

ANDREW COUNTY
MULTI-JURISDICTIONAL
HAZARD MITIGATION
PLAN

Approved September 23, 2021

Amended October 14, 2021

Written by Mo-Kan
Regional Council

CONTRIBUTORS

Andrew County Hazard Mitigation Planning Committee

Jurisdictional Representatives

Name	Title	Jurisdiction/Agency/Organization
Bob Caldwell	Andrew County Presiding Commissioner	Andrew County
Fritz Hegeman	Andrew County Commissioner	Andrew County
Gary Bauman	Andrew County Commissioner	Andrew County
Ryan Bever	Emergency Management Director	Andrew County
Rick Russell	Amazonia Mayor	City of Amazonia
Kerri Krumme	Clerk of County Club Village	County Club Village
Teresa Neely	Clerk of Cosby	Village of Cosby
Bob Lance	Clerk of Fillmore	City of Fillmore
Jason Dunbar	Rosendale Mayor	City of Rosendale
Bruce Lundy	City Administrator of Savannah	City of Savannah
Kathy Roach	Clerk of Rea	Village of Rea
Don Lawrence and Becky Grimes	Superintendent Principal	Avenue City School District
Mark McDaniel	Superintendent	North Andrew School District
Eric Kurre	Superintendent	Savannah School District
Daniel Brewer	Fire Chief	Rosendale Fire Protection District
Andrew Hoffman	Administrator	Andrew County Health Department

Stakeholder Representatives

Name	Title	Agency/Organization
Grant Gillett	Andrew County Sheriff	Andrew County
Michael Booth	Regional Coordinator	SEMA
Alex Braszko Jr.	Lieutenant Colonel	US Army
Karen Clibon	Administrator	Andrew County Senior Center
Sharon Cornelius	Manager	Public Water Supply District #2
Leslie Cope	Emergency Responder	Andrew County
Cindy Esley	Treasurer	Andrew County
Madison Donahue	Emergency Responder	Andrew County
Kenny Hill	Mayor of Rea	Village of Rea
Katie Johnson	Administrator	LaVerna Village Nursing Home
Karol Johnson	Community Volunteer	Community Volunteer
Gina Lucas	County Engagement Specialist	Missouri University Extension Office
Rick Thorton	Fire Chief	Helena Fire District
Johnney Neely	Former Mayor of Cosby	Village of Cosby
Brian Roatry	Fire Chief	Savannah Fire Department
Lesley Schulte	Emergency Response Planner	Andrew County
Matt Younger	Administrator	NW Health Services

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EXECUTIVE SUMMARY

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Andrew County and participating jurisdictions and school/special districts developed this multi-jurisdictional local hazard mitigation plan update to reduce future losses from hazard events to the County and its communities and school/special districts. The plan is an update of a plan that was approved on November 21, 2016. 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 Andrew County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan that covers the following jurisdictions that participated in the planning process:

- Andrew County
- City of Amazonia
- Village of Cosby
- Country Club Village
- City of Fillmore
- Village of Rea
- City of Rosendale
- City of Savannah
- Avenue City R-IX School District
- North Andrew R-VI School District
- Savannah R-III School District
- Rosendale Fire Protection District
- Andrew County Health Department

Andrew County and the entities listed above developed a Multi-Jurisdictional Hazard Mitigation Plan that was approved by FEMA on November 21, 2016 (hereafter referred to as the *2016 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 Andrew County and participating jurisdictions. The MPC updated the risk assessment that identified and profiled hazards that pose a risk to Andrew 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. Protect the lives, property and livelihoods of all citizens
2. Manage growth in designated hazard areas through sustainable policies, principles and practices.
3. Ensure access to information regarding hazards preparation and recovery.
4. Ensure continued operation of government and emergency functions in a disaster.

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

Table I. Mitigation Action Matrix

	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
	Prevention							
1.3.1	Create a plan to accommodate individuals with needs for transport to and stay in emergency shelters, including compliance with the American with Disabilities Act (ADA).	Andrew County	Medium	1	All	Yes	Yes	N/A
1.3.2	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	Andrew County	Medium	1	Severe Winter Weather	Yes	Yes	N/A
1.2.1	Expand use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	Amazonia	High	1	Dam Failure, Drought, Earthquake, Flood, Heat Wave, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
2.1.1	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs, including Community Rating System (CRS) that improves flood resiliency.	Andrew County	High	2	Flood	Yes	Yes	Yes
2.1.4	Update/adopt new NFIP documents/programs, including contributing information to the 102 Watershed study for Risk Map.	Amazonia	High	2	Flood	Yes	Yes	Yes
2.1.6	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.	Country Club Village	High	2	Flood	Yes	Yes	Yes
2.1.7	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.	Rea	High	2	Flood	Yes	Yes	Yes
2.1.9	Contribute to the 102 Watershed study for Risk	Rosendale	High	2	Flood	Yes	Yes	Yes

	Map and update/adopt new NFIP documents/programs.							
1.3.5	Create a plan to accommodate individuals with needs for transport to and stay in emergency shelters, including compliance with the American with Disabilities Act (ADA).	Savannah	Medium	1	All	Yes	Yes	N/A
1.3.6	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	Savannah	Medium	1	Severe Winter Weather	Yes	Yes	N/A
2.1.10	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.	Savannah	High	2	Flood	Yes	Yes	Yes
1.1.10	Assess existing public facilities for the location of suitable safe areas. These areas should be clearly marked and employees and visitors information of their location.	Avenue City School District	High	1	Tornado, Thunderstorm	N/A	N/A	N/A
1.2.4	Expand use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	Avenue City School District	High	1	Dam Failure, Drought, Earthquake, Flood, Heat Wave, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
1.2.5	Develop and implement official snow day plans and policies for non-essential personnel.	Avenue City School District	High	1	Severe Winter Weather	N/A	N/A	N/A
4.2.8	Participate in a web-based notification system.	Avenue City School District	High	4	Earthquake, Flood, Tornado	N/A	N/A	N/A
Structure and Infrastructure Projects								
1.1.1	Work with private entities to construct tornado shelters in facilities where large numbers of people live, work or congregate.	Andrew County	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
1.1.3	Require the building of permanent storm shelters in mobile home parks.	Andrew County	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
4.2.1	Maintain offsite data backup of county records and plan to safeguard those that do not have backups.	Andrew County	High	4	Earthquake, Flood, Severe Winter Weather,	N/A	N/A	N/A

					Thunderstorm, Tornado			
4.2.2	Maintain offsite data backup of city records and plan to safeguard those that do not have backups.	Amazonia	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	N/A	N/A	N/A
4.2.3	Add resiliency improvements to the city's wastewater system to better withstand flood events.	Amazonia	High	4	Flood	Yes	Yes	N/A
4.2.4	Acquire a generator.	Cosby	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	No	N/A
1.1.5	Installation of new culverts in areas prone to flash flooding due to storm water runoff.	Country Club Village	High	1	Flood	Yes	Yes	N/A
1.1.6	Stormwater drainage improvements in areas prone to flash flooding due to storm water runoff.	Country Club Village	High	1	Flood	Yes	Yes	N/A
1.2.2	Acquire a tornado siren.	Fillmore	High	1	Tornado, Thunderstorm	No	Yes	N/A
4.2.6	Acquire a generator.	Rea	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	No	N/A
1.1.7	Incorporate the design of shelters in the construction of new public facilities like libraries, community centers, etc.	Savannah	High	1	Tornado, Thunderstorm	No	Yes	N/A
4.2.7	City owned utilities facilities and distribution system are assessed for vulnerability to hazards and retrofit and modify, as necessary.	Savannah	Medium	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	Yes	N/A
1.1.9	Construction of a storm shelter.	Avenue City School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A

4.2.9	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructure	Avenue City School District	Medium	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	Yes	Yes
4.2.10	Maintain offsite data backup of records and plan to safeguard those that do not have backups.	Avenue City School District	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	N/A	N/A	N/A
1.1.11	Construction of a storm shelter.	North Andrew School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
1.1.12	Create an inventory of facilities with generators and emergency power that can be used in the event of natural disasters. Equip facilities to connect to generators.	North Andrew School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
1.1.13	Construction of a storm shelter.	Savannah School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
1.1.14	Create an inventory of facilities with generators and emergency power that can be used in the event of natural disasters. Equip facilities to connect to generators.	Savannah School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
4.2.11	Acquire a generator.	Andrew County Health Department	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	No	N/A
4.2.12	Acquire a generator.	Rosendale Fire Protection District	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	No	N/A
Natural Systems Protection								
2.1.2	Work with SEMA in buyout program for repetitive loss structures in flood-prone areas.	Andrew County	High	2	Flood	Yes	Yes	Yes
2.1.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain	Andrew County	Low	2	Flood	Yes	Yes	Yes

	maps and similar documents.							
2.3.1	Follow guidelines in the Missouri 2002 Drought Plan by MDNR	Andrew County	Low	2	Drought	Yes	Yes	N/A
2.1.5	Promote environmentally sound watershed and storm water practices to decrease flash flooding.	Amazonia	Low	2	Flood	Yes	Yes	Yes
2.1.8	Work with SEMA in buyout program for repetitive loss structures in flood-prone areas.	Rosendale	High	2	Flood	Yes	Yes	Yes
2.2.1	Enact ordinances prohibiting residential and commercial development in all high hazard prone areas.	Savannah	Medium	2	Flood, Land Subsidence, Wildfire	No	Yes	Yes
2.1.11	Ensure that the city has the latest copies of flood insurance rate maps, flood plain maps and similar documents.	Savannah	Low	2	Flood	Yes	Yes	Yes
2.3.2	Follow guidelines in the Missouri 2002 Drought Plan by MDNR	Savannah	Low	2	Drought	Yes	Yes	N/A
2.1.12	Update comprehensive land use plans to specifically address development in hazard prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.	Savannah	Low	2	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire	Yes	Yes	Yes
2.1.13	Promote environmentally sound watershed and storm water practices to decrease flash flooding.	Savannah	Low	2	Flood	Yes	Yes	Yes
Emergency Services								
1.1.2	Review and map emergency access routes and evacuation routes and mitigate any problem areas.	Andrew County	Low	1	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire	Yes	Yes	N/A
1.3.3	Create an inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	Andrew County	High	1	Severe winter weather, Tornado, Thunderstorm	Yes	Yes	N/A
4.1.2	Develop an accurate countywide series of maps detailing floodplain, flash flood danger zones, land subsidence susceptible areas and process this information within a Geographic Information System.	Andrew County	Low	4	Flood, Land Subsidence	Yes	Yes	Yes

4.1.3	Execute and maintain mutual aid agreements with all relevant agencies.	Andrew County	Medium	4	Dam Failure, Earthquake, Flood, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
4.1.4	Implement annual cybersecurity training for county staff.	Andrew County	High	4	Cyber Disruption	N/A	N/A	N/A
4.1.5	Create a cybersecurity plan for the county to decrease the likelihood of a cyber disruption to the county.	Andrew County	High	4	Cyber Disruption	N/A	N/A	N/A
1.1.4	Review and map emergency access and evacuation routes and mitigate any problem areas.	Amazonia	Low	1	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire	Yes	Yes	Yes
4.2.5	Emergency responders will switch to a web-based notification system.	County Club Village	High	4	Earthquake, Flood, Tornado	N/A	N/A	Yes
1.1.8	Form and train Community Emergency Response Team (CERT).	Savannah	High	1	Dam Failure, Drought, Earthquake, Flood, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
4.1.6	Acquire new SCBA gear and turn out gear.	Rosendale Fire Protection District	High	4	Wildfire	N/A	N/A	N/A
Education and Outreach								
3.1.1	Conduct a public education campaign to inform dam owners and citizens living near the inundation zones of dams about the need to property maintain and upgrade these structures,	Andrew County	Low	3	Dam Failure	Yes	Yes	N/A

	particularly those that are more than 50 years old.							
3.1.2	Add Andrew County onto the City of Savannah's TextCaster program.	Andrew County	Medium	3	Drought, Flood, Heat Wave, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
3.1.3	Distribute information to businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.	Andrew County	Medium	3	Flood	Yes	Yes	N/A
3.1.4	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready-in-3 program.	Andrew County	Medium	3	Flood, Earthquake, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
3.1.5	Distribute information to businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.	Amazonia	Medium	3	Flood	Yes	Yes	N/A
3.1.6	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	Country Club Village	High	3	Thunderstorm, Tornado	Yes	Yes	N/A
1.3.4	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.	Savannah	Medium	1	Flood, Severe Winter Weather, Heat Wave, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
3.1.7	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready-in-3 program and distribute information on how to winterize homes, locate water shut off valves and prepare for extreme cold.	Savannah	Medium	3	Flood, Earthquake, Severe Winter Weather, Thunderstorm,	N/A	N/A	N/A

					Tornado, Wildfire			
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PREREQUISITES

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

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

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

Model Resolution

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

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

WHEREAS the (local governing body/school district) recognizes the threat that natural hazards pose to people and property within 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.): _____
Print name: _____

1 INTRODUCTION AND PLANNING PROCESS

1	INTRODUCTION AND PLANNING PROCESS	1.1
1.1	<i>Purpose.....</i>	<i>1.1</i>
1.2	<i>Background and Scope.....</i>	<i>1.2</i>
1.3	<i>Plan Organization.....</i>	<i>1.2</i>
1.4	<i>Planning Process</i>	<i>1.3</i>
1.4.1	Multi-Jurisdictional Participation.....	1.6
1.4.2	The Planning Steps	1.7

1.1 PURPOSE

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Mitigation activities may be implemented prior to, during or after an incident. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs (<http://www.fema.gov/what-mitigation>).

Federal Emergency Management Agency (FEMA) has implemented the various hazard mitigation planning provisions through the Code of Federal Regulations (CFR) at 44 CFR Part 201. The CFR provisions set forth the mitigation plan requirement for local and tribal governments as a condition of receiving FEMA hazard mitigation assistance. Under 44 CFR §201.6, local governments, schools or other publicly funded districts must have adopted a FEMA-approved local hazard mitigation plan in order to apply for hazard mitigation project grants. Section 322 of the Robert T. Stafford Relief and Emergency Assistance Act (P.L. 93-288), as amended by the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390), provides for States, Tribes and local governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning.

The plan also meets the minimum planning requirements for all FEMA mitigation programs, such as Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), Pre-Disaster Mitigation (PDM) and where appropriate, other FEMA mitigation related programs such as the National Earthquake Hazards Reduction Program (NEHRP), the National Flood Insurance Program (NFIP) and the Community Rating System (CRS). Entities that do not adopt the plan will not be eligible for mitigation grants.

The Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule were published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act or DMA). The DMA established the requirements for local hazard mitigation plans are in the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). The communities and school districts were informed that adopting the plan is a prerequisite for mitigation grant eligibility. Entities that do not adopt the plan will not be eligible for mitigation grants.

1.2 BACKGROUND AND SCOPE

As required by 44 CFR §201.6(d)(3), local jurisdictions must review and revise their plan to reflect changes in development, progress in local mitigation efforts and changes in priorities and resubmit it for approval every five (5) years in order to continue to be eligible for mitigation project grant funding. The 2021 Andrew County Multi-Jurisdictional Hazard Mitigation Plan is a revision of the previous five-year update adopted in March 2016 which was the second update of the original plan.

Jurisdictions that participated in the last plan and are continuing participation in the 2021 include:

- Andrew County
- City of Amazonia
- Village of Cosby
- Country Club Village
- City of Fillmore
- City of Rea
- City of Rosendale
- City of Savannah
- Avenue City R-IX School District
- North Andrew R-VI School District
- Savannah R-III School District

The Andrew County Health Department and Rosendale Fire Protection District both participated in the last plan but not as their own jurisdictions. In this plan update they are participating as their own jurisdictions. Information in the plan will be used to help guide and coordinate mitigation activities and decisions for local land use policies in the future.

1.3 PLAN ORGANIZATION

The 2021 HMP is organized into five chapters, which are:

- Chapter 1: Introduction and Planning Process
- Chapter 2: Planning Area Profile and Capabilities
- Chapter 3: Risk Assessment
- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Maintenance Process
- Appendices:
 - Appendix A: References
 - Appendix B: Planning Process Documentation
 - Appendix C: Completed/Deleted Mitigation Actions
 - Appendix D: Adoption Resolutions
 - Appendix E: Critical/Essential Facilities (Redacted from Public Version)

The plan format has been standardized across the state in order to create hazard mitigation plans

that are more consistent with each other, making it easier to locate information, as well as making plans more consistent from update to update. Chapter 5, Plan Maintenance Process, was added to expand the amount of information on maintaining the plan between updates. In the 2016 update, plan maintenance information was located in Section 4, Mitigation Strategy. Routine review and maintenance of mitigation actions and goals is important to make sure actions are being implemented on schedule and for the plan’s goals to guide mitigation efforts. By increasing the focus on plan maintenance through the addition of a separate chapter, this aspect will receive the attention it deserves.

The table below (Table 1.1) shows each chapter and summarizes the changes made in the update.

Table 1.1 Changes Made in Plan Update

2016 HMP	2021 HMP
Section 1: Community Profiles	Chapter 1: Introduction and Planning Process
Section 2: Hazard Identification	Chapter 2: Planning Area Profile and Capabilities
Section 3: Vulnerability and Capability Assessment	Chapter 3: Risk Assessment
Section 4: Mitigation Strategy	Chapter 4: Mitigation Strategy
	Chapter 5: Plan Maintenance Process (new chapter)
Appendices	Appendices

1.4 PLANNING PROCESS

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

Mo-Kan Regional Council contracted to facilitate the plan’s updating process. Mo-Kan staff met with the Andrew County Presiding Commissioner and Emergency Management Director during the informational meeting to develop a list of area stakeholders and local jurisdiction representatives for the Mitigation Planning Committee (MPC). The updating process included the three MPC meetings. Mo-Kan staff produced the draft and final plan update in a FEMA approved document and coordinated with the Missouri State Emergency Management Agency (SEMA) and FEMA plan reviews.

The main topics at the MPC meetings are discussed in Section 1.4.2. Mo-Kan solicited public involvement in the planning process. Press releases were disseminated for the MPC meetings

that were held on February 20, 2020 and December 3, 2020. Appendix A provides the results from the survey that was distributed to the public for input into the risk analysis and planning process. Appendix B provides documentation of the planning process including public involvement solicitations and meeting notices.

The draft of the plan was posted on the Andrew County website for public review and comment. A press release was sent notifying the public that the plan was available for comment. Input from city and county officials was solicited through distribution of drafts of the plan to their jurisdictions.

Table 1.2 shows the representatives from local jurisdictions and Table 1.3 shows the stakeholders that attended meetings and participated on the MPC.

Table 1.2. Jurisdictional Representatives Andrew County Mitigation Planning Committee

Name	Title	Jurisdiction/Agency/Organization
Bob Caldwell	Andrew County Presiding Commissioner	Andrew County
Fritz Hegeman	Andrew County Commissioner	Andrew County
Gary Bauman	Andrew County Commissioner	Andrew County
Ryan Bever	Emergency Management Director	Andrew County
Rick Russell	Amazonia Mayor	City of Amazonia
Kerri Krumme	Clerk of County Club Village	County Club Village
Teresa Neely	Clerk of Cosby	Village of Cosby
Bob Lance	Clerk of Fillmore	City of Fillmore
Jason Dunbar	Rosendale Mayor	City of Rosendale
Bruce Lundy	City Administrator of Savannah	City of Savannah
Kathy Roach	Clerk of Rea	Village of Rea
Don Lawrence	Superintendent	Avenue City School District
Becky Grimes	Principal	
Mark McDaniel	Superintendent	North Andrew School District
Eric Kurre	Superintendent	Savannah School District
Daniel Brewer	Fire Chief	Rosendale Fire Protection District
Andrew Hoffman	Administrator	Andrew County Health Department

Table 1.3. Stakeholder Representatives Andrew County Mitigation Planning Committee

Name	Title	Agency/Organization
Grant Gillett	Andrew County Sheriff	Andrew County
Michael Booth	Regional Coordinator	SEMA
Alex Braszko Jr.	Lieutenant Colonel	US Army – Community Volunteer
Karen Clibon	Administrator	Andrew County Senior Center
Sharon Cornelius	Manager	Public Water Supply District #2
Leslie Cope	Emergency Responder	Andrew County
Cindy Esley	Treasurer	Andrew County
Madison Donahue	Emergency Responder	Andrew County
Kenny Hill	Mayor of Rea	Village of Rea
Katie Johnson	Administrator	LaVerna Village Nursing Home
Karol Johnson	Community Volunteer	Community Volunteer
Gina Lucas	County Engagement Specialist	Missouri University Extension Office
Rick Thorton	Fire Chief	Helena Fire District
Johnney Neely	Former Chairman of the Board of Cosby	City of Cosby
Brian Roatry	Fire Chief	Savannah Fire Department
Lesley Schulte	Emergency Response Planner	Andrew County

Matt Younger	Administrator	NW Health Services
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The table below lists the area of expertise of each jurisdictional representative on the MPC. The six mitigation categories include prevention, property protection, structural flood control projects emergency services, natural resource protection, education and public information and emergency services.

Table 1.4. MPC Capability with Six Mitigation Categories

Community Department/Office	Prevention	Structure and Infrastructure Projects		Natural Systems Protection	Education and Awareness Programs	Emergency Services
		Property Protection	Structural Flood Control Projects			
Andrew County Sheriff's Office						Yes
Andrew County Road & Bridge	Yes		Yes			
Andrew County Emergency Management	Yes					Yes
Andrew County Health Department					Yes	
Andrew County Senior Center					Yes	
Andrew County Floodplain Administrator	Yes		Yes	Yes		
City of Amazonia		Yes				
County Club Village		Yes				
Village of Cosby		Yes				
City of Fillmore		Yes				
Village of Rea		Yes				
City of Rosendale		Yes				
City of Savannah		Yes				
Avenue City R-IX School District					Yes	
North Andrew R-VI School District					Yes	
Savannah R-III School District					Yes	
MU Extension Office					Yes	
Andrew County Health Department	Yes				Yes	
Helena Fire Protection District	Yes	Yes				
Rosendale Fire Protection District	Yes	Yes				Yes
Savannah Fire Protection District	Yes	Yes				Yes
Levee Districts				Yes		
LaVerna Senior Village	Yes				Yes	

NW Health Services	Yes				Yes	
Public Water Supply District #2	Yes				Yes	

1.4.1 Multi-Jurisdictional Participation

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

Each jurisdiction is required to participate in the planning process and officially adopt the plan, in order to be eligible for mitigation funding grants. The MPC established some minimum criteria that each jurisdiction must meet in order to be considered a “participant.” Plan participation requirements were defined as:

- Designation of a representative from each participating jurisdiction to serve on the MPC;
- Participation in two MPC meetings by either direct participation or authorized representation or host a work session with the specific jurisdiction;
- Each participating jurisdiction must provide to the MPC sufficient information to support plan development by completion and return of data collection questionnaires and validating/correcting critical facility inventories;
- Eliminated actions from the previously approved plan that were not implemented because they were impractical, inappropriate, not cost-effective, or were otherwise not feasible;
- Review and comment on plan drafts;
- Actively solicit input from the public, local officials, and other interested parties about the planning process and provide an opportunity for them to comment on the plan;
- Provide documentation to show time donated to the planning effort; and
- All participants should formally adopt the mitigation plan prior to submittal to FEMA for final approval.

Communities with full-time staff were able to attend meetings, in general, but the communities without full-time staff had difficulty. The MPC agreed that if a jurisdiction was unable to attend the meetings that participation could be met by communicating with Mo-Kan to receive meeting materials and submitting necessary paperwork. See Table 1.3 for jurisdictional involvement in the planning process. Step 2 lists some of the additional meetings held with jurisdictions unable to attend meetings. The plan will be amended when participation requirements are fulfilled.

Table 1.5. Jurisdictional Participation in Planning Process

Jurisdiction	Kick-off Meeting	Meeting #2	Meeting #3	Adequate Individual Meetings/ Correspondence	Data Collection Questionnaire Response	Update/Develop Mitigation Actions
Andrew County	Yes	Yes	Yes	Yes	Yes	Yes
City of Amazonia	No	No	No	Yes	Yes	Yes
Country Club Village	Yes	Yes	Yes	Yes	Yes	Yes
Village of Cosby	Yes	Yes	Yes	Yes	Yes	Yes
City of Fillmore	No	Yes	Yes	Yes	Yes	Yes
City of Rosendale	No	No	No	Yes	Yes	Yes
Village of Rea	Yes	Yes	Yes	Yes	Yes	Yes

City of Savannah	No	Yes	Yes	Yes	Yes	Yes
Avenue City-IX School District	No	Yes	Yes	Yes	Yes	Yes
North Andrew-VI School District	No	No	No	Yes	Yes	Yes
Savannah R-III School District	No	Yes	Yes	Yes	Yes	Yes
Rosendale Fire Protection District	Yes	Yes	Yes	Yes	Yes	Yes
Andrew County Health Department	Yes	No	No	Yes	Yes	Yes

1.4.2 The Planning Steps

FEMA’s Local Mitigation Planning Handbook (March 2013), Local Mitigation Plan Review Guide (October 1, 2013), and Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials (March 1, 2013) were used as the sources for the HMP update. The update followed the 10-step planning process adapted from FEMA’s Community Rating System (CRS) and Flood Mitigation Assistance programs. The 10-step process allows the Plan to meet funding eligibility requirements of the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, Community Rating System, and Flood Mitigation Assistance Program. Table 1.4 shows how the CRS process aligns with the Nine Task Process outlined in the 2013 Local Mitigation Planning Handbook.

Table 1.6. County Mitigation Plan Update Process

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

Step 1: Organize the Planning Team
(Handbook Tasks 1, 2, and 4)

In October 2019, Mo-Kan entered into cooperative agreements with SEMA and Andrew County to prepare this multi-jurisdictional plan for local jurisdictions in Andrew County. Discussions on the development of the Andrew County Multi-Jurisdictional Hazard Mitigation Plan began on January 13, 2020 with a meeting attended by Mo-Kan staff, Andrew County Commissioners and Emergency Management Director. This meeting was conducted to discuss the timeline for developing the hazard mitigation plan, the planning process, identification of stakeholders and community organizations to include in the planning process and a date for the Kick-Off meeting to initiate participation of jurisdictions and public entities in the planning process. The attendees identified prospective representatives and stakeholders and a contact list was prepared for mailing an invitation letter to the Kick-Off Meeting. The list of invitees included local elected officials, municipal government staff, county government staff, emergency services personnel, school administrators, members from health and social services organizations, utility providers, and volunteer organizations. Neighboring communities and counties were welcome to participate.

The MPC met on three occasions from February to December 2020 to collaborate on the plan's update. Participants assisted in data collection; reviewed and revised goals, objectives and mitigation strategies; and provided reviews and comments on the plan throughout the update process. Communication with MPC members occurred throughout the planning process through face-to-face meetings, phone interviews, and email correspondence in addition to committee meetings. Public notices, press releases, agendas and sign-in sheets for those meetings are in Appendix B. There is a notable gap between the first and second meetings. This was due to the Covid-19 pandemic, when all public engagement was postponed. When it became apparent the pandemic was not a short-term event, MPC meetings resumed on Zoom.

The table below shows the meeting schedule and items discussed for MPC meetings.

Table 1.7. Schedule of MPC Meetings

Meeting	Topic	Date
Informational Meeting	Met with Commissions and Emergency Management Director to discuss the composition of the Mitigation Planning Committee. Discussed risk assessment methodology and the timeline for updating the plan.	Jan. 13, 2020
Planning Meeting #1	Discussed the background and importance of the HMP, timeline and participation requirements, reviewed of 2013 plan and distributed the community data questionnaire forms.	Feb. 20, 2020
Commissioner & EMD Meeting	While large meetings were on hold due to the pandemic, a small meeting was held with the County Commissioners and Emergency Management Director (EMD) to the to discuss the risk assessment, potential actions and the next steps for updating the plan.	August 24, 2020

Jurisdictional Telephone Calls	In lieu of a meeting during the pandemic, a risk assessment summary and guidance on creating new and evaluating old actions were emailed. Phone calls were made to individual jurisdictions to review the material and offer assistance in evaluating past actions.	Various dates
Planning Meeting #2 (Zoom)	Discussed the goals, objective and actions of the HMP, reviewed the risk assessment, and discussed public outreach opportunities and evaluating past actions.	Nov. 18, 2020
Planning Meeting #3 (Zoom)	Reviewed the planning process, discussed public outreach opportunities, and provided an overview of the public comment/adoption process.	Dec. 3, 2020
Local Emergency Planning Committee	Reviewed the hazard mitigation plan and actions with emergency response personnel from various sectors.	Feb. 18, 2021

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

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

The MPC held their Kick-Off meeting on February 20, 2020. Some of the MPC members had participated in the 2016 update but the updating process was new for many attendees. There was discussion on soliciting public input and the importance of public outreach. It was determined to hold a series of public meetings and to present HMP update information at city council meetings, Local Emergency Planning Committee (LEPC) meetings and other type of meetings. Mo-Kan staff and local jurisdictions disseminated public notices and press releases to the media, urging public attendance and input.

The Community Rating System (CRS) was discussed to determine if jurisdictions were interested in participation. Andrew County has some issues with flooding so there was interest. MPC The committee was open to public input at these meetings and incorporated this information into the plan when thought appropriate.

A survey was created to get the public’s feedback about what hazards they were the most concerned with and what mitigation actions they would like to see included in the update. The survey was posted on the county’s website and a link was posted in the local newspaper, the Savannah Reporter. The survey results are located in Appendix A.

In addition, information regarding the hazard mitigation plan, as well as Ready-in-Three campaign materials were distributed at the following locations: Andrew County Courthouse, Savannah City Hall, Rolling Hills Library, Public Water District #2 and Senior Center. All meetings were open to the public. Step 3: Coordinate with

Other Departments and Agencies and Incorporate Existing Information (Handbook Task 3)

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

At the informational meeting, held on January 13, 2020, the Andrew County Commissioners and Emergency Management Director were asked to compile a list of organizations to invite to participate in updating the plan, whose goals and interests interfaced with hazard mitigation. Invitations were sent to all jurisdictions located in Andrew County, school districts, emergency management and responders personnel, industry representatives, etc. A list of organizations and agencies receiving invitations are in Appendix B. Invitation respondents were the MPC, whose input guided the plan update.

Coordination with FEMA Risk MAP Project

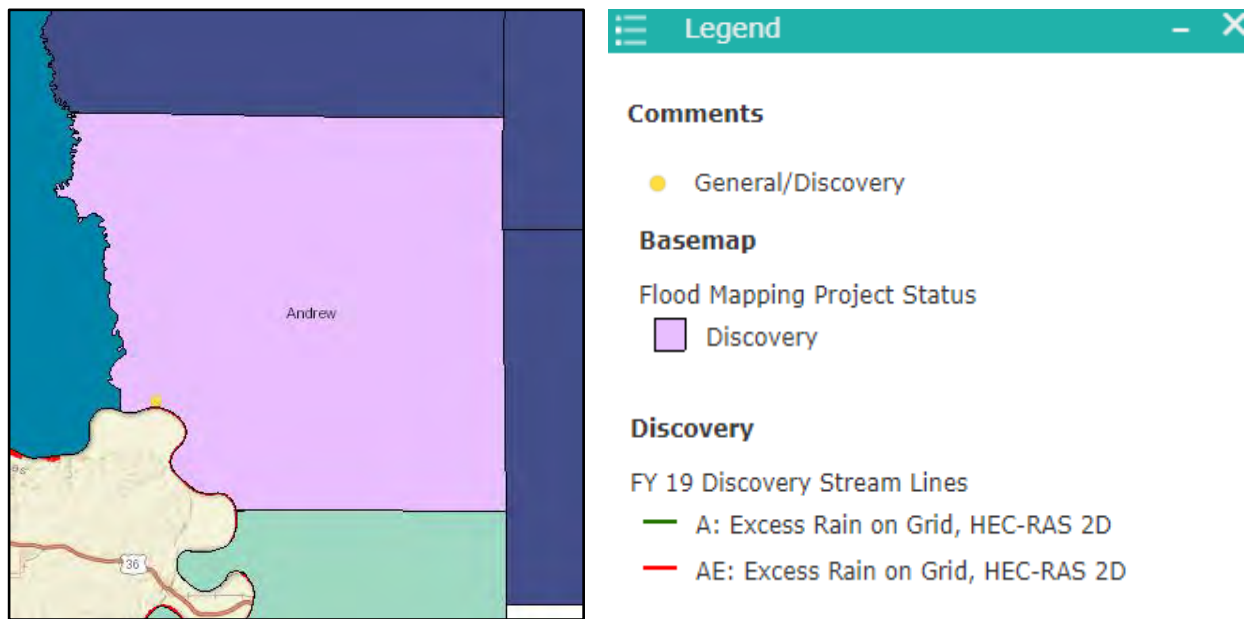
Risk Mapping, Assessment, and Planning (Risk MAP) is the Federal Emergency Management Agency (FEMA) Program that provides communities with flood information and tools they can use to enhance their mitigation plans and take action to better protect their citizens. Through collaboration with State, Tribal, and local entities, Risk MAP delivers quality data that increases public awareness and leads to action that reduces risk to life and property.

The map below illustrates the current status of Andrew County in regard to RiskMap projects. Andrew County has a Risk Map in the discovery phase of the 102 Watershed, which means information and data is the process of being collected.

Coordination with FEMA Risk MAP Project

FEMA is performing a Study Discovery Process for the 102 Watershed, which includes all of Andrew County. Mo-Kan staff and staff and elected officials from Andrew County and the City of Savannah were in attendance for this meeting on February 27, 2020. City and county representatives discussed the problematic areas for flooding with SEMA and the consultant for the project. Although the 102 Watershed mapping will be completed after the plan is approved, Mo-Kan and the consultants are sharing information.

Figure 1.1. RiskMAP Study Status Map



(Source: <http://bit.ly/MOSEMAOutreach>)

Integration of Other Data, Reports, Studies, and Plans

Additional input was solicited from other agencies and organizations that were not able to attend planning committees. Data was collected and reviewed from multiple sources, which are referenced throughout the document. These sources include, but are not limited to, the US Census, Andrew and Buchanan Counties HMPs (adjacent counties), Flood Insurance Studies (FIS), Flood Insurance Rate Maps (FIRMS), State Department of Natural Resources (DNR) dam information, National Inventory of Dams (NID), dam inspection reports, local comprehensive plans and land use plans, US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics.

Step 4: Assess the Hazard: Identify and Profile Hazards (Handbook Task 5)

At the first MPC meeting, held on February 20, 2020, hazards from the previous plan were briefly identified and profiled. The MPC agreed that historically, tornadoes and severe weather had been the primary areas of concern. During fall a risk summary was email to jurisdictions for review. At the second MPC meeting, held on November 18, 2020 the hazards were discussed in more detail. A survey was distributed would be important for getting the public's feedback on which hazards they were most concerned about.

A list of previous disaster declarations was available to jurisdictions to assist in their risk assessment, but this list was not reviewed at the MPC meeting. The data collection questionnaire forms provided valuable information regarding each jurisdiction's experience with disasters. This information was used by the individual jurisdictions in evaluating their risk assessment and by Mo-Kan staff in generating the data for risk assessments for Chapter 3. The MPC reviewed each

jurisdiction's data collection questionnaire at the second MPC meeting.

The 2018 Clinton County HMP and 2018 State Plan provided a basis for the 2021 Andrew County HMP. DeKalb and Buchanan County's updated HMPs were also referred to since the updates followed the new outline and these are adjacent counties.

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

Jurisdictions identified their respective assets on their Data Collection Questionnaire form, as well as during work sessions. These assets were compared against various GIS layers and HAZUS to access their vulnerability to disasters.

The city clerks, mayors and/or city council members of their respective jurisdictions collaborated to complete the data collection questionnaires. Andrew County has full-time staff, but other communities have only one or no full-time staff. Providing information on the data collection questionnaires often fell to one person. The superintendents and/or principals completed the data collection questionnaires for their school districts. Most of the data on the school questionnaire forms was readily available, in a different format, for school emergency plans. The data retrieved from the questionnaires can be found in Chapter 3. This data includes information on regulatory, personnel, fiscal and technical capabilities, and existing mitigation initiatives.

Inventory estimates for each jurisdiction's building stock in the county were derived through the use of HAZUS MH 3.2. The methodology for estimating losses varies by hazard. Loss estimates are included for various hazard profiles in the Risk Assessment chapter.

Step 6: Set Goals (Handbook Task 6)

It was at the second MPC meeting that the goals from the previous plan were reviewed. Meeting participants discussed the goals and decided to continue with the same goals and objectives in this plan. The 2016 and 2021 goals and objectives are:

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens.

- Objective: Protect citizens' lives and property.
- Objective: Provide sufficient warning of impending disasters.
- Objective: Identify the citizens most vulnerable to disasters and plan accordingly.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

- Objective: Decrease the impact of disasters.
- Objective: Decrease the cost of the next disaster.
- Objective: Increase our economic resistance to disasters.

Goal 3: Ensure Access to Information Regarding Hazards Preparation and Recovery.

Objective: Increase knowledge among citizens about disaster safety.

Goal 4: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

- Objective: Increase disaster mitigation management capability in local governments.
- Objective: Strengthen critical infrastructure.

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

At the second MPC meeting, held on November 18, 2020, the mitigation strategy from the previous plan was reviewed and a new strategy was discussed. Representatives from the jurisdictions also reviewed the previous actions and reported on progress made on previously proposed actions. A packet for each jurisdiction was emailed to jurisdictions that included evaluation and information on how to complete the forms and the actions to be evaluated and a follow up phone call from Mo-Kan staff was made to each jurisdiction to review the contents and further explain how to evaluate the past actions.

Participants were to consider the potential cost of each action in relation to the anticipated future cost savings. Members were encouraged to continue forwarding only those actions that substantively addressed long-term risks identified in the risk assessment. There was little difference in the risk assessment of natural hazards from the former plan. However, the members elected to add man-made disasters to the update as man-made disasters are situations that the jurisdictions want to prepare for.

The jurisdictions independently prioritized their actions. The methodology from the 2016 plan was used, in which jurisdictions self-determined which actions were high, medium and low priorities. Consideration included the action's potential to save lives and protect property, cost and local capacity to implement/pursue. STAPLEE methodology was not used but available to jurisdictions if they wanted to use it. Actions followed the SMART criteria of being Specific, Measurable, Action oriented, Relevant and Time-bound. The goals and actions were consistent with the hazards identified in the plan and reflected the local priorities and vulnerability to hazards.

MPC members were encouraged to continue actions that addressed long-term risks identified in the risk assessment. The link to FEMA publication *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013)* was made available for jurisdictions to reference.

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

At the third MPC meeting, held on December 3, new actions were discussed. The individual jurisdictions submitted their new actions after discussion with their respective city council or school board. It was at the individual jurisdiction's discretion on whether to include actions with low STAPLEE scores.

Step 9: Adopt the Plan
(Handbook Task 8)

Jurisdictions were provided a link to the plan to make available to the public. The public and the jurisdictions were asked for feedback. The plan went before the Andrew County Commissioners and the other jurisdictions for public comment in March and for adoption in March and April. Adoption resolutions can be found in Appendix D.

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

Plan maintenance was discussed at the third MPC meeting, held on December 3, 2020. This included strategies for plan implementation, monitoring and plan review dates. Andrew County, and other jurisdictions established general dates to review the plan so they can monitor and evaluate their progress on obtaining the plan's goals and completing the actions. During a review of the plan, the public will be notified and invited to participate. Details of plan maintenance and review are in Chapter 5.

2 PLANNING AREA PROFILE AND CAPABILITIES

2	PLANNING AREA PROFILE AND CAPABILITIES	2.1
2.1	<i>Andrew County Planning Area Profile</i>	2.1
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2.1.2	Climate	2.3
2.1.3	Population/Demographics	2.3
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2.1 ANDREW COUNTY PLANNING AREA PROFILE

Andrew County is located in northwest Missouri, approximately 45 miles north of Kansas City and is bordered by the counties of Holt, Nodaway, Gentry, DeKalb and Buchanan. The Missouri River forms the southwestern boarder of the county between Kansas and Missouri. The county seat of Savannah is located near the geographic center of the county. As shown in Figure 2.1 on the following page, the communities in the county are Amazonia, Bolckow, Cosby, Country Club Village, Fillmore, Rea, Rosendale and Savannah.

Figure 2.1.

Map of Andrew County



Source: <http://publicrecords.onlinesearches.com/maps/map-of-Andrew-County-Missouri.php>

According to the U.S. Bureau of the Census 2019 Annual Population Estimates, the population of Andrew County is 17,503. This is an addition of 497 more people than the 2010 U.S. Census population of 17,006. The change is 2 percent. Missouri and the United States experienced growth rates of 3 percent and 6 percent respectively, during the same timeframe. According to the 2019 American Community Survey, Andrew County's median household income (MHI) increased 11 percent from \$52,720 in 2010 to \$58,772 in 2019. During the same timeframe, Missouri and the United States experienced an increase in median income of 22 percent and 31 percent, respectively. From 2010 to 2019, the median house value in the county rose from \$125,500 to \$147,900, an increase of 17 percent. This increase lagged behind the state and national median house value increases of 20 percent and 33 percent, respectively. (Source: <http://www.factfinder.census.gov>)

2.1.1 Geography, Geology and Topography

According to the United States Census Bureau, Andrew County is about 436 square miles; with 3.7 square miles of that being water. The county is predominately rural, with gentle slopes. The fairly centrally located Savannah serves as the county seat. Agriculture is the primary land use.

The bedrock of Andrew County is classified as being Quaternary and Pennsylvanian bedrock. Alluvium soil formed in the Missouri River flood plain and consists mainly of a rich mixture of sand, silt and clay. These soils are 100 to 150 feet thick. The rest of the region is underlain with bedrock from the Upper Pennsylvanian Age and is characterized by an alternation of thin shale, limestone and sandstones. In some places, the limestone may be up to 300 feet thick, but usual thicknesses are only a few feet. The landscape of Andrew County is mainly one of gently sloping to strongly sloping uplands. The Nodaway, 102, and Platte Rivers flow southward. Between these rivers are narrow ridges and sloping hillsides dissected by small drainage ways, which flow toward larger streams. Bordering many of the areas are rolling steep hillsides. There are limestone and shale formations cropped out on the lower parts of the hillsides.

The Missouri River borders on Andrew County's southwest side. Other significant rivers include the 102 River, Nodaway River and tributaries to the Platte River. There are four HUC 8 watersheds in Andrew County. They are the Independence-Sugar Watershed, Nodaway, Platte and One Hundred and Two. These are shown on the map below.

Figure 2.2 Watersheds in Andrew County



Source: <https://dnr.mo.gov/omw/OMWWatersheds.htm>

2.1.2 Climate

The climate of northwest Missouri is continental in nature with cold winters, hot summers and is subject to extreme changes in temperature, humidity, cloudiness and wind speeds. The average growing season is 170 days. The mean annual temperature is 52.2 degrees Fahrenheit, with an average January temperature of 26.2 degrees and an average July temperature of 78.2. The average annual precipitation is 31.22 inches. Of this total, 75 percent usually falls in April through September, the growing season for most crops.

Tornadoes and severe thunderstorms strike in the region. These storms are usually local in extent and of short duration. Hail occurs during the warmer parts of the year. The average seasonal snowfall is 20.5 inches. The greatest recorded snow depth was 51.1 inches and occurred during the winter of 1925-1926. In an average year, there are 23 days with at least one inch of snow cover on the ground, but it is unusual for the snow cover to last more than seven consecutive days. Prevailing winds are from the south, and average wind speed is highest in April, at 13 miles per hour.

2.1.3 Population/Demographics

The table below shows the population of the communities in the county. Population data may not be completely accurate since portions of some of the incorporated areas overlap into adjacent counties.

Table 2.1. Andrew County Population 2000-2019 by Jurisdiction

Jurisdiction	2000 Population	2010 Population	2019 Annual Population Estimate	# Change (2010-2019)	% Change (2010-2019)
Unincorporated Andrew County	8,994	8,969	8,792	- 202	- 2%
Amazonia	277	312	267	- 45	- 14%
Cosby	143	124	213	89	71%
Country Club	1,846	2,449	2,729	280	11%
Fillmore	211	297	194	- 17	- 8%
Rea	56	50	39	-11	- 22%
Rosendale	180	143	111	- 32	- 22%
Savannah	4,762	5,057	5,159	102	2%
Andrew County Total	16,492	17,291	17,503	212	1%
Missouri	5,595,211	5,988,927	6,137,428	148,501	2%
United States	281,421,906	308,745,538	328,239,523	19,493,985	6%

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

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 2016 American Community Survey, 5.7 percent of Andrew County’s population is under 5 years old, which is below the matching statewide and national percentages of 6.0 percent and 5.9 percent. Andrew County’s percentage of over population of 65 years old is 10.5 percent, which is slightly higher than the statewide and national percentages of 9.5 percent and 9.1 percent, respectively. The county has 6,763 households, with the persons per household, 2019 being 2.56 in Andrew County. This is a slight smidge larger than the statewide of 2.55 and slightly smaller than the national average 2.70.

The vulnerability analyses in the next chapter of this plan will include Social Vulnerability Index (SoVI ®) information from the Hazards and Vulnerability Research Institute at the University of South Carolina. The University developed an index to evaluate and rank the ability to respond to, cope with, recover from, and adapt to disasters. The index synthesizes 30 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. Andrew County has a SoVI® score of -1.309999943 and in the national percentile of 29.1 percent (Source: http://artsandsciences.sc.edu/geog/hvri/sites/sc.edu.geog.hvri/files/attachments/SoVI_10_14_Website.pdf).

Figure 2.3 shows how Andrew County compares to the state and nation in social vulnerability to environmental hazards. A higher percentage indicates a higher vulnerability. Scores in the top 20 percent of the United States are more vulnerable counties (red) and scores in the bottom 20 percent of the United States indicate the least vulnerable counties (blue). Andrew County scores in the low-medium range for vulnerability.

Figure 2.3 Social Vulnerability Index

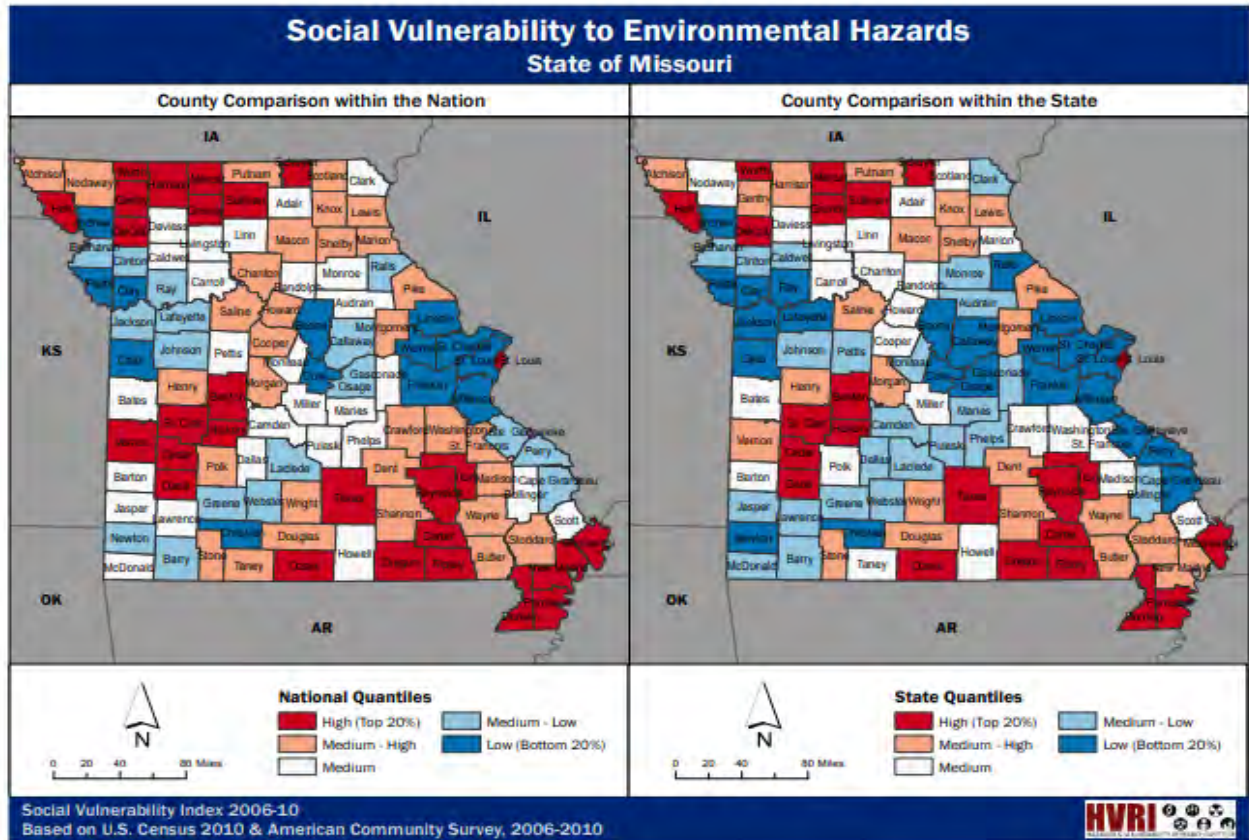


Table 2.2 provides additional demographic and economic indicators for the county.

Table 2.2. Unemployment, Poverty, Education, and Language Percentage Demographics, Andrew 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
Andrew County	59%	3%	22%	81%	24%	1%
Amazonia	43%	2%	15%	70%	1%	1%
Cosby	66%	3%	6%	73%	13%	1%
Country Club	68%	6%	6%	85%	82%	3%
Fillmore	50%	2%	23%	72%	4%	.5%
Rea	61%	3%	7%	94%	0%	0%
Rosendale	56%	3%	22%	70%	4%	0%
Savannah	61%	2%	9%	75%	16%	4%
Missouri	63%	3%	13%	88%	21%	6%
United States	63%	5%	13%	88%	23%	22%

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

2.1.4 History

Andrew County was organized 1841, is one of six counties in the Indian Platte Purchase Territory annexed to Missouri in 1837. Named for Andrew Jackson Davis, a St. Louis editor, the county was first settled in the middle 1830s. Pioneers were from Ohio, Indiana, Tennessee, Kentucky, Virginia, and other parts of Missouri.

Amazonia was laid out in 1857. A post office called Amazonia has been in operation since 1859. The origin of the name Amazonia is unknown.

Village of Country Club was originally named the St. Joseph Country Club in 1898 (St. Joseph is the community located immediately south of the present-day village). In 1954 the Village of Country Club incorporated, formally separating from St. Joseph.

Cosby was founded in the late 1870s, and moved about one mile to a new town site in 1885 when the railroad was extended to that point. The village was named after Cosby Miller, the child of a first settler. A post office called Cosby has been in operation since 1879.

Fillmore was laid out in 1845 and was named for Millard Fillmore, a statesman, and afterward 13th President of the United States.

Rosendale has had a post office called Rosendale since 1869. The city was named for the abundance of wild roses near the original town site. 1869.

Savannah was founded in 1841. The city was named after Savannah Woods, the child of a first settler. First briefly called Union, it was renamed for Savannah, Ga. The Platte Co. Railroad (C. B. & Q.) reached there in 1860, and today's Chicago. In the post-Civil War years, the town grew as a shipping point and trading center. A post office called Savannah has been in operation since 1841 and the Andrew County Courthouse was listed on the National Register of Historic Places in 1980.

Source: Wikipedia and Andrew County Museum

2.1.5 Occupations

The table below lists the occupation statistics for the incorporated cities and the county, as a whole.

Table 2.3. Occupation Statistics, Andrew 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
Andrew County	34.3% (2,887)	13.7% (1,157)	22.4% (1,884)	10.4% (875)	19.2% (1,614)
Amazonia	9.5% (9)	24.2% (23)	22.1% (21)	10.5% (10)	33.7% (32)
Cosby	27.4% (26)	28.4% (27)	7.4% (7)	15.8% (15)	21.1% (20)
Country Club	19% (120)	27.9% (176)	26.6% (168)	1.3% (8)	25.2% (159)
Fillmore	25.3% (22)	12.6% (11)	13.8% (12)	19.5% (17)	28.7% (25)
Rea	20.8% (5)	12.5% (3)	12.5% (3)	20.8% (5)	33.3% (8)

Rosendale	4.3% (2)	10.9% (5)	39.1% (18)	8.7% (4)	37% (17)
Savannah	33.3% (831)	15.1% (378)	21.9% (546)	9.6% (241)	20.1% (502)

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

2.1.6 Agriculture

According to the USDA 2012 Census on Agriculture, Clinton County has 758 farms with a total acreage of 191,602 acres. The average size of farms and acres of the neighboring counties of Andrew, Buchanan, and DeKalb is 210,043 acres and 805 farms. The average size per farm is 253 acres, which is slightly lower than the state average of 285 acres. The market value of agricultural products sold is \$56,419,000, with \$38,632,000 coming from crops, nursery, and green house products and \$17,787,000 coming from livestock, poultry and their products. Beef cattle production was a significant farming activity, with 25,568 head of cattle on 320 farms and 17,986 head of cows and calves sold on 299 farms. Other significant farming activities included production of 2,268,812 bushels of corn from 112 farms, and 30,407 tons of forage from 357 farms. In addition, 61 percent of principle operators reported their primary occupation being something other than farming. The 2011-2015 Community Survey 5-Year Estimates show that 268 were employed in agriculture, fishing, and forestry operations, which is 2.8 percent of the Andrew County workforce.

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

The table below lists the FEMA Hazard Mitigation Assistance (HMA) that were received in the planning area.

Table 2.4. FEMA HMA Grants in Andrew County from 1993-2020

Disaster Declaration	Project Type	Sub-Grantee	Date Approved	Project Total
DR-4012-0002-R	206.2: Safe Room (HMPG)	Andrew County – Camp Geiger BSA	Sept 14, 2016	\$1,819,662
DR-1934-0005-F	601.1: Generators (HMPG)	Amazonia	October 17, 2012	\$21,850
Total				\$1,841,512

Source: Federal Emergency Management Agency, accessed July 9, 2020

2.1.8 FEMA Public Assistance (PA) Grants in Planning Area

The table below lists the Public Assistance (PA) grants that have been awarded to Andrew County between 1993-2020.

Table 2.5. FEMA PA Grants in Andrew County from 1993-2020

Disaster Declaration	Project Type	Project Size	Applicant	Project Total
1934	Not listed	Not listed	Amazonia	Not listed
1708	Not listed	Not listed	Fillmore	Not listed
1635	Not listed	Not listed	Andrew County	Not listed

1708	Not listed	Not listed	Savannah Rural Fire Protection District	Not listed
1708	Not listed	Not listed	Andrew County	Not listed
1736	Not listed	Not listed	United Electric Co-op	Not listed
1736	Not listed	Not listed	Savannah	Not listed
1736	Not listed	Not listed	Andrew County	Not listed
1736	Not listed	Not listed	Savannah Rural Fire Protection District	Not listed
1773	Not listed	Not listed	Andrew County	Not listed
1934	Not listed	Not listed	Andrew County	Not listed
1961	Not listed	Not listed	Andrew County	Not listed
4012	Not listed	Not listed	United Electric Co-Op	Not listed
4012	Not listed	Not listed	Andrew County	Not listed
4012	Not listed	Not listed	Amazonia Levee District	Not listed
4200	Not listed	Not listed	Andrew County	Not listed
4238	Not listed	Not listed	United Electric Co-Op	Not listed
4238	Not listed	Not listed	Andrew County	Not listed
4435	Not listed	Not listed	Andrew County	Not listed
4451	Not listed	Not listed	Andrew County	Not listed
1635	Debris Removal	Small	Andrew	\$7,590.49
1708	Roads and Bridges	Small	Andrew	\$8,122.05
1708	Roads and Bridges	Small	Andrew	\$8,957.44
1708	Public Buildings	Small	Andrew	\$867.67
1708	Protective Measures	Small	Andrew	\$2,152.41
1708	Roads and Bridges	Small	Andrew	\$1,008.66
1708	Roads and Bridges	Small	Andrew	\$4,768.36
1708	Roads and Bridges	Small	Andrew	\$1,776.57
1708	Roads and Bridges	Small	Andrew	\$6,250.28
1708	Roads and Bridges	Small	Andrew	\$2,884.45
1708	Roads and Bridges	Small	Andrew	\$13,942.51
1708	Roads and Bridges	Small	Andrew	\$4,997.64
1708	Roads and Bridges	Small	Andrew	\$12,871.01
1708	Protective Measures	Small	Andrew	\$975.44
1708	Roads and Bridges	Small	Andrew	\$3,382.82
1708	Roads and Bridges	Small	Andrew	\$1,343.67
1708	Debris Removal	Small	Andrew	\$1,211.93
1708	Protective Measures	Small	Andrew	\$725.17

1736	Debris Removal	Small	Andrew	\$14,557.13
1736	Protective Measures	Small	Andrew	\$2,719.31
1736	Protective Measures	Small	Andrew	\$551.85
1736	Protective Measures	Small	Andrew	\$5,212.50
1736	Debris Removal	Small	Andrew	\$15,920.70
1736	Protective Measures	Small	Andrew	\$565.02
1736	Debris Removal	Large	Andrew	\$159,388.72
1736	Protective Measures	Small	Andrew	\$6,546.56
1736	Protective Measures	Small	Andrew	\$5,534.42
1736	Protective Measures	Small	Andrew	\$13,163.63
1736	Debris Removal	Small	Andrew	\$25,176.00
1736	Protective Measures	Small	Andrew	\$1,875.25
1736	Debris Removal	Large	Andrew	\$57,543.86
1773	Debris Removal	Small	Andrew	\$3,518.70
1773	Roads and Bridges	Small	Andrew	\$4,968.45
1773	Protective Measures	Small	Andrew	\$199.52
1773	Roads and Bridges	Large	Andrew	\$502,396.55
1934	Roads and Bridges	Small	Andrew	\$25,282.53
1934	Roads and Bridges	Small	Andrew	\$5,737.52
1934	Roads and Bridges	Small	Andrew	\$6,626.72
1934	Roads and Bridges	Small	Andrew	\$2,109.23
1934	Roads and Bridges	Small	Andrew	\$1,864.43
1934	Roads and Bridges	Small	Andrew	\$3,458.64
1934	Roads and Bridges	Small	Andrew	\$3,273.74
1934	Roads and Bridges	Small	Andrew	\$10,441.59
1934	Roads and Bridges	Small	Andrew	\$6,195.83
1934	Roads and Bridges	Small	Andrew	\$5,023.61
1934	Roads and Bridges	Small	Andrew	\$9,477.59
1934	Roads and Bridges	Small	Andrew	\$3,136.82
1934	Roads and Bridges	Small	Andrew	\$3,378.26
1934	Roads and Bridges	Small	Andrew	\$3,361.65
1934	Roads and Bridges	Small	Andrew	\$6,037.38
1961	Protective Measures	Small	Andrew	\$25,618.67
1961	Protective Measures	Small	Andrew	\$5,032.54
4012	Roads and Bridges	Small	Andrew	\$17,739.00

4012	Roads and Bridges	Large	Andrew	\$269,097.69
4012	Roads and Bridges	Large	Andrew	\$50,075.48
4012	Debris Removal	Small	Andrew	\$13,212.00
4012	Debris Removal	Small	Andrew	\$2,841.01
4012	Roads and Bridges	Large	Andrew	0
4012	Debris Removal	Small	Andrew	\$47,282.40
4012	Protective Measures	Small	Andrew	\$42,541.64
4012	Protective Measures	Small	Andrew	\$13,872.93
4012	Protective Measures	Small	Andrew	\$1,434.87
4200	Debris Removal	Small	Andrew	\$3,413.03
4200	Roads and Bridges	Small	Andrew	\$17,008.67
4238	Roads and Bridges	Small	Andrew	\$65,118.12
4238	Debris Removal	Small	Andrew	\$3,600.99
4435	Roads and Bridges	Small	Andrew	\$14,811.5
4451	Roads and Bridges	Small	Andrew	\$3,465.08
4451	Roads and Bridges	Small	Andrew	\$52,013.84
Total				\$1,647,251.74

Source: Federal Emergency Management Agency, accessed July 9, 2020

2.2 JURISDICTIONAL PROFILES AND MITIGATION CAPABILITIES

2.2.1 Unincorporated Andrew County

Andrew County includes all unincorporated areas within the county's boundaries. The county government consists of three commissioners, west, east and presiding. The different departments of the county are listed below.

- Board of Commissioners: Presiding - Bob Caldwell, West - Gary Baumann, East - Frederick "Fritz" Hegeman
- County Assessor and Floodplain Administrator: Paul Garrison
- County Attorney: Steven Stevenson
- County Recorder: Sarah Miller
- County Sheriff: Grant Gillett
- County Treasurer: Cindy Esely
- Emergency Management: Ryan Bever
- Health Department: Kelly Sloan

Mitigation Initiatives/Capabilities

Andrew County is located in Northwest Missouri and the southwest corner borders the Missouri River. The population is estimated to be 8,792, which is a two percent decrease from 2000. The emergency

management coordinator is a part-time position and includes coordinating the Local Emergency Planning Committee meetings. The county submitted a FEMA grant application for an outdoor warning system for the unincorporated area of Helena. A RiskMAP project of the 102 Watershed is in the discovery phase. Table 2.6 lists the mitigation capabilities of Andrew County.

Table 2.6. Unincorporated Andrew County Mitigation Capabilities

Capabilities	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	Yes
Builder's Plan	No
Capital Improvement Plan	No
City Emergency Operations Plan	No
County Emergency Operations Plan	Yes
Local Recovery Plan	No
County Recovery Plan	No
City Mitigation Plan	Yes
County Mitigation Plan	Yes
Debris Management Plan	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No
Flood Mitigation Assistance (FMA) Plan	Yes
Watershed Plan	No
Firewise or other fire mitigation plan	No
School Mitigation Plan	No
Critical Facilities Plan	No
Policies/Ordinance	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	Yes
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Stormwater Ordinance	No
Drainage Ordinance	No
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Seismic Construction Ordinance	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
Hazard Awareness Program	No
National Flood Insurance Program (NFIP)	Yes
NFIP Community Rating System (CRS) program	No
National Weather Service (NWS) Storm Ready	No
Firewise Community Certification	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	No

Capabilities	Status Including Date of Document or Policy
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	No
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	--
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes
Evacuation Route Map	No
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Director	Yes, part time
NFIP Floodplain Administrator	Yes, Paul Garrison
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	Yes, full time
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	Yes, American Legion
Local Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	Yes
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes

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

Source: Data Collection Questionnaire, June 5, 2020

2.2.2 Amazonia

Amazonia is located in the southwest part of Andrew County, near the Missouri River. The local government consists of a mayor and four city council members. The population is estimated to be 267 and has seen a 14 percent decrease since 2000. The city has submitted a FEMA grant application for flood resiliency improvements for the wastewater systems and for an outdoor warning system, since their 20-year-old system broke in 2019. Recent construction included flood mitigation so areas in town that once flooded are now at a decreased risk for floods now. The community does not have a public tornado shelter. There are approximately six businesses in town, with the largest employing four people. Table 2.7 lists Amazonia’s mitigation capabilities.

Table 2.7. Amazonia Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	Yes
County Mitigation Plan	Yes
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
Policies/Ordinance	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	Yes
Subdivision Ordinance	No

Capability	Status Including Date of Document or Policy
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
Seismic Construction Ordinance	No
Capability	
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	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	No
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	No
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	Yes
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	No
NFIP Floodplain Administrator	Yes
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No

Capability	Status Including Date of Document or Policy
Salvation Army	No
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.	No
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	No
Fees for water, sewer, gas, or electric services	Yes
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, July 9, 2020

2.2.3 Cosby

Cosby is located in the southeastern part of Andrew County. The local government consists of a mayor and four city council members. The population is estimated to be 213 and has seen a 71 percent increase since 2000. The city has submitted a FEMA application for an outdoor warning system. The community does not have a public tornado shelter. There are approximately six businesses in town, with the largest employing six people. Table 2.9 lists Cosby's mitigation capabilities.

Table 2.8. Cosby Mitigation Capabilities

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

Capability	Status Including Date of Document or Policy
Building Code	No
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
Seismic Construction Ordinance	No
Capability	
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	Sanctioned
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	No
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	No
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	Yes
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	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

Capability	Status Including Date of Document or Policy
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	Yes
Local Funding Availability	
Ability to apply for Community Development Block Grants	No
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	No
Fees for water, sewer, gas, or electric services	Yes
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, 2020

2.2.4 Country Club Village

Country Club Village is located in the southeastern part of Andrew County. St. Joseph is immediately south of the community and there is not a definable space between the communities. The local government consists of five city council members. The population is estimated at 2,729 and has seen an 11 percent increase since 2000. The community does not have a safe room or a tornado siren. About 50 percent of the community can hear the sirens from St. Joseph. There are approximately thirty businesses in town, with the largest employing twenty people. Table 2.10 lists Country Club Village's mitigation capabilities.

Table 2.9. Country Club Village Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	Yes, September 2015
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	Yes
County Mitigation Plan	No
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

Capability	Status Including Date of Document or Policy
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	
Zoning Ordinance	Yes
Building Code	Yes, International Building Code adopted October 2015
Floodplain Ordinance	Adopted March 22, 2011
Subdivision Ordinance	Yes
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	Yes, Section 415.150 Municipal Code
Drainage Ordinance	Yes, Section 415.150 Municipal Code
Seismic Construction Ordinance	No
Capability	
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	Yes
ISO Fire Rating	
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	Yes
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	No
Hazard Analysis/Risk Assessment (County)	No
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	Yes
Staff/Department	
Building Code Official	Yes, part-time
Building Inspector	Yes, part-time
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	No
NFIP Floodplain Administrator	Yes, Village Clerk
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No

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

Source: Data Collection Questionnaire, 2020

2.2.5 Fillmore

Fillmore is located in the western part of Andrew County. The local government consists of a mayor and four alderman. The population is estimated to be at 211 and has seen an eight percent decrease since 2000. The community does not have a public tornado shelter but it has an outdoor warning siren. There are approximately six businesses in town, with the largest employing six people Table 2.11 lists Fillmore’s mitigation capabilities.

Table 2.10. Fillmore Mitigation Capabilities

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

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

Capability	Status Including Date of Document or Policy
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	Yes – Community Betterment Non-Profit Corporation
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	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	No

Source: Data Collection Questionnaire, 2020

2.2.6 Rea

Rea is located in the north part of Andrew County. The local government consists of a mayor and town board. The population is estimated to be at 39 and has seen a twenty-two percent decrease since 2000. The community has submitted a FEMA grant application for an outdoor warning siren. The community uses the Union Church’s basement as public tornado shelter and have stocked it with emergency supplies, but it is not a FEMA grade shelter. There are approximately four businesses in town, with the largest being the grain elevator that employs six people. Table 2.12 lists Rea’s mitigation capabilities.

Table 2.11. Rea Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	No
Builder’s Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	Yes
County Mitigation Plan	Yes
Local Mitigation Plan (PDM)	No
County Mitigation Plan (PDM)	No
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	No

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

Capability	Status Including Date of Document or Policy
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	No
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	No
Fees for water, sewer, gas, or electric services	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

Source: Data Collection Questionnaire, 2020

2.2.7 Rosendale

The City of Rosendale is in the central northern part of Andrew County, by the 102 River. Local government consists of a mayor and five council members. According to the 2020 Census, the population is estimated to be 111, which is a twenty-two percent decrease compared to the 2000 Census. A significant part of the community is in a floodplain and experiences periodic flooding. The school serves a large rural area and was relocated west of town and has a gym that doubles as a saferoom, that is open to the community. However, the saferoom does not meet FEMA standards. The post office and fire department have both relocated outside of the floodplain, leaving no critical facilities within the city limits. The community does not have an outdoor warning siren, but an application has been submitted to the Hazard Mitigation Grant Program (HMGP) for one to be located at the fire department. The table below lists Rosendale's mitigation capabilities.

Table 2.12. Rosendale Mitigation Capabilities

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

Capability	Status Including Date of Document or Policy
Local Mitigation Plan	Yes
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	
Critical Facilities Plan (Mitigation/Response/Recovery)	No
Policies/Ordinance	
Zoning Ordinance	No
Building Code	No
Floodplain Ordinance	Yes
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	No
Seismic Construction Ordinance	No
Capability	
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	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	No
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	No
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (Local)	Yes
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	No
Staff/Department	
Building Code Official	No

Capability	Status Including Date of Document or Policy
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	No
Development Planner	No
Public Works Official	No
Emergency Management Coordinator	No
NFIP Floodplain Administrator	Yes, part-time
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	No
County Emergency Management Commission	No
Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	
American Red Cross	No
Salvation Army	No
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	No
Local Funding Availability	
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	No
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, 2020

2.2.8 Savannah

The City of Savannah is in the central part of Andrew County and serves as the county seat. Local government consists of a mayor and four council members. The population is estimated to be 5,159 which is a two percent increase compared to the 2000 Census. The community is the population center of the county and most of the county's critical and essential facilities are in Savannah. The nearby city of St. Joseph has the medical facilities and additional resources that are not available locally. The community has four outdoor warning sirens that are linked to county and can be activated by the Sheriff's Office dispatch or by City Police's Office. There are no saferooms in the community but the school district has applied for FEMA grants to construct a saferoom. The City of Savannah also participates in TextCaster, that sends early warning notifications from the National Weather Service. The city works in conjunction with the county health department on educational/awareness campaigns. The table below lists Savannah's mitigation capabilities.

Table 2.13. Savannah Mitigation Capabilities

Capability	Status Including Date of Document or Policy
Planning Capabilities	
Comprehensive Plan	Yes, 1973
Builder's Plan	No
Capital Improvement Plan	No
Local Emergency Plan	No
County Emergency Plan	No
Local Recovery Plan	No
County Recovery Plan	No
Local Mitigation Plan	Yes
County Mitigation Plan	Yes, 2016
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
Policies/Ordinance	
Zoning Ordinance	Yes
Building Code	Yes, ICC 2006
Floodplain Ordinance	Yes, 3/21/2011
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Drainage Ordinance	Yes, 8/2000
Seismic Construction Ordinance	No
Capability	
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	No
Debris Management Plan	No
Program	
Zoning/Land Use Restrictions	No
Codes Building Site/Design	No
National Flood Insurance Program (NFIP) Participant	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	5
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	No
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
Studies/Reports/Maps	

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

The table below is a summary table of mitigation capabilities in Andrew County.

Table 2.14. Mitigation Capabilities Summary Table

CAPABILITIES	Andrew County	Amazonia	Country Club	Cosby	Fillmore	Rea	Rosendale	Savannah
Planning Capabilities								
Comprehensive Plan	Yes	No	Yes, September 2015	No	No	No	No	Yes, 1973
Builder's Plan	No	No	No	No	No	No	No	No
Capital Improvement Plan	No	No	No	No	No	No	No	No
Local Emergency Plan	No	No	No	No	No	No	No	No
County Emergency Plan	No	No	No	No	No	No	No	No
Local Recovery Plan	No	No	No	No	No	No	No	No
County Recovery Plan	No	No	No	No	No	No	No	No
Local Mitigation Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Mitigation Plan	Yes	Yes	No	Yes	No	Yes	Yes	Yes, 2016
Local Mitigation Plan (PDM)	No	No	No	No	No	No	No	No
County Mitigation Plan (PDM)	No	No	No	No	No	No	No	No
Debris Management Plan	No	No	No	No	No	No	No	No
Economic Development Plan	No	No	No	No	No	No	No	No
Transportation Plan	No	No	No	No	No	No	No	No
Land-use Plan	No	No	No	No	No	No	No	Yes, 1973
Flood Mitigation Assistance (FMA) Plan	Yes	No	No	No	No	No	No	No
Watershed Plan	No	No	No	No	No	No	No	No
Firewise or other fire mitigation plan	No	No	No	No	No	No	No	No
Critical Facilities Plan (Mitigation/Response/Recovery)	No	No	No	No	No	No	No	No
Policies/Ordinance								
Zoning Ordinance	No	No	Yes	No	No	No	No	Yes
Building Code	No	No	Yes, International Building Code adopted October 2015	No	No	No	No	Yes, ICC 2006

CAPABILITIES	Andrew County	Amazonia	Country Club	Cosby	Fillmore	Rea	Rosendale	Savannah
Floodplain Ordinance	Yes	Yes	Adopted March 22, 2011	No	No	No	Yes	Yes, 3/21/2011
Subdivision Ordinance	No	No	Yes	No	No	No	No	No
Tree Trimming Ordinance	No	No	No	No	No	No	No	No
Nuisance Ordinance	No	No	No	No	Yes	No	No	No
Storm Water Ordinance	No	No	Yes, Section 415.150 Municipal Code	No	No	No	No	No
Drainage Ordinance	No	No	Yes, Section 415.150 Municipal Code	No	No	No	No	Yes, 8/2000
Site Plan Review Requirements	No	No	No	No	No	No	No	Yes
Historic Preservation Ordinance	No	No	No	No	No	No	No	No
Landscape Ordinance	No	No	No	No	No	No	No	No
Seismic Construction Ordinance	No	No	No	No	No	No	No	No
Program								
Zoning/Land Use Restrictions	No	No	Yes	No	No	No	No	Yes
Codes Building Site/Design	No	No	Yes	No	No	No	No	Yes
National Flood Insurance Program (NFIP) Participant	Yes	Yes	Yes	Sanctioned	No	No	Yes	Yes
NFIP Community Rating System (CRS) Participating Community	No	No	No	No	No	No	No	No
Hazard Awareness Program	No	No	No	No	No	No	No	No
National Weather Service (NWS) Storm Ready	No	No	No	No	No	No	No	No
Building Code Effectiveness Grading (BCEGs)	No	No	Yes	No	No	No	No	No
ISO Fire Rating	No	No		No	No	No		5
Economic Development Program	No	No	No	No	No	No	No	No
Land Use Program	No	No	No	No	No	No	No	No
Public Education/Awareness	No	No	Yes	No	No	No	No	No
Property Acquisition	No	No	No	No	No	No	No	No
Planning/Zoning Boards	No	No	Yes	No	No	No	No	
Stream Maintenance Program	No	No	No	No	No	No	No	No
Tree Trimming Program	No	No	No	No	No	No	No	No

CAPABILITIES	Andrew County	Amazonia	Country Club	Cosby	Fillmore	Rea	Rosendale	Savannah
Engineering Studies for Streams (Local/County/Regional)	No	No	No	No	No	No		
Mutual Aid Agreements	No	No	Yes	No	No (Fillmore Fire Protection District does)	No	No	Yes
Studies/Reports/Maps								
Hazard Analysis/Risk Assessment (Local)	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Hazard Analysis/Risk Assessment (County)	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Flood Insurance Maps	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
FEMA Flood Insurance Study (Detailed)	No	No	No	No	No	No	No	No
Evacuation Route Map	No	No	No	No	No	No	No	No
Critical Facilities Inventory	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Vulnerable Population Inventory	No	No	No	No	No	No	No	No
Land Use Map	No	No	Yes	No	No	No	No	
Staff/Department								
Building Code Official	No	No	Yes, part-time	No	No	No	No	Yes
Building Inspector	No	No	Yes, part-time	No	No	No	No	Yes
Mapping Specialist (GIS)	No	No	No	No	No	No	No	Contract
Engineer	No	No	No	No	No	No	No	Contract
Development Planner	No	No	No	No	No	No	No	No
Public Works Official	No	No	No	No	No	No	No	Yes
Emergency Management Coordinator	Yes	No	No	No	No	No	No	No
NFIP Floodplain Administrator	Yes	Yes	Yes, Village Clerk	Yes	No	Yes	Yes	Yes
Emergency Response Team	No	No	No	No	No	No	No	No
Hazardous Materials Expert	No	No	No	No	No	No	No	No
Local Emergency Planning Committee	Yes	Yes	No	Yes	No	Yes	No	No
County Emergency Management Commission	No	No	No	No	No	No	No	No
Sanitation Department	No	No	No	No	No	No	No	No
Transportation Department	Yes	Yes	No	Yes	No	Yes	No	No
Economic Development Department	No	No	No	No	No	No	No	No
Housing Department	No	No	No	No	No	No	No	No
Historic Preservation	No	No	No	No	No	No	No	No

CAPABILITIES	Andrew County	Amazonia	Country Club	Cosby	Fillmore	Rea	Rosendale	Savannah
Non-Governmental Organizations (NGOs)								
American Red Cross	No	No	No	No	No	No	No	No
Salvation Army	No	No	No	No	No	No	No	No
Veterans Groups	Yes	Yes	No	No	No	No	No	Yes
Environmental Organization	No	No	No	No	No	No	No	No
Homeowner Associations	Yes	No	Yes, six	No	No	No	No	No
Neighborhood Associations	No	No	No	No	No	No	No	No
Chamber of Commerce	No	No	No	No	No	No	No	Yes
Community Organizations (Lions, Kiwanis, etc.)	No	No	No	No	Yes	No	No	Yes
Financial Resources								
Apply for Community Development Block Grants	Some categories	Yes	No	No	Yes	Yes	Yes	Some categories
Fund projects through Capital Improvements funding	Yes	No	No	No	No	No	Yes	Yes
Authority to levy taxes for specific purposes	Yes	No	No	No	Yes	No	No	Yes
Fees for water, sewer, gas, or electric services	Yes	Yes	Yes, sewer	Yes	Yes	No	Yes	Yes
Impact fees for new development	Yes	No	No	No	No	No	No	No
Incur debt through general obligation bonds	Yes	No	Yes	No	Yes	No	No	Yes
Incur debt through special tax bonds	Yes	No	Yes	No	Yes	No	No	Yes
Incur debt through private activities	Yes	No	Yes	No	No	No	No	Yes
Withhold spending in hazard prone areas	Yes	No	No	No	No	No	No	Yes

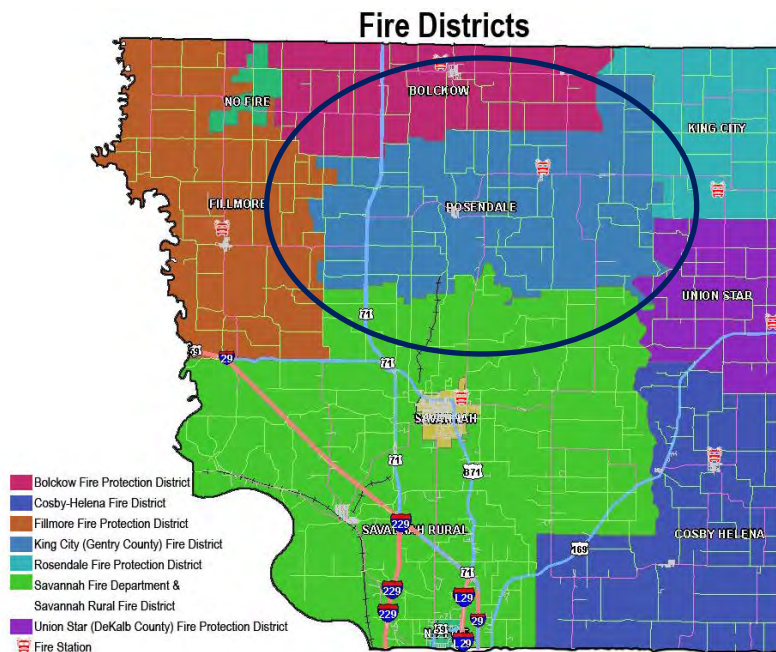
Source: Data Collection Questionnaires, 2020

2.2.9 Special Districts

Andrew County Health Department serves the entirety of Andrew County. There is a five-member board of trustees. The department’s public education outreach includes Ready-in-3, Show Me Response, Medical Reserve Corps (MRC), fire safety and health promotions, mosquito and tick prevention, sun safety and water safety. The health department coordinates a monthly safety coalition meeting and the department has an emergency operations and continuity plan. The department has the ability to fund projects through capital improvement funding. During the COVID-19 pandemic the health department was very active in testing and public education.

Rosendale Fire Protection District serves the areas of Rosendale, Rea and other unincorporated areas of Andrew County, as shown on the map below. The all-volunteer district is run by a three-person board of directors. Besides responding to calls, the volunteers go to the local school on safety day to explain fire safety to 1st and 2nd graders. Mutual aid agreements are in place with all neighboring fire districts. Mutual aid is of high importance, as flooding from the 102 River makes Highway 48 impassible several times a year, cutting off the Rosendale Fire Protection District from part of its coverage area. The Fillmore Fire Protection District is often the district that responds to calls west of the 102 River when the highway is flooded. The district is not able to fund projects through capital improvement funding, nor incur debt through bonding. However, they are able to incur debt through private activities. The map below shows the Rosendale Fire Protection District’s location in Andrew County. It is one of seven fire protection districts in the county.

Figure 2.4 Andrew County Fire Districts



(Source: Andrew County GIS)

2.2.10 Public School District Profiles and Mitigation Capabilities

Avenue City R-IX School District serves approximately 187 students in grades kindergarten thru 8th grade in one main building. Students are primarily from the unincorporated area of Avenue City. The student population is expected to change 5 to 10 percent in the next five years. A storm shelter was constructed over a decade ago that is thought to have been constructed to FEMA standards at the time. The school’s emergency system is tied to local enforcement and there is also a NOAA weather

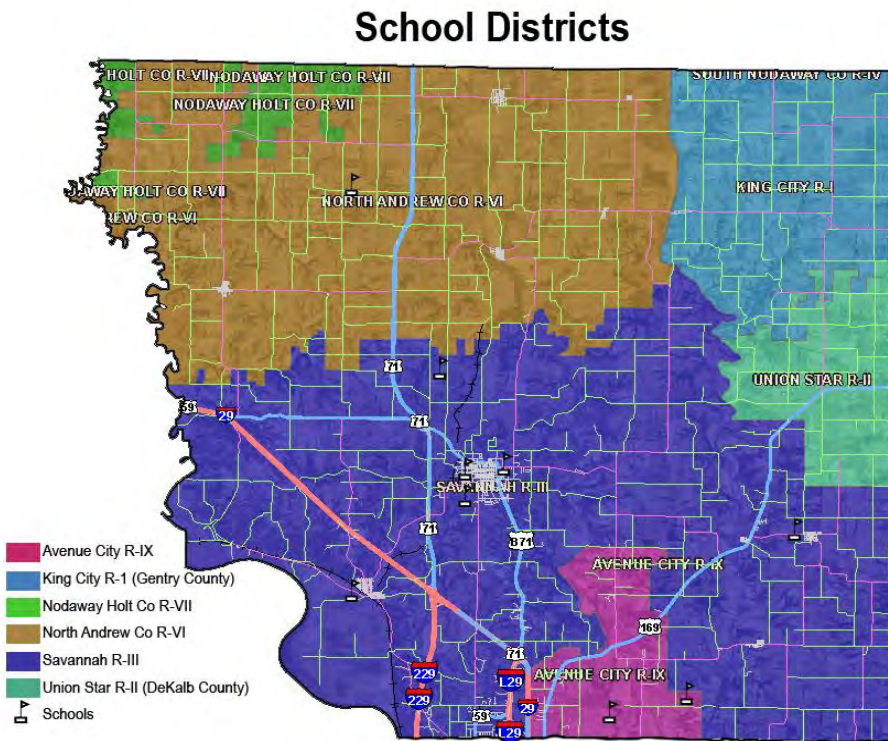
radio and an income system and emergency warning alerts system. Since the last plan update, a new cafeteria, kitchen, nurse’s office and administrative offices have been constructed. In the next five years, the school would like to build a new gymnasium.

North Andrew R-VI School District serves approximately 367 students in grades kindergarten thru 12th grade in one main building. Students are primarily from the communities of Rosendale, Bolckow, Fillmore and Rea. The student population level is expected to remain about the same in the next five years. The school’s gym serves as storm shelter, and is open to the community if needed, but it is not a FEMA-grade storm shelter. No major building construction is anticipated in the next five years, unless grant funding is received to construct a FEMA-grade storm shelter. No new construction has occurred since the last update. The school has an intercom system and a part time resource officer.

Savannah R-III School District serves approximately 2,362 students in grades kindergarten thru 12th grade in seven facilities. Schools are located in Savannah, Amazonia, the unincorporated area of Helena and Country Club. School enrollment has been relatively consistent for approximately 20 years. Since the last plan update the school district constructed a new pre-kindergarten building. The school district plans to make improvements at all six campuses and if receive grant funds, construct three FEMA-grade storm shelters. The school district currently has three FEMA grants in review for funding.

The map below shows the school district areas in Andrew County. Although the Union Star and King City School Districts serve students in Andrew County, the majority of the students in those school districts are from other counties, thus those school districts participate in their respective Hazard Mitigation Plans.

Figure 2.5 Andrew County School Districts



(Source: MSDIS)

Table 2.15. Buildings and Enrollment Data, 12/18/19

District Name	Building Name	Building Enrolment
Avenue City R-IX	Avenue City Elementary	179

Source: <http://mcids.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>, 12/18/19

Table 2.16. North Andrew R-VI Buildings and Enrollment Data, 12/18/19

District Name	Building Name	Building Enrolment
North Andrew County R-VI	North Andrew Elementary	154
North Andrew County R-VI	North Andrew Middle	97
North Andrew County R-VI	North Andrew High	117

Source: <http://mcids.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>, 12/18/19

Table 2.17. Savannah R-III Buildings and Enrollment Data, 12/18/19

District Name	Building Name	Building Enrolment
Savannah R-III	Amazonia Elementary	93
Savannah R-III	Early Childhood Learning Center	48
Savannah R-III	Helena Elementary	94
Savannah R-III	John Glenn Elementary	285
Savannah R-III	Minnie Cline Elementary	584
Savannah R-III	Savannah Middle	514
Savannah R-III	Savannah High	723

Source: <http://mcids.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>, 12/18/19

The table below describes the school districts' capacity for hazard mitigation.

Table 2.18. Summary of Mitigation Capabilities-School Districts Avenue City R-IX, North Andrew R-VI, Savannah R-III

Capability	Avenue City R-IX	North Andrew R-VI	Savannah R-III
Planning Elements			
Master Plan/ Date	No	Yes, 2004	Yes, 2019
Capital Improvement Plan/Date	Yes, 2018	Yes, 2004	Yes, 2019
School Emergency Plan / Date	Yes, 2019	Yes, 2004	Yes, 2020
Weapons Policy/Date	Yes, 2018	Yes, 2004	Yes, 2011
Personnel Resources			
Full-Time Building Official (Principal)	Yes, Principal	Yes, Principal/Superintendent	Yes, Principal at each campus
Emergency Manager	Yes, Principal and Superintendent	No	Yes, Superintendent
Grant Writer	No	No	No
Public Information Officer	Yes, Superintendent	No	Yes, Communications Coordinator
Financial Resources			
Capital Improvements Project Funding	Yes	Yes	Yes
Local Funds	Yes	Yes	Yes
General Obligation Bonds	With public vote	No	No, with a vote yes
Special Tax Bonds	With public approval	No	No, with a vote yes

Private Activities/Donations	Yes	No	Yes
State and Federal Funds/Grants	With approval	Yes	Yes
Other			
Public Education Programs	Yes	Yes	Yes
Fire Evacuation Training	Yes	Yes	Yes
Tornado Sheltering Exercises	Yes	Yes	Yes
Public Address/Emergency Alert System	Yes	Yes	Yes
NOAA Weather Radios	Yes	No	Yes
Lock-Down Security Training	Yes	Yes	Yes
Tornado Shelter/Saferoom	Yes	No	No
Campus Police	The position ended May 2021	Yes, part-time	No, rely on city police and county sheriff

Source: Data Collection Questionnaire, 2020

3 RISK ASSESSMENT

3.1	HAZARD IDENTIFICATION	3.2
3.1.1	Review of Existing Mitigation Plans	3.3
3.1.2	Review Disaster Declaration History	3.3
3.1.3	Research Additional Sources	3.4
3.1.4	Hazards Identified	3.7
3.1.5	Multi-Jurisdictional Risk Assessment	3.8
3.2	ASSETS AT RISK	3.8
3.2.1	Total Exposure of Population and Structures	3.8
3.2.2	Critical and Essential Facilities and Infrastructure	3.10
3.2.3	Other Assets	3.14
3.3	LAND USE AND DEVELOPMENT	3.17
3.3.1	Development Since Previous Plan Update	3.17
3.3.2	Future Land Use and Development	3.18
3.4	HAZARD PROFILES, VULNERABILITY, AND PROBLEM STATEMENTS	3.20
3.4.1	Flooding (Riverine and Flash)	3.22
3.4.2	Levee Failure	3.32
3.4.3	Dam Failure	3.38
3.4.4	Earthquakes	3.45
3.4.5	Land Subsidence/Sinkholes	3.50
3.4.6	Drought	3.53
3.4.7	Extreme Temperatures	3.60
3.4.8	Severe Thunderstorms Including High Winds, Hail, and Lightning	3.66
3.4.9	Severe Winter Weather	3.73
3.4.10	Tornado	3.80
3.4.11	Wildfire	3.86
3.4.12	Public Health Emergencies/Environmental	3.95
3.4.13	Cyber Disruption	3.105

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

The goal of the risk assessment is to estimate the potential loss in the planning area, including loss of life, personal injury, property damage, and economic loss, from a hazard event. The risk assessment process allows communities and school/special districts in the planning area to better understand their potential risk to the identified hazards. It will provide a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events. Although this plan is an update from 2016, there has been minimal change of risk in the planning area.

This chapter is divided into four main parts:

- **Section 3.1 Hazard Identification** identifies the hazards that threaten the planning area and provides a factual basis for elimination of hazards from further consideration;
- **Section 3.2 Assets at Risk** provides the planning area's total exposure to natural hazards, considering critical facilities and other community assets at risk;
- **Section 3.3 Land Use and Development** discusses development that has occurred since the last plan update and any increased or decreased risk that resulted. This section also discusses areas of planned future development and any implications on risk/vulnerability;
- **Section 3.4 Hazard Profiles and Vulnerability Analysis** provides more detailed information about the hazards impacting the planning area. For each hazard, there are three sections: 1) Hazard Profile provides a general description and discusses the threat to the planning area, the geographic location at risk, potential Strength/Magnitude/Extent, previous occurrences of hazard events, probability of future occurrence, risk summary by jurisdiction, impact of future development on the risk; 2) Vulnerability Assessment further defines and quantifies populations, buildings, critical facilities, and other community/school or special district assets at risk to natural hazards; and 3) Problem Statement briefly summarizes the problem and develops possible solutions.

3.1 HAZARD IDENTIFICATION

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

The plan profiles all natural hazards that can affect Andrew County. The natural hazards that can affect the county have been identified in the 2016 Andrew County Hazard Mitigation Plan and the 2018 Missouri State Plan. Natural hazards are naturally occurring climatological, hydrological or geologic events that have a negative effect on people and the built environment. Human-Caused/Technological hazards refer to hazards that stem from technological or industrial conditions that can include hazardous materials events, national security hazards, power failure, telecommunications failure and public health emergencies/environmental issues.

3.1.1 Review of Existing Mitigation Plans

The Mitigation Planning Committee (MPC) reviewed the hazards identified in the previously approved plan, as well as the hazards identified in the most recent state plan. Andrew County was determined not to be at risk for some natural hazards due to location, climate or soil structure. These hazards, which are not included in the hazard mitigation plan are tsunamis, volcanoes, avalanches, hurricanes, coastal storms, coastal erosion, expansive soils and landslides.

In Missouri, local plans customarily include only natural hazards, as only natural hazards are required by federal regulations to be included. However, the MPC determined to include a public health emergencies/environmental section in this plan in light of the ongoing COVID-19 global pandemic and its impacts in Andrew County.

3.1.2 Review Disaster Declaration History

Federal and/or state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. If the disaster is so severe that both the local and state governments' capacities are exceeded; a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

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 lists the federal FEMA disaster declarations that have occurred in Andrew County from 1965 to present.

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

Disaster Number	Description	Declaration Date Incident Period	Individual Assistance (IA) Public Assistance (PA)
DR-203	Severe Storms, Flooding	July 27, 1965	--
DR-372	Heavy Rains, Tornadoes, Flooding	April 19, 1973	--
DR-407	Severe Storms, Flooding	November 1, 1973	--
DR-439	Severe Storms, Flooding	June 10, 1974	--
DR-3017	Drought	September 24, 1976	--
DR-3071	Ice Jam, Flooding	March 12, 1979	--
DR-713	Severe Storms, Flooding	June 21, 1984 June 6 – 16, 1984	--
DR-995	Flooding, Severe Storm	July 9, 1993 June 10 – October 25, 1993	--
DR-1054	Severe Storm, Tornadoes, Hail, Flooding	June 2, 1995 May 13 – June 23, 1995	PA

DR-1253	Severe Storms, Flooding, Tornadoes	October 14, 1998 October 4-11, 1998	--
DR-1270	Severe Storms, Flooding	April 20, 1999 April 3-14, 1999	--
DR-1524	Severe Storms, Tornadoes, Flooding	June 11, 2004 May 18 – 31, 2004	IA
DR-3232	Hurricane Katrina Evacuation	August 29 – October 1, 2005 September 10, 2005	PA
DR-1635	Severe Storms, Tornadoes, Flooding	April 5, 2006 March 30 – April 3, 2006	IA, PA
DR-1708	Severe Storms, Flooding	June 11, 2007 May 5-18, 2007	IA, PA
DR-1736	Severe Winter Storms	December 6-15, 2007 December 27, 2007	PA
DR-3281	Severe Winter Storms	December 12, 2007 December 8-15, 2007	--
DR-1773	Severe Storms, Flooding	June 25, 2008 June 1 – August 13, 2008	IA, PA
DR-3303	Severe Winter Storm	January 30, 2009 January 26 – 28, 2009	--
DR-1934	Severe Storms, Flooding, Tornadoes	August 17, 2010 June 12, July 31, 2010	PA
DR-3325	Flooding	June 30, 2011 June 1 – August 1, 2011	--
DR-4012	Flooding	August 12, 2011 June 1 – August 1, 2011	IA, PA
DR-3317	Winter Storm	February 3, 2011 January 31 – February 5, 2011	--
DR-1961	Winter Storm, Snowstorm	March 23, 2011 January 31 – February 2011	PA
DR-4200	Severe Storms, Tornadoes, Straight-line Winds, Flooding	October 31, 2014 September 9 – 10, 2014	PA
DR-4238	Severe Storms, Tornadoes, Straight-line Winds, Flooding	August 7, 2015 May 15 – July 27, 2015	PA
DR-4435	Severe Storms, Straight-line Winds, and Flooding	May 20, 2019 March 11 – April 16, 2019	PA
DR-4451	Severe Storms, Tornadoes, and Flooding	July 9, 2019 April 29 – July 05, 2019	IA, PA
DR-4490	Missouri Covid-19 Pandemic	March 26, 2020 January 20, 2020- ongoing	IA, PA

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

3.1.3 Research Additional Sources

Below are 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 (11-21-2016)
- Federal Emergency Management Agency (FEMA)
- Missouri Department of Natural Resources (MDNR)
- 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 (Hazardus)
- 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 (source identified in body of plan where necessary)

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 July 2020, 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.

Injuries and deaths caused by a storm event are reported on an area-wide basis. With NCEI data, the death or injury listed in connection with that county search may not necessarily occur in that county.

3.1.4 Hazards Identified

The hazards that significantly impact the planning area and were chosen for further analysis in alphabetical order. Not all hazards impact every jurisdiction. The table below provides a summary of the jurisdictions impacted by each hazard. A “Yes” indicates the jurisdiction is impacted by the hazard, and a "--" indicates the hazard is not applicable to that jurisdiction. There are variations in the assessed hazard risk for hazards, such as levee failure, as not all jurisdictions are near rivers with levee systems.

Table 3.2. Hazards Identified for Each Jurisdiction

Jurisdiction	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding (River and Flash)	Land Subsidence/Sinkholes	Levee Failure	Severe Winter Weather	Thunderstorm/Lightning/Hail/High Wind	Tornado	Wildfire	Public Health Emergencies/Environmental Issues
Andrew County	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Amazonia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cosby	--	Yes	Yes	Yes	Yes	Yes	--	Yes	Yes	Yes	Yes	Yes
Country Club	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fillmore	--	Yes	Yes	Yes	Yes	Yes	--	Yes	Yes	Yes	Yes	Yes
Rea	--	Yes	Yes	Yes	Yes	Yes	--	Yes	Yes	Yes	Yes	Yes
Rosendale	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	Yes	Yes	Yes	Yes
Savannah	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	Yes	Yes	Yes	Yes
Schools and Special Districts												
Avenue City R-IX	--	--	Yes	Yes	Yes	Yes	--o	Yes	Yes	Yes	Yes	Yes
North Andrew County R-VI	--	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Savannah R-III	Yes	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3.1.5 Multi-Jurisdictional Risk Assessment

The risk assessment evaluates each participating jurisdiction's vulnerability to each hazard that can affect the planning area. Many of the hazards identified in the risk assessment have the same probability of occurrence throughout the planning area. The hazards that vary across the planning area in terms of risk include dam failure, flash flood, structural or wildland fire, riverine flood and flash flood. These differences are detailed in each hazard profile under geographic location and vulnerability.

Andrew County is fairly uniform in terms of climate, topography, and building construction characteristics. County Club Village and Savannah have more assets at a greater density, and therefore have a greater vulnerability to weather-related hazards. Rural areas have agricultural assets (crops/livestock) that are vulnerable to hail damages. These differences will be also discussed in greater detail in the vulnerability sections of each hazard.

3.2 ASSETS AT RISK

This section assesses the planning area population, structures, critical facilities and infrastructure, and other important assets that may be at risk to hazards. The inventory of assets for each jurisdiction were derived from the Andrew County structures dataset downloaded from Missouri Spatial Data Information Service (MSDIS), local jurisdiction data collection questionnaires, and HAZUS MH 3.2. There have not been significant changes to the planning area since the previous hazard mitigation plan.

3.2.1 Total Exposure of Population and Structures

Unincorporated County and Incorporated Cities

In the following three tables, population data is based on Census Bureau data. Building counts and building exposure values are based on parcel data developed by the State of Missouri Geographic Information Systems (GIS) database. This data, organized by County, is available on Google Drive through the following link (https://drive.google.com/drive/folders/182nt_gcECfMWqflz0fQhVuXJgusX07Z). 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). 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. 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	2015-2019 Annual Population Estimate	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
Amazonia	267	145	\$21,387	\$11,305	\$32,692
Cosby	213	57	\$7,463	\$4,419	\$11,882
Country Club Village	2,729	929	\$139,597	\$72,272	\$211,869
Fillmore	194	105	\$15,669	\$8,462	\$24,131
Rea	39	58	\$3,341	\$1,627	\$4,968
Rosendale	111	83	\$12,333	\$6,875	\$19,208
Savannah	5,159	2,079	\$322,119	\$179,217	\$501,336
Andrew County (Unincorp.)	17,503	8,314	\$577,233	\$293,198	\$870,431
Totals	26,408	11,879	\$1,113,330	\$584,878	\$1,698,208

Source: U.S. Bureau of the Census, Annual population estimates/ 5-Year American Community Survey 2015-2019; Building Count and Building Exposure, Missouri GIS Database from SEMA Mitigation Management; Contents Exposure derived by applying multiplier to Building Exposure based on Hazus MH 2.1 standard contents multipliers per usage type as follows: Residential (50%), Commercial (100%), Industrial (150%), Agricultural (100%). For purposes of these calculations, government, school, and utility were calculated at the commercial contents rate.

Table 3.4. Building Values/Exposure by Usage Type

Building Values/Exposure by Usage Type							
All values are in thousands of dollars.							
The table below calculates the TOTAL VALUE OF BUILDINGS AND CONTENTS within each jurisdiction of the County. The total exposure values for the County were derived from the inventory data associated with FEMA's loss estimation software Hazus. See the State Hazard Mitigation Plan, Table 3.1. Content values were also included and were estimated as a percentage of building value based on their property type, using FEMA/HAZUS estimated content replacement values. Those content values are 50% for residential, 100% for commercial and governmental and 150% for industrial.							
Total Building & Content Value							
Total Value							
Jurisdiction	Agriculture	Commercial	Education	Government	Industrial	Residential	Grand Total
Amazonia	\$35	\$2,903	\$676	\$250	\$447	\$28,380	\$32,692
Cosby	\$41	\$2,580	\$0	\$250	\$0	\$9,010	\$11,882
Country Club	\$53	\$12,579	\$1,352	\$125	\$0	\$197,759	\$211,869
Fillmore	\$0	\$2,258	\$0	\$250	\$0	\$21,623	\$24,131
Rea	\$213	\$0	\$0	\$250	\$0	\$4,505	\$4,968
Rosendale	\$6	\$1,290	\$0	\$125	\$895	\$16,893	\$19,209
Savannah	\$18	\$73,215	\$10,143	\$1,127	\$11,630	\$405,204	\$501,336
Andrew - Unincorp	\$27,531	\$57,088	\$3,381	\$5,886	\$10,736	\$765,810	\$870,432
Grand Total	\$27,974	\$153,203	\$15,552	\$8,766	\$23,708	\$1,469,004	\$1,698,207

Source: Missouri Spatial Data Information Service (MSDIS)

Table 3.5. Building Counts by Usage Type

Building Counts by Usage Type							
The table below, created from the MSDIS database, presents the NUMBER OF BUILDINGS within each jurisdiction of the County.							
Jurisdiction	Agriculture	Commercial	Education	Government	Industrial	Residential	Grand Total
Amazonia	6	9	1	2	1	126	145
Cosby	7	8		2		40	57
Country Club	9	39	2	1		878	929
Fillmore		7		2		96	105
Rea	36			2		20	58
Rosendale	1	4		1	2	75	83
Savannah	3	227	15	9	26	1799	2079
Andrew - Unincorp	4661	177	5	47	24	3400	8314
Grand Total	4,736	475	23	70	53	6,522	11,879

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

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

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

Public School District	2020 Enrollment	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
Avenue City Elementary	187	1	7,000,000.00	1,500,000.00	8,500,000.00
North Andrew Elementary	162	1 (k-12)	12,444,671.00	1,827,386.00*	14,272,057.00*
North Andrew Middle	73	1 (k-12)	12,444,671.00	*Same as above	*Same as above
North Andrew High	130	1 (k-12)	12,444,671.00	*Same as above	*Same as above
Amazonia Elementary	93	1	3,199,701.91	430,374.78	3,630,076.69
Helena Elementary	101	1	3,305,200.55	452,510.52	3,757,711.07
John Glenn Elementary	270	1	5,265,134.22	672,692.27	5,937,826.49
Minnie Cline Elementary	614	1	12,182,010.39	1,435,311.80	13,617,322.19
Savannah Middle	540	1	14,419,652.25	1,723,177.32	16,142,829.57
Savannah High	665	1	20,537,794.14	2,548,581.99	23,086,376.13
Savannah Early Childhood	42	1	1,094,802.32	190,853.56	1,285,655.88

Source: Enrollment data from <https://data-msdis.opendata.arcgis.com/datasets/mo-2020-public-schools>; The Building Exposure, Contents Exposure, and Total Exposure amounts come from the completed Data Collection Questionnaires from Public School Districts. In general, the school districts obtain this information from their insurance coverage amounts.

3.2.2 Critical and Essential Facilities and Infrastructure

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

- **Critical Facility:** Those facilities 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:

- Files from the Emergency Management Director, including Chemical Facilities (Tier II Facilities)
- HAZUS 4.2

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

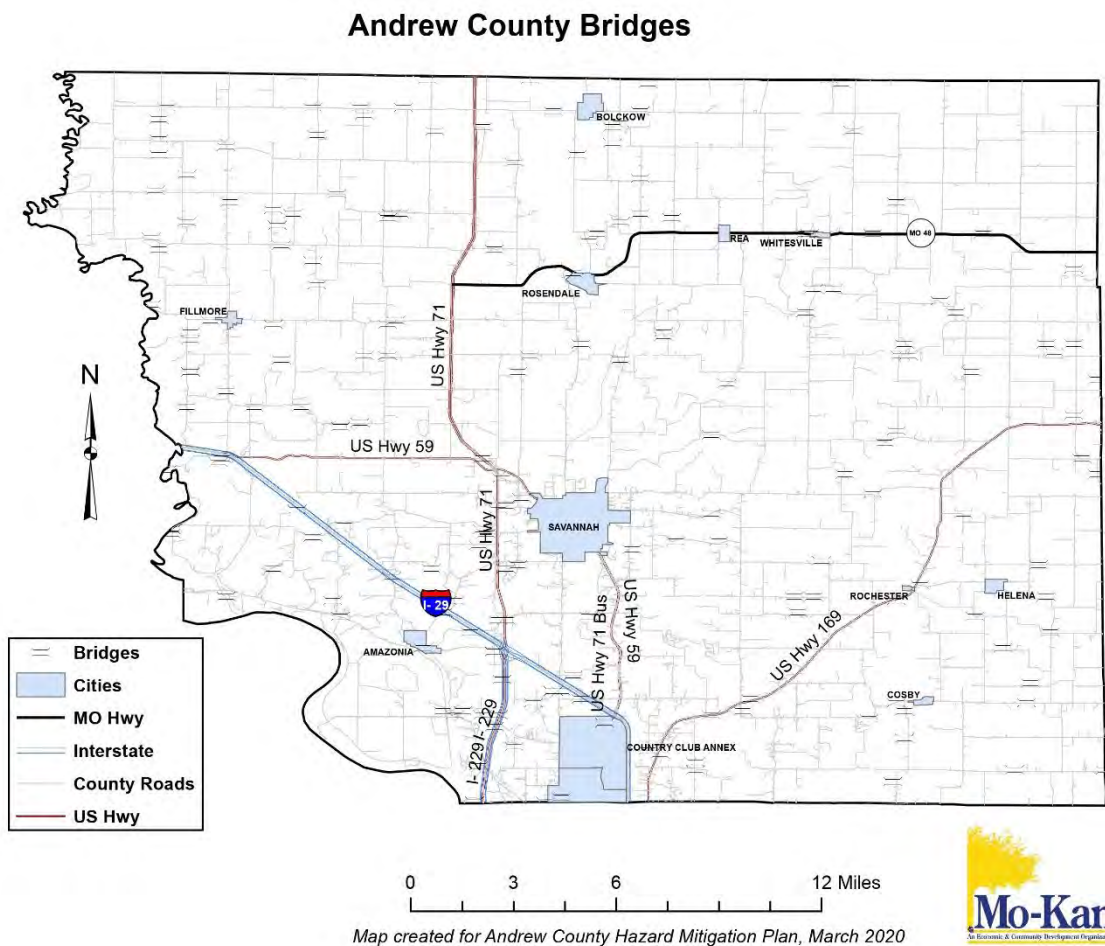
Jurisdiction	Airport Facility	Bus Facility	Childcare Facility	Communications Tower	Electric Power Facility	Emergency Operations	Fire Service	Government	Housing	Shelters	Highway Bridge	Hospital/Health Care	Military	Natural Gas Facility	Nursing Homes	Police Station	Potable Water Facility	Rail	Sanitary Pump Stations	School Facilities	Stormwater Pump Stations	Tier II Chemical Facility	Wastewater Facility	TOTAL
Amazonia	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	8
Cosby	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	4
Country Club	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	7
Fillmore	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	5
Rea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rosendale	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	3	0	0	0	7
Savannah	0	0	2	1	1	1	2	2	4	1	1	2	0	0	1	1	1	0	1	4	1	6	1	33
Unincorporated County	0	0	0	22	0	0	1	0	0	1	166	0	0	0	1	1	0	0	0	1	0	7	0	199
Totals	0	0	2	26	4	1	6	4	5	2	169	2	0	0	2	2	5	1	5	11	1	17	4	267

Source: Missouri 2018 State Hazard Mitigation Plan and Hazard Mitigation Viewer; Data Collection Questionnaires; HAZUS, EMD

According to the Federal Highway Administration, Andrew County has 168 bridges, and as of December 31, 2018, 61 are rated as good, 78 are fair and 29 are in poor condition (<http://www.fhwa.dot.gov/bridge/nbi/no10/county.cfm>). Two recent state bridge projects included the replacement of the north and southbound I-29 bridges over Hopkins Creek and rehabilitation of the north and southbound bridges over Route T. These bridges are included in Gov. Mike Parson's \$351 million Focus on Bridges program, which will repair or replace 250 bridges across the state (<https://www.modot.org/node/20818>).

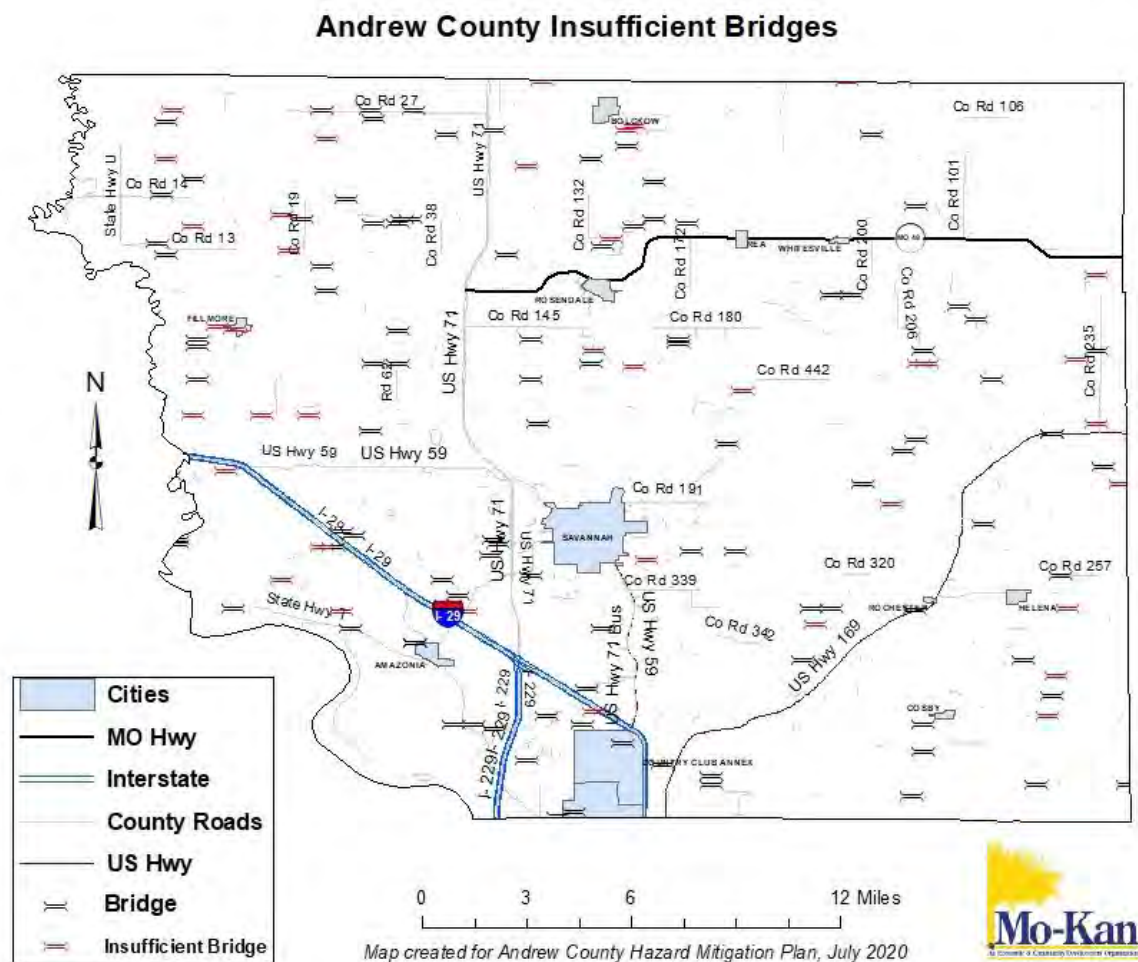
The term "scour critical" refers to one of the database elements in the National Bridge Inventory. This element is quantified using a "scour index", which is a number indicating the vulnerability of a bridge to scour during a flood. Bridges with a scour index between 1 and 3 are considered "scour critical", or a bridge with a foundation determined to be unstable for the observed or evaluated scour condition. There are 5 county and 4 state scour critical bridges identified in Andrew County.

Figure 3.8. Andrew County Bridges



Source: Hazus 4.2

Figure 3.9. Andrew County Structurally Deficient Bridges



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.

Specific natural, historic, cultural, and economic assets in the planning area are included below.

Threatened and Endangered Species: Table 3.10 shows Federally Threatened, Endangered, Proposed and Candidate Species in the county.

Table 3.10. Threatened and Endangered Species in Andrew County

Common Name	Scientific Name	Status
Indiana Bat	Myotis sodalis	Endangered
Northern Long-eared Bat	Myotis septentrionalis	Threatened
Pallid Sturgeon	Scaphirhynchus albus	Endangered

Source: U.S. Fish and Wildlife Service, <http://www.fws.gov/midwest/Endangered/lists/missouri-cty.html>

Natural Resources: The Missouri Department of Conservation (MDC) provides a database of lands the MDC owns, leases, or manages for public use. Table 3.11 lists the names and locations of parks and conservation areas in the planning area.

Table 3.11. Parks in Andrew County

Park / Conservation Area	Address	City
Brown (Tom) Access	From Amazonia, take Route T northwest 3 miles, then County Road 458 south to area entrance.	Unincorporated County
Christie (James DA) CA	From Rosendale, take Highway 48 northeast about 1.50 miles.	Unincorporated County
Elrod Mill Access	From Union Star, take Highway 169 west 1.50 miles, then Route M north 0.50 mile, then County Road 221 west 2 miles, then County Road 216 north 1 mile to area entrance.	Unincorporated County
Evan N. Davis Memorial CA	From Rosendale, take Highway 48 northeast about 1.50 miles, then County Road 125 north about 0.50 mile.	Unincorporated County
Hadorn Bridge Access	From Savannah, take Route C north 5 miles, then County Road 182 east to the area.	Unincorporated County
Happy Holler Lake CA	The area is composed of three tracts. Lake entrance: from Savannah, take Route E east 4 miles, then Route D north 6 miles to the parking lot. Refer to map for directions to tracts 2 and 3.	Unincorporated County
Honey Creek CA	At the I-29 Fillmore exit (Exit 65), take Highway 59 south about 0.125 mile, then Route RA east to area entrance.	Unincorporated County
Messick Park	100-198 N 12 th Street	City of Savannah
Midway Access	From Bolckow, take Route B west 1 mile to the area entrance.	Unincorporated County
Nodaway Island Access	From Amazonia, take Route T west 3 miles, then County Road 4412 south to area entrance.	Unincorporated County
Nodaway Valley CA	From St. Joseph, take I-29 north, then Highway 59 (Exit 67) west 3.50 miles, then Route B north 9 miles to the area.	Unincorporated County

Rochester Falls Access	From St. Joseph, take Highway 169 north 10 miles to area entrance.	Unincorporated County
Rock Quarry Access	From St. Joseph, take I-29 north to exit 53, take Business Highway 71 north about 1.25 miles, then County Road 345 east 1.50 miles. At the T intersection, take County Road 344 north 0.25 mile to the area entrance.	Unincorporated County
Savannah City Lake	From Savannah, take Business Highway 71 north 0.50 mile, then County Road 428 south 0.70 mile, and County Road 427 west to the area	Unincorporated County
Worthwine Island CA	North of St. Joseph, from Interstate 229 take Route K north 1 mile, then take Gravel Road 396 west 3 miles.	Unincorporated County

Source: <http://mdc7.mdc.mo.gov/applications/moatlas/AreaList.aspx?txtUserID=guest&txtAreaNm=s>

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 3.12 lists the properties in Andrew County that are on the National Register of Historic Places.

Table 3.12. Andrew County Properties on the National Register of Historic Places

Property	Address	City	Date Listed
Andrew County Courthouse	4 th and Main Streets	Savannah	September 11, 1980
Roberts Octagonal Barn	Jct of MO B and MO 48	Rea	November 18, 1999
Walnut Park Farm Historic District	Jct of MO 59 & MO 71	St. Joseph vic.	December 22, 1999

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

Economic Resources: Table 3.13 shows major non-government employers in the planning area.

Table 3.13. Major Non-Government Employers in Andrew County

Employer Name	Main Locations	Product or Service	Employees
LaVerna Village Nursing Home	Savannah	Care Facility	100
Shady Lawn Care Center	Savannah	Care Facility	40
United Electric CoOp	Savannah	Utilities	53
United Fiber	Savannah	Utilities	36
Victory Chevrolet	Savannah	Car Dealership	40
Walton Motors	Savannah	Car Dealership	20
Brothers Market	Savannah	Food	48

Source: Data Collection Questionnaires; Savannah Chamber of Commerce

Agriculture: Agriculture has traditionally been an important part of the county's economy. According to the 2017 Census of Agriculture, crop and livestock sales are in excess of \$74,990,000 and 1,144 people are employed as farmers or farm hands in Andrew County, with a total of 706 farms encompassing 204,944 acres of land. And account for 11.6% of the overall workforce. The three top crops being soybeans, corn, and beef.

3.3 LAND USE AND DEVELOPMENT

3.3.1 Development Since Previous Plan Update

The population in Andrew County has remained relatively stable, with the most growth seen in Country Club Village, the City of Savannah, and unincorporated areas of the county. Table 3.14 shows the population growth statistics for all cities in Andrew County as well as the county as a whole.

Table 3.14. County Population Growth, 2010-2019

Jurisdiction	Total Population 2010	Total Population 2019	2010-2019 # Change	2000-2019 % Change
Amazonia	310	321	11	3.42%
Cosby	124	125	1	.80%
Country Club	2,449	2,497	48	1.92%
Fillmore	184	188	4	2.17%
Rea	50	48	-2	-4.00%
Rosendale	143	146	3	2.09%
Savannah	5,057	5,223	166	3.28%
Total (including unincorporated areas)	17,291	17,712	421	2.43%

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. Table 3.15 shows the change in numbers of housing units in the planning area from 2010 to 2019.

Table 3.15. Change in Housing Units, 2010-2019

Jurisdiction	Housing Units 2010	Housing Units 2019	2010-2019 # Change	2000-2019 % Change
Andrew County	7,306	7,321	15	0.20%
Amazonia	136	141	5	3.67%
Cosby	124	125	1	0.80%
Country Club Village	1,012	1,022	10	0.98%
Fillmore	89	87	-2	-0.02%
Rea	25	24	-1	-4.00%
Rosendale	74	69	5	-6.75%
Savannah	2,187	2,214	27	1.23%

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

The changes in development for each participating jurisdiction since the previous plan update are discussed below. Within each hazard section under the heading “Previous and Future Development,” these changes in development that have impacted the community’s vulnerability to specific hazards will be discussed.

Andrew County - With only slight population and housing increases since the last update, and no major plans for new development, the hazard vulnerability for the county has no significant changes.

Amazonia - While Amazonia has experienced a slight population increase, there has been no subsequent commercial development, and there are no plans for any new development. The

population increase has not been significant enough to increase the hazard vulnerability of the community.

Cosby - With population and housing numbers relatively unchanged since the last update, and no subsequent commercial development or plans for new development, the hazard vulnerability for the community also remains unchanged.

Country Club Village - Considering a less than one percent increase in population and housing in Country Club Village since the last update, the hazard vulnerability remains unchanged. Given that no significant commercial development has occurred, and there are no plans for new development, there is no change in risk for natural hazards.

Fillmore - With population and housing numbers relatively unchanged since the last update, and no subsequent commercial development or plans for new development, the hazard vulnerability for the community also remains unchanged.

Rea - Since the last update, Rea has seen a slight decrease in population and housing, leaving the hazard vulnerability unchanged. Given that no significant commercial development has occurred, and there are no plans for new development, there is no change in risk for natural hazards.

Rosendale - Because of minimal population and housing changes in Rosendale, the hazard vulnerability of the community remains the same from the last update. No subsequent commercial development and no plans for any new development have occurred that would lead to a change in risk for natural hazards.

Savannah - Savannah saw no significant growth in population (3.8 percent) or housing (1.23 percent) since the last plan that would affect the hazard vulnerability for the community. Discussions have occurred regarding future annexations but currently no plans for future development have been identified.

3.3.2 Future Land Use and Development

The remaining discussion in this section provides future growth and development information, where available, relative to each participating jurisdiction, based on the format used above for the county information.

Andrew County - Andrew County has no zoning ordinances within the county. There may be some zoning issues in the incorporated areas (cities) of the county but none in the county. The lack of zoning in Andrew County also dictates that the County has no authority to issue building permits or occupancy permits.

Amazonia - No future development is expected at this time. The population and number of businesses has not increased since the last HMP update. Therefore, there is no indication of this changing.

County Club Village - No future development is expected at this time. The population and number of businesses has not increased significantly since the last HMP update. Therefore, there is no indication of this changing.

Cosby - No future development is expected at this time. The population and number of businesses has not increased since the last HMP update. Therefore, there is no indication of this changing.

Fillmore - No future development is expected at this time. The population and number of businesses has not increased since the last HMP update. Therefore, there is no indication of this changing.

Rea - No future development is expected at this time. The population and number of businesses has not increased since the last HMP update. Therefore, there is no indication of this changing.

Rosendale - No future development is expected at this time. The population and number of businesses has not increased since the last HMP update. Therefore, there is no indication of this

changing.

Savannah - No future development is expected at this time. The population and number of businesses has not increased significantly since the last HMP update. Therefore, there is no indication of this changing.

School District's Future Development

Avenue City R-IX School District

Located in Cosby, the Avenue City R-IX School District serves K-8 students and has seen an increase in enrollment over the last 20 years. According to the [Missouri Spatial Data Information Service Open Data Site](https://apps.dese.mo.gov/MCDS/Reports/SSRS/Print.aspx?Reportid=d2fb6433-147a-4175-8363-6bfe0379cedd), 187 students were enrolled at Avenue City in 2020, up approximately seven percent from the 134 students enrolled in 2000 (<https://apps.dese.mo.gov/MCDS/Reports/SSRS/Print.aspx?Reportid=d2fb6433-147a-4175-8363-6bfe0379cedd>).

Enrollment is expected to increase between five and 10 percent over the next five years as new housing units are built in the district.

Since the last plan update, building renovations including a new entryway, cafeteria and kitchen, and nurse's and administrative offices have been completed, along with the addition of new security systems. In the next five years, according to information provided by the district, the hope is to construct a new gymnasium.

North Andrew R-III School District

Serving the communities of Fillmore, Rea, Rosendale and Bolckow, the North Andrew R-III School District has experienced a slight decline in enrollment over the last 20 years when comparing 2020 and 2000 school data. The [Missouri Spatial Data Information Service Open Data Site](https://apps.dese.mo.gov/MCDS/Reports/SSRS/Print.aspx?Reportid=d2fb6433-147a-4175-8363-6bfe0379cedd) reported 363 K-12 students enrolled in 2020, down from the 365 K-12 students enrolled in 2000 (<https://apps.dese.mo.gov/MCDS/Reports/SSRS/Print.aspx?Reportid=d2fb6433-147a-4175-8363-6bfe0379cedd>).

Enrollment is expected to remain the same over the next five years, and there are no plans for building improvements, according to information provided by the district.

Savannah R-III School District

Located in the City of Savannah, the Savannah R-III School District also serves Amazonia, Helena, and Country Club Village. 2020 school district enrollment data gleaned from the [Missouri Spatial Data Information Service Open Data Site](https://apps.dese.mo.gov/MCDS/Reports/SSRS/Print.aspx?Reportid=d2fb6433-147a-4175-8363-6bfe0379cedd) shows a decline in enrollment from past years. According to Missouri's Department of Elementary and Secondary Education (DESE) historical data from 2000, the district's K-12 enrollment was 2,372 students compared with Pre-K-12 enrollment of 2,325 students in 2020. A new Early Learning Center opened its doors in Savannah in 2018 thanks in part to grant funding and despite the reported 42 Pre-K students enrolled in 2020, overall enrollment in the district has declined by close to 10 percent.

The district has 16 buildings/sites it maintains including one high school, one middle school, four elementary schools, and one preschool. A 69-cent tax increase proposition for capital improvements was voted down in 2019 by Andrew County residents. The proposed tax levy, referred to as Proposition Gold, would have generated \$18 million for the district over 20 years (<https://www.kq2.com/content/news/69-cent-levy-for-Savannah-schools-fails-at-the-polls.html>).

Savannah R-III has applied for FEMA grant monies to fund the construction of tornado safe rooms at Minnie Cline, John Glenn Elementary, and Savannah High School. The district also plans to make building improvements at all six campuses in the next five years, as well as renovations at the high school.

3.4 HAZARD PROFILES, VULNERABILITY, AND PROBLEM STATEMENTS

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

Hazard Profiles

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

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 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.
- **Strength/Magnitude/Extent:** This includes information about the strength, magnitude, and extent of a hazard.
- **Previous Occurrences:** This section includes available information on historic incidents and their impacts. Historic event records form a solid basis for probability calculations.
- **Probability of Future Occurrence:** The frequency of recorded past events is used to estimate the likelihood of future occurrences.
- **Changing Future Conditions Considerations:** The effects of long-term changes in weather patterns and climate on the identified hazards.

Vulnerability Assessments

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

Requirement §201.6(c)(2)(ii)(A):The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

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

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

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

Following the hazard profile for each hazard will be the vulnerability assessment. The vulnerability assessment further defines and quantifies populations, buildings, critical facilities, and other community assets at risk to damages from natural hazards. The vulnerability assessments will be based on the best available county-level data, which is in the Missouri Hazard Mitigation Plan (2018), referred to as the 2018 State Plan. The county-level assessments in the 2018 State Plan were based on the following sources:

- Statewide GIS data sets compiled by state and federal agencies; and
- FEMA's HAZUS-MH 4.2 loss estimation software

The vulnerability assessments in the Andrew 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 provides 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:** The plan provides potential losses to existing development (including types and numbers, of buildings, critical facilities, etc.) for each participating jurisdiction.
- **Previous and Future Development:** This section will include information on how changes in development have impacted the community's vulnerability to this hazard. It will 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, as well as 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 will 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 will be included 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 3.4.3 and Section 3.4.2 respectively. It will not be addressed in this section.

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

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

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

are often not in a floodplain. This type of flooding, often referred to as sheet flooding, is becoming increasingly prevalent as development outstrips the ability of the drainage infrastructure to properly carry and disburse the water flow.

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

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

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

Geographic Location

Riverine flooding is most likely to occur in SFHAs. Maps in Figures 3.16 to 3.18 show SFHAs for Andrew County and jurisdictions that have a 100-year floodplain within their city limits. The 100-year floodplain boundaries are based on a Flood Hazard Zone GIS layer from FEMA (<https://hazards.fema.gov/gis/nfhl/rest/services/public/NFHL/MapServer/28>) published in February 2020. Full size 100-year floodplain maps are located in Appendix A.

Figure 3.16. Andrew County's 100-Year Floodplain with Critical Facilities

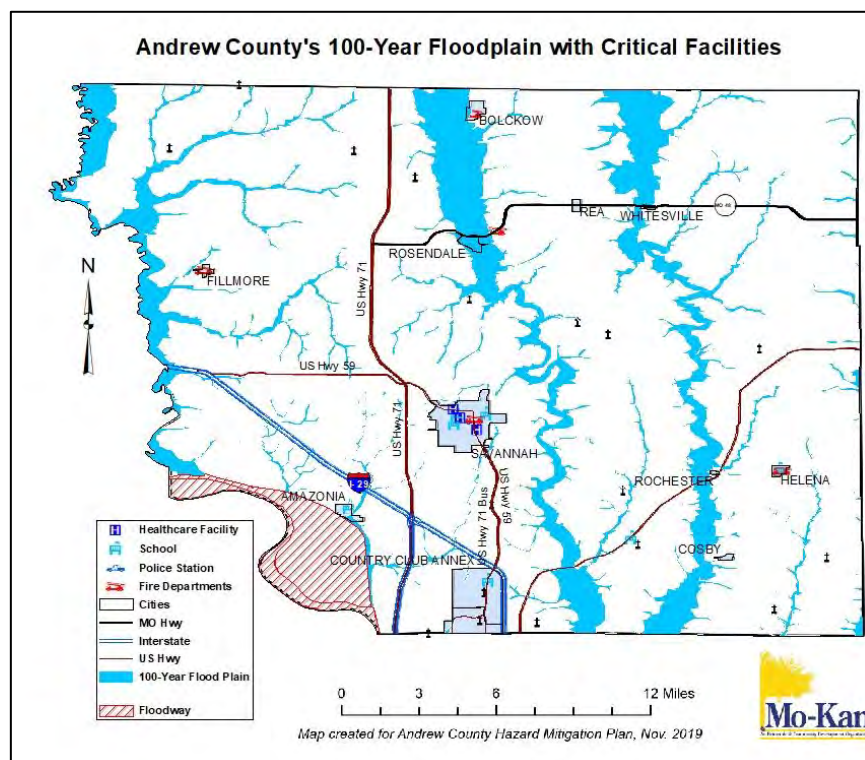
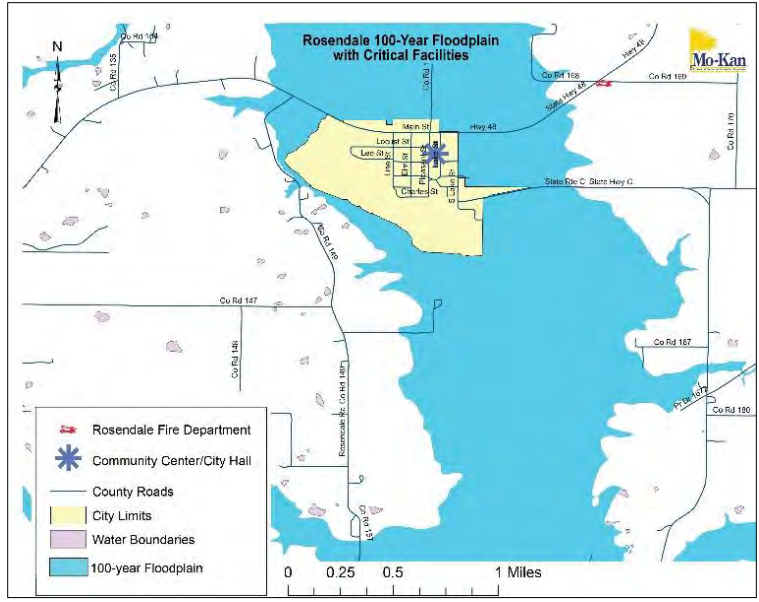


Figure 3.17.

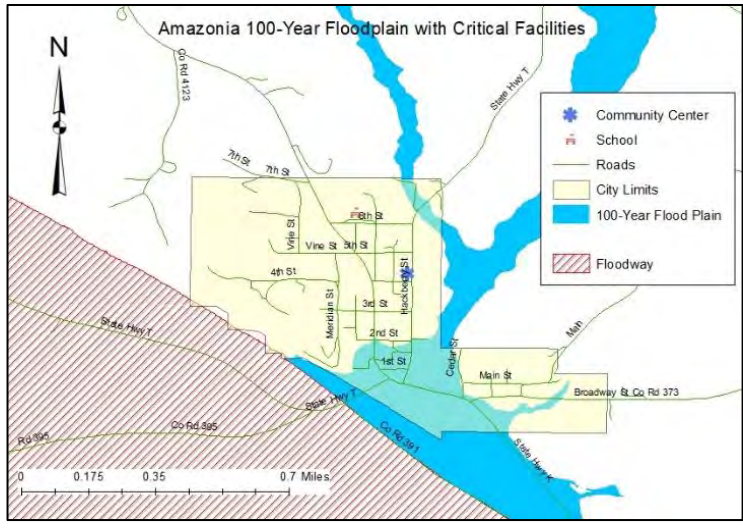
Rosendale’s 100-Year Floodplain with Critical Facilities



Only Zone A (100- year floodplain) present. See Appendix A for full sized map

Figure 3.18.

Amazonia’s 100-Year Floodplain with Critical Facilities



A review of the NCEI storm event database determined which jurisdictions are most prone to flood events from 2000-2020 and are listed in Table 3.19.

Table 3.19. Andrew County NCEI Flood Events by Location, 2000-2020

Location	# of Events
Andrew County	9
Unincorporated County (unspecified)- 6 flood events	
Unincorporated Andrew County (Avenue City) - 0 flood events	
Unincorporated Andrew County (Midway)- 1 flood events	

Unincorporated Andrew County (Nodaway) - 2 flood events	
Unincorporated County (Whitesville)- 0 flood events	
Amazonia	1
Bolckow	1
Country Club Village	0
Cosby	0
Fillmore	0
Rosendale	3
Rea	1
Savannah	0

Source: National Centers for Environmental Information, accessed 3/30/20

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. Table 3.20 lists the number of flash flood events by location recorded in NCEI for the 20-year period. Several areas have seen repeated flooded, such as Rosendale and specific sections of Savannah.

In 2004 Savannah experienced a flash flood that caused several roads to wash out and resulted in \$10,000 in reported property loss.

Table 3.20. Andrew County NCEI Flash Flood Events by Location, 2000-2020

Location	# of Events
Andrew County	3
Unincorporated Andrew County (unspecified)- 0 flood events	
Unincorporated Andrew County (Avenue City) – 1 flood events	
Unincorporated Andrew County (Midway) – 0 flood events	
Unincorporated Andrew County (Nodaway) – 1 flood events	
Unincorporated County (Whitesville) - 1 flood events	
Amazonia	0
Bolckow	2
Country Club Village	0
Cosby	0
Fillmore	1
Rea	1
Rosendale	2
Savannah	3

Source: National Centers for Environmental Information, accessed 3/30/20

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 3.21 lists NFIP participation for the communities in the planning area. Table 3.22 lists the

number of policies in force, amount of insurance in force, number of closed losses, and total payments for each jurisdiction.

Table 3.21. NFIP Participation in Andrew County

Community ID #	Community Name	NFIP Participant (Y/N/Sanctioned)	Current Effective Map Date	Regular-Emergency Program Entry Date
290004	Andrew County	Yes	04/18/11	07/04/88
290005	Amazonia	Yes	04/18/11	05/01/05
290604	Village of Country Club	Yes	04/18/11 (M)	08/24/84
290498	Cosby	Sanctioned	04/18/11	S – 04/18/12
---	Fillmore	No	---	---
---	Rea	No	---	---
290008	Rosendale	Yes	04/18/11(M)	09/10/93
290664	Savannah	Yes	04/18/11	12/21/78

Source: NFIP Community Status Book, February 2020, 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

Cosby is sanctioned because it has not adopted the floodplain maps. Below is a list of NFIP policy and claim statistical information.

Table 3.22. NFIP Policy and Claim Statistics as of January 26, 2021

Community Name	Policies in Force	Insurance in Force	Closed Losses*	Total Payments
Amazonia	2	\$62,000 (\$1,112)	3	\$82,414
Andrew County	20	\$3,409,700 (\$23,221)	108	\$2,982,551
Village of Country Club	7	\$883,000 (\$5,831)	1	\$9,150
Novinger	1	\$109,200 (\$493)	5	\$286,724
Rosendale	9	\$633,900 (\$5,750)	23	\$594,744
Savannah	---	---	1	\$8,372

Source: <https://nfipservices.floodsmart.gov/reports-flood-insurance-data>
 *Closed Losses are those flood insurance claims that resulted in payment.

Repetitive Loss/Severe Repetitive Loss Properties

Repetitive Loss Properties are those properties with at least two flood insurance payments of \$5,000 or more in a 10-year period. According to the Flood Insurance Administration, jurisdictions included in the planning area have a combined total of 25 repetitive loss properties. Due to Federal restrictions on data sharing, the state was unable to provide full Repetitive Loss data or current Severe Repetitive Loss data. The Property Type was not available for Repetitive Loss properties and the Severe Repetitive Loss data, which was obtained from the 2018 MO State Hazard Mitigation Plan, does not specify if the properties are mitigated or non-mitigated. The table below provides a summary of the repetitive loss properties in Andrew County.

Table 3.23. Andrew County Repetitive Loss Properties

County	Total Losses	Properties	Total Building Payments	Total Contents Payments	Total Payments	Average Payments
Andrew	68	23	\$2,407,865	\$172,948	\$2,580,813	\$37,953
Rosendale	4	2	\$25,627	\$0	\$25,627	\$6,407
Totals	72	25	\$2,433,493	\$172,948	\$2,606,441	\$36,201

Source: National Flood Insurance Data, as of September 30, 2019

Severe Repetitive Loss (SRL): A SRL property is defined 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 is one Severe Repetitive Loss property in Andrew County, as indicated in Table 3.24 below.

Table 3.24. Andrew County Severe Repetitive Loss Properties

County	# of SRL Properties	# of Paid NFIP Claims	Total Paid Losses	Average Payment
Andrew	1	4	\$134,320.56	\$33,580.14

Source: 2018 MO State Hazard Mitigation Plan, 4.37

Previous Occurrences

Past Presidential Flood Disaster Declarations that occurred in Andrew County are listed below in Table 3.25. Interstate I-29 was closed for approximately 30 days, causing considerable hardship as a large amount of traffic diverted to Highway 71 and other local roads that are not used to heavy traffic.

Table 3.25. Presidential Disaster Declarations for Flood, 1975-2020

Date	Declaration #	Disaster
March 12, 1979	DR-3071	Ice Jam, Flooding
June 21, 1984; June 6 – 16, 1984	DR-713	Severe Storms, Flooding
July 9, 1993; June 10 – October 25, 1993	DR-995	Flooding, Severe Storm
June 2, 1995; May 13 – June 23, 1995	DR-1054	Severe Storm, Tornadoes, Hail, Flooding
October 14, 1998; October 4-11, 1998	DR-1253	Severe Storms, Flooding, Tornadoes
April 20, 1999; April 3-14, 1999	DR-1270	Severe Storms, Flooding
June 11, 2004	DR-1524	Severe Storms, Tornadoes, Flooding
April 5, 2006; March 30 – April 3, 2006	DR-1635	Severe Storms, Tornadoes, Flooding
June 11, 2007; May 5-18, 2007	DR-1708	Severe Storms, Flooding
June 25, 2008; June 1 – August 13, 2008	DR-1773	Severe Storms, Flooding
August 17, 2010; June 12, July 31, 2010	DR-1934	Severe Storms, Flooding, Tornadoes
June 30, 2011; June 1 – August 1, 2011	DR-3325	Flooding
August 12, 2011; June 1 – August 1, 2011	DR-4012	Flooding

October 31, 2014; September 9 – 10, 2014	DR-4200	Severe Storms, Tornadoes, Straight-line Winds, Flooding
August 7, 2015; May 15 – July 27, 2015	DR-4238	Severe Storms, Tornadoes, Straight-line Winds, Flooding
May 20, 2019; March 11 – April 16, 2019	DR-4435	Severe Storms, Straight-line Winds, and Flooding
July 9, 2019; April 29 – July 05, 2019	DR-4451	Severe Storms, Tornadoes, and Flooding

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

Tables 3.26 and 3.27 below list both flash flood and river flooding for the past 21 years.

Table 3.26. NCEI Andrew County Flash Flood Events Summary, 2000 to 2020

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2004	5	0	0	\$10,000	0
2005	1	0	0	0	0
2007	1	0	0	0	0
2009	1	0	0	0	0
2015	4	0	0	0	0
2020	1	0	0	0	0
Totals	12	0	0	\$10,000	0

Source: NCEI, date accessed 7/17/20

Table 3.27. NCEI Andrew County Riverine Flood Events Summary, 2000 to 2020

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2000	1	0	0	0	0
2001	2	0	0	0	0
2004	2	0	0	0	0
2005	1	0	0	0	0
2006	1	0	0	0	0
2007	2	0	0	\$4,000	\$1,000
2008	1	0	0	0	0
2019	6	0	0	\$100,000	\$100,000
Total	16	0	0	\$104,000	\$101,000

Source: NCEI, date accessed 7/17/20

The narrative for the 2007 flooding stated that nearly every home in Rosendale suffered damage from flooding, although the reported property damages were only \$4,000. The 2019 flooding was a Presidential Declared Disaster and upstream releases in conjunction with several broken levees and local high-water levels on the Missouri River, combined to create prolonged and significant flooding. One of the narratives noted, “The dollar valued assigned to this event is likely inaccurate as a full tally of the extent of the physical damages is unknown.” Another narrative spoke of “monetary damages unknown despite the entry indicating 0 dollars of damages” (See Appendix A). June 25, 2021, heavy rain caused evacuation of several homes in Amazonia and residences stating that they had not experienced flooding like that in the 30 years they have lived in the community.

Probability of Future Occurrence

There were 12 flash flood events over a 21-year time frame (12 divided by 21 = .57), resulting in a 57% probability that a flash flood will occur somewhere in Andrew County per year.

There were 16 riverine flood events over a 21-year time frame (16 divided by 21 = .76), resulting in

an 76% probability that flooding will occur somewhere in Andrew County per year.

Changing Future Conditions Considerations

According to the State Plan, 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 percent in the maximum 5-day precipitation by the late 21st century. As the number of heavy rain events increase, more flooding and pooling water can be expected.

Flooding occasionally threatens navigation and riverfront communities, and greater river flows could increase these threats. In April and May 2011, a combination of heavy rainfall and melting snow caused a flood that closed the Mississippi River to navigation, threatened Caruthersville, and prompted evacuation of Cairo, Illinois, due to concerns that its flood protection levees might fail. 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.

Source: 2018 MO State Hazard Mitigation Plan, 3.1-3.2

Vulnerability

Vulnerability Overview

Since 1975, Andrew County has been included in 18 Presidential Disaster Declarations for flooding. Periods of heavy rain falling at the rate of one inch per hour floods low water crossings throughout the county making many roads impassable. This creates a severe threat to motorists that attempt to drive through flood waters over the roadway. Riverine flooding occurs less frequently than flash flooding, however, there are 25 repetitive loss properties in the county and property damage is likely

to continue. Areas in low lying areas outside of the floodplain are frequently flooded. Street flooding over roadways has been reported in all communities in the county. There are no school or special district facilities in SFHAs in Andrew County. Increases in development add to surface runoff and can exacerbate flash flooding in areas that previously have not experienced flooding.

The 2018 State Plan’s section on State Vulnerability Overview and State Estimates of Potential Losses is the best and most recent data available. For Andrew County, one of the counties with digital FIRMS, the regulatory special flood hazard area was utilized to determine flood hazard areas and depth of flooding. Next, depth grids were generated using cross sections from the FIRM database and/or hydraulic models in combination with the terrain elevation data from which the DFIRM was derived.

When DFIRM boundaries are used to generate a user-defined depth grid, the more accurate, surveyed floodplain boundaries and flood depths are preserved. It should be noted because of the recognition of this increased accuracy, user-generated depth grids were produced wherever digital FIRM data was available, both with regards to detailed and approximate (Zone A) flood zones. These data were used in conjunction with available LIDAR data from the Missouri Spatial Data Information Service and the US Army Corps of Engineers. In areas that had digital FIRM data where LIDAR was not entirely available, USGS 10-meter digital elevation models were used to supplement these gaps in LIDAR coverage.

To determine the number of structures at risk, the default census block inventory available in Hazus was used, along with a structure inventory dataset developed by the University of Missouri GIS Department (MSDIS) to indicate the number of structures exposed to the risk.

Table 3.28 below identifies the total direct building loss and income loss for Andrew County.

Table 3.28. Potential Building/Income Loss to Flood

Andrew County	Potential Flood Building/Income Loss
Countywide Building Exposure	\$1,724,819,000
Structural Damage	\$29,193,000
Loss Ratio	1.69%
Contents Loss	\$17,870,000
Inventory Loss	\$373,000
Total Direct Loss	\$47,436,000
Total Income Loss	\$223,000
Total Direct and Income Loss	\$47,659,000
# MSDIS Residential Structures Exposed	211
# Hazus Buildings Risk	78
# Substantial Damages	23
# Displaced People	998
# Shelter Needs	238

Source: 2018 MO State Mitigation Plan, pg. 3.110

Potential Losses to Existing Development

Flood loss estimates by structure for Andrew County were identified in the 2018 State Plan and are presented in Table 3.29.

Table 3.29. Potential Losses for Building Type by Jurisdiction

Type of Structure	# of Structures	Total # of Loss
Residential	211	\$45,455,322
Agriculture	145	\$31,433,643
Commercial	14	\$7,914,546
Education	0	0
Government	15	\$10,957,500
Industry	2	\$623,895
Total Loss- HAZUS Layer		\$96,394,907
Total # of People Affected	530	

Source: 2018 MO State Hazard Mitigation Plan, pg. 3.113

Table 3.30 provides the total exposure count for structures in each jurisdiction. Losses were estimated by applying a 5 percent damage factor to total exposure.

Table 3.30. Total Exposure for Structures and Contents by Building Type

Jurisdiction	Residential	Commercial	Agriculture	Other	Estimated Exposure	Estimated Loss
Unincorp. Andrew Co.	473	4	142	13	\$870,432,000	\$43,521,600
Amazonia	32	6	2	1	\$32,692,000	\$1,634,600
Country Club	38	0	0	0	\$211,869,000	\$10,593,450
Rosendale	184	4	1	3	\$19,209,000	\$960,450
Savannah	8	0	0	0	\$501,336,000	\$25,066,800

Source: MSDIS Andrew

(https://docs.google.com/spreadsheets/d/1qivc9lvQW9qG6VnQkzV88_DXXWVpWrKW/edit#gid=1181027936)

There are no schools in SFHAs; however, the community building in Rosendale is located in a floodplain.

Impact of Previous and Future Development

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

Hazard Summary by Jurisdiction

As demonstrated in Table 3.30, exposure of assets in SFHAs varies among jurisdictions. It should be noted that all communities in Andrew County can be impacted by flooding of major roads and low water crossings.

Andrew County – experiences minor and major flooding on a fairly regular basis. The unincorporated area of Nodaway, located in the southwest corner of the county, struggles with eroding riverbanks near homes and county gravel roads and culverts washing out.

Amazonia - is partially located in a floodplain, and the pump station and generator for the city's wastewater treatment system was built above the floodplain when installed. However, recent flash flood events have put a strain on the wastewater treatment system in Amazonia, and the community

is seeking to obtain grant funds to raise several manholes and televise the sewer lines for potential damage due to recurrent flooding.

Country Club Village – experiences flooding during heavy rains and is seeking grant funding to address ongoing stormwater flooding issues.

Cosby – is located outside of the floodplain and experiences little flooding issues within their city limits. The community is located near a flood plain and flood events can potentially impact the community’s most critical highway.

Fillmore – experiences minor issues from flooding in city limits but flooding in the surrounding areas can impact major roads and low water crossings.

Rea - experiences minor issues from flooding in city limits but flooding in the surrounding area can impact major roads and low water crossings.

Rosendale – is located in a floodplain and experiences periodic but extensive flooding. The school, post office and fire station have been relocated outside of the floodplain. The building that serves as the community building and city hall is located within the floodplain but it is privately owned. There are still residences that experience flooding. Mutual aid agreements for emergency response are essential during flooding. The community has a floodplain administrator.

Savannah – experiences some localized flooding during heavy rain events but it is rarely widespread.

The three school districts do not have facilities located in the floodplain and have not experienced extensive flooding in their facilities. However, flooding results in road and bridge closures and makes low water crossings impassable, disrupting bus routes.

Problem Statement

Floods are frequent events and have been listed in 18 out of 29 Presidential Disaster Declarations that have included Andrew County. Most communities and the county participate in the NFIP. These communities have passed floodplain management ordinances and have the ability to substantially regulate development in the floodplain. Their participation in the NFIP enables residents to purchase flood insurance. Street flooding in incorporated areas can be addressed through storm water management projects and enforcement of storm water management regulations. Cosby is sanctioned since it has not adopted the new floodplain maps.

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 percent 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.

According to the State Plan, Many levees shown on effective FIRMs were originally mapped in the 1970s and 1980s. FEMA has made a concerted effort to update these FIRMs through the RiskMAP Program. Prior to 1986, levees were shown on FIRMs as providing protection from the base flood (accredited) when they were designed and constructed in accordance with sound engineering practices. Since 1986, levees have been accredited on FIRMs only when they meet the requirements of 44 CFR 65.10 "Mapping Areas Protected by Levee Systems," including certification by a registered professional engineer or a Federal agency with responsibility for levee design. Levees that do not meet the requirements of 44 CFR 65.10 cannot be accredited on a FIRM. Furthermore, areas behind the levee and at risk to base flood inundation are mapped as high-risk areas subject to FEMA's

minimum floodplain management regulations and mandatory flood insurance purchase requirement. As DFIRMs are developed, levees fall under one of the four following mapping categories:

- 1) Accredited Levee - With the exception of areas of residual flooding (interior drainage), if the data and documentation specified in 44 CFR 65.10 is readily available and provided to FEMA, the area behind the levee will be mapped as a moderate-risk area. There is no mandatory flood insurance purchase requirement in a moderate-risk area, but flood insurance is strongly recommended.
- 2) Provisionally Accredited Levee (PAL) - If data and documentation is not readily available, and no known deficiency precludes meeting requirements of 44 CFR 65.10, FEMA can allow the party seeking recognition up to two years to compile and submit full documentation to show compliance with 44 CFR 65.10. During this two-year period of provisional accreditation, the area behind the levee will be mapped as moderate-risk with no mandatory flood insurance purchase requirement.
- 3) De-Accredited Levees – If the information established under 44 CFR 65.10 is not readily available and provided to FEMA, and the levee is not eligible for the PAL designation, the levee will be de-accredited by FEMA. The area behind the levee will be mapped as a high-risk area subject to mandatory flood insurance purchase requirement.
- 4) Never Accredited Levees - levees that have never been shown on a FIRM as meeting the criteria of 44CFR65.10.

The table below lists information about Andrew County’s levee system.

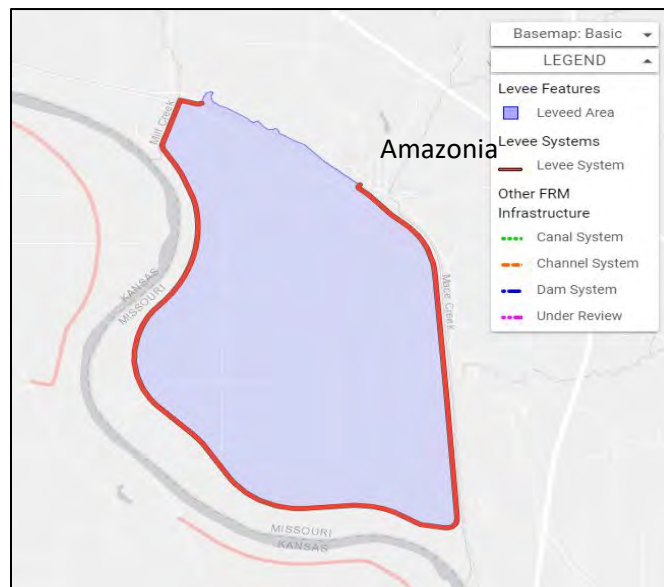
Table 3.31. Andrew County Levee Status

Primary Community	Levee Owner	USACE Program Levee	Levee Status
Amazonia	Amazonia Levee District	Yes	De-accredited

Source: 2018 MO State Hazard Mitigation Plan, 3.130

Andrew County does not have an accredited levee system; therefore, there is no official protected area. The levee appears on two different DFIRMs and the map below shows the leveed area.

Figure 3.32. De-accredited Amazonia Levee as Shown in National Levee Database



Source: <https://levees.sec.usace.army.mil/#/levees/system/3605000139/summary>

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, other than the Amazonia Levee. 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 are no known instances of levee failure in Andrew County. During the 2011 flooding, the USACE inspected sand boils that were forming near the levee. Sand boils are caused from river water trying to equalize pressure on the land side, and can be an early indicator of levee failure (Source: <https://www.nationalguard.mil/News/Article/610388/missouri-national-guard-helps-monitor-sand-boils-in-northwest-missouri/>). The sand boils were considered harmless but monitored to make sure the situation did not change.

According to the Risk Characteristics listed for the Amazonia Levee in the National Levee Database, the Levee Safety Action Classification (LSAC) is based on a combination of the flood hazard frequency, the anticipated levee performance, and the potential consequences. The 2012 levee screening risk assessment estimate the likelihood of a flood overtopping this levee at a one chance in 1,000, meaning there is a 0.1 percent chance of overtopping in any given year. This equals a 3 percent likelihood of water overtopping the levee over the life of a typical 30-year mortgage.

Probability of Future Occurrence

There have been no reported instances of levee failures in Andrew County. Therefore, probabilities cannot be calculated as there is no data available.

According to the Risk Characteristics listed for the Amazonia Levee in the National Levee Database, flooding of the levee could lead to flood depths greater than 15 feet, which could result in life loss and economic consequences. The levee was loaded over 75 percent in 1993 and 2019. The levee performed as designed in 2019, with no serious performance concerns. Recommended risk management activities include continuing effective operations and maintenance practices, ensuring pipes through the levee are inspected as required, and monitoring erosion in Mill Creek. Levee sponsors are encouraged to work with local emergency management personnel to review and update emergency planning efforts on a regular basis. Efforts should be made to inform those that live or work behind the levee of their flood risk.

The following was identified in the Amazonia Levee System Risk Characteristic:

What is driving the risk? (Listed in order of priority)	What is being done about it? (Risk Management)
Aging levee system requires ongoing maintenance and repair.	Local sponsor is prioritizing operations and maintenance activities to address highest risk items

Changing Future Conditions Considerations

According to the 2018 State 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 3.33 below defines the three ratings.

Figure 3.33. Definitions of the Three Levee System Ratings

Levee System Inspection Ratings	
Acceptable	All inspection items are rated as Acceptable.
Minimally Acceptable	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.
Unacceptable	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 Amazonia Levee system status is de-accredited; however, a routine inspection was completed on May 16, 2019.

Potential Losses to Existing Development

The State Plan's estimated potential losses from a levee failure for Andrew County are listed below. Utilizing an assumed depth-damage percentage of 50 percent, the building loss estimate for failure of levee segments designed to provide 1-percent-annual-chance flood protection is computed to be \$24,014,866.45.

Table 3.34. Building Loss from Levee Failure- Andrew County

Andrew County	Estimated Number of Structures	Estimated Structure Value	Estimated Population Affected
Agriculture	65	\$14,095,426.36	--
Commercial	3	\$1,695,974.17	--
Government	3	\$2,191,500.00	--
Residential	28	\$6,031,985.92	70
Total	99	\$24,014,886.45	70

Source: 2018 MO State Hazard Mitigation Plan, pg. 3.141

According to the National Levee Database, the 2012 screening level risk assessment conducted by the USACE estimated the Amazonia Levee System's leveed area to include approximately 69 people, and the property value to be approximately \$7.1 million, and the agricultural product value to be roughly \$3 million. Please note, the State Plan's estimated losses were on a county level and the risk assessment conducted by the USACE was specifically for the Amazonia Levee System, and the methodology for the studies varied.

Impact of Previous and Future Development

Due to the increased frequency of flooding events, current and future development in the leveed area could be at risk of flooding. There is no additional development planned at this time.

According to the State Plan 2018, flooding is the most common hazard associated with levee failure, breach or overtopping. Levee failure, breach or overtopping can result not only in loss of life, but also considerable loss of capital investment, loss of income and property damage. Levees can provide a false sense of security by property owners and may lead to a misunderstanding of the true risk of assets in levee protected zones. While levees do provide flood protection, given enough time most will either overtop or fail leading to unsuspected damages. The Association of State Floodplain Managers (ASFPM) issued a position White Paper in 2007 calling levees the double-edged sword in which they discourage the building of new levees, development behind existing levees and increasing standards for levee construction. (Source: https://www.floods.org/PDF/ASFPM_Levee_Policy_Challenges_White_Paper_021907.pdf)

Hazard Summary by Jurisdiction

The Amazonia Levee District is the only levee system constructed by the USACE in Andrew County. There are no critical facilities located in the leveed area. As stated, approximately 70 people live in the leveed area and the land use is primarily for agricultural purposes.

Problem Statement

The flooding along the Missouri River has increased in frequency. The Amazonia Levee District is the only levee constructed by the USACE, but it is currently de-accredited. Pursuing PAL accreditation and eventually accreditation would allow the leveed area to be recognized as a protected area, which will result in NFIP changes in the leveed area. Accreditation does not guarantee protection from flooding but does provide a certain level of protection. Also, addressing “Aging levee system requires ongoing maintenance and repair,” as identified in the Risk Assessment would contribute to the system’s long-term integrity. The levee is eligible for assistance from USACE to repair damages to the levee system caused by flooding.

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.

Dams regulated by the state are non-federally regulated dams that are over 35 feet in height. Missouri Department of Natural Resources (MDNR) Water Resources Center maintains the Dam and Reservoir Safety Program in Missouri. They ensure these dams are safely constructed, operated, and maintained pursuant to Chapter 236 of Revised Statutes of Missouri. The MDNR has data on the regulated and non-regulated dams in the state and uses the dam hazard classification system shown in Table 3.35.

Federally regulated dams fall under the jurisdiction of the US. Army Corps of Engineers (USACE) and the U.S. Department of Agriculture and Forest Service. The USACE maintains the National Inventory of Dams (NID), which includes data and the hazard classification of dams described in Table 3.36.

Table 3.35. MoDNR Dam Hazard Classification Definitions

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

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

Table 3.36. NID Dam Hazard Classification Definitions

Hazard Class	Definition
High Hazard	Failure results in likely loss of human life.
Significant Hazard	Failure results in possible loss of human life and likely significant property or environmental destruction.
Low Hazard	Failure results in only minimal property damage.

Source: National Inventory of Dams

Geographic Location

Dams Located Within the Planning Area

The MDNR data base lists 28 dams in Andrew County and none of these dams are federally regulated. One is state regulated, Happy Holler Dam, since it is over 35 feet in height, which is a Class I dam. This means the area downstream from the dam that would be affected by inundation contains one to nine permanent dwellings, or one (1) or more campgrounds with permanent water, sewer and electrical services or one (1) or more industrial buildings. Inspection of these dams must occur once every three years.

The USACE lists 28 dams in their NID for Andrew County. Nine of these dams are classified as high hazard, with the failure of the dam likely resulting in loss of human life. The high hazard dams are Dysart Lake Dam, Happy Holler Dam, Keller Lake Dam, Lake La Verne Dam, Lakeland Estates, Savannah City Reservoir, Schweizer Lake Dam, Smith Lake Dam and Thompson Lake Dam. One is classified as significant hazard, Landess Dam Site 002. There are 18 low hazard dams, which are: Andrew County Lake Dam, Bashor Dam #1, Clint Messner, Cole Lake Dam, Connie Field, Culver Lake Dam, Ford Lake Dam, Jeff & Caryl Lance Dam #1, Kelley Lake Dam, Lance #1, Mononame 278, Paradise Lake, Peterson Lake Dam, Roach 005, Schweizer 003 and 004, Sybert Lake Dams – Lower and Upper.

Table 3.37 is a list of the nine dams in Andrew County that are NID (high hazard). There is only one MDNR Class 1 dam, Happy Holler Dam, which is also a NID high hazard dam. The table includes names, locations, and other pertinent information for all high hazard dams in the planning area. The term “acre-foot” is a unit of volume commonly used in reference to large-scale water resources, such as reservoirs, aqueducts, canals, sewer flow capacity, irrigation water, and river flows (Source: <https://en.wikipedia.org/wiki/Acre-foot>).

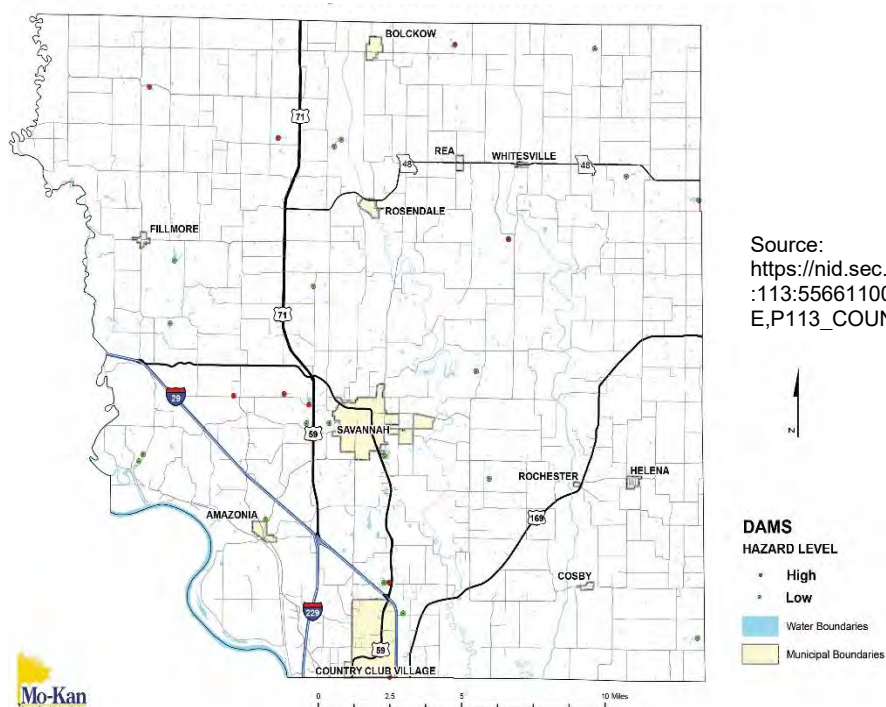
Table 3.37. High Hazard and Class I Dams in Andrew County

Dam Name	Emergency Action Plan (EAP)/AP	Dam Height (Ft)	Normal Storage (Acre-Ft)	Last Inspection Date	River	Nearest Downstream City	Distance To Nearest City (Miles)	Dam Owner
Dysart Lake Dam	Not Required	25	107	--	Tr-Arapahoe Creek	St. Joseph	--	Howard Dysart
Happy Holler Dam	Yes	43	803	03/08/16	Platte River	Whitesville	--	MO Dept of Conservation
Keller Lake Dam	Not Required	25	80	06/02/80	Tr- Dillion Creek	County Club Village	2 miles	AJ Keller
Lake La Verne Dam	Not Required	30	257	--	Tr- Platte River			Fred Crouch Farm
Lakeland Estates Lake Dam	Not Required	25	67	--	Tr- 102 River	St. Joseph/ County Club Village	--	Lakeland Estates
Savannah City Reservoir	Not Required	34	364	05/15/79	Mace Creek	Amazonia	5 miles	City of Savannah
Schweizer Lake Dam	Not Required	25	67		Mill Creek	MO River	4 miles	Calvin Schweizer
Smith Lake Dam	Not Required	28	105	--	Tr – Pedlark Creek			Clifford Smith
Thompson Lake Dam	Not Required	30	112	--	Tr – Caples Creek	Amazonia	5 miles	Roger Carson

Sources: Missouri Department of Natural Resources, <https://dnr.mo.gov/geology/wrc/dam-safety/damsinmissouri.htm> and National Inventory of Dams, http://nid.usace.army.mil/cm_apex/f?p=838:12. Accessed 3/27/2020

Figure 3.38 shows the locations of the NID high hazard dams and MDNR Class I dams in Andrew County.

Figure 3.38. High Hazard Dam and Class I Dam Locations in Andrew County



The Savannah City Reservoir is located northwest of the city of Savannah in a rural area. The reservoir is a recreational area enjoyed by many residents. A few homes are located in the area around the reservoir. It is also located near U.S. Highway 71, and the reservoir is a back-up water supply for the City of Savannah. Happy Holler Dam is the only state-regulated dam. Happy Holler Lake Conservation Area includes a 622-acre conservation area. The park also includes camping sites, but there are no amenities. There are no homes or facilities in the area. Keller Lake Dam is a private dam located in an area north of the intersection of U.S. Highway 59 and Interstate 29. There are homes and businesses near the lake.

Upstream Dams Outside the Planning Area

Gavins Point Dam is located upstream on the Missouri River in South Dakota. The reservoir area behind the dam has limited storage capacity, resulting in Gavins Point Dam making controlled water releases. If the water levels below the dam are high, these releases can result in flooding along the Missouri River in Andrew County. The impacted area would largely be farmland but the City of Amazonia would also be at risk of flooding. The figure below shows Gavins Point Dam.

Figure 3.39. Upstream Dams Outside Andrew County – Gavins Point Dam



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

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. For this reason, dam failures could flood areas outside of mapped flood hazards.

Happy Holler Lake Dam's safety permit was renewed on May 10, 2019, and the inspection report noted that the dam did not have any observed defects that required correction at the time of inspection (see Appendix E).

Previous Occurrences

There are no recorded instances of dam failure in Andrew County.

Probability of Future Occurrence

Since there are no recorded instances of dam failure in Andrew County, it is not possible to calculate the probability of dam failure.

Regular inspections can alert the owners if there are emerging integrity issues with a dam. Happy Holler Dam is owned by the MDC and has recently been inspected, has inundation maps and has an Emergency Action Plan (EAP) in the event of a dam failure. There are eight other NID high hazard dams that are not regulated by MDNR or a federal agency. The high hazard classification means that a dam failure could result in a loss of life. The Savannah Reservoir and Keller Lake Dams have not been inspected in approximately 40 years. The last inspection on the other high hazard dams is unknown.

Changing Future Conditions Considerations

According to the 2018 State Plan, studies have been conducted to investigate the impact of climate change scenarios on dam safety. Dam failure is already tied to flooding and the increased pressure flooding places on dams. The impacts of changing future conditions on dam failure will most likely be those related to changes in precipitation and flood likelihood. Changing future conditions projections suggest that precipitation may increase and occur in more extreme events, which may increase risk of flooding, putting stress on dams and increasing likelihood of dam failure.

Vulnerability

Vulnerability Overview

The table and maps below provide an overview of Andrew County's vulnerability to dam failure.

Table 3.40. Estimated Numbers and Values of Structures and Population Vulnerable to Failure of State-Regulated Dams with Available Inundation Areas

	Estimated # of Structures	Estimated Value of Structures	Estimated # of People Vulnerable to Failure of State Regulate Dam
Andrew	109	\$25,626,397	191
Agriculture	26	\$5,638,171	0
Commercial	4	\$2,261,299	0
Government	1	\$730,500	0
Industrial	2	\$623,895	0
Residential	76	\$16,372,533	191

Source: 2018 Mo State Hazard Mitigation Plan, pg. 3.173

Table 3.41. Estimated Numbers and Values of Structures and Population Vulnerable to Failure of USACE Dams with Available Inundation Areas

	Estimated Number of Structures	Estimated Value of Structures	Estimated # of People Vulnerable to Failure of USACE Dams
Andrew	494	\$117,900,851	638
Agriculture	213	\$46,189,628	0
Commercial	14	\$7,914,546	0
Government	12	\$8,766,000	0
Industrial	1	\$311,947	0
Residential	254	\$54,718,729	638

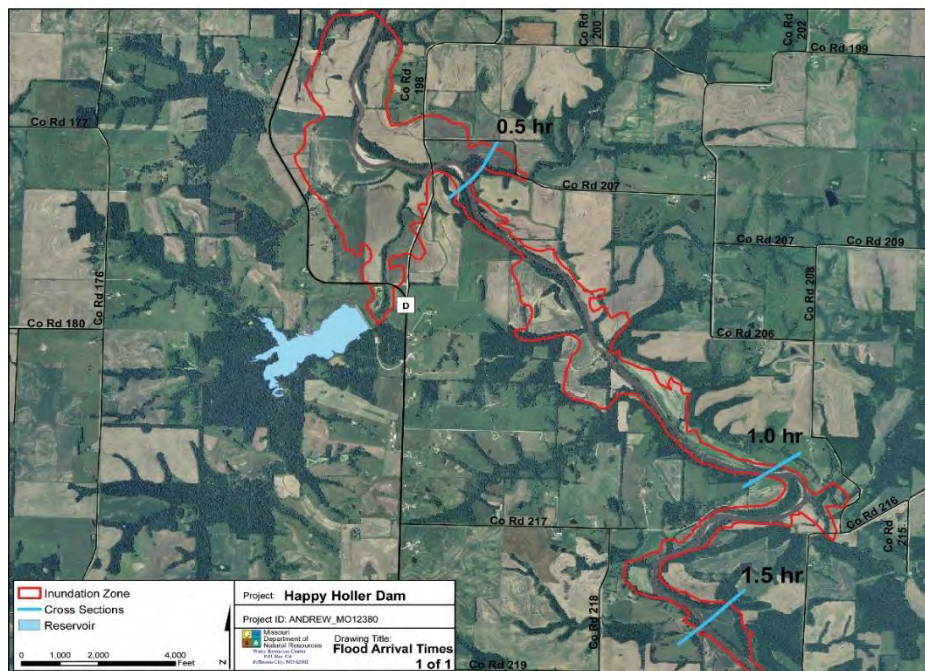
Source: 2018 Mo State Hazard Mitigation Plan, pg.3.178

To determine state estimates of potential loss, a damage estimation of 20 percent of the total structure value in dam inundation areas was used. This damage amount is based on FIA depth-damage curves for a one-story structure with no basement flooded to two feet. According to the 2018 MO State Hazard Mitigation Plan, p. 3.189, the estimation resulted in a total of \$28,705,450 in potential losses as a result of dam failure (combined state-regulated and USACE) for Andrew County.

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

Happy Holler Lake Dam was recently inspected and had no areas of concern. According to the inundation zone maps, within 30 minutes a dam breach would impact Route D and County Road 198, and potentially one residence that is located on the border of the inundation zone. After the 30-minute mark, no other structures or roads would be impacted. Figure 3.42 shows the inundation zone if the Happy Holler Dam were to breach.

Figure 3.42. Happy Holler Dam Inundation Zone Map



Source: Happy Holler Dam Breach Inundation Map, MO DNR

Impact of Previous and Future Development

Per the 2018 State Plan, the majority of dams in Missouri are less than 35 feet high and/or not owned by a federal entity and are therefore not regulated by the State or a federal entity. While the State has encouraged dam owners to have these unregulated dams inspected, the MoDNR lacks the authority to assess the condition of these dams and any downstream hazards. Flood risk is a shared responsibility including communities within the floodplain, owners and operators of dams and levees, owners and operators of infrastructure within the floodplain and agencies with jurisdiction for emergency management and evacuation authority. Local residents are expected to know their risk. One key public message is that flood risk mitigation projects (including dams and levees) reduce risk; they do not eliminate it. Future development should take dam proximity and risk potential into consideration. Most dams are located in rural areas, with minimal development occurring nearby.

Hazard Summary by Jurisdiction

There are significant variations in vulnerability to dam failure across the planning area since vulnerability is largely based on proximity to a High Hazard and/or Class I dam. The other dams are located in rural areas, most likely with the only residence in the unofficial inundation zone being the owners of the dam. No schools are located near high hazard dams. The following jurisdictions have been identified as the most vulnerable:

Andrew County – Most of the dams are located in the unincorporated areas of the county, away from population centers. However, a breach could put lives and property at risk in some instances. A breach at Happy Holler Dam would impact State Route D and the home located in its inundation zone. Keller Lake Dam does not have an official inundation zone map. It is located south of Savannah's city limits and is near Highway 59, an important transportation route. A dam failure would impact traffic, as well as cause flooding to any residents and homes located nearby.

Amazona – In the event of a dam failure at Gavins Point Dam, the City of Amazonia may be vulnerable to flooding. There is a levee system, but there is the risk of the system overtopping in a catastrophic event.

Country Club Village – Two high and two low hazard level dams are located in or near the village. A dam failure could impact lives, property and critical roads, such as Highway 59 and Highway 29.

Rosendale – Although no dams are in city limits, the community is prone to flooding. An upstream dam failure that flows into the 102 River could result in the swelling of the river, potentially flooding City of Rosendale.

Savannah – The Savannah Reservoir does not have an official inundation zone map. Aerial maps show six residences and a county road within 2,500 feet of the dam's flow direction. Highway 71 is also in close proximity but is elevated. A dam failure could result in loss of life and property, and disruption to traffic.

Savannah R-III School District – No buildings are in inundation zones. However, there could be loss of life if a bus transporting students was caught in the flow of dam failure.

Problem Statement

Most of the high hazard dams are in rural areas, primarily used for agriculture. However, as previously noted, there are several dams that are located near residential areas and critical transportation routes. In the event of a dam failure, life and property will be at risk. Development is occurring near the Keller Lake Dam, south of Savannah, which is unregulated and hasn't been inspected since 1980. Possible solutions include the development of an emergency action plan, evacuation plan, and review of local ordinance to determine potential for development restrictions within the inundation areas. A lack of regular inspection/maintenance of unregulated high hazard

dams was noted by the Mitigation Planning Committee. Additional possible solutions include the development of a regular maintenance schedule, identification of qualified staff and/or consultant to assist, and maintenance report submittal requirements.

3.4.4 Earthquakes

Hazard Profile

Hazard Description

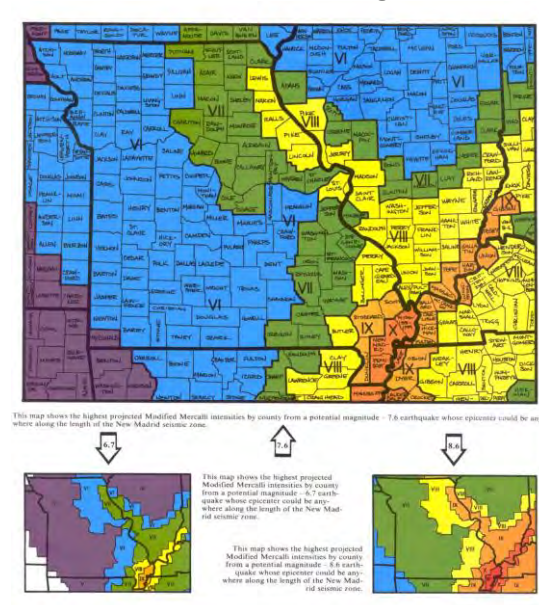
An earthquake is a sudden motion or trembling that is caused by a release of energy accumulated within or along the edge of the earth's tectonic plates. Earthquakes occur primarily along fault zones and tears in the earth's crust. Along these faults and tears in the crust, stresses can build until one 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.

The greatest hazard from earthquakes in Andrew County comes from the New Madrid Seismic Zone situated in the boot-heel area of southeast Missouri. The potential of high magnitude earthquakes occurring along the New Madrid fault presents risk that does not vary across the planning area. The Nemaha uplift in central Kansas is also prone to seismic activity, however, the center of the Humbolt fault zone near the Nemaha Uplift is approximately 100 miles west of Andrew County and produces lower magnitude seismic events.

Geographic Location

Figure 3.43 shows the highest projected Modified Mercalli intensities by county from a potential magnitude 7.6 earthquake whose epicenter could be anywhere along the length of the New Madrid Seismic Zone. The secondary maps in Figure 3.44 show the same regional intensities for 6.7 and 8.6 earthquake, respectively.

Figure 3.43. Impact Zones for Earthquake Along the New Madrid Fault



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

Figure 3.44.

Projected Earthquake Intensities

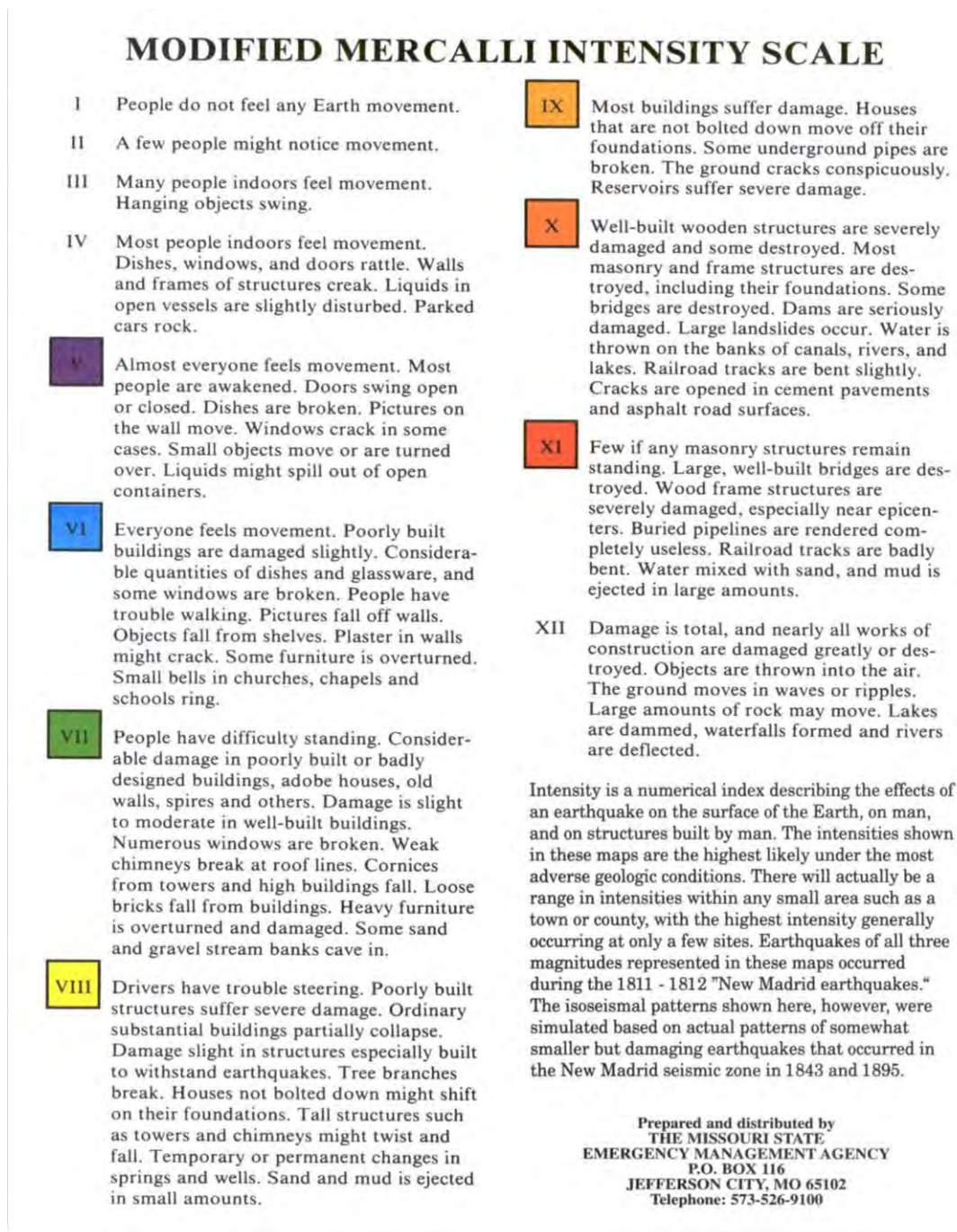
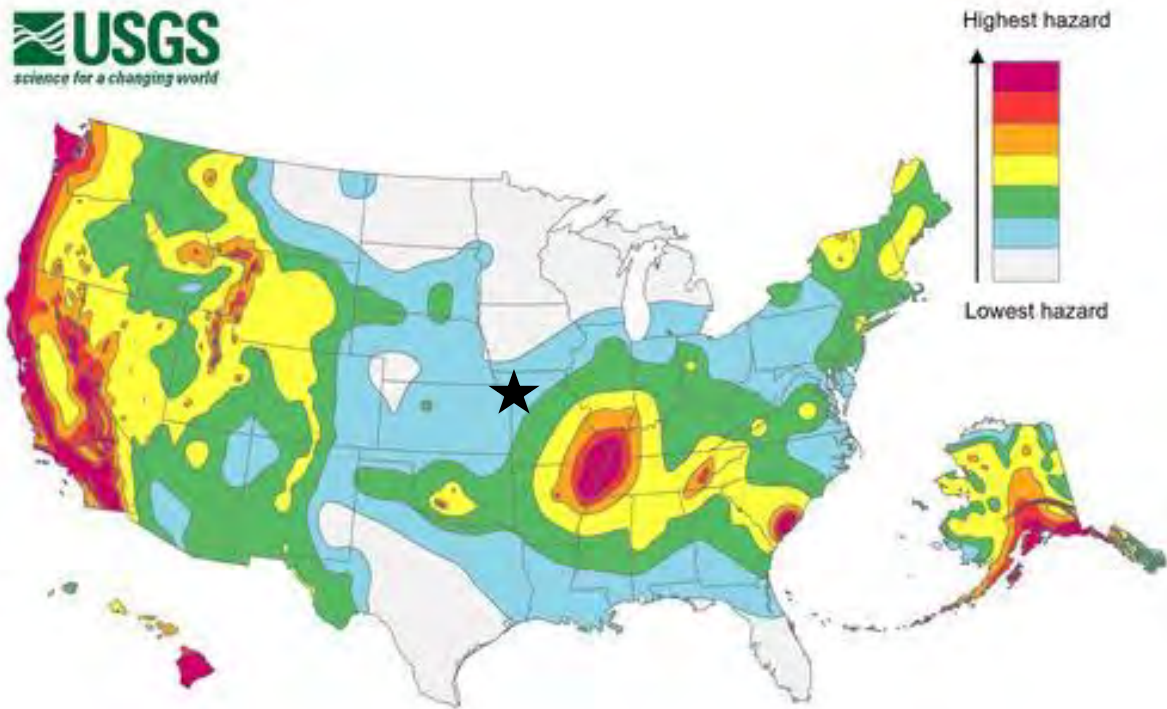


Figure 3.45 illustrates seismicity in the United States. Andrew County is located in the blue zone, which is the second lowest hazard area.

Figure 3.45. United States Seismic Hazard Map



Source: United States Geological Survey at https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/styles/atom_page_medium/public/thumbnails/image/2018nshmlongterm.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

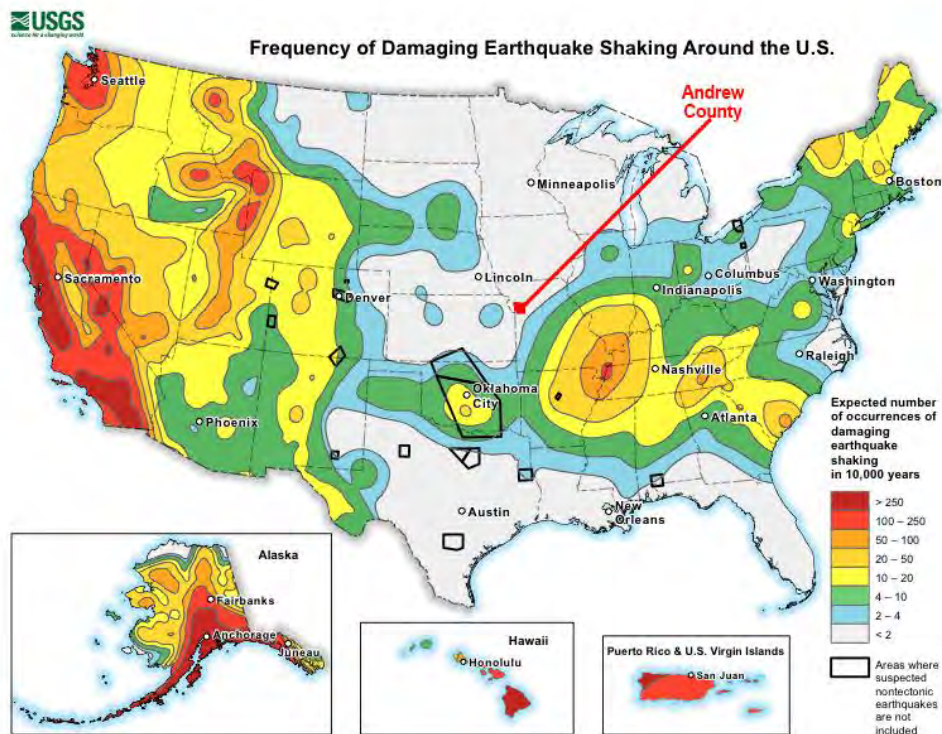
Earthquakes are rare in Andrew County. There have been no reported earthquakes since 1930 according to homefacts.com, there is a .35 percent chance of a 5.0 earthquake or greater in the next 50 years.

On February 13, 2016 a neighboring county, Buchanan County, felt tremors from a 5.1 earthquake originating near Fairview, Oklahoma. No damage was reported. There is speculation that the earthquake was the result of man-made activity, fracking. Thus, man-made activity may contribute to future earthquake activity.

Probability of Future Occurrences

The United States Geological Survey (USGS) damaging earthquake frequency map for the United States is shown in Figure 3.46. Andrew County, shown in red, falls into the less than two occurrences of damaging earthquake shaking in 10,000 years, indicated in white on the map to show the very small probability of the planning area to experience damaging earthquake effects. No known earthquakes have occurred in Andrew County.

Figure 3.46. Frequency of Damaging Earthquake Shaking Around the U.S.



Source: https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/styles/atom_page_medium/public/thumbnails/image/2014hazmap-induced-lg.gif

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.

Source: 2018 Mo State Hazard Mitigation Plan, p. 3202

Vulnerability Overview

Ground shaking is the most damaging effect from earthquakes. Ground shaking will impact all structures and critical infrastructure such as roads and electrical transmission systems. In the event of a 7.6 magnitude earthquake, damage to structures would vary depending on the quality of construction. In addition, some underground utilities may be damaged. Injuries may occur but fatalities are unlikely.

Potential Losses to Existing Development

Potential losses to existing development include the total exposure for all communities listed in Tables 3.4 and 3.4 in the Assets at Risk section of this chapter. According to the State Plan, Andrew County's total annualized loss due to earthquake is \$6,000 and was determined using FEMA's loss estimation software Hazus 3.2 (October 2016). The software develops annualized loss estimates by aggregating the losses and their exceedance probabilities from the eight return periods (100, 250, 500, 750, 1,000, 1,500, 2,000, and 2,500 years). Annualized loss is the maximum potential annual dollar loss resulting from various return periods averaged on a 'per year' basis. It is the summation of all HAZUS supplied return periods multiplied by the return period probability (as a weighted calculation). This is the 3.205 3 Risk Assessment scenario that FEMA uses to compare relative risk from earthquakes and other hazards at the county level nationwide.

The total exposure of each jurisdiction was used to estimate losses from a 7.6 earthquake along the New Madrid. A damage factor of 0.5 percent was applied to each jurisdiction's total building and contents based on the expected impact for Zone VI on the modified Mercalli scale. Table 3.47 depicts the estimated losses in each jurisdiction based on total exposure and a 0.5 percent damage factor.

Table 3.47. Estimated Earthquake Losses for Andrew County

Jurisdictions	Estimated Potential Earthquake Losses
Amazonia	\$163.46
Cosby	\$59.41
Country Club Village	\$1,059.35
Fillmore	\$120.66
Rea	\$24.84
Rosendale	\$96.05
Savannah	\$2,506.68
Unincorporated Andrew County	\$4,352.16

Source: Missouri Spatial Data Information Service (MSDIS)

Impact of Previous and Future Development

Future development is not expected to increase the risk other than contributing to the overall exposure of potential damage. Older structures may be more at-risk to damage in the event of an earthquake.

Hazard Summary by Jurisdiction

Since earthquake intensity is not likely to vary greatly throughout the planning area, the risk remains the same throughout. However, damages could differ if there are structural variations in the planning area's built environment. Table 3.48 breaks down the percentage of housing units by age in the planning area.

Table 3.48. Age of Housing Units in Andrew County

Year Structure Built	Andrew County	Amazonia	Cosby	Country Club Village	Fillmore	Rea	Rosendale	Savannah	Total Housing Units By Year & %
1939 or earlier	1,336	28	46	64	44	6	23	433	2,032 or 18.44%
1940 to 1979	2,535	50	33	504	20	8	17	884	4,074 or 36.97%
1980 to 1999	2,143	27	6	333	29	6	12	623	3,187 or 28.92%
2000 to 2013	1,123	27	1	56	0	3	0	237	1,456 or 13.21%
2014 or later	201	0	0	38	0	0	0	27	270 or 2.45%
Total Housing Units	7,338	132	86	995	93	23	52	2,204	11,019 or 99.99%

Sources: US Census ACS 5-year 2015-2019

Problem Statement

Based on the intensity damage description in Figure 3.44, a 7.6 magnitude earthquake along the New Madrid fault may result in slight damage to older, poorly built structures, if any. Approximately 18 percent of Andrew County's housing units were built in 1939 or earlier; therefore, those structures could potentially be impacted. Potential damages to future development can be mitigated by all jurisdictions adopting and enforcing IBC 2012 building codes. Impact to older homes can be somewhat mitigated during remodeling and renovation.

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 collapses 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 other have vertical walls. Some hold water and form natural ponds.

Geographic Location

There is one known sinkhole, Jann Sinkhole, in Jefferson Township, Andrew County, located east of State Highway 169 near Millstone Boulevard. Figure 3.49 shows the location of the Jann Sinkhole, as well as active mining sites in the county

Figure 3.49. Sinkholes and Active Mining Sites in Andrew County



Source:
<https://modnr.maps.arcgis.com/apps/webappviewer/index.html?id=3ac3a61da4af4834811503a24a3cb935>

Areas where mining activities have occurred can be more susceptible to sinkholes. In Andrew County, there are 98 known locations where limestone or sand/gravel mining activities have taken place. There are four active industrial limestone mines in Andrew 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. Notable events are outlined. Jann Sinkhole is the one documented sinkhole in Andrew County that was verified by the Department of Natural Resources.

Probability of Future Occurrence

With one known sinkhole in Andrew County and no available information on its origins, the probability of future sinkhole occurrences cannot be calculated.

Changing Future Conditions Considerations

Direct effects from changing climate conditions such as an increase in droughts could contribute to an increase in sinkholes. These changes raise the likelihood of extreme weather, meaning the torrential rain and flooding conditions which often lead to the exposure of sinkholes are likely to become increasingly common. Certain events such as a heavy precipitation following a period of drought can trigger a sinkhole due to low levels of groundwater combined with a heavy influx of rain.

The National Climate Assessment, published in 2014 by the U.S. Global Change Research Program, predicts that the increasing number of extreme rainfall and flooding events the Midwest has experienced are expected to continue. Extreme rainfall events and flooding have increased during the last century, and these trends are expected to continue, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure.

Vulnerability

Vulnerability Overview

Based on county level data from the 2018 State Plan, Andrew County has a low vulnerability ranking based on the number of identified mines and/or sinkholes. There are no dollar amounts identified for potential losses from sinkholes or mines, according to the state plan, and no potential impact to the population.

Potential Losses to Existing Development

It is difficult to estimate future losses based on historical losses since no known losses have occurred.

Impact of Previous and Future Development

Even though Missouri has a moderate probability of a sinkhole event, the soil and subsoil structure of Andrew County make significant land movement events unlikely.

Hazard Summary by Jurisdiction

Most of Missouri's sinkholes are naturally occurring. Since it is possible to determine the geographical extent of this hazard in most cases, mitigation can be targeted. Avoiding the hazard is much more cost effective than altering or mitigating the sinkhole itself. It may be prudent to limit construction in the area near the Jann Sinkhole in Jefferson Township with building code and floodplain management practices.

Problem Statement

Even though no specific jurisdictions within the county have experienced any sinkhole events, they should be mindful that an event could occur, particularly at a former mineral mining site. Avoiding construction on or near a known sinkhole site or former mining site would decrease the likelihood of loss of life and property in a sinkhole event.

3.4.6 Drought

Hazard Profile

Hazard Description

A 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

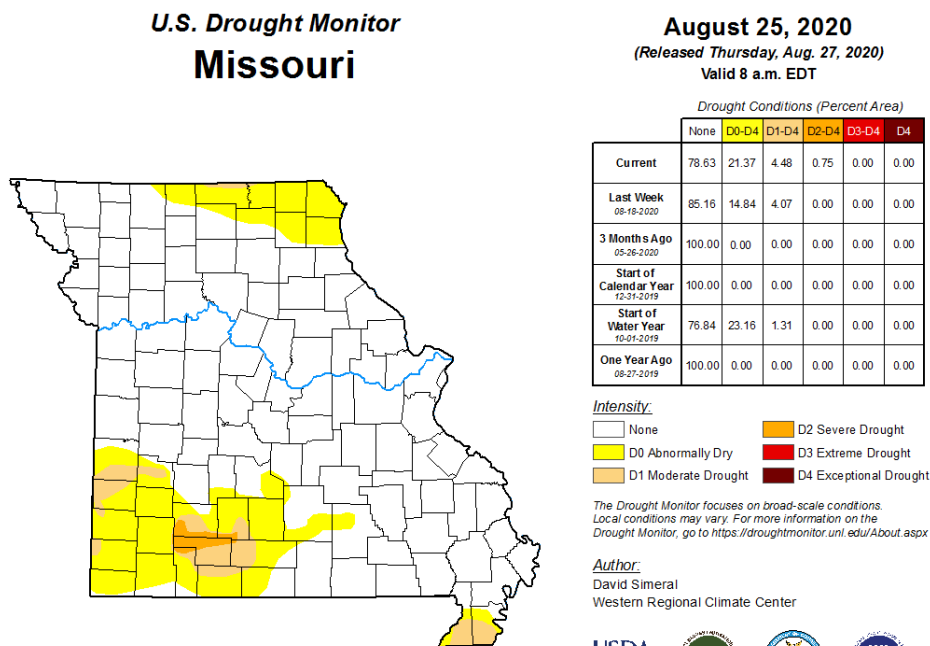
The entire planning area is at risk to drought. Drought most directly impacts the agricultural sector. Andrew County covers 433 square miles and approximately 320 square miles (74 percent) is land in farm use and 3.7 square miles (.85 percent) is water. Of the 204,944 acres of land in farm use, 1,194 acres are irrigated. From 2012 to 2017, the number of farms decreased by 14.5 percent but acres in farmland increased by 3.2 percent. Farming is spread throughout the county.

(Sources: [https://www.nass.usda.gov/Quick Stats/CDQT/chapter/2/table/1/state/MO/county/003/year/2017](https://www.nass.usda.gov/Quick_Stats/CDQT/chapter/2/table/1/state/MO/county/003/year/2017) and <https://www.census.gov/quickfacts/fact/table/andrewcountymissouri/LND110210#LND110210>).

Strength/Magnitude/Extent

The National Drought Monitor Center at the University of Nebraska at Lincoln summarized the potential severity 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. The U.S. Drought Monitor is an example of the geographic area that could be in drought at any given moment in time. It is only a snapshot of conditions at a given moment in time. Figure 3.50 shows that Andrew County was not in a drought period in August 2020.

Figure 3.50. U.S. Drought Monitor Map of Missouri on August 25, 2020



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

droughtmonitor.unl.edu

The Palmer Drought Severity Index (PDSI) was developed to measure dryness based on recent precipitation and temperature. Based on a “supply-and-demand model” of soil moisture, the indices’ uses temperature and the amount of moisture in the soil for supply calculations, which are relatively straightforward. Demand, on the other hand, is more complicated as it is dependent on various factors, such as evapotranspiration and recharge rates. Since these rates are harder to calculate, Palmer developed an algorithm to overcome these difficulties that estimated 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 but 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 is also 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

The USDA’s Risk Management Agency tracks insured crop loss payments in the county as a result of drought. Table 3.51 shows the crop loss payments in Andrew County from 2010 to 2020. Crop loss payments were the highest in 2012, with a total of \$14,900,517.00. Table 3.52 describes drought conditions/declarations from 2011-2018 as reported on the National Drought Mitigation Center’s Drought Impact Reporter.

Table 3.51. Crop Loss Payments in Andrew County from 2010-2020

Year	Crop Loss Payment
2020	\$24,962.00
2019	\$995.00
2018	\$8,571,361.00
2017	\$265,014.00
2016	\$3,839.00
2015	\$0
2014	\$1,163.00
2013	\$1,410,221.00
2012	\$14,900,517.00
2011	\$10,051.85
2010	\$0

Source: <http://www.rma.usda.gov/data/cause.html>

Table 3.52. Drought Impact Reports, 2011-2018

Date:	Description:
7-01-2011 - 10-18-2011	All but three counties in Missouri were declared to be natural disaster areas by the U.S. Department of Agriculture due to drought from July 1 through August 30. The only counties not included in the declaration were Atchison, Holt and Mississippi counties. This declaration permits affected farmers, ranchers, and other agricultural producers to apply for low-interest emergency loans from the Farm Service Agency. Columbia Missourian (Mo.), Oct. 18, 2011
01-01-2012-unknown	The U.S. Department of Agriculture (USDA) on July 17, 2012, designated 97 counties in Missouri as primary natural disaster areas due to damage and losses caused by drought and excessive heat that began in April 1, 2012, and continues. Contiguous counties in other states are also eligible. The counties declared primary disaster areas are: Adair, Cole, Iron, Monroe, Andrew , Cooper, Jackson, Montgomery, Atchison, Crawford, Jasper, Morgan, Audrain, Dade, Jefferson, Newton, Barry, Dallas, Johnson, Nodaway, Barton, Daviess, Knox, Oregon, Benton, De Kalb, Laclede, Osage, Boone, Dent, Lafayette, Pettis, Buchanan, Douglas, Lawrence, Phelps, Caldwell, Franklin, Lewis, Pike, Callaway, Gasconade, Lincoln, Platte, Camden, Gentry, Linn, Polk, Carroll, Greene, Livingston, Pulaski, Cass, Grundy, McDonald, Putnam, Cedar, Harrison, Macon, Ralls, Chariton, Henry, Maries, Randolph, Christian, Hickory, Marion, Ray, Clark, Holt, Mercer, Reynolds, Clay, Howard, Miller, St. Charles, Clinton, Howell, Moniteau, St. Clair, Ste. Genevieve, St. Francois, St. Louis, and Saline. USDA FSA press release No. 0074.12, July 17, 2012
01-09-2013 - 05-16-2013	The U.S. Department of Agriculture began declaring counties as primary and secondary disaster areas related to drought in January, for the 2013 growing season. Farmers in affected counties have eight months from the date of the declaration to apply for low-interest emergency loans. For more information, agricultural producers should contact their Farm Service Agency office. From Farm Service Agency press releases, beginning Jan. 9, 2013.
09-11-2013 - 09-14-2013	Reduced corn yield, soybeans shorter than normal, pastures dead, in Andrew County, Missouri. Some producers are saying this summer is worse than last summer (2012), by now last year we had some rain showers in August/early September, the pastures had started to regrow and bean pods were able to fill. Within the counties I cover it truly depends on where you are located if this year is worse than last year and if you are a corn/bean crop producer or livestock/forage producer. It does vary significantly. Hope this helps. Submitted September 11, 2013 via Patrick Guinan, Missouri State Climatologist, on behalf of a livestock specialist
09-13-2013 - unknown	Late planted corn in the northern third of Missouri, or north of Interstate 70, due to the cool, wet spring, was "dead or dying" from drought and heat. Brownfield Ag News (Jefferson City, Missouri), Sept. 13, 2013
05-01-2017 - 08-16-2017	My husband and I own a 20 head herd of cattle. The drought is affecting their grass, hay and water supply. This drought has impacted everyone's hay quantity and quality this summer, and their fall pasture supply. Ponds are also starting to show significant amount of bank. While our neighboring counties to the north and south have received

	<p>significant rainfalls this summer, we have received very little. The storms have been very small and spotty and somehow seem to miss a small corridor stretching through Holt, Andrew, Harrison, Daviess, DeKalb, and Caldwell counties. For the months of May, June and July in DeKalb County, the historic average rainfall for those three combined months is 14.76 inches. This year we received 6.44 inches in those three months, which are our prime growing season for forages and row crops. Cattle farmers in the drought area are struggling to find pastures. Some have already started supplementing hay where in a normal year they wouldn't feed hay until October. Corn in the area is starting to dry down and farmers fear the ears may not have fully filled out. The soybean crop is in great need of moisture to fill out the pods. From DeKalb County, Missouri, on August 16, 2017</p>
05-01-2017 - 09-28-2017	<p>DeKalb County, Missouri, is 7.72 inches behind normal rainfall. In northwest Missouri, pastures are poor, hay crop was half of normal and soybean yields are struggling. From Daviess County, Missouri, on September 28, 2017</p>
07-18-2018 - unknown	<p>Missouri farmers who responded to a Missouri Farm Bureau survey reported that the drought was severely hitting hay production and will likely force many producers to sell livestock. Ninety-eight percent of respondents reported that their first cutting of hay was of poorer quality or quantity than usual, averaging 43 percent below normal production. In northwest Missouri, more than 86 percent anticipated needing to purchase hay to get them through until spring, but just 13 percent said hay was available for purchase in their area. Producers expected to travel at least 110 miles to find suitable hay. In addition, hay prices have risen about 106 percent, and reaching as high as 130 percent in northwest Missouri. Seventy-two percent of respondents expect to have to sell some of their herds, due to drought. Of that 72 percent, more than 60 percent felt they would have to sell at least 20 percent of their herd. Montrose Daily Press (Colo.), July 18, 2018</p>
07-18-2018 - unknown	<p>Forty-seven Missouri counties were on drought alert, including Andrew, after Gov. Mike Parson signed an executive order on July 18. The action activated the Drought Assessment Committee and associated drought impact teams. All state agencies were also directed to consider how the state could assist affected communities and identify potentially affected communities. Missouri Net (Jefferson City, Mo.), July 18, 2018</p>
07-26-2018 - 08-09-2018	<p>The Missouri Department of Natural Resources' Financial Assistance Center has made emergency funding available for publicly owned community water systems that were affected by drought. Systems serving fewer than 10,000 people within the drought alert area were eligible for grants and low-interest loans. The application deadline was Aug. 9. KTVO-TV ABC 3 Kirksville (Kirksville, Mo.), July 26, 2018</p>
07-26-2018 - unknown	<p>Missouri U.S. Senators Claire McCaskill and Roy Blunt sought drought assistance from the U.S. Department of Agriculture to release Conservation Reserve Program (CRP) acreage for haying and grazing. The senators would also like approval of the Missouri Farm Service Agency's request for special authority to release CRP acreage covered by additional conservation practices for haying and grazing. Missouri Net (Jefferson City, Mo.), July 26, 2018</p>
08-20-2018 - unknown	<p>Missouri Gov. Mike Parson announced a new relief program for farmers, allowing them to hay and pump water from some state land as intense drought gripped the state. Farmers can access water from 28 conservation areas and five state parks in the</p>

	northern and middle parts of the state, where drought was the worst. Up to 5,000 gallons of water can be pumped daily per farm. A state lottery will allow 16 farmers an opportunity to hay nearly 900 acres of Missouri State Parks land with haying taking place between Aug. 27 and Nov. 27. Fort Worth Star-Telegram (Texas), Aug. 20, 2018
09-09-2018 - unknown	Early reports of corn yields in northwest Missouri ranged from 10 to 50 bushels per acre, with one field making 70 bpa, stated Wayne Flanary, who serves as an area agronomist for University Extension. Many farmers in the area opted to cut their corn for silage after drought damaged the crop. St. Joseph News-Press (Mo.), Sept. 9, 2018

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

Probability of Future Occurrence

A 21-year period is used from which to draw data on drought events in order to obtain a more accurate estimate of probability. Over the 21-year record period, Andrew County was in a drought for 16 months. There are a total of 252 months in the record period. The calculated risk percent from the number of months of drought and the total number of months in the record period equates to the annual average percentage of 6.4 percent probability of drought occurrence in the county. Although drought is not predictable, long-range outlooks and predicted impacts of climate change could indicate an increased chance of drought persistence and severity. The sixteen events took place in 2000 (one event), 2012 (six events) and 2013 (four events) and 2018 (5 events).

Source: <https://www.NCEI.noaa.gov/stormevents>

Vulnerability

Vulnerability Overview

The majority of Andrew County is in a region highly susceptible to drought in the state, whereas the southwestern section, which is in the Missouri River floodplain, is considered only slightly susceptible to drought. Overall, the county has medium vulnerability rating for drought. Surface water sources usually become inadequate during extended drought. The groundwater resources are normally poor, and typically supply enough water only for domestic needs. Irrigation is generally not feasible. When irrigation is practical, groundwater withdrawal may affect other uses. Surface water sources are used to supplement irrigation supplied by groundwater sources.

The agriculture sector is particularly vulnerable to drought. Periods of dry weather can reduce stock ponds and force the early sale of livestock. Between 2012 and 2017, cattle sales have decreased by nearly 39 percent, which lessens the demand for stock ponds (Source: Ag. Census 2012 and 2007). However, drought can still stress stock ponds water levels and be disruptive to crop production. Those relying on private wells are likely to be impacted by reductions in the groundwater supply.

None of the communities in Andrew County use water from a well as the only source of water. There are two surface water sites in the county, including the One Hundred Two River near Bolckow and the Agee Creek near Savannah.

Source: <https://maps.waterdata.usgs.gov/mapper/index.html>.

Potential Losses to Existing Development

The 2018 State Plan shows that from 2007 through 2016 the annualized drought crop claims in Andrew County was between \$1,272,901 to \$2,157,867 (Source: https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf). In addition, according to

the USDA Risk Management Agency, there was a total of \$1,415,223.00 in insured crop loss payments from 2013-2016. (Source: <http://www.rma.usda.gov/data/cause.html>). According to this data, the total losses divided by the 10-year timeframe ($\$17,775,965/10$) equals \$1,777,596.50 per year. There are no anticipated structural losses, loss of life or injuries associated with this hazard.

Impact of Previous and Future Development

Increases in acreage planted with crops would add to exposure to drought-related agricultural losses. In addition, increases in population result in increased demand for treated water, adding additional strain on water supply systems. If Andrew County's population continues to grow, it will place greater demands on water resources and potentially increase drought vulnerability. Population estimates from July 1, 2019 show a 2.4 percent increase in the county's population, for an estimated total of 17,712 people.

Changing Future Conditions Considerations

Since severe drought is a natural part of Missouri's climate, it poses a risk to this agriculture-dependent state. In the future, increases in evaporation rates due to higher temperatures may increase the intensity of naturally occurring droughts.

Although springtime in Missouri is likely to be wetter, summer droughts are likely to be more severe. Higher evaporation and lower summer rainfall are likely to reduce river flows. The drought of 2012 narrowed navigation channels, forced lock closures, and caused dozens of barges to run aground on the Mississippi River along the Missouri shoreline. The resulting impact on navigation cost the region more than \$275 million. The drought of 2012–2013 also threatened municipal and industrial water users along the Missouri River. The number of heavy rainfall events is predicted to increase, yet researchers currently expect little change in total rainfall amounts, indicating that the periods between heavy rainfalls will be marked by an increasing number of dry days. Higher temperatures and increased evapotranspiration increase the likelihood of drought. This could lead to agricultural drought and suppressed crop yields.

According to the 2014 National Climate Assessment, the Midwest region could be impacted over the next few decades by longer growing seasons and rising carbon dioxide levels, which may increase yields of some crops; however, extreme weather events such as drought or flooding, will offset the benefits seen from extended growing seasons and higher carbon dioxide levels. Over the long term, climate change is expected to decrease agricultural productivity.

Hazard Summary by Jurisdiction

In Andrew County, drought losses to crops alone averaged \$1,777,596.50 per year over the 10-year period from 2007-2016. Although the probability of drought is the same for the entire county, farming and livestock enterprises in the unincorporated parts of the county would feel the greatest impact. These impacts are mitigated somewhat by the purchase of crop insurance. The communities in Andrew County are on water systems. However, many rural residents rely on limited source wells, which would be impacted during water shortages. In cities, the drought conditions would be the same as those experienced in rural areas, but the magnitude would be different with only lawns and local gardens impacted. In addition, building foundations could be weakened due to shrinking and expanding soils. School and special districts would be the least impacted by drought, however, those districts in communities with single source wells may experience water shortages prior to those in larger communities.

Problem Statement

Although drought most likely will not cause structural damage, the impact is greatest on the agriculture sector and if persistent enough, could cause reductions in groundwater and water shortages in communities that provide potable water services. Potential solutions to mitigate the impact of drought would be for communities to develop an ordinance to restrict the use of public water resources for non-essential usage, such as landscaping, washing cars, filling swimming pools, etc. during extreme drought periods. Schools can also implement water conservation measures at all district facilities.

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 lasts 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 on the next page 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 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.

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

Geographic Location

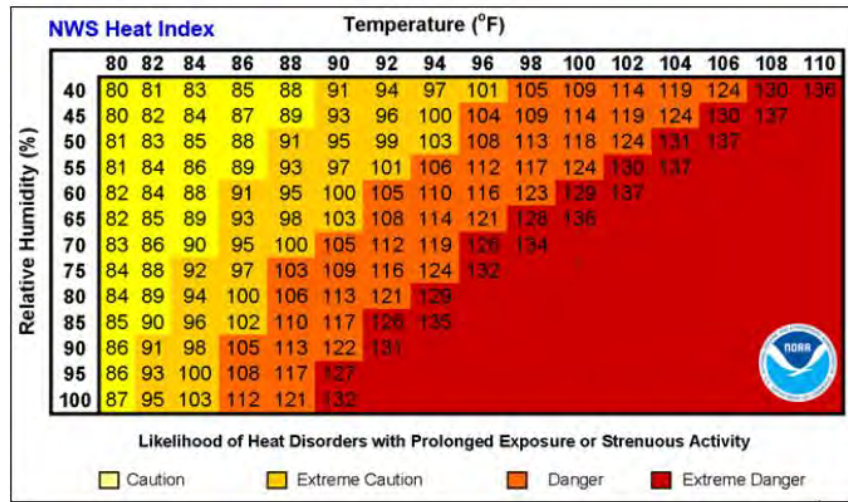
Extreme heat is an area-wide hazard event; therefore, the risk of extreme heat does not vary across the planning area.

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 nighttime 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.

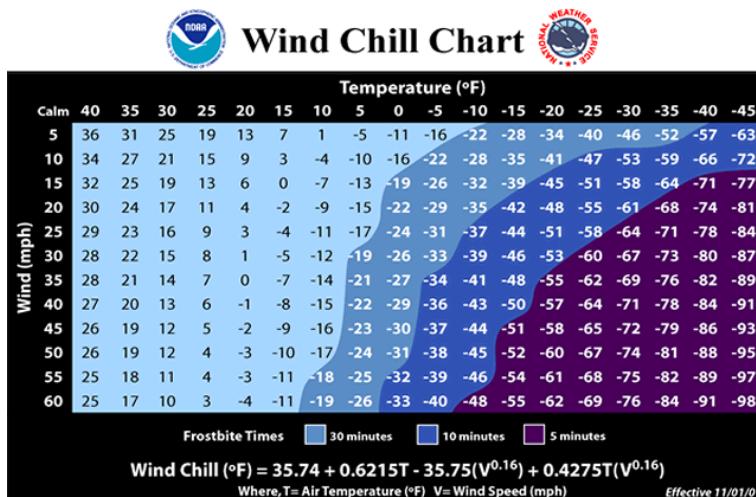
Figure 3.53. Heat Index (HI) Chart



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 3.54. Wind Chill Chart



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

Previous Occurrences

In the National Centers for Environmental Information (NCEI) database, there are four recorded

events listed for Andrew County between the years 1980 and 2020 that involve extreme temperatures:

10-06-2000- Extreme Cold/wind Chill (lows dropped below freezing for five consecutive days and record low temperatures were also recorded in the area)

12-10-2000- Extreme Cold/wind Chill (Arctic air gripped the region from December 10-31 with average highs in the teens and twenties and average lows in the single digits)

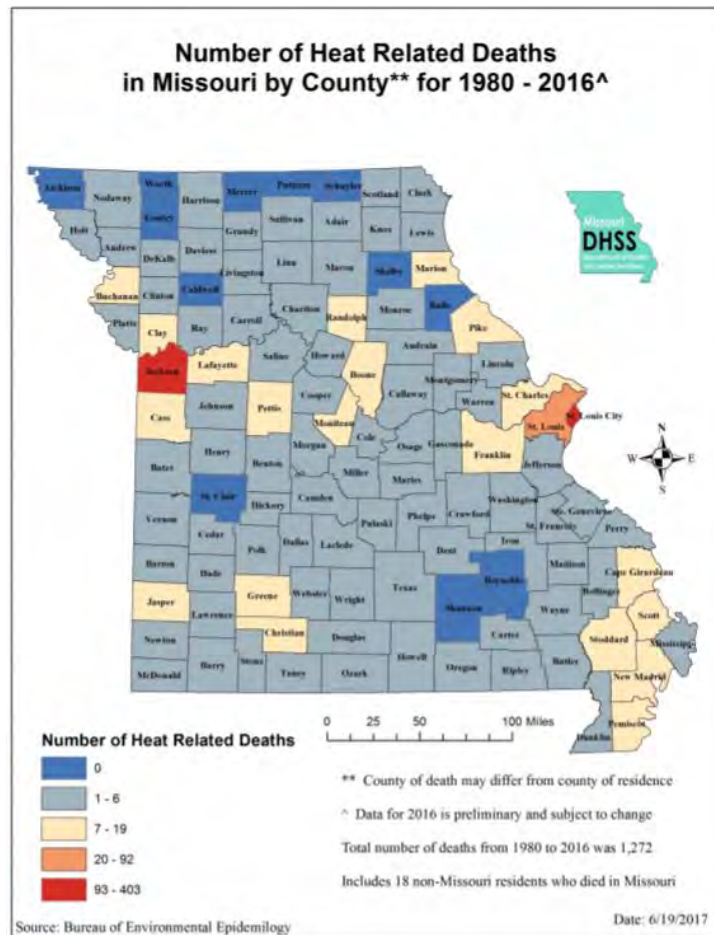
08-06-2007- Excessive Heat (heat index readings in the 105-to-115-degree range for several days)

07/18/2012- Excessive Heat (high temperatures in the 100-to-110-degree range, combined with humidity, produced equally high heat indices)

From 1980-2016, there were 1,272 fatalities in Missouri attributed to summer heat. This translates to an annual state average of 35 deaths. According to the Department of Health and Senior Services, between one and six heat-related deaths occurred in Andrew County from 1980-2016 (5).

The National Weather Service stated that among natural hazards, no other natural disaster—not lightning, hurricanes, tornadoes, floods, or earthquakes—causes more deaths.

Figure 3.55. Heat Related Deaths in Missouri 1980 - 2016



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

Extreme heat or cold can also cause stress to crops and animals. According to USDA Risk Management Agency, losses to insurable crops during the 10-year time period from 2007 to 2016 were \$354,232.

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.

In June 2020, excessive heat caused a section of U.S. Route 59 west of Savannah to “blow up,” causing the road to be closed for four days. A pavement blow-up occurs when the roadway surface expands at a crack or joint where moisture has seeped in. The crack weakens the pavement, and the heat causes the pavement to buckle and warp.



Source: MoDOT Northwest Twitter Post

Probability of Future Occurrence

According to the data from 1980 to July 2020, there were four recorded extreme temperatures events. When the four events are divided by the 41-year timeframe, there is a 9.8 percent of an extreme temperature event occurring each year. While it would appear as if there is a relatively low chance of an extreme temperature event, many events are underreported in the NCEI, so in actuality, the probability could be higher.

Changing Future Conditions Considerations

If higher emissions persist, unprecedented warming is expected by the end of the century. Even with lower greenhouse gas emissions, average annual temperatures are expected to exceed historical record levels by the middle of the 21st century. For example, in Andrew County, in 2012, there were 30 days reported where temperatures exceeded 95 degrees F. If higher annual emissions continue to occur, the number of 95-plus degree days is expected to be 75 days by 2025; whereas, if annual emissions decrease, the number of 95-plus degree days is expected to be 50 days by 2025. Temperature increases will cause future heat waves to be more intense, a concern for this region which already experiences hot and humid conditions. If the warming trend conditions, future heat waves are likely to be more intense, and cold wave intensity is projected to decrease.

Elderly and other vulnerable populations experience the impacts of extreme heat events most acutely. As people try to keep cool, higher demands are placed on electricity, which amplifies stress on power systems and may lead to a greater number of power outages. Higher air temperatures also create greater atmospheric concentrations of ozone, resulting in poorer air quality. As the air temperature increases, so does water temperatures, which may lead to harmful algal blooms, resulting in poorer water quality.

Some ways to mitigate against the impacts of future extreme heat may include: more education on heat stress prevention; organizing cooling centers; allocating additional transportation funding to repair and maintain roads damaged by buckling and potholes; and reducing nutrient runoff to help curtail algal blooms. Local governments should also anticipate and prepare for increased demand on public recreational facilities, utility systems, and healthcare centers. Another way to incur valuable savings is to improve energy efficiency in public buildings.

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 3.56 lists typical symptoms and health impacts due to exposure to extreme heat.

Table 3.56. 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

Extreme heat and extreme cold events are common occurrences in Missouri. The method used to determine vulnerability to extreme temperatures across Missouri was statistical analysis of data from several sources: National Centers for Environmental Information (NCEI) storm events data (1996 to December 31, 2016), total population and percentage of population over 65 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, four factors were considered in determining overall vulnerability to extreme temperatures as follows: total population, percentage of population over 65, likelihood of 3.264 3 Risk Assessment occurrence, and social vulnerability. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. (2018 State Plan, 3.263-4)

These rating values correspond to the following descriptive terms:

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

Andrew County has a low vulnerability rating, according to state data, as just around 17 percent of the population is over 65, as shown in Table 3.57.

Table 3.57. Population, Percent of Population over 65, and SOVI Data

County	Total Population (2015 ACS)	Total Population Rating	Percentage of Population over 65	Percent of Population over 65 rating	SOVI Ranking	SOVI Rating
Andrew	15,963	1	17.1	2	Low	1

Source: 2018 Mo State Hazard Mitigation Plan, p. 3.265

The likelihood of occurrence and overall vulnerability of an extreme temperature event in Andrew County was also rated low, based on previous occurrences, as shown in Table 3.58 (2018 State Plan, 3.267).

Table 3.58. Likelihood of Occurrence and Overall Vulnerability Rating for Extreme Temperatures

County	HEAT					COLD				
	Total Events	Likelihood of Occurrence	Likelihood Rating	Total Vulnerability	Total Vulnerability Description	Total Events	Likelihood of Occurrence	Likelihood Rating	Total Vulnerability	Total Vulnerability Description
Andrew	15,963	1	17.1	6	Low	3	0.14	1	5	Low

Potential Losses to Existing Development

Based on the USDA Crop Insurance payments for extreme temperature losses of \$354,232 during the 10-year period from 2007-2016, the average annual loss equates to \$35,423.20 across the county.

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. Although some jurisdictions are experiencing a modest increase in population, it is not significant enough to change the jurisdiction’s vulnerability.

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 3.59 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.

Table 3.59. Andrew Country Population Under Age 5 and Over Age 65

Jurisdiction	Population Under 5 Years	Population 65 Years and Over
Andrew County	1,143	3,170
Amazonia	19	90
Cosby	18	12
Country Club Village	187	395
Fillmore	6	26
Rea	0	12
Rosendale	7	11
Savannah	449	840

Source: U.S. Census Bureau ACS 5-year 2015-2019

While all the buildings are air conditioned in the Savannah School District, with the exception of the old middle school gym, many systems are 25 years old or older, making them more susceptible to malfunctions during use. The school districts do not have policies mandating closure during high heat events but monitor the situation and make school closures accordingly.

Problem Statement

Older and younger segments of the population are more vulnerable to the impact of extreme temperatures. In addition, people living in poverty may be more vulnerable during periods of extreme temperatures due to a lack of air conditioning or utilities in their homes. Institutionalized populations such as those living in nursing homes become more vulnerable to extreme heat due to power outages. This problem has been mitigated with the installation of emergency generators at a number of these facilities. The jurisdictions can expand their partnerships with local community organizations who donate fans and offer weatherization programs to vulnerable populations in the county.

3.4.8 Severe Thunderstorms Including High Winds, Hail, and Lightning

Hazard Profile

Hazard Description

A thunderstorm is formed from a combination of moisture, rapidly rising warm air and a force capable of lifting air such as warm or cold fronts, a sea breeze or a mountain. Nearly 1,800 thunderstorms are in progress over the surface of the earth at any time. The United States experiences 100,000 thunderstorms each year. Approximately 1,000 tornadoes develop from these storms. At any given moment across the world, there are about 1,800 thunderstorms occurring.

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 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 discharge of electricity that shoots through the air causing vibrations and creating the sound of thunder.

Hail

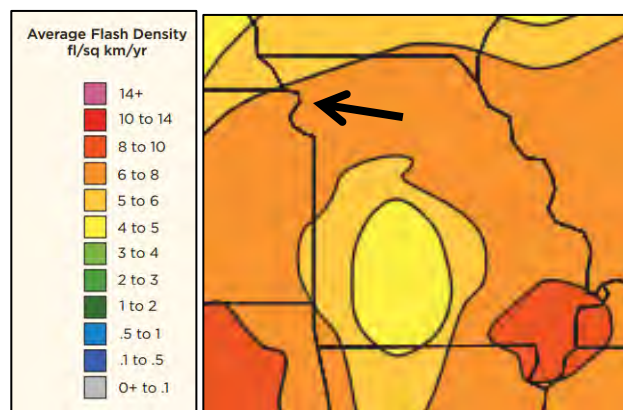
According to the National Oceanic and Atmospheric Administration (NOAA), hail is precipitation that is formed when thunderstorm updrafts carry raindrops upward into extremely cold atmosphere causing them to freeze. The raindrops form into small frozen droplets. They continue to grow as they come into 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 $\frac{1}{4}$ " diameter or pea sized hail requires updrafts of 24 miles per hour, while a $2\frac{3}{4}$ " 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

Andrew County is at risk for thunderstorms. Figure 3.60 shows lightning frequency in the state. Andrew County is identified with an arrow. It is located in the orange zone on the map, indicating a six to eight average flash density per square kilometer per year. Much of the state is in the same zone.

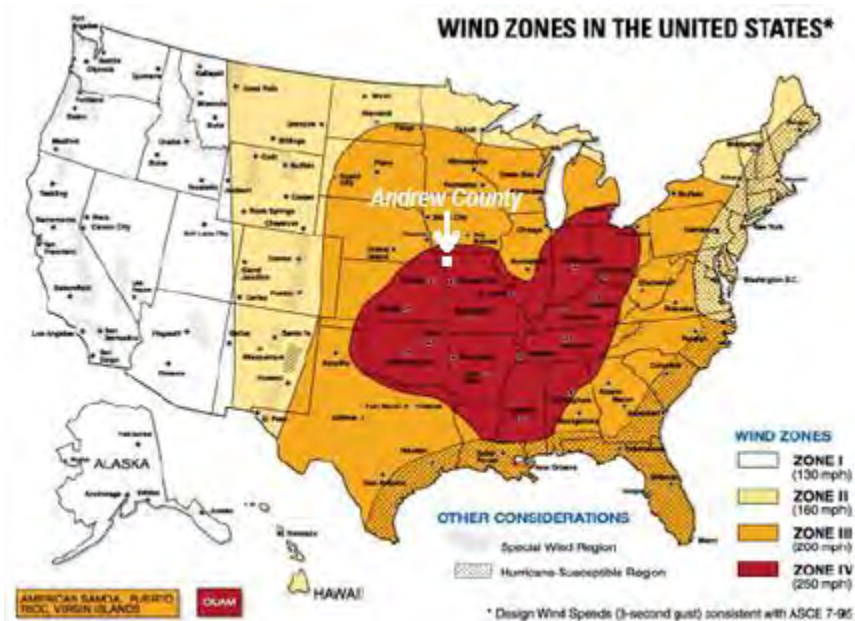
Figure 3.60. Location and Frequency of Lightning in Missouri



Source: http://www.lightningsafety.noaa.gov/stats/08_Vaisala_NLDN_Poster.pdf

Figure 3.61 shows wind zones in the United States. Andrew County is identified with an arrow. It is located in the red zone, Zone IV, on the map. Winds can reach 250 miles per hour in this zone.)

Figure 3.61. Wind Zones in the United States



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

Strength/Magnitude/Extent

Severe thunderstorm losses are usually attributed to the associated hazards of hail, 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 making federal assistance necessary. Hail and wind 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 destroy plants 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, occasionally fatal, to humans.

In general, assets in Andrew County vulnerable to thunderstorms with lightning, high winds, and hail include people, crops, vehicles, and 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 financial impact on jurisdictions is reduced.

Most lightning damages occur to electronic equipment located inside buildings. 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 rendered useless by lightning strikes.

Based on information provided by the Tornado and Storm Research Organization (TORRO), Table 3.62 below describes typical damage impacts of the various sizes of hail.

Table 3.62. Tornado and Storm Research Organization Hailstorm Intensity Scale

Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	21-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	31-40	1.2-1.6	Pigeon's egg > squash ball	Widespread glass damage, vehicle bodywork damage
Destructive	41-50	1.6-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	51-60	2.0-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	61-75	2.4-3.0	Tennis ball > cricket ball	Severe roof damage, risk of serious injuries
Destructive	76-90	3.0-3.5	Large orange > Soft ball	Severe damage to aircraft bodywork
Super Hailstorms	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

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

Straight-line winds are defined as any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 miles per hour, which represent the most common type of severe weather. They are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks like tornadoes, the associated wind damage can be extensive and affect entire (and multiple) counties. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase. The onset of thunderstorms with lightning, high wind, and hail is generally rapid. Duration is less than six hours and warning time is generally six to twelve hours. Nationwide, lightning kills 75 to 100 people each year. Lightning strikes can also start structural and wildland fires, as well as damage electrical systems and equipment.

Previous Occurrences

The tables below (Tables 3.63 through 3.66) summarize past crop damages as indicated by crop insurance claims, as well as the magnitude of the impact on the planning area's agricultural economy. Thunderstorms were not listed as the cause of loss for any insurance claims in Andrew County from 2007-2010 or from 2012-2014.

Table 3.63. Crop Insurance Claims Paid in Andrew County from High Winds, 2007-2016

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2011	Corn	Wind/Excess Wind	\$86,468.00
2011	Soybeans	Wind/Excess Wind	\$2,791.00
2015	Soybeans	Wind/Excess Wind	\$5,183.00
2016	Corn	Wind/Excess Wind	\$169,043.00
Total			\$263,485.00

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

Table 3.64. Crop Insurance Claims Paid in Andrew County from Hail, 2007-2016

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2009	Corn	Hail	\$28,791.00
2009	Soybeans	Hail	\$2,801.00
2011	Corn	Hail	\$203,052.00
2011	Soybeans	Hail	\$852,836.00
2011	All Other Crops	Hail	\$40,076.00
2012	Corn	Hail	\$71,895.00
2012	Wheat	Hail	\$487.00
2012	All Other Crops	Hail	\$5,572.00
2014	Soybeans	Hail	\$46,712.00
2016	Corn	Hail	\$7,445.00
2016	Soybeans	Hail	\$6,581.00
Total		Hail	\$1,266,248.00

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

The tables below include NCEI reported events and damages for the past 20 years for thunderstorms, wind, and hail. There were no NCEI reported events for lightning. One limitation of NCEI reported lightning events is the fact that only those that result in fatality, injury, and/or property and crop damage were reported.

There were 53 days with recorded thunderstorm wind events in Andrew County, of which caused an estimated \$83,000 in property damages but no injuries.

Table 3.65. NCEI Thunderstorm Wind Events in Andrew County, 1999-2019

Jurisdiction	Date	Wind Speed (in knots)	Injuries	Property Damage
Fillmore	07/25/01	57 kts.	0	\$10,000.00
Savannah	03/08/02	52 kts.	0	\$1,000.00
Savannah	8/8/07	60 kts.	0	\$1,000.00
Fillmore	6/8/08	56 kts.	0	\$5,000.00
Amazonia	12/27/08	60 kts.	0	\$500.00
Lone Corner	8/9/10	61 kts.	0	\$1,000.00
Savannah	8/13/10	52 kts.	0	\$1,000.00
Bolckow	5/21/11	61 kts.	0	\$1,000.00
Savannah	6/26/11	52 kts.	0	\$1,000.00
Savannah	6/11/15	65 kts.	0	\$50,000.00
Bolckow	8/8/15	56 kts.	0	\$10,000.00
Helena	5/25/16	61 kts.	0	\$500.00
Avenue City	6/22/19	61 kts	0	\$1,000.00
Total				\$83,000.00

Source: NCEI, <https://www.NCEI.noaa.gov/stormevents>

There were 36 days with recorded hail (one inch and larger) events in Andrew County, causing no injuries and no recorded property damage. Table 3.66 only lists hail events with hail over two inches in diameter. Also, there were only two recorded high wind events between 1999-2019, with no reported injuries or property damage.

Table 3.66. NCEI Hail Events in Andrew County, 1999-2019

Jurisdiction	Date	Hail size (in)	Injuries	Property Damage
--------------	------	----------------	----------	-----------------

Savannah	09/11/00	2.75	0	\$0
Rosendale	09/09/14	2.50	0	\$0

Source: NCEI, <https://www.NCEI.noaa.gov/stormevents>

Probability of Future Occurrence

Thunderstorm Wind: There have been 53 recorded thunderstorm wind events over a 21-year period from 1999-2019. This equates to three thunderstorm wind events in any given year with a 100% probability of occurrence. There were 13 events that resulted in \$83,000.00 in property damages. This equates to 2.5 damaging events per year with annualized losses of \$3,952.38.

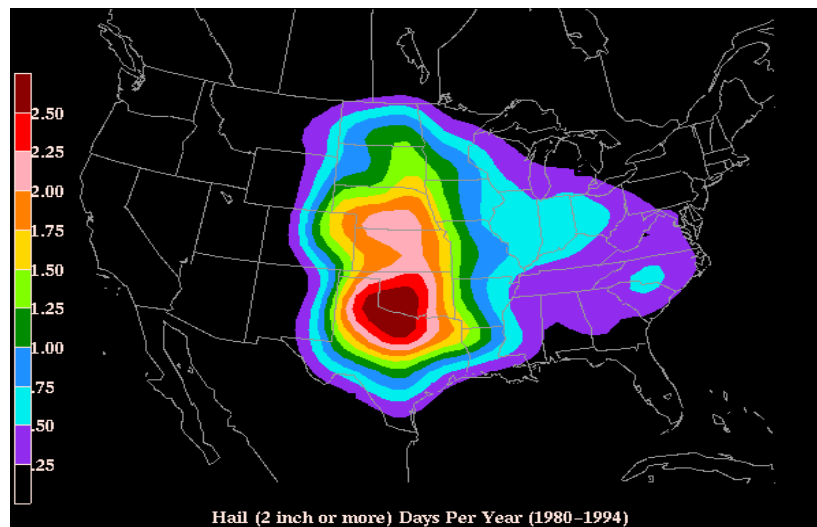
Lightning: There were no NCEI reported events for lightning. One limitation of NCEI reported lightning events is the fact that only those that result in fatality, injury, and/or property and crop damage are reported.

Hail: There has been 36 recorded hail events over a 21-year period from 1999-2019. This equates to 1.7 hail events in any given year with a 100% probability of occurrence. There were no recorded events that resulted in property damage from hail; therefore, there were no annualized losses. This is likely underreported.

Strong Wind: There has been two recorded strong wind events over a 21-year period from 1999-2019. This equates to 0.1 strong wind event in any given year. There were no reports of damage or injuries from the NCEI database, so there are no annualized losses.

Figure 3.67 is based on hailstorm data from 1980-1994. It shows the probability of hailstorm occurrence (2" diameter or larger) based on the number of days per year. Andrew County is located in the light green zone, indicating the county's probability of hailstorm with 2" diameter or larger hail at 1.25 to 1.5 days per year.

Figure 3.67. Annual Hailstorm Probability (2" diameter or larger), 1980-1994



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

Changing Future Conditions Considerations

According to the 2018 State Hazard Mitigation Plan, NASA's Earth Observatory provides an analysis on how climate change could, theoretically, increase potential storm energy by warming the surface

and putting more moisture in the air through evaporation. The presence of warm, moist air near the surface is a key ingredient for summer storms that meteorologists have termed “convective available potential energy,” or CAPE. With an increase in CAPE, there is greater potential for cumulus clouds to form. The study also counters this theory with the theory that warming in the Arctic could lead to less wind shear in the mid-latitude areas prone to summer storms, making the storms less likely.

Predicted increases in temperature could help create atmospheric conditions that are fertile breeding grounds for severe thunderstorms and tornadoes in Missouri and Andrew County. 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. Source: MO Hazard Mitigation Plan, pp. 3.293-3.294

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 Andrew 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. Source:_)

The method used to determine vulnerability to severe thunderstorms across Missouri, including in Andrew County, 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 and mobile home 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, six factors were considered in determining overall vulnerability to lightning as follows: housing density, building exposure, percentage of mobile homes, social vulnerability, likelihood of occurrence, and average annual property loss. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. These rating values correspond to the following descriptive terms: 1) Low 2) Low-medium 3) Medium 4) Medium-high 5) High

According to this method, Andrew County has a medium-low vulnerability rating for thunderstorms, including high wind, hail, and lightning as detailed in Tables 3.68 and 3.69 below.

Table 3.68. Housing Density, Building Exposure, SOVI, and Mobile Home Data by County

County	Total Building Exposure (Hazes)	Building Exposure Rating	Housing Density	Housing Density Rating	SOVI Ranking	SOVI Ranking Rating	Percent Mobile Homes	Percent Mobile Home Ranking
Andrew	\$1,724,819,000	1	16.88	1	Medium Low	2	7.6	2

Source: 2018 Mo State Hazard Mitigation Plan, p. 3.296

Table 3.69. Number of High Wind, Hail, and Lightning Events, Likelihood of Occurrence, and Associated Ratings

County	HIGH WIND			HAIL			LIGHTNING		
	Total # of Events	Likelihood of Occurrence	Likelihood of Occurrence Rating	Total # of Events	Likelihood of Occurrence	Likelihood of Occurrence Rating	Total # of Events	Likelihood of Occurrence	Likelihood of Occurrence Rating
Andrew	53	2.524	1	80	3.810	2	0	0.000	1

Source: 2018 Mo State Hazard Mitigation Plan, p. 3.299

Potential Losses to Existing Development

The average annual loss determined from historical losses for high wind and hail are indicators of the potential losses to existing development. While a limited number of high wind events have been recorded in Andrew County, they have the potential to damage private property and commercial buildings. Based on the \$83,000.00 in losses from thunderstorm wind damage recorded in the NCEI database from 1999-2019, potential losses for future events is annualized at \$4,150.00.

Previous and Future Development

Additional development would result in the exposure of more households and businesses vulnerable to damages from severe thunderstorms/ high winds/lightning/hail.

Hazard Summary by Jurisdiction

Although thunderstorms/high winds/lightning/hail events are area-wide, there may be demographics indicating higher losses in one jurisdiction as compared to another. Structures built before 1939 are considered more vulnerable to the impact of high wind and hail damage. Please see Table 3.48 for ages of structures in jurisdictions in Andrew County.

Problem Statement

The NCEI Storm Events Database notes close to 100 thunderstorm wind events over the last 21 years in Andrew County with over \$80,000 dollars in damages.

Poorly built structures, barns, and outbuildings are more vulnerable to the impact of high winds during

thunderstorms. High winds can topple utility poles and lead to power outages. Both high winds and hail can damage roofs. Hail can also damage crops and dent cars and trucks. People are also at risk of injury and death during high wind events. Crop insurance mitigates the risk to farmers and the agriculture sector within the county.

The risk of injury and death in the county can be mitigated by identifying safe refuge areas in public buildings, nursing homes and other facilities that house vulnerable populations that do not have a saferoom. Retrofitting school district facilities to better withstand high winds will provide more protection for students and staff. Additional warnings and alerts will also provide the public and schools more time to take cover during high wind events. Education and hazard awareness programs would also increase public safety in the event of severe thunderstorm events.

3.4.8 Severe Winter Weather

Hazard Profile

Hazard Description

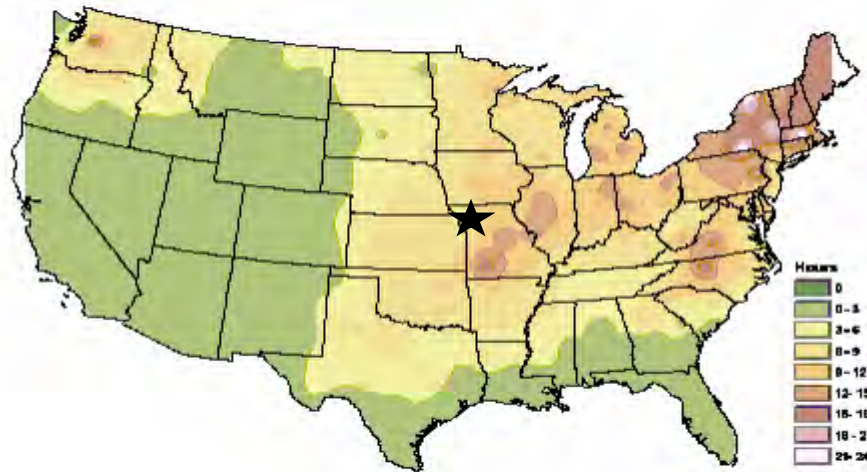
A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. The National Weather Service describes different types of winter storm events as follows.

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

Geographic Location

The entire county is vulnerable to heavy snow, ice, extreme cold temperatures and freezing rain. Figure 3.70 shows the zones of average number of hours of freezing rain per year. Andrew County is located in the light yellow zone, indicating it receives three to six hours of freezing rain per year.

Figure 3.70. NWS National 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

The table below lists NCEI reported events and damages for the past 21 years in Andrew County.

Table 3.71. NCEI Andrew County Winter Weather Events Summary, 2000 - 2020

Type of Event	Inclusive Dates	Magnitude	# of Injuries	Property Damages	Crop Damages
Extreme Cold/Wind	12/10/2000	Arctic air for about 20 days	0	0	0
Winter Storm	12/11/2000	3-5 inches of snow	0	0	0
Winter Storm	1/28/2001	¼ to ½ inch of ice	0	0	0
Heavy Snow	2/9/2001	Snow and ice accumulation	0	0	0
Heavy Snow	2/27/2001	6-9 inches of snow	0	0	0
Heavy Snow	3/15/2001	6 inches of snow	0	0	0
Heavy Snow	1/30/2002	Long major ice and snowstorm	0	0	0
Winter Storm	12/9/2003	Up to 4 inches of snow and high winds	0	0	0
Winter Storm	1/4/2004	6-7 inches of snow	0	0	0
Winter Storm	1/25/2004	Freezing rain and ¼ inch of ice	0	0	0
Winter Storm	2/5/2004	Sleet, freezing rain and snow	0	0	0
Winter Storm	1/4/2005	Several rounds of freezing rain and ice	0	0	0
Winter Weather	1/20/2006	Sleet, freezing rain and 2-4 inches of snow	0	0	0
Ice Storm	12/10/2007	Ice up to an inch thick	0	\$500,000	0
Winter Storm	12/22/2007	Six to nine inches of snow	0	0	0
Heavy Snow	2/5/2008	Up to six and a half inches of snow	0	0	0
Winter Storm	2/16/2008	Up to four inches of snow	0	0	0
Ice Storm	12/18/2008	One half inches of ice	0	0	0
Blizzard	12/7/2009	Blizzard conditions with 6 to 8 inches of snow	0	0	0
Blizzard	12/24/2009	Up to 8 inches of snow fell and strong winds	0	0	0
Winter Storm	2/21/2010	Six to eight inches of snow was reported across the	0	0	0
Winter Weather	1/10/2011	Up to 8 inches of snow was reported in Savannah.	0	0	0
Winter Storm	1/22/2011	Cosby measured 6.5 inches of snow	0	0	0
Winter Storm	2/1/2011	Up to 5 inches of snow was observed in Cosby	0	0	0
Winter Storm	2/24/2011	Up to 6.5 inches of snow, and strong winds	0	0	0
Winter Weather	11/9/2011	Up to one inch of snow was reported in Savannah	0	0	0
Winter Weather	12/19/2011	One inch of snow was measured in Savannah	0	0	0
Winter Weather	2/13/2012	One to one and a half inches of snow	0	0	0
Winter Weather	2/23/2012	One half inch of snow	0	0	0
Blizzard	12/20/2012	High winds and three inches of snow	0	0	0
Winter Storm	2/21/2013	Four to six inches of snow	0	0	0
Heavy Snow	12/21/2013	Freezing rain and 6 and 9 inches of snow	0	0	0
Cold/Wind Chill	1/5/2014	Polar plunge of arctic air	0	0	0
Heavy Snow	2/4/2014	A major winter storm with up to a foot of snow	0	0	0
Heavy Snow	1/31/2015	7 to 9 inches of snow	0	0	0
Heavy Snow	2/1/2015	7 to 9 inches of snow	0	0	0
Winter Storm	12/27/2015	1/2 inch of ice, 1 inch of sleet, 3-4 inches of snow	0	0	0
Blizzard	11/25/2018	Heavy snow, 45 mph wind gusts for nearly 6 hours	0	0	0
Winter Storm	1/11/2019	8 and 10 inches of snow	0	0	0
Winter Storm	1/10/2020	Freezing rain (1/3 inch), 2-3 inches of snow	0	0	0
Totals	----	----	0 deaths	\$500,000	0

Source: NCEI, data accessed 02/8/21

Winter storms, cold, frost and freeze take a toll on crop production in the planning area. The table below shows the USDA's Risk Management Agency payments for insured crop losses in Andrew County as a result of cold conditions and snow for the past 14 years.

Table 3.72. Crop Insurance Claims Paid in Andrew County as a Result of Cold Conditions and Snow from 2007 - 2020

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid (\$)
2007	WHEAT	Freeze	\$ 1,399.00
2007	WHEAT	Cold Winter	\$ 1,912.00

2007	WHEAT	Freeze	\$ 4,915.00
2007	WHEAT	Freeze	\$ 4,915.00
2007	WHEAT	Freeze	\$ 4,915.00
2007	All Other Crops	Freeze	\$ 50,233.00
2008	WHEAT	Other (Snow-Lightning-Etc.)	\$ 5,046.00
2008	WHEAT	Other (Snow-Lightning-Etc.)	\$ 5,046.00
2009	SOYBEANS	Cold Wet Weather	\$ 6,388.00
2010	WHEAT	Cold Winter	\$ 1,240.00
2010	CORN	Cold Wet Weather	\$ 2,225.00
2011	CORN	Cold Wet Weather	\$ 4,299.00
2011	SOYBEANS	Cold Wet Weather	\$ 2,550.00
2012	WHEAT	Cold Winter	\$ 1,947.00
2012	SOYBEANS	Cold Wet Weather	\$ 3,690.00
2013	CORN	Cold Wet Weather	\$ 225,890.00
2013	SOYBEANS	Cold Wet Weather	\$ 34,322.00
2013	SOYBEANS	Cold Wet Weather	\$ 20,652.00
2014	CORN	Freeze	\$ 1,161.00
2014	CORN	Other (Snow-Lightning-Etc.)	\$ 407.00
2014	SOYBEANS	Frost	\$ 2,944.00
2014	SOYBEANS	Frost	\$ 2,944.00
2015	----	----	----
2016	SOYBEANS	Drought	\$ 1,426.00
2017	----	----	----
2018	SOYBEANS	Cold Wet Weather	\$ 28.50
2019	----	----	----
2020	WHEAT	Cold Winter	\$ 4,480.00
Total	----	----	\$ 393,575.50

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

Probability of Future Occurrence

The probability for all of the different types of winter weather are included as one probability, since one storm generally includes several different types of events. There were 40 severe winter weather events in Andrew County from 2000 to 2020 (21 years). This equates to a 100 percent probability of occurrence in any given year with approximately 2 events in any given year.

Changing Future Conditions Considerations

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. Source: 2018 Mo State Hazard Mitigation Plan, p. 3.338

Vulnerability

Vulnerability Overview

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

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

Overhead power lines and infrastructure are also vulnerable to damages from winter storms. In particular, ice accumulation during winter storm events can cause 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.

According to the 2018 Mo Hazard Mitigation Plan, for areas north of the Missouri River, like Andrew County, the probability of a snowstorm, ice storm, or extreme cold should be considered high due to historically higher average snowfall and lower average temperatures. However, the SRMT has rated the severity as moderate due to local knowledge of the overall level of preparedness in this area. For example, homes and businesses may be better insulated due to the higher probability of severe cold relative to other areas. Also, people living in this area may be more likely to use snow tires or purchase four-wheel-drive vehicles. People living in this area may be more likely to maintain adequate supplies of home heating fuels and consider other preparedness measures. Local and state governments may have access to more snow clearing equipment and maintain adequate supplies of materials needed for snow or ice removal. School districts and businesses may be more likely to develop and use snow routes or establish closing procedures.

In the 2018 State Plan, the method used to determine vulnerability to severe winter weather across Missouri was statistical analysis of data from several sources: National Centers for Environmental Information (NCEI) storm events data (1996 to December 31, 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 3.73 lists exposure and loss amounts, as well as the medium low vulnerability rating for Andrew County based on the vulnerability criteria.

Table 3.73. 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 Ranking Rating
Andrew	\$1,724,819,000	1	16.88	1	Medium Low	2

Source: State Plan

Potential Losses to Existing Development

According to the NCEI, during the 21-year period from 1997 to 2018, a total of \$100,000 in recorded property losses equates to \$4,761.90 in average annual losses in Andrew County.

Previous and Future Development

Future commercial development can expect functional downtime and decreased revenues during periods of severe winter weather. No new road construction in the county is anticipated. However, the southern part of the county has experienced growth, which also increases the demand of keeping roads cleared.

Hazard Summary by Jurisdiction

Severe winter weather can cause power outages and put structures at risk to fires when individuals in homes resort to using portable fuel heaters. The risk of extreme cold deaths and frostbite varies among segments of the populations. People over 65 and those living below the poverty level have an increased vulnerability to severe winter weather. Table 3.74 includes information on populations over 65 and the percent living below the poverty level by jurisdiction.

Table 3.74. Percentage of Population Over 65 and Below Poverty Line

Jurisdiction	% of Population Over 65	% of Population Below Poverty Line
Andrew County	18	8
Amazonia	34	15
Cosby	6	7
Country Club Village	14	7
Fillmore	13	24
Rea	31	8
Rosendale	1	40
Savannah	16	9

Source: US Census ACS 5-year 2015-2019

Rosendale has the largest percent of families living below the poverty level, at nearly 40 percent, while Amazonia has the highest percentages of residents over 65.

Andrew County and its jurisdictions are fortunate in that there are no known homeless people living on the streets. Community Action Partnership of Greater St. Joseph (CAP) serves Andrew County and offers financial assistance to those needing help paying their heating bill and offers a program

assisting with winterizing homes (<https://www.capstjoe.org>). Andrew County Ministries is another resource in the county for those struggling to pay utility bills.

Problem Statement

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. People over 65 and those living in poverty and the homeless have an increased risk of hypothermia and frostbite due to extreme cold and wind chill.

Public works departments and road districts can develop snow removal plans and maintain adequate snow removal equipment and salt to quickly open roads after periods of heavy snow and freezing rain. To minimize power outages throughout the county, jurisdictions can work with local electric coops and utility companies to develop vegetation management programs in rights of way. This vegetation management plan can minimize damage from tree limbs which may fall when laden with ice from ice storms. In the event of a power outage, entities with space for emergency shelters, such as churches and schools, can shelter people if equipped with independent power supplies like generators.

3.4.9 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

Due to the nature of tornadoes, they can occur anywhere in Andrew County.

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 0) 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 3.75. 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

The wind speeds for the EF scale and damage descriptions are based on information on the NOAA Storm Prediction Center as listed in Table 3.76. The damage descriptions are summaries. For the actual EF scale, it is necessary to look up the damage indicator (type of structure damaged) and refer to the degrees of damage associated with that indicator. Information on the Enhanced Fujita Scale’s damage indicators and degrees of damage is located online at www.spc.noaa.gov/efscale/ef-scale.html.

Table 3.76. 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

Table 3.77 includes NCEI reported tornado events and damages since 1993 in Andrew County. Prior to that date, only highly destructive tornadoes were recorded. 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 3.77. Recorded Tornadoes in Andrew County, 1993 – 2020

Date	Beginning Location	Ending Location	Length (miles)	Width (yards)	F/EF Rating	Death	Injury	Property Damage	Crop Damages
06/25/1994	1SE Whitesville		.8	100 yards	F2	1	2	5M	0
07/04/1995	0 Route D		.1	10	0	0	0	3K	0
04/08/1999	3NW Fillmore	3W Bolckow	8	75	F1	0	2	500K	250K
05/04/2001	3NW Amazonia	3NW Amazonia	20	30	F0	0	0	0	0
05/04/2001	5NW Fillmore	6NW Fillmore	25	.5	F0	0	0	0	0
06/04/2005	2NE Fillmore	2NNE Fillmore	1	50	F0	0	0	0	0
06/04/2005	4SW Avenue City	1SW Avenue City	3	50	F0	0	0	0	0

03/30/2006	5SE Fillmore	5E Fillmore	5	800	F2	0	8	800K	0
05/21/2011	4ESE Fillmore	4ESE Fillmore	1.22	60	EF0	0	0	7.00K	0
	Total					1	12	6,310,000	250K

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

Several of the tornadoes that have occurred in Andrew County have caused death and injury, as well as property and crop damage. The narratives on the website provide additional details about the events. In 1994, the unincorporated area of Whitesville experienced an F2 tornado that resulted in a fatality of a 58-year old woman and the injury of her husband, and another person seeking shelter in a vehicle. Twelve mobile homes were destroyed in this event. In 2006, another F2 tornado caused eight injuries in the town of Fillmore, destroying three houses and causing minor to moderate damage to eight other houses. The map below shows historic tornado paths of 25 tornadoes in Andrew County from June 7, 1957 to May 21, 2011.

Figure 3.78. Andrew County Map of Historic Tornado Events



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

USDA Risk Management Agency has no crop damage claims as a result of tornadoes from 2007 to 2016.

Probability of Future Occurrence

The probability for tornado events of all magnitudes in any given year in Andrew County is 42.8 percent. This number is derived from 9 reported tornadoes of any magnitude in 21 years, equaling a 42.8 percent probability of a tornado occurring in Andrew County in any given year.

Changing Future Conditions Considerations

According to the State 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 has 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

Andrew County is in Northwest Missouri, where the high frequency of dangerous and destructive tornadoes has led to the region being referred to as “Tornado Alley.” The map below (Figure 3.79) illustrates areas where dangerous tornadoes have historically occurred.

Figure 3.79. Tornado Alley in the U.S.



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

The method used in the 2018 State Plan to determine vulnerability to tornadoes across Missouri included statistical analysis of data from several sources: HAZUS building exposure value data, population density and mobile home data from the U.S. Census (2015 ACS), the calculated Social Vulnerability Index for Missouri Counties from the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina, and storm events data (1950 to December 31, 2016) from the National Centers for Environmental Information (NCEI). It is important to realize that one limitation to the NCEI data is that many tornadoes that might have occurred in uninhabited areas, as well as some in inhabited areas, may not have been reported. The incompleteness of the data suggests that it is not appropriate for use in parametric modeling. In addition, NOAA data cannot show a realistic frequency distribution of different Fujita scale tornado events, except for recent years. Thus a parametric model based on a combination of many physical aspects of the tornado to predict future expected losses was not used. The statistical model used for this analysis was probabilistic based purely on tornado frequency and historic losses. It is based on past experience and forecasts the expected results for the immediate or extended future. From the statistical data collected, six factors were considered in determining overall vulnerability to tornadoes as follows: building exposure, population density, social vulnerability, percentage of mobile homes, likelihood of occurrence, and annual property loss. Based on natural breaks in the statistical data, a rating value of 1 through 5 was assigned to each factor. These rating values correspond to the following descriptive terms:

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

Additional details on the methodology can be found in the State Plan, starting on page 3.337.

Table 3.80 below provides the building exposure, population density, SOVI index ranking and percentage of mobile homes by county and the associated vulnerability rating. Based on this data, Andrew County has a medium low vulnerability to tornadoes.

Table 3.80. Building Exposure, Population Density, SOVI Index Rating

County	Total Building Exposure (Hazus)	Exposure Rating	Population Density	Population Rating	SOVI Index Ranking	SOVI Rating	Percent Mobile Homes	Mobile Home Rating
Andrew	\$1,724,818,000	1	39.97	1	Medium Low	2	7.6	2

Source: Missouri State Plan 2018, pg. 3.377

Potential Losses to Existing Development

The table below from the State Plan shows the overall vulnerability analysis and the total overall vulnerability rating for tornadoes, including a likelihood of occurrence rating and an annualized property loss total.

Table 3.81. Likelihood of Occurrence, Annual Property Loss, and Overall Vulnerability Rating for Tornadoes

County	Total Number of Tornadoes	Likelihood of Occurrence	Likelihood of Occurrence Rating	Total Annualized Property Loss	Total Annualized Property Loss Rating	Overall Vulnerability Rating	Overall Vulnerability Rating Description
Andrew	24	.358	3	\$96,572	1	10	Low

Source: Missouri State Plan 2018, pg. 3.381

The most important loss is that of human life. Unfortunately, loss of life and injury has occurred in Andrew County from tornado events.

Previous and Future Development

As the population increases in Andrew County, so does the exposure to property damage and loss of life or injury as a result of a tornado. The county and communities have increased their efforts to reduce the risk.

The courthouse has signage instructing the public where to take shelter in the building during a tornado. School district assets are also at risk from tornadoes. The North Andrew School District constructed a tornado shelter with funding from a 2011 FEMA mitigation grant. The shelter can accommodate 1,100 people and is available to the public for shelter during tornado and high wind events. The Savannah School District has also applied for grant funding to do the same for three of their gyms. Camp Geiger, the Boy Scout Camp in Andrew County, completed construction of 13 concrete emergency shelters in 2016 that serve multiple functions as restrooms, storage and a gazebo with seating above the shelter. Each shelter contains emergency outside communication, as well as emergency lighting.



Image of Scout Camp Geiger Tornado Shelter

Hazard Summary by Jurisdiction

In Andrew County, a tornado could occur due to its location in Tornado Alley and historical precedence. The county also has an at-risk population of homes that are valued below \$50,000 (578) and mobile homes (543) that are at a higher risk yet (Source: ACS 5-year 2015-2019). These homes are at risk because they could have weak structural protection from high winds associated with tornadoes due to their low value or may not have a foundation.

Homes that are over 25 years old also face the risk of older building codes and deteriorating structure. A tornado, of any magnitude, could have a large, adverse impact on these homes. Because a significant number of homes in Andrew County are over 25 years old, the impact of a tornado would be substantial. Please see Table 3.48 for the ages of homes of jurisdictions in Andrew County.

A tornado event could occur anywhere in the planning area, but some jurisdictions, such as Savannah would suffer heavier damages because of the age of the housing, concentration of buildings and higher number of mobile homes (Source: www.factfinder.census.gov).

Problem Statement

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. According to the NCEI, over the past 23 years significant tornado events in Andrew County have resulted in three deaths, six injuries and \$385,000 in property damage. Information in the State Plan indicates that Andrew County has a low vulnerability to tornadoes based on frequency of occurrence and previous damages. However, the Risk Assessment survey taken by county residents noted tornadoes as a top concern.

The risk of property damage, injury, and death in the county can be mitigated by constructing FEMA safe rooms in facilities that house vulnerable populations such as nursing homes, government buildings, and schools. In addition, identifying safe refuge areas in public buildings, nursing homes and other facilities that house vulnerable populations that do not have a safe room could reduce risk. Retrofitting school district facilities with protective filming of windows and installation of blast proof doors will provide more protection for students and staff at school facilities. Additional warnings and alerts will also provide the public and schools more time to take cover during a tornado. In addition, public safety fairs provide an opportunity to disseminate information to homeowners about individual safe room construction in homes. Cities can adopt or update and enforce IBC 2012 building codes that include construction techniques such as roof tie down straps for mobile homes to mitigate damage to future development.

3.4.10 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.

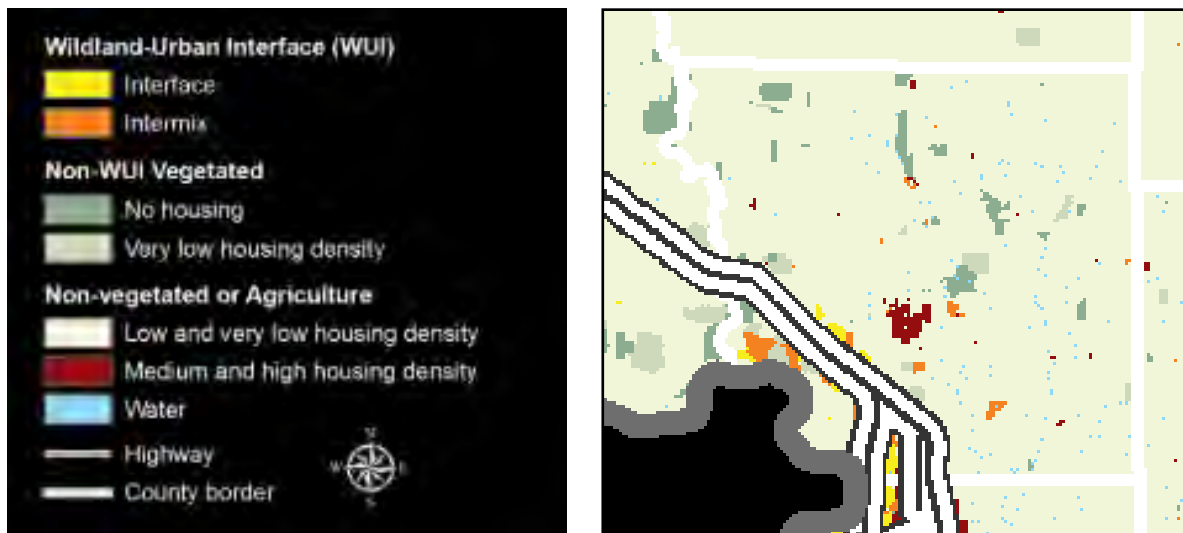
Most of Missouri fires occur during the spring season between February and May. The length and severity of wildland fires depend largely on weather conditions. Spring in Missouri is usually characterized by low humidity and high winds. These conditions result in higher fire danger. In addition, due to 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 to 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

Damages due to wildfires would be higher in communities with more wildland-urban interface (WUI) areas. The term refers to the zone of transition between unoccupied land and human development. 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.

The map below shows the WUI areas in Andrew County. The areas of yellow (Interface) and orange (Intermix) are of the most concern. The communities of the Village of County Club and Amazonia, and the unincorporated area of Avenue City are at the highest risk.

Figure 3.82 Wildland-Urban Interface (WUI) Areas in Andrew County



Source: University of Wisconsin Silvis Lab http://silvis.forest.wisc.edu/GeoData/WUI_cp12/maps/gifs/black/Missouri_WUI_cp12_black_2010.gif

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

The Missouri Department of Conservation Wildfire Data Search shows that from 2002-2019, 702 fire events occurred, burning 6,437 acres (Source: <https://mdc12.mdc.mo.gov/Applications/MDCFireReporting/Home/FireReportSearch>). The largest fire took place on April 12, 2014 when the Savannah Rural Fire District responded to a fire that burned 250 acres. The cause of the fire was reported as “miscellaneous.” The most fires and number of acres burned both occurred in 2011 with 75 calls and a reported 1,037 acres burned. The largest fire that year burned 240 acres.

On June 22, 2019, according to KQ2.com, a fire occurred on the top floor of a building containing apartments in downtown Savannah at the intersection of 5th and Main Streets. Crews from Savannah, Rosendale, Fillmore, and Cosby-Helena assisted, and minor smoke and moderate water damage was reported. On Oct. 9, 2020, Savannah Rural Fire responded to a business fire at Savage Lanes, according to the savrep.com, that caused minor smoke damage.

Mutual aid agreements are of high importance in Andrew County. The fire protection districts in the county are staffed by volunteers and have limited resources to fight fires with. When a fire seems as if it will exceed local capabilities, mutual aid is requested. Also, there are several highways that regularly flood, making it impossible for vehicles of any type to cross. In the case of Rosendale Fire Protection District, they are occasionally cut off from the western portion of their coverage area due to flooding on Highway 48 and rely on the Fillmore Fire Protection District to respond to calls. Thus, mutual aid agreements offer citizens protection for fires throughout Andrew County.

Probability of Future Occurrence

Based on fire reporting statistics from the MDC, there were a total of 624 reported wildfires from January 2004 – January 2020 (204 months). This equates to an average of 3.06 wildfire events monthly or 36.7 annually and a 100 percent probability of occurrence in any given year.

Changing Future Conditions Considerations

According to the State 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 in urban and rural settings.

Vulnerability

Vulnerability Overview

Although the National Fire Incident Reporting System does capture data on wildfires, it was determined that the Department of Conservation historical wildfire data was the best resource. The Department of Conservation data has more individual events recorded per county. Therefore, this data appeared to be more comprehensive. Some fire departments report to both data sets. So, adding the two sets of data together would have double-counted fires. Table 3.83 below shows Andrew County's statistical data for wildfire vulnerability, using the Department of Conservation data.

Table 3.83. Wildfire Numbers, Likelihood of Occurrence, Acres Burned

County	Number of Wildfires 2004-January 2020	Likelihood of Occurrence (#/year)	Total Acres Burned	Average Annual Acreage Burned
Andrew	471	36.23	4,252.66	327

Source: Missouri State Plan 2018, pg. 3. 394

There are the limitations of the data presented. The National Fire Incident Reporting System (NFIRS) data from 2004 to 2008 was used to determine vulnerability where it is stated in the State Plan. However, only 61 percent of fire departments in Missouri reported to the NFIRS so the Department of Conservation data was used to determine county vulnerability.

Potential Losses to Existing Development

The State Plan calculated estimated values of buildings at risk, buildings values available in the HAZUS census block data to determine an average value for each property type. This average value per property type was then applied to the number of structures in the WUI areas, by type, to calculate an overall estimated value of buildings at risk by type. In addition to counts and values of structures at risk, an estimated population impacted for each county was calculated based on the number of residential properties in the WUI areas multiplied by the average household size. The tabled below provides the estimated numbers and values of structures and population vulnerable to wildfire and potential loss estimates.

Table 3.84. Andrew County Structures, Population Vulnerable to Wildfire

County	Number of Structures	Value of Structures	Population
Andrew	812	\$199,010,723	1,667
Agricultural	82	\$17,781,922	
Commercial	61	\$34,484,808	
Education	1	\$1,196,308	
Government	3	\$2,191,500	
Industrial	1	\$311,947	
Residential	664	\$143,044,238	

Source: Missouri State Plan 2018, pg. 3.400

According to the State Plan, Andrew County's wildfire potential loss estimates are \$7,476,679 per year.

Table 3.85 Potential Loss Estimates for WUI Acreage

County	Total WUI Acreage	Total Structure Value Within WUI	Average Value/Acre Within WUI	Average Annual Acreage Burned	Potential Loss
Andrew	8,703.93	\$199,010,723	\$22,864	327	\$7,476,679

Source: Missouri State Plan 2018, pg. 3.416

Impact of Previous and Future Development

Future development in the WUI area near County Club Village is anticipated.

Hazard Summary by Jurisdiction

Individual jurisdiction data is not readily available for the area. Communities with more WUI areas will be at greater risk of wildland fires. The communities of County Club Village, Amazonia and structures on the periphery of Savannah and the Avenue City School District are at greater risk for wildland fires.

Problem Statement

Wildfire occurrence is frequent within Andrew County. These events can destroy, damage, and threaten structures in hazard prone areas. Populations and structures in WUI areas of the county have an increased risk to wildfires due to the level of fuel mixed with structures. Information in the State Plan indicates that Andrew County has a low vulnerability to wildfire based on frequency of occurrence and previous damages.

Cities that have adopted landscape ordinances can include fire safe landscape design requirements in these areas. The school districts, such as Avenue City School District and Savannah School District, that have facilities located in WUI areas have a slightly elevated risk of wildfire due to the proximate amount of fuel present. The county and its communities can promote fire resistant construction materials and landscape design techniques to mitigate the risk to wildfire in future development. Information about these materials and techniques are included in the MDC publication, "Living with Wildfire." Including this information in education and awareness programs for the public may potentially mitigate wildfire damage in the county.

3.4.11 Public Health Emergencies/Environmental Issues

Hazard Profile

Hazard Description

Public health emergencies can take many forms—pandemics, large-scale incidents of food or water contamination, or extended periods without adequate water and sewer services. There can also be harmful exposure to chemical, radiological, or biological agents, and largescale infestations of disease-carrying insects or rodents. The first part of this section focuses on emerging public health concerns and pandemics, while the second part addresses natural and human-caused air and water pollution.

Public health emergencies can occur as primary events by themselves, or they may be secondary to another disaster or emergency, such as tornado, flood, or hazardous material incident. The common characteristic of most public health emergencies is that they adversely impact or have the potential to adversely impact a large number of people. Public health emergencies can be worldwide or localized in scope and magnitude.

In particular, two public health hazards have recently emerged as issues of great concern, with far reaching consequences. One pertains to the intentional release of a radiological, chemical, or biological agent, as a terrorist act of sabotage to adversely impact a large number of people. The second hazard concerns a deadly outbreak (other than one caused by an act of terrorism) that could kill or sicken thousands of people across the county or around the globe. The primary communicable or infectious diseases addressed within this plan are influenza and COVID-19.

- **Influenza-** Whether natural or manmade, health officials say the threat of a dangerous new strain of influenza (flu) virus in pandemic proportions is a very real possibility in the years ahead. Unlike most illnesses, the flu is especially dangerous because it is spread through the air. A classic definition of influenza is a respiratory infection with fever. Each year, flu infects humans and spreads around the globe. There are three types of influenza virus: Types A, B, and C. Type A is the most common, most severe, and the primary cause of flu epidemics. Type B cases occur sporadically and sometimes as regional or widespread epidemics. Type C cases are quite rare and hence sporadic, but localized outbreaks have occurred. Seasonal influenza usually is treatable, and the mortality rate remains low. Each year, scientists estimate which particular strain of flu is likely to spread, and they create a vaccine to combat it. A flu pandemic occurs when the virus suddenly changes or mutates and undergoes an —antigenic shift, permitting it to attach to a person’s respiratory system and leave the body’s immune system defenseless against the invader.

- **COVID-19-** According to the Centers for Disease Control and Prevention (CDC), COVID-19 is a respiratory virus that is transmitted through respiratory droplets when people with the virus cough, sneeze, sing, talk or breathe while in close contact with others. These droplets and particles can linger in the air for minutes to hours, making the virus spread through airborne transmission. Appearing two-14 days after exposure, symptoms may include fever chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting and/or diarrhea. While influenza (flu), and COVID-19 are both contagious respiratory illnesses, COVID-19 is caused by infection with a new coronavirus (called SARS-CoV-2), and appears to spread more easily than flu and cause more serious illness in more vulnerable populations, such as older populations and those with pre-existing conditions. In severe cases, intubation is required and, if unsuccessful in managing respiratory symptoms, may result in death. Since being identified by the World Health Organization as a potential global health concern in January 2020 and then as a pandemic in March 2020, the virus has spread globally, with more than 27.7 million cases in the United States, including 486,000 deaths, as of February 15, 2021. As with other flu-like viruses, COVID-19 has mutated since its unknown etiologic origination in Wuhan City, China, according to the U.S. Food and Drug Administration, thus resulting in genetic variation in the population of circulating viral strains, such as the B.1.1.7 variant discovered in England in September 2020 and now in the U.S.

Additional diseases of public health concern include tuberculosis, Smallpox, St. Louis Encephalitis, Meningitis, Lyme disease, West Nile, SARS, Zika, and Ebola; however, these diseases will not be profiled for this plan. Additional environmental concerns addressed in this hazard profile focus on air and water pollution, because if people breathe contaminated air and/or drink contaminated water, the potential implications on public health can be devastating and widespread.

Air Pollution

While much more of a concern in metropolitan areas, high amounts of ozone, carbon dioxide, nitrogen compounds, and other vehicular pollutants, can impact air quality and pose a health risk. For more information on Missouri's Air Pollution Control Program, contact the Missouri Department of Natural Resources at <http://dnr.mo.gov/env/apcp>. Andrew County has one air monitoring station, located near Savannah and downwind of St. Joseph to help determine the exposure of a segment of residents in the St. Joseph metropolitan area to ground-level ozone and to monitor attainment of the ambient air quality standards. For more information on this station, visit <https://dnr.mo.gov/env/esp/aqm/Savannah.htm>.

Water Pollution

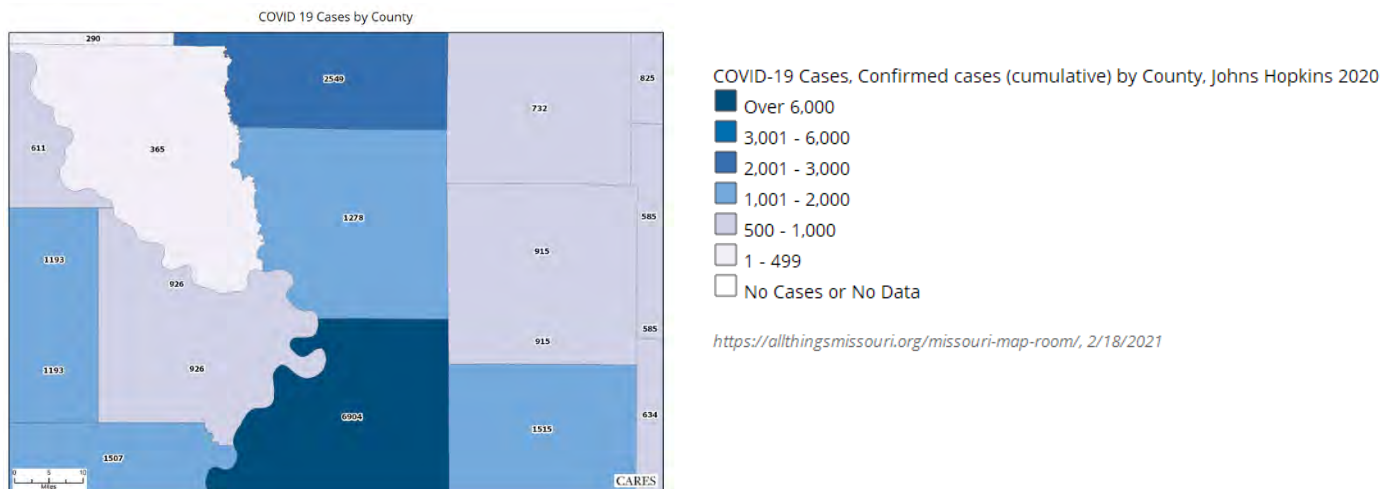
According to the State Plan, there are currently 115,772 miles of classified streams in Missouri and 142,666 miles of unclassified streams. There are 363,653 acres of classified lakes and 68,302 acres of unclassified lakes. In Andrew County, the Nodaway and Platte Rivers are both classified as impaired according to DNR's MO 2016 Section 305b Water Quality Report due to *Escherichia coli* (E. coli) nonpoint source pollution (NPS), as well as the Missouri River, which also includes municipal point sources.

The Environmental Protection Agency (EPA) also maintains the National Pollutant Discharge Elimination System (NPDES). Authorized by the Clean Water Act, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discreet conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states. Since its introduction in 1972, the NPDES permit program is responsible for significant improvements to our Nation's water quality.

Geographic Location

All communities in Andrew County are at risk to public health emergencies. The Missouri Department of Health and Senior Services tracks the spread of influenza and other communicable diseases within the State through reporting from hospitals, laboratories, and healthcare providers. The following map, from Johns Hopkins University, shows confirmed cases of COVID 19 by county as of Feb. 18, 2021.

Figure 3.86. COVID 19 Cases by County, Johns Hopkins University



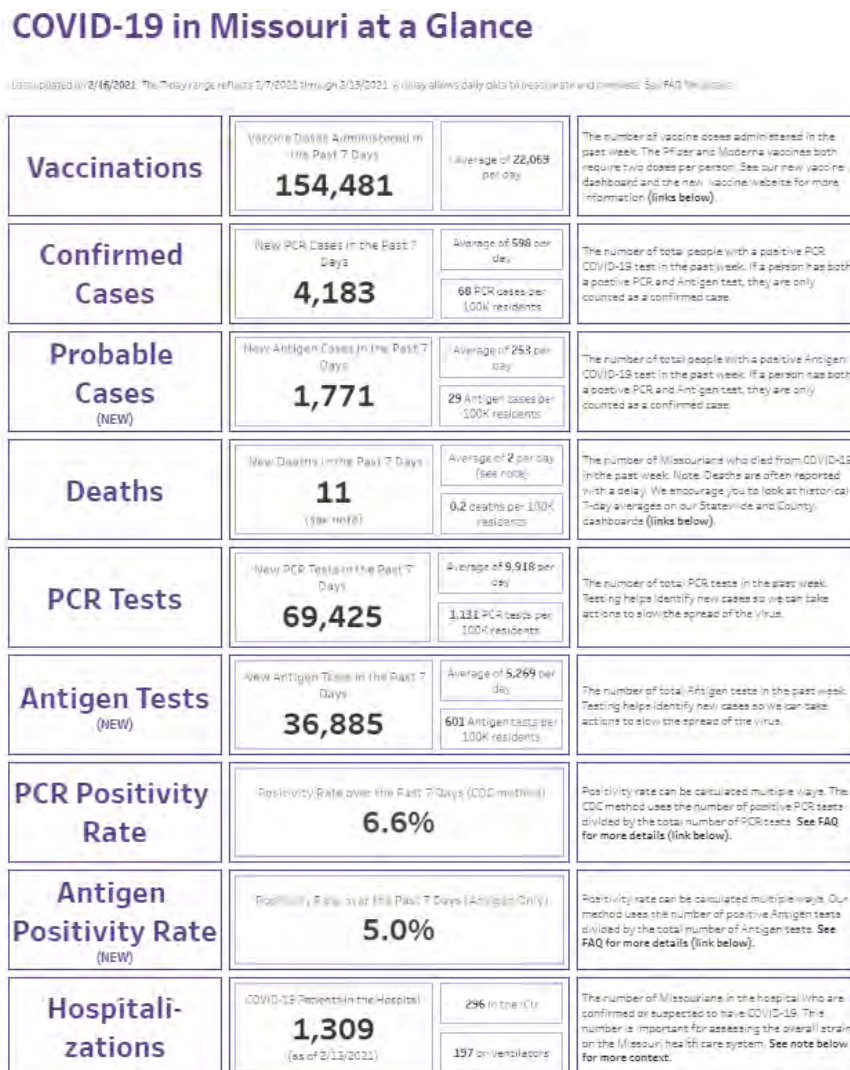
Strength/Magnitude/Extent

The State Hazard Mitigation Plan, which was last updated in 2018, cited the probability of a pandemic at less than one percent. However, the COVID-19 outbreak has become a significant public health emergency. COVID-19 made landfall on the west coast of the United States in late January 2020.

Missouri reported its first corona virus-related death on March 18, 2020, just five days after a state of emergency was declared. By March 21, Governor Mike Parson would announce a ban on gatherings of 10 or more people. A stay at home order was issued for Missouri residents and the Missouri National Guard was activated by April 2. Executive Order 20-12, issued on April 24, 2020, extended the state emergency through December 30, 2020, Executive Order 20-19 once again extended the state emergency and Air Guard activation until March 31, 2021 (<https://www.sos.mo.gov/library/reference/orders/2020>).

On June 11, 2020, Parson announced the state had met the four pillars for his reopening plan, including expanded testing capacity, expanded reserves of personal protective equipment (PPE), successful monitoring of hospital and health care system capacity, and improved ability to track potential outbreaks with public health data (<https://governor.mo.gov/press-releases/archive/governor-parson-announces-missouri-will-fully-reopen-enter-phase-2-recovery>). A state COVID-19 dashboard, <https://showmestrong.mo.gov/data/public-health/>, continues tracking the number of tests administered, active cases, deaths and vaccinations (Figure 3.87).

Figure 3.87. COVID-19 Public Health Dashboard



Similarly, many counties, including Andrew County, erected their own public health dashboards. A public health dashboard created by the University of Missouri Extension office and hosted on the Andrew County Health Department's website (<http://www.andrewcountyhealth.com/index.php/resources/covid-dashboard>), listed total confirmed COVID-19 cases in the county at 1,275 as of February 16, 2021, with 17 confirmed COVID-19 deaths. Nearby Nodaway County had 2,549 cases with 24 deaths and Buchanan County had 6,896 cases with 127 deaths; therefore, Andrew County showed a lower COVID-19 infection and mortality rate when compared to neighboring counties. Initially due to limited testing capacity, eligibility criteria had to be met in order for people to receive a test. As more tests became available and in an effort to confirm/track cases, tests were scheduled and administered either through free community testing sites, with Andrew County hosting one such site in September 2020, and through public and private health care providers. A list of testing sites was made available at <https://health.mo.gov/living/healthcondiseases/communicable/novel-coronavirus/mobile-testing.php>. Because of the airborne and close contact nature of COVID-19 transmissions, all people, including Andrew County residents, are at risk of contracting the virus but can help in the prevention of its spread through simple measures like wearing a mask, frequent hand washing, avoiding close contact with others and those who are sick, disinfecting objects and surfaces, covering the mouth and nose with a tissue to cough or sneeze, and staying home away from others if sick (<https://health.mo.gov/living/healthcondiseases/communicable/novel-coronavirus/prevention.php>).

Previous Occurrences

Since the early 1900s, five lethal pandemics have swept the globe: Spanish Flu of 1918-1919; Asian Flu of 1957-1958; Hong Kong Flu of 1968-1969; Swine Flu of 2009-2010; and COVID-19 of 2019-present. The Spanish Flu was the most severe pandemic in recent history. The number of deaths was estimated to be 50-100 million worldwide and 675,000 in the United States. Its primary victims were mostly young, healthy adults. COVID-19 ranks second deadliest in the United States with a reported 487,109 deaths as of February 16, according to Johns Hopkins University of Medicine (<https://coronavirus.jhu.edu/>) with a higher mortality rate among older populations, those with pre-existing conditions, and disadvantaged populations. The 1957 Asian Flu pandemic killed about 70,000 people in the United States, mostly the elderly and chronically ill. The 1968 Hong Kong Flu pandemic killed 34,000 Americans. The 2009 Swine Flu caused 12,469 deaths in the United States.

Environmental Issues

The EPA maintains a list of facilities that release the most toxic chemicals each year. The most current report, from 2019, shows no known toxics release inventory (TRI) sites in Andrew County; two sites in Holt County to the west; three sites in Nodaway County to the north; one site in Gentry County to the east; and 23 sites in Buchanan County to the south (<https://gispub.epa.gov/trina2019/>).

Probability of Future Hazard Events

It is impossible to predict when the next pandemic will occur or its impact, thus noted as less than one percent. The CDC continually monitors and assesses pandemic threats and prepares for an influenza pandemic. Novel influenza A viruses with pandemic potential include Asian lineage avian influenza A (H5N1) and (H7N9) viruses. These viruses have all been evaluated using the Influenza Risk Assessment Tool (IRAT) to assess their potential pandemic risk. Because the CDC cannot predict how severe a future pandemic will be, advance planning is needed at the national, state and local level. The Missouri Department of Health and Senior Service maintains a Pandemic Influenza Plan for the State.

Today, a much larger percentage of the world's population is clustered in cities, making them ideal breeding grounds for epidemics. Additionally, the explosive growth in air travel means the virus could

literally be spread around the globe within hours. Under such conditions, there may be very little warning time. Outbreaks are expected to occur simultaneously throughout much of the nation, preventing shifts in human and material resources that normally occur with other natural disasters. These and many other aspects make influenza pandemic unlike any other public health emergency or community disaster.

Environmental concerns are also on the rise, with recent scientific data emphasizing the long-term impacts that air and water pollution can have on the ecology of affected areas. With continued enforcement of regulatory standards for airborne releases and discharges to waterways, routine emissions by industrial facilities are relatively easy to monitor and control. However, the potential always remains for unauthorized 3.511 3 Risk Assessment dumping and releases and for failure of systems to control industrial discharges, resulting in potential environmental emergencies (2018 Mo State Hazard Mitigation Plan, pp. 3.510-3.511).

Changing Future Conditions Considerations

According to the U.S. Global Change Research Program, the influences of climate change on public health is significant and varied. The influences range from the clear threats of temperature extremes and severe storms to less obvious connections related to insects. Climate and weather can also affect water and food quality in particular areas, with implications for public health.

Hot days can be unhealthy—even dangerous. High air temperatures can cause heat stroke and dehydration, and affect people’s cardiovascular and nervous systems. Midwestern cities like St. Louis are vulnerable to heat waves, because many houses and apartments lack air conditioning, and urban areas are typically warmer than their rural surroundings. In recent decades, severe heat waves have killed hundreds of people across the Midwest. Heat stress is expected to increase as climate change brings hotter summer temperatures and more humidity. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor.

Higher temperatures and wetter conditions tend to increase mosquito and tick activity, leading to an increased risk of zoonotic diseases. Mosquitos are known to carry diseases such as West Nile virus (WNV), La Crosse/California encephalitis, Jamestown Canyon virus, St. Louis encephalitis, and Eastern equine encephalitis. The two major concerns associated with warmer and wetter conditions are that the mosquito species already found in Missouri and the diseases that they carry will become more prevalent, and that new species carrying unfamiliar diseases will start to appear for the first time.

Warmer winters with fewer hard freezes in areas that already see WNV-carrying mosquitos are likely to observe both a higher incidence of WNV and a longer WNV season, ultimately leading to an increase in human cases. Non-native mosquito species may move into Missouri if the climate becomes more suitable for them, bringing with them diseases such as Jamestown Canyon virus, Chikungunya, and Dengue Fever.

Ticks are also well-known disease vectors in Missouri, carrying pathogens such as Lyme disease, anaplasmosis, Ehrlichiosis, Powassan virus, and Babesiosis. Warmer, wetter weather can lead to an increase in algal blooms and declining beach health. An increase in flood events may also be associated with an increased incidence of mold problems in homes and businesses, as well as contamination of wells and surface waters due to sewer overflows and private septic system failures.

If these predictions come true, communities must contend with the human health impacts related to the increased prevalence of infectious diseases, heat waves, and changes in air and water quality. Public health officials will need to focus on spreading information and enacting pest and disease reduction. Flood prone communities will need to focus on continuously improving flood controls and

mitigation strategies, including restricting building and chemical storage in floodplains, upgrading well and septic requirements, and providing water testing kits to residents (2018 Mo State Hazard Mitigation Plan, p. 3.511).

Vulnerability

Vulnerability Overview

Public Health Emergencies

For planning purposes, it is reasonable to assume a rapid movement of a pandemic flu virus from major metropolitan areas to rural areas of Missouri. The 2018 Missouri Hazard Mitigation Plan accurately stated that the effect of a pandemic on individual communities would be relatively prolonged – weeks to months – and could have a devastating effect on the health and well-being of Missouri citizens and the American public. CDC estimates of such an outbreak, as reported in the 2018 State Plan, included these estimates, most of which have been met and exceeded by COVID-19:

- Up to 200 million persons will be infected
- Between 40 and 100 million persons will become clinically ill
- Between 18 and 45 million persons will require outpatient care
- Between 300,000 and 800,000 persons will be hospitalized
- Between 88,000 and 300,000 people will die nationwide
- Effective preventative and therapeutic measures, including vaccines and antiviral agents, likely will be in short supply, as well as some antibiotics to treat secondary infections
- Economic losses from the next pandemic may range from \$71 to 166 billion, depending on the attach rate.

Compared to public health emergencies, as previously described, environmental incidents involving air and water pollution would likely impact a more localized area; however, long-term effects on the environment in the impacted area could linger for many years.

As previously noted, all of Missouri and Andrew County is at risk to public health emergencies, while some special populations are at increased risk for infectious diseases (2018 MO Hazard Mitigation Plan, 3.512), including the institutionalized elderly, prison populations and children, particularly unimmunized children.

Environmental Issues

Although Missouri has never had an environmental disaster of large proportions, there are many instances where hazardous substances can impact the environment with considerable consequences to either air or water. Floods often temporarily interrupt community water supplies, creating the need for emergency potable water for thousands of people, as was the case in July 1993 when St. Joseph's municipal water plant was forced to shut down for an extended period when contaminated floodwater threatened to enter the system. Floodwaters also disrupt wastewater treatment facilities, resulting in the discharge of raw or improperly treated sewage. Amazonia's wastewater treatment process was compromised by flood waters during a flood event in July 2020, resulting in the town paying thousands of dollars to pump excess water out of the system to keep it running. Periodically, water pollutants cause fish kills in Missouri streams, and excessive air pollutants associated with smog in large metropolitan areas create public health problems.

Potential Losses to Existing Development

Public Health Emergencies

According to the State Plan, Buildings, infrastructure, and critical facilities are not vulnerable to this hazard. It affects only persons susceptible to the illness. The lasting impacts and potential losses are largely social/economic and are dependent on the type, extent, and duration of the illness. A 2007 study prepared by the Trust for America’s Health, a nonprofit organization dedicated to making disease prevention a national priority, developed a model to assess the potential impact of a pandemic flu on each state’s workforce and how 20 key industry sectors and trade would be affected. Economic impact to Missouri was estimated to include the following:

- Projected GDP Loss from Pandemic: \$12.4 billion
- Projected GDP Percentage Loss from Pandemic: 5.74%
- Ranking of Percentage Losses Out of 50 States (Highest = 1): 14
- Projected Impact on the Workforce: \$5.5 billion in losses
- Projected Impact on Industries: \$4.7 billion in losses
- Projected Trade Impact: \$2.2 billion in losses
- Projected Number of Lives Lost: 47,000
- Projected Number of Sick Workers (assuming 3 weeks of work lost (with 50 weeks of work per year) from those who are either ill, fear the risk of infection at work, or need to take care of sick family members): 1,717,000

Source: Mo State Hazard Mitigation Plan, p.3.513

For this State Hazard Mitigation Plan Update, pandemic influenza was used as the worst-case scenario for estimating potential losses. The Missouri Department of Health and Senior Service’s Pandemic Influenza Plan assumes the clinical disease attack rate would be 30 percent in the overall population. Combining this assumption with an estimate of age distribution for influenza cases and the estimated direct and indirect health care costs, the economic impact of pandemic influenza can be calculated for each county within Missouri. The table below presents the estimates for age distribution and disease outcome.

Table 3.88 Potential Vulnerability of Andrew County for Pandemic Influenza

Population	Potential Population Affected	Total Hospitalizations per Age Group (#)			Economic Impact per Age Group (\$)			Total Economic Impact	Vulnerability
		1) 0-19	2) 20-64	3) 65+	1) 0-19	2) 20-64	3) 65+		
17,296	7,613	1) 16.36	2) 55.98	3) 20.21	1) \$51,494.96	2) \$360,998.88	3) \$148,554.33	\$561,048.18	Low

Source: 2018 Mo Hazard Mitigation Plan, p. 3.515

Impact of Previous and Future Development

Public Health Emergencies

As populations increase and the cost of health care climbs, potential losses can be expected to rise.

Environmental Issues

Throughout the State, continuing suburban development impacts streams in several ways. Shortening and culverting of channels leads to the direct loss of streams and riparian areas. The increase in impervious surface area in the surrounding watershed leads to unnatural hydrograph patterns, with lower baseflow and higher stormflow. The altered channel and higher peak flows can increase erosion, while the runoff from the impervious surface carries increased levels of sediment and various chemicals from the urban environment. Elevated nutrient levels or bacterial contamination is also likely if individual or community domestic sewage systems are not well maintained.

Hazard Summary by Jurisdiction

Andrew County is susceptible to public health emergencies, including pandemics. The table below displays the information about confirmed and probable Covid-19 cases per jurisdiction in Andrew County, as of March 22, 2021.

Table 3.89 Andrew County Covid-19 Cases as of March 22, 2021

City	Number of Cases Reported	2019 Population Estimate	Percentage
No city specified	36	--	--
Amazonia	89	267	33%
Cosby	84	213	31%
Country Club Village	206	2,729	8%
Fillmore	35	194	18%
Helena (unincorporated)	48	--	--
Rea	34	39	87%
Rosendale	73	111	66%
Savannah	981	5,159	19%
Total	1,644	17,503	9%

Source: <https://allthingsmissouri.org/county-covid-19-dashboards/andrew-county/>

Problem Statement

Preparing for, responding to and recovering from public health emergencies like COVID-19 will require a strategy with many similarities to other disease outbreaks, be they naturally occurring or resulting from terrorist action. The time-honored public health activities to lessen the impact on morbidity and mortality such as education, vaccination, prophylaxis, isolation/quarantine and the closure of public facilities are common to all, despite the particular disease of concern. In addition, clear, concise communication with the public, within the Missouri Department of Health and Senior Services (DHSS), and with other agencies remains a critical component, as does the ability of the involved agencies to achieve collaboration and coordination. By its very nature, an influenza

pandemic, once started, will not be stopped until it has run its course. This course can be shortened and weakened by many things, with vaccination being the gold standard for protecting the population. Pandemic plans describe strategies of preparedness, response and recovery to attempt to decrease illnesses and deaths during the pandemic period to manageable levels (i.e., that do not overwhelm the critical infrastructures of the State), and to promote community resiliency and rapid recovery.

3.4.13 Cyber Disruption

Hazard Profile

Hazard Description

Cyber disruption is an emerging hazard that has gained increasing notoriety as the vulnerability to disruption grows parallel with the dependence for cybernetic systems. An official definition for cyber disruption has not been solidified amongst professionals and can only be described as an interruption or disruption of the normal operations, use and/or function of a cybernetic system.

Disruptions can typically fall into two very general categories; un-intentional disruption and intentional disruption. Un-intentional disruptions are the more common type of disruption as they usually occur when a portion of the system fails. This can look like a typo or mistake in the code used to design the system or a physical failure of hardware or network. Disruption can also be a cascading effort of a failure of other systems supporting the network, i.e. power.

Intentional disruption is typically a directed 'attack' on a cybernetic system to achieve an intended goal, which is usually malicious in intent. These types of disruptions are the most worrisome to governments as they pose the potential to cause irreparable harm to the function and capability of critical systems or supporting systems that are used in daily operations.

The FBI defines this intentional disruption as a threat: "a cyber-threat is any circumstance or event with the potential to adversely impact operations (including mission, functions, image, or reputation), agency assets, or individuals through an information system via unauthorized access, destruction, disclosure, modification of information, and/or denial of service."

There are many types of cyber disruptions producing a wide variety of societal impacts. Incidents can range from purposeful criminal activities meant to steal money or information, to making public statements (defacto internet protests), to purposefully causing infrastructure damage or injuring persons through disruptions. The most severe cyber-disruption is defined as Cyberterrorism - a terrorist act designed to cause disruptions to computer-based information systems with the express purpose to cause fear, injury or economic loss. In addition to these disruptions, some government entities and businesses are susceptible to cyber activities with some becoming ongoing targets of "hackers" looking to cause harm or promote a personal or political agenda. In many cases, nationally, there are individuals and groups whose mission is to purposefully disrupt and hack systems to cause disruptions and damage.

The most common type of attack cyber criminal's use is the direct denial of service or DDoS attack. This is where a server or website will be pinged rapidly with information requests overloading the system and causing it to crash. DDoS attacks have been a commonly used tool of organizations labeled by the FBI as cyber terrorists such as Anonymous and Lulz Security. Additionally, these organizations have organized website defacements largely as protests perceived injustices and/or groups they consider hate groups. More sinister attacks have been carried out by other cyber terrorist groups.

Though it is an emerging hazard, cyber disruption has not gone unnoticed. The risks associated with

the Nation's dependence on these networked technologies led to the development of Presidential Policy Directive 41 (PPD-41): United States Cyber Incident Coordination, which sets forth principles governing the Federal Governments to any cyber incident, whether involving government or private sector entities.

PPD-41 recognizes that the frequency of cyber incidents is increasing, and this trend is unlikely to be reversed anytime soon. The National Cyber Incident Response Plan (NCIRP) was developed according to the direction of PPD-41). In 2010, the Department of Homeland Security (DHS) issued the NCIRP Interim Version. This plan was recently updated in December of 2016 (<https://www.us-cert.gov/ncirp>).

In Missouri, the Information Technology Services Division (ITSD), which is part of the Office of Administration (OA), provides direct IT support to nearly all the state government agencies that are under the umbrella of Missouri's 14 IT-consolidated departments. During the 2016 legislative session, ITSD received additional ongoing funding for cyber security from Governor Nixon and the General Assembly. These funds are being used by ITSD's team of cyber security professionals as they enhance the state's cyber security systems and train state employees in cyber security best practices. Within ITSD, the Office of Cyber Security (OCS) is responsible for managing all cyber security related events within the enterprise and ensuring proper administrative and technical controls are implemented to safeguard the State of Missouri's information system (State of Information Technology in Missouri, 2015, <https://oa.mo.gov/information-technology-itsd>)

Geographic Location

Cyber disruption events can occur and/or impact virtually any location that computing devices are used. A disruption to a cybernetic system can have far-reaching effects beyond the location of the system. As a result, cyber disruption that occurs outside of the state or even the nation can impact Missouri. The converse is true as well; an event that impacts systems in Andrew County can cause impacts outside the State.

Strength/Magnitude/Extent

The extent or magnitude/severity of a cyber disruption event is variable depending on the nature of the disruption. Impacts of disruption of a small, isolated cybernetic system could impact only a few functions/processes. However, impacts of disruption of large, integrated cybernetic systems could impact many functions/processes, as well as many individuals that rely on those systems.

The State of Missouri categorizes the severity of a cyber disruption ranging from low to high depending upon the system disrupted and the intention of the attacker. Some systems have redundant capabilities or are not critical to daily operations. As such the severity of a disruption to that system is low. However, there are other systems that are integral to operations, contain sensitive information, or provide access/control to critical systems. A disruption to those systems would have a severe impact on the county.

Though a cyber disruption can have limited impacts within a system's own operations, it also can have extended cascading affects throughout multiple systems. The system that is disrupted and the source of the disruption are major factors in the impact. If it is an intentional disruption and the system is critical then the impact has the potential to be quite devastating.

Probability of Future Occurrence

As cyber disruption is an emerging hazard, the reporting and tracking of disruptive events is difficult. In most cases, it is not required to report an event, and when it is reported most of the information is protected due to the sensitive nature of the systems that have been disrupted. However, there

currently exist several complex databases that track cyber disruption occurrences. Each system makes use of its own definitions and tracking methods. Hackmageddon is one online source that tracks Cyber Attack Statistics.

Changing Future Conditions Considerations

Cyber Disruption is considered a human-caused/technological hazard and is not impacted by changes in weather patterns/climate.

Vulnerability

Vulnerability Overview

Cyber disruptions have the potential to undermine the confidence that people have in their own security when dealing with any number of cyber systems. Intentional events would also succeed in building doubt in their government's ability to protect them from harm. The potential for a major cyber disruption, through intentional attacks, is the scenario that is more likely to occur, based on currently available information. Attacks of that variety are minimal, though increasing in frequency as the threat evolves. Attackers are likely to have either very specific targets, or desire wide-spread publicity from the attacks that would lead towards the targeting of popular, iconic, or critical systems.

Potential Losses to Existing Development

Due to the variables involved, it is not possible to generate quantitative loss estimates to Andrew County for cyber disruption incidents. The state plan lists 100% possibility of occurrence of cyber disruption, with an impact ranging from low to high (2018 State Plan, pg. 3.443).

Impact of Previous and Future Development

All jurisdictions are considered prone to this hazard. As the populace and infrastructure increasingly rely on cyber systems in daily operations, the risk for cyber disruption will only increase. This is a newly developing threat so as more resources are devoted to countering the hazard; the risk to a disruption would hopefully decrease. As infrastructure and facilities are upgrade while new development occurs, planners will need to keep in mind the potential for disruption to essential services due to cyber disruption.

Hazard Summary by Jurisdiction

Cyber Disruption is an emerging hazard that has gained an increasing notoriety as the vulnerability to disruption grows parallel with the dependence for cybernetic systems. Due to the variables involved in the type of disruption (un-intentional vs. intentional), motives of intentional attacks, methods of intentional attacks, and targets of intentional attacks, it is not possible to predict when, how, or where cyber disruption can occur. Mitigation opportunities for this hazard include continued diligence of the county and local government and private-sector entities to continue to monitor, block, and report cyber-attacks as well as continually assess the vulnerability of systems to intentional or unintentional disruptions.

Private citizens must also maintain an awareness of potential threats and vulnerabilities to protect private systems. A study from 2020 stated that Missouri was ranked 7th for victim loss by state and those losses were estimated at \$115,913,584. Elderly citizens tend to be the victims of intentional cyber scams. The table below shows the age range of the victims that experience financial loss in the United States. Data specific to Andrew County is not available at this time.

Table 3.90

Financial Loss to Missouri Victims of Cyber Theft

2020 VICTIMS BY AGE GROUP		
Victims		
Age Range ²	Total Count	Total Loss
Under 20	23,186	\$70,980,763
20 - 29	70,791	\$197,402,240
30 - 39	88,364	\$492,176,845
40 - 49	91,568	\$717,161,726
50 - 59	85,967	\$847,948,101
Over 60	105,301	\$966,062,236

Source: mshp.dps.mo.gov

Problem Statement

All residents, businesses and jurisdictions of Andrew County are at risk to cyber disruption. To address this emerging threat, a community volunteer with a cyber threat background organized for the Missouri Office of Homeland Security to host a cybersecurity presentation for county and city staff and elected officials. Plans are being made for future trainings and developing a cyber security plan.

4 MITIGATION STRATEGY

4 MITIGATION STRATEGY 4.1

4.1 Goals..... 4.1

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4.3 Implementation of Mitigation Actions 4.25

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 risk assessment. The mitigation strategy was developed through a collaborative group process. The process included review of 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 were 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 Andrew County’s existing hazard mitigation plan approved by FEMA on November 21, 2016. Therefore, the goals from the 2016 Andrew County Hazard Mitigation Plan were reviewed to see if they were still valid, feasible, practical, and applicable to the defined hazard impacts. The MPC conducted a discussion session during their second meeting to review and update the plan goals, and also reviewed Buchanan County HMP goals for comparison. 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 felt that 2016 goals were thorough and would be appropriate to carry forward into the 2021 plan.

The 2021 goals are:

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens.

- Objective 1: Protect citizens’ lives and property.
- Objective 2: Provide sufficient warning of impending disasters.
- Objective 3: Identify the citizens most vulnerable to disasters and plan accordingly.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.

- Objective 1: Decrease the impact of disasters.
- Objective 2: Decrease the cost of the next disaster.
- Objective 3: Increase our economic resistance to disasters.

Goal 3: Ensure Access to Information Regarding Hazards Preparation and Recovery.

Objective 1: Increase knowledge among citizens about disaster safety.

Goal 4: Ensure Continued Operation of Government and Emergency Functions in a Disaster.

- Objective 1: Increase disaster mitigation management capability in local governments.
- Objective 2: Strengthen critical infrastructure.

4.2 Identification and Analysis of Mitigation Actions

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

Some specific sources for mitigation action ideas include the following:

- FEMA's Mitigation Action Ideas Publication, <https://www.fema.gov/media-library/assets/documents/30627>
- FEMA's Climate Resilient Activities for Hazard Mitigation Assistance, <https://www.fema.gov/media-library/assets/documents/110202>
- EPA's Hazard Mitigation for Natural Disasters Publication, <https://www.epa.gov/waterutilityresponse/hazard-mitigation-natural-disasters>
- EPA's Planning for an Emergency Drinking Water Supply Publication, <https://www.epa.gov/waterutilityresponse/water-utility-planning-emergency-drinking-water-supply>

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

The MPC included problem statements in the plan update at the end of each hazard profile. The problem statements summarize the risk to the planning area presented by each hazard and include possible methods to reduce that risk. Use of the problem statements allowed the MPC to recognize new and innovative strategies for mitigate risks in the planning area. The MPC reviewed the following information during Meeting #2:

- 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 Meeting #3, individual jurisdictions, including school and special districts, developed final mitigation strategy for submission to the MPC. They were encouraged to review the details of the risk assessment vulnerability analysis specific to their jurisdiction. They were also provided a link to the FEMA’s publication, *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013)*. This document was developed by FEMA as a resource for identification of a range of potential mitigation actions for reducing risk to natural hazards and disasters.

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

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

Additionally, the future inclusion of each mitigation action in the plan update was identified as either keep, delete, or modify. Based on the status updates, there were 114 completed actions, 56 continuing actions (either ongoing or modified), and 234 deleted actions. There are also new actions introduced. Rosendale Fire Protection District is its own jurisdiction in the updated plan and also has a new action item.

The table below provides a summary of the action statuses for each jurisdiction:

Table 4.1. Action Status Summary

Jurisdiction	Completed Actions	Continuing Actions (ongoing or modify)	Deleted Actions
Andrew County	13	17	27
Amazonia	9	6	26
Cosby	2	0	38
Country Club Village	23	5	19
Fillmore	0	1	39
Rea	7	1	33
Rosendale	14	2	25
Savannah	24	13	14
Avenue City School District	2	7	8
North Andrew School District	10	2	2
Savannah R-III School District	10	2	3

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

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

Completed Actions	Completion Details (date, amount, funding source)
Andrew County	
Prepare service announcements and have ready to be disseminated via the electronic system during emergencies and disasters.	City of Savannah has TextCaster in place. Pricing \$2,000 implementation fee, annual fee \$.05 per person.
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.	Red Cross and local fire districts have this list.
Assess public facilities for the location of suitable safe areas. If available, these areas should be clearly marked and employees and visitors informed of their location in public facilities.	
Form and train Community Response Teams in cities and neighborhood associations.	
Continue use of electronic methods, including internet, Twitter, texting and calling systems to notify public of a hazard.	
Inform citizens of what to do to help elderly and disabled friends, neighbors or employees.	
Encourage up-to-date commercial and industrial disaster plans that are coordinated with community disaster plans.	Tier II filed yearly.
Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operations and off hours.	
Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.	
Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	
Incorporate mitigation planning efforts coordinator with duties of emergency management director.	
Make all GIS hazard information available online to county and municipal permitting departments through the Hazard Mitigation Plan.	This is done through the County's Floodplain Manager.
Acquire outdoor warning system in the unincorporated area of Helena.	Received a FEMA grant and outdoor warning system was installed in 2021.
Amazonia	
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.	
Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc.	Have established a mitigation area. It was completed in the 90's when the new bridge was built.

and incorporate this in all comprehensive land use plan updates.	
Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.	Updated annually and presented to council.
Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.	City clerk continues to update.
Encourage schools and emergency responders to participate in a web-based notification system.	Have TextCaser system.
Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.	
Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	
Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.	
Acquire outdoor warning system.	Received a FEMA grant and outdoor warning system was installed in 2021.
Cosby	
Inform all city and county department heads and school districts that a disaster mitigation plan exists.	Completed.
Acquire outdoor warning system.	Received a FEMA grant and outdoor warning system was installed in 2021.
Country Club Village	
Continue program to provide air conditions to those people in the community who do not have them and area at risk during a heat wave.	Evergy Power Company provides fans to people in the community who do not have them and are at risk during a heat wave.
Review emergency access routes and evacuation routes and mitigate any problem areas.	Police Department reviews emergency routes and evacuation routes and identifies problem areas.
Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	Police and fire departments use electronic methods to notify public of hazards.
Inform citizen what to do to help elderly and disable friends, neighbors or employees.	Police department uses social media, and newsletter to inform n ways to assist elderly and disabled neighbors.
Update inventory facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	The village hall and fire station have emergency power generators to be used to power shelters (city hall & fire station) during a natural disaster.
Adopt the most current edition of model building code to address structural and architectural issues related to hazard mitigation.	The village adopted the 2009 Building Code Standards in September 2015.
Mandate the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide	The village continues to comply with state stormwater management regulations (MS4).

storm water management plan.	
Enact ordinances prohibiting residential and commercial development in all high-hazard prone areas.	Current zoning regulations stress the importance storm water management before issuing permits to build commercial or residential structures.
Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.	Mo-Kan provide information on flood maps. SEMA provides information on flood evacuation procedures.
Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.	City Clerk maintains an accurate list of emergency responders and other pertinent information.
Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.	
Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready-in-3 program.	
Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.	
Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	
Execute and maintain mutual aid agreements with all relevant agencies.	
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	
Inform all city and county department heads and school districts that a disaster mitigation plan exists.	
Develop and implement official snow day plans and policies for non-essential personnel.	
Update comprehensive land use plans to specifically address development in hazard-prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.	
Promote environmentally sound watershed and storm water practices to decrease flash flooding.	
Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.	
Encourage tree trimming by electric companies to help offset damages from breaking limbs.	
Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.	Our building inspector reviews and monitors upgrades for critical buildings and infrastructures.
Rea	
Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	Most residents have them.
Encourage the incorporation and design of	The church basement is being used and it's stocked with

shelters in the construction of new public facilities like libraries, community centers, etc.	emergency supplies.
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	NOAA weather radios are in public facilities.
Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.	The village is vigilant in talking about this.
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation	The village asking them is there's anything they need to know.
Encourage schools and emergency responders to participate in a web-based notification system.	The school is on the notification list and there is a DARE officer in school daily.
Acquire outdoor warning system.	Received a FEMA grant and outdoor warning system was installed in 2021.
Rosendale	
Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	
Continue use of electronics methods, including internet, Twitter, texting and calling systems to notify public of a hazard.	Done through Facebook and texting.
Inform citizens what to do to help elderly and disabled friends, neighbors or employees.	This is done in the community.
Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.	This is ongoing.
Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operations and off hours.	
Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.	
Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado saferooms in their homes to reduce the potential for loss of life.	
Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.	
Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.	
Maintain a publicly accessible list of names, positions, contact information, roles and responsibilities for all public safety positions and departments.	
Execute and maintain mutual aid agreements with all relevant agencies.	
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	

Inform all city and county department heads and school districts that a disaster mitigation plan exists.	
Acquire outdoor warning system.	Received a FEMA grant and outdoor warning system was installed in 2021.
Savannah	
Incorporate hazard buffer zones into subdivision platting regulations.	
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.	Occurs as needed.
Designate certain air-conditioned facilities as heat emergency shelters and encourage people without air conditioning to use them in a heat wave.	Information sharing occurs about air-conditioned facilities.
Review emergency access routes and evacuation routes and mitigate any problem areas.	Done as needed.
Encourage the building of permanent storm shelters in mobile home parks.	Required in the city code.
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	Weather radios or signing up for texts from National Weather Service.
Cities that do not have warning systems should purchase them.	Savannah has a warning siren.
Continue use of electronic methods, including internet, Twitter, texting and calling systems to notify public of a hazard.	This works well for us.
Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	The city has several generators, but most will be put into use and not available.
Adopt the most current edition of a model building code to address structural and architectural issues related to hazard mitigation.	The city currently follows ICC 2006.
Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.	Have required in a subdivision when it went through zoning.
Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.	Yes, this is done.
Amend municipal ordinances to include a section mandating the building of a wind-resistant shelter with a capacity to handle the expected population in any new mobile home park or park undergoing renovation or expansion.	This is required in our code.
Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.	Maintained.
Encourage citizen that live in areas near timber or tall grass to remove vegetation, yard debris and	City has a yard waste site, citizens are allowed to dump these items.

other combustible materials that may be near structures.	
Maintain a publicly accessible list of names, positions, contact information, roles and responsibilities for all public safety positions and departments.	This data is available on the city's website.
Execute and maintain mutual aid agreements with all relevant agencies.	City will request and provide mutual aid as needed.
Inform all city and county department heads and school districts that a disaster mitigation plan exists.	City passes out the plan when it is finalized.
Develop and implement official snow day plans and policies for non-essential personnel.	Everyone that works for the city is essential.
Update comprehensive land use plans to specially address development in hazard-prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.	We are currently updating our zoning ma and will see if planners can identify hazard areas.
Encourage schools and emergency responders to participate in a web-based notification system.	The city offers a text/email notification system.
Maintain offsite data back u of county records and plan to safeguard those that do not have backups.	The city has cloud storage. Unsure about the county.
Encourage tree trimming by electric companies to help offset damages from breaking limbs.	The city has not had to encourage them since they seem to do well.
Review, prioritize, institute, and monitor needed upgrades and retrofits for critical buildings and infrastructure.	The city's loss prevention company requires regular inspections.
Avenue City School District	
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	One in use.
Educate children in disaster preparedness and how to survive disasters.	Current capability.
North Andrew School District	
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services and agencies to locate survivors after a disaster.	
Assess exiting public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	
Review emergency access routes and evacuation routes and mitigate any problem areas.	
Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	
Educate children in disaster preparedness and how to survive disasters.	Have drills and education.
Maintain a publicly accessible list of names, position contact information, roles and responsibilities for all public safety positions and departments.	
Inform all city and cunty department heads and	

school districts that a disaster mitigation plan exists.	
Develop and implement official snow day plans and policies for non-essential personnel.	
Encourage schools and emergency responders to participate in a web-based notification system.	
Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructure.	
Savannah School District	
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.	
Review emergency access routes and evacuation routes and mitigate any problem areas.	
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	
Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of hazard.	Currently employee communication coordinator to facilitate.
Educate children in disaster preparedness and how to survive disasters.	Always.
Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	Update yearly.
Encourage property owners, business and occupants in hazard areas to participate in policy formation.	
Inform all city and county department heads and school districts that a disaster mitigation plan exists.	
Develop and implement official snow day plans and policies for non-essential personnel.	
Encourage school and emergency responders to participate in a web-based notification system.	
Deleted Actions	Reason for Deletion
Andrew County	
Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	No resources to implement or pursue.
Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.	Combined with another similar action that will be continued.
Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.	No resources to implement or pursue.
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	No resources to implement or pursue.
Cities that do not have warning systems should purchase them.	No resources to implement or pursue.

Continue to participate in buyout program for the highest risk properties located in the highest risk flood areas.	Combined with another similar action that will be continued.
Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.	No resources to implement or pursue.
Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.	No resources to implement or pursue.
Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.	No resources to implement or pursue.
Publish detailed hazard maps on city and county websites and provide paper copies to the public.	No resources to implement or pursue.
Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.	No resources to implement or pursue.
Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.	No resources to implement or pursue.
Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.	No resources to implement or pursue.
Maintain website for the Local Emergency Planning Committee.	No resources to implement or pursue.
Develop and implement official snow day plans and policies for non-essential personnel.	No resources to implement or pursue.
Promote environmentally sound watershed and storm water practices to decrease flash flooding.	No resources to implement or pursue.
Encourage schools and emergency responders to participate in a web-based notification system.	Not our jurisdiction.
Obtain data to complete more thorough vulnerability assessments and determine potential loss.	No resources to implement or pursue.
Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.	No resources to implement or pursue.
Encourage tree trimming by electric companies to help offset damages from breaking limbs.	No resources to implement or pursue.
Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.	No resources to implement or pursue.
Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.	No resources to implement or pursue.

Water and wastewater districts should elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plans, potable water treatment plants and pump stations.	No resources to implement or pursue.
Maintain the website for the Local Emergency Planning Committee.	No resources to implement or pursue.
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	
Inform all city and county department heads and school districts that a disaster mitigation plan exists.	No resources to implement or pursue.
Develop and implement official snow day plans and policies for non-essential personnel.	No resources to implement or pursue.
Amazonia	
Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	Completed and delete.
Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.	No new construction
Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.	No funding source to provide air conditioners
Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.	There's one church without the means to construct a tornado shelter.
Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	The community building and school are potential locations but the action item will be deleted due to no staff to oversee the implementation.
Form and train Community Response Teams in cities and neighborhood associations.	Lack of local involvement. Initiative could be lead by county.
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	Cell phones can be utilized for this.
Inform citizens what to do to help elderly and disabled friends, neighbors or employees.	This is done by word of mouth and a current capability.
Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).	No resources to implement.
Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	Lack of resources/volunteers to implement.
Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	No funding.
Continue to participate in buyout program for the highest risk properties located in the highest-risk	Lack of interest.

flood areas.	
Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.	Not necessary.
Continue to work with SEMA in ongoing buyout program for repetitive loss structures in flood-prone areas.	It's up to individuals to make arrangements with SEMA.
Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.	Unaware of this plan.
Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.	Will partner with the county.
Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.	No resources to implement or pursue.
Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready-In-3 program.	No resources to implement or pursue.
Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.	Lack of community involvement.
Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.	Lack of community cooperation.
Execute and maintain mutual aid agreements with all relevant agencies.	Handled by county.
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	Lack of community cooperation.
Inform all city and county department heads and school districts that a disaster mitigation plan exists.	Andrew County leads on this.
Develop and implement official snow day plans and policies for non-essential personnel.	All city employees are part time.
Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.	No issues with this.
Encourage tree trimming by electric companies to help offset damages from breaking limbs.	Evergy sends notifications annually and provides service on as needed basis for main thorough fares.
Cosby	
Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	No resources to implement or pursue.
Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.	No resources to implement or pursue.
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency	No resources to implement or pursue.

services agencies to locate survivors after a disaster.	
Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.	No resources to implement or pursue.
Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.	No resources to implement or pursue.
Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	No resources to implement or pursue.
Review emergency access routes and evacuation routes and mitigation any problem areas.	No resources to implement or pursue.
Form and train Community Response Teams in cities and neighborhood associations	No resources to implement or pursue.
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	No resources to implement or pursue.
Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	No resources to implement or pursue.
Inform citizens what to do to help elderly and disabled friends, neighbors or employees.	No resources to implement or pursue.
Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).	No resources to implement or pursue.
Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources to implement or pursue.
Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	No resources to implement or pursue.
Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.	No resources to implement or pursue.
Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.	No resources to implement or pursue.
Communities that do not currently participate in the National Flood Insurance Program (NFIP) will consider doing so.	No resources to implement or pursue.
Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.	No resources to implement or pursue.
Ensure all local governments have the latest copies of flood insurance rate maps, flood plain	No resources to implement or pursue.

maps and similar documents.	
Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.	No resources to implement or pursue.
Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.	No resources to implement or pursue.
Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.	No resources to implement or pursue.
Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.	No resources to implement or pursue.
Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.	No resources to implement or pursue.
Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.	No resources to implement or pursue.
Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.	No resources to implement or pursue.
Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.	No resources to implement or pursue.
Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.	No resources to implement or pursue.
Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	No resources to implement or pursue.
Execute and maintain mutual aid agreements with all relevant agencies.	No resources to implement or pursue.
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	No resources to implement or pursue.
Develop and implement official snow day plans and policies for non-essential personnel.	No resources to implement or pursue.
Promote environmentally sound watershed and storm water practices to decrease flash flooding.	No resources to implement or pursue.
Encourage schools and emergency responders to participate in a web-based notification system.	No resources to implement or pursue.
Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.	No resources to implement or pursue.
Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.	No resources to implement or pursue.
Encourage tree trimming by electric companies to	No resources to implement or pursue.

help offset damages from breaking limbs.	
Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.	No resources to implement or pursue.
Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.	No resources to implement or pursue.
Country Club Village	
Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	No resources to implement or pursue.
Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.	No resources to implement or pursue.
Incorporate hazard buffer zones into subdivision platting regulations.	No resources to implement or pursue.
Incorporate hazard buffer zones into subdivision platting regulations.	No resources to implement or pursue.
Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.	No resources to implement or pursue.
Form and train Community Response Teams in cities and neighborhood associations.	No resources to implement or pursue.
A NOAA weather radio in continuous operation in all facilities offering public accommodations.	No resources to implement or pursue.
Cities that do not have warning systems should purchase them.	No resources to implement or pursue.
Work with organizations and utilities to provide materials to volunteer labor to assist at-risk groups in winterizing their homes.	No resources to implement or pursue.
Continue to participate in buy out program for the highest risk properties located in the highest-risk flood areas.	No resources to implement or pursue.
Adopt alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.	Very small portion of Country Club Village is located within the flood plain.
Amend municipal ordinances to include a section mandating the building of a wind-resistant shelter with a capacity to handle the expected population in any new mobile home park or park undergoing renovation or expansion.	No resources to implement or pursue.
Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.	No resources to implement or pursue.
Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.	No resources to implement or pursue.
Conduct a public education campaign to inform citizens across the region of the benefits of	No resources to implement or pursue.

constructing tornado saferooms in their homes to reduce the potential for loss of life.	
Encourage businesses and homeowners in flood-prone area to elevate mechanical systems such as furnaces, water heaters and electrical panels.	No resources to implement or pursue.
Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.	No resources to implement or pursue.
Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.	Utility companies make decision regarding above ground transmission lines, poles and similar structures.
Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.	No resources to implement or pursue.
Fillmore	
Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	No resources to implement or pursue.
Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers etc.	No resources to implement or pursue.
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.	No resources to implement or pursue.
Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.	No resources to implement or pursue.
Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.	No resources to implement or pursue.
Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	No resources to implement or pursue.
Review emergency access routes and evacuation routes and mitigate any problem areas.	No resources to implement or pursue.
Form and train Community Response Teams in cities and neighborhood associations.	No resources to implement or pursue.
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	No resources to implement or pursue.
Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	No resources to implement or pursue.
Inform citizens what to do to help elderly and disable friends, neighbors or employees.	No resources to implement or pursue.
Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with	No resources to implement or pursue.

Disabilities Act (ADA).	
Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources to implement or pursue.
Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	No resources to implement or pursue.
Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.	No resources to implement or pursue.
Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.	No resources to implement or pursue.
Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.	No resources to implement or pursue.
Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.	No resources to implement or pursue.
Maintain and update list of names, phone numbers and duties for all emergency service employees during regular operation and off hours.	No resources to implement or pursue.
Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.	No resources to implement or pursue.
Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.	No resources to implement or pursue.
Conduct a public education campaign to inform citizen across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.	No resources to implement or pursue.
Provide information to media to publish or broadcast emergency information when conditions warrants. Establish contact information with media for night and weekend emergencies.	No resources to implement or pursue.
Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.	No resources to implement or pursue.
Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.	No resources to implement or pursue.
Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.	No resources to implement or pursue.
Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.	No resources to implement or pursue.

Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	No resources to implement or pursue.
Execute and maintain mutual aid agreements with all relevant agencies.	No resources to implement or pursue.
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	No resources to implement or pursue.
Inform all city and county departments heads and school districts that a disaster mitigation plan exists.	No resources to implement or pursue.
Develop and implement official snow day plans and policies for non-essential personnel.	No resources to implement or pursue.
Promote environmentally sound watershed and storm water practices to decrease flash flooding.	No resources to implement or pursue.
Encourage schools and emergency responders to participate in a web-based notification system.	No resources to implement or pursue.
Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.	No resources to implement or pursue.
Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.	No resources to implement or pursue.
Encourage tree trimming by electric companies to help offset damages from breaking limbs.	No resources to implement or pursue.
Review, prioritize, institute and monitor needed upgrades and retrofits for critical building and infrastructures.	No resources to implement or pursue.
Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.	No resources to implement or pursue.
Rea	
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.	No resources to implement or pursue.
Continue program to provide air conditioners to those people in their community who do not have them and are at risk during a heat wave.	No resources to implement or pursue.
Work with private entities, such as churches and businesses to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.	No resources to implement or pursue.
Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	No resources to implement or pursue.
Inform citizens what to do to help elderly and disabled friends, neighbors or employees.	
Review emergency access routes and evacuation	No resources to implement or pursue.

routes and mitigate any problem areas.	
Form and train Community Response Teams in cities and neighborhood associations.	No resources to implement or pursue.
Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	No resources to implement or pursue.
Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).	No resources to implement or pursue.
Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources to implement or pursue.
Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	No resources to implement or pursue.
Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.	No resources to implement or pursue.
Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.	No resources to implement or pursue.
Consider alternative uses for flood prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporated this in all comprehensive land use plan updates.	No resources to implement or pursue.
Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.	No resources to implement or pursue.
Maintain and update list of names, phone numbers and duties for all emergency service employees during regular operation and off hours.	No resources to implement or pursue.
Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.	No resources to implement or pursue.
Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.	No resources to implement or pursue.
Conduct a public education campaign to inform citizen across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.	No resources to implement or pursue.
Provide information to media to publish or broadcast emergency information when conditions warrants. Establish contact information with media for night and weekend emergencies.	No resources to implement or pursue.
Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.	No resources to implement or pursue.

Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.	No resources to implement or pursue.
Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.	No resources to implement or pursue.
Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	No resources to implement or pursue.
Execute and maintain mutual aid agreements with all relevant agencies.	No resources to implement or pursue.
Inform all city and county departments heads and school districts that a disaster mitigation plan exists.	No resources to implement or pursue.
Develop and implement official snow day plans and policies for non-essential personnel.	No resources to implement or pursue.
Promote environmentally sound watershed and storm water practices to decrease flash flooding.	No resources to implement or pursue.
Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.	No resources to implement or pursue.
Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.	No resources to implement or pursue.
Encourage tree trimming by electric companies to help offset damages from breaking limbs.	The power company takes care of this.
Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.	No resources to implement or pursue.
Encourage utility providers to assess their facilities, distribution system, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.	No resources to implement or pursue.
Rosendale	
Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.	No resources to implement or pursue.
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services, agencies to locate survivors after a disaster.	No resources to implement or pursue.
Continue program to provide air conditioners to those people in their community who do not have them and are at risk during a heat wave.	No resources to implement or pursue.
Work with private entities, such as churches and businesses to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.	No resources to implement or pursue.
Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	No resources to implement or pursue.

Review emergency access routes and evacuation routes and mitigate any problem areas.	No resources to implement or pursue.
Form and train Community Response Teams in cities and neighborhood associations.	No resources to implement or pursue.
Creation of a community safe room in Rosendale, located at the North Andrew School District.	Not the responsible entity.
Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	No public accommodations.
Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).	There are no public shelters.
Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	No resources to implement or pursue.
Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	No resources to implement or pursue.
Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.	No resources to implement or pursue.
Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.	No resources to implement or pursue.
Encourage large-scale buyout of flood prone properties in Rosendale and relocate affected property owners.	Combined with another action.
Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.	No resources to implement or pursue.
Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.	No resources to implement or pursue.
Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.	No resources to implement or pursue.
Develop and implement official snow day plans and policies for non-essential personnel.	No resources to implement or pursue.
Promote environmentally sound watershed and storm water practices to decrease flash flooding.	No resources to implement or pursue.
Encourage schools and emergency responders to participate in a web-based notification system.	No resources to implement or pursue.
Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.	No resources to implement or pursue.
Encourage electric and telecommunications utilities to anchor or strengthen above ground	No resources to implement or pursue.

transmission lines, plies or similar structures.	
Encourage tree trimming by electric companies to help offset damages from breaking limbs.	No resources to implement or pursue.
Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.	No resources to implement or pursue.
Savannah	
Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	The city did this but now have a storm siren and emergency texting notification system that works better.
Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.	No funds for this.
Work with private entities such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work on congregate.	Good idea but there are no new structures planned. Action item is combined with a similar action that will be continued.
Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	Need more information to implement.
Continue to participate in buyout program for the highest risk properties located in the highest-risk flood area.	The city does not have the funds for this.
Continue to work with SEMA in ongoing buyout program for repetitive loss structures in flood-prone areas.	Repetitive loss structures do not exist in the city.
Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.	City would support any such campaign but no resources to develop it.
Continue partnerships to allow use of cable access channels to broadcast severe weather preparation information.	The city no longer has that public access channel.
Conduct a public education campaign to inform citizens across the region of the benefits of construction tornado saferooms in their homes to reduce the potential for loss of life.	The city will pass along any resources we were provided about this topic. Action item is combined with a similar action item that will be continued.
Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.	The city does not have the ability to communicate with those that can get the warning and info broadcasted.
Encourage businesses and homeowners in flood-prone area to elevate mechanical systems such as furnaces, water heaters and electrical panels.	The city has not done this but can provide information, if available. However, the city is unable to develop materials to provide.
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	The city has not done this but will do so if required.
Encourage electric al and telecommunications utilities to anchor or strengthen above ground	This action is appropriate.

transmission lines, poles or similar structures.	
Water and wastewater districts should elevate vulnerable equipment at wastewater treatment plans, potable water treatment plants and pump stations.	There are some areas that the city needs to work on. Action item is combined with a similar action item that will be continued.
Avenue City School District	
Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.	N/A
Review emergency access routes and evacuation routes and mitigation any problem areas.	N/A
Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	N/A
Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	N/A
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	N/A
Inform all city and county department heads and school districts that a disaster mitigation plan exists.	N/A
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	N/A
Inform all city and county department heads and school districts that a disaster mitigation plan exists.	N/A
North Andrew School District	
Maintain offsite data back up of county records and plan to safeguard those that do not have backups.	Not the school district's responsibility.
Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.	No resources to implement or pursue.
Savannah R-III School District	
Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.	Lack of funds. There's a separate action item for the school's facilities.
Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.	There is a separate action item for informing school districts that a disaster mitigation plan exists.
Maintain offsite data backup of county records and plan to safeguard those that do not have backups.	The school has records backed up/not county records.

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

4.3 Implementation of Mitigation Actions

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

Jurisdictional MPC members were encouraged to meet with 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 jurisdictions independently prioritized their actions. The methodology from the 2016 plan was used, in which jurisdictions self-determined which actions were high, medium and low priorities. Consideration included the action's potential to save lives and protect property, cost and local capacity to implement/pursue. STAPLEE methodology was not used but available to jurisdictions if they wanted to use it. Actions followed the SMART criteria of being Specific, Measurable, Action oriented, Relevant and Time-bound. The goals and actions were consistent with the hazards identified in the plan and reflected the local priorities and vulnerability to hazards. The actions for the 2021 plan are listed below, followed by a summary table (Table 4.3) that lists the actions in the categories of prevention, structure and infrastructure projects, emergency services and education/outreach.

Figure 4.3. Blank STAPLEE Worksheet

STAPLEE Worksheet	
Name of Jurisdiction:	
Action or Project	
Action/Project Number:	Insert a unique action number for this action for future tracking purposes. This can be a combination of the jurisdiction name, followed by the goal number and action number (i.e. Joplin1.1)
Name of Action or Project:	
Mitigation Category:	Prevention; Structure and Infrastructure Projects; Natural Systems Protection; Education and Outreach; Emergency Services
STAPLEE Criteria	
Evaluation Rating	
Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	
S: Is it Socially Acceptable	

T: Is it Technically feasible and potentially successful?		
A: Does the jurisdiction have the Administrative capacity to execute this action?		
P: Is it Politically acceptable?		
L: Is there Legal authority to implement?		
E: Is it Economically beneficial?		
E: Will the project have either a neutral or positive impact on the natural Environment ?		
Will historic structures be saved or protected?		
Could it be implemented quickly?		
STAPLEE SCORE		
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	
MITIGATION EFFECTIVENESS SCORE		
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		

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

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Thunderstorm
Problem being Mitigated:	Lack of adequate shelter
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.1
Name of Action or Project:	Tornado Shelter
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Work with private entities to construct tornado shelters in facilities where large numbers of people live, work or congregate.
Estimated Cost:	Varies
Benefits:	Protect citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Andrew County Commissioners
Supporting Organization/Department:	Andrew County Assessors
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Private funds
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Minimal construction in unincorporated area

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire
Problem being Mitigated:	Unknown emergency access and evacuation routes
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.2
Name of Action or Project:	Emergency Access and Evacuation Routes
Mitigation Category:	Emergency Services
Action or Project Description:	Review and map emergency access routes and evacuation routes and mitigate any problem areas.
Estimated Cost:	\$500 for mapping
Benefits:	Protect citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management Director
Supporting Organization/Department:	Andrew County Road and Bridge
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	Continuing
Report of Progress:	Lack of resources and funding

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Thunderstorm
Problem being Mitigated:	Lack of adequate shelter
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	Tornado Shelters in Mobile Home Parks
Name of Action or Project:	1.1.3
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Require the building of permanent storm shelters in mobile home parks.
Estimated Cost:	Varies
Benefits:	Protect citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Andrew County Commissioners
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, private, grants, state, federal, match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	There are several mobile home parks in the county but have not enacted an ordinance requiring tornado shelter construction yet.

Action Worksheet	
Name of Jurisdiction:	Amazonia
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire
Problem being Mitigated:	Lack of identified emergency routes
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.4
Name of Action or Project:	Emergency access and evacuation
Mitigation Category:	Emergency Services
Action or Project Description:	Review and map emergency access and evacuation routes and mitigate any problem areas.
Estimated Cost:	\$500
Benefits:	Protect citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Amazonia City Council
Supporting Organization/Department:	NA
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Not progress due to funding and staffing but identified as important
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Country Club Village
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Flash flooding issues
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.5
Name of Action or Project:	Culvert Improvements
Mitigation Category:	Structures and Infrastructure Projects
Action or Project Description:	Installation of new culverts in areas prone to flash flooding due to storm water runoff.
Estimated Cost:	\$213,610
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Country Club Village Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	BRIC grant application was submitted in 2020 and local cash match has been committed

Action Worksheet	
Name of Jurisdiction:	Country Club Village
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Flash flooding issues
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.6
Name of Action or Project:	Stormwater Drainage Improvements
Mitigation Category:	Structures and Infrastructure Projects
Action or Project Description:	Stormwater drainage improvements in areas prone to flash flooding due to storm water runoff.
Estimated Cost:	\$541,750
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Country Club Village Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	BRIC grant application was submitted in 2020 and local cash match has been committed

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Thunderstorm
Problem being Mitigated:	Lack of shelter
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.7
Name of Action or Project:	Storm shelters
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Incorporate the design of shelters in the construction of new public facilities like libraries, community centers, etc.
Estimated Cost:	Varies
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	No new public facilities were constructed

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Flood, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire
Problem being Mitigated:	Lack of community members trained for emergency response
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.8
Name of Action or Project:	CERT
Mitigation Category:	Emergency Services
Action or Project Description:	Form and train Community Emergency Response Team (CERT).
Estimated Cost:	Unknown
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	City of Savannah
Supporting Organization/Department:	Andrew County Emergency Response
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None – the community will require assistance to implement

Action Worksheet	
Name of Jurisdiction:	Avenue City School District
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Thunderstorm
Problem being Mitigated:	Lack of shelter
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.9
Name of Action or Project:	Storm shelters
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Construction of a storm shelter.
Estimated Cost:	Varies
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Avenue City School Board
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Application was submitted to FEMA but no response. Would require a public vote if storm shelter grant application was approved.

Action Worksheet	
Name of Jurisdiction:	Avenue City School District
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Thunderstorm
Problem being Mitigated:	Lack of shelter
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.10
Name of Action or Project:	Marking of safe areas
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Assess existing public facilities for the location of suitable areas. These safe areas should be clearly marked and employees and visitors informed of their location.
Estimated Cost:	None
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Avenue City School Board
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Sheltering area are identified and drills conducted annually.

Action Worksheet	
Name of Jurisdiction:	North Andrew School District
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Thunderstorm
Problem being Mitigated:	Lack of shelter
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.11
Name of Action or Project:	Storm shelters
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Construction of a storm shelter.
Estimated Cost:	Varies
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	North Andrew School Board
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Need additional funds to implement

Action Worksheet	
Name of Jurisdiction:	North Andrew School District
Risk / Vulnerability	
Hazard(s) Addressed:	Severe winter weather, Tornado, Thunderstorm
Problem being Mitigated:	Lack of power source during inclement weather
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.12
Name of Action or Project:	Inventory of Generators/Emergency Power
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Create an inventory of facilities with generators and emergency power that can be used in the event of natural disasters. Equip facilities to connect to generators.
Estimated Cost:	Unsure
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	North Andrew School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	3 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	No progress due to funding

Action Worksheet	
Name of Jurisdiction:	Savannah School District
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Thunderstorm
Problem being Mitigated:	Lack of shelter
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.13
Name of Action or Project:	Storm shelters
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Construction of a storm shelter.
Estimated Cost:	\$1,000,000
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Savannah School Board
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Have submitted a grant application to FEMA

Action Worksheet	
Name of Jurisdiction:	Savannah School District
Risk / Vulnerability	
Hazard(s) Addressed:	Severe winter weather, Tornado, Thunderstorm
Problem being Mitigated:	Lack of power source during inclement weather
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.1.14
Name of Action or Project:	Inventory of Generators/Emergency Power
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Create an inventory of facilities with generators and emergency power that can be used in the event of natural disasters. Equip facilities to connect to generators.
Estimated Cost:	Unsure
Benefits:	Protects citizens' lives and property
Plan for Implementation	
Responsible Organization/Department:	Savannah School Board
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	3 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	No progress due to funding

Action Worksheet	
Name of Jurisdiction:	Amazonia
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Flood, Heat Wave, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire
Problem being Mitigated:	Lack of notice of inclement weather events
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.2.1
Name of Action or Project:	Use of electronic notification
Mitigation Category:	Prevention
Action or Project Description:	Expand use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.
Estimated Cost:	Unsure
Benefits:	Provide sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	Amazonia City Council
Supporting Organization/Department:	Andrew County Emergency Management
Action/Project Priority:	High
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Will work with Andrew County to expand notification system

ACTION WORKSHEET

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Deteriorating infrastructure
Action or Project	
Applicable Goal Statement:	Protect the lives, property, and livelihood of all citizens
Action/Project Number:	1.1.15
Name of Action or Project:	Bridge Replacement
Mitigation Category:	Structure and Infrastructure Projects
Action or Project Description:	Replace bridge on CD 399
Estimated Cost:	\$500,000
Benefits:	Strengthening infrastructure
Plan for Implementation	
Responsible Organization/Department:	Andrew County Commission
Supporting Organization/Department:	Andrew County
Action/Project Priority:	High
Timeline for Completion:	1 year
Potential Fund Sources:	Grants, Internal, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Fillmore
Risk / Vulnerability	
Hazard(s) Addressed:	Tornado, Thunderstorm
Problem being Mitigated:	Lack of notification
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.2.2
Name of Action or Project:	Tornado Sirens
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Acquire a tornado siren.
Estimated Cost:	\$25,000
Benefits:	Notification of inclement weather
Plan for Implementation	
Responsible Organization/Department:	Fillmore City Council
Supporting Organization/Department:	Andrew County Emergency Management
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Grant application submitted to FEMA in 2020 and local match raised from private funds

Action Worksheet	
Name of Jurisdiction:	Rosendale
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding, Dam Failure
Problem being Mitigated:	Lack of notification
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.2.3
Name of Action or Project:	Laser River Level Reader
Mitigation Category:	Mitigation
Action or Project Description:	Installation of a laser river level reader to warn residents of flooding
Estimated Cost:	\$25,000
Benefits:	Notification of rising water levels
Plan for Implementation	
Responsible Organization/Department:	Rosendale City Council
Supporting Organization/Department:	Andrew County Emergency Management
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Avenue City School District
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Flood, Heat Wave, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire
Problem being Mitigated:	Lack of notice of inclement weather events
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.2.4
Name of Action or Project:	Use of electronic notification
Mitigation Category:	Prevention
Action or Project Description:	Expand use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.
Estimated Cost:	Unsure
Benefits:	Provide sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	Avenue City School District
Supporting Organization/Department:	
Action/Project Priority:	High
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	New calling system to be installed in summer of 2021

Action Worksheet	
Name of Jurisdiction:	Avenue City School District
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Flood, Heat Wave, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire
Problem being Mitigated:	Lack of notice of inclement weather events
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.2.5
Name of Action or Project:	Snow Day Plans and Policies
Mitigation Category:	Prevention
Action or Project Description:	Develop and implement official snow day plans and policies for non-essential personnel.
Estimated Cost:	None
Benefits:	Provide sufficient warning of impending disasters
Plan for Implementation	
Responsible Organization/Department:	Avenue City School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	This occurs annually.

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	All
Problem being Mitigated:	Assess barriers
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.3.1
Name of Action or Project:	ADA compliance and planning
Mitigation Category:	Prevention
Action or Project Description:	Create a plan to accommodate individuals with needs for transport to and stay in emergency shelters, including compliance with the American with Disabilities Act (ADA).
Estimated Cost:	None
Benefits:	Identify the citizens most vulnerable to disasters and plan accordingly
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	Modified
Report of Progress:	Identified the skilled nursing homes of Shady Lawn and Laverna Village will need assistance with evacuation to shelter

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Winter Weather
Problem being Mitigated:	Unsuitable housing for winter weather
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.3.2
Name of Action or Project:	Home Winterization for At-Risk Groups
Mitigation Category:	Prevention
Action or Project Description:	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.
Estimated Cost:	Undetermined
Benefits:	Identify the citizens most vulnerable to disasters and plan accordingly
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	Andrew County Commissioners
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Grants, Internal, Private
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None but would like to continue this action

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Severe winter weather, Tornado, Thunderstorm
Problem being Mitigated:	Lack of power source during inclement weather
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.3.3
Name of Action or Project:	Inventory of Generators/Emergency Power
Mitigation Category:	Emergency Services
Action or Project Description:	Create an inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.
Estimated Cost:	None
Benefits:	Identify the citizens most vulnerable to disasters and plan accordingly
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	Continuing
Report of Progress:	None at this time due to staffing challenges

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Flood, Severe Winter Weather, Heat Wave, Thunderstorm, Tornado, Wildfire
Problem being Mitigated:	Vulnerable citizens without anyone to assist them
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.3.4
Name of Action or Project:	Helping vulnerable people
Mitigation Category:	Education and outreach
Action or Project Description:	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.
Estimated Cost:	None
Benefits:	Identify the citizens most vulnerable to disasters and plan accordingly
Plan for Implementation	
Responsible Organization/Department:	City of Savannah
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Not implemented due to staffing but a good action to pursue

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	All
Problem being Mitigated:	Assess barriers
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.3.5
Name of Action or Project:	ADA compliance and planning
Mitigation Category:	Prevention
Action or Project Description:	Create a plan to accommodate individuals with needs for transport to and stay in emergency shelters, including compliance with the American with Disabilities Act (ADA).
Estimated Cost:	None
Benefits:	Identify the citizens most vulnerable to disasters and plan accordingly
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	Continuing
Report of Progress:	None, due to staffing challenges

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Severe Winter Weather
Problem being Mitigated:	Unsuitable housing for winter weather
Action or Project	
Applicable Goal Statement:	Protect the Lives, Property and Livelihoods of All Citizens
Action/Project Number:	1.3.6
Name of Action or Project:	Home Winterization for At-Risk Groups
Mitigation Category:	Prevention
Action or Project Description:	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.
Estimated Cost:	Undetermined
Benefits:	Identify the citizens most vulnerable to disasters and plan accordingly
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Grants, Internal, Private
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None but would like to continue this action

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Risk of flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.1
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs, including Community Rating System (CRS) that improves flood resiliency.
Estimated Cost:	None
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Andrew County Flood Plain Manager
Supporting Organization/Department:	Andrew County Commissioners
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Modified
Report of Progress:	Current NFIP member but will expand/continue participation

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Severe/repetitive flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.2
Name of Action or Project:	Buyout Program
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Work with SEMA in buyout program for repetitive loss structures in flood-prone areas.
Estimated Cost:	Varies
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Andrew County Commissioners
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Grants, Internal, State, Federal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Continuing
Report of Progress:	To date, property owners have refused FEMA's buyout program

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Lack of information about hazard areas
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.3
Name of Action or Project:	Floodplain Maps
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.
Estimated Cost:	\$0 - \$500
Benefits:	Decrease the impact of the next disaster
Plan for Implementation	
Responsible Organization/Department:	Andrew County Floodplain Manager
Supporting Organization/Department:	N/A
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None

Action Worksheet	
Name of Jurisdiction:	Amazonia
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Risk of flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.4
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Update/adopt new NFIP documents/programs, including contributing information to the 102 Watershed study for Risk Map.
Estimated Cost:	None
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Amazonia City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Modified
Report of Progress:	Current NFIP member but will expand/continue participation

Action Worksheet	
Name of Jurisdiction:	Amazonia
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Issues with flash flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.5
Name of Action or Project:	Watershed and Storm Water Practices
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Promote environmentally sound watershed and storm water practices to decrease flash flooding.
Estimated Cost:	None
Benefits:	Decrease impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Amazonia City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Continuing
Report of Progress:	Lack of staffing

Action Worksheet	
Name of Jurisdiction:	Country Club Village
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Risk of flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.6
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.
Estimated Cost:	None
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Country Club Village Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Modified
Report of Progress:	Current NFIP member but will expand/continue participation

Action Worksheet	
Name of Jurisdiction:	Rea
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Risk of flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.7
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.
Estimated Cost:	None
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Rea City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Modified
Report of Progress:	Current NFIP member but will expand/continue participation

Action Worksheet	
Name of Jurisdiction:	Rosendale
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Severe/repetitive flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.8
Name of Action or Project:	Buyout Program
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Work with SEMA in buyout program for repetitive loss structures in flood-prone areas.
Estimated Cost:	Varies
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Rosendale
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Grants, Internal, State, Federal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Continuing
Report of Progress:	To date, property owners have refused FEMA's buyout program

Action Worksheet	
Name of Jurisdiction:	Rosendale
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Risk of flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.9
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.
Estimated Cost:	None
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Rosendale City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Modified
Report of Progress:	Current NFIP member but will expand/continue participation

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Risk of flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.10
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.
Estimated Cost:	None
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Modified
Report of Progress:	Current NFIP member but will expand/continue participation

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Lack of information about hazard areas
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.11
Name of Action or Project:	Floodplain Maps
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Ensure that the city has the latest copies of flood insurance rate maps, flood plain maps and similar documents.
Estimated Cost:	\$0 - \$500
Benefits:	Decrease the impact of the next disaster
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	Andrew County Floodplain Manager
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire
Problem being Mitigated:	Identification of hazard prone areas and strategies
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.12
Name of Action or Project:	Comprehensive Land Use Plan
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Update comprehensive land use plans to specifically address development in hazard prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.
Estimated Cost:	\$0-\$7,000, depends if consultant is used
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Low
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Comprehensive Plan
Progress Report	
Action Status:	Continuing
Report of Progress:	Updating zoning map and will see what is identified as hazard prone areas.

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Issues with flash flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.13
Name of Action or Project:	Watershed and Storm Water Practices
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Promote environmentally sound watershed and storm water practices to decrease flash flooding.
Estimated Cost:	None
Benefits:	Decrease impact of disasters
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	Continuing
Report of Progress:	Lack of staffing

ACTION WORKSHEET

Action Worksheet	
Name of Jurisdiction:	City of Amazonia
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Severe/repetitive flooding
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.1.14
Name of Action or Project:	Buyout Program
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Work with SEMA in buyout program for repetitive loss structures in floodprone areas.
Estimated Cost:	Varies
Benefits:	Decrease the impact of disasters
Plan for Implementation	
Responsible Organization/Department:	City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Grants, Internal, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinance
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Flood, Land Subsidence, Wildfire
Problem being Mitigated:	Increased property exposure
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.2.1
Name of Action or Project:	Prohibiting development in high hazard prone areas
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Enact ordinances prohibiting residential and commercial development in all high hazard prone areas.
Estimated Cost:	None
Benefits:	Decrease cost of next disaster
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Need assistance in identifying these areas

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Drought
Problem being Mitigated:	Water scarcity
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.3.1
Name of Action or Project:	Drought Plan
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Follow guidelines as suggested in the Missouri 2002 Drought Plan by MDNR.
Estimated Cost:	None
Benefits:	Decrease our economic resistance to disasters
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	N/A
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None, due to staffing

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Drought
Problem being Mitigated:	Water scarcity
Action or Project	
Applicable Goal Statement:	Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices
Action/Project Number:	2.3.2
Name of Action or Project:	Drought Plan
Mitigation Category:	Natural Systems Protection
Action or Project Description:	Follow guidelines as suggested in the Missouri 2002 Drought Plan by MDNR.
Estimated Cost:	None
Benefits:	Decrease our economic resistance to disasters
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	N/A
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None, due to staffing

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Dam failure
Problem being Mitigated:	Unprepared for dam failure event
Action or Project	
Applicable Goal Statement:	Ensure Access to Information Regarding Hazards Preparation and Recovery
Action/Project Number:	3.1.1
Name of Action or Project:	Dam Information
Mitigation Category:	Education and Outreach
Action or Project Description:	Conduct a public education campaign to inform dam owners and citizens living near the inundation zones of dams about the need to properly maintain and upgrade these structures, particularly those that are more than 50 years old.
Estimated Cost:	None
Benefits:	Increase knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	Andrew County Commissioners
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	Continuing
Report of Progress:	None, due to staffing

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Drought, Flood, Heat Wave, Severe Winter Weather, Thunderstorm, Tornado, Wildfire
Problem being Mitigated:	Unprepared for inclement weather
Action or Project	
Applicable Goal Statement:	Ensure Access to Information Regarding Hazards Preparation and Recovery
Action/Project Number:	3.1.2
Name of Action or Project:	Public Information
Mitigation Category:	Education and Outreach
Action or Project Description:	Add Andrew County onto the City of Savannah's TextCaster program.
Estimated Cost:	Unsure
Benefits:	Increase knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	Andrew County Commissioners
Supporting Organization/Department:	Andrew County Emergency Management
Action/Project Priority:	Medium
Timeline for Completion:	3 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Modified
Report of Progress:	Lack of staffing hasn't allowed this action to move forward

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Flood damage to critical systems
Action or Project	
Applicable Goal Statement:	Ensure Access to Information Regarding Hazards Preparation and Recovery
Action/Project Number:	3.1.3
Name of Action or Project:	Elevating Critical Residential Systems
Mitigation Category:	Education and Outreach
Action or Project Description:	Distribute information to businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.
Estimated Cost:	\$200 for printed materials
Benefits:	Increase knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Modified
Report of Progress:	None at this time due to staffing

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Flood, Earthquake, Severe Winter Weather, Thunderstorm, Tornado, Wild Fire
Problem being Mitigated:	Lack of preparedness for emergency
Action or Project	
Applicable Goal Statement:	Ensure Access to Information Regarding Hazards Preparation and Recovery
Action/Project Number:	3.1.4
Name of Action or Project:	Ready-in-3program
Mitigation Category:	Education and Outreach
Action or Project Description:	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready-in-3 program.
Estimated Cost:	None
Benefits:	Increase knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	2 years
Potential Fund Sources:	None
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Information has been handed out before but will do so on a wider and more frequent manner

Action Worksheet	
Name of Jurisdiction:	Amazonia
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Flood damage to critical systems
Action or Project	
Applicable Goal Statement:	Ensure Access to Information Regarding Hazards Preparation and Recovery
Action/Project Number:	3.1.5
Name of Action or Project:	Elevating Critical Residential Systems
Mitigation Category:	Education and Outreach
Action or Project Description:	Distribute information to businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.
Estimated Cost:	\$200 for printed materials
Benefits:	Increase knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	Amazonia City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Will be distributed on an as needed basis

Action Worksheet	
Name of Jurisdiction:	Country Club Village
Risk / Vulnerability	
Hazard(s) Addressed:	Thunderstorm, Tornado
Problem being Mitigated:	Lack of known safe areas
Action or Project	
Applicable Goal Statement:	Ensure access to Information Regarding Hazards Preparation and Recovery
Action/Project Number:	3.1.6
Name of Action or Project:	Identification and signage for safe areas
Mitigation Category:	Education and Outreach
Action or Project Description:	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.
Estimated Cost:	\$100 for signage
Benefits:	Increase knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	County Club Village Council
Supporting Organization/Department:	Police and Fire Chief
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Police and Fire Chief will discuss implementation

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Flood, Earthquake, Severe Winter Weather, Thunderstorm, Tornado, Wildfire
Problem being Mitigated:	Lack of preparedness for emergency
Action or Project	
Applicable Goal Statement:	Ensure Access to Information Regarding Hazards Preparation and Recovery
Action/Project Number:	3.1.7
Name of Action or Project:	Ready-in-3program
Mitigation Category:	Education and Outreach
Action or Project Description:	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready-in-3 program and distribute information on how to winterize homes, locate water shut off valves and prepare for extreme cold.
Estimated Cost:	None
Benefits:	Increase knowledge among citizens about disaster safety
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	2 years
Potential Fund Sources:	None
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Ready-In-3 information has been handed out before but will do so on a wider and more frequent manner

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Flood, Land Subsidence
Problem being Mitigated:	Problem areas not identified on maps
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.1.2
Name of Action or Project:	Mapping
Mitigation Category:	Emergency Services
Action or Project Description:	Develop an accurate countywide series of maps detailing floodplain, flash flood danger zones, land subsidence susceptible areas and process this information within a Geographic Information System.
Estimated Cost:	\$500 for maps
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	Andrew County Assessor
Action/Project Priority:	Low
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None but will work with the floodplain managers in the county to create the maps

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Dam Failure, Earthquake, Flood, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire
Problem being Mitigated:	Lack of mutual aid agreement
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.1.3
Name of Action or Project:	Mutual Aid Agreements
Mitigation Category:	Emergency Response
Action or Project Description:	Execute and maintain mutual aid agreements with all relevant agencies.
Estimated Cost:	None
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	Andrew County Emergency Management
Supporting Organization/Department:	Andrew County Commissioners
Action/Project Priority:	Medium
Timeline for Completion:	2 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	Continuing
Report of Progress:	Verbal agreements have been made but they will be put into writing

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Cyber Disruption
Problem being Mitigated:	Mitigate potential intentional cyber disruption
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.1.4
Name of Action or Project:	Cybersecurity Training
Mitigation Category:	Emergency Response
Action or Project Description:	Implement annual cybersecurity training for county staff.
Estimated Cost:	
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	Emergency Management Director
Supporting Organization/Department:	N
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Andrew
Risk / Vulnerability	
Hazard(s) Addressed:	Cyber Disruption
Problem being Mitigated:	Mitigate potential intentional and unintentional cyber disruption
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.1.5
Name of Action or Project:	Creation of a cybersecurity plan
Mitigation Category:	Emergency Response
Action or Project Description:	Create a cybersecurity plan for the county to decrease the likelihood of a cyber disruption to the county.
Estimated Cost:	
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	Emergency Management Director
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Rosendale Fire Protection District
Risk / Vulnerability	
Hazard(s) Addressed:	Wildfire
Problem being Mitigated:	Lack of equipment
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.1.6
Name of Action or Project:	Acquire new gear
Mitigation Category:	Emergency Response
Action or Project Description:	Acquire new SCBA gear and turn out gear.
Estimated Cost:	\$50,000
Benefits:	Increase disaster mitigation management capability in local governments
Plan for Implementation	
Responsible Organization/Department:	Rosendale Fire Protection District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	LEOP
Progress Report	
Action Status:	New
Report of Progress:	Gathering documentation to apply for FEMA grant

Action Worksheet	
Name of Jurisdiction:	Andrew County
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Potential loss of records
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.1
Name of Action or Project:	Backup of county records
Mitigation Category:	Structure and Infrastructure Projects (IT)
Action or Project Description:	Maintain offsite data backup of county records and plan to safeguard those that do not have backups.
Estimated Cost:	Unsure
Benefits:	Strengthen critical infrastructure
Plan for Implementation	
Responsible Organization/Department:	Andrew County Commissioners
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None, due to funding

Action Worksheet	
Name of Jurisdiction:	Amazonia
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Potential loss of records
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.2
Name of Action or Project:	Backup of city records
Mitigation Category:	Structure and Infrastructure Projects (IT)
Action or Project Description:	Maintain offsite data backup of city records and plan to safeguard those that do not have backups.
Estimated Cost:	Unsure
Benefits:	Strengthen critical infrastructure
Plan for Implementation	
Responsible Organization/Department:	Amazonia City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	None, due to funding

Action Worksheet	
Name of Jurisdiction:	Amazonia
Risk / Vulnerability	
Hazard(s) Addressed:	Flood
Problem being Mitigated:	Vulnerable wastewater system
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.3
Name of Action or Project:	Wastewater Resiliency Improvements
Mitigation Category:	Structure and Infrastructure Improvements
Action or Project Description:	Add resiliency improvements to the city's wastewater system to better withstand flood events.
Estimated Cost:	\$438,366.00
Benefits:	Strengthen critical infrastructure
Plan for Implementation	
Responsible Organization/Department:	Amazonia City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants, State, Federal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	BRIC grant was submitted in 2020 and local funds have been committed

Action Worksheet	
Name of Jurisdiction:	Cosby
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Inability for city to function
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.4
Name of Action or Project:	Generator
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Acquire a generator to place in a critical facility in the event of a prolonged power outage.
Estimated Cost:	\$25,000
Benefits:	Assures that city business and communication can continue without disruption. It also allows for the facility to serve as a warming/cooling center and citizens with medical needs, such as on oxygen or home dialysis, can have continued access to power.
Plan for Implementation	
Responsible Organization/Department:	Cosby City Council
Supporting Organization/Department:	Andrew County Emergency Management
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Country Club Village
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Tornado
Problem being Mitigated:	Communication difficulty
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.5
Name of Action or Project:	Web-based Notification Systems
Mitigation Category:	Emergency Services
Action or Project Description:	Emergency responders will switch to a web-based notification system.
Estimated Cost:	Unsure
Benefits:	Strengthen Critical Infrastructure
Plan for Implementation	
Responsible Organization/Department:	Country Club Village
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Modified
Report of Progress:	None

Action Worksheet	
Name of Jurisdiction:	Rea
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Inability for city to function
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.6
Name of Action or Project:	Generator
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Acquire a generator to place in a critical facility in the event of a prolonged power outage.
Estimated Cost:	\$25,000
Benefits:	Assures that city business and communication can continue without disruption. It also allows for the facility to serve as a warming/cooling center and citizens with medical needs, such as on oxygen or home dialysis, can have continued access to power.
Plan for Implementation	
Responsible Organization/Department:	Rea City Council
Supporting Organization/Department:	Andrew County Emergency Management
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Savannah
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Vulnerable critical infrastructure
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.7
Name of Action or Project:	Strengthen Critical Infrastructure
Mitigation Category:	Structure and infrastructure projects
Action or Project Description:	City-owned utilities facilities and distribution system are assessed for vulnerability to hazards and retrofit and modify, as necessary.
Estimated Cost:	Varies
Benefits:	Strengthen Critical Infrastructure
Plan for Implementation	
Responsible Organization/Department:	Savannah City Council
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Have assessed water and sewer plant but have some places that need to be worked on

Action Worksheet	
Name of Jurisdiction:	Avenue City School District
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Tornado
Problem being Mitigated:	Communication difficulty
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.8
Name of Action or Project:	Web-based Notification Systems
Mitigation Category:	Prevention
Action or Project Description:	Participate in web-based notification system.
Estimated Cost:	Unsure
Benefits:	Strengthen Critical Infrastructure
Plan for Implementation	
Responsible Organization/Department:	Avenue City School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	The school uses web-based notification.

Action Worksheet	
Name of Jurisdiction:	Avenue City School District
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Vulnerable critical infrastructure
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.9
Name of Action or Project:	Strengthen Critical Infrastructure
Mitigation Category:	Structure and infrastructure projects
Action or Project Description:	Review, prioritize, institute and monitor needed upgrades and retrofits to critical buildings and infrastructures.
Estimated Cost:	Varies
Benefits:	Strengthen Critical Infrastructure
Plan for Implementation	
Responsible Organization/Department:	Avenue City School District
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Internal, Grants, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	These types of things are reviewed annually.

Action Worksheet	
Name of Jurisdiction:	Avenue City School District
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Potential loss of records
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.10
Name of Action or Project:	Backup of school records
Mitigation Category:	Structure and Infrastructure Projects (IT)
Action or Project Description:	Maintain offsite data backup of school records and plan to safeguard those that do not have backups.
Estimated Cost:	Unsure
Benefits:	Strengthen critical infrastructure
Plan for Implementation	
Responsible Organization/Department:	Avenue City School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	Continuing
Report of Progress:	Maintains records with electronic back-up.

Action Worksheet	
Name of Jurisdiction:	Andrew County Health Department
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Inability for department to function
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.11
Name of Action or Project:	Generator
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Acquire a generator to place in the department's facility in the event of a prolonged power outage.
Estimated Cost:	\$25,000
Benefits:	Assures that and health department business and communication can continue without disruption.
Plan for Implementation	
Responsible Organization/Department:	Andrew County Health Department Board
Supporting Organization/Department:	Andrew County Emergency Management
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Rosendale Fire Protection District
Risk / Vulnerability	
Hazard(s) Addressed:	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado
Problem being Mitigated:	Inability for fire district to function
Action or Project	
Applicable Goal Statement:	Ensure Continued Operation of Government and Emergency Functions in a Disaster
Action/Project Number:	4.2.12
Name of Action or Project:	Generator
Mitigation Category:	Structure and Infrastructure
Action or Project Description:	Acquire a generator to place in the facility in the event of a prolonged power outage.
Estimated Cost:	\$25,000
Benefits:	Assures that the department can continue to operate and assist those in need.
Plan for Implementation	
Responsible Organization/Department:	Rosendale Fire Protection District Board
Supporting Organization/Department:	Andrew County Emergency Management
Action/Project Priority:	High
Timeline for Completion:	2 years
Potential Fund Sources:	Internal, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	N/A
Progress Report	
Action Status:	New
Report of Progress:	

Table 4.3.

Mitigation Action Matrix

	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
	Prevention							
1.3.1	Create a plan to accommodate individuals with needs for transport to and stay in emergency shelters, including compliance with the American with Disabilities Act (ADA).	Andrew County	Medium	1	All	Yes	Yes	N/A
1.3.2	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	Andrew County	Medium	1	Severe Winter Weather	Yes	Yes	N/A
1.2.1	Expand use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	Amazonia	High	1	Dam Failure, Drought, Earthquake, Flood, Heat Wave, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
2.1.1	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs, including Community Rating System (CRS) that improves flood resiliency.	Andrew County	High	2	Flood	Yes	Yes	Yes
2.1.4	Update/adopt new NFIP documents/programs, including contributing information to the 102 Watershed study for Risk Map.	Amazonia	High	2	Flood	Yes	Yes	Yes
2.1.6	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.	Country Club Village	High	2	Flood	Yes	Yes	Yes
2.1.7	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.	Rea	High	2	Flood	Yes	Yes	Yes
2.1.9	Contribute to the 102 Watershed study for Risk	Rosendale	High	2	Flood	Yes	Yes	Yes

	Map and update/adopt new NFIP documents/programs.							
1.3.5	Create a plan to accommodate individuals with needs for transport to and stay in emergency shelters, including compliance with the American with Disabilities Act (ADA).	Savannah	Medium	1	All	Yes	Yes	N/A
1.3.6	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.	Savannah	Medium	1	Severe Winter Weather	Yes	Yes	N/A
2.1.10	Contribute to the 102 Watershed study for Risk Map and update/adopt new NFIP documents/programs.	Savannah	High	2	Flood	Yes	Yes	Yes
1.1.10	Assess existing public facilities for the location of suitable safe areas. These areas should be clearly marked and employees and visitors information of their location.	Avenue City School District	High	1	Tornado, Thunderstorm	N/A	N/A	N/A
1.2.4	Expand use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	Avenue City School District	High	1	Dam Failure, Drought, Earthquake, Flood, Heat Wave, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
1.2.5	Develop and implement official snow day plans and policies for non-essential personnel.	Avenue City School District	High	1	Severe Winter Weather	N/A	N/A	N/A
4.2.8	Participate in a web-based notification system.	Avenue City School District	High	4	Earthquake, Flood, Tornado	N/A	N/A	N/A
Structure and Infrastructure Projects								
1.1.1	Work with private entities to construct tornado shelters in facilities where large numbers of people live, work or congregate.	Andrew County	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
1.1.3	Require the building of permanent storm shelters in mobile home parks.	Andrew County	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
4.2.1	Maintain offsite data backup of county records and plan to safeguard those that do not have backups.	Andrew County	High	4	Earthquake, Flood, Severe Winter Weather,	N/A	N/A	N/A

					Thunderstorm, Tornado			
4.2.2	Maintain offsite data backup of city records and plan to safeguard those that do not have backups.	Amazonia	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	N/A	N/A	N/A
4.2.3	Add resiliency improvements to the city's wastewater system to better withstand flood events.	Amazonia	High	4	Flood	Yes	Yes	N/A
4.2.4	Acquire a generator.	Cosby	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	No	N/A
1.1.5	Installation of new culverts in areas prone to flash flooding due to storm water runoff.	Country Club Village	High	1	Flood	Yes	Yes	N/A
1.1.6	Stormwater drainage improvements in areas prone to flash flooding due to storm water runoff.	Country Club Village	High	1	Flood	Yes	Yes	N/A
1.2.2	Acquire a tornado siren.	Fillmore	High	1	Tornado, Thunderstorm	No	Yes	N/A
4.2.6	Acquire a generator.	Rea	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	No	N/A
1.1.7	Incorporate the design of shelters in the construction of new public facilities like libraries, community centers, etc.	Savannah	High	1	Tornado, Thunderstorm	No	Yes	N/A
4.2.7	City owned utilities facilities and distribution system are assessed for vulnerability to hazards and retrofit and modify, as necessary.	Savannah	Medium	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	Yes	N/A
1.1.9	Construction of a storm shelter.	Avenue City School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A

4.2.9	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructure	Avenue City School District	Medium	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	Yes	Yes
4.2.10	Maintain offsite data backup of records and plan to safeguard those that do not have backups.	Avenue City School District	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	N/A	N/A	N/A
1.1.11	Construction of a storm shelter.	North Andrew School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
1.1.12	Create an inventory of facilities with generators and emergency power that can be used in the event of natural disasters. Equip facilities to connect to generators.	North Andrew School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
1.1.13	Construction of a storm shelter.	Savannah School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
1.1.14	Create an inventory of facilities with generators and emergency power that can be used in the event of natural disasters. Equip facilities to connect to generators.	Savannah School District	High	1	Tornado, Thunderstorm	Yes	Yes	N/A
4.2.11	Acquire a generator.	Andrew County Health Department	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	No	N/A
4.2.12	Acquire a generator.	Rosendale Fire Protection District	High	4	Earthquake, Flood, Severe Winter Weather, Thunderstorm, Tornado	Yes	No	N/A
Natural Systems Protection								
2.1.2	Work with SEMA in buyout program for repetitive loss structures in flood-prone areas.	Andrew County	High	2	Flood	Yes	Yes	Yes
2.1.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain	Andrew County	Low	2	Flood	Yes	Yes	Yes

	maps and similar documents.							
2.3.1	Follow guidelines in the Missouri 2002 Drought Plan by MDNR	Andrew County	Low	2	Drought	Yes	Yes	N/A
2.1.5	Promote environmentally sound watershed and storm water practices to decrease flash flooding.	Amazonia	Low	2	Flood	Yes	Yes	Yes
2.1.8	Work with SEMA in buyout program for repetitive loss structures in flood-prone areas.	Rosendale	High	2	Flood	Yes	Yes	Yes
2.2.1	Enact ordinances prohibiting residential and commercial development in all high hazard prone areas.	Savannah	Medium	2	Flood, Land Subsidence, Wildfire	No	Yes	Yes
2.1.11	Ensure that the city has the latest copies of flood insurance rate maps, flood plain maps and similar documents.	Savannah	Low	2	Flood	Yes	Yes	Yes
2.3.2	Follow guidelines in the Missouri 2002 Drought Plan by MDNR	Savannah	Low	2	Drought	Yes	Yes	N/A
2.1.12	Update comprehensive land use plans to specifically address development in hazard prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.	Savannah	Low	2	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire	Yes	Yes	Yes
2.1.13	Promote environmentally sound watershed and storm water practices to decrease flash flooding.	Savannah	Low	2	Flood	Yes	Yes	Yes
Emergency Services								
1.1.2	Review and map emergency access routes and evacuation routes and mitigate any problem areas.	Andrew County	Low	1	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire	Yes	Yes	N/A
1.3.3	Create an inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	Andrew County	High	1	Severe winter weather, Tornado, Thunderstorm	Yes	Yes	N/A
4.1.2	Develop an accurate countywide series of maps detailing floodplain, flash flood danger zones, land subsidence susceptible areas and process this information within a Geographic Information System.	Andrew County	Low	4	Flood, Land Subsidence	Yes	Yes	Yes

4.1.3	Execute and maintain mutual aid agreements with all relevant agencies.	Andrew County	Medium	4	Dam Failure, Earthquake, Flood, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
4.1.4	Implement annual cybersecurity training for county staff.	Andrew County	High	4	Cyber Disruption	N/A	N/A	N/A
4.1.5	Create a cybersecurity plan for the county to decrease the likelihood of a cyber disruption to the county.	Andrew County	High	4	Cyber Disruption	N/A	N/A	N/A
1.1.4	Review and map emergency access and evacuation routes and mitigate any problem areas.	Amazonia	Low	1	Dam Failure, Earthquake, Flood, Severe Winter Weather, Tornado, Wildfire	Yes	Yes	Yes
4.2.5	Emergency responders will switch to a web-based notification system.	County Club Village	High	4	Earthquake, Flood, Tornado	N/A	N/A	Yes
1.1.8	Form and train Community Emergency Response Team (CERT).	Savannah	High	1	Dam Failure, Drought, Earthquake, Flood, Land Subsidence, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
4.1.6	Acquire new SCBA gear and turn out gear.	Rosendale Fire Protection District	High	4	Wildfire	N/A	N/A	N/A
Education and Outreach								
3.1.1	Conduct a public education campaign to inform dam owners and citizens living near the inundation zones of dams about the need to property maintain and upgrade these structures,	Andrew County	Low	3	Dam Failure	Yes	Yes	N/A

	particularly those that are more than 50 years old.							
3.1.2	Add Andrew County onto the City of Savannah's TextCaster program.	Andrew County	Medium	3	Drought, Flood, Heat Wave, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
3.1.3	Distribute information to businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.	Andrew County	Medium	3	Flood	Yes	Yes	N/A
3.1.4	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready-in-3 program.	Andrew County	Medium	3	Flood, Earthquake, Severe Winter Weather, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
3.1.5	Distribute information to businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.	Amazonia	Medium	3	Flood	Yes	Yes	N/A
3.1.6	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.	Country Club Village	High	3	Thunderstorm, Tornado	Yes	Yes	N/A
1.3.4	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.	Savannah	Medium	1	Flood, Severe Winter Weather, Heat Wave, Thunderstorm, Tornado, Wildfire	N/A	N/A	N/A
3.1.7	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready-in-3 program and distribute information on how to winterize homes, locate water shut off valves and prepare for extreme cold.	Savannah	Medium	3	Flood, Earthquake, Severe Winter Weather, Thunderstorm,	N/A	N/A	N/A

					Tornado, Wildfire			
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5 PLAN MAINTENANCE PROCESS

5 PLAN MAINTENANCE PROCESS5.1

5.1 Monitoring, Evaluating, and Updating the Plan..... 5.1

 5.1.1 Responsibility for Plan Maintenance 5.1

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5.2 Incorporation into Existing Planning Mechanisms 5.2

5.3 Continued Public Involvement 5.4

This chapter provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

5.1 Monitoring, Evaluating, and Updating the Plan

44 CFR Requirement 201.6(c)(4): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

5.1.1 Responsibility for Plan Maintenance

The 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 after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. Andrew County’s Emergency Management Director will be responsible for initiating the plan reviews and will invite members of the MPC to the meeting.

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

5.1.3 Plan Maintenance Process

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

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

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

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

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

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

Changes will be made to the plan to remedy actions that have failed or are not considered feasible. Feasibility will be determined after a review of action consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring of this plan. Updating of the plan will be accomplished by written changes and submissions, as the MPC deems appropriate and necessary. Changes will be approved by Andrew County Commissioners Board of and the governing boards of the other participating jurisdictions.

5.2 Incorporation into Existing Planning Mechanisms

44 CFR Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Where possible, plan participants, including school and special districts, will use existing plans and/or programs to implement hazard mitigation actions. Those existing plans and programs were described in Chapter 2 of this plan. Based on the capability assessments of the participating jurisdictions, communities in Andrew 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;
- Andrew County Emergency Operations Plan;
- Capital improvement plans and budgets; and
- School and Special District Plans and budgets

The MPC members involved in updating these existing planning mechanisms will be responsible for integrating the findings and actions of the mitigation plan, as appropriate. The MPC is also responsible for monitoring this integration and incorporation of the appropriate information into the five-year update of the multi-jurisdictional hazard mitigation plan.

Additionally, after the annual review of the Hazard Mitigation Plan, the Andrew County Emergency Management Director will provide the updated Mitigation Strategy with current status of each mitigation action to the County (Boards of Supervisors or Commissions) as well as all Mayors, City Clerks, and School District Superintendents. The Emergency Manager Director will request that the mitigation strategy be incorporated, where appropriate, in other planning mechanisms.

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

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

Jurisdiction	Planning Mechanisms	Integration Process for Previous Plan	Integration Process for Current Plan
Andrew County	Comprehensive Plan Emergency Operations Plan Flood Mitigation Assistance Plan Floodplain Ordinance	Highly active participation in the plan update. Implemented actions as funding and staffing allowed.	Highly active participation. Identified new actions or ongoing actions for mitigation improvements in the unincorporated county. Will use appropriate planning mechanisms to implement.
City of Amazonia	Floodplain Ordinance Annual budget meeting	No identified process.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
Country Club Village	Comprehensive Plan Zoning Ordinances Building Codes Stormwater Ordinance Drainage Ordinance	Implemented actions as funding and staffing allowed.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
Village of Cosby	Annual budget meeting	No identified process.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.

City of Fillmore	Annual budget meeting	No identified process.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
City of Rosendale	Floodplain Ordinance Annual budget meeting	No identified process.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
Village of Rea	Annual budget meeting	No identified process.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
City of Savannah	Comprehensive Plan Land Use Plan Zoning Ordinances Building Codes Floodplain Ordinance Drainage Ordinance	Implemented actions as funding and staffing allowed.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
Avenue City-IX School District	Master plan Capital Improvement Plan School Emergency Plan	Implemented actions as funding and staffing allowed.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
North Andrew-VI School District	Master plan Capital Improvement Plan School Emergency Plan	Implemented actions as funding and staffing allowed. Received funds for a saferoom/gym.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
Savannah R-III School District	Master plan Capital Improvement Plan School Emergency Plan	Implemented actions as funding and staffing allowed. Applied for funds for a saferoom/gym.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
Rosendale Fire Protection District	Annual budget meeting	No process identified.	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.
Andrew County Health Department	Annual budget meeting	N/A	Identified new actions or ongoing actions for mitigation improvements. Will use appropriate planning mechanisms to implement.

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^{10(b)} reviews will be posted at the local jurisdiction’s courthouse or city hall. An effort will be made to post the reviews the local newspaper, as well as, on websites 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: References

2017 Census of Agriculture

American Meteorological Society. "Freezing Rain Events in the United States."

<http://ams.confex.com/ams/pdfpapers/71872.pdf>

Andrew County Museum

Andrew County Health Department's website

<http://www.andrewcountyhealth.com/index.php/resources/covid-dashboard>

Andrew County Hazard Mitigation Plan, 2017

Data Collection Questionnaires completed by each jurisdiction

Environmental Protection Agency (EPA)

<https://www.epa.gov/waterutilityresponse/hazard-mitigation-natural-disasters>

<https://www.epa.gov/waterutilityresponse/water-utility-planning-emergency-drinking-water-supply>

Federal Emergency Management Agency (FEMA)

<https://www.fema.gov/media-library/assets/documents/110202>

<https://www.fema.gov/media-library/assets/documents/30627>

https://www.fema.gov/pdf/library/ism2_s1.pdf

Federal Highway Administration (FHWA)

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

Flood Insurance Administration

HAZUS 3.2

John Hopkins University

Missouri Department of Natural Resources (MoDNR)

<http://dnr.mo.gov/shpo/mnrlist.htm>

http://dnr.mo.gov/env/wrc/docs/rules_reg_94.pdf

<https://modnr.maps.arcgis.com/apps/webappviewer/index.html?id=3ac3a61da4af4834811503a24a3cb9>

<https://dnr.mo.gov/env/esp/aqm/Savannah.htm>

<https://dnr.mo.gov/omw/OMWWatersheds.htm>

Missouri Department of Conservation

<http://mdc7.mdc.mo.gov/applications/moatlas/AreaList.aspx?txtUserID=guest&txtAreaNm=s>

Missouri Department of Transportation (MoDOT)

Missouri Division of Fire Marshal Safety

Missouri Hazard Mitigation Plan (2018)

Missouri Public Service Commission

Missouri Spatial Data Information Service (MSDIS)

<https://data-msdis.opendata.arcgis.com/datasets/mo-2020-public-schools>

Missouri Tornado History Project

<http://www.tornadohistoryproject.com/tornado/Missouri>

National Agricultural Statistics Service (Agriculture production/losses)

National Centers for Environmental Information

National Drought Mitigation Center Drought Reporter

<http://www.rma.usda.gov/data/cause.html>

National Inventory of Dams (NID)

https://nid.sec.usace.army.mil/ords/f?p=105:113:556611007921::NO:113,2:P113_STATE,P113_COUNTY:MO,003

National Flood Insurance Program (NFIP) Community Status

<https://nfpiservices.floodsmart.gov//reports-flood-insurance-data>

National Fire Incident Reporting System (NFIRS)

National Flood Insurance Data, as of September 30, 2019

National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI)

<https://www.NCEI.noaa.gov/stormevents>

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

<http://www.spc.noaa.gov/efscale/ef-scale.html>

<http://www.lightningsafety.noaa.gov/>

http://www.lightningsafety.noaa.gov/stats/08_Vaisala_NLDN_Poster.pdf

National Weather Service (NWS)

<https://www.weather.gov/safety/heat-index>

www.spc.noaa.gov/faq/tornado/ef-scale.html

www.weather.gov/os/heat/index.shtml

Savannah Chamber of Commerce

State Emergency Management Agency (SEMA)

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

State of Missouri GIS data

Tornado and Storm Research Organization (TORRO), Department of Geography, Oxford Brookes University

U.S. Army Corps of Engineers

<https://levees.sec.usace.army.mil/#/levees/system/3605000139/summary>

U.S. Bureau of the Census

<https://www.census.gov/quickfacts/fact/table/andrewcountymissouri/LND110210#LND110210>

US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics

<https://www.rma.usda.gov/data/cause>

https://www.nass.usda.gov/Quick_Stats/CDQT/chapter/2/table/1/state/MO/county/003/year/2017

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

U.S. Fish and Wildlife Service

United States Geological Survey (USGS)

https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/styles/atom_page_medium/public/thumbnails/image/2018nshmlongterm.jpg

<https://maps.waterdata.usgs.gov/mapper/index.html>

University of Wisconsin Silvis Lab http://silvis.forest.wisc.edu/GeoData/WUI_cp12/maps/gifs/black/Missouri_WUI_cp12_black_2010.gif

Wikipedia

<https://allthingsmissouri.org/county-covid-19-dashboards/andrew-county/>

http://artsandsciences.sc.edu/geog/hvri/sites/sc.edu.geog.hvri/files/attachments/Missouri_0610.pdf

http://artsandsciences.sc.edu/geog/hvri/sites/sc.edu.geog.hvri/files/attachments/SoVI10_14Website.pdf

<http://bit.ly/MOSEMAOutreach>

<https://coronavirus.jhu.edu/>

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

<https://www.factfinder.census.gov>

<https://governor.mo.gov/press-releases/archive/governor-parson-announces-missouri-will-fully-reopen-enter-phase-2-recovery>

<https://health.mo.gov/living/healthcondiseases/communicable/novel-coronavirus/mobile-testing.php>

<https://health.mo.gov/living/healthcondiseases/communicable/novel-coronavirus/prevention.php>

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

https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/styles/atom_page_medium/public/thumbnails/image/2014hazmap-induced-lg.gif

<https://mdc12.mdc.mo.gov/Applications/MDCFireReporting/Home/FireReportSearch>

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

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

<https://www.nationalguard.mil/News/Article/610388/missouri-national-guard-helps-monitor-sand-boils-in-northwest-missouri/>

<http://publicrecords.onlinesearches.com/maps/map-of-Andrew-County-Missouri.php>

<https://showmestrong.mo.gov/data/public-health/>

<https://www.sos.mo.gov/library/reference/orders/2020>

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

<http://www.vaisala.com/en/products/thunderstormandlightningdetectionsystems/Pages/NLDN.aspx>

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

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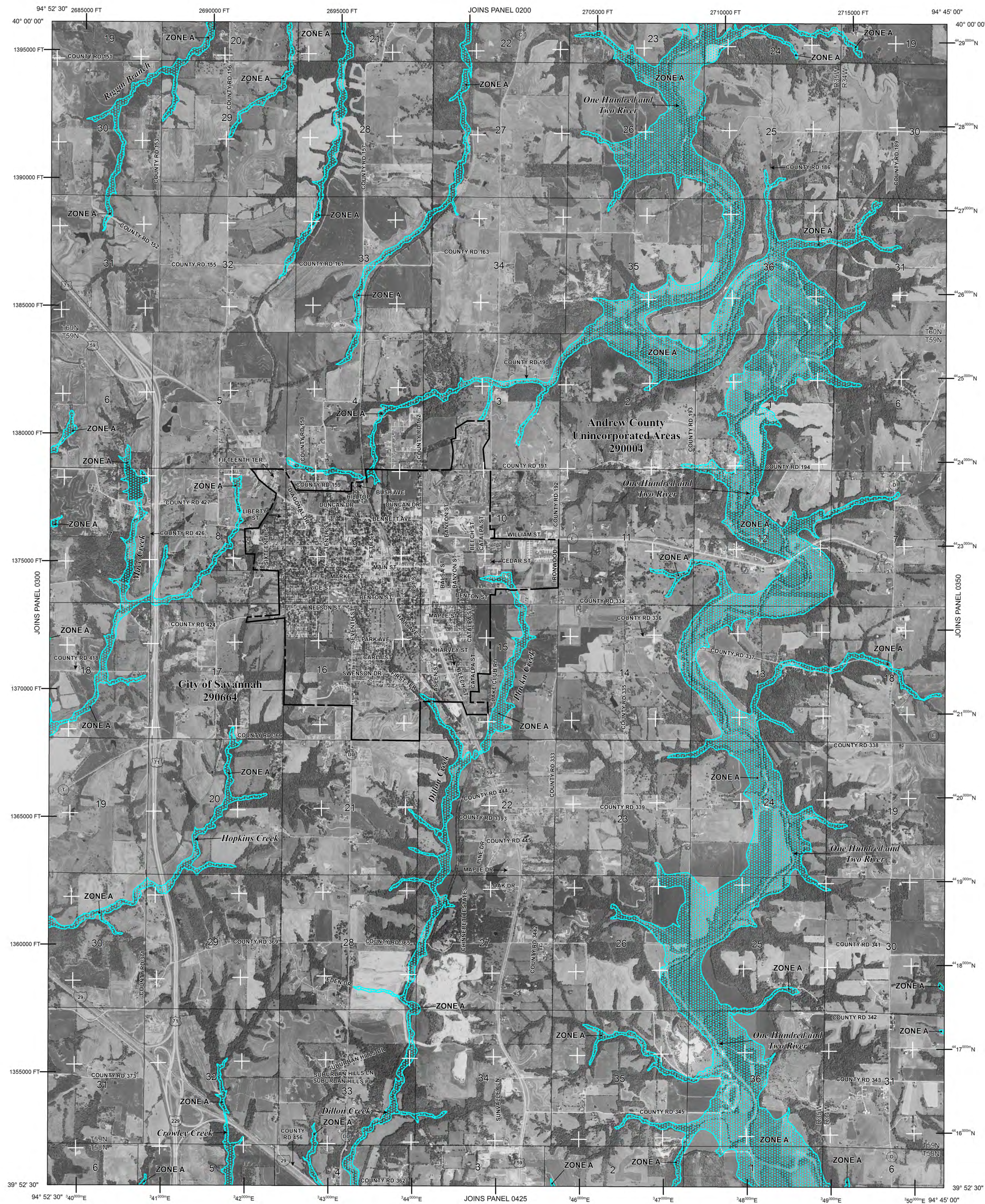
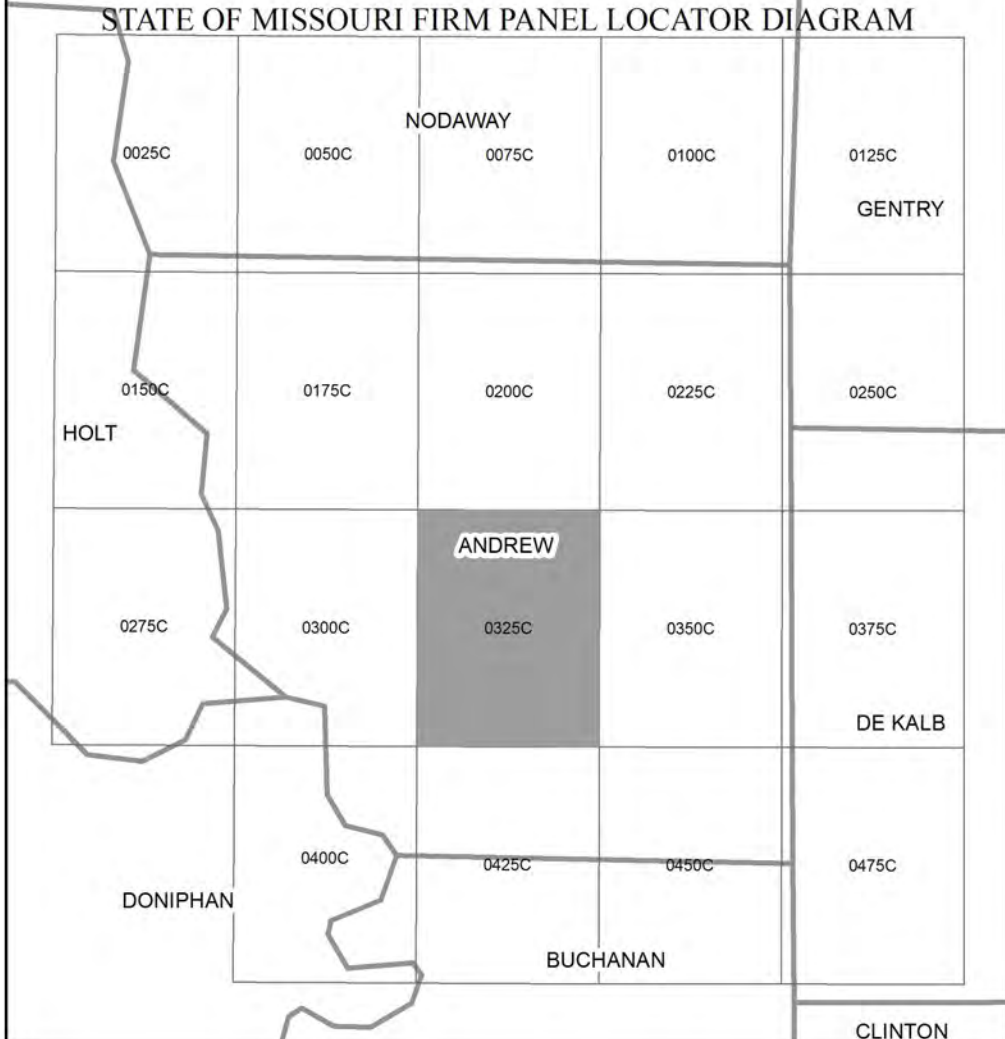
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STATE OF MISSOURI FIRM PANEL LOCATOR DIAGRAM



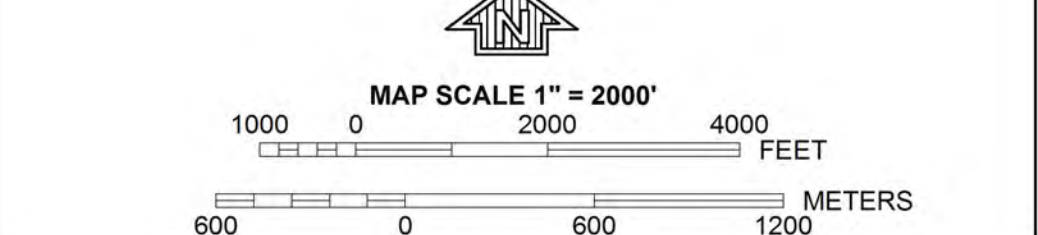
LEGEND

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- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
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- Base Flood Elevation line and value; elevation in feet*
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile

* Referenced to the North American Vertical Datum of 1988
 Cross section line
 Transect line
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 87°07'45", 32°22'30"
 42°76'00"E
 1000-meter Universal Transverse Mercator grid values, zone 15
 5000-foot grid ticks: Missouri State Plane coordinate system, west zone (FIPS 2403), Transverse Mercator projection
 Bench mark (see explanation in Notes to Users section of this FIRM panel)
 M1.5

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index
 EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
 APRIL 18, 2011
 EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0325C

FIRM FLOOD INSURANCE RATE MAP

ANDREW COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 325 OF 475
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDREW COUNTY	290004	0325	C
SAVANNAH, CITY OF	290664	0325	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
29003C0325C

EFFECTIVE DATE
APRIL 18, 2011

Federal Emergency Management Agency

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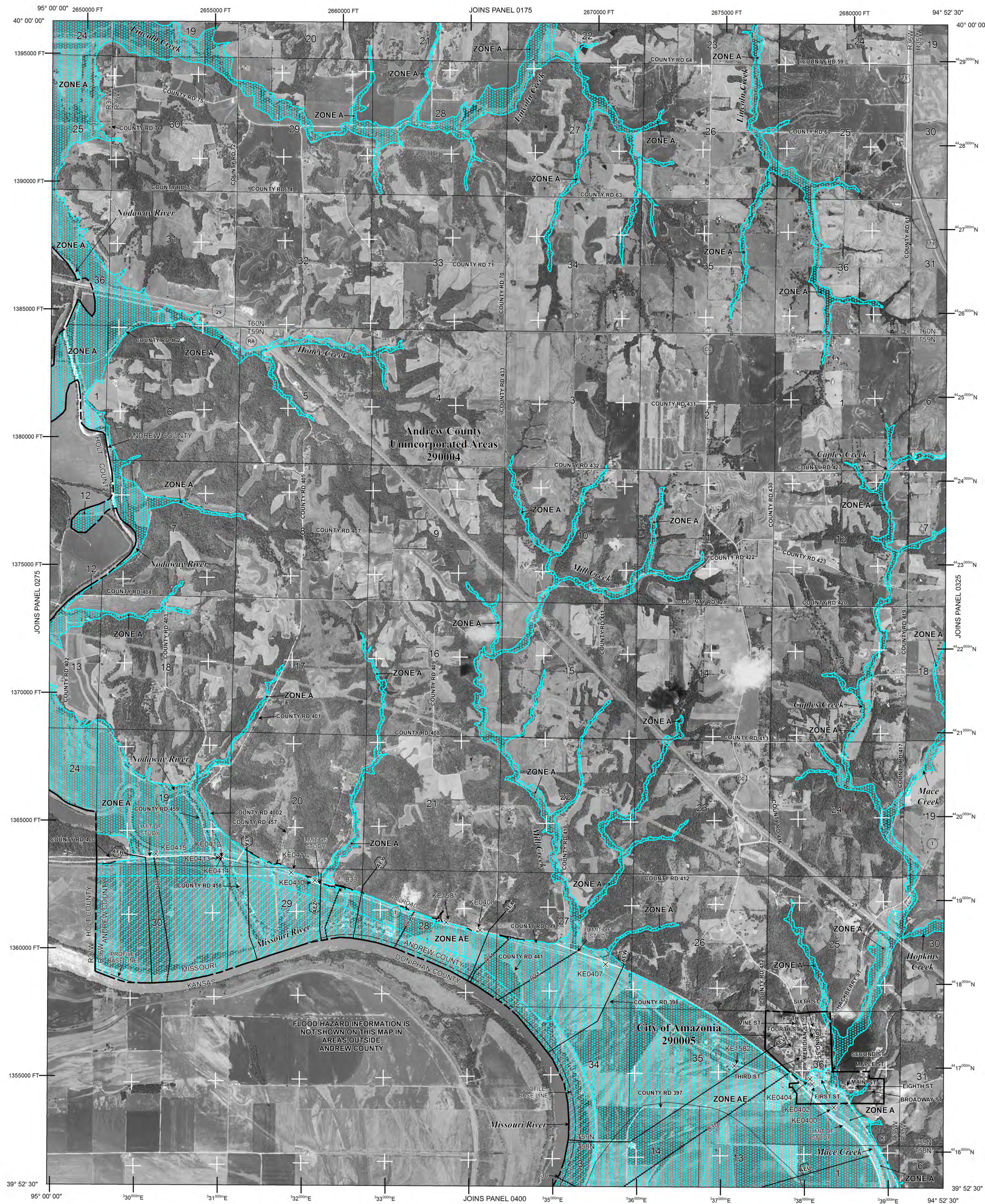
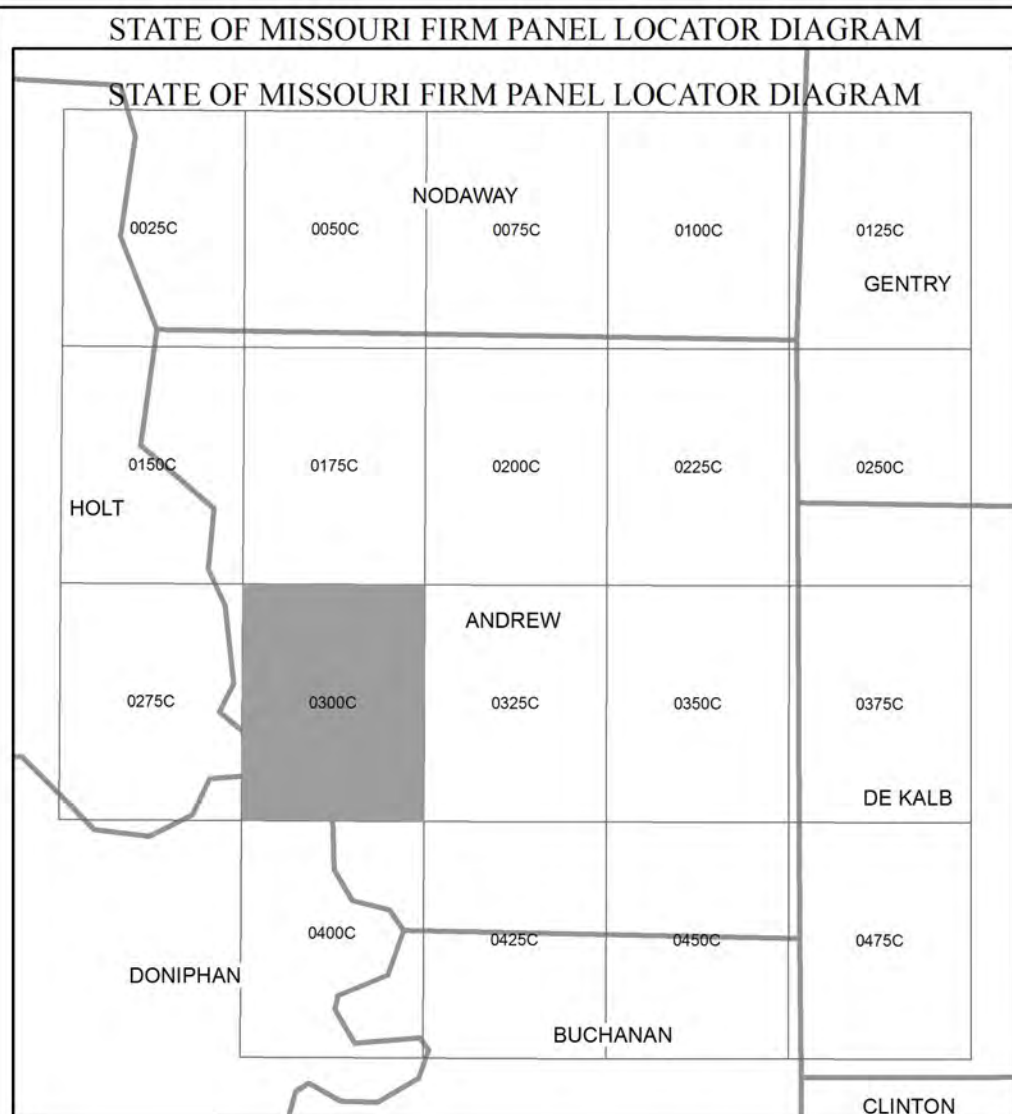
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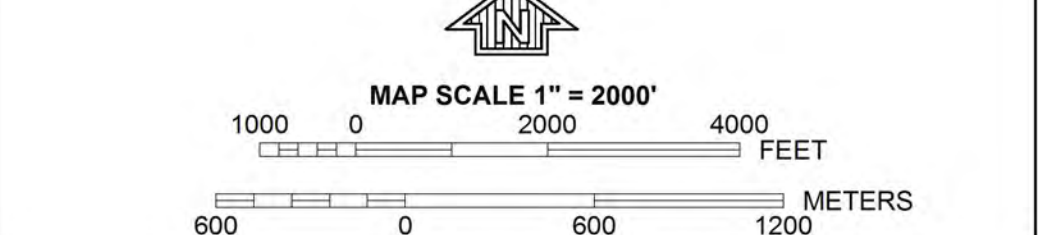
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 600000 FT Bench mark (see explanation in Notes to Users section of this FIRM panel)
 M1.5 River Mile

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 APRIL 18, 2011
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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0300C

FIRM FLOOD INSURANCE RATE MAP

ANDREW COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 300 OF 475
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
AMAZONIA, CITY OF	290005	0300	C
ANDREW COUNTY	290004	0300	C

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MAP NUMBER 29003C0300C

EFFECTIVE DATE APRIL 18, 2011

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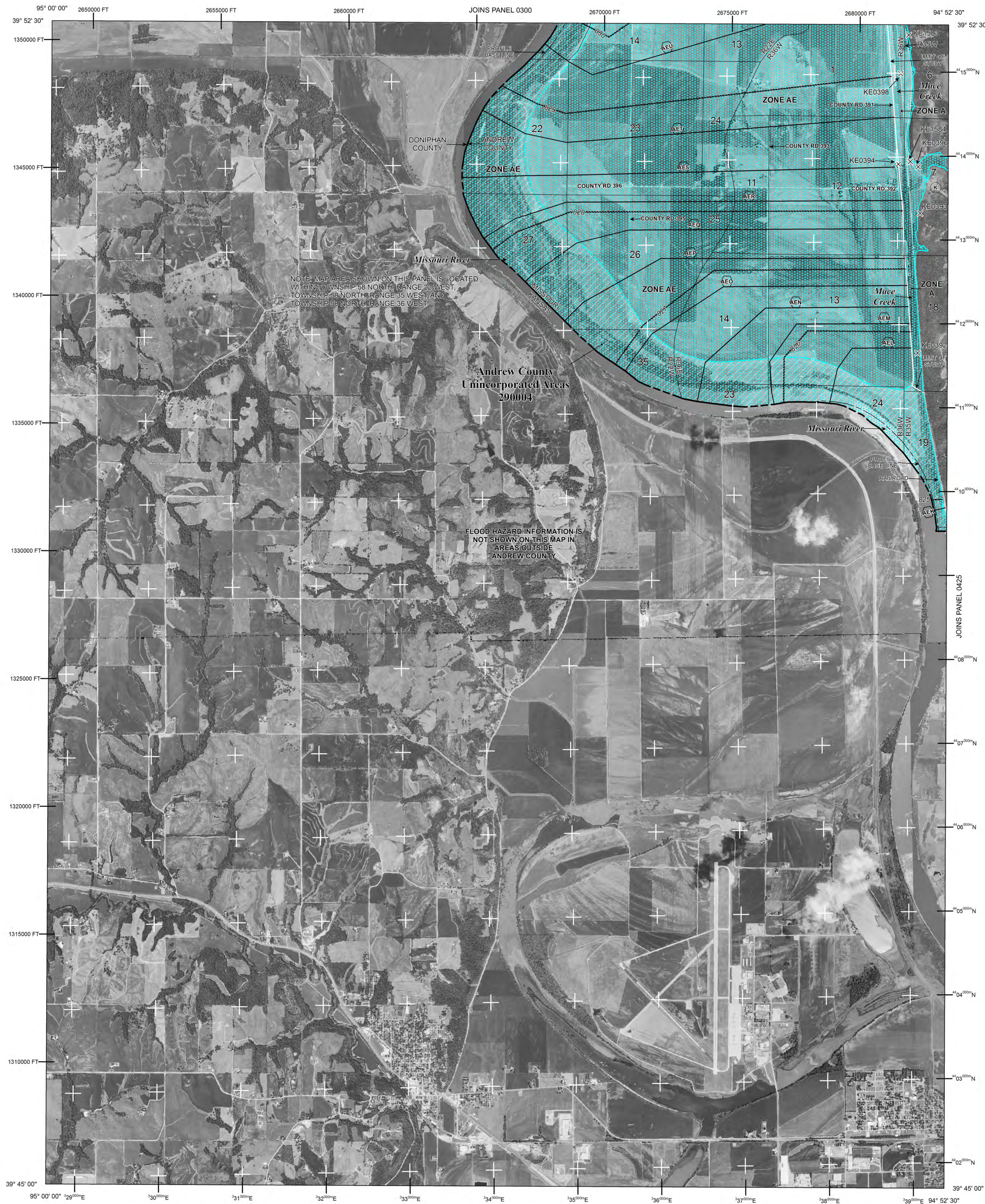
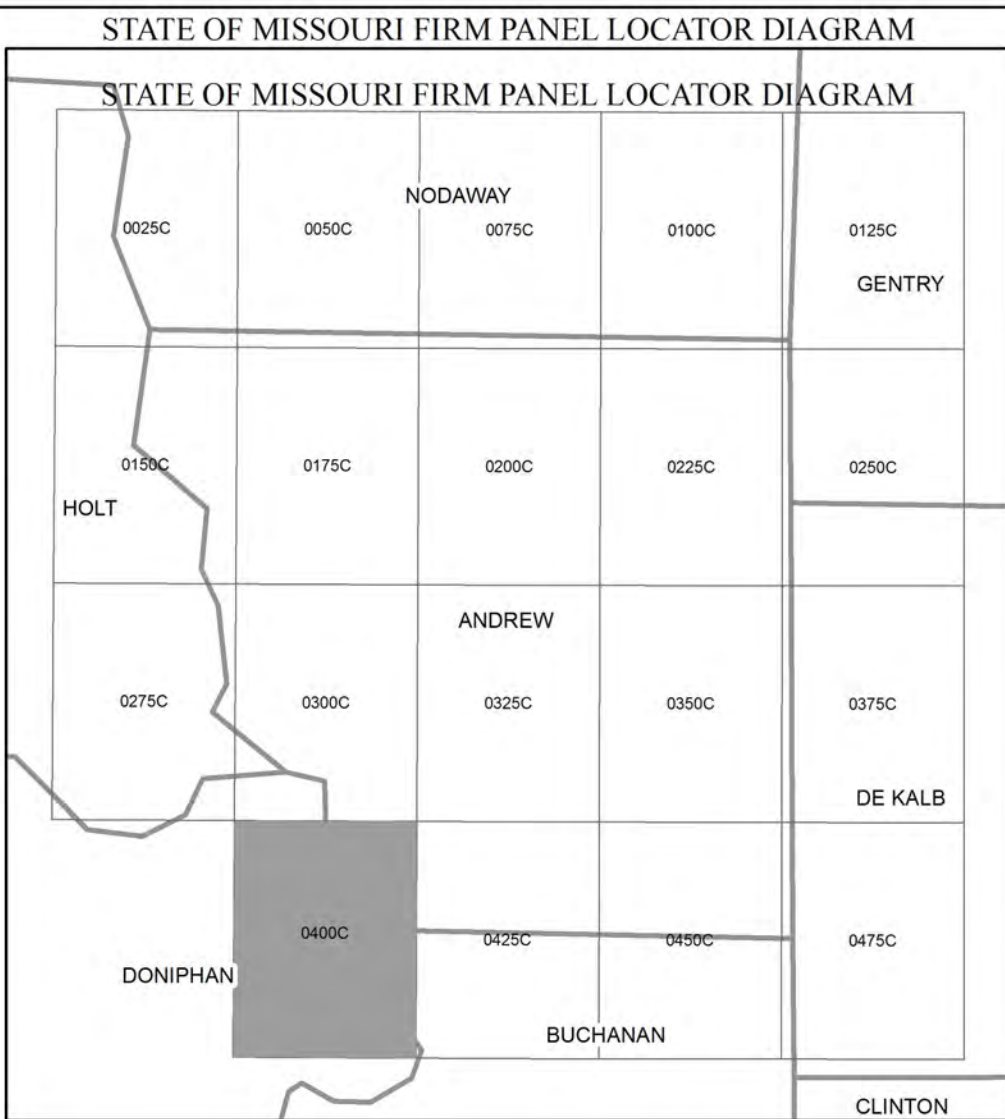
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 - Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
 - 1000-meter Universal Transverse Mercator grid values, zone 15
 - 5000-foot grid ticks; Missouri State Plane coordinate system, west zone (FIPS 2403), Transverse Mercator projection
 - Bench mark (see explanation in Notes to Users section of this FIRM panel)
 - M1.5 River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
APRIL 18, 2011

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

0 1000 2000 4000 FEET

0 600 1200 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0400C

FIRM FLOOD INSURANCE RATE MAP

ANDREW COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 400 OF 475
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDREW COUNTY	290004	0400	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
29003C0400C

EFFECTIVE DATE
APRIL 18, 2011

Federal Emergency Management Agency

National Flood Hazard Layer FIRMMette



94° 53'54" W 39° 53'28" N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
		Area of Undetermined Flood Hazard <i>Zone D</i>
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		202 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
OTHER FEATURES		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped
	The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.	



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **7/15/2020 at 12:26 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

0 250 500 1,000 1,500 2,000 Feet 1:6,000

USGS The National Map: Orthoimagery. Data refreshed April 2020

94° 53'16" W 39° 53' N

Data Access

- [Search](#)
- [Bulk Data Download \(CSV\)](#)
- [Storm Data Publication](#)

Documentation

- [Database Details](#)
- [Version History](#)
- [Storm Data FAQ](#)
- [NOAA's NWS Documentation](#)
- [Tornado EF Scale](#)

External Resources

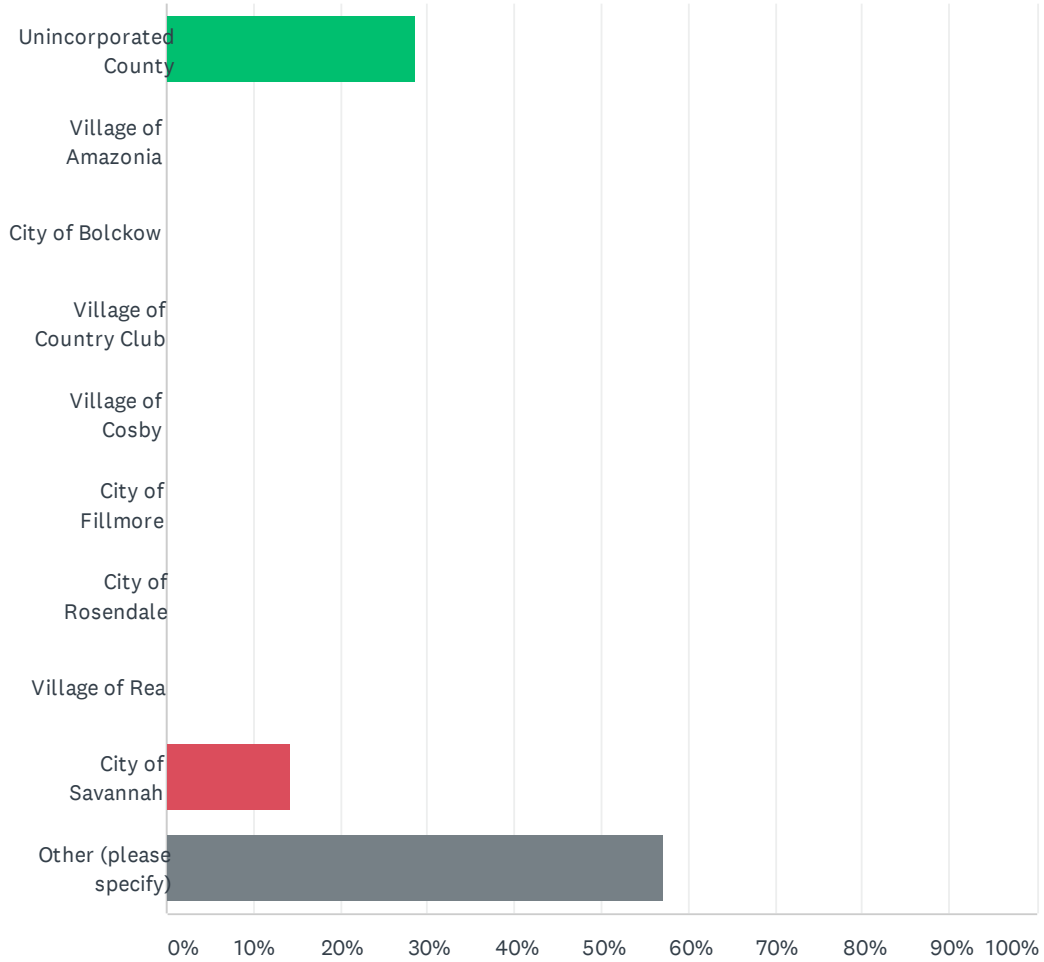
- [NOAA's SPC Reports](#)
- [NOAA's SPC WCM Page](#)
- [NOAA's NWS Damage Assessment Toolkit](#)
- [NOAA's Tsunami Database](#)
- [ESRI/FEMA Civil Air Patrol Images](#)
- [SHELDUS](#)
- [USDA Cause of Loss Data](#)

Storm Events Database**Event Details:**

Event	Flood
-- Flood Cause	Heavy Rain / Snow Melt
State	MISSOURI
County/Area	ANDREW
WFO	EAX
Report Source	Emergency Manager
NCEI Data Source	CSV
Begin Date	2019-03-13 00:00 CST-6
Begin Location	5S AMAZONIA
Begin Lat/Lon	39.8075/-94.909
End Date	2019-03-31 23:59 CST-6
End Location	5SE COSBY
End Lat/Lon	39.8148/-94.6129
Deaths Direct/Indirect	0/0 (fatality details below, when available...)
Injuries Direct/Indirect	0/0
Property Damage	100.00K
Crop Damage	100.00K
Episode Narrative	Several months of heavy snow across the Northern Plains set the stage for a significant and catastrophic flooding event when temperatures warmed and heavy rain fell across Nebraska and the Dakotas. While the more significant damage occurred across eastern Nebraska several counties along the Missouri River and Northern and Central Missouri also saw some significant impacts. Numerous locations along the Missouri River received major flooding, in which the impacts were aggravated by by several levy failures. These failures resulted in numerous roads across the area being completely washed away and the inundation of several small towns and residential areas. While the flash flooding threats associated with the levy failures were fairly transient, the Missouri River remained in either minor or moderate flood through the rest of the month.
Event Narrative	Once the Missouri River started flooding on March 9, it remained in flood through the remainder of the month. The gauges in Rulo, Brownville, and St. Joseph all hit preliminary records as a result of this flooding. The flooding was caused by several rounds of heavy snow across the Northern Plains through the winter months, followed by a rapid warm-up and several days of heavy rain. The Missouri River Basin across the Northern Plains flooded with catastrophic consequences as numerous dams and levees failed. As the water flowed into the Missouri River upstream of Andrew County, the river swelled and ultimately overwhelmed the levees along the river. Local fields were submerged, which delayed the growing season in the region. I-29 from St. Joseph northward to the Iowa/Missouri border was closed until mid May. Note: The dollar valued assigned to this event is likely inaccurate as a full tally of the extent of the physical damages is unknown. The Missouri River remained in flood through the rest of the month, into April.

Q1 Where do you live? Please select your community from the list:

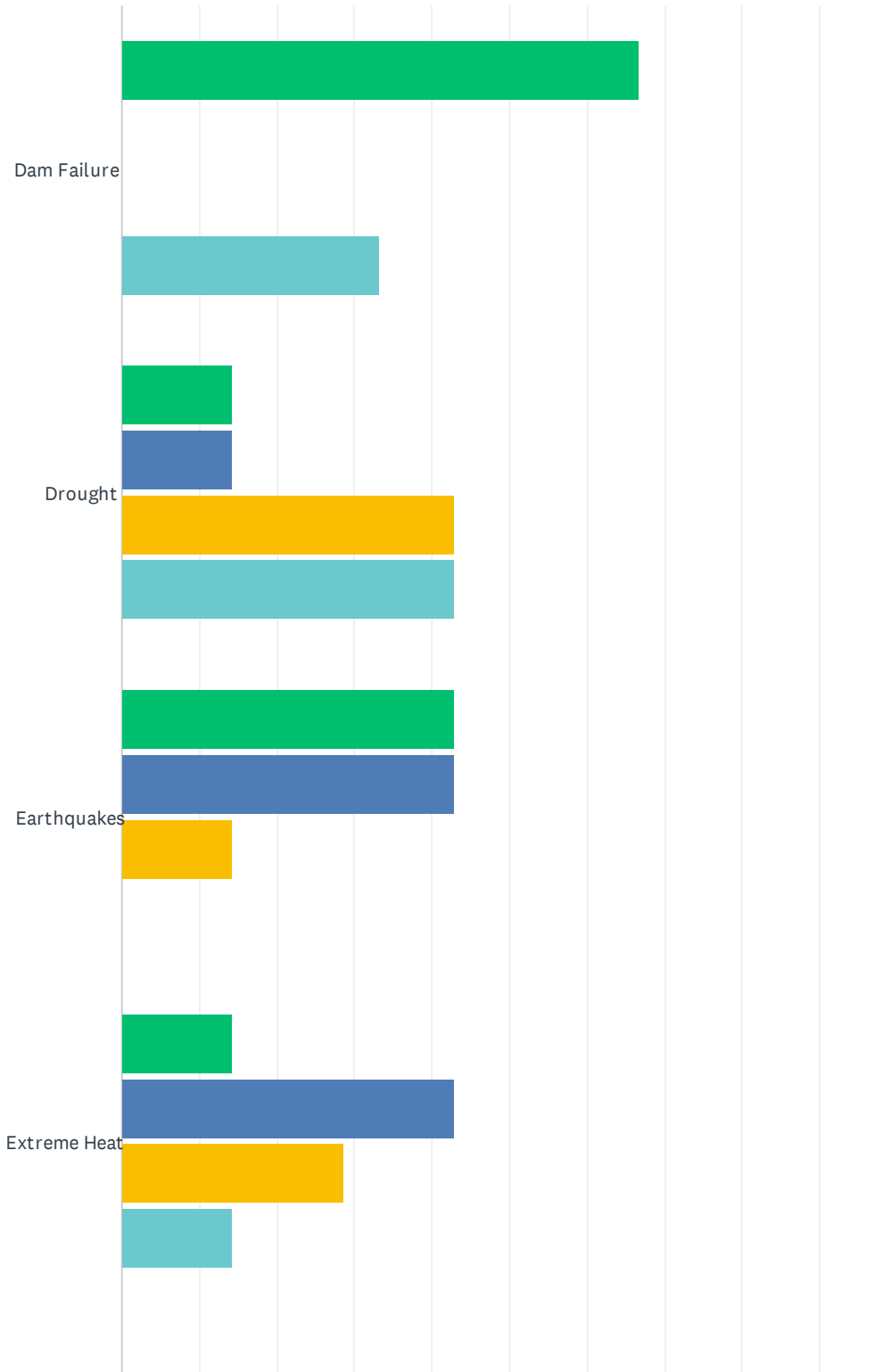
Answered: 7 Skipped: 0



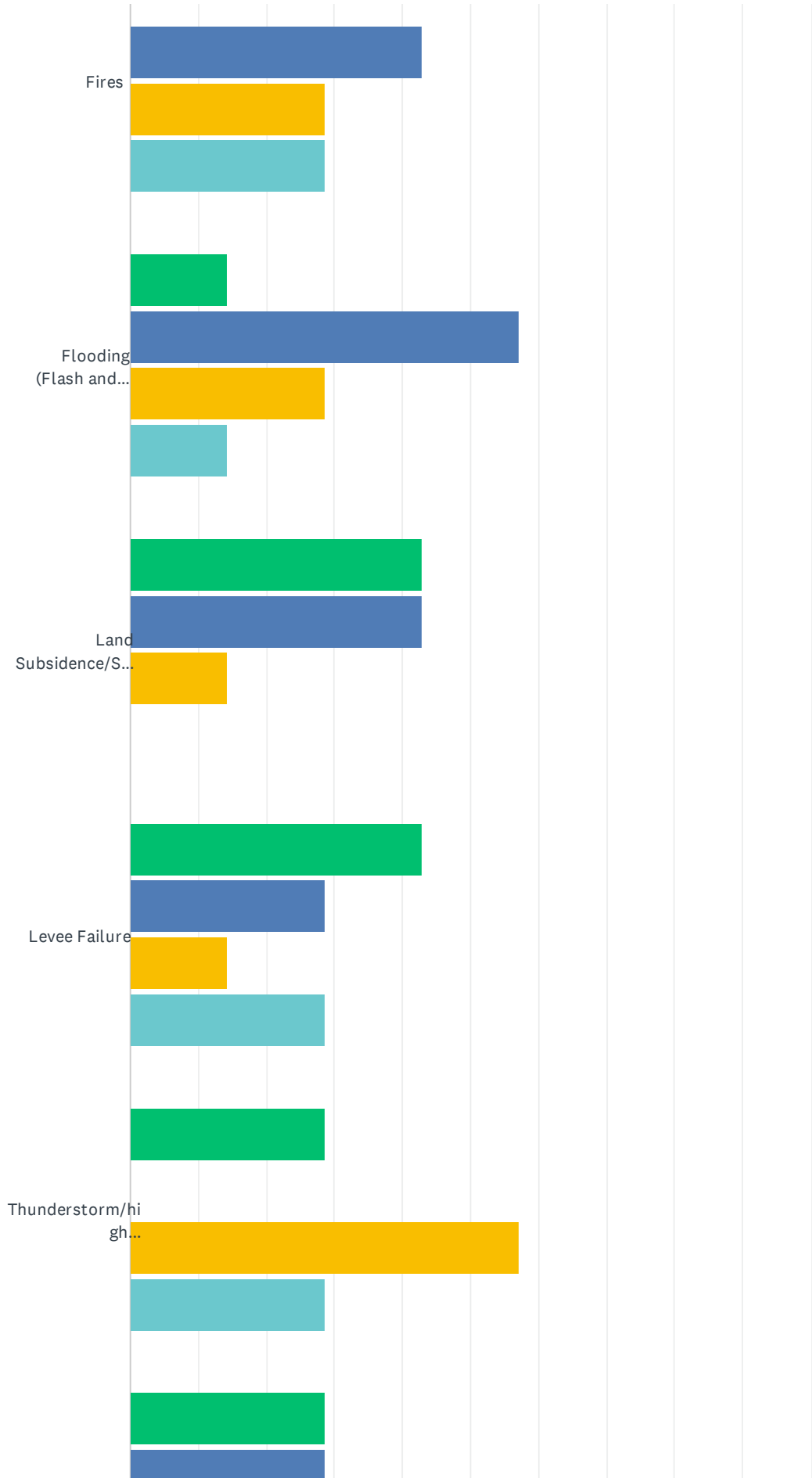
ANSWER CHOICES	RESPONSES	
Unincorporated County	28.57%	2
Village of Amazonia	0.00%	0
City of Bolckow	0.00%	0
Village of Country Club	0.00%	0
Village of Cosby	0.00%	0
City of Fillmore	0.00%	0
City of Rosendale	0.00%	0
Village of Rea	0.00%	0
City of Savannah	14.29%	1
Other (please specify)	57.14%	4
Total Respondents: 7		

Q2 Please indicate your opinion on the likelihood for each natural hazard to impact your community using the following rating system. Please rate EACH hazard 1 through 4 as follows: 1=Unlikely, 2=Occasional, 3=Likely, 4=Highly Likely

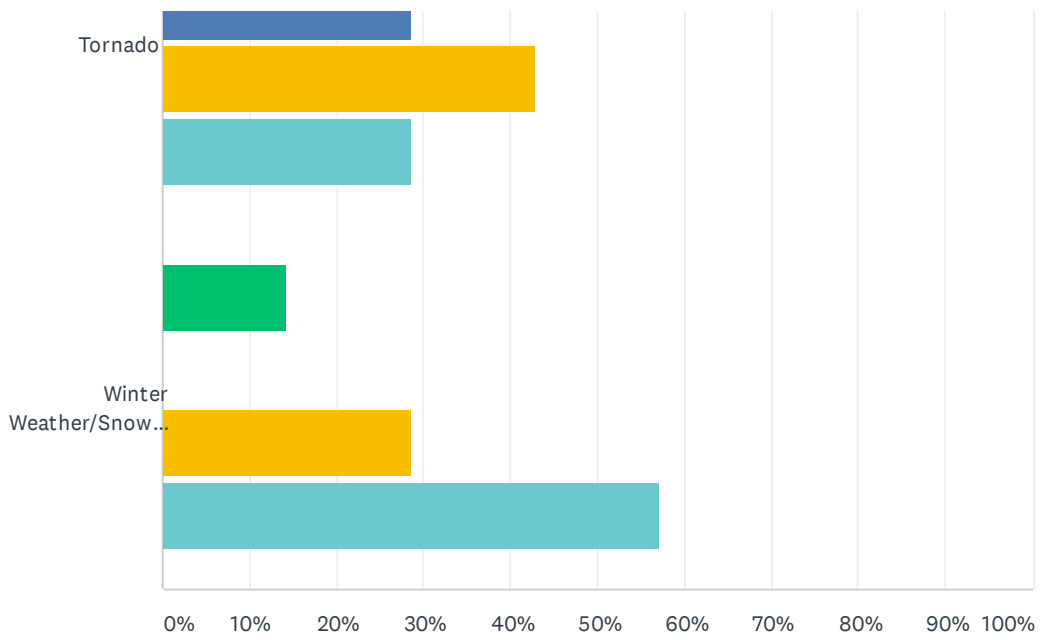
Answered: 7 Skipped: 0



Andrew County Resident Survey



Andrew County Resident Survey

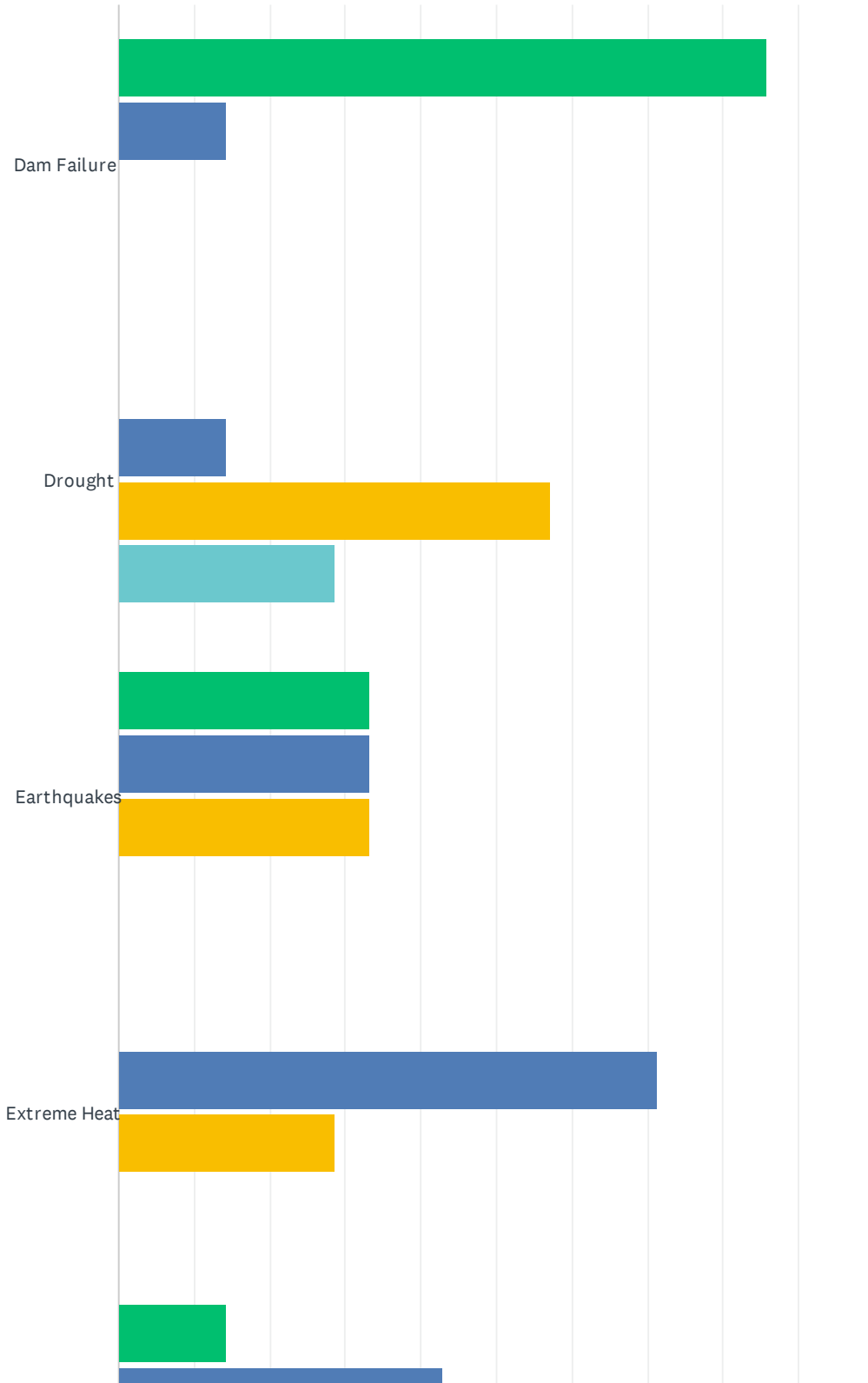


■ 1
 ■ 2
 ■ 3
 ■ 4

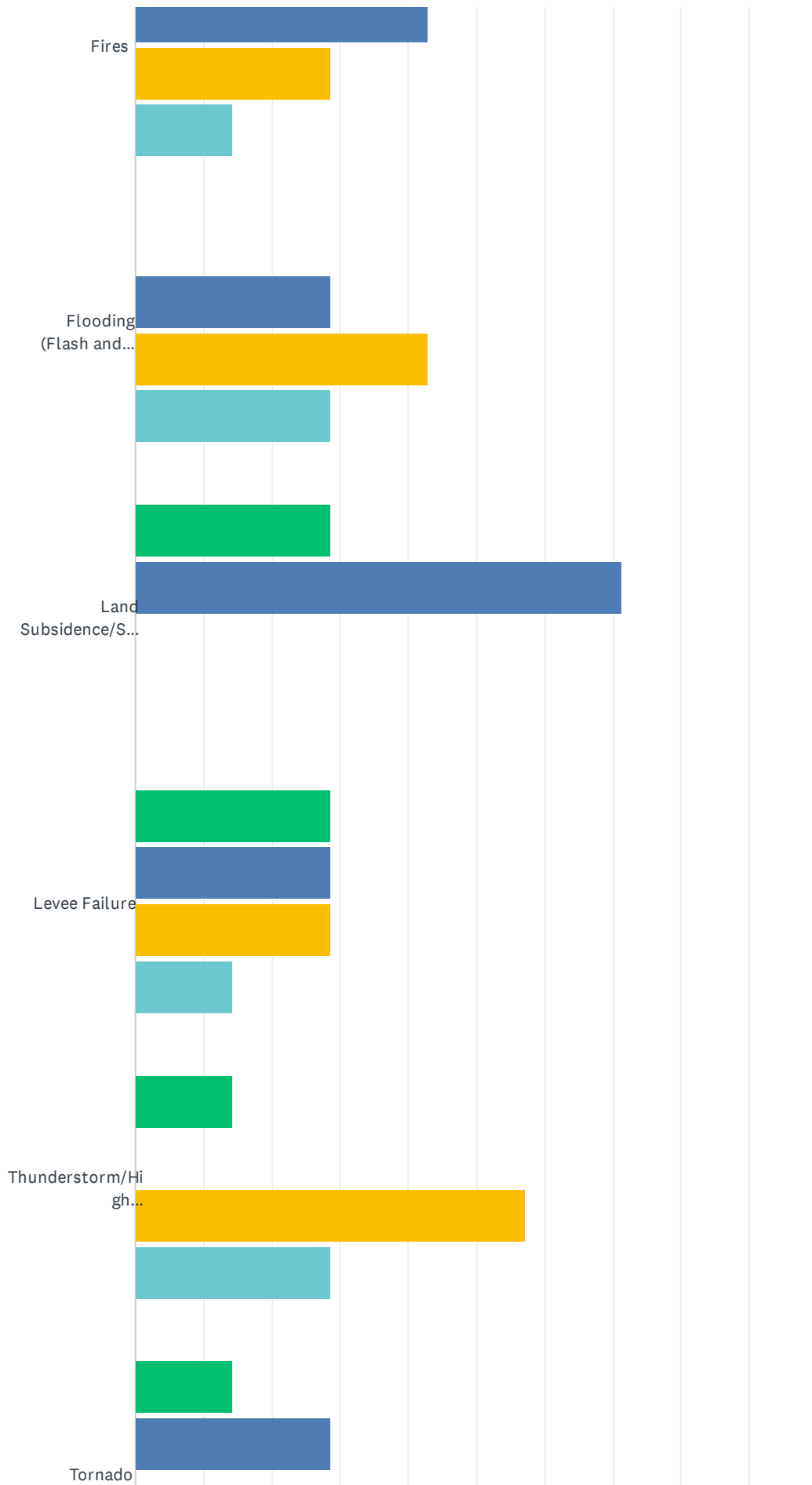
	1	2	3	4	TOTAL RESPONDENTS
Dam Failure	66.67% 4	0.00% 0	0.00% 0	33.33% 2	6
Drought	14.29% 1	14.29% 1	42.86% 3	42.86% 3	7
Earthquakes	42.86% 3	42.86% 3	14.29% 1	0.00% 0	7
Extreme Heat	14.29% 1	42.86% 3	28.57% 2	14.29% 1	7
Fires	0.00% 0	42.86% 3	28.57% 2	28.57% 2	7
Flooding (Flash and River)	14.29% 1	57.14% 4	28.57% 2	14.29% 1	7
Land Subsidence/Sinkholes	42.86% 3	42.86% 3	14.29% 1	0.00% 0	7
Levee Failure	42.86% 3	28.57% 2	14.29% 1	28.57% 2	7
Thunderstorm/high Winds/Lightning/Hail	28.57% 2	0.00% 0	57.14% 4	28.57% 2	7
Tornado	28.57% 2	28.57% 2	42.86% 3	28.57% 2	7
Winter Weather/Snow/Ice/Severe Cold	14.29% 1	0.00% 0	28.57% 2	57.14% 4	7

Q3 Please indicate your opinion on the potential magnitude of each hazard's impact on your community using the following rating system: 1=Negligible, 2=Limited, 3=Critical, 4=Catastrophic

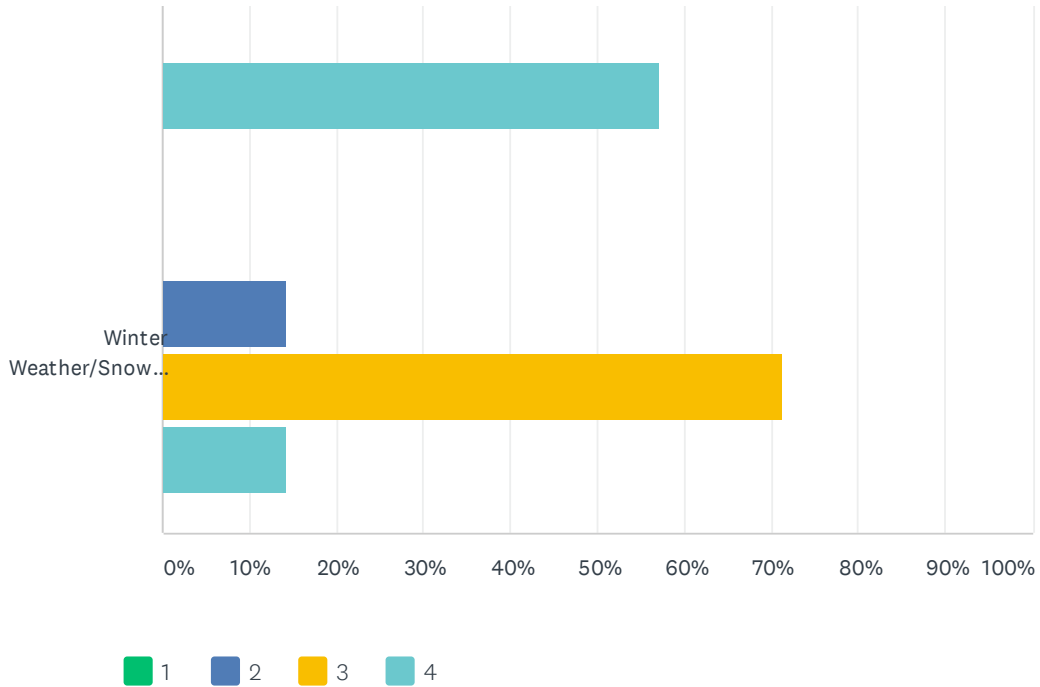
Answered: 7 Skipped: 0



Andrew County Resident Survey



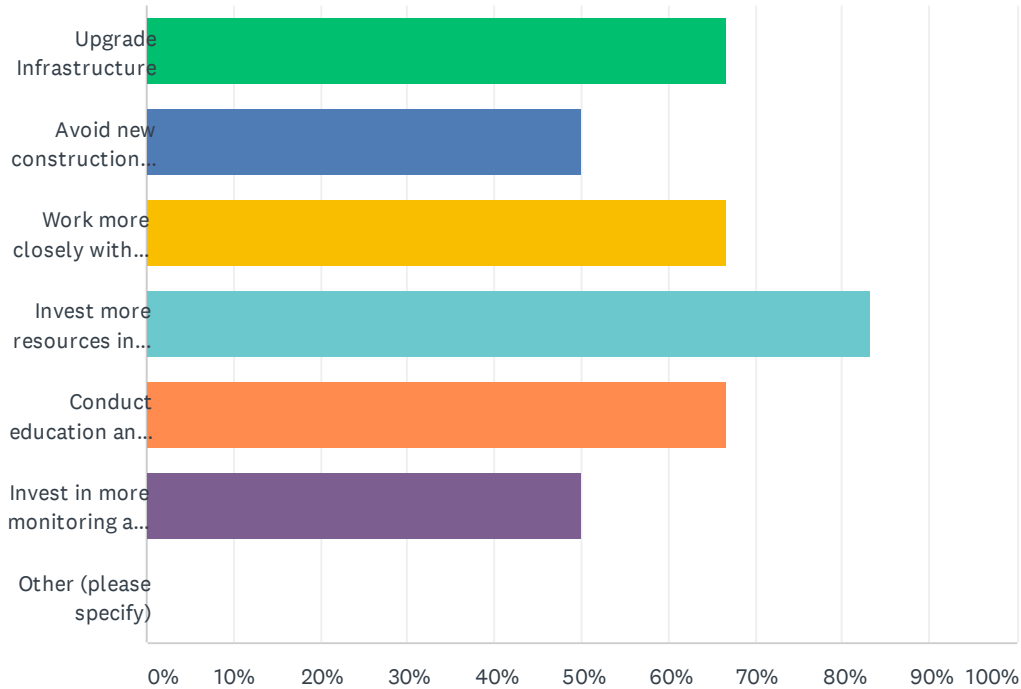
Andrew County Resident Survey



	1	2	3	4	TOTAL RESPONDENTS
Dam Failure	85.71% 6	14.29% 1	0.00% 0	0.00% 0	7
Drought	0.00% 0	14.29% 1	57.14% 4	28.57% 2	7
Earthquakes	33.33% 2	33.33% 2	33.33% 2	0.00% 0	6
Extreme Heat	0.00% 0	71.43% 5	28.57% 2	0.00% 0	7
Fires	14.29% 1	42.86% 3	28.57% 2	14.29% 1	7
Flooding (Flash and River)	0.00% 0	28.57% 2	42.86% 3	28.57% 2	7
Land Subsidence/Sinkholes	28.57% 2	71.43% 5	0.00% 0	0.00% 0	7
Levee Failure	28.57% 2	28.57% 2	28.57% 2	14.29% 1	7
Thunderstorm/High Winds/Lightning/Hail	14.29% 1	0.00% 0	57.14% 4	28.57% 2	7
Tornado	14.29% 1	28.57% 2	0.00% 0	57.14% 4	7
Winter Weather/Snow/Ice/Severe Cold	0.00% 0	14.29% 1	71.43% 5	14.29% 1	7

Q4 In your opinion, which of the following strategies are the most effective investments to reduce the risk of future hazard damage? Please check all that apply.

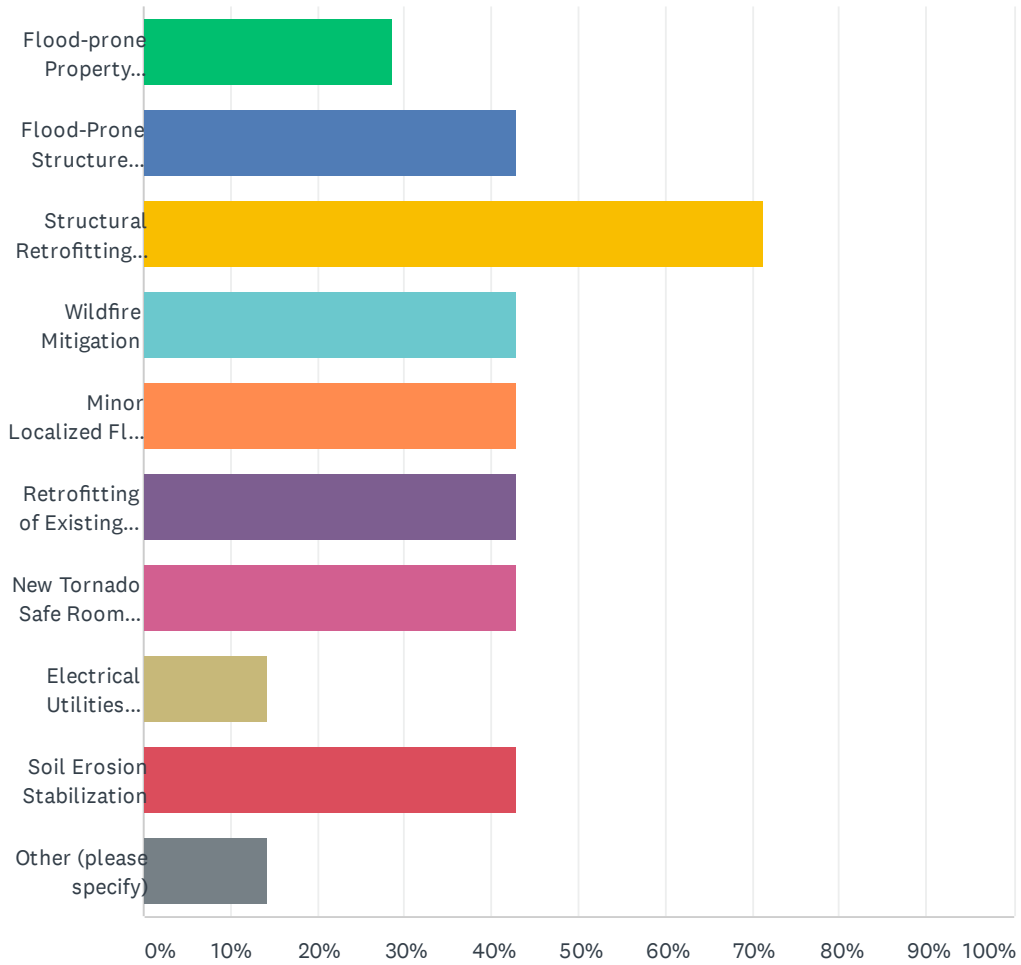
Answered: 6 Skipped: 1



ANSWER CHOICES	RESPONSES	
Upgrade Infrastructure	66.67%	4
Avoid new construction in areas prone to damage	50.00%	3
Work more closely with private property owners	66.67%	4
Invest more resources in preventative maintenance	83.33%	5
Conduct education and awareness Programs	66.67%	4
Invest in more monitoring and planning for protection of community assets	50.00%	3
Other (please specify)	0.00%	0
Total Respondents: 6		

Q5 FEMA Hazard Mitigation Assistance Grants are administered by the State Emergency Management Agency. Listed below are some types of projects considered. Please indicate your opinion as to which projects could benefit your community. Check all that you think would be beneficial.

Answered: 7 Skipped: 0



Andrew County Resident Survey

ANSWER CHOICES	RESPONSES	
Flood-prone Property Acquisition & Structure Demolition /Relocation	28.57%	2
Flood-Prone Structure Elevation	42.86%	3
Structural Retrofitting of Existing Buildings to Add a Tornado Safe Room	71.43%	5
Wildfire Mitigation	42.86%	3
Minor Localized Flood Reduction Projects (storm water management or localized flood control projects)	42.86%	3
Retrofitting of Existing Buildings, and Facilities from Wind Damage.	42.86%	3
New Tornado Safe Room Construction	42.86%	3
Electrical Utilities Infrastructure Retrofit	14.29%	1
Soil Erosion Stabilization	42.86%	3
Other (please specify)	14.29%	1
Total Respondents: 7		

Q6 Please comment on any other issues that the Andrew County Hazard Mitigation Planning Committee should consider in developing a strategy to reduce future losses caused by natural disasters.

Answered: 3 Skipped: 4

Appendix B: Planning Process Documents



Andrew County, MO
PRESS RELEASE

For Immediate Release

Contact: Rebecca Thacker
(816) 233-3144

ANDREW COUNTY HAZARD MITIGATION PLANNING COMMITTEE

Andrew County, MO – Andrew County is seeking public participation in updating the Andrew County Multi-Jurisdictional Hazard Mitigation Plan. The purpose of the plan is to mitigate the impact of natural hazards and to reduce the loss of life and property. The public can help by serving on the planning committee and/or by distributing information at public events.

The planning committee will be comprised of representatives from Andrew County, the incorporated cities, public school districts, agencies, businesses and community volunteers. The first of four meetings will be held at 7:00 pm on Thursday, February 20 at the Andrew County Youth Building, 201 Banyon Street, Savannah, Mo 64485.

The plan update will address a comprehensive list of hazards – ranging from severe winter storms and floods to drought and tornadoes – and will assess the likely impacts of these hazards on communities and school districts in Andrew County. The committee will also update mitigation strategies and identify additional activities to reduce the vulnerability of people and property from extreme weather events.

Feedback from the public will be incorporated into the plan, which will be available for public review and comment. Upon the formal adoption by each participating jurisdiction, the plan will be presented to Missouri State Emergency Management Agency (SEMA) and Federal State Emergency Management Agency (FEMA) for approval. Jurisdictions that participate in updating the plan will remain eligible for hazard mitigation assistance grants.

Mo-Kan Regional Planning Commission is partnering with Andrew County to update the plan. For more information about participating and/or to RSVP to the upcoming meeting, contact Mo-Kan at (816) 233-3144. Please RSVP by February 14.

###

Hazard Mitigation Planning Meeting #1
Sign-in Sheet

Date: Thursday, February 20, 2020
Time: 7:00 PM
Location: 201 Banyon Street, Savannah

Name	Email Address
Gina Lucas	Lucasg@missouri.edu
John Neely	jtneely@yahoo.com
Teresa Neely	jtneely@yahoo.com
Leslie Cope	leslie.cope@andrewcounty.org
Daniel Brewer	danielBrewer755@gmail.com
Blake Rudel	acadrudel@gmail.com
Bryan Atkins	Sheriff@andrewcounty.org
Madison Donaire	madison.donaire@andrewcounty.org
Ryan Bever	ryan.bever@andrewcounty.org
Kathy Roach	nomirea@yahoo.com
Kenny Hill	-
Gary Chambers	Villageclerk1@villageofcrawleyokla.com
Nic Hutcheson	
Bob Caldwell	
Fritz Hegeman	fritzhegeman@gmail.com

Hazard Mitigation Planning Meeting #1
Sign-in Sheet


Date: Thursday, February 20, 2020
Time: 7:00 PM
Location: 201 Banyon Street, Savannah

Name	Email Address
Gary Baumann	gary213@centurytel.net
Linda Loderoute	linda@mo-kan.org
Rebecca Thacker	
Hayley Howard	

Andrew County Multi-Jurisdictional Hazard Mitigation Plan Update

Planning Meeting #1

February 20, 2020
Andrew County Youth Building
Savannah, Missouri



1

Meeting Agenda

- Welcome and Introductions
- What is the Hazard Mitigation Plan (HMP)? (Background & Purpose)
- Why do we need to Participate? (Grant Eligibility & Programs)
- What's the Process of Updating the Plan? (Planning Tasks)
- What are the Requirements to be a Participant?
- Timeline
- Local Match
- Next Steps



2

Welcome & Introductions

- Please tell us who you are and what jurisdiction/organization you are with.

**Please sign-in and fill out the volunteer form*



3

What is a Hazard Mitigation Plan?

- Sustained action taken to reduce or eliminate long-term risk to human life and property from hazardous events
- Mitigation planning is a process for communities to:
 - Identify the hazards to which they are at risk
 - Assess the potential impact of those hazards
 - Develop goals, objectives, and actions to reduce impacts
 - Prioritize and implement mitigation actions




4

Why Do We Need to Participate?

- Disaster Mitigation Act of 2000
- Requires local governments to adopt a natural hazard mitigation plan to maintain eligibility for FEMA mitigation funds.
- Plan must be updated and approved by FEMA every 5 years.
- Goal is to reduce loss of life and property in the event of a natural disaster.
- Create more resilient communities.




5

Approved HMP Establishes Eligibility for FEMA Grants

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation Program (PDM)
- Flood Mitigation Assistance Program
 - Repetitive Loss Program
 - Severe Repetitive Loss Program




6

Hazard Mitigation Grant Program (HMGP)

- The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration.
- Eligible applicants are state agencies, local governments, private non-profit organizations, or Indian tribal governments.
- 75% federal & 25% non-federal match
- An approved local mitigation plan is required.



7

Pre-Disaster Mitigation Program (PDM)

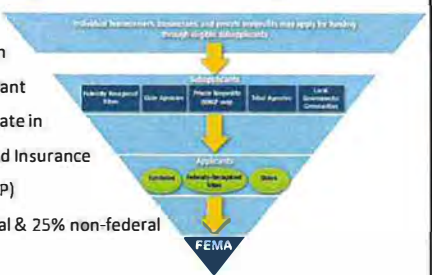

- Annual Appropriation
- Nationally Competitive Grant
- 75% federal & 25% non-federal match
 - SEMA forwards selected applications to FEMA
 - An approved local mitigation plan is required.



8


Flood Mitigation Assistance Program

- Annual Appropriation
- Sub-applicant must participate in National Flood Insurance Program (NFIP)
- 75% federal & 25% non-federal match
- An approved local mitigation plan is required.

9


What's the Process to Update Andrew County's Hazard Mitigation Plan?



10

What is in the plan?


- Chapter 1 – planning process
- Chapter 2 – community profiles and capabilities
- Chapter 3 – risk assessment
- Chapter 4 – mitigation strategy
- Chapter 5 – plan maintenance



11

9 Tasks to Complete the Plan Update

- Task 1: Determine the Planning Area
- Task 2: Build the Planning Team
- Task 3: Create an Outreach Strategy
- Task 4: Review Community Capabilities
- Task 5: Conduct a Risk Assessment
- Task 6: Develop a Mitigation Strategy
- Task 7: Review and Adopt the Plan
- Task 8: Keep the Plan Current
- Task 9: Create a Safe and Resilient Community




12

Multi-jurisdictional Plan Approach

Task 1: Determine the Planning Area

- Andrew County
- Village of Amazonia
- City of Bolckow
- Village of Country Club
- Village of Cosby
- City of Fillmore
- City of Rosendale
- City of Rea
- City of Savannah
- Avenue City School District
- North Andrew School District
- Savannah School District
- Special Districts
- Who's missing?



13

Task 2: Build the Planning Team

<p><u>Jurisdictions</u></p> <ul style="list-style-type: none"> ■ Emergency Responders ■ County and City Clerks ■ Elected Officials ■ Public Works Directors ■ Floodplain Managers ■ Stormwater Managers ■ School Principals & Superintendents 	<p><u>Stakeholders</u></p> <ul style="list-style-type: none"> ■ Business Partners ■ Private-non-profits ■ State & Federal Agencies ■ Academia ■ Healthcare Sector ■ Senior Living Facilities ■ Local/Regional Agencies ■ Who is missing?
--	--




14

Public Involvement Requirement

Task 3: Creating an Outreach Strategy

- During Drafting Stage
 - Public Survey – please see handout
 - Survey Monkey?
 - Hard Copies—City Halls/Libraries/Post Offices?
 - Link on County Website/Other Websites?
- Prior to approval
 - Draft Available via County Website
 - Hard Copies - at least two public locations
- Other Ideas/Events for Public Outreach? Ready-In-3?




15

Data Collection Questionnaires

Task 4: Reviewing Community Capabilities

- Please see the questionnaire
- The questionnaire asks for information that's used for reviewing community capabilities
- It's common for several people to contribute information to complete the questionnaire
- Critical facilities information is required



16

Critical Facilities Examples

Essential Facilities	High Potential Loss Facilities	Transportation and Lifeline Facilities
<ul style="list-style-type: none"> •Hospitals and other medical facilities •Police stations •Fire station •Emergency Operations Centers 	<ul style="list-style-type: none"> •Power plants •Dams/levees •Military installations •Hazardous material sites •Schools •Shelters •Day care centers •Nursing homes •Main government buildings 	<ul style="list-style-type: none"> •Highways, bridges, and tunnels •Railroads and facilities •Bus facilities •Airports •Water treatment facilities •Natural gas facilities and pipelines •Oil facilities and pipelines •Communications facilities

- Take a few minutes to review and ask questions
- Please submit before the next meeting (mail or e-mail)



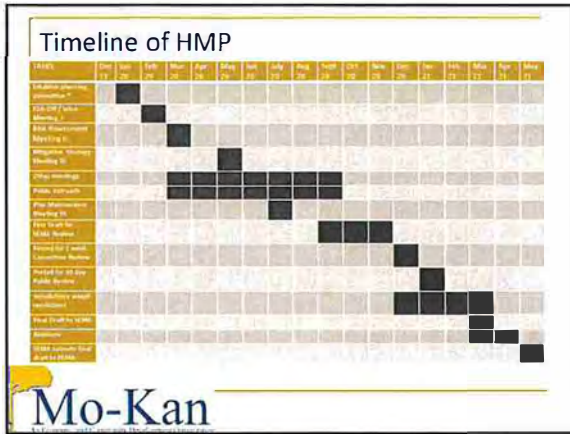
17

Requirements for Each Participating Jurisdiction

- Attend at least one HMP meeting
- Complete data questionnaire form and list of critical/essential facilities
- Complete updated risk assessment
- Evaluate past mitigation actions
- Develop new and update past mitigation actions (at least one)
- Provide comments on plan drafts as requested
- Inform the public and provide opportunities for comment on the plan
- Adopt the plan (adoption resolution template)



18



19

In-Kind Match

- Andrew County is responsible for \$7,337.75 in-kind match
- In-kind match activities include:
 - Planning Committee meetings (unless elected or appointed)
 - Hosting public meetings and talking to community groups
 - Researching or compiling data related to the plan
 - Donation of supplies, labor or equipment for a project in the plan
 - Time spent and mileage driving to HMP activities

**All donated hours and labor must be documented on timesheet*
**All donated supplies and equipment must be on an invoice*

Mo-Kan

20

The Next Steps

- Submit community data questionnaire forms
- 2nd Planning Committee meeting (date: March 19)
- 3rd Planning Committee meeting (date: May 21)
- 4th Planning Committee meeting (date: July-TBD)
- Schedule public meetings and outreach
- Encourage people to provide feedback/join the committee

Mo-Kan

21

Questions

Rebecca Thacker rebecca@mo-kan.org
 Linda Laderoute linda@mo-kan.org
 Hayley Howard hayley@mo-kan.org

Mo-Kan Regional Council
 224 N. 7th Street
 St. Joseph, MD 64501
 816-233-3144

Mo-Kan

22



Andrew County, MO
PRESS RELEASE

For Immediate Release

Contact: Rebecca Thacker
(816) 233-3144

ANDREW COUNTY HAZARD MITIGATION PLANNING MEETING

Andrew County, MO – Andrew County is seeking public participation in updating the Andrew County Multi-Jurisdictional Hazard Mitigation Plan. The purpose of the plan is to mitigate the impact of natural hazards and to reduce the loss of life and property. The public can help by serving on the planning committee, taking the public survey and/or by distributing information at public events.

The planning committee will be comprised of representatives from Andrew County, the incorporated cities, public school districts, agencies, businesses and community volunteers. **The second planning committee meeting scheduled for this Wednesday, November 18th at 6:30 pm.** It will be a Zoom meeting.

The plan update will address a comprehensive list of hazards – ranging from severe winter storms and floods to drought and tornadoes – and will assess the likely impacts of these hazards on communities and school districts in Andrew County. The committee will also update mitigation strategies and identify additional activities to reduce the vulnerability of people and property from extreme weather events.

Andrew County citizens are also encouraged to take a short, 6-question survey online at <https://www.surveymonkey.com/r/TH6TS89>. Feedback from the public survey will be incorporated into the plan, which will be available for public review and comment. Upon the formal adoption by each participating jurisdiction, the plan will be presented to Missouri State Emergency Management Agency (SEMA) and Federal State Emergency Management Agency (FEMA) for approval. Jurisdictions that participate in updating the plan will remain eligible for hazard mitigation assistance grants.

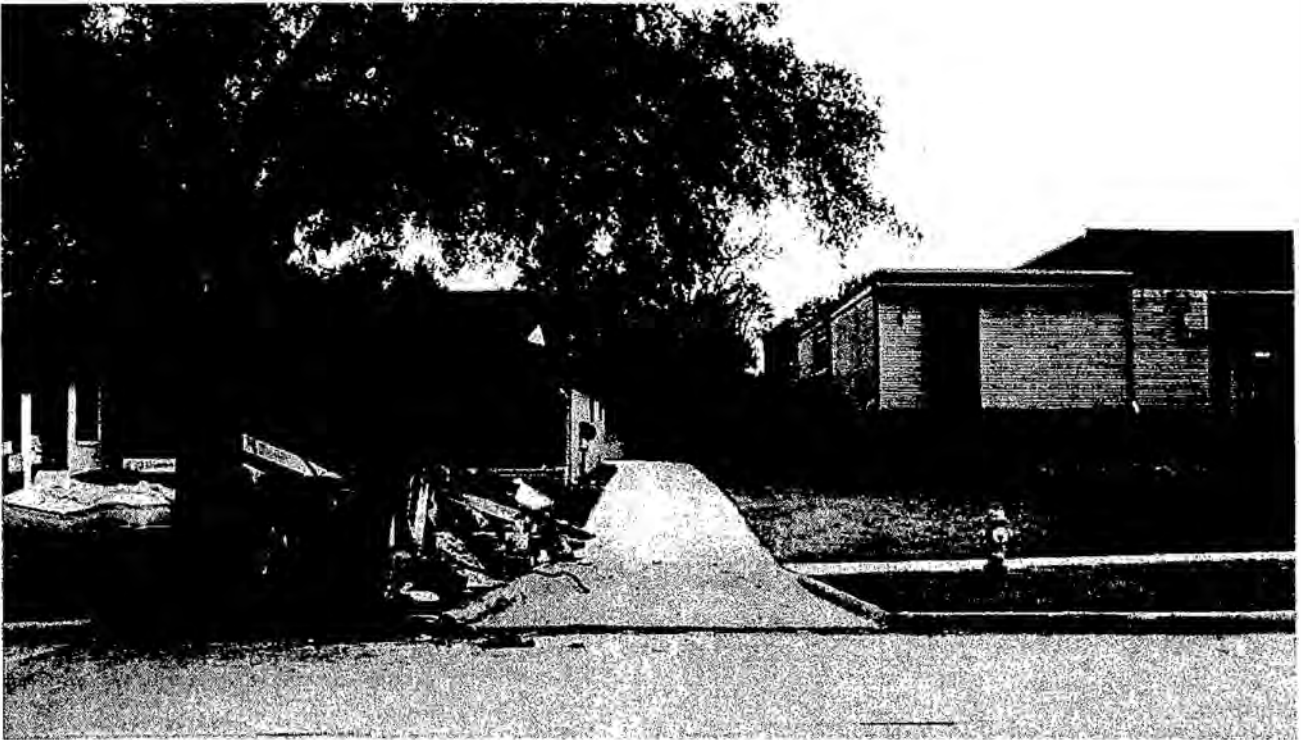
Mo-Kan Regional Planning Commission is partnering with Andrew County to update the plan. For more information about participating and/or to RSVP to the upcoming meeting, contact Mo-Kan at (816) 233-3144. **Please RSVP by November 16th for the second planning meeting.**

###

Every \$1 Invested in Disaster Mitigation Saves \$6

Spending to reduce risk saves lives and creates jobs, key study finds

ARTICLE January 11, 2018 By: Laura Lightbody & Matthew Fuchs Topics: Infrastructure Projects: Flood-Prepared Communities Tags: Floods Read time: 1 min



The house on the right in Meyerland, Texas, was elevated above the 100-year floodplain and largely spared damage from Hurricane Harvey while the non-elevated one on the left sustained flood damage. A new study by the National Institute of Building Sciences finds \$6 saved for every dollar invested in mitigation activities to reduce risk and disaster losses.

© Raj Mankad/Rice Design Alliance

With the damage from Hurricanes Harvey and Irma estimated at \$290 billion, it is clear that the nation must do more to better protect our communities from natural disasters. One way to do that is by anticipating the threats and acting in advance to reduce risk and limit losses. These are investments with proven returns.

Today, the National Institute of Building Sciences (NIBS) released a finding that every \$1 invested in disaster mitigation by three federal agencies saves society \$6. *The Natural Hazard*

mitigation saves. 2017 interim report was the first part of the long-awaited update to a 2009 study that had identified a lower return on investment.

The report highlights significant savings from mitigation in terms of safety, property protection, and continuity when communities are struck by riverine or coastal flooding, hurricanes, earthquakes, or wildfires.

The research analyzed 23 years of grant funding for the Federal Emergency Management Agency (FEMA), the Economic Development Agency, and Housing and Urban Development (HUD), including for such programs as FEMA's Pre-Disaster Mitigation Grant Program and HUD's Community Development Block Grant Program.

In the case of riverine flood, the savings are a \$7-to-\$1 benefit for proactive mitigation steps such as acquiring or demolishing flood-prone buildings.

The report also found a \$4-to-\$1 benefit when construction exceeds the International Code Council's 2015 model building codes, which provide a significant level of safety but do not save as much as going beyond code. Such investments in "code-plus" mitigation include elevating a home above the level required by the ICC to reduce flood risk.

In the coming months, NIBS will further research the benefits of reducing natural disaster risk to water and energy infrastructure. The institute hopes to aggregate its findings on a range of mitigation strategies and provide one cost-benefit ratio that shows the overall advantage of investing in mitigation.

Laura Lightbody directs The Pew Charitable Trusts' flood-prepared communities initiative.

RELATED EXPERTS



Laura Lightbody
Project Director
Flood-Prepared Communities



RELATED

- Topics** Infrastructure
- Tags** Floods
- Projects** Flood-Prepared Communities
- Experts** Laura Lightbody
- Places** United States



Andrew County, MO
PRESS RELEASE

For Immediate Release

Contact: Rebecca Thacker
(816) 233-3144

ANDREW COUNTY HAZARD MITIGATION PLANNING MEETING

Andrew County, MO – Andrew County is seeking public participation in updating the Andrew County Multi-Jurisdictional Hazard Mitigation Plan. The purpose of the plan is to mitigate the impact of natural hazards and to reduce the loss of life and property. The public can help by serving on the planning committee, taking the public survey and/or by distributing information at public events.

The planning committee will be comprised of representatives from Andrew County, the incorporated cities, public school districts, agencies, businesses and community volunteers. **The second planning committee meeting scheduled for this Wednesday, November 18th at 6:30 pm.** It will be a Zoom meeting.

The plan update will address a comprehensive list of hazards – ranging from severe winter storms and floods to drought and tornadoes – and will assess the likely impacts of these hazards on communities and school districts in Andrew County. The committee will also update mitigation strategies and identify additional activities to reduce the vulnerability of people and property from extreme weather events.

Andrew County citizens are also encouraged to take a short, 6-question survey online at <https://www.surveymonkey.com/r/TH6TS89>. Feedback from the public survey will be incorporated into the plan, which will be available for public review and comment. Upon the formal adoption by each participating jurisdiction, the plan will be presented to Missouri State Emergency Management Agency (SEMA) and Federal State Emergency Management Agency (FEMA) for approval. Jurisdictions that participate in updating the plan will remain eligible for hazard mitigation assistance grants.

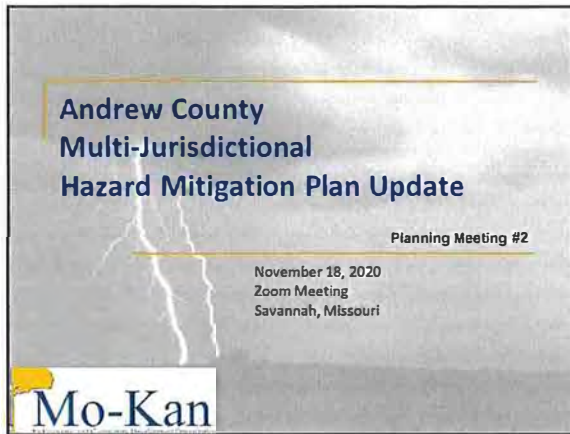
Mo-Kan Regional Planning Commission is partnering with Andrew County to update the plan. For more information about participating and/or to RSVP to the upcoming meeting, contact Mo-Kan at (816) 233-3144. **Please RSVP by November 16th for the second planning meeting.**

###

Hazard Mitigation Planning Meeting #3
Sign-in Sheet

Date: Wednesday, November 18, 2020
Time: 6:30 PM
Location: Zoom

Name	Jurisdiction
Ryan Bever	Andrew County -EMD
Bob Caldwell	Andrew County Commissioner
Bob Lance	Fillmore
Gary Chambers	Country Club Village
Teresa Heely	Cosby clerk
Kath Roach	Rea clerk
Karol Johnson	Laveena Senior Living
Lesley Schutte	NW /Andrew County Health Dept
Becky Grimes	Avenue City SD - principle
Matt Younger	NW Health Services
Sharon Cornelius	Water district director-#2
Daniel Brewer	Rosendale Fire District
Jim Maag	Helena Fire District
Nic Hutchison	Mo-Kan
Hayley Howard	mo-kan



Andrew County Multi-Jurisdictional Hazard Mitigation Plan Update

Planning Meeting #2

November 18, 2020
Zoom Meeting
Savannah, Missouri

Mo-Kan

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Meeting Agenda

- Review
- Public Outreach
- Review Mitigation Goals
- Hazard Profile and Vulnerability Assessment
- Previous Occurrences
- In-Kind Match
- Next Steps

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2

Review

- What? Andrew County Hazard Mitigation Plan
- Who? All jurisdictions
- Why? To reduce loss and life and property
Also, to stay eligible for FEMA/SEMA funding
- When? Draft due in May 2021 (very soon!)
- What's in-kind? Documented local effort of volunteer hours and/or cash

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3

9 Tasks to Complete the Plan Update

- Task 1: Determine the Planning Area
- Task 2: Build the Planning Team
- Task 3: Create an Outreach Strategy**
- Task 4: Review Community Capabilities and Plan Goals**
- Task 5: Conduct a Risk Assessment**
- Task 6: Develop a Mitigation Strategy**
- Task 7: Review and Adopt the Plan
- Task 8: Keep the Plan Current
- Task 9: Create a Safe and Resilient Community

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Task 3 – Create an Outreach Strategy

This has become very difficult during the pandemic!

- Senior Center distributed surveys and Ready-In-3 materials
- Rolling Hills Library has Ready-In-3 materials available
- Andrew County Safety Coalition let us speak at their meeting
- Other ideas?
- Public survey – Survey Monkey

<https://www.surveymonkey.com/r/F6PZPLZ>

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Task 4 – Review Community Capabilities & Data Questionnaire Forms

- Must be submitted in order to be considered a participating jurisdiction!
- Data questionnaires needed from Fillmore and Bolckow

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6

Common Categories of Mitigation Goals

- Reduce Risk to Life and Property
- Public Education
- Policies/Planning/Training/Communication
- Protection of Critical/Essential Facilities

Every \$1 Invested in Disaster Mitigation Saves \$6
(pewtrusts.org)

Review of Past Mitigation Goals

- Goals describe the overall direction of the plan
- Jurisdictions will create individual actions that align with goals and objectives



7


2016 Andrew County HMP Goals (pg. 166)

Goal 1: Protect the Lives, Property and Livelihoods of All Citizens.
Objective 1: Protect citizens' lives and property.
Objective 2: Provide sufficient warning of impending disasters.
Objective 3: Identify the citizens most vulnerable to disasters and plan accordingly.

Goal 2: Manage Growth in Designated Hazard Areas Through Sustainable Policies, Principles and Practices.
Objective 1: Decrease the impact of disasters.
Objective 2: Decrease the cost of the next disaster.
Objective 3: Increase our economic resistance to disasters.

Goal 3: Ensure Access to Information Regarding Hazards Preparation and Recovery.
Objective 1: Increase knowledge among citizens about disaster safety.

Goal 4: Ensure Continued Operation of Government and Emergency Functions in a Disaster.
Objective 1: Increase disaster mitigation management capability in local governments.
Objective 2: Strengthen critical infrastructure.



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Buchanan County HMP Goals


Goal 1: Protect the Lives, Property and Livelihoods of All Citizens.
Objective 1: Protect citizen's lives and property.
Objective 2: Provide sufficient warning of impending disasters.
Objective 3: Identify the citizens most vulnerable to disasters and plan accordingly.

Goal 2: Provide Mitigation to Lessen the Impact in Hazard Prone Areas.
Objective 1: Lessen the impact of certain disasters and reduce the damage of disasters.
Objective 2: Decrease the cost of the next disaster.
Objective 3: Increase our economic resistance to disasters.

Goal 3: Increase Resources Available to Citizens via Education and Preparedness Information.
Objective 1: Increase knowledge among citizens about disaster safety and preparedness.

Goal 4: Ensure Continued Operation of Government and Emergency Functions in a Disaster.
Objective 1: Increase disaster mitigation management capability in local governments.

Goal 5: Identify Critical Infrastructure Components.
Objective 1: Increase mitigation strategies to support those infrastructures.



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State 2018 HMP Goals


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

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

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

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

(Objectives listed in the handout)



10

Determine/Update Mitigation Goals

Does anything need changed?




11

Task 5: Hazard Identification and Risk Assessment

- Hazard Profile
 - Geographic Location
 - Severity/Magnitude/Extent
 - Previous Occurrences
 - Probability of Future Occurrence
- Vulnerability Assessment
 - Vulnerability Overview
 - Potential Losses to Existing Development
 - Future Development
 - Hazard Summary by Jurisdiction
- Problem Statement

Based on existing plan, state plan, additional information from planning committee, additional research/analysis



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Natural Hazards for Consideration

- Dam Failure
- Drought
- Earthquakes
- Extreme Heat
- Fires (Urban/Structural and Wild)
- Flooding (Flash and River)
- Land Subsidence/Sinkholes
- Levee Failure
- Thunderstorm/High Winds/Lightning/Hail
- Tornado
- Winter Weather/Snow/Ice/Severe Cold
- New: Pandemic & Community Rating System

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Previous Occurrences

- What significant natural hazards have occurred in the past five years? What was the impact?
- Have any mitigation actions been implemented in the past five years, such as outdoor warning sirens, tornado safe rooms, adoption of building codes, etc.

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Task 6: Develop Mitigation Strategy

What are Mitigation Actions?

- Actions are activities/programs/etc., that support the plan's goals and objectives
- Have long-term and cumulative benefits
- Some may be low-cost and easy to implement
- Others may be dependent on available funding
- Relevant to your jurisdiction
- Jurisdiction must have one action that is potentially funded by FEMA (Not all actions will be eligible for FEMA grants)

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Review Previous Actions

- Status updates required for ALL actions from previous plan (FEMA will not approve plan without this)
- Identified as completed, deleted or continuing
- Must be received by December 1 or considered a non-participating jurisdiction. This will make pending FEMA grant applications ineligible.
- Evaluations still needed from Bolckow, County Club Village, Fillmore, Rosendale and Rea

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Example of Evaluation of Past Actions

Item	Description	Completed	Deleted	Continuing	Notes	Reviewed
1.1.1	Identify all on the list of addresses and conduct an inspection to determine if the structure is in compliance with the applicable code and standards.	X				X
1.1.2	Conduct program to provide information to Home Inspectors of the community and to educate them on the importance of their role in the safety of their area.		X			X
1.1.3	Work with private entities, such as utilities and businesses, to encourage the installation of surge protection devices in their facilities.		X		only 1 school	X
1.1.4	Review emergency response plans and procedures for all public facilities.	X			Conduct Wild School potential location	X
1.1.5	Review and update Community Response Plans for all public facilities.		X		need more info to determine how many buildings are in the area	X
1.1.6	Identify all public facilities that are in need of repair or replacement.		X		list of current and future projects	X
1.1.7	Identify all public facilities that are in need of repair or replacement.		X		and please refer to the list	X

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Create New Actions

- Should be SMART: specific, measurable, achievable, relevant and time-bound
- Complete form for new action
- Aim for a few meaningful actions
- Due by December 15
- Set a date when your jurisdiction will review the HMP on an annual basis – default date will be January of each year


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In-Kind Match

- Andrew County is responsible for **\$ 7,337.75** of in-kind match
- At 43% of goal with **\$3,190.16** of in-kind match
- In-kind match activities include:
 - Planning Committee (unless elected or appointed)
 - Public meeting attendees
 - Hosting public meetings and talking to community groups
 - Researching or compiling information related to the plan
 - Mileage for driving to HMP activities
 - Making copies of materials needed for the update and meetings

**All in-kind hours and labor must be properly documented*



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The Next Steps

- Schedule additional public meetings and public outreach!
- 3rd Planning Committee meeting
 - tentatively December 3, 6:30 pm
- Deadline for new actions is December 15, 2020
- Draft of plan will be posted in January 2021
- Available for public review/comment
- Resolution adopting the plan due by April 2021



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Questions

Trevor Tull trevor@mo-kan.org
 Hayley Howard hayley@mo-kan.org
 Nic Hutchison nich@mo-kan.org
 Rebecca Thacker rebecca@mo-kan.org

Mo-Kan Regional Council
 224 N. 7th Street
 St. Joseph, MO 64501
 816-233-3144



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State of Missouri Mitigation Goals and Objectives 2018 (pg. 671)

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

1.1. Maintain a robust mitigation program that addresses ways to mitigate the loss of life from disaster events. (This includes supporting the development and funding of mitigation plans and sensible mitigation projects to reduce the effects of natural hazards, future flooding, eliminate repetitive flood losses, improve safety and reduce losses during severe weather events, mitigate losses due to earthquakes, minimize losses due to terrorism, and reduce risk and losses due to high wind, tornadoes, winter storms, drought, high heat, and fire.)

1.2. Strengthen cooperation with SEMA's mitigation partners and help educate them about mitigation.

1.3. Support the development of sensible enabling legislation, programs, and capabilities of federal, state, and local governments and public-private partnerships engaged in mitigation activities.

1.4. Increase public awareness of disaster risks and effective mitigation measures that protect human life.

1.5. Maintain a high level of mitigation proficiency among SEMA staff.

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

2.1. Support the development of sensible mitigation projects to protect key and essential facilities and services.

2.2. Continue to educate federal, state, and local public officials; educational institutions; private associations; and private business entities that provide essential services about hazards and how mitigation can reduce losses and help maintain continuity.

2.3. Educate state and local officials concerning the need to use sensible mitigation techniques for new facility construction.

2.4. Encourage maximum participation in maintaining effective state and local mitigation plans, disaster plans, and business continuity plans.

2.5. Encourage federal, state, and local officials; educational institutions; private associations; and private business entities that provide essential services to incorporate mitigation into other plans.

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

3.1. Maintain an effective mitigation program that addresses ways to mitigate the loss of property from disaster events. (This includes supporting the development and funding of mitigation plans and sensible mitigation projects to reduce the effects of natural hazards, future flooding, eliminate repetitive flood losses, improve safety and reduce losses during severe weather events, mitigate losses due to earthquakes, minimize losses due to terrorism, and reduce risk and losses due to high wind, tornadoes, winter storms, drought, high heat, and fire.)

3.2. Strengthen cooperation with SEMA's mitigation partners and help educate them about mitigating the loss of property.

3.3. Support organizations that work to help mitigate the adverse effects of disasters.

3.4. Increase public awareness of disaster risks and effective mitigation measures that protect property.

3.5. Support the National Flood Insurance Program, Community Rating System (CRS), earthquake insurance, and other programs that serve to reduce the impacts of disasters on properties.

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

4.1. Develop, implement, and complete mitigation projects as expeditiously, effectively, efficiently, and unobtrusively as possible.

4.2. Consider sustainability issues (ecologically sound, economically viable, socially just, and humane) when developing or reviewing mitigation projects and plans.

4.3. Lead and support the work of mitigation partners to educate the general public about how mitigation can help protect communities and promote community tranquility.

4.4. Develop and provide periodic reports and success stories to federal, state, and local public officials, educational institutions, private associations, private business entities, and the public on the progress of hazard mitigation activities.

4.5. Encourage citizens and citizen organizations to support and use mitigation in plans, projects, and public outreach to increase a sense of community security and safety.

Andrew County Risk Assessment Summary:

Dam Failure – There are 9 high hazard dams in Andrew County (meaning that a dam failure could result in loss of life). Only one of those is state regulated (had recent inspection with no concerns). Keller and Savannah City Reservoir had inspections in 1980 and 1979 (respectively), unknown dates on when other dams had inspections. Approximately \$118m structure value and 638 people in inundation areas. No history of dam failure.

Drought – Average of \$1.5 million loss a year to drought. Approx. 7% chance of a drought happening a year in Andrew County.

Earthquakes – Not a high-risk hazard.

Extreme Heat – Considered a low-risk hazard. The losses to insurable crops from 2007 to 2016 was \$354,232. Excessive heat caused a “blow up” on U.S. Route 59 west of Savannah this year.

Fire – There is a 100% chance of a wildfire occurring each year somewhere in Andrew County, averaging 327 acres burned per year.

Flooding – 60% chance of flash flood, 80% chance of riverine flood occurring per year in Andrew County. 102 Watershed mapping occurring soon.

Land Subsidence/Sinkholes – Not a high-risk hazard. Jann Sinkhole in Jefferson Township exists. Mining sites are susceptible to sink holes. Recent sink hole in County Club Village.

Levee Failure – Amazonia Levee De-accredited. Potential loss from levee failure is \$24 million. No history of levee failure.

Thunderstorms (includes high winds, hail and lightning) – Considered a medium low hazard. Crop losses for the years 2007-2016 were as follows: high winds, \$263,485; hail, \$1,266,248; lightning, \$0. Of all severe weather, hail has the highest probability of occurrence at 100 percent. Property damage attributed to wind events from 1999-2019 was \$83,000; however, there was no recorded property damage due to hail during the same time period.

Tornado – The annualized loss from tornadoes is \$96,572 with a 30% chance of a tornado occurring somewhere in Andrew County each year. State Plan says that the vulnerability rating is low but it typically is of high concern to residents.

Severe Winter Weather – There is a 100% chance of severe winter weather event happening per year. There is an annual average of \$350,000 in property loss per year in Andrew County.



Andrew County, MO
PRESS RELEASE

For Immediate Release

Contact: Rebecca Thacker
(816) 233-3144

ANDREW COUNTY HAZARD MITIGATION PLANNING MEETING RESCHEDULED

Andrew County, MO – Andrew County is seeking public participation in updating the Andrew County Multi-Jurisdictional Hazard Mitigation Plan. The purpose of the plan is to mitigate the impact of natural hazards and to reduce the loss of life and property. The public can help by serving on the planning committee, taking the public survey and/or by distributing information at public events.

The planning committee will be comprised of representatives from Andrew County, the incorporated cities, public school districts, agencies, businesses and community volunteers. **The third planning committee meeting scheduled is for 6:30 pm on December 3rd and will be held via Zoom.** The public is welcome to participate.

The plan update will address a comprehensive list of hazards – ranging from severe winter storms and floods to drought and tornadoes – and will assess the likely impacts of these hazards on communities and school districts in Andrew County. The committee will also update mitigation strategies and identify additional activities to reduce the vulnerability of people and property from extreme weather events.

Andrew County citizens are also encouraged to take a short, 6-question survey online at <https://www.surveymonkey.com/r/TH6TS89>. Feedback from the public survey will be incorporated into the plan, which will be available for public review and comment. Upon the formal adoption by each participating jurisdiction, the plan will be presented to Missouri State Emergency Management Agency (SEMA) and Federal State Emergency Management Agency (FEMA) for approval. Jurisdictions that participate in updating the plan will remain eligible for hazard mitigation assistance grants.

Mo-Kan Regional Planning Commission is partnering with Andrew County to update the plan. Call Mo-Kan Regional Council at 816-233-3144 for the Zoom link for the December 3rd meeting.

###

Hazard Mitigation Planning Meeting #3
Sign-in Sheet

Date: Thursday, December 3, 2020
Time: 6:30 PM
Location: Zoom

Name	Jurisdiction
Ryan Bever	Andrew County -EMD
Bob Caldwell	Andrew County Commissioner
Gary Chambers	Country Club Village -clerk
Teresa Neely	Cosby -clerk
Kathy Roach	Rea -clerk
Bruce Lundy	SAVANNAH -administrator
Becky Grimes	Avenue City SD -principle
Eric Kurre	Savannah SD -superintendent
Sharon Cornelius	water district director-#2
Mike Booth	SEMA regional coordinator
Alex Braszko	Rosecrans base
Bob Lance	Fillmore clerk
Brian Butler	Andrew County emergency response
Daniel Brewer	Rosendale Fireprotection
Jennifer	Andrew County emergency response

**Andrew County
Multi-Jurisdictional
Hazard Mitigation Plan Update**

Planning Meeting #3

December 3, 2020
Zoom Meeting
Savannah, Missouri

Mo-Kan

1

Meeting Agenda

- Review
- Public Outreach Update
- Plan Maintenance
- Draft
- Public Comment
- Adopt the plan
- In-Kind Match
- Next Steps

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Review

- **What?** Andrew County Hazard Mitigation Plan
- **Who?** All jurisdictions
- **Why?** To reduce loss of life and property
Also, to stay eligible for FEMA/SEMA funding
- **When?** Draft due in May 2021 (very soon!)
- **What's in-kind?** Documented local effort of volunteer hours and/or cash

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3

9 Tasks to Complete the Plan Update

- Task 1: Determine the Planning Area
- Task 2: Build the Planning Team
- **Task 3: Create an Outreach Strategy**
- Task 4: Review Community Capabilities and Plan Goals
- Task 5: Conduct a Risk Assessment
- Task 6: Develop a Mitigation Strategy
- **Task 7: Review and Adopt the Plan**
- **Task 8: Keep the Plan Current**
- **Task 9: Create a Safe and Resilient Community**

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Task 3 – Create an Outreach Strategy

This has become very difficult during the pandemic!

- Second Harvest Thanksgiving Distribution on Nov. 24
- Recycle event on Dec. 5
- Savannah City Hall
- Reaching out to doctor offices
- Public survey – Survey Monkey

<https://www.surveymonkey.com/r/F6PZPLZ>

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Task 7 – Review and Adopt the Plan

- A draft of the plan will be sent to each jurisdiction in January
- Please review sections relevant to your jurisdiction
- Make available for public review and comment
- Post a notice
- Some options for review are:
 - Print a copy and make available to the public (form for comments will be provided)
 - Post link to the plan on Mo-Kan's website (comments can be submitted on our website)
 - Track your public review and comment efforts

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Andrew County Commissioner Meeting – Hazard Mitigation Plan

Andrew County Courthouse

January 13, 2020

9 am

- 1) What is the Hazard Mitigation Plan**
- 2) Process for Updating the Plan**
- 3) In-kind Match**
- 4) Public Outreach/Participation**
- 4) Review Stakeholder/Meeting Invitation List**
- 3) Timeline**

Helena Siren Community Meeting

01/21/2020

Hazard Mitigation:

Discussed the hazard Mitigation plan and that this work we are doing falls into the overall large planning.

Siren:

Shared details about the sirens functions, reach, and grant details.

Community had questions in regards to:

1. Used Siren—Can this be utilized? Bill Britten in St. Joseph may be a resource
2. Maintenance—Will Ryan be able cover with county dollars?
3. Can local grants be utilized as part of the match funding?

Community Commitments:

Confirmed: Evergy

Possibilities: Walmart, Union Star Bank, Helena UMC, Helena Baptist, Home Depot, Messick Foundation, International Paper, 4-H club

Confirmed following meeting:

Richard Wall 816-390-3730 \$500

Jerry and Margaret Dishman 816-390-1511 \$300

Mike Hurst 816-390-3388 \$100

Donnie Thornton 816-262-2616 \$100

LouAnn Mahlandt 816-369-9202 \$100

Rudy and Martha Clark 816-617-1451 \$100

Randall and Cheryl Wyckoff 816-378-2703 \$100

Dan and Annette Long dano1258@outlook.com \$100

Donald and Deann Schnitker \$100

Thornton Farms \$100

Johnney & Teresa Neely JTNeely@yahoo.com 378-2315 344-8949 (John) 262-2891(Teresa)

Andrew County Commissioner Meeting – Hazard Mitigation Plan

Andrew County Courthouse

August 24, 2020

9 am

- 1) Review County Profile**
- 2) Review Critical/Essential Facilities Table**
- 3) Planned Development Locations**
- 4) EMAP, Community Rating System (CRS), Pandemic Sections – do you want these added?**
- 5) When/How Final Plan Reviewed for Annual Progress**
- 6) Review Risk Assessment**
- 7) Evaluate Past Actions**

It's preferred to have a limited number of actions that the jurisdictions will make a serious attempt to enact over the next five years, instead of many actions without an effort to implement them. Jurisdictions must have one action that is potentially fundable by a FEMA grant (saferoom, tornado siren, etc.). Actions must be measurable and timebound, so continued actions with the verbiage "encourage" or "explore" need to be modified or deleted. If a past action describes a current capability, it is considered complete and should not be carried forward unless being expanded or improved upon.

Next Steps –

- Submit evaluated past actions
- Create new actions
- Encourage public input and in-kind participation
- Adopt plan after the public comment period

County developing plan to highlight risks to residents

The county's annual risk assessment suggests there is a 60 percent chance of flash flooding and an 80 percent chance of river flooding annually in flood plain areas of Andrew County.

Andrew County commissioners met Aug. 24 with Emergency Management Director Ryan Beaver and staff from MOKAN, the regional planning organization. The county is in the process of preparing a new detailed planning document identifying potential hazards and ways to mitigate their impact on county residents.

Commissioners are awaiting a report on the 102 River's entire watershed area as it relates to flooding. MOKAN also reported the levee protecting Amazonia has lost its federal accreditation.

There is a potential of a \$24 million loss if the levee were to fail. MOKAN said the Amazonia levee has no history of failure.

The report has also identified nine dams in Andrew County. Two of the dams are public: the state-regulated dam at Happy Holler Wildlife Area and the Savannah reservoir, which was inspected last in 1980.

The other seven are private dams involving small bodies of water. Beaver reported to the commissioners that there is no history of dam failure in Andrew County.

Fritz Hegeman, the Eastern District commissioner, strongly suggested there was need for a review of those seven dams. Beaver agreed to work with the commissioner to arrange for a review of all seven private dams because there has been no public inspection.

The seven private and two public dams protect property valued at around \$118 million, with about 638 people living in possible inundation areas.

The draft report has identified hail damage as being the most likely severe weather situation to have an annual impact on Andrew County residents. The other weather condition with an annual chance of having an impact on the county is severe winter weather.

MOKAN reports there is only a 30 percent chance of a tornado occurring somewhere in Andrew County each year.

The draft report also states that there is a 100 percent chance of a wildfire occurring every year in Andrew County. Annual statistics suggest wildfire will burn about 327 acres.

MOKAN will be seeking public participation in creating the hazard mitigation report, but efforts in this area have been delayed because of the COVID-19 pandemic.

The plan must be completed and reviewed by state and federal officials before November 2021.

Andrew County Health and Safety Coalition

November 5, 2020 --- 0830

Zoom

<https://umsystem.zoom.us/j/3125897619?pwd=aWlZUIZXSDBlZHVsdXBrc2VhZGVoZlZlUT09>

Working together to promote population health and community safety.

1. Introductions
2. Approval of Previous Meeting Minutes
3. Treasurer's Report (Steve)
4. Committee Reports
 - a. Drug Fee Superstars Committee
 - b. School Sub Committee (K'Lea/Jayne) --Tabled
 - c. Finance Committee (Andrew)
 - d. Survey Committee (Angela) – Update
5. Old Business
 - a. Andrew County Health Department COVID and Schools Workgroup
 - b. Andrew County Health Department COVID-19 Dashboard
6. New Business
 - a. Mo-Kan: Andrew County Hazard Mitigation Plan
 - b. First Impact
 - c. Mental Health First Aid
7. Roundtable Discussion
8. Adjournment

Parking Lot

Lots of ideas have been shared and I thought we could start to keep a list of ideas/projects



LEPC Meeting

Thursday, 18, 2021 11:00am - 1pm

Attendees

Chair: David Vincent

Vice Chair: Andrew Hoffman

Treasurer: Cindy Esely

Coordinator: Ryan Bever and Briar Butner

LEPC: Committee

Agenda

Last Meeting Follow-up

Last year's meeting was done by email, text, and phone call. The communication with the LEPC was to buy equipment for hazmat training. Reference the meeting notes attached to this document.

New Business

Approval of LEPC annual budget

Approval of January, 2020 LEPC meeting minutes

1. Nominations for a new Chair, Vice Chair, and Treasurer. Nominations can be sent to me privately or voiced during the meeting. The newly elected Chair, Vice Chair, and Treasurer will be tallied by the executive officers.

- a. Email ryan.bever@andrewcounty.org to submit your nomination for each position in the following format:

Chairman:

Vice-Chairman:

Treasurer:

2. Andrew County has been awarded two hazmat classes from the MERC (Missouri Emergency Response Commission).
 - a. ***Hazmat Sizeup for the First Responder***
 - i. April 10th, 2021 8:00 am – 5:00 pm 400 E Main St, Savannah, MO 64485
 - b. ***Hazmat Basic Life Saver Provider***
 - i. May 8th, 2021 8:00am-5:00pm 400 E Main Street, Savannah, MO 64485
3. Tier II plans have not been received from Andrew County's Chemical facilities. Andrew County Emergency Management Agency will be in contact with those facilities to inquire about their progress.
4. Introduction to Cybersecurity - Alex Braszko
5. Andrew County Warning Siren Grant Update - Hayley Howard
6. Rosecrans Air Show
 - a. May 1st-2nd
7. COVID-19 Response - Jayne White
8. American Red Cross COVID-19 Response - Ralph Deshong
9. Purchase of Zoom membership to host meetings

Open For Questions/Comments

Any suggestions for discussion in the next meeting

Next Meeting Agenda Items

1. Next Meeting
 - a. April 1st, 2021 11:00am-1:00pm

Andrew County LEPC Meeting Minutes

02/18/2021

Attendees

Jayne White
Alex Braszko
Cyndee Merrit
Ralph Dishong
Don Lawrence
Ethel Catron
Gina Lucas
Brian Roarty
Briar Butner
Ryan Bever
Madison Donahoo
Gary Baumann
Cindy Esely
Grant Gillett
Frederick Hegeman
Andrew Hoffman
Kyler Oliver
Bill Brinton

Agenda

Last Meeting Follow-up

Last year's meeting was done by email, text, and phone call. The communication with the LEPC was to buy equipment for hazmat training. Reference the meeting notes attached to this document.

- Approval of January, 2020 LEPC meeting minutes
 - **Approved**

New Business

Approval of LEPC annual budget

1. Nominations for a new Chair, Vice Chair, and Treasurer. Nominations can be sent to me privately or voiced during the meeting. The newly elected Chair, Vice Chair, and Treasurer will be tallied by the executive officers.

a. Email ryan.bever@andrewcounty.org to submit your nomination for each position in the following format:

Chairman:

Vice-Chairman:

Treasurer:

2. Andrew County has been awarded two hazmat classes from the MERC (Missouri Emergency Response Commission).

a. ***Hazmat Sizeup for the First Responder***

i. April 10th, 2021 8:00 am – 5:00 pm 400 E Main St, Savannah, MO 64485

b. ***Hazmat Basic Life Saver Provider***

i. May 8th, 2021 8:00am-5:00pm 400 E Main Street, Savannah, MO 64485

3. Tier II plans have not been received from Andrew County's Chemical facilities. Andrew County Emergency Management Agency will be in contact with those facilities to inquire about their progress.

4. Introduction to Cybersecurity - Alex Braszko

a. **Formative stages of developing cyber security plan**

b. **Meeting with DHS CISA to coordinate testing for the community-identify vulnerabilities**

5. Andrew County Warning Siren Grant Update - Hayley Howard

a. **MO-KAN Hazard mitigation plan update- eligible for fema grants for the state**

b. **Hazard mitigation grant program- five grants for warning sirens in the county- 5 communities have been approved**

1. Camera turned on while speaking
2. Warning siren for avenue city- Don Lawrence
3. Changes at MERC - LEPC planning funds not being spent on what it is supposed to be used for hazmat planning and hazmat training
4. EMD can no longer be chairperson for LEPC

Next Meeting Agenda Items

1. Next Meeting
 - a. April 1st, 2021 11:00am-1:00pm

Meeting Adjourned- 12:09 pm

Andrew County Multi-Jurisdictional Hazard Mitigation Plan

What is a Hazard Mitigation Plan (HMP)? It is a plan that is focused on reducing the loss of life and property in the event of a natural disaster. The county, communities, special districts, emergency management, schools, organizations and other stake-holders are involved in identifying what the risks are and developing a strategy to minimize these risks.

What's the process for updating the plan? A series of meetings will be held to update the plan. Jurisdictions will also need to provide information/data about their jurisdiction, evaluate past actions from the last plan, identify new actions, etc. It's a time consuming process so having several people from each jurisdiction participating makes it an easier process. Often the EMD and Commissioners take the lead to encourage participation and gather information. The public needs to have ample opportunity to comment on the plan. When the plan is completed, each jurisdiction will need to formally adopt the plan. The plan will be sent to SEMA and then FEMA for review.

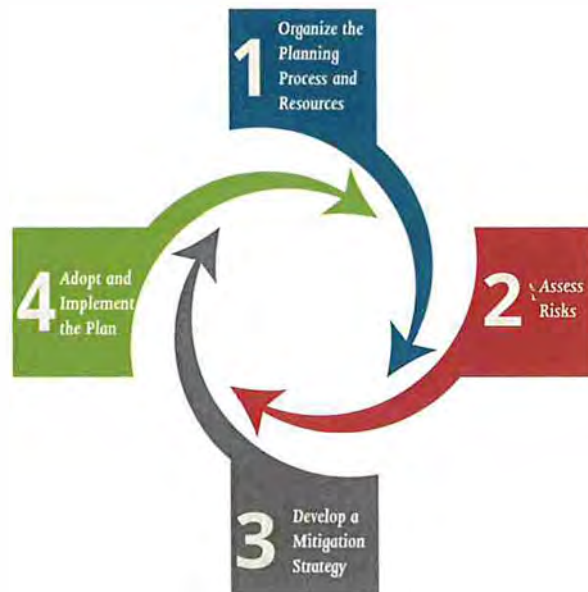
Why do we need to do this? Having a current HMP keeps the jurisdiction eligible for certain FEMA funding and grants. Clarksdale recently submitted an application for a community safe room.

HMPs are updated every five years. The current plan expires November 21, 2021.

Local match is \$7,337.75 and can be cash or in-kind. The in-kind volunteer rate is \$23.21 and mileage is \$.45 per mile. Food no longer counts as in-kind expense, nor does someone's time for completing a survey. Elected official's time typically does not count towards in-kind.

Mo-Kan will invoice for local match in installments during the plan update. If there's sufficient in-kind match, the funds will be reimbursed.

The Planning Process



1. Organize the Planning Process and Resources – At the start, a state, tribe, or local government should focus on assembling the resources needed for a successful mitigation planning process. This includes securing technical expertise, defining the planning area, and identifying key individuals, agencies, neighboring jurisdictions, businesses, and/or other stakeholders to participate in the process. The planning process for local and tribal governments must include opportunities for the public to comment on the plan.

2. Assess Risks – Next, the state, tribe, or local government needs to identify the characteristics and potential consequences of hazards. It is important to understand what geographic areas each hazard might impact and what people, property, or other assets might be vulnerable.

3. Develop a Mitigation Strategy – The state, tribe, or local government then sets priorities and develops long-term strategies for avoiding or minimizing the undesired effects of disasters. The mitigation strategy addresses how the mitigation actions will be implemented and administered.

4. Adopt and Implement the Plan – Once FEMA has received the adoption from the governing body and approved the plan, the state, tribe, or local government can bring the mitigation plan to life in a variety of ways, ranging from implementing specific mitigation projects to changing aspects of day-to-day organizational operations. To ensure success, the plan must remain a relevant, living document through routine maintenance. The state, tribe, or local government needs to conduct periodic evaluations to assess changing risks and priorities and make revisions as needed.

(<https://www.fema.gov/hazard-mitigation-planning-process>)



FEMA

Building Community Resilience by Integrating Hazard Mitigation

The Role of Local Leadership

How Can Local Leaders Promote the Integration of Hazard Mitigation into Local Planning?

Local community leaders and decision makers play an important role in setting priorities, providing overarching policy direction, and bringing stakeholders together. Their visibility can be used to spearhead initiatives that promote the importance of integrating hazard mitigation to achieve overall community safety and resilience. In addition, they have the ability to communicate with a broad base of constituents and partners. These qualities are invaluable for the success of an integrated, interdepartmental, multi-jurisdictional hazard mitigation strategy. Here are some ways to promote integrated hazard mitigation solutions:

- **Frame the issue.** On its own, integrating hazard mitigation and safe growth policies can seem like an obscure topic to decision makers and the general public. Frame the issue in terms that resonate with the community, such as economic development, environmental protection, or providing essential public services. Use these issues to highlight the importance of hazard mitigation in supporting these community values.
- **Make safety and resilience a priority.** Ensure that public safety and community resilience are considered in all decisions. When deliberating or voting on an issue, providing policy direction, or setting budgets, ask how that decision affects safety and resilience, and ask which hazard mitigation practices may strengthen the decision.
- **Build partnerships.** Bring stakeholders to the planning table by fostering partnerships among local departments, between agencies, and between communities. Include representatives of interest groups such as environmental organizations, business associations, or professional associations. Make use of technical experts—this helps to provide a more robust knowledge pool for developing ways to integrate hazard mitigation. Invite civic organizations and the general public to participate and provide input.
- **Get the message out.** Use the visibility of a local leader as a platform to champion, or raise awareness on, the importance of hazard mitigation and community resilience. Quickly highlight successful actions and return on investment to promote other actions. Be repetitive and consistent with the message through multiple channels of communication.



FEMA/Norman Lenburg



FEMA/Manny Broussard

Local leaders promote integration of hazard mitigation within the community by framing the issue, making it a priority, building partnerships, and conveying the message. Conveying the message includes demonstrating and celebrating success.

Responsibility for promoting community safety and resilience does not lie with a single person or department. Hazards often cross jurisdictional boundaries, requiring communication and partnerships among neighboring communities and various organizations that can support integration efforts.

What Community Tools Support Community Resilience?

Building or enhancing community resilience does not need to mean expensive structural protection measures. Decisions that are made relating to land use, environmental protection, economic development, capital improvements, government operations, and budgets all have a role to play in mitigating hazard risks. The most effective way to promote resilience at the community level is to integrate the consideration of risk, and ways to reduce or eliminate risk, into all decisions.

Examples of integrated hazard mitigation solutions include:

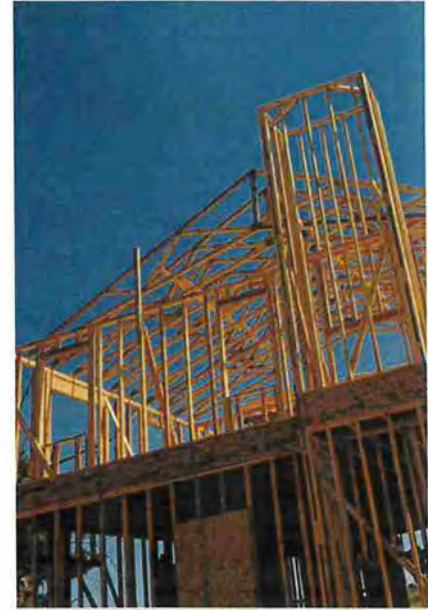
- Establishing goals, policies, and objectives that are linked to risk reduction and resiliency in the comprehensive, general, or other community plans;
- Incorporating hazard mitigation standards in permit reviews;
- Using tax increment financing, transportation improvement financing, or other public funding mechanisms to help pay for hazard mitigation measures;
- Using capital improvement programs to fund hazard mitigation measures;
- Using infrastructure improvements to guide growth away from known hazard areas;
- Using zoning and other land use controls to prohibit or discourage hazardous development patterns;
- Preserving natural areas or open space as buffers against known hazards, such as wildfire breaks;
- Preserving or restoring natural functions that minimize hazard impacts, such as wetland restoration;
- Incorporating structural retrofits or relocation of existing buildings or infrastructure during the post-disaster redevelopment process; and
- Incorporating the awareness of hazard risks and hazard mitigation into public outreach practices.

Why is Hazard Mitigation Important?

Hazard mitigation has value on a number of levels. Mitigation creates safer communities by reducing loss of life and damage to property. Mitigation also enables individuals and communities to recover more quickly from disasters. And, mitigation lessens the financial impact of disasters on individuals and all levels of government.



FEMA/Michelle Miller-Freese



FEMA/Ruth Kennedy

For More Information

Refer to FEMA's integration guidance document, *Integrating Hazard Mitigation Into Local Planning*, available at www.fema.gov/hazard-mitigation-planning-resources

ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN



WHAT IS A HAZARD MITIGATION PLAN?

A hazard mitigation plan (HMP) is "the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards" (44 CF\$ 201.6).

HMPs are necessary to establish and maintain eligibility for grant funds. The planning process is as important as the plan itself because it creates a framework for governments to reduce the negative impacts from future disasters on lives, property, and the economy.

Hazard mitigation planning can significantly reduce the physical, financial, and emotional losses caused by disasters. The Disaster Mitigation Act of 2000 is federal legislation that establishes a pre-disaster hazard mitigation program and requirements for the national BRIC (Building Resilient Infrastructure and Communities) program. It encourages and rewards state and local pre-disaster planning and promotes sustainability.

Completion of an HMP will result in more effective risk reduction projects and in a faster and more efficient allocation of funding.

PURPOSE

The Andrew County Emergency Management Agency is leading the update of the countywide HMP, in cooperation with our region's planning council (Mo-Kan). This plan is an opportunity to detail a variety of potential hazards that affect some or all of our residents and will also allow the county and participating municipalities to be eligible for future mitigation funding from the Federal Emergency Management Agency (FEMA).

The goal of the plan is to identify projects that can reduce damages from future hazards. The plan includes a risk assessment and a hazard mitigation strategy. The primary natural hazards of concern in Andrew County include: Drought, Severe Weather, Severe Winter Storm, Flood, Dam Failure, and Extreme Temperature. In addition, the County is evaluating the pandemic.

The plan will focus on existing buildings and potential future development, infrastructure, and critical infrastructure, and critical facilities, such as water utilities, roadways, and municipal buildings, that might be impacted.

What are the benefits of participating in the Hazard Mitigation Plan?

There are numerous benefits to participating in the HMP including:

- Awareness of risk and vulnerabilities
- Identification of implementable strategies and funding sources
- Reduction of hazard impact (save lives, property, and the local economy)
- Creation of partnerships and develop comprehensive approaches that enhance project grant funding opportunities.
- Pooling of resources and reduce their level of effort while avoiding duplication of effort.
- Creation of more resilient communities; bounce-back from disasters faster!

FAQS ABOUT THE PLAN

How can you reduce/eliminate risk? Identify mitigation actions/projects/activities or processes that can include **1)** Local plans and regulations; **2)** Structure and infrastructure projects; **3)** Natural systems protection; **4)** Education and awareness programs.

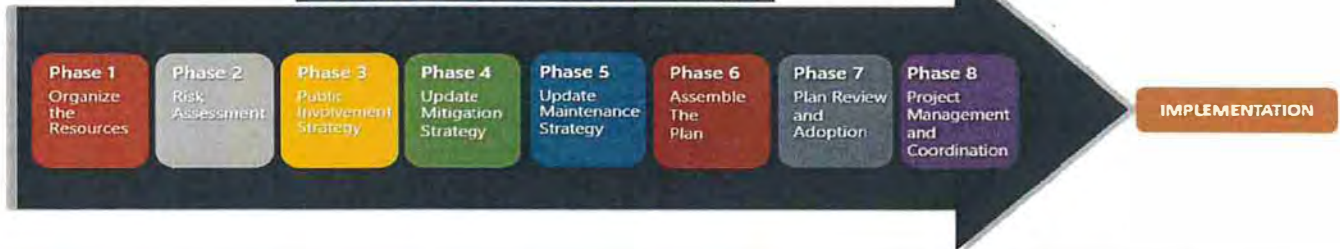
What grant funding is available? FEMA Hazard Mitigation Assistance grant funding is available with a FEMA-approved Hazard Mitigation Plan (annual and post-disaster grant funding opportunities).

How can I support the plan? Take the citizen survey! This will help us obtain input and get a better understanding of citizen preparedness for hazard events.

Where can I see the 2021 plan? Sections of the draft plan will be available in Spring 2021 for download, review at:

<https://andrewcounty.org/emergency-management/>
OR
<https://www.mo-kan.org/community/hazard-mitigation/>

PHASES OF THE PLAN



SUPPORT THE PLAN

Public input on the mitigation planning process is very important. Here are a few ways to get involved:

Review the existing plan and reach out with comments on the update:

Rebecca Thacker
Community Planner,
Mo-Kan Regional Council
rebecca@mo-kan.org
816-233-3144

Ryan Bever
Andrew County
Emergency Management
ryan.bever@andrewcounty.org

Take the citizen survey!

Andrew County residents can help with the plan by taking a short survey.

To complete the survey, go to:

<https://www.surveymonkey.com/r/Andrewhmp>

OR

Scan the QR code



HAZARD MITIGATION GRANTS

BUILDING RESILIENT INFRASTRUCTURE & COMMUNITIES (BRIC)

Support for states, local communities, tribes & territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards.

ELIGIBLE ENTITIES: state, local, tribal & territorial governments

ELIGIBLE PROJECTS:

- Pre-disaster activities that reduce risks to natural hazards, with a focus on critical services & facilities, public infrastructure, public safety & public health
- Using aquifer storage and recovery, floodplain & stream restoration, flood diversion and storage, or green infrastructure methods that may reduce the impacts of flood & drought.

FUNDING TYPE: Cost share: 75 Fed/25 Local OR 90 Fed/10 Local for small, impoverished communities

AMOUNT OF ASSISTANCE: Up to \$600,000

ELIGIBILITY REQUIREMENTS:

1. Your community must have an approved hazard mitigation plan and be a member of the National Flood Insurance Program in good standing (not on probation, suspended, or withdrawn).
2. Benefit-Cost Analysis required to validate cost effectiveness

APPLICATION PERIOD: Annually, September-December

FLOOD MITIGATION ASSISTANCE (FMA) PROGRAM

Provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured annually under the National Flood Insurance Program.

ELIGIBLE ENTITIES: local governments, including cities, townships, counties, special district governments, & Indian tribal governments

ELIGIBLE PROJECTS:

- Project scoping to develop community/individual flood mitigation projects that reduce flood claims against NFIP.
- Community flood mitigation projects that address community flood risk with the goal of reducing NFIP claim payments (Aquifer Storage & Recovery, Floodwater Diversion & Storage, Floodplain & Stream Restoration, & Low Impact Development/Green Infrastructure).
- Technical assistance to maintain a viable FMA program over time.
- Projects that mitigate risk of flooding to individual NFIP insured structures.

FUNDING TYPE: Cost share: 75 Fed/25 Local (Federal cost share of up to 100% for Severe Repetitive Loss (SRL) properties & up to 90% for Repetitive Loss properties)

AMOUNT OF ASSISTANCE: Up to \$600,000 for flood projects; \$50,000 for tech assistance; \$25,000 for local flood hazard mitigation planning

ELIGIBILITY REQUIREMENTS:

1. Your community must have an approved hazard mitigation plan and be a member of the National Flood Insurance Program in good standing (not on probation, suspended, or withdrawn).
2. Benefit-Cost Analysis to validate cost effectiveness for flood mitigation projects (not required for project scoping & technical assistance)

APPLICATION PERIOD: Annually, September-December

HAZARD MITIGATION GRANT PROGRAM (HMGP)

Assists in implementing long-term hazard mitigation planning & projects following a Presidential major disaster declaration.

ELIGIBLE ENTITIES: state, local, tribal and territorial governments (individuals can apply through local govt)

ELIGIBLE PROJECTS:

- Sirens & safe rooms
- Protecting or purchasing public or private property that experienced, or is in danger of experiencing, repetitive damage.
- Purchasing & removing a flood-prone property from an individual.
- Developing/adopting hazard mitigation plans- required for state, local, tribal & territorial governments to receive funding for HMP projects.
- Using aquifer storage & recovery, floodplain & stream restoration, flood diversion & storage, or green

infrastructure methods to reduce flood & drought impacts.

FUNDING TYPE: Cost share: 75 Fed/25 Local

AMOUNT OF ASSISTANCE: Based on total cost of disaster

ELIGIBILITY REQUIREMENTS:

1. Your home must be located in the state that received a presidential major disaster declaration.
2. Your community must have an approved hazard mitigation plan & be a member of the National Flood Insurance Program in good standing (not on probation, suspended, or withdrawn).
3. Your home rebuilding project must be cost-effective, technically feasible, environmentally sound & FEMA approved.

APPLICATION PERIOD: Within 60 days after presidential declaration

HAZARD MITIGATION GRANT PROCESS (FMA/BRIC)



FEMA GO
<https://go.fema.gov>
APPLY FOR ALL GRANTS ONLINE

Public Survey: Andrew County Multi-jurisdictional Hazard Mitigation Plan

Andrew County is updating its Multi-jurisdictional Hazard Mitigation Plan, with the goal reducing the vulnerability of people and property to the impacts of natural hazards and to remain eligible for mitigation funding programs from FEMA.

Public input is important during the planning process. Your comments will be considered by your community's representatives on the planning committee as the plan is developed. Please take a few moments to answer the following questions. Thank you for your participation.

1. Please select your jurisdiction from the list:

- | | | |
|--|--|---|
| <input type="checkbox"/> Unincorporated County | <input type="checkbox"/> Village of Cosby | <input type="checkbox"/> City of Savannah |
| <input type="checkbox"/> Village of Amazonia | <input type="checkbox"/> City of Fillmore | |
| <input type="checkbox"/> City of Bolckow | <input type="checkbox"/> City of Rosendale | |
| <input type="checkbox"/> Village of Country Club | <input type="checkbox"/> Village of Rea | |

2. Please select your township from the list:

- | | | |
|----------------------------------|------------------------------------|------------------------------------|
| <input type="checkbox"/> Benton | <input type="checkbox"/> Jefferson | <input type="checkbox"/> Platte |
| <input type="checkbox"/> Clay | <input type="checkbox"/> Lincoln | <input type="checkbox"/> Rochester |
| <input type="checkbox"/> Empire | <input type="checkbox"/> Monroe | |
| <input type="checkbox"/> Jackson | <input type="checkbox"/> Nodaway | |

3. Please indicate your opinion on the *likelihood* for each natural hazard to impact YOUR JURISDICTION (identified above). **Please rate EACH hazard 1 through 4 as follows: 1=Unlikely, 2=Occasional, 3=Likely, 4=Highly Likely**

- | | | |
|---------------------------------------|---|---|
| <input type="checkbox"/> Dam Failure | <input type="checkbox"/> Fires | <input type="checkbox"/> Thunderstorm/High Winds/Lightning/Hail |
| <input type="checkbox"/> Drought | <input type="checkbox"/> Flooding (Flash and River) | <input type="checkbox"/> Tornado |
| <input type="checkbox"/> Earthquakes | <input type="checkbox"/> Land Subsidence/Sinkholes | <input type="checkbox"/> Winter Weather/Snow/Ice/Severe Cold |
| <input type="checkbox"/> Extreme Heat | <input type="checkbox"/> Levee Failure | |

Public Survey: Andrew County Multi-jurisdictional Hazard Mitigation Plan

4. Please indicate your opinion on the *potential magnitude* of each hazard's impact on YOUR JURISDICTION (identified above). Please rate **EACH hazard 1 through 4 as follows: 1=Negligible, 2=Limited, 3=Critical, 4=Catastrophic**

- | | | |
|---------------------------------------|---|---|
| <input type="checkbox"/> Dam Failure | <input type="checkbox"/> Fires | <input type="checkbox"/> Thunderstorm/High Winds/Lightning/Hail |
| <input type="checkbox"/> Drought | <input type="checkbox"/> Flooding (Flash and River) | <input type="checkbox"/> Tornado |
| <input type="checkbox"/> Earthquakes | <input type="checkbox"/> Land Subsidence/Sinkholes | <input type="checkbox"/> Winter Weather/Snow/Ice/Severe Cold |
| <input type="checkbox"/> Extreme Heat | <input type="checkbox"/> Levee Failure | |

5. FEMA Hazard Mitigation Assistance Grants are administered by the State Emergency Management Agency. Listed below are some types of projects considered.

Please check all those that could benefit your jurisdiction, in your opinion:

- | | |
|--|---|
| <input type="checkbox"/> Flood-prone Property Acquisition & Structure Demolition /Relocation | <input type="checkbox"/> Retrofitting of Existing Buildings, and Facilities from Wind Damage. |
| <input type="checkbox"/> Flood-Prone Structure Elevation | <input type="checkbox"/> New Tornado Safe Room Construction |
| <input type="checkbox"/> Structural Retrofitting of Existing Buildings to Add a Tornado Safe Room | <input type="checkbox"/> Electrical Utilities Infrastructure Retrofit |
| <input type="checkbox"/> Wildfire Mitigation | <input type="checkbox"/> Soil Erosion Stabilization |
| <input type="checkbox"/> Minor Localized Flood Reduction Projects (storm water management or localized flood control projects) | <input type="checkbox"/> Other (please specify)
_____ |

6. Please comment on any other issues that the Andrew County Hazard Mitigation Planning Committee should consider in developing a strategy to reduce future losses caused by natural disasters.

Appendix C: Completed/Deleted Mitigation Actions

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: Andrew County

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		
1.1.1	Prepare public service announcements and have ready to be disseminated via the electronic notification system during emergencies and disasters.		X		City of Savannah has text alert plan. Price is \$200.00 implementation fee; annual fee \$0.05 per resident. National weather text alert. (minimum of \$1000.00)	✓
1.1.2	Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	X			Radio plan cancelled. Smart phones will be used.	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.2.2	Cities that do not have warning systems should purchase them.		X			✓
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.		X			✓
1.2.4	Place warning sirens in densely populated unincorporated areas.		X		Country Club	✓
1.3.1	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.		X		Information System	✓
1.3.2	Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).		X		No specialty homes Skilled Nursing Homes - Shady Lawn Lavera Village	✓
1.3.3	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.		X			✓
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.		X			✓
2.1.1	Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.		X			✓
2.1.2	[REDACTED]		X			✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
2.1.4	Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.			X		X
2.1.5	Conduct a public education campaign to inform dam owners and citizens living near the inundation zones of dams about the need to properly maintain and upgrade these structures, particularly those that are more than 50 years old.		X			✓
2.2.1	Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.			X		X
2.2.2	Continue to work with SEMA in ongoing buyout program for repetitive loss structures in flood-prone areas.		X		? Email sent to Sema FLOOD PLAIN PROPERTY OWNERS REFUSE FEMA BUY BASIC PROGRAM.	✓
2.3.1	Encourage up-to-date commercial and industrial disaster plans that are coordinated with community disaster plans.		X		Tier II Filed yearly	✓
2.3.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.		X		Get 2 Paul Ingersoll ins.	✓
2.3.4	Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.		X			✓
2.3.5	Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.		X		? Research this plan	✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
3.1.1	Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.			X	Information System	X
3.1.2	Publish detailed hazards maps on city and county websites and provide paper copies to the public.			X		X
3.1.3	Continue partnerships with City of Savannah to allow use of cable access channels to broadcast severe weather preparation information.		X		Discussing to add Anderson County onto the Savannah's Text-Caster program	✓
3.1.5	Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.			X		X
3.1.6	Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.	X			Savannah Reporter KQR	✓
3.1.7	Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.		X			✓
3.1.8	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.		X		DHSS	
3.1.9	Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.			X		X
3.1.10	Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.			X		✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.		X			✓
4.1.2	Execute and maintain mutual aid agreements with all relevant agencies.		X		City County agreement It is not in writing at this time	✓
4.1.3	Incorporate mitigation planning efforts coordinator with duties of emergency management director.		X			✓
4.1.4	Develop an accurate countywide series of maps detailing flood, plain, flash flood danger zones, land subsidence susceptible areas and process this information within a Geographic Information System.		X		Paul Garrison Flood Plain manager Andrew County / Annie Sybert Rosendale, MO.	✓
4.1.5	Make all GIS hazard information available online to county and municipal permitting departments through the Hazard Mitigation Plan.		X		* Paul Garrison Flood Plain Manager	✓
4.1.6	Maintain the web site for the Local Emergency Planning Committee.			X		X
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.		X			✓
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.		X			✓
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.			X		X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
4.1.11	Promote environmentally sound watershed and storm water practices to decrease flash flooding.			X		X
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.		X			✓
4.1.13	Obtain data to complete more thorough vulnerability assessments and determine potential losses.			X		X
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.		X			✓
4.2.2	Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.			X		X
4.2.3	Encourage tree trimming by electric companies to help offset damages from breaking limbs.			X		X
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.			X		X
4.2.5	Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.			X		X
4.2.6	Water and wastewater districts should elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plants, potable water treatment plants and pump stations.			X		X

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

review w/
city council -
scan / send to
assess. to
Hayley
w/
minutes

Jurisdiction: Amazonia

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- 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		
1.1.2	Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	X				X
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.		X		no new construction - due	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.		X			✓
1.1.6	Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.			X		X
1.1.7	Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.			X	Only 1 check	X
1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.		X		Comm. bldg / school potential location	X
1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.		X		need evac route for it to detour because city access impassable during high water	✓
1.1.11	Form and train Community Response Teams in cities and neighborhood associations			X	lack of commun. invol (And. Co. Em. man. duty)	X
1.2.1	Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations			X	cell phones can be utilized	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.2.2	Cities that do not have warning systems should purchase them.		X		Grant in progress	✓
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.		X		new tech / Andrew Co. -	✓
1.3.1	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.		X		word of mouth	X
1.3.2	Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).			X	not enough resources	X
1.3.3	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.			X	lack of resources / interest cooperation	X
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.			X	no shelters - only gener on lift station to sanitation keep services	✓
2.1.1	Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.			X	no interest	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
<i>ACTION ITEM</i> 2.1.2	Continue to participate in the National Flood Insurance Program (NFIP).		X		city co. member who goes to meeting	✓
<i>done</i> 2.1.4	Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.			X	not necessary	X
<i>Comp</i> 2.2.1	Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.	X		X	have migration area - completed when new bridge built (1960s/70s)	M
<i>done</i> 2.2.2	Continue to work with SEMA in ongoing buyout program for repetitive loss structures in flood-prone areas.			X	up to individuals to make arrang - w/ SEMA	X
<i>Comp</i> 2.3.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.	X			updated annually & presented to council	M
<i>Comp</i> 2.3.4	Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.		X		city clerk continues to update annually	M
<i>done</i> 2.3.5	Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.			X	unaware of	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
3.1.1	Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.		X		partner w/ And Co.	X
3.1.5	Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.			X	lack of interest by comm	X
3.1.6	Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.		X		boil orders + sewer lines breaks are reported	M
3.1.7	Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.		X		As changes will be addressed on an as needed basis	M
3.1.8	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.			X	lack of awareness of program	M
3.1.9	Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.			X	lack of comm. inv.	X
3.1.10	Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.			X	lack of comm. cooperation	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.	X			Provided annually @ city council meeting	✓
4.1.2	Execute and maintain mutual aid agreements with all relevant agencies.			X	lack of And Co. Em. handles this	✓
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.			X	lack of comm. cooperation	X
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.			X	And. Co. charge leads on this	X
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.			X	All city empl. are part one	X
4.1.11	Promote environmentally sound watershed and storm water practices to decrease flash flooding.		X	X	no res lack of financial resources but will provide info to residents as requested	M
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.	X			Textcaster	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - <input checked="" type="checkbox"/> Delete - X Modify - M
		Complete	Ongoing	No Progress		
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.		X		made funds for official offsite location & files backed up / put in fire proof safe	<input checked="" type="checkbox"/>
4.2.2	Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.			X	no issues	X
4.2.3	Encourage tree trimming by electric companies to help offset damages from breaking limbs.			X	Energy notification annually provides service as needed basis	<input checked="" type="checkbox"/>
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.		X		Waiting on Finan. assistance for main thoroughfares	M
4.2.5	Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.	X	X	X	Do not assess semi-annually and addressed on as needed basis	<input checked="" type="checkbox"/>

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: Cosby

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.

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- 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.
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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		
1.1.2	Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.					
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.					

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.					
1.1.6	Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.					
1.1.7	Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.					
1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.					
1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.					
1.1.11	Form and train Community Response Teams in cities and neighborhood associations					
1.2.1	Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.					
1.2.2	Cities that do not have warning systems should purchase them.		✓		Working with Andrew City and Sena for siren	
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.					

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
1.3.1	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.					
1.3.2	Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).					
1.3.3	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.					
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.					
2.1.1	Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.					
2.1.4	Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.					
2.1.6	Communities that do not currently participate in the National Flood Insurance Program (NFIP) will consider doing so.					
2.2.1	Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.					

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
2.3.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.					
2.3.4	Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.					
2.3.5	Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.					
3.1.1	Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.					
3.1.5	Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.					
3.1.6	Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.					
3.1.7	Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.					
3.1.8	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.					
3.1.9	Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.					

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
3.1.10	Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.					
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.					
4.1.2	Execute and maintain mutual aid agreements with all relevant agencies.					
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.					
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.	X			completed as	X
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.					
4.1.11	Promote environmentally sound watershed and storm water practices to decrease flash flooding.					
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.					
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.					
4.2.2	Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.					

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
4.2.3	Encourage tree trimming by electric companies to help offset damages from breaking limbs.					
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.					
4.2.5	Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.					

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: Country Club Village

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#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
1.1.2	Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.					Delete X
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.					Delete X
1.1.4	Incorporate hazard buffer zones into subdivision platting regulations.					Delete X

1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.		X		Police Department is will prepare a list of addresses with shelters to assist emergency services agencies to locate survivors after a disaster.	Keep
1.1.6	Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.		X		Evergy Power Company provides fans to people in the community who do not have them and are at risk during a heat wave	Keep
1.1.7	Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.					Delete X
1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.			X	The Police Chief will contact the Fire Chief to discuss implementation of designating public facilities as emergency shelters.	Keep
1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.		X		Police Department reviews emergency routes and evacuation routes and identifies problem areas	Keep
1.1.11	Form and train Community Response Teams in cities and neighborhood associations					Delete
1.2.1	A NOAA weather radio in continuous operation in all facilities offering public accommodations.					Delete
1.2.2	Cities that do not have warning systems should purchase them.					Delete
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.		X		Police and Fire Departments use electronic methods to notify public of hazards	Keep
1.3.1	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.		X		Police Department uses Facebook page to inform citizens on ways to help elderly and	Keep
1.3.2	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.		X		Police Department uses social media, and newsletter to inform on ways to assist elderly and disabled neighbors.	Keep

1.3.3	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.			X		Delete X
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.	X			The village hall and fire station have emergency power generators to be used to power shelters (city hall & fire station) during a natural disaster	Keep
2.1.1	Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.			X		Delete X
2.1.2	Continue to participate in the National Flood Insurance Program (NFIP).		X			Keep
2.1.3	Adopt the most current edition of a model building code to address structural and architectural issues related to hazard mitigation.	X			The village adopted the 2009 Building Code Standards, September 2015	Modify
2.1.4	Mandate the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.		X		The village continues to comply with state storm water management regulations (MS4)	Keep
2.2.1	Adopt alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.				Very small portion of Country Club Village is located within the flood plain	Delete
2.2.3	Amend municipal ordinances to include a section mandating the building of a wind-resistant shelter with a capacity to handle the expected population in any new mobile home park or park undergoing renovation or expansion.					Delete X
2.3.2	Enact ordinances prohibiting residential and commercial development in all high-hazard prone areas.	X			Current zoning regulations stress the importance storm water management before issuing permits to build commercial or residential structures	Keep

2.3.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.		X		MOKAN provides information on flood maps. SEMA provides information on flood evacuation procedures	Keep
2.3.4	Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.	X			City Clerk maintains an accurate list of emergency responders and other pertinent information	Keep
2.3.5	Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.			X		Delete
3.1.1	Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.			X		Delete
3.1.5	Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.			X		Delete
3.1.6	Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.		X		Police and Fire Departments provide emergency information to media as needed.	Keep
3.1.7	Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.			X	Not applicable to most village residents	Delete X
3.1.8	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.		X		CCV MS4 Consultant conducts stormwater management training for elementary school students.	Keep
3.1.9	Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.			X	This program is not feasible due to lack of staffing	Delete

3.1.10	Citizens that live in areas near timber or tall grass are required to remove vegetation, yard debris and other combustible materials that may be near structures.		X		Ordinances are enforced to control tall grass and yard debris removal	Keep
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.		X		Contact information is available to the general public for all emergency first responders.	Keep
4.1.2	Execute and maintain mutual aid agreements with all relevant agencies.		X		Andrew County law enforcement and fire departments have mutual aid agreements and assist one another on a regular basis.	Keep
4.1.7	Property owners, business and occupants in hazard areas have an opportunity to participate in mitigation policy formation.		X		Residents are encouraged to at Planning and Zoning meetings to participate in policy formation of policies that effect the environment they live in	Keep
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.	X			All city department heads are aware that a disaster plan exists.	Keep
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.		X		Board of Trustees Chairman makes snow day decisions on an as need basis.	Keep
4.1.10	Update comprehensive land use plans to specifically address development in hazard-prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.	X			2015 Comprehensive Plan (updated version) adopted by Country Club Village Board of Trustees, December 2015.	Keep
4.1.11	Promote environmentally sound watershed and storm water practices to decrease flash flooding.		X		The village hired a MS4 Consultant in 2018. Compliant with all state stormwater management requirements.	Keep
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.		X			Keep
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.	X			Village has offsite data back up of village records	Keep
4.2.2	Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.			X	Utility companies make decision regarding above ground transmission lines, poles and similar structures	Delete

4.2.3	Electric company trims trees to help offset damages from breaking limbs.		X			Keep
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.		X		Our building inspector reviews and monitors upgrades for critical buildings and infrastructures.	Keep
4.2.5	Encourage providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.					Delete

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: Fillmore

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#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
1.1.2	Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.			X	<i>Not pursued</i>	X
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.			X	<i>Not pursued</i>	X
1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.			X	<i>Not pursued</i>	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.			X	<i>Not pursued</i>	
4.2.5	Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.			X	<i>U</i>	

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.1.6	Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.			X	<i>Not pursued</i>	X
1.1.7	Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.			X	''	X
1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.			X	''	X
1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.			X	''	X
1.1.11	Form and train Community Response Teams in cities and neighborhood associations			X	''	X
1.2.1	Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.			X	''	X
1.2.2	Cities that do not have warning systems should purchase them.	X				✓
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.			X	<i>Not pursued</i>	X
1.3.1	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.			X	''	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.3.2	Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).			X	<i>Not pursued</i>	X
1.3.3	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.			X	<i>//</i>	X
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.			X	<i>//</i>	X
2.1.1	Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.			X	<i>//</i>	X
2.1.4	Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.			X	<i>//</i>	X
2.1.6	Communities that do not currently participate in the National Flood Insurance Program (NFIP) will consider doing so.			X	<i>//</i>	X
2.2.1	Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.			X	<i>//</i>	X
2.3.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.			X	<i>//</i>	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
2.3.4	Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.			X	Not pursued	X
2.3.5	Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.			X		X
3.1.1	Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.			X		X
3.1.5	Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.			X		X
3.1.6	Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.			X		X
3.1.7	Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.			X		X
3.1.8	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.			X		X
3.1.9	Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.			X		X
3.1.10	Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.			X		X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.			X	Not pursued	
4.1.2	Execute and maintain mutual aid agreements with all relevant agencies.			X		
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.			X		
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.			X		
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.			X		
4.1.11	Promote environmentally sound watershed and storm water practices to decrease flash flooding.			X		
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.			X		
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.			X		
4.2.2	Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.			X		
4.2.3	Encourage tree trimming by electric companies to help offset damages from breaking limbs.			X		

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: Rea

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		
1.1.2	Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.		✓		most have them	✓
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.		✓		We have our church basement + have it stocked with emergency supplies	✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
<i>del</i> 1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.					
<i>del</i> 1.1.6	Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.					
<i>del</i> 1.1.7	Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.					
<i>del</i> 1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.					
<i>del</i> 1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.					
<i>del</i> 1.1.11	Form and train Community Response Teams in cities and neighborhood associations					
<i>Comp</i> 1.2.1	Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.		✓		<i>we have this</i>	✓
<i>Period</i> [redacted]	Cities that do not have warning systems should purchase them.		✓			Keep
<i>del</i> 1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.					

REPRODUCTION OF INFORMATION FROM THE NATIONAL ARCHIVES

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.3.1	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.					
1.3.2	Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).					
1.3.3	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.					
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.					
2.1.1	Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.					
2.1.4	Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.				N/A	
2.1.6	Communities that do not currently participate in the National Flood Insurance Program (NFIP) will consider doing so.					
2.2.1	Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.				we are in a flood plain	

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
del 2.3.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.					
del 2.3.4	Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.					
del 2.3.5	Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.					
del 3.1.1	Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.					
del 3.1.5	Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.					
del 3.1.6	Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.					
del 3.1.7	Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.				we have no flood prone areas	
del 3.1.8	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.					
del 3.1.9	Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.					

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
3.1.10	Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.		✓		We are vigilant about talking about this	✓
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.					
4.1.2	Execute and maintain mutual aid agreements with all relevant agencies.					
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.		✓		We ask them if there is anything we need to know	✓
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.					
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.					
4.1.11	Promote environmentally sound watershed and storm water practices to decrease flash flooding.					
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.	✓			The NA school is on text list & have a spare officer in school daily	✓
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.					
4.2.2	Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.			✓		

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
del 4.2.3	Encourage tree trimming by electric companies to help offset damages from breaking limbs.		✓		The power company takes the care	—
del 4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.					
del 4.2.5	Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.			✓		

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: Rosendale

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		
1.1.2	Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.		✓			✓
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.				N/A	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - <input checked="" type="checkbox"/> Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.				N/A	X
1.1.6	Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.				N/A	X
1.1.7	Work with private entities, such as churches and businesses, to encourage the construction of tomoado shelters in facilities where large numbers of people live, work or congregate.				N/A	X
1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.				NA	X
1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.				N/A	X
1.1.11	Form and train Community Response Teams in cities and neighborhood associations				N/A	X
1.1.13	Creation of a community safe room in Rosendale, located at the North Andrew School District.				N/A	X
1.2.1	Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.				N/A No public accommodations	X
1.2.2	Cities that do not have warning systems should purchase them.		✓		In progress	Keep ✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.		X		facebook, & texting	✓
1.3.1	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.		X		we do this	✓
1.3.2	Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).			X	We have no public shelters N/A	X
1.3.3	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.			X	N/A	X
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.			X	N/A	X
2.1.1	Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.		X			✓
2.1.2	[REDACTED]		X		on going with Ryan Bever & Bonnie Sykes	Keep ✓
2.1.4	Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.				N/A	X
2.1.7	Encourage large-scale buyout of flood-prone properties in Rosendale and relocate affected property owners.		X			✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
2.2.1	Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.				N/A	X
2.2.2	Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.				N/A	X
2.3.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.		X		on going	✓
2.3.4	Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.		X			✓
2.3.5	Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.		X			✓
3.1.1	Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.				N/A	X
3.1.5	Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.	X				✓
3.1.6	Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.		X			✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
3.1.7	Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.		X			✓
3.1.8	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.				N/A	X
3.1.9	Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.				N/A	X
3.1.10	Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.		X			✓
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.		X			✓
4.1.2	Execute and maintain mutual aid agreements with all relevant agencies.		X			✓
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.		X			✓
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.		X			✓
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.				N/A	X
4.1.11	Promote environmentally sound watershed and storm water practices to decrease flash flooding.				N/A	X

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.				N/A	X
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.				N/A	X
4.2.2	Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.				N/A	X
4.2.3	Encourage tree trimming by electric companies to help offset damages from breaking limbs.		X			✓
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.				N/A	X
4.2.5	Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.		X			✓

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: City of Savannah

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		
1.1.2	Encourage residents to purchase weather radios to ensure they have sufficient access to information in times of disasters.	X			We did but now have storm sirens and emergency texting notification that I think works better	
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.			✓	No new building happening	✓
1.1.4	Incorporate hazard buffer zones into subdivision platting regulations.		X		will do, not alot going on	✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.		X		Happens as needed	✓
1.1.6	Continue program to provide air conditioners to those people in the community who do not have them and are at risk during a heat wave.			X	No funds for this	M
1.1.7	Work with private entities, such as churches and businesses, to encourage the construction of tornado shelters in facilities where large numbers of people live, work or congregate.			X	Good idea, just there are no new structures planned	✓
1.1.8	Designate certain air-conditioned facilities as heat emergency shelters and encourage people without air conditioning to use them in a heat wave.		X		Info sharing occurs	✓
1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.			X	Need more information to implement	✓
1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.			X	As needed	✓
1.1.11	Form and train Community Response Teams in cities and neighborhood associations			X	Will require assistance with this	✓
1.1.12	Encourage the building of permanent storm shelters in mobile home parks.		X		This is in our code	✓
1.2.1	Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.		X		Weather radio or sign up for texts from National Weather Service	M

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
1.2.2	Cities that do not have warning systems should purchase them.	✓			we have a warning system	✓
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.	✓			This works well for us.	✓
1.3.1	Inform citizens what to do to help elderly and disabled friends, neighbors or employees.			✓	We have not been doing this but I think it is a good idea.	✓
1.3.2	Continue to evaluate accommodating individuals with special needs in emergency shelters, including compliance with the Americans with Disabilities Act (ADA).			✗	We have not had to shelter anyone as a City	✓
1.3.3	Work with organizations and utilities to provide materials and volunteer labor to assist at-risk groups in winterizing their homes.			✗	The City would be supportive of this	✓
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.		✗		The City has several generators but most will be put into use and not available	✓
2.1.1	Continue to participate in buyout program for the highest risk properties located in the highest-risk flood areas.			✗	We do not have the funds for this.	✗
2.1.2	Continue to participate in the National Flood Insurance Program (NFIP).		✗		We will continue.	✓
2.1.3	Adopt the most current edition of a model building code to address structural and architectural issues related to hazard mitigation.		✗		We currently follow IBC 2006	✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
2.1.4	Encourage the construction of detention basins, small lakes and greenways or riparian corridors to channel and catch storm water, thereby reducing the likelihood of flooding as part of a countywide storm water management plan.		X		Have required in a subcommittee when it went thru 2002	✓
2.2.1	Consider alternative uses for flood-prone areas, such as sports fields, parks, wildlife habitats, etc. and incorporate this in all comprehensive land use plan updates.		X		YES	✓
2.2.2	Continue to work with SEMA in ongoing buyout program for repetitive loss structures in flood-prone areas.		X		Does not exist	✓
2.2.3	Amend municipal ordinances to include a section mandating the building of a wind-resistant shelter with a capacity to handle the expected population in any new mobile home park or park undergoing renovation or expansion.		X		This is required in our code	✓
2.3.2	Enact ordinances prohibiting residential and commercial development in all high-hazard prone areas.			X	Will need assistance identifying high hazard prone areas in town.	✓
2.3.3	Ensure all local governments have the latest copies of flood insurance rate maps, flood plain maps and similar documents.		X		I will need to verify we have these or get them	
2.3.4	Maintain and update lists of names, phone numbers and duties for all emergency service employees during regular operation and off hours.		X		Maintained	✓
2.3.5	Follow guidelines as suggested in the Missouri 2002 Drought Plan, developed by MDNR.		X		I need to educate myself on the guidelines	✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
3.1.1	Develop an ongoing campaign to educate the community about seasonal hazards by adopting a disaster theme for each season and coordinate this campaign with a variety of promotional resources.			X	We would support any such campaign	✓
3.1.3	Continue partnerships with City of Savannah to allow use of cable access channels to broadcast severe weather preparation information.			X	Savannah no longer has that public access channel	X
3.1.5	Conduct a public education campaign to inform citizens across the region of the benefits of constructing tornado safe rooms in their homes to reduce the potential for loss of life.			X	We would pass along any resources we were provided about this topic	✓
3.1.6	Provide information to media to publish or broadcast emergency information when conditions warrant. Establish contact information with media for night and weekend emergencies.		X		We do have the ability to communicate with those that can get warning and info broadcasted	✓
3.1.7	Encourage businesses and homeowners in flood-prone areas to elevate mechanical systems such as furnaces, water heaters and electrical panels.			X	We have not done this, but can provide information if it is available.	
3.1.8	Continue and expand public awareness campaigns on hazard preparedness. Involve the Ready in 3 program.			X	If provided with information we can share on our web site or at City Hall	✓
3.1.9	Educate citizens on how to winterize their homes, shut off water valves in case a pipe bursts and prepare for extreme cold.			X	We have not done this but probably could provide some information documents	✓
3.1.10	Encourage citizens that live in areas near timber or tall grass to remove vegetation, yard debris and other combustible materials that may be near structures.		X		The City has a yard waste site, citizens are allowed to dump these items	✓
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.		X		This data is available on the City website Savannah Mo. net	✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
4.1.2	Execute and maintain mutual aid agreements with all relevant agencies.		X		City will request and provide mutual aid as needed	✓
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.			X	We have not done this but will if required.	✓
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.			X	When the plan is finalized I would be willing to pass it out.	✓
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.			X	Everyone that works for the City is Essential	✓
4.1.10	Update comprehensive land use plans to specifically address development in hazard-prone areas and recommend strategies for decreasing the jurisdiction's vulnerability to hazards.		X		We are currently updating our zoning map and will see if planners can identify hazardous areas	✓
4.1.11	Promote environmentally sound watershed and storm water practices to decrease flash flooding.		X		In the past the City has worked on storm drainage in an attempt to deal with the	✓
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.		X		The City offers a text/Email notification system	✓
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.		X		The City has cloud storage I don't know about Her County	✓
4.2.2	Encourage electric and telecommunications utilities to anchor or strengthen above ground transmission lines, poles or similar structures.		X		I think this is appropriate	✓
4.2.3	Encourage tree trimming by electric companies to help offset damages from breaking limbs.			X	We have not had to encourage they seem to do well here in Savannah.	✓

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep - ✓ Delete - X Modify - M
		Complete	Ongoing	No Progress		
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.		X		Our loss prevention company requires regular inspections	✓
4.2.5	Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to natural hazards and if necessary, retrofit or modify them to decrease their vulnerability.		X		I think this is a priority and we do the best we can at our water + sewer plants	✓
4.2.6	Water and wastewater districts should elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plants, potable water treatment plants and pump stations.		X		We do have some plans we need to work on.	✓

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: Avenue City School

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		
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.		X		New construction will not occur until 2024	keep
1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.				N/A	

1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.		X		Sheltering areas are identified and drills conducted annually	Keep
1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.				N/A	Delete
1.2.1	Encourage a NOAA weather radio in continuous operation in all facilities offering public accommodations.	X			One in use	Delete
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.		X		New calling system to be installed summer of 2021	Keep
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.				NA	
3.1.4	Educate children in disaster preparedness and how to survive disasters.	x			Current capacity	Delete
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.				N/A	Delete
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.				N/A	Delete
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.				N/A	Delete
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.				N/A	Delete

4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.				N/A	Delete
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.		X		This occurs annually	keep
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.		X		School uses web based notification	Keep
keep	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.		X		We have no county records – we maintain records with electronic backup	Keep
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.		X		These types of things are reviewed annually	Keep

ASSESSMENT OF PREVIOUSLY PROPOSED ACTIONS

Jurisdiction: North Andrew School

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		
1.1.3	Encourage the incorporation and design of shelters in the construction of new public facilities like libraries, community centers, etc.			No Progress	Funds	Keep
1.1.5	Maintain an up-to-date list of addresses with shelters to assist fire departments and emergency services agencies to locate survivors after a disaster.		ON going			Keep

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
1.1.9	Assess existing public facilities for the location of suitable safe areas. If available, these safe areas should be clearly marked and employees and visitors informed of their location in public facilities.		Ongoing			Keep
1.1.10	Review emergency access routes and evacuation routes and mitigation any problem areas.	Complete				Keep
1.1.13	Creation of a community safe room in Rosendale, located at the North Andrew School District.			No progress	Lack of funds	Keep
1.2.3	Continue use of electronic methods, including Internet, Twitter, texting and calling systems to notify public of a hazard.		Ongoing			Keep
1.3.4	Update inventory of facilities with generators and emergency power that can be used as shelters in the event of natural disasters. Equip shelters to connect to generators.			No progress		
3.1.4	Educate children in disaster preparedness and how to survive disasters.		Ongoing		Drills and education	Keep
4.1.1	Maintain a publicly accessible list of names, position, contact information, roles and responsibilities for all public safety positions and departments.		Ongoing			Keep
4.1.7	Encourage property owners, business and occupants in hazard areas to participate in mitigation policy formation.			No progress		Keep
4.1.8	Inform all city and county department heads and school districts that a disaster mitigation plan exists.		Ongoing			Keep

#	Action	Status			Description of Implementation Activities or Reasons for Lack of Progress	Keep – ✓ Delete – X Modify – M
		Complete	Ongoing	No Progress		
4.1.9	Develop and implement official snow day plans and policies for non-essential personnel.		Ongoing			Keep
4.1.12	Encourage schools and emergency responders to participate in a web-based notification system.		Ongoing			Keep
4.2.1	Maintain offsite data back up of county records and plan to safeguard those that do not have back ups.			No progress	We have school records backed up/not county records	Modify
4.2.4	Review, prioritize, institute and monitor needed upgrades and retrofits for critical buildings and infrastructures.		Ongoing		Continual evaluation	Keep

Action Worksheet

Name of Jurisdiction: Savannah R3 School District – Savannah High School <small>Action of Project</small>		
Risk / Vulnerability		
Name of Action or Project:		Safe Room for Savannah High School
Mitigation Category:		Prevention Objective 1: 1 – Protect citizen's lives and property
STAPLEE Criteria		
Evaluation Rating		Score
Definitely YES = 3 Maybe YES = 2		
Probably NO = 1 Definitely NO = 0		
S: Is it Socially Acceptable		3
T: Is it Technically feasible and potentially successful?		3
A: Does the jurisdiction have the Administrative capacity to execute this action?		3
P: Is it Politically acceptable?		3
L: Is there Legal authority to implement?		3
E: Is it Economically beneficial?		3
E: Will the project have either a neutral or positive impact on the natural Environment ?		3
Will historic structures be saved or protected?		3
Could it be implemented quickly?		3
STAPLEE SCORE		27
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.	10
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	10
MITIGATION EFFECTIVENESS SCORE		20
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		47

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

Dr. Eric Kurre, Superintendent, (816) 324-3144

Problem being Mitigated:	Inadequate shelter for community, students and staff during a tornado or severe thunderstorm/wind event
Hazard(s) Addressed:	Tornado, Severe Thunderstorm/Wind Events
Action or Project	
Action/Project Number:	
Name of Action or Project:	Safe Room for Savannah High School
Action or Project Description:	Construction of a safe room that serves a dual purpose as a gym.
Applicable Goal Statement:	Objective 1:1: Protect our citizen's lives and property
Estimated Cost:	1,500,000
Benefits:	Protect lives
Plan for Implementation	
Responsible Organization/Department:	Savanah R3 School district
Action/Project Priority:	High
Timeline for Completion:	2 – 2.5 year
Potential Fund Sources:	Grants, Internal, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	Tornado Safe rooms included in Board of education's building safety plans
Progress Report	
Action Status	New
Report of Progress	

Action Worksheet

Name of Jurisdiction:	Savannah R3 School District – John Glenn Elementary <small>Action of Project</small>	
Risk / Vulnerability		
Name of Action or Project:	Safe Room for John Glenn Elementary	
Mitigation Category:	Prevention Objective 1: 1 – Protect citizen's lives and property	
STAPLEE Criteria		
Evaluation Rating		Score
Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0		
S: Is it Socially Acceptable		3
T: Is it Technically feasible and potentially successful?		3
A: Does the jurisdiction have the Administrative capacity to execute this action?		3
P: Is it Politically acceptable?		3
L: Is there Legal authority to implement?		3
E: Is it Economically beneficial?		3
E: Will the project have either a neutral or positive impact on the natural Environment ?		3
Will historic structures be saved or protected?		3
Could it be implemented quickly?		3
STAPLEE SCORE		27
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.	10
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	10
MITIGATION EFFECTIVENESS SCORE		20
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		47

<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)
--	---	--

Completed by
(Name, Title, Phone Number)

Dr. Eric Kurre, Superintendent, (816) 324-3144

Problem being Mitigated:	Inadequate shelter for community, students and staff during a tornado or severe thunderstorm/wind event
Hazard(s) Addressed:	Tornado, Severe Thunderstorm/Wind Events
Action or Project	
Action/Project Number:	
Name of Action or Project:	Safe Room for John Glenn Elementary
Action or Project Description:	Construction of a safe room that serves a dual purpose as a multipurpose room & gym.
Applicable Goal Statement:	Objective 1:1: Protect our citizen's lives and property
Estimated Cost:	1,200,000
Benefits:	Protect lives
Plan for Implementation	
Responsible Organization/Department:	Savannah R3 School district
Action/Project Priority:	High
Timeline for Completion:	2 – 2.5 year
Potential Fund Sources:	Grants, Internal, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	Tornado Safe rooms included in Board of education's building safety plans
Progress Report	
Action Status	New
Report of Progress	

Action Worksheet

Name of Jurisdiction: Savannah B3 School District – Minnie Cline Elementary
Action or Project:

Risk / Vulnerability

Name of Action or Project: Safe Room for Minnie Cline Elementary

Mitigation Category: Prevention
 Objective 1: 1 – Protect citizen’s lives and property

STAPLEE Criteria	Evaluation Rating	Score
	Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	

S: Is it **Socially** Acceptable 3

T: Is it **Technically** feasible and potentially successful? 3

A: Does the jurisdiction have the **Administrative** capacity to execute this action? 3

P: Is it **Politically** acceptable? 3

L: Is there **Legal** authority to implement? 3

E: Is it **Economically** beneficial? 3

E: Will the project have either a neutral or positive impact on the natural **Environment**? 3

Will historic structures be saved or protected? 3

Could it be implemented quickly? 3

STAPLEE SCORE 27

Mitigation Effectiveness Criteria	Evaluation Rating	Score
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Will the implemented action result in lives saved? Assign from 5-10 points based on the likelihood that lives will be saved. 10

Will the implemented action result in a reduction of disaster damages? Assign from 5-10 points based on the relative reduction of disaster damages. 10

MITIGATION EFFECTIVENESS SCORE 20

TOTAL SCORE (STAPLEE + Mitigation Effectiveness) 47

<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)
--	---	--

Completed by _____
 (Name, Title, Phone Number) Dr. Eric Kurre, Superintendent, (816) 324-3144

Problem being Mitigated:	Inadequate shelter for community, students and staff during a tornado or severe thunderstorm/wind event
Hazard(s) Addressed:	Tornado, Severe Thunderstorm/Wind Events
Action or Project	
Action/Project Number:	
Name of Action or Project:	Safe Room for Minnie Cline Elementary
Action or Project Description:	Construction of a safe room that serves a dual purpose as a multipurpose room & gym.
Applicable Goal Statement:	Objective 1:1: Protect our citizen's lives and property
Estimated Cost:	1,200,000
Benefits:	Protect lives
Plan for Implementation	
Responsible Organization/Department:	Savannah R3 School district
Action/Project Priority:	High
Timeline for Completion:	2 – 2.5 year
Potential Fund Sources:	Grants, Internal, State, Federal, Match
Local Planning Mechanisms to be Used in Implementation, if any:	Tornado Safe rooms included in Board of education's building safety plans
Progress Report	
Action Status	New
Report of Progress	

Appendix D: Adoption Resolutions

ANDREW COUNTY, Missouri RESOLUTION NO.

A RESOLUTION OF ANDREW COUNTY ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS Andrew County recognizes the threat that natural hazards pose to people and property within Andrew County and

WHEREAS Andrew County has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Andrew County from the impacts of future hazards and disasters; and

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

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

NOW THEREFORE, BE IT RESOLVED BY, Andrew County in the State of Missouri, THAT:

In accordance with Andrew County's local rules, Andrew County adopts the final FEMA-approved *Plan*.

ADOPTED by a vote of 3 in favor and 0 against, and 0 abstaining, this 5th day of April, 2021.

By (Sig): Bob Caldwell
Print name: Bob Caldwell

ATTEST: Sarah E. Miller
By (Sig.): Sarah E. Miller
Print name: SARAH E. MILLER

APPROVED AS TO FORM: Sarah E. Miller
By (Sig.): Sarah E. Miller
Print name: SARAH E. MILLER

VILLAGE OF AMAZONIA, Missouri RESOLUTION NO. 5-3-2021

A RESOLUTION OF VILLAGE OF AMAZONIA ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS Village of Amazonia recognizes the threat that natural hazards pose to people and property within Village of Amazonia and

WHEREAS has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Village of Amazonia from the impacts of future hazards and disasters; and

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

WHEREAS adoption by Village of Amazonia demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

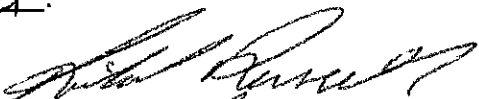
NOW THEREFORE, BE IT RESOLVED BY Village of Amazonia in the State of Missouri, THAT:

In accordance with the Village of Amazonia's local rules, the Village of Amazonia adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 3rd day of May 2021.

By (Sig):

Print name:



Richard Russell Mayor

ATTEST:

By (Sig.):

Print name:

Roy Proctor Deputy Mayor

APPROVED AS TO FORM:

By (Sig.):

Print name:

Heather Chandler Clerk

VILLAGE OF COSBY, Missouri RESOLUTION NO. 21-1

A RESOLUTION OF VILLAGE OF COSBY ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS Village of Cosby recognizes the threat that natural hazards pose to people and property within Village of Cosby and

WHEREAS has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Village of Cosby from the impacts of future hazards and disasters; and

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

WHEREAS adoption by Village of Cosby demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY Village of Cosby in the State of Missouri, THAT:

In accordance with the Village of Cosby's local rules, the Village of Cosby adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of ___ in favor and 0 against, and ___ abstaining, this 3 day of May, 2021

By (Sig): [Signature]
Print name: David Rables

ATTEST:
By (Sig.): [Signature]
Print name: Teresea A. Neely

APPROVED AS TO FORM:
By (Sig.): [Signature]
Print name: Teresea A. Neely

VILLAGE OF COUNTRY CLUB, Missouri RESOLUTION NO. 02

A RESOLUTION OF VILLAGE OF COUNTRY CLUB ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS Village of Country Club recognizes the threat that natural hazards pose to people and property within Village of Country Club and

WHEREAS has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Village of Country Club from the impacts of future hazards and disasters; and

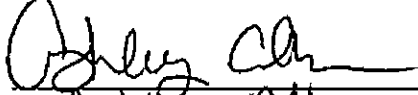
WHEREAS Village of Country Club recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, Village of Country Club will endeavor to integrate the *Plan* into the comprehensive planning process; and

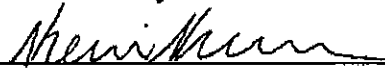
WHEREAS adoption by Village of Country Club demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY Village of Country Club in the State of Missouri, THAT:

In accordance with the Village of Country Club's local rules, the Village of Country Club adopts the final FEMA-approved *Plan*.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, this 3rd day of May, 2021.

By (Sig): 
Print name: ASHLEY ALBERT

ATTEST:
By (Sig.): 
Print name: Kerri Krumme

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

A RESOLUTION OF CITY OF FILLMORE ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS City of Fillmore recognizes the threat that natural hazards pose to people and property within City of Fillmore and

WHEREAS has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in City of Fillmore from the impacts of future hazards and disasters; and

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

WHEREAS adoption by City of Fillmore demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY City of Fillmore in the State of Missouri, THAT:

In accordance with the City of Fillmore's local rules, the City of Fillmore adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 4th day of May, 2021.

By (Sig.): Victoria L. Schubert
Print name: Victoria L. Schubert

ATTEST:
By (Sig.): Terry W. Lance
Print name: Terry W. Lance

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

CITY OF REA, Missouri RESOLUTION NO. _____

A RESOLUTION OF CITY OF REA ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS City of Rea recognizes the threat that natural hazards pose to people and property within City of Rea and

WHEREAS has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in City of Rea from the impacts of future hazards and disasters; and

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

WHEREAS adoption by City of Rea demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY City of Rea in the State of Missouri, THAT:

In accordance with the City of Rea's local rules, the City of Rea adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of 4 in favor and ___ against, and ___ abstaining, this 28 day of April, 2021.

By (Sig): Kathy Roach
Print name: Kathy Roach

ATTEST: Robert M. Brittain
By (Sig.): Robert M. Brittain
Print name: Robert M. Brittain

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

CITY OF ROSENDALE Missouri RESOLUTION NO. _____

A RESOLUTION OF CITY OF ROSENDALE ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS City of Rosendale recognizes the threat that natural hazards pose to people and property within City of Rosendale and

WHEREAS has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in City of Rosendale from the impacts of future hazards and disasters; and

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

WHEREAS adoption by City of Rosendale demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY City of Rosendale in the State of Missouri, THAT:

In accordance with the City of Rosendale's local rules, the City of Rosendale adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 13 day of April, 2021.

By (Sig): Jason Dunbar
Print name: Jason Dunbar

ATTEST:
By (Sig.): Jeanette Dunbar
Print name: Jeanette Dunbar

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

CITY OF SAVANNAH Missouri
RESOLUTION NO. 2021-2

A RESOLUTION OF CITY OF SAVANNAH ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS City of Savannah recognizes the threat that natural hazards pose to people and property within City of Savannah and

WHEREAS has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in City of Savannah from the impacts of future hazards and disasters; and

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

WHEREAS adoption by City of Savannah demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY City of Savannah in the State of Missouri, THAT:

In accordance with the City of Savannah's local rules, the City of Savannah adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 19th day of April, 2021



Kirk Larson, Mayor

ATTEST: Beth Kar

Beth Kar, City Clerk

AVENUE CITY R-IX SCHOOL DISTRICT, Missouri RESOLUTION NO. __

A RESOLUTION OF AVENUE CITY R-IX SCHOOL DISTRICT ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS Avenue City R-IX School District recognizes the threat that natural hazards pose to people and property within Avenue City R-IX School District and

WHEREAS Avenue City R-IX School District has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Avenue City R-IX School District from the impacts of future hazards and disasters; and

WHEREAS Avenue City R-IX School District recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, Avenue City R-IX School District will endeavor to integrate the *Plan* into the comprehensive planning process; and

WHEREAS adoption by Avenue City R-IX School District demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY Avenue City R-IX School District, in the State of Missouri, THAT:

In accordance with the Avenue City R-IX School District's local rules, the Avenue City R-IX School District adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of ___ in favor and ___ against, and ___ abstaining, this ___ 11th ___ day of May 2021

By (Sig):

Print name: Rodney Davison Board President

ATTEST:

By (Sig.):

Print name: Janice Penkan Board Secretary

APPROVED AS TO FORM:

By (Sig.):

Print name:

NORTH ANDREW R-VI SCHOOL DISTRICT, Missouri RESOLUTION NO. _____

A RESOLUTION OF NORTH ANDREW R-VI SCHOOL DISTRICT ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS North Andrew R-VI School District recognizes the threat that natural hazards pose to people and property within North Andrew R-VI School District and

WHEREAS North Andrew R-VI School District has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in North Andrew R-VI School District from the impacts of future hazards and disasters; and

WHEREAS North Andrew R-VI School District recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, North Andrew R-VI School District will endeavor to integrate the *Plan* into the comprehensive planning process; and

WHEREAS adoption by North Andrew R-VI School District demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

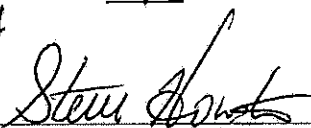
NOW THEREFORE, BE IT RESOLVED BY North Andrew R-VI School District, in the State of Missouri, THAT:

In accordance with the North Andrew R-VI School District's local rules, the North Andrew R-VI School District adopts the final *FEMA-approved Plan*.


ADOPTED by a vote of 7 in favor and 0 against, and 0 abstaining, this 21 day of June, 2021

By (Sig):

Print name:



Steve Houston



Mark McDaniel

ATTEST:

By (Sig.):

Print name:



Jeanne M Pierson

APPROVED AS TO FORM:

By (Sig.):

Print name:

SAVANNAH R-III SCHOOL DISTRICT, Missouri RESOLUTION NO. _____

A RESOLUTION OF SAVANNAH R-III SCHOOL DISTRICT ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS Savannah R-III School District recognizes the threat that natural hazards pose to people and property within Savannah R-III School District and

WHEREAS Savannah R-III School District has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Savannah R-III School District from the impacts of future hazards and disasters; and

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

WHEREAS adoption by Savannah R-III School District demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY, Savannah R-III School District in the State of Missouri, THAT:

In accordance with the Savannah R-III School District's local rules, the Savannah R-III School District adopts the final FEMA-approved *Plan*.

ADOPTED by a vote of 6 in favor and 0 against, and 0 abstaining, this 11th day of May, 2021.

By (Sig): _____

Print name: Joseph Barbosa President

ATTEST:

By (Sig.): _____

Print name: Jessica Gillett Secretary

APPROVED AS TO FORM:

By (Sig.): _____

Print name: _____



BE Active.
EAT Healthy.
BE You.

ANDREW COUNTY HEALTH DEPARTMENT

(816) 324-3139 / Fax: (816) 324-6002
Website: www.andrewcountyhealth.com

106 North 5th Street/P.O. Box 271
Savannah, MO 64485

ANDREW COUNTY HEALTH DEPARTMENT Missouri RESOLUTION NO. 04272021

A RESOLUTION OF ANDREW COUNTY HEALTH DEPARTMENT ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS Andrew County Health Department recognizes the threat that natural hazards pose to people and property within Andrew County Health Department and

WHEREAS Andrew County Health Department has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Andrew County Health Department from the impacts of future hazards and disasters; and

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

WHEREAS adoption by Andrew County Health Department demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY Andrew County Health Department, in the State of Missouri, THAT:

In accordance with Andrew County Health Department's local rules, the Andrew County Health Department adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 27th day of April, 2021.

By (Sig): Kelly Sloan
Print name: Kelly Sloan

ATTEST:
By (Sig.): Mike Gallagher
Print name: Mike Gallagher

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

ROSENDALE FIRE PROTECTION DISTRICT, Missouri RESOLUTION NO. 2

A RESOLUTION OF ROSENDALE FIRE PROTECTION DISTRICT ADOPTING THE ANDREW COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS Rosendale Fire Protection District recognizes the threat that natural hazards pose to people and property within Rosendale Fire Protection District and

WHEREAS Rosendale Fire Protection has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Andrew County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Rosendale Fire Protection District from the impacts of future hazards and disasters; and

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

WHEREAS adoption by Rosendale Fire Protection District demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY Rosendale Fire Protection District, in the State of Missouri, THAT:

In accordance with the Rosendale Fire Protection District's local rules, the Rosendale Fire Protection District adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of ___ in favor and ___ against, and ___ abstaining, this ___6th___ day of July 2021.

By (Sig.): Daniel S. Brewer, Board Pres.
Print name: DANIEL S. BREWER

ATTEST:
By (Sig.): Jesse McGuire
Print name: Jesse McGuire

APPROVED AS TO FORM:
By (Sig.): Jean McGuire
Print name: JEAN Mc GUIRE