrow to indicate the location of the planning area on the map, or use narrative to explain what the map illustrates in terms of the planning area.

Figure 3.15. U.S. Drought Monitor Map of Missouri on Date



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.

Previous Occurrences

Table 3.35. Previous Occurrences of Drought in Sullivan County 2000-2025

Begin Date	End Date	Episode Narrative
4/1/2000	4/30/2000	April 2000 was the driest on record in the state of Missouri, according to the Midwestern Climate Center. The lowest rainfall totals occurred in parts of west-central Missouri, where WFO Pleasant Hill received 0.30 inches of precipitation, and Sweet Springs picked up only 0.47 inches. At Kansas City International Airport, 0.65 inches of rain fell during the month, making it the driest April recorded in Kansas City.
7/1/2012	7/31/2012	Below normal precipitation continued through July, with D3 extreme drought conditions across the county. Milan reported 1.30 inches of rain for the month. Green City reported 1.61 inches of rain.
8/1/2012	8/31/2012	Below normal precipitation continued through August, with D3 extreme drought conditions across the county. Milan reported 1.14 inches of rain for the month.
9/1/2012	9/30/2012	Severe to extreme drought conditions prevailed in the county. Milan measured 1.57 inches of rain.
10/1/2012	10/31/2012	Drought D2 to D3 conditions prevailed across the county. Milan received 2.68 inches of rain.
11/1/2012	11/30/2012	Drought D1 to D2 conditions prevailed across the county. Milan received 1.89 inches of rain.
12/1/2012	12/31/2012	Drought D1 to D2 conditions prevailed across the county. Milan received 1.73 inches of precipitation.
1/1/2013	1/31/2013	Moderate to severe D1 to D2 drought conditions prevailed across the county. Green City reported 1.78 inches of precipitation.
8/27/2013	8/31/2013	Severe D2 drought conditions developed across Sullivan County at the end of August. Milan reported 0.12 inches of rain.
9/1/2013	9/30/2013	Severe drought D2 conditions persisted across the county. Milan reported 3.63 inches of rain.
9/1/2013	9/30/2013	Severe drought D2 conditions persisted across the county. Milan reported 3.63 inches of rain.
10/1/2013	10/31/2013	Severe D2 drought conditions continued across the county. Milan received 2.52 inches of rain.
6/1/2018	6/30/2018	Starting at the very end of May and going into June the US Drought Monitor at the University of Nebraska declared portions of Sullivan County 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. http://droughtmonitor.unl.edu/data/png/20180626/20180626_wfoeax_trd.png
7/1/2018	7/31/2018	The abnormally dry summer continued into and through July for Sullivan County. The Drought Monitor put the county in D3 and maintained it into August. As of yet, the breadth and magnitude of the impacts are unknown.

8/1/2018	8/31/2018	Sullivan County reached or maintained D4 drought status for the entire month. While rain did move into the area through the month, the ground was dry enough from the below normal precipitation and above normal temperatures through the month to warrant D4 status maintenance. The direct impact to Sullivan County is unclear, but statewide drought impacts are estimated around 2 billion dollars, per The University of Missouri Extension Center. The drought has also hurt pastures, with about three-quarters in poor or very poor conditions, according to the USDA report. Many pastures haven't been able to support grazing cattle, prompting farmers to feed cattle with hay that might normally be saved for winter. It's also hurt the hay crop, which is down about one-third from normal. The 2018 drought is turning out small corn ears. Some farmers are not waiting until harvest, instead trying to get the most out of the crop by baling it or cutting it for silage for cattle. Farmers can now clean out sediment in ponds to increase water-holding capacity. Ponds in the conservation program are built for erosion control. Sources: https://www.stltoday.com/news/local/govt-and-politics/from-drinking-water-to-farms-drought-s-effect-creeping-across/article_35440d14-a1c4-5f86-ac64-b5b63906fe57.html . https://www.foxnews.com/us/drought-takes-toll-on-missouri-farmers-crops-cattle . https://www.missouriruralist.com/weather/cattleman-turns-baling-corn-drought . https://www.missouriruralist.com/conservation/3-conservation-restrictions-lifted-during-drought .
9/1/2018	9/30/2018	The drought of 2018 continued for Sullivan County, however an influx of some moisture brought some minor relief to the county. Conditions improved from D4 to D3 during the month of September, but the impacts and losses of several crops were already felt across the region. The amount of damages is unknown at this point, but numerous farmers were unable to get full return from their crops.
10/1/2018	10/9/2018	Due to widespread dry conditions through the summer and early fall of 2018 most counties experienced extreme to exceptional drought (D3-D4). While some counties saw marked improvement through the late summer and early fall the drought continued into the second week of October. The drought improved area-wide after 6-12 inches of rain fell in a four day stretch in early October. This effectively ended the drought area-wide. While the exact damage costs are unknown, it is estimated that farmer across the entire region suffered millions of dollars of losses due to the extremely dry conditions.
10/11/2022	10/31/2022	Significant precipitation deficits over the summer months and continuing into fall led to severe drought developing across a small portion of southeast Sullivan County by October 11th and continuing through the remainder of the month.
11/1/2022	11/15/2022	Significant precipitation deficits yielded D2 drought conditions continuing into November before improving to D1 or better by November 15th.
6/13/2023	6/30/2023	Due to relatively dry conditions across the area, severe drought was introduced by the US Drought Monitor. At this time there have been minimal to no impact due to this starting and ongoing drought.
7/1/2023	7/31/2023	After another relatively dry month across the area central and northern Missouri saw generally deteriorating drought conditions. By the middle to end of the month almost the entire area was covered in D3 extreme drought conditions.
8/1/2023	8/31/2023	Severe (D2) to Extreme Drought (D3) persisted through the month of August in Sullivan County.

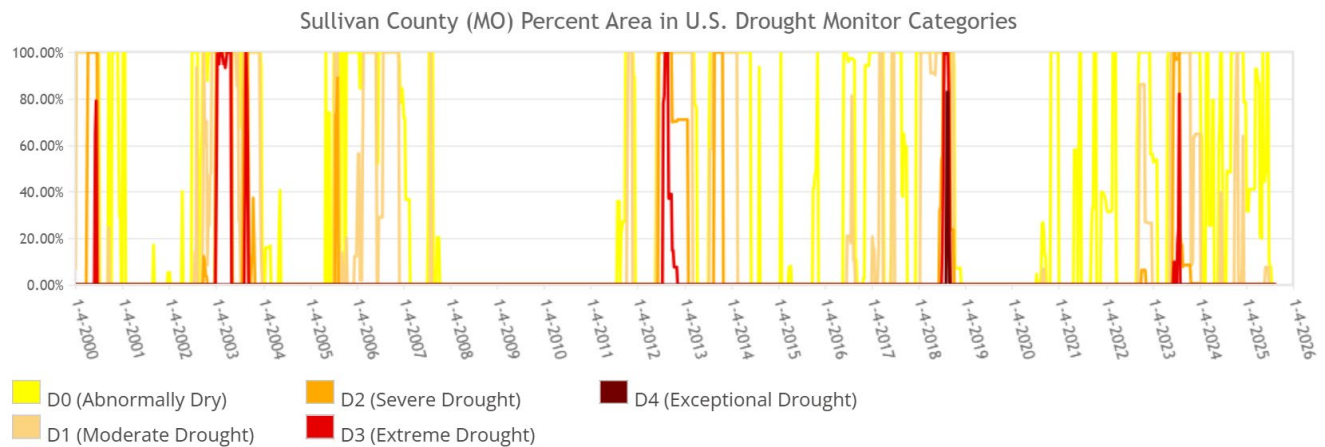
Table 3.36. Weeks and Months of drought conditions 2004-2025

Sullivan County	D0	D1	D2	D3	D4
Weeks at this Designation	343	234	93	30	3
Months at this Designation	78.9	53.1	21.4	6.9	0.7

Table 3.37. Crop Insurance Claims Paid in Sullivan County 2014-2024

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	Corn	Drought	\$2,402.00
	Soybeans		\$11,957.00
	Wheat		\$17,749.00
2015	Soybeans	Drought	\$883.00
2016	Corn	Drought	\$13,875.50
	Soybeans		\$54,368.00
	Wheat		\$26,732.93
2017	Corn	Drought	\$30,471.00
	Soybeans		\$429,889.75
2018	Corn	Drought	\$1,439,320.96
	Soybeans		\$1,773,257.80
	Wheat		\$11,308.00
2019	No Claim		\$0
2020	Corn	Drought	\$172,439.00
	Soybeans		\$852,365.00
2021	Corn	Drought	\$18,797.50
	Soybeans		\$93,660.40
	Wheat		\$24,419.00
2022	Corn	Drought	\$135,483.00
	Soybeans		\$687,034.80
2023	Corn	Drought	\$107,536.00
	Soybeans		\$287,055.00
	Wheat		\$-2767.00
2024	Corn	Drought	\$46,283.38
	Soybeans		\$204,720.50
Total			\$6,439,241.52

Source: USDA Risk Management Agency <http://www.rma.usda.gov/data/cause>**Figure 3.16. Sullivan county drought time-series**



From the U.S. Drought Monitor website, <https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx>, 8-25-2025



Probability of Future Occurrence

In the formulas below we have calculated the likelihood of a drought based on data going back to 2004. This is a time period of 94.1 months or 1129 weeks

$$\text{Probability} = \frac{78.9}{94.1} = 83.8\% \text{ Chance of D0}$$

$$\text{Probability} = \frac{53.1}{94.1} = 24.4\% \text{ Chance of D1}$$

$$\text{Probability} = \frac{21.4}{94.1} = 22.7\% \text{ Chance of D2}$$

$$\text{Probability} = \frac{6.9}{94.1} = 7.3\% \text{ Chance of D3}$$

$$\text{Probability} = \frac{0.7}{94.1} = 0.7\% \text{ Chance of D4}$$

The probability of Sullivan County experiencing some type of drought is very likely. Drought conditions have been encountered in at least 83% of the weekly survey's going back to 2004. Over the course of the 26 years surveyed 22 have featured at least D0 drought conditions for one of the weekly reports.

Changing Future Conditions Considerations

Although drought is not predictable, long-range outlooks and predicted impacts of climate change could indicate an increased chance of drought. With an increase in annual temperatures due to a changing climate, droughts are more likely to occur through higher evaporation rates. With the likelihood of wetter springs there is an increased chance of dryer summers. The dryness is likely to reduce the river flow and may lead to a shortage of agricultural water availability. This has a large effect on the farm-dependent community.

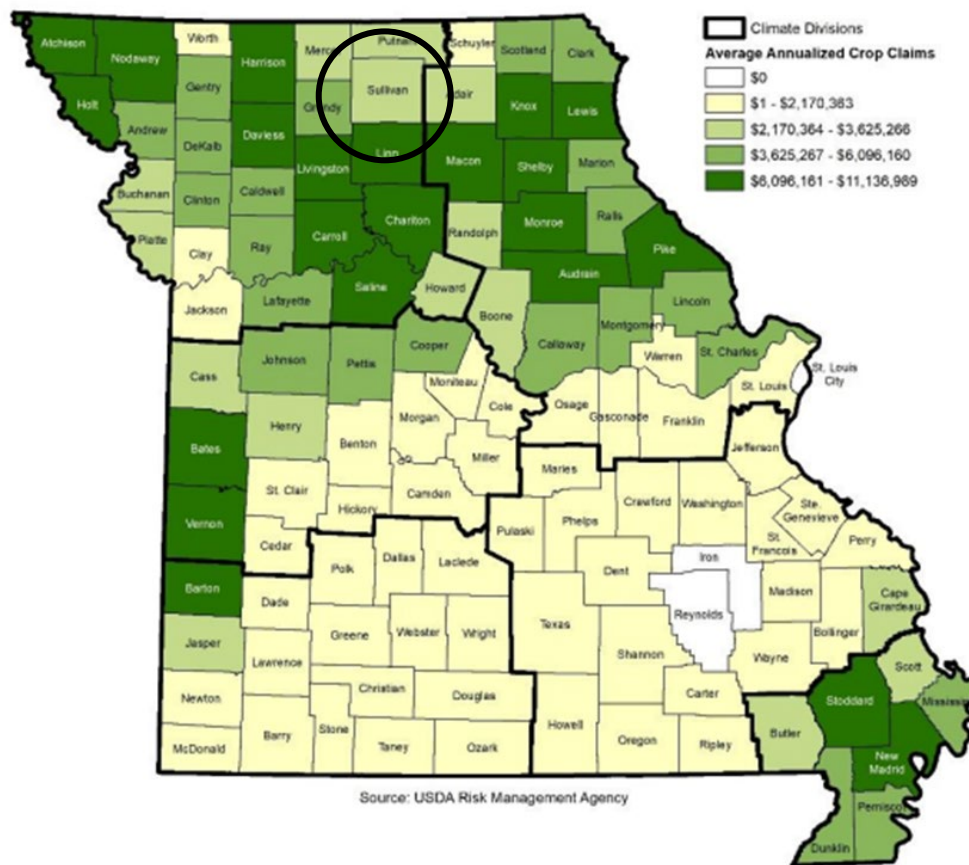
A new analysis, performed for the Natural Resources Defense Council, examined the effects of climate change on water supply and demand in the contiguous United States. The study found that more than 1,100 counties will face higher risks of water shortages by mid-century as a result of climate change. 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 US, including areas that may currently be described as experiencing water shortages of some degree. This study shows a moderate risk of water shortages in 2050 for Sullivan County with the effects of climate change.

Vulnerability

Vulnerability Overview

Sullivan County, being a largely agriculture dependent county has a significant vulnerability to drought impacts as shown in the graphs and tables below

Figure 3.17. Annualized Drought Crop Insurance Claims Paid 2013-2021



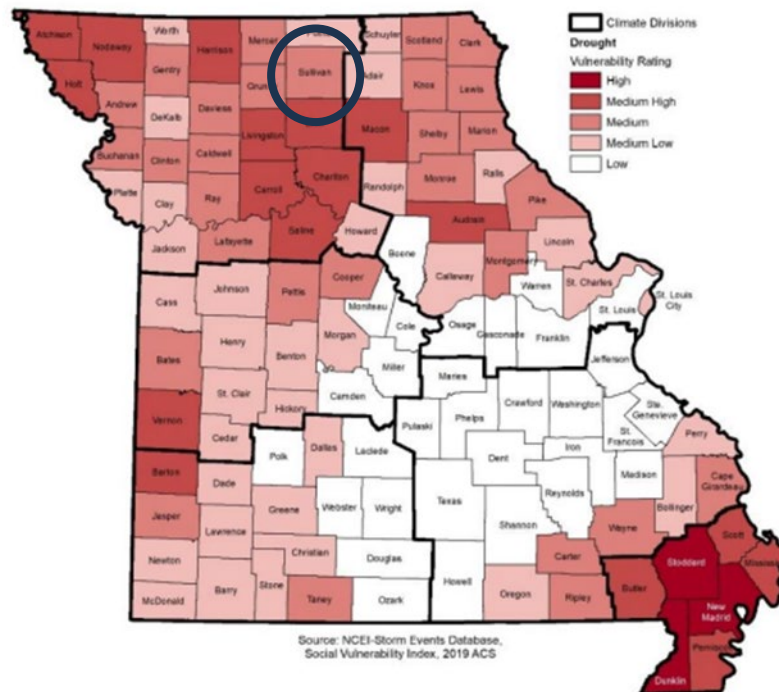
Source: 2023 Missouri state hazard mitigation plan

Table 3.38. Vulnerability of Sullivan County to Drought

Factor Considered to Determine Vulnerability	
SOVI Index Rating	4
USDA RMA Total Drought Crop Claims	\$35,867,493
Average Annualized Crop Claims	\$3,586,749
USDA Claims Rating	3
2017 Crop Exposure	\$28,441,000
Crop Exposure Rating	2
Likelihood of Severe Drought	0.65
Drought Occurrence Rating	2
Total Rating	12
Total Rating (text) to Drought	Medium

Source: 2023 Missouri State Hazard Mitigation Plan

Drought Vulnerability in Sullivan County



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.

Impact of Previous and Future Development

A new large reservoir is planned for Sullivan County to assist with water supply issues during times of significant drought; However, this could also lead to growth that would place a strain on water supplies in the region.

Changing Future Conditions Considerations

Although drought is not predictable, long-range outlooks and predicted impacts of climate change could indicate an increased chance of drought. With an increase in annual temperatures due to a changing climate, droughts are more likely to occur through higher evaporation rates. With the likelihood of wetter springs there is an increased chance of dryer summers. The dryness is likely to reduce the river flow and may lead to a shortage of agricultural water availability. This has a large effect on the farm-dependent community.

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 US, including areas that may currently be described as experiencing water shortages of some degree. This study shows a moderate risk of water shortages in 2050 for Sullivan County with the effects of climate change.

Hazard Summary by Jurisdiction

Drought has the potential to impact all of Sullivan County, except for 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 damage seen historically because of drought in the county affects 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 because of drought. If drought conditions are severe and prolonged, water supplies could also be affected.

Problem Statement

Summarize the key problems highlighted in the risk assessment such as drought-vulnerable water supplies, agriculture losses, etc. Mention variations in risk between geographic areas, if any. Include school districts and special districts, if applicable. A brief discussion of possible solutions should be included and could be brought forward into the strategy section in later analysis. For example:

- County A has been within a severe drought for the past 3 years with an extra strain placed on the water supply system. 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 the figure below 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.

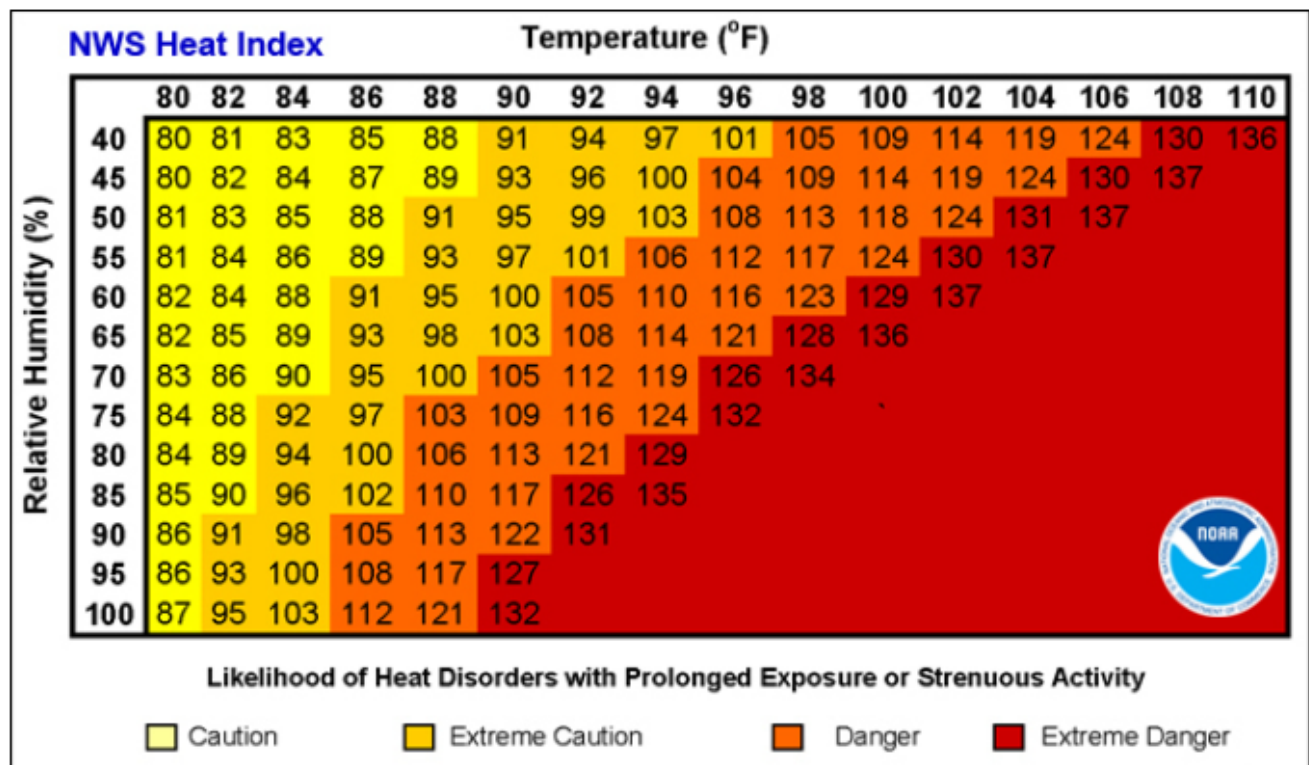
Geographic Location

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 3.18. Heat Index (HI) Chart

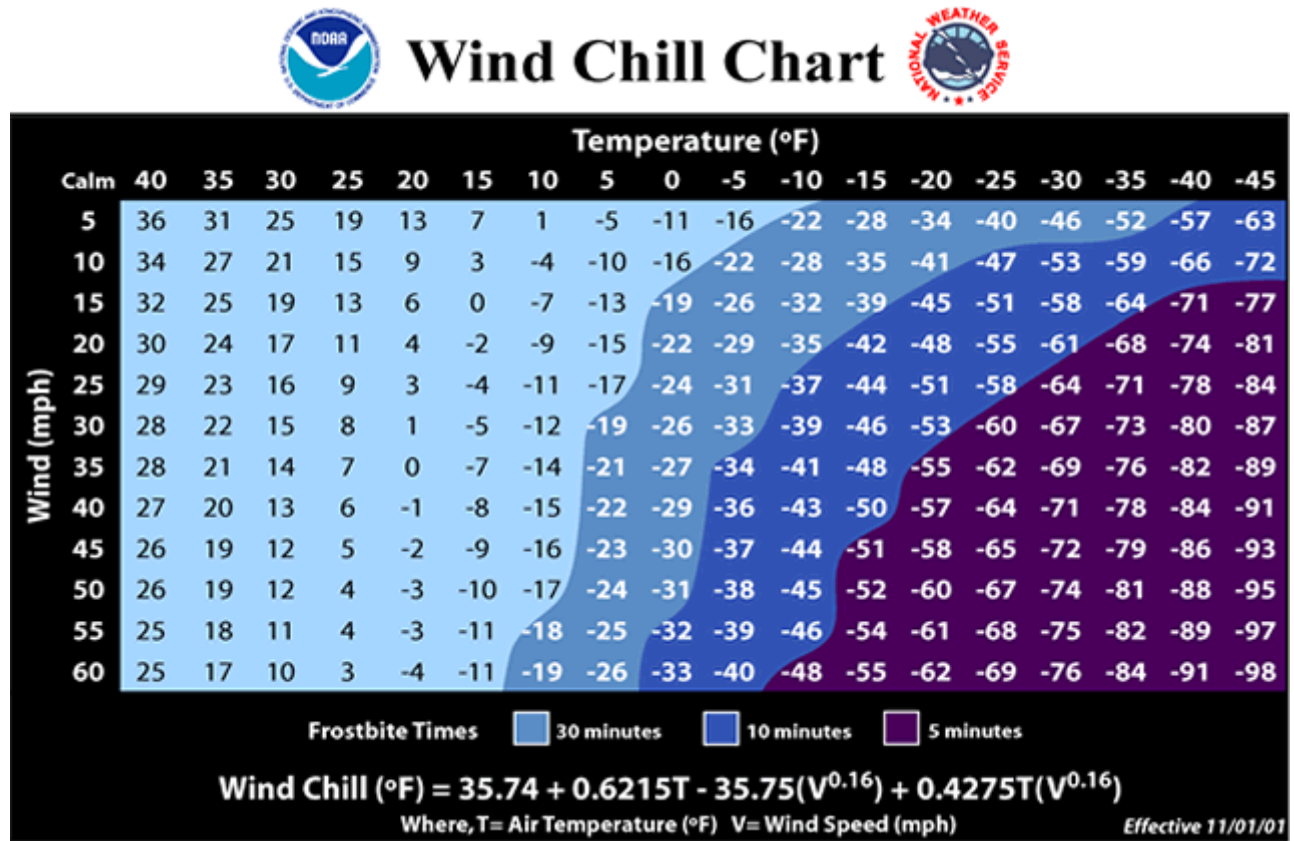


Source: National Weather Service (NWS); <https://www.weather.gov/safety/heat-index>

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 3.19. Wind Chill Chart



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

Previous Occurrences

Extreme Heat

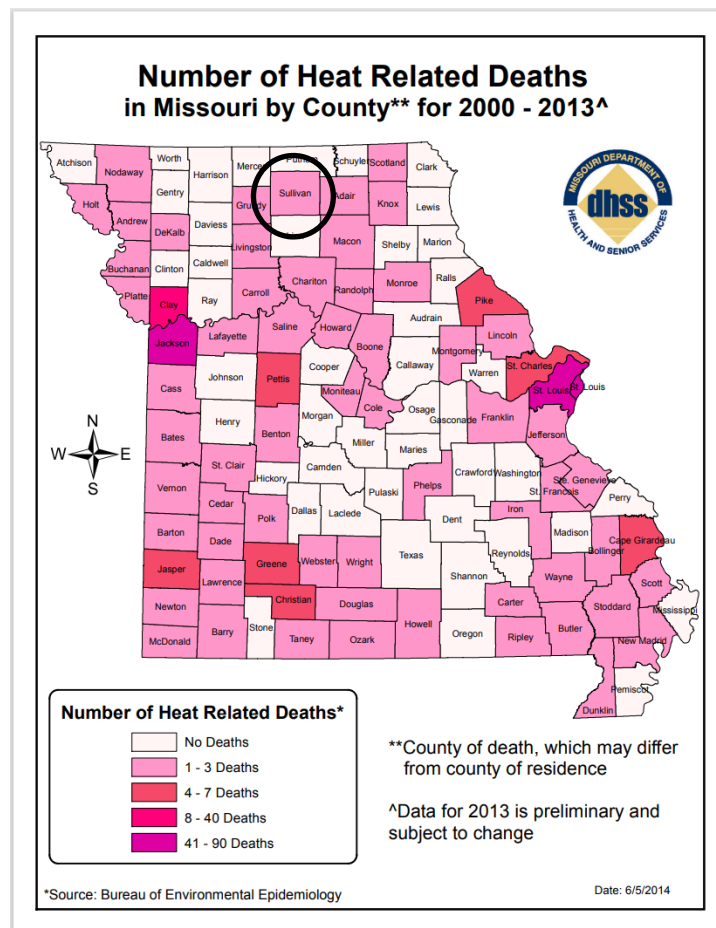
There are 5 reported incidents of extreme heat reported over the last 20 years from the county.

Table 3.39. Extreme heat reports from NCEI 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

Figure 3.20. Heat Related Deaths in Missouri 2000-2013



Source: <https://health.mo.gov/living/healthcondiseases/hyperthermia/pdf/hyper2b.pdf>

Table 3.40. Crop Insurance Claims Paid in Sullivan County 2014-2024

Heat			
Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014		No Claim	\$0
2015		No Claim	\$0
2016	Wheat	Heat	\$4,837.00
2017		No Claim	\$0
2018		No Claim	\$0
2019		No Claim	\$0
2020	Soybeans	Heat	\$3,060.00
2021		No Claim	\$0
2022	Corn	Heat	\$93,578.00
	Soybeans		\$96,765.00
2023	Corn	Heat	\$2,033.00
	Soybeans		\$2,477.00
2024	Corn	Heat	\$409.00
	Soybeans		\$131,759.00
Total			\$334,918

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

There is somewhat limited data available for Sullivan County high temperature readings, but the data indicates that from 2000-2024, readings at Green City topped 95 degrees on average 4.1 times per year according to data from the National centers for environmental information

Excessive heat summaries 2000-2024

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.

Extreme Cold

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

Table 3.41. Extreme Cold reports from NCEI 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 3.42. Crop Insurance Claims Paid in Sullivan County 2014-2024

Extreme Cold			
Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	Wheat	Cold Winter	\$149,735.00
2015	Wheat	Cold Winter	\$91,924.00
2016	No Claim		\$0
2017	No Claim		\$0
2018	Wheat	Cold Winter	\$22,694.00
2019	No Claim		\$0
2020	No Claim		\$0
2021	No Claim		\$0
2022	No Claim		\$0
2023	Wheat	Cold Winter	\$10,340.00
2024	No Claim		\$0
Total			\$274,693.00

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

There is somewhat limited data available for Sullivan County low temperature readings, but the data indicates that from 2000-2024, readings at Green City dropped below 20 degrees on average 53.0 times per year, and dropped below zero on an average of 9 times per year according to data from the National centers for environmental information

Extreme cold summaries

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 \$. 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

While there is a somewhat limited data set for reported extreme temperatures, there is evidence to support that at least 8 out of the past 20 years have had incidents of extreme heat or cold. This would yield a roughly 40% chance for a extreme temperature event to occur during any calendar year.

The following formula can be used to calculate the probability of occurrence, which is the total number of reports divided by the number of years.

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

$$\text{Probability} = \frac{5}{20} = 25\% \text{ Chance of Extreme heat}$$

$$\text{Probability} = \frac{11}{20} = 55\% \text{ Chance of Extreme temperatures combined}$$

Changing Future Conditions Considerations

By the end of the century, the temperatures are projected to continue to increase. The best-case scenario, with lower greenhouse gas emissions, the temperatures are expected to exceed historic levels by the middle of the 21st century. If greenhouse gas emissions are not curbed, historically unprecedented warming is projected by the end of the century. Due to the change in climate, it is projected that by the middle of the 21st century, record breaking heat is likely to occur on a regular basis. This will lead to a higher frequency of heat waves.

The impacts of extreme temperatures are experienced more acutely by the elderly and other vulnerable populations. High temperatures are often higher in urban areas, of which Chariton County has none. There is a higher demand for electricity as people try and keep cool. This increased demand adds a strain to electricity providers 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. Chariton 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 illness 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 following table lists the statistics for the most vulnerable population groups

Table 3.43. Sullivan 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
Sullivan County	377	6.3%	1204	20.1%
City of Milan	157	8.6%	226	12.4%
City of Green City	35	5.8%	144	23.9%
City of Green Castle	19	8.5%	57	25.4%
City of Newtown	4	3.5%	28	24.8%
Village of Harris	3	4.6%	16	24.6%
Village of Humphreys	4	4.5%	6	6.7%
Village of Pollock	0	0%	13	28.3%

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

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

Table 3.44. 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

Potential Losses to Existing Development

Over the past 10 years extreme temperatures have led to \$609,603 in documented losses, converted to an annualized basis this would yield \$60,960.30 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

The hazards posed by extreme temperatures are largely uniform throughout the county outside of limited impact to the school districts

Problem Statement

The county has a growing population of residents over 65 years, who are at a greater risk for

extreme-temperature related illnesses, injuries, and death. Possible solutions include organizing outreach to the vulnerable elderly populations, including establishing and promoting accessible heating or cooling centers in the community and creating a database in coordination with the Health Department to track those individuals at high risk.

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 and tornadoes which are discussed in other sections of this chapter.

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.

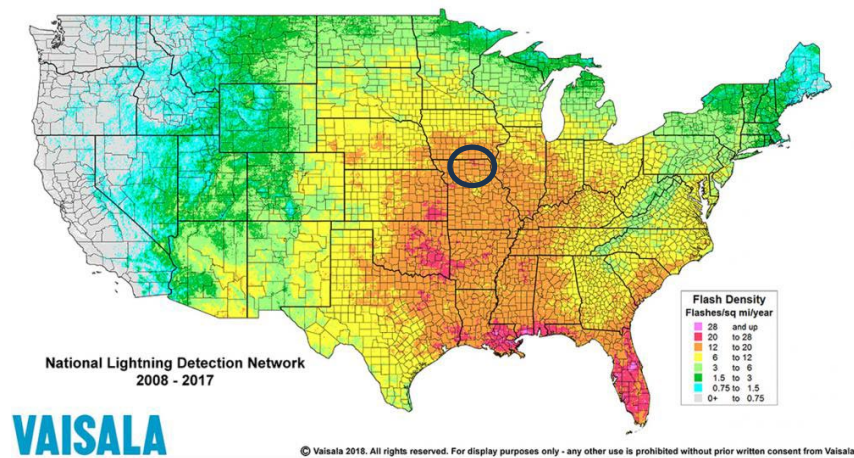
Hail

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 on 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.

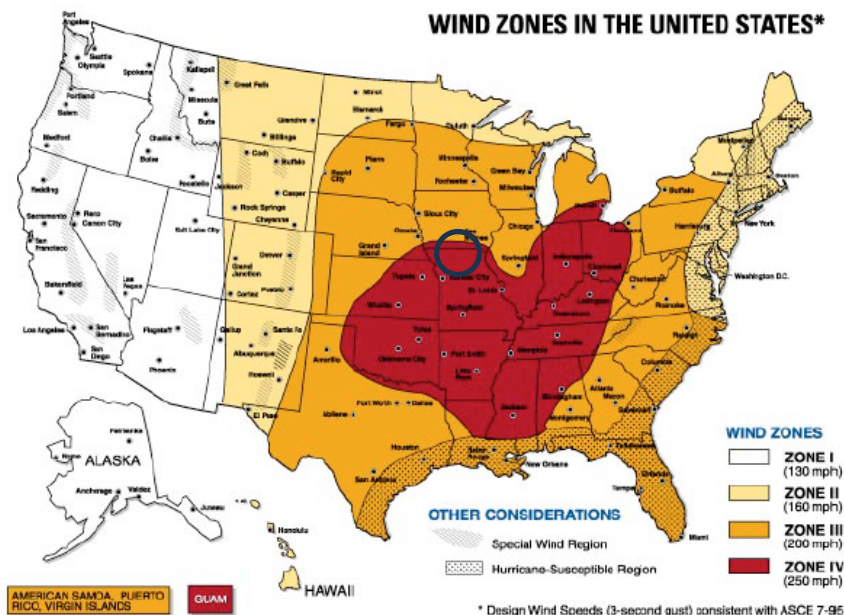
Geographic Location

Figure 3.21. 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.

Figure 3.22. 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 3.45. 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 (**Table 3.46 through Table 3.49**) 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.

Table 3.46. Crop Insurance Claims Paid in Sullivan County from Thunderstorms, 2014-2024.

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
No Claims listed			

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

Table 3.47. Crop Insurance Claims Paid in Sullivan County from High Winds, 2014-2024

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	No Claim		\$0
2015	No Claim		\$0
2016	Corn	Wind	\$193,779.50
2017	Corn	Wind	\$15,427.00
2018	Corn	Wind	\$6,042.00
2019	No Claim		\$0
2020	No Claim		\$0
2021	No Claim		\$0
2022	No Claim		\$0
2023	No Claim		\$0
2024	No Claim		\$0
Total			\$215,248.50

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

Table 3.48. Crop Insurance Claims Paid in Sullivan County from Lightning, 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	Soybeans	Lightning	\$832.00
2019	No Claim		\$0
2020	No Claim		\$0
2021	No Claim		\$0
2022	No Claim		\$0
2023	No Claim		\$0
2024	No Claim		\$0
Total			\$832.00

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

Table 3.49. Crop Insurance Claims Paid in Sullivan County from Hail, 2014-2024

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	Corn	Hail	\$23,544.00
	Wheat		\$16,686.50
2015	No Claim		\$0
2016	No Claim		\$0
2017	No Claim		\$0

2018	Corn	Hail	\$13,807.00
	Soybeans		\$75,905.00
2019	No Claim		\$0
2020	No Claim		\$0
2021	No Claim		\$0
2022	No Claim		\$0
2023	Soybeans	Hail	\$959.00
2024	No Claim		\$0
Total			\$130,901.50

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

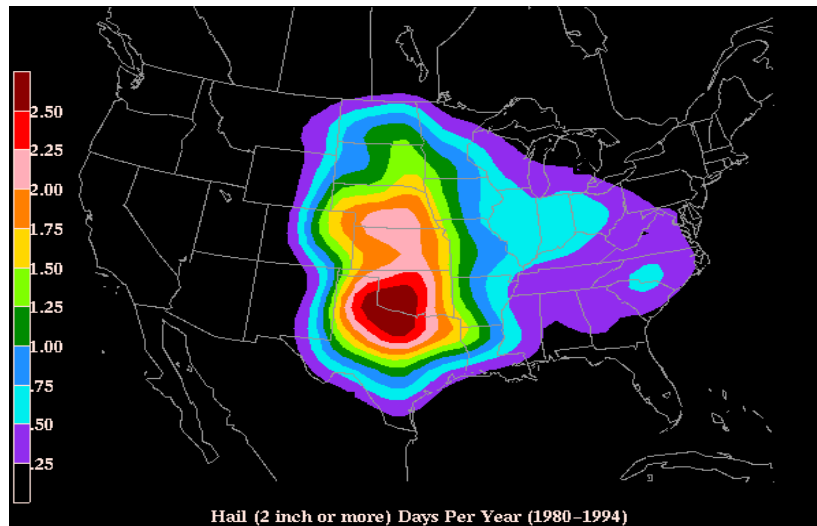
Table 3.50. Severe thunderstorm events in Sullivan County, 2004-2024

Probability of Future Occurrence

Include probability calculations for thunderstorms, high winds, hail, and lightning. Calculate the probability (x number of reported events in y number of years equals z probability of an event in the planning area in any given year). If the results indicate that more than one event would occur annually, state the average number of events annually.

Insert a map (**Figure 3.23**) based on hailstorm data from 1980-1994. It shows the probability of hailstorm occurrence (2" diameter or larger) based on number of days per year. Describe the location of County A in terms of which zone it is in or use a graphic in the map showing the county location.

Figure 3.23. Annual Hailstorm Probability (2" diameter or larger), U 1980- 1994



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

Changing Future Conditions Considerations *OPTIONAL*

Discuss the impact of climate change scenarios on severe thunderstorms. Sources of information include:

- 2023 State Plan, see Chapter 3, Section 3.3.8, Changing Future Conditions Considerations, page 3.234
- US Climate Resilience Toolkit; <https://toolkit.climate.gov/tools/climate-explorer>

- National Climate Assessment; <https://nca2014.globalchange.gov/>

Vulnerability

Vulnerability Overview

Use county level data from the 2023 State Plan, see Chapter 3, Section 3.3.8, State Vulnerability Overview, as the best and most recent data available. Severe thunderstorm vulnerability data is also available with the MSDIS Structure Inventory and All Hazards Risk Dataset available on Google Drive (available in both GIS and Excel formats).

Sample language follows. 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/>

Potential Losses to Existing Development

Utilize information on historical losses to determine average annual loss as an indicator of potential future losses.

Previous and Future Development

Describe impact of current development trends for County A, if any. Note that additional development results in the exposure of more households and businesses vulnerable to damages from severe thunderstorms/ high winds/lightning/hail.

Hazard Summary by Jurisdiction

Although thunderstorms/high winds/lightning/hail events are area-wide, there may be demographics indicating higher losses in one jurisdiction as compared to another. Include information about jurisdictions with high percentages of housing built before 1939, as shown in census data. Note any other construction or demographic differences that could indicate higher losses in one community. Include data about school and special district assets indicating previous losses, including information from the Data Collection Questionnaire. 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

Summarize the risks presented in the preceding analysis. Include a brief discussion of possible solutions, which could be brought forward into the strategy section in later analysis. For example:

- The NCEI Storm Events Database notes over 200 thunderstorm wind events in County B with over \$2 million dollars in damages. Possible solutions include review of local ordinance and building codes to address high winds and/or construction techniques to include structural bracing, straps and clips, or anchor bolts.

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.

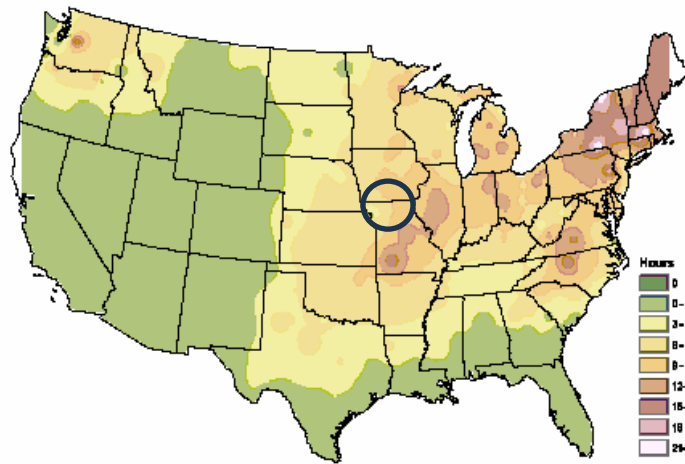
- **Blizzard**—Winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less than $\frac{1}{4}$ mile for at least three hours.
- **Blowing Snow**—Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow 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 3.24. 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 — falling or blowing snow combined strong winds will 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 3.51. Previous Winter storm events in Sullivan County 1994-2024

Blizzard			
Date	Deaths	Injuries	Damage
12/7/2009	0	0	0
2/1/2011	0	0	0
11/25/2018	0	0	0

Total: 3	0	0	0
Heavy Snow			
4/10/1997	0	0	\$750,000
3/15/2001	0	0	0
1/30/2002	0	0	0
3/1/2002	0	0	0
2/12/2007	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: 9	0	0	\$750,000
Ice Storm			
1/4/1998	0	0	0
11/29/2006	0	0	0
12/1/2007	0	0	0
12/10/2007	0	0	\$10,000
12/18/2008	0	0	0
1/15/2017	0	0	0
2/7/2019	0	0	0
Total: 7	0	0	\$10,000
Winter Storm			
12/11/2000	0	0	0
1/28/2001	0	0	0
2/9/2001	0	0	0
2/27/2001	0	0	0
1/16/2003	0	0	0
2/15/2003	0	0	0
3/4/2003	0	0	0
2/5/2004	0	0	0
1/4/2005	0	0	0
1/12/2007	0	0	0
12/22/2007	0	0	0
2/21/2010	0	0	0
2/24/2011	0	0	0
12/20/2012	0	0	0
2/21/2013	0	0	0
2/25/2013	0	0	0
12/27/2015	0	0	0
1/11/2019	0	0	0
1/10/2020	0	0	0
4/16/2020	0	0	0
12/29/2020	0	0	0
1/14/2022	0	0	0
Total: 22	0	0	0
Total: 41	0	0	\$760,000

Source: NWS NCEI Data accessed July 2025

Table 3.53. Winter storm events summaries for Sullivan County Missouri 1994-2024

Year	Date	Event Summary
1994		No reported events
1995		No reported events
1996		No reported events
1997	4/10/1997	No event summary supplied by NCEI
1998	1/4/1998	An icy rain fell during the morning hours of January 4th resulting in an eighth to a quarter inch of ice accumulation and slippery roadways.

		There were numerous non-injury traffic accidents reported throughout Northwest Missouri and many reports of minor injuries due to pedestrians falling on icy sidewalks. Since the freezing rain occurred on a Sunday, traffic was light which prevented widespread problems.
1999		No reported events
2000	12/11/2000	A storm system brought a mixed bag of wintery precipitation to northern Missouri on December 11th. Precipitation began as freezing drizzle late in the evening of December 10th. After midnight precipitation increased in intensity and changed over to snow across the northern tier of Missouri. Snowfall totaled 7 inches in Fairfax Missouri, with 3-5 inches reported north of a St. Joseph to Kirksville line. Ice accumulations of up to 3/8 of an inch were reported from Marshall and Sedalia into the Boonville area. While heavy accumulation of snow and ice were not noted over the remainder of the area, the combination of snow and ice was sufficient to disrupt travel. Numerous traffic accidents were reported, and two airplanes slid off icy taxiways at the Kansas City International Airport, but no serious injuries were reported. Most schools in the area were closed and many remained closed the next day.
2001	1/28/2001	A storm system brought a mixed bag of wintry precipitation to northern Missouri on January 28th and 29th. The precipitation started as snow but quickly became freezing rain during the morning hours, mainly south of a line from St. Joseph to Fayette. North of this line snowfall totals averaged 1 to 5 inches. Fairfax Missouri reported 6 inches and 4 to 6 inch amounts were reported around Bethany and Moberly. Ice accumulations ranged from 1/4 to 1/2 inch across the entire area. The combination of snow and ice was sufficient to disrupt travel, especially north of Interstate 70. Numerous traffic accidents were reported and some schools were closed the following Monday.
	2/9/2001	"A strong storm system moved across Northwest Missouri on February 9th with a variety of winter
	2/27/2001	weather. Heavy snows of 8 to 10 inches fell across Nodaway county, with 6 to 8 inches north of a St. Joseph to Grant City line. The remainder of the area reported 1/4 to 1/2 inch of ice accumulation,
	3/15/2001	No summary provided.
2002	1/30/2002	A long-lived major ice and snow storm blasted much of northwest, northern and central Missouri from late Tuesday, January 29th, until Thursday, January 31st. Ice accumulations of over an inch were observed from the Kansas City metropolitan area, east and north through Moberly Missouri. At one point 409,504 total customers were without electrical power in the CWA, with some residents without power up to two weeks. For the Kansas City area, the ice storm was ranked as the worst ever. Further north across northern Missouri, heavy snow fell generally along and north of a line, from St. Joseph to Trenton to Kirksville. Snow accumulations ranged from 8 to 14 inches.
	3/1/2002	A vigorous late winter storm moved across the Midwest. This storm spread two to six inches of snow across northwest Missouri. Strong gusty northwest winds caused considerable blowing and drifting of the snow. Driving was hazardous and numerous accidents were reported.

2003	1/16/2003	A winter storm moved across portions of northwest and north central Missouri on January 16th. The storm produced a swath of 3 to 8 inch snows, from Maryville east to Princeton.
	2/15/2003	A winter storm moved along the Iowa Missouri border from February 15th through February 16th. The storm produced snows from 3 to 8 inches, in an area from Bethany to Kirksville. In addition to the snow...there was up to a quarter inch of ice accumulation. Gusty northwest winds produced snow drifts from 2 to 4 feet in depth.
	3/4/2003	A late winter storm moved through extreme northern Missouri on March 4th. Areas from Milan to Livonia received from 5 to 6 inches of snow. A quarter of an inch of ice accumulation was reported around Bethany.
2004	2/5/2004	A winter storm on February 5th left a wide area of 6 to 8 inches of snow.
2005	1/4/2005	1/4 to 3/4" of ice was reported across these areas
2006		
	1/20/2006	A winter weather system brought a wintry mix of sleet, freezing rain, and snow to the area. Snow amounts were from 2 to 4 inches.
	11/29/2006	A strong Arctic cold front swept through the region on November 29th. As the cold air surged south during the day, rain which had been falling through a warm layer in the atmosphere, quickly changed to freezing rain and some sleet as it reached the surface. Areas from Sedalia to Macon received from 1/4 to 1/2 inch of ice. A band of ice up to 1/4 of an inch, fell from Clinton northeast into Kirksville. A large swath from Butler to Plattsburg, and then extending northeast to Princeton and Milan, including the Kansas City metropolitan area, received from 1/4 to 1/2 of an inch of ice accumulation. Lighter amounts of up to 1/4 of an inch of ice was reported from Saint Joseph to Bethany.
2007	1/12/2007	Up to an inch of freezing rain and sleet across the county.
	2/12/2007	Four to six inches of snow fell across the county.
	12/1/2007	One quarter to four tenths of an inch of ice was reported across the county.
	12/10/2007	Three quarters of an inch of ice was reported across the county. Many tree branches and power lines were reported down.
	12/22/2007	Six to nine inches of snow was observed across northern portions of the county. Blowing and drifting of the snow made travel hazardous.
2008	12/18/2008	One quarter of an inch of ice was observed.
2009	12/7/2009	Blizzard conditions were observed across the county. Snowfall amounts reached 8 inches, in the northwestern part of the county.
2010	2/21/2010	Up to 8.5 inches of snow was measured in Green City. Blowing and drifting snow caused hazardous driving conditions.
2011	1/10/2011	Five to six inches of snow was 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 12 inches, measured in Milan. Travel was nearly impossible, with the blowing and drifting snow, and the very low visibilities. This event currently holds the record for the single greatest snowfall on record in many communities.
	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.
	12/19/2011	One inch of snow was measured in Green City.
2012	1/27/2012	Three inches of snow was measured in Green City.
	2/13/2012	The observer in Green City measured 2.5 inches of snow.
	2/24/2012	The observer in Green City measured one inch of snow.
	12/20/2012	The combination of high winds and snowfall of one to three inches, caused near blizzard conditions across the county.
2013		
	2/21/2013	Green City measured 6 inches of snow.
	2/25/2013	Nine inches of snow was measured at Milan.
	5/2/2013	Green City measured 3.0 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 vehicle spin-outs across the area, and despite the ice accumulation the widespread effects were rather minimal.
2014	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.
2015	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 8 to 10 inches fell across the county with the highest reported total from the county coming from Green City, where 9 inches fell. Numerous vehicle accidents occurred due to the poor driving conditions, but no serious injuries were reported.
	12/28/2015	Several areas across northeast Kansas and northwest Missouri saw ice accumulations approaching a quarter inch as well as sleet ranging from a quarter to a half inch in most locations, with some locations reporting over an inch of sleet. Once the sleet ended another 3 to 4 inches of snow fell before the system moved out.
2016		No reported events
2017	1/16/2017	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.
2018	11/25/2018	Blizzard conditions started after a few hours of lightly to moderately falling snow. Once the heavy snow arrived winds gusted up to 40 mph for nearly 4 hours, creating whiteout conditions , officially measured by the ASOS at nearby KTVK and KIRK as 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.
2019		
	1/12/2019	Between 8 and 12 inches of snow fell across Sullivan County, with most of it falling over the course of the first 12 hours. Light snow continued into the next day (January 12), but 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 Sullivan County received approximately a quarter inch of ice accumulation. Numerous vehicle accidents occurred area-wide and minor tree damage occurred.
2020		
	1/11/2020	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.
	4/17/2020	Light snow fell off and on through the day on Thursday, accumulating about an inch; however, by mid to late afternoon the snow picked up intensity. One to two inch per hour snow rates were reported across the area for periods. Numerous reports of very low visibility due to very heavy snow were also received. The heavier snow came to an end on the evening of April 16, and gradually tapered to a stop by early morning on April 17. When all was said and done there was about 6-10 inches of snow reported across portions of the county.
	12/30/2020	During the day on December 29, a potent winter storm moved into the area. The precipitation started as primarily snow during the morning hours producing a couple inches of accumulation, but switched to freezing rain just before 1 pm as warm air aloft moved over the area. Moderate, to at times heavy rain ensued through the rest of the morning and early to middle afternoon hours, before eventually moving out by the evening hours. The main impact from this storm was several power outages around the area. Due to the rain rates, not all of the nearly 1 inch of liquid precipitation accreted on surfaces, but a quarter to half inch did accrete, causing a significant disruption to the power, and closing numerous roads.

2021		No reported events
2022	1/15/2022	Several reports from across the area indicated around 6-8 inches of snow Sullivan County.
2023		No reported events
2024		No reported events

Source: NCEI storm reports database; 1994-2024, accessed July 2925

Table 3.54. Crop Insurance Claims Paid in Sullivan County as a Result of Cold Conditions and Snow 2014 to 2024

Year	Crop Name	Cause of Loss	Insurance Paid (\$)
2014	Wheat	Cold Winter	\$149,735.00
	Wheat	Freeze	\$118.00
	Soybeans	Freeze	\$3,584.00
2015	Wheat	Cold Winter	\$91,924.00
2016	No Claim		\$0
2017	No Claim		\$0
2018	Wheat	Cold Winter	\$22,694.00
2019	No Claim		\$0
2020	No Claim		\$0
2021	No Claim		\$0
2022	No Claim		\$0
2023	Wheat	Cold Winter	\$10,340.00
2024	No Claim		\$0
Total			\$278,395.00

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

Probability of Future Occurrence

There is a very high likelihood of a winter storm impacting the county, as all but 3 of the last 20 years have had at least 1 reported winter storm event. This yields an 85% of at least 1 winter storm event in the county during a calendar year.

Changing Future Conditions Considerations

Changes in long term climate will lead to varying impacts of winter storms to the county and it's infrastructure and residents.

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 damages is difficult to determine. Businesses can experience loss of income as a result of closure during winter storms.

Overhead power lines and infrastructure are also vulnerable to damages from winter storms. In particular ice accumulation during winter storm events damage to power lines due to the ice weight on the lines and equipment. Damages also occur to lines and equipment from falling trees and tree limbs weighted 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.

Potential Losses to Existing Development

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 1997 when a heavy snow event caused over \$750,000 in damage, Major ice storms in the past have led to long duration power outages and costly repairs.

Crop losses have totaled \$278,396 due to winter storm conditions over the last 10 years, calculated to a annualized basis the estimated cost would be \$27,839.50. Other costs associated with winter storms are harder to annualized due to the lack of data.

Previous and Future Development

Any growth and development within the county would lead to increased risks and impacts to infrastructure.

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

Winter storms lead to major damage to infrastructure and disruptions to daily life. The rural nature

of the county leads to increased risks to power distribution systems and rural roads.

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 mile.

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

Sullivan County, Missouri, has experienced a significant history of tornadoes, with documented events stretching back to at least the late 19th and early 20th centuries. Historically, devastating

tornadoes have impacted various parts of the county, including a particularly destructive event in 1899 that destroyed the town of Newtown and claimed 20 lives, and a 1918 tornado that killed six people after cutting a quarter-mile wide, three-mile long swath. While records highlight destructive events in and around towns like Newtown, Milan, Osgood, Pollock, and Humphreys, tornadoes in Sullivan County have generally shown paths across various rural and developed areas, often resulting in structural damage to homes and businesses, downed trees, and sometimes fatalities or injuries.

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 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 3.55. 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 Nu	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/fag/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 3.56. 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.

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 purpose 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.

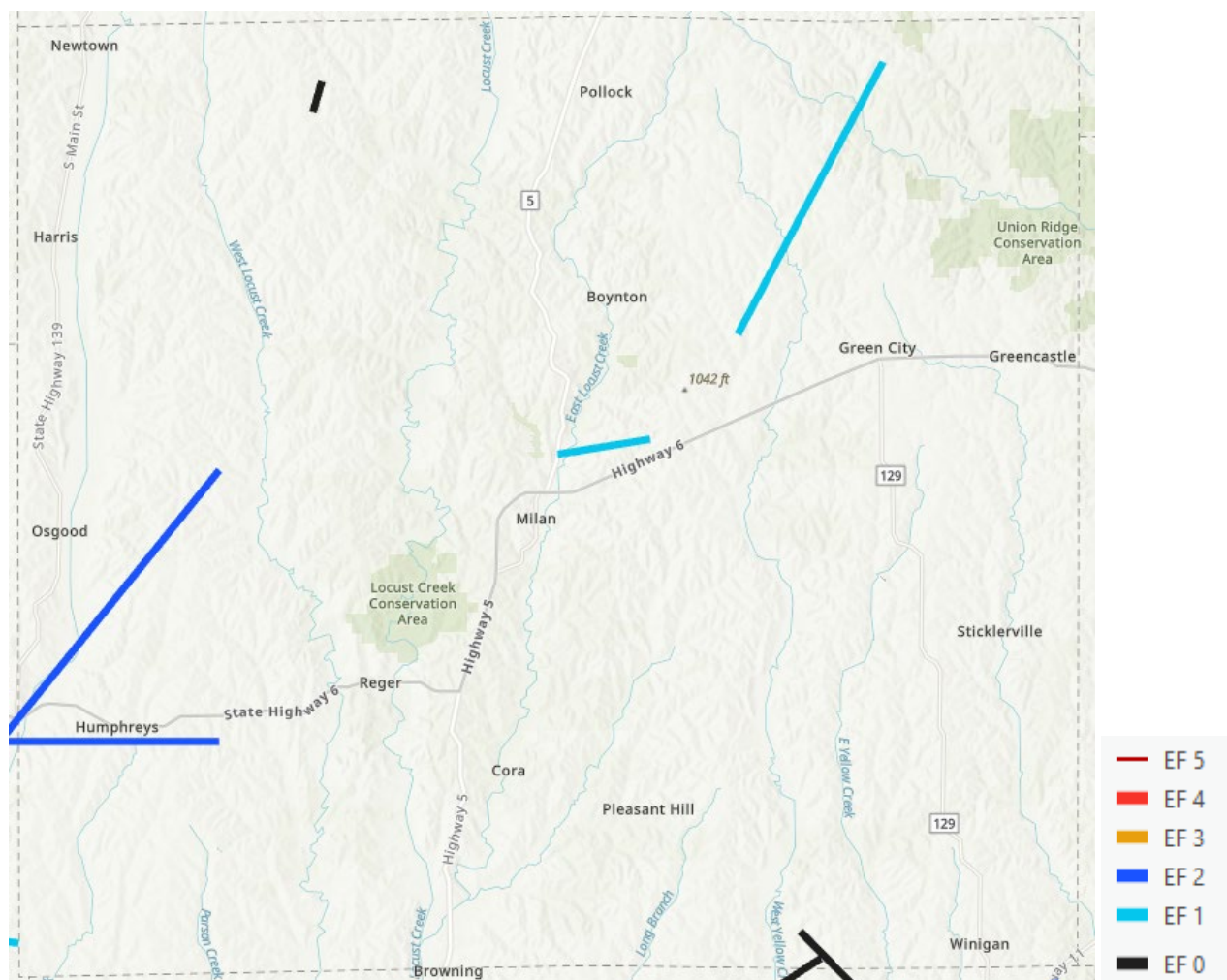
Table 3.57. Recorded Tornadoes in Sullivan County, 1993 – Present

Date	Beginning Location	Ending Location	Length (miles)	Width (yards)	F/EF Rating	Death	Injury	Property Damage	Crop Damages
6-12-08	1NW PENNVILLE	1NNW PENNVILLE	0.21	25	0	0	0	0	0
7-21-08	5W WINIGAN	1SSW WINIGAN	4.44	25	0	0	0	0	0

5-13-09	2NNE MILAN	3SSE BOYNTON	4.35	100	1	1	0	25,000	0
7-19-10	0N HARRIS	0N HARRIS	0.01	25	0	0	0	0	0
7-19-10	3SW MILAN	3SW MLAN	0.10	25	0	0	0	400	0
10-8-18	2N JUDSON	3N JUDSON	0.82	25	0	0	0	0	0
	Total	6				1	0	25,400	0

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

Figure 3.25. Sullivan County Map of Historic Tornado Events



Data from the USDA cause of loss summary indicates no crop losses from tornadoes in the county.

Probability of Future Occurrence

There is a low likelihood of tornadoes in Sullivan County each year. Over the last 32 years, 4 years have featured at least 1 reported tornado. This results in a 12% chance of a tornado during a calendar year.

$$\text{Probability of wildland fire Incident} = \frac{4}{32} = 0.12$$

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

Sullivan County, Missouri, exhibits a significant vulnerability to tornadoes due to its geographical placement within a climatologically active severe weather region. The convergence of warm, moist air from the Gulf of Mexico and cooler, drier air masses creates an unstable atmospheric environment conducive to the formation of powerful supercell thunderstorms, the primary producers of strong tornadoes. This meteorological susceptibility is compounded by a documented history of impactful tornado events.

Figure 3.26. Tornado Alley in the U.S.



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

Potential Losses to Existing Development

Tornadoes reported in the county since 1993 have resulted in \$25,400 in damages to property, This yields an annualized loss of \$1,016.

Previous and Future Development

New building development and community growth can significantly heighten vulnerability to tornadoes in several ways, even in areas historically prone to them. Primarily, as urban and suburban areas expand, they often sprawl into previously undeveloped or sparsely populated regions. This "urban sprawl" directly increases the number of people and properties within a tornado's potential path. A tornado passing through an open field causes minimal damage, but the same tornado traversing a newly developed subdivision with hundreds of homes will result in far greater economic loss and risk to human life, regardless of its intensity.

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.

Problem Statement

insert

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.

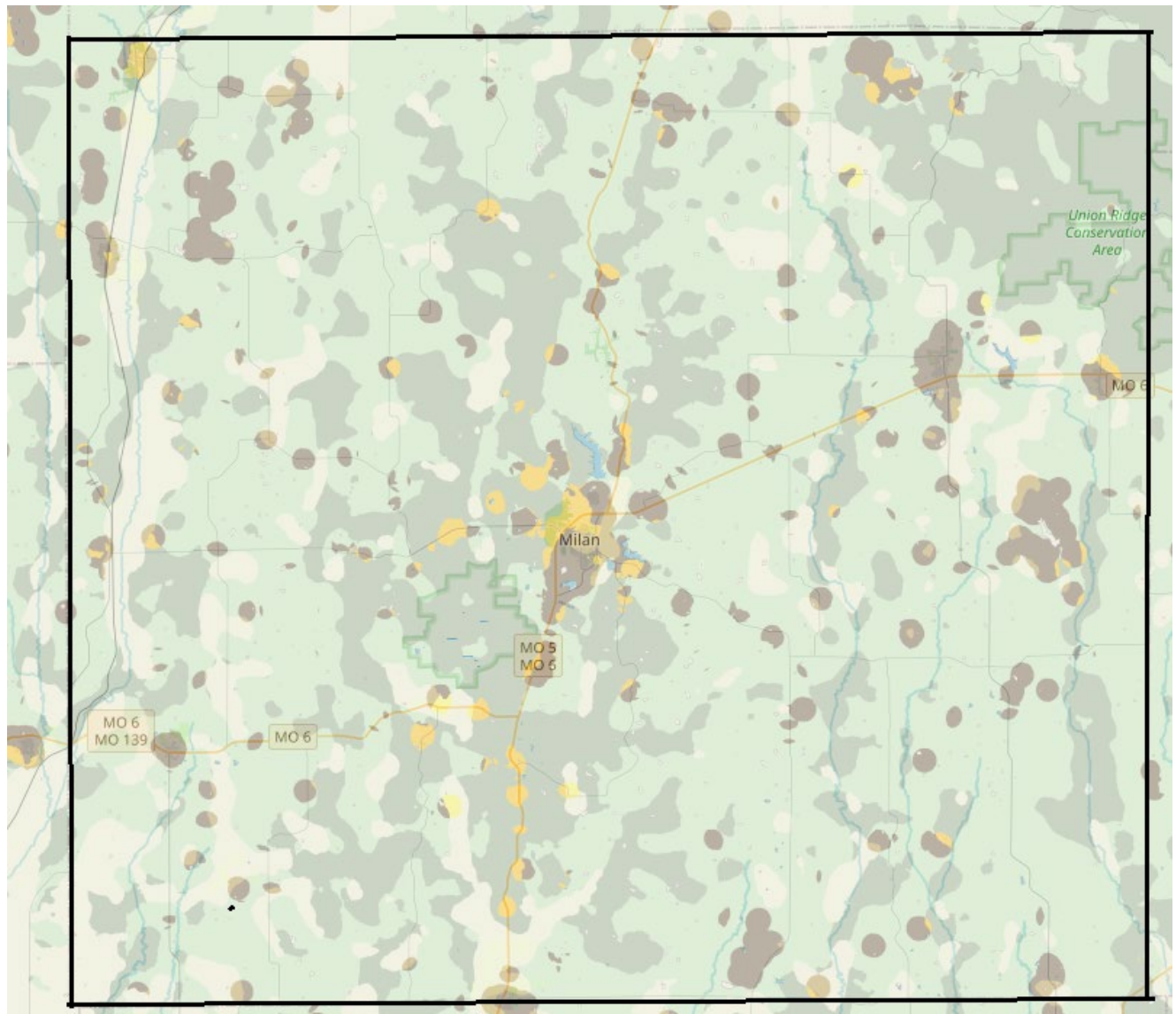
The Forestry Division of the Missouri Department of Conservation (MDC) is responsible for protecting privately owned and state-owned forests and grasslands from wildfires. To accomplish this task, eight forestry regions have been established in Missouri for fire suppression. The Forestry Division works 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 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

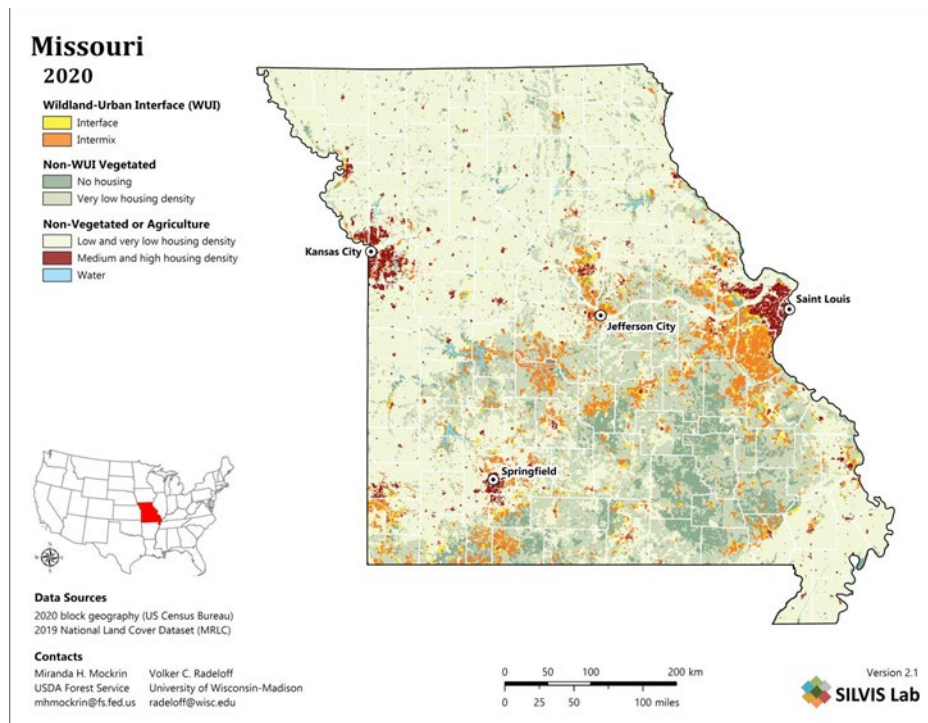
While all of Sullivan County is at risk for the possibility of wildfires, areas with a higher Wildland Urban interface (WUI) are more susceptible to losses from a wildfire situation. See the following figures for more detailed information.

Figure 3.27. University of Wisconsin Wildland Urban Map showing Sullivan County



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

Figure 3.28. Wildfire Urban Interface (WUI) Areas, 2020



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 3.58. Counts of fires reported by year

Year	Number of fires reported
2015	0
2016	11
2017	21
2018	0
2019	20
2020	0
2021	1
2022	1
2023	9
2024	4
Total	67
Average	7

Source: Missouri department of conservation wildfire reporting system

Table 3.59. Average Acreage Burned

Year	Acres burned
2015	0
2016	273.1
2017	1,113.0
2018	0
2019	4,829.86
2020	0
2021	11.85
2022	46.335
2023	110.388
2024	19.431
Average	640
Total	6,403.964

Source: Missouri department of conservation wildfire reporting system

Figure 3.29. Average Annual Acreage Burned

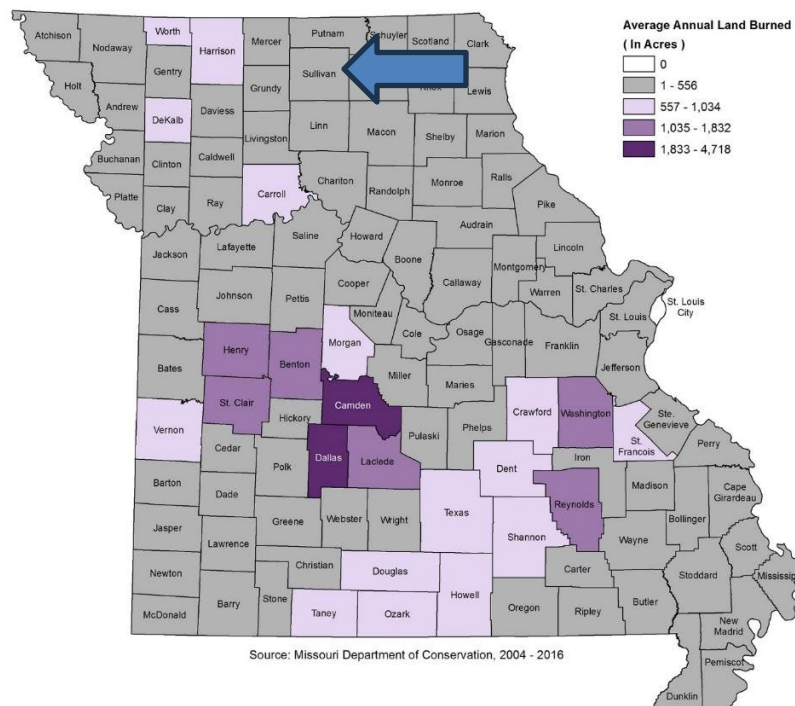


Table 3.60. Causes of Fire by type and count

Cause	Number of fires
Debris	34
Unknown	25
Equipment	8
Miscellaneous	7
Smoking	4
Power line	4
Not Reported	3
Lightning	2
Campfire	1

Source: Missouri department of conservation wildfire reporting system.

Probability of Future Occurrence

There is a high likelihood of wildfire in Sullivan County in a given year. Over the last 10 years, 7 years have featured at least 1 reported fire. This results in a 70% chance of a wildfire during a calendar year.

$$\text{Probability of wildland fire Incident} = \frac{7}{10} = 0.70$$

The number of fires reported each year may vary greatly, but averaging the results yields around 8 wildland fire reports each year.

$$\text{Average wildland fires each year} = \frac{67}{10} = 7$$

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 3.61. Estimated numbers and Values of Structures and Population Vulnerable to Wildfire in Sullivan County

Type of Property	Number of Structures	Value of Structures	Population
Residential	138	\$25,962,203	391
Agriculture	2	\$4,665	0
Commercial	2	\$893,210	0
Government	1	\$1,405,143	0
Total	143	\$28,265,221.00	391

Source: 2023 Missouri state hazard mitigation plan

Table 3.62. Statistical Data for Wildfire Hazard in Sullivan County

Number of Wildfires 2015-2025	Likelihood of Occurrence (#/year)	Total Acres Burned	Average Annual Acreage Burned
67	7	6,403.964	640

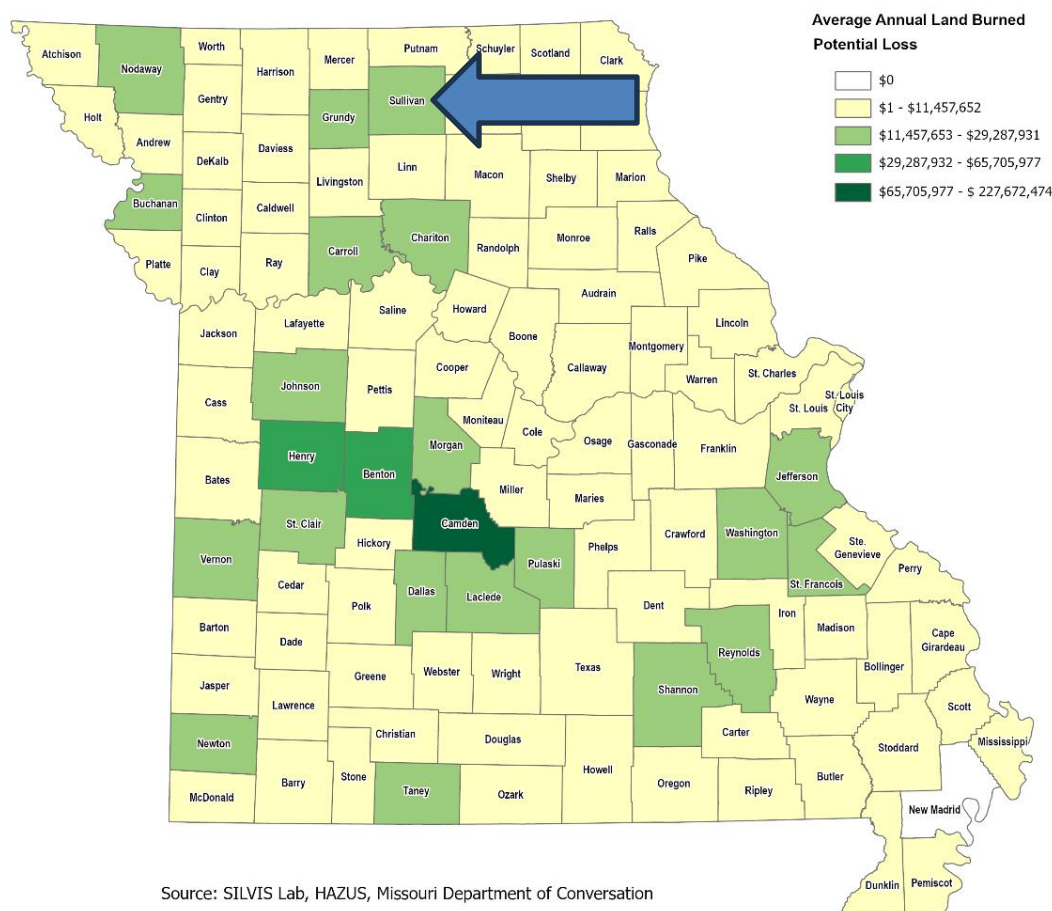
Source: 2023 Missouri State Hazard Mitigation Plan

Table 3.63. Wildfire Potential Loss Estimates in Sullivan County

Total WUI Acreage	Total Structure Value Within WUI	Average Value/Acre within WUI	Average Annual Acreage Burned	Potential Loss
831.1	\$28,265,221	\$34,009	640	\$13,398,990

Source: 2023 Missouri State Hazard Mitigation Plan

Figure 3.30. Wildfire Potential Loss Estimate



Source: SILVIS Lab, HAZUS, Missouri Department of Conservation

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.

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 Sullivan 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 regions 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	Goals.....	4.1
4.2	Identification and Analysis of Mitigation Actions.....	4.1
4.3	Implementation of Mitigation Actions	4.4

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

This planning effort is an update to Sullivan County’s existing hazard mitigation plan approved by FEMA on May 20th, 2021. Therefore, the goals from the 2020 Sullivan 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

Some specific sources for mitigation action ideas include the following:

- FEMA's Mitigation Ideas Publication, https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf
- FEMA's Climate Resilient Activities for Hazard Mitigation Assistance, <https://www.fema.gov/emergency-managers/risk-management/climate-resilience>
- FEMA Resources for Climate Resilience, https://www.fema.gov/sites/default/files/documents/fema_resources-climate-resilience.pdf
- EPA's Hazard Mitigation for Natural Disasters Publication, <https://www.epa.gov/waterutilityresponse/hazard-mitigation-natural-disasters>
- EPAs Planning for an Emergency Drinking Water Supply Publication, <https://www.epa.gov/waterutilityresponse/water-utility-planning-emergency-drinking-water-supply>

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 consider^{7(a)}, 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 0 completed actions, 40 continuing actions (either ongoing or modified), and 2 deleted actions.

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

Table 4.1. Action Status Summary

Jurisdiction	Completed Actions	Continuing Actions (ongoing or modify)	Deleted Actions
Sullivan County	0	5	1
Greencastle	0	4	0
Green City	0	4	0
Milan	0	5	0
Green City R-1	0	2	0
Milan C-2	0	2	1
Total:	0	40	2

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)
No completed actions	
Deleted Actions	Reason for Deletion
County 2020.5	Deemed not a natural hazard, no longer included in plan
Milan C-2 2020.2	Deemed not a natural hazard, no longer included in plan

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

Table 4.3. Summary of actions from the 2021 plan

Status	Action from Previous Plan
Continued	County 2020.1 Maintain transportation infrastructure
Continued/Modified	County 2020.2 Generators for shelters/critical facilities
Continued	County 2020.3 Debris removal
Continued	County 2020.4 Installation/upgrade siren
Removed	County 2020.5 Pandemic response
Continued	County 2020.6 NOAA Weather radios
Continued	Milan 2020.1 Generator for shelter/critical facilities
Continued	Milan 2020.2 Maintain transportation infrastructure
Continued	Milan 2020.3 Safe rooms and storm shelters
Continued	Milan 2020.4 Installation/upgrade siren
Continued	Milan 2020.5 NFIP participation
Continued	Green City 2020.1 Maintain transportation infrastructure
Continued	Green City 2020.2 Generator for shelter/critical facilities

Continued	Green City 2020.3 Installation/upgrade siren
Continued	Green City 2020.4 Safe rooms/storm shelter
Continued	Greencastle 2020.1 Maintain transportation infrastructure
Continued	Greencastle 2020.2 Generator for shelter/critical facilities
Continued	Greencastle 2020.3 Installation/upgrade siren
Continued	Greencastle 2020.4 Safe rooms/storm shelters
Continued	Milan C-2 2020.1 Safe rooms / Storm Shelters
Removed	Milan C-2 2020.2 Pandemic response
Continued	Milan C-2 2020.3 Generator
Continued	Green City R-I Safe rooms / storm shelters
Continued	Green City R-I Generator

4.3 Implementation of Mitigation Actions

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 ___. 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 Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0		Score
S: Is it Socially Acceptable		
T: Is it Technically feasible and potentially successful?		
A: Does the jurisdiction have the Administrative capacity to execute this action?		
P: Is it Politically acceptable?		
L: Is there Legal authority to implement?		
E: Is it Economically beneficial?		
E: Will the project have either a neutral or positive impact on the natural Environment ?		
Will historic structures be saved or protected?		
Could it be implemented quickly?		
STAPLEE SCORE		
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	
MITIGATION EFFECTIVENESS SCORE		
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		
☐ High Priority (30+ points)	☐ Medium Priority (25 - 29 points)	☐ Low Priority (<25 points)

Completed by
(Name, Title, Phone Number)

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:	Sullivan 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 2025.1
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide emergency preparedness information and resources related to all natural disasters to the public through active education and outreach programs.
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:	County Emergency Management
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	NA
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:	Sullivan 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 2025.2
Name of Action or Project:	Maintain transportation infrastructure
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Mitigate the risk to life and property and promote continued operation of government and emergency functions by regularly maintaining and improving infrastructure.
Estimated Cost:	\$500,000
Benefits:	Reduce long term costs by improving infrastructure and addressing on-going issues long
Plan for Implementation	
Responsible Organization/Department:	Road and Bridge Department
Supporting Organization/Department:	n/a
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:	Sullivan County
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:	County 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:	County Commission
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:	Sullivan County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Earthquake, Severe thunderstorm, Sever winter storm, 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 2025.4
Name of Action or Project:	Debris removal
Mitigation Category:	Structure and Infrastructure, Natural systems protection
Action or Project Description:	Mitigate the risk to life and property and promote continued operation of government and emergency functions by regularly removing debris as needed along transportation routes and drainage systems.
Estimated Cost:	\$500,000
Benefits:	Frequent removal of debris will help clear roadways and drainage systems. Emergency services can respond quicker to emergencies. Stormwater can drain effectively and reduce the risk of flooding with regular removal of debris.
Plan for Implementation	
Responsible Organization/Department:	County Road and Bridge Department
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	HMGP, FEMA Recovery, Transportation budget
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:	Sullivan 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 2025.5
Name of Action or Project:	Installation of warning siren
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 Commission
Supporting Organization/Department:	
Action/Project Priority:	Medium
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:	Sullivan 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 robust early warning systems
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:	N.O.A.A. Weather Radio
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide emergency preparedness information and resources related to all natural disasters to the public through active education and outreach programs.
Estimated Cost:	\$5,000
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:	County Emergency Management
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	NA
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:	City of Greencastle
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:	CGCA 2025.1
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide emergency preparedness information and resources related to all natural disasters to the public through active education and outreach programs.
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:	City Council
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	NA
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:	City of Greencastle
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:	CGCA 2025.2
Name of Action or Project:	Maintain transportation infrastructure
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Mitigate the risk to life and property and promote continued operation of government and emergency functions by regularly maintaining and improving infrastructure.
Estimated Cost:	\$500,000
Benefits:	Reduce long term costs by improving infrastructure and addressing on-going issues long
Plan for Implementation	
Responsible Organization/Department:	Road and Bridge Department
Supporting Organization/Department:	n/a
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 Greencastle
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:	CGCA 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:	City Council
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:	City of Greencastle
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:	CGCA 2025.4
Name of Action or Project:	Installation of warning siren
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:	City Council
Supporting Organization/Department:	
Action/Project Priority:	Medium
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:	City of Greencastle
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:	CGCA 2025.5
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:	City Council
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:	City of Green City
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:	CGC 2025.1
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide emergency preparedness information and resources related to all natural disasters to the public through active education and outreach programs.
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:	City Council
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	NA
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:	City of Green City
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:	CGC 2025.2
Name of Action or Project:	Maintain transportation infrastructure
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Mitigate the risk to life and property and promote continued operation of government and emergency functions by regularly maintaining and improving infrastructure.
Estimated Cost:	\$500,000
Benefits:	Reduce long term costs by improving infrastructure and addressing on-going issues long
Plan for Implementation	
Responsible Organization/Department:	Road and Bridge Department
Supporting Organization/Department:	n/a
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 Green City
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:	CGC 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:	City Council
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:	City of Green City
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
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. 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:	CGC 2025.4
Name of Action or Project:	Installation of warning sirens, Weather Radios and other alerting systems
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Installation of early warning sirens, Weather radios, and mass notification systems for the community
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:	City Council
Supporting Organization/Department:	
Action/Project Priority:	Medium
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:	City of Green City
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:	CGC 2025.5
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:	City Council
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:	City of Green City
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Areas that flood due to excessive storm water and insufficient drainage
Action or Project	
Applicable Goal Statement:	Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.
Action/Project Number:	CGC 2025.6
Name of Action or Project:	Flood reduction studies and reports
Mitigation Category:	Structure and Infrastructure Projects, Planning and regulation
Action or Project Description:	Conduct data collection and studies to locate areas in the community most prone to flooding and identify the root cause
Estimated Cost:	\$10,000
Benefits:	By locating the most likely areas to flood and underlying causes the city can focus it's resources on projects that will have the greatest long term impacts
Plan for Implementation	
Responsible Organization/Department:	City Council
Supporting Organization/Department:	
Action/Project Priority:	Medium
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:	New
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Green City
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure
Problem being Mitigated:	Early detection of possible issues with dams
Action or Project	
Applicable Goal Statement:	Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.
Action/Project Number:	CGC 2025.7
Name of Action or Project:	Routine review/inspection of dams, training
Mitigation Category:	Structure and Infrastructure Projects, Planning and regulation
Action or Project Description:	City staff will be trained on how to spot potential problems with dam structures and will conduct routine visual reviews and inspections to spot signs of distress.
Estimated Cost:	\$10,000
Benefits:	Identifying hazards before they become serious will allow for repairs to be completed in a more cost effective manor, correcting problems before a failure would lead to reductions in loss of life and property
Plan for Implementation	
Responsible Organization/Department:	City Council
Supporting Organization/Department:	
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:	New
Report of Progress:	Awaiting funding

Action Worksheet	
Name of Jurisdiction:	City of Milan
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:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide emergency preparedness information and resources related to all natural disasters to the public through active education and outreach programs.
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:	City Council
Supporting Organization/Department:	FEMA, SEMA, NWS, USGS
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	NA
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:	City of Milan
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:	CM 2025.2
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:	City Council
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:	City of Milan
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 2025.3
Name of Action or Project:	Maintain & Upgrade transportation infrastructure
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Mitigate the risk to life and property and promote continued operation of government and emergency functions by regularly maintaining and improving infrastructure.
Estimated Cost:	\$5,000,000
Benefits:	Reduce long term costs by improving infrastructure and addressing on-going issues long
Plan for Implementation	
Responsible Organization/Department:	Road and Bridge Department
Supporting Organization/Department:	n/a
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/Modified
Report of Progress:	On going as needed

Action Worksheet	
Name of Jurisdiction:	City of Milan
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:	CM 2025.4
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:	City Council
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:	City of Milan
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure, Drought, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire
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. 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 2025.5
Name of Action or Project:	Installation of warning sirens, Weather Radios and other alerting systems
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Installation of early warning sirens, Weather radios, and mass notification systems for the community
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:	City Council
Supporting Organization/Department:	
Action/Project Priority:	Medium
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:	City of Milan
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Unregulated development in the floodplains
Action or Project	
Applicable Goal Statement:	Goal 2: Minimize property damage due to flooding, levee failure or dam incidents.
Action/Project Number:	CM 2025.6
Name of Action or Project:	PARTICIPATION IN NFIP (National Floodplain Insurance Program)
Mitigation Category:	Planning and Regulation
Action or Project Description:	County will continue participation in NFIP, re-evaluate and continue enforcement of ordinances and regulations, and continue to work with the floodplain manager.
Estimated Cost:	\$100/Yearly
Benefits:	Protection of structures insured through NFIP.
Plan for Implementation	
Responsible Organization/Department:	Floodplain Administrator
Supporting Organization/Department:	
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:	Floodplain Ordinance
Progress Report	
Action Status:	Continued
Report of Progress:	Continue, in progress

Action Worksheet	
Name of Jurisdiction:	Green City R-I School District
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:	GCSD 2025.1
Name of Action or Project:	Public mitigation education
Mitigation Category:	Education and Outreach
Action or Project Description:	Provide emergency preparedness information and resources related to all natural disasters to the public through active education and outreach programs.
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:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	NA
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:	Green City R-I School District
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:	GCSD 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:	Green City R-I School District
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:	GCSD 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:	Milan C-2 School District
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 emergency preparedness information and resources related to all natural disasters to the public through active education and outreach programs.
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:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	NA
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:	Milan C-2 School District
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:	Milan C-2 School District
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

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 2025.2	Maintain transportation infrastructure	Sullivan Co	High	2	Flooding	x		
County 2025.3	Generators	Sullivan Co	Low	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
County 2025.4	Debris Removal	Sullivan Co	Low	1,4,5	Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	x		
County 2025.5	Outdoor warning siren	Sullivan Co	High	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Tornado, Wildfire	x	x	
CGCA 2025.2	Maintain transportation infrastructure	Greencastle	High	2	Flooding	x		
CGCA 2025.3	Generators	Greencastle	Low	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CGCA 2025.4	Outdoor warning siren	Greencastle	High	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Tornado, Wildfire	x	x	
CGCA 2025.5	Storm shelters and safe rooms	Greencastle	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CGC 2025.2	Maintain transportation infrastructure	Green City	Medium	2	Flooding	x		
CGC 2025.3	Generators	Green City	High	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CGC 2025.4	Install/upgrade warning siren, Weather radios, emergency alert systems	Green City	High	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Tornado, Wildfire	x	x	
CGC 2025.5	Storm shelters and safe rooms	Green City	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CGC 2025.6	Flood studies and flood reduction projects	Green City	High	2	Flooding	x	x	
CGC 2025.7	Routine dam inspections	Green City	High	2	Dam failure	x	x	
CM 2025.3	Generators	Milan	High	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CM 2025.3	Maintain & Upgrade transportation infrastructure	Milan	Medium	2	Flooding	x	x	

Note: Remove these footer instructional notes for final document.

4.38

Black Text – Instructional information for the mitigation planner

Blue Text – Sample language to assist the mitigation planner

Green Text – Reference Information for the Community Rating System

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CM 2025.4	Storm shelters and safe rooms	Milan	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
CM 2025.5	Install/upgrade warning siren, Weather radios, emergency alert systems	Milan	Medium	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Tornado, Wildfire	x	x	
GCSD 2025.2	Storm shelters and safe rooms	Green City R-I	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
GCSD 2025.3	Generators	Green City R-I	High	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
MSD 2025.2	Storm shelters and safe rooms	Milan C-2	High	1,3,4,5	Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
MSD 2025.3	Generators	Milan C-2	High	1,3,4,5	Earthquakes, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado	x	x	
Natural Systems Protection								
County 2025.4	Debris Removal	Sullivan Co	Low	1,4,5	Earthquakes, Severe thunderstorms, Severe winter weather, Tornado	x		
CGC 2025.7	Routine dam inspections	Green City	High	2	Dam failure	x	x	
CM 2025.7	Participation in the NFIP	Milan	High	2	Flooding	x	x	x
Planning and Regulation								
CGC 2025.6	Flood studies and flood reduction projects	Green City	High	2	Flooding	x	x	
CGC 2025.7	Routine dam inspections	Green City	High	2	Dam failure	x	x	
CM 2025.7	Participation in the NFIP	Milan	High	2	Flooding	x	x	x
Education and Outreach								
County 2025.1	Mitigation education	Sullivan Co	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x
County 2025.6	N.O.A.A. Weather Radios	Sullivan Co.	High	1,2,3,4	Flooding, Dam Failure, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	
CGCA 2025.1	Mitigation education	Greencastle	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
CGC 2025.1	Mitigation education	Green City	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x
CM 2025.1	Mitigation education	Milan	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x
GCSD 2025.1	Mitigation education	Green City R-I	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x
MSD 2025.1	Mitigation education	Milan C-2	High	1,2,3,4,5	Flooding, Dam failure, Drought, Earthquakes, Levee Failure, Extreme Temperatures, Severe thunderstorms, Severe winter weather, Tornado, Wildfire	x	x	x

5 PLAN MAINTENANCE PROCESS

5 PLAN MAINTENANCE PROCESS	5.1
5.1 Monitoring, Evaluating, and Updating the Plan.....	5.1
5.1.1 Responsibility for Plan Maintenance	5.1
5.1.2 Plan Maintenance Schedule	5.2
5.1.3 Plan Maintenance Process.....	5.2
5.2 Incorporation into Existing Planning Mechanisms	5.3
5.3 Continued Public Involvement	5.5

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 Sullivan 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 Sullivan 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 agrees to meet annually and after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. The Sullivan County Emergency Management Director 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 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 Sullivan County Emergency Management 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 Sullivan County Emergency Committee deems appropriate and necessary. Changes will be approved by the Sullivan 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.

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 Sullivan 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;
- Sullivan 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 (or designated responsible entity) 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 (or designated responsible entity) 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 Sullivan 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
Sullivan 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
	Sullivan 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
	Local Budget, CEDS, Emergency Plan, City Ordinances	Annual review	Annual CEDS review, Emergency Plan Review, Regional Transportation Plan
	Local Budget, CEDS, Emergency Plan, City Ordinances, Floodplain Ordinance	Annual Review	Annual CEDS review, Emergency Plan Review, Regional Transportation Plan
	Local Budget, CEDS, Emergency Plan, City Ordinances	Annual Review	Annual CEDS review, Emergency Plan Review, Regional Transportation Plan
	Local Budget, CEDS, Emergency Plan, City Ordinances	Annual Review	Annual CEDS review, Emergency Plan Review, Regional Transportation Plan
	Local Budget, CEDS,	Annual Review	Annual CEDS review,

	Emergency Plan, City Ordinances		Emergency Plan Review, Regional Transportation Plan
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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 Sullivan County website following each annual review of the mitigation plan and will solicit comments from the public based on the annual review.

The Sullivan 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 Sullivan 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.