

## CONTRIBUTORS

### Adair County Hazard Mitigation Planning Committee

#### Jurisdictional Representatives

Name		Title	Department	Jurisdiction/Agency/Organiz
Margaret	Ferrell	City Clerk	Administration	Millard
Shelly	Shipman	Superintendent	Administration	Adair Co. R-II
Jon	Cook	Emergency Management Dir.	Administration	Kirksville
Mari	Macomber	City Manager	Administration	Kirksville
Robert	Webb	Superintendent	Administration	Kirksville R-III
Rick	Roberts	Superintendent	Administration	Adair County R-I
Jeff	Dodson	Mayor	Administration	Novinger
Pam	Pflum	Mayor	Administration	Gibbs
JoAnn	Kincaid	Mayor	Administration	Brashear
Mark	Shahan	Presiding Commissioner	Administration	Adair County
Mark	Thompson	Commissioner	Administration	Adair County
Bill	King	Commissioner	Administration	Adair County
Ashley	Young	Asst. City Manager	Administration	Kirksville
Clayton	True	City Planner	Planning	Kirksville
Ron	Young	Code Enforcement	Administration	Kirksville

#### Stakeholder Representatives

Name		Title	Department	Agency/Organization
Chris	Killday	Director	Emergency Response	Kirksville 911 Center
Jim	Hughes	Chief	Emergency Response	Kirksville Police/Fire
Carolyn	Chrisman	Director	Economic Dev.	KREDI
Glen	Balliew	Director	Administration	Kirksville Public Works
Sara	Seifert	Chief	Emergency Response	Truman State Police
Steve	Farnsworth	Deputy Chief	Emergency Response	Kirksville Police

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## EXECUTIVE SUMMARY

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The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Adair 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 districts. The plan is an update of a plan that was approved on June 2014. 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 Adair County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan that covers the following jurisdictions that participated in the planning process:

- Unincorporated Adair County
- City of Kirksville
- City of Novinger
- City of Brashear
- Village of Millard
- Village of Gibbs
- Adair County R-I School District
- Adair County R-II School District
- Kirksville R-III School District

Adair County and the entities listed above developed a Multi-Jurisdictional Hazard Mitigation Plan that was approved by FEMA on June 2014 (hereafter referred to as the *June 2014 Hazard Mitigation Plan*). This current planning effort serves to update that previously approved plan.

The plan update process followed a methodology in accordance with FEMA guidance, which began with the formation of a Mitigation Planning Committee (MPC) comprised of representatives from Adair County and participating jurisdictions. The MPC updated the risk assessment that identified and profiled hazards that pose a risk to Adair 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 tornadoes 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:

1. Public Awareness- Using a variety of communication avenues to increase the citizens awareness of and to promote education about the natural hazards that they may face, their vulnerability to these hazards, and how to lessen the effect of future natural hazards.

2. Strengthen communication and coordination between local governments, emergency personnel, public agencies, and citizens to mitigate the effects of future natural hazards.
3. Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties; on natural resources; on infrastructure; and on the local economy.

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 0.1 Mitigation Action Matrix**

#	Action	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
Adair County 2020.1	Participate in the National Flood Insurance Program.	High	3	Flooding			
Adair County 2020.2	Early Warning Sirens	Medium	3	All Hazards	Yes	Yes	
Adair County 2020.3	Maintain Transportation Infrastructure	High	3	Flooding Severe Thunderstorms, Winter Weather	Yes		
Adair County 2020.4	Response to Pandemic	Medium	2	Pandemic	Yes	Yes	
Adair county 2020.5	Safe Rooms and Storm Shelters	High	3	Tornado, Severe Thunderstorms	Yes		
Adair County 2020.6	Generators for Shelter(s)	High	3	Extreme Temperature, Severe Thunderstorm, Severe Winter Weather, Tornado	Yes		
Adair County 2020.7	Emergency Operations center	Medium	3	All Hazards	Yes		
Kirksville 2020.1	NFIP Participation	High	3	Flooding	Yes	Yes	Yes
Kirksville 2020.2	Installation/Upgrade Sirens	High	3	All Hazards	Yes		
Kirksville 2020.3	Extreme Temperature Shelters	High	3	Extreme Temperatures, Severe Winter Weather	Yes		
Kirksville 2020.4	Safe Rooms and Storm Shelters	High	3	Tornado, Severe Thunderstorms, Flash Flooding, Riverine Flooding	Yes		

**Table 0.1 Mitigation Action Matrix**

#	Action	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
Kirksville 2020.5	Dam Protection	High	3	Riverine Flooding, Flash Flood, Dam Failure	Yes	Yes	
Kirksville 2020.6	Flood Mitigation	High	3	Flooding	Yes	Yes	
Kirksville 2020.7	Fire Mitigation	High	3	Wildfire	Yes	Yes	
Kirksville 2020.8	Water Source Protection	Low	3	Drought	Yes		
Kirksville 2020.9	Improved Communication and Coordination	High	3	Riverine Flooding, Flash Flooding, Severe Thunderstorms, Tornado	Yes		
Novinger 2020.1	NFIP Participating	High	3	Flooding	Yes	Yes	Yes
Novinger 2020.2	Installation / Upgrade Sirens	High	3	All Hazards	Yes		
Novinger 2020.3	Maintain Transportation Infrastructure	High	3	Flooding, Severe Weather, Winter Storms	Yes		
Novinger 2020.4	Safe Rooms and Storm Shelters	High	3	Tornado Severe Thunderstorms			
Brashear 2020.1	Establish NFIP Participation	High	3	Flooding	Yes	Yes	
Brashear 2020.2	Installation / Upgrade Sirens	High	3	All Hazards	Yes		
Brashear 2020.3	Maintain Transportation Infrastructure	High	3	Flooding, Severe Thunderstorms, Winter Storms	Yes		
Brashear 2020.4	Safe Rooms and Storm Shelters	High	3	Tornado, Severe Thunderstorms			
Millard 2020.1	Establish NFIP Participation	High	3	Flooding	Yes	Yes	
Millard 2020.2	Installation / Upgrade Sirens	High	3	All Hazards	Yes		
Millard 2020.3	Maintain Transportation Infrastructure	High	3	Flooding, Severe Thunderstorms,	Yes		

**Table 0.1 Mitigation Action Matrix**

#	Action	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
				Winter Storms			
Millard 2020.4	Safe Rooms and Storm Shelters	Hight	3	Tornado, Severe Thunderstorm			
Gibbs 2020.1	Establish NFIP Participation	High	3	Flooding	Yes	Yes	
Gibbs 2020.2	Installation / Upgrade Sirens	High	3	All Hazards	Yes		
Gibbs 2020.3	Maintain Transportation Infrastructure	High	3	Flooding, Severe Thunderstorms, Winter Storms	Yes		
Gibbs 2020.4	Safe Rooms and Storm Shelters	High	3	Tornado, Severe Thunderstorm			
Adair County R-1 2020.1	Safe Rooms	High	3	Tornado, Severe Thunderstorms, Earthquake	Yes		
Adair County R-1 2020.2	Intercom System	High	3	Tornado, Severe Thunderstorm, Earthquake	Yes		
Adair County R-II 2020.1	Safe Rooms	High	3	Tornado, Severe Thunderstorms, Earthquake	Yes		
Adair County R-II 2020.2	Intercom System	High	3	Tornado, Severe Thunderstorm, Earthquake	Yes		
Kirksville R-III 2020.1	Safe Rooms	High	3	Tornado, Severe Thunderstorms, Earthquake	Yes		
Kirksville R-III 2020.2	Intercom System	High	3	Tornado, Severe Thunderstorm, Earthquake	Yes		

## PREREQUISITES

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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 A, 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.

- Unincorporated Adair County
- City of Kirksville
- City of Novinger
- City of Brashear
- Village of Millard
- Village of Gibbs
- Adair County R-I School District
- Adair County R-II School District
- Kirksville R-III School District

## 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 the (*local governing body/school district*); and

WHEREAS the (*local governing body/school district*) has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the (*plan name*), hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the (*local governing body/school district*) from the impacts of future hazards and disasters; and

WHEREAS the (*local governing body*) recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the (*local governing body/school district*) will endeavor to integrate the *Plan* into the comprehensive planning process; and

WHEREAS adoption by the (*local governing body/school district*) demonstrates their 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:

In accordance with (*local rule for adopting resolutions*), the (*local governing body/school district*) adopts the final *FEMA-approved Plan*.

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. \_\_\_\_\_

# 1 INTRODUCTION AND PLANNING PROCESS

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## 1.1 PURPOSE

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Hazard mitigation is “any actions taken to reduce or eliminate the long-term risk to human life and property from natural hazards”. We understand that hazard events will continue to occur, and at their worst can result in death and destruction of property and infrastructure. The work done to minimize the impact of hazard events to life and property is called hazard mitigation. Adair County and the participating jurisdictions and school districts developed this multijurisdictional local hazard mitigation plan update to reduce future losses from hazards.

- The County of Adair, City of Kirksville, City of Novinger, City of Brashear, Village of Millard, Village of Gibbs, and Adair County R-I School District, Adair County R-II School District, Kirksville R-III School District adopted the Plan as a prerequisite for mitigation grant eligibility pursuant to the Disaster Mitigation Act of 2000 (Public Law 106-390) and 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 December 4, 2013. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act or DMA). The regulations established the requirements for local hazard mitigation plans are in the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288).

## 1.2 BACKGROUND AND SCOPE

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This plan is a 5-year update of the plan that was approved in June of 2014. The plan and update were prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 to result in the eligibility for the Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance Grant Programs.

- Following is a list of participants in both the previous plan as well as the current update; County of Adair, City of Kirksville, City of Novinger, City of Brashear, Village of Millard, Village of Gibbs, and Adair County R-I School District, Adair County R-II School District, Kirksville R-III School District.

In addition to securing grant funding eligibility, the plan is useful for incorporating hazard mitigation planning and principals into other documents, such as zoning regulations and land use plans.

## 1.3 PLAN ORGANIZATION

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The current update document involved review, evaluation and amendment of the existing Plan. It addresses the same natural hazards that were addressed in the original Plan.

Following is a breakdown of the organization of the 2019 Adair County Hazard Mitigation Plan update:

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

**Table 1.1** shows each chapter and the changes summarized in the Update.

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**Table 1.1. Changes Made in Plan Update**

Plan Section	Summary of Updates
<b>Chapter 1</b>	Updated members of the Mitigation Planning Committee and participating jurisdictions formally adopted the MPC
<b>Chapter 2</b>	Planning Area Profile and Capabilities- All Census and economic demographic data updated.
<b>Chapter 3</b>	Risk Assessment- All hazard event data was updated and new risk and vulnerability analysis were performed using new data.
<b>Chapter 4</b>	Mitigation Strategy- A large number of actions were discarded from the previous plan and can be found on Table 4.1
<b>Chapter 5</b>	Plan Implementation and Maintenance- The plan maintenance process was revamped and detailed to include annual and as needed plan review meetings.

## 1.4 PLANNING PROCESS

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Adair County, Missouri contracted with the Northeast Missouri Regional Planning Commission to facilitate the update of the multi-jurisdictional, local hazard mitigation plan. In fulfillment of this role, the RPC:

- Assist in establishing a Mitigation Planning Committee (MPC) as defined by the Disaster Mitigation Act (DMA),
- Find out if the MPC established for the previously approved plan was a standing committee that met in the interim, and set forth any changes in the MPC membership and procedures since adoption of the previous plan,
- Assess 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,
- Ensure the updated plan meets the DMA requirements as established by federal regulations and follows the most current planning guidance of the Federal Emergency Management Agency (FEMA),
- Facilitate the entire plan development process,
- Identify the data that MPC participants could provide and conduct the research and documentation necessary to augment that data,
- Assist in soliciting public input,
- Produce the draft and final plan update in a FEMA-approvable document and coordinate the Missouri State Emergency Management Agency (SEMA) and (FEMA) plan reviews.

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**Table 1.2. Jurisdictional Representatives of Adair County Mitigation Planning Committee**

Name		Title	Department	Jurisdiction/Agency/Organiz
Margaret	Ferrell	City Clerk	Administration	Millard
Shelly	Shipman	Superintendent	Administration	Adair Co. R-II
Jon	Cook	Emergency Management Dir.	Administration	Kirksville
Mari	Macomber	City Manager	Administration	Kirksville
Robert	Webb	Superintendent	Administration	Kirksville R-III
Rick	Roberts	Superintendent	Administration	Adair County R-I
Jeff	Dodson	Mayor	Administration	Novinger
Pam	Pflum	Mayor	Administration	Gibbs
JoAnn	Kincaid	Mayor	Administration	Brashear
Mark	Shahan	Presiding Commissioner	Administration	Adair County
Mark	Thompson	Commissioner	Administration	Adair County
Bill	King	Commissioner	Administration	Adair County
Ashley	Young	Asst. City Manager	Administration	Kirksville
Clayton	True	City Planner	Planning	Kirksville
Ron	Young	Code Enforcement	Administration	Kirksville



Community Department/Office	Prevention	Structure and Infrastructure Projects		Natural Systems Protection	Education and Awareness Programs	Emergency Services
		Property Protection	Structural Flood Control Projects			
County Commission	✓	✓	✓	✓	✓	✓
EMD	✓	✓	✓	✓	✓	✓
County Public Works	✓	✓	✓	✓	✓	✓
Public Safety	✓	✓	✓	✓	✓	✓
City Clerk	✓	✓	✓	✓	✓	✓
Building Official	✓	✓	✓	✓	✓	✓
City Administrator	✓	✓	✓	✓	✓	✓
Mayor	✓	✓	✓	✓	✓	✓
School Administration	✓	✓		✓	✓	✓

### 1.4.1 Multi-Jurisdictional Participation

Hazard mitigation is defined as “sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards” and its purpose is to lessen the negative impact of a disaster on community's economic, social and environmental well-being.

Outreach programs that increase the public's awareness of hazard risks, projects to protect critical facilities and the removal of structures from flood hazard areas are all examples of mitigation actions. Local mitigation actions and concepts can also be incorporated into land use plans and building codes.

Local governments have the responsibility to protect the health, safety and welfare of their citizens. Proactive mitigation policies and actions help reduce risk and create safer, more disaster-resilient communities. Mitigation is an investment in a community's future safety and sustainability by facilitating:

- The protection of public safety and prevention of loss of life and injury
- The reduction of harm to existing and future development
- The prevention of damage to a community's unique assets

The importance of active public participation in such an endeavor is obvious, but can be difficult to obtain in reality. Nowhere is difficulty more apparent than in small rural communities like those in Northeast Missouri. The County of Adair participated in all elements of the planning process,

Local government jurisdictions and the school district were invited to participate in the planning process via email and in many cases follow up phone calls and personal visits. (Appendix B-public documentation). Committee members were placed on a contact list featuring email and contact information. They were also directed to the Regional Planning Commissions webpage.

Jurisdictions that were presented with a multi-jurisdictional plan are required to participate in the planning process and formally adopt the plan. The County of Adair, City of Kirksville, City of Novinger, City of Brashear, Village of Millard, Village of Gibbs, Adair County R-I School District, Adair County R-II School District, Kirksville R-III School District participated in the

plan update by meeting minimal requirements as described in the next paragraph. Each participating jurisdiction has formally adopted the mitigation plan.

Minimum participation requirements included:

- Designation of a representative to serve on the MPC;
- Provision of sufficient information to support plan development by completion and return of Data Collection Questionnaires and validating/correcting critical facility inventories;
- When applicable provide progress reports on mitigation actions from the previously approved plan and identify 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;
- Provide documentation to show time donated to the planning effort (if a FEMA planning grant was awarded to the County); and
- Formally adopt the mitigation plan prior to submittal to SEMA and FEMA for final approval.

The County of Adair, City of Kirksville, City of Novinger, City of Brashear, Village of Millard, Village of Gibbs, and Adair County R-I School District, Adair County R-II School District, and Kirksville R-III School District met the participation requirements.

**Table 1.3. Jurisdictional Participation in Planning Process**

Jurisdiction	Kick-off Meeting	No Meeting #2	No Meeting #3	Data Collection Questionnaire Response	Update/Develop Mitigation Actions
County of Adair	No			X	Yes
City of Kirksville	X			X	Yes
City of Novinger	No			X	Yes
City of Brashear	No			X	Yes
Village of Millard	X			X	Yes
Village of Gibbs	No			X	Yes
Adair County R-I School Dist.	No			X	Yes
Adair County R-II School Dist.	X			X	Yes
Kirksville R-III School District	No			X	Yes

## 1.4.2 The Planning Steps

**Table 1.4. County Mitigation Plan Update Process**

Community Rating System (CRS) Planning Steps (Activity 510)	Local Mitigation Planning Handbook Tasks (44 CFR Part 201)
Step 1. Organize	Task 1: Determine the Planning Area and Resources
	Task 2: Build the Planning Team 44 CFR 201.6(c)(1)
Step 2. Involve the public	Task 3: Create an Outreach Strategy 44 CFR 201.6(b)(1)

Step 3. Coordinate	Task 4: Review Community Capabilities 44 CFR 201.6(b)(2) & (3)
Step 4. Assess the hazard	Task 5: Conduct a Risk Assessment 44 CFR 201.6(c)(2)(i) 44 CFR 201.6(c)(2)(ii) & (iii)
Step 5. Assess the problem	
Step 6. Set goals	Task 6: Develop a Mitigation Strategy 44 CFR 201.6(c)(3)(i); 44 CFR 201.6(c)(3)(ii); and 44 CFR 201.6(c)(3)(iii)
Step 7. Review possible activities	
Step 8. Draft an action plan	
Step 9. Adopt the plan	Task 8: Review and Adopt the Plan
Step 10. Implement, evaluate, revise	Task 7: Keep the Plan Current
	Task 9: Create a Safe and Resilient Community 44 CFR 201.6(c)(4)

### ***Step 1: Organize the Planning Team***

In January 2019 RPC staff met with the Adair County Commissioners to begin the planning process. In April 2019 staff from the RPC organized the Kickoff meeting that was held on July 18, 2019. Local jurisdictions were notified by email and letter of the Kickoff meeting and personal phone calls were made to promote attendance at the Kickoff meeting. Agenda for Kickoff meeting is included in Appendix B as well as the minutes for the Kickoff meeting. After the Kickoff meeting jurisdictions unable to attend the meeting was contacted and asked to attend the next meeting. Following meetings #2 and #3 were delayed and decided to move forward with interacting the jurisdiction individually with the inability to get the entire MPC to meet as a group.

**Table 1.5. Schedule of MPC Meetings**

Meeting	Topic	Date
Informational Meeting	Met directly with local jurisdictions and follow up phone calls to discuss the planning process and importance of participation.	01/1/2019 – 3/1/2019
Kick-off Meeting	Purpose, process, planning area, building the team, participation, requirements, public outreach, data collection questionnaires, discussion of hazards, risk	7/18/2019
Planning Meeting #2	Purpose, discussion of hazards, risk assessment, determine/update	8/1/2019 – 1/1/2020
Planning Meeting #3	Review of the draft plan, discussion of plan update process, plan maintenance, discussion of adoption resolutions, Submission to SEMA/FEMA	1/1/2020 – 7/1/2020

### ***Step 2: Plan for Public Involvement***

The Kickoff Meeting's agenda is included in Appendix B which includes discussion, minutes, 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. As stated in the minutes, the participants felt a survey tool would not be effective and chose to solicit public involvement at the local level as they would be the key contacts for obtaining public comment. Public notice was posted on the NEMO RPC website, a notice was also posted at the County Courthouse.

No public comments were received which is characteristic for the area. The public in Adair County typically does not become active in planning activities such as plan development or updates.

### ***Step 3: Coordinate with Other Departments and Agencies and Incorporate Existing Information***

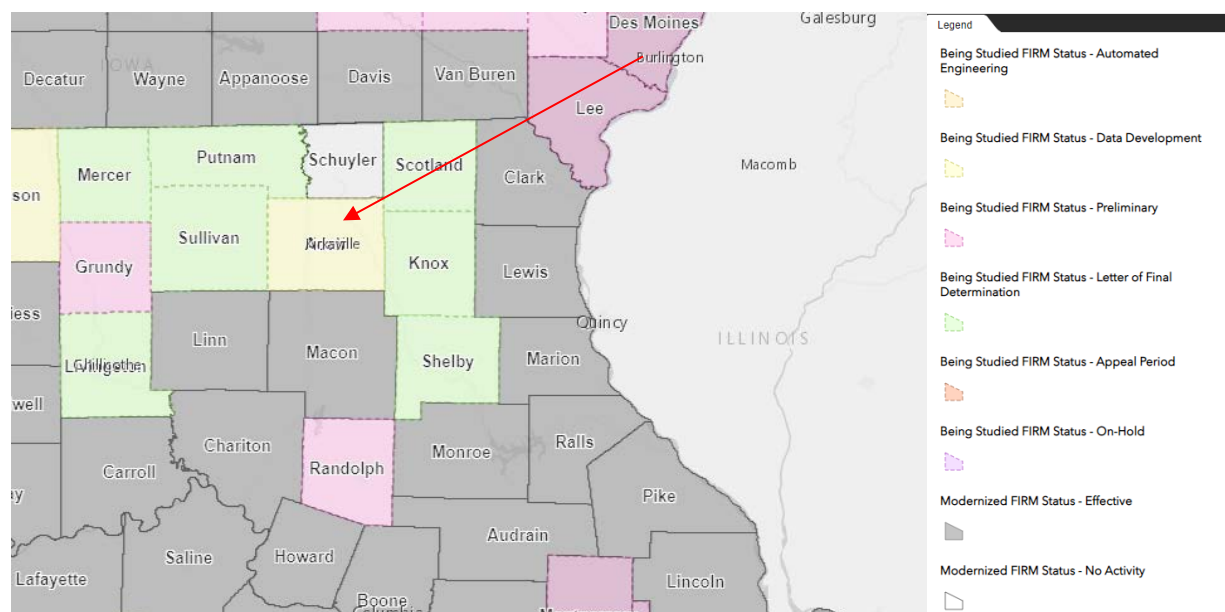
The Adair County stakeholders were sent an invitation to attend the second planning meeting and a separate email was sent seeking their input. Stakeholders invited to participate include, police departments, fire departments, nursing homes, economic developer, Missouri Department of Natural Resources, Missouri Department of Transportation, water districts, and ambulance districts. Neighboring communities were informed of the Adair County plan update and were invited to attend or offer input to the plan as they saw fit. No comments were received from the stakeholders during the planning process.

#### **Coordination with FEMA Risk MAP Project**

Adair County current Modernized Firm Status is "Being Studied FIRM Status-Data Development".

Figure 1.1 illustrates the current status of Missouri Counties in regards to RiskMap projects.

**Figure 1.1. RiskMAP Study Status Map**



### Integration of Other Data, Reports, Studies, and Plans

Other documents critical to the formation to the plan included the Flood Insurance Studies (FIS), Flood Insurance Rate Maps (FIRMs), State Department of Natural Resources (DNR) dam information, the National Inventory of Dams (NID), dam inspection reports, state fire reports, Wildland/Urban Interface and Intermix areas from the SILVIS Lab - Department of Forest Ecology and Management - University of Wisconsin, local comprehensive plans, economic development plans, US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics, and local budgets.

### **Step 4: Assess the Hazard: Identify and Profile Hazards**

At the July 18, 2019 meeting MPC profiled their hazards which was accomplished by reviewing:

- previous disaster declarations in the county
- hazards in the most recent State Hazard Mitigation Plan
- hazards identified in the previously approved hazard mitigation plan.

The results of this process can be reviewed in Section 3 of this document. Data Collection Questionnaires from the previous plan update were disseminated to jurisdictions in attendance. Participants were requested to review and update the Questionnaires and submit to the RPC no later than August 1, 2019. An email and face to face meeting with those not in attendance but considered potential planning team members were sent requesting completion of the Data Collection Questionnaire.

### ***Step 5: Assess the Problem: Identify Assets and Estimate Losses***

Assets were identified with demographic data from the US Census, Census of Agriculture, GIS Structure data, Data Collection Questionnaires and information from the RPC.

All loss estimates could not be provided due to lack of information provided by participating Jurisdictions. MPC members could not ascertain the value of buildings in the community, thus the information was not provided.

### ***Step 6: Set Goals***

The MPC reviewed the goals from the previously approved plan at the July 18, 2019 meeting and amended and consolidated the previous goals.

1. Public Awareness- Using a variety of communications avenues to increase the citizens awareness of and promote education about the natural hazards that they may face, their vulnerability to these hazards, and how to lessen the effect of future natural hazards.
2. Strengthen communication and coordination between local governments, emergency personnel, public agencies, and citizens to mitigate the effect of future natural hazards.
3. Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties; on natural resources; on infrastructure; and on the local economy.

### ***Step 7: Review Possible Mitigation Actions and Activities***

As part of the in person and phone meetings, members were asked to review the mitigation strategy from the previously approved plan and note changes and update as it pertains to their individual jurisdictions. Committee members were requested to address progress (or lack thereof) on previously identified actions in the previously approved plan. MPC members were encouraged to continue forward only those actions that substantively address long-term mitigation solutions to the risks identified in the risk assessment.

There were virtually no changes to any of the risk's assessment in the plan. The MPC used the STAPLEE method to analyze and prioritize proposed actions.

### ***Step 8: Draft an Action Plan***

Proposed actions were provided by MPC members and rated using the STAPLEE methodology. These actions were reviewed for concurrence by the MPC during the final review of the draft plan.

### ***Step 9: Adopt the Plan***

After the majority of the draft plan was composed, adoption resolution examples were given to the jurisdictional representatives and requested for adoption by whatever means their jurisdictions utilize for such activities.

### ***Step 10: Implement, Evaluate, and Revise the Plan***

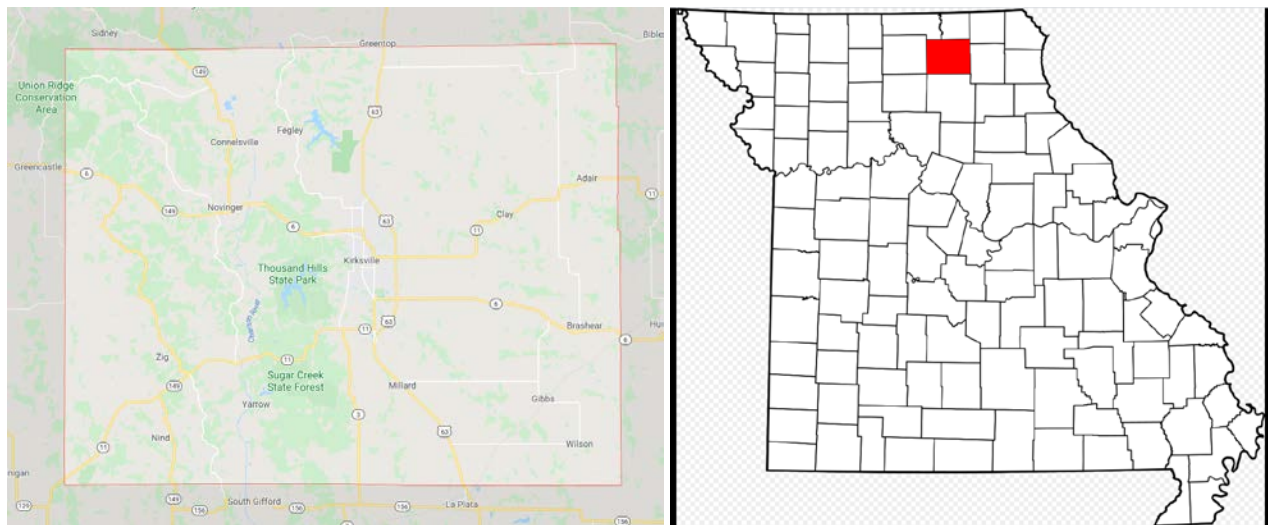
Part of the plan draft development included an outline of plan maintenance (Chapter 5) and was discussed and accepted by the MPC members in face to face and phone meetings. This process includes reviews annually and in the wake of any significant hazard event, as well as provisions for the five-year update process.

## 2 PLANNING AREA PROFILE AND CAPABILITIES

<b>2</b>	<b>PLANNING AREA PROFILE AND CAPABILITIES .....</b>	<b>2.1</b>
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### 2.1 ADAIR PLANNING AREA PROFILE

**Figure 2.1. Map of Adair County**



According to the US Census, the population estimate for Adair County as of July 1, 2018 is 25,437 persons compared to the 2010 Census population of 25,607; a decrease of .67% in the seven-year period. This decrease in population falls behind the growth estimate for the State of Missouri for the same time period (1.6%) and of the Nation at 4.1%. According to the 2017 American Community Survey Estimates, Adair County has experienced 1.8% increase in population since the 2000 Census.

The Adair County median household income from the 2000 US Census is \$26,677, as of the 2017 US Census estimate it is \$40,046 this is an approximate a 50.1% increase. This percent of growth falls



just higher than the growth estimate for the Nation for the same time period (28.3%) and higher than the State of Missouri at 27%.

### 2.1.1 Geography, Geology and Topography

Adair County has a total of 567 square miles of land and approximately 2.1 square miles is water.

The County is a mix of residents living in unincorporated and incorporated areas. Kirksville is the largest community with a population of 17,579, Novinger has 346 residents, Brashear is home to 194 residents, Gibbs has 99 residents, and Millard has 77 residents according to the 2017 US Census Estimates. The remaining population of 7,142 resides in unincorporated areas of the County. The county has maintained its population with only a slight decrease in population.

### 2.1.2 Climate

Adair County has an average annual average of 40 inches of precipitation with an average of 19 inches of snow per year. Adair county averages 197 sunny days per year with an annual high average temperature of 85.6 degrees and annual average low temperature of 15.4 degrees.

### 2.1.3 Population/Demographics

**Table 2.1. Adair County Population 2010-2017 by Jurisdiction**

Jurisdiction	2010 Population	2017 Population	# Change (2000-2010)	% Change (2000-2010)
Adair County Total	25,607	25,437	-170	-0.67%
Kirksville	17,505	17,579	+74	+0.42%
Novinger	456	346	-110	-24.1%
Brashear	273	194	-79	-28.9%
Gibbs	107	99	-8	-7.4%
Millard	89	77	-12	-13.4

Source: U.S. Bureau of the Census, Decennial Census, Annual Population Estimates, American Community Survey 5-year Estimates

**Table 2.2. Adair Population under Age 5 and over Age 65**

Jurisdiction	Population Under 5 Years	Population 65 Years and Over
Adair County Total	1,259	3,596
Kirksville	773	2,175
Novinger	15	54
Brashear	8	19
Gibbs	14	13
Millard	3	22

Source: American Community Survey 5-year estimates 2017

According to 2017 Census data 4.9% of the County's population was under the age of 5 (1,259). This percentage aligns closely with the nation at 6.5% and the State at 6.5%. Adair County has a

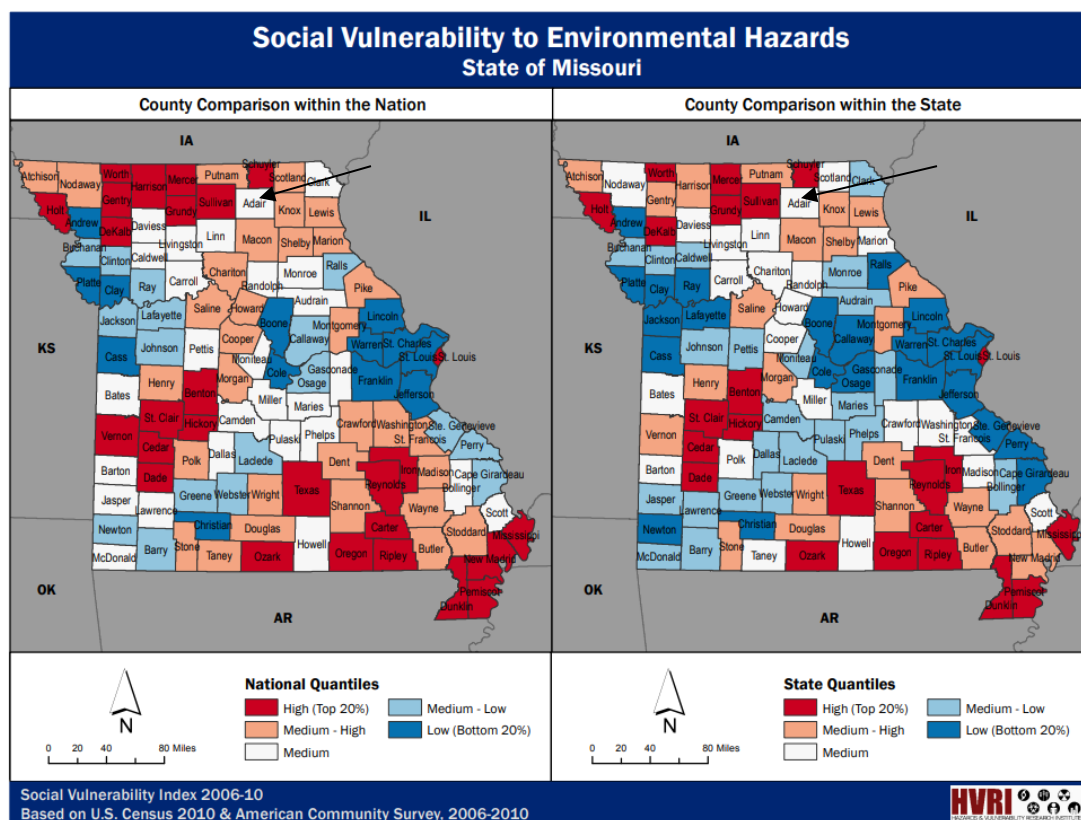
population of 3,596 (14.1%) residents who are over the age of 65. At the National level 13.0% of residents are 65 and over; while 14.0% of Missourians are over the age of 65. The median age of residents in the County is 27.7 with the highest percentage of residents falling between the ages of 20-24. The median age of residents of the US is 37.2 with 37.9 being the median age of residents of Missouri.

There are 9,669 total occupied households in the County. The average household size is 2.9 compared to that of the Nation at 2.58 and the State at 2.45. Of the County's occupied households, 25.2% had children under the age of 18 and 10.5% occupied with individuals 65 and over. Racial makeup of the County is predominately white at 93.4% with 4.3% being black or African American and 2.9% of Asian heritage.

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.

According to the SoVI Score for Adair County, they have a medium social vulnerability to environmental hazards compared to the nation and a medium social vulnerability when compared to the state of Missouri.

**Figure 2.2. SoVI for Adair County**



Source: [http://artsandsciences.sc.edu/geog/hvri/sites/sc.edu.geog/hvri/files/attachments/MO\\_1014.pdf](http://artsandsciences.sc.edu/geog/hvri/sites/sc.edu.geog/hvri/files/attachments/MO_1014.pdf)

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**Table 2.3. Unemployment, Poverty, Education, and Language Percentage Demographics, Clark 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
Adair County	10,589	3.1%	10.7%	35.6%	31.0%%	6.0%
Kirksville	6,980	3.3%	13.2%	35.6%	32.8%	6.6%
Novinger	151	3.4%	14.0%	47.5%	12.5%	7.0%
Brashear	111	2.5%	9.3%	47.3%	12.3%	1.1%
Gibbs	15	9.2%	18.5%	71.9%	1.8%	0.0%
Millard	12	0%	10.0%	50.0%	0.0%	0.0%
State	4,844,505	5.8%	14.6%	30.4%	10.1%	1.1%
Nation	255,797,692	6.6%	14.6%	30.5%	10.5%	4.6%

Source: U.S. Census, 2017 American Community Survey, 5-year Estimates.

## 2.1.4 History

Adair County is a county located in the northeastern part of the U.S. state of Missouri. As of the 2010 Census, the population was 25,607. Its county seat is Kirksville. The county was first settled by immigrants from Kentucky and organized on January 29, 1841. The first permanent settlement in Adair County began in 1828. Many of the first settlers were from Adair County in Kentucky, for which the Missouri county was named. The county in Kentucky was named for John Adair, a respected Governor of Kentucky. This was 25 years after the Louisiana Purchase, seven years after Missouri was granted statehood, and four years after the Sac and Fox Native American tribes surrendered their claims to the land. The original settlement was called "Cabins of White Folks," or simply, "The Cabins," and was located six miles (9.7 km) west of present-day Kirksville along the Chariton River.

## 2.1.5 Occupations

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**Table 2.4. Occupation Statistics, Adair 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
Adair County	4,147	2,053	2,718	1,059	1,297
Kirksville	2,662	1,418	1,759	537	853
Novinger	41	23	28	33	32
Brashear	22	26	25	21	21
Millard	3	4	5	4	6
Gibbs	5	7	11	6	12

Source: U.S. Census, 2017 American Community Survey, 5-year Estimates.

## 2.1.6 Agriculture

Adair County has a total of 822 farms with the total acreage of 273,155 acres. The average farm size is 332 acre which is higher than the state average of 285 acres. The top crop for Adair County is Corn for grain. The average value of product sold per farm was \$43,539.

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

Adair County has yet to receive a FEMO Hazard Mitigation Assistance Grant in the planning area.

## 2.1.8 FEMA Public Assistance (PA) Grants in Planning Area

**Table 2.5. FEMA PA Grants in County from 1993-2019**

Disaster #	Application Title	Applicant ID	Damage Category	Project Size	Project Amt.
1005	ACN-C-4 - Bank of the lagoon	001-53534-00	Roads and Bridges	Small	\$15,450.00
1006	ACK-C3- Culvert Pipes	001-39026-00	Roads and Bridges	Small	\$52,270.00
1010	AC-C-12 - Roads, Culverts	001-99001-00	Roads and Bridges	Small	\$37,899.14
1047	ROAD WASHOUT	001-08002-00	Roads and Bridges	Small	\$1,931.76
1053	ROAD & CULVERT WASHOUT	001-08002-00	Roads and Bridges	Small	\$28,573.92
1101	MES007C - Roadway Repair	001-99001-00	Roads and Bridges	Large	\$1,206,480.26
1128	ADMP02 -Bridge	001-99001-00	Roads and Bridges	Small	\$0.00
1129	ADMP03 - Bridge	001-99001-00	Roads and Bridges	Large	\$114,853.81
1131	ADMP01 -Bridge	001-99001-00	Roads and Bridges	Large	\$150,010.63
1134	AC-C-17 - ROADS, CULVERTS	001-99001-00	Roads and Bridges	Small	\$40,796.75
1136	AC-C-14 - ROADS, CULVERTS	001-99001-00	Roads and Bridges	Small	\$36,365.51
1137	AC-C-16 - ROADS, CULVERTS	001-99001-00	Roads and Bridges	Small	\$53,808.76
1138	AC-C-15 - ROADS, CULVERTS	001-99001-00	Roads and Bridges	Small	\$28,902.12
1139	AC-C-13 - ROADS, CULVERTS	001-99001-00	Roads and Bridges	Small	\$16,793.90

1141	ACK-C4 - Emergency Spillway	001-39026-00	Water Control Facilities	Small	\$18,612.00
1143	MPP01 - Concrete sidewalk, embankment slope protection	001-39026-00	Roads and Bridges	Small	\$2,856.98
1154	ACN-C-3 - Roads, Culverts	001-53534-00	Roads and Bridges	Small	\$51,987.03
1173	INTERIOR BUILDING DAMAGES	001-000FA-00	Public Buildings	Large	\$89,641.70
1196	AF- AE1 - Adair County Extension Center	001-00F4E-00	Public Buildings	Small	\$51,559.06
1199	AF- AB1 - Adair County Extension Center	001-00F4E-00	Protective Measures	Small	\$6,839.90
1234	ROAD & CULVERT WASHOUT (REVISION 1)	001-99001-00	Roads and Bridges	Small	\$19,289.39
1236	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$28,118.46
1256	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$14,384.58
1260	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$21,269.73
1263	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$8,213.06
1264	ROAD WASHOUT - REVISED 11/05/08	001-99001-00	Roads and Bridges	Small	\$27,560.01
1272	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$20,049.64
1286	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$30,127.88
1289	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$18,607.38
1341	PA PILOT - DEBRIS REMOVAL	001-53534-00	Debris Removal	Small	\$1,165.75
1342	ROAD WASHOUTS	001-99001-00	Roads and Bridges	Small	\$11,186.45
1347	ROAD WASHOUTS	001-99001-00	Roads and Bridges	Small	\$25,202.33
1350	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$10,554.24
1352	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$22,629.79
1353	ROADS WASHOUT	001-99001-00	Roads and Bridges	Small	\$24,754.46
1360	ROAD WASHOUTS	001-99001-00	Roads and Bridges	Small	\$27,585.35

1367	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$35,154.85
1368	ROAD / BRIDGE WASHOUT	001-99001-00	Roads and Bridges	Small	\$19,977.05
1369	ROAD WASHOUTS	001-99001-00	Roads and Bridges	Small	\$20,868.59
1391	WATERLINE DAMAGE	001-39026-00	Public Utilities	Small	\$1,326.55
1394	WASTEWATER PLANT DAMAGE	001-39026-00	Public Utilities	Small	\$5,488.17
1397	ROAD & CULVERT WASHOUT	001-39026-00	Roads and Bridges	Small	\$2,513.09
1400	ROAD & CULVERT WASHOUT	001-39026-00	Roads and Bridges	Small	\$3,386.69
1401	EMERGENCY PROTECTIVE MEASURES	001-39026-00	Protective Measures	Small	\$6,987.40
1402	EMERGENCY PROTECTIVE MEASURES	001-39026-00	Protective Measures	Small	\$3,085.30
1405	DPW CHEVY 1/2 TON TRUCK DAMAGE	001-39026-00	Public Buildings	Small	\$1,000.00
1407	ROAD WASHOUT	001-53534-00	Roads and Bridges	Small	\$7,757.03
1412	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$35,276.19
1413	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$19,348.42
1418	WATER LINE DAMAGE	001-US25G-00	Public Utilities	Small	\$50,626.40
1419	ROAD & BRIDGE WASHOUT	001-99001-00	Roads and Bridges	Small	\$32,889.83
1421	ROAD WASHOUTS	001-99001-00	Roads and Bridges	Small	\$10,953.25
1437	ROAD WASHOUTS	001-99001-00	Roads and Bridges	Small	\$41,614.91
1453	BUILDING CONTENTS DAMAGE	001-39026-00	Public Buildings	Small	\$2,389.07
1454	BUILDING & CONTENTS DAMAGE	001-39026-00	Public Buildings	Small	\$3,900.03
1462	ROAD & CULVERT WASHOUT	001-99001-00	Roads and Bridges	Small	\$33,976.04
1463	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$34,021.75
1465	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$7,018.53
1466	ROAD WASHOUT	001-99001-00	Roads and Bridges	Small	\$33,795.29

1470	MEDICAL ADMIN BLDG DAMAGE	001-053EF-00	Public Buildings	Small	\$18,067.08
1649	WATER MAIN DAMAGES/REPAIRS	001-US25G-00	Public Utilities	Small	\$2,221.16
1650	PIPELINE R-O-W DAMAGES	001-US25G-00	Public Utilities	Small	\$7,833.80
1651	WATERLINE WASHOUTS	001-US25G-00	Public Utilities	Small	\$5,770.72
1653	WATER MAIN DAMAGES	001-US25G-00	Public Utilities	Small	\$7,338.20
<b>Total:</b>					<b>\$2,770,917.12</b>

Source: Federal Emergency Management Agency, 2019

## 2.2 JURISDICTIONAL PROFILES AND MITIGATION CAPABILITIES

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This section will include individual profiles for each participating jurisdiction. It will also include a discussion of previous mitigation initiatives and ongoing mitigation capabilities in the planning area. There will be a summary table indicating specific capabilities of each jurisdiction that relate to their ability to implement mitigation opportunities. The unincorporated county is profiled first, followed by the incorporated communities, the special districts, and the public-school districts.

### 2.1.1 Unincorporated Adair County

By Missouri State Statute (Section 48.020.1) Adair County is defined as a 3<sup>rd</sup> Class County, meaning it's assessed valuation is less than six hundred million dollars. The County seat is located in Kirksville.

Adair County has five cities and villages (City of Kirksville, City of Novinger, City of Brashear, Village of Millard, and the Village of Gibbs). The county government provides services such as law enforcement, judicial services, land records, tax collection, property assessment, administration of elections, construction and maintenance of roads and bridges.

The County is governed by an elected board of Commissioners composed of a Presiding Commissioner, 1<sup>st</sup> District Commissioner, and 2<sup>nd</sup> District Commissioner. Other positions within Adair County include:

- County Assessor
- Circuit Court Clerk
- County Collector
- County Commission
- County Clerk
- County Coroner
- Prosecuting Attorney
- Public Administrator
- County Recorder
- County Road and Bridge Supervisor
- County Sheriff
- County Treasurer

**Table 2.6. Unincorporated Adair County Mitigation Capabilities**

Capability	Status Including Date of Document or Policy
<b>Planning Capabilities</b>	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	Yes
County Emergency Plan	Yes
Local Recovery Plan	No
County Recovery Plan	Yes
Local Mitigation Plan	No
County Mitigation Plan	Yes
Local Mitigation Plan (PDM)	No
County Mitigation Plan (PDM)	No
Economic Development Plan	Yes
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
<b>Policies/Ordinance</b>	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
<b>Capability</b>	
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Iowa Wetlands and Riparian Areas Conservation Plan	No
Debris Management Plan	No
<b>Program</b>	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	No
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	3
Economic Development Program	Yes
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
<b>Studies/Reports/Maps</b>	



Capability	Status Including Date of Document or Policy
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	No
<b>Staff/Department</b>	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	Yes
Engineer	No
Development Planner	No
Public Works Official	Yes
Emergency Management Coordinator	Yes
NFIP Floodplain Administrator	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	Yes
Housing Department	No
Historic Preservation	No
<b>Non-Governmental Organizations (NGOs)</b>	
American Red Cross	Yes
Salvation Army	Yes
Veterans Groups	Yes
Environmental Organization	Yes
Homeowner Associations	No
Neighborhood Associations	Yes
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes
<b>Local Funding Availability</b>	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	No
Impact fees for new development	No
Ability to incur debt through general obligation bonds	No
Ability to incur debt through special tax bonds	No
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

## 2.1.2 City of Kirksville

Kirksville is a city in and the county seat of Adair County, Missouri, United States. Located in the Benton Township, its population was 17,505 at the 2010 census. Kirksville is home to two colleges: Truman State University and A.T. Still University.

Kirksville was laid out in 1841 on a 40-acre (0.06 sq mi; 16.19 ha) site, and was first incorporated in 1857.

According to tradition, Jesse Kirk, Kirksville's first postmaster, shared a dinner of turkey and whiskey with surveyors working in the area on the condition that they would name the town after him. Not only the first postmaster, Kirk was also the first to own a hotel and a tavern in Kirksville.

Contrary to popular belief, the name of the city has no connection to John Kirk, onetime president of Truman State University from 1899 to 1925. However, the grandson of Jesse Kirk reported that the town was named for Kirk's son John, a figure of local legend credited with killing two deer with a single bullet. "Hopkinsville" was explained as a joking reference to the peculiar gait of John Kirk's lame father-in-law, David Sloan; the jocular name was discarded when the village was selected for the seat of justice in Adair County.

The Battle of Kirksville was fought August 6–9, 1862, during the American Civil War. Union troops led by John McNeil forced Confederate volunteers under Joseph Porter to vacate the city. Casualty estimates (almost entirely Confederate) range from 150-200 dead and up to 400 wounded. According to the August 12, 1862, *Quincy Herald* there were 8 Federal dead and 25 wounded. The victorious Union commander, Colonel McNeil, gained brief national attention for his post-battle execution of a small number of Confederate prisoners. These prisoners had been previously captured in battle and then paroled with the understanding they would no longer take up arms against the Union, upon penalty of death if recaptured. Nonetheless, Confederate government officials were outraged, and it is said that Confederate president Jefferson Davis even called for the execution of Colonel (later Brigadier General) McNeil if he were to be captured.

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**Table 2.7. City of Kirksville Mitigation Capabilities**

Capability	Status Including Date of Document or Policy
<b>Planning Capabilities</b>	
Comprehensive Plan	Yes 3/1/2014
Builder's Plan	No
Capital Improvement Plan	Yes 12/17/2019
Local Emergency Plan	Yes 5/1/2019
County Emergency Plan	Yes 5/1/2019
Local Recovery Plan	Yes 5/1/2019
County Recovery Plan	Yes 5/1/2019
Local Mitigation Plan	Yes 2/24/2014
County Mitigation Plan	Yes 2/24/2014
Local Mitigation Plan (PDM)	No
County Mitigation Plan (PDM)	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	Yes 3/1/2014
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	Yes 12/02/2015
Firewise or other fire mitigation plan	No
School Mitigation Plan	No

Capability	Status Including Date of Document or Policy
Critical Facilities Plan (Mitigation/Response/Recovery)	No
<b>Policies/Ordinance</b>	
Zoning Ordinance	Yes
Building Code	Yes
Floodplain Ordinance	Yes
Subdivision Ordinance	Yes
Tree Trimming Ordinance	Yes
Nuisance Ordinance	Yes
Storm Water Ordinance	Yes
Drainage Ordinance	Yes
<b>Capability</b>	
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	Yes
Landscape Ordinance	No
Iowa Wetlands and Riparian Areas Conservation Plan	No
Debris Management Plan	No
<b>Program</b>	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	Yes
Hazard Awareness Program	Yes
National Weather Service (NWS) Storm Ready	Yes
Building Code Effectiveness Grading (BCEGs)	Yes
ISO Fire Rating	3
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes
Property Acquisition	Yes
Planning/Zoning Boards	Yes
Stream Maintenance Program	Yes
Tree Trimming Program	Yes
Engineering Studies for Streams (Local/County/Regional)	Yes
Mutual Aid Agreements	Yes
<b>Studies/Reports/Maps</b>	
Hazard Analysis/Risk Assessment (Local)	Yes
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	No
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	Yes
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	Yes
Land Use Map	Yes
<b>Staff/Department</b>	
Building Code Official	Yes
Building Inspector	Yes
Mapping Specialist (GIS)	Yes
Engineer	Yes
Development Planner	Yes
Public Works Official	Yes
Emergency Management Coordinator	Yes
NFIP Floodplain Administrator	Yes
Emergency Response Team	Yes
Hazardous Materials Expert	Yes
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes

Capability	Status Including Date of Document or Policy
Sanitation Department	Yes
Transportation Department	Yes
Economic Development Department	Yes
Housing Department	Yes
Historic Preservation	Yes
<b>Non-Governmental Organizations (NGOs)</b>	
American Red Cross	Yes
Salvation Army	Yes
Veterans Groups	Yes
Environmental Organization	Yes
Homeowner Associations	Yes
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes
<b>Local Funding Availability</b>	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
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
Ability to withhold spending in hazard prone areas	Yes

Source: Data Collection Questionnaire

### 2.1.3 Village of Millard

Millard is a village in Pettis Township, Adair County, Missouri, United States. The population was 89 at the 2010 census. According to the United States Census Bureau, the village has a total area of 0.12 square miles (0.31 km<sup>2</sup>), all land. Millard was laid out in 1872, and most likely named after Maggie A. Miller, one of the founders. A post office called Millard was established in 1870, and remained in operation until 1942.

According to the 2010 Census there were 40 households of which 22.5% had children under the age of 18 living with them, 57.5% were married couples living together, 7.5% had a female householder with no husband present, 2.5% had a male householder with no wife present, and 32.5% were non-families. 30.0% of all households were made up of individuals and 12.5% had someone living alone who was 65 years of age or older. The average household size was 2.23 and the average family size was 2.70.

**Table 2.8. Village of Millard Mitigation Capabilities**

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

Capability	Status Including Date of Document or Policy
County Mitigation Plan	Yes
Local Mitigation Plan (PDM)	No
County Mitigation Plan (PDM)	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
<b>Policies/Ordinance</b>	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
<b>Capability</b>	
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Iowa Wetlands and Riparian Areas Conservation Plan	No
Debris Management Plan	No
<b>Program</b>	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	No
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	3
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
<b>Studies/Reports/Maps</b>	
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
<b>Staff/Department</b>	
Building Code Official	No
Building Inspector	No

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

Source: Data Collection Questionnaire

## 2.1.4 City of Novinger

Novinger is a town in Nineveh Township, Adair County, Missouri, United States. The population was 456 at the 2010 census.

Key events in Novinger history include the arrival of the Quincy, Missouri & Pacific railroad and filing of the town plat by founder John C. Novinger in 1878, the establishment of a U.S. Post Office the next year, and the first shaft coal mine in 1883. A turn-of-the-century coal mining boom saw Welsh, Germans, Scots-Irish, Italians, natives of the Balkan countries and many others and their families immigrate from all over the world. It was this boom that finally saw Novinger incorporated as a city in 1901 as the population swelled into the thousands. However, the Great Depression, a post-World War II switch to mostly natural gas and electric heat in American homes, and heavy industry's lessening coal use doomed the area coal fields. The railroads had pulled out by 1950, and the last mine, Billy Creek Coal Mine southwest of Novinger, closed in January 1966. At the time of its closing Billy Creek was the last operating deep shaft mine in Missouri. According to the United States Census Bureau, the city has a total area of 0.80 square miles (2.07 km<sup>2</sup>), of which 0.79 square miles (2.05 km<sup>2</sup>) is land and 0.01 square miles (0.03 km<sup>2</sup>) is water. Novinger can be found on the north side of Missouri Highway 6, approximately seven miles west of Kirksville. Missouri Highway 149

bisects the town on a north–south axis, while Adair County Route "O" travels through the main downtown business district.

**Table 2.9. City of Novinger Mitigation Capabilities**

Capability	Status Including Date of Document or Policy
<b>Planning Capabilities</b>	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	Yes
Local Recovery Plan	No
County Recovery Plan	Yes
Local Mitigation Plan	No
County Mitigation Plan	Yes
Local Mitigation Plan (PDM)	No
County Mitigation Plan (PDM)	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
<b>Policies/Ordinance</b>	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
<b>Capability</b>	
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Iowa Wetlands and Riparian Areas Conservation Plan	No
Debris Management Plan	No
<b>Program</b>	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	3
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

Capability	Status Including Date of Document or Policy
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
<b>Studies/Reports/Maps</b>	
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
<b>Staff/Department</b>	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	No
NFIP Floodplain Administrator	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Historic Preservation	No
<b>Non-Governmental Organizations (NGOs)</b>	
American Red Cross	No
Salvation Army	No
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes
<b>Local Funding Availability</b>	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Ability to incur debt through general obligation bonds	No
Ability to incur debt through special tax bonds	No
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No



## 2.1.5 City of Brashear

Brashear is a city in Salt River Township, Adair County, Missouri, United States. The population was 273 at the 2010 census. The town of Brashear was laid out in 1872. It was named after Richard Matson Brashear (1846-1933), who was a prominent farmer and businessman in the area. Richard Matson Brashear was the son of William Gowan Brashear (1807-1862), who is said to have been one of the first white settlers in the area in 1842. However, the Brashear community dates back prior to 1872 by several years. Approximately one mile north of the current location, there once stood a prosperous small village named Paulville, also known as Paultown, which was established around 1855 by a man named Walker Paul (1816-1888). Paulville served as a trading hub for the farms of eastern Adair County, along with several other businesses, one of which was a grist mill. Sometime during the Civil War, the grist mill was put to the torch to prevent Confederate recruits from being resupplied. The coming of the Quincy, Missouri & Pacific Railroad in 1872 saw a wholesale population shift. The building of a rail depot at the newly platted town of Brashear caused a very large portion of Paulville's population and business to migrate the short distance south. Through the latter half of the 19th century and first few decades of the 20th, Brashear's business district ebbed and flowed as many farm communities are wont to do. Similarly, the Great Depression and post-World War Two mobility of the American public led to many changes. In 1950 Brashear had a population of only 152, however that number has been on a slight rise ever since. A few business concerns remain today, but most residents travel west to Kirksville or east to Edina for their shopping and employment.

**Table 2.10. City of Brashear Mitigation Capabilities**

Capability	Status Including Date of Document or Policy
<b>Planning Capabilities</b>	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	Yes
Local Recovery Plan	No
County Recovery Plan	Yes
Local Mitigation Plan	No
County Mitigation Plan	Yes
Local Mitigation Plan (PDM)	No
County Mitigation Plan (PDM)	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
<b>Policies/Ordinance</b>	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
<b>Capability</b>	

Capability	Status Including Date of Document or Policy
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Iowa Wetlands and Riparian Areas Conservation Plan	No
Debris Management Plan	No
<b>Program</b>	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	Yes - S
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	3
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
<b>Studies/Reports/Maps</b>	
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
<b>Staff/Department</b>	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	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
<b>Non-Governmental Organizations (NGOs)</b>	
American Red Cross	No
Salvation Army	No
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No

Capability	Status Including Date of Document or Policy
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.	No
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Ability to incur debt through general obligation bonds	No
Ability to incur debt through special tax bonds	No
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

### 2.1.6 Village of Gibbs

The town of Gibbs was an outgrowth of the Santa Fe Railroad, laid out in 1887 when the rail lines passed through southeastern Adair County. The name Gibbs was chosen in honor of Frank W. Gibbs, who donated land to the Santa Fe Railroad for the construction of a rail depot and stockyard. At the time of Gibbs' incorporation in 1894, it was anticipated that the town might become Adair County's main rail shipping point for the Santa Fe. This hope was bolstered by the fact that the road leading to Gibbs was the first all-weather road in the county. In the late 1800s a considerable amount of cattle and hogs were shipped from the Gibbs depot to packing houses in Chicago, along with seasonal carloads of fresh apples, strawberries, and eggs to points across America. Perrin & Company of Chicago also constructed a grain elevator trackside for the storage and shipping of corn, with lesser amounts of barley, oats, and wheat. The addition of a second Santa Fe trackline next to the existing one in 1908 added to Gibbs residents hopes for a bright future.

However, the majority of merchants and businesses of Kirksville, the county's major trading hub, instead chose to use La Plata, on the Macon-Adair County border, as their major shipping and passenger service outlet on the Santa Fe. A US Post Office was established in 1887, and several businesses could be found including a barber shop, several general merchants, and two blacksmiths. The Gibbs business district also had of two hotels, an opera house, a bank, lumberyard, undertaker service, a cement factory, and the aforementioned grain elevator. The Bank of Gibbs was founded in 1898 and served the citizens of Gibbs, Adair County, and northern Macon county well. It closed in 1933. For a time at the turn-of-the-century Gibbs had its own newspaper, *Gibbs Telegraph*. Gibbs featured four churches, but a falling population led to the closing of the last one in the early 1980s. The last Gibbs business, a grocery store, closed in 1970. It was also in that year that a rural health clinic, established by a Kirksville hospital in 1949, closed. The Santa Fe rail depot was closed in the 1960s and the two-room school was consolidated into the Brashear (Adair County R-2) school system in 1966. It is now primarily a 'bedroom community' with most residents traveling to cities like Kirksville and Macon for employment. A 2007 rental dispute between the US Postal Service and the building's owners has led to the closing, at least temporarily, of the Gibbs post office.

**Table 2.11. Village of Gibbs Mitigation Capabilities**

Capability	Status Including Date of Document or Policy
<b>Planning Capabilities</b>	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	Yes
Local Recovery Plan	No
County Recovery Plan	Yes
Local Mitigation Plan	No
County Mitigation Plan	Yes
Local Mitigation Plan (PDM)	No
County Mitigation Plan (PDM)	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No
<b>Policies/Ordinance</b>	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
<b>Capability</b>	
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Iowa Wetlands and Riparian Areas Conservation Plan	No
Debris Management Plan	No
<b>Program</b>	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	No
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	3
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
<b>Studies/Reports/Maps</b>	

Capability	Status Including Date of Document or Policy
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
<b>Staff/Department</b>	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	No
NFIP Floodplain Administrator	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Historic Preservation	No
<b>Non-Governmental Organizations (NGOs)</b>	
American Red Cross	No
Salvation Army	No
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	No
<b>Local Funding Availability</b>	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Ability to incur debt through general obligation bonds	No
Ability to incur debt through special tax bonds	No
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

## 2.1.7 Summary of Jurisdictional Capabilities

Complete the following table to summarize the mitigation capabilities of the county and unincorporated cities. For each capability, indicate “yes” or “no”. If relevant, enter the date of the most recent version.

**Table 2.12. Mitigation Capabilities Summary Table**

CAPABILITIES	Unincorp. Adair County	City of Kirksville	City of Novinger	City of Brashear	Village of Millard	Village of Gibbs
<b>Planning Capabilities</b>						
Comprehensive Plan	No	Yes	No	No	No	No
Builder's Plan	No	No	No	No	No	No
Capital Improvement Plan	No	Yes	No	No	No	No
Local Emergency Plan	No	Yes	No	No	No	No
County Emergency Plan	Yes	Yes	Yes	Yes	Yes	Yes
Local Recovery Plan	No	Yes	No	No	No	No
County Recovery Plan	Yes	Yes	Yes	Yes	Yes	Yes
Local Mitigation Plan	No	Yes	No	No	No	No
County Mitigation Plan	Yes	Yes	Yes	Yes	Yes	Yes
Local Mitigation Plan (PDM)	No	No	No	No	No	No
County Mitigation Plan (PDM)	No	No	No	No	No	No
Debris Management Plan	No	No	No	No	No	No
Economic Development Plan	Yes	No	No	No	No	No
Transportation Plan	No	No	No	No	No	No
Land-use Plan	No	Yes	No	No	No	No
Flood Mitigation Assistance (FMA) Plan	No	No	No	No	No	No
Watershed Plan	No	Yes	No	No	No	No
Firewise or other fire mitigation plan	No	No	No	No	No	No
School Mitigation Plan	No	No	No	No	No	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No	No	No	No	No	No
<b>Policies/Ordinance</b>						
Zoning Ordinance	No	Yes	No	No	No	No
Building Code	No	Yes	No	No	No	No
Floodplain Ordinance	No	Yes	No	No	No	No
Subdivision Ordinance	No	Yes	No	No	No	No
Tree Trimming Ordinance	No	Yes	No	No	No	No

CAPABILITIES	Unincorp. Adair County	City of Kirksville	City of Novinger	City of Brashear	Village of Millard	Village of Gibbs
Nuisance Ordinance	No	Yes	No	No	No	No
Storm Water Ordinance	No	Yes	No	No	No	No
Drainage Ordinance	No	Yes	No	No	No	No
Site Plan Review Requirements	No	Yes	No	No	No	No
Historic Preservation Ordinance	No	Yes	No	No	No	No
Landscape Ordinance	No	No	No	No	No	No
Iowa Wetlands and Riparian Areas Conservation Plan	No	No	No	No	No	No
<b>Program</b>						
Zoning/Land Use Restrictions	No	Yes	No	No	No	No
Codes Building Site/Design	No	Yes	No	No	No	No
National Flood Insurance Program (NFIP) Participant	No	Yes	Yes	Yes	No	No
NFIP Community Rating System (CRS) Participating Community	No	Yes	No	No	No	No
Hazard Awareness Program	No	Yes	No	No	No	No
National Weather Service (NWS) Storm Ready	No	Yes	No	No	No	No
Building Code Effectiveness Grading (BCEGs)	No	Yes	No	No	No	No
ISO Fire Rating	3	3	3	3	3	3
Economic Development Program	Yes	Yes	No	No	No	No
Land Use Program	No	Yes	No	No	No	No
Public Education/Awareness	No	Yes	No	No	No	No
Property Acquisition	No	Yes	No	No	No	No
Planning/Zoning Boards	No	Yes	No	No	No	No
Stream Maintenance Program	No	Yes	No	No	No	No
Tree Trimming Program	No	Yes	No	No	No	No
Engineering Studies for Streams (Local/County/Regional)	No	Yes	No	No	No	No
Mutual Aid Agreements	Yes	Yes	Yes	Yes	Yes	Yes
<b>Studies/Reports/Maps</b>						
Hazard Analysis/Risk Assessment (Local)	No	Yes	No	No	No	No
Hazard Analysis/Risk Assessment (County)	No	Yes	No	No	No	No
Flood Insurance Maps	No	No	No	No	No	No
FEMA Flood Insurance Study (Detailed)	No	No	No	No	No	No

CAPABILITIES	Unincorp. Adair County	City of Kirksville	City of Novinger	City of Brashear	Village of Millard	Village of Gibbs
Evacuation Route Map	No	Yes	No	No	No	No
Critical Facilities Inventory	No	Yes	No	No	No	No
Vulnerable Population Inventory	No	Yes	No	No	No	No
Land Use Map	No	Yes	No	No	No	No
<b>Staff/Department</b>						
Building Code Official	No	Yes	No	No	No	No
Building Inspector	No	Yes	No	No	No	No
Mapping Specialist (GIS)	Yes	Yes	No	No	No	No
Engineer	No	Yes	No	No	No	No
Development Planner	No	Yes	No	No	No	No
Public Works Official	Yes	Yes	No	No	No	No
Emergency Management Coordinator	Yes	Yes	No	No	No	No
NFIP Floodplain Administrator	No	Yes	No	No	No	No
Emergency Response Team	No	Yes	No	No	No	No
Hazardous Materials Expert	No	Yes	No	No	No	No
Local Emergency Planning Committee	Yes	Yes	Yes	Yes	Yes	Yes
County Emergency Management Commission	No	Yes	No	No	No	No
Sanitation Department	No	Yes	No	No	Yes	No
Transportation Department	No	Yes	No	No	No	No
Economic Development Department	Yes	Yes	No	No	No	No
Housing Department	No	Yes	No	No	No	No
Historic Preservation	No	Yes	No	No	No	No
<b>Non-Governmental Organizations (NGOs)</b>						
American Red Cross	Yes	Yes	No	No	No	No
Salvation Army	Yes	Yes	No	No	No	No
Veterans Groups	Yes	Yes	Yes	No	No	No
Environmental Organization	Yes	Yes	No	No	No	No
Homeowner Associations	No	Yes	No	No	No	No
Neighborhood Associations	No	No	No	No	No	No
Chamber of Commerce	Yes	Yes	Yes	Yes	No	No
Community Organizations (Lions, Kiwanis, etc.)	Yes	Yes	Yes	No	No	No
<b>Financial Resources</b>						
Apply for Community Development Block Grants	Yes	Yes	Yes	Yes	Yes	Yes



CAPABILITIES	Unincorp. Adair County	City of Kirksville	City of Novinger	City of Brashear	Village of Millard	Village of Gibbs
Fund projects through Capital Improvements funding	No	Yes	No	No	No	No
Authority to levy taxes for specific purposes	Yes	Yes	Yes	Yes	Yes	Yes
Fees for water, sewer, gas, or electric services	No	Yes	Yes	Yes	Yes	Yes
Impact fees for new development	No	Yes	No	No	No	No
Incur debt through general obligation bonds	No	Yes	No	No	No	No
Incur debt through special tax bonds	No	Yes	No	No	No	No
Incur debt through private activities	No	No	No	No	No	No
Withhold spending in hazard prone areas	No	Yes	No	No	No	No

Source: Data Collection Questionnaire

## 2.1.8 Public School District Profiles and Mitigation Capabilities

### Adair Co. R-I (001-090)

Phone: 660-488-6411  
 Fax: 660-488-5400  
 E-mail: [roberts@novinger.k12.mo.us](mailto:roberts@novinger.k12.mo.us)

County-District Code: 001-090  
 County: Adair

Congressional District: 06  
 House District: 3 , 4  
 Senate District: 18

600 Rombauer Avenue  
 Novinger, MO 63559-2477

Supervisory Area: I  
 MSIP: Accredited

Assessed Valuation: \$17,122,995  
 Tax Levy: \$4.3256

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	Enrollment (Prior Year)				
	Schools	Cert. Staff	Residents	Non-Res.	Total
Elementary Schools	1	15	140	0	140
Middle Schools	0	0	0	0	0
Jr. High Schools	0	0	0	0	0
High Schools	1	15	99	0	99
Total	2	30	239	0	239

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Name	Title	Yrs in District
Mr. Brek Snyder	Pres. of Bd.	
Mrs. Trisha D Ferrell	Secy. of Bd.	
Mr. Rick L Roberts	Supt.	7
Mrs. Trisha D Ferrell	Secy. To Supt.	6
Mrs. Robin Daniels	Prin.	7
Mrs. Stephanie Somers	Prof. Dev. Chairperson	

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#### **Adair Co. High (1050)**

600 Rombauer Avenue Novinger, MO 63559-2477  
 Phone: 660-488-6411 Fax:660-488-5400

Grade Span: 07-12

Principal: Ms. Robin Daniels (7 years in district)  
 E-mail: [rdaniels@novinger.k12.mo.us](mailto:rdaniels@novinger.k12.mo.us)

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#### **Adair Co. Elem. (4020)**

600 Rombauer Avenue Novinger, MO 63559-2477  
 Phone: 660-488-6412 Fax:660-488-5400

Grade Span: K-06

Principal: Ms. Robin Daniels (7 years in district)  
 E-mail: [rdaniels@novinger.k12.mo.us](mailto:rdaniels@novinger.k12.mo.us)

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## Adair Co. R-II (001-092)

Phone: 660-323-5272  
Fax: 660-323-5250  
E-mail: [shelly\\_shipman@brashear.k12.mo.us](mailto:shelly_shipman@brashear.k12.mo.us)

205 W Dewey  
Brashear, MO 63533-2429

County-District Code: 001-092  
County: Adair

Supervisory Area: I  
MSIP: Accredited

Congressional District: 06  
House District: 4  
Senate District: 18

Assessed Valuation: \$15,454,147  
Tax Levy: \$4.2280

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	Schools	Cert. Staff	Enrollment (Prior Year)		
			Residents	Non-Res.	Total
Elementary Schools	1	16	69	0	69
Middle Schools	0	0	0	0	0
Jr. High Schools	0	0	0	0	0
High Schools	1	15	79	1	80
Total	2	31	148	1	149

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Name	Title	Yrs in District
Mr. James Reeves	Pres. of Bd.	
Mr. Keith Turner	Secy. of Bd.	
Mrs. Shelly M Shipman	Supt.	33
Mrs. Stacy R Reeves	Secy. To Supt.	25
Mrs. Tammy Wolter	Prof. Dev. Chairperson	

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### **Adair Co. High (1050)**

205 W Dewey Brashear, MO 63533-2429  
Phone: 660-323-5272 Fax: 660-323-5250

Grade Span: 07-12

Principal: Mrs. Christ Grissom (19 years in district)  
E-mail: [christy\\_grissom@brashear.k12.mo.us](mailto:christy_grissom@brashear.k12.mo.us)

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### **Adair Co. Elem. (4020)**

205 W Dewey Brashear, MO 63533-2429  
Phone: 660-323-5272 Fax: 660-323-5250

Grade Span: K-06

Principal: Mrs. Christy Grissom (19 years in district)  
E-mail: [christy\\_grissom@brashear.k12.mo.us](mailto:christy_grissom@brashear.k12.mo.us)

## Kirksville R-III (001-091)

Phone: 660-665-7774  
Fax: 660-626-1448  
E-mail: [mary\\_m@kirksville.k12.mo.us](mailto:mary_m@kirksville.k12.mo.us)

1901 E Hamilton St.  
Kirksville, MO 63501-3904

County-District Code: 001-091  
County: Adair

Supervisory Area: I  
MSIP: Accredited

Congressional District: 06  
House District: 3 , 4  
Senate District: 18

Assessed Valuation: \$261,168,794  
Tax Levy: \$4.1867

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	Schools	Cert. Staff	Enrollment (Prior Year)		
			Residents	Non-Res.	Total
Elementary Schools	2	127	1,253	12	1,265
Middle Schools	1	53	582	0	582
Jr. High Schools	0	0	0	0	0
High Schools	1	81	741	0	741
Total	4	261	2,576	12	2,588

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Name	Title	Yrs in District
Mrs. Nan Davis	Pres. of Bd.	
Dr. Jeremy Houser	Secy. of Bd.	
Mr. Robert Webb	Supt.	1
Mrs. Mary Magruder	Secy. To Supt.	39
Mrs. Tricia Reger	Asst. Supt. Business Affairs	22
Dr. Cindy Dowis	Dir. Spec. Educ.	24
Mrs. Tricia Reger	Dir. Elem. Educ.	22
Mrs. Sara Williams	DIR. Activities	12
Mr. Shawn Corbett	Trans./Spec. Prgms.	15
Mrs. Janelle Stephens	Prof. Dev. Chairperson	

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### **Kirksville Sr. High (1050)**

1300 S Cottage Grove Kirksville, MO 63501-3910  
Phone: 660-665-4631 Fax: 660-626-1439

Grade Span: 09-12

Principal: Mr. Randy Mikel (25 years in district)  
E-mail: [RANDY\\_M@kirksville.k12.mo.us](mailto:RANDY_M@kirksville.k12.mo.us)

### **Kirksville Area Tech. Center (1100)**

1103 S Cottage Grove Kirksville, MO 63501-3977  
Phone: 660-665-2865 Fax: 660-626-1477

Grade Span: 09-12

Principal: Mr. Jesse Wolf (5 years in district)  
E-mail: [JWOLF@KIRKSVILLE.K12.MO.US](mailto:JWOLF@KIRKSVILLE.K12.MO.US)

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### **William Matthew Middle School (3000)**

1515 S Cottage Grove Kirksville, MO 63501-3979  
Phone: 660-665-3793 Fax: 660-626-1418

Grade Span: 06-08

Principal: Mrs. Julie Esquivel (14 years in district)  
E-mail: [JESQUIVEL@KIRKSVILLE.K12.MO.US](mailto:JESQUIVEL@KIRKSVILLE.K12.MO.US)

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**Kirksville Primary (4030)**

1815 E Hamilton Kirksville, MO 63501-3903  
 Phone: 660-665-5691 Fax: 660-626-1421

Grade Span: PK-02

Principal: Mr. Ernest Motley (4 years in district)  
 E-mail: [EMOTLEY@kirksville.k12.mo.us](mailto:EMOTLEY@kirksville.k12.mo.us)

**Ray Miller Elem. (4050)**

2010 E Normal Kirksville, MO 63501-3321  
 Phone: 660-665-2834 Fax: 660-626-1464

Grade Span: 03-05

Principal: Mrs. Kristin VanRie (12 years in district)  
 E-mail: [kVanRie@kirksville.k12.mo.us](mailto:kVanRie@kirksville.k12.mo.us)

**Table 2.13. Adair County R-I Buildings and Enrollment Data 2019**

District Name	Building Name	Building Enrolment
Adair County R-I	Adair Co. Elem.	140
Adair County R-I	Adair Co. High	99

Source: <http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>, 2019

**Table 2.14. Adair County R-II Buildings and Enrollment Data 2019**

District Name	Building Name	Building Enrolment
Adair County R-II	Adair Co. Elem	69
Adair County R-II	Adair Co. High	79

Source: <http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>, 2019

**Table 2.15. Kirksville R-III Buildings and Enrollment Data 2019**

District Name	Building Name	Building Enrolment
Kirksville R-III	Kirksville Area Tech Center	0
Kirksville R-III	Kirksville Primary	689
Kirksville R-III	Kirksville Sr. High	741
Kirksville R-III	Ray Miller Elem.	564
Kirksville R-III	William Matthew Middle School	582

Source: <http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>, 2019

**Table 2.16. Summary of Mitigation Capabilities- Adair County R-I, Adair County R-II, Kirksville R-III**

Capability	Adair County R-I	Adair County R-II	Kirksville R-III
<b>Planning Elements</b>			
Master Plan	Yes	Yes	No
Capital Improvement Plan	No	No	Yes
School Emergency Plan	Yes	Yes	Yes
Weapons Policy	Yes	Yes	Yes
<b>Personnel Resources</b>			
Full-Time Building Official (Principal)	Yes	Yes	Yes
Emergency Manager	No	No	Yes
Grant Writer	No	No	No
Public Information Officer	No	No	Yes
<b>Financial Resources</b>			
Capital Improvements Project Funding	Yes	Yes	Yes
Local Funds	Yes	Yes	Yes
General Obligation Bonds	Yes	Yes	No
Special Tax Bonds	Yes	Yes	No
Private Activities/Donations	Yes	Yes	No
State and Federal Funds/Grants	Yes	Yes	Yes
<b>Other</b>			
Public Education Programs	No	No	No
Privately or Self- Insured?	-	-	-
Fire Evacuation Training	Yes	Yes	Yes
Tornado Sheltering Exercises	Yes	Yes	Yes
Public Address/Emergency Alert System	Yes	Yes	Yes
NOAA Weather Radios	Yes	Yes	Yes
Lock-Down Security Training	Yes	Yes	Yes
Mitigation Programs	No	No	No
Tornado Shelter/Saferoom	No	No	No
Campus Police	No	No	Yes

Source: Data Collection Questionnaire



## 3 RISK ASSESSMENT

<b>3</b>	<b>RISK ASSESSMENT .....</b>	<b>3.1</b>
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3.1.1	Review of Existing Mitigation Plans .....	3.3
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3.2	<i>ASSETS AT RISK .....</i>	3.8
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The goal of the risk assessment is to estimate the potential loss in the planning area, including loss of life, personal injury, property damage, and economic loss, from a hazard event. The risk assessment process allows communities and school/special districts in the planning area to better understand their potential risk to the identified hazards. It will provide a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

Changes in this version:

Then risk assessment in this plan consolidates, updates and streamlines content from the 2014 approved plan. Content has been restructured to cover a broad range of emerging hazards, vulnerabilities, and risk issues. Significant changes have been made that include standardized terminology, new GIS-based ranking methodology which assesses hazard risk by jurisdiction and review of local risk assessments, land use planning and development.

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**

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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, such as flooding.

Each year there are increases in human-caused incidents, which can be just as devastating as natural disasters. For the purpose of this plan “human-caused hazards” are technological hazards and terrorism. These are distinct from natural hazards primarily in that they originate from human activity. In contrast, while the risks presented by natural hazards may be increased or decreased as a result of human activity, they are not inherently human-induced. The term “technological hazards” refers to the origins of incidents that can arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials. For the sake of simplicity, this guide assumes that technological emergencies are accidental and that their consequences are unintended.

### **3.1.1 Review of Existing Mitigation Plans**

The MPC previously developed a multi-jurisdiction Hazard Mitigation Plan dated February 2014 and Adair County, City of Kirksville, City of Brashear, City of Gibbs, City of Millard and the City of Novinger participated in the multi-jurisdictional county-wide plan. The 2014 Hazard Mitigation Plan was consulted in development of the risk assessment and information included and updated where appropriate.

The MPC decided to include only natural hazards, as only natural hazards are required by federal regulations to be included. The human-caused and technological hazards were eliminated from further analysis due to these hazards are not necessary for plans to meet the requirements of the Disaster Mitigation Act of 2000.

### **3.1.2 Review Disaster Declaration History**

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 Adair County, Missouri, 1965-Present**

<b>Disaster Number</b>	<b>Description</b>	<b>Incident Period Declaration Date</b>	<b>Individual Assistance (IA) Public Assistance (PA)</b>
DR-372	Heavy Rains, Tornadoes, Flooding	4/19/1973	-
DR-407	Severe Storms, Flooding	11/01/1973	-
DR-439	Severe Storms, Flooding	6/10/1974	-
EM-3017	Drought	9/24/1976	-
DR-995	Flooding, Severe Storms	6/10/1993 -10/25/1993	-
DR-1054	Severe Storm, Tornadoes, Hail, Flooding	5/13/1995 – 6/23/1995 6/02/1995	-
DR-1412	Severe Storms, Tornadoes	4/24/2002 – 6/10/2002 5/06/2002	PA
DR-1403	Ice Storm	1/29/2002 – 2/13/2002 2/6/2002	PA
DR-1524	Severe Storms, Tornadoes, Flooding	5/18/2004 – 5/31/2004 6/11/2004	IA
EM-3232	Hurricane Katrina Evacuation	8/29/2005 – 10/01/2005 9/10/2005	PA
DR-1736	Severe Winter Storms	12/6/2007 – 12/15/2007 12/27/2007	PA
EM-3281	Severe Winter Storms	12/08/2007 – 12/15/2007 12/12/2007	-
DR-1773	Severe Storms, Flooding	6/1/2008 – 8/13/2008 6/25/2008	IA/PA
DR-1809	Severe Storms, Flooding, Tornado	9/11/2008 – 9/24/2008 11/13/2008	IA/PA
DR-1847	Severe Storms, Tornadoes, Flooding	5/8/2009 – 5/16/2009 6/19/2009	IA/PA
EM-3303	Severe Winter Storm	1/26/2009 – 1/28/209 1/30/2009	-
DR-1934	Severe Storms, Flooding, and Tornadoes	6/12/2010 – 7/31/2010 8/17/2010	PA
EM-3317	Severe Winter Storm	1/31/201 – 2/5/2011 2/3/2011	-
DR-1961	Severe Winter Storm and Snowstorm	1/31/2011 – 2/5/2011 3/23/2011	PA
DR-4200	Severe Storms, Tornadoes, Straight-line Winds, Flooding	9/9/2014 – 9/10/2014 10/31/2014	PA
DR-4238	Severe Storms, Tornadoes, Straight-line Winds, Flooding	5/15/2015 – 7/27/2015 8/7/2015	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, and 2018)
- Previously approved planning area Hazard Mitigation Plan (Date)
- Federal Emergency Management Agency (FEMA)
- Missouri Department of Natural Resources
- National Drought Mitigation Center Drought Reporter
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics
- National Agricultural Statistics Service (Agriculture production/losses)
- Data Collection Questionnaires completed by each jurisdiction
- State of Missouri GIS data
- Environmental Protection Agency
- Flood Insurance Administration
- Hazards US (Hazus)
- Missouri Department of Transportation
- Missouri Division of Fire Marshal Safety
- Missouri Public Service Commission
- National Fire Incident Reporting System (NFIRS)
- National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI);
- County and local Comprehensive Plans to the extent available
- County Emergency Management
- County Flood Insurance Rate Map, FEMA
- Flood Insurance Study, FEMA
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin
- U.S. Army Corps of Engineers
- U.S. Department of Transportation
- United States Geological Survey (USGS)
- Various articles and publications available on the internet (you should state that you will give citations to the sources in the body of the plan)

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

**Table 3.2. Hazards Identified for Each Jurisdiction**

Jurisdiction	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding (River and Flash)	Land Subsidence/Sinkholes	Levee Failure	Severe Winter Weather	Severe Thunderstorms (Lightning/Hail/High Wind)	Tornado	Wildfire
Adair County	X	x	X	X	X	X	X	X	X	X	X
City of Kirksville	X	X	X	X	X	X	-	X	X	X	X
City of Novinger	-	X	X	X	X	X	X	X	X	X	X
City of Brashear	-	X	X	X	X	X	-	X	X	X	X
Village of Millard	-	X	X	X	X	X	-	X	X	X	X
Village of Gibbs	-	X	X	X	X	X	-	X	X	X	X
Adair County R-1	-	X	X	X	-	X	-	X	X	X	X
Adair County R-2	-	X	X	X	-	X	-	X	X	X	X
Kirksville R-3	-	X	X	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. The City of Kirksville is 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 section of each hazard.

The hazards that vary across the planning area in terms of risk include dam failure, flash flood, grass or wildland fire, levee failure, river flood, flash flood, and sinkholes/land subsidence. Explain that these differences are detailed 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.

### **Missouri Mitigation Viewer**

With the 2018 Hazard Mitigation Plan Update, SEMA now provides online access to 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.

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 2018 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/MoHazardMitigationPlanViewer2018>
- <https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide

Assets at Risk available from the Mitigation Viewer include:

- State Owned Facilities
- State Leased Facilities
- Department of Higher Education Facilities
- State Owned Bridges

### **Flood Risk Datasets**

- **Good:** If a digital FIRM (DFIRM) is not available for the flood risk analysis, use the census block exposure data out of Hazus or available as a Tiger/Line (note links above). If this method is chosen, apply corporate boundaries of jurisdictions in the plan to the GIS data available to parse out assets at risk for each jurisdiction. If this method is chosen, use this exposure data for all hazards so that the analysis is consistent.
- **Better:** If a DFIRM is available for the flood risk assessment AND parcel data is available in GIS format w/ associated building values—but not in a format that can be imported into Hazus, analysis

can be done to show parcels and associated values in the planning area compared against the actual regulatory floodplain. The limitation with this is that your potential loss estimates will not be based on a depth/damage function as they are in Hazus. But, this is still a much more accurate picture of what is vulnerable to flooding than using the Hazus estimated floodplain and census block. If you use this method for the flood risk assessment, it is best to use the parcel data for the total exposure for all hazards so that the analysis is consistent. Contents values are not usually included w/ parcel data structure values. However, using the formulas that Hazus uses, they can be calculated. Residential (50%), Commercial (100%), Industrial (150%), Agricultural (100%).

- **Best:** If DFIRM with depth grids are available, as produced during the Risk MAP process, AND parcel data is available in GIS format AND parcel data is in a format compatible w/ Hazus' user-defined data, this gives the best analysis. This provides the actual parcels and associated values in the planning area against the actual regulatory floodplain and will also take into account the depth-damage function in Hazus.

### 3.2.1 Total Exposure of Population and Structures

#### Unincorporated County and Incorporated Cities

In the following three tables, population data is based on 2010 Census Bureau data. Building counts and building exposure values are based on parcel data provided by the State of Missouri Geographic Information Systems (GIS) database which can be obtained directly from the SEMA Mitigation Management Section. 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. **Table 3.5** provides the building count total for the county and each city in the planning area broken out by building usage types (residential, commercial, industrial, and agricultural).

**Table 3.3. Maximum Population and Building Exposure by Jurisdiction**

Jurisdiction	2017 Annual Population Estimate	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
City of Kirksville	17,519	6,612	\$1,068,939	\$579,147	\$1,648,086
City of Novinger	346	272	\$50,350	\$20,281	\$70,631
City of Brashear	194	205	\$26,188	\$11,749	\$37,937
Village of Millard	77	52	\$6,293	\$3,238	\$9,531
Village of Gibbs	99	60	\$5,397	\$2,675	\$8,072
Adair County	24,437	10,098	\$504,044	\$264,888	\$768,932
<b>Totals</b>		17,299	\$1,661,211	\$881,978	\$2,543,189

Source: U.S. Bureau of the Census, Annual population estimates/ 5-Year American Community Survey 2018; Building Count and Building Exposure, Missouri GIS Database from SEMA Mitigation Management; Contents Exposure derived by applying multiplier to Building Exposure based on Hazus MH 2.1 standard 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 Value Exposure by Usage Type**

Jurisdiction	Agriculture	Commercial	Education	Government	Industrial	Residential	Total
City of Kirksville	385	147,688	101,816	4,219	19,824	795,007	\$1,068,939
City of Novinger	45	3,828	13,975	402	0	32,101	\$50,351
City of Brashear	107	1,209	3,993	201	0	20,678	\$26,188
Village of Millard	18	201	0	0	0	6,073	\$6,292
Village of Gibbs	47	0	0	0	0	5,350	\$5,397
Adair County	13,704	22,163	0	2,612	7,330	458,235	\$504,044
<b>Totals:</b>	\$14,306	\$175,089	\$119,784	\$7,434	\$27,154	\$1,317,444	\$1,661,211

Source: U.S. Bureau of the Census, Annual population estimates/ 5-Year American Community Survey 2018; Building Count and Building Exposure, Missouri GIS Database from SEMA Mitigation Management; Contents Exposure derived by applying multiplier to Building Exposure based on Hazus MH 2.1 standard 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 3.5. Building Counts by Usage Type**

Jurisdiction	Agriculture	Commercial	Education	Government	Industrial	Residential	Total
City of Kirksville	190	733	51	21	119	5,498	6,612
City of Novinger	22	19	7	2	0	222	272
City of Brashear	53	6	2	1	0	143	205
Village of Millard	9	1	0	0	0	42	52
Village of Gibbs	23	0	0	0	0	37	60
Adair County	6,762	110	0	13	44	3,169	10,098
<b>Totals:</b>	7,059	869	60	37	163	9,111	17,299

School districts assets are included in the tables above. However, more discrete school district data is provided below and was taken from the School District Data Collection Questionnaire, data provided by Missouri's Department of Elementary and Secondary Education (DESE) 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 (\$)
Adair County R-1 School Dist.	239	7			
Adair County R-2 School Dist.	148	2	\$6,978,700	\$1,117,500	\$8,096,200
Kirksville R-3 School Dist.	2,588	5			
Totals:					

Source: <http://mcids.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>.

### 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:

- 2018 Missouri State Hazard Mitigation Plan and Hazard Mitigation Viewer <http://bit.ly/MoHazardMitigationPlanViewer2018>
- Northeast Missouri Regional Planning Commission list of critical facility inventory.
- Chemical Facilities (Tier II Facilities) information (if included in the list of hazards identified by the participants) can be obtained by contacting the county LEPC. The LEPC will then request information (name, address, purpose for asking, etc.) and then provide the information. In order to find out who the LEPC contact is for your planning areas, see [https://sema.dps.mo.gov/docs/programs/executive/MERC/LEPC\\_Manual/LEPC-addresses.pdf](https://sema.dps.mo.gov/docs/programs/executive/MERC/LEPC_Manual/LEPC-addresses.pdf)
- Hazus contains an inventory of critical facilities that can be exported for each jurisdiction.
- The Homeland Security Infrastructure Protection Program (HSIPP) is another source. But access may be restricted.

**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
City of Kirksville	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
City of Brashear			X				X	X	X		X									X				
City of Novinger			X				X	X	X		X									X			X	
Village of Gibbs																								
Village of Millard																								
County of Adair	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
<b>Totals</b>																								

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

**Bridges:** This term 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. A map from Transportation for America is not currently working. MoDot was contacted and provided a map of structurally deficient bridges in Adair County.

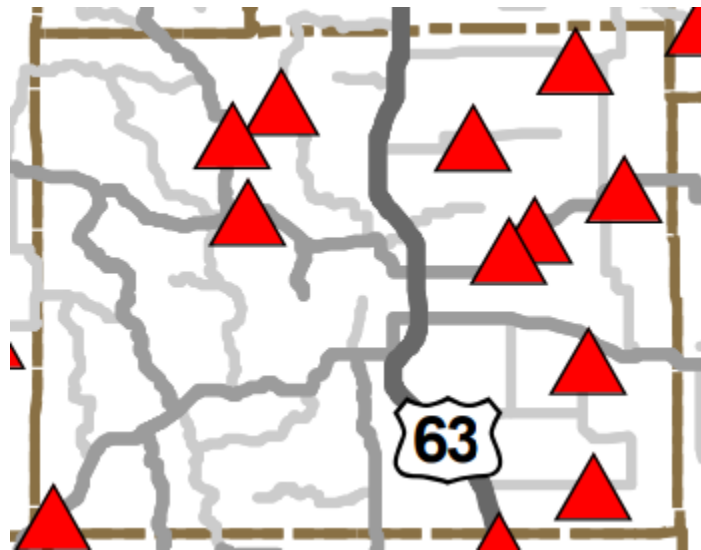
Source: <http://www.fhwa.dot.gov/bridge/nbi/no10/county.cfm>

**Figure 3.1. Adair County Bridges**

Missouri								
County	Bridge Counts				Bridge Area (Square Meters)			
	All	Good	Fair	Poor	All	Good	Fair	Poor
ADAIR (001)	299	209	63	27	46,641	30,725	10,744	5,172

Source: <https://www.fhwa.dot.gov/bridge/nbi/no10/county18b.cfm#mo>

**Figure 3.2. Adair County Structurally Deficient Bridges**



County	Feature	Route	Log Mile	Detour Length	Year Built	Lanes On	ADT	Item 41-Status	Length	Width
ADAIR	MUSSEL FK	MO 11 S	43.39194	34.1	1933	2	349	A - OPEN NO RESTRICTIONS	196	22.92
ADAIR	CHARITON RVR	MO 6 E	134.41414	27.9	1953	2	3912	A - OPEN NO RESTRICTIONS	508	27.50
ADAIR	HAZEL CR	RT B S	3.75596	2.48	1950	1	90	P - POSTED FOR LOAD	180	22.25
ADAIR	N FK SALT RVR	RT T E	4.34062	123.38	1955	1	256	P - POSTED FOR LOAD	102	22.25
ADAIR	SHUTEYE CR	MO 149 S	27.17894	19.84	1930	1	381	P - POSTED FOR LOAD	113	20.92
ADAIR	N TIMBER CR	RT V S	0.85994	14.26	1932	2	252	P - POSTED FOR LOAD	88	20.92
ADAIR	STEER CR	MO 11 S	16.26322	31.62	1933	1	715	P - POSTED FOR LOAD	76	21.25
ADAIR	FLOYD CR	MO 11 S	14.4987	9.3	1933	1	715	P - POSTED FOR LOAD	94	22.58
ADAIR	S FK S FABIUS RVR	MO 11 S	9.87288	20.46	1933	1	1083	P - POSTED FOR LOAD	94	20.92
ADAIR	N FK S FABIUS RVR	RT A S	13.65302	20.46	1941	1	360	P - POSTED FOR LOAD	175	24.25
ADAIR	BEAR CR	RT E	4.6407	21.7	1947	2	170	P - POSTED FOR LOAD	108	24.25

### 3.2.3 Other Assets

Assessing the vulnerability of the planning area to disaster also requires data on the natural, historic, cultural, and economic assets of the area. This information is important for many reasons.

- These types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- Knowing about these resources in advance allows for consideration immediately following a hazard event, which is when the potential for damages is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- The presence of natural resources can reduce the impacts of future natural hazards, such as wetlands and riparian habitats which help absorb floodwaters.
- Losses to economic assets like these (e.g., major employers or primary economic sectors) could have severe impacts on a community and its ability to recover from disaster.

**Table 3.8. Threatened and Endangered Species in Adair County**

Common Name	Scientific Name	Status
Gray Bat	Myotis Grisescens	Endangered
Indiana Bat	Myotis Sodalis	Endangered
Northern Long-Eared Bat	Myotis Septentrionalis	Threatened
Mead's Milkweed	Asclepias Meadii	Threatened

Source: U.S. Fish and Wildlife Service, <http://www.fws.gov/midwest/Endangered/lists/missouri-cty.html>; see also <https://ecos.fws.gov/ipac/> and select 'Get Started' > Step '1 Find Location', choose select by state or county and enter the county name, selecting the appropriate community > follow remaining on-screen instructions.

**Table 3.9. Parks in Adair County**

Park / Conservation Area	Address	City
Big Creek CA	From Kirksville, take Business Highway 63 south 0.50 mile, then take Highway 11 west 1.70 miles, then take Route H north 1.70 miles, and take Rainbow Basin Trail west 1 mile.	Adair County
Cook (Elmer A) Mem. Access	From Kirksville, take Highway 11 west 7 miles to the Chariton River bridge.	Adair County
Hazel Creek Lake	From Kirksville, take Highway 63 north 3.20 miles, then Hungry Hollow Road west 1.50 miles to the lake.	Kirksville
Spur Pond	In Kirksville from the intersection of Potter and Osteopathy Streets, take Osteopathy Street south 0.80 mile to the southeast corner of Patryla Park, or from Northeast Regional Medical Center north 0.40 mile.	Kirksville
Montgomery Woods CA	From Kirksville, take Highway 11 west 18 miles, then take Montgomery Woods Trail south 0.75 mile to the area.	Adair County
Mullanix Ford Access	From Greentop, take Route K west 6 miles to the Chariton River bridge.	Adair County
Northeast Regional Office	Located on the south edge of Kirksville on Highway 63 south, across from the Days Inn Motel.	Kirksville
Shoemaker CA	From Novinger, take Route O north 7 miles, then Spring Creek Road west, then Stahl Road south.	Adair County
Sugar Creek CA	From Kirksville, take Highway 11 west 4 miles, then Route N south 0.25 mile to the area.	Adair County
Truitt (Henry) Access	From Novinger, take Highway 6 east 1 mile to the Chariton River bridge.	Novinger
Union Ridge CA	From Green Castle, take Route D north 2.50 miles.	Adair County

Source: <http://mdc7.mdc.mo.gov/applications/moatlas/AreaList.aspx?txtUserID=guest&txtAreaNm=s>  
The best source for park information is usually county and community websites.

**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. Adair County Properties on the National Register of Historic Places**

<b>Property</b>	<b>Address</b>	<b>City</b>	<b>Date Listed</b>
Adair County Courthouse	Washington St.	Kirksville	8/11/78
Bear Creek Baptist Church	Kirksville Vicinity	Kirksville	3/29/84
Cabins Historic District	Novinger Vicinity	Novinger	7/17/79
First Presbyterian Church	201 S. High St	Kirksville	7/10/17
Grim Building	113-115 E Washington St.	Kirksville	6/27/79
Harris, Capt. Thomas C., House	1308 N. Franklin St.	Kirksville	10/15/73
Journal Printing Co. Building	119 S. Elson St.	Kirksville	7/14/11
Kirksville Courthouse Square Historic District	200 Block N. Franklin St, 100 Block E. Harrison St, 100 Block W. Harrison	Kirksville	5/21/09
Laughlin, Drs. George and Blanche, House	706 S. Haliburton St.	Kirksville	3/11/14
Lincoln School	907 S. Wbash st	Kirksville	1/31/17
Masonic Temple	217 E. Harrison St.	Kirksville	1/7/10
St. Mary's Church	MO 11	Adair County	12/16/74
Salisbury School	MO K	Kirksville	10/23/17
Smith, Dr. E. Sanborn, House	111 E. Patterson St.	Kirksville	1/30/09
Smith, Orie, Black and White Stock Farm Historic District	½ mile SE of junction of MO Highway P and County Road 129B	Kirksville	1/16/01
Sojourners Club	211 S. Elson St.	Kirksville	3/11/14
Thousand Hills State Park Petroglyphs Archaeological Site	Address Restricted		1/23/70
Travelers Hotel	301 W. Washington St.	Kirksville	9/16/09
Trinity Episcopal Church	124 N. Mulanix St	Kirksville	1/2/08

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

**Table 3.11. Major Non-Government Employers in Adair County**

Employer Name	Main Locations	Product or Service	Employees
Kraft Heinz	2504 Industrial Rd. Kirksville, MO 63501	Manufacturing	900
Truman St. University	100 E. Normal Ave. Kirksville, MO 63555	Education	759
A.T. Still University	800 W. Jefferson St. Kirksville, MO 63501	Education	703
Northeast Regional Medical Center	315 S Osteopathy Ave. Kirksville, MO 63501	Healthcare	438
Wal-Mart	2206 N. Baltimore St. Kirksville, MO 63501	Retail	302
Sedexo	901 S. Franklin St. Kirksville, MO 63501	Food Service	215
Hy-Vee Food Store	500 N. Baltimore St. Kirksville, MO 63501	Retail	326
Preferred Family Health Care	900 E. La Harpe St. Kirksville, MO 63501	Healthcare	217
Kirksville Manor Care	1705 E. La Harpe St. Kirksville, MO 63501	Healthcare	118
Twin Pines Adult Care	316 S Osteopathy Ave. Kirksville, MO 63501	Healthcare	103
Northeast Missouri Health Council	1416 Crown Dr. Kirksville, MO 63501	Healthcare	133
Home Depot	3015 N. Baltimore St. Kirksville, MO 63501	Retail	100

**Source:** Data Collection Questionnaires; KREDI Employment Report

**Agriculture:** Agriculture plays an important role in the Adair County economy. As described in **Figure 3.3**, Adair County is greater than 1.5 in Agribusiness Employment Quotient.

**Table 3.12. Agriculture-Related Jobs in Adair County**

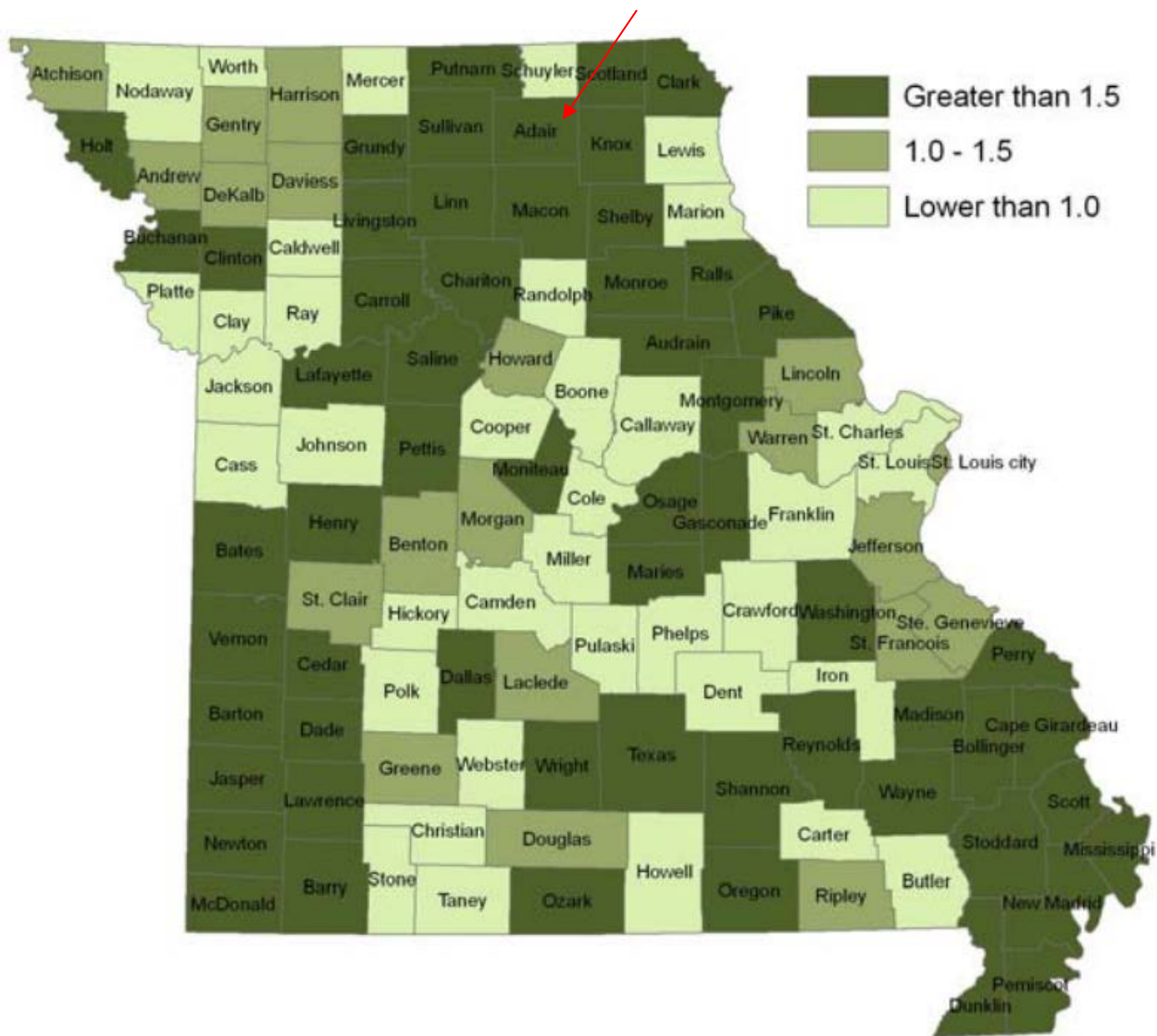
Item	Adair
Farms ..... number	822
Land in farms ..... acres	273,155
Average size of farm ..... acres	332
Median size of farm ..... acres	154
Estimated market value of land and buildings:	
Average per farm ..... dollars	815,104
Average per acre ..... dollars	2,453
Estimated market value of all machinery and equipment ..... \$1,000	65,121
Average per farm ..... dollars	79,223
Farms by size:	
1 to 9 acres ..... farms	17
10 to 49 acres ..... farms	144
50 to 179 acres ..... farms	295
180 to 499 acres ..... farms	229
500 to 999 acres ..... farms	81
1,000 acres or more ..... farms	56
Total cropland ..... farms	698
Harvested cropland ..... acres	134,006
Irrigated land ..... farms	568
..... acres	101,631
Market value of agricultural products sold (see text) ..... \$1,000	12
Average per farm ..... dollars	93
Crops, including nursery and greenhouse crops ..... \$1,000	35,789
Livestock, poultry, and their products ..... \$1,000	43,539
Farms by value of sales:	
Less than \$2,500 ..... farms	293
\$2,500 to \$4,999 ..... farms	72
\$5,000 to \$9,999 ..... farms	91
\$10,000 to \$24,999 ..... farms	107
\$25,000 to \$49,999 ..... farms	89
\$50,000 to \$99,999 ..... farms	89
\$100,000 or more ..... farms	81
Government payments ..... farms	415
Total income from farm-related sources, gross before taxes and expenses (see text) ..... \$1,000	3,054
Total farm production expenses ..... \$1,000	387
Average per farm ..... dollars	5,046
Net cash farm income of operation (see text) ..... farms	822
..... \$1,000	8,084
Average per farm ..... dollars	9,834
Principal operator by primary occupation:	
Farming ..... number	362
Other ..... number	460
Principal operator by days worked off farm:	
Any ..... number	526
200 days or more ..... number	336
Livestock and poultry:	
Cattle and calves inventory ..... farms	396
Beef cows ..... number	37,295
Milk cows ..... farms	366
..... number	17,792
Cattle and calves sold ..... farms	17
Hogs and pigs inventory ..... number	80
Hogs and pigs sold ..... farms	366
Sheep and lambs inventory ..... number	18,417
Layers inventory (see text) ..... farms	18
Broilers and other meat-type chickens sold ..... number	(D)
..... farms	13
..... number	5,096
..... farms	25
..... number	1,064
..... farms	63
..... number	9,456
..... farms	3
..... number	260
Selected crops harvested:	
Corn for grain ..... farms	114
..... acres	14,150
Corn for silage or greenchop ..... bushels	483,827
..... farms	21
..... acres	1,735
..... tons	15,603
Wheat for grain, all ..... farms	35
..... acres	1,664
Winter wheat for grain ..... bushels	96,595
..... farms	35
..... acres	1,664
Spring wheat for grain ..... bushels	96,595
..... farms	-
..... acres	-
..... bushels	-

Source: [https://www.nass.usda.gov/Publications/AgCensus/2012/Full\\_Report/Volume\\_1\\_Chapter\\_2\\_County\\_Level/](https://www.nass.usda.gov/Publications/AgCensus/2012/Full_Report/Volume_1_Chapter_2_County_Level/)



### Figure 3.3.

## Agribusiness Employment Location Quotient



Source: [https://www.missourieconomy.org/pdfs/missouri\\_farms\\_and\\_agribusiness.pdf](https://www.missourieconomy.org/pdfs/missouri_farms_and_agribusiness.pdf)

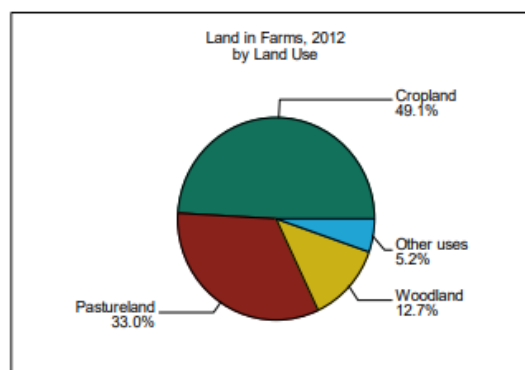
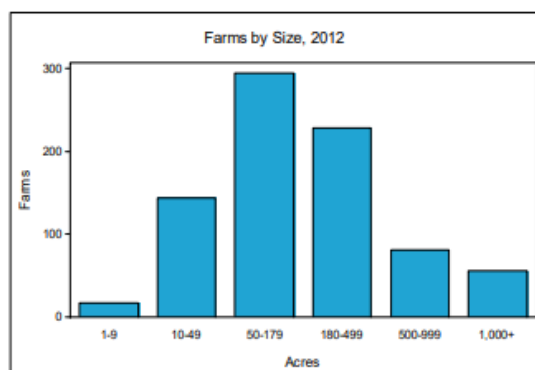
Figure 3.4. 2012 Census of Agriculture, Adair County



## Adair County Missouri



	2012	2007	% change
<b>Number of Farms</b>	822	944	- 13
<b>Land in Farms</b>	273,155 acres	279,855 acres	- 2
<b>Average Size of Farm</b>	332 acres	296 acres	+ 12
<b>Market Value of Products Sold</b>	\$35,789,000	\$33,413,000	+ 7
Crop Sales \$20,148,000 (56 percent)			
Livestock Sales \$15,641,000 (44 percent)			
<b>Average Per Farm</b>	\$43,539	\$35,395	+ 23
<b>Government Payments</b>	\$3,054,000	\$3,309,000	- 8
<b>Average Per Farm Receiving Payments</b>	\$7,359	\$7,011	+ 5



US Department of Agriculture  
National Agricultural Statistics Service

[www.agcensus.usda.gov](http://www.agcensus.usda.gov)

Source: [https://www.agcensus.usda.gov/Publications/2012/Online\\_Resources/County\\_Profiles/Missouri/cp29137.pdf](https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Missouri/cp29137.pdf)

## 3.3 LAND USE AND DEVELOPMENT

### 3.3.1 Development Since Previous Plan Update

**Table 3.13. County Population Growth, 2010-2017**

Jurisdiction	Total Population 2010	Total Population 2017	2010-2017 # Change	2000-2017 % Change
Adair County	25,607	25,437	-170	-0.67%
Kirksville	17,505	17,579	+74	+0.42%
Brashear	273	194	-79	-28.9%
Novinger	456	346	-110	-24.1%
Gibbs	107	99	-8	-7.4%
Millard	89	77	-12	-13.4%

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

Population growth or decline is generally accompanied by increases or decreases in the number of housing units. The communities of Kirksville and Gibbs were the only communities that showed an increase in housing with Brashear, Novinger and Millard reflecting a decline. Overall, there has been an increase in housing in Adair County of 1.7% as shown in **Table 3.12**.

**Table 3.14. Change in Housing Units, 2010-2017**

Jurisdiction	Housing Units 2010	Housing Units 2017	2010-2017 # Change	2000-2017 % Change
Adair County	11,263	11,457	+194	+1.7%
Kirksville	7,434	7,705	+271	+3.6%
Brashear	133	131	-2	-1.2%
Novinger	246	223	-23	-9%
Gibbs	42	61	+19	+45%
Millard	45	35	-10	-22%

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

Population growth or decline is generally accompanied by increase or decreases in the number of housing units. U.S. Census information is compiled every 10 years, with the last Census completed in 2010 estimates were used for the above data. According to American Fact Finder estimates show that in 2017 Population is expected to decline. Vulnerability to hazards will be affected based on population, and where new housing units have been built. Due to city ordinances, vulnerability is not expected to increase as ordinances for new builds have been set in place to protect citizens.

### 3.3.2 Future Land Use and Development

#### School District's Future Development

There are no Anticipated future development plans for other schools within the planning area.

#### Adair County and participating jurisdictions

There are no anticipated future development plans for special districts within the planning area.

## 3.4 HAZARD PROFILES, VULNERABILITY, AND PROBLEM STATEMENTS

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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**

Each hazard identified in Section 3.1.4 will be profiled individually in this section in alphabetical order. 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 Adair County planning area. Detailed profiles for each of the identified hazards 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. Tables are a good way to convey this data. Include events for the previous 20 years if available for hazards that are random in occurrence, such as tornadoes. Hazard events that occur more often such as severe thunderstorms can include data for the previous 10 years. Use judgment for retrieval of enough data on which to base a solid probability calculation. Some hazard events occur many times annually and retrieving data for all events can become cumbersome. When this is the case, searches can be limited by criteria such as magnitude (for example, an NCEI search for hail could be limited to events with hail sizes of 2.0" and above). Be sure to include updated data that includes previous events since the last plan update.
- **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.

## **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 2018 State Hazard Mitigation Plan Update. With the 2018 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 2018 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 2018 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/MoHazardMitigationPlanViewer2018>.

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

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

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

- **Vulnerability Overview:** The plan must provide an overall summary of each jurisdiction's vulnerability to the identified hazards. The overall summary of vulnerability identifies structures, systems, populations or other community assets as defined by the community that are susceptible to damage and loss for hazard events.
- **Potential Losses to Existing Development:** (including types and numbers, of buildings, critical facilities, etc.) For each participating jurisdiction, the plan must describe the potential impacts of the hazard. Impact means the consequences of 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. Jurisdiction-specific information in those cases where the risk varies across the planning area.

### 3.4.1 Flooding (Riverine and Flash)

#### **Hazard Profile**

##### ***Hazard Description***

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

Flooding caused by dam and levee failure is discussed in **Section 3.42** and **Section 3.43** respectively. It will not be addressed in this section.

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

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

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

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

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

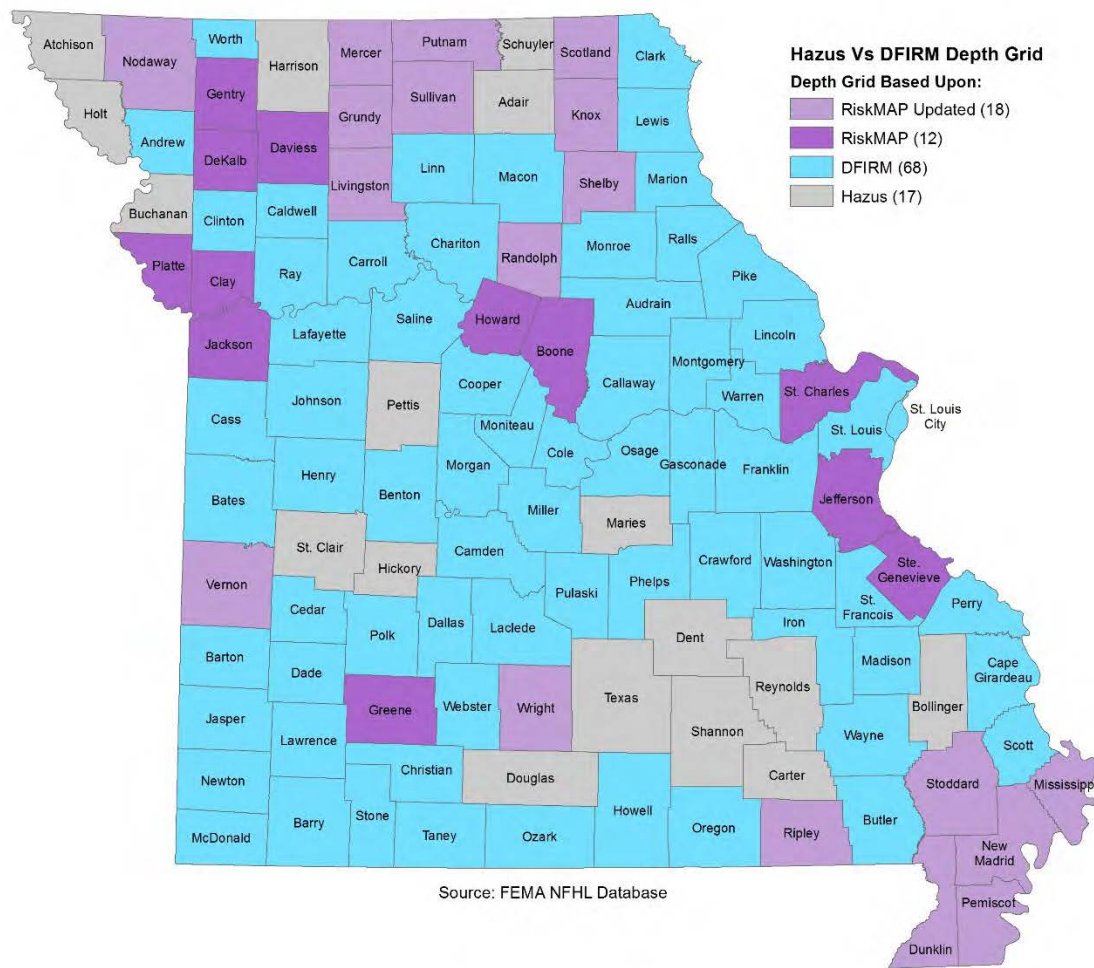
Although flash floods are somewhat unpredictable, there are factors that can point to the likelihood of flash floods occurring. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. This, along with knowledge of the watershed characteristics, modeling techniques,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

## Geographic Location

Riverine flooding can occur in any low-lying areas of Adair County which are adjacent to rivers and creeks during periods of heavy rain when the ground is already saturated. Many rural roads within the county are dependent upon low water crossings, many of which are not navigable during periods of high water. During times of flooding, these low water crossings can present risk to life and property if an attempt is made to cross.

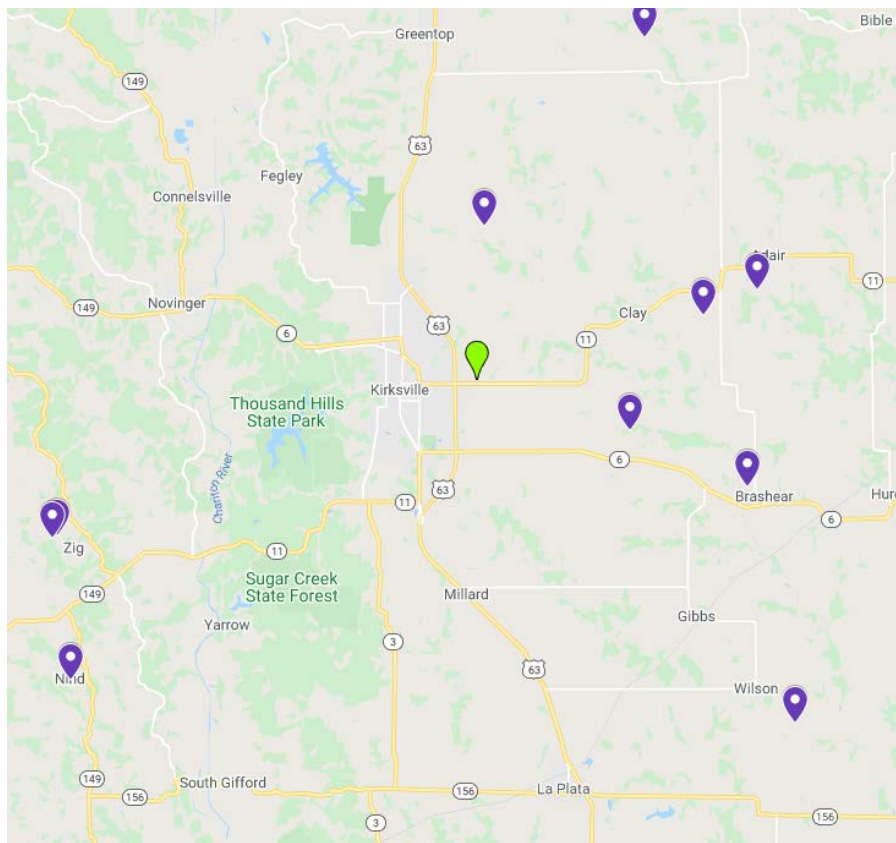
According to the National Mapping System, major rivers and creeks in Adair County include Chariton River, Hazel Creek, Little Hazel Creek, North Fork Salt River, Cottonwood Fork, Bridge Creek, Bee Branch, North Fork South Fabius, Buck Branch, Blackbird Creek, Shuteye Creek, Davis Branch, Spring Creek, Jobs Creek, Plum Branch, Billy Creek, Turkey Creek, Floyd Creek, Nick Branch, Steer Creek, Willis Branch, Dave Branch, Hog Creek, Little Mussel Creek, Walnut Creek, Goose Creek, Gill Branch, Bear Creek, Timber Branch, Big Deer Branch, Surratt Creek, Titus Creek, Long Branch, Richard Creek, Indian Creek, and Mussel Fork. Special Flood Hazard areas (SFHAs) have not yet been mapped by FEMA and therefore some information for this hazard may be limited.

**Figure 3.5. RiskMap, DFIRM and Hazus Based Depth Grids Used in Hazus Analysis**





**Figure 3.6. Low Water Crossings in Adair County**



The National Centers for Environmental Information shows there has been 9 flood events in Adair County from 1999-2019. Twenty years of history is generally adequate for a trend analysis. Through 21 years there has been 9 flood events in Adair County. Any given year there is a 42.8% chance that a flood event could happen in the county.

**Table 3.15. Adair County NCEI Flood Events by Location, 1999-2019**

Location	# of Events
Unincorporated Adair County	7
City of Kirksville	1
City of Novinger	1

Source: National Centers for Environmental Information, 1/25/2019

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. NCEI database was used to determine which jurisdictions are most prone to flash flooding during a 20-year time period. **Table 3.16** shows the number of flash flood events by location recorded in NCEI for the 20-year period.



**Table 3.16. Adair County NCEI Flash Flood Events by Location, 1999-2019**

Location	# of Events
Unincorporated Adair County	11
-Unincorporated Adair County (Connelsville)- 5 flood events	
-Unincorporated Adair County (IRK Cannon Mem ARPT)- 1 flood events	
-Unincorporated Adair County (Bullion)- 1 flood events	
-Unincorporated Adair County (Fegley)- 1 flood events	
-Unincorporated Adair County (Loeffler)- 1 flood events	
-Unincorporated Adair County (Shibleys PT)- 1 flood events	
-Unincorporated Adair County (Danforth)- 1 flood events	
City of Kirksville	13
City of Brashear	1
Village of Millard	1
Village of Gibbs	2

Source: National Centers for Environmental Information, 1/25/2019

### ***Strength/Magnitude/Extent***

Missouri has a long and active history of flooding over the past century, according to the 2018 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.

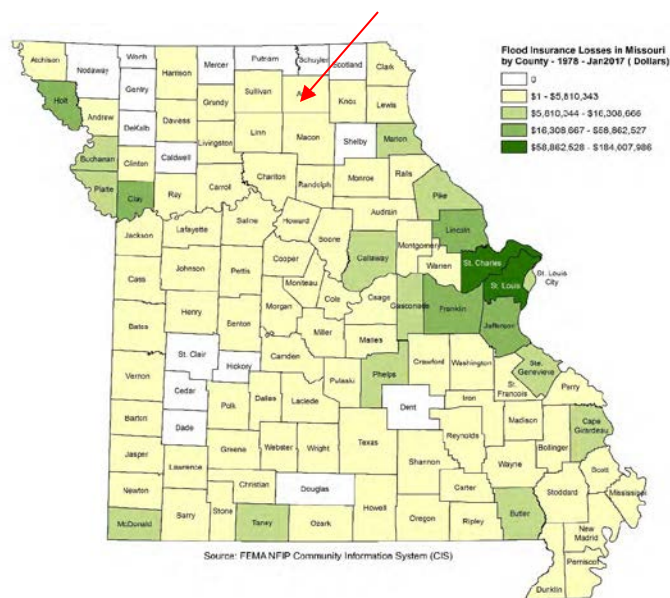
### ***National Flood Insurance Program (NFIP) Participation***

**Table 3.17. NFIP Participation in Adair County**

Community ID #	Community Name	NFIP Participant (Y/N/Sanctioned)	Current Effective Map Date	Regular-Emergency Program Entry Date
29002	City of Kirksville	Y	2/4/1981	2/4/1981
	City of Brashear	S	2/14/1976	
29003	City of Novinger	Y	6/15/1981	6/15/1981
	Village of Millard			
	Village of Gibbs			
	Adair County	S	11/16/1984	

Source: NFIP Community Status Book, 1/25/2019; BureauNet, <http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>; M= No elevation determined – all Zone A, C, and X: NSFHA = No Special Flood Hazard Area; E=Emergency Program

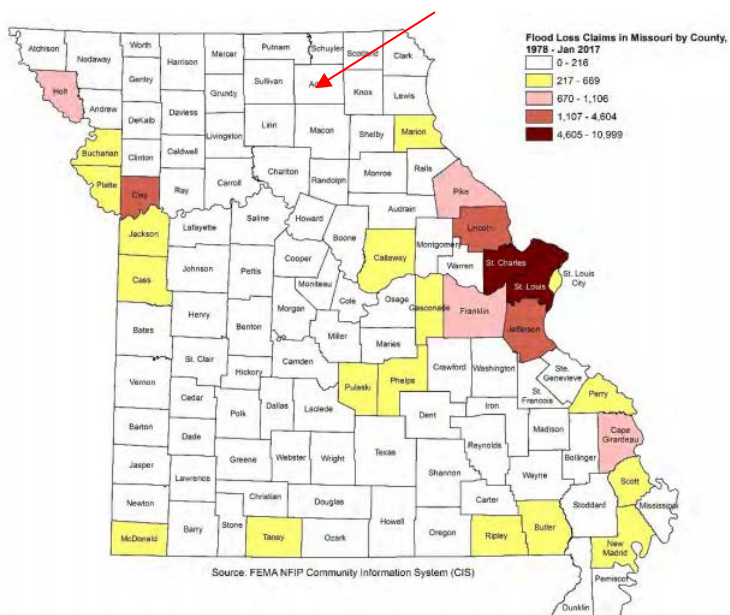
**Figure 3.7. Map of Dollars Paid Historically for Flood Insurance Losses in Missouri by County, (1979- January 2017)**



Source: 2018 Missouri State Hazard Mitigation Plan, \*Red arrow denotes Adair County

Figure 3.7 shows that during the period of 1978 – January 2017 Adair County received between \$1 - \$5,810,343 in Flood Insurance.

**Figure 3.8. Flood Loss Claims in Missouri by County (1978 – January 2017)**



Source: 2018 Missouri State Hazard Mitigation Plan, \*Red arrow denotes Adair County

Figure 3.8 shows that during the period of 1978 – January 2017 Adair County had between 0-216 flood loss claims.

### ***Repetitive Loss/Severe Repetitive Loss Properties***

Repetitive Loss Properties are those properties with at least two flood insurance payments of \$1,000 or more each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. According to the Flood Insurance Administration, jurisdictions included in the planning area have a combined total of one repetitive loss properties. **Table 3.18** provides a summary of the repetitive loss properties in the planning area.

**Table 3.18. Adair County Repetitive Loss Properties**

Jurisdiction	# of Properties	Type of Property	# Mitigated	Building Payments	Content Payments	Total Payments	Average Payment	# of Losses
City of Kirksville	1	ASSMD Condo	0	\$5,229.44	\$24,800.00	\$30,029.44	\$15,014.72	2

Source: Flood Insurance Administration as of 9/26/2019

A SRL property is defined it as a single family property (consisting of one-to-four residences) that is covered under flood insurance by the NFIP; and has (1) incurred flood-related damage for which four or more separate claims payments have been paid under flood insurance coverage with the amount of each claim payment exceeding \$5,000 and with cumulative amounts of such claims payments exceeding \$20,000; or (2) for which at least two separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

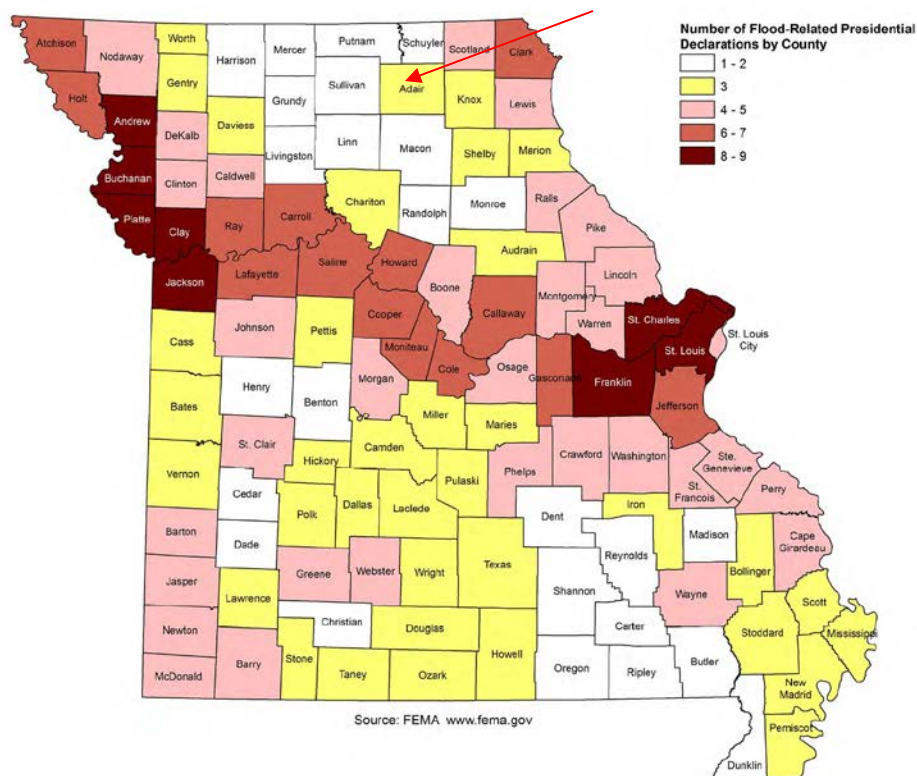
There are zero validated Severe Repetitive Loss properties in the Adair County.

### ***Previous Occurrences***

**Table 3.19. Adair County Presidential Declared Flood Events 1999-2019**

Declaration Number	Declaration Date	Disaster Description
DR1412	May 6, 2002	Severe Storms, Tornadoes and Flooding
DR 1524	June 11, 2004	Severe Storms, Tornadoes and Flooding
DR 1773	June 25, 2008	Severe Storms and Flooding
DR 1809	November 13, 2008	Severe Storms, Flooding, and Tornado
DR 1847	June 19, 2009	Severe Storms, Tornadoes and Flooding
DR 1934	August 17, 2010	Severe Storms, Flooding and Tornadoes
DR 4200	October 31, 2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
DR 4238	August 7, 2015	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
DR 4451	July 9, 2019	Severe Storms, Tornadoes and Flooding

**Figure 3.9. Number of Flood-Related Presidential Declaration by County**



Source: 2018 Missouri State Hazard Mitigation Plan, \*Red Arrow denotes Adair County

**Table 3.20. NCEI Adair County Flash Flood Events Summary, 1999 to 2019**

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2001	2	0	0	0	0
2002	2	0	0	\$500k	0
2008	7	0	0	0	0
2009	4	0	0	0	0
2010	7	0	0	10k	0
2011	1	0	0	0	0
2014	2	0	0	0	0
2015	3	0	0	0	0

Source: NCEI, data accessed [1/25/2019]

**Table 3.21. NCEI County A Riverine Flood Events Summary, 1999 to 2019**

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2001	2	0	0	0	0
2002	1	0	0	0	0
2004	1	0	0	0	0
2007	1	0	0	0	0
2008	3	0	0	300k	260k
2015	1	0	0	0	0

Source: NCEI, 1/25/2019

### ***Probability of Future Occurrence***

Flash Flooding in the planning area has occurred frequently in the last 21 years with 28 events with an average probability of 133% of a flash flood event in any given year.

Riverine Flooding in the planning area has occurred 9 times in the last 21 years making riverine flooding a 42.8% probability flooding will occur in any given year.

### ***Changing Future Conditions Considerations***

If departure from normal with respect to increased precipitation intensity continues, frequency of floods in Missouri is likely to increase as well. Over the last half century, average annual precipitation in most of the Midwest has increased by 5 to 10 percent. But rainfall during the four wettest days of the year has increased about 35 percent, and the amount of water flowing in most streams during the worst flood of the year has increased by more than 20 percent.

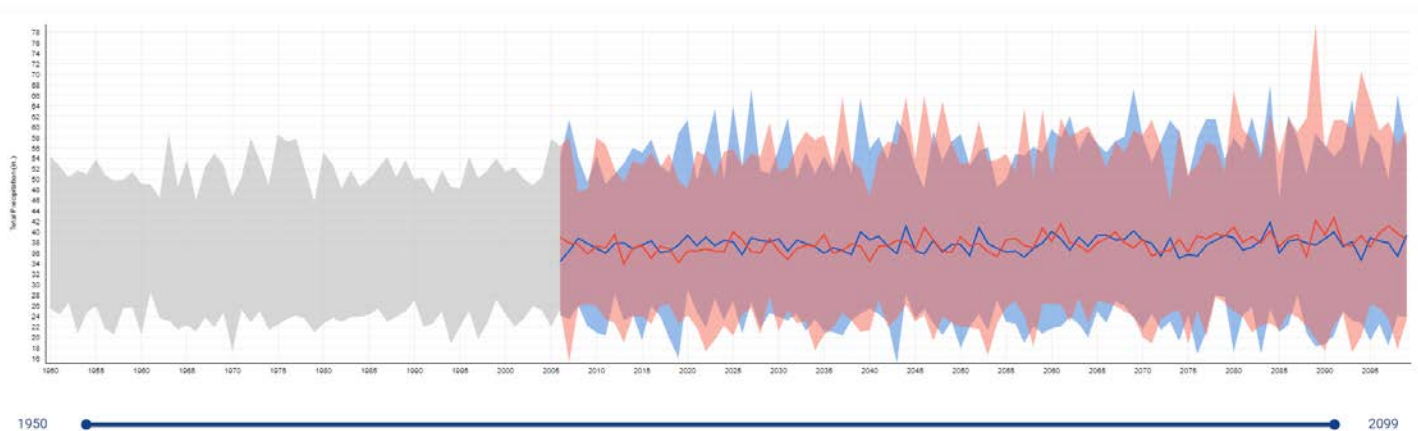
It is likely (66-100% probability) that the frequency of heavy precipitation or the proportion of total rainfall from heavy falls will increase in the 21st century across the globe. More specifically, it is "very likely" (90-100% probability) that most areas of the United States will exhibit an increase of at least 5% in the maximum 5-day precipitation by late 21st century. As the number of heavy rain events increase, more flooding and pooling water can be expected.

The expected increases in rainfall frequency and intensity are likely to put additional stress on natural hydrological systems and community stormwater systems. Heavier snowfalls in the winter will lead to intensified spring flooding, and groundwater levels will remain high even in non-floodplain areas. Such changes in climate patterns can lead to the development of compounding events that interact to create extreme conditions. Flooding caused by high groundwater levels typically recedes more slowly than riverine flooding, slowing the response and recovery process. Groundwater-fed rivers and streams are also likely to experience heightened flooding when groundwater levels are high.

Jurisdictions updating or installing stormwater management systems should consider potentially larger future discharge amounts when sizing culverts and drainage ways; storage capacity can also be increased by building retention basins to hold excess stormwater. Communities already prone to flooding should be prepared for a potential increase in facility closures and/or damages, as well as an increase in public demand for flood response and assistance. Natural features that experience repeated flooding may manifest changes in the form of stream bank instability and changing shoreline, floodplain, and wetland boundaries. Communities may also wish to plan for the potential loss of cropland and damage to both private property and public infrastructure such as bridges.

The environmental impacts of flooding include erosion, surface and groundwater contamination, and reduced water quality. The threat of more frequent flood events may thus be a concern particularly for communities who depend on lakes, rivers, or trout streams for tourism. Rural communities may experience increases in well contamination and road washouts, while urban areas may be particularly vulnerable to flash flooding as heavy rain events quickly overwhelm the ability of a more impermeable environment to absorb excess stormwater.

**Figure 3.10. Annual Total Precipitation for Adair County**



Source: US Climate Resilience Toolkit; <https://toolkit.climate.gov/tools/climate-explorer>

It is likely (66-100% probability) that the frequency of heavy precipitation or the proportion of total rainfall from heavy storms will increase in the 21st century across the globe. More specifically, it is “very likely” (90-100% probability) that most areas of the United States will exhibit an increase of at least 5% in the maximum 5-day precipitation by late 21st century. As the number of heavy rain events increase, more flooding and pooling water can be expected.

The expected increases in rainfall frequency and intensity are likely to put additional stress on natural hydrological systems and community storm water systems. Heavier snowfalls in the winter will lead to intensified spring flooding, and groundwater levels will remain high even in non-floodplain areas. Such changes in climate patterns can lead to the development of compounding events that interact to create extreme conditions. Flooding caused by high groundwater levels typically recedes more slowly than riverine flooding, slowing the response and recovery process. Groundwater-fed rivers and streams are also likely to experience heightened flooding when groundwater levels are high. Jurisdictions updating or installing storm water management systems should consider potentially larger future discharge amounts when sizing culverts and drainage ways; storage capacity can also be increased by building retention basins to hold excess storm water. Communities already prone to flooding should be prepared for a potential increase in facility closures and/or damages, as well as an increase in public demand for flood response and assistance. Natural features that experience repeated flooding may manifest changes in the form of stream bank instability and changing shoreline, floodplain, and wetland boundaries. Communities may also wish to plan for the potential loss of cropland and damage to both private property and public infrastructure such as bridges. The environmental impacts of flooding include erosion, surface and groundwater contamination, and poor-quality water. The threat of more frequent flood events may thus be a concern particularly for communities who depend on lakes, rivers, or trout streams for tourism. Rural communities may experience increases in well contamination and road washouts, while urban areas may be particularly vulnerable to flash flooding as heavy rain events quickly overwhelm the ability of a more impermeable environment to absorb excess storm water.

More climate information is available from the following sources:

- 2018 State Plan, see Chapter 3, Section 3.3.1, Changing Future Conditions Considerations, page 3.100
- US Climate Resilience Toolkit; <https://toolkit.climate.gov/tools/climate-explorer>
- National Climate Assessment; <https://nca2014.globalchange.gov/>



## Vulnerability

## Vulnerability Overview

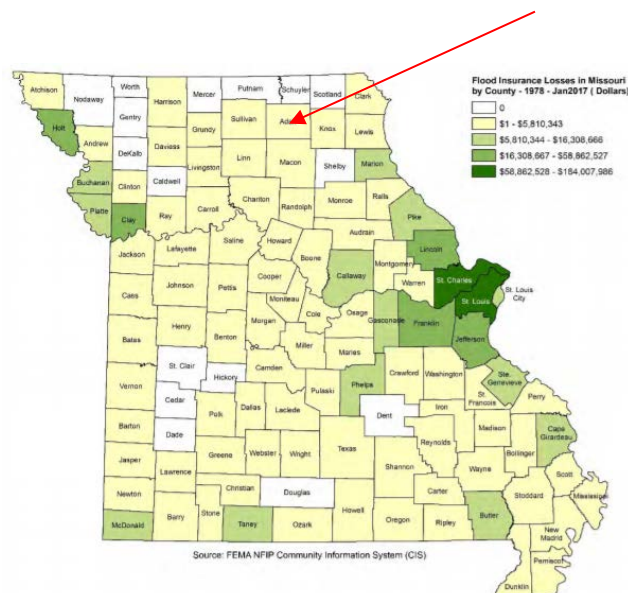
Flooding presents a danger to life and property, often resulting in injuries, and in some cases, fatalities. Floodwaters themselves can interact with hazardous materials. Hazardous materials stored in large containers could break loose or puncture as a result of flood activity. Examples are bulk propane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

According to the 2018 Missouri State Hazard Mitigation Plan, Adair County ranged at the lower end of Flood Insurance Losses between \$1 – \$5,810,343 shown below in **Figure 3.11**.

**Figure 3.11. Map of Dollars Paid Historically for Flood insurance Losses in Missouri from 1978 – January 2017**



**Source: 2018 Missouri State Hazard Mitigation Plan \*Red Arrow indicates Adair County**

### ***Potential Losses to Existing Development***

Using the data obtained from Flood Insurance Administration the City of Kirksville has a history of repetitive loss, and is most vulnerable to have another event occur.

### ***Impact of Previous and Future Development***

Any future development in floodplains would increase risk in those areas. For the 1 community participating in the National Flood Insurance Program, enforcement of the floodplain management regulations will ensure mitigation of future construction in those areas. However, even if structures are mitigated, evacuation may be necessary due to rising waters. In addition, floods that exceed mitigated levels may still cause damages.

### ***Hazard Summary by Jurisdiction***

Vulnerability to flooding varies by jurisdiction as each community has a different layout. The floodplain maps in the Geographic Location section depict the flood area in each jurisdiction. **Table 3.18** reflects the NCEI Flash Flood Events in Unincorporated Adair County at 28.

### **Problem Statement**

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



## 3.4.2 Levee Failure

### **Hazard Profile**

#### ***Hazard Description***

Levees are earth embankments constructed along rivers and coastlines to protect adjacent lands from flooding. Floodwalls are concrete structures, often components of levee systems, designed for urban areas where there is insufficient room for earthen levees. When levees and floodwalls and their appurtenant structures are stressed beyond their capabilities to withstand floods, levee failure can result in injuries and loss of life, as well as damages to property, the environment, and the economy.

Levees can be small agricultural levees that protect farmland from high-frequency flooding. Levees can also be larger, designed to protect people and property in larger urban areas from less frequent flooding events such as the 100-year and 500-year flood levels. For purposes of this discussion, levee failure will refer to both overtopping and breach as defined in FEMA's Publication "So You Live Behind a Levee"

(<http://mrcc.isws.illinois.edu/1913Flood/awareness/materials/SoYouLiveBehindLevee.pdf>).

Following are the FEMA publication descriptions of different kinds of levee failure.

#### **Overtopping: When a Flood Is Too Big**

Overtopping occurs when floodwaters exceed the height of a levee and flow over its crown. As the water passes over the top, it may erode the levee, worsening the flooding and potentially causing an opening, or breach, in the levee.

#### **Breaching: When a Levee Gives Way**

A levee breach occurs when part of a levee gives way, creating an opening through which floodwaters may pass. A breach may occur gradually or suddenly. The most dangerous breaches happen quickly during periods of high water. The resulting torrent can quickly swamp a large area behind the failed levee with little or no warning.

Earthen levees can be damaged in several ways. For instance, strong river currents and waves can erode the surface. Debris and ice carried by floodwaters—and even large objects such as boats or barges—can collide with and gouge the levee. Trees growing on a levee can blow over, leaving a hole where the root wad and soil used to be. Burrowing animals can create holes that enable water to pass through a levee. If severe enough, any of these situations can lead to a zone of weakness that could cause a levee breach. In seismically active areas, earthquakes and ground shaking can cause a loss of soil strength, weakening a levee and possibly resulting in failure. Seismic activity can also cause levees to slide or slump, both of which can lead to failure.

### ***Geographic Location***

Missouri is a state with many levees. Currently, there is no single comprehensive inventory of levee systems in the state. Levees have been constructed across the state by public entities and private entities with varying levels of protection, inspection oversight, and maintenance. The lack of a comprehensive levee inventory is not unique to Missouri.

There are two concurrent nation-wide levee inventory development efforts, one led by the United State Army Corps of Engineers (USACE) and one led by Federal Emergency Management Agency (FEMA). The National Levee Database (NLD), developed by USACE, captures all USACE related levee projects, regardless of design levels of protection. The Midterm Levee Inventory (MLI), developed by FEMA, captures all levee data (USACE and non-USACE) but primarily focuses on levees that provide 1% annual-chance flood protection on FEMA Flood Insurance Rate Maps

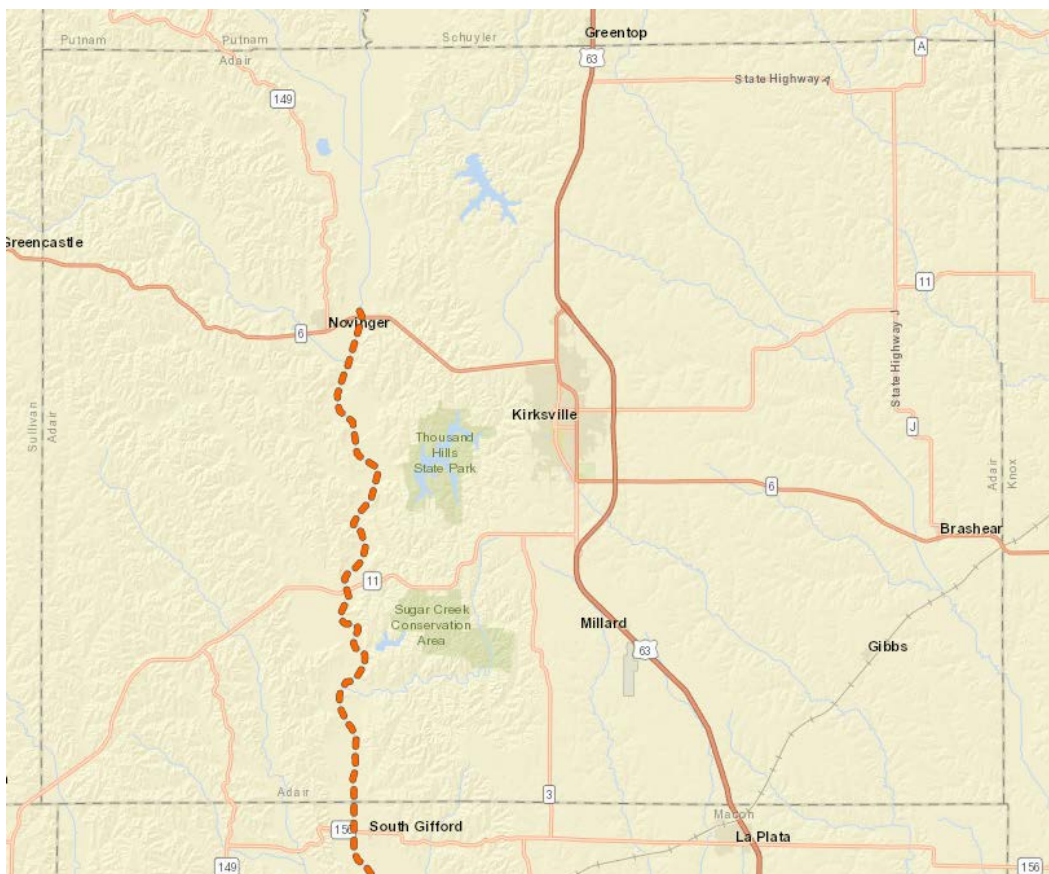
(FIRMs).

It is likely that agricultural levees and other non-regulated levees within the planning area exist that are not inventoried or inspected. These levees that are not designed to provide protection from the 1-percent annual chance flood would overtop or fail in the 1-percent annual chance flood scenario. Therefore, any associated losses would be taken into account in the loss estimates provided in the Flood Hazard Section.

Adair County has one levee that runs through the county. The Chariton River Channel (Levee ID: 3605000229) was USACE Federally constructed and managed by the USACE Kansas City District. The levee is 19.26 miles long with portions in both Adair and Macon Counties. The Chariton River Channel is listed on the USACE National Levee Database but was not recognized in the 2018 Missouri Hazard Mitigation Plan.

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**Figure 3.12. Location of Chariton River Channel Levee**



Source: USACE National Levee Database

### ***Strength/Magnitude/Extent***

Levee failure is typically an additional or secondary impact of another disaster such as flooding or earthquake. The main difference between levee failure and losses associated with riverine flooding is magnitude. Levee failure often occurs during a flood event, causing destruction in addition to what would have been caused by flooding alone. In addition, there would be an increased potential for loss of life due to the speed of onset and greater depth, extent, and velocity of flooding due to levee breach.

As previously mentioned, agricultural levees and levees that are not designed to provide flood protection from at least the 1-percent annual chance flood likely do exist in the planning area. However, none of these levees are shown on the Preliminary DFIRM, nor are they enrolled in the USACE Levee Safety Program. As a result, an inventory of these types of levees is not available for analysis. Additionally, since these types of levees do not provide protection from the 1-percent annual chance flood, losses associated with overtopping or failure are captured in the Flood Section of this plan.

### ***Previous Occurrences***

There have been no previous levee breaches or incidents in the planning area. The National Levee Database has the risk for this levee as “Not Screened” and there is no risk characterization summary. It does state that 93 people and 61 structures are at risk from levee failure but not all in the planning area.

There are no levee breaches listed for this levee in either the 2013 or 2018 State Plan.

### ***Probability of Future Occurrence***

There are no records of previous events in the planning area and therefore probabilities cannot be calculated. The lack of a centralized database for Missouri levees impacts this analysis.

### ***Changing Future Conditions Considerations***

According to the 2018 State Hazard Mitigation Plan, the impact of changing future conditions on levee failure will most likely be related to changes in precipitation and flood likelihood. Climate change projections suggest that precipitation may increase and occur in more extreme events, which may increase risk of flooding, putting stress on levees and increasing likelihood of levee failure. Furthermore, aging levee infrastructure and a lack of regular maintenance (including checking for seepage and removing trees, roots and other vegetation that can weaken a levee) coupled with more extreme weather events may increase risk of future levee failure.

## **Vulnerability**

### ***Vulnerability Overview***

The USACE regularly inspects levees within its Levee Safety Program to monitor their overall condition, identify deficiencies, verify that maintenance is taking place, determine eligibility for federal rehabilitation assistance (in accordance with P.L. 84-99), and provide information about the levees on which the public relies. Inspection information also contributes to effective risk assessments and supports levee accreditation decisions for the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA).

The USACE now conducts two types of levee inspections. Routine Inspection is a visual inspection to verify and rate levee system operation and maintenance. It is typically conducted each year for all levees in the USACE Levee Safety Program. Periodic Inspection is a comprehensive inspection led by a professional engineer and conducted by a USACE multidisciplinary team that includes the levee sponsor. The USACE typically conducts this inspection every five years on the federally authorized levees in the USACE Levee Safety Program.

Both Routine and Periodic Inspections result in a rating for operation and maintenance. Each levee segment receives an overall segment inspection rating of Acceptable, Minimally Acceptable, or Unacceptable. **Figure 3.13** below defines the three ratings.

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**Figure 3.13. Definitions of the Three Levee System Ratings**

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

The Chariton River Channel has not been rated.

#### ***Potential Losses to Existing Development***

The Chariton River Channel is listed in the National Levee Database but has not been screened for risk. The number of people at risk is 93 and the number of structures at risk is 61. The total property value at risk is \$12.5 million.

#### ***Impact of Previous and Future Development***

There is no known development planned in the areas protected by this levee so there is no anticipated increase in risk due to levee failure

#### ***Hazard Summary by Jurisdiction***

The city limits of Novinger come into areas that are protected by the levee. However, there are no critical facilities that are located in this area. Areas impacted by levee failure are mostly farmland and undeveloped area.

#### **Problem Statement**

Flooding due to a potential levee breach poses very little hazard to life or property in Adair County. However, the Chariton River Channel levee is not a levee that is regularly inspected and therefore the stability of the levee is unknown. Regular inspections and maintenance should be performed on the levee to prevent any future breaches.

### 3.4.3 Dam Failure

#### Hazard Profile

##### ***Hazard Description***

A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams are typically constructed of earth, rock, concrete, or mine tailings. Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, affecting both life and property. Dam failure can be caused by any of the following:

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

Data from dams in Adair County has been collected from two sources; a listing by the Missouri Department of Natural Resources (MoDNR) and the National Inventory of Dams (NID). Each has its own system of classifying dams. Neither the MoDNR nor the NID hazard potential classification references the condition of the dam. For the risk analysis, data was used from all MoDNR Class I and NID Hazard dams.

**Table 3.22. MoDNR Dam Hazard Classification Definitions**

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

Source: Missouri Department of Natural Resources, [http://dnr.mo.gov/env/wrc/docs/rules\\_reg\\_94.pdf](http://dnr.mo.gov/env/wrc/docs/rules_reg_94.pdf)

**Table 3.23. NID Dam Hazard Classification Definitions**

Hazard Class	Definition
Low Hazard	A dam located in an area where failure could damage only farm or other uninhabited buildings, agricultural or undeveloped land including hiking trails, or traffic on low volume roads that meet the requirements for low hazard dams.
Significant Hazard	A dam located in an area where failure could endanger a few lives, damage an isolated home, damage traffic on moderate volume roads that meet certain requirements, damage low-volume railroad tracks, interrupt the use or service of a utility serving a small number of customers, or inundate recreation facilities, including campground areas intermittently used for sleeping and serving a relatively small number of persons.
High Hazard	A dam located in an area where failure could result in any of the following: extensive loss of life damage to more than one home, damage to industrial or commercial facilities, interruption of a public utility serving a large number of customers, damage to traffic on high-volume roads that meet the requirements for hazard class C dams or a high-volume railroad line, inundation of a frequently used recreation facility serving a relatively large number of persons, or two or more individual hazards described for significant hazard dams.

Source: National Inventory of Dams

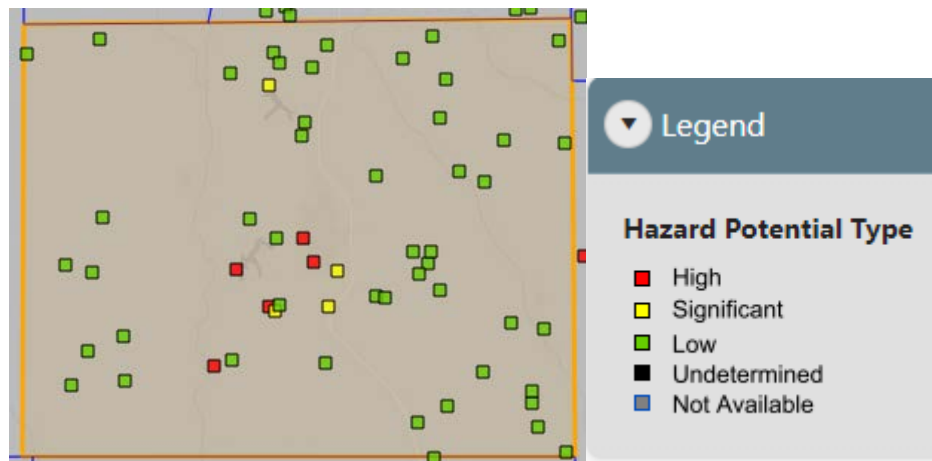
**Figure 3.14. Summary of Dams in Adair County**



Source: [https://nid.sec.usace.army.mil/ords/f?p=105:113:15780699236619::NO:113,2:P113\\_STATE,P113\\_COUNTY:MO,001](https://nid.sec.usace.army.mil/ords/f?p=105:113:15780699236619::NO:113,2:P113_STATE,P113_COUNTY:MO,001)

### Geographic Location

**Figure 3.15. Dams in Adair County by Hazard Potential**



Source: [https://nid.sec.usace.army.mil/ords/f?p=105:113:15780699236619::NO:113,2:P113\\_STATE,P113\\_COUNTY:MO,001](https://nid.sec.usace.army.mil/ords/f?p=105:113:15780699236619::NO:113,2:P113_STATE,P113_COUNTY:MO,001)

**Table 3.24. NID High Hazard Dams in the Adair County Planning Area**

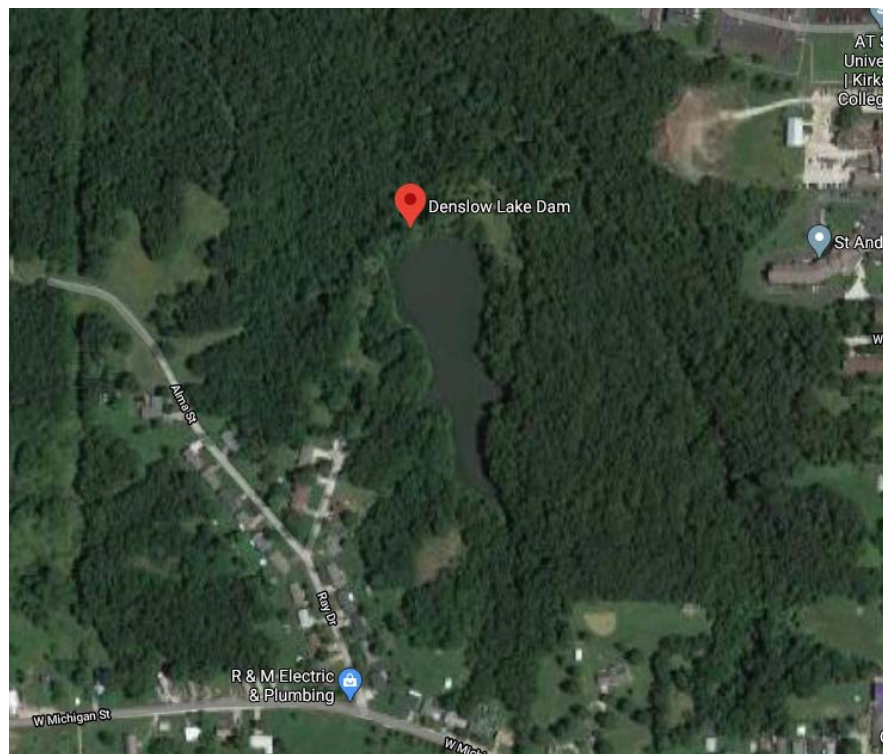
Dam Name	Emergency Action Plan (EAP)AP	Dam Height (Ft)	Normal Storage (Acre-Ft)	Last Inspection Date	River	Nearest Downstream City	Distance To Nearest City (Miles)	Dam Owner
Denslow Lake Dam	NR	25	40	--	TR-Chariton	Kirksville	1	J S Denslow
Garret Lake Dam	NR	25	107	--	TR Bear Creek	Kirksville	1	Garret Lake Home Owners
Jayne Lake Dam	NR	30	126	--	TR Gill Branch Big Creek	Kirksville	3	Edward R Jayne
Forrest Lake Dam	Yes	66	15.961	5/11/2016	Chariton River	Kirksville	3	City of Kirksville
Spring Lake Dam	NR	25	936	8/22/1979	Elm Creek	Millard	5	Spring Lake Inc.

Sources: National Inventory of Dams, [http://nid.usace.army.mil/cm\\_apex/f?p=838:12](http://nid.usace.army.mil/cm_apex/f?p=838:12)

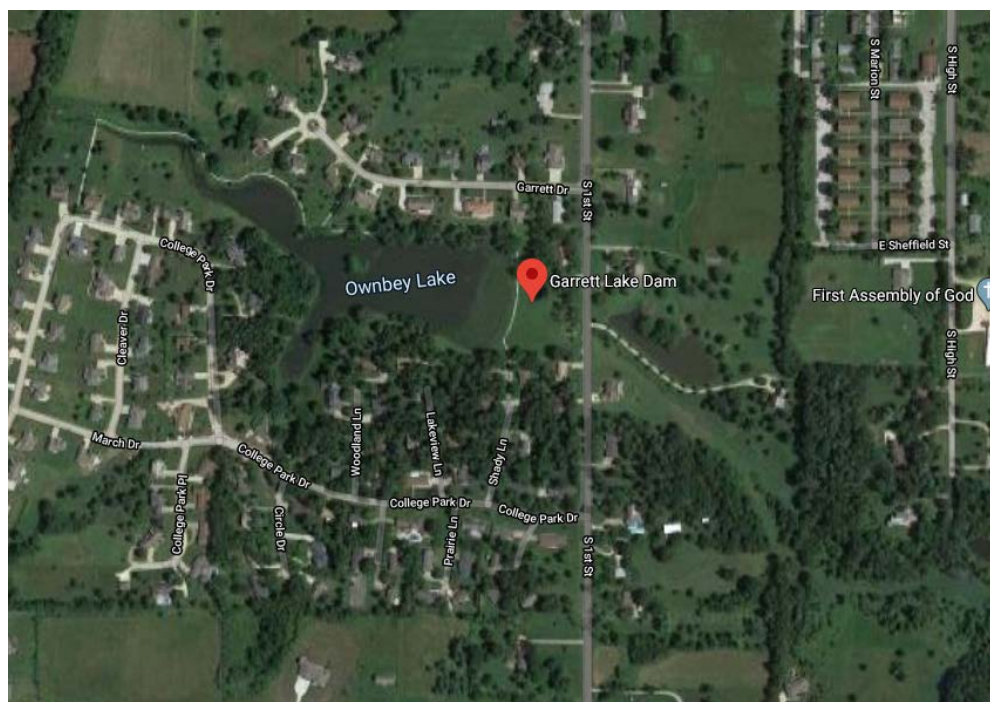


**Figure 3.16. High Hazard Dam Locations in Adair County and Areas Impacted in the Event of Breach.**

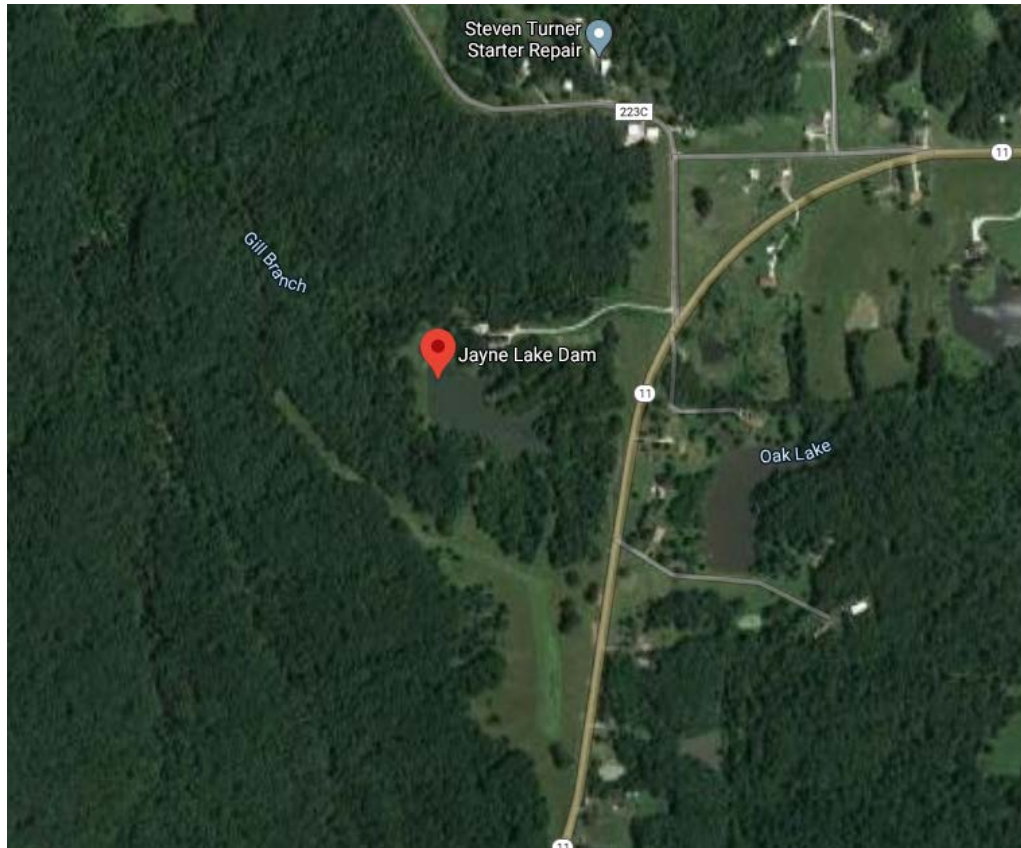
**Denslow Lake Dam**



**Garret Lake Dam**



## Jayne Lake Dam

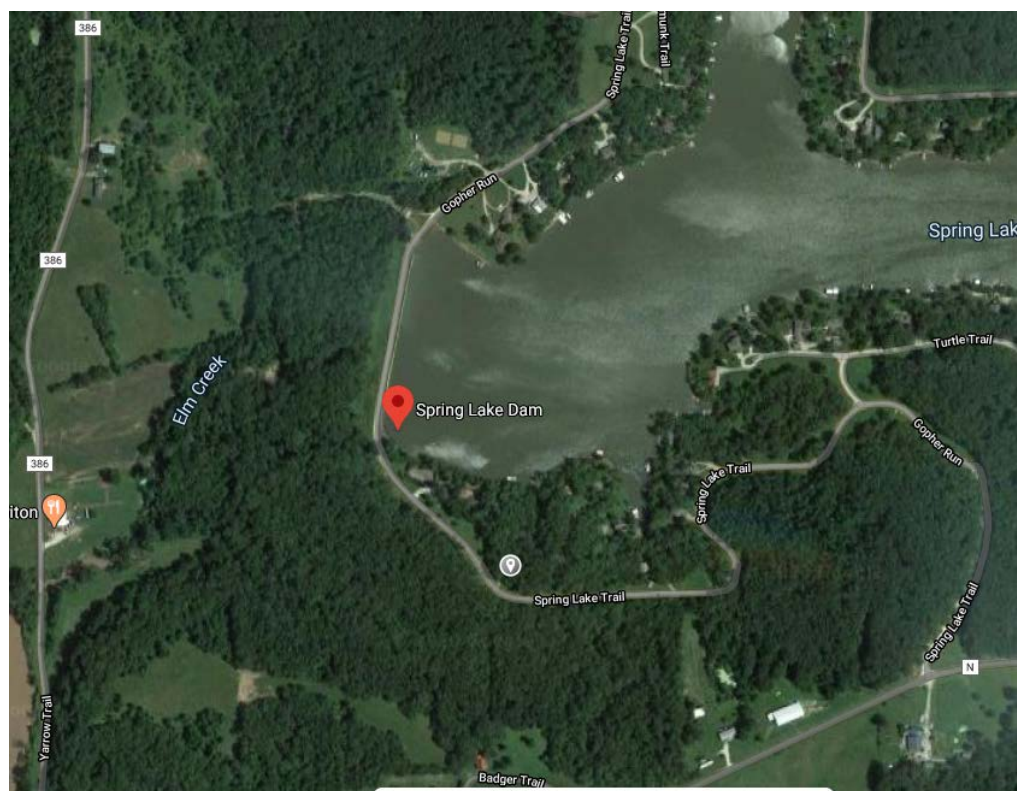


## Forrest Lake Dam



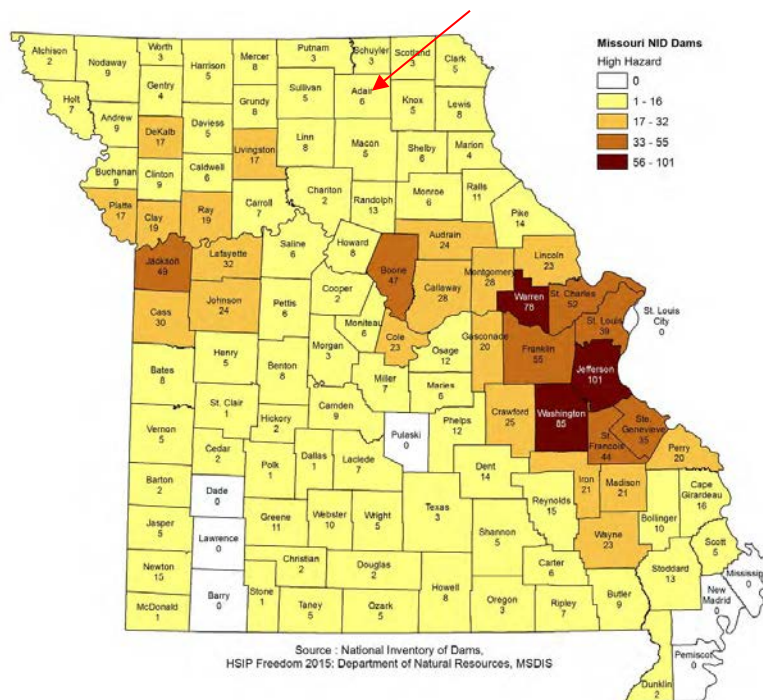


## Spring Lake Dam



Source: Google Maps

**Figure 3.17. High Hazard and State Regulated Dams**



## Upstream Dams Outside the Planning Area

The Missouri Department of Natural Resources was consulted to see if dams located outside of the county would impact Adair County in the event of a failure. It was determined that there are no upstream dams that would place Adair County in any danger.

### ***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.

Inundation data, however, is not currently available for any of the county's dams or the surrounding areas. The future probable severity of a dam failure in Adair County is shown below according to DNR's hazard potential levels.

Hazard Level	Probable Risk
High	Catastrophic
Significant	Critical
Low	Negligible

### ***Previous Occurrences***

To determine previous occurrences of dam failure within Adair County, the previously approved county hazard mitigation plan, the 2018 Missouri State Hazard Mitigation Plan, and the Stanford University's National Performance of Dams Program (<http://npdp.stanford.edu> ) were consulted. There are no records of dam failure within the county boundaries.

### ***Probability of Future Occurrence***

There are no recorded dam failures in Adair County which makes forecasting probability of future failure difficult. There are two factors that can impact dam failure; regulation and inspection. Regulation requires regular inspections which can determine issues that contribute to failure. Of the 5 High Hazard NID dams in the county, one receives regular inspections and has an Emergency Action Plan. The impact of regular inspection and maintenance significantly reduces probability of dam failure.

### ***Changing Future Conditions Considerations***

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***

Vulnerability to dam failure is a factor due to the number of dams in the planning area, including 5 High Hazard Dams. As there are no recorded dam failures and most of them are located in unincorporated areas, the planning committee chose only to address the high hazard dams when funding becomes available.

### ***Potential Losses to Existing Development:***

The state-regulated dams if breached could account for the loss of 6 agriculture and residential structures valued at \$\$2,161,414 with potential loss of life at 5 persons.

---

**Table 3.25. Dam Exposure for Adair County**

Scotland County	No. of Structures	Value of Structures	Population
Agriculture	4	\$1,735,758	0
Residential	2	\$425,656	5

### ***Impact of Previous and Future Development***

There is no evidence of development within the inundation areas of a dam within Adair County planning area.

### ***Hazard Summary by Jurisdiction***

The vast majority of Adair County is not in danger of being inundated due to a breach in a dam. No further analysis of dam failure hazard will be conducted for this plan update. Less than 10 properties will be impacted in the unincorporated areas if a dam breaches. It will be helpful for residents near the high hazard dams to get familiarized with the dam's Emergency Action Plan (EAP) and work closely with County EMD.

## **Problem Statement**

Some entities in Adair County that own and control dams do not properly inspect and maintain them to ensure safety of people and property that lie within the inundation area of a dam breach. Summarize the risks presented in the preceding dam failure analysis. Possible solutions include the development of a regular maintenance schedule, identification of qualified staff or consultant to assist.

### **3.4.4 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.

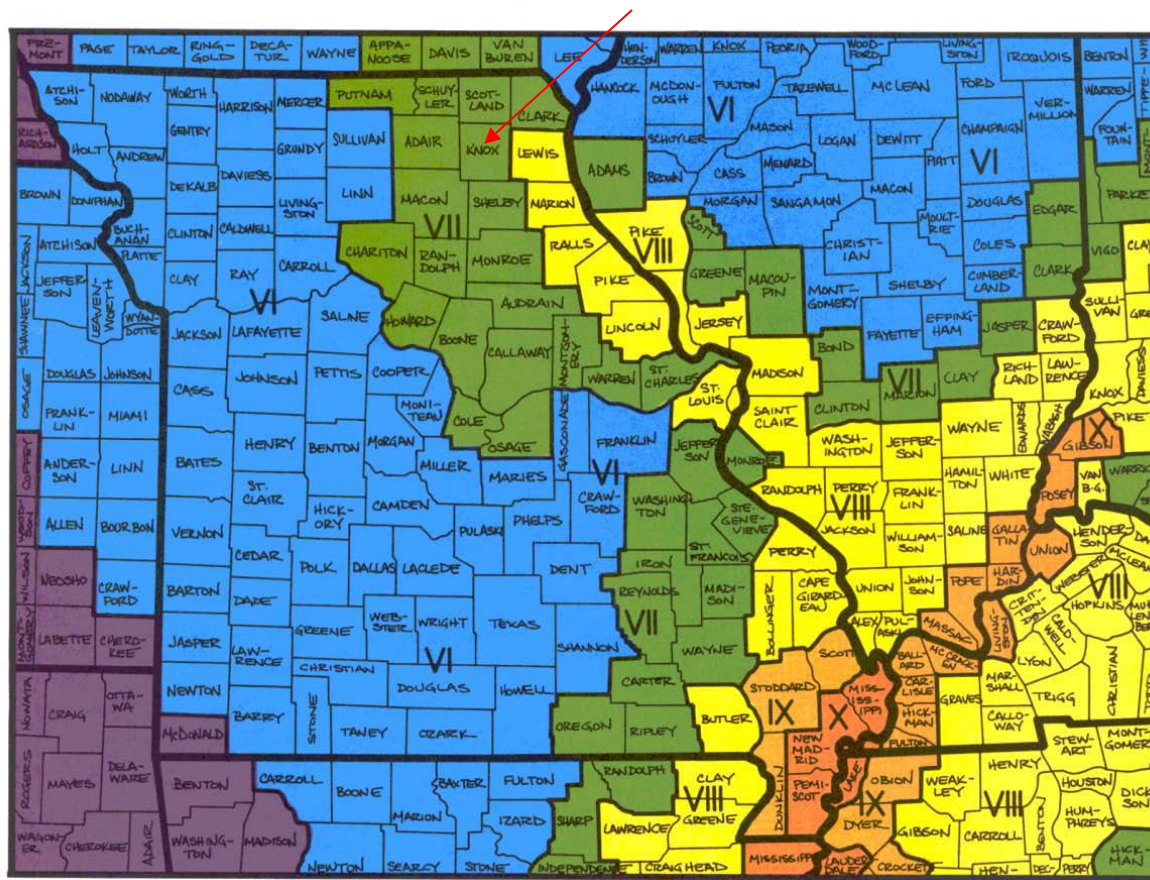
Some earthquakes occur in the middle of plates, as is the case for seismic zones in the Midwestern United States. The most seismically active area in the Midwest is the New Madrid Seismic Zone. The possibility of the occurrence of a catastrophic earthquake in the central and Eastern United States is real as evidenced by history. The impacts of significant earthquakes affect large areas, terminating public services and systems needed to aid the suffering and displaced. As with hurricanes, mass relocation may be necessary, but the residents who are suffering from the earthquake can neither leave the heavily impacted areas nor receive aid or even communication in the aftermath of a significant event.

##### ***Geographic Location***

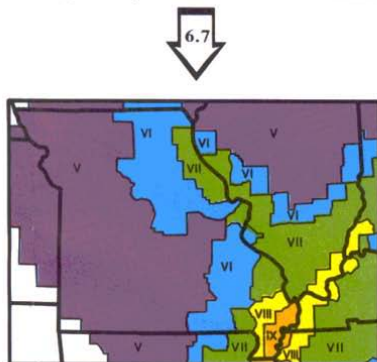
Seismic activity on the New Madrid Seismic Zone of Southeastern Missouri is very significant both historically and at present. On December 16, 1811 and January 23 and February 7 of 1812, three earthquakes struck the central U.S. with magnitudes estimated to be 7.5 – 8.0. These earthquakes caused violent ground cracking and volcano-like eruptions of sediment (sand blows) over an area of >10,500 km<sup>2</sup>, and uplift of a 50km by 23 km zone (the Lake County uplift). The shaking was felt over a total area of over 10 million km<sup>2</sup> (the largest felt area of any historical earthquake). Of all the historical earthquakes that have the U.S., an 1811- style event would do the most damage if it recurred today. If an 1811 earthquake occurred in Scotland County the earthquake intensity would not vary within the county. Damage would be to buildings of good design and construction, slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures and some chimneys broken.



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

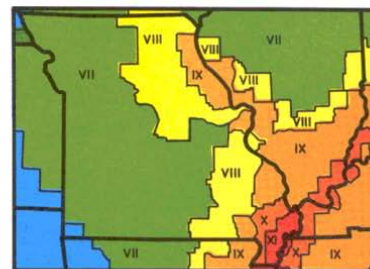


This map shows the highest projected Modified Mercalli intensities by county from a potential magnitude - 7.6 earthquake whose epicenter could be anywhere along the length of the New Madrid seismic zone.



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

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



Source: Red Arrow Denotes Adair County [https://sema.dps.mo.gov/docs/EQ\\_Map.pdf](https://sema.dps.mo.gov/docs/EQ_Map.pdf)

Adair County lies within the Category VII meaning the effects of a New Madrid quake should be relatively minor.

**Figure 3.19. Projected Earthquake Intensities**

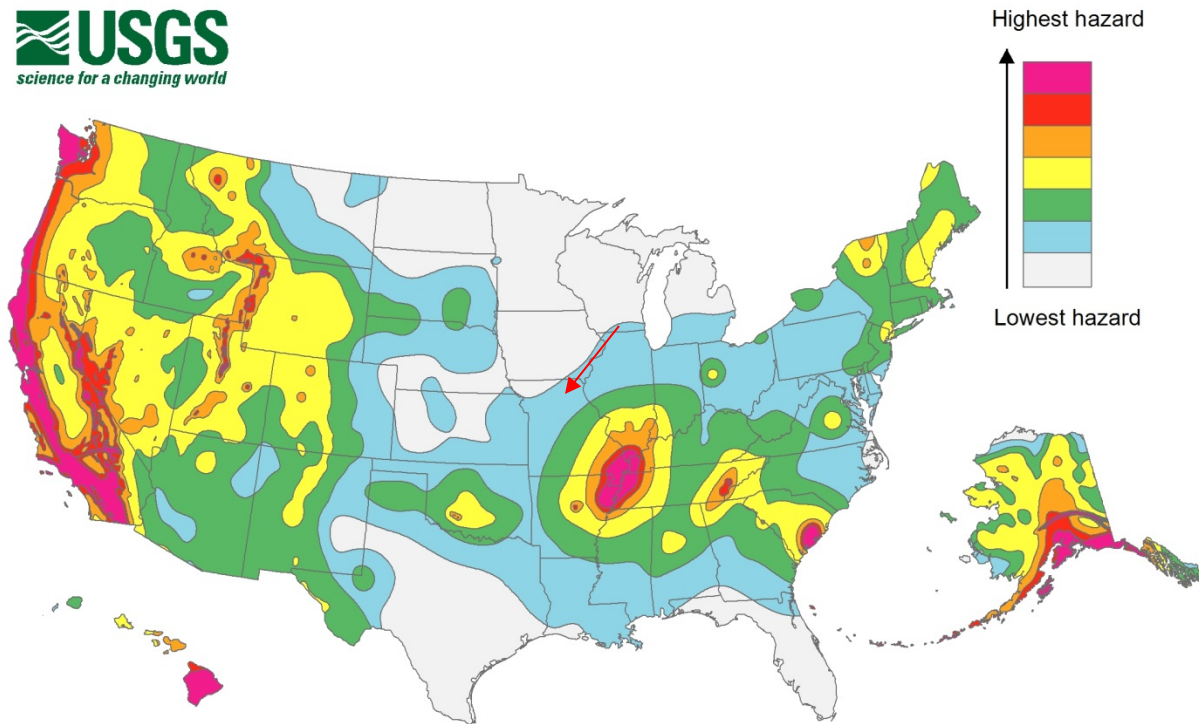
## MODIFIED MERCALLI INTENSITY SCALE

- |  |  |
|--|--|
| <p>I People do not feel any Earth movement.</p> <p>II A few people might notice movement.</p> <p>III Many people indoors feel movement. Hanging objects swing.</p> <p>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.</p> <p><b>V</b> 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.</p> <p><b>VI</b> 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.</p> <p><b>VII</b> 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.</p> <p><b>VIII</b> 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.</p> | <p><b>IX</b> 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.</p> <p><b>X</b> 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.</p> <p><b>XI</b> 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.</p> <p><b>XII</b> 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.</p> |
|--|--|
- Intensity is a numerical index describing the effects of an earthquake on the surface of the Earth, on man, and on structures built by man. The intensities shown in these maps are the highest likely under the most adverse geologic conditions. There will actually be a range in intensities within any small area such as a town or county, with the highest intensity generally occurring at only a few sites. Earthquakes of all three magnitudes represented in these maps occurred during the 1811 - 1812 "New Madrid earthquakes." The isoseismal patterns shown here, however, were simulated based on actual patterns of somewhat smaller but damaging earthquakes that occurred in the New Madrid seismic zone in 1843 and 1895.
- Prepared and distributed by  
THE MISSOURI STATE  
EMERGENCY MANAGEMENT AGENCY  
P.O. BOX 116  
JEFFERSON CITY, MO 65102  
Telephone: 573-526-9100



**Figure 3.20** shows the seismicity in the United States. Adair County is located within the small blue ring on the map.

**Figure 3.20. United States Seismic Hazard Map**



Source: United States Geological Survey at (red arrow denotes Adair County)  
[https://earthquake.usgs.gov/hazards/hazmaps/conterminous/2014/images/HazardMap2014\\_lg.jpg](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.

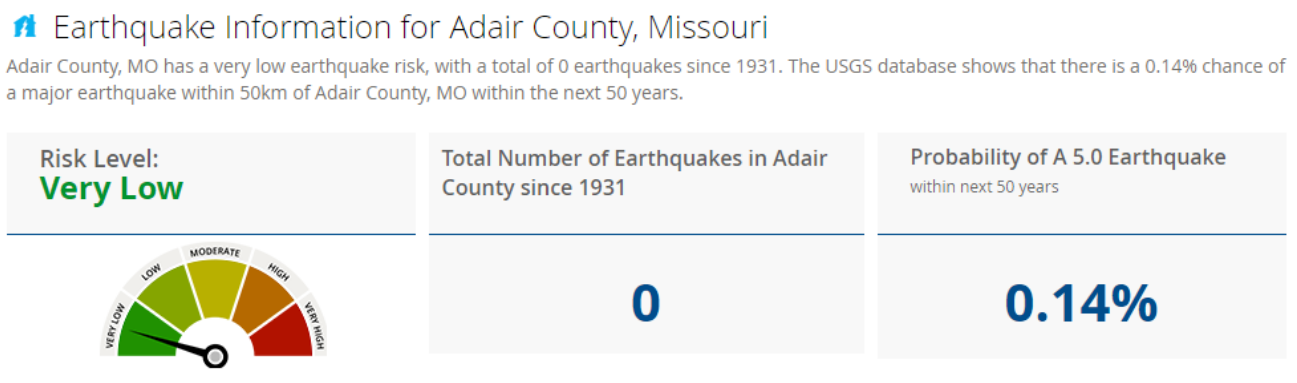
### Modified Mercalli Intensity Scale

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 no recorded earthquakes in Adair County since 1931 according to the information obtained from homefacts.com as shown in **Figure 3.21**.

**Figure 3.21. Earthquake Information for Adair County**



Source: <https://www.homefacts.com/earthquakes/Missouri/Adair-County.html>

### Probability of Future Occurrence

The established calculation formula for probability of an earthquake in Adair County would yield a zero probability. Homefacts.com calculates Adair County to have a .14% chance in any given year.

### Changing Future Conditions Considerations

Scientists are beginning to believe there may be a connection between changing climate conditions and earthquakes. Changing ice caps and sea-level redistribute weight over fault lines, which could potentially have an influence on earthquake occurrences. However, currently no studies quantify the relationship to a high level of detail, so recent earthquakes should not be linked with climate change. While not conclusive, early research suggests 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 2018 State Plan, Chapter 3, Section 3.3.4, State Vulnerability Overview, annualized loss for Adair County as \$19,000, with per capita loss of \$0.80.

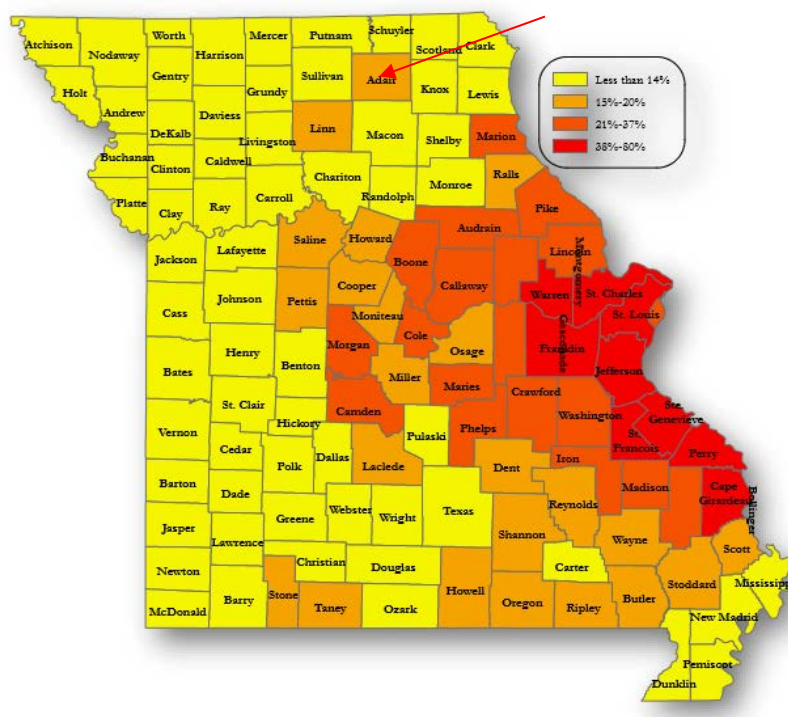
Missouri is the third largest market for earthquake insurance among the states, exceeded only by California and Washington. A study by the U.S. Geological Survey estimates the probability of a magnitude 7.5 or greater earthquake in the New Madrid zone over the next 50 years is 7-10 percent. The probability of an earthquake exceeding magnitude 6 over the same period is 25-40 percent. A joint assessment by the Mid-America Earthquake Center of the University of Illinois and the Federal Emergency Management Agency predicts the New Madrid event could constitute the highest total economic loss of any natural disaster in U.S. history. Earthquake coverage is not included on most homeowner's insurance policies. It must be purchased as separate coverage, called an "endorsement." This type of insurance requires that the earthquake is the direct cause of damage to the property. Natural disasters can, in many instances, trigger other events that may also damage property. One example is earthquakes causing bodies of water to produce waves, resulting in flooding.

Earthquake insurance usually features two high deductibles: Rather than a dollar amount, it's a percentage of the cost of rebuilding the home and a separate deductible for the home's contents. Deductibles of 10-15 percent are common. For example, with a 15 percent deductible, the owner of a \$200,000 home could expect to pay up to \$30,000 in deductibles for damage to the dwelling before receiving any benefit from their earthquake insurance policy.

The material used to build the home can also determine premiums or whether your home is even insurable. For instance, rates may be cheaper for wood-frame homes, which withstand tremors better than homes made of masonry such as brick and stone. Single-story homes may also receive better rates as they tend to sustain less damage from an earthquake. Age of the home can also affect premiums. Some insurers will not offer earthquake insurance for masonry homes.

In Adair County, earthquake insurance premiums have gone up nearly 140% since 2000 and the average Annual Earthquake premium is \$75. As shown in Figure 3.22, only a small percentage of residences in Adair County have earthquake coverage. According to a 2019 report generated by the Department of Insurance, Financial Institutions, and Professional Registration states that only 14.7% of Adair County residences have Earthquake coverage.

**Figure 3.22. Percent of Residences with Earthquake Insurance, 2018**



Source: [https://insurance.mo.gov/earthquake/documents/EarthquakeInsuranceMarketsInMissouriReport20197-8-2019\\_000.pdf](https://insurance.mo.gov/earthquake/documents/EarthquakeInsuranceMarketsInMissouriReport20197-8-2019_000.pdf)

### ***Potential Losses to Existing Development***

The Hazus building inventory counts are based on the 2010 census data adjusted to 2014 numbers using the Dun & Bradstreet Business Population Report. Inventory values reflect 2014 valuations, based on RSMeans (a supplier of construction cost information) replacement costs. Population counts are 2010 estimates from the U.S. Census Bureau.

**Figure 3.23. HAZUS-MH Earthquake Loss Estimation 2% Probability of Exceedance in 50 Years Scenario Direct Economic Losses Results Summary for Adair County**

County	Cost Structural Damage	Cost Non-Structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio	Relocation Loss	Capital Related Loss	Wage Losses	Rental Income Loss	Total Loss
Adair	\$2,456	\$5,252	\$1,421	\$26	.30	\$1,559	\$512	\$775	\$841	\$12,841

Source: 2018 Missouri State Hazard Mitigation Plan

\*All values are in thousands \*\*Loss ratio is the sum of structural and nonstructural damage divided by the entire building inventory value within a county.

### ***Impact of Previous and Future Development***

Future development is not expected to increase the risk other than contributing to the overall exposure of what could become damaged as a result of an event.

### ***Hazard Summary by Jurisdiction***

Earthquake intensity is not likely to vary greatly throughout Adair County and therefore the risk will be the same throughout. Damages would differ were structural variations in the planning area built-environment. For example, if one community has a higher percentage of residences built prior to 1939 than the other participants, that community is likely to experience higher damages.

Problem Statement

### **Problem Statement**

Although Adair 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 do to the low likely hood of impact. An emergency plan for earthquakes needs to be made available to all residents and stated what would happen in the event of an earthquake with details for communications and transportation. Downtown building owners need to know plan in case damage is done to their building. Residents need to be made aware of where the generators and emergency buildings are located. Utilization of social media and texting needs to be encouraged.

### 3.4.5 Land Subsidence/Sinkholes

#### **Hazard Profile**

##### ***Hazard Description***

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that naturally can be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. The sudden collapse of the land surface above them can be dramatic and range in size from broad, regional lowering of the land surface to localized collapse. However, the primary causes of most subsidence are human activities: underground mining of coal, groundwater or petroleum withdrawal, and drainage of organic soils. In addition, sinkholes can develop as a result of subsurface void spaces created over time due to the erosion of subsurface limestone (karst).

Land subsidence occurs slowly and continuously over time, as a general rule. On occasion, it can occur abruptly, as in the sudden formation of sinkholes. Sinkhole formation can be aggravated by flooding.

In the case of sinkholes, the rock below the surface is rock that has been dissolving by circulating groundwater. As the rock dissolves, spaces and caverns form, and ultimately the land above the spaces collapse. In Missouri, sinkhole problems are usually a result of surface materials above openings into bedrock caves eroding and collapsing into the cave opening. These collapses are called “cover collapses” and geologic information can be applied to predict the general regions where collapse will occur. Sinkholes range in size from several square yards to hundreds of acres and may be quite shallow or hundreds of feet deep.

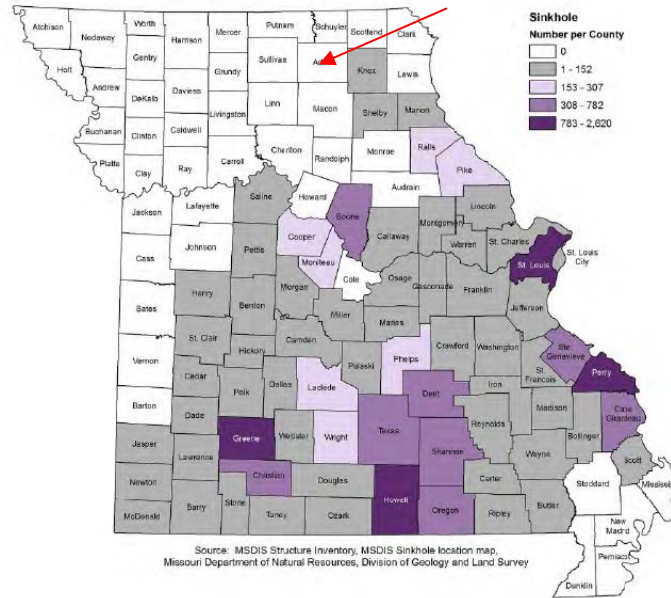
According to the U.S. Geological Survey (USGS), the most damage from sinkholes tends to occur in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania. Fifty-nine percent of Missouri is underlain by thick, carbonate rock that makes Missouri vulnerable to sinkholes. Sinkholes occur in Missouri on a fairly frequent basis. Most of Missouri’s sinkholes occur naturally in the State’s karst regions (areas with soluble bedrock). They are a common geologic hazard in southern Missouri, but also occur in the central and northeastern parts of the State. Missouri sinkholes have varied from a few feet to hundreds of acres and from less than one to more than 100 feet deep. The largest known sinkhole in Missouri encompasses about 700 acres in western Boone County southeast of where Interstate 70 crosses the Missouri River. Sinkholes can also vary in shape like shallow bowls or saucers whereas others have vertical walls. Some hold water and form natural ponds.

According to the 2018 State Hazard Mitigation Plan there are 120 mines in Adair County and 0 sinkholes.

## Geographic Location

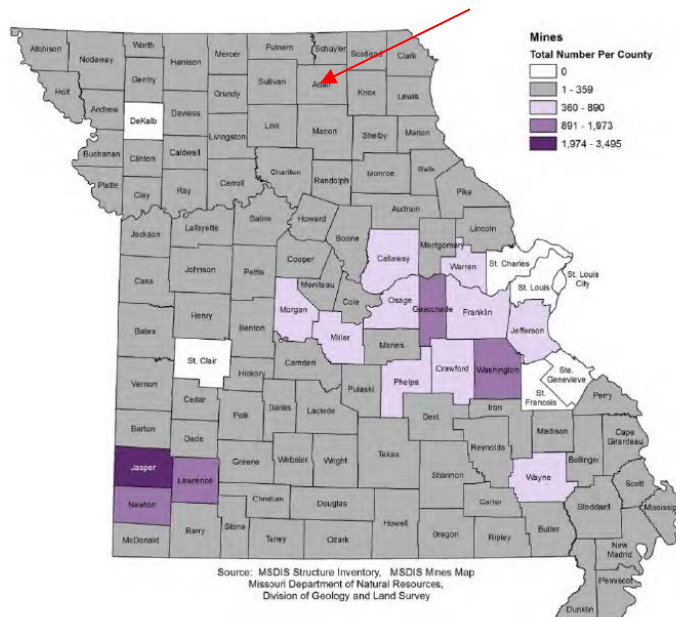
Figure 3.24 shows the number of sinkholes in Adair County and Figure 3.25 the number of mines in the County.

**Figure 3.24. Sinkholes in Adair County**



Source: 2018 Missouri State Hazard Mitigation Plan; Arrow indicates Adair County

**Figure 3.25. Mines in Adair County**



Source: 2018 Missouri State Hazard Mitigation Plan; Arrow indicates Adair County

## Strength/Magnitude/Extent

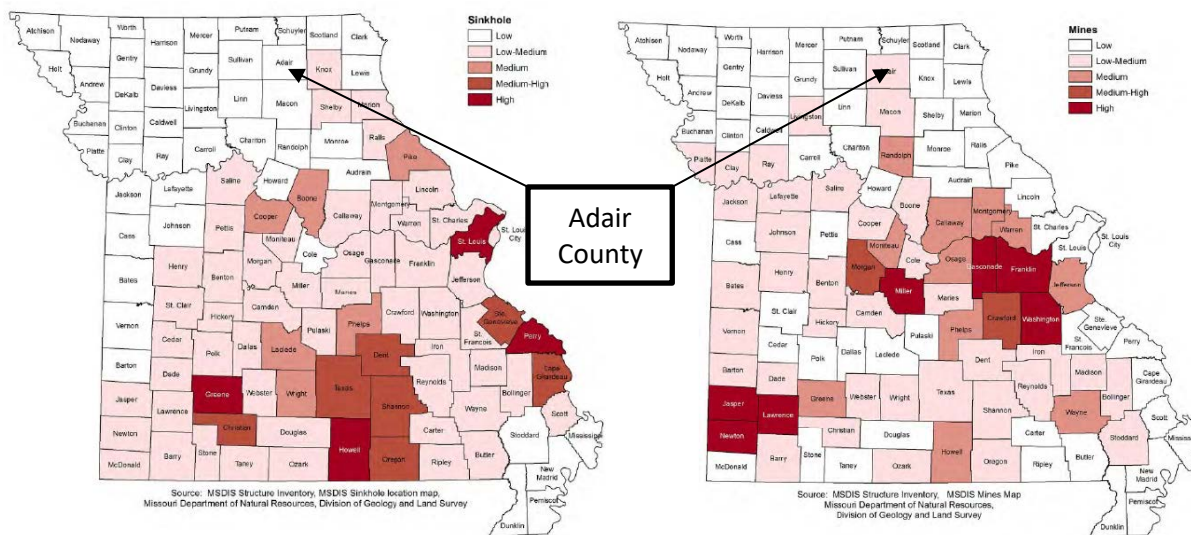
Sinkholes vary in size and location, and these variances will determine the impact of the hazard. A sinkhole could result in the loss of a personal vehicle, a building collapse, or damage to infrastructure such as roads, water, or sewer lines. Groundwater contamination is also possible from a sinkhole. Because of the relationship of sinkholes to groundwater, pollutants captured or dumped in sinkholes could affect a community's groundwater system. Sinkhole collapse could be triggered by large earthquakes. Sinkholes located in floodplains can absorb floodwaters but make detailed flood hazard studies difficult to model.

## Previous Occurrences

As noted in the 2018 State Plan, sinkholes are a regular occurrence in Missouri, but rarely are the events of any significance. There has been no occurrence of sink hole induced damage in Adair County.

Sinkholes in the planning area are not a common occurrence due to the composition of land. While some sinkholes may be considered a slow changing nuisance, others are more sudden, catastrophic collapses that can destroy property, delay construction projects and contaminate ground water resources.

**Figure 3.26. Sinkhole and Mine Rating Values by County**



Source: Missouri State Hazard Mitigation Plan 2018

## Probability of Future Occurrence

There are no records of previous event dates in the planning area and therefore the probability of future occurrences cannot accurately be determined due to the limited information. As represented in the figures above, the sinkholes and mines located in Adair County have a low to low-medium rating value.

## ***Changing Future Conditions Considerations***

Sink holes in Missouri are, for the most part, naturally occurring; however, mining operations and fracking can contribute to their formation. In addition, the increased precipitation forecast by climate change advocates could conceivably cause rapid on-set of sink holes.

## **Vulnerability**

### ***Vulnerability Overview***

Sinkholes in the planning area are not common occurrence due to composition of the land. While some sinkholes may be considered a slow changing nuisance; other more sudden, catastrophic collapses can destroy property, delay construction projects and contaminate ground water resources.

The Missouri Department of Natural Resources shows no sinkholes for the planning area.

### ***Potential Losses to Existing Development***

The potential impact of sinkholes on existing structures is difficult to determine due to the lack of data on historic damages caused by sinkholes and the mapping of potential sinkholes is difficult if not impossible to predict where a sinkhole will collapse and how significant the collapse will be. Because sinkhole collapse is not predictable and previous events have not occurred in the rural area there is not significant data to estimate the future losses due to a sinkhole.

### ***Impact of Previous and Future Development***

As more development occurs in unmapped rural areas and incorporated areas the vulnerability to the hazard will increase; however, sinkholes are unpredictable and the development in rural areas is difficult to limit due to the lack of occurrence. There are currently no sinkholes in the planning area, and the Adair County participating jurisdictions have no plans to limit construction due to sinkholes.

## ***Hazard Summary by Jurisdiction***

The risk for the development is uniform throughout Adair County and has not affected one jurisdiction specifically.

## **Problem Statement**

Sinkholes can develop anywhere in the County without warning and grow to varying sizes with disruption of services, especially to transportation and utilities. The most inexpensive method for remediating them is to bring in fill material. It will be helpful for Adair County be aware of the possibility of a sinkhole occurring at any time.

### 3.4.6 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.

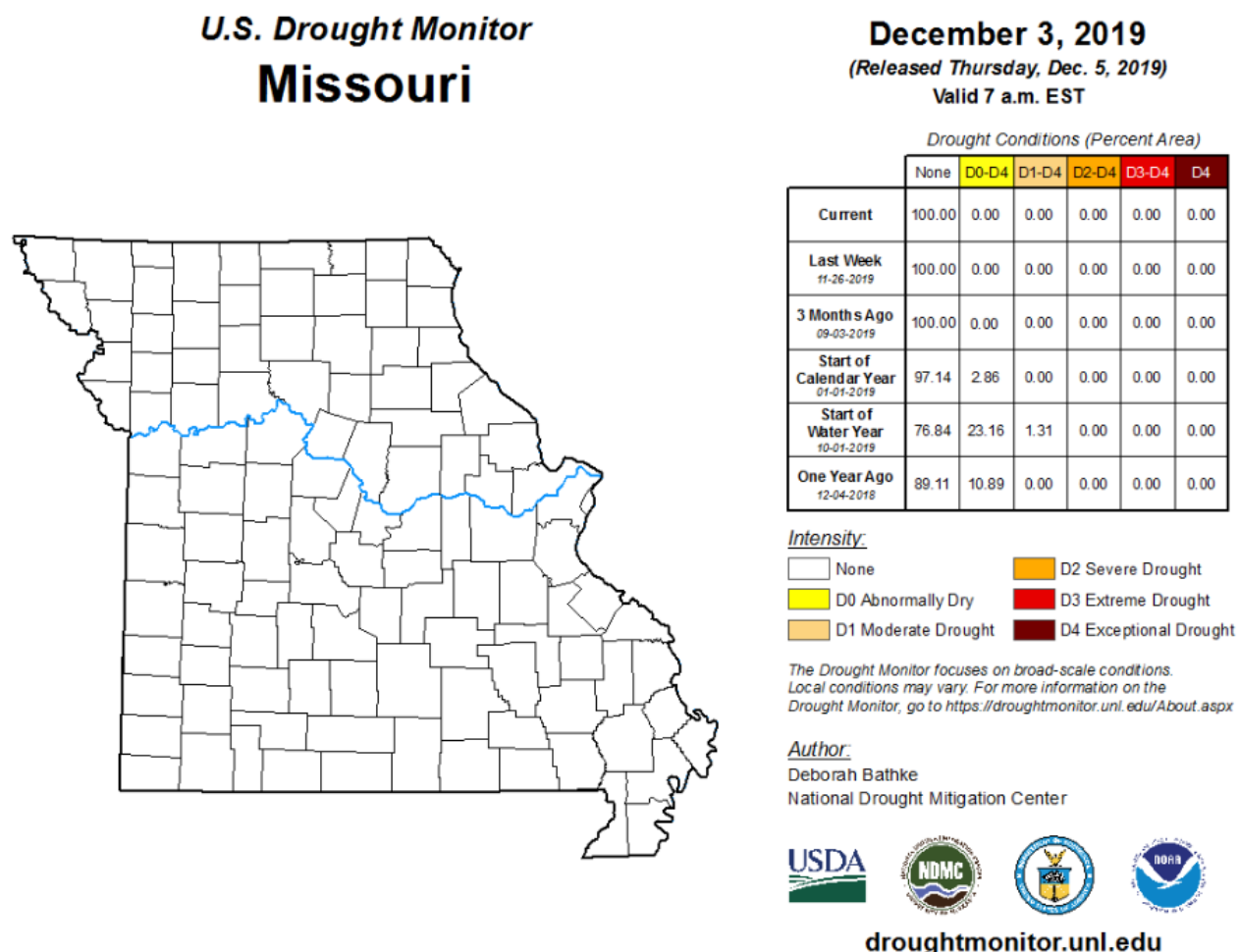
- Meteorological drought is defined in terms of the basis of the degree of dryness (in comparison to some “normal” or average amount) and the duration of the dry period. A meteorological drought must be considered as region-specific since the atmospheric conditions that result in deficiencies of precipitation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

Droughts are regional in nature. All areas of the United States are vulnerable to the risk of drought and extreme heat. Droughts can be widespread or localized events. The extent of the droughts varies both in terms of the extent of the heat and range of precipitation. The severity of a drought depends on locations, duration, and geographical extent. Additionally, drought severity depends on the water supply, usage demands made by human activities, vegetation and agricultural operations. Drought brings several different problems that must be addressed. The quality and quantity of crops, livestock and other agricultural assets will be affected during a drought. Drought can adversely impact forested areas leading to an increased potential for extremely destructive forest and woodland fires that could threaten residential, commercial, and recreational structures. According to the 2012 Census of Agriculture, Adair County consist of 273,155 acres land in farms, crop sales generate \$20,148,000 and livestock sales generate \$15,648,000. A drought would directly impact livestock production and the agriculture economy in Adair County.



**Figure 3.27. 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

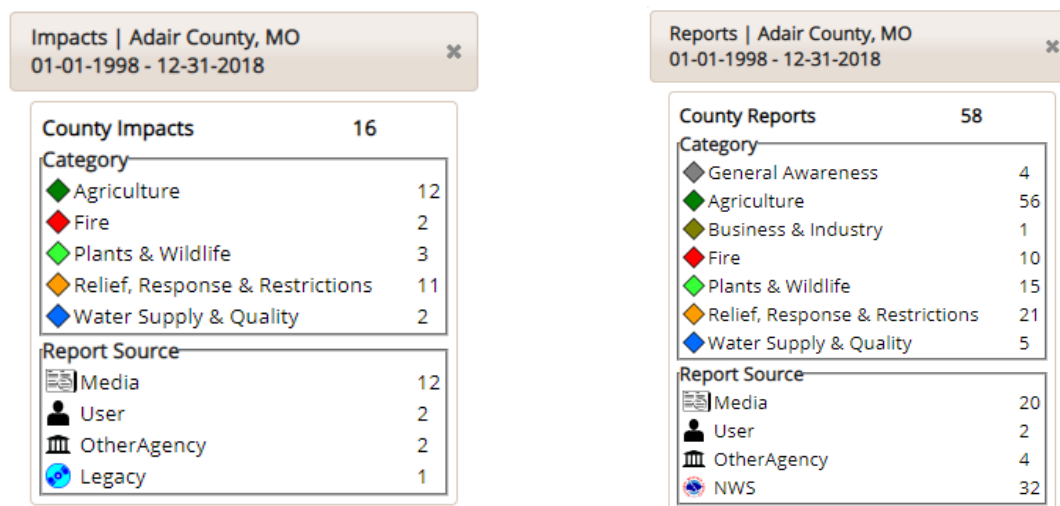
Table 3.29 shows crop losses attributed to drought from January 2009 through December 2019. For the 11-year period, crop losses due to drought totaled \$13,527,946.40. Four years showed no losses while \$3,166,212 for the second highest in 2013 and \$8,339,350 for the largest total in 2012.

**Table 3.26. Drought Losses 2009-2019**

Year	Dollars
2009	\$0
2010	\$0
2011	\$398,541.50
2012	\$8,339,350
2013	\$3,166,212
2014	\$0
2015	\$0
2016	\$28,433
2017	\$83,143
2018	\$1,440,540.78
2019	\$71,726.90

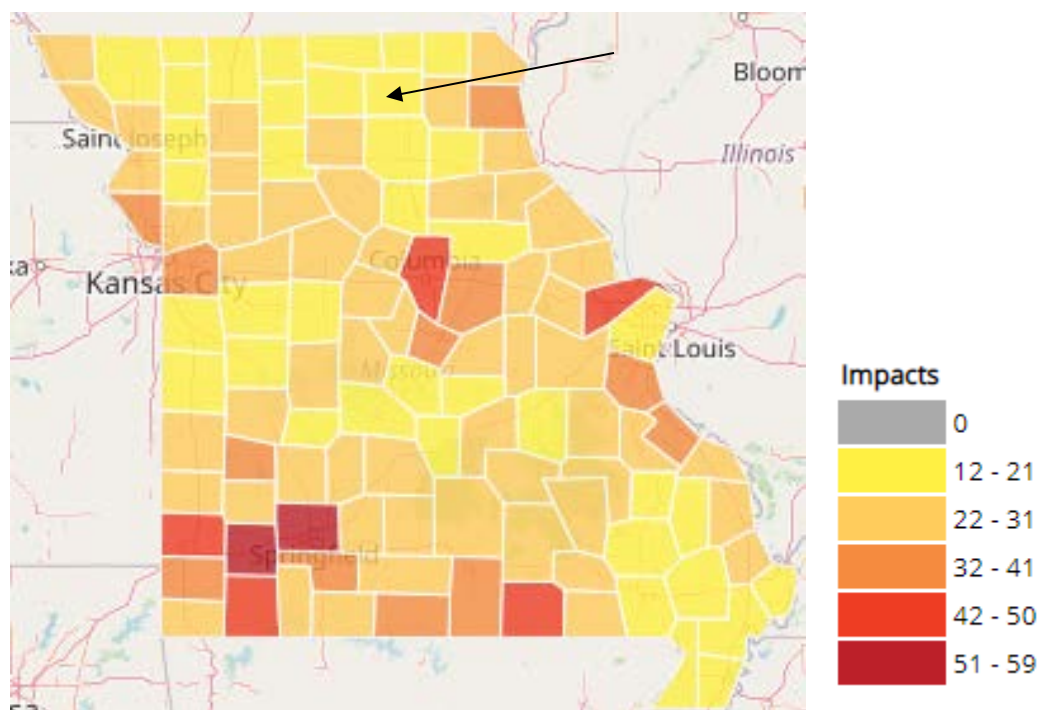
According to the National Drought Mitigation Center's Drought Impact Reporter, during the 21-year period from January 1998 to December 2018, Adair County had 58 drought reports and 16 impacts.

**Figure 3.28. Drought Impact on Adair County**



Source: <https://droughtreporter.unl.edu/map/>

**Figure 3.29. Adair County Drought Impact (January 1999 – December 2018)**



Source: Drought Impact Reporter, <https://droughtreporter.unl.edu> (arrow denotes Adair County)

### ***Probability of Future Occurrence***

According to the 2018 State Plan, Adair County has a medium total rating for droughts and is very likely to experience droughts in the future, with a 10.72% chance likelihood of a severe drought.

**Figure 3.30. Vulnerability of Adair County to Drought**

County	SOVI Index Rating	USDA RMA Total Drought Crop Claims	Average Annualized Crop Claims	USDA Claims Rating	2012 Crop Exposure	Crop Exposure Rating	Likelihood of Severe Drought (%)	Drought Occurrence Rating	Total Rating	Total Rating (Text) Drought
Adair	1	\$11,949,408	\$1,327,712	3	\$20,148,000	2	10.72	5	11	Medium

Factors Considered	Low (1)	Low-medium (2)	Medium (3)	Medium-high-4	High (5)
Social Vulnerability Index	1	2	3	4	5
Crop Exposure Ratio Rating	\$886,000 - \$10,669,000	\$10,669,001 - \$33,252,000	\$33,252,001 - \$73,277,000	\$73,277,001 - \$155,369,000	\$155,369,001 - \$256,080,000
Annualized USDA Crop Claims Paid	< \$340,000	\$670,000-\$669,999	\$670,000-\$999,999	\$1M-\$1,299,999	> \$1,300,000
Likelihood of Occurrence of severe or extreme drought	1-1.9%	2-3.9%	4-5.9%	6-8.9%	9-10.72%
Total Drought Vulnerability Rating	7-8	9-10	11-12	13-14	15-17

Although drought is not predictable, long-range outlooks and predicted impacts of climate change could indicate an increased chance of drought.

## ***Changing Future Conditions Considerations***

The 2018 State Plan, Severe drought, a natural part of Missouri's climate, is at risk to this agriculture-dependent state. Future increases in evaporation rates due to higher temperatures may increase the intensity of naturally-occurring droughts. The number of heavy rainfall events is predicted to increase, yet researchers currently expect little change in total rainfall amounts, indicating the periods between heavy rainfalls will be marked by an increasing number of dry days. Higher temperatures and increased evapotranspiration increase the likelihood of a drought. This could lead to agricultural drought and suppressed crop yields.

## **Vulnerability**

### ***Vulnerability Overview***

According to the analysis from the 2018 State Plan, Adair County is a medium vulnerability County for droughts.

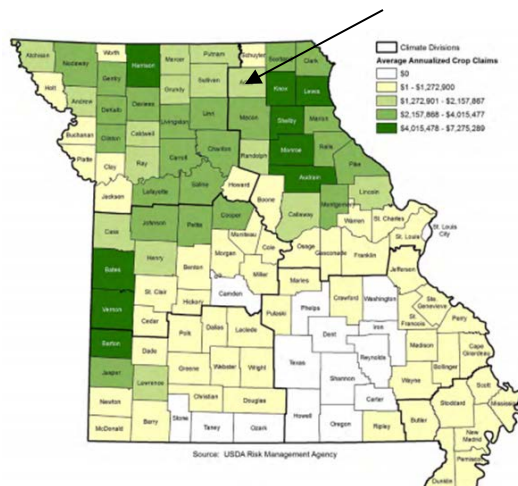
### ***Potential Losses to Existing Development***

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***

Future development will remain vulnerable to drought. Typically, some urban and rural areas are more susceptible than others. For example, urban areas are subject to water shortages during periods of drought. Excessive demands of the populated area place a limit on water resources. In rural areas, crops and livestock may suffer from extended periods of heat and drought. As the size of farms increase more crops will be exposed to drought-related agricultural losses. Dry conditions can lead to the ignition of wildfires that could threaten residential, commercial and recreational areas.

**Figure 3.31. Annualized Drought Crop Insurance Claims Paid from 2007 – 2016**

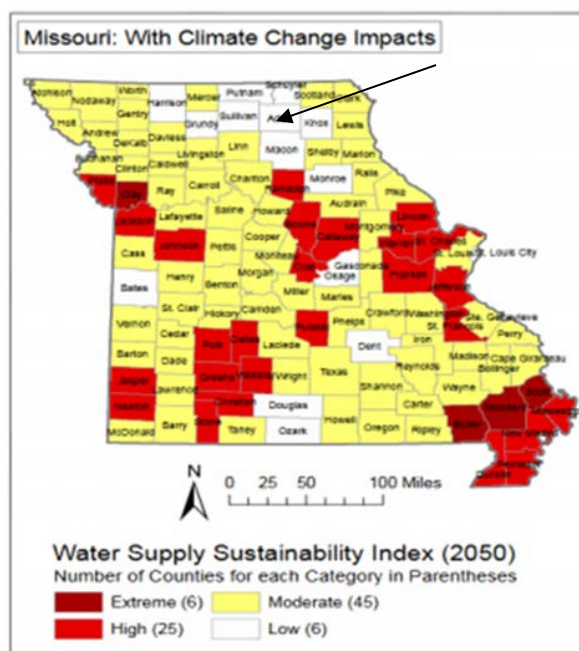


Source: Missouri State Hazard Mitigation Plan, 2018 (Arrow denotes Adair County)

### ***Changing Future Conditions Considerations***

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

**Figure 3.32. Climate Change Impact**



Source: <http://www.nrdc.org/globalWarming/watersustainability/>

### ***Hazard Summary by Jurisdiction***

The entire planning area will be affected by drought to some degree. The unincorporated agricultural areas of Adair County are the most vulnerable to drought while the drought condition will also affect the cities except the magnitude would be different with only lawns, local garden and possibly infrastructure impacted. In addition, damage to crops, produce, livestock, soils and building foundations could be weakened due to shrinking and expanding soil.

### **Problem Statement**

Adair County is at a medium risk for a severe drought which is 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 ordinances/regulation for inclusion of water-use restrictions during periods of drought.

### **3.4.7 Extreme Temperatures**

#### **Hazard Profile**

##### ***Hazard Description***

Extreme temperature events, both hot and cold, can impact human health and mortality, natural ecosystems, agriculture and other economic sectors. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index chart shown in **Figure 3.33** 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***

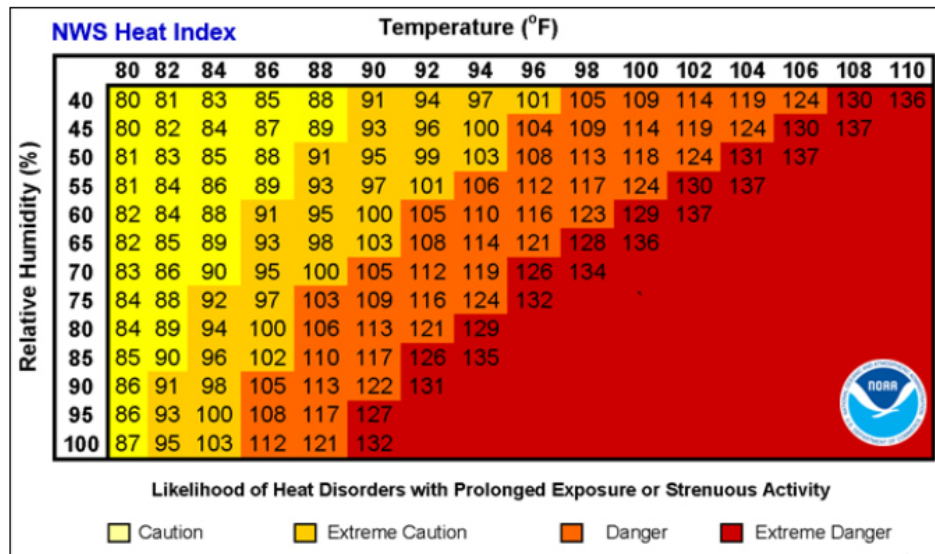
The entire planning area is subject to extreme heat and all participating jurisdictions are affected.

##### ***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 3.33. Heat Index (HI) Chart**

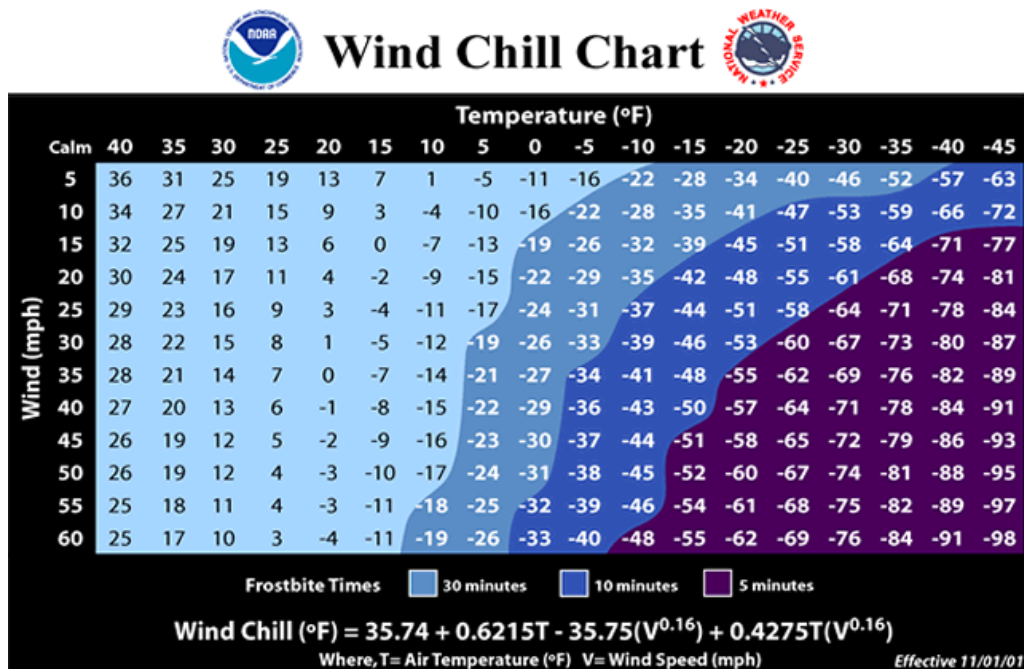


Source: National Weather Service (NWS); <https://www.weather.gov/safety/heat-index>

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 3.34. Wind Chill Chart**



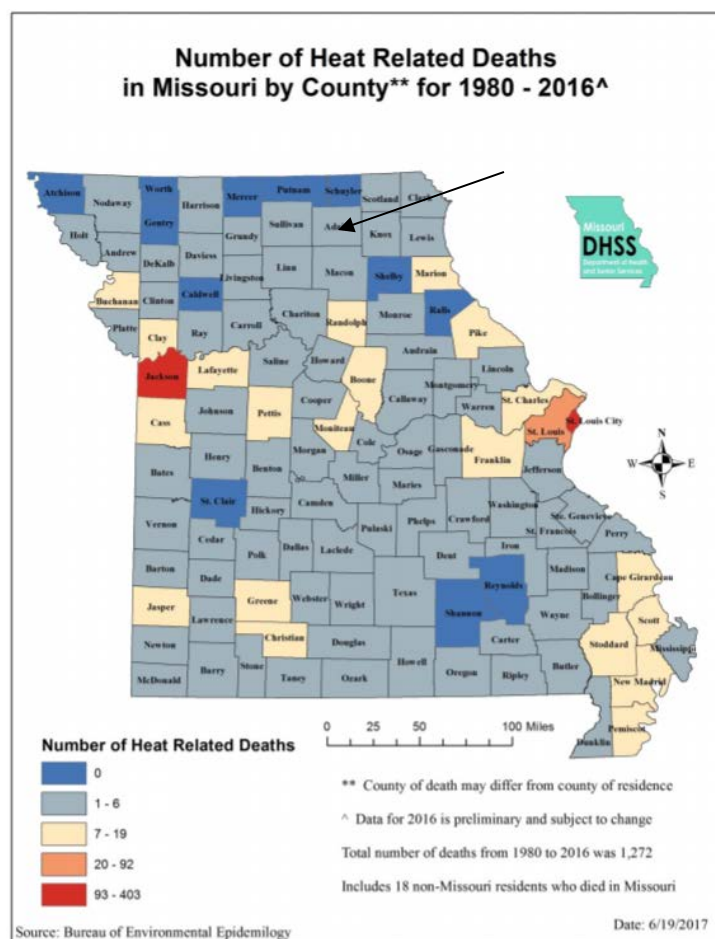
Source: <https://www.weather.gov/safety/cold-wind-chill-chart>



## Previous Occurrences

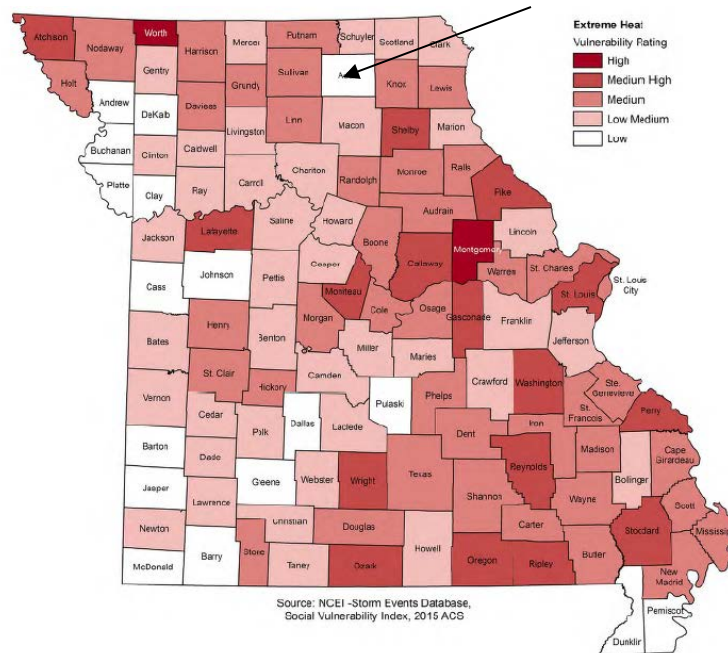
The recorded events in the National Centers for Environmental Information (NCEI) database state there have been 2 recorded events of excessive heat in the 20-year period of 2000-2019. There was 0 deaths or injuries associated with these events. The NCEI database shows 3 recorded events of extreme cold/wind chill, with 0 deaths or injuries associated with this event. Figure 3.35 illustrates between 1-6 heat related deaths in Adair County between the time of 1980-2016, no supporting documentation could be found to include in this plan.

**Figure 3.35. Heat Related Deaths in Missouri 2000 - 2016**



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

**Figure 3.36. Agricultural Insurance Claims Due to Extreme Temperatures**



**Source: Missouri State Hazard Mitigation Plan 2018 (arrow denotes Adair County)**

Extreme heat can cause stress to crops and animals. According to USDA Risk Management Agency, losses to insurable crops during the 10-year time period from 2009 to 2018 were \$145,235. 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, 0 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***

NCEI, dating back to 2000 indicates 2 years with an extreme heat event. Based on this historical data, the calculated probability of an extreme heat event in any given year is 10%. The probability was determined by taking the number of years with an extreme heat events (2) divided by the number of year (20) data was obtained for.

### ***Changing Future Conditions Considerations***

According to the 2018 Missouri State Plan, average annual temperatures are projected to most likely exceed historical record levels by the middle of the 21st century. The impacts of extreme heat events are experienced most acutely by the elderly and other vulnerable populations. High temperatures are exacerbated in urban environments, a phenomenon known as the urban heat island effect, which in

turn tend to have higher concentrations of vulnerable populations. Higher demand for electricity as people try to keep cool amplifies stress on power systems and may lead to an increase in the number of power outages. Atmospheric concentrations of ozone occur at higher air temperatures, resulting in poorer air quality, while harmful algal blooms flourish in warmer water temperatures, resulting in poorer water quality.

## **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.

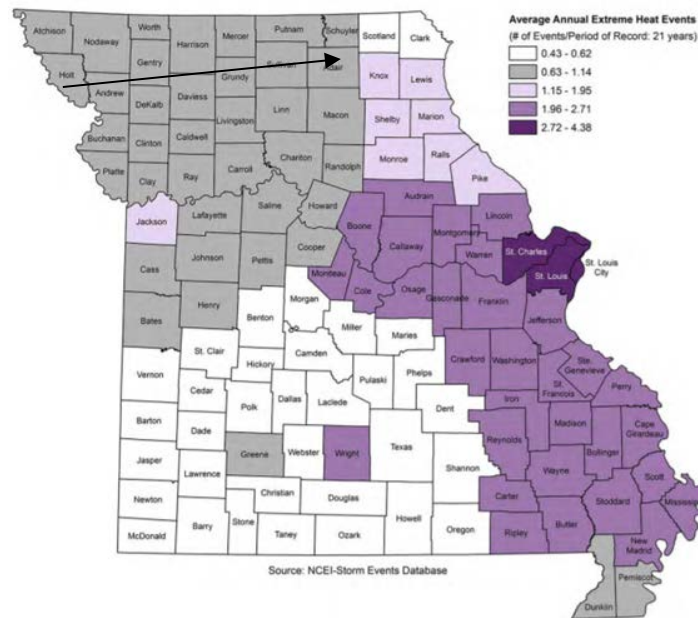
**Table 3.27** lists typical symptoms and health impacts due to exposure to extreme heat.

**Table 3.27. 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

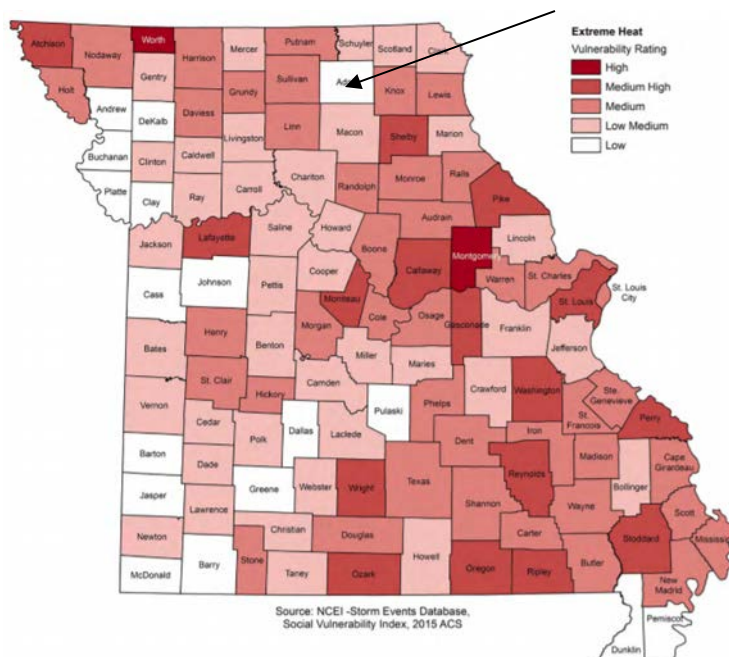
Source: National Weather Service Heat Index Program, [www.weather.gov/os/heat/index.shtml](http://www.weather.gov/os/heat/index.shtml)

**Figure 3.37. Average Annual Occurrence for Extreme Heat**



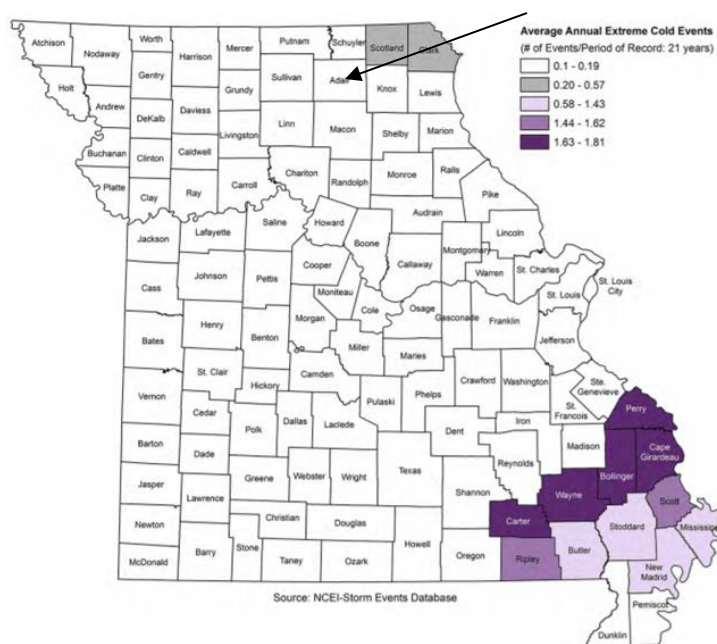
Source: Missouri State Hazard Mitigation Plan, 2018 (arrow denotes Adair County)

**Figure 3.38. Vulnerability Rating for Extreme Heat**



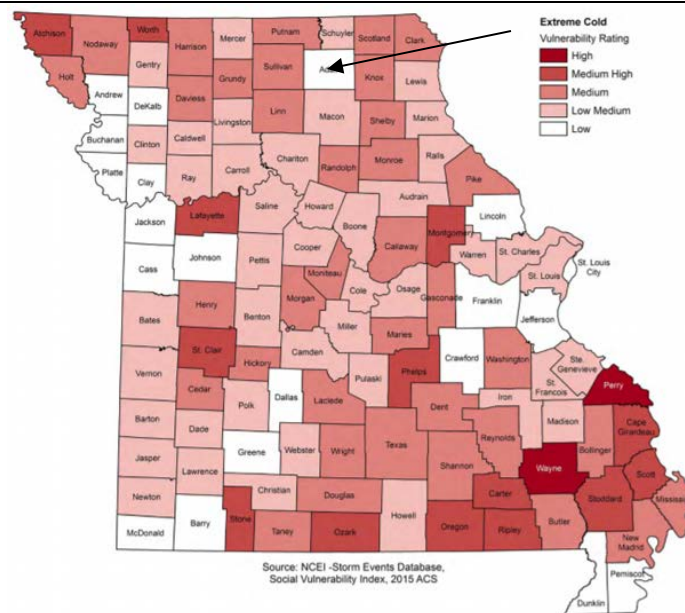
Source: Missouri State Hazard Mitigation Plan, 2018 (arrow denotes Adair County)

**Figure 3.39. Vulnerability for Extreme Cold Events**



Source: Missouri State Hazard Mitigation Plan, 2018 (arrow denotes Adair County)

**Figure 3.40. Vulnerability for Extreme Cold**



Source: Missouri State Hazard Mitigation Plan, 2018 (arrow denotes Adair County)

### ***Potential Losses to Existing Development***

During extreme heat events structural, road, and electrical infrastructure are vulnerable to damages. Depending upon temperatures and duration of extreme heat, losses will vary.

### ***Impact of Previous and Future Development***

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

According to the American Community Survey Adair County experienced a slight population decrease with Kirksville showing slight growth. Overall Adair County's population has been somewhat stagnant.

### ***Hazard Summary by Jurisdiction***

Those at greatest risk for heat-related illness and deaths include 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. To determine jurisdictions within the planning area with populations more vulnerable to extreme heat, demographic data was obtained from the 2010 census on population percentages in each jurisdiction comprised of those under age 5 and over age 65. Data was not available for overweight individuals and those on medications vulnerable to extreme heat. **Table 3.28** below summarizes vulnerable populations in the participating jurisdictions. Note that school and special districts are not included in the table because students and those working for the special districts are not customarily in these age groups.

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**Table 3.28. Adair County Population Under Age 5 and Over Age 65, 2018 ACS 5-Year Estimates Data**

<b>Jurisdiction</b>	<b>Population Under 5 yrs</b>	<b>Population 65 yrs and over</b>
Adair County	1,259	3,596
City of Kirksville	773	2,175
City of Brashear	8	19
City of Novinger	15	54
Village of Millard	3	22
Village of Gibbs	14	13

Source: American Community Survey 5-year estimates 2017

### **Problem Statement**

Adair 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.



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

#### **Hazard Profile**

##### ***Hazard Description***

##### ***Thunderstorms***

A thunderstorm is defined as a storm that contains lightning and thunder which is caused by unstable atmospheric conditions. When cold upper air sinks and warm moist air rises, storm clouds or 'thunderheads' develop resulting in thunderstorms. This can occur singularly, as well as in clusters or lines. The National Weather Service defines a thunderstorm as "severe" if it includes hail that is one inch or more, or wind gusts that are at 58 miles per hour or higher. At any given moment across the world, there are about 1,800 thunderstorms occurring. Severe thunderstorms most often occur in Missouri in the spring and summer, during the afternoon and evenings, but can occur at any time. Other hazards associated with thunderstorms are heavy rains resulting in flooding (discussed separately in **Section 3.4.1**) and tornadoes (discussed separately in **Section 3.4.10**).

##### ***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***

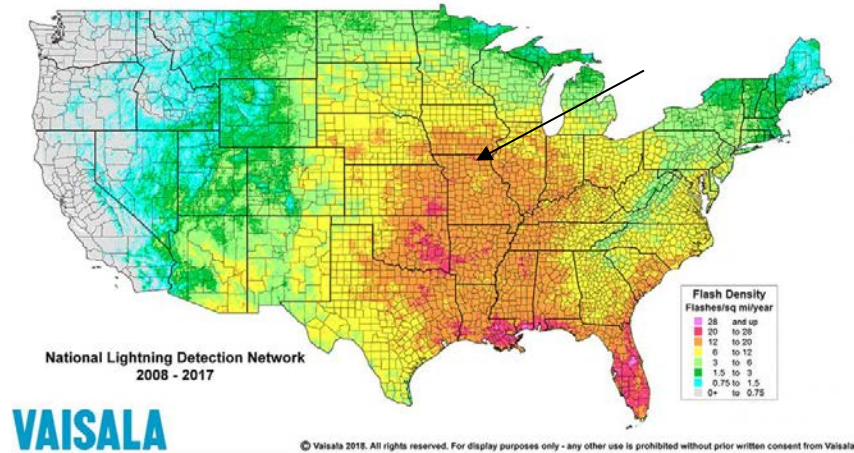
According to the National Oceanic and Atmospheric Administration (NOAA), hail is precipitation that is formed when thunderstorm updrafts carry raindrops upward into extremely cold atmosphere causing them to freeze. The raindrops form into small frozen droplets. They continue to grow as they come into 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 down to the earth. For example, a ¼" diameter or pea sized hail requires updrafts of 24 miles per hour, while a 2 ¾" diameter or baseball sized hail requires an updraft of 81 miles per hour. According to the NOAA, the largest hailstone in diameter recorded in the United States was found in Vivian, South Dakota on July 23, 2010. It was eight inches in diameter, almost the size of a soccer ball. Soccer-ball-sized hail is the exception, but even small pea-sized hail can do damage.

## Geographic Location

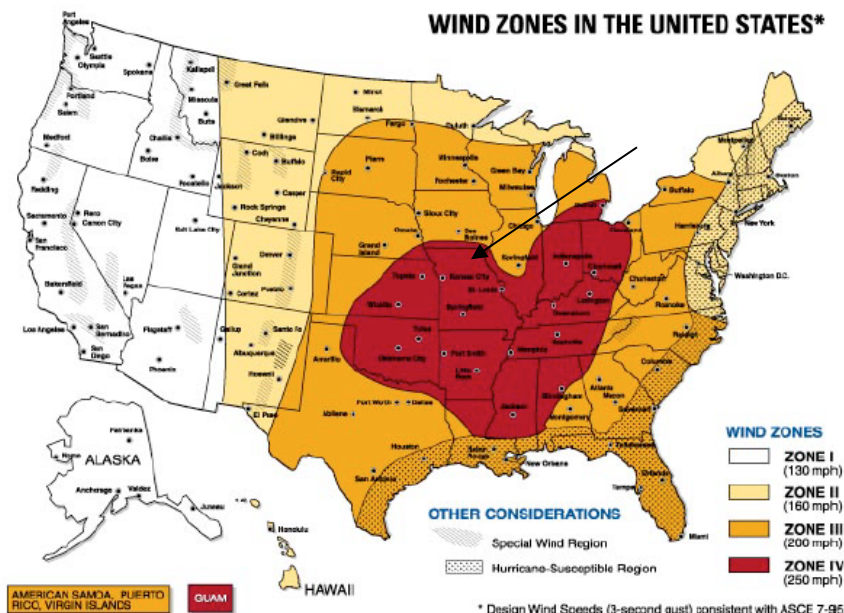
Thunderstorms/high winds/hail/lightning events are an area-wide hazard that can happen anywhere in the county. Although these events occur similarly throughout the planning area, they are more frequently reported in more urbanized areas. In addition, damages are more likely to occur in more densely developed urban areas.

**Figure 3.41. 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 3.42. 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](https://www.fema.gov/pdf/library/ism2_s1.pdf) (Planning area indicated by an arrow)



## Strength/Magnitude/Extent

Based on information provided by the Tornado and Storm Research Organization (TORRO), **Table 3.29** below describes typical damage impacts of the various sizes of hail.

**Table 3.29. 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/hyscale.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 3.30 through Table 3.33**) 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.

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**Table 3.30. Crop Insurance Claims Paid in Adair County from Thunderstorms, 2009 - 2018.**

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

Source: USDA Risk Management Agency, Insurance Claims, <https://www.rma.usda.gov/data/cause>

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**Table 3.31. Crop Insurance Claims Paid in Adair County from High Winds, 2009 - 2018**

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2017	Corn	Wind/Excess Wind	\$92
Total			\$92

Source: USDA Risk Management Agency, Insurance Claims, <https://www.rma.usda.gov/data/cause>

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**Table 3.32. Crop Insurance Claims Paid in Adair County from Lightning, 2009 - 2018**

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

USDA Risk Management Agency, Insurance Claims, <https://www.rma.usda.gov/data/cause>

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**Table 3.33. Crop Insurance Claims Paid in Adair County from Hail, 2009 - 2018**

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2010	Corn	Hail	\$1,748
2011	Corn	Hail	\$3,106
2011	Soybeans	Hail	\$2,792
2013	Corn	Hail	\$2,328
2013	Soybeans	Hail	\$77,608
2014	Soybeans	Hail	\$11,356
2018	Corn	Hail	\$1,531
2018	Soybeans	Hail	\$35,780
Totals:			\$136,249

USDA Risk Management Agency, Insurance Claims, <https://www.rma.usda.gov/data/cause>

### ***Probability of Future Occurrence***

#### **Thunderstorms**

Due to no reports, adequate calculations cannot be configured at this time.

#### **High Winds**

Based on NCEI data, there have been zero events in a 10-year period, based on this data the probability cannot be calculated due to no events occurring.

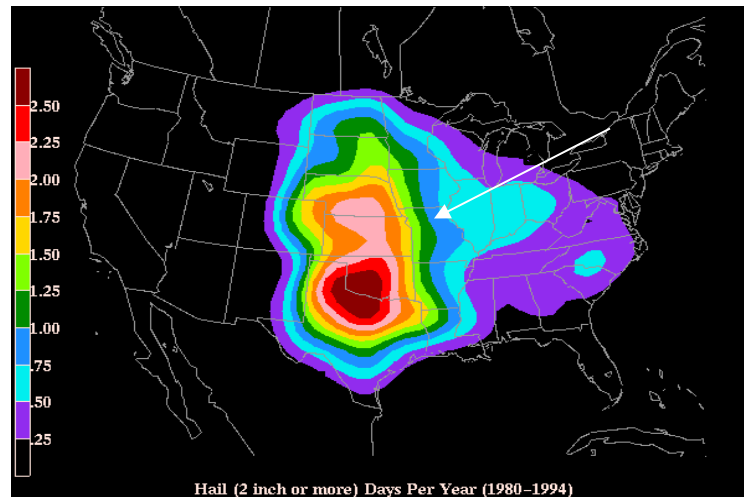
#### **Lightning**

Based on NCEI data, there have been 0 events in a 10-year period in Adair County. Based on history, the probability of a lightning event in any given year is unable to be calculated due to no events occurring.

## Hail

Based on NCEI data, there have been 34 events in a 10 year period, producing an average of 3.4 hail events each year in Adair County. Based on history, the probability of a hail event in any given year is 100 percent. Thus, making the probability as likely in any given year.

**Figure 3.43. Annual Hailstorm Probability (2" diameter or larger), U 1980- 1994**



Source: NSSL, [http://www.nssl.noaa.gov/users/brooks/public\\_html/bighail.gif](http://www.nssl.noaa.gov/users/brooks/public_html/bighail.gif) Note: arrow indicates Adair County

## Changing Future Conditions Considerations

According to the 2018 Missouri State Plan, predicted increases in temperature could help create atmospheric conditions that are fertile breeding grounds for severe thunderstorms and tornadoes in Missouri. Possible impacts include an increased risk to life and property in both the public and private sectors. Public utilities and manufactured housing developments will be especially prone to damages. Jurisdictions already affected should be prepared for more of these events, and should thus prioritize mitigation actions such as construction of safe rooms for vulnerable populations, retrofitting and/or hardening existing structures, improving warning systems and public education, and reinforcing utilities and additional critical infrastructure.

## Vulnerability

### ***Vulnerability Overview***

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

hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are also commonly damaged by hail. Hail has been known to cause injury to humans, occasionally fatal injury.

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

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

### ***Potential Losses to Existing Development***

Most damages occur to electronic equipment located inside buildings, but structural damage can also occur when a lightning strike causes a building fire. Communications equipment and warning transmitters and receivers can also be knocked out by lightning strikes. There has not been any fatalities or injuries due to lightning in Adair County during the 10-year period reviewed. When the review period was extended to 20 years, there was 1 reported lightning event with no individuals injured. There have been several insurance claims due to wind, lightning and hail due to loss of property.

### **Hail**

There were 5 years with reported crop insurance claims for a 10-year period resulting in \$136,249 in insurance payments.

### **High Winds**

During an 10-year period there was 1 year with crop insurance claims resulting in \$92 in insurance payments.

### **Lightning**

The total number of Lightning crop insurance claims for a 10-year period could not be determined as claims were listed under "Other (Snow, Lightning, etc.)"

### **Thunderstorms**

During the 10-year period there were no insurance claims due to thunderstorms.

### ***Previous and Future Development***

Adair County's trend in increased development will likely increase vulnerability to thunderstorms, high winds, hail and lightning. If there is more development of housing neighborhoods and businesses, the increased population will be vulnerable to all the hazards.

### ***Hazard Summary by Jurisdiction***

Thunderstorms/high winds/ lightning/hail events are area-wide, NCEI data did not seem to indicate that any particular community had higher losses as compared to another.

## **Problem Statement**

Thunderstorms can damage power lines with the high winds or fallen debris such as tree limbs. Not everyone in the county utilizes social media, texting or have access to a weather radio, communities would benefit from updated sirens. 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.

### 3.4.9 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.

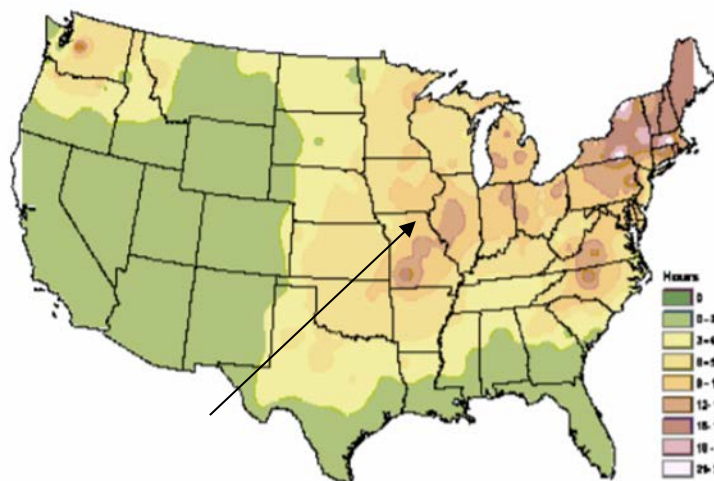
- **Blizzard**—Winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less than  $\frac{1}{4}$  mile for at least three hours.
- **Blowing Snow**—Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
-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

The entire Adair County planning area is vulnerable to heavy snow, ice, extreme cold temperatures and freezing rain. Figure 3.44 shows the approximate location of Adair County.

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**Figure 3.44. NWS Statewide Average Number of Hours per Year with Freezing Rain**



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

### ***Strength/Magnitude/Extent***

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

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

- Winter Weather Advisory — Winter weather conditions are expected to cause significant inconveniences and may be hazardous. If caution is exercised, these situations should not become life threatening. Often the greatest hazard is to motorists.
- Winter Storm Watch — Severe winter conditions, such as heavy snow and/or ice are possible within the next day or two.
- Winter Storm Warning — Severe winter conditions have begun or are about to begin.
- Blizzard Warning — Snow and strong winds will combine to produce a blinding snow (near zero visibility), deep drifts, and life-threatening wind chill.
- Ice Storm Warning -- Dangerous accumulations of ice are expected with generally over one quarter inch of ice on exposed surfaces. Travel is impacted, and widespread downed trees and power lines often result.
- Wind Chill Advisory -- Combination of low temperatures and strong winds will result in wind chill readings of -20 degrees F or lower.
- Wind Chill Warning -- Wind chill temperatures of -35 degrees F or lower are expected. This is a life-threatening situation.

### ***Previous Occurrences***

**Table 3.34. NCEI Adair County Winter Weather Events Summary, [2009 - 2018]**

Type of Event	Inclusive Dates	Magnitude	# of Injuries	Property Damages	Crop Damages
Winter Weather	2/4/2010	-	0	\$0	\$0
Winter Weather	1/10/2011	-	0	\$0	\$0
Winter Weather	1/11/2012	-	0	\$0	\$0
Winter Weather	1/27/2012	-	0	\$0	\$0
Winter Weather	2/13/2012	-	0	\$0	\$0
Winter Weather	11/12/2018	-	0	\$50,000	\$0
Blizzard	12/7/2009	-	0	\$0	\$0
Blizzard	2/1/2011	-	0	\$0	\$0
Blizzard	12/20/2012	-	0	\$0	\$0
Blizzard	11/25/2018	-	0	\$0	\$0
Extreme Cold	2/6/2014	-	0	\$0	\$0
Heavy Snow	12/21/2013	-	0	\$0	\$0
Heavy Snow	2/4/2014	-	0	\$0	\$0
Heavy Snow	1/31/2015	-	0	\$0	\$0
Heavy Snow	2/1/2015	-	0	\$0	\$0
Ice Storm	1/15/2017	-	0	\$0	\$0
Winter Storm	2/21/2020	-	0	\$0	\$0
Winter Storm	2/24/2011	-	0	\$0	\$0
Winter Storm	2/21/2013	-	0	\$0	\$0
Winter Storm	2/21/2010	-	0	\$0	\$0
Winter Storm	2/25/2013	-	0	\$0	\$0
Winter Storm	12/21/2013	-	0	\$0	\$0
Winter Storm	12/27/2015	-	0	\$0	\$0

Source: NCEI, data accessed [2009 - 2018]

**Table 3.35. Presidential Declaration for Winter Storms in Adair County**

Declaration Date	Disaster No.	Incident Type	Type of Assistance
02/06/2002	DR-1403	Ice Storm	PA
12/27/2007	DR-1736	Severe Winter Storms	PA
12/12/2007	EM-3281	Severe Winter Storms	-
01/30/2009	EM-3303	Severe Winter Storms	-
02/03/2011	EM-3317	Severe Winter Storms	-
03/23/2011	DR-1961	Severe Winter Storm	PA

Winter storms, cold, frost and freeze take a toll on crop production in the planning area. Table 3.36 shows the USDA's Risk Management Agency payments for insured crop losses in the planning area as a result of cold conditions and snow for the past 10 years.

**Table 3.36. Crop Insurance Claims Paid in Adair County as a Result of Cold Conditions and Snow 2009 - 2018**

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid (\$)
2009	Wheat	Cold Winter	\$3,916
2009	Wheat	Cold Wet Weather	\$138,820
2009	Corn	Frost	\$7,224
2009	Soybeans	Frost	\$19,237
2011	Corn	Cold Wet Weather	\$15,007
2012	Corn	Cold Wet Weather	\$44,815
2012	Soybeans	Cold Wet Weather	\$18,895
2013	Wheat	Cold Wet Weather	\$9,586
2013	Corn	Cold Wet Weather	\$14,045
2013	Soybeans	Cold Wet Weather	\$5,146
2014	Wheat	Freeze	\$12,332
2014	Wheat	Cold Winter	\$42,110
2014	Wheat	Cold Wet Weather	\$11,361
2014	Corn	Frost	\$370
2014	Corn	Cold Wet Weather	\$1,881
2014	Soybeans	Cold Wet Weather	\$2,147
2015	Wheat	Cold Winter	\$14,088
2015	Wheat	Cold Wet Weather	\$12,190.36
2015	Corn	Cold Wet Weather	\$48,677
2015	Soybeans	Cold Wet Weather	\$2,449
2016	Wheat	Cold Wet Weather	\$5,008
2016	Corn	Cold Wet Weather	\$1,247
2017	Corn	Cold Wet Weather	\$634
<b>Total</b>			<b>\$431,185.36</b>

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



## ***Probability of Future Occurrence***

The entire planning area is vulnerable to the effects of winter storm/blizzard, ice storms, winter weather, cold/wind chill and heavy snow. All effects of winters tend to make driving more treacherous and can impact the response of emergency vehicles. The probability of utility and infrastructure failure increases during winter weather due to the freezing rain accumulation on utility poles and power lines. Elderly populations are considered particularly vulnerable to the impact of winter weather.

## ***Changing Future Conditions Considerations***

According to the 2018 Missouri State Plan, a shorter overall winter season and fewer days of extreme cold may have both positive and negative indirect impacts. Warmer winter temperatures may result in changing distributions of native plant and animal species and/or an increase in pests and non-native species. Warmer winter temperatures will result in a reduction of lake ice cover. Reduced lake ice cover impacts aquatic ecosystems by raising water temperatures. Water temperature is linked to dissolved oxygen levels and many other environmental parameters that affect fish, plant, and other animal populations. A lack of ice cover also leaves lakes exposed to wind and evaporation during a time of year when they are normally protected. As both temperature and precipitation increase during the winter months, freezing rain will be more likely. Additional wintertime precipitation in any form will contribute to saturation and increase the risk and/or severity of spring flooding. A greater proportion of wintertime precipitation may fall as rain rather than snow.

## **Vulnerability**

### ***Vulnerability Overview***

The method used to determine vulnerability to severe winter weather across Missouri was statistical analysis of data from several sources: National Centers for Environmental Information (NCEI) storm events data (1996 to December 31, 2016), HAZUS Building Exposure Value data, housing density data from the U.S. Census (2015 ACS), and the calculated Social Vulnerability Index for Missouri Counties from the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina. From the statistical data collected, five factors were considered in determining overall vulnerability to severe winter weather as follows: housing density, building exposure, social vulnerability, likelihood of occurrence, and average annual property loss. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. These rating values correspond to the following descriptive terms: 1) Low 2) Low-medium 3) Medium 4) Medium-high 5) High.

**Table 3.37. Ranges of Severe Winter Weather Vulnerability Factor Rating**

Factors Considered	Low (1)	Low Medium (2)	Medium (3)	Medium High (4)	High (5)
<b>Common Factors</b>					
Housing Density (# per sq. mile)	4.11-44.23	44.24-134.91	134.92-259.98	259.99-862.69	862.70-2836.23
Building Exposure (\$)	\$269,532-\$3,224,641	\$3,224,642-\$8,792,829	\$8,792,830-\$22,249,768	\$22,249,769-\$46,880,213	\$46,880,214-\$138,887,850
Social Vulnerability	1	2	3	4	5
Likelihood of Occurrence (# of events/ yrs. of data)	1.05-1.43	1.44-1.76	1.77-2.10	2.11-2.67	2.68-4.57
Average Annual Property Loss (annual property loss/ yrs. Of data)	\$0-\$143,095.24	\$143,095.25-\$406,666.67	\$406,666.68-\$1,191,000.95	\$1,191,000.96-\$3,184,761.90	\$3,184,761.91-\$5,861,666.67

Source: 2018 Missouri State Hazard Mitigation Plan

**Table 3.38. Ranges for Severe Winter Weather Combined Vulnerability Rating**

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

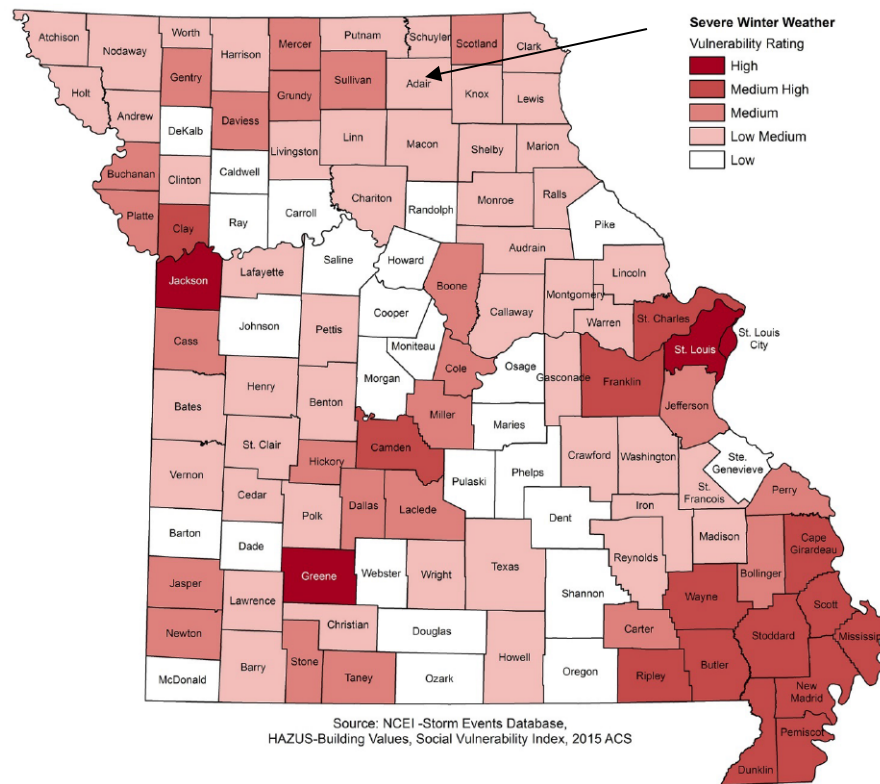
Source: 2018 Missouri State Hazard Mitigation Plan

**Table 3.39. Housing Density, Building Exposure, and SOVI Data by County**

County	Total Building Exposure (Hazes)	Building Exposure Rating	Housing Density	Housing Density Rating	SOVI Ranking	SOVI Rating
Adair	\$2,599,614,000	1	19.93	1	Medium	3

Source: 2018 Missouri State Hazard Mitigation Plan

**Figure 3.45. Vulnerability Summary for Severe Weather**



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 2009 BCA Reference Guide, the economic impact as a result of loss of power is \$126 per person per day of lost service.

### ***Potential Losses to Existing Development***

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

### ***Previous and Future Development***

Future development could potentially increase vulnerability to this hazard by increasing demand on the utilities and increasing the exposure of infrastructure networks.

### ***Hazard Summary by Jurisdiction***

Although crop loss as a result of severe winter storm occurs more in the unincorporated portions of the planning area, the density of vulnerable populations is higher in the urban areas of the planning areas. It is considered that the magnitude of this hazard is relatively equal. The factors of probability, warning time, and duration are also equal across the planning area. Therefore, the conclusion is the hazard does not substantially vary by jurisdiction.

### **Problem Statement**

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

## **3.4.10 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***

Tornadoes can occur in the entire planning area and no area is immune from tornado damage.

#### ***Strength/Magnitude/Extent***

Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour and damage paths can be more than one mile wide and 50 miles long. Tornadoes have been known to lift and move objects weighing more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes also can generate a tremendous amount of flying debris or

“missiles,” which often become airborne shrapnel that causes additional damage. If wind speeds are high enough, missiles can be thrown at a building with enough force to penetrate windows, roofs, and walls. However, the less spectacular damage is much more common.

Tornado magnitude is classified according to the EF- Scale (or the Enhance Fujita Scale, based on the original Fujita Scale developed by Dr. Theodore Fujita, a renowned severe storm researcher). The EF- Scale (see **Table 3.40**) 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 3.40. 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/faq/tornado/ef-scale.html](http://www.spc.noaa.gov/faq/tornado/ef-scale.html)

The wind speeds for the EF scale and damage descriptions are based on information on the NOAA Storm Prediction Center as listed in **Table 3.41**. 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](http://www.spc.noaa.gov/efscale/ef-scale.html).

**Table 3.41. 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

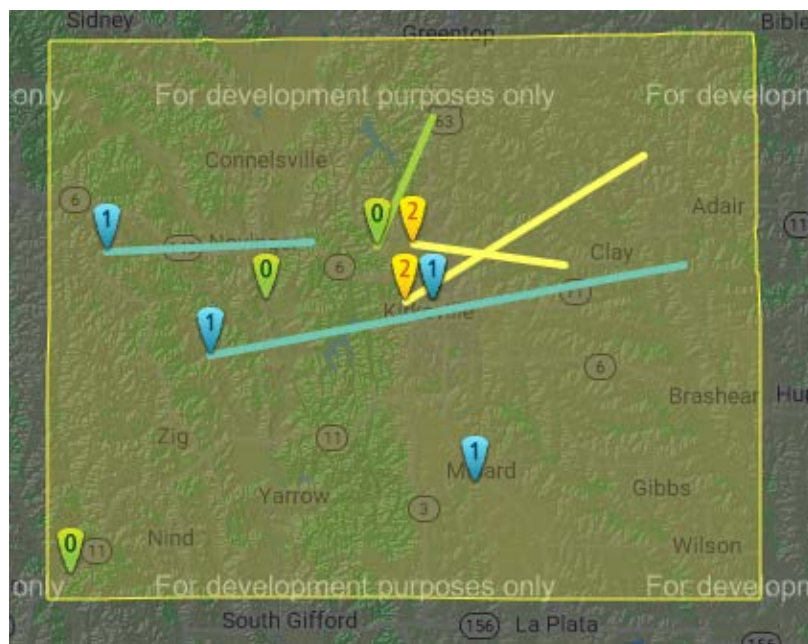
There are limitations to the use of NCEI tornado data that must be noted. For example, one tornado may contain multiple segments as it moves geographically. A tornado that crosses a county line or state line is considered a separate segment for the purposes of reporting to the NCEI. Also, a tornado that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

**Table 3.42. Recorded Tornadoes in Adair County, 1993 – Present**

Date	Beginning Location	Ending Location	Length (miles)	Width (yards)	F/EF Rating	Death	Injury	Property Damage	Crop Damages
6/14/1998	3NW Kirksville	7N Kirksville	5	25	F0	0	0	\$0	\$0
5/13/2009	4NNW Pure Air	2E Novinger	7.72	100	EF1	0	0	\$100,000	\$0
5/13/2009	2NNW Kirksville	2WSW Clay	5.8	150	EF2	2	6	\$5,000,000	\$0
5/4/2010	3SE Loeffler	3SE Loeffler	.1	20	EF0	0	0	\$0	\$0
9/10/2014	2E Pure Air	2SSW Adair	18.27	20	EF1	0	0	\$0	\$0
<b>TOTAL:</b>						<b>2</b>	<b>6</b>	<b>\$5,100,00</b>	<b>\$0</b>

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

**Figure 3.46. Adair County Map of Historic Tornado Events**



Source: Missouri Tornado History Project, <http://www.tornadohistoryproject.com/tornado/Missouri>



Data from the USDA Risk Management Agency showed that from the years 2009-2018 there were no insurance payments in Adair County for crop damages as a result of tornadoes.

### ***Probability of Future Occurrence***

The National Centers for Environmental Information reported 4 tornadoes in Scotland County in a 26-year time period, which calculates to a 15 percent chance of tornado in any given year. Therefore, it is a low probability that some portion of Adair County will experience tornado activity in any given year.

### ***Changing Future Conditions Considerations***

According to the 2018 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 U.S. The research concluded that the number of days with large outbreaks have been increasing since the 1950s 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 the more densely packed tornadoes. Because Missouri experiences on average around 39.6 tornadoes a year, such research is closely followed by meteorologists in the state.

## **Vulnerability**

### ***Vulnerability Overview***

Adair County is located in a region of the U.S. with high frequency of dangerous and destructive tornadoes referred to as “Tornado Alley”. Figure 3.51 illustrates areas where dangerous tornadoes historically have occurred.

From the statistical data collected, six factors were considered in determining overall vulnerability to tornadoes as follows: building exposure, population density, social vulnerability, percentage of mobile homes, likelihood of occurrence, and annual property loss. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. These rating values correspond to the following descriptive terms: 1) Low 2) Low-medium 3) Medium 4) Medium-high 5) High.

**Figure 3.47. Tornado Alley in the U.S.**



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



**Table 3.43. Ranges for Tornado Vulnerability Factors Ratings**

Factors Considered	Low (1)	Low-medium (2)	Medium (3)	Medium-High (4)	High (5)
<b>Common Factors</b>					
Building Exposure (\$)	\$269,532-\$3,224,641	\$3,224,642-\$8,792,829	\$8,792,830-\$22,249,768	\$22,249,769-\$46,880,213	\$46,880,214-\$138,887,850
Population Density (#per sq. mile)	4.11-44.23	44.24-134.91	134.92-259.98	259.99-862.69	862.70-2,836.23
Social Vulnerability	1	2	3	4	5
Percent Mobile Homes	0.2-4.5%	4.51-8.8%	8.81-14%	14.01-21.2%	21.21-33.2%
Likelihood of Occurrence (# of events/ yrs. of data)	0.119 - 0.208	0.209 - 0.313	0.314 - 0.417	0.418 - 0.552	0.553 - 0.791
Total Annualized Property Loss (\$ / yrs. of data)	\$974 - \$281,874	\$281,875 - \$991,825	\$991,826 - \$2,099,000	\$2,099,001 - \$5,047,474	\$5,047,475 - \$42,467,109

Source: 2018 Missouri State Hazard Mitigation Plan

**Table 3.44. Ranges for Tornado Combined Vulnerability Rating**

	Low (1)	Low-medium (2)	Medium (3)	Medium-High (4)	High (5)
Tornado Combined Vulnerability	7-10	11-12	13-14	15-16	17-21

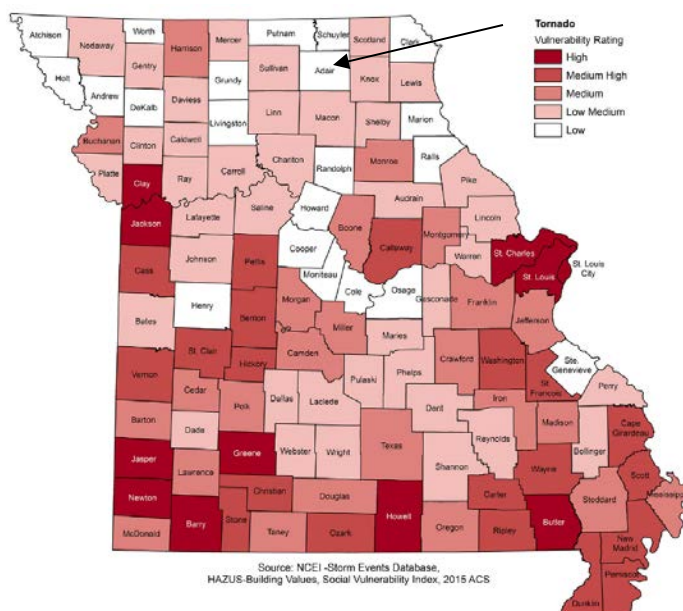
Source: 2018 Missouri State Hazard Mitigation Plan

**Table 3.45. Building Exposure, Population Density, SOVI and Mobile Home Data**

County	Total Building Exposure (Hazus)	Exposure Rating	Population Density	Population Rating	SOVI Index Ranking	SOVI Rating	Percent Mobile Homes	Mobile Home Rating
Adair	\$2,599,614,000	1	44.73	1	Medium	3	8.1	2

Source: 2018 Missouri State Hazard Mitigation Plan

**Figure 3.48. Vulnerability to Tornadoes**

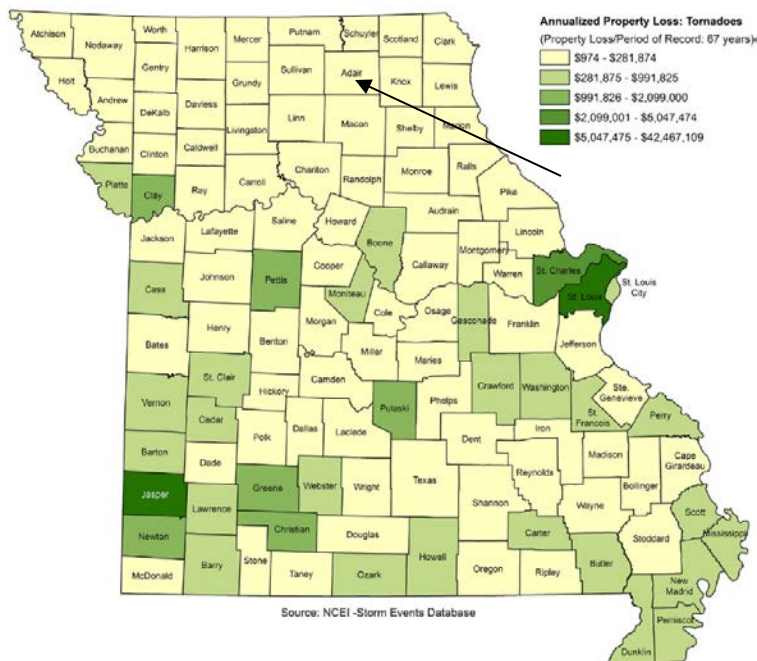


Source: 2018 Missouri State Hazard Mitigation Plan

## Potential Losses to Existing Development

In the past 67 years, Adair County has had minimal annualized property loss(\$974- \$281,874) from tornadoes.

**Figure 3.49. Annualized Property Loss for Tornadoes**



Source: 2018 Missouri State Hazard Mitigation Plan

## Previous and Future Development

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

## Hazard Summary by Jurisdiction

Tornado events could occur anywhere in the planning area, but some jurisdictions would suffer heavier damages because of the age of the housing or the high concentration of mobile homes. Communities that have adopted building codes may also be less vulnerable to damages.

## Problem Statement

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

### **3.4.11 Wildfire**

#### **Hazard Profile**

##### ***Hazard Description***

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

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

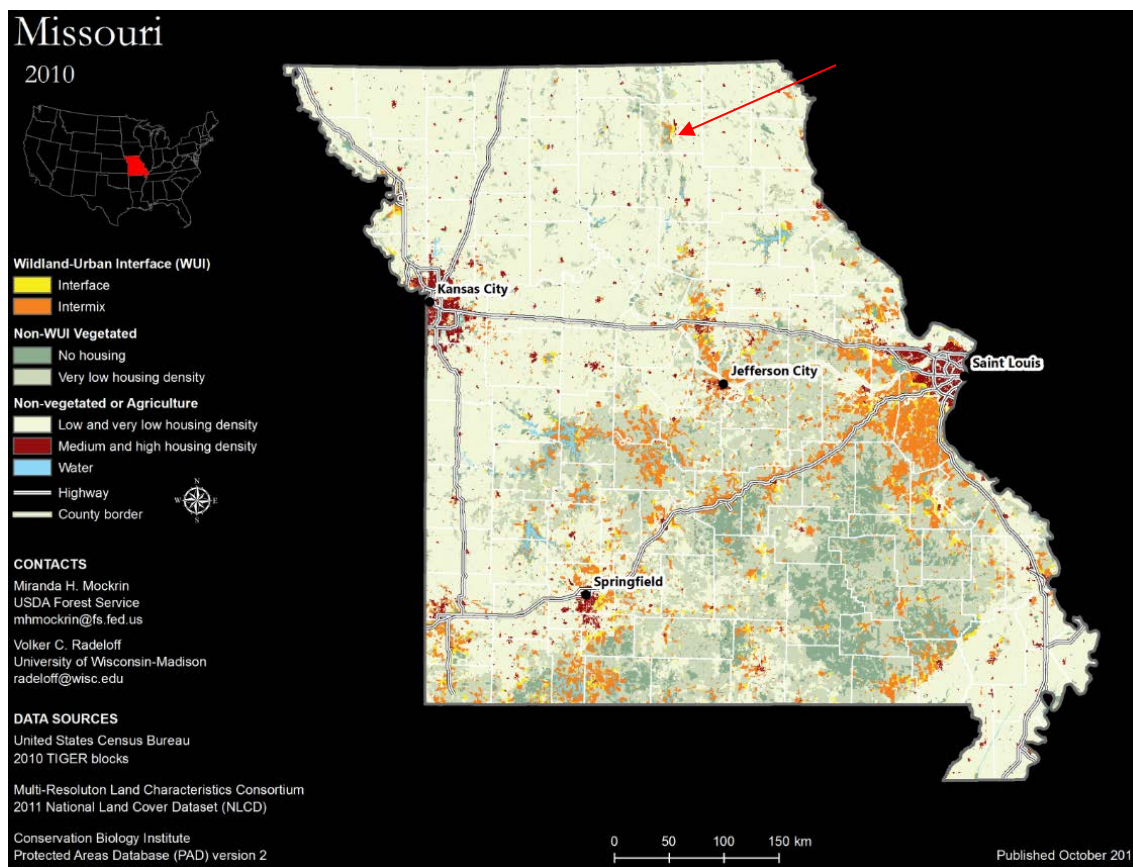
Most of Missouri fires occur during the spring season between February and May. The length and severity of wildland fires depend largely on weather conditions. Spring in Missouri is usually characterized by low humidity and high winds. These conditions result in higher fire danger. In addition, due to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

##### ***Geographic Location***

The term refers to the zone of transition between unoccupied land and human development and needs to be defined in the plan. Within the WUI, there are two specific areas identified: 1) Interface and 2) Intermix. The interface areas are those areas that abut wildland vegetation and the Intermix areas are those areas that intermingle with wildland areas.

According to the 2018 Missouri State Plan the Wildland-Urban Interface estimated the numbers and values of structures and population vulnerable to wildfire as the following: Total number of structures 5,103 valued at \$1,470,441,114 and a population of 10,044. The breakdown of the structures consists of 356 Agriculture valued at \$154,482,424, 390 Commercial valued at \$230,692,247, 34 Education valued at \$131,374,903, 6 Government valued \$3,568,320, 61 Industrial valued at \$44,527,376 and 4,256 Residential valued at \$905,795,844.

**Figure 3.50. 2010 Missouri Wildland Urban Interface**



Source: [http://silvis.forest.wisc.edu/GeoData/WUI\\_cp12/maps/gifs/black/Missouri\\_WUI\\_cp12\\_black\\_2010.gif](http://silvis.forest.wisc.edu/GeoData/WUI_cp12/maps/gifs/black/Missouri_WUI_cp12_black_2010.gif) \*Red Arrow indicates Adair County

### ***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***

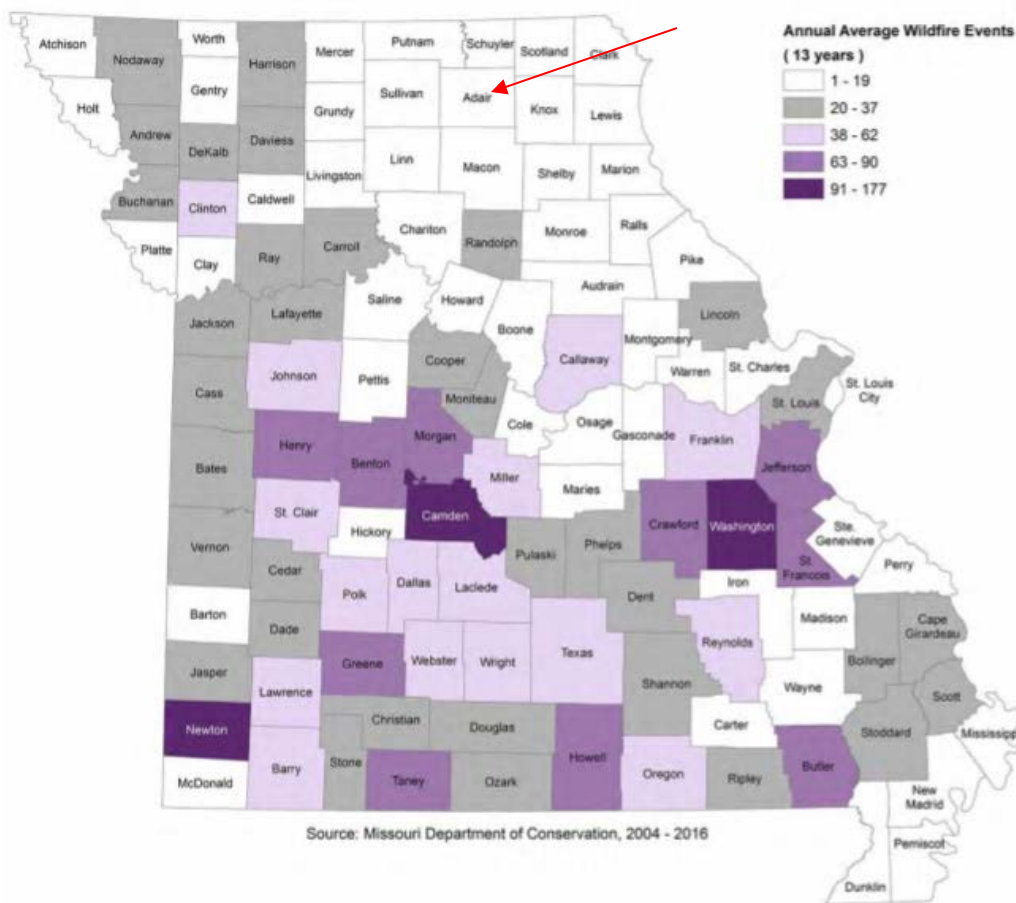
According to the Missouri Division of Fire Safety (MDFS) website, as well as the Missouri Department of Conservation Wildfire data search, there were 99 reported wildland or grass fires in Adair County from 2009 – 2019. In total, these 99 fires burned 1,127.9 acres and no injuries were reported. During the 10-year reporting period, 27 of the fires had an unknown cause for starting and burning 368.33 acres, 46 were started by debris and burnt 610.14 acres, 8 of the fires were started by equipment and burnt 14 acres, 3 of the fires was started by campfire and burnt 8.25 acres, 5 of the fires were started by arson and burnt 31.4 acres.

At this time, no information is available from school districts and special districts regarding previous fire events and the damages resulting from them.

### ***Probability of Future Occurrence***

Wildfires in the planning area are most likely to occur every year with very little resulting damage. The wildfires occur in the unincorporated areas and are limited to undeveloped land. The jurisdictions and school districts are largely surrounded by undeveloped land but have not been affected by wildfires. In years of significant drought or excessive heat the potential for a wildfire in planning area increases.

**Figure 3.51. Likelihood of Wildfire Events 2004 – 2016**



Source: 2018 Missouri State Hazard Mitigation Plan \*red arrow denotes Adair County



When analyzing the wildland fires, there has been an average of 9.9 fires burning 112.79 acres per year. However, it was reported these fires did not result in major damages. The probability score to be likely in any given year that a wildfire could occur in the planning area.

### ***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 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 forest are 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.

## **Vulnerability**

### ***Vulnerability Overview***

According to the 2018 Missouri State Hazard Mitigation Plan, 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.

### ***Potential Losses to Existing Development***

**Table 3.46. Estimated Numbers and Values of Structures and Population Vulnerable to Wildfire in Adair County**

County	Number of Structures	Value of Structures	Population
Adair	5,103	\$1,470,441,114	10,044

Source: 2018 Missouri State Hazard Mitigation Plan

**Figure 3.52. Wildfire Potential Loss Estimates**

County	Total WUI Acreage	Total Structure Value Within WUI	Average Value/Acre within WUI	Average Annual Acreage Burned	Potential Loss
Adair	14,601.51	\$1,470,441,114	\$100,705	126	\$12,688,798

Source: 2018 Missouri State Hazard Mitigation Plan

### ***Impact of Previous and Future Development***

Future and previous development in the wildland-urban interface would increase vulnerability to the hazard.

### ***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. The school districts are located in a rural area and do not face danger of wildfire due to barriers in place around the school. As long as drought conditions are not seriously inflamed, future wildfires in Adair 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 available for the levels of burn bans, many residents lack education in fire safety and not all residents utilize social media and texting. Education needs to occur on the dangers associated with not complying with the burn bans, more education for fire safety and encourage utilization of social media and texting. Due to Adair County's high drought rating, they may be more susceptible to fires.

## 3.4.12 Pandemic

### **Hazard Profile**

#### ***Hazard Description***

According to the Center for Disease Control, a pandemic is a global outbreak of disease. Pandemics happen when a new virus emerges to infect people and can spread between people sustainably. Because there is little to no pre-existing immunity against the new virus, it spreads worldwide.

#### ***Geographic Location***

All of Adair County is susceptible to a pandemic outbreak due to its main characteristic of being on a global level.

#### ***Strength/Magnitude/Extent***

Risk depends on characteristics of the virus, including how well it spreads between people; the severity of resulting illness; and the medical or other measures available to control the impact of the virus (for example, vaccines or medications that can treat the illness) and the relative success of these. In the absence of vaccine or treatment medications, nonpharmaceutical interventions become the most important response strategy. These are community interventions that can reduce the impact of disease.

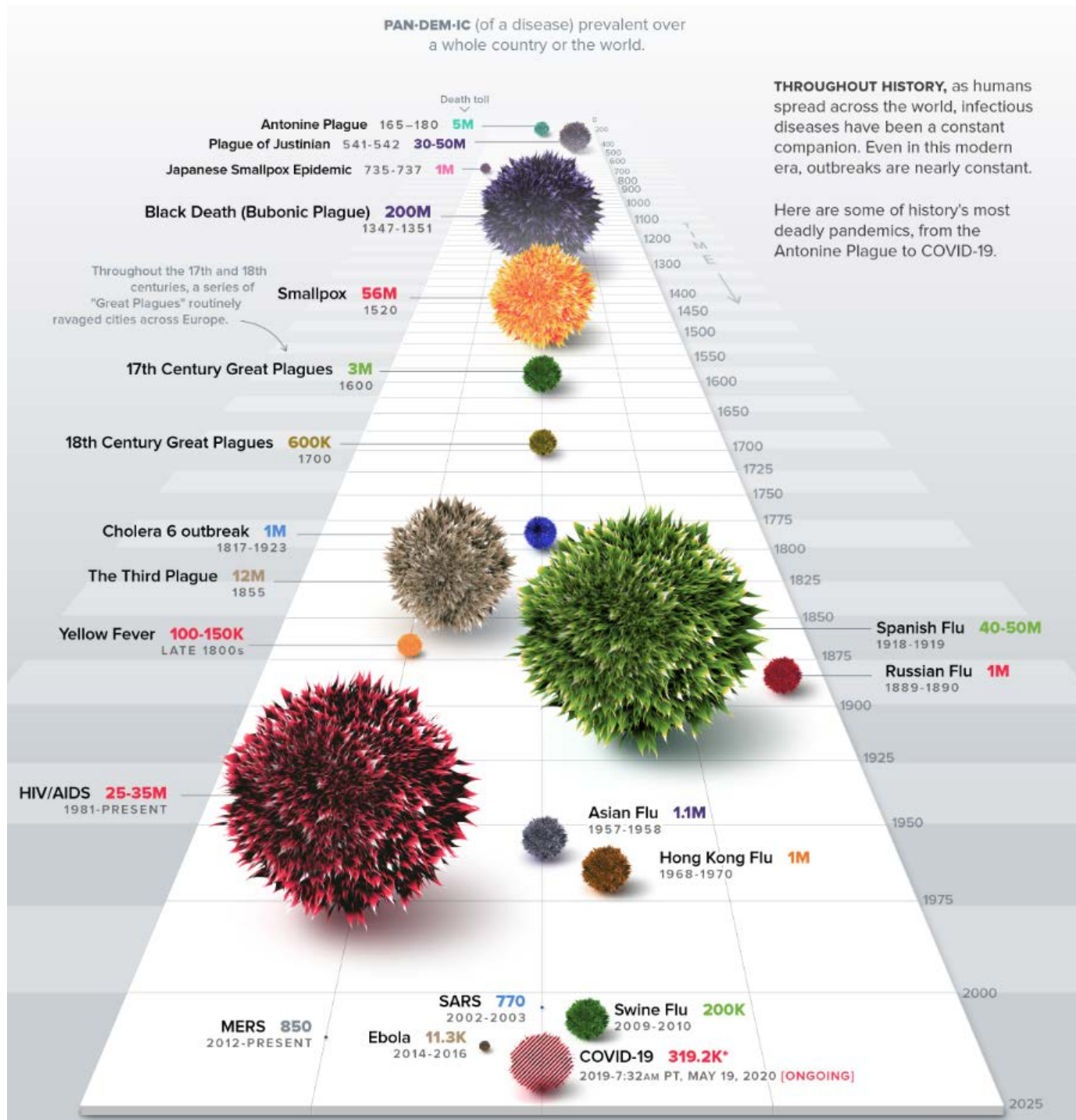
#### ***Previous Occurrences***

The planning area, in addition to others across the globe, is currently in the midst of a pandemic. The virus that causes COVID-19 is infecting people and spreading easily from person-to-person. On March 11, 2020 the COVID-19 outbreak was characterized as a pandemic by the World Health Organization. According to the Center for Disease Control, this is the first pandemic known to be caused by a new coronavirus. In the past century, there have been four pandemics caused by the emergence of new influenza viruses. As a result, most research and guidance around pandemics is specific to influenza, but the same premises can be applied to the current COVID-19 pandemic. Pandemics of respiratory disease follow a certain progression outlined in a “Pandemic Intervals Framework.” Pandemics begin with an investigation phase, followed by recognition, initiation, and acceleration phases. The peak of illnesses occurs at the end of the acceleration phase, which is followed by a deceleration phase, during which there is a decrease in illnesses. Different countries can be in different phases of the pandemic at any point in time and different parts of the same country can also be in different phases of a pandemic.

As humans have spread across the world, so have infectious diseases. Even in this modern era, outbreaks are nearly constant, though not every outbreak reaches pandemic level. **Figure 3.53** below outlines the history of pandemics dating back to 165.



Figure 3.53.



Source: <https://www.visualcapitalist.com/history-of-pandemics-deadliest/>

### Probability of Future Occurrence

The threat of pandemics in the planning area, and across the globe, remains a concern.

## Changing Future Conditions Considerations

Climate change and weather patterns are widely thought to have direct impacts on the probability and severity of future pandemic outbreaks. Habitat loss due to climate is bringing animals that can transmit disease in contact with humans more often. Floods can enhance the spread of infectious agents like insects, bacteria, and viruses. Increasing temperatures and humidity affect the development, survival and spread of not only pathogens, but also their hosts (often animals).

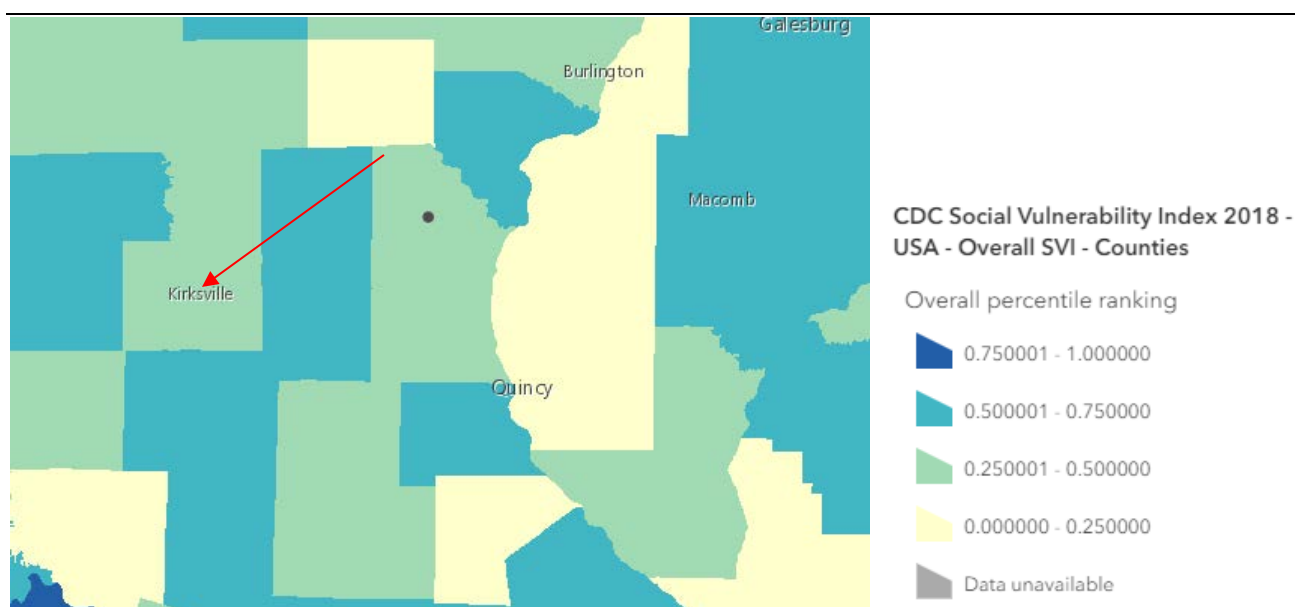
## Vulnerability

### Vulnerability Overview

Each jurisdiction and its population, businesses, and school districts are vulnerable to a pandemic outbreak. Due to a high elderly population throughout the planning area, an outbreak of an infectious or viral disease could have major impacts on the communities and the assets each possess.

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## 3 Social Vulnerability Rating in the United States



Source: <https://livingatlas.arcgis.com/policy/browse/?loc=-90.825,40.309,8&col=88f17b4580e846609f92c9f75a9d9eee,2c8fdc6267e4439e968837020e7618f3,48638a1be455429287d6756985013910,02a82293e2dd475391cb3699b5e82d61,d89c527f2e6b4d658db0948ea9d49cd9,48a70b524601428ba297e3106b751401,be559110b5c34591b1a767fbb807bcbf,e0427fbc472f4a45b7d94d182a5e9591,142e65436bed4063973380feae6ed248&viz=2c8fdc6267e4439e968837020e7618f3&hs=1> (Red Arrow Denotes Adair County)

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## Potential Losses to Existing Development

During a pandemic, COVID-19 for example, people have been ordered to stay home, schools adjourned the remainder of the year, restaurants and bars are forced to close their doors. It is very likely the livelihood of the population and some of the planning area's most beloved assets and businesses will not be able to recover the pandemic due to extreme economic loss and health threats.

## Impact of Previous and Future Development

Pandemics create unprecedented disruption for global health and the development of communities. Urbanization in the developing world is bringing more and more rural residents into denser

neighborhoods, while population increases are putting greater pressure on the environment. In conjunction, air traffic nearly doubled in the past decade. These macro trends are having major impacts on the spread of infectious disease.

### ***Hazard Summary by Jurisdiction***

The planning area is largely rural and many have a sense of “safeness” when it comes to an infectious or viral pandemic, in the sense that most of the population can securely distance themselves from one another, whereas larger cities do not have that luxury. Unfortunately, pandemics happen on a global level and no community is immune.

### **Problem Statement**

In order to keep transmission rates low during a pandemic outbreak, residents need to safely distance themselves as best as possible and follow the numerous Center for Disease Control guidelines. Due to the lack of accessibility to ongoing public health information and broadband connectivity, it is especially challenging to inform residents about current and upcoming pandemic updates. It is an issue in rural America to convey the severity of pandemic outbreaks and provide preparedness instruction because social media, website posts, podcasts, etc. are not an option for every resident in the planning area.

## 4 MITIGATION STRATEGY

4	MITIGATION STRATEGY .....	4.1
4.1	Goals.....	4.1
4.2	Identification and Analysis of Mitigation Actions.....	4.2
4.3	Implementation of Mitigation Actions .....	4.4

**44 CFR Requirement §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.**

This section presents the mitigation strategy updated by the Mitigation Planning Committee (MPC) based on the [updated] risk assessment. The mitigation strategy was developed through a collaborative group process. The process included review of [updated] general goal statements to guide the jurisdictions in lessening disaster impacts as well as specific mitigation actions to directly reduce vulnerability to hazards and losses. The following definitions are taken from FEMA’s *Local Hazard Mitigation Review Guide (October 1, 2012)*.

- **Mitigation Goals** are general guidelines that explain what you want to achieve. Goals are long-term policy statements and global visions that support the mitigation strategy. The goals address the risk of hazards identified in the plan.
- **Mitigation Actions** are specific actions, projects, activities, or processes taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan’s mission and goals.

### 4.1 Goals

**44 CFR Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.**

This planning effort is an update to Adair Counties’ existing hazard mitigation plan approved by FEMA in March 2014. Therefore, the goals from the 2014 Adair 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 planning meeting to review and update the plan goals. To ensure that the goals developed for this update were comprehensive and supported State goals, the 2018 State Hazard Mitigation Plan goals were reviewed. The MPC also reviewed the goals from current surrounding county plans.

**Goal 1:** Public Awareness- Using a variety of communications avenues to increase the citizens awareness of and promote education about the natural hazards that they may face, their vulnerability to these hazards, and how to lessen the effect of future natural hazards.

**Goal 2:** Strengthen communication and coordination between local governments, emergency personnel, public agencies, and citizens to mitigate the effect of future natural hazards.

**Goal 3:** Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties; on natural resources; on infrastructure; and on the local economy.

## 4.2 Identification and Analysis of Mitigation Actions

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**44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.**

During the MPC Planning 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 mitigate risks in the planning area.

During the planning meeting the mitigation strategy was reviewed. For a comprehensive range of mitigation actions to consider, the MPC reviewed the following information during the planning meeting:

- A list of actions proposed in the previous mitigation plan, the current State Plan, and approved plans in surrounding counties,
- Key issues from the risk assessments, including the problem statements concluding each hazard profile and vulnerability analysis,
- State priorities established for HMA grants, and
- Public input during meetings, responses to data collection questionnaires, and other efforts to involve the public in the plan development process.

For the Planning Meeting, 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 B of this plan. During the Planning Meeting a list of actions for each jurisdiction was provided 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, all action items were determined to be ongoing and everyday activities and deleted.

**Table 4.1. Action Status Summary**

<b>Jurisdiction</b>	<b>Completed Actions</b>	<b>Continuing Actions (ongoing or modify)</b>	<b>Deleted Actions</b>
<b>Adair County (Unincorp.)</b>	<b>0</b>	<b>4</b>	<b>6</b>
<b>City of Kirksville</b>	<b>0</b>	<b>2</b>	<b>5</b>
<b>City of Novinger</b>	<b>0</b>	<b>2</b>	<b>5</b>
<b>City of Brashear</b>	<b>0</b>	<b>2</b>	<b>5</b>
<b>Village of Novinger</b>	<b>0</b>	<b>2</b>	<b>5</b>
<b>Village of Gibbs</b>	<b>0</b>	<b>2</b>	<b>5</b>
<b>Adair County R-I</b>	<b>0</b>	<b>2</b>	<b>5</b>
<b>Adair County R-II</b>	<b>0</b>	<b>2</b>	<b>5</b>
<b>Kirksville R-III</b>	<b>0</b>	<b>2</b>	<b>5</b>

**Table 4.2. Summary Deleted Actions from the Previous Plan**

<b>Deleted Actions</b>	<b>Reason for Deletion</b>
Promote the use of weather radios. (All Jurisdictions)	This activity was determined to be an everyday/ongoing activity.
Implement tree trimming programs, dead tree removal programs. (All Jurisdictions)	This activity was determined to be an everyday/ongoing activity.
Encourage minimum standards for building codes in all cities. (All Jurisdictions)	This activity was determined to be an everyday/ongoing activity.
Encourage local governments to develop and implement regulations for securing of hazardous materials tanks and mobile homes. (Adair County)	This activity was determined to be an everyday/ongoing activity.
Establish an education program on emergency procedures and hazard mitigation, and encourage educational emergency management press releases. (All Jurisdictions)	This activity was determined to be an everyday/ongoing activity.
Crate and publicize countywide and/or citywide drills. (All Jurisdictions)	This activity was determined to be an everyday/ongoing activity.

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

## 4.3 Implementation of Mitigation Actions

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**44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include an action strategy describing how the actions identified in paragraph (c)(2)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefits review of the proposed projects and their associated costs.**

Jurisdictional MPC members were encouraged to meet with others in their community to finalize the actions to be submitted for the updated mitigation strategy. Throughout the MPC consideration and discussion, emphasis was placed on the importance of a benefit-cost analysis in determining project priority. The Disaster Mitigation Act requires benefit-cost review as the primary method by which mitigation projects should be prioritized. The MPC decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the 2018 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.

The plan must indicate if the prioritization process and/or methodology have changed since the previous plan's adoption. If the process has changed, describe how it changed and why it changed. If the prioritization process and methodology have not changed, state this here in the plan with a description. Actions should be prioritized independently for EACH jurisdiction. For example, if two communities each have an action to acquire flood prone properties, these should be evaluated independently based on each jurisdiction's capabilities.

FEMA's STAPLEE methodology was used to assess the costs and benefits, overall feasibility of mitigation actions, and other issues impacting project. During the prioritization process, the jurisdictions used worksheets to assign scores. The worksheets posed questions based on the STAPLEE elements as well as the potential mitigation effectiveness of each action. 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 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		
<b>Name of Jurisdiction:</b>		
<b>Action or Project</b>		
<b>Action/Project Number:</b>	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)	
<b>Name of Action or Project:</b>		
<b>Mitigation Category:</b>	Prevention; Structure and Infrastructure Projects; Natural Systems Protection; Education and Outreach; Emergency Services	
STAPLEE Criteria	<b>Evaluation Rating</b> Definitely YES = 3    Maybe YES = 2 Probably NO = 1    Definitely NO = 0	Score
<b>S:</b> Is it <b>Socially</b> Acceptable		
<b>T:</b> Is it <b>Technically</b> feasible and potentially successful?		
<b>A:</b> Does the jurisdiction have the <b>Administrative</b> capacity to execute this action?		
<b>P:</b> Is it <b>Politically</b> acceptable?		
<b>L:</b> Is there <b>Legal</b> authority to implement?		
<b>E:</b> Is it <b>Economically</b> beneficial?		
<b>E:</b> Will the project have either a neutral or positive impact on the natural <b>Environment</b> ?		
Will historic structures be saved or protected?		
Could it be implemented quickly?		
<b>STAPLEE SCORE</b>		
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.	
<b>MITIGATION EFFECTIVENESS SCORE</b>		
<b>TOTAL SCORE (STAPLEE + Mitigation Effectiveness)</b>		

<input type="checkbox"/> <b>High Priority</b> (30+ points)	<input type="checkbox"/> <b>Medium Priority</b> (25 - 29 points)	<input type="checkbox"/> <b>Low Priority</b> (<25 points)
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Completed by  
(Name, Title, Phone Number)

## ACTION WORKSHEET: Example

Action Worksheet	
<b>Name of Jurisdiction:</b>	
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	List the hazard or hazards that will be addressed by this action
<b>Problem being Mitigated:</b>	Provide a brief description of the problem that the action will address. Utilize the problem statement developed in the risk assessment.
Action or Project	
<b>Applicable Goal Statement:</b>	Choose the goal statement that applies to this action
<b>Action/Project Number:</b>	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)
<b>Name of Action or Project:</b>	
<b>Mitigation Category:</b>	Prevention; Structure and Infrastructure Projects; Natural Systems Protection; Education and Outreach; Emergency Services
<b>Action or Project Description:</b>	Describe the action or project.
<b>Estimated Cost:</b>	Provide an estimate of the cost to implement this action. This can be accomplished with a range of estimated costs.
<b>Benefits:</b>	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	
<b>Responsible Organization/Department:</b>	Which organization will be responsible for tracking this action? Be specific to include the specific department or position within a department.
<b>Action/Project Priority:</b>	Include the STAPLEE score and Priority (H, M, L)
<b>Timeline for Completion:</b>	How many months/years to complete.
<b>Potential Fund Sources:</b>	List specific funding sources that may be used to pay for the implementation of the action.
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	
Progress Report	
<b>Action Status:</b>	Indicate status as New, Continuing Not Started, or Continuing in Progress)
<b>Report of Progress:</b>	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	
<b>Name of Jurisdiction:</b>	Adair County
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Flooding
<b>Problem being Mitigated:</b>	Participate in the NFIP
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Adair County 2020.1
<b>Name of Action or Project:</b>	NFIP Participation
<b>Mitigation Category:</b>	Natural Systems Protection, Structure and Infrastructure Projects, Emergency Services, Education and Outreach
<b>Action or Project Description:</b>	Become a fully certified participant in the National Flood Insurance Program
<b>Estimated Cost:</b>	NA
<b>Benefits:</b>	Protection of life and reduction of damages due to accessibility to citizens in times of need.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	County Commission / EMD
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1 Year
<b>Potential Fund Sources:</b>	County Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	Floodplain Ordinance
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
Name of Jurisdiction:	Adair County
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Early Warning Sirens
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Adair County 2020.2
Name of Action or Project:	Install/Upgrade Warning Sirens
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services
Action or Project Description:	Installation or upgrade of warning sirens in areas of the County needing a siren or one upgraded.
Estimated Cost:	\$75,000
Benefits:	Mitigation actions will limit the future harm to structures and lives in the County.
Plan for Implementation	
Responsible Organization/Department:	County EMD
Action/Project Priority:	Medium Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

<b>Action Worksheet</b>	
<b>Name of Jurisdiction:</b>	Adair County
<b>Risk / Vulnerability</b>	
<b>Hazard(s) Addressed:</b>	Flooding, Severe Thunderstorms, Winter Weather
<b>Problem being Mitigated:</b>	Protecting lives from natural hazards
<b>Action or Project</b>	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Adair County 2020.3
<b>Name of Action or Project:</b>	Maintain Transportation Infrastructure
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Project will make necessary improvements to roads, culverts, low water crossings, road elevations, bank stabilizations, bridges and the general transportation infrastructure throughout the city.
<b>Estimated Cost:</b>	\$750,000
<b>Benefits:</b>	The project protects citizens from harm due to damaged transportation infrastructure.
<b>Plan for Implementation</b>	
<b>Responsible Organization/Department:</b>	County Commission / EMD
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	NA
<b>Progress Report</b>	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
Name of Jurisdiction:	Adair County
Risk / Vulnerability	
Hazard(s) Addressed:	Pandemic
Problem being Mitigated:	Protecting lives from pandemic outbreaks.
Action or Project	
Applicable Goal Statement:	Goal 2: Strengthen communication and coordination between local governments, emergency personnel, public agencies, and citizens to mitigate the effect of future natural hazards
Action/Project Number:	Adair County 2020.4
Name of Action or Project:	Response to Pandemic
Mitigation Category:	Emergency Services, Prevention, Public Education
Action or Project Description:	Project will provide necessary resources for the response to pandemic outbreaks.
Estimated Cost:	\$500,000
Benefits:	The project protects citizens from harm due to pandemic outbreaks.
Plan for Implementation	
Responsible Organization/Department:	County Commission / EMD
Action/Project Priority:	Medium Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

<b>Action Worksheet</b>	
<b>Name of Jurisdiction:</b>	Adair County
<b>Risk / Vulnerability</b>	
<b>Hazard(s) Addressed:</b>	Tornado, Severe Thunderstorms
<b>Problem being Mitigated:</b>	Lack of shelter for residents.
<b>Action or Project</b>	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Adair County 2020.5
<b>Name of Action or Project:</b>	Safe Rooms and Storm Shelters
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Build safe rooms and establish local ordinances requiring community storm shelters within sizable mobile home parks and subdivisions.
<b>Estimated Cost:</b>	\$1,000,000
<b>Benefits:</b>	The project protects citizens from harm due to tornados or severe thunderstorms.
<b>Plan for Implementation</b>	
<b>Responsible Organization/Department:</b>	County Commission / EMD
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	NA
<b>Progress Report</b>	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	Adair County
<b>Risk / Vulnerability</b>	
<b>Hazard(s) Addressed:</b>	Extreme Temperature, Severe Thunderstorm, Severe Winter Weather, Tornado
<b>Problem being Mitigated:</b>	Generator for Shelter(s)
<b>Action or Project</b>	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Adair County 2020.6
<b>Name of Action or Project:</b>	Generator for Shelter(s)
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Obtain a generator for shelters as funds become available.
<b>Estimated Cost:</b>	\$65,000
<b>Benefits:</b>	Generator will allow for continued use of shelters for service to citizens in the event of an outage, this would be beneficial during any hazard.
<b>Plan for Implementation</b>	
<b>Responsible Organization/Department:</b>	County Commission / EMD
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds / RHSOC
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	NA
<b>Progress Report</b>	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project



<b>Action Worksheet</b>	
<b>Name of Jurisdiction:</b>	Adair County
<b>Risk / Vulnerability</b>	
<b>Hazard(s) Addressed:</b>	All Hazards
<b>Problem being Mitigated:</b>	Need for central emergency operation center in the event of disaster.
<b>Action or Project</b>	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Adair County 2020.7
<b>Name of Action or Project:</b>	Emergency Operations Center
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services, Response
<b>Action or Project Description:</b>	Obtain equipment to establish an emergency operations center.
<b>Estimated Cost:</b>	\$200,000
<b>Benefits:</b>	An established EOC allows a designated area to be utilized for emergency situations.
<b>Plan for Implementation</b>	
<b>Responsible Organization/Department:</b>	County Commission / EMD
<b>Action/Project Priority:</b>	Medium Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	NA
<b>Progress Report</b>	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Kirksville
<b>Risk / Vulnerability</b>	
<b>Hazard(s) Addressed:</b>	Flooding
<b>Problem being Mitigated:</b>	Continue to participate in the NFIP
<b>Action or Project</b>	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Kirksville 2020.1
<b>Name of Action or Project:</b>	NFIP Participation
<b>Mitigation Category:</b>	Natural Systems Protection, Structure and Infrastructure Projects, Emergency Services, Education and Outreach
<b>Action or Project Description:</b>	Continue City of Kirksville's participation and good standing in the National Flood Insurance Program.
<b>Estimated Cost:</b>	NA
<b>Benefits:</b>	Protection of life and reduction of damages due to accessibility to citizens in times of need.
<b>Plan for Implementation</b>	
<b>Responsible Organization/Department:</b>	City Manager / EMD
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1 Year
<b>Potential Fund Sources:</b>	City Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	Floodplain Ordinance
<b>Progress Report</b>	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Kirksville
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	All Hazards
<b>Problem being Mitigated:</b>	Early Warning Siren
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Kirksville 2020.2
<b>Name of Action or Project:</b>	Installation/Upgrade Sirens
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Increase number of outdoor warning speakers/sirens. Expand the utilization of existing Mass Notification System/IPAWS to additional local agencies. Increase E911 capabilities to accommodate "Next-Generation" 911/text to 911.
<b>Estimated Cost:</b>	\$1,000,000
<b>Benefits:</b>	Improved communications in emergencies. Reduce loss of life and property by improving emergency reporting and communication to the public.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	EMD/911 Coordinator
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	2-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds/Local Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	LEOP
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Kirksville
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Extreme Temperatures, Severe Winter Weather
<b>Problem being Mitigated:</b>	Lack of shelter for elderly and at-risk population from extreme temperatures.
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Kirksville 2020.3
<b>Name of Action or Project:</b>	Extreme Temperature Shelters
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Increase access to cooling/warming centers by partnering with community organizations and/or increase utility support programs.
<b>Estimated Cost:</b>	\$50,000
<b>Benefits:</b>	Reduce injury to at risk populations.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	EMD
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	2-3 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds / Local
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	LEOP
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Kirksville
<b>Risk / Vulnerability</b>	
<b>Hazard(s) Addressed:</b>	Tornado, Severe Thunderstorms, Flash Flooding, Riverine Flooding
<b>Problem being Mitigated:</b>	Lack of shelter for residents.
<b>Action or Project</b>	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Kirksville 2020.4
<b>Name of Action or Project:</b>	Safe Rooms and Storm Shelters
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Build safe rooms and establish local ordinances requiring community storm shelters within sizable mobile home parks and subdivisions.
<b>Estimated Cost:</b>	\$1,000,000
<b>Benefits:</b>	The project protects citizens from harm due to tornados or severe thunderstorms.
<b>Plan for Implementation</b>	
<b>Responsible Organization/Department:</b>	EMD
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	2-3 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds / Local Funding
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	LEOP
<b>Progress Report</b>	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
Name of Jurisdiction:	City of Kirksville
Risk / Vulnerability	
Hazard(s) Addressed:	Riverine Flooding, Flash Flooding, Dam Failure
Problem being Mitigated:	Unregulated at-risk dams.
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Kirksville 2020.5
Name of Action or Project:	Dam Protection
Mitigation Category:	Prevention
Action or Project Description:	Mandate professional dam inspections for all at-risk dams in the City. Identify downstream at-risk structures and regulate construction in at-risk flood plains.
Estimated Cost:	Unknown
Benefits:	Reduce the loss to property and economic losses from dam failure.
Plan for Implementation	
Responsible Organization/Department:	Codes/Planning
Action/Project Priority:	High
Timeline for Completion:	10 years
Potential Fund Sources:	Local, State/Federal Grants
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	New
Report of Progress:	New

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Kirksville
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Flooding
<b>Problem being Mitigated:</b>	Flooding Throughout the City Roadways / Storm Drains
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Kirksville 2020.6
<b>Name of Action or Project:</b>	Flood Mitigation
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Reduce risks to life and property by identifying at-risk roadways, bridges, crossings, and storm drainage, and planning projects to mitigate the hazard.
<b>Estimated Cost:</b>	\$1,000,000
<b>Benefits:</b>	Mitigation actions will limit the future harm to structures and lives in the County.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	Codes/Planning
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	Floodplain Ordinance
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Kirksville
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Wildfire
<b>Problem being Mitigated:</b>	Reduce rise of wildfire through education, enforcement, and communication.
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Kirksville 2020.7
<b>Name of Action or Project:</b>	Fire Mitigation
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Reduce the potential impact of wildfire by identifying high risk interface areas, conducting fuels mitigation, and increasing wildland firefighting training and equipment.
<b>Estimated Cost:</b>	\$20,000
<b>Benefits:</b>	Mitigation actions will limit the future harm to structures, property and lives in the County.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	Fire Dept.
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	2-3 years
<b>Potential Fund Sources:</b>	Local, State/Federal Grants
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	LEOP
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project



Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Kirksville
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Drought
<b>Problem being Mitigated:</b>	Water shortage from severe drought
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Kirksville 2020.8
<b>Name of Action or Project:</b>	Water Source Protection
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Maintain the capacity and quality of local water supplies through watershed and reservoir maintenance.
<b>Estimated Cost:</b>	\$500,000
<b>Benefits:</b>	Maintains the quality and capacity of available reservoirs to provide adequate water during extended drought.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	Public Works
<b>Action/Project Priority:</b>	Low
<b>Timeline for Completion:</b>	5-10 Years
<b>Potential Fund Sources:</b>	Local, State/Federal Grants
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Kirksville
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Riverine Flooding, Flash Flooding, Severe Thunderstorm, Tornado
<b>Problem being Mitigated:</b>	Reduce the impacts of severe weather
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Kirksville 2020.9
<b>Name of Action or Project:</b>	Improved Communication and Coordination
<b>Mitigation Category:</b>	Emergency Services
<b>Action or Project Description:</b>	Improve communications and agency coordination by developing a dedicated EOC with integrated technology including communication, notification, and situational awareness equipment and connectivity.
<b>Estimated Cost:</b>	\$100,000
<b>Benefits:</b>	Improve notification and response to severe weather, reducing the impact on the community.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	Emergency Management
<b>Action/Project Priority:</b>	High
<b>Timeline for Completion:</b>	2-3 Years
<b>Potential Fund Sources:</b>	Local, State/Federal Grants
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	LEOP
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
Name of Jurisdiction:	City of Novinger
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Continue to participate in the NFIP
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Novinger 2020.1
Name of Action or Project:	NFIP Participation
Mitigation Category:	Natural Systems Protection, Structure and Infrastructure Projects, Emergency Services, Education and Outreach
Action or Project Description:	Continue City of Novinger's participation and good standing in the National Flood Insurance Program.
Estimated Cost:	NA
Benefits:	Protection of life and reduction of damages due to accessibility to citizens in times of need.
Plan for Implementation	
Responsible Organization/Department:	City Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1 Year
Potential Fund Sources:	City Funds
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain Ordinance
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

Action Worksheet	
Name of Jurisdiction:	City of Novinger
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Early Warning Siren
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Novinger 2020.2
Name of Action or Project:	Installation/Upgrade Sirens
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services
Action or Project Description:	Installation or the upgrade of warning sirens in areas of the City needing a siren or the siren upgraded.
Estimated Cost:	\$25,000
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 Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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 Novinger
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Severe Thunderstorms, Winter Storms
Problem being Mitigated:	Protecting lives from natural hazards
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Novinger 2020.3
Name of Action or Project:	Maintain Transportation Infrastructure
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services, Response
Action or Project Description:	Project will make necessary improvements to roads, culverts, low water crossings, road elevations, bank stabilizations, bridges and the general transportation infrastructure throughout the City.
Estimated Cost:	\$400,000
Benefits:	The project protects citizens from harm due to damaged transportation infrastructures.
Plan for Implementation	
Responsible Organization/Department:	City Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Novinger
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Tornado, Severe Thunderstorms
<b>Problem being Mitigated:</b>	Lack of shelter for residents.
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Novinger 2020.4
<b>Name of Action or Project:</b>	Safe Rooms and Storm Shelters
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Build safe rooms and establish local ordinances requiring community storm shelters within sizable mobile home parks and subdivisions.
<b>Estimated Cost:</b>	\$1,000,000
<b>Benefits:</b>	The project protects citizens from harm due to tornados or severe thunderstorms.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	City Clerk
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	NA
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

<b>Action Worksheet</b>	
<b>Name of Jurisdiction:</b>	City of Brashear
<b>Risk / Vulnerability</b>	
<b>Hazard(s) Addressed:</b>	Flooding
<b>Problem being Mitigated:</b>	Participate in the NFIP
<b>Action or Project</b>	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Brashear 2020.1
<b>Name of Action or Project:</b>	Establish NFIP Participation
<b>Mitigation Category:</b>	Natural Systems Protection, Structure and Infrastructure Projects, Emergency Services, Education and Outreach
<b>Action or Project Description:</b>	Establish participation and good standing in the National Flood Insurance Program.
<b>Estimated Cost:</b>	NA
<b>Benefits:</b>	Protection of life and reduction of damages due to accessibility to citizens in times of need.
<b>Plan for Implementation</b>	
<b>Responsible Organization/Department:</b>	City Clerk
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1 Year
<b>Potential Fund Sources:</b>	City Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	Floodplain Ordinance
<b>Progress Report</b>	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
Name of Jurisdiction:	City of Brashear
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Early Warning Siren
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Brashear 2020.2
Name of Action or Project:	Installation/Upgrade Sirens
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services
Action or Project Description:	Installation or the upgrade of warning sirens in areas of the City needing a siren or the siren upgraded.
Estimated Cost:	\$25,000
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 Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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 Brashear
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Severe Thunderstorms, Winter Storms
Problem being Mitigated:	Protecting lives from natural hazards
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Brashear 2020.3
Name of Action or Project:	Maintain Transportation Infrastructure
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services, Response
Action or Project Description:	Project will make necessary improvements to roads, culverts, low water crossings, road elevations, bank stabilizations, bridges and the general transportation infrastructure throughout the City.
Estimated Cost:	\$400,000
Benefits:	The project protects citizens from harm due to damaged transportation infrastructures.
Plan for Implementation	
Responsible Organization/Department:	City Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	City of Brashear
<b>Risk / Vulnerability</b>	
<b>Hazard(s) Addressed:</b>	Tornado, Severe Thunderstorms
<b>Problem being Mitigated:</b>	Lack of shelter for residents.
<b>Action or Project</b>	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Brashear 2020.4
<b>Name of Action or Project:</b>	Safe Rooms and Storm Shelters
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Build safe rooms and establish local ordinances requiring community storm shelters within sizable mobile home parks and subdivisions.
<b>Estimated Cost:</b>	\$1,000,000
<b>Benefits:</b>	The project protects citizens from harm due to tornados or severe thunderstorms.
<b>Plan for Implementation</b>	
<b>Responsible Organization/Department:</b>	City Clerk
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	NA
<b>Progress Report</b>	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
Name of Jurisdiction:	Village of Millard
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Participate in the NFIP
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Millard 2020.1
Name of Action or Project:	Establish NFIP Participation
Mitigation Category:	Natural Systems Protection, Structure and Infrastructure Projects, Emergency Services, Education and Outreach
Action or Project Description:	Establish participation and good standing in the National Flood Insurance Program.
Estimated Cost:	NA
Benefits:	Protection of life and reduction of damages due to accessibility to citizens in times of need.
Plan for Implementation	
Responsible Organization/Department:	City Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1 Year
Potential Fund Sources:	City Funds
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain Ordinance
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

Action Worksheet	
Name of Jurisdiction:	Village of Millard
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Early Warning Siren
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Millard 2020.2
Name of Action or Project:	Installation/Upgrade Sirens
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services
Action or Project Description:	Installation or the upgrade of warning sirens in areas of the Village needing a siren or the siren upgraded.
Estimated Cost:	\$25,000
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 Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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:	Village of Millard
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Severe Thunderstorms, Winter Storms
Problem being Mitigated:	Protecting lives from natural hazards
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Millard 2020.3
Name of Action or Project:	Maintain Transportation Infrastructure
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services, Response
Action or Project Description:	Project will make necessary improvements to roads, culverts, low water crossings, road elevations, bank stabilizations, bridges and the general transportation infrastructure throughout the village.
Estimated Cost:	\$400,000
Benefits:	The project protects citizens from harm due to damaged transportation infrastructures.
Plan for Implementation	
Responsible Organization/Department:	City Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	Village of Millard
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Tornado, Severe Thunderstorms
<b>Problem being Mitigated:</b>	Lack of shelter for residents.
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Millard 2020.4
<b>Name of Action or Project:</b>	Safe Rooms and Storm Shelters
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Build safe rooms and establish local ordinances requiring community storm shelters within the village.
<b>Estimated Cost:</b>	\$500,000
<b>Benefits:</b>	The project protects citizens from harm due to tornados or severe thunderstorms.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	City Clerk
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	NA
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
Name of Jurisdiction:	Village of Gibbs
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Participate in the NFIP
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Gibbs 2020.1
Name of Action or Project:	Establish NFIP Participation
Mitigation Category:	Natural Systems Protection, Structure and Infrastructure Projects, Emergency Services, Education and Outreach
Action or Project Description:	Establish participation and good standing in the National Flood Insurance Program.
Estimated Cost:	NA
Benefits:	Protection of life and reduction of damages due to accessibility to citizens in times of need.
Plan for Implementation	
Responsible Organization/Department:	City Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1 Year
Potential Fund Sources:	City Funds
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain Ordinance
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

Action Worksheet	
Name of Jurisdiction:	Village of Gibbs
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Early Warning Siren
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Gibbs 2020.2
Name of Action or Project:	Installation/Upgrade Sirens
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services
Action or Project Description:	Installation or the upgrade of warning sirens in areas of the Village needing a siren or the siren upgraded.
Estimated Cost:	\$25,000
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 Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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:	Village of Gibbs
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Severe Thunderstorms, Winter Storms
Problem being Mitigated:	Protecting lives from natural hazards
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Gibbs 2020.3
Name of Action or Project:	Maintain Transportation Infrastructure
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services, Response
Action or Project Description:	Project will make necessary improvements to roads, culverts, low water crossings, road elevations, bank stabilizations, bridges and the general transportation infrastructure throughout the village.
Estimated Cost:	\$400,000
Benefits:	The project protects citizens from harm due to damaged transportation infrastructures.
Plan for Implementation	
Responsible Organization/Department:	City Clerk
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project

Action Worksheet	
<b>Name of Jurisdiction:</b>	Village of Gibbs
Risk / Vulnerability	
<b>Hazard(s) Addressed:</b>	Tornado, Severe Thunderstorms
<b>Problem being Mitigated:</b>	Lack of shelter for residents.
Action or Project	
<b>Applicable Goal Statement:</b>	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
<b>Action/Project Number:</b>	Gibbs 2020.4
<b>Name of Action or Project:</b>	Safe Rooms and Storm Shelters
<b>Mitigation Category:</b>	Prevention, Structure and Infrastructure Projects, Emergency Services
<b>Action or Project Description:</b>	Build safe rooms and establish local ordinances requiring community storm shelters within the village.
<b>Estimated Cost:</b>	\$500,000
<b>Benefits:</b>	The project protects citizens from harm due to tornados or severe thunderstorms.
Plan for Implementation	
<b>Responsible Organization/Department:</b>	City Clerk
<b>Action/Project Priority:</b>	High Priority
<b>Timeline for Completion:</b>	1-5 Year
<b>Potential Fund Sources:</b>	Hazard Mitigation Grant Funds
<b>Local Planning Mechanisms to be Used in Implementation, if any:</b>	NA
Progress Report	
<b>Action Status:</b>	NEW
<b>Report of Progress:</b>	NEW Project

Action Worksheet	
Name of Jurisdiction:	Adair County R-1
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Severe Thunderstorms, Earthquake
Problem being Mitigated:	Lack of shelter for students and employees of the district.
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Adair County R-1 2020.1
Name of Action or Project:	Safe Rooms
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services
Action or Project Description:	Build safe rooms
Estimated Cost:	\$1,000,000
Benefits:	Protect human lives.
Plan for Implementation	
Responsible Organization/Department:	Adair County R-1 Superintendent
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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:	Adair County R-1
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Severe Thunderstorms, Earthquake
Problem being Mitigated:	Lack of intercom system throughout entire school.
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Adair County R-1 2020.2
Name of Action or Project:	Intercom System
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services, Outreach
Action or Project Description:	Upgrade intercom system.
Estimated Cost:	\$150,000
Benefits:	Protect human lives.
Plan for Implementation	
Responsible Organization/Department:	Adair County R-1 Superintendent
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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:	Adair County R-II
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Severe Thunderstorms, Earthquake
Problem being Mitigated:	Lack of shelter for students and employees of the district.
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Adair County R-II 2020.1
Name of Action or Project:	Safe Rooms
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services
Action or Project Description:	Build safe rooms
Estimated Cost:	\$1,000,000
Benefits:	Protect human lives.
Plan for Implementation	
Responsible Organization/Department:	Adair County R-II Superintendent
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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:	Adair County R-II
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Severe Thunderstorms, Earthquake
Problem being Mitigated:	Lack of intercom system throughout entire school.
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Adair County R-II 2020.2
Name of Action or Project:	Intercom System
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services, Outreach
Action or Project Description:	Upgrade intercom system.
Estimated Cost:	\$150,000
Benefits:	Protect human lives.
Plan for Implementation	
Responsible Organization/Department:	Adair County R-II Superintendent
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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:	Kirksville R-III
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Severe Thunderstorms, Earthquake
Problem being Mitigated:	Lack of shelter for students and employees of the district.
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Kirksville R-III 2020.1
Name of Action or Project:	Safe Rooms
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services
Action or Project Description:	Build safe rooms
Estimated Cost:	\$1,000,000
Benefits:	Protect human lives.
Plan for Implementation	
Responsible Organization/Department:	Kirksville R-III Superintendent
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
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:	Kirksville R-III
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Severe Thunderstorms, Earthquake
Problem being Mitigated:	Lack of intercom system throughout entire school.
Action or Project	
Applicable Goal Statement:	Goal 3: Investigate, implement, maintain, and enforce mitigation policies and programs that limit the impact of natural hazards: on the loss of life; on new and existing properties.
Action/Project Number:	Kirksville R-III 2020.2
Name of Action or Project:	Intercom System
Mitigation Category:	Prevention, Structure and Infrastructure Projects, Emergency Services, Outreach
Action or Project Description:	Upgrade intercom system.
Estimated Cost:	\$150,000
Benefits:	Protect human lives.
Plan for Implementation	
Responsible Organization/Department:	Kirksville R-III Superintendent
Action/Project Priority:	High Priority
Timeline for Completion:	1-5 Year
Potential Fund Sources:	Hazard Mitigation Grant Funds
Local Planning Mechanisms to be Used in Implementation, if any:	NA
Progress Report	
Action Status:	NEW
Report of Progress:	NEW Project



# 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

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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 Pla

**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 Adair County MPC is an advisory body and can only make recommendations to county, city, town, or district elected officials. Its primary duty is 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 Adair County Commission will be responsible for initiating the plan reviews and will invite members of the MPC (or other designated responsible entity) to the meeting.

In coordination with all participating jurisdictions, the Emergency Management Director will be responsible for initiating a five-year written update of the plan to be submitted to the Missouri State Emergency Management Agency (SEMA) and FEMA Region VII per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

### **5.1.3 Plan Maintenance Process**

Progress on the proposed actions can be monitored by evaluating changes in vulnerabilities identified in the plan. The MPC during the annual meeting should review changes in vulnerability identified as follows:

- Decreased vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions,
- Increased vulnerability due to hazard events, and/or
- Increased vulnerability as a result of new development (and/or annexation).

Future 5-year updates to this plan will include the following activities:

- Consideration of changes in vulnerability due to action implementation,
- Documentation of success stories where mitigation efforts have proven effective,
- Documentation of unsuccessful mitigation actions and why the actions were not effective,
- Documentation of previously overlooked hazard events that may have occurred since the previous plan approval,
- Incorporation of new data or studies with information on hazard risks,
- Incorporation of new capabilities or changes in capabilities,
- Incorporation of growth data and changes to inventories, and
- Incorporation of ideas for new actions and changes in action prioritization.

In order to best evaluate any changes in vulnerability as a result of plan implementation, the participating jurisdictions will adopt the following process:

- Each proposed action in the plan identified an individual, office, or agency responsible for action implementation. This entity will track and report on an annual basis to the jurisdictional MPC member on action status. The entity will provide input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing risk.
- If the action does not meet identified objectives, the jurisdictional MPC member will determine necessary remedial action, making any required modifications to the plan.

Changes will be made to the plan to remedy actions that have failed or are not considered feasible. Feasibility will be determined after a review of action consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not

ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring of this plan. Updating of the plan will be accomplished by written changes and submissions, as the (MPC or designated responsible entity) deems appropriate and necessary. Changes will be approved by the Adair County Commissioners and the governing boards of the other participating jurisdictions.

## 5.2 Incorporation into Existing Planning Mechanisms

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**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.**

For the most part the participating jurisdictions did not incorporate the previously approved mitigation plan into other planning mechanism due to other plans already being approved.

Where possible, plan participants, including school and special districts, will use existing plans and/or programs to implement hazard mitigation actions. Those existing plans and programs were described in Section 2 of this plan. Based on the capability assessments of the participating jurisdictions, communities in Adair 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;
- Adair County's 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 Adair County Emergency Management will provide the updated Mitigation Strategy with current status of each mitigation action to the County Commission as well as all Mayors, City Clerks, and School District Superintendents. The Emergency Manager Director will request that the mitigation strategy be incorporated, where appropriate, in other planning mechanisms.

**Table 5.1** below lists the planning mechanisms by jurisdiction into which the Hazard Mitigation Plan will be integrated.

**Table 5.1. Planning Mechanisms Identified for Integration of Hazard Mitigation Plan**

<b>Jurisdiction</b>	<b>Planning Mechanisms</b>	<b>Integration Process for Previous Plan</b>	<b>Integration Process for Current Plan</b>
Unincorporated Adair County	County Road and Bridge Plan	Road and Bridge Department attended all planning meetings and identified actions relating to transportation infrastructure were included in annual update to Comprehensive Plan	Road and Bridge Department attended all planning meetings and identified actions relating to transportation infrastructure were included in annual update to Comprehensive Plan
City of Kirksville	Comprehensive Plan Land Use Plan	The previous plan was not Integrated into previous plans due to the items not applicable to being added in previous plans.	Plan will be incorporated into Comprehensive Plan Update and Land Use Plan Update
City of Novinger	Local Budget	The previous plan was not Integrated into previous budgets due to the items not applicable to being added in previous plans.	The Hazard Mitigation Plan will be integrated into future budgets by consulting the plan during the planning process.
City of Brashear	Local Budget	The previous plan was not Integrated into previous budgets due to the items not applicable to being added in previous plans.	The Hazard Mitigation Plan will be integrated into future budgets by consulting the plan during the planning process.
Village of Millard	Local Budget	The previous plan was not Integrated into previous budgets due to the items not applicable to being added in previous plans.	The Hazard Mitigation Plan will be integrated into future budgets by consulting the plan during the planning process.
Village of Gibbs	Local Budget	The previous plan was not Integrated into previous budgets due to the items not applicable to being added in previous plans.	The Hazard Mitigation Plan will be integrated into future budgets by consulting the plan during the planning process.
Adair County R-I	Building Plan	The previous plan was not Integrated into previous budgets due to	The Hazard Mitigation Plan will be integrated into future budgets by

		the items not applicable to being added in previous plans.	consulting the plan during the planning process.
Adair County R-II	Building Plan	The previous plan was not Integrated into previous budgets due to the items not applicable to being added in previous plans.	The Hazard Mitigation Plan will be integrated into future budgets by consulting the plan during the planning process.
Kirksville R-III	Building Plan	The previous plan was not Integrated into previous budgets due to the items not applicable to being added in previous plans.	The Hazard Mitigation Plan will be integrated into future budgets by consulting the plan during the planning process.

## 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 Adair County website following each annual review of the mitigation plan and will solicit comments from the public based on the annual review. When the MPC reconvenes for the five-year update, it will coordinate with all stakeholders participating in the planning process. Included in this group will be those who joined the MPC after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be actively solicited, at a minimum, through available website postings and press releases to local media outlets, primarily newspapers.

# **Appendix A**

## **Adoption Resolutions**

Adair County, Missouri RESOLUTION NO. 2020-1

A RESOLUTION OF THE ADAIR COUNTY, MISSOURI ADOPTING THE ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN AND THE EFFORT TO BECOME A DISASTER RESISTANCE COMMUNITY.

WHEREAS the ADAIR COUNTY recognizes the threat that natural hazards pose to people and property within the ADAIR COUNTY; and

WHEREAS the ADAIR COUNTY has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in ADAIR COUNTY from the impacts of future hazards and disasters; and

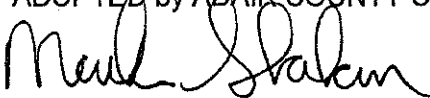
WHEREAS ADAIR COUNTY recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the ADAIR COUNTY will endeavor to integrate the *Plan* into the comprehensive planning process; and

WHEREAS adoption by ADAIR COUNTY demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

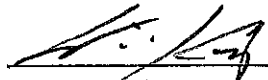
NOW THEREFORE, BE IT RESOLVED BY THE COUNTY COMMISSIONERS OF ADAIR COUNTY, in the State of Missouri, THAT:

ADAIR COUNTY HEREBY adopts the ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN.

ADOPTED by ADAIR COUNTY COMMISSION, this 6th day of October, 2020.



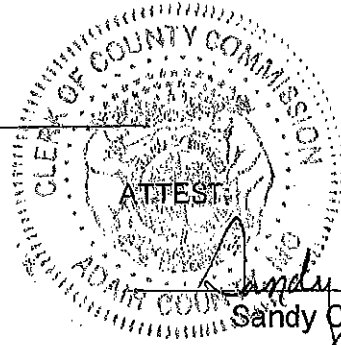
Mark Shahan, Presiding Commissioner

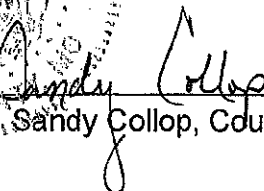


Bill King, 1<sup>st</sup> District Commissioner



Mark Thompson, 2<sup>nd</sup> District Commissioner



  
Sandy Collop, County Clerk

RESOLUTION NO. R2020-5-44

**A RESOLUTION ADOPTING THE ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN AND PARTICIPATING IN THE HAZARD MITIGATION EFFORTS.**

**WHEREAS**, the **CITY OF KIRKSVILLE** recognizes that no community is immune from natural hazards whether it be tornado/severe thunderstorm, flood, severe winter weather, drought, heat wave, earthquake, dam failure, or wildfire and recognizes the importance of enhancing its ability to withstand natural hazards as well as the importance of reducing the human suffering, property damage, interruption of public services and economic losses caused by those hazards; and

**WHEREAS**, the **CITY OF KIRKSVILLE** may have previously pursued measures such as building codes, fire codes, floodplain management regulations, zoning ordinances, and storm water management regulations to minimize the impact of natural hazards; and

**WHEREAS**, the Federal Emergency Management Agency and the State Emergency Management Agency have developed a natural hazard mitigation program that assists communities in their efforts to become Disaster-resistant Communities which are sustainable communities after a natural disaster that focus, not just on disaster relief, but also on recovery and reconstruction that brings the community to at least pre-disaster conditions in an accelerated, orderly and preplanned manner; and

**WHEREAS**, by participating in the Natural Hazards Mitigation Program, the **CITY OF KIRKSVILLE** will be eligible to apply for post-disaster mitigation funds; and

**WHEREAS**, the **CITY OF KIRKSVILLE** desires to commit to working with government partners to implement the Natural Hazards Mitigation Plan; and

**WHEREAS**, the **CITY OF KIRKSVILLE** will implement pertinent precepts of the mitigation plan by incorporation into other community plans and mechanisms where appropriate; and

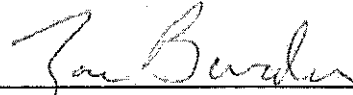
**WHEREAS**, all aspects pertaining to the **CITY OF KIRKSVILLE**, in the ADAIR County Multi-Jurisdictional Hazard Mitigation Plan attached hereto and incorporated by reference herein be approved; and

**WHEREAS**, the **CITY OF KIRKSVILLE** will participate in the evaluation and review of the Plan after a disaster as well as complete a mandated five-year update submitted to the State Emergency Management Agency and the Federal Emergency Management Agency for review and approval; and

**NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF KIRKSVILLE AS FOLLOWS:** The **CITY OF KIRKSVILLE** hereby approves the **ADAIR COUNTY Multi-jurisdictional Natural Hazard Mitigation Plan** attached hereto for the purpose of building a safer community by reducing natural hazard vulnerability.



Passed by the City Council and signed by the Mayor this 18th day of May, 2020.



Zac Burden, Mayor

ATTEST:



Wanda J. Cagle, Deputy City Clerk

**CITY OF MILLARD, Missouri RESOLUTION NO. \_\_**

**A RESOLUTION OF THE CITY OF MILLARD, MISSOURI ADOPTING THE ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN AND THE EFFORT TO BECOME A DISASTER RESISTANCE COMMUNITY.**

WHEREAS the **CITY OF MILLARD** recognizes the threat that natural hazards pose to people and property within the **CITY OF MILLARD**; and

WHEREAS the **CITY OF MILLARD** has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the **ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the **ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN** identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the **CITY OF MILLARD** from the impacts of future hazards and disasters; and

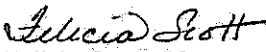
WHEREAS the **CITY OF MILLARD** recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the **CITY OF MILLARD** will endeavor to integrate the *Plan* into the comprehensive planning process; and

WHEREAS adoption by the **CITY OF MILLARD** demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

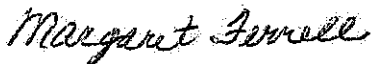
NOW THEREFORE, BE IT RESOLVED BY THE **CITY OF MILLARD**, in the State of Missouri, THAT:

**THE CITY OF MILLARD HEREBY adopts the ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN.**

ADOPTED by the CITY OF MILLARD, this 14 day of May, 2020.

  
Felicia Scott, Mayor

ATTEST:

  
Margaret Farrell, City Clerk

**KIRKSVILLE R-III SCHOOL DISTRICT, Missouri RESOLUTION NO. \_\_\_\_**

**A RESOLUTION OF THE KIRKSVILLE R-III SCHOOL DISTRICT, MISSOURI ADOPTING THE ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN AND THE EFFORT TO BECOME A DISASTER RESISTANCE COMMUNITY.**

WHEREAS the **KIRKSVILLE R-III SCHOOL DISTRICT** recognizes the threat that natural hazards pose to people and property within the **KIRKSVILLE R-III SCHOOL DISTRICT**; and

WHEREAS the **KIRKSVILLE R-III SCHOOL DISTRICT** has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the **ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the **ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN** identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the **KIRKSVILLE R-III SCHOOL DISTRICT** from the impacts of future hazards and disasters; and

WHEREAS **KIRKSVILLE R-III SCHOOL DISTRICT** recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the **KIRKSVILLE R-III SCHOOL DISTRICT** will endeavor to integrate the *Plan* into the comprehensive planning process; and

WHEREAS adoption by **KIRKSVILLE R-III SCHOOL DISTRICT** demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*,

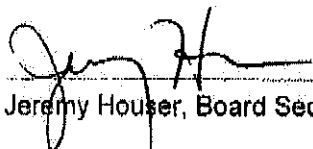
NOW THEREFORE, BE IT RESOLVED BY THE SCHOOL BOARD OF KIRKSVILLE R-III SCHOOL DISTRICT, in the State of Missouri, THAT: In accordance with KIRKSVILLE R-III SCHOOL DISTRICT School Board Policy, HEREBY adopts the **ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**.

ADOPTED by a vote of 4 in favor and 0 against and 0 abstaining, this 27<sup>th</sup> day of May, 2020.

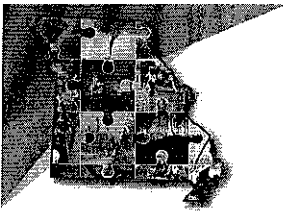


Nan Davis, Board President

ATTEST:



Jeremy Houser, Board Secretary



# **SEMA Mitigation Management LOCAL MITIGATION PLAN FORMAT GUIDANCE KICKOFF MEETING INVITATION FOR JURISDICTIONS**

## **Subject: Adair County Multi-Jurisdictional Hazard Mitigation Plan Update**

On behalf of Adair County, you are invited to the first of three planning meetings to update the Adair County Multi-Jurisdictional Hazard Mitigation Plan.

### **Adair County Multi-Jurisdictional Hazard Mitigation Plan Update**

#### **Kickoff Meeting**

**July 18, 2019**

**Meeting Time: 10:00 AM**

**Place: Kirksville Economic Development Building**

**Address: 315 S. Franklin, Kirksville, MO 63501**

Adair County is beginning the process to update the Adair County Multi-Jurisdictional Hazard Mitigation Plan to better protect the people and property of Adair County from the effects of natural hazard events. The existing plan was approved by FEMA in June, 2014. The plan update will be prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations. These regulations establish the requirements that hazard mitigation plans must meet in order for Adair County and the participating jurisdictions, to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Because Adair County is subject to many kinds of hazards, access to these federal programs is vital.

### **What is a Hazard Mitigation Plan?**

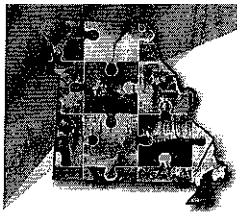
A hazard mitigation plan is the result of a planning process which identifies policies and actions that can be implemented over the long term to reduce the risk and future losses resulting from hazard events. The Adair County Multi-Jurisdictional Hazard Mitigation Plan Update will address a comprehensive list of natural hazards likely to impact the County. The identified mitigation policies and actions will be based on an assessment of hazards, vulnerabilities, and risks.

The hazard mitigation planning process is also heavily dependent on the participation of representatives from local government agencies and departments, the public, and other stakeholder groups. A Hazard Mitigation Planning Committee will be formed to support this project and will include representatives from the County, cities, school districts, private-non-profit entities, business partners, academic institutions, and other local, state, and federal agencies acting in or serving Adair County.

### **What is My Role in the Planning Process?**

The Northeast Missouri Regional Planning Commission has taken the lead in updating this plan. The point of contact is Derek Weber, Executive Director. To successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input. Jurisdictions (including county and city governments and public-school districts) that do not participate in an approved Hazard Mitigation Plan are **NOT eligible** to apply for FEMA's Hazard Mitigation Assistance grants. Participation in the planning process will include:

- Attending and contributing in the planning committee meetings;
- Providing requested data (as available);
- Reviewing and providing comments on plan drafts;
- Advertising, coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the plan.



# **SEMA Mitigation Management**

## **LOCAL MITIGATION PLAN FORMAT GUIDANCE**

### **KICKOFF MEETING INVITATION FOR JURISDICTIONS**

#### **What can I expect for the planning committee meetings?**

In the coming months, the Northeast Missouri Regional Planning Commission will facilitate three planning meetings, as briefly described below. Detailed agendas and information on the context of each meeting or activities performed within each meeting will be provided during the planning process.

- **Project Kick-off Meeting.** This meeting will initialize work with the planning committee including presentation of the federal planning requirements, participation requirements of planning committee members, and the proposed project work plan and schedule. A plan for public involvement and coordination with other agencies and departments will also be discussed at this initial meeting, especially regarding external agencies, such as state and federal agencies that may have significant interests (property, critical assets and infrastructure) in the County or that have information to help support the planning process.
- **Risk Assessment Meeting.** This meeting will include presentation of the risk assessment results and review/development of mitigation goals.
- **Mitigation Strategy Meeting.** This meeting will include updating of existing mitigation actions and identification and development of new mitigation strategies based upon the risk assessment.

#### **Additional Resources**

The following links provide additional information on hazard mitigation and the planning process.

- **Adair County Multi-Jurisdictional Hazard Mitigation Plan, June 2014**  
[http://www.nemorpc.org/wp-content/uploads/2019/02/ADAIR-HMP-RVSD-05\\_12\\_2014-rvs-dd.pdf](http://www.nemorpc.org/wp-content/uploads/2019/02/ADAIR-HMP-RVSD-05_12_2014-rvs-dd.pdf)
- **The requirements and procedures for state, tribal and local mitigation plans as presented in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201**  
<https://www.fema.gov/hazard-mitigation-planning-laws-regulations-policies>
- **Frequently Asked Questions regarding hazard mitigation planning**  
<https://www.fema.gov/hazard-mitigation-planning-frequently-asked-questions>

Adair County requests your assistance in forwarding this invitation to others in your jurisdiction. Appropriate participants in the planning committee include, but are not limited to: emergency responders, county clerks, city clerks, elected officials, public works directors, floodplain managers, stormwater managers, county and city planners, economic development directors, GIS staff, business partners, private-non-profit representatives, school principals, school facilities directors, and school superintendents.

Please confirm your attendance or provide contact information for your designated alternate by responding to Derek Weber at (660)465-7281 or [derekweber@nemorpc.org](mailto:derekweber@nemorpc.org).

Thank you,

Derek Weber  
Executive Director  
Northeast Missouri Regional Planning Commission

Adair County  
Multi-Jurisdictional Hazard Mitigation Plan Update  
Kickoff Planning Meeting  
July 18<sup>th</sup> 2019  
10:00 AM

## **Agenda**

Welcome/Introductions      Derek Weber, Executive Director  
Northeast Missouri RPC

Hazard Mitigation Planning Purpose

Grant Programs Linked to Approved Plan

Planning Tasks / Multi-jurisdictional Approach

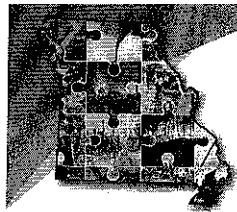
Participation Requirements

Data Collection Questionnaires

Discussion of Hazards

Critical Facilities

Next Steps in the Planning Process



# **SEMA Mitigation Management LOCAL MITIGATION PLAN FORMAT GUIDANCE KICKOFF MEETING INVITATION FOR JURISDICTIONS**

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On behalf of Adair County, you are invited to the first of three planning meetings to update the Adair County Multi-Jurisdictional Hazard Mitigation Plan.

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### **What is My Role in the Planning Process?**

The Northeast Missouri Regional Planning Commission has taken the lead in updating this plan. The point of contact is Derek Weber, Executive Director. To successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input. Jurisdictions (including county and city governments and public-school districts) that do not participate in an approved Hazard Mitigation Plan are **NOT eligible** to apply for FEMA's Hazard Mitigation Assistance grants. Participation in the planning process will include:

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Please confirm your attendance or provide contact information for your designated alternate by responding to Derek Weber at (660)465-7281 or [derekweber@nemorpc.org](mailto:derekweber@nemorpc.org).

Thank you,

Derek Weber  
Executive Director  
Northeast Missouri Regional Planning Commission



Adair County  
Multi-Jurisdictional Hazard Mitigation Plan Update  
Kickoff Planning Meeting  
July 18<sup>th</sup> 2019  
11:00 AM

## **Agenda**

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Discussion of Hazards

Critical Facilities

Next Steps in the Planning Process

To **Adair County Hazard Mitigation Planning Committee**  
From **Derek Weber, Executive Director**  
**Northeast Missouri Regional Planning Commission**  
Tel / E-mail **(660)465-7281 Ext.1 / derekweber@nemorpc.org**  
Date **July 18, 2019**  
Subject **Minutes from Adair County Hazard Mitigation Planning Kickoff Meeting**  
**held on July 18, 2019**

This document is a record of attendance and a summary of the issues discussed during the above meeting. The presentation began with an introduction on the purpose of hazard mitigation planning, grant programs linked to an approved plan, and the benefits of a multi-jurisdictional approach. The hazard mitigation planning process was reviewed to include requirements for participation and public involvement and the use of data collection questionnaires. The planning committee participated in a discussion of the hazards that have the potential to impact Adair County, including preliminary research on each hazard. The sources for compiling a GIS layer of critical facilities were also discussed and additional sources identified by planning committee members were noted. The meeting concluded with a discussion of the next steps in the planning process. The meeting was held at the Kirksville Economic Development Building at 315 S. Franklin, Kirksville, MO 63501 from 10:00AM to 12:00PM.

## Attendees

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Name	Title	Department	Jurisdiction
Margaret Farrell	Clerk		Millard
Chayton True	Planner	Codes and Planning	Kirksville
Shelly Shipman	Superintendent		Adair R-II
Jon Cook	Chief	Fire Dept.	Kirksville
Chris Killday	Director	911	Adair County
Jim Hughes	Chief	Police	Kirksville
Ashley Young	Asst. Manager		Kirksville
Mari Macomber	Manager		Kirksville
Ron Young	Director	Code Enforcement	Kirksville
Carolyn Chrisman	Director	Economic Development	Kirksville
Glenn Balliew	Director	Public Works	Kirksville
Sara Seifert	Chief	Campus Police	Truman St. University
Steve Farnsworth	Deputy Chief	Police	Kirksville

## Introductions

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Derek Weber, Executive Director of Northeast Missouri Regional Planning Commission began the meeting by welcoming and thanking the attendees for coming and having all attendees introduce themselves and the jurisdiction or entity they were representing.

## Hazard Mitigation Planning Purpose

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Derek Weber, Executive Director with Northeast Missouri Regional Planning Commission presented information on the purpose of Hazard Mitigation Planning and the Disaster Mitigation Act of 2000. The attendees were reminded this is an update of the Adair County Hazard Mitigation Plan, previously approved in June 2014. The current plan expires in June 2019.

## **Grant Programs Linked to Approved Plan**

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Derek Weber briefly discussed the FEMA Hazard Mitigation Assistance grants that require participation in an approved Hazard Mitigation Plan for jurisdictions to be eligible to apply. These include: Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program

## **Participation Requirements**

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Derek Weber also described the role of the HMPC. Each jurisdiction participating in development of the plan must meet the following minimum requirements:

1. Designate a representative to serve on the Adair County HMPC
2. Provide data for and assist in the development of the updated risk assessment that describes how various hazards impact your jurisdiction,
3. Provide data to describe current capabilities,
4. Develop/update mitigation actions (at least one) specific to your jurisdiction,
5. Review comments on plan drafts as requested,
6. Provide documentation to show time donated to the planning effort (if a FEMA planning grant was awarded to the county); and
7. Formally adopt the mitigation plan.

Jurisdictions that choose not to participate in development of a FEMA-approved mitigation plan **will not** be eligible applicants for FEMA Hazard Mitigation Assistance Grants.

## **Data Collection Questionnaires**

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Representatives from local governments and school districts were provided with hard copies of Data Collection Questionnaires. The Data Collection Questionnaire is designed to collect information on existing capabilities within each jurisdiction to implement mitigation initiatives as well as collect information on previous hazard events. The questionnaires are different for local units of government and schools. The Data Collection Questionnaires were reviewed as a group and then meeting participants were given time to review the forms individually and note any questions about the forms.

**The deadline for submittal of the Data Collection Guides is August 18, 2019**

## **Update Mitigation Goals**

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Derek Weber facilitated a discussion of the mitigation goals. Common categories of mitigation goals were presented along with past plan goals.

The previous goals were reviewed and they were updated to the following:

1. Public Awareness- Using a variety of communications avenues to increase the citizens awareness of and promote education about the natural hazards that they may face, their vulnerability to these hazards, and how to lessen the effect of future natural hazards.
2. Strengthen communication and coordination between local governments, emergency personnel, public agencies, and citizens to mitigate the effect of future natural hazards.
3. Investigate, implement, maintain, and enforce mitigation policies and programs that limit the

impact of natural hazards: on the loss of life; on new and existing properties; on natural resources; on infrastructure; and on the local economy.

## **Mitigation Action Updates**

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The planning committee members were informed they would be contacted to review previous mitigation actions and how they wanted to proceed with the mitigation actions. Each jurisdiction is required to have at least one mitigation action item.

When reviewing past plan all the action items were determined to be redundant and everyday tasks rather than actual projects that would mitigate future hazards.

## **Next Steps**

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Attendees were asked to complete their jurisdiction's Data Collection Questionnaire and critical facility list and send back by August 19, 2019.

# ADAIR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE KICKOFF MEETING--SIGN-IN SHEET

**Project:** Adair County, Missouri Multi-Jurisdictional Hazard Mitigation Plan Update

**Facilitator:** Derek Weber, Executive Director  
Northeast Missouri Regional Planning Commission

**Meeting Date/Time:** July 18, 2019 10:00 AM

**Place/Room:** Kirksville Economic Development Building  
315 South Franklin, Kirksville, MO 63555

Name	Title	Department/Agency	Email	Phone #	Signature
Margaret Turner	Clark Kirksville City Planner	Planning City of Kirksville Codes & Planning	mtturner1950@yahoo.com	660-341-5750 660-665-2067	Margaret Turner
Chayton True	Adair Co. R-11 Superintendent	Adair Co. R-11	ctrue@kirksvillecity.com	660-627-1272	Chayton True
Shelly Shipman	Chief	City of Kirksville Fire Dept.	shelly.shipman@brshas.k12.mo.us	660.323.5272	Shelly Shipman
Jon Cook	Director	City of Kirksville Fire Dept.	jcook@kirksvillecity.com	660-341-8340	Jon Cook
Chris Kellday	Chief	Kirksville Police Dept.	ckellday@kirksvillecity.com	660-5-5631	Chris Kellday
Jim Hughes	Assistant City Manager	City of Kirksville	jhughes@kirksvillecity.com	660.627.1224	Jim Hughes
Ashley Young	City Manager	City of Kirksville	ayoung@kirksvillecity.com	660.627.1224	Ashley Young
Mari Macomber	Boe Extension Director	City of Kirksville	mmacomber@kirksvillecity.com	660.627.1225	Mari Macomber
Joe Young	City of Kirksville	City of Kirksville	jyoung@kirksvillecity.com	660.627.1224	Joe Young
Carolyn Chisner	EO K-11 EDCI	K-11 EDCI	chisner@kirksvillecity.com	660.5-2003	Carolyn Chisner

<b>Project:</b>	Adair County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update
<b>Facilitator:</b>	Derek Weber, Executive Director Northeast Missouri Regional Planning Commission
<b>Meeting Date/Time:</b>	July 18, 2019 10:00 AM
<b>Place/Room:</b>	Kirksville Economic Development Building 315 South Franklin, Kirksville, MO 63555

[illegible]

**Multi-Jurisdictional Hazard Mitigation Plan**  
**Data Collection Questionnaire**  
**For Local Governments**

County: Adair County

Jurisdiction: Adair County

Return by:

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process **will not** be eligible applicants for FEMA mitigation funding programs. Please note: School Districts and other Educational Institutions should complete the Data Collection Questionnaire indicated "For School Districts and Educational Institutions".

Prepared by:

Phone: 660-665-2283

Email: [bking@adaircomo.com](mailto:bking@adaircomo.com)

Date:

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber, Executive Director NEMO RPC

Address: 121 S. Cecil St, Memphis, MO 63555

Email: [derekweber@nemorpc.org](mailto:derekweber@nemorpc.org)

Fax: (660)465-7163

# CAPABILITY ASSESSMENT & INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

*Mark Thompson*  
*work sheet*

The purpose of this section is to collect information to document existing capabilities as well as determine existing plans, studies, reports, and technical information that may need to be incorporated in the mitigation plan. Although some of this information may have been captured in your previous mitigation plan, it is important to ensure this information is current in the plan update.

Please indicate which of the following your jurisdiction has in place. For elements that do not pertain to your type of public entity, please indicate with "N/A". If applicable, please provide a completion date for the element. If your jurisdiction does not have a particular element, and a higher level of government has the authority pertaining to your jurisdiction, please indicate this in the comments column. If your jurisdiction has any of the **underlined and bolded** elements, please provide a copy of the document to the contact listed on the front and indicate method in the comments column (i.e. available on the web, will email or mail).

Element	Yes, No, N/A	Comments and/or Weblink
<b>Planning Capabilities</b>		
<b><u>Comprehensive Plan</u></b>	Date: <i>ADA</i>	
Builder's Plan	Date: <i>NO</i> <del><i>ADA</i></del>	
Capital Improvement Plan	Date: <i>NO</i> <del><i>N/A</i></del>	
City Emergency Operations Plan	Date: <i>N/A</i>	
County Emergency Operations Plan	Date: <i>4-17-2019</i>	
Local Recovery Plan	Date: <i>No</i> <del><i>ADA</i></del>	
County Recovery Plan	Date: <del><i>NO</i></del> <i>yes</i>	
City Mitigation Plan	Date: <i>N/A</i>	
County Mitigation Plan	Date: <i>?</i>	
Debris Management Plan	Date: <i>?</i>	
<b><u>Economic Development Plan</u></b>	Date: <i>yes</i>	
Transportation Plan	Date: <i>No</i>	
Land-use Plan	Date: <i>No</i>	
Flood Mitigation Assistance (FMA) Plan	Date: <i>?</i>	
<b><u>Watershed Plan</u></b>	Date: <i>No</i>	
Firewise or other fire mitigation plan	Date: <i>No</i>	
Critical Facilities Plan (Mitigation/Response/Recovery)	Date: <i>No</i>	



Element	Yes, No, N/A	Comments and/or Weblink
<b>Policies/Ordinance</b>		
Zoning Ordinance	No	
Building Code	Version: No	
Floodplain Ordinance	Date: No	
Subdivision Ordinance	No	
Tree Trimming Ordinance	No	
Nuisance Ordinance	No	
Stormwater Ordinance	No	
Drainage Ordinance	No	
Site Plan Review Requirements	No	
Historic Preservation Ordinance	No	
Landscape Ordinance	No	
<b>Program</b>		
Zoning/Land Use Restrictions	No	
Codes Building Site/Design	No	
Hazard Awareness Program		
National Flood Insurance Program (NFIP)		
NFIP Community Rating System (CRS) program		If so, what is your current level rating?
National Weather Service (NWS) Storm Ready Certification		
Firewise Community Certification		
Building Code Effectiveness Grading (BCEGs)		
ISO Fire Rating	Rating: ✓	
Economic Development Program	Yes	EEZ
Land Use Program	No	
Public Education/Awareness	No	
Property Acquisition	No	
Planning/Zoning Boards	No	
Stream Maintenance Program	No	
Tree Trimming Program	No	
<b>Engineering Studies for Streams (Local/County/Regional)</b>	No	

Element	Yes, No, N/A	Comments and/or Weblink
Mutual Aid Agreements	Yes	Sheriff
<b>Studies/Reports/Maps</b>		
<u>Hazard Analysis/Risk Assessment (City)</u>	NA	
<u>Hazard Analysis/Risk Assessment (County)</u>	Yes	LEPC
Evacuation Route Map	No	
<u>Critical Facilities Inventory</u>	No	
<u>Vulnerable Population Inventory</u>	No	
<u>Land Use Map</u>	No	
<b>Staff/Department</b>		<b>Full Time or Part Time?</b>
Building Code Official	No	
Building Inspector	No	
Mapping Specialist (GIS)	Yes	
Engineer	No	
Development Planner	No	
Public Works Official	Yes	
Emergency Management Coordinator	Yes	
NFIP Floodplain Administrator	No	
Emergency Response Team	No	
Hazardous Materials Expert	No	
Local Emergency Planning Committee	Yes	
County Emergency Management Commission	No	
Sanitation Department	No	
Transportation Department	?	
Economic Development Department	Yes	
Housing Department	No	
Historic Preservation	No	
<b>Non-Governmental Organizations (NGOs)</b>	<b>Is there a local chapter? Yes or No</b>	
American Red Cross	Yes	
Salvation Army	Yes	
Veterans Groups	Yes	

Element	Yes, No, N/A	Comments and/or Weblink
Local Environmental Organization	Yes	
Homeowner Associations	No	
Neighborhood Associations	Yes	
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.)	Yes	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		No
Authority to levy taxes for specific purposes		Yes
Fees for water, sewer, gas, or electric services		No
Impact fees for new development		No
Incur debt through general obligation bonds		No
Incur debt through special tax bonds		No
Incur debt through private activities		No
Withhold spending in hazard prone areas		No

For plan updates, the plan maintenance process outlined in your previous plan requires all participating jurisdictions to incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate. A key element of effective implementation of mitigation is for the mitigation plan to be incorporated in existing authorities, policies, programs, and resources. Next to each applicable planning mechanism, indicate how your jurisdiction incorporated the previous mitigation plan. If no incorporation has occurred, please explain, including background information detailing any challenges preventing incorporation.

Planning Capabilities	Method of Incorporation Since Previous Plan or Challenges Preventing Incorporation
Comprehensive Plan	<i>no changes</i>
Builder's Plan	<i>N/A</i>
Capital Improvement Plan	<i>N/A</i>
Local Recovery Plan	<i>NA</i>
County Recovery Plan	<i>NA</i>
Debris Management Plan	<i>NA</i>
Economic Development Plan	<i>N/A</i> <i>2002</i>
Transportation Plan	<i>N/A</i>
Land-use Plan	<i>NA</i>
Watershed Plan	<i>NA</i>
Firewise or other Fire Mitigation Plan such as Community Wildfire Protection Plan	<i>NA</i>

## Additional Questions

1. How is your government structure organized? (Commission, Mayor/City Council, how many members)

Commission / 3

2. List any past or ongoing public education or information programs, such as for responsible water use, fire safety, household preparedness, or environmental education.

None

3. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities. Be sure to include pending or approved projects submitted for FEMA mitigation grants.

None

4. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.

None

5. How many outdoor warning sirens are in your community?

city - 6

Truman - 2

Novinger - 1

How are they activated (indicate responsible department/personnel)?

Central dispatch

6. Does your community utilize any other warning systems such as Cable Override, Reverse 911, etc? If so, please describe.

Cable-one, radio, Ap for phone  
TV notices

7. Does your community have designated public tornado shelters/saferooms? If so, are they constructed in accordance with FEMA standards?

NO

Please provide address locations:

8. List residential, commercial and industrial development in your jurisdiction since last plan update.

?

9. Describe development trends and expected growth areas. Is any new development expected to occur in the 100-year floodplain? Is any new development expected to occur in any other known hazard areas? If possible, please provide a map indicating potential/planned growth areas.

N/A

10. Are any new facilities or infrastructure planned for construction during the next five years? If so, please provide facility name and purpose along with proposed locations, if known.

wind farms

solar farms

11. Please list major employers in your jurisdiction with an estimated number of employees.

Adair Foods - Kraft  
Truman University  
Hospital  
Public Schools

} #'s unknown

12. Please list Mitigation Planning Committee members who served during the development of the previously approved plan. Was the process set forth for monitoring the implementation of the previously approved mitigation plan adhered to? Did the Committee meet as was specified in the previously approved plan? Why or why not?

?

Call Derek

13. Describe your jurisdiction's participation in the NFIP. Include information about how compliance with the NFIP is enforced locally.

don't ~~part~~ participate

**Multi-Jurisdictional Hazard Mitigation Plan**  
**Data Collection Questionnaire**  
**For Local Governments**

County: Adair \_\_\_\_\_

Jurisdiction: City of Kirksville \_\_\_\_\_

Return by: August 2, 2019 \_\_\_\_\_

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process **will not** be eligible applicants for FEMA mitigation funding programs. Please note: School Districts and other Educational Institutions should complete the Data Collection Questionnaire indicated "For School Districts and Educational Institutions".

Prepared by: Ashley Young \_\_\_\_\_

Phone: 660.627.1224 \_\_\_\_\_

Email: ayoung@kirksvillecity.com \_\_\_\_\_

Date: August 2, 2019 \_\_\_\_\_

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber

Address: 121 S. Cecil St. Memphis, MO 63555

Email: derekweber@nemorpc.org

Fax: (660) 465-7163

# CAPABILITY ASSESSMENT & INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

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Element	Yes, No, N/A	Comments and/or Weblink
<b>Planning Capabilities</b>		
<b><u>Comprehensive Plan</u></b>	Date: 03/01/2014	<u>Weblink</u>
Builder's Plan	Date: N/A	
Capital Improvement Plan	Date: 12/17/2019	Will Email
City Emergency Operations Plan	Date: 05/01/2019	Will Email
County Emergency Operations Plan	Date: 05/01/2019	Will Email
Local Recovery Plan	Date: 05/01/2019	Will Email (in Adair County – Kirksville EOP)
County Recovery Plan	Date: 05/01/2019	Will Email (in Adair County – Kirksville EOP)
City Mitigation Plan	Date: 02/24/2014	Will Email
County Mitigation Plan	Date: 02/24/2014	Will Email
Debris Management Plan	Date: N/A	Components are contained in the EOP. It designates Public Works as responsible, but is not a complete Debris Management Plan.
<b><u>Economic Development Plan</u></b>	Date: N/A	
Transportation Plan	Date: N/A	
Land-use Plan	Date: 03/01/2014	Page 24 <u>Weblink</u>
Flood Mitigation Assistance (FMA) Plan	Date: N/A	
<b><u>Watershed Plan</u></b>	Date: 12/02/2015	Will Email (A Source Water Protection Plan)
Firewise or other fire mitigation plan	Date: N/A	



Element	Yes, No, N/A	Comments and/or Weblink
Critical Facilities Plan (Mitigation/Response/Recovery)	Date: N/A	
<b>Policies/Ordinance</b>		
Zoning Ordinance	Yes	<a href="#">Weblink</a>
Building Code	Version: 2015	<a href="#">Weblink</a>
Floodplain Ordinance	Date: 2005	<a href="#">Weblink</a>
Subdivision Ordinance	Yes	<a href="#">Weblink</a>
Tree Trimming Ordinance	Yes	Requirements found in several sections of the Municipal Code.
Nuisance Ordinance	Yes	<a href="#">Weblink</a>
Stormwater Ordinance	Yes	<a href="#">Weblink</a>
Drainage Ordinance	Yes	<a href="#">Weblink</a>
Site Plan Review Requirements	Yes	All site plans are reviewed by the Codes and Planning Department.
Historic Preservation Ordinance	Yes	<a href="#">Weblink</a>
Landscape Ordinance	No	
<b>Program</b>		
Zoning/Land Use Restrictions	Comprehensive Plan, Subdivision Code, and Zoning Code	Administered by the Codes and Planning Department, Planning and Zoning Commission, and City Council through rezoning applications and subdivision plats
Codes Building Site/Design	Comprehensive Plan, Subdivision Code, and Zoning Code	Administered by the Codes and Planning Department, Planning and Zoning Commission, and City Council through rezoning applications and subdivision plats
Hazard Awareness Program	Yes	Annex H of County / City EOP
National Flood Insurance Program (NFIP)	Kirksville Floodplain Ordinance	Administered by the Codes and Planning Department
NFIP Community Rating System (CRS) program	N/A	If so, what is your current level rating?
National Weather Service (NWS) Storm Ready Certification	Yes	Recertified 07/22/2019
Firewise Community Certification	N/A	N/A
Building Code Effectiveness Grading (BCEGs)	Yes	99 Residential, 4 Commercial
ISO Fire Rating	Rating: 3	Fire rating 3 within 1000 feet of hydrant
Economic Development Program	Yes	City of Kirksville; Kirksville Regional Economic Development, Inc.; Missouri Rural Enterprise and Innovation Center; Kirksville Office of Tourism; Kirksville Area Chamber of Commerce; Main Street Kirksville

Element	Yes, No, N/A	Comments and/or Weblink
Land Use Program	Comprehensive Plan, Subdivision Code, and Zoning Code	Administered by the Codes and Planning Department, Planning and Zoning Commission, and City Council through rezoning applications and subdivision plats
Public Education/Awareness	Yes	<a href="#">Weblink</a>
Property Acquisition	Yes	<a href="#">Weblink</a>
Planning/Zoning Boards	Kirksville Planning & Zoning Commission	Nine member commission
Stream Maintenance Program	Yes	<a href="#">Weblink</a> + <a href="#">Weblink</a> + Land Disturbance Manual + Land Disturbance Field Manual + Preconstruction Checklist + Post Construction Checklist (Will Email)
Tree Trimming Program	Yes	Requirements found in several sections of the Municipal Code.
<b><u>Engineering Studies for Streams (Local/County/Regional)</u></b>	Yes	<a href="#">Weblink</a>
Mutual Aid Agreements	Yes	Per City Council: automatic mutual aid agreements
<b>Studies/Reports/Maps</b>		
<b><u>Hazard Analysis/Risk Assessment (City)</u></b>	Yes	Annex H of County / City EOP
<b><u>Hazard Analysis/Risk Assessment (County)</u></b>	Yes	Annex H of County / City EOP
Evacuation Route Map	Yes	Attachment C of Appendix 5 of County / City EOP
<b><u>Critical Facilities Inventory</u></b>	Yes	Annex H of County / City EOP
<b><u>Vulnerable Population Inventory</u></b>	Yes	Annex J of County / City EOP
<b><u>Land Use Map</u></b>	Yes	Pages 25-26 <a href="#">Weblink</a>
<b>Staff/Department</b>		<b>Full Time or Part Time?</b>
Building Code Official	Yes	Full Time
Building Inspector	Yes	Full Time (3)
Mapping Specialist (GIS)	Yes	Full Time
Engineer	Yes	Full Time
Development Planner	Yes	Full Time
Public Works Official	Yes	Full Time
Emergency Management Coordinator	Yes	Full Time
NFIP Floodplain Administrator	Yes	Full Time
Emergency Response Team	Yes	Part Time
Hazardous Materials Expert	Yes	Part Time
Local Emergency Planning Committee	Yes	Part Time

Element	Yes, No, N/A	Comments and/or Weblink
County Emergency Management Commission	Yes	Part Time
Sanitation Department	N/A	Contracted
Transportation Department	Yes	Full Time
Economic Development Department	Yes	Full Time
Housing Department	Yes	Full Time
Historic Preservation	Yes	Part Time
<b>Non-Governmental Organizations (NGOs)</b>	<b>Is there a local chapter? Yes or No</b>	
American Red Cross	Yes	
Salvation Army	Yes	
Veterans Groups	Yes	
Local Environmental Organization	Yes	
Homeowner Associations	Yes	
Neighborhood Associations	No	
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.	Yes	
<b>Financial Resources</b>	<b>Is your jurisdiction able to? Yes or No</b>	
Apply for Community Development Block Grants	Yes	
Fund projects thru Capital Improvements funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric services	Yes	
Impact fees for new development	Yes	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Incur debt through private activities	No	
Withhold spending in hazard prone areas	Yes	

For plan updates, the plan maintenance process outlined in your previous plan requires all participating jurisdictions to incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate. A key element of effective implementation of mitigation is for the mitigation plan to be incorporated in existing authorities, policies, programs, and resources. Next to each applicable planning mechanism, indicate how your jurisdiction incorporated the previous mitigation plan. If no incorporation has occurred, please explain, including background information detailing any challenges preventing incorporation.

Planning Capabilities	Method of Incorporation Since Previous Plan or Challenges Preventing Incorporation
Comprehensive Plan	
Builder's Plan	N/A
Capital Improvement Plan	
Local Recovery Plan	
County Recovery Plan	
Debris Management Plan	Components are contained in the EOP. It designates Public Works as responsible, but is not a complete Debris Management Plan.
Economic Development Plan	N/A
Transportation Plan	N/A
Land-use Plan	
Watershed Plan	
Firewise or other Fire Mitigation Plan such as Community Wildfire Protection Plan	N/A

## Additional Questions

1. How is your government structure organized? (Commission, Mayor/City Council, how many members)

Council / Manager form of government. Five member City Council elected at large who, in turn, hire a City Manager.

2. List any past or ongoing public education or information programs, such as for responsible water use, fire safety, household preparedness, or environmental education.

- National Fire Safety Week
- Community Training: Preparedness Series

3. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities. Be sure to include pending or approved projects submitted for FEMA mitigation grants.

- Cottage Grove Box Culvert Replacement Project
- Manor Road Box Culvert Replacement Project
- General Infrastructure CDBG for SC-2 Bradford to Manor Phase 2: Bradford to Ely Project

4. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.

- No public storm shelters

5. How many outdoor warning sirens are in your community?

6 City sirens, 2 at Truman State University, and 1 in Novinger MO.

How are they activated (indicate responsible department/personnel)?

Activated upon authorization of EMDs (County/City), Police Chief or Supervisor, Fire Chief or Supervisor, or City Manager. Activated and deactivated by 911 Center employees.

6. Does your community utilize any other warning systems such as Cable Override, Reverse 911, etc? If so, please describe.

We have cable override and regroup (IPAWS) and Wireless emergency alerts.

7. Does your community have designated public tornado shelters/saferooms? If so, are they constructed in accordance with FEMA standards?

No and no.

Please provide address locations:

N/A

8. List residential, commercial and industrial development in your jurisdiction since last plan update.

The last Emergency Operations plan was completed May 1, 2019 and updated annually.

9. Describe development trends and expected growth areas. Is any new development expected to occur in the 100-year floodplain? Is any new development expected to occur in any other known hazard areas? If possible, please provide a map indicating potential/planned growth areas.

While our floodplain map is being updated by FEMA, we do not expect any new development to be allowed within a 100-year floodplain.

10. Are any new facilities or infrastructure planned for construction during the next five years? If so, please provide facility name and purpose along with proposed locations, if known.

Please see attached Capital Improvement Plan

11. Please list major employers in your jurisdiction with an estimated number of employees.

See K-REDI Annual Employment Report 2018

12. Please list Mitigation Planning Committee members who served during the development of the previously approved plan. Was the process set forth for monitoring the implementation of the previously approved mitigation plan adhered to? Did the Committee meet as was specified in the previously approved plan? Why or why not?

- Adair County (Unincorporated areas) – Mark Thompson, Adair County Commissioner
- City of Brashear – Rhoda Branson, Mayor
- City of Gibbs – Pam Pflum, Mayor
- City of Kirksville – Mari Macomber, City Manager
- City of Millard – Felicia C. Scott, Mayor
- City of Novinger – Jeff Dodson, Mayor

13. Describe your jurisdiction's participation in the NFIP. Include information about how compliance with the NFIP is enforced locally.

The City has a Flood Plain ordinance that is used to enforce regulations of the NFIP.

# VULNERABILITY ASSESSMENT

The purpose of this worksheet is to assess the vulnerable buildings, populations, critical facilities, infrastructure, and other important assets in your community by using the best available data to complete the table. Use the table on the next page to compile a detailed inventory of specific assets at risk including critical facilities and infrastructure; natural, cultural, and historical assets; and economic assets. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

Natural Hazards	
Flooding (Major & Flash) - <b>RF</b>	Drought - <b>D</b>
Levee Failure - <b>LF</b>	Extreme Temperature - <b>ET</b>
Dam Failure - <b>DF</b>	Severe Thunderstorm (incl. winds, hail, lightning) - <b>ST</b>
Earthquake - <b>EQ</b>	Severe Winter Weather (incl. snow, ice, severe cold) - <b>SWW</b>
Land Subsidence / Sinkholes - <b>LSS</b>	Tornadoes - <b>T</b>
	Wildfire - <b>WF</b>

## Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA's HAZUS-MH loss estimation software uses the following three categories of critical assets. 'Essential facilities' are those that if damaged would have devastating impacts on disaster response and/or recovery. 'High potential loss facilities' are those that would have a high loss or impact on the community. Transportation and lifeline facilities are third category of critical assets; examples are provided below.

### Essential Facilities

Hospitals and other medical facilities  
Police stations  
Fire station  
Emergency Operations Centers

### High Potential Loss Facilities

Power plants  
Dams/levees  
Military installations  
Hazardous material sites  
Schools  
Shelters  
Day care centers  
Nursing homes  
Main government buildings

### Transportation and Lifeline

Highways, bridges, and tunnels  
Railroads and facilities  
Bus facilities  
Airports  
Water treatment facilities  
Natural gas facilities and pipelines  
Oil facilities and pipelines  
Communications facilities

## Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.

## Asset Inventory

Please list critical facilities and other community assets, the square feet, values, and occupancy/capacity. If not applicable, enter "N/A". In the last column, use the codes from the previous page to indicate hazards to which the asset is vulnerable. Add as many rows as needed. If this information is available in GIS format, please provide.

## Critical Facilities

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
<u>Essential Facilities such as hospitals and other medical facilities, police and fire stations, Emergency Operations Centers</u>						
Kirksville Fire Department	401 N Franklin, Kirksville	17280				
Kirksville Police Department Kirksville/Adair Co EOC	119 E McPherson, Kirksville	7544				
Northeast Regional Medical Center	315 S Osteopathy, Kirksville	100,000				
Adair County Ambulance Dist.	606 W Potter, Kirksville					
Air Evac helicopter service	508 W Potter, Kirksville					
911 Dispatch Center	201 S Franklin, Kirksville					
Adair County Sheriff's Dept.	215 N Franklin, Kirksville	17368				
Kirksville City Hall	201 S Franklin, Kirksville	11200				
Water Treatment Plant	1900 W Potter, Kirksville					
Wastewater Treatment Plant	23002 Atlas Lane, Kirksville					
Public Works Complex	2001 N Osteopathy, Kirksville					



Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
High Potential Loss Facilities such as power plants, dams/levees, military installations, hazardous materials sites, shelters, day care centers, nursing homes, main government buildings (Do not include schools—they will be reported by the school districts)						
*See Attached Table						
Transportation and Lifelines such as highways, bridges, and tunnels; railroads and facilities, bus facilities, airports, water treatment facilities, natural gas facilities and pipelines, oil facilities, oil facilities and pipelines, communications facilities						
Liberty Utilities	916 N Green, Kirksville	200				
Ferrell Gas Co	2800 N Baltimore, Kirksville	1500				
Pinnacle Propane	N Hwy 63 E, Brashear					
Ameren	204 E Cottonwood, Kirksville	20441				
Kirksville Regional Airport	27161 David Hall Trail, Kirksville	3612				
Kirksville Water Treatment Plant	1900 W Potter, Kirksville	5000				
E-911 Dispatch Center	201 S Franklin, Kirksville					
Pipelines thru Adair Co	See attachments					
Highways & Bridges	See attachments					
Railroads / facilities	See attachments					

**\*If replacement cost data is not available, use the best available data (assessed valuation or other method for estimating cost) and explain any data deficiencies.**

**Economic Assets (Major Employers, etc)**

Asset	Address	Product/ Service	Value (if known)	Number of Employees	Hazards
See K-REDI Annual Employment Report 2018					

## HISTORIC HAZARD EVENTS

Please fill out the sheet on the next page for each significant hazard event that affected **Your Jurisdiction**. **Make as many copies as necessary to record all events** and complete with as much detail as possible. This includes all events associated with the hazards listed below that have caused previous damage in your jurisdiction. It is especially important to capture events that either were not included in the previous Hazard Mitigation Plan or occurred since the plan was completed. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

<b>Jurisdiction</b>	
<b>Type of event</b>	Tornado
<b>Nature and magnitude of event</b>	
<b>Location</b>	Kirksville & Adair County
<b>Date of event</b>	May 13, 2009
<b>Injuries</b>	
<b>Deaths</b>	2 in Adair County / 1 in Sullivan County
<b>Property damage</b>	
<b>Infrastructure damage</b>	
<b>Crop damage</b>	
<b>Business/economic impacts</b>	
<b>Road/school/other closures</b>	
<b>Other damage</b>	
<b>Insured losses</b>	
<b>Federal/state disaster relief funding</b>	
<b>Source of information</b>	
<b>Comments</b>	

## HISTORIC HAZARD EVENTS (continued)

Please fill out the sheet on the next page for each significant hazard event that affected **Your Jurisdiction**. **Make as many copies as necessary to record all events** and complete with as much detail as possible. This includes all events associated with the hazards listed below that have caused previous damage in your jurisdiction. It is especially important to capture events that either were not included in the previous Hazard Mitigation Plan or occurred since the plan was completed. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Jurisdiction	Kirksville
Type of event	Ice Storm
Nature and magnitude of event	
Location	
Date of event	12/1/2007
Injuries	0
Deaths	0
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Source of information	NOAA
Comments	

## HISTORIC HAZARD EVENTS (continued)

Please fill out the sheet on the next page for each significant hazard event that affected **Your Jurisdiction**. **Make as many copies as necessary to record all events** and complete with as much detail as possible. This includes all events associated with the hazards listed below that have caused previous damage in your jurisdiction. It is especially important to capture events that either were not included in the previous Hazard Mitigation Plan or occurred since the plan was completed. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

<b>Jurisdiction</b>	Kirksville
<b>Type of event</b>	Ice Storm
<b>Nature and magnitude of event</b>	
<b>Location</b>	
<b>Date of event</b>	12/10/2007
<b>Injuries</b>	0
<b>Deaths</b>	0
<b>Property damage</b>	
<b>Infrastructure damage</b>	
<b>Crop damage</b>	
<b>Business/economic impacts</b>	
<b>Road/school/other closures</b>	
<b>Other damage</b>	
<b>Insured losses</b>	
<b>Federal/state disaster relief funding</b>	
<b>Source of information</b>	NOAA
<b>Comments</b>	Kirksville



## HISTORIC HAZARD EVENTS (continued)

Please fill out the sheet on the next page for each significant hazard event that affected **Your Jurisdiction**. **Make as many copies as necessary to record all events** and complete with as much detail as possible. This includes all events associated with the hazards listed below that have caused previous damage in your jurisdiction. It is especially important to capture events that either were not included in the previous Hazard Mitigation Plan or occurred since the plan was completed. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

<b>Jurisdiction</b>	Kirksville
<b>Type of event</b>	Ice Storm
<b>Nature and magnitude of event</b>	
<b>Location</b>	
<b>Date of event</b>	12/18/2008
<b>Injuries</b>	0
<b>Deaths</b>	0
<b>Property damage</b>	
<b>Infrastructure damage</b>	
<b>Crop damage</b>	
<b>Business/economic impacts</b>	
<b>Road/school/other closures</b>	
<b>Other damage</b>	
<b>Insured losses</b>	
<b>Federal/state disaster relief funding</b>	
<b>Source of information</b>	NOAA
<b>Comments</b>	Kirksville

## HISTORIC HAZARD EVENTS (continued)

Please fill out the sheet on the next page for each significant hazard event that affected **Your Jurisdiction**. **Make as many copies as necessary to record all events** and complete with as much detail as possible. This includes all events associated with the hazards listed below that have caused previous damage in your jurisdiction. It is especially important to capture events that either were not included in the previous Hazard Mitigation Plan or occurred since the plan was completed. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

<b>Jurisdiction</b>	
<b>Type of event</b>	Severe Storms
<b>Nature and magnitude of event</b>	
<b>Location</b>	Kirksville
<b>Date of event</b>	September 9, 2014
<b>Injuries</b>	
<b>Deaths</b>	
<b>Property damage</b>	
<b>Infrastructure damage</b>	
<b>Crop damage</b>	
<b>Business/economic impacts</b>	
<b>Road/school/other closures</b>	
<b>Other damage</b>	
<b>Insured losses</b>	
<b>Federal/state disaster relief funding</b>	
<b>Source of information</b>	SEMA
<b>Comments</b>	



# ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: \_\_\_\_\_

The contractor/plan development facilitator has provided a list of actions proposed in the previously approved plan for each jurisdiction. Use the worksheet below to evaluate whether each action is still current, feasible, desirable, and/or creates benefit that outweighs the cost.

The worksheet should include information on the status of the action and progress made in implementation, if any. This includes:

- For **completed actions** provide a description of the implementation process. This may be a success story you would like to publicize in your community.
- Some of the actions might have been **ongoing** in nature, such public information and education programs. When this is the case, indicate what activity has occurred during the previous five years, and indicate if this program is still viable enough that it should be carried on into the future.
- If **no progress** has been made in the implementation of a given action, discuss why. Note that implementation is not a requirement. However, if no progress has been made, perhaps this is an action that would be appropriate to delete in the updated plan.

During review of the previously approved actions, consider whether any new actions should be proposed. Perhaps damages from a recent hazard event have indicated the need for new approaches to protect property and life. Review the problem statements from the updated plan for ideas. Also review the FEMA publication *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013)*.

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
	<u>Weblink</u>					

High Potential Loss Facilities such as power plants, dams/levees, military installations, hazardous materials sites, shelters, day care centers, nursing homes, main government buildings (Do not include schools—they will be reported by the school districts)				
Preferred Family Healthcare	900 E Laharpe, Kirksville	658000		
Preferred Family Healthcare	1101 S Jamison, Kirksville	19500		
Bruce Normile Juvenile Justice	1400 S Boundary, Kirksville			
Kirksville Manor Care Ctr.	1705 E Laharpe, Kirksville	64759		
The Pines Nursing Home	1900 S Jamison, Kirksville			
Highland Crest / The Arbors	2204 S Halliburton, Kirksville	10808+10		
NEMO Sr. Services (Village 76)	100 Valley Forge Dr, Kirksville			
Kirksville Heights	2400 S Baltimore, Kirksville	16342		
Fjeld Arms Sr. Living	2016 N Florence, Kirksville			
St. Andrews Apts Sr. Living	500 S Osteopathy, Kirksville			
Faith Lutheran Preschool	1820 S Baltimore, Kirksville	23920		
Raggedy Ann & Andy Preschool	707 N Centennial, Kirksville	110760		
Adair County Family YMCA	1708 S Jamison, Kirksville			
Bright Beginnings Daycare	1123 N Osteopathy, Kirksville	9250		
CAPNEMO Head Start Daycare	1011 S Jamison, Kirksville	4200		
Early Childhood Learning Ctr	1405 S Cottage Grove, Kirksville	100768		
Kirksville Child Dev Center	2805 S Halliburton, Kirksville	1800		
CAPNEMO Head Start	915 W Locust, Kirksville	3696		
Novinger Wildcat Den	600 Rombauer, Novinger			
Adair County Hazmat Facilities	See Attachments			
Forest Lake Dam	Thousand Hills State Park			
Hazel Creek Lake Dam	Buck Creek Trail, Hazel Creek Lake			
Water Treatment Plant	1900 W Potter, Kirksville			
Wastewater Treatment Plant	23002 Atlas Lane, Kirksville			

**Multi-Jurisdictional Hazard Mitigation Plan**  
**Data Collection Questionnaire**  
**For Local Governments**

County: Adair

Jurisdiction: Village of Millard

Return by: \_\_\_\_\_

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process **will not** be eligible applicants for FEMA mitigation funding programs. Please note: School Districts and other Educational Institutions should complete the Data Collection Questionnaire indicated "For School Districts and Educational Institutions".

Prepared by: Margaret Ferrell & Felicia Scott

Phone: 660-665-2067

Email: mferrell1950@yahoo.com

Date: 7-23-19

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber

Address: 121 S. Cecil St. Memphis, MO 63555

Email: derekweber@nemorpc.org

Fax: (660)465-7163

Element	Yes, No, N/A	Comments and/or Weblink
<b>Policies/Ordinance</b>		
Zoning Ordinance	N/A	
Building Code	Version: N/A	
Floodplain Ordinance	Date: N/A	
Subdivision Ordinance	N/A	
Tree Trimming Ordinance	N/A	
Nuisance Ordinance		currently being updated
Stormwater Ordinance	N/A	
Drainage Ordinance	N/A	
Site Plan Review Requirements	N/A	
Historic Preservation Ordinance	N/A	
Landscape Ordinance	N/A	
<b>Program</b>		
Zoning/Land Use Restrictions	N/A	
Codes Building Site/Design	N/A	
Hazard Awareness Program	N/A	
National Flood Insurance Program (NFIP)	N/A	
NFIP Community Rating System (CRS) program	N/A	If so, what is your current level rating?
National Weather Service (NWS) Storm Ready Certification	N/A	
Firewise Community Certification	N/A	
Building Code Effectiveness Grading (BCEGs)	N/A	
ISO Fire Rating	Rating: N/A	
Economic Development Program	N/A	
Land Use Program	N/A	
Public Education/Awareness	N/A	
Property Acquisition	N/A	
Planning/Zoning Boards	N/A	
Stream Maintenance Program	N/A	
Tree Trimming Program	N/A	
<b>Engineering Studies for Streams (Local/County/Regional)</b>	N/A	

Element	Yes, No, N/A	Comments and/or Weblink
Local Environmental Organization	<i>no</i>	
Homeowner Associations	<i>no</i>	
Neighborhood Associations	<i>no</i>	
Chamber of Commerce	<i>no</i>	
Community Organizations (Lions, Kiwanis, etc.)	<i>no</i>	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		<i>yes</i>
Fund projects thru Capital Improvements funding		<i>no</i>
Authority to levy taxes for specific purposes		<i>yes</i>
Fees for water, sewer, gas, or electric services		<i>sewer</i>
Impact fees for new development		<i>no</i>
Incur debt through general obligation bonds		<i>no</i>
Incur debt through special tax bonds		<i>no</i>
Incur debt through private activities		<i>no</i>
Withhold spending in hazard prone areas		<i>no</i>

## Additional Questions

1. How is your government structure organized? (Commission, Mayor/City Council, how many members)

*Board of Trustees*

2. List any past or ongoing public education or information programs, such as for responsible water use, fire safety, household preparedness, or environmental education.

*None*

3. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities. Be sure to include pending or approved projects submitted for FEMA mitigation grants.

*None*

4. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.

*Nothing*

5. How many outdoor warning sirens are in your community? *None*

How are they activated (indicate responsible department/personnel)? *N/A*

6. Does your community utilize any other warning systems such as Cable Override, Reverse 911, etc? If so, please describe.

*Not at this time*

7. Does your community have designated public tornado shelters/saferooms? If so, are they constructed in accordance with FEMA standards?

*No*

Please provide address locations:

# VULNERABILITY ASSESSMENT

The purpose of this worksheet is to assess the vulnerable buildings, populations, critical facilities, infrastructure, and other important assets in your community by using the best available data to complete the table. Use the table on the next page to compile a detailed inventory of specific assets at risk including critical facilities and infrastructure; natural, cultural, and historical assets; and economic assets. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

Natural Hazards	
Flooding (Major & Flash) - <b>RF</b>	Drought - <b>D</b>
Levee Failure - <b>LF</b>	Extreme Temperature - <b>ET</b>
Dam Failure - <b>DF</b>	Severe Thunderstorm (incl. winds, hail, lightning) - <b>ST</b>
Earthquake - <b>EQ</b>	Severe Winter Weather (incl. snow, ice, severe cold) - <b>SWW</b>
Land Subsidence / Sinkholes - <b>LSS</b>	Tornadoes - <b>T</b>
	Wildfire - <b>WF</b>

## Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA's HAZUS-MH loss estimation software uses the following three categories of critical assets. 'Essential facilities' are those that if damaged would have devastating impacts on disaster response and/or recovery. 'High potential loss facilities' are those that would have a high loss or impact on the community. Transportation and lifeline facilities are third category of critical assets; examples are provided below.

### Essential Facilities

Hospitals and other medical facilities  
Police stations  
Fire station  
Emergency Operations Centers

### High Potential Loss Facilities

Power plants  
Dams/levees  
Military installations  
Hazardous material sites  
Schools  
Shelters  
Day care centers  
Nursing homes  
Main government buildings

### Transportation and Lifeline

Highways, bridges, and tunnels  
Railroads and facilities  
Bus facilities  
Airports  
Water treatment facilities  
Natural gas facilities and pipelines  
Oil facilities and pipelines  
Communications facilities

## Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.

Name of Asset	Address	Area (sq. ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
High Potential Loss Facilities such as power plants, dams/levees, military installations, hazardous materials sites, shelters, day care centers, nursing homes, main government buildings (Do not include schools—they will be reported by the school districts)						
Sewer Lift Station						
Transportation and Lifelines such as highways, bridges, and tunnels, railroads and facilities, bus facilities, airports, water treatment facilities, natural gas facilities and pipelines, oil facilities, oil facilities and pipelines, communications facilities						

\*If replacement cost data is not available, use the best available data (assessed valuation or other method for estimating cost) and explain any data deficiencies.



## HISTORIC HAZARD EVENTS

Please fill out the sheet on the next page for each significant hazard event that affected **Your Jurisdiction**. **Make as many copies as necessary to record all events** and complete with as much detail as possible. This includes all events associated with the hazards listed below that have caused previous damage in your jurisdiction. It is especially important to capture events that either were not included in the previous Hazard Mitigation Plan or occurred since the plan was completed. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Jurisdiction	<i>not aware of any</i>
Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Source of information	
Comments	

**Multi-Jurisdictional Hazard Mitigation Plan**  
**Data Collection Questionnaire**  
**For Local Governments**

County: Adair County

Jurisdiction: City of Brashear

Return by:

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process **will not** be eligible applicants for FEMA mitigation funding programs. Please note: School Districts and other Educational Institutions should complete the Data Collection Questionnaire indicated "For School Districts and Educational Institutions".

Prepared by: Angie McKim

Phone: 660-323-5575

Email: [citybrsh@marktwain.net](mailto:citybrsh@marktwain.net)

Date:

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber, Executive Director NEMO RPC

Address: 121 S. Cecil St, Memphis, MO 63555

Email: [derekweber@nemorpc.org](mailto:derekweber@nemorpc.org)

Fax: (660)465-7163

# CAPABILITY ASSESSMENT & INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

The purpose of this section is to collect information to document existing capabilities as well as determine existing plans, studies, reports, and technical information that may need to be incorporated in the mitigation plan. Although some of this information may have been captured in your previous mitigation plan, it is important to ensure this information is current in the plan update

Please indicate which of the following your jurisdiction has in place. For elements that do not pertain to your type of public entity, please indicate with "N/A". If applicable, please provide a completion date for the element. If your jurisdiction does not have a particular element, and a higher level of government has the authority pertaining to your jurisdiction, please indicate this in the comments column. If your jurisdiction has any of the **underlined and bolded** elements, please provide a copy of the document to the contact listed on the front and indicate method in the comments column (i.e. available on the web, will email or mail).

Element	Yes, No, N/A	Comments and/or Weblink
<b>Planning Capabilities</b>		
<b><u>Comprehensive Plan</u></b>	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	Yes	
City Mitigation Plan	No	
County Mitigation Plan	Yes	
Debris Management Plan	No	
<b><u>Economic Development Plan</u></b>	No	
Transportation Plan	NO	
Land-use Plan	No	
Flood Mitigation Assistance (FMA) Plan	No	
<b><u>Watershed Plan</u></b>	No	
Firewise or other fire mitigation plan	No	
Critical Facilities Plan (Mitigation/Response/Recovery)	No	

Element	Yes, No, N/A	Comments and/or Weblink
<b>Policies/Ordinance</b>		
Zoning Ordinance	No	
Building Code	No	
Floodplain Ordinance	No	
Subdivision Ordinance	No	
Tree Trimming Ordinance	No	
Nuisance Ordinance	No	
Stormwater Ordinance	No	
Drainage Ordinance	No	
Site Plan Review Requirements	No	
Historic Preservation Ordinance	No	
Landscape Ordinance	No	
<b>Program</b>		
Zoning/Land Use Restrictions	No	
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 Certification	No	
Firewise Community Certification	No	
Building Code Effectiveness Grading (BCEGs)	No	
ISO Fire Rating	3	
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	
<b><u>Engineering Studies for Streams (Local/County/Regional)</u></b>	No	

Element	Yes, No, N/A	Comments and/or Weblink
Mutual Aid Agreements	Yes	
<b>Studies/Reports/Maps</b>		
<u>Hazard Analysis/Risk Assessment (City)</u>	No	
<u>Hazard Analysis/Risk Assessment (County)</u>	No	
Evacuation Route Map	No	
<u>Critical Facilities Inventory</u>	No	
<u>Vulnerable Population Inventory</u>	No	
<u>Land Use Map</u>	No	
<b>Staff/Department</b>		<b>Full Time or Part Time?</b>
Building Code Official	No	
Building Inspector	No	
Mapping Specialist (GIS)	No	
Engineer	No	
Development Planner	No	
Public Works Official	No	
Emergency Management Coordinator	No	
NFIP Floodplain Administrator	No	
Emergency Response Team	No	
Hazardous Materials Expert	No	
Local Emergency Planning Committee	Yes	
County Emergency Management Commission	No	
Sanitation Department	No	
Transportation Department	No	
Economic Development Department	No	
Housing Department	No	
Historic Preservation	No	
<b>Non-Governmental Organizations (NGOs)</b>	<b>Is there a local chapter? Yes or No</b>	
American Red Cross	No	
Salvation Army	No	
Veterans Groups	No	

Element	Yes, No, N/A	Comments and/or Weblink
Local Environmental Organization	No	
Homeowner Associations	No	
Neighborhood Associations	No	
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.	No	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		No
Authority to levy taxes for specific purposes		Yes
Fees for water, sewer, gas, or electric services		Yes
Impact fees for new development		No
Incur debt through general obligation bonds		No
Incur debt through special tax bonds		No
Incur debt through private activities		No
Withhold spending in hazard prone areas		No

For plan updates, the plan maintenance process outlined in your previous plan requires all participating jurisdictions to incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate. A key element of effective implementation of mitigation is for the mitigation plan to be incorporated in existing authorities, policies, programs, and resources. Next to each applicable planning mechanism, indicate how your jurisdiction incorporated the previous mitigation plan. If no incorporation has occurred, please explain, including background information detailing any challenges preventing incorporation.

Planning Capabilities	Method of Incorporation Since Previous Plan or Challenges Preventing Incorporation
Comprehensive Plan	
Builder's Plan	
Capital Improvement Plan	
Local Recovery Plan	
County Recovery Plan	
Debris Management Plan	
Economic Development Plan	
Transportation Plan	
Land-use Plan	
Watershed Plan	
Firewise or other Fire Mitigation Plan such as Community Wildfire Protection Plan	

## Additional Questions

1. How is your government structure organized? (Commission, Mayor/City Council, how many members)
  - Mayor
  - City Council – 4 members
  - Clerk
2. List any past or ongoing public education or information programs, such as for responsible water use, fire safety, household preparedness, or environmental education.
3. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities. Be sure to include pending or approved projects submitted for FEMA mitigation grants.

4. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.
  - Evacuation and sheltering concerns of a large low-income/elderly population
  - Mass notification of vulnerable populations

5. How many outdoor warning sirens are in your community?
  - None

How are they activated (indicate responsible department/personnel)?

- NA

6. Does your community utilize any other warning systems such as Cable Override, Reverse 911, etc? If so, please describe.
  - No

7. Does your community have designated public tornado shelters/saferooms? If so, are they constructed in accordance with FEMA standards?
  - No

8. List residential, commercial and industrial development in your jurisdiction since last plan update.
  - None

9. Describe development trends and expected growth areas. Is any new development expected to occur in the 100-year floodplain? Is any new development expected to occur in any other known hazard areas? If possible, please provide a map indicating potential/planned growth areas.
  - None

10. Are any new facilities or infrastructure planned for construction during the next five years? If so, please provide facility name and purpose along with proposed locations, if known.
  - None



11. Please list major employers in your jurisdiction with an estimated number of employees.
    - Commuter/Farm Community
  12. Please list Mitigation Planning Committee members who served during the development of the previously approved plan. Was the process set forth for monitoring the implementation of the previously approved mitigation plan adhered to? Did the Committee meet as was specified in the previously approved plan? Why or why not?
    - No previous members
  13. Describe your jurisdiction's participation in the NFIP. Include information about how compliance with the NFIP is enforced locally.
    - Sanctioned no active compliance measures
-

# VULNERABILITY ASSESSMENT

The purpose of this worksheet is to assess the vulnerable buildings, populations, critical facilities, infrastructure, and other important assets in your community by using the best available data to complete the table. Use the table on the next page to compile a detailed inventory of specific assets at risk including critical facilities and infrastructure; natural, cultural, and historical assets; and economic assets. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

Natural Hazards	
Flooding (Major & Flash) – <b>RF</b>	Drought - <b>D</b>
Levee Failure – <b>LF</b>	Extreme Temperature - <b>ET</b>
Dam Failure – <b>DF</b>	Severe Thunderstorm (incl. winds, hail, lightning) - <b>ST</b>
Earthquake – <b>EQ</b>	Severe Winter Weather (incl. snow, ice, severe cold) - <b>SWW</b>
Land Subsidence / Sinkholes - <b>LSS</b>	Tornadoes - <b>T</b>
	Wildfire - <b>WF</b>

## Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA's HAZUS-MH loss estimation software uses the following three categories of critical assets. 'Essential facilities' are those that if damaged would have devastating impacts on disaster response and/or recovery. 'High potential loss facilities' are those that would have a high loss or impact on the community. Transportation and lifeline facilities are third category of critical assets; examples are provided below.

### Essential Facilities

Hospitals and other  
medical facilities  
Police stations  
Fire station  
Emergency Operations  
Centers

### High Potential Loss Facilities

Power plants  
Dams/levees  
Military installations  
Hazardous material sites  
Schools  
Shelters  
Day care centers  
Nursing homes  
Main government buildings

### Transportation and Lifeline

Highways, bridges, and tunnels  
Railroads and facilities  
Bus facilities  
Airports  
Water treatment facilities  
Natural gas facilities and  
pipelines  
Oil facilities and pipelines  
Communications facilities

## Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.

## Asset Inventory

Please list critical facilities and other community assets, the square feet, values, and occupancy/capacity. If not applicable, enter "N/A". In the last column, use the codes from the previous page to indicate hazards to which the asset is vulnerable. Add as many rows as needed. If this information is available in GIS format, please provide.

## Critical Facilities

Name of Asset	Address	Area (sq. ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
<u>Essential Facilities</u> such as hospitals and other medical facilities, police and fire stations, Emergency Operations Centers						
NONE						
<u>High Potential Loss Facilities</u> such as power plants, dams/levees, military installations, hazardous materials sites, shelters, day care centers, nursing homes, main government buildings (Do not include schools—they will be reported by the school districts)						

Name of Asset	Address	Area (sq. ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
City Hall	105 East Main St.					RF, EQ, T, SWW, ST
Transportation and Lifelines such as highways, bridges, and tunnels; railroads and facilities, bus facilities, airports, water treatment facilities, natural gas facilities and pipelines, oil facilities and pipelines, communications facilities						
Highway 6						RF, EQ, T

\*If replacement cost data is not available, use the best available data (assessed valuation or other method for estimating cost) and explain any data deficiencies.

**Multi-Jurisdictional Hazard Mitigation Plan**  
**Data Collection Questionnaire**  
**For Local Governments**

County: Adair County

Jurisdiction: Village of Gibbs

Return by:

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process **will not** be eligible applicants for FEMA mitigation funding programs. Please note: School Districts and other Educational Institutions should complete the Data Collection Questionnaire indicated "For School Districts and Educational Institutions".

Prepared by: Cheryl Walker

Phone: 660-342-1982

Email:

Date:

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber, Executive Director NEMO RPC

Address: 121 S. Cecil St, Memphis, MO 63555

Email: derekweber@nemorpc.org

Fax: (660)465-7163

# CAPABILITY ASSESSMENT & INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

The purpose of this section is to collect information to document existing capabilities as well as determine existing plans, studies, reports, and technical information that may need to be incorporated in the mitigation plan. Although some of this information may have been captured in your previous mitigation plan, it is important to ensure this information is current in the plan update

Please indicate which of the following your jurisdiction has in place. For elements that do not pertain to your type of public entity, please indicate with "N/A". If applicable, please provide a completion date for the element. If your jurisdiction does not have a particular element, and a higher level of government has the authority pertaining to your jurisdiction, please indicate this in the comments column. If your jurisdiction has any of the **underlined and bolded** elements, please provide a copy of the document to the contact listed on the front and indicate method in the comments column (i.e. available on the web, will email or mail).

Element	Yes, No, N/A	Comments and/or Weblink
<b>Planning Capabilities</b>		
<b><u>Comprehensive Plan</u></b>	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	Yes	
City Mitigation Plan	No	
County Mitigation Plan	Yes	
Debris Management Plan	No	
<b><u>Economic Development Plan</u></b>	No	
Transportation Plan	No	
Land-use Plan	No	
Flood Mitigation Assistance (FMA) Plan	No	
<b><u>Watershed Plan</u></b>	No	
Firewise or other fire mitigation plan	No	
Critical Facilities Plan (Mitigation/Response/Recovery)	No	

Element	Yes, No, N/A	Comments and/or Weblink
<b>Policies/Ordinance</b>		
Zoning Ordinance	No	
Building Code	No	
Floodplain Ordinance	No	
Subdivision Ordinance	No	
Tree Trimming Ordinance	No	
Nuisance Ordinance	No	
Stormwater Ordinance	No	
Drainage Ordinance	No	
Site Plan Review Requirements	No	
Historic Preservation Ordinance	No	
Landscape Ordinance	No	
<b>Program</b>		
Zoning/Land Use Restrictions	No	
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 Certification	No	
Firewise Community Certification	No	
Building Code Effectiveness Grading (BCEGs)	No	
ISO Fire Rating	3	
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	
<b><u>Engineering Studies for Streams (Local/County/Regional)</u></b>	No	

Element	Yes, No, N/A	Comments and/or Weblink
Mutual Aid Agreements	Yes	
<b>Studies/Reports/Maps</b>		
<b><u>Hazard Analysis/Risk Assessment (City)</u></b>	No	
<b><u>Hazard Analysis/Risk Assessment (County)</u></b>	No	
Evacuation Route Map	No	
<b><u>Critical Facilities Inventory</u></b>	No	
<b><u>Vulnerable Population Inventory</u></b>	No	
<b><u>Land Use Map</u></b>	No	
<b>Staff/Department</b>		<b>Full Time or Part Time?</b>
Building Code Official	No	
Building Inspector	No	
Mapping Specialist (GIS)	No	
Engineer	No	
Development Planner	No	
Public Works Official	No	
Emergency Management Coordinator	No	
NFIP Floodplain Administrator	No	
Emergency Response Team	No	
Hazardous Materials Expert	No	
Local Emergency Planning Committee	Yes	
County Emergency Management Commission	No	
Sanitation Department	No	
Transportation Department	No	
Economic Development Department	No	
Housing Department	No	
Historic Preservation	No	
<b>Non-Governmental Organizations (NGOs)</b>	<b>Is there a local chapter? Yes or No</b>	
American Red Cross	No	
Salvation Army	No	
Veterans Groups	No	



Element	Yes, No, N/A	Comments and/or Weblink
Local Environmental Organization	No	
Homeowner Associations	No	
Neighborhood Associations	No	
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.	No	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		No
Authority to levy taxes for specific purposes		Yes
Fees for water, sewer, gas, or electric services		Yes
Impact fees for new development		No
Incur debt through general obligation bonds		No
Incur debt through special tax bonds		No
Incur debt through private activities		No
Withhold spending in hazard prone areas		No

For plan updates, the plan maintenance process outlined in your previous plan requires all participating jurisdictions to incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate. A key element of effective implementation of mitigation is for the mitigation plan to be incorporated in existing authorities, policies, programs, and resources. Next to each applicable planning mechanism, indicate how your jurisdiction incorporated the previous mitigation plan. If no incorporation has occurred, please explain, including background information detailing any challenges preventing incorporation.

Planning Capabilities	Method of Incorporation Since Previous Plan or Challenges Preventing Incorporation
Comprehensive Plan	
Builder's Plan	
Capital Improvement Plan	
Local Recovery Plan	
County Recovery Plan	
Debris Management Plan	
Economic Development Plan	
Transportation Plan	
Land-use Plan	
Watershed Plan	
Firewise or other Fire Mitigation Plan such as Community Wildfire Protection Plan	

## Additional Questions

1. How is your government structure organized? (Commission, Mayor/City Council, how many members)
  - Mayor / City Council / Clerk
2. List any past or ongoing public education or information programs, such as for responsible water use, fire safety, household preparedness, or environmental education.
  - None
3. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities. Be sure to include pending or approved projects submitted for FEMA mitigation grants.
  - None
4. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.
  - Shelters
5. How many outdoor warning sirens are in your community?
  - None

How are they activated (indicate responsible department/personnel)?

- NA
6. Does your community utilize any other warning systems such as Cable Override, Reverse 911, etc? If so, please describe.
    - No
  7. Does your community have designated public tornado shelters/saferooms? If so, are they constructed in accordance with FEMA standards?
    - No
  8. List residential, commercial and industrial development in your jurisdiction since last plan update.
    - None
  9. Describe development trends and expected growth areas. Is any new development expected to occur in the 100-year floodplain? Is any new development expected to occur in any other known hazard areas? If possible, please provide a map indicating potential/planned growth areas.
    - None
  10. Are any new facilities or infrastructure planned for construction during the next five years? If so, please provide facility name and purpose along with proposed locations, if known.
    - None
  11. Please list major employers in your jurisdiction with an estimated number of employees.
    - none
  12. Please list Mitigation Planning Committee members who served during the development of the previously approved plan. Was the process set forth for monitoring the implementation of the previously approved mitigation plan adhered to? Did the Committee meet as was specified in the previously approved plan? Why or why not?
    - No previous members
  13. Describe your jurisdiction's participation in the NFIP. Include information about how compliance with the NFIP is enforced locally.
    - Not Participating no active compliance measures

# VULNERABILITY ASSESSMENT

The purpose of this worksheet is to assess the vulnerable buildings, populations, critical facilities, infrastructure, and other important assets in your community by using the best available data to complete the table. Use the table on the next page to compile a detailed inventory of specific assets at risk including critical facilities and infrastructure; natural, cultural, and historical assets; and economic assets. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

Natural Hazards	
Flooding (Major & Flash) – <b>RF</b>	Drought - <b>D</b>
Levee Failure – <b>LF</b>	Extreme Temperature - <b>ET</b>
Dam Failure – <b>DF</b>	Severe Thunderstorm (incl. winds, hail, lightning) - <b>ST</b>
Earthquake – <b>EQ</b>	Severe Winter Weather (incl. snow, ice, severe cold) - <b>SWW</b>
Land Subsidence / Sinkholes - <b>LSS</b>	Tornadoes - <b>T</b>
	Wildfire - <b>WF</b>

## Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA's HAZUS-MH loss estimation software uses the following three categories of critical assets. 'Essential facilities' are those that if damaged would have devastating impacts on disaster response and/or recovery. 'High potential loss facilities' are those that would have a high loss or impact on the community. Transportation and lifeline facilities are third category of critical assets; examples are provided below.

### Essential Facilities

Hospitals and other  
medical facilities  
Police stations  
Fire station  
Emergency Operations  
Centers

### High Potential Loss Facilities

Power plants  
Dams/levees  
Military installations  
Hazardous material sites  
Schools  
Shelters  
Day care centers  
Nursing homes  
Main government buildings

### Transportation and Lifeline

Highways, bridges, and tunnels  
Railroads and facilities  
Bus facilities  
Airports  
Water treatment facilities  
Natural gas facilities and  
pipelines  
Oil facilities and pipelines  
Communications facilities

## Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.

## Asset Inventory

Please list critical facilities and other community assets, the square feet, values, and occupancy/capacity. If not applicable, enter "N/A"). In the last column, use the codes from the previous page to indicate hazards to which the asset is vulnerable. Add as many rows as needed. If this information is available in GIS format, please provide.

## Critical Facilities

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
Essential Facilities such as hospitals and other medical facilities, police and fire stations, Emergency Operations Centers						
NONE						
High Potential Loss Facilities such as power plants, dams/levees, military installations, hazardous materials sites, shelters, day care centers, nursing homes, main government buildings (Do not include schools—they will be reported by the school districts)						

Name of Asset	Address	Area (sq. ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
None						
Transportation and Lifelines such as highways, bridges, and tunnels; railroads and facilities, bus facilities, airports, water treatment facilities, natural gas facilities and pipelines, oil facilities, oil facilities and pipelines, communications facilities						

**\*If replacement cost data is not available, use the best available data (assessed valuation or other method for estimating cost) and explain any data deficiencies.**

Economic Assets (Major Employers, etc)

Asset	Address	Product/ Service	Value (if known)	Number of Employees	Hazards
NONE					



## HISTORIC HAZARD EVENTS

Please fill out the sheet on the next page for each significant hazard event that affected **Your Jurisdiction**. **Make as many copies as necessary to record all events** and complete with as much detail as possible. This includes all events associated with the hazards listed below that have caused previous damage in your jurisdiction. It is especially important to capture events that either were not included in the previous Hazard Mitigation Plan or occurred since the plan was completed. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

<b>Jurisdiction</b>	
<b>Type of event</b>	
<b>Nature and magnitude of event</b>	
<b>Location</b>	
<b>Date of event</b>	
<b>Injuries</b>	
<b>Deaths</b>	
<b>Property damage</b>	
<b>Infrastructure damage</b>	
<b>Crop damage</b>	
<b>Business/economic impacts</b>	
<b>Road/school/other closures</b>	
<b>Other damage</b>	
<b>Insured losses</b>	
<b>Federal/state disaster relief funding</b>	
<b>Source of information</b>	
<b>Comments</b>	



**Multi-Jurisdictional Hazard Mitigation Plan**  
**Data Collection Questionnaire**  
**For Local Governments**

County: Adair County

Jurisdiction: City of Novinger

Return by:

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process **will not** be eligible applicants for FEMA mitigation funding programs. Please note: School Districts and other Educational Institutions should complete the Data Collection Questionnaire indicated "For School Districts and Educational Institutions".

Prepared by: Lisa Rhoads

Phone: 660-488-5383

Email: [cityofnv@nemr.net](mailto:cityofnv@nemr.net)

Date:

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber, Executive Director NEMO RPC

Address: 121 S. Cecil St, Memphis, MO 63555

Email: [derekweber@nemorpc.org](mailto:derekweber@nemorpc.org)

Fax: (660)465-7163

# CAPABILITY ASSESSMENT & INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

The purpose of this section is to collect information to document existing capabilities as well as determine existing plans, studies, reports, and technical information that may need to be incorporated in the mitigation plan. Although some of this information may have been captured in your previous mitigation plan, it is important to ensure this information is current in the plan update

Please indicate which of the following your jurisdiction has in place. For elements that do not pertain to your type of public entity, please indicate with "N/A". If applicable, please provide a completion date for the element. If your jurisdiction does not have a particular element, and a higher level of government has the authority pertaining to your jurisdiction, please indicate this in the comments column. If your jurisdiction has any of the **underlined and bolded** elements, please provide a copy of the document to the contact listed on the front and indicate method in the comments column (i.e. available on the web, will email or mail).

Element	Yes, No, N/A	Comments and/or Weblink
<b>Planning Capabilities</b>		
<b><u>Comprehensive Plan</u></b>	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	Yes	
City Mitigation Plan	No	
County Mitigation Plan	Yes	
Debris Management Plan	No	
<b><u>Economic Development Plan</u></b>	No	
Transportation Plan	No	
Land-use Plan	No	
Flood Mitigation Assistance (FMA) Plan	No	
<b><u>Watershed Plan</u></b>	No	
Firewise or other fire mitigation plan	No	
Critical Facilities Plan (Mitigation/Response/Recovery)	No	

Element	Yes, No, N/A	Comments and/or Weblink
<b>Policies/Ordinance</b>		
Zoning Ordinance	No	
Building Code	No	
Floodplain Ordinance	No	
Subdivision Ordinance	No	
Tree Trimming Ordinance	No	
Nuisance Ordinance	No	
Stormwater Ordinance	No	
Drainage Ordinance	No	
Site Plan Review Requirements	No	
Historic Preservation Ordinance	No	
Landscape Ordinance	No	
<b>Program</b>		
Zoning/Land Use Restrictions	No	
Codes Building Site/Design	No	
Hazard Awareness Program	No	
National Flood Insurance Program (NFIP)	Yes	
NFIP Community Rating System (CRS) program	No	
National Weather Service (NWS) Storm Ready Certification	No	
Firewise Community Certification	No	
Building Code Effectiveness Grading (BCEGs)	No	
ISO Fire Rating	3	
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	
<b><u>Engineering Studies for Streams (Local/County/Regional)</u></b>	No	

Element	Yes, No, N/A	Comments and/or Weblink
Mutual Aid Agreements	Yes	
<b>Studies/Reports/Maps</b>		
<b><u>Hazard Analysis/Risk Assessment (City)</u></b>	No	
<b><u>Hazard Analysis/Risk Assessment (County)</u></b>	No	
Evacuation Route Map	No	
<b><u>Critical Facilities Inventory</u></b>	No	
<b><u>Vulnerable Population Inventory</u></b>	No	
<b><u>Land Use Map</u></b>	No	
<b>Staff/Department</b>		<b>Full Time or Part Time?</b>
Building Code Official	No	
Building Inspector	No	
Mapping Specialist (GIS)	No	
Engineer	No	
Development Planner	No	
Public Works Official	No	
Emergency Management Coordinator	No	
NFIP Floodplain Administrator	No	
Emergency Response Team	No	
Hazardous Materials Expert	No	
Local Emergency Planning Committee	Yes	
County Emergency Management Commission	No	
Sanitation Department	No	
Transportation Department	No	
Economic Development Department	No	
Housing Department	No	
Historic Preservation	No	
<b>Non-Governmental Organizations (NGOs)</b>	<b>Is there a local chapter? Yes or No</b>	
American Red Cross	No	
Salvation Army	No	
Veterans Groups	No	

Element	Yes, No, N/A	Comments and/or Weblink
Local Environmental Organization	No	
Homeowner Associations	No	
Neighborhood Associations	No	
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.	No	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		No
Authority to levy taxes for specific purposes		Yes
Fees for water, sewer, gas, or electric services		Yes
Impact fees for new development		No
Incur debt through general obligation bonds		No
Incur debt through special tax bonds		No
Incur debt through private activities		No
Withhold spending in hazard prone areas		No

For plan updates, the plan maintenance process outlined in your previous plan requires all participating jurisdictions to incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate. A key element of effective implementation of mitigation is for the mitigation plan to be incorporated in existing authorities, policies, programs, and resources. Next to each applicable planning mechanism, indicate how your jurisdiction incorporated the previous mitigation plan. If no incorporation has occurred, please explain, including background information detailing any challenges preventing incorporation.

Planning Capabilities	Method of Incorporation Since Previous Plan or Challenges Preventing Incorporation
Comprehensive Plan	
Builder's Plan	
Capital Improvement Plan	
Local Recovery Plan	
County Recovery Plan	
Debris Management Plan	
Economic Development Plan	
Transportation Plan	
Land-use Plan	
Watershed Plan	
Firewise or other Fire Mitigation Plan such as Community Wildfire Protection Plan	

## Additional Questions

1. How is your government structure organized? (Commission, Mayor/City Council, how many members)
  - Mayor / City Council / Clerk
2. List any past or ongoing public education or information programs, such as for responsible water use, fire safety, household preparedness, or environmental education.
  - None
3. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities. Be sure to include pending or approved projects submitted for FEMA mitigation grants.
  - None
4. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.
  - Shelters/generators
5. How many outdoor warning sirens are in your community?
  - 1

How are they activated (indicate responsible department/personnel)?

- Fire Dept
6. Does your community utilize any other warning systems such as Cable Override, Reverse 911, etc? If so, please describe.
    - No
  7. Does your community have designated public tornado shelters/saferooms? If so, are they constructed in accordance with FEMA standards?
    - No
  8. List residential, commercial and industrial development in your jurisdiction since last plan update.
    - None
  9. Describe development trends and expected growth areas. Is any new development expected to occur in the 100-year floodplain? Is any new development expected to occur in any other known hazard areas? If possible, please provide a map indicating potential/planned growth areas.
    - None
  10. Are any new facilities or infrastructure planned for construction during the next five years? If so, please provide facility name and purpose along with proposed locations, if known.
    - None
  11. Please list major employers in your jurisdiction with an estimated number of employees.
    - none
  12. Please list Mitigation Planning Committee members who served during the development of the previously approved plan. Was the process set forth for monitoring the implementation of the previously approved mitigation plan adhered to? Did the Committee meet as was specified in the previously approved plan? Why or why not?
    - No previous members
  13. Describe your jurisdiction's participation in the NFIP. Include information about how compliance with the NFIP is enforced locally.
    - Participating no active compliance measures

# VULNERABILITY ASSESSMENT

The purpose of this worksheet is to assess the vulnerable buildings, populations, critical facilities, infrastructure, and other important assets in your community by using the best available data to complete the table. Use the table on the next page to compile a detailed inventory of specific assets at risk including critical facilities and infrastructure; natural, cultural, and historical assets; and economic assets. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

Natural Hazards	
Flooding (Major & Flash) – <b>RF</b>	Drought - <b>D</b>
Levee Failure – <b>LF</b>	Extreme Temperature - <b>ET</b>
Dam Failure – <b>DF</b>	Severe Thunderstorm (incl. winds, hail, lightning) - <b>ST</b>
Earthquake – <b>EQ</b>	Severe Winter Weather (incl. snow, ice, severe cold) - <b>SWW</b>
Land Subsidence / Sinkholes - <b>LSS</b>	Tornadoes - <b>T</b>
	Wildfire - <b>WF</b>

## Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA's HAZUS-MH loss estimation software uses the following three categories of critical assets. 'Essential facilities' are those that if damaged would have devastating impacts on disaster response and/or recovery. 'High potential loss facilities' are those that would have a high loss or impact on the community. Transportation and lifeline facilities are third category of critical assets; examples are provided below.

### Essential Facilities

Hospitals and other  
medical facilities  
Police stations  
Fire station  
Emergency Operations  
Centers

### High Potential Loss Facilities

Power plants  
Dams/levees  
Military installations  
Hazardous material sites  
Schools  
Shelters  
Day care centers  
Nursing homes  
Main government buildings

### Transportation and Lifeline

Highways, bridges, and tunnels  
Railroads and facilities  
Bus facilities  
Airports  
Water treatment facilities  
Natural gas facilities and  
pipelines  
Oil facilities and pipelines  
Communications facilities

## Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.



## Asset Inventory

Please list critical facilities and other community assets, the square feet, values, and occupancy/capacity. If not applicable, enter "N/A". In the last column, use the codes from the previous page to indicate hazards to which the asset is vulnerable. Add as many rows as needed. If this information is available in GIS format, please provide.

## Critical Facilities

Name of Asset	Address	Area (sq.ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
<u>Essential Facilities</u> such as hospitals and other medical facilities, police and fire stations, Emergency Operations Centers						
Fire Station	100 Front St. Novinger, MO 63559					
<u>High Potential Loss Facilities</u> such as power plants, dams/levees, military installations, hazardous materials sites, shelters, day care centers, nursing homes, main government buildings (Do not include schools—they will be reported by the school districts)						

Name of Asset	Address	Area (sq. ft.)	Replacement Value (Insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
Adair County R-I School	600 Rombauer Ave, Novinger, MO 63559					
Transportation and Lifelines such as highways, bridges, and tunnels, railroads and facilities, bus facilities, airports, water treatment facilities, natural gas facilities and pipelines, oil facilities, oil facilities and pipelines, communications facilities						
Highway 6						

**\*If replacement cost data is not available, use the best available data (assessed valuation or other method for estimating cost) and explain any data deficiencies.**

Economic Assets (Major Employers, etc)

Asset	Address	Product/ Service	Value (if known)	Number of Employees	Hazards
NONE					

## HISTORIC HAZARD EVENTS

Please fill out the sheet on the next page for each significant hazard event that affected **Your Jurisdiction**. **Make as many copies as necessary to record all events** and complete with as much detail as possible. This includes all events associated with the hazards listed below that have caused previous damage in your jurisdiction. It is especially important to capture events that either were not included in the previous Hazard Mitigation Plan or occurred since the plan was completed. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

<b>Jurisdiction</b>	
<b>Type of event</b>	
<b>Nature and magnitude of event</b>	
<b>Location</b>	
<b>Date of event</b>	
<b>Injuries</b>	
<b>Deaths</b>	
<b>Property damage</b>	
<b>Infrastructure damage</b>	
<b>Crop damage</b>	
<b>Business/economic impacts</b>	
<b>Road/school/other closures</b>	
<b>Other damage</b>	
<b>Insured losses</b>	
<b>Federal/state disaster relief funding</b>	
<b>Source of information</b>	
<b>Comments</b>	

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## Multi-Jurisdictional Hazard Mitigation Plan

### Data Collection Questionnaire

#### For School Districts and Educational Institutions

County: Adair

School District /  
Educational Institution Name: Adair County R-11

Return by: August 2, 2019

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process will not be eligible applicants for FEMA mitigation funding programs.

Prepared by: Shelly Shipman

Phone: 660.323.5272

Email: shelly-shipman@brashear.k12.mo.us

Date: 7-29-19

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber

Address: 121 S. Cecil St. Memphis, MO 63555

Email: derekweber@nemorpc.org

Fax: (660)465-7163

# CAPABILITY ASSESSMENT & INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

The purpose of this section is to collect information to document existing capabilities as well as determine existing plans, studies, reports, and technical information that may need to be incorporated in the mitigation plan.

Please indicate which of the following your school district / institution has in place. For elements that do not pertain to you, please indicate with "N/A". If applicable, please provide a completion date for the element. If your school district / institution has any of the underlined and bolded elements, please provide a copy of the document to the contact indicated on the front of this questionnaire and indicate method in the comments column (i.e. available on the web, will email or mail).

Element	Yes/No	Completion Date	Comments
Master Plan	Yes	8/15/2018	CSIP - State Requirement
Capital Improvement Plan	N/A		
<u>School Emergency Plan</u>			
Shelter in place protocols	Yes	12/20/2018	
Evacuation protocols	Yes		
Weapons Policy	Yes	5/31/13	

## Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your school district / institution.

Resource	Yes/No	Department/Position	Comments
Full-time building official (i.e. Principal)	Yes	K-12 Supt. & K-12 Principal	
Emergency Manager	NO		
Grant Writer	NO		
Public Information Officer	NO		

## Financial Resources

Identify whether your school district / institution has access to or is eligible to use the following financial resources for hazard mitigation.

Financial Resource	Yes/No	Comments
Capital improvements project funding	Yes	
Local funds	Yes	
General obligation bonds	Yes	
Special tax bonds	Yes	
Private activities/donations	Yes	
State and federal funds	Yes	

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## Additional Capabilities Questions

1. Are your buildings equipped with a public address (PA) system or other emergency alert system?  
Please describe. *yes - PA system through buildings + outside through phone system and speakers*
2. Does your school buildings' have NOAA Weather Radios?  
*yes - 1*
3. List any past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect facilities or provide education regarding hazards that could occur.  
*N/A*
4. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities.  
*N/A*
5. Do any of your buildings have designated tornado shelters or "saferooms"? If so, are they constructed in accordance with FEMA standards? *NO*  
*N/A*
6. Did your school district / institution make any additions to buildings or construction new buildings since the last plan update (2010)? Please list the buildings and the improvement.  
*yes - Three outdoor sheds - used for storage only.*
7. Does your school district / institution plan to remodel or construct any buildings in the next 5 years? If so, please list the building or proposed building and planned improvements. Are any planned construction activities in known hazard areas?  
*# No.*
8. What percentage is your projected enrollment expected to increase or decrease in the next five years?  
*5%.*
9. Do you have your own campus police? Please explain your police department or who you rely on for security needs.  
*NO*



## VULNERABILITY ASSESSMENT

### Asset Inventory

The purpose of this worksheet is to assist in the assessment of the vulnerable populations and facilities owned by your school district / institution. Use the table below to compile a detailed inventory of specific assets at risk. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

Natural Hazards	
Flooding (Major & Flash) - RF	Drought - D
Levee Failure - LF	Extreme Temperature - ET
Dam Failure - DF	Severe Thunderstorm (incl. winds, hail, lightning) - ST
Earthquake - EQ	Severe Winter Weather (incl. snow, ice, severe cold) - SWW
Land Subsidence / Sinkholes - LSS	Tornadoes - T
Drought - D	Wildfire - WF

Please list buildings owned by your school district / institution including the square feet, values, and occupancy/capacity. If not applicable or not available, enter "N/A". Add as many rows as needed. If you have this data in GIS formats, or other formats, please provide in lieu of this.

Building / Asset	Address	Approximate Square Feet (sq. ft.)	Estimated Replacement Cost (if insured)	Estimated Current Value	Occupancy / Capacity	Natural Hazard
Brashear High School	School Building / Grounds	31,298	\$4.5 mill	\$675,000	During school months -	RF
Elementary School	205 W. Dewey Street	16,500	2.3 mill	\$360,000	200 people	D
Eat Shack	Brashear, MO 63533	368	\$25,000	\$3,000		ST
Bus Storage	102 W. Chestnut	140	\$9,500	\$3,000		SWW
Storage Building	305 N. King Street	2,400	\$108,000	\$53,000		T
Athletic Storage Building	205 W. Dewey Street	400	\$18,000	\$17,500		
Garage	103 N. King Street	345	\$10,000	\$3,000		





# HISTORIC HAZARD EVENTS (continued)

Please fill out one sheet for each significant hazard event that affected your school district /institution with as much detail as possible. This includes all hazard events listed on the Vulnerability Assessment page that have caused previous damage. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insurance losses	
Federal/state disaster relief funding	
Source of information	
Comments	

# Multi-Jurisdictional Hazard Mitigation Plan

## Data Collection Questionnaire

### For School Districts and Educational Institutions

County:

School District /  
Educational Institution Name:

Return by:

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process **will not** be eligible applicants for FEMA mitigation funding programs.

Prepared by: Shawn Corbett

Phone: (660) 626-1444

Email: scorbett@kirksville.k12.mo.us

Date: 5/12/20

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber

Address: 121 S. Cecil St., Memphis, MO. 63555

Email: derek.weber@nemospco.org

Fax: (660) 465-7163

# CAPABILITY ASSESSMENT & INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

The purpose of this section is to collect information to document existing capabilities as well as determine existing plans, studies, reports, and technical information that may need to be incorporated in the mitigation plan.

Please indicate which of the following your school district / institution has in place. For elements that do not pertain to you, please indicate with "N/A". If applicable, please provide a completion date for the element. If your school district / institution has any of the **underlined and bolded** elements, please provide a copy of the document to the contact indicated on the front of this questionnaire and indicate method in the comments column (i.e. available on the web, will email or mail).

Planning Elements	Yes/No	Date of Latest Version	Comments
Master Plan	N/A		
Capital Improvement Plan	Yes	Winter '20	Mail
<b><u>School Emergency Plan</u></b>			
Shelter in place protocols	Yes	May '20	Mail
Evacuation protocols	Yes	May '20	Mail
Weapons Policy	Yes	May '20	Mail

## Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your school district / institution.

Personnel Resources	Yes/No	Department/Position	Comments
Full-time building official (i.e. Principal)	Yes	Superintendent	Bob Webb
Emergency Manager	Yes	Safety Coordinator	Sharon Corbett
Grant Writer	N/A		
Public Information Officer	Yes	Superintendent	Bob Webb

## Financial Resources

Identify whether your school district /institution has access to or is eligible to use the following financial resources for hazard mitigation.

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

## Additional Capabilities Questions

1. Are your buildings equipped with a public address (PA) system or other emergency alert system?  
Please describe.

PA Systems in each building, Fire Alarms.

2. Does your school buildings' have NOAA Weather Radios?

Yes

3. List any past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect facilities or provide education regarding hazards that could occur.

Natural disaster training response provided to all faculty, staff, students twice per semester

4. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities.

N/A

5. Do any of your buildings have designated tornado shelters or "saferooms"? If so, are they constructed in accordance with FEMA standards?

No

6. Did your school district / institution make any additions to buildings or construction new buildings since the last plan update (2010)? Please list the buildings and the improvement.

Spanhower football stadium - Turf installed and new bleachers on home side.

7. Does your school district / institution plan to remodel or construct any buildings in the next 5 years? If so, please list the building or proposed building and planned improvements. Are any planned construction activities in known hazard areas?

N/A

8. What percentage is your projected enrollment expected to increase or decrease in the next five years?

No on both

9. Do you have your own campus police? Please explain your police department or who you rely on for security needs.

We have a School Resource Officer on campus at the High School we share cost 50/50 w/our local police department.

## VULNERABILITY ASSESSMENT

### Asset Inventory

The purpose of this worksheet is to assist in the assessment of the vulnerable populations and facilities owned by your school district / institution. Use the table below to compile a detailed inventory of specific assets at risk. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

Natural Hazards	
Flooding (Major & Flash) - RF	Drought - D
Levee Failure - LF	Extreme Temperature - ET
Dam Failure - DF	Severe Thunderstorm (incl. winds, hail, lightning) - ST
Earthquake - EQ	Severe Winter Weather (incl. snow, ice, severe cold) - SWW
Land Subsidence / Sinkholes - LSS	Tornadoes - T
Drought - D	Wildfire - WF

Please list buildings owned by your school district / institution including the square feet, values, and occupancy/capacity. If not applicable or not available, enter "N/A". Add as many rows as needed. **If you have this data in GIS formats, or other formats, please provide in lieu of this.**

Name of Asset	Address	Area (sq.ft.)	Replacement Value (insured) (\$)	Contents Value (\$)	Occupancy/ Capacity (#)	Natural Hazards
Central Office	1901 E. Hamilton	7800	N/A	N/A	N/A	ST, SWW, T, EQ
Primary School	1815 E. Hamilton	85000				
Early Childhood	1405 S. Cottage Grove	39700				
Middle School	1515 S. Cottage Grove	69500				
High School	1300 S. Cottage Grove	115200				
Technical Center	1103 S. Cottage Grove	62500				
Roy Miller	2010 E. Normal	73800				

[illegible]

## HISTORIC HAZARD EVENTS

Please fill out one sheet for each significant hazard event that affected your school district / institution with as much detail as possible. This includes all hazard events listed on the Vulnerability Assessment page that have caused previous damage. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type	Storm Damage wind & rain
Name of Hazard Event	Wind/Rain Storm
Location	HS Building / Ball field / Storage Shed
Date	10-14-17
Deaths	None
Injuries	None
Property Damage	\$9,200
Infrastructure Damage	N/A
Other Damage	N/A
Public Safety Concerns	N/A
Recovery Status / Current Status	N/A
Other Damage	N/A
Other Damage	N/A
Other Damage	N/A
Other Damage	N/A
Other Damage	N/A
Comments	



## HISTORIC HAZARD EVENTS

Please fill out one sheet for each significant hazard event that affected **your school district / institution** with as much detail as possible. This includes all hazard events listed on the Vulnerability Assessment page that have caused previous damage. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	No events
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Source of information	
Comments	

# CAPITAL IMPROVEMENT PROJECTS - Master Planning

## Categories

Updated 12\19\19

1. Health\Life Safety
2. Maintenance
3. Program & Curriculum
4. Pride Appearance

Projects	Building	Categories		19\20	20\21	21\22	22\23	23\24
<u>High School - Bond Issue?</u>	HS							
Admin. Roof, Entry, Restrooms								
Safety - Tech Center\HS Walk								
Gym Updates								
Paint	Campus	4		Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
<u>Roof Replace</u>	MS\RME					Ongoing	Ongoing	Ongoing
MS Roof Commons	MS	1\2		Projected				
RME Roof Horsehoe	RME	1\2		Projected				
Tech Center Roof Entry	Vo-Tech	1\2		Projected				
RME Exterior Paint	RME	2\4						
Campus Camera Security Sys.	Campus	1		Projected	Projected			
<u>HVAC Replace</u>	Campus					Ongoing	Ongoing	Ongoing
HS HVAC Replace x 6	HS	2		Projected				
HS Pump Replace x3	HS	2		Projected				
MS Pump Replace	MS	2		Projected				
Gycol System Replace	ECLC\RME\MS	2		Projected				
Asphalt\Concrete Repair	Campus	2		Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
Spainhower Parking Lot	Stadium	4						
RME Café Tile Floor Replace	RME	2\4						
District Carpet\Tile Replace	Campus	2\4		Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
MS Gym Curtain	MS	1\4						
Boys Gym Locker Replace	MS	3\4						
Additional Tennis Courts x 2	Athletics	3						
Athletics Outdoor Lighting	HS\Visitor	1\4						
Central Office EFIS	CO	2\4						
Paint Awning	HS	2\4						
Asphalt Replace	Campus	1\4						
Card Readers	KPS\HS	3						

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## Multi-Jurisdictional Hazard Mitigation Plan

### Data Collection Questionnaire

#### For School Districts and Educational Institutions

County: Adair

School District /  
Educational Institution Name: Adair County R-11

Return by: August 2, 2019

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process will not be eligible applicants for FEMA mitigation funding programs.

Prepared by: Shelly Shipman

Phone: 660.323.5272

Email: shelly-shipman@brashear.k12.mo.us

Date: 7-29-19

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber

Address: 121 S. Cecil St. Memphis, MO 63555

Email: derekweber@nemorpc.org

Fax: (660)465-7163

# CAPABILITY ASSESSMENT & INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

The purpose of this section is to collect information to document existing capabilities as well as determine existing plans, studies, reports, and technical information that may need to be incorporated in the mitigation plan.

Please indicate which of the following your school district / institution has in place. For elements that do not pertain to you, please indicate with "N/A". If applicable, please provide a completion date for the element. If your school district / institution has any of the underlined and bolded elements, please provide a copy of the document to the contact indicated on the front of this questionnaire and indicate method in the comments column (i.e. available on the web, will email or mail).

Element	Yes/No	Completion Date	Comments
Master Plan	Yes	8/15/2018	CSIP - State Requirement
Capital Improvement Plan	N/A		
<u>School Emergency Plan</u>			
Shelter in place protocols	Yes	12/20/2018	
Evacuation protocols	Yes		
Weapons Policy	Yes	5/31/13	

## Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your school district / institution.

Resource	Yes/No	Department/Position	Comments
Full-time building official (i.e. Principal)	Yes	K-12 Supt. & K-12 Principal	
Emergency Manager	NO		
Grant Writer	NO		
Public Information Officer	NO		

## Financial Resources

Identify whether your school district / institution has access to or is eligible to use the following financial resources for hazard mitigation.

Financial Resource	Yes/No	Comments
Capital improvements project funding	Yes	
Local funds	Yes	
General obligation bonds	Yes	
Special tax bonds	Yes	
Private activities/donations	Yes	
State and federal funds	Yes	

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## Additional Capabilities Questions

1. Are your buildings equipped with a public address (PA) system or other emergency alert system?  
Please describe. *yes - PA system through buildings + outside through phone system and speakers*
2. Does your school buildings' have NOAA Weather Radios?  
*yes - 1*
3. List any past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect facilities or provide education regarding hazards that could occur.  
*N/A*
4. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities.  
*N/A*
5. Do any of your buildings have designated tornado shelters or "saferooms"? If so, are they constructed in accordance with FEMA standards? *NO*  
*N/A*
6. Did your school district / institution make any additions to buildings or construction new buildings since the last plan update (2010)? Please list the buildings and the improvement.  
*yes - Three outdoor sheds - used for storage only.*
7. Does your school district / institution plan to remodel or construct any buildings in the next 5 years? If so, please list the building or proposed building and planned improvements. Are any planned construction activities in known hazard areas?  
*# No.*
8. What percentage is your projected enrollment expected to increase or decrease in the next five years?  
*5%.*
9. Do you have your own campus police? Please explain your police department or who you rely on for security needs.  
*NO*

# VULNERABILITY ASSESSMENT

## Asset Inventory

The purpose of this worksheet is to assist in the assessment of the vulnerable populations and facilities owned by your school district / institution. Use the table below to compile a detailed inventory of specific assets at risk. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

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Dam Failure - DF	Severe Thunderstorm (incl. winds, hail, lightning) - ST
Earthquake - EQ	Severe Winter Weather (incl. snow, ice, severe cold) - SWW
Land Subsidence / Sinkholes - LSS	Tornadoes - T
Drought - D	Wildfire - WF

Please list buildings owned by your school district / institution including the square feet, values, and occupancy/capacity. If not applicable or not available, enter "N/A". Add as many rows as needed. If you have this data in GIS formats, or other formats, please provide in lieu of this.

Building / Asset	Address	Approximate Square Feet (sq. ft.)	Estimated Replacement Cost (if insured)	Estimated Current Value	Occupancy / Capacity	Natural Hazard
Brashear High School	School Building / Grounds	31,298	\$4.5 mill	\$675,000	During school months -	RF
Elementary School	205 W. Dewey Street	16,500	2.3 mill	\$360,000	200 people	D
Eat Shack	Brashear, MO 63533	368	\$25,000	\$3,000		ST
Bus Storage	102 W. Chestnut	140	\$9,500	\$3,000		SWW
Storage Building	305 N. King Street	2,400	\$108,000	\$53,000		T
Athletic Storage Building	205 W. Dewey Street	400	\$18,000	\$17,000		
Garage	103 N. King Street	345	\$10,000	\$3,000		



# HISTORIC HAZARD EVENTS (continued)

Please fill out one sheet for each significant hazard event that affected your school district /institution with as much detail as possible. This includes all hazard events listed on the Vulnerability Assessment page that have caused previous damage. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insurance losses	
Federal/state disaster relief funding	
Source of information	
Comments	



# Multi-Jurisdictional Hazard Mitigation Plan

## Data Collection Questionnaire

### For School Districts and Educational Institutions

County:

School District /  
Educational Institution Name:

Return by:

Please complete this data collection questionnaire as accurately and completely as possible as this information will appear in the mitigation plan. A data collection questionnaire must be completed for each "jurisdiction" that wishes to be included in the plan. According to FEMA's definition a jurisdiction is any local government, including counties, municipalities, cities, towns, school districts, special districts, councils of government, and tribal organizations. Any of these entities as well as publicly funded colleges and universities that do not participate in the planning process **will not** be eligible applicants for FEMA mitigation funding programs.

Prepared by: Shawn Corbett

Phone: (660) 626-1444

Email: scorbett@kirksville.k12.mo.us

Date: 5/12/20

**Please return questionnaires by mail, email, or fax to:**

Name: Derek Weber

Address: 121 S. Cecil St., Memphis, MO. 63555

Email: derek.weber@nemospa.org

Fax: (660) 465-7163

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The purpose of this section is to collect information to document existing capabilities as well as determine existing plans, studies, reports, and technical information that may need to be incorporated in the mitigation plan.

Please indicate which of the following your school district / institution has in place. For elements that do not pertain to you, please indicate with "N/A". If applicable, please provide a completion date for the element. If your school district / institution has any of the **underlined and bolded** elements, please provide a copy of the document to the contact indicated on the front of this questionnaire and indicate method in the comments column (i.e. available on the web, will email or mail).

Planning Elements	Yes/No	Date of Latest Version	Comments
Master Plan	N/A		
Capital Improvement Plan	Yes	Winter '20	Mail
<b><u>School Emergency Plan</u></b>			
Shelter in place protocols	Yes	May '20	Mail
Evacuation protocols	Yes	May '20	Mail
Weapons Policy	Yes	May '20	Mail

## Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your school district / institution.

Personnel Resources	Yes/No	Department/Position	Comments
Full-time building official (i.e. Principal)	Yes	Superintendent	Bob Webb
Emergency Manager	Yes	Safety Coordinator	Sharon Corbett
Grant Writer	N/A		
Public Information Officer	Yes	Superintendent	Bob Webb

## Financial Resources

Identify whether your school district /institution has access to or is eligible to use the following financial resources for hazard mitigation.

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

## Additional Capabilities Questions

1. Are your buildings equipped with a public address (PA) system or other emergency alert system?  
Please describe.

PA Systems in each building, Fire Alarms.

2. Does your school buildings' have NOAA Weather Radios?

Yes

3. List any past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect facilities or provide education regarding hazards that could occur.

Natural disaster training response provided to all faculty, staff, students twice per semester

4. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities.

N/A

5. Do any of your buildings have designated tornado shelters or "saferooms"? If so, are they constructed in accordance with FEMA standards?

No

6. Did your school district / institution make any additions to buildings or construction new buildings since the last plan update (2010)? Please list the buildings and the improvement.

Spanhower football stadium - Turf installed and new bleachers on home side.

7. Does your school district / institution plan to remodel or construct any buildings in the next 5 years? If so, please list the building or proposed building and planned improvements. Are any planned construction activities in known hazard areas?

N/A

8. What percentage is your projected enrollment expected to increase or decrease in the next five years?

No on both

9. Do you have your own campus police? Please explain your police department or who you rely on for security needs.

We have a School Resource Officer on campus at the High School we share cost 50/50 w/our local police department.

## VULNERABILITY ASSESSMENT

### Asset Inventory

The purpose of this worksheet is to assist in the assessment of the vulnerable populations and facilities owned by your school district / institution. Use the table below to compile a detailed inventory of specific assets at risk. In the natural hazard column of the asset inventory table, indicate (by assigned abbreviation) which of the following hazards the asset is vulnerable to:

Natural Hazards	
Flooding (Major & Flash) - RF	Drought - D
Levee Failure - LF	Extreme Temperature - ET
Dam Failure - DF	Severe Thunderstorm (incl. winds, hail, lightning) - ST
Earthquake - EQ	Severe Winter Weather (incl. snow, ice, severe cold) - SWW
Land Subsidence / Sinkholes - LSS	Tornadoes - T
Drought - D	Wildfire - WF

Please list buildings owned by your school district / institution including the square feet, values, and occupancy/capacity. If not applicable or not available, enter "N/A". Add as many rows as needed. **If you have this data in GIS formats, or other formats, please provide in lieu of this.**

Name of Asset	Address	Area (sq.ft.)	Replacement Value (insured) (\$)	Contents Value (\$)	Occupancy/Capacity (#)	Natural Hazards
Central Office	1901 E. Hamilton	7800	N/A	N/A	N/A	ST, SWW, T, EQ
Primary School	1815 E. Hamilton	85000				
Early Childhood	1405 S. Cottage Grove	39700				
Middle School	1515 S. Cottage Grove	69500				
High School	1300 S. Cottage Grove	115200				
Technical Center	1103 S. Cottage Grove	62500				
Roy Miller	2010 E. Normal	73800				

[illegible]

## HISTORIC HAZARD EVENTS

Please fill out one sheet for each significant hazard event that affected **your school district / institution** with as much detail as possible. This includes all hazard events listed on the Vulnerability Assessment page that have caused previous damage. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of Event	Storm Damage wind & rain
Name of the Hazard	Wind/Rain Storm
Location	HS Building / Ball field / Storage Shed
Exposure Number	10-14-17
Impact	None
Death	None
Property Damage	\$9,200
Business Interruption	N/A
Cost of Repair	N/A
Business Interruption Losses	N/A
Real Estate Losses	N/A
Other Damage	N/A
Future Losses	N/A
Future Losses (if not insured)	N/A
Source of Information	
Comments	

## HISTORIC HAZARD EVENTS

Please fill out one sheet for each significant hazard event that affected **your school district / institution** with as much detail as possible. This includes all hazard events listed on the Vulnerability Assessment page that have caused previous damage. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	No events
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Source of information	
Comments	

# CAPITAL IMPROVEMENT PROJECTS - Master Planning

## Categories

Updated 12\19\19

1. Health\Life Safety
2. Maintenance
3. Program & Curriculum
4. Pride Appearance

Projects	Building	Categories		19\20	20\21	21\22	22\23	23\24
<u>High School - Bond Issue?</u>	HS							
Admin. Roof, Entry, Restrooms								
Safety - Tech Center\HS Walk								
Gym Updates								
Paint	Campus	4		Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
<u>Roof Replace</u>	MS\RME					Ongoing	Ongoing	Ongoing
MS Roof Commons	MS	1\2		Projected				
RME Roof Horsehoe	RME	1\2		Projected				
Tech Center Roof Entry	Vo-Tech	1\2		Projected				
RME Exterior Paint	RME	2\4						
Campus Camera Security Sys.	Campus	1		Projected	Projected			
<u>HVAC Replace</u>	Campus					Ongoing	Ongoing	Ongoing
HS HVAC Replace x 6	HS	2		Projected				
HS Pump Replace x3	HS	2		Projected				
MS Pump Replace	MS	2		Projected				
Gycol System Replace	ECLC\RME\MS	2		Projected				
Asphalt\Concrete Repair	Campus	2		Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
Spainhower Parking Lot	Stadium	4						
RME Café Tile Floor Replace	RME	2\4						
District Carpet\Tile Replace	Campus	2\4		Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
MS Gym Curtain	MS	1\4						
Boys Gym Locker Replace	MS	3\4						
Additional Tennis Courts x 2	Athletics	3						
Athletics Outdoor Lighting	HS\Visitor	1\4						
Central Office EFIS	CO	2\4						
Paint Awning	HS	2\4						
Asphalt Replace	Campus	1\4						
Card Readers	KPS\HS	3						