Benton County Hazard Mitigation Plan

Encompassing the Jurisdictions of:

Benton County

City of Bella Vista
City of Bentonville
City of Bethel Heights
City of Cave Springs
City of Centerton
City of Decatur
City of Gentry
City of Gravette
City of Little Flock
City of Lowell
City of Pea Ridge
City of Rogers
City of Siloam Springs
City of Sulphur Springs

Town of Avoca
Town of Garfield
Town of Gateway
Town of Highfill
Town of Springtown

Northwest Arkansas Community College

Bentonville School District
Decatur School District
Gentry School District
Gravette School District

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Contents

Glossary of Terms

ADEM – Arkansas Department of Emergency Management
ANRC – Arkansas Natural Resources Commission
ASU – Arkansas State University
BFE – Base Flood Elevation
BPS – Bold Planning Solutions
DFIRM – Digital Flood Insurance Rate Map
DMA 2000 – Disaster Mitigation Act of 2000
EMS – Emergency Medical Services
EOP – Emergency Operations Plan
FMA – Flood Mitigation Assistance Grant Program
FEMA – Federal Emergency Management Agency
FIRM – Flood Insurance Rate Map
FOUO – For Official Use Only
HMGP – Hazard Mitigation Grant Program
HMP – Hazard Mitigation Plan
HMPT – Hazard Mitigation Planning Team
ICS – Incident Command System
I/CFs – Infrastructure and Critical Facilities
LEPC – Local Emergency Planning Committee
NEIC – National Earthquake Information Center
NFHL – National Flood Hazard Layer
NFIP – National Flood Insurance Program
NMSZ – New Madrid Seismic Zone
NRCS – Natural Resources Conservation Service
NWACC – Northwest Arkansas Community College
OEM – Office of Emergency Management
PDM – Pre Disaster Mitigation Grant Program
PoC – Point of Contact
RFP – Request for Proposal
SD – School District
SS – Severe Storms
SOP – Standard Operating Procedure
SSURGO – Soil Survey Geographic Database
UALR – University of Arkansas Little Rock
USACE – United States Army Corps. Of Engineers
USDA – United States Department of Agriculture
USGS – United States Geological Survey
WID – Watershed Improvement District
WS – Winter Storm
WUI – Wildland Urban Interface

Executive Summary

The Benton County Hazard Mitigation Plan is being developed to update and revise hazard mitigation activities for Benton County and its participating jurisdictions. The Benton County Hazard Mitigation Planning Team will evaluate mitigation measures to be undertaken, and outline a strategy for implementation of mitigation projects. This plan covers 20 municipalities and 7 school districts in Benton County, including the governments of: Benton County, the City of Bella Vista, City of Bentonville, City of Bethel Heights, City of Cave Springs, City of Centerton, City of Decatur, City of Gentry, City of Gravette, City of Little Flock, City of Lowell, City of Pea Ridge, City of Rogers, City of Siloam Springs, City of Sulphur Springs, the Town of Avoca, Town of Garfield, Town of Gateway, Town of Highfill, Town of Springtown, Bentonville School District, Decatur School District, Gentry School District, Gravette School District, Pea Ridge School District, Rogers School District, Siloam Springs District.

Formal adoption and implementation of a hazard mitigation plan presents many benefits to Benton County. By identifying problems and possible solutions in advance of a disaster, Benton County will be in a better position to obtain pre- and post-disaster funding.

The strategic goals of the 2014 Benton County HMP are as follows:

1) Reduce loss of life and decrease property losses to Benton County and its jurisdictions due to natural disasters; and

2) Provide the framework and coordination to encourage government, and public and private organizations, at all levels, to undertake mitigation in order to minimize potential disasters and to employ mitigation strategies in the recovery following disasters.

Specific planning objectives are as follows:

1) Identify, describe, and characterize the hazards to which Benton County and its jurisdictions are susceptible; and

2) Assess the risk of each hazard, including probability, frequency, exposure, vulnerability; and

3) Examine feasible mitigation opportunities appropriate for the identified hazards, prioritize those opportunities; and

4) Implement mitigation actions to reduce loss of lives and property; and

5) Identify mitigation opportunities for long-range planning consideration.

Introduction to Mitigation

The Emergency Management Cycle & Mitigation
Understanding this cycle is the first step in effectively planning and operating in relation to all disaster related activities. The emergency management cycle is an open ended and ongoing process. The four phases in the process are mitigation, preparedness, response, and recovery. Each phase of the cycle can last years or moments in length while different paths can exist simultaneously.

Mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and human-caused hazards.

It is carried out as any sustained action to reduce or eliminate long-term risk to life and property from a hazard event. Mitigation encourages long-term reduction of hazard vulnerability. As is the goal of emergency management, the goal of mitigation is to save lives and reduce property damage.

The Disaster Mitigation Act of 2000 (DMA 2000)
In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 became law on October 30, 2000, and amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the "Stafford Act") (Public Law 93-288, as amended). Regulations for this activity can be found in Title 44 of the Code of Federal Regulations Part 206, Subpart M.

This legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. This act establishes a pre-disaster hazard mitigation program and new requirements for the national, post-disaster, Hazard Mitigation Grant Program.

Section 322 of the act specifically addresses mitigation planning at the state and local levels. It identifies new requirements that allow HMGP funds to be used for mitigation planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan in place prior to receiving post-disaster HMGP funds. Local and tribal mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

DMA 2000 is intended to facilitate cooperation between state and local authorities, prompting them to work together. It encourages and rewards local and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network will better enable local and state governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects. To implement the new DMA 2000 requirements, FEMA prepared an interim final rule, published in the Federal Register on February 26, 2002, at 44 CFR Parts 201 and 206, which establishes planning and funding criteria for states and local communities.

On October 31, 2007, FEMA subsequently published an Interim Rule in the Federal Register, which ensures the Flood Mitigation Assistance (FMA) program planning requirements are consistent with the

mitigation planning regulations as cited in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201 (44 CFR Part 201).

This interim rule established that local communities must comply with mitigation planning requirements to be eligible to apply for FEMA mitigation project grant funding, including FMA and FEMA's Severe Repetitive Loss Program. Meeting the requirements of the regulations cited above ensures participating jurisdictions in the planning area will be eligible to receive disaster assistance, including hazard mitigation grants available through the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288, as amended.

The Benton County Office of Emergency Management has the responsibility to coordinate all local activities relating to hazard evaluation and mitigation, and to prepare and submit to FEMA a local hazard mitigation plan, following the criteria established in 44 CFR 201.6 and Section 322 of the Disaster Mitigation Act of 2000 (Public Law 106-390).

Section 1 – Planning Process

1.1 – Plan Introduction

This hazard mitigation plan consists of 27 jurisdictions: 1 county, 14 cities, 5 towns and 7 school districts. Each jurisdiction actively participated in the planning process from its inception. Each jurisdiction provided at least one representative to provide a locality specific perspective.

Planning team members actively participated in meetings, solicited input from members of their communities, and ensured that all jurisdiction information was reflected in the plan.

If a planning team member could not attend a meeting they were called via telephone, and all documentation which was presented at the meeting was mailed to the team member. The phone call consisted of a brief overview of the meeting along with time for the planning team member to make his or her suggestions or comments. A detailed description of the planning process, including a list of contributions from each jurisdiction, is provided in Section 1.2.2 Jurisdictions while a complete list of planning team participation is in section 1.3 – Stakeholder Participation.

1.2 – Plan Development

1.2.1 – Plan Drafting Stage

Benton County's revision process began in January of 2014, when the Benton County OEM applied for a HMGP planning grant under FEMA DR-4143. Benton County was awarded the grant to begin the process of updating their previously approved plan. Following the funding commitments, Benton County hired BOLDplanning to facilitate the plan's development.

Benton County's mitigation planning process was initiated on 29 May 2014 when BOLDplanning hosted a public kick-off planning meeting. At this meeting, an initial planning team comprised of representatives from each participating jurisdiction was organized. The initial team was instructed to solicit interested persons from their community to participate on the planning team. All participating jurisdictions actively participated in the planning process through soliciting input and participation in meetings.

Four planning events were held throughout the planning process. The final planning meeting was a public hearing held on DAY MONTH 2014. The planning events included meetings with representation from each Benton County jurisdiction and members of the public were invited as well. Planning events also included conference phone calls with municipal and agency officials who could not attend scheduled meetings.

Throughout the process the public was given opportunities to review HMP drafts, ask questions, and provide input on hazards. They were invited to provide feedback on mitigation project prioritization, hazard identification, and hazard ranking. Details and documentation of the public's participation can be found in Appendix C – Public Participation.

Planning Process Summary

1.) Benton County appointed a planning team consisting of the Mayors of the participating jurisdictions, Benton County's Emergency Manager, school district superintendents the mitigation department from BOLDplanning and appropriate EM or planning municipal employees.

2.) The Benton County OEM engaged BOLDplanning to provide staff support in conducting the planning process and preparing the plan.

3.) Meetings were held with team members to understand and agree on planning processes and steps required, including organizing resources, assessing hazards, developing a mitigation plan, implementing the plan and monitoring progress.

BOLDplanning held subsequent discussions about the planning process with ADEM staff.

1.2.2 – Jurisdictions

The following table lists the participating jurisdictions of Benton County, their lead representative contact during the HMP's development, and their HMPT contributions by development phase.

Table 1 – Jurisdictional Contribution by Planning Phase

Jurisdiction & Representative	Planning Process	Risk Assessment	Mitigation Strategy	Plan Maintenance
Benton County Robert McGowen, Office of Emergency Management, Director	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information on critical facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	PoC and lead jurisdiction for the HMPT	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Avoca	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information on critical facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Bella Vista	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Bentonville Brent Boydstrom, Bentonville Fire Department, Fire Chief	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Bethel Springs	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Cave Springs	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	

Jurisdiction & Representative	Planning Process	Risk Assessment	Mitigation Strategy	Plan Maintenance
Centerton	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Decatur	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Elm Springs Avon Haurey, Department of Veteran's Affairs, Emergency Manager	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Garfield	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Gateway	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Gentry	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	

Jurisdiction & Representative	Planning Process	Risk Assessment	Mitigation Strategy	Plan Maintenance
Gravette James Rusternolz, Gravette Police Department, Assistant Chief of Police	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Highfill	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Little Flock Buddy Blue, City of Little Flock, Mayor	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Lowell Eden Long, City of Lowell, Mayor	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Pea Ridge Jackie Crabtree, City of Pea Ridge, Mayor	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Rogers Jarod Mason, Rogers Police Department, Lieutenant	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Siloam Springs	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	

Jurisdiction & Representative	Planning Process	Risk Assessment	Mitigation Strategy	Plan Maintenance
Springtown Paul Lemke, City of Springtown, Mayor	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Sulphur Springs	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
		Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Northwest Arkansas Community College	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	Provided enrollment data	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Bentonville SD	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	Provided enrollment data	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Decatur SD	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	Provided enrollment data	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Gentry SD Jason Barrett, Gentry School District, Transportation Director	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	Provided enrollment data	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	

Jurisdiction & Representative	Planning Process	Risk Assessment	Mitigation Strategy	Plan Maintenance
Gravette SD Richard Carver, Gravette School District, Transportation Director	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	Provided enrollment data	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Pea Ridge SD	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	Provided enrollment data	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Rogers SD	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	Provided enrollment data	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	
Siloam Springs SD	Participated in HMPT	Completed hazard history documentation	Provided mitigation projects and actions history.	Will participate in the LEPC as prescribed in Section 2 - Plan Maintenance
	Provided information, facilities, hazards, PoCs	Completed risk assessment questionnaire	Proposed mitigation projects	
	Provided enrollment data	Reviewed risk assessment	Prioritizing mitigation projects using STAPLE+E	

1.2.3 – Major Mitigation Planning Meetings

The Benton County HMPT held various public meetings to discuss the mitigation plan process as well as gain public support and input for the plan. The following is a brief synopsis of those meetings. Proof of meetings, sign in sheets, and public notification documentation can be found in Appendix C – Public Participation.

Hazard Mitigation Plan Kick-Off Meeting
29 May 2014
The kick-off meeting was held for the Benton County HMPT. The mitigation planning process was reviewed, questions were answered, and roles were assigned. The HMPT ranked hazards, prioritized mitigation projects, and scheduled a public planning meeting. BOLDplanning worked with the HMPT to collect contact information, hazard history, facility information, and other pertinent jurisdictional information. Documentation for this meeting is located in Appendix C – Public Participation.

Hazard Mitigation Plan Public Information Meeting
29 May 2014
A public announcement ran for two weeks in the Sheridan Headlight Newspaper. The public was invited to voice any concerns, ask questions, and provide input. The meeting was held at the Benton County OEM's EOC with Tony Gertz and Fulton Wold available in person to answer any technical questions. Documentation for this meeting is located in Appendix C – Public Participation.

Hazard Mitigation Plan Public Review Meeting
X MONTH 2014
Public announcements ran for two weeks in local jurisdictions' newspapers and on the Benton County OEM's website. The public was invited to voice any concerns, ask questions, and review a draft copy of the Benton County Hazard Mitigation Plan. The meeting was held at the Benton County OEM with Tony Gertz available in person to answer any technical questions. Documentation for this meeting is located in Appendix C – Public Participation.

Hazard Mitigation Plan Final Review Meeting
X MONTH 2014
The Benton County Hazard Mitigation Plan was reviewed by the HMPT and any stakeholders, as requested, prior to ADEM submission.

Hazard Mitigation Plan Adoption Signing
To Be Determined
The Benton County Hazard Mitigation Plan adoption letters will be disseminated and signed by the participating jurisdictions. The signing of these resolutions codify the adoption of the HMP by the participating jurisdictions.

1.3 – Stakeholder Participation

The Benton County HMPT is made up of individuals working together for the development and ongoing maintenance of this plan. The participants are grouped into actively participating planning team members from the participating communities within Benton County.

- Hazard Mitigation Planning Team – This group consists of individuals from Benton County, the participating cities, towns and school districts of Benton County, the Arkansas Department of Emergency Management, supporting State and Federal Agencies, and BOLDplanning.

- Other Stakeholders – This group consists of representatives from the local community or their businesses. This plan was developed with the support and input from various commercial interests including local hospitals, industry, planning departments, health departments, and veteran's affairs.

- Members from the public at large – FEMA requires this planning effort to be open to constant input from interested citizens in compliance with the Sunshine Laws. In Arkansas, public meetings must comply with the Arkansas Open Meetings Law, unless established by statutory exemption. Therefore, any individual citizens who wish to be involved in this effort to mitigate future disasters are encouraged to attend the HMPT meetings and to solicit relevant comments to be included in the draft sections of the written plan.

The following table details the stakeholders and HMPT members who participated in the hazard mitigation planning process. This list contains all relevant local and state agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, and any appropriate neighboring communities.

Table 2 – Stakeholders & HMPT Members

Name	Organization	Position	Collaboration/Invitation
Principal Plan Developers			
Fulton Wold	BOLDplanning	Executive Officer	Organized planning schedule, meetings, and development process
Tony Gertz	BOLDplanning	Mitigation Planner	Project Manager and mitigation specialist
Local Governments			
Steve Sims	Bella Vista FD	Fire Chief	
Chris Suneson	Bella Vista Planning	Planning Director	
Jennifer Bonner	Bella Vista Planning	Planner	
Ken Farmer	Bella Vista PD	Chief of Police	
Marc Tro------	Benton County		
Michael DeRose	Benton County Emergency Communications		
Joy Bailey	Benton County Health Dept.	Planning Director	
Robert McGowen	Benton County OEM	Director	Represented jurisdiction and provided input
Mike Dixon	Benton County OEM	Deputy Director	Provided additional support and input
Brent Boydstrom	Bentonville FD	Fire Chief	
Ben Wall	Elm Springs	Mayor	
Avon Haurey	Fayettville Dept. of Veteran's Affairs	Emergency Manager	
James Rusternolz	Gravette PD	Asst. Chief of Police	
Buddy Blue	Little Flock	Mayor	
Eden Long	Lowell	Mayor	
Jackie Crabtree	Pea Ridge	Mayor	
Jamie Baggett	Pea Ridge FD		
Jarod Mason	Rogers PD	Lieutenant	
Bryan Austin	Siloam Springs PD	Lieutenant	
Travis White	Siloam Springs FD	Battalion Chief	
Paul Lemke	Springtown	Mayor	
School Districts			
Jason Barrett	Gentry SD	Transportation Director	
Richard Carver	Gravette SD	Transportation Director	

State Agencies			
Lacye Blake	ADEM	State Mitigation Officer	Provided ADEM oversight
Jennifer Oakley	ADEM	Mitigation Planner	Provided ADEM oversight and technical assistance.
Norma Fujikawa	ADH	Preparedness Coordinator	
David Wiley	AR Forestry Commission	Administration Office Supervisor	Provided wildfire information for Benton County
Academia, Neighboring Communities, and Private Organizations			
Steve Oler	NW Arkansas Hospitals	Emergency Preparedness Coordinator	
Hugh Burge	-	Facilities Consultant	
Rick Windham	ARVEST	Business Continuity Planner	
Chris Dryman	ARVEST	Business Continuity Planner	
Gary Dennis	NWACC	Director of Public Safety	
Gregg Sweeten	McDonald County OEM	Emergency Management Director	
Lonny Phillips	Simmons Food	Regional Safety Manager	
David Celis	Simmons Food	PSM Coordinator	

1.4 – Community Involvement

The Benton County HMPT provided the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process. The public was notified of open meetings via the Northwestern Arkansas Marketplace, the Benton County OEM's website, and on the Benton County OEM's Facebook page. under the upcoming county events section. BOLDplanning and the Benton County OEM invited all non-covered or soon to expire jurisdictions and school districts to participate in the plan. Any jurisdiction or school district not covered in this HMP is either covered under another plan, or declined to participate.

Participating jurisdictions were notified of HMPT meetings via e-mail, regular mail, and telephone. Emergency managers from neighboring counties were personally invited to attend the public draft review meeting. For two weeks prior to each public meeting an announcement was placed on the Benton County OEM website. Please see Appendix C – Public Participation for documentation.

At the first public planning meeting attendees ranked and identified hazards, created a community profile, prioritized mitigation projects, and completed a risk assessment questionnaire. During this meeting, and the latter public review hearing, concerned citizens and other parties were invited to review the most current draft, provide any input of feedback, and ask any relevant questions of the Benton County HMPT and BOLDplanning. No members of the public or concerned citizens attended either meeting.

Relevant federal, regional, state, local, and tribal governments, as well as any private and non-profit organizations were invited to provide input and technical expertise. The entities who volunteered to participate are listed in the following table.

Table 3 – Partner Involvement by Entity

Entity Classification	Entity	Entity Input
Federal Agencies	NOAA, USACE, USDA NRCS, USGS	Provided weather data, dam data, soil data, and geological data.
State Agencies	ADEM, AR Department of Health, AR Division of Forestry, AR NRCS	Provided oversight & technical assistance. Provided wildfire records.
Local Government	Benton County OEM, Benton County Health Department, Benton County Planning Department, Fayettville Department of Veteran's Affairs, Participating Municipalities	HMPT members, principle subjects. Provided input.
Private Business	ARVEST, BOLDplanning, North West Arkansas Hospitals, Simmon Foods	HMPT members, Directed planning effort, principle planners.
Academia	Bentonville SD, Decatur SD, Gentry SD, Gravette SD, Pea Ridge SD, Rogers SD, Siloam Springs SD	HMPT members, principle subjects. Provided input.

Section 2 – Plan Documentation, Development, & Maintenance

2.1 – Available Resources

2.1.1 – Documentation Resources

The HMPT conducted a comprehensive review of Benton County and the participating jurisdictions to determine the availability of existing emergency management and preparedness information.

Benton County Critical Facilities List
The HMPT compiled a list of critical facilities and pertinent information on those facilities. This list is used throughout the plan and is the basis for the vulnerability assessments and loss estimates. The complete list is posted in Appendix D.

Benton County Emergency Operations Plan
The Benton County OEM has developed a county-wide EOP. Using a commercial template to follow "best practices" methodology, this plan is a work in progress that is constantly being developed, tested, and updated. Information from the EOP has been integrated and used in the development of the Benton County HMP.

Benton County Hazard Mitigation Plan
Benton County is currently covered by a FEMA approved local hazard mitigation plan. The current plan has been reviewed and is incorporated into this plan per FEMA requirements.

Benton County Planning Documents
Benton County and its participating jurisdictions provided a host of planning, zoning, and development related documents. These documents were reviewed, assessed, and cataloged throughout the HMP.

2.1.2 – Fiscal Resources

The HMPT conducted an assessment of their available funding options. The following is a list of federal, state, and local funding sources either available, or relevant to the Benton County HMP.

Flood Mitigation Assistance Program
The FMA program is designed to aid in the buyout of RL and SRL properties as well as assist in the funding of flood mitigation projects and activities.

Hazard Mitigation Grant Program
The HMGP is managed by FEMA and administered by ADEM. The development of this plan has been funded by an HMGP grant at a 75% match.

Local Revenues & Budgets
Recognizing the importance of hazard mitigation planning, Benton County and its participating jurisdictions have self-funded the 25% match required by the FEMA HMGP grant.

Pre Disaster Mitigation Grant Program
PDM is managed by FEMA and is a nationally competitive grant program. Benton County does not have any PDM funds available for mitigation planning.

2.1.3 – Technical Resources

The Benton County HMPT employed a variety of technical resources in its plan development. These technical resources were instrumental in completing an accurate vulnerability and risk assessment.

Arkansas GeoStor
The State of Arkansas maintains its GIS data files in the form of an online database named: GeoStor. This database provided numerous local and regional GIS data files used in developing the Benton County HMP's risk assessment.

Benton County Planning Department
The Benton County Planning Department provided critical facility, dam inundation, land use, and other GIS data for use in the plan.

BOLDplanning
With over 9 years of experience in hazard mitigation planning, BOLDplanning's Mitigation Department was the principle plan writer.

ESRI ArcGIS v10
Each map developed for this plan, and the HAZUS models, were developed using ESRI's ArcGIS v10.

FEMA DFIRM – Map Data Center
FEMA's NFHL data was instrumental in mapping floodplain locations and estimating potential flood impacts and loss estimates.

NOAA NCDC
Weather data and historical events were primary provided by NOAA's NCDC.

University of Wisconsin – Madison SILVIS Labs
SILVIS Labs collects and distributes the raw WUI information used in calculating Benton County and its participating jurisdictions' wildfire risk.

USACE
The USACE provided Benton County and BOLDplanning with data from its national dam inventory containing their location and assessed hazard level.

USGS
The USGS's studies and reports on earthquakes in Central Arkansas and the New Madrid Seismic Zone provided the basis for the Benton County and its participating jurisdictions' earthquake risk assessment.

2.2 – Continued Public Involvement

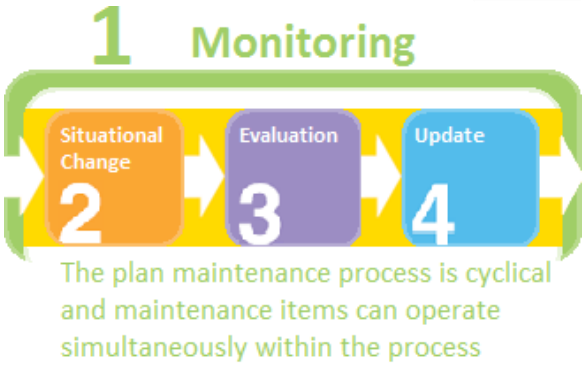
Benton County is dedicated to involving the public in the continual shaping of its Hazard Mitigation Plan and development of its mitigation projects and activities.

The Benton County HMPT will continue to keep the public informed about its hazard mitigation projects and activities through its OEM's website. Additionally, it will provide a "comments/suggestions" option for the public to submit their input through their website.

The public will also be invited to participate in annual HMPT meetings to review and discuss the HMP events of the past year.

Copies of the Benton County Hazard Mitigation Plan will be available on their website and distributed to each jurisdiction.

2.3 – Plan Maintenance Process



The Benton County HMPT has developed a method to ensure monitoring, evaluation, and updating of its HMP. Upon adoption of the Benton County HMP, its LEPC will form a subcommittee on mitigation projects comprised of Benton County's OEM Director and jurisdictional representatives from the HMPT. The chair of the subcommittee will be determined by a vote in the subcommittee. Additional members may be added based on necessity. The sub-committee will submit a quarterly report to the LEPC which in turn will submit an annual report to the OEM.

Please see the Benton County HMP Quarterly Report form at the end of this section.

The Benton County OEM may request a non-scheduled report on the monitoring, evaluation, or updating of any portion of the HMP due to irregular progress on mitigation actions and or projects, in the aftermath of a hazard event, or for any reason deemed appropriate.

2.3.1 – Plan Monitoring

Plan monitoring can be defined as the ongoing process by which stakeholders obtain regular feedback on the progress being made towards achieving their goals and objectives. In the more limited approach, monitoring may focus on tracking projects and the use of the agency's resources. In the broader approach, monitoring also involves tracking strategies and actions being taken by partners and non-partners, and figuring out what new strategies and actions need to be taken to ensure progress towards the most important results.

A monitoring report will be written and submitted to the LEPC quarterly and after the annual HMPT meeting or when triggered by a situation change. The monitoring report will answer the following questions.

- Is the mitigation project under, over, or on budget?
- Is the mitigation project behind, ahead of, or on schedule?
- Are there any changes in Benton County's capabilities which impact the HMP?
- Are there any changes in Benton County's hazard risk?
- Has the mitigation action been initiated or its initiation planned?
- If applicable, has participation in a mitigation action's collaboration been regular?
- If any, what plan updates occurred, why they occurred, and what is their impact?

The plan maintenance process is cyclical and maintenance items can operate simultaneously within the process.

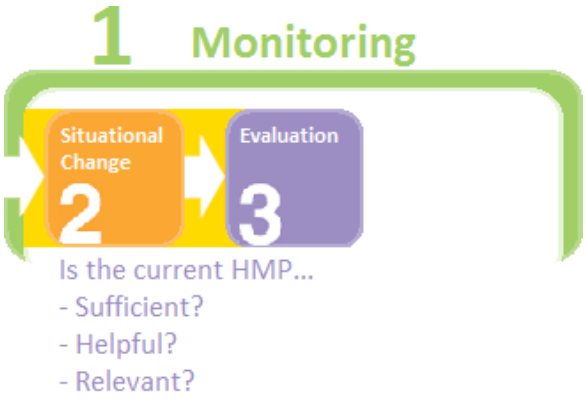
2.3.2 – Plan Evaluating

A plan evaluation is a rigorous and independent assessment of either completed or ongoing activities to determine the extent to which they are achieving stated objectives and contributing to decision making.

An evaluation report will be written and submitted to the LEPC when the situation dictates. The following situations are typical examples of when an evaluation will be necessary.

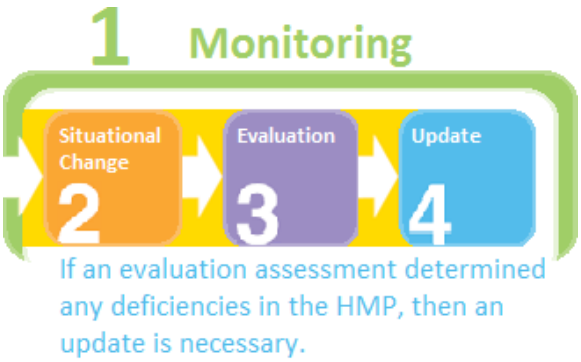
- Post hazard event
- Post training exercise
- Post tabletop or drill exercise
- Significant change or completion of a mitigation project
- Significant change or completion of a mitigation action

An evaluation report will ask the following questions in response to the previously listed events.



- Do the mitigation objectives and goals continue to address the current hazards?
- Are there new or previously unforeseen hazards?
- Are current resources appropriate for implementing a mitigation project?
- Was the outcome of a mitigation action/project expected?
- Are there implementation problems?
- Are there coordination problems?

2.3.3 – Plan Updating



Typically, a HMP update is initiated upon the completion of a plan evaluation and even then, only when the evaluation determines an update is appropriate. Additionally, when new hazard data becomes available it will be added to the HMP. New data will be confirmed or denied at annual HMPT meeting.

For whatever reason, a HMP update can be written anytime it is deemed necessary by the Benton County OEM.

Benton County will begin their update process three years from this plan's adoption according to FEMA DMA2000 guidelines on local mitigation plan updates under the direction of the director of the Benton County OEM.

Benton County Local Emergency Planning Committee
Benton County Hazard Mitigation Plan
Quarterly Report

Hazard Mitigation Plan Sub Committee Chair:
Meeting Date:_____
Plan Approval Date:
Plan Expiration Date:

Have there been any disasters or training events since the last report? If so, list them below:

Disaster Number/Training Event	Hazard Type(s)	Was the hazard expected or unforeseen?	Is a plan update required?
Example: DR-1000	*Volcanic Eruption*	*Unforeseen*	*Yes*
Example: Annual Training	*Flash Flooding*	*Expected*	*No*

Mitigation Projects:

Mitigation Project	Participating Jurisdictions	Proposed/Schedules/In Progress/Completed	Behind/Ahead/On-Schedule	Estimated Completion Date
Example: Tornado Safe Room	*Pea Ridge*	*In Progress*	*On-Schedule*	*1/1/2016*

Miscellaneous Notes:

Section 3 – Community Profile

Benton County was established in 1836. It rests in the north western most corner of the state bordering Oklahoma to the west and Missouri to the north. It encompasses the Fayettville-Springdale-Rogers metropolitan statistical area with its southern neighbor, Washington County.

Its economic growth began in the 1950s and 1960s via poultry farming and the opening of the first Wal-Mart store.Today, Benton County boasts and strong and continually growing economy hosting the headquarters for Wal-Mart, Daisy Outdoor products, and JB Hung Transport Services.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3.1 – Demographics

The U.S. Census Bureau estimates as of 2013, Benton County has a total of 237,297 people residing within its boundaries, 100,385 of which reside in cities and towns. All the participating jurisdictions, with the exception of Little Flock, Springtown, and Sulphur Springs, have seen significant population growth that has potentially altered its hazard vulnerability. Little Flock has not seen significant growth or decline while Springtown and Sulphur Springs have seen a respective decrease in population by 20.18% and 21.61%.

The table below details the participating jurisdictions' demographic information. Jurisdictions with significant growth are highlighted in red while jurisdictions with significant declining growth are highlighted in green.

Table 4 – Community Demographics

Jurisdiction	Size (Sq. Mi.)	Population			% Population Change		
		2000	2010	2013	2000 - 2010	2010 - 2013	2000 - 2013
Benton County (Inclusive)	847.36	153,406	222,896	237,297	45.30%	6.46%	54.69%
Benton County (Exclusive)	657.93	88,045	128,312	136,912	45.73%	6.70%	55.50%
Avoca	1.81	423	490	508	15.84%	3.67%	20.09%
Bella Vista	66.37	16,582	26,587	27,642	60.34%	3.97%	66.70%
Bentonville	21.26	19,730	35,862	40,167	81.76%	12.00%	103.58%
Bethel Heights	2.52	714	2,381	2,456	233.47%	3.15%	243.98%
Cave Springs	7.28	1,103	1,754	2,151	59.02%	22.63%	95.01%
Centerton	4.02	2,146	9,586	10,556	346.69%	10.12%	391.89%
Decatur	2.29	1,314	1,706	1,758	29.83%	3.05%	33.79%
Garfield	3.67	490	504	516	2.86%	2.38%	5.31%
Gateway	0.57	116	407	422	250.86%	3.69%	263.79%
Gentry	2.38	2,165	3,175	3,351	46.65%	5.54%	54.78%
Gravette	2.34	1,810	3,124	3,213	72.60%	2.85%	77.51%
Highfill	11.32	379	588	621	55.15%	5.61%	63.85%
Little Flock	7.56	2,585	2,598	2,711	0.50%	4.35%	4.87%
Lowell	6.26	5,013	7,346	7,940	46.54%	8.09%	58.39%
Pea Ridge	4.09	2,346	4,818	5,026	105.37%	4.32%	114.24%
Rogers	33.58	38,829	56,309	60,112	45.02%	6.75%	54.81%
Siloam Springs SD	10.56	10,843	15,115	15,856	39.40%	4.90%	46.23%
Springtown	0.54	114	87	91	-23.68%	4.60%	-20.18%
Sulphur Springs	1.01	671	513	526	-23.55%	2.53%	-21.61%

Jurisdiction	Students	Staff	Total
NWACC			
Bentonville SD			
Decatur SD			
Gentry SD			
Gravette SD			
Pea Ridge SD			
Rogers SD			
Siloam Springs SD			

**The data are from the U.S. Census Bureau and the respective school districts.*

3.1.1 – Land Use & Development Trends

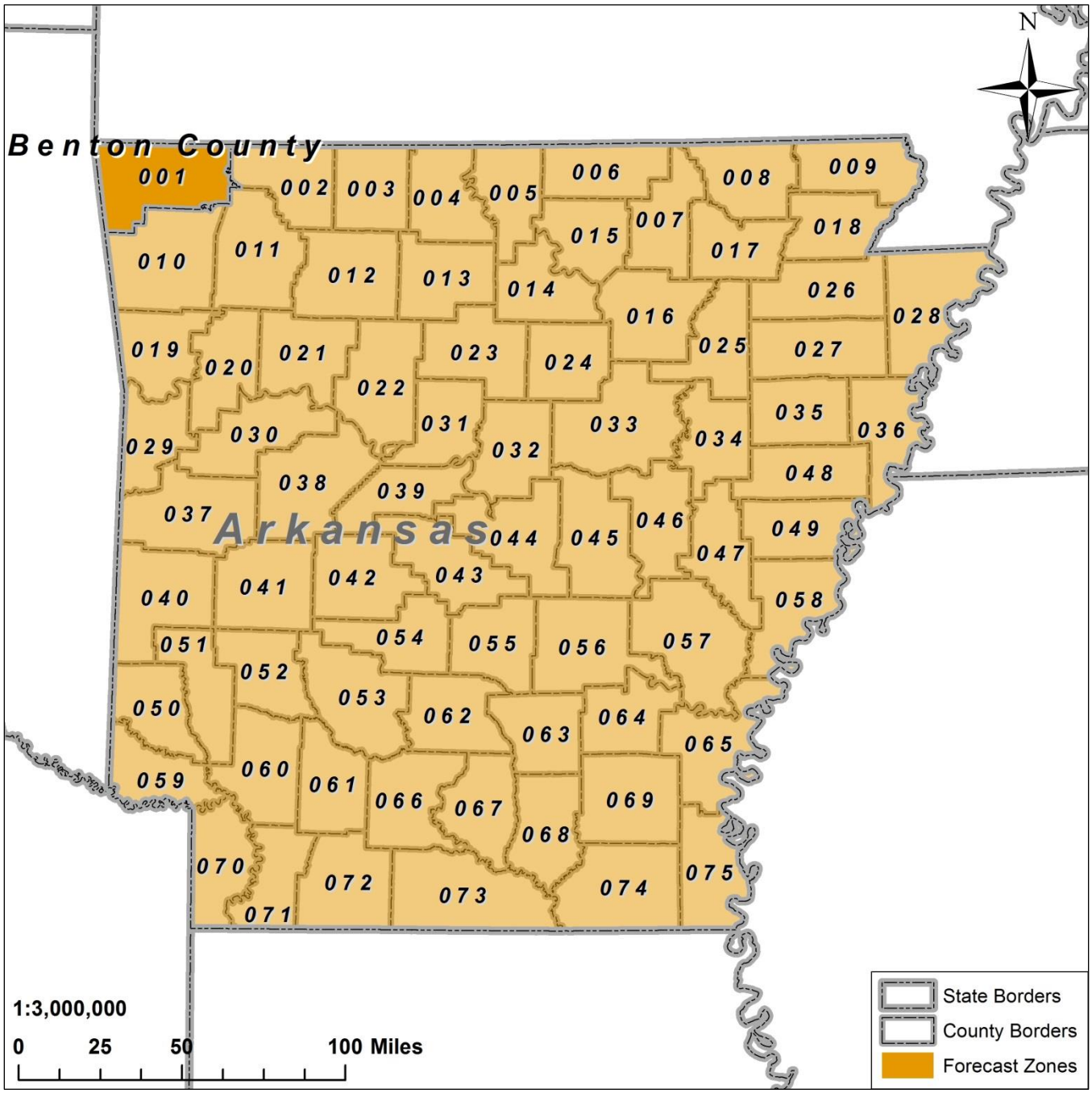
3.1.2 – Infrastructure & Critical Facilities

3.2 – Climate

Benton County, Arkansas, receives 45.1 inches of rain per year. The US yearly average is 36.5. Snowfall is typically 11.1 inches while the US average is 25 inches. The number of days with any measurable precipitation is 93.

On average, there are 217 sunny days per year in Benton County. The July high 86.5 degrees and the January low is 20.5. The comfort index, which is based on humidity during the hot months, is a 33 out of 100, where a higher value represents more comfort. The US average comfort index is 44.

All weather related data used will be in reference to Benton County or the location of the specific event. Some of the historical weather tables listed in Appendix E use NWS Public Forecast Zones. Please use the map on the following page to determine Benton County's Public Forecast Zone.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Section 4 – Hazard Risk Assessment

The goal of mitigation is to reduce the future impacts of hazards including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist recovery. To be done correctly, mitigation decision making should be based on risk assessment.

A risk assessment consists of three components: hazard profiling, exposure, and vulnerability assessment. The process entails past hazard events, probability of future events, asset lists, loss estimation, and other sections where appropriate.

A history of declared disasters helps capture an overview of the hazards facing Benton County and its participating jurisdictions. Since 1969, Benton County and its participating jurisdictions have suffered from 17 declared disasters. These disaster declarations were due to flooding, Hurricane Katrina, severe storms, tornadoes, and winter storms. A list of the declared disasters occurring in Benton County and its participating jurisdictions since 1969 is presented in the table below. Smaller disasters are more frequent and are not reflected in the table.

Table X – Disaster Declarations, Benton County

Designation	Date Declared	Incident Type
DR-4143	9/4/2013	Flooding, Severe Storms
DR-1975	5/2/2011	Flooding, Severe Storms, Tornadoes
DR-1819	2/6/2009	Severe Winter Storm
EM-3301	1/28/2009	Severe Winter Storm
DR-1758	5/20/2008	Flooding, Severe Storms, Tornadoes
DR-1751	3/26/2008	Flooding, Severe Storms, Tornadoes
EM-3215	9/2/2005	Hurricane Katrina
DR-1528	6/30/2004	Flooding, Severe Storms
DR-1472	6/6/2003	Flooding, Severe Storms, Tornadoes
DR-1354	12/29/2000	Severe Winter Storm
EM-3159	12/28/2000	Severe Winter Storm
DR-865	5/15/1990	Severe Storm
EM 3019	12/3/1976	Drought
DR-437	6/8/1974	Flooding, Severe Storms
DR-375	4/27/1973	Flooding, Severe Storms
DR-321	1/27/1972	Flooding, Severe Storms
DR-254	2/15/1969	Flooding, Severe Storms

4.1 – Identifying Hazards

The first step in developing a hazard assessment is identifying the hazards with reasonable potential to strike Benton County or its participating jurisdictions. Identification allows appropriate and well planned action to mitigate the extent and impact of a hazard event as well as facilitating emergency response and recovery operations. Not all disaster contingencies can be planned for however, by using an all-hazards approach to planning, the mitigation process yields increased preparedness for unforeseen hazard events.

The table at the bottom of this page lists the hazards profiled in the State of Arkansas Hazard Mitigation Plan. Based on the research described above, 9 of these hazards pose a risk to at least one of the participating jurisdictions. These are: dam failure, droughts, excessive heat, expansive soils, floods, tornadoes, severe storms (includes hail, high winds, lightning, and thunderstorms), wildfires, and winter storms. Hail, high winds, lightning, and thunder storm winds are included under the severe storms profile.

Details for each hazard and their potential impact on Benton County are located in Section 4.3. The following tables compare the identified and profiled hazards as they relate to their previous plan and to the state's plan. Any hazards which affect the State of Arkansas or were profiled in the previous plan, but do not affect any of Benton County's jurisdictions are listed as 'excluded.' An analysis of why a hazard has been excluded can be found in Section 4.5 – Excluded Hazards.

Table X – Identified Hazards

Hazards in State/Previous HMP	Previous Inclusions	Included/Excluded	Justification
Dam Failure	Local & State Plan	Included	Hazard areas identified
Drought	Local & State Plan	Included	Disaster History
Earthquake	Local & State Plan	Included	Hazard areas identified
Excessive Heat	Local Plan	Included	Disaster History
Floods	Local & State Plan	Included	Hazard areas identified
Hail	Local & State Plan	Included - In Severe Storms	Disaster History
High Winds	Local & State Plan	Included - In Severe Storms	Disaster History
Landslides	Local & State Plan	Excluded	See Section 4.6
Thunderstorms	Local & State Plan	Included - In Severe Storms	Disaster History
Tornadoes	Local & State Plan	Included	Disaster History
Winter Storms	Local & State Plan	Included	Disaster History
Wildfires	Local & State Plan	Included	Disaster History

4.2 – Profiling Hazards

4.3.1 – Description
This section describes the general characteristics of the hazard.

4.3.2 – Location & Extent
Contains information on location; the geographic areas in the planning area that affected by the hazard, and extent; the strength or magnitude of the hazard, for each hazard.

4.3.3 – Previous Occurrences
This section contains a history of previous hazard events for the profiled hazard.

Methodology: Most of the historical hazard data used in the risk assessment originates from NOAA. In most instances the hazard affects a large geographic area and thus the hazard data is reported at the county level. *This is the best available data for these hazards*. The calculations for Previous Occurrences and the Probability of Future Events are based on county level data.

4.3.3A – Probability of Future Events
Contains the likelihood of the hazard occurring.

Table X – Probability Categories

Category	Range (Per Year)
Rare	0% - 25%
Not Likely	25% - 50%
Likely	50% - 75%
Highly Likely	75% - 100%

4.3.4 – Vulnerability & Impact
Describes the potential impacts of the hazard for each participating jurisdiction and provides an overall summary of each jurisdiction's vulnerability to the hazard through structures, systems, populations, and community assets that are susceptible to damage and loss from the hazard.

4.3.4A – Infrastructure & Critical Facilities
When appropriate, this section details the infrastructure and facilities pertinent to the hazard.

4.3.4B – Land Use & Development Trends
Provides a general description of land use and development trends within the community.

4.3.4C – Unique or Varied Risk
Assesses each jurisdiction's risk where it varies from the risks facing the entire planning area.

4.3.4D – Repetitive Loss Structures
Describes the types of facilities and estimates the number of repetitive loss properties exposed to the hazard.

4.3.5 – HAZUS Models
When appropriate this section will contain the results of various HAZUS simulation models.

4.3DF – Dam Failure

4.3.1 – Description

A dam is a barrier across flowing water that obstructs, directs or slows down the flow, often creating a reservoir, lake or impoundments. Most dams have a section called a spillway or weir, over or through, which water flows, either intermittently or continuously.

Dams fail in two ways, a controlled spillway release done to prevent full failure, or the partial or complete collapse the dam itself. In each instance an overwhelming amount of water, and potentially debris, is released. Dam failures are rare, but when they occur can cause loss of life, and immense damage to infrastructure and the environment.

Common reasons for dam failure are the following:

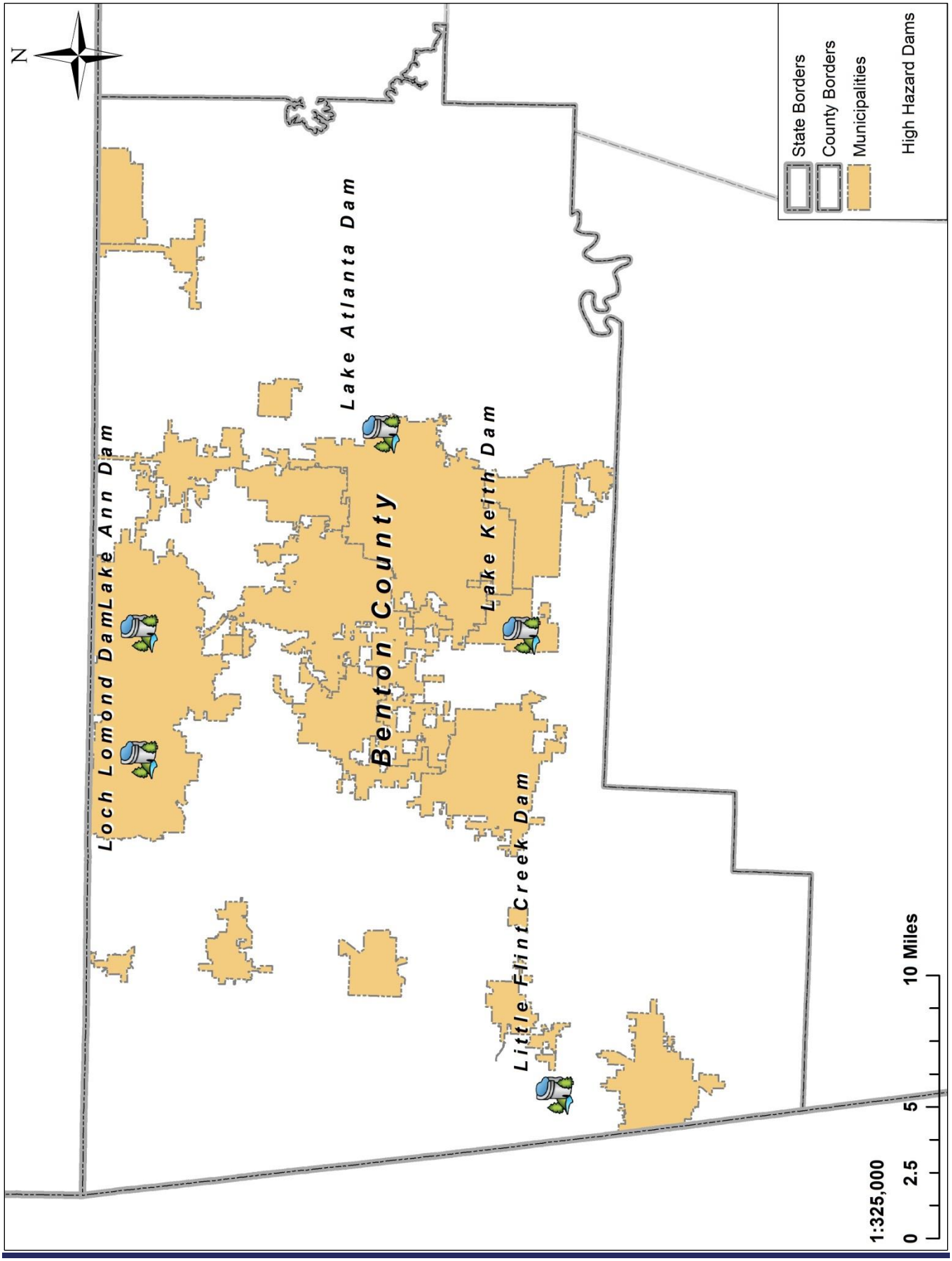
- Sub-standard construction materials/techniques
- Spillway design error
- Geological instability caused by changes to water levels during filling or poor surveying
- Sliding of a mountain into the reservoir
- Poor maintenance, especially of outlet pipes (Extreme inflow
- Human, computer or design error
- Internal erosion, especially in earthen dams.
- Earthquakes

4.3.2 – Location & Extent

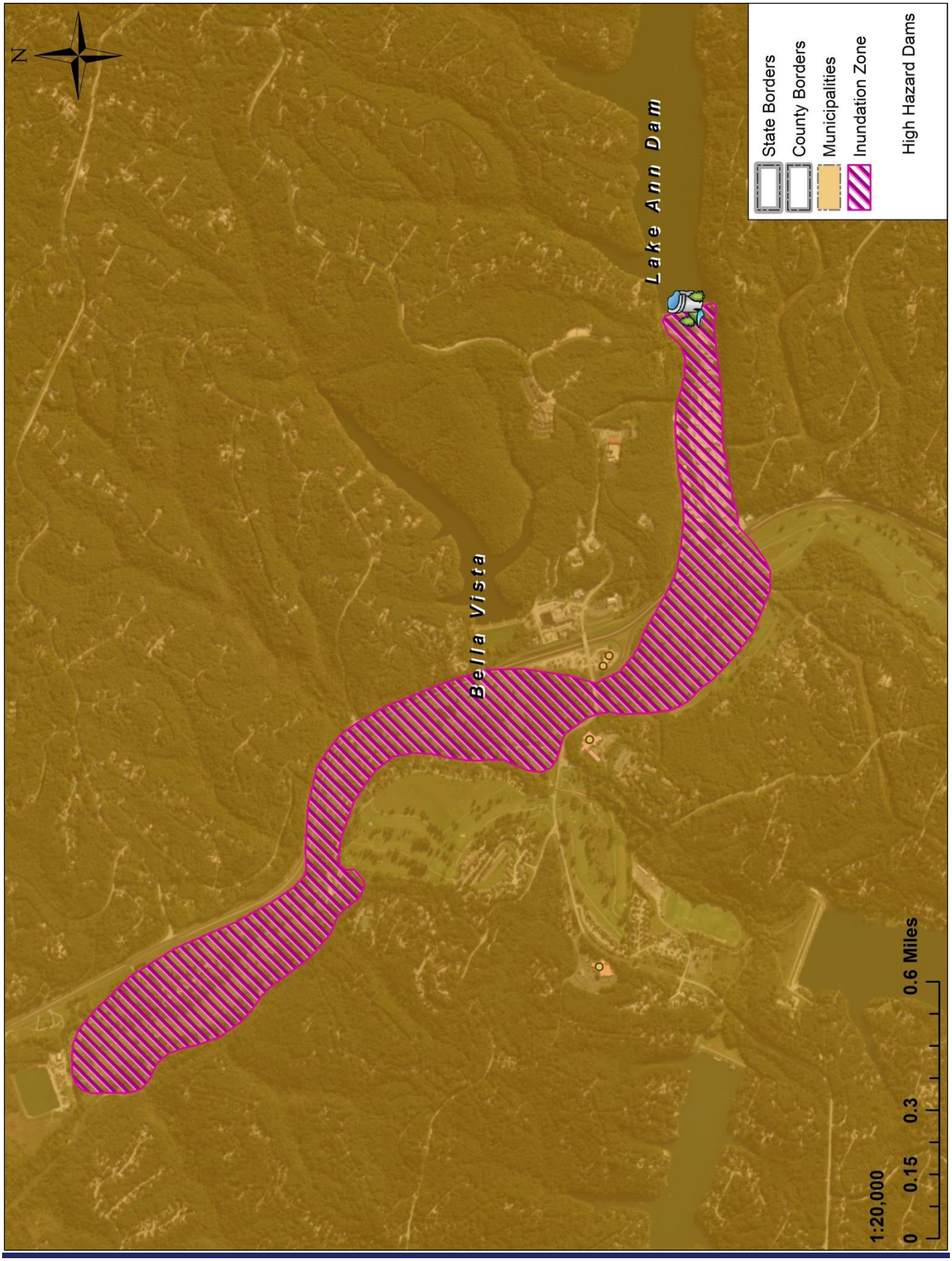
Dam failure can occur with little warning. Intense storms may produce a flood in a few hours or even minutes from upstream locations. Dam failure can occur within hours of the first signs of breaching. Although the floodwaters will drain, the area will be affected by flooding from the dam failure for days to weeks and the destruction will affect the area for years.

The USACEs ranks each dam, reservoir, and WID according to a hazard risk of low, significant, and high. Benton County and its participating jurisdictions have 5 dams labeled as “high hazard” by the USACE. These are; Lake Ann Dam, Lake Atlanta Dam, Lake Keith Dam, Little Flint Creek Dam, and the Lock Lomond Dam. Maps on the following pages depict the locations of these dams as well as their modeled impact zone.

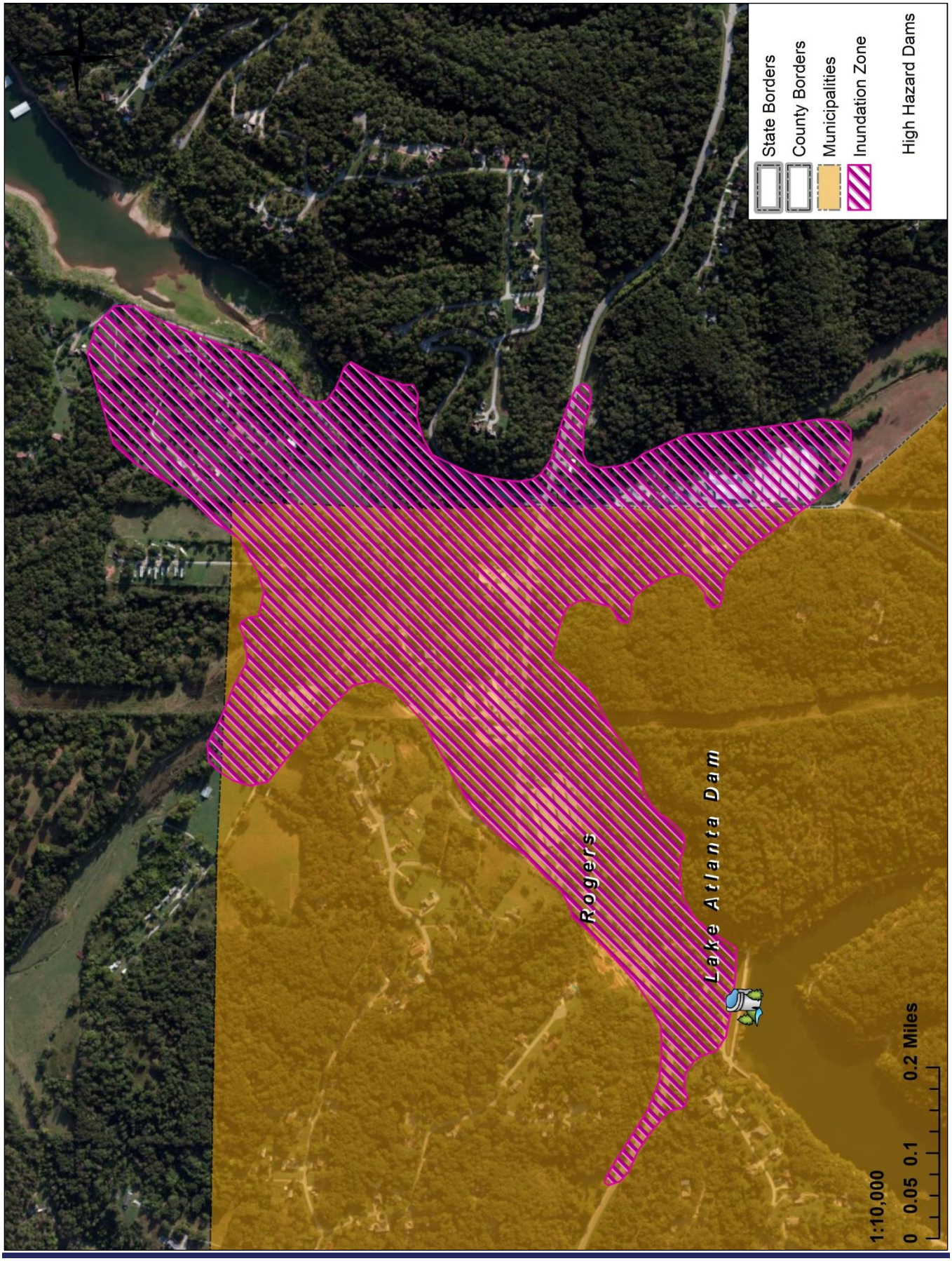
Map X – Dam Locations, Benton County



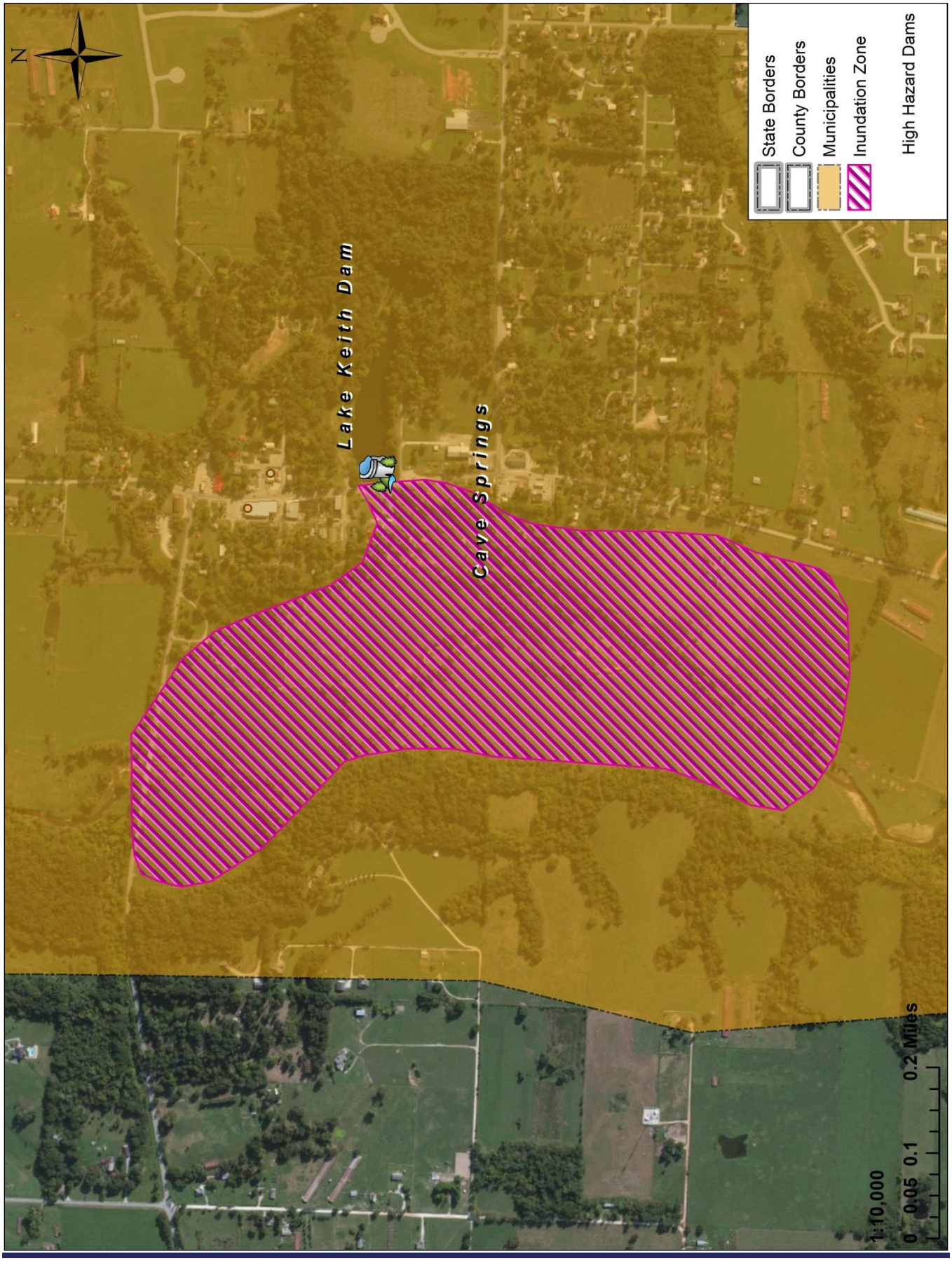
Map X – Inundation Zone, Lake Ann Dam



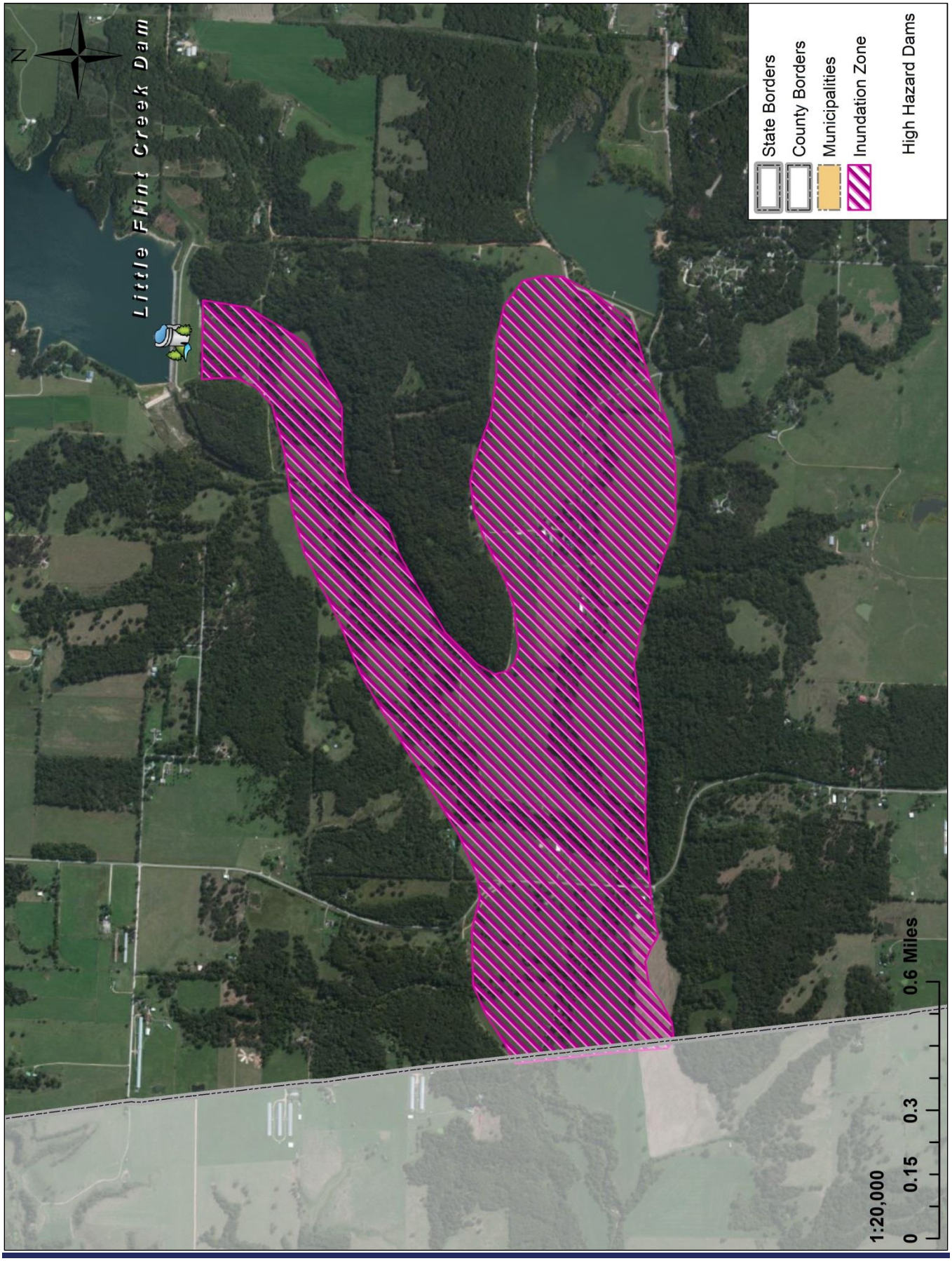
Map X – Dam Inundation, Lake Atlanta Dam



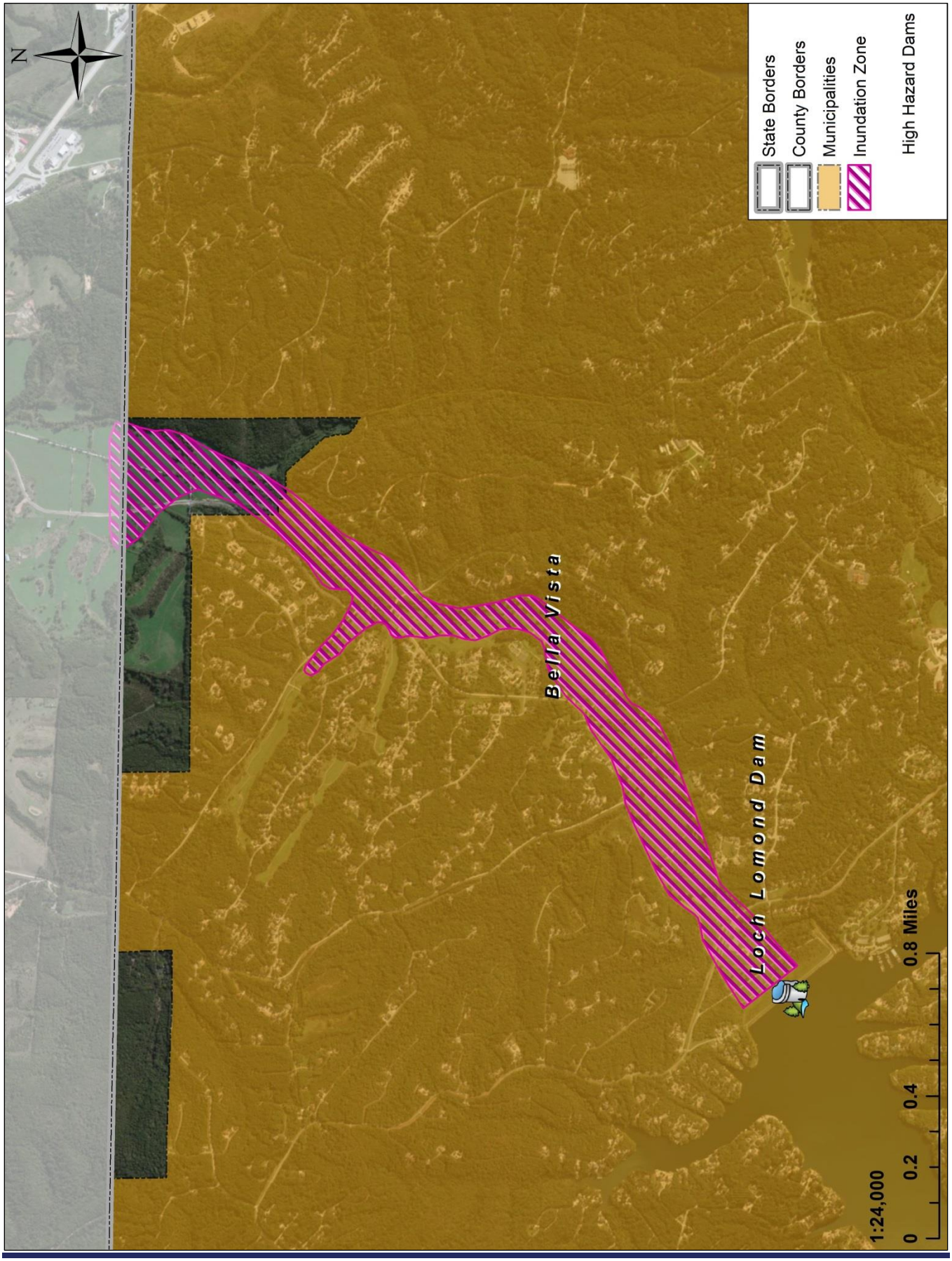
Map X – Dam Inundation, Lake Keith Dam



Map X – Dam Inundation, Little Flint Creek Dam



Map X – Dam Inundation, Loch Lomond Dam



4.3.3 – Previous Occurrences

There are more than 80,000 dams in the United States, according the USACE's National Inventory of Dams. Approximately one third of these are classified as a high or significant hazard to life and property in the event of a breach of failure.

Presently there are no incidents of dam failure in Benton County or its participating jurisdictions.

4.3.3A – Probability of Future Events

As previously stated there can be advanced warning to no warning at all for a dam failure event. At present, there is no history of a dam failure of any size in Benton County or its participating jurisdictions. In lieu of any historical events, the next best prediction tool would be based on the structural state of the dam. However, maintenance and structural information on the USACE's dams in Benton County and its participating jurisdictions is confidential information and not for public use.

Given the absence of any historical precedence of dam failure in Benton County and its participating jurisdictions, information on the dams being poorly maintained, or having reoccurring structural flaws, the probability of experiencing a dam failure event is categorized as 'rare.'

4.3.4 – Assessing Vulnerability and Impacts

Dam Failure Impacts

The USACE's inundation studies do not have estimated flow times or water depths. The best data available to draw impact conclusions is based on the impact area, as shown in the previous maps, and the normal water volume located behind a dam. Any amount of water listed below has the potential, given a variety of release speeds, to completely destroy and buildings in its wake or trickle through as nothing more than intense rain.

Table X – Dam Failure Impacts

Dam	Max Volume (Acre Ft.)	Normal Volume (Acre Ft.)
Lake Atlanta	800	360
Lake Ann	2,900	1,800
Lake Keith	50	22
Little Flint Creek	24,400	18,300
Lock Lomond	23,099	14,093

**The data are from the USACE.*

Vulnerability of Facilities

Facilities within a dam failure inundation area are at extreme risk. The water level of a dam failure can range from inches, causing damage similar to small floods, to completely engulfing a structure in water. Additionally, the speed of the flow can cause variations in the impact. A slow flow will cause damage similar to a riverine flood, however, a fast moving, high level flow has the potential to completely destroy a structure.

Vulnerability of Population

Populations within a dam failure inundation area are at extreme risk. Depending on the speed of the water's arrival, a community's population may not have time to evacuate. Additionally, evacuation routes can be blocked by the dam waters. If flood waters arrive quickly, many people can die. Depending on the elevation of the water, a community's population may not have any available shelter to avoid the waters.

Vulnerability of Systems

Community systems with a dam failure inundation area are at extreme risk. Depending on water level, and arrival speed a community's entire energy infrastructure, transportation networks, and economic systems could be completely destroyed.

4.3.4A – Infrastructure & Critical Facilities

Through the USACE's inundation studies, none of Benton County or its participating jurisdictions' infrastructure or critical facilities were found to be at risk. A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends

Benton County and it participating jurisdictions have varying growth as detailed in Section 3.1.1 – Land Use & Development Trends.

Increased residential growth increases a community's risk to drought by way of its systems' vulerability as defined in Section 4.3.4 of this hazard profile. None of the participating jurisdictions have seen significant growth and thus their risk to droughts has not increased since the development of their last plan.

4.3.4C – Unique & Varied Risk

Given the USACE's inundation studies, only Benton County, Bella Vista, Cave Springs, and Rogers are exposed to any risk from dam failure.

4.3D – Droughts

4.3.1 – Description

Drought is an abnormally dry period lasting months or years when an area has a deficiency of water and precipitation in its surface and or underground water supply. The hydrological imbalance can be grouped into the following non-exclusive categories.

- ***Agricultural:*** When the amount of moisture in the soil no longer meets the needs of previously grown crops.
- ***Hydrological:*** When surface and subsurface water levels are significantly below their normal levels.
- ***Meteorological:*** When there is a significant departure from the normal levels of precipitation.
- ***Socio-Economic:*** When the water deficiency begins to significantly affect the population.

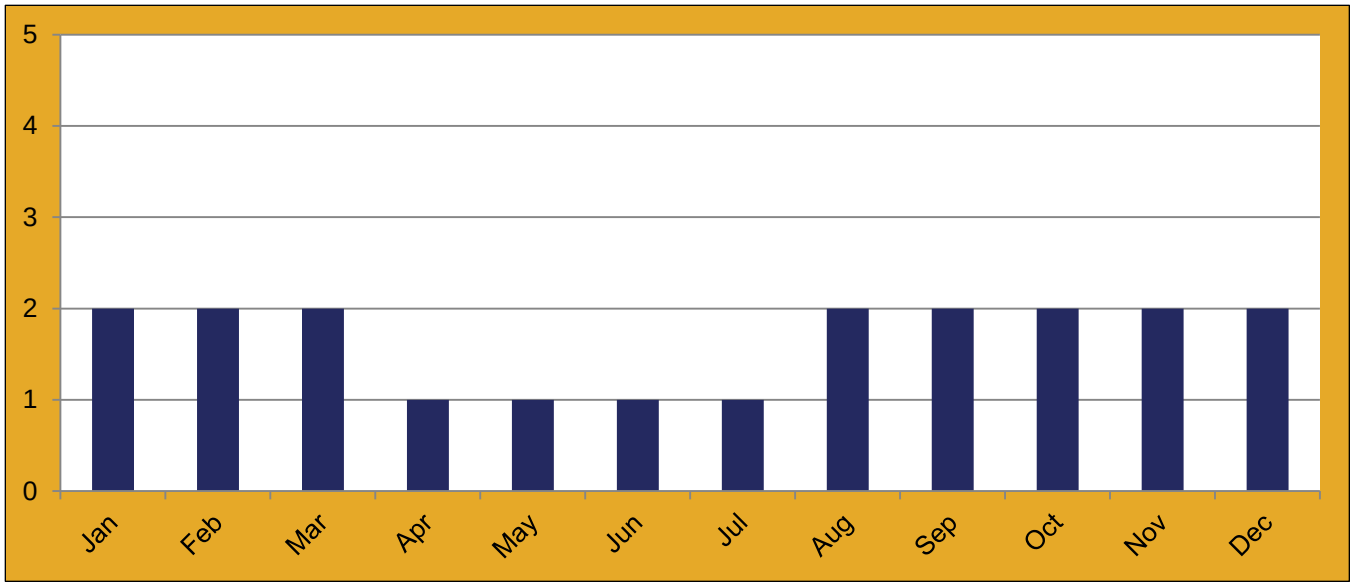
Droughts are regularly monitored by multiple federal agencies using a number of different indices. Typically, they are seasonal occurring in the late spring through early fall. Drought monitoring focuses on precipitation and temperature. When precipitation is less than normal, and natural water supplied begins to decease, a drought is occurring.

When below average, little or no rain falls soil can dry out and plants can die. If unusually dry weather persists and water supply problems develop the time period is defined as a drought. Human activity such as over farming, excessive irrigation, deforestation, and poor erosion controls can exacerbate a drought's effects. It can take weeks or months before the effects of below average precipitation on bodies of water are observed. Depending on the region droughts can happen quicker, noticed sooner, or have their effects naturally mitigated. The more humid and wet an area is, the quicker the effects will be realized. A naturally dry region, which typically relies more on subsurface water will take more time to actualize its effects.

Periods of drought can have significant environment, agricultural, health, economic, and social consequences. The effects vary depending on vulnerability and regional characteristics. Droughts can also reduce water quality through a decreased ability for natural rivers and streams to dilute pollutants and increase contamination. See the list below for the most common effects of droughts and the chart on the following page for Benton County and its participating jurisdictions' seasonal occurrences of droughts.

- Diminished crop growth or yield
- Erosion
- Dust storms
- Ecosystem and environmental damage
- Increased probability of wildfires
- Reduced electricity production due to reduced flow through hydroelectric dams
- Shortages of water for industrial production
- Increased risk of wildfires

Chart 1 – Droughts per Month, Benton County (2005 – 2013)



4.3.2 – Location & Extent

Extended periods without sufficient rainfall can and do occur across Benton County and its participating jurisdictions affecting the entire planning area, causing damage to lawns, gardens, flora and fauna. The events, when they do occur, occur on a massive geographic scale, often affecting multiple counties, regions, and states. Severe drought can cause enormous economic consequences, not only in the county but in the region and nation as well. There is no set speed of onset or warning period. A drought may begin in as short of period as a week or it may take months to reach an official declared drought. Additionally, the drought can last for as little as a week to up to the entire season.

Droughts are regularly monitored by multiple federal agencies using a number of different indices. Typically, they are seasonal occurring in the late spring through early fall. Drought monitoring focuses on precipitation and temperature. When precipitation is less than normal, and natural water supplied began to decease, a drought is occurring. There is no set speed of onset or warning period, a drought may began in as short of period as a week or it may take months to reach an official declared drought. Additionally, the drought can last for as little as a week to up the entire season.

When a drought begins and ends is difficult to determine. Rainfall data alone won't tell if an area is in a drought, how severe the drought may be, or how long the area has been in drought. However, one can identify various indicators of drought, such as rainfall, snowpack, stream flow, and more, and track these indicators to monitor drought. Researchers have developed a number of tools to help define the onset, severity, and end of droughts. Drought indices take thousands of bits of data on rainfall, snowpack, stream flow, etc., analyze the data over various time frames, and turn the data into a comprehensible big picture. A drought index value is typically a single number, which is interpreted on a scale of abnormally wet, average, and abnormally dry. There are three primary drought indices that are all used to determine the onset and the severity of a drought, the Standard Precipitation Index, the Palmer Drought Severity Index, and the Crop Moisture Index. During a drought event, Benton County and its participating jurisdictions can expect see a range anywhere from 0.0 to – 4.0 on the Palmer Drought Severity Index or a -1.0 to -2 on the Standard Precipitation Index. Please see below and the following page for descriptions and tables of the primary drought indices.

The agricultural industry is the first and hardest hit by droughts. According to the NRCS' 2013 Land Use Survey, Benton County and its participating jurisdictions do not have a significant agricultural industry. The only recognizable pocket exists in Centerton. They do however, have a significant amount of pasture land. These are depicted in Map X on page XX.

Crop Moisture Index (CMI)

A derivative of the PDSI is the CMI. It looks at moisture supply in the short term for crop producing regions. The CMI monitors week-to-week crop conditions, whereas the PDSI monitors long-term meteorological wet and dry spells. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. Because it is designed to monitor short-term moisture conditions affecting a developing crop, the CMI is not a good long-term drought monitoring tool. The CMI's rapid response to changing short-term conditions may provide misleading information about long-term conditions. The CMI uses the same index as the PDSI, but in its own redefined context.

The Palmer Drought Severity Index (PDSI)

The PDSI has been used the longest for monitoring drought. The PDSI allows for a categorization of various levels of wetness and dryness that are prominent over an area. The PDSI is calculated based on precipitation and temperature data, as well as the local Available Water Content (AWC) of the soil. Palmer values may lag emerging droughts by several months, are less well suited for mountainous land or areas of frequent climatic extremes, and are complex—haves an unspecified, built-in time scale that can be misleading.

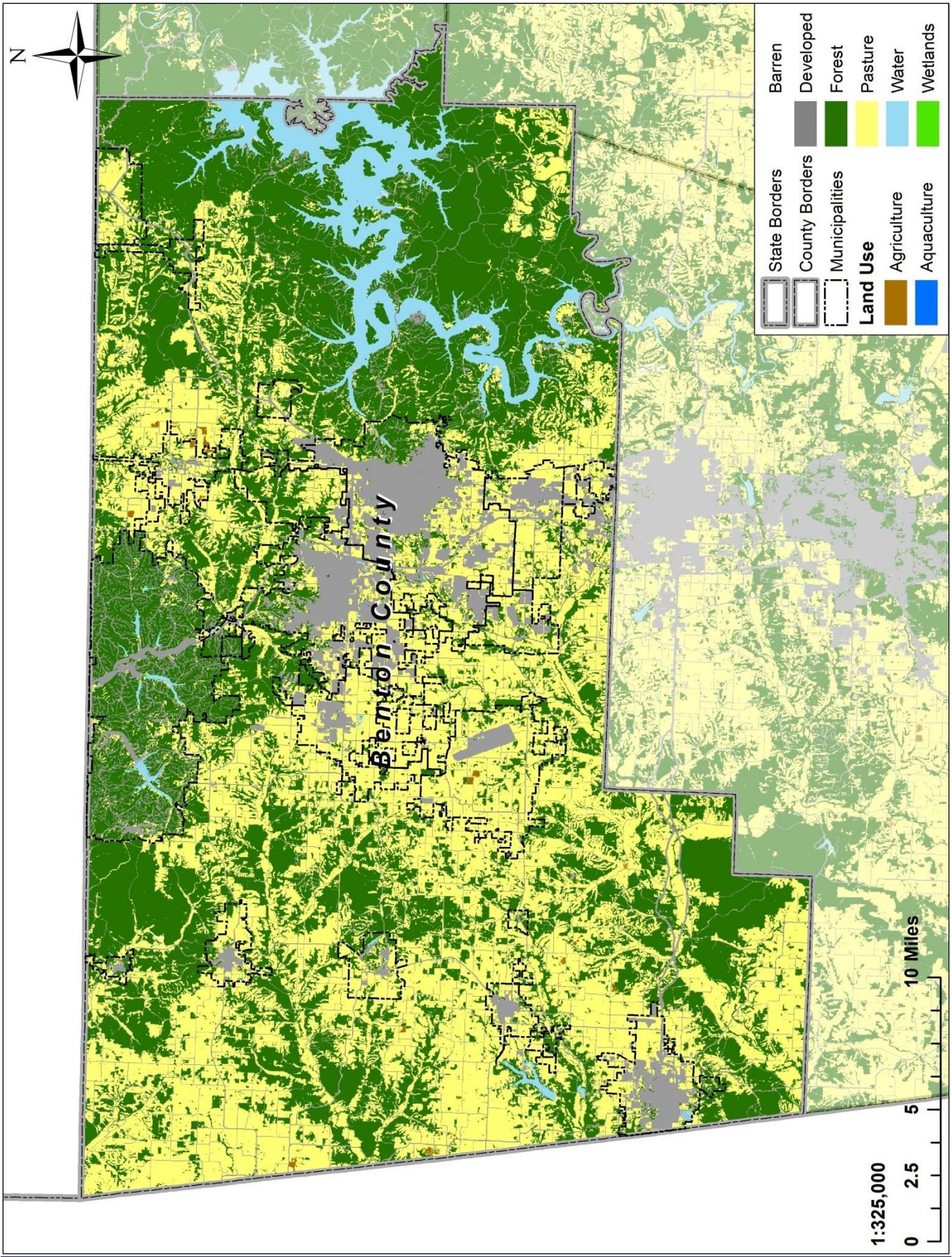
Table X – Palmer Drought Severity Index	
Extremely Wet	4.0 or more
Very Wet	3.0 to 3.99
Moderately Wet	2.0 to 2.99
Slightly Wet	1.0 to 1.99
Incipient Wet Spell	0.5 to 0.99
Near Normal	0.49 to -0.49
Incipient Dry Spell	-0.5 to -0.99
Mild Drought	-1.0 to -1.99
Moderate Drought	-2.0 to -2.99
Severe Drought	-3.0 to -3.99
Extreme Drought	-4.0 or less

The Standard Precipitation Index (SPI)

The SPI shows the actual precipitation compared to the probability of precipitation for various time frames. The SPI is an index based on precipitation only. It can be used on a variety of time scales, which allows it to be useful for both short-term agricultural and long-term hydrological applications. A drought event occurs any time the SPI is continuously negative and reaches an intensity of -1.0 or less. The event ends when the SPI becomes positive. Each drought event, therefore, has a duration defined by its beginning and end, and intensity for each month the event continues. The positive sum of the SPI for all the months within a drought event can be termed the drought's "magnitude".

Table X – Standard Precipitation Index	
Extremely Wet	2.0+
Very Wet	1.5 to 1.99
Moderately Wet	1.0 to 1.49
Near Normal	-.99 to .99
Moderately Dry	-1.0 to -1.49
Severely Dry	-1.5 to -1.99
Extremely Dry	-2 and less

Map X – Land Use, Benton County



4.3.3 – Previous Occurrences

Comprehensive data on droughts, drought impacts, and drought forecasting is extremely limited and often inaccurate. Due to the complexity of drought monitoring, the complexity of agricultural and livestock market pricing, and the large areas droughts impact, the USDA and USGS have difficulty quantifying and standardizing drought data. Each of these contributing drought factors has confounding variables within them.

The USGS partners with the USDA for drought monitoring by means of ground water and aquifer measurement. Since ground water and aquifer levels are highly variable from year to year, this indicator is useful for reporting whether there is a current shortage or surplus, but is unhelpful in forecasting future events. Additionally, ground water and aquifer levels are correlates only in a lagged model to climactic conditions further compounding their usefulness in predicting future droughts.

Drought's primary impact is on agriculture and livestock. However, there are many factors it can affect: most notably livestock count, crop prices, crop losses, livestock size, and livestock by products such as milk. Absent a drought, these factors highly vary from season to season. Prices vary with international market factors influenced by conditions across the globe. Crop yields vary with other climate conditions such as too much rain during planting season or insect abundance, and even marketing campaigns developed to sell more meat from one type of livestock. Drought is only one factor in an equation of many variables.

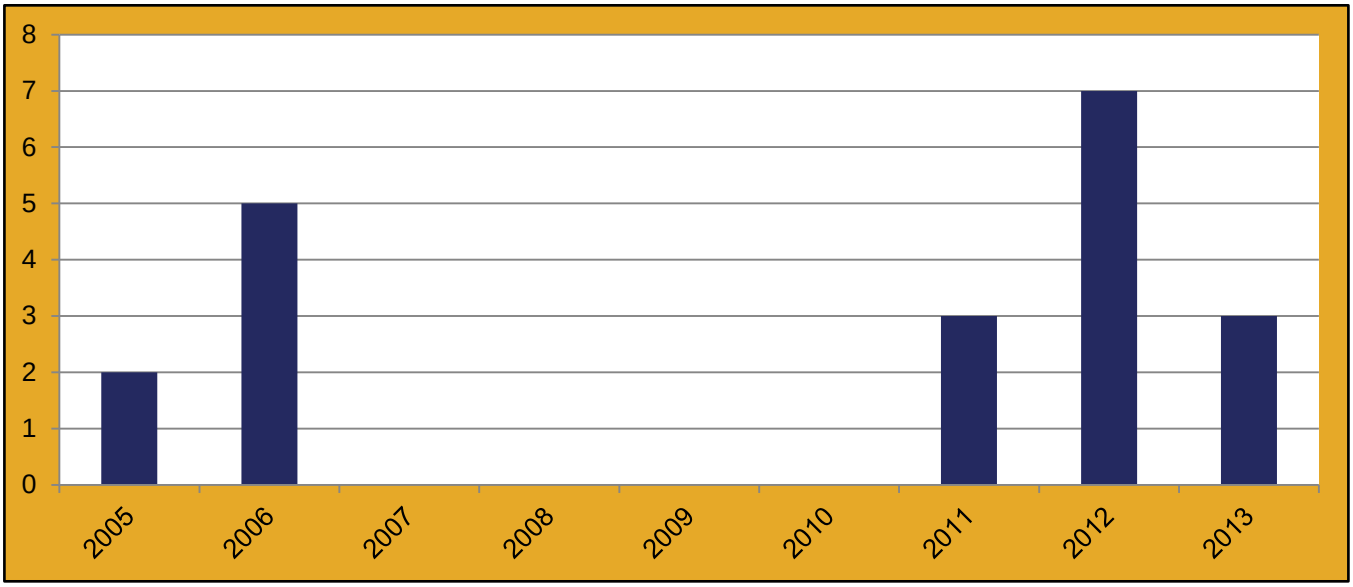
The USDA monitors these conditions and aggregates the data to create its drought monitor. However, due to the reasons discussed, it is limited in its ability to quantify how severe a drought was over specified period of time and a specific jurisdiction.

Benton County and its participating jurisdictions have no recorded deaths of injuries from droughts.

Since 2005, NOAA has recorded 20 drought events in Benton County and its participating jurisdictions. Benton County and its participating jurisdictions have not recorded any property or crop damage from drought events.

For a complete list of NOAA recorded drought events, please reference Appendix E.

Chart 2 – Droughts per Year, Benton County (2005 – 2013)



4.3.3A – Probability of Future Events

Benton County and its participating jurisdictions can expect a drought event with a 222.22.00% probability per year, or 2.2222 events per year.

Table X – Probability, Droughts	
Event Year	**Event Count**
2005	2
2006	5
2007	0
2008	0
2009	0
2010	0
2011	3
2012	7
2013	3
Total Recorded Events =	20
Total Years =	9
Yearly Probability =	**222.22%**

**The data are from the NOAA NCDC Storm Event Database.*

4.3.4 – Assessing Vulnerability & Impact

Drought Impacts
Benton County and its participating jurisdictions have recorded 20 drought events since 2005, of which the range and magnitude is unrecorded. Based on the future probability in Table XX, Benton County and its participating jurisdictions can expect 2.2222 drought events per year which can range anywhere below 0 and -4 on the Palmer Drought Severity Index.

Table X – Historical Impacts, Droughts	
Count of Events	20
Impacts Per Year	2.22
Average Magnitude	-
Magnitude Range	-
Average Cost	$0
Magnitude of Cost	$0 - $0
Total Recorded Cost	$0
Average Fatalities	0
Total Fatalities	0
Average Injuries	0
Total Injuries	0

The data are compiled from the NOAA NCDC Storm Event Database.

Vulnerability of Facilities
Drought does not pose any risk to Benton County or its participating jurisdictions' facilities.

Vulnerability of Population
Drought in itself poses no direct risk of injury or death to Benton County and its participating jurisdictions' population.

Vulnerability of Systems
Drought can have a significant effect on a jurisdiction's agriculture and tourism economies. If the precipitation level is below normal, farmers and ranchers will struggle to grow their crops and feed their livestock. If rivers, streams, and lakes dry up, tourist will be less likely to enjoy a jurisdiction's amenity resources. Map XX depicts land use throughout Benton County and its participating jurisdictions. According to the USDA's land use data, there are sizable wetlands and pastures throughout Benton County. Prolonged droughts can drain a wetland, permanently damaging local ecosystems. Local sources estimate that a prolonged drought over a season or more would likely kill off up to 25% of Benton County and its participating jurisdiction's livestock.

4.3.4A – Infrastructure & Critical Facilities
Drought does not pose any risk to Benton County or its participating jurisdictions' infrastructure and critical facilities. A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends

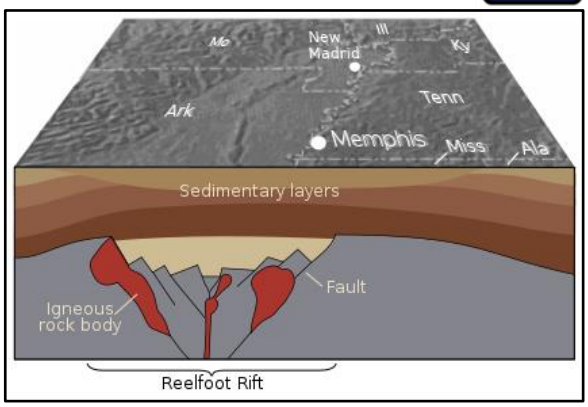
Benton County and it participating jurisdictions have varying growth as detailed in Section 3.1.1 – Land Use & Development Trends.

Increased residential growth increases a community's risk to drought by way of its systems' vulerability as defined in Section 4.3.4 of this hazard profile. None of the participating jurisdictions have seen significant growth and thus their risk to droughts has not increased since the development of their last plan.

4.3.4C – Unique & Varied Risk

The participating jurisdictions of Benton County, Highfill, and Pea Ridge have significant agricultural areas at risk to droughts. These areas are marked in Map X.

4.3EQ – Earthquakes

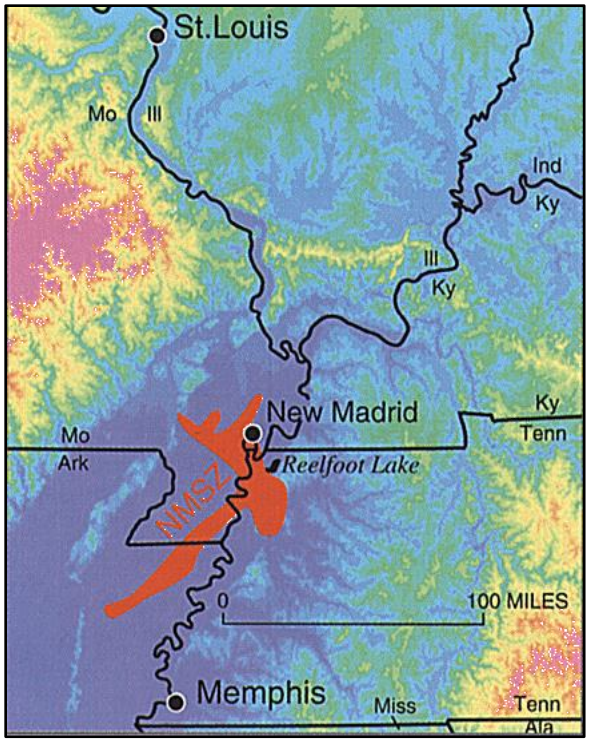


4.3.1 – Description

An earthquake is the result of a sudden release of energy in the Earth's crust that creates seismic waves. In the most general sense, the word earthquake is used to describe any event that generates seismic waves. Earthquakes are typically caused by the rupturing of geological faults. Occasionally, they are also caused by other events such as volcanic activity, landslides, mine blasts, and nuclear tests. An earthquake's point of initial rupture is called its focus or hypocenter. The epicenter is the point at ground level directly above the hypocenter.

At the Earth's surface, earthquakes manifest themselves by shaking and sometimes displacement of the ground. When the epicenter of a large earthquake is located offshore, the seabed may be displaced sufficiently to cause a tsunami. Earthquakes can also trigger landslides, and occasionally volcanic activity. The shallower an earthquake, the more damage to structures it causes, all else being equal.

4.3.2 – Location & Extent



Portions of Arkansas are at risk from the New Madrid Seismic Zone. The location of the NMSZ is shown in the photo the right. In addition to the NMSZ, other parts of central Arkansas experience low level and low intensity earthquakes (between 1.0 and 5.0).

Earthquakes strike suddenly and without warning, occur at any time of the year, and at any time of the day. A damaging earthquake occurs without definitive signals and massive earthquakes are accompanied by aftershocks. The duration of shaking can last anywhere from a second to a period of minutes.

There are numerous characteristics measured when observing earthquake activity, however, its force, depth, peak ground acceleration, and the distance to the epicenter are the most influential in determining damage.

2 scales are used when referring to earthquake activity; estimating the total force of the earthquake, the Richter Scale, and the observed damage from an earthquake, the Modified Mercalli Intensity Scale. Please see the figures on the following pages for both scales and their estimated matching equivalent index.

Earthquakes of magnitude 5.5 or greater are considered potentially threatening to Benton County and its jurisdictions, as this is the point at which structures can become damaged. Any earthquake felt at this magnitude or greater would cause for cessation of operations until sight inspections can take place.

Table X – Modified Mercalli Scale Vs. Richter Scale

Category	Effects	Richter Scale (approximate)
I. Instrumental	Not felt	1-2
II. Just perceptible	Felt by only a few people, especially on upper floors of tall buildings	3
III. Slight	Felt by people lying down, seated on a hard surface, or in the upper stories of tall buildings	3.5
IV. Perceptible	Felt indoors by many, by few outside; dishes and windows rattle	4
V. Rather strong	Generally felt by everyone; sleeping people may be awakened	4.5
VI. Strong	Trees sway, chandeliers swing, bells ring, some damage from falling objects	5
VII. Very strong	General alarm; walls and plaster crack	5.5
VIII. Destructive	Felt in moving vehicles; chimneys collapse; poorly constructed buildings seriously damaged	6
IX. Ruinous	Some houses collapse; pipes break	6.5
X. Disastrous	Obvious ground cracks; railroad tracks bent; some landslides on steep hillsides	7
XI. Very disastrous	Few buildings survive; bridges damaged or destroyed; all services interrupted (electrical, water, sewage, railroad); severe landslides	7.5
XII. Catastrophic	Total destruction; objects thrown into the air; river courses and topography altered	8

Table X – % Peak Ground Acceleration Vs. Mercalli & Richter Scales

Mercalli Scale Intensity	Richter Scale (Approximate)	Minimum %g	Maximum %g
I	1 - 2	0.00%	0.17%
II - III	3 - 3.5	0.17%	1.40%
IV	4	1.40%	3.90%
V	4.5	3.90%	9.20%
VI	5	9.20%	18.00%
VII	5.5	18.00%	34.00%
VIII	6	34.00%	65.00%
IX	6.5	65.00%	124.00%
X +	7 +	124.00%	-

**The data are from the USGS.*

4.3.3 – Previous Occurrences

The New Madrid Seismic Zone

The NMSZ differs from traditional fault lines in many ways. There has not been any notable and intense seismic activity from the NMSZ in 200 years. The lack of an extensive historical record and other unique characteristics make it difficult to predict the frequency of events. Please see map 38 on page 85 for historical NMSZ earthquakes.

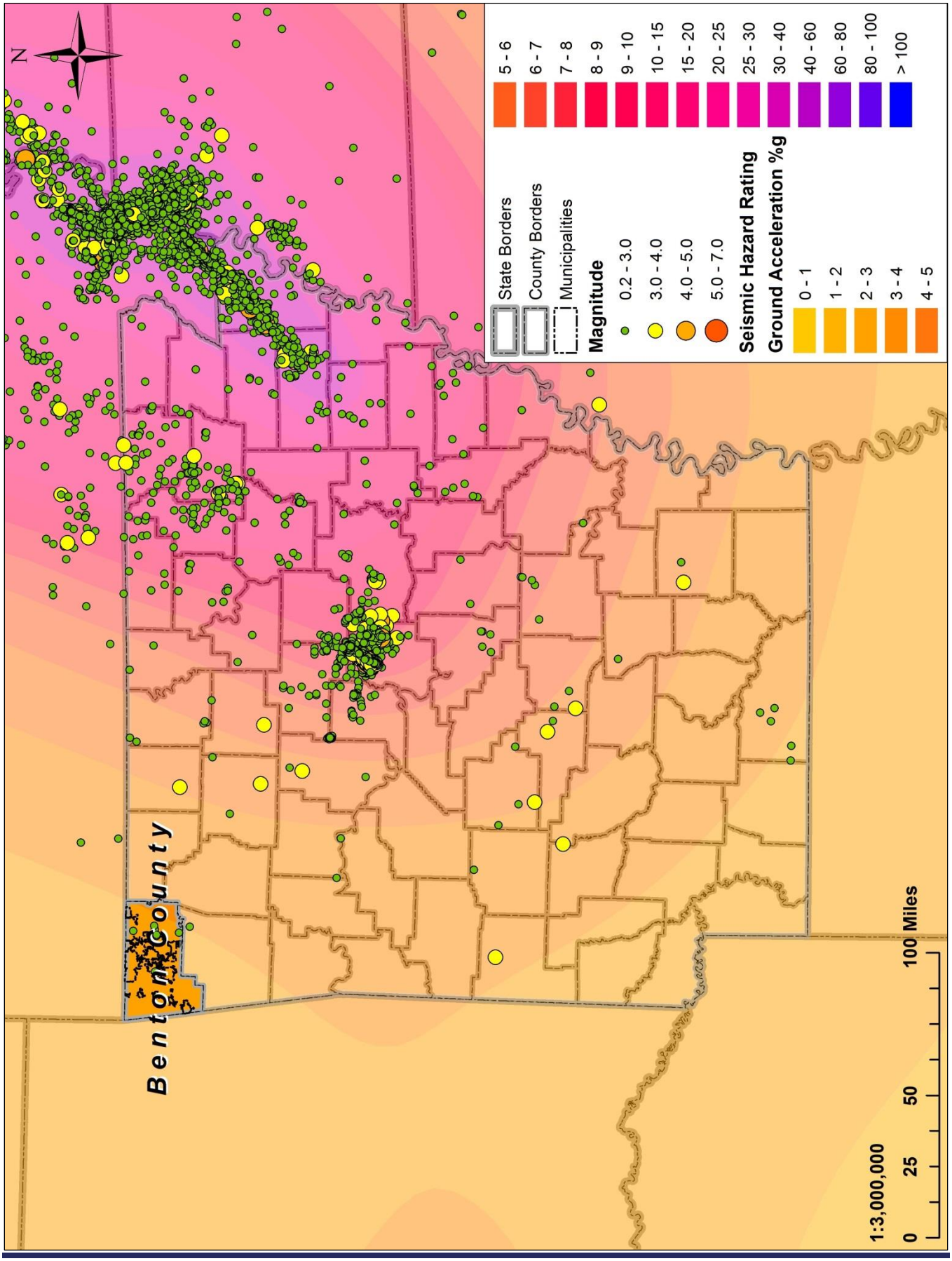
The largest earthquakes felt in the United States were along the New Madrid Fault. A three month long series of quakes from 1811 to 1812 included four major earthquakes. These earthquakes were felt over the entire Eastern United States, with Missouri, Tennessee, Kentucky, Indiana, Illinois, Ohio, Alabama, Arkansas, and Mississippi experiencing the strongest ground shaking.

- **December 16, 1811**, 0815 UTC (2:15 a.m.); (M ~7.2 – 8.1) Epicenter in northeast Arkansas. It caused only slight damage to man-made structures, mainly because of the sparse population in the epicentral area. The future location of Memphis, Tennessee experienced level IX shaking on the Mercalli Intensity Scale. A seismic seiche propagated upriver, and Little Prairie (a village that was on the site of the former Fort San Fernando, near the site of present-day Caruthersville, Missouri) was heavily damaged by soil liquefaction.
- **December 16, 1811**, 1415 UTC (8:15 a.m.); (M ~7.2–8.1) Epicenter in northeast Arkansas. This shock followed the first earthquake by six hours and was similar in intensity.
- **January 23, 1812**, 1500 UTC (9 a.m.); (M ~7.0–7.8) Epicenter in the Missouri Bootheel. The meizoseismal area was characterized by general ground warping, ejections, fissuring, severe landslides, and caving of stream banks.
- **February 7, 1812**, 0945 UTC (4:45 a.m.); (M ~7.4–8.0) Epicenter near New Madrid, Missouri. New Madrid was destroyed. At St. Louis, Missouri, many houses were severely damaged, and their chimneys were toppled. Uplift along a segment of this reverse fault created temporary waterfalls on the Mississippi at Kentucky Bend, created waves that propagated upstream, and caused the formation of Reelfoot Lake by obstructing streams in what is now Lake County, Tennessee.

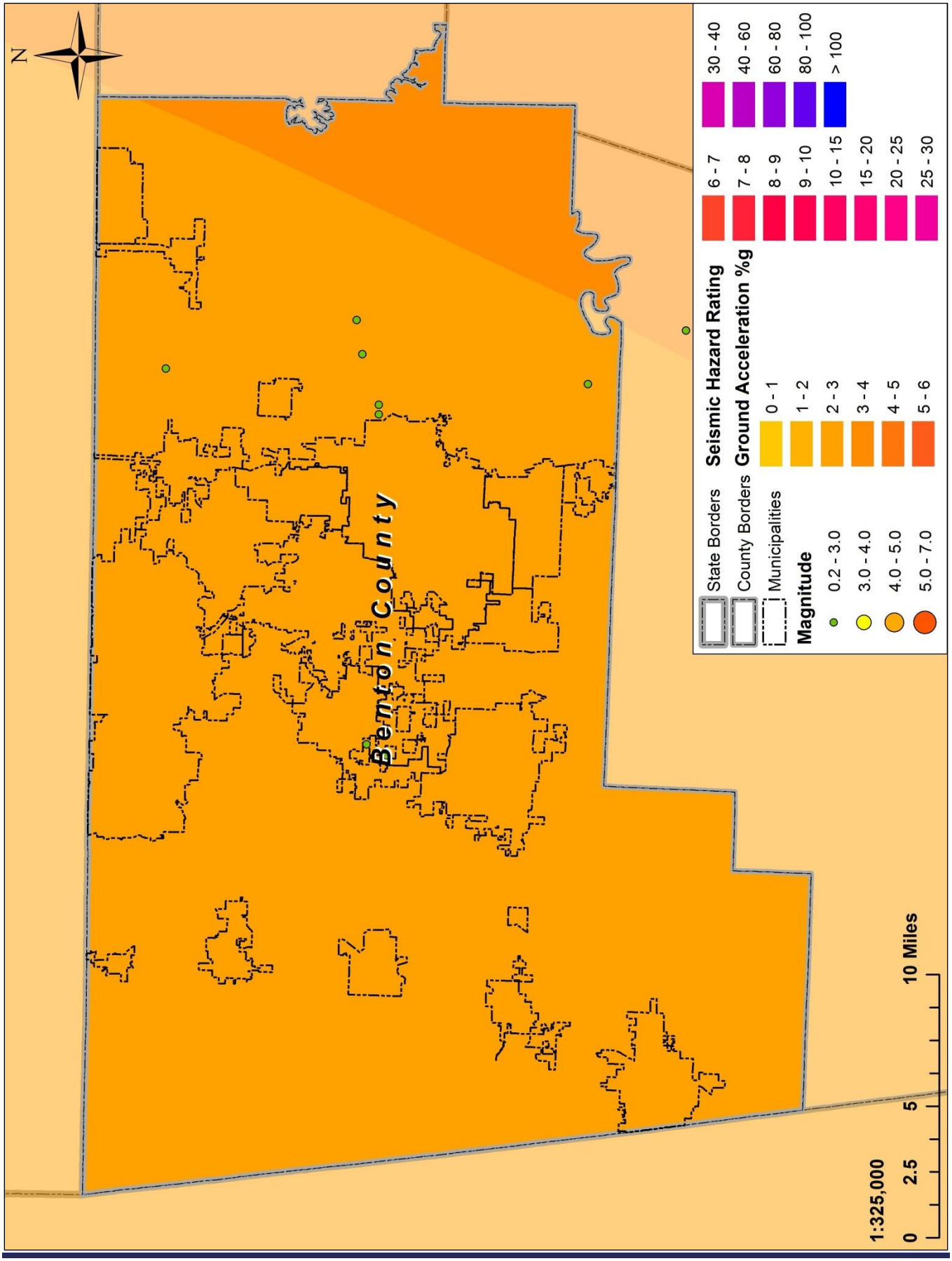
A recent USGS study on the NMSZ, “Earthquake Hazard in the New Madrid Seismic Zone Remains a Concern” states:

> *“There are historical accounts of major earthquakes in the New Madrid region during 1811–12. The geologic record of pre-1811 earthquakes also reveals that the New Madrid seismic zone has repeatedly produced sequences of major earthquakes, including several of magnitude 7 to 8, over the past 4,500 years. These prehistoric earthquakes caused severe and widespread ground failures in the New Madrid region, much like those caused by the 1811–12 earthquake sequence.”*

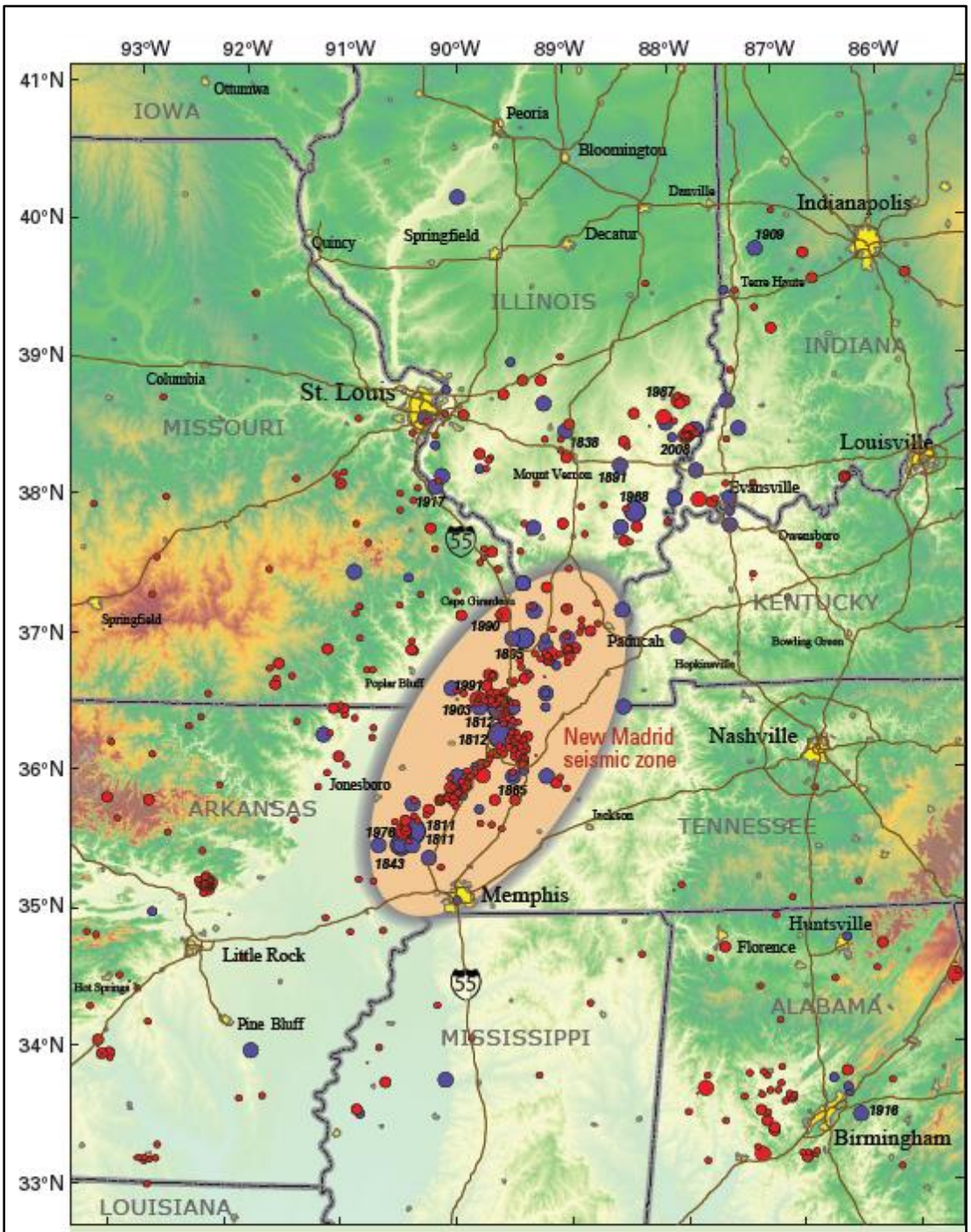
Map X – Earthquakes, Arkansas



Map X – Seismic Hazard Rating, Benton County



Map X – Earthquakes, NMSZ



Topographic map showing earthquakes greater than magnitude 2.5 (circles) of the central United States. Red circles are earthquakes that occurred after 1972 (U.S. Geological Survey Preliminary Determination of Epicenters (PDE) catalog). Blue circles are earthquakes that occurred before 1973 (USGS PDE and historical catalog). Larger earthquakes are represented by larger circles. Yellow patches show urban areas with populations greater than 10,000.

4.3.3A – Probability of Future Events

The New Madrid Seismic Zone

Included in the USGS 2006 study on the NMSZ was a scientific prediction on the future probability of an earthquake event.

In summary, the study predicts the NMSZ will produce the following:

- A Magnitude 6 earthquake at a probability of 25% - 50% in the next 50 years.
- An earthquake sequence similar to the 1811-12 earthquakes at a probability of 7% - 10% in the next 50 years.

A recent USGS study on the NMSZ, "Earthquake Hazard in the New Madrid Seismic Zone Remains a Concern" states:

> "It was the consensus of this broad group of scientists that (1) the evidence indicates that we can expect large earthquakes similar to the 1811–12 earthquakes to occur in the future with an average recurrence time of 500 years and that (2) magnitude 6 earthquakes, which can also cause serious damage, can be expected more frequently than the large 1811–12 shocks.

Based on this history of past earthquakes, the USGS estimates the chance of having an earthquake similar to one of the 1811–12 sequence in the next 50 years is about 7 to 10 percent, and the chance of having a magnitude 6 or larger earthquake in 50 years is 25 to 40 percent."

4.3.4 – Assessing Vulnerability & Impacts

Earthquake Impacts

The Mid America Earthquake Center ran a comprehensive region wide NMSZ simulation in 2008. They estimate Benton County will sustain 0 to 1,000 casualties and between 0 and 1,000 buildings will be damaged. The results of the estimates are shown in Map XX on page XX. The range of expected impacts from a NMSZ event on Benton County and its jurisdictions is estimated as a 4 on the Richter Scale and a category IV on the Mercalli Scale. The potential impacts of a NMSZ earthquake on each jurisdiction are detailed in 4.3.4C. According the study, Benton County is located far outside the estimated area of a NMSZ impact. However, it is possible that a NMSZ event could occur at a greater than predicted magnitude and impact Benton County.

Vulnerability of Facilities

Benton County and its jurisdictions' structural vulnerability to earthquakes vary based on the construction quality, construction material, soil and foundation, and earthquake resilience of each structure. Buildings in Arkansas must abide by the Arkansas Fire Prevention Code 2007 which set a minimum standard for structural earthquake resilience. However, a high magnitude earthquake will still damage or destroy structures.

Historically, there are no recorded incidents of property damage from earthquakes to any of Benton County or its jurisdictions' structures.

Data Deficiency

Structural resistance to earthquakes is a significant factor in determining earthquake vulnerability. It is likely there are structural differences in Benton County and its jurisdictions' buildings which change the vulnerability ratings. Benton County and its jurisdictions' structures specific information on earthquake structural resistance is unavailable.

Dam Failure Vulnerability

Mentioned in Section 4.3DF – Dam Failure, structural information on Benton County and its jurisdiction's dams is unavailable. Therefore in the event of an earthquake, it is possible a secondary hazard of dam failure may occur and threaten the planning area.

Please reference Table XX on page XX to compare Mercalli Classes to likely impacts and damages.

Vulnerability of Population

Benton County and its jurisdictions' population vulnerability to earthquakes is largely dependent on its vulnerability to facilities. An earthquake will shake object off a wall or shake off parts of a structure which has the potential to hurt the population. Additionally, there is the risk of a facility partially or fully collapsing which would injure or kill a high number of the people inside. The population total of Benton County and its jurisdictions is 237,297. Of the 237,297, none are considered in any comparable or measurable risk due to the county being far outside the estimated impact area.

Historically, there are no recorded incidents of death or injury from earthquakes in Benton County or any of its participating jurisdictions.

Vulnerability of Systems

If an earthquake damages any part of Benton County or its jurisdictions, it is highly likely the entire planning area will be similarly damaged due to the geographic scale of earthquakes. A high magnitude event would likely cripple the planning area, destroying buildings and infrastructure, starting fires,

widespread loss of power and basic services, and hampering local emergency management and response services from providing the necessary assistance.

If a high magnitude earthquake originates from the NMSZ it is likely the entire region will be dramatically affected and emergency services from local, regional, state, and the federal government will be spread thin among the region. A high magnitude earthquake will not only yield these direct and immediate effects, but will likely hurt Benton County and its jurisdictions' economy and scar its population for years.

4.3.4A – Infrastructure & Critical Facilities

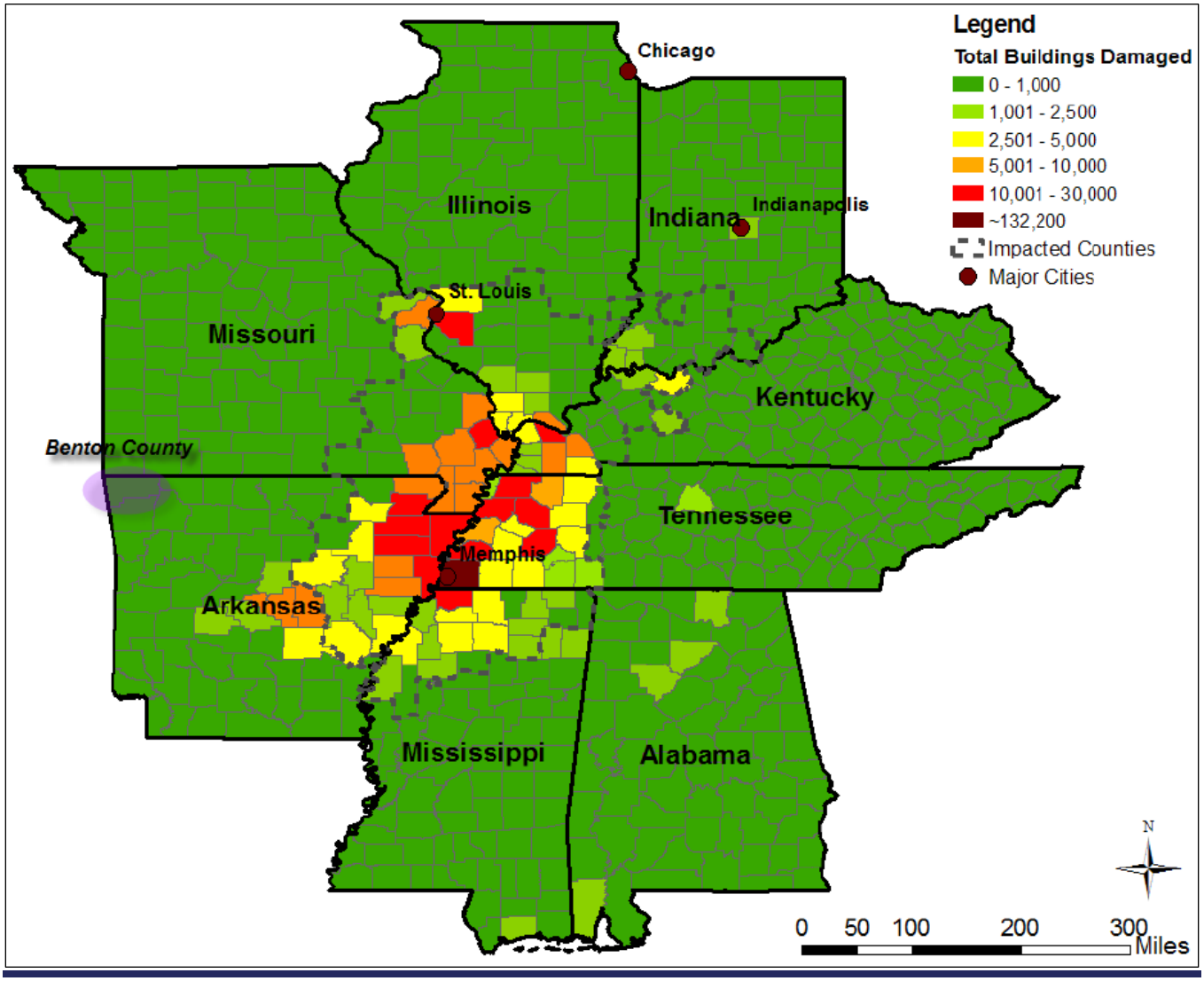
Benton County and its participating jurisdictions' critical facilities face the same risk to earthquakes as does their parent jurisdiction. All infrastructure and critical facilities in Benton County and its participating jurisdictions are located in the 3% to 4% ground acceleration zone. For more detail on this risk please see 'Vulnerability of Facilities.' A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends

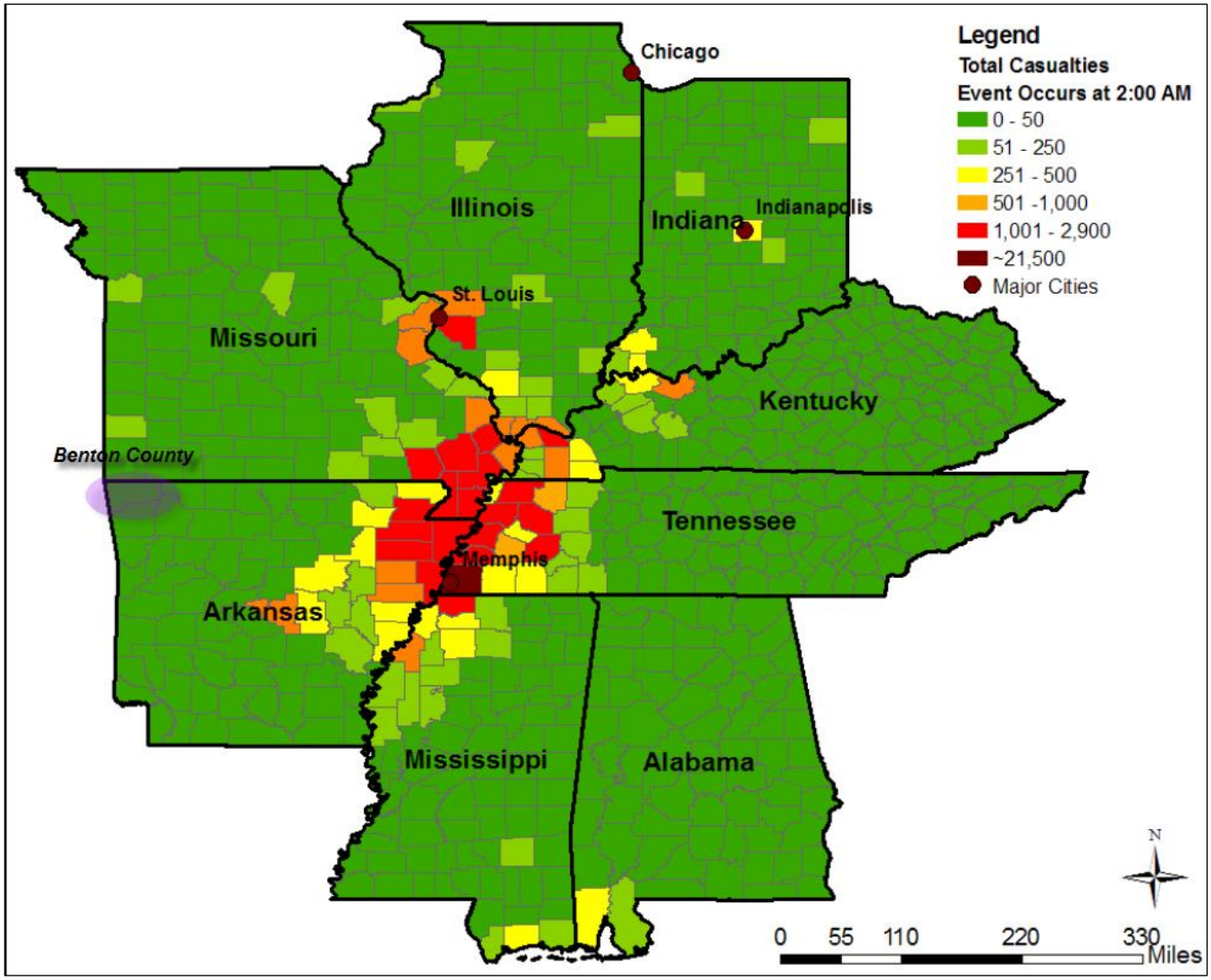
4.3.4C – Unique & Varied Risk

Based on the models and seismic maps in this section, Benton County and its participating jurisdictions all exist within the 3% to 4% ground acceleration zone with the exception of a largely empty portion of eastern Benton County.

Map X – NMSZ Simulation, Total Buildings Damaged



Map X – NMSZ Simulation, Total Casualties



4.3EH – Excessive Heat

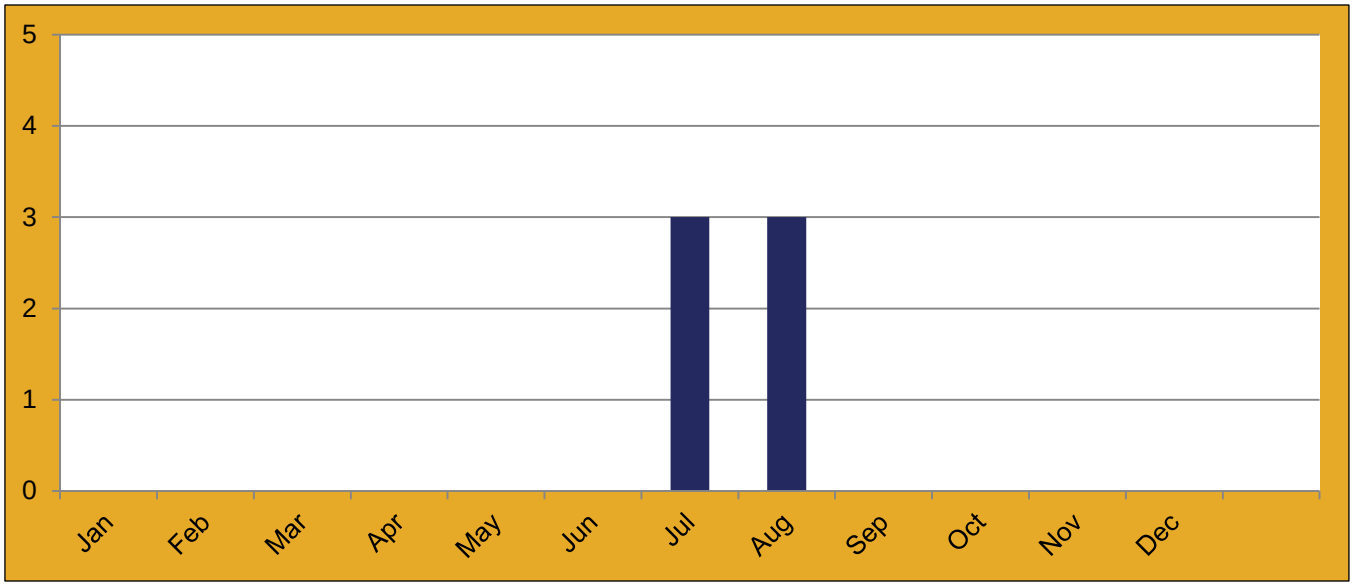
4.3.1 – Description

Heat is the number one weather-related killer in the United States, resulting in hundreds of fatalities each year. In fact, on average, extreme heat claims more lives each year than floods, lightning, tornadoes and hurricanes combined.

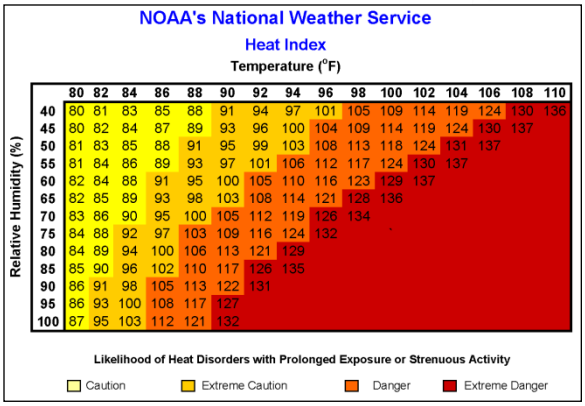
Excessive heat events occur when the heat index is in excess of 105 during the day with a nighttime low index of 80 or higher forecast to occur for 2 consecutive days.

North American summers are hot; the majority of the United States sees heat waves on a regular basis. East of the Rockies, they tend to combine both high temperature and high humidity; although some of the worst heat waves have been catastrophically dry.

Chart 3 – Excessive Heat Events per Month, Benton County (1998 – 2013)



4.3.2 – Location & Extent



Excessive heat occurs often throughout Benton County and its participating jurisdictions. The events, when they do occur, occur on a massive geographic scale, often affecting multiple counties, regions, and states designating the entire planning area and its jurisdictions as at risk to excessive heat.

Waves of excessive heat can be predicted days in advance and occur seasonally during or around the summer. NOAA and local weather services may employ an extreme heat watch, warning, and or advisories to assist in alerting a community. The alerts and the events can last for a few days or for a period of weeks.

Excessive heat is measured using the heat index. The heat index measures how it feels in regards to the actual temperature and the relative humidity.

NOAA does not have specific excessive heat monitoring stations in the planning area. Daily activities throughout Benton County and its participating jurisdictions will remain unchanged under the “caution” level. Under “extreme caution” schools will begin monitoring its students, EMS will heighten its preparedness to heat related injuries, community festivals and organized gatherings will distribute water and monitor attendees, and health care facilities will monitor their vulnerable populations. If the index level reaches “danger” or “extreme danger” schools will cancel outdoor activities, community festivals and organized gatherings will be cancelled, health care facilities will restrict outdoor activities for vulnerable populations, and the Benton County OEM will work to minimize prolonged exposure of the population in any ways possible.

Based on climate data from the NWS, Benton County and its participating jurisdictions can expect extreme heat events up to 110 degrees Fahrenheit. This temperature, depending on the humidity, puts Benton County and its participating jurisdictions in the “Danger” category of NOAA’s heat index.

4.3.3 – Previous Occurrences

Since 1998, NOAA has recorded 6 excessive heat events in Benton County, Arkansas. Benton County does not have a record of any fatalities or injuries from these events. The best available data from NOAA does not include heat indices. For a complete list of NOAA recorded excessive heat events, please reference Appendix E.

The table below details the climate norms for Benton County and its participating jurisdictions as they relate to excessive heat. The record high for the hottest months; June, July, August, and September are 101, 110, 110, and 117 degrees Fahrenheit respectively. The average high for the hottest months are 84, 89, 89, and 81 degrees Fahrenheit.

Table X – Temperature, Benton County

Temperature is in Fahrenheit	Month											
	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
Record High	77	83	89	93	93	101	110	110	103	96	83	78
Average High	46	51	60	69	76	84	89	89	81	70	59	48

**The data are from the NWS.*

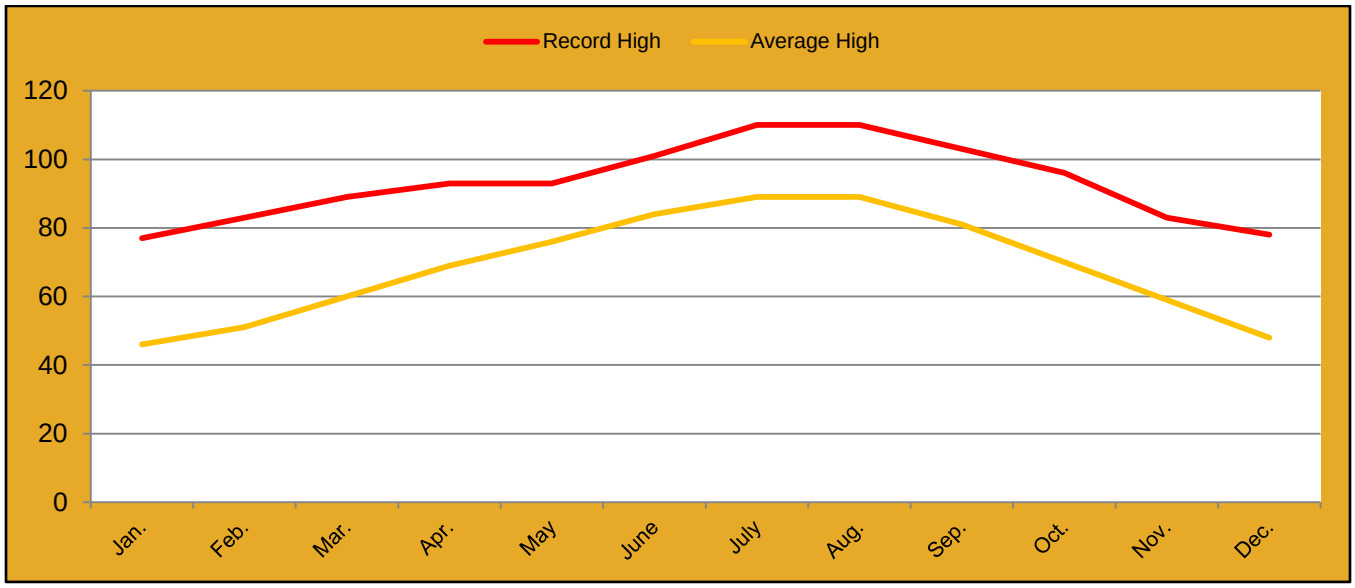
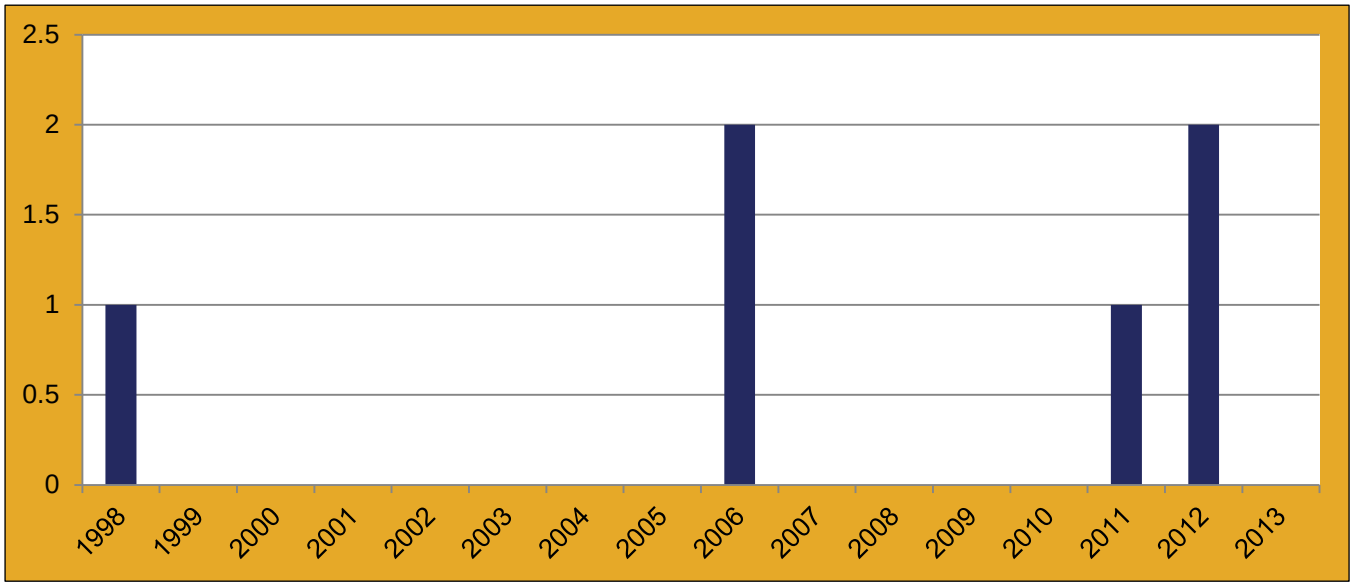


Chart 4 – Excessive Heat Events per Year, Benton County (1998 – 2013)



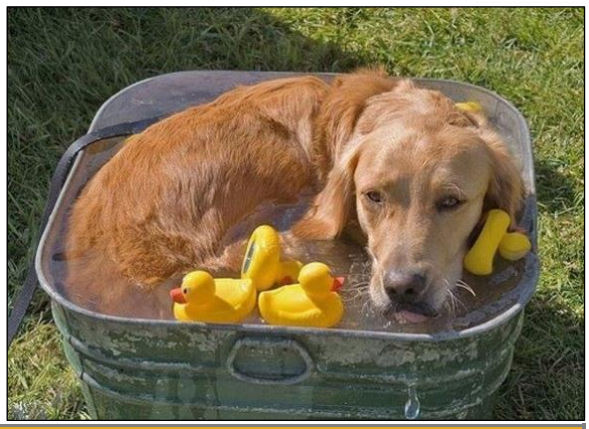
4.3.3A – Probability of Future Events

Benton County and its participating jurisdictions can expect an excessive heat event with a 37.50% probability per year, or 0.3750 events per year.

Table X – Probability, Excessive Heat	
Event Year	**Event Count**
1998	1
1999	0
2000	0
2001	0
2002	0
2003	0
2004	0
2005	0
2006	2
2007	0
2008	0
2009	0
2010	0
2011	1
2012	2
2013	0
Total Recorded Events =	6
Total Years =	16
Yearly Probability =	**37.50%**

**The data are from the NOAA NCDC Storm Event Database.*

4.3.4 – Assessing Vulnerability & Impacts



Excessive Heat Impacts

Benton County has recorded 6 excessive heat events since 1998, of which there is no recorded range of impact. Based on the heat index on page XX and the future probability in Table XX, Benton County and its participating jurisdictions can expect 0.3750 excessive heat events per year ranging anywhere above the minimum criteria of a 105 degree heat index.

Table X – Historical Impacts, Excessive Heat

Count of Events	6
Impacts Per Year	0.38
Average Magnitude	-
Magnitude Range	-
Average Cost	$0
Magnitude of Cost	$0 - $0
Total Recorded Cost	$0
Average Fatalities	0.67
Total Fatalities	4
Average Injuries	0
Total Injuries	0

**The data are compiled from the NOAA NCDC Storm Event Database.*

Vulnerability of Facilities

Excessive heat does not pose a risk to Benton County or its participating jurisdictions' facilities.

Vulnerability of Population

Excessive heat can be a grave threat to the citizens of any exposed community. At certain levels, the human body cannot maintain proper internal temperatures. Exposure to heat and dehydration can injure and even kill people through heat stroke, dehydration, and by also compounding existing medical conditions.

The citizens of Benton County and its participating jurisdictions must take great care to remain cool and well hydrated. Any causal or typical behavior may become dangerous if exposure to extreme heat is prolonged. For the citizens of Benton County and its participating jurisdictions this ranges from outdoor activities, daily activities, and even indoor activities within an improperly cooled structure.

Benton County and its participating jurisdictions have 4 recorded fatalities from excessive heat.

Vulnerability of Systems

Excessive heat may cause a community to overuse their air conditioners and cooling units causing an excessive power draw on its energy infrastructure. If the drain is great enough it could bring down portions of the power grid and cause a power loss throughout Benton County or its participating jurisdictions. Without power the citizens of Benton County or its participating jurisdictions would have difficulty keeping cool and thus put them at risk of bodily harm. Local representatives in Benton County reported that during previous excessive heat events, the electrical grid did not fail. It stands then, that if the grid is vulnerable to failure, it would potentially occur at heat indices far exceeding the recorded historical events.

4.3.4A – Infrastructure & Critical Facilities

Extreme heat does not pose a risk to Benton County or its participating jurisdictions' facilities. A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends

Benton County and its participating jurisdictions have varying growth as detailed in Section 3.1.1 – Land Use & Development Trends.

Increased residential growth increases a community's risk to extreme heat by way of its population, and systems' vulerabilities as defined in Section 4.3.4 of this hazard profile. None of the participating jurisdictions have seen significant growth and thus their risk to excessive heat has not increased.

4.3.4C – Unique & Varied Risk

Excessive heat has ability to affect a portion of or the entire planning area. Unfortunately, there is no accurate method of predicting the location or extent of an extreme heat event's impact, that being if it will affect one participating jurisdiction up to any number or all participating jurisdictions. Due to these characteristics, there are no calculable unique risks between the participating jurisdictions.

Additionally, it is not possible to predict any varying probability between the participating jurisdictions with the exception of varying risk as it is proportionate to a participating jurisdiction's demographics. Logically, participating jurisdictions with a greater population are at a higher risk as participating jurisdictions with a lower population are at a lower risk.

Although this plan addresses vulnerability to excessive heat, without the possibility of being able to calculate all components of risk at a jurisdictional level, each jurisdiction's individual risk to extreme heat is not possible to calculate.

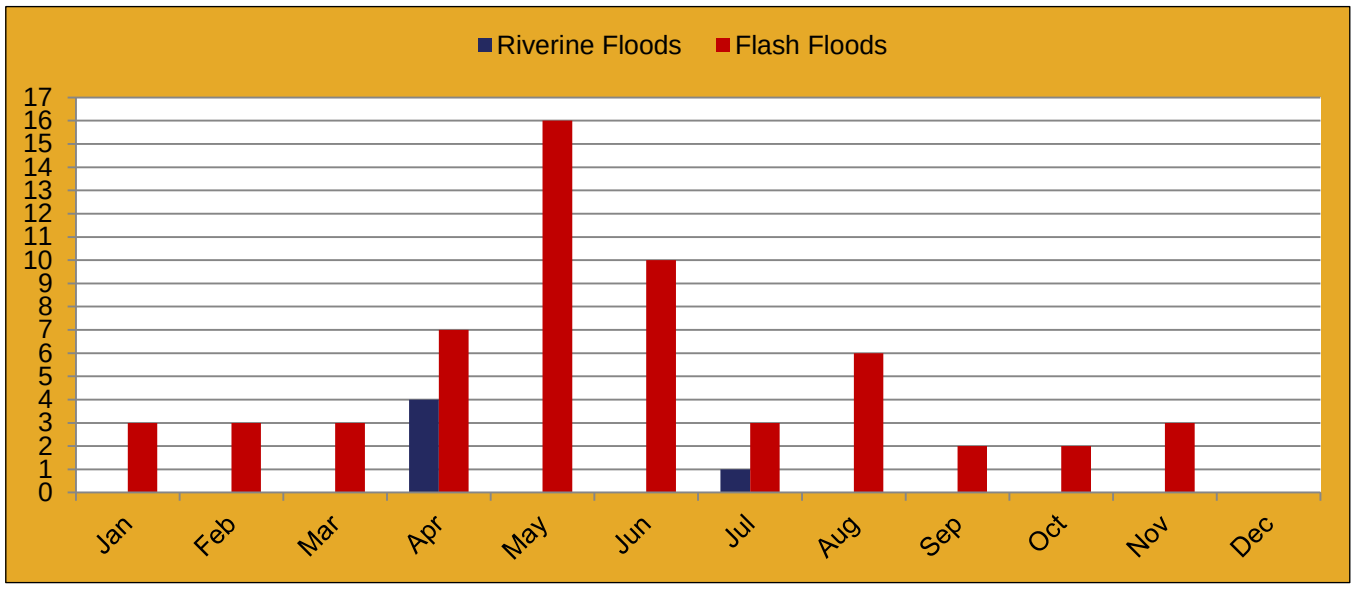
4.3F – Floods

4.3.1 – Description

Flooding is the most prevalent and costly disaster in the United States. Flooding occurs when water, due to dam failures, rain, or melting snows, exceeds the absorptive capacity of the soil and the flow capacity of rivers, streams or coastal areas. At this point, the water concentration hyper extends the capacity of the flood way and the water enters the floodplain. Floods are most common in seasons of rain and thunderstorms. Floods can be associated with other natural phenomenon such as rainstorms, thunderstorms, hurricanes, coastal swells, earthquakes, tsunamis and rapidly melting snow.

Intense rainfall, accompanying the large thunderstorms in Benton County and its participating jurisdictions, may result in water flowing rapidly from higher elevations into valleys, collecting in, and sometimes overtopping the low lying streams. Various types of floods can happen quickly in the form of a flash flood, or accumulate seasonally over a period of weeks as is the case in a riverine flood. Flooding can occur anytime throughout the year, but is typically associated with the spring season. The chart below illustrates season differences between riverine and flash flood impacts per month.

Chart 5 – Floods per Month, Benton County (1993 – 2013)



4.3.2 – Location & Extent

A variety of factors affect the type and severity of flooding within Benton County and its participating jurisdictions including topography, urban development and infrastructure, and geology. Serious flooding in the mountainous or elevated areas is unusual because streams tend to be faster flowing and flood waters drain quickly.

Intense flooding will create havoc in any jurisdictions affected. The predicative magnitude of these floods varies. Based on the variation of impacts; floods can cause minimal damage in the form of just inches of water seeping into foundations to structures being completely submerged. Intense and widespread flooding can trap people and entire communities without basic goods or services. Any amount of damage can render a structure unusable for years given the extensive amount of clean-up and reclamation necessary. The table below depicts the estimated range of riverine flood depths throughout the participating jurisdictions.

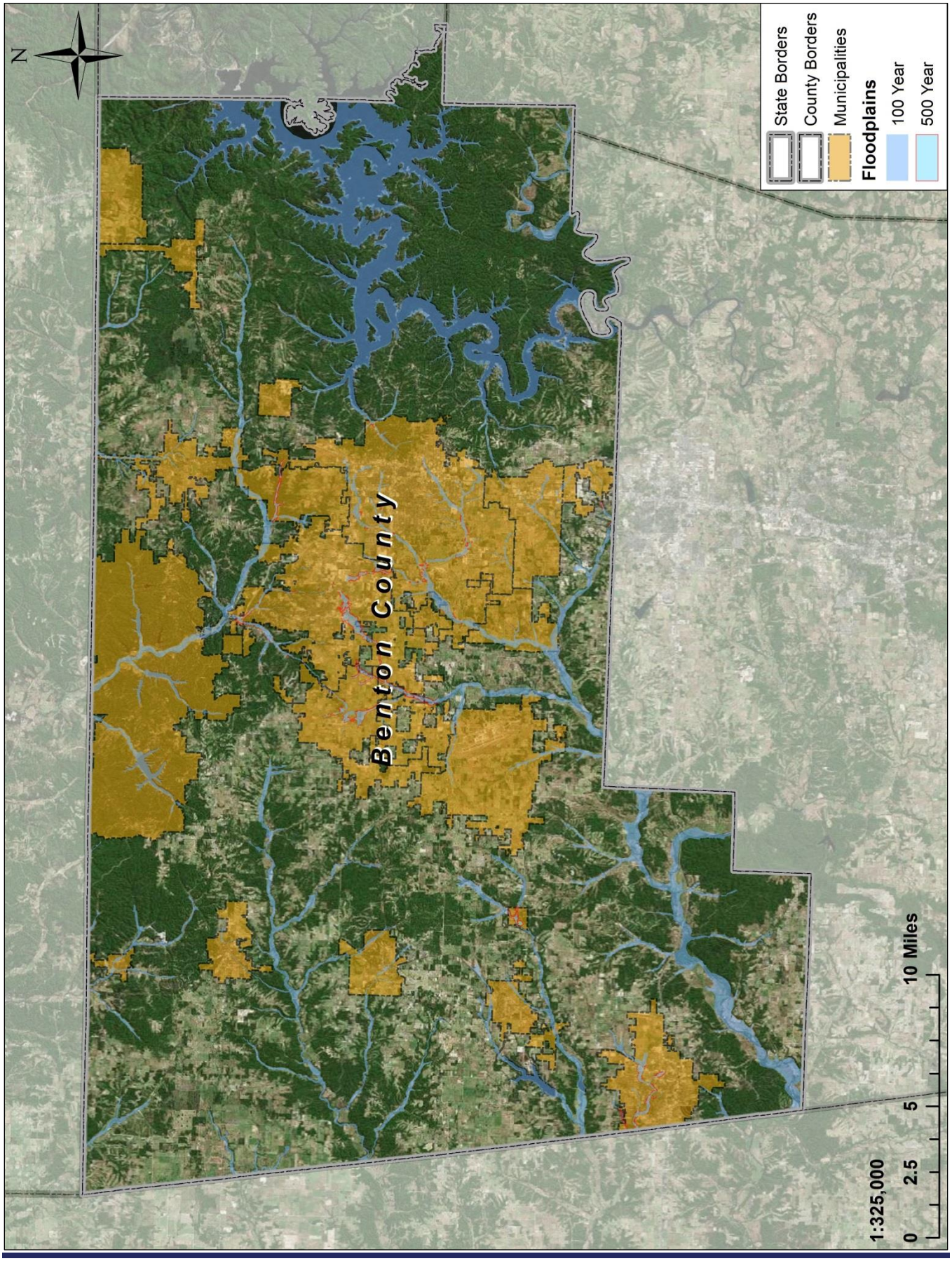
The map on the following page shows FEMA's NFHL data to depict the location of 100 and 500 year floodplains throughout Benton County. Please see the accompanying Map Compendium for high detail, jurisdiction scale maps depicting these floodplains.

Table X – Flood Zone Classifications

Zone Class	Description
A	An area inundated by 1% annual chance flooding, for which no BFEs have been determined. (100 Year Floodplain)
AE	An area inundated by 1% annual chance flooding, for which BFEs have been determined. (100 Year Floodplain)
B	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood. An area inundated by 0.2% annual chance flooding.

**For the following FEMA NFHL maps the A and AE zones have been combined as they are both considered 100 year floodplains.*

Map X – Floodplains, Benton County



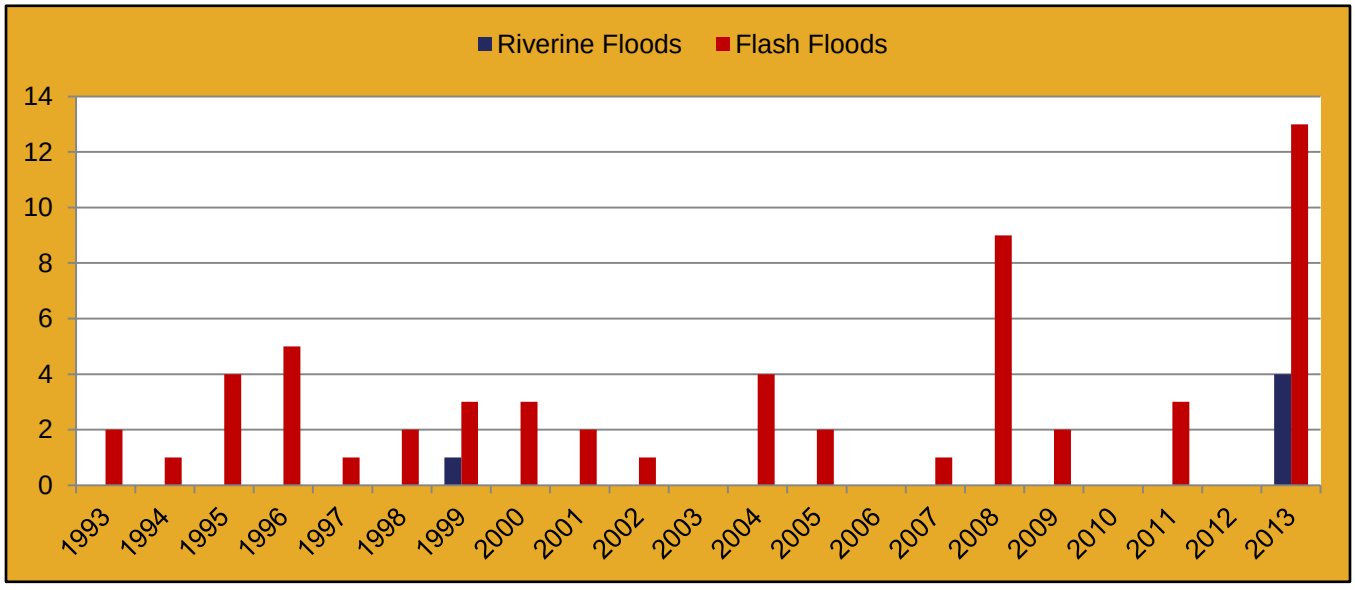
4.3.3 – Previous Occurrences

Since 1993, NOAA has recorded 5 riverine flood impacts in Benton County and its participating jurisdictions. Therefore, Benton County and its participating jurisdictions have not experienced any damage to property of harm to life from riverine flooding.

Since 1993, NOAA has recorded 58 flash flood impacts in Benton County and its participating jurisdictions. Benton County and its participating jurisdictions have recorded 6 fatalities and 0 injuries relating to flash flooding. These events have cost Benton County and its participating jurisdictions $7,755,000 in property damage.

Please see the chart below for flash and riverine flooding events per year.

Chart 6 – Floods per Year, Benton County (1993 – 2013)



4.3.3A – Probability of Future Events

The definition of each flood zone's classification is used for the purpose of calculating the yearly probability of a riverine flood.

Jurisdictions with property in a 100 year floodplain can expect a 1% annual chance of flooding within the designated areas. Jurisdictions with property in a 500 year floodplain can expect a 0.2% annual chance of flooding within the designated areas.

Table X – Probability, Riverine Floods		
Jurisdiction	**Floodplain Exposure**	
	100 Year (1% Annual)	**500 Year (0.2% Annual)**
Benton County	**X**	**X**
Avoca	**X**	**-**
Bella Vista	**X**	**-**
Bentonville	**X**	**X**
Bethel Heights	**X**	**-**
Cave Springs	**X**	**-**
Centerton	**X**	**X**
Decatur	**X**	**-**
Garfield	**-**	**-**
Gateway	**-**	**-**
Gentry	**X**	**-**
Gravette	**X**	**-**
Highfill	**X**	**-**
Little Flock	**X**	**X**
Lowell	**X**	**-**
Pea Ridge	**X**	**-**
Rogers	**X**	**X**
Siloam Springs	**X**	**X**
Springtown	**X**	**X**
Sulphur Springs	**X**	**-**
NWACC	**-**	**-**
Bentonville SD	**X**	**X**
Decatur SD	**-**	**-**
Gentry SD	**-**	**-**
Gravette SD	**-**	**-**
Pea Ridge SD	**-**	**-**
Rogers SD	**X**	**X**
Siloam Springs SD	**-**	**-**

**The data are compiled from the FEMA NFHL.*

Benton County and its participating jurisdictions can each expect a flash flood event with 276.19% probability per year, or 2.7619 events per year. For a complete list of NOAA recorded flash flood events, please reference Appendix E.

Table X – Probability, Flash Floods	
Event Year	**Event Count**
1993	2
1994	1
1995	4
1996	5
1997	1
1998	2
1999	3
2000	3
2001	2
2002	1
2003	0
2004	4
2005	2
2006	0
2007	1
2008	9
2009	2
2010	0
2011	3
2012	0
2013	13
Total Recorded Events =	58
Total Years =	21
Yearly Probability =	**276.19%**

**The data are from the NOAA NCDC Storm Event Database.*

4.3.4 – Assessing Vulnerability & Impacts

Flood Impacts

Based on Maps XX through XX, and the future probability in Section 4.3.3.A, Benton County, Bentonville, Centerton, Little Flock, Rogers, Siloam Springs, Springtown, the Bentonville SD, and the Rogers SD are exposed to 100 and 500 year floodplains and can expect 0.01 riverine floods per year and additional 0.002 floods per year. Avoca, Bella Vista, Bethel Heights, Cave Springs, Decatur, Gentry, Gravette, Highfill, Lowell, Pea Ridge, and Sulphur Springs, are exposed to 100 year floodplains and can expect 0.01 riverine floods per year. Garfield, Gateway, the Decatur SD, Gentry SD, Gravette SD, Pea Ridge SD, and the Siloam Springs SD are not exposed to any FEMA designated floodplains. The probability of flash flooding is equal through each participating jurisdiction.

The following table is provided as a best available estimate of what a typical riverine or flash flood event in the region may cause in terms of damage, injuries, and fatalities.

Table X – Historical Impacts, Floods

Hazard	Riverine Floods	Flash Floods
Count of Events	5	58
Impacts Per Year	0.33	2.76
Average Magnitude	-	-
Magnitude Range	-	-
Average Cost	$0	$133,706.90
Magnitude of Cost	$0 - $0	$0 - $2,000,000
Total Recorded Cost	$0	$7,755,000
Average Fatalities	0	0.10
Total Fatalities	0	6
Average Injuries	0	0
Total Injuries	0	0

**The data are compiled from the NOAA NCDC Storm Event Database.*

Vulnerability of Facilities

Benton County and its participating jurisdictions have college structures, dams and levees, a fire station, mines, schools, and commercial and residential structures in floodplains. Flooding can cause minimal or complete damage to any of these types of facilities taking them offline for days to years depending on the resources available after an event.

The average riverine flood event in Benton County and its participating jurisdictions costs $0. The average flash flood costs $133,706.90, while the existing range of a single incident has been from $0 to $2,000,000. Benton County and its participating jurisdictions have incurred a total of $0 in property damage from riverine flood events and $7,755,000 in property damage from flash flood events.

Vulnerability of Population

If evacuation is not heeded, or flood waters rise quickly enough, Benton County and it participating jurisdictions' population can drown or become trapped on rooftops or points of high elevations. Depending on the conditions, this will expose them to elements and deprive them of basic needs and services.

Long term care facilities housing vulnerable populations can take longer to evacuate. Additionally, the potential presence of mold after a flood requires extra care to be taken before their population can re-inhabit a facility.

Benton County and its participating jurisdictions have 6 recorded fatalities from riverine and flash flood events.

Vulnerability of Systems
Critical facilities and infrastructure can be rendered unusable or permanently destroyed having a significant impact on a jurisdiction's ability to conduct its day to day or current flood event operations. Significant damage to residential and or commercial structures can irrevocably damage a community and its economy creating refugees and economic hardship. If a chemical facility is significantly impacted it is possible the chemicals stored at the facilities can wash away with the flood waters and have detrimental effects on the local environment.

4.3.4A – Infrastructure & Critical Facilities
A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends
Benton County and it participating jurisdictions have varying growth as detailed in Section 3.1.1 – Land Use & Development Trends.

Increased residential growth increases a community's risk to floods by way of its facilities, population, and systems' vulerabilities as defined in Section 4.3.4 of this hazard profile. None of the participating jurisdictions have seen significant growth and thus there is no increase in their risk to floods.

Any buildings or infrastructure built in the future will have the same risk as other buildings or infrastructure built within or outside of the designated floodplains.

4.3.4C – Unique & Varied Risk

Due to the nature of flash flooding, each jurisdiction in the planning area has an equal risk to a flash flood impact. The variable risks to riverine flooding are detailed in the table below.

Table X – Unique & Varied Risk, Riverine Floods	
Jurisdiction	**Risk Characteristics**
Benton County	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Avoca	Parts of the jurisdiction are located in a 100 year floodplain.
Bella Vista	Parts of the jurisdiction are located in a 100 year floodplain.
Bentonville	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Bethel Heights	Parts of the jurisdiction are located in a 100 year floodplain.
Cave Springs	Parts of the jurisdiction are located in a 100 year floodplain.
Centerton	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Decatur	Parts of the jurisdiction are located in a 100 year floodplain.
Garfield	No risk to riverine flooding.
Gateway	No risk to riverine flooding.
Gentry	Parts of the jurisdiction are located in a 100 year floodplain.
Gravette	Parts of the jurisdiction are located in a 100 year floodplain.
Highfill	Parts of the jurisdiction are located in a 100 year floodplain.
Little Flock	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Lowell	Parts of the jurisdiction are located in a 100 year floodplain.
Pea Ridge	Parts of the jurisdiction are located in a 100 year floodplain.
Rogers	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Siloam Springs	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Springtown	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Sulphur Springs	Parts of the jurisdiction are located in a 100 year floodplain.
NWACC	No risk to riverine flooding.
Bentonville SD	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Decatur SD	No risk to riverine flooding.
Gentry SD	No risk to riverine flooding.
Gravette SD	No risk to riverine flooding.
Pea Ridge SD	No risk to riverine flooding.
Rogers SD	Parts of the jurisdiction are located in 100 and 500 year floodplains.
Siloam Springs SD	No risk to riverine flooding.

4.3.4D – Repetitive Loss Structures

The Arkansas Natural Resources Commission has reported there are 13 RL/SRL properties in Benton County and its participating jurisdictions. These properties have filed a total of 32 claims for a total of $891,759 with an average payout of $10,305.

Table X – RL/SRL Properties

Jurisdiction	Building Type	Insured?	Claims	Average Payout	Total Paid Out
Benton County	Single Family	Yes	2	$10,676.35	$21,352.69
Benton County	Non-Residential	No	2	$3,110.45	$6,220.89
Benton County	Non-Residential	No	3	$38,390.80	$115,172.40
Bentonville	Single Family	No	2	$5,046.72	$2,523.36
Cave Springs	Single Family	Yes	2	$7,877.89	$15,755.78
Decatur	Non-Residential	No	4	$70,033.60	$280,134.41
Decatur	Non-Residential	No	2	$33,241.52	$66,483.03
Rogers	Single Family	Yes	2	$72,676.25	$145,352.49
Rogers	Condo	Yes	3	$7,991.35	$23,974.05
Rogers	Multi-Family	Yes	2	$22,972.32	$45,944.63
Rogers	Multi-Family	No	2	$4,477.17	$8,954.34
Siloam Springs	Non-Residential	No	3	$24,449.86	$73,349.57
Siloam Springs	Non-Residential	No	3	$28,847.32	$86,541.95
		Total =	**32**	**$10,305.99**	**$891,759.59**

**The data are from the Arkansas Natural Resources Commission.*

4.3.5 – HAZUS Models

Included in the risk assessment are comprehensive simulations conducted in FEMA's HAZUS-MH v2.1. To properly display Benton County and its participating jurisdictions' risk to riverine floods, eight models have been developed for this plan.

The simulations models utilize the USGS's National Elevation Database (at 1 arc second) as the baseline for determining stream basins, hydrology, and drainage. A 10 square mile stream drainage setting was used to calculate each models hydrology functions. One simulation models a 500 year flood, while the other models a 100 year flood.

The information depicts the simulation models' estimates for: debris generation, economic losses, shelter requirements, transportation infrastructure damage, and utility infrastructure damage. Maps are included to display the simulated flood boundaries.

Table X – HAZUS Model 1 – 100 Year Flood								
Economic Loss	**Capital Stock Losses**			**Building Loss Ratio**	**Income Losses**			**Total**
	Building	**Contents**	**Inventory**		**Relocation**	**Capital**	**Wages & Rental**	
	$20,726,000	$15,055,000	$362,000	2.6%	$14,000	$2,000	$6,000	$36,165,000
Shelter	**Displaced People**				**People Needing Short Term Shelter**			
	592				203			
Debris	**Finishes (Tons)**		**Structures (Tons)**		**Foundations (Tons)**		**Total (Tons)**	
	6,993		7,547		9,283		23,823	
Utilities	**Potable Water**	**Waste Water**	**Oil Systems**	**Natural Gas**	**Electric Power**	**Communication**	**Total**	
Facilities	$0	$82,070	$0	$0	$0	$0	$82,070	
Pipelines	$0	$0	$0	$0	$0	$0	$0	
Total =	$0	$0	$0	$0	$0	$0	$0	
Transportation	**Highways**	**Railways**	**Light Rail**	**Bus Facilities**	**Ports**	**Ferries**	**Airports**	**Total**
Segments	$0	$0	$0	$0	$0	$0	$0	$0
Bridges	$0	$0	$0	$0	$0	$0	$0	$0
Tunnels	$0	$0	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0	$0

Map X – HAZUS Model 1, 100 Year Flood

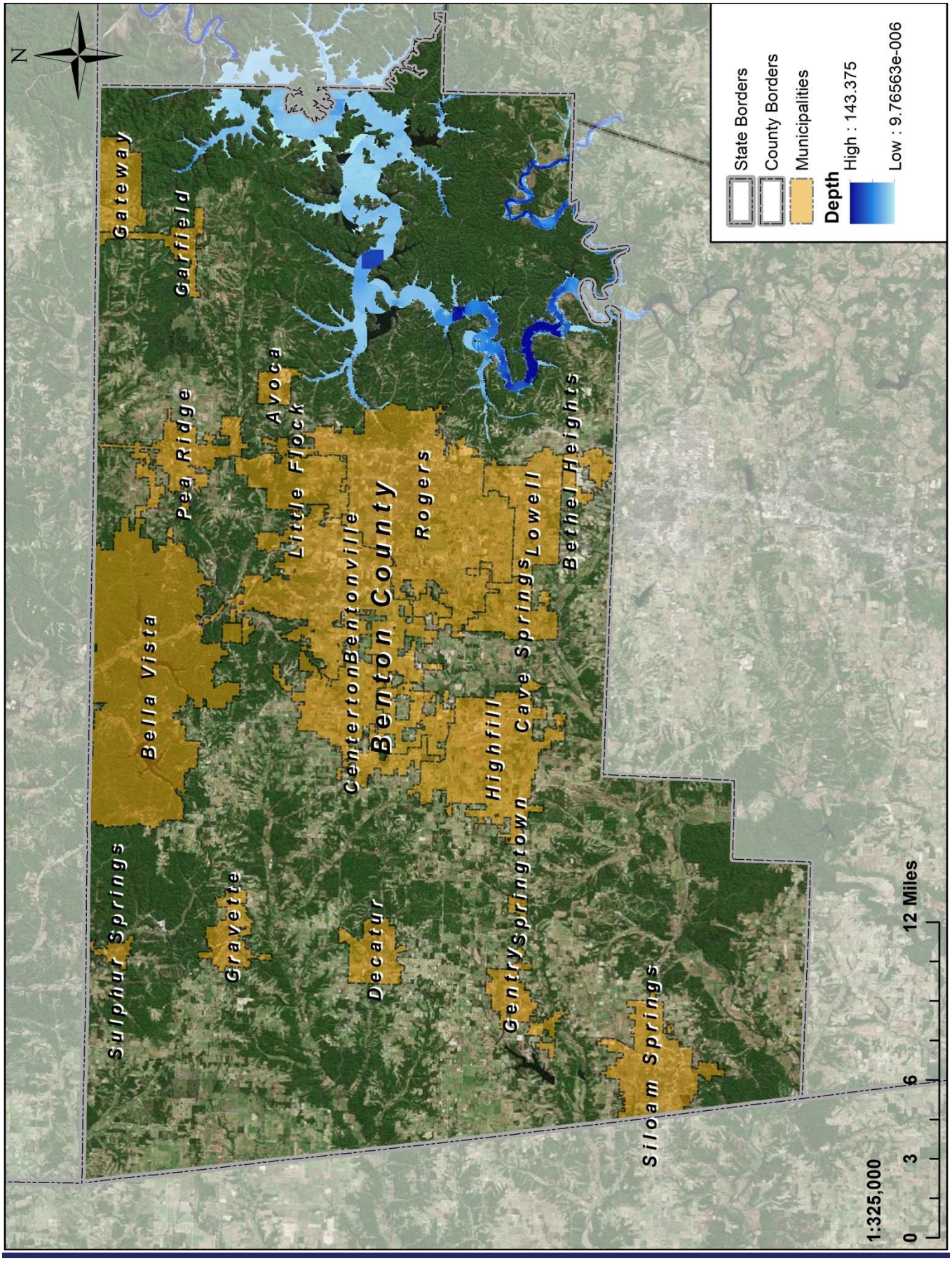


Table X – HAZUS Model 2 – 500 Year Flood								
Economic Loss	**Capital Stock Losses**			**Building Loss Ratio**	**Income Losses**			**Total**
	Building	**Contents**	**Inventory**		**Relocation**	**Capital**	**Wages & Rental**	
	$25,425,000	$18,250,000	$414,000	3.1%	$17,000	$4,000	$7,000	$44,117,000
Shelter	**Displaced People**				**People Needing Short Term Shelter**			
	690				255			
Debris	**Finishes (Tons)**		**Structures (Tons)**		**Foundations (Tons)**		**Total (Tons)**	
	8,447		9,941		12,012		30,399	
Utilities	**Potable Water**	**Waste Water**	**Oil Systems**	**Natural Gas**	**Electric Power**	**Communication**	**Total**	
Facilities	$0	$563,040	$0	$0	$0	$0	$563,040	
Pipelines	$0	$0	$0	$0	$0	$0	$0	
Total =	$0	$0	$0	$0	$0	$0	$0	
Transportation	**Highways**	**Railways**	**Light Rail**	**Bus Facilities**	**Ports**	**Ferries**	**Airports**	**Total**
Segments	$0	$0	$0	$0	$0	$0	$0	$0
Bridges	$0	$0	$0	$0	$0	$0	$0	$0
Tunnels	$0	$0	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0	$0

Map X – HAZUS Model 2, 500 Year Flood

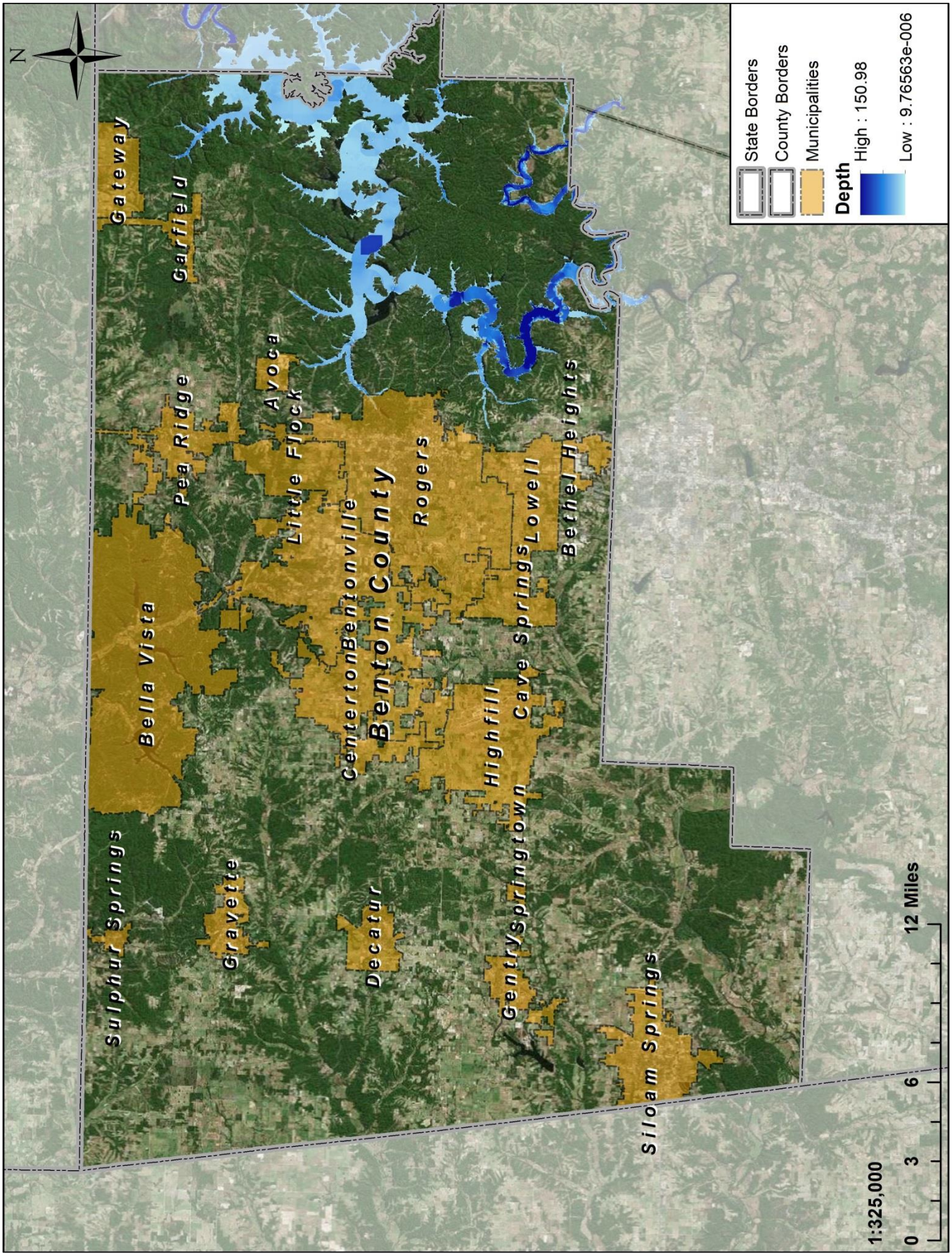


Table X – HAZUS Model 3 – 100 Year Flood								
Economic Loss	**Capital Stock Losses**			**Building Loss Ratio**	**Income Losses**			**Total**
	Building	**Contents**	**Inventory**		**Relocation**	**Capital**	**Wages & Rental**	
	$13,639,000	$23,307,000	$2,126,000	1.8%	$25,000	$94,000	$100,000	$39,302,000
Shelter	**Displaced People**				**People Needing Short Term Shelter**			
	759				333			
Debris	**Finishes (Tons)**		**Structures (Tons)**		**Foundations (Tons)**		**Total (Tons)**	
	1,805		322		475		2,602	
Utilities	**Potable Water**	**Waste Water**	**Oil Systems**	**Natural Gas**	**Electric Power**	**Communication**	**Total**	
Facilities	$0	$6,449,730	$0	$0	$0	$0	$6,449,730	
Pipelines	$0	$0	$0	$0	$0	$0	$0	
Total =	$0	$0	$0	$0	$0	$0	$0	
Transportation	**Highways**	**Railways**	**Light Rail**	**Bus Facilities**	**Ports**	**Ferries**	**Airports**	**Total**
Segments	$0	$0	$0	$0	$0	$0	$0	$0
Bridges	$440	$0	$0	$0	$0	$0	$0	$440
Tunnels	$0	$0	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0	$0

Map X – HAZUS Model 3, 100 Year Flood

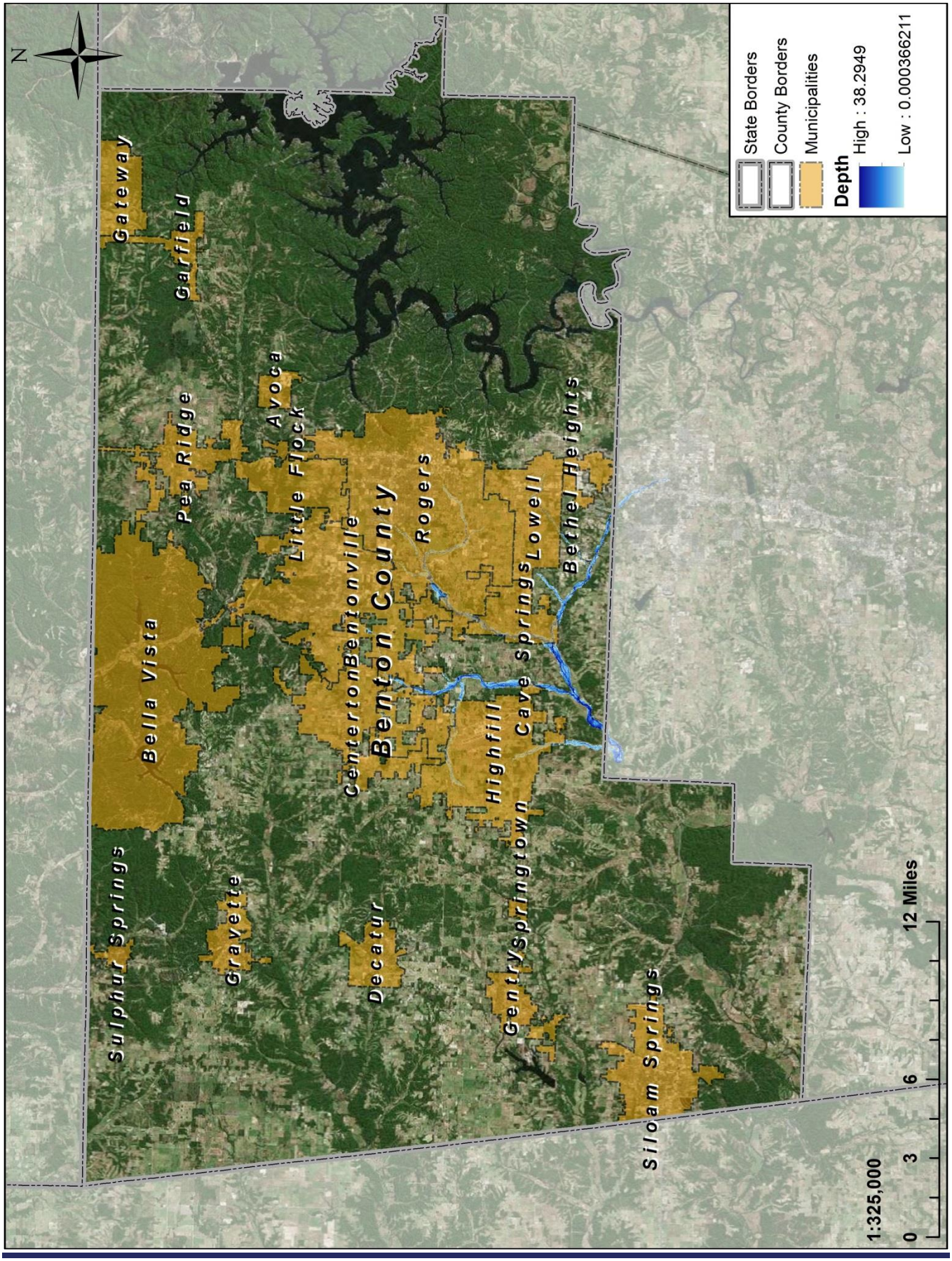


Table X – HAZUS Model 4 – 500 Year Flood

Economic Loss	Capital Stock Losses			Building Loss Ratio	Income Losses			Total
	Building	Contents	Inventory		Relocation	Capital	Wages & Rental	
	$16,889,000	$28,364,000	$2,853,000	2.3%	$27,000	$102,000	$111,000	$48,088,000

Shelter	Displaced People	People Needing Short Term Shelter
	884	406

Debris	Finishes (Tons)	Structures (Tons)	Foundations (Tons)	Total (Tons)
	2,305	479	654	3,438

Utilities	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
Facilities	$0	$8,006,850	$0	$0	$0	$0	$8,006,850
Pipelines	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0

Transportation	Highways	Railways	Light Rail	Bus Facilities	Ports	Ferries	Airports	Total
Segments	$0	$0	$0	$0	$0	$0	$0	$0
Bridges	$0	$0	$0	$0	$0	$0	$0	$0
Tunnels	$0	$0	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0	$0

Map X – HAZUS Model 4, 500 Year Flood

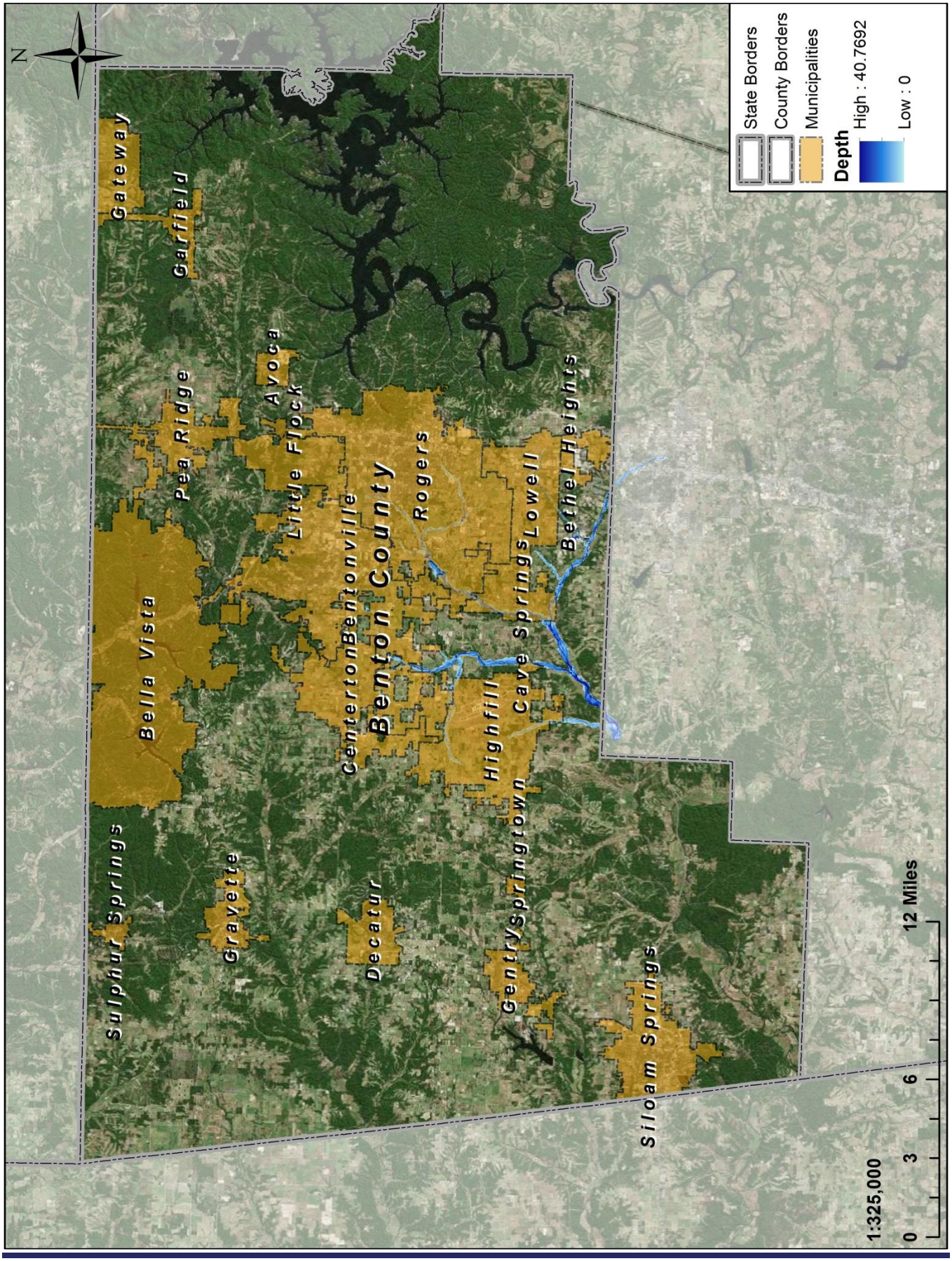


Table X – HAZUS Model 5 – 100 Year Flood

Economic Loss	Capital Stock Losses			Building Loss Ratio	Income Losses			Total
	Building	Contents	Inventory		Relocation	Capital	Wages & Rental	
	$14,946,000	$24,381,000	$1,841,000	4.2%	$19,000	$49,000	$65,000	$41,311,000

Shelter	Displaced People	People Needing Short Term Shelter
	658	146

Debris	Finishes (Tons)	Structures (Tons)	Foundations (Tons)	Total (Tons)
	4,130	3,102	3,927	11,159

Utilities	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
Facilities	$0	$0	$0	$0	$0	$0	$0
Pipelines	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0

Transportation	Highways	Railways	Light Rail	Bus Facilities	Ports	Ferries	Airports	Total
Segments	$0	$0	$0	$0	$0	$0	$0	$0
Bridges	$0	$0	$0	$0	$0	$0	$0	$0
Tunnels	$0	$0	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0	$0

Map X – HAZUS Model 5, 100 Year Flood

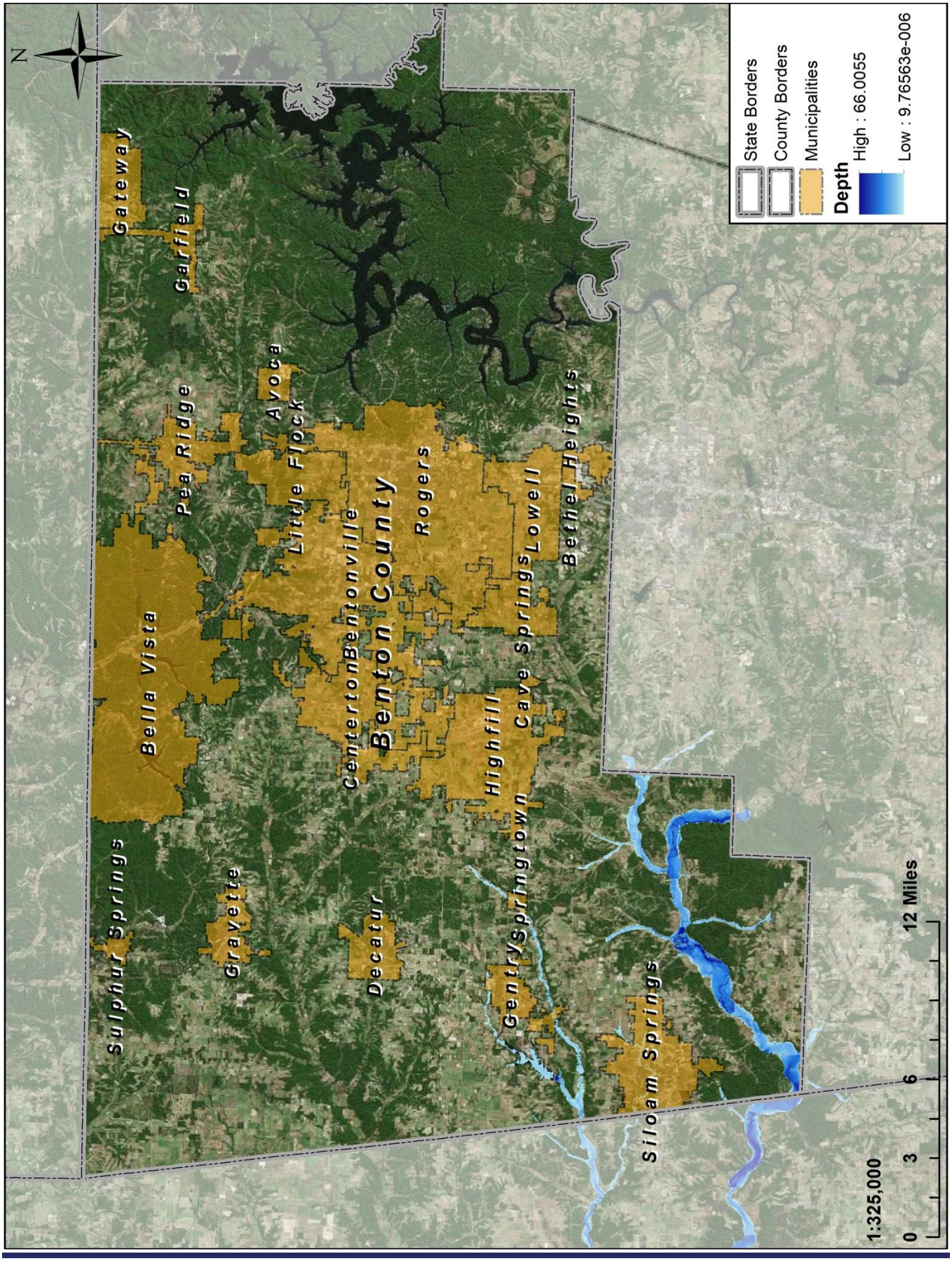


Table X – HAZUS Model 6 – 500 Year Flood								
Economic Loss	**Capital Stock Losses**			**Building Loss Ratio**	**Income Losses**			**Total**
	Building	**Contents**	**Inventory**		**Relocation**	**Capital**	**Wages & Rental**	
	$23,404,000	$37,771,000	$2,482,000	6.0%	$34,000	$79,000	$106,000	$63,888,000
Shelter	**Displaced People**				**People Needing Short Term Shelter**			
	848				223			
Debris	**Finishes (Tons)**		**Structures (Tons)**		**Foundations (Tons)**		**Total (Tons)**	
	6,420		6,130		6,681		19,231	
Utilities	**Potable Water**	**Waste Water**	**Oil Systems**	**Natural Gas**	**Electric Power**	**Communication**	**Total**	
Facilities	$0	$4,694,490	$0	$0	$0	$0	$4,694,490	
Pipelines	$0	$0	$0	$0	$0	$0	$0	
Total =	$0	$0	$0	$0	$0	$0	$0	
Transportation	**Highways**	**Railways**	**Light Rail**	**Bus Facilities**	**Ports**	**Ferries**	**Airports**	**Total**
Segments	$0	$0	$0	$0	$0	$0	$0	$0
Bridges	$0	$0	$0	$0	$0	$0	$0	$0
Tunnels	$0	$0	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0	$0

Map X – HAZUS Model 6, 500 Year Flood

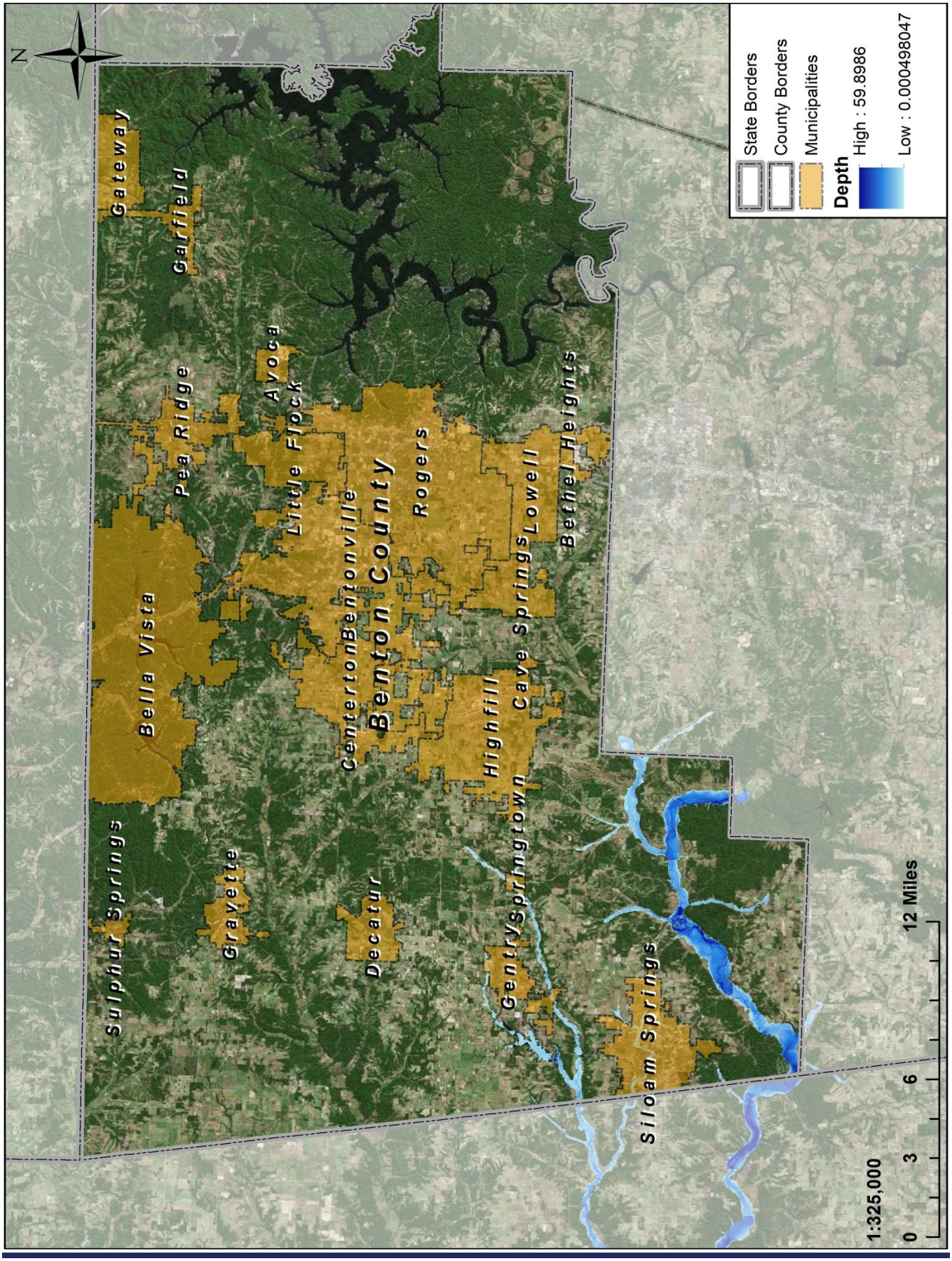


Table X – HAZUS Model 7 – 100 Year Flood								
Economic Loss	**Capital Stock Losses**			**Building Loss Ratio**	**Income Losses**			**Total**
	Building	**Contents**	**Inventory**		**Relocation**	**Capital**	**Wages & Rental**	
	$3,680,000	$3,506,000	$182,000	2.0%	$0	$1,000	$2,000	$7,371,000
Shelter	**Displaced People**				**People Needing Short Term Shelter**			
	198				13			
Debris	**Finishes (Tons)**		**Structures (Tons)**		**Foundations (Tons)**		**Total (Tons)**	
	1,273		1,121		1,312		3,705	
Utilities	**Potable Water**	**Waste Water**	**Oil Systems**	**Natural Gas**	**Electric Power**	**Communication**	**Total**	
Facilities	$0	$0	$0	$0	$0	$0	$0	
Pipelines	$0	$0	$0	$0	$0	$0	$0	
Total =	$0	$0	$0	$0	$0	$0	$0	
Transportation	**Highways**	**Railways**	**Light Rail**	**Bus Facilities**	**Ports**	**Ferries**	**Airports**	**Total**
Segments	$0	$0	$0	$0	$0	$0	$0	$0
Bridges	$0	$0	$0	$0	$0	$0	$0	$0
Tunnels	$0	$0	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0	$0

Map X – HAZUS Model 7, 100 Year Flood

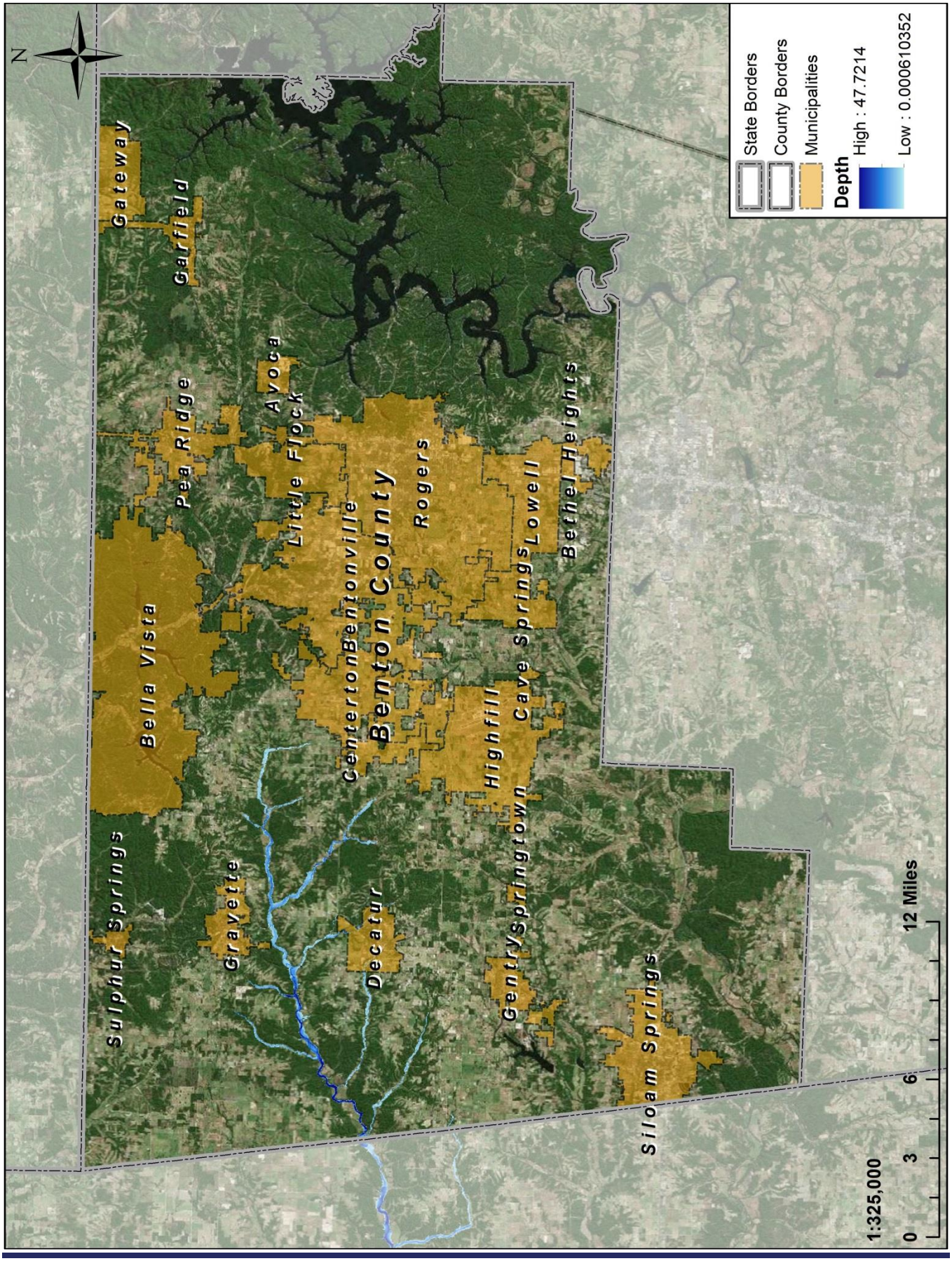


Table X – HAZUS Model 8 – 500 Year Flood

Economic Loss	Capital Stock Losses			Building Loss Ratio	Income Losses			Total
	Building	Contents	Inventory		Relocation	Capital	Wages & Rental	
	$4,405,000	$4,147,000	$210,000	2.4%	$0	$1,000	$2,000	$8,765,000

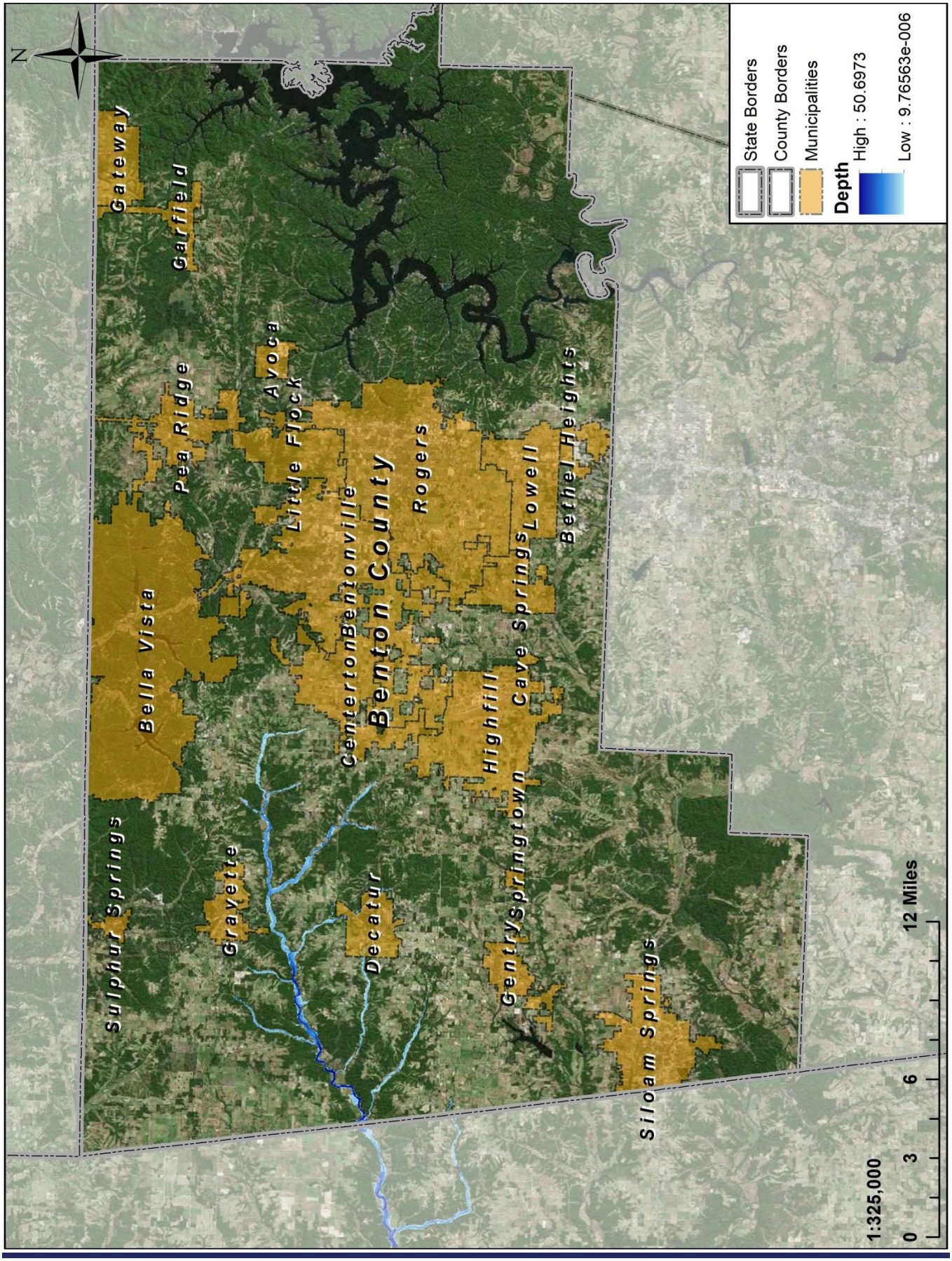
Shelter	Displaced People	People Needing Short Term Shelter
	222	16

Debris	Finishes (Tons)	Structures (Tons)	Foundations (Tons)	Total (Tons)
	1,471	1,628	1,825	4,923

Utilities	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
Facilities	$0	$0	$0	$0	$0	$0	$0
Pipelines	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0

Transportation	Highways	Railways	Light Rail	Bus Facilities	Ports	Ferries	Airports	Total
Segments	$0	$0	$0	$0	$0	$0	$0	$0
Bridges	$0	$0	$0	$0	$0	$0	$0	$0
Tunnels	$0	$0	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
Total =	$0	$0	$0	$0	$0	$0	$0	$0

Map X – HAZUS Model 8, 500 Year Flood



4.3SS – Severe Storms

4.3.1 – Description

Severe storms comprise the hazardous and damaging weather effects often found in violent storm fronts. They can occur together or separate, they are common and usually not hazardous, but on occasion they can pose a threat to life and property.

This plan defines Severe Storms as a combination of the following severe weather effects as defined by NOAA and the NWS.

Hail: Showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud.

High/Strong Wind: Sustained wind speeds of 40 miles per hour or greater lasting for 1 hour or longer, or winds of 58 miles per hour or greater for any duration. Often referred to as straight line winds to differentiate from rotating or tornado associated wind.

Lightning: A visible electrical discharge produced by a thunderstorm. The discharge may occur within or between clouds, between the cloud and air, between a cloud and the ground or between the ground and a cloud.

Thunderstorm Winds: The same classification as high or strong winds, but accompanies a thunderstorm. It is also referred to as a straight line wind to differentiate from rotating or tornado associated wind.

For consistency with the NWS and NOAA, high and strong winds are shown separate from thunderstorm winds when raw, collected data is displayed. However, for their impacts and probability, they are combined and referred to simply as “wind” events.

Chart 7 – Hail Impacts per Month, Benton County (1956 – 2013)

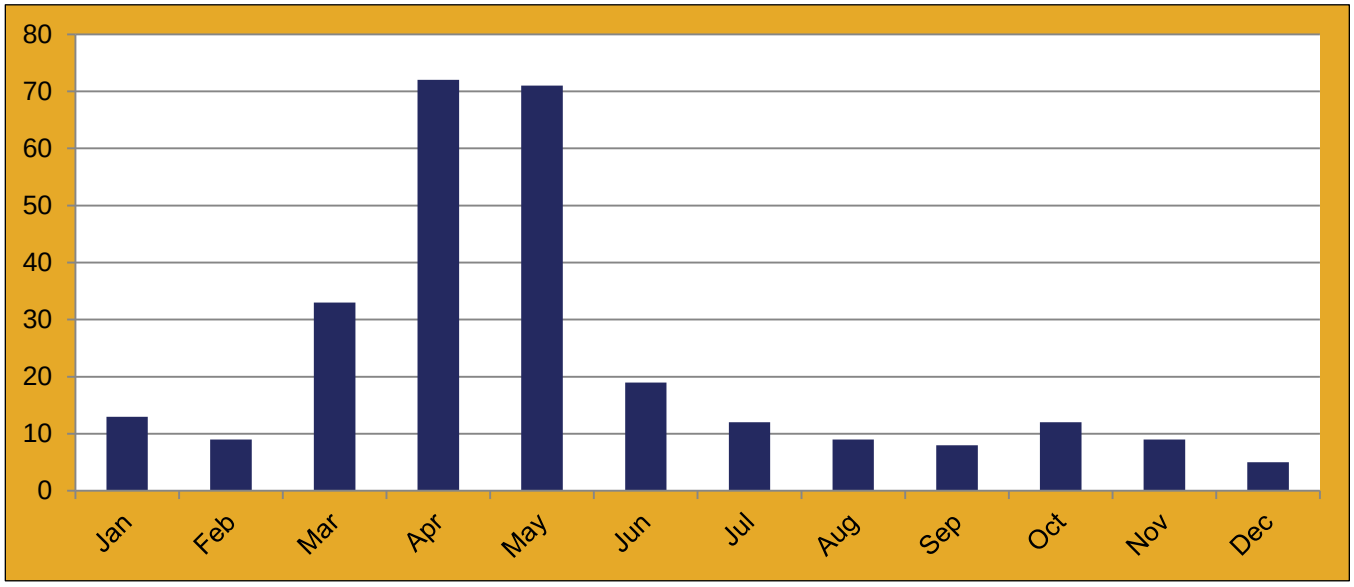


Chart 8 – High & Strong Winds per Month, Benton County (1998 – 2013)

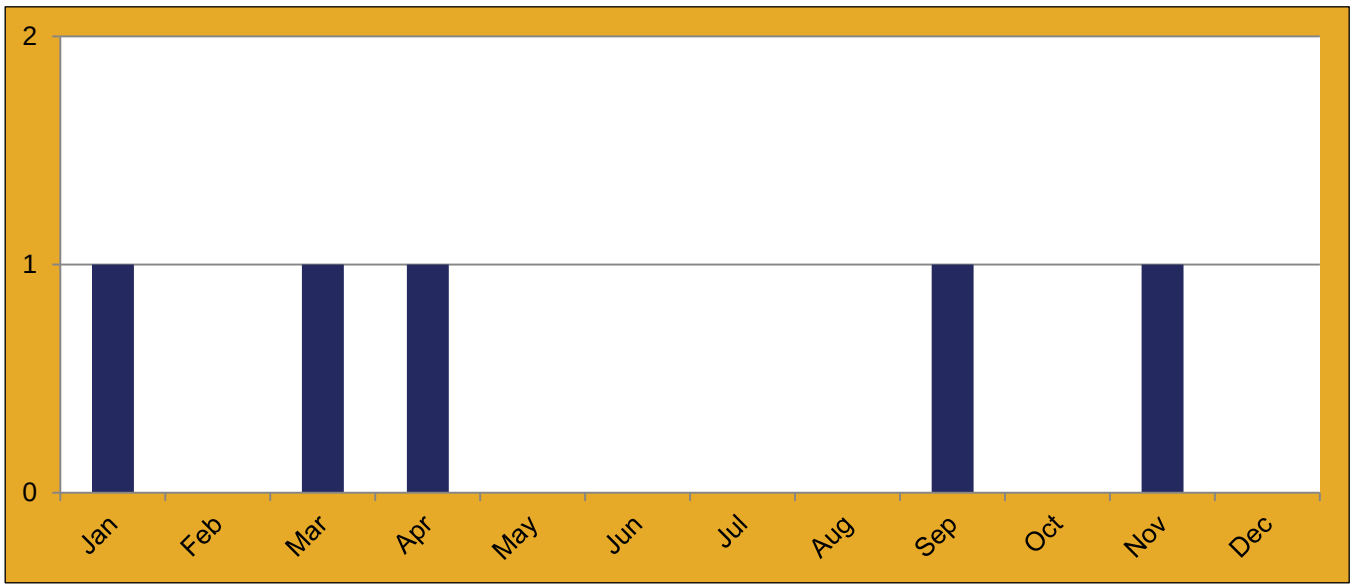


Chart 9 – Lightning Impacts per Month, Benton County (1998 – 2013)

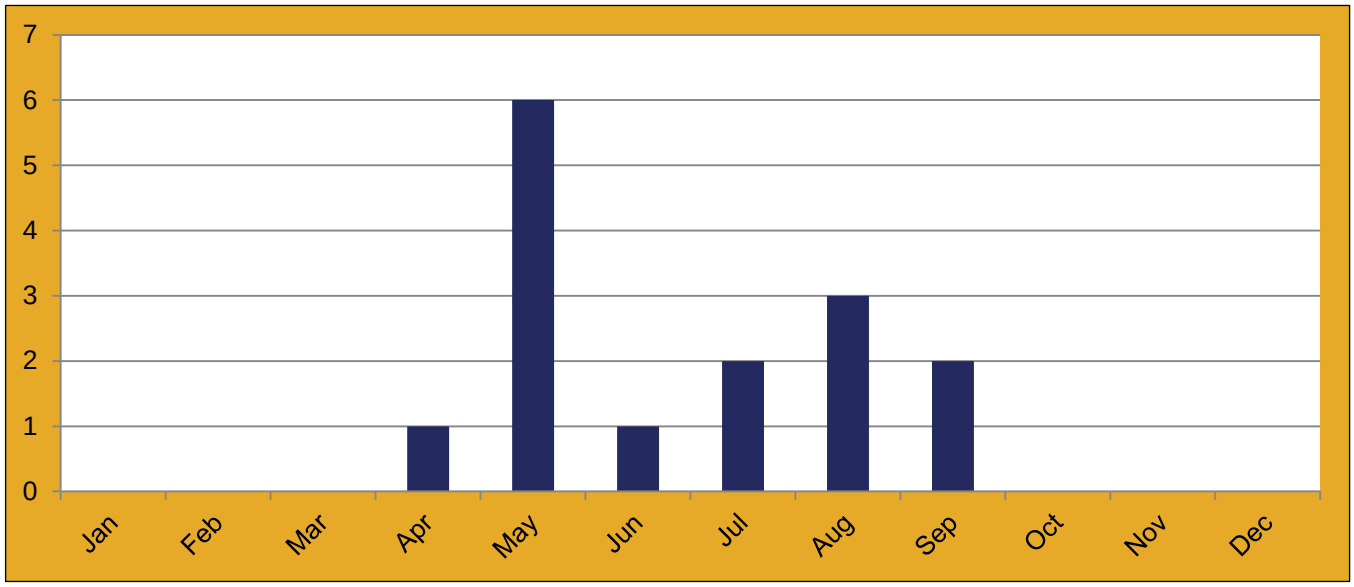
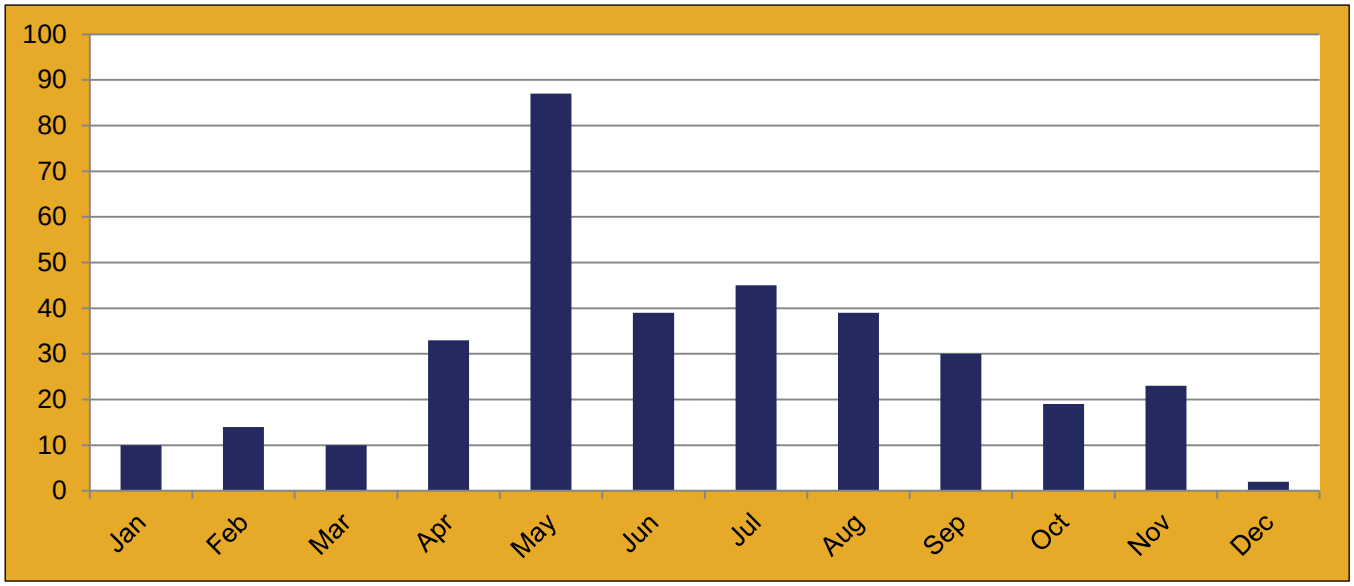


Chart 10 – Thunderstorm Winds per Month, Benton County (1956 – 2013)



4.3.2 – Location & Extent

Severe storms occur throughout the year in Benton County and its participating jurisdictions. Thunderstorms, high, and strong winds can affect any size area from a county, region, or isolated pockets of city or neighborhood. In contrast, lightning will strike a single point. It is not often multiple strikes will hit and damage persons and property in one severe storm event. Hail will occur in small pockets of an accompanying storm.

Storms, severe or not, are often predicted within a day or multiple days in advance. The severity of a storm is not as easily predicted and when it is, the window of notification is up to few hours to under an hour. When a storm is imminent it is unknown whether or not hail, lightning, or damaging winds will occur until after an incident has been reported.

Strong, high, and thunderstorm winds are classified as winds which occur between 40 and 70 miles per hour lasting for 1 hour or greater or of 58 miles per hour for any duration. The Beaufort Scale shown on below, displays the ranges of wind speed and correlates them with their typical effects. At a level 7 and 8 citizens should remain indoors and anywhere above a level 8 will cause damage to structures. Damage to any amount of structures can cause serious disruption to Benton County and its participating jurisdictions. The scope of damage can range from one residential house up to widespread destruction of homes and reinforced buildings throughout the county.

It can safely be assumed any severe storm has the potential to cause a lightning strike. It can happen instantly with no warning and happen anytime throughout the storm's passage. A storm's lightning intensity is measured by lightning activity intensity levels outlined in the table on the following page. A strike could damage structures throughout the county and render it unusable for a period of time, or cause it to catch fire and damage it beyond repair. Most lightning strikes do not hit structures or people and therefore go unreported.

Hail typically falls in sizes anywhere from half an inch to upwards of 3 inches. A complete hail index with size and typical damages can be found in Table XX. Any incidents of hail can cause injury to Benton County and its participating jurisdictions' citizens, while anything above 1 inch could cause damage to structures. If windows are broken, some facilities will be rendered unusable until repaired.

Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.

Table X – Lightning Activity Intensity Levels	
LAL Level	**Description**
LAL 1	No Thunderstorms
LAL 2	Isolated thunderstorms: Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud-to-ground strikes in a 5 minute period.
LAL 3	Widely scattered thunderstorms: Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud-to-ground strikes in a 5 minute period.
LAL 4	Scattered thunderstorms: Moderate rain is commonly produced Lightning is frequent, 11 to 15 cloud-to-ground strikes in a 5 minute period.
LAL 5	Numerous thunderstorms: Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud-to-ground strikes in a 5 minute period.

Table X – Modified NOAA/TORRO Hailstorm Intensity Scale				
Code	**Intensity Category**	**Diameter (Inches)**	**Approximate Size**	**Typical Damage Impacts**
H0	Hard Hail	0 - 0.33	Pea	No damage
H1	Potentially Damaging	0.33 - 0.60	Marble/Mothball	Slight damage to crops
H2	Potentially Damaging	0.60 - 0.80	Dime/Grape	Significant damage to crops
H3	Severe	0.80 - 1.20	Nickel to Quarter	Severe damage to crops, damage to glass and plastic, paint and wood scored
H4	Severe	1.20 - 1.60	Half Dollar	Widespread glass damage, vehicle bodywork damage
H5	Destructive	1.60 - 2.00	Silver Dollar to Golf Ball	Damage to tiled roofs, significant risk of personal injury.
H6	Destructive	2.00 - 2.40	Egg	Aircraft bodywork dented, brick walls pitted
H7	Very Destructive	2.40 - 3.00	Tennis Ball	Severe roof damage, risk of serious injuries to persons not protected
H8	Very Destructive	3.00 - 3.50	Baseball to Orange	Severe damage to aircraft bodywork
H9	Super Hailstorms	3.50 - 4.00	Grapefruit	Extensive structural damage, risk of severe injury or fatal injuries to persons not protected
H10	Super Hailstorms	4.00 +	Softball and up	Extensive structural damage, risk of severe injury or fatal injuries to persons not protected

4.3.3 – Previous Occurrences

Benton County and its participating jurisdictions have recorded 1 fatality and 21 injuries due to Severe Storms.

Since 1956, NOAA has recorded 270 hail events in Benton County and its participating jurisdictions. These hail events have caused $3,076,000 in recorded property damage.

Since 1993, NOAA has recorded 15 lightning events in Benton County and its participating jurisdictions. These lightning strikes have caused $957,000 in recorded property damage.

Since 2006, NOAA has recorded 5 strong and high wind events in Benton County and its participating jurisdictions. These strong wind events have caused $31,000 in recorded property damage.

Since 1956, NOAA has recorded 348 thunderstorm wind events in Benton County and its participating jurisdictions. These thunderstorm wind events have caused $9,428,020 in recorded property damage.

For a complete list of NOAA recorded severe storm events, please reference Appendix E.

Chart 11 – Hail Impacts per Year, Benton County (1956 – 2013)

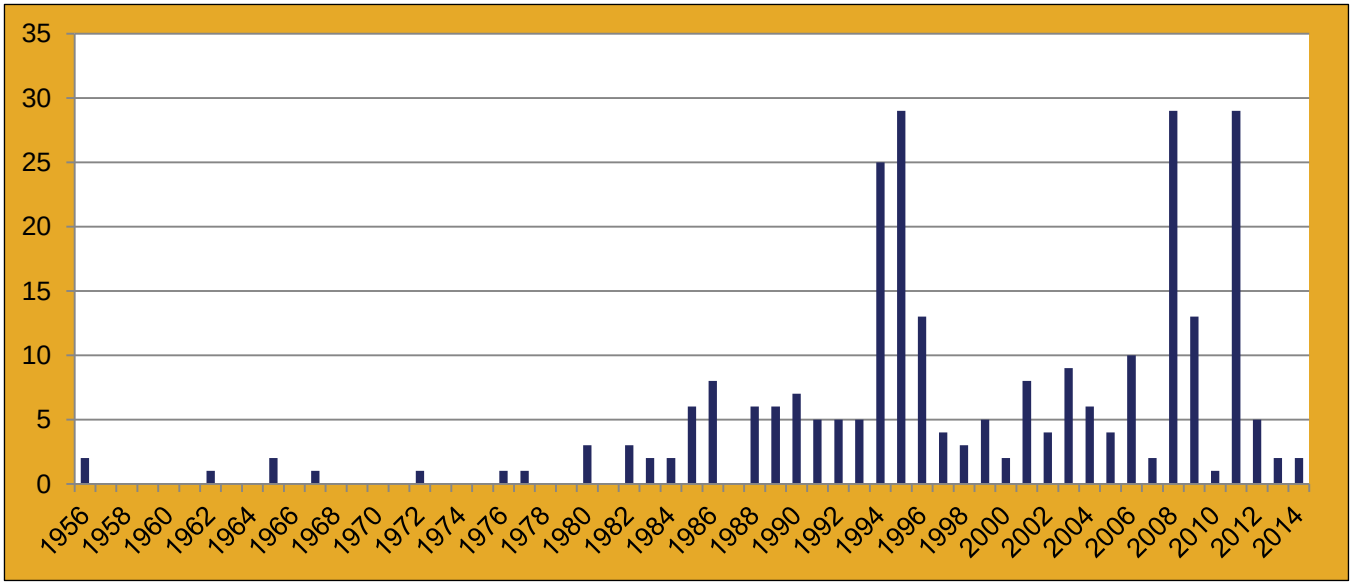


Chart 12 – High & Strong Winds per Year, Benton County (1998 – 2013)

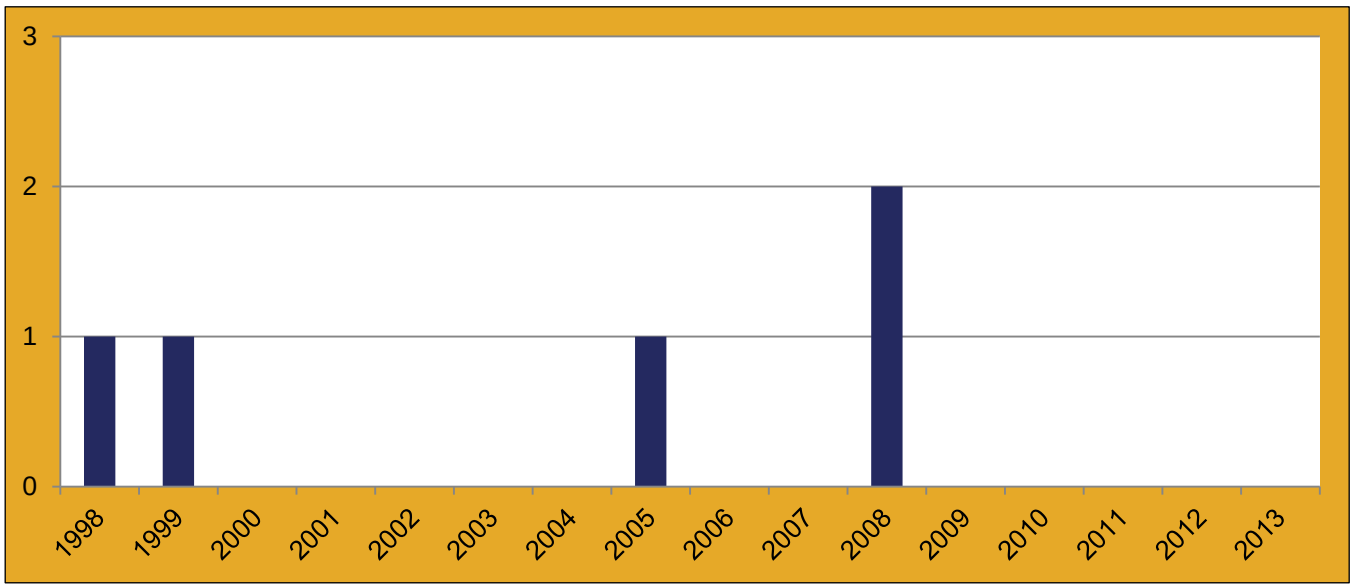


Chart 13 – Lightning Impacts per Year, Benton County (1993 – 2013)

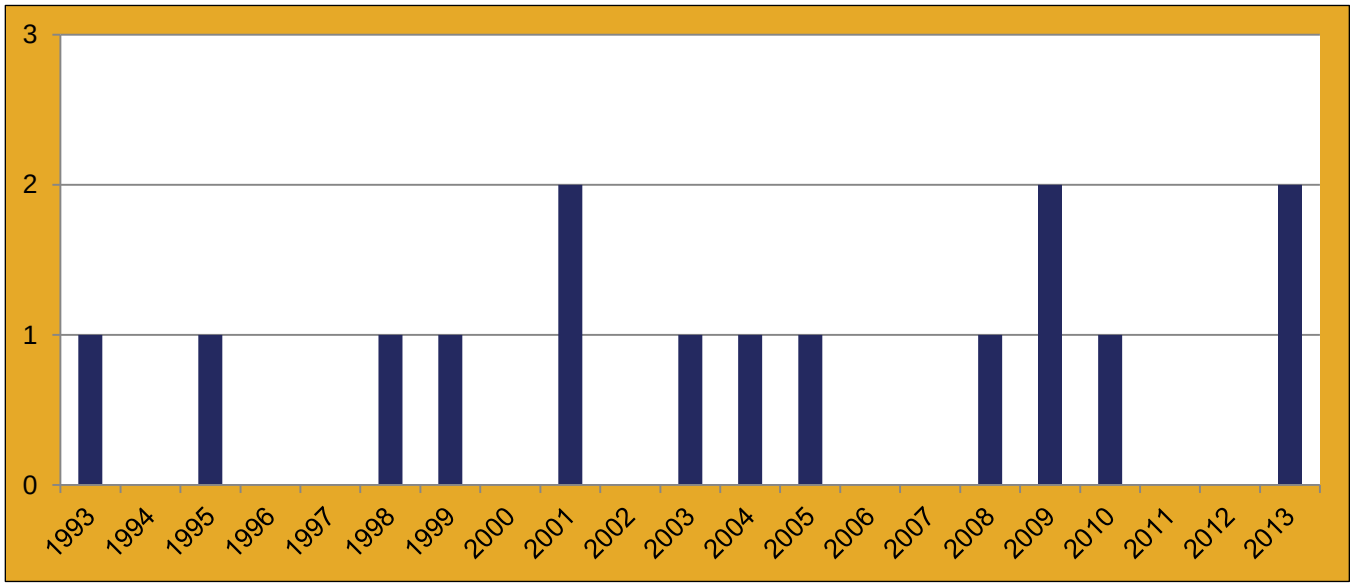
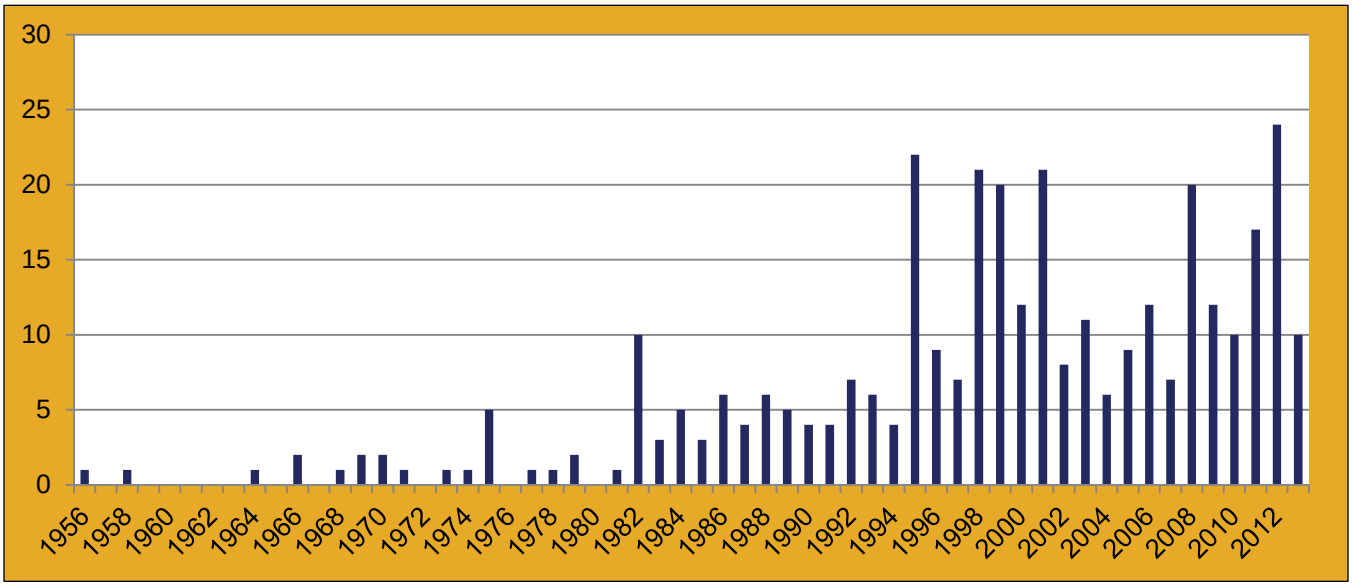
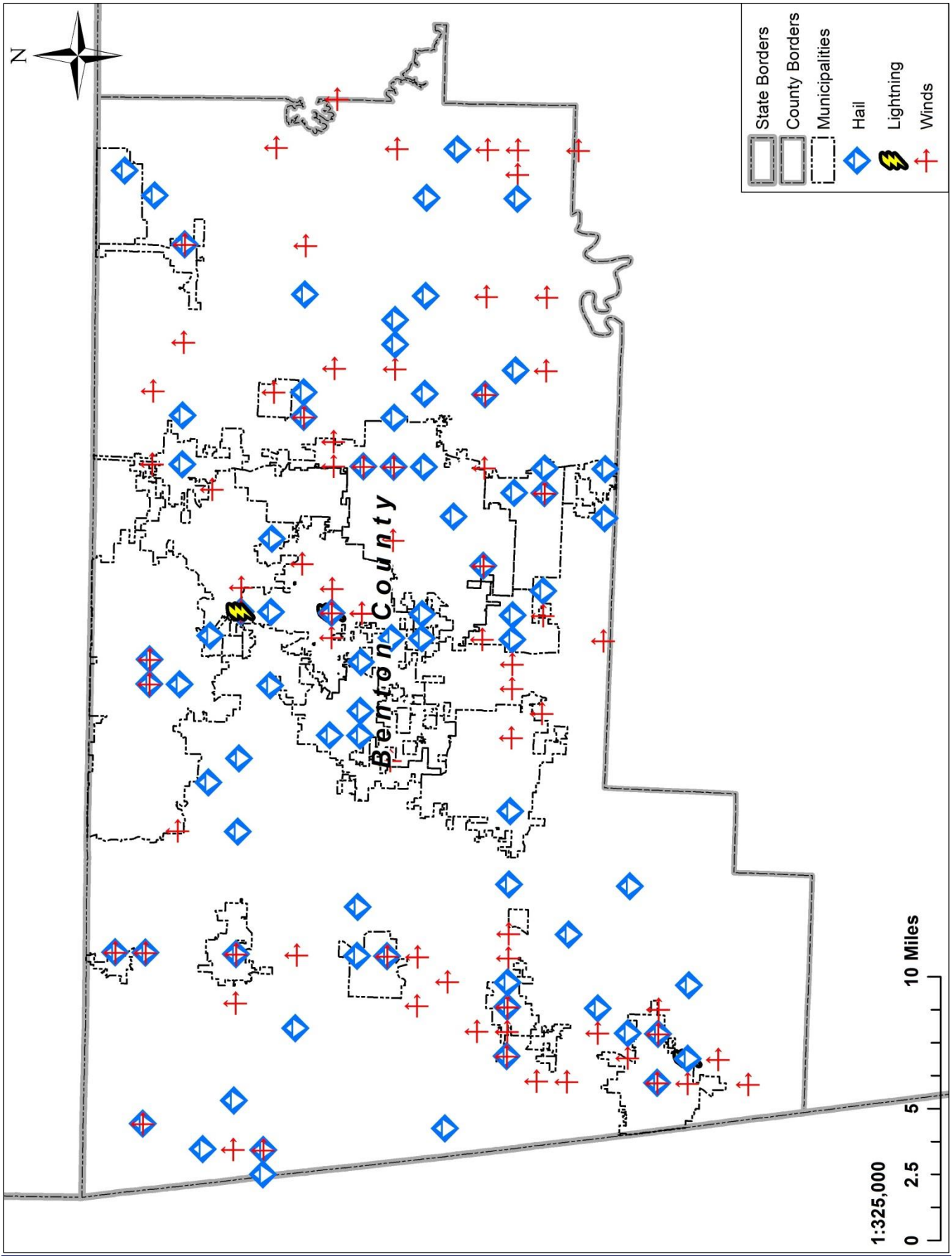


Chart 14 – Thunderstorm Winds per Year, Benton County (1956 – 2013)



Map X – Severe Storms, Benton County



4.3.3A – Probability of Future Events

Benton County and its participating jurisdictions can each expect a hail event with 457.63% probability per year, or 4.5763 events per year. They can each expect a lightning event with a 71.43% probability or 0.7143 lightning events per year, while they can expect a strong, high, or thunderstorm wind event with a 598.31% probability per year, or 5.9831 events per year.

Table X – Probability, Severe Storms

Event Year	Event Count		
	Hail	Lightning	Wind Events
1956 - 1959	2	-	2
1960 - 1969	4	-	6
1970 - 1979	3	-	14
1980 - 1989	36	-	43
1990	7	-	4
1991	5	-	4
1992	5	-	7
1993	5	1	6
1994	25	0	4
1995	29	1	22
1996	13	0	9
1997	4	0	7
1998	3	1	22
1999	5	1	21
2000	2	0	12
2001	8	2	21
2002	4	0	8
2003	9	1	11
2004	6	1	6
2005	4	1	10
2006	10	0	12
2007	2	0	7
2008	29	1	22
2009	13	2	12
2010	1	1	10
2011	29	0	17
2012	5	0	24
2013	2	2	10
Total Recorded Events =	270	15	353
Total Years =	59	21	59
Yearly Probability =	**457.63%**	**71.43%**	**598.31%**

**The data are from the NOAA NCDC Storm Event Database.*

4.3.4 – Assessing Vulnerability & Impacts

Hail Impacts

Benton County and its participating jurisdictions have recorded 267 hail events since 1956, of which the range of magnitude was between 0.75 and 4.5 inches in diameter with an average of 0.87 inches. Based on the hailstorm scale in Table XX and future probability in Table XX, Benton County and its participating jurisdictions can expect 4.5763 hail events per year ranging from 'hard hail' to 'hail storm.'

Lightning Impacts

Benton County and its participating jurisdictions have recorded 15 lightning event since 1993, of which the range of magnitude is not recorded. Based on the future probability found in Table XX, Benton County and its participating jurisdictions can expect 0.71 lightning events per year with an unknown range of impact.

Wind Impacts

Benton County and its participating jurisdictions have recorded 353 wind events since 1956, of which the range of magnitude was between 58 and 86 miles per hour with an average of 66.81 miles per hour. Based on the Beaufort Scale on page XXX and future probability in Table XX, Benton County and its participating jurisdictions can expect 5.98 wind events per year ranging from Beaufort Scale 8 – "Twigs and small branches broken off trees." to Beaufort Scale 12 – "Violence and destruction."

Table X – Historical Impacts, Severe Storms

Hazard	Hail	Lightning	Winds
Count of Events	267	15	353
Impacts Per Year	4.57	0.71	5.98
Average Magnitude	0.87	-	66.81
Magnitude Range	0.75 - 4.5	-	58 - 86
Average Cost	$15,855.67	$63,800	$26,708
Magnitude of Cost	$0 - $2,500,000	$0 - $500,000	$0 - $3,500,000
Total Recorded Cost	$3,076,000	$957,000	$9,428,020
Average Fatalities	0	0	0.01
Total Fatalities	0	0	1
Average Injuries	0	0.67	0.03
Total Injuries	0	10	11

**The data are compiled from the NOAA NCDC Storm Event Database.*

Vulnerability of Facilities

Structural vulnerability to severe storms is the same throughout Benton County and its participating jurisdictions. Hail can be costly by damaging rooftops, outdoor equipment, and windows. Lightning can strike anything with the potential to significantly damage electrical infrastructure or ignite a fire. Wind events create flying debris which can damage infrastructure and buildings. Strong enough wind can cause structure damage to older, less well constructed buildings even toppling or leveling them.

The average hail event in Benton County and its participating jurisdictions costs $15,855.67 while the existing range of a single incident has been from $0 to $2,500,000.

The average lightning event in Benton County and its participating jurisdictions costs $63,800, while the existing range of a single incident has been from $0 to $500,000.

The average wind event in Benton County and its participating jurisdictions costs $26,708, while the existing range of a single incident has been from $0 to $3,500,000.

Vulnerability of Population

Benton County and its participating jurisdictions' vulnerability to severe storms is the same throughout the planning area. In the absence of proper shelter, hail can cause serious injury to an unprotected person. As long as Benton County and its participating jurisdictions' citizens stay indoors and away from windows, they will be protected against hail injury and death. Similarly, they can avoid being struck by lightning by staying indoors. Although lightning may strike a structure sheltering people, it is extremely unlikely that the strike itself will directly injure or kill a sheltered person. As long as a structure is able to maintain its integrity during high speed winds, it will protect people from wind injury or death. However, old or poorly constructed facilities are not good shelter as previously mentioned flying debris can break windows or cause structural damage. Either of these instances have the potential to seriously injure or kill anyone taking shelter in older, less well constructed building.

Historically, there have been 1 fatality and 21 injuries recorded from severe storms in the planning area.

Vulnerability of Systems

Benton County and its participating jurisdictions' assets and systems' vulnerability to severe storms is the same throughout the planning area.

Hail damage is typically superficial and does not hamper a community's assets, systems, or activities. Lightning strikes can destroy or damage a community asset, but since their strikes are typically isolated and rarely hit anything, it is unlikely to significantly impact a larger system. Wind events can destroy and damage multiple structures and points of infrastructure. It has the potential to significantly impact a community's power grid compounding the effects of other hazards such as, extreme heat, tornadoes, and winter storms.

4.3.4A – Infrastructure & Critical Facilities

All infrastructure and critical facilities are equally at risk, since severe storms indiscriminately affect the entire planning area. A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends

Benton County and its participating jurisdictions' predominant growth area is residential housing, as detailed in Section 3.1.1 – Land Use & Development Trends.

Increased residential growth increases a community's risk to severe storms by way of its facilities, population, and systems' vulerabilities as defined in Section 4.3.4 of this hazard profile. None of the participating jurisdictions have seen significant growth and thus their risk to severe storms has not increased.

Any buildings or infrastructure built in the future will have the same risk as other buildings or infrastructure built within the planning area.

4.3.4C – Unique & Varied Risk

Severe storms have ability to affect a portion of or the entire planning area. Unfortunately, there is no accurate method of predicting the location or extent of a severe storm's impact, that being if it will affect one participating jurisdiction up to any number or all participating jurisdictions.

Additionally, it is not possible to predict any varying probability between the participating jurisdictions with the exception of varying risk as it is proportionate to a participating jurisdiction's demographics. Logically, participating jurisdictions with a greater population are at a higher risk as participating jurisdictions with a lower population are at a lower risk.

Although this plan addresses vulnerability to severe storms, without the possibility of being able to calculate all components of risk at a jurisdictional level, each jurisdiction's individual risk to severe storms is not possible to calculate.

To predict unique and varied risks for Benton County and its participating jurisdictions, one would need a comprehensive catalog of wind resilience ratings, hail impact ratings, and grounding capacity for every piece of infrastructure and structure.

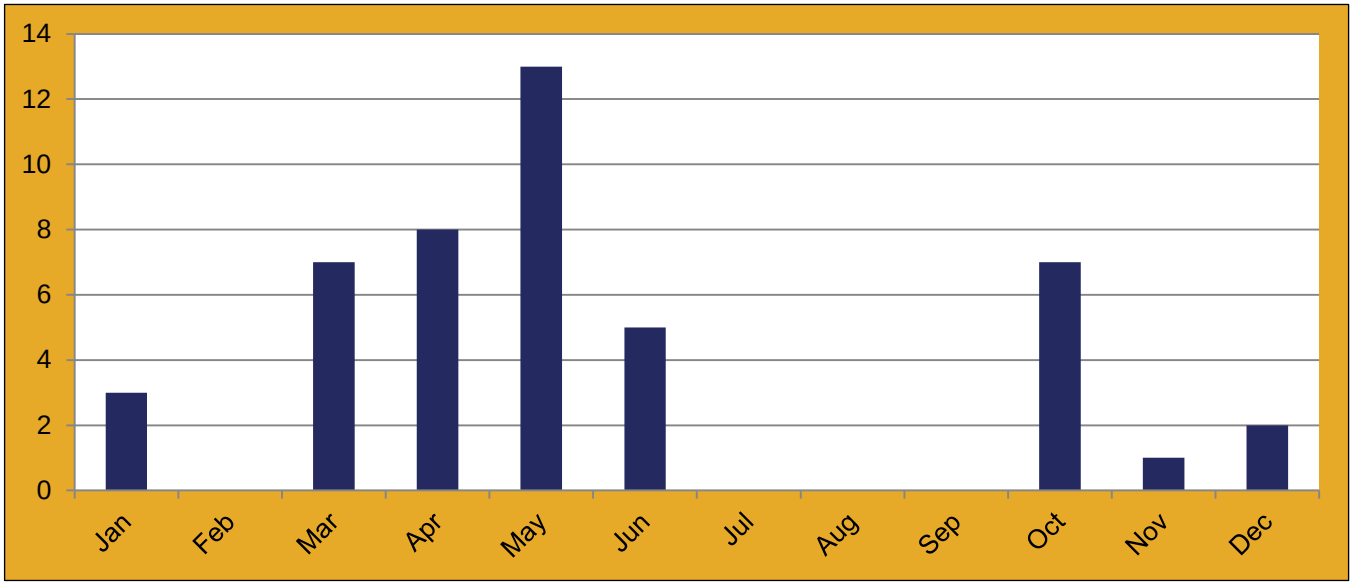
4.3T – Tornadoes

4.3.1 – Description

A tornado is a violent, dangerous, rotating column of air that is in contact with both the surface of the earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. Often referred to as a twister or a cyclone, they can strike anywhere and with little warning. Tornadoes come in many shapes and sizes, but are typically in the form of a visible condensation funnel, whose narrow end touches the earth and is often encircled by a cloud of debris and dust.

Tornadoes can cause several kinds of damage to buildings. Tornadoes have been known to lift and move objects weighing more than 3 tons, toss homes more than 300 feet from their foundations, and siphon millions of tons of water. However, less spectacular damage is much more common. Houses and other obstructions in the path of the wind cause the wind to change direction. This change in wind direction increases pressure on parts of the building. The combination of increased pressures and fluctuating wind speeds creates stress on the building that frequently causes connections between building components, roofing, siding, windows, etc., to fail. Tornadoes can also generate a tremendous amount of flying debris. If wind speeds are high enough, airborne debris can be thrown at buildings with enough force to penetrate windows, roofs, and walls.

Chart 15 – Tornadoes per Month, Benton County (1954 – 2013)



4.3.2 – Location & Extent

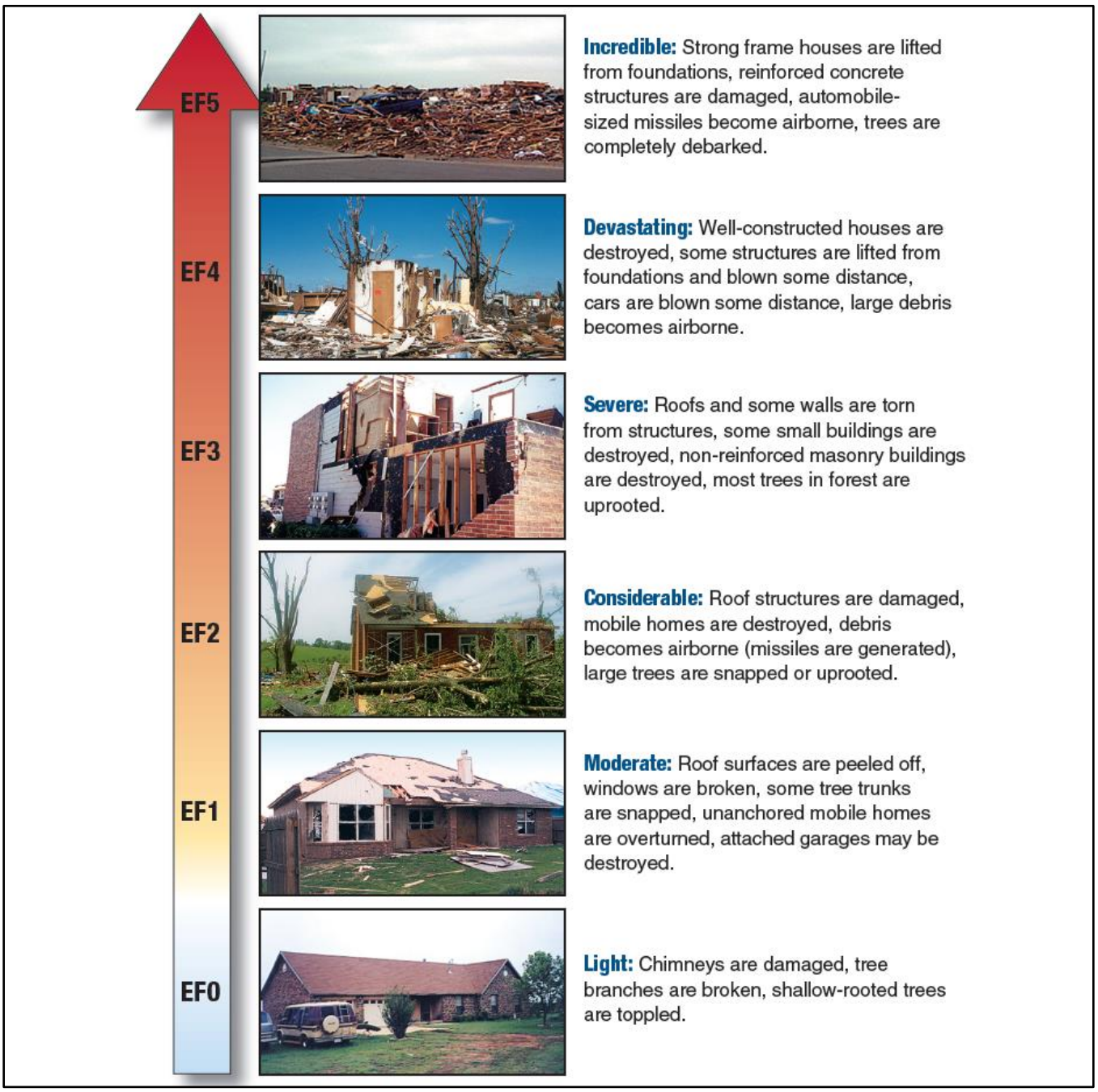
Fujita Scale		EF Scale	
Fujita Scale	3-Second Gust Speed (mph)	EF Scale	3-Second Gust Speed (mph)
F0	45-78	EF0	65-85
F1	79-117	EF1	86-109
F2	118-161	EF2	110-137
F3	162-209	EF3	138-167
F4	210-261	EF4	168-199
F5	262-317	EF5	200-234

Tornadoes can strike anywhere in Benton County or its participating jurisdictions placing the entire planning area at risk. Most tornados have wind speeds less than 110 miles per hour, and travel a few miles before dissipating. Many tornadoes only exist for a few seconds in the form of a touchdown. The most extreme tornados can attain wind speeds of more than 200 mph, stretch more than two miles across, and travel dozens of miles.

A tornado may arrive with a storm front and touchdown in a matter of seconds without warning. Other times tornado watches and sirens will alert communities of high potential tornado producing weather or an already formed tornado and its likely path.

Until 2007 the Fujita Tornado Scale ranked the severity of tornadoes. The Fujita scale assigned a numerical F value, F0 through F5, based on the wind speeds and estimated damage. Since 2007 the U.S. switched over to the Enhanced Fujita Scale. The altered scale adjusted the wind speed values per F level and introduced a rubric for estimating damage.

An EF0 tornado could lightly damage structures where they would become unsafe to use until repaired. An EF1 or larger tornado could destroy the entire neighborhood, town, or city or damage any number of structures to the point where they would be unusable for at least a year.

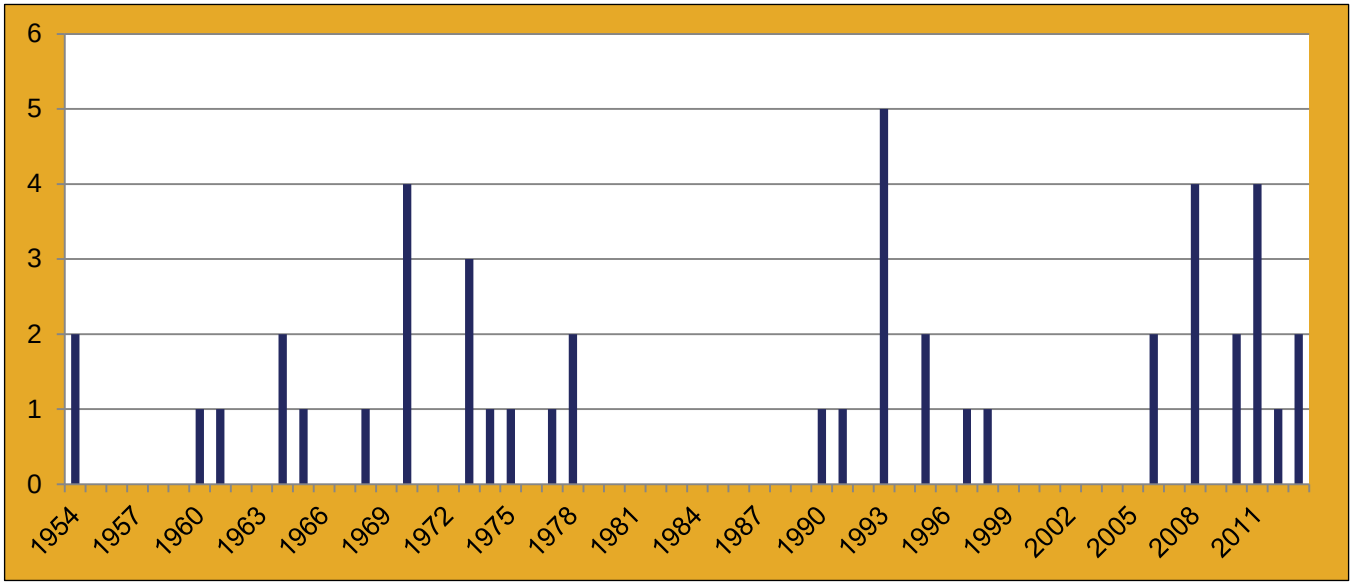

EF5
EF4
EF3
EF2
EF1
EF0
Incredible: Strong frame houses are lifted from foundations, reinforced concrete structures are damaged, automobile-sized missiles become airborne, trees are completely debarked.
Devastating: Well-constructed houses are destroyed, some structures are lifted from foundations and blown some distance, cars are blown some distance, large debris becomes airborne.
Severe: Roofs and some walls are torn from structures, some small buildings are destroyed, non-reinforced masonry buildings are destroyed, most trees in forest are uprooted.
Considerable: Roof structures are damaged, mobile homes are destroyed, debris becomes airborne (missiles are generated), large trees are snapped or uprooted.
Moderate: Roof surfaces are peeled off, windows are broken, some tree trunks are snapped, unanchored mobile homes are overturned, attached garages may be destroyed.
Light: Chimneys are damaged, tree branches are broken, shallow-rooted trees are toppled.

4.3.3 – Previous Occurrences

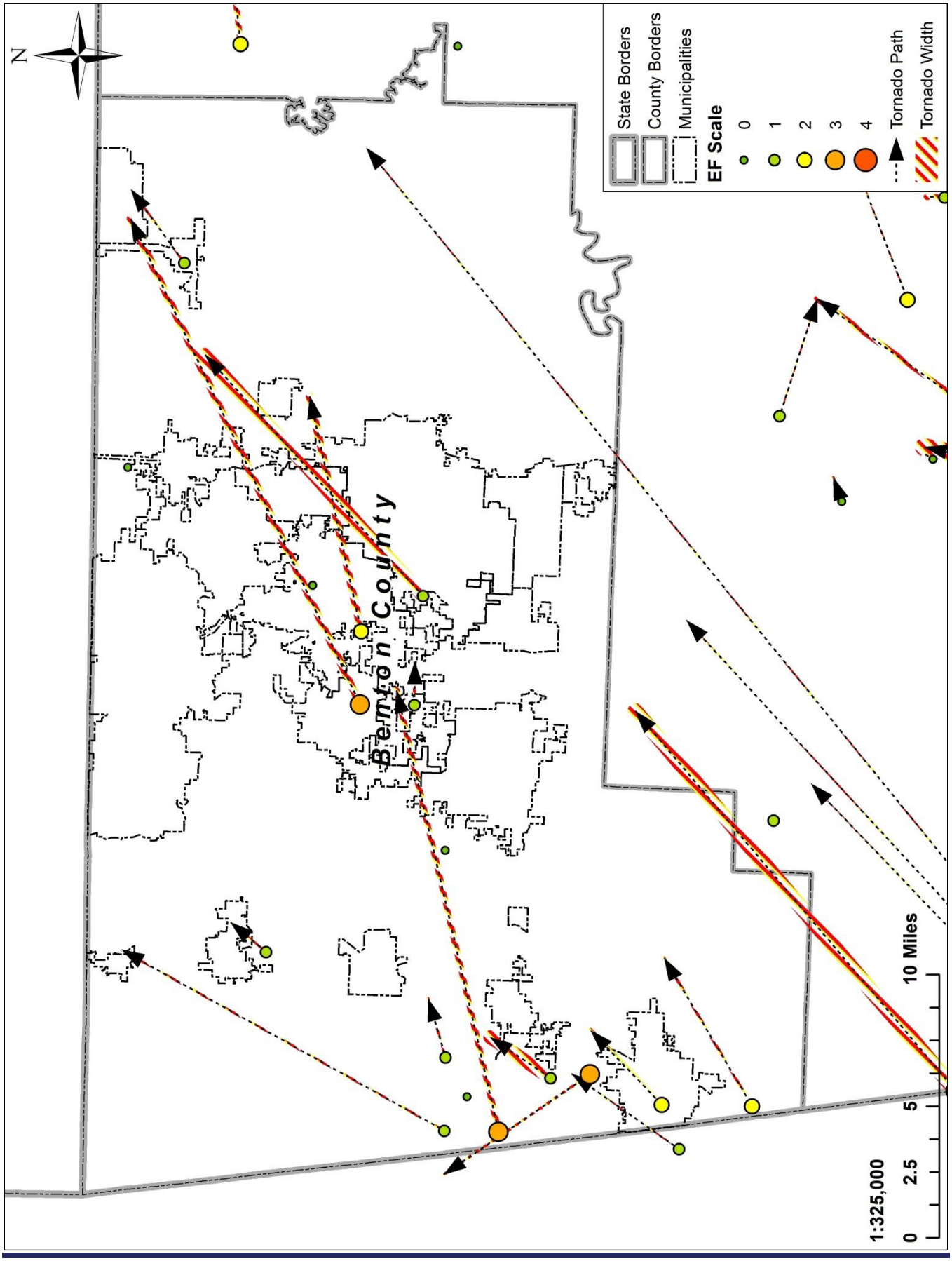
Since 1954, NOAA has recorded 46 tornado event in Benton County and its participating jurisdictions. Benton County and its participating jurisdictions have recorded 0 deaths and 28 injuries relating to tornado activity costing $19,792,750 in property damage.

For a complete list of NOAA recorded tornado events, please reference Appendix E.

Chart 16 – Tornadoes per Year, Benton County (1954 – 2013)



Map X – Tornadoes, Benton County



4.3.3A – Probability of Future Events

Benton County and its participating jurisdictions can expect a tornado with a probability of 75.41% per year or 0.7541 tornado events per year.

Table X – Probability, Tornadoes	
Event Year	**Event Count**
1954 - 1959	2
1960 - 1969	6
1970 - 1979	12
1980 - 1989	0
1990	1
1991	1
1992	0
1993	5
1994	0
1995	2
1996	0
1997	1
1998	1
1999	0
2000	0
2001	0
2002	0
2003	0
2004	0
2005	0
2006	2
2007	0
2008	4
2009	0
2010	2
2011	4
2012	1
2013	2
Total Recorded Events =	31
Total Years =	61
Yearly Probability =	**75.41%**

**The data are from the NOAA NCDC Storm Event Database.*

4.3.4 – Assessing Vulnerability & Impacts

Tornado Impacts

Benton County and its participating jurisdictions have recorded 46 tornadoes since 1954, of which the range of magnitude was between EF0 and EF3 with an approximate average of an EF1. Based on the Enhanced Fujita Scale on page XXX and the future probability in Table XX, the Benton County and its participating jurisdictions can expect 0.77 tornadoes per year ranging from 'light' to 'considerable' damage with the proven potential to be impacted by an EF3 dealing out a 'severe' amount of damage.

Table X – Historical Impacts, Tornadoes	
Count of Events	46
Impacts Per Year	0.77
Average Magnitude (Enhance Fujita Scale)	1.04
Magnitude Range (Enhance Fujita Scale)	EF0 - EF3
Average Cost	$430,277
Magnitude of Cost	$0 - $10,000,000
Total Recorded Cost	$19,792,750
Average Fatalities	0
Total Fatalities	0
Average Injuries	0.61
Total Injuries	28

**The data are compiled from the NOAA NCDC Storm Event Database.*

Vulnerability of Facilities

Benton County and its participating jurisdictions' vulnerability is the same throughout the planning area. Most tornadoes are in the EF0 – EF2 class. Building to modern wind standards and state codes provides significant protection from these hazard events; however, a community in the direct path of a violent, high scale tornado can do little to prevent significant property damage. Designing buildings to protect against extreme wind speeds, such as those associated with an EF4 or EF5 is extremely challenging and cost prohibitive. Anything less than a FEMA Code 361 compliant structure is susceptible to significant damage or complete destruction. Currently, there are not any completed FEMA Code 361 compliant structures in Benton County or its participating jurisdictions.

The average tornado event in Benton County and its participating jurisdictions costs $430,277, while the existing range of a single incident has been between and EF0 and EF3.

Please reference the figure on page XXX to compare EF classes to likely impacts and damages.

Vulnerability of Population

Benton County and its participating jurisdictions' vulnerability to tornadoes is the same throughout the planning area.

Benton County and its participating jurisdictions have a total population of 237,297. An EF4 or EF5 tornado has the potential to level the smaller jurisdictions and kill everyone in them while being able to do nearly the same in the larger ones. A lesser magnitude tornado has the ability to kill Benton County and its participating jurisdictions' citizens as it rips off the roofs and walls of its structures while launching airborne missiles born from debris.

Historically, there have been 0 recorded fatalities and 28 injuries from tornadoes in Benton County and its participating jurisdictions.

Vulnerability of Systems
Benton County and its participating jurisdictions' community assets and systems' vulnerability to tornadoes is equal throughout the planning area. A small magnitude tornado will not significantly damage a community of its systems, but a larger magnitude tornado can impact a community for weeks, months, or years and even destroy a town or city completely. Significant damage to Benton County and its participating jurisdictions would hinder the community's economy and increase its social vulnerability.

4.3.4A – Infrastructure & Critical Facilities
All infrastructure and critical facilities are equally at risk, since tornadoes indiscriminately affect the entire planning area. A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends
Increased residential growth increases a community's risk to tornadoes by way of its facilities, population, and systems' vulerabilities as defined in Section 4.3.4 of this hazard profile. None of the participating jurisdictions have seen significant growth and thus their risk to tornadoes has not increased.

As Benton County and its participating jurisdictions grow, it will need to initiate more programs building tornado safe rooms and encouraging the construction of private safe rooms. Additionally, community and school safe rooms will need to be built based on projections of future population and not the current number.

Any buildings or infrastructure built in the future will have the same risk as other buildings or infrastructure built within the planning area.

4.3.4C – Unique & Varied Risk
Tornadoes have ability to affect a portion of or the entire planning area. Unfortunately, there is no accurate method of predicting the location or extent of a tornado's impact, that being if it will affect one participating jurisdiction up to any number or all participating jurisdictions.

Additionally, it is not possible to predict any varying probability between the participating jurisdictions with the exception of varying risk as it is proportionate to a participating jurisdiction's demographics. Logically, participating jurisdictions with a greater population are at a higher risk as participating jurisdictions with a lower population are at a lower risk.

Additionally, it is not possible to predict any varying probability between the participating jurisdictions. Although this plan addresses vulnerability to tornadoes, without the possibility of being able to calculate all components of risk at a jurisdictional level, each jurisdiction's individual risk to tornadoes is not possible to calculate.

4.3WF – Wildfires

4.3.1 – Description

The NWS defines a wildfire as: Any free burning uncontainable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. They can occur naturally, by human accident, and on rare occasions by human action. Typically their point of origin is far from human development with the exception of roads, power lines, and similar infrastructure. There is a constant threat to hikers, campers, and other people engaging in outdoor activities. Significant danger to life and property occurs when human development meets and becomes intertwined with wildland's vegetation. The threat of wildfire increases in areas prone to intermittent drought, or are generally arid or dry.

Population de-concentration in the U.S. has resulted in rapid development in the outlying fringe of metropolitan areas and in rural areas with attractive recreational and aesthetic amenities, especially forests. This demographic change is increasing the size of the wildland-urban interface (WUI), defined as the area where structures and other human development meet or intermingle with undeveloped wildland. Its expansion has increased the likelihood that wildfires will threaten life and property.

Rampant destruction can be mitigated by fire services regularly engaging in preventative burns and land use measures to minimize the spread of wildfire events. Both of these practices are used in New Mexico to minimize the extent of wildfire

4.3.2 – Location & Extent

The expansion of the WUI in recent decades has significant implications for wildfire management and its impact. The WUI creates an environment in which fire can move readily between structural and vegetation fuels. Two types of WUI are mapped: intermixed and interface. Intermix WUI are areas where housing and vegetation intermingle; interface WUI are areas with housing in the vicinity of dense, contiguous wildland vegetation.

The duration of a wildfire depends on the weather conditions, how dry it is, the availability of fuel to spread, and the ability of responders to contain and extinguish the fire. Historically, some wildfires have lasted only hours, while other fires have continued to spread and grow for an entire season. They spread quickly and often begin unnoticed until they have grown large enough to signal by dense smoke. If fuel is available, and the high wind speeds hit, a wildfire can spread over a large area in a very short amount of time. These factors make the difference between small upstart fires easily controlled by local fire services to fires destroying thousands of acres requiring multiple state and federal assets for containment and suppression.

Given the WUI and Intermix depictions on Maps XX through XX (Located in Map Compendium), every jurisdiction is exposed to wildfires with the exception of Bethel Heights, the NWACC, Decatur SD, Gentry SD, Pea Ridge SD, and the Siloam Springs SD.

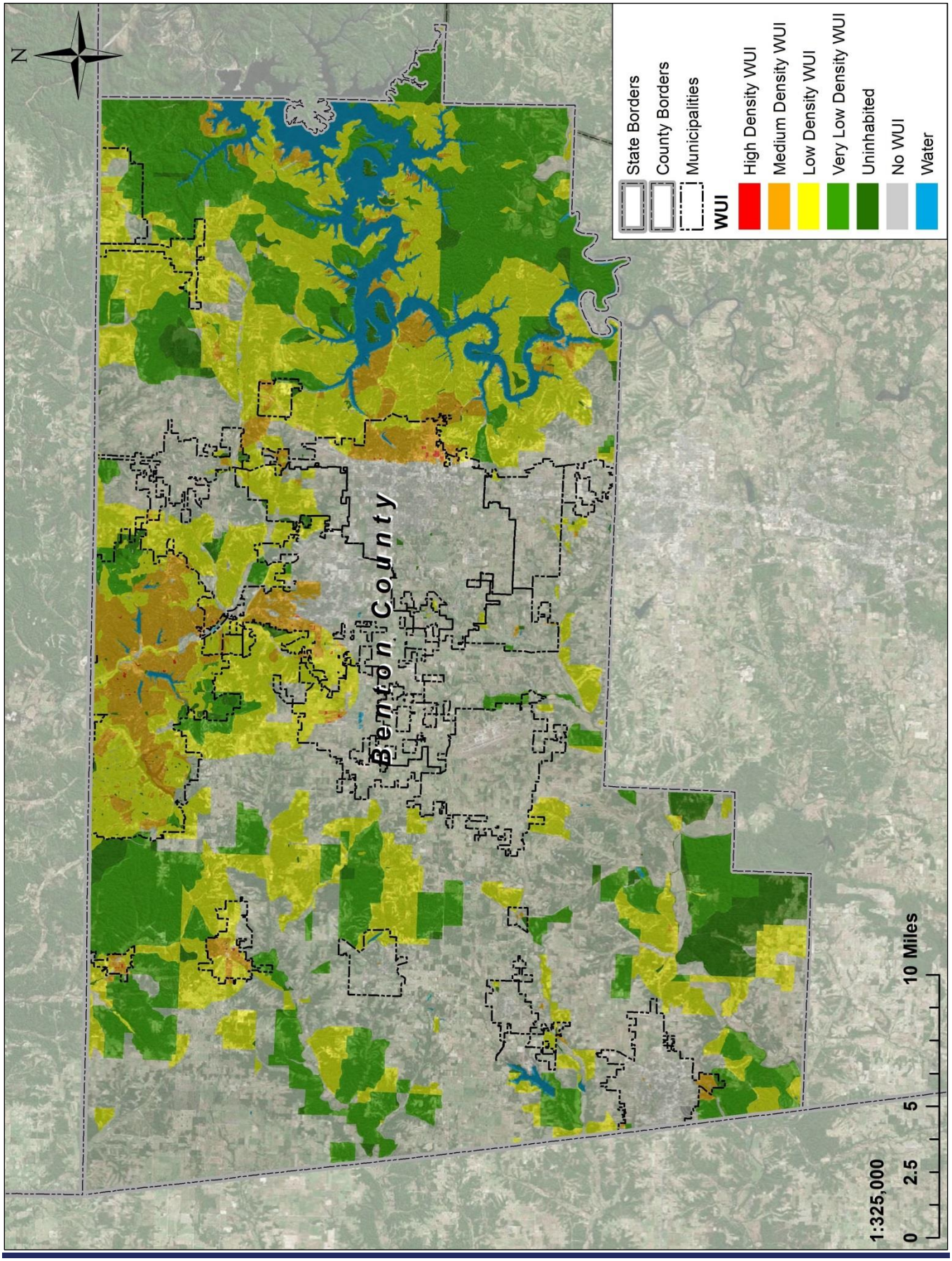
Table XX shown below, details the range of wildfire damages. The severity of the wildfire depends on a number of quickly changing environmental factors. It is impossible to strategically estimate the severity of a wildfire as the quickly changing factors, drought conditions and wind speed, have such a great influence on the wildfire conditions. If exposed to the WUI or Intermix, Benton County or one of its participating jurisdictions could experience a wildfire ranging from 0 to 4 on the Burn Severity Index.

Table X – Burn Severity Index

Rank	Burn Severity	Description	Characteristics
0	Unburned	Fire extinguished before reaching microsite	• Leaf litter from previous years intact and uncharred • No evidence of char around base of trees and shrubs • Pre-burn seedlings and herbaceous vegetation present.
1	Low Severity Burn	Surface fire which consumes litter yet has little effect on trees and understory vegetation.	• Burned with partially consumed litter present • Evidence of low flame heights around base of trees and shrubs (<0.5 m) • No significant decreases in overstory & understory basal area, diversity or species richness from pre-burn assessments • Usually burning below 80 ° C
2	Medium-Low Severity Burn	No significant differences in overstory density and basal area, & no significant differences in species richness. However, understory density, basal area, and species richness declined.	• No litter present and 100% of the area covered by duff • Flame lengths < 2 m • Understory mortality present, little or no overstory mortality
3	Medium-High Severity Burn	Flames that were slightly taller than those of Medium-low intensity fires, but these fires had occasional hot spots that killed large trees, With significant reduction in the understory	• Soil exposure on l-50% of the area • Flame lengths <6m • High understory mortality with some overstory trees affected
4	High Severity Burn	Crown fires, usually a stand replacing burn with relatively high overstory mortality	• Soil exposure >50% • Flame lengths >6m • Higher overstory mortality >20% • Usually burning above 800 ° C

**The index is courtesy of the Southern Appalachian Forest Coalition*

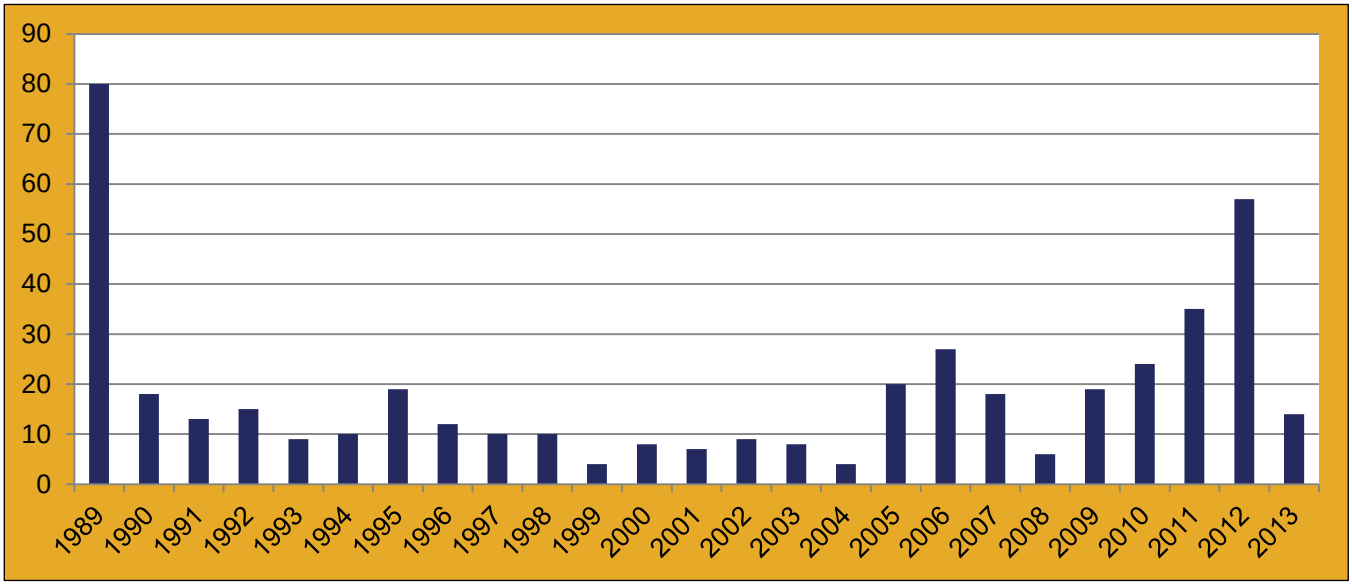
Map X – WUI, Benton County



4.3.3 – Previous Occurrences

Benton County and its participating jurisdictions regularly experience wildfire events. The Arkansas Forestry Commission reports Benton County and its participating jurisdictions have recorded 456 fires burning 11,729.00 acres between 1989 and 2013. The Arkansas Forestry Commission does not have any recorded deaths or injuries from wildfire in Benton County or its participating jurisdictions.

Chart 17 – Wildfires per Year, Benton County (1989 – 2013)



4.3.3A – Probability of Future Events

The data collected by the Arkansas Forestry Commission is based on the county level. Benton County and its participating jurisdictions can expect a wildfire event with a 1824.00% probability per year, or 18.24 fires per year.

Table X – Probability, Wildfires			
Event Year	**Acres Burned**	**Event Count**	
1989	994	80	
1990	789	18	
1991	306	13	
1992	147	15	
1993	78	9	
1994	83	10	
1995	207	19	
1996	250	12	
1997	274	10	
1998	199	10	
1999	19	4	
2000	117	8	
2001	91	7	
2002	629	9	
2003	168	8	
2004	105	4	
2005	336	20	
2006	1,021	27	
2007	552	18	
2008	56	6	
2009	201	19	
2010	405	24	
2011	3,237	35	
2012	1,235	57	
2013	230	14	
Total Acres Burned =	11,729.00	Total Recorded Events =	456
Total Years =	25		
Acres Per Year =	**469.16**	**Yearly Probability =**	**1824.00%**

**The data are from the Arkansas Forestry Commission.*

4.3.4 – Assessing Vulnerability & Impacts

Wildfire Impacts

Benton County and its participating jurisdictions have recorded 456 wildfires since 1989, of which have burned 11,729.00 acres at an average of 469.16 acres per year and 25.72 acres per fire. Based on the future probability in Table XX, Benton County and its participating jurisdictions can expect 469.16 acres to be burned per year. More specific predictions on potential impacts are dependent on highly variable and continually changing conditions not appropriate for this level of planning.

Table X – Historical Impacts, Wildfires		
Years (1989 - 2013)	**Fires**	**Acres**
25	456	11,729.00
Per Year	18.24	469.16
Acres Per Fire	25.72	

**The data are compiled from the Arkansas Forestry Commission.*

Vulnerability of Facilities

A wildfire burning near a jurisdiction may cover it in soot, cause secondary fires from traveling coals, or directly engulf facilities burning them to the ground. Facilities can be protected by creating defensible spaces or buffer zones, maintaining a fuel free environment, and structural modifications to prevent the growth of a wildfire.

Vulnerability of Population

Benton County and its participating jurisdictions have a population of 237,297. A jurisdiction's population greatest vulnerability is an inability to properly evacuate. They can be caught off guard due to improper warning systems and become trapped in a growing wildfire.

Historically, there are no recorded fatalities or injuries in Benton County and its participating jurisdictions from wildfire.

Vulnerability of Systems

In the event a wildfire begins to burn and grow, evacuation routes may become blocked by the fire or by other people attempting to evacuate. The impingement of the local transportation system make appropriate warning and information paramount in mitigating Benton County and its participating jurisdictions' systems vulnerability to wildfires.

4.3.4A – Infrastructure & Critical Facilities

A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends

Increased residential growth increases a community's risk to wildfires by way of its facilities, population, and systems' vulerabilities as defined in Section 4.3.4 of this hazard profile. None of the participating jurisdictions have seen significant growth growth into identified hazard areas thus their risk to wildfires has not increased.

Any buildings or infrastructure built in the future will have the same risk as other buildings or infrastructure built within the identified hazard areas.

4.3.4C – Unique & Varied Risk

Table X – Unique & Varied Risk, Wildfires

Jurisdiction	Risk Characteristics
Benton County	Contains WUI zones of 'low' and 'medium' risk
Avoca	Contains WUI zones of 'low' and 'medium' risk
Bella Vista	Contains WUI zones of 'low,' 'medium,' and 'high' risk
Bentonville	Contains WUI zones of 'low,' 'medium,' and 'high' risk
Bethel Heights	Contains no WUI zones
Cave Springs	Contains WUI zones of 'low' and 'medium' risk
Centerton	Contains WUI zones of 'low,' 'medium,' and 'high' risk
Decatur	Contains WUI zones of 'low' and 'medium' risk
Garfield	Contains WUI zones of 'low' and 'medium' risk
Gateway	Contains WUI zones of 'low' and 'medium' risk
Gentry	Contains WUI zones of 'low' and 'medium' risk
Gravette	Contains WUI zones of 'low,' 'medium,' and 'high' risk
Highfill	Contains WUI zones of 'low' risk
Little Flock	Contains WUI zones of 'low' and 'medium' risk
Lowell	Contains WUI zones of 'low' risk
Pea Ridge	Contains WUI zones of 'low' and 'medium' risk
Rogers	Contains WUI zones of 'low,' 'medium,' and 'high' risk
Siloam Springs	Contains WUI zones of 'medium' risk
Springtown	Contains WUI zones of 'low' and 'medium' risk
Sulphur Springs	Contains WUI zones of 'low,' 'medium,' and 'high' risk
NWACC	Contains no WUI zones
Bentonville SD	Contains WUI zones of 'low' and 'medium' risk
Decatur SD	Contains no WUI zones
Gentry SD	Contains no WUI zones
Gravette SD	Contains WUI zones of 'low' and 'medium' risk
Pea Ridge SD	Contains no WUI zones
Rogers SD	Contains WUI zones of 'low,' 'medium,' and 'high' risk
Siloam Springs SD	Contains no WUI zones

4.3WS – Winter Storms

4.3.1 – Description

A winter storm encompasses multiple effects caused by winter weather. Included are strong winds, ice storms, heavy or prolonged snow, sleet, and extreme temperatures. Winter storms can be increasingly hazardous in areas and regions that only see winter storms intermittently.

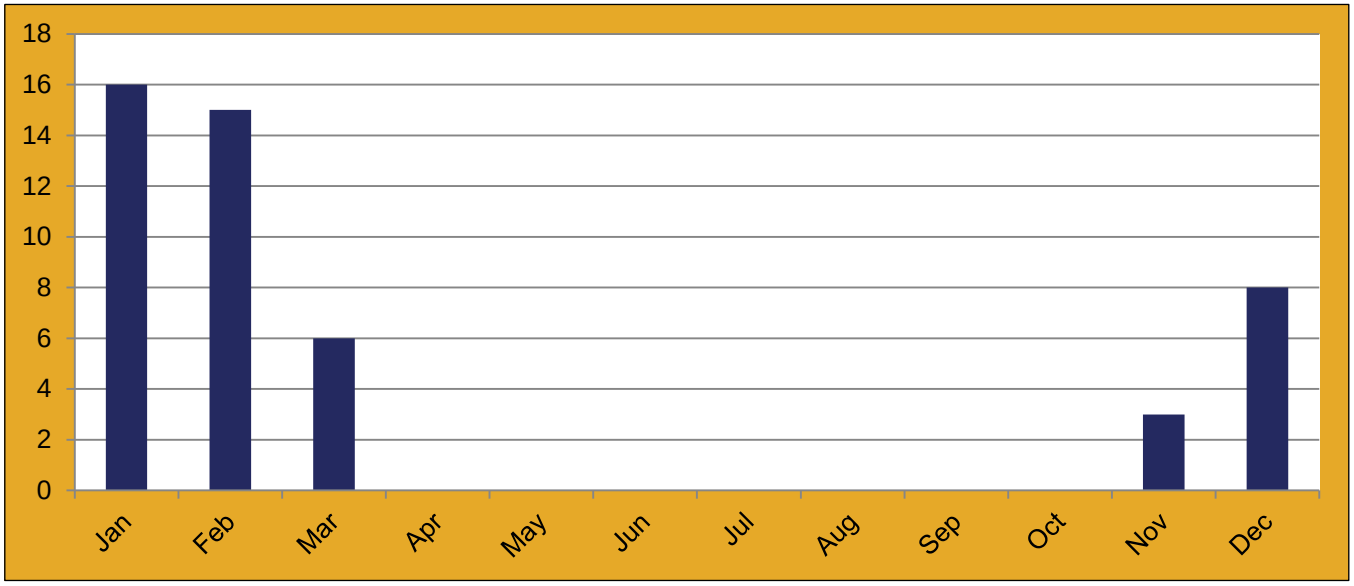
This plan defines winter storms as a combination of the following winter weather effects as defined by NOAA and the NWS.

Ice Storm: An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of ¼" or greater.

Heavy Snow: This generally means snowfall accumulating to 4" or more in depth in 12 hours or less; or snowfall accumulating to 6" or more in depth in 24 hours or less. In forecasts, snowfall amounts are expressed as a range of values, e.g., "8 to 12 inches." However, in heavy snow situations where there is considerable uncertainty concerning the range of values, more appropriate phrases are used, such as "...up to 12 inches..." or alternatively "...8 inches or more."

Winter Storm: Hazardous winter weather in the form of heavy snow, heavy freezing rain, or heavy sleet. May also include extremely low temperatures and increased wind.

Chart 18 – Winter Storms per Month, Benton County (1993 – 2013)



4.3.2 – Location & Extent

Winter storms occur regularly throughout Benton County and its participating jurisdictions and often affect the entire planning area. These events occur on a massive geographic scale, often affecting multiple counties, regions, and states.

Winter storms typically form with warning and are often anticipated. Like other large storm fronts, the severity of a storm is not as easily predicted and when it is, the window of notification is up to few hours to under an hour. Although meteorologists estimate the amount of snowfall a winter storm will drop, it is not known exactly how many feet of snow will fall, whether or not it will form an ice storm, or how powerful the winds will be until the storm is already affecting a community.

Winter storms can range from moderate snow over a few hours to blizzard conditions with high winds, freezing rain or sleet, heavy snowfall with blinding wind-driven snow and extremely cold temperatures that last several days.

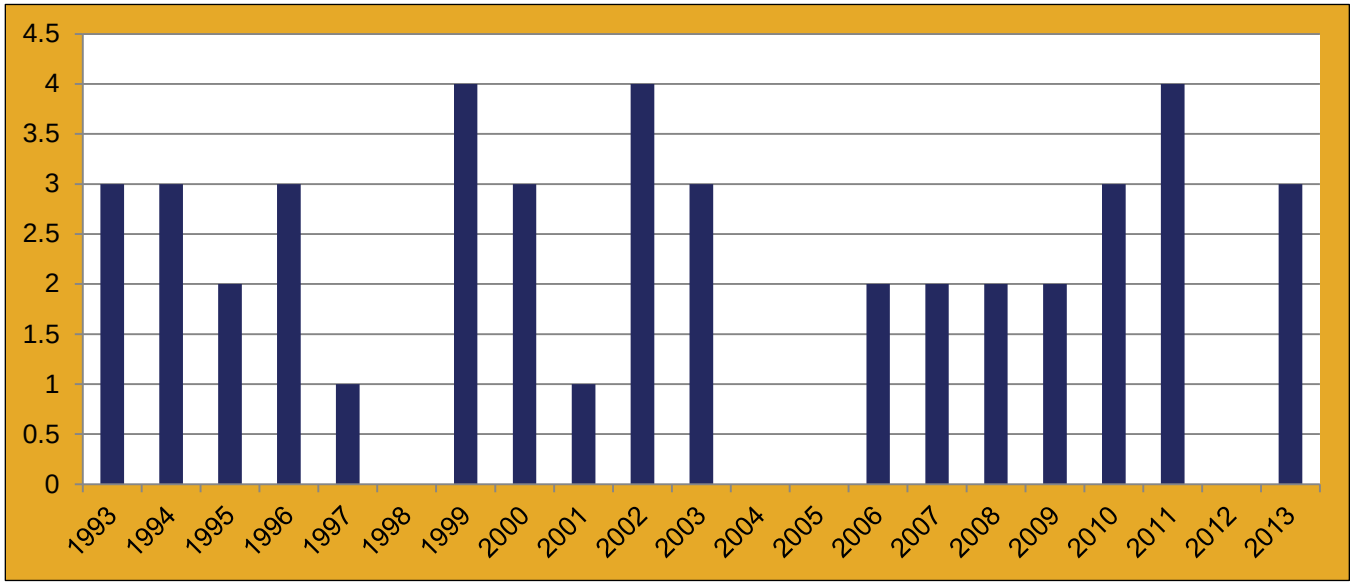
4.3.3 – Previous Occurrences

Benton County and its participating jurisdictions have no recorded deaths from winter storms.

Since 1997, NOAA has recorded 21 winter storm in Benton County and its participating jurisdictions. Benton County and its participating jurisdictions have recorded $525,460,000 in property damage from winter storms.

For a complete list of NOAA recorded winter storm events, please reference Appendix E.

Chart 19 – Winter Storms per Year, Benton County (1993 – 2013)



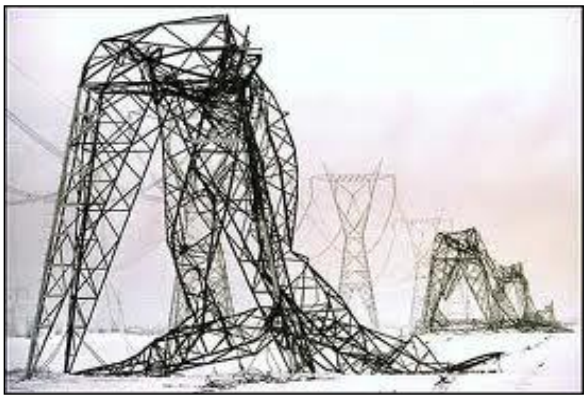
4.3.3A – Probability of Future Events

Benton County and its participating jurisdictions can expect a winter storm with a 241.29% probability per year, or 2.1429 events per year.

Table X – Probability, Winter Storms	
Event Year	**Event Count**
1993	3
1994	3
1995	2
1996	3
1997	1
1998	0
1999	4
2000	3
2001	1
2002	4
2003	3
2004	0
2005	0
2006	2
2007	2
2008	2
2009	2
2010	3
2011	4
2012	0
2013	3
Total Recorded Events =	45
Total Years =	21
Yearly Probability =	**214.29%**

**The data are from the NOAA NCDC Storm Event Database.*

4.3.4 – Assessing Vulnerability & Impact



Winter Storm Impacts

Benton County and its participating jurisdictions have recorded 48 winter storm events since 1993, of which the range of magnitude can be any combination of winter storms, but will always be considered severe. Based on the future probability in Table X, Benton County and its participating jurisdictions can expect 2.1429 winter storm events per year which could impact in the form of heavy accumulated snow, accumulated ice, extreme and prolonged cold temperatures, or any combination of the three.

Table X – Historical Impacts, Winter Storms	
Count of Events	48
Impacts Per Year	2.14
Average Magnitude	-
Magnitude Range	-
Average Cost	$2,735,800
Magnitude of Cost	$0 - $50,000,000
Total Recorded Cost	$68,395,000
Average Fatalities	0
Total Fatalities	0
Average Injuries	0
Total Injuries	0

**The data are compiled from the NOAA NCDC Storm Event Database.*

Vulnerability of Facilities

Structural vulnerability to winter storms is the same throughout Benton County and its participating jurisdictions. Heavy snow accumulation can cause roofing to collapse on old or poorly constructed facilities. Ice storms will coat a facility's exterior, but is unlikely to cause anything more than superficial damage. Prolonged, extremely cold temperatures can cause significant damage to poorly insulated or heated facilities. The cold temperatures can cause a facility's water pipes and plumbing systems to freeze. As the water in these systems turns to ice it expands and eventually will cause pipes to burst.

The average winter storm in Benton County and its participating jurisdictions costs $2,735,800, while the existing range of a single incident has been from $0 to $50,000,000.

Vulnerability of Population

Benton County and its participating jurisdictions' population are equally vulnerable throughout the planning area. Benton County and its participating jurisdictions' citizens are at risk from prolonged, cold temperatures if they fail to be sheltered in an adequately heated structure or are unable to reach shelter. Some structures are dependent on electricity for their heating making them vulnerable if a winter storm causes power outages. Additionally, if a winter storm restricts travel, people may become immobile on roadways and be at the mercy of their vehicle's gas supply. Exposure from winter storms in any of these cases can lead to frostbite and hypothermia. Both of these conditions if untreated can lead to death.

Historically, there have been 0 recorded fatalities relating to winter storms across region wide fronts in Benton County and its participating jurisdictions.

Vulnerability of Systems

Benton County and its participating jurisdictions' assets and systems vulnerability to winter storms is the same throughout the planning area. Winter storms create havoc on roads impacting travel from decreased speeds and traffic jams to an ice storm or blowing snow drifts making any travel impossible or extremely dangerous. Additionally, ice storms and snow accumulation can directly bring down power lines or bring down vegetation onto power lines. From these scenarios, Benton County and its participating jurisdictions can suffer power outages making it difficult to heat structures and exposing its citizens to prolonged cold temperatures.

4.3.4A – Infrastructure & Critical Facilities

All infrastructure and critical facilities are equally at risk, since winter storms indiscriminately affect the entire planning area. A complete list of infrastructure and critical facilities can be found in Appendix D.

4.3.4B – Land Use & Development Trends

Increased residential growth increases a community's risk to winter storms by way of its facilities, population, and systems' vulerabilities as defined in Section 4.3.4 of this hazard profile. None of the participating jurisdictions have seen significant growth and thus their risk to winter storms has not increased.

Any buildings or infrastructure built in the future will have the same risk as other buildings or infrastructure built within the planning area.

4.3.4C – Unique & Varied Risk

Winter storms have ability to affect a portion of or the entire planning area. Unfortunately, there is no accurate method of predicting the location or extent of a severe winter weather event's impact, that being if it will affect one participating jurisdiction up to any number or all participating jurisdictions.

Additionally, it is not possible to predict any varying probability between the participating jurisdictions with the exception of varying risk as it is proportionate to a participating jurisdiction's demographics. Logically, participating jurisdictions with a greater population are at a higher risk as participating jurisdictions with a lower population are at a lower risk.

Additionally, it is not possible to predict any varying probability between the participating jurisdictions. Although this plan addresses vulnerability to winter storms, without the possibility of being able to calculate all components of risk at a jurisdictional level, each jurisdiction's individual risk to winter storms is not possible to calculate

Section 5 – Mitigation Strategy

5.1 – Mitigation Capabilities

Benton County and its participating jurisdictions' governments utilize a single emergency management agency for their services, this being the Benton County Emergency Management Agency.

Local initiatives, programs, and policies, are often facilitated by the Benton County EMA in coordination with local governments, and other emergency related entities, as it is the sole, primary agency responsible for emergency management. The Benton County EMA does this by fostering local partnerships and relationships, an active LEPC, and assisting local governments with funding and training initiatives.

All future implemented mitigation projects will be overseen by the Benton County EMA and will coordinate with the corresponding local municipal government. The corresponding local government involvement will vary by jurisdiction and be decided by that jurisdictional government as they see it fit to best plan, design, and implement mitigation projects.

Each jurisdiction has the ability to levee their own taxes through law, or in the case of school districts, through referendum. Each jurisdiction has their own budget to appropriate towards hazard mitigation as they deem appropriate or necessary. Additionally, the Benton County EMA will seek out grant opportunities through the State of Arkansas and FEMA to help decrease the financial burden on local government.

The development and implementation of this plan comes with the full authority of the Benton County Office of Emergency Management, through the participating jurisdictions, and all resources deemed appropriate and necessary.

Building Codes
All participating jurisdictions in the Benton County HMP are obligated by law to abide by the State of Arkansas Fire Prevention Code 2007. The Benton County HMP does not change any of the state requirements and therefore does not interfere with any jurisdiction's current building code enforcement or land use planning. If a participating jurisdiction has adopted further building codes, it is noted in the capabilities' tables.

Land Use & Zoning
Benton County and its participating jurisdictions adhere to a wide variety of land use and zoning plans and restrictions, please see the tables on the following page for further information.

NFIP Construction Compliance
NFIP participating jurisdictions in Benton County are required to meet the minimum standards set forth by participating in the NFIP through the local NFIP Coordinator. The county's NFIP coordinator currently ensures all new construction projects are properly surveyed and receive an elevation certificate. The NFIP coordinator uses FEMA issued D/FIRMs information. Each participating municipality has their own FPA/NFIP-C that coordinates with the county's FPA/NFIP-C

The determination of whether and how to use the Benton County HMP in any NFIP related processes and decisions will be left to the expertise of the FPA/NFIP-C.

Table X – Local Mitigation Capabilities – 1			
Jurisdiction	**ISO Fire Insurance Rating**	**Building Codes**	**Adopted Codes**
Benton County	8	Arkansas Fire Prevention 2007	None
Avoca	6	Arkansas Fire Prevention 2007	Firewise
Bella Vista	5	Arkansas Fire Prevention 2007	None
Bentonville	2	International Fire Prevention 2012	Firewise
Bethel Heights	5	Arkansas Fire Prevention 2007	None
Cave Springs	6	Arkansas Fire Prevention 2007	Firewise
Centerton	6	Arkansas Fire Prevention 2007	Firewise
Decatur	7	Arkansas Fire Prevention 2007	Firewise
Garfield	7	Arkansas Fire Prevention 2007	None
Gateway	7	Arkansas Fire Prevention 2007	None
Gentry	5	Arkansas Fire Prevention 2007	Firewise
Gravette	4	Arkansas Fire Prevention 2007	None
Highfill	5	Arkansas Fire Prevention 2007	Firewise
Little Flock	5	Arkansas Fire Prevention 2007	Firewise
Lowell	3	International Fire Prevention 2012	Firewise
Pea Ridge	-	Arkansas Fire Prevention 2007	None
Rogers	3	International Fire Prevention 2012	Firewise
Siloam Springs	3	International Fire Prevention 2012	Firewise
Springtown	-	Arkansas Fire Prevention 2007	None
Sulphur Springs	7	Arkansas Fire Prevention 2007	Firewise
NWACC	N/A	Arkansas Fire Prevention 2007	None
Bentonville SD	N/A	Arkansas Fire Prevention 2007	None
Decatur SD	N/A	Arkansas Fire Prevention 2007	None
Gentry SD	N/A	Arkansas Fire Prevention 2007	None
Gravette SD	N/A	Arkansas Fire Prevention 2007	None
Pea Ridge SD	N/A	Arkansas Fire Prevention 2007	None
Rogers SD	N/A	Arkansas Fire Prevention 2007	None
Siloam Springs SD	N/A	Arkansas Fire Prevention 2007	None
NW AR CC	N/A	Arkansas Fire Prevention 2007	None

Table X – Local Mitigation Capabilities – 2				
Jurisdiction	**Building Codes**	**Capital Improvement Plan**	**Comprehensive Plan**	**EOP**
Benton County	Yes	No	No	Yes
Avoca	Yes	No	Yes	Covered under county EOP
Bella Vista	Yes (2012)	No	No	Covered under county EOP
Bentonville	Yes (2012)	No	No	Covered under county EOP
Bethel Heights	Yes	No	No	Covered under county EOP
Cave Springs	Yes	No	No	Covered under county EOP
Centerton	Yes	No	No	Covered under county EOP
Decatur	Yes	No	No	Covered under county EOP
Garfield	Yes	No	No	Covered under county EOP
Gateway	Yes	No	No	Covered under county EOP
Gentry	Yes	No	Yes	Covered under county EOP
Gravette	Yes	No	No	Covered under county EOP
Highfill	Yes	No	No	Covered under county EOP
Little Flock	Yes	No	No	Covered under county EOP
Lowell	Yes (2012)	No	No	Covered under county EOP
Pea Ridge	Yes	No	No	Covered under county EOP
Rogers	Yes	No	No	Covered under county EOP
Siloam Springs	Yes (2012)	No	No	Covered under county EOP
Springtown	Yes	No	No	Covered under county EOP
Sulphur Springs	Yes	No	No	Covered under county EOP
NWACC	N/A	N/A	N/A	Covered under county EOP
Bentonville SD	N/A	N/A	N/A	Covered under county EOP
Decatur SD	N/A	N/A	N/A	Covered under county EOP
Gentry SD	N/A	N/A	N/A	Covered under county EOP
Gravette SD	N/A	N/A	N/A	Covered under county EOP
Pea Ridge SD	N/A	N/A	N/A	Covered under county EOP
Rogers SD	N/A	N/A	N/A	Covered under county EOP
Siloam Springs SD	N/A	N/A	N/A	Covered under county EOP
NW AR CC	N/A	N/A	N/A	Covered under county EOP

Table X – Local Mitigation Capabilities – 3						
Jurisdiction	**Floodplain Management Ordinance**	**Growth Management Plan**	**Post-Disaster Plan**	**Site Plan Review Requirement**	**Subdivision Ordinance**	**Zoning Ordinance**
Benton County	No	Yes	Expired	No	Yes	No
Avoca	No	Yes	Expired	No	Yes	Yes
Bella Vista	Yes	Yes	Expired	No	Yes	Yes
Bentonville	No	Yes	Expired	No	Yes	Yes
Bethel Heights	No	Yes	Expired	No	No	No
Cave Springs	No	Yes	Expired	No	Yes	Yes
Centerton	No	Yes	Expired	No	Yes	No
Decatur	No	Yes	Expired	No	No	No
Garfield	No	Yes	Expired	No	No	Yes
Gateway	No	Yes	Expired	No	No	No
Gentry	No	Yes	Expired	No	No	No
Gravette	No	Yes	Expired	No	No	No
Highfill	No	Yes	Expired	No	Yes	Yes
Little Flock	No	Yes	Expired	No	No	No
Lowell	No	Yes	Expired	No	No	No
Pea Ridge	No	Yes	Expired	No	Yes	No
Rogers	No	Yes	Expired	No	No	No
Siloam Springs	Yes	Yes	Expired	No	Yes	Yes
Springtown	Yes	Yes	Expired	No	No	No
Sulphur Springs	No	Yes	Expired	No	No	Yes
NWACC	N/A	N/A	No	N/A	N/A	N/A
Bentonville SD	N/A	N/A	No	N/A	N/A	N/A
Decatur SD	N/A	N/A	No	N/A	N/A	N/A
Gentry SD	N/A	N/A	No	N/A	N/A	N/A
Gravette SD	N/A	N/A	No	N/A	N/A	N/A
Pea Ridge SD	N/A	N/A	No	N/A	N/A	N/A
Rogers SD	N/A	N/A	No	N/A	N/A	N/A
Siloam Springs SD	N/A	N/A	No	N/A	N/A	N/A
NW AR CC	N/A	N/A	No	N/A	N/A	N/A

5.2 – NFIP & CRS Participation

Eighteen jurisdictions participating in this plan are currently active members of the NFIP. The table below contains a list of each community and their NFIP Status. Neither Garfield or Gateway is listed in the FEMA Community Status Book. This is due to the absence of any floodplains in their municipal borders. School districts are not municipal entities and thus do not classify as possible participants of the NFIP program. Benton County, Bentonville, and Centerton participate in FEMA's CRS program. Benton County and Bentonville have CRS ratings of 8 while Centerton has a CRS rating of 9.

The Benton County Planning Department oversees all NFIP related activities within the county. They employ NFIP Coordinator/FPAs to ensure BFE elevation certificates are completed for all new construction in the planning area, ensuring any development in a flood plain is accompanied by a Flood Hazard Development Certificate, and further develops the NFIP program in the planning area to mitigate flood risk to its population. Both certificates are required prior to construction and to be completed by a licensed surveyor.

Table X – NFIP Participating Communities

FEMA Community Status Book Report, Arkansas – (10/16/2014)

Jurisdiction	CID	Initial FHBM Identified	Initial Firm Identified	Current Effective Map Date	Sanction Date
Benton County	050419	10/18/1977	09/18/91	06/05/12	09/18/91
Avoca	050582	-	09/18/91	06/05/12	09/18/92
Bella Vista	050511	-	09/28/07	09/28/07	06/12/08
Bentonville	050012	05/10/74	07/16/80	06/05/12	07/16/80
Bethel Heights	050386	04/25/75	09/18/91	09/28/07	04/19/96
Cave Springs	050398	10/29/1976	09/18/91	06/05/12	04/28/08
Centerton	050399	04/18/75	08/24/82	06/05/12	08/24/82
Decatur	050319	04/18/75	01/03/86	09/28/07	01/03/86
Garfield	No Data	No Data	No Data	No Data	No Data
Gateway	No Data	No Data	No Data	No Data	No Data
Gentry	050324	05/02/75	09/18/91	09/28/07(M)	03/11/05
Gravette	050327	05/02/75	08/24/82	09/28/07(M)	08/24/82
Highfill	050581	-	09/18/91	06/05/12(M)	07/22/03
Little Flock	050479	06/21/77	09/18/91	06/05/12	01/14/08
Lowell	050342	05/02/75	08/19/87	06/05/12	08/19/87
Pea Ridge	050361	04/18/75	09/01/87	06/05/12	09/01/87
Rogers	050013	05/24/74	03/02/81	06/05/12	03/02/81
Siloam Springs	050014	05/10/74	11/19/1980	09/28/07	11/19/1980
Springtown	050004	-	09/28/07	06/05/12	09/09/04
Sulphur Springs	050015	08/23/74	09/21/82	09/28/07	09/21/82
NWACC	N/A	N/A	N/A	N/A	N/A
Bentonville SD	N/A	N/A	N/A	N/A	N/A
Decatur SD	N/A	N/A	N/A	N/A	N/A
Gentry SD	N/A	N/A	N/A	N/A	N/A
Gravette SD	N/A	N/A	N/A	N/A	N/A
Pea Ridge SD	N/A	N/A	N/A	N/A	N/A
Rogers SD	N/A	N/A	N/A	N/A	N/A
Siloam Springs SD	N/A	N/A	N/A	N/A	N/A

5.3 – Mitigation Goals

Goals for Benton County and its participating jurisdictions were established based upon results from the local and state risk assessments, Benton County HMPT meetings, and input from non-planning team local jurisdiction and state officials. These goals represent Benton County and its participating jurisdictions' long-term vision for the continued reduction of hazard risks and the enhancement of mitigation capabilities.

Goal 1: Reduce the risk from natural hazard events utilizing community cooperation and an all hazards approach.

Goal 2: Pursue additional, complete, and accurate data in support of mitigation planning, disaster preparedness, disaster response, and disaster recovery operations.

Goal 3: Integrate the hazard mitigation plan's findings into the planning, and decision making processes for all current and future emergency management and preparedness related activities.

Goal 4: Minimize the risk to life and property from dam failures.

Goal 4: Minimize the risk to property from droughts.

Goal 5: Minimize the risk to life and property from earthquakes.

Goal 6: Minimize the risk to life from excessive heat.

Goal 7: Minimize the risk to property from expansive soils.

Goal 8: Minimize the risk to life and property from floods.

Goal 9: Minimize the risk to life and property from severe storms.

Goal 10: Minimize the risk to life and property from tornadoes.

Goal 11: Minimize the risk to life and property from wildfires.

Goal 12: Minimize the risk to life and property from winter storms.

5.4 – Mitigation Projects

The Benton County HMPT identified a comprehensive range of 23 possible and unique mitigation projects. The selected set carefully takes an all-hazards approach to mitigation while simultaneously addressing each of the individual, 9, profiled hazards.

The projects and actions were selected based upon their potential to reduce the risk to life and property with an emphasis on new and existing infrastructure, ease of implementation, community and agency support, consistency with local jurisdictions' plans and capabilities, available funding, vulnerability, and total risk. For further information on evaluation criteria, please see Section 5.5. The full list of mitigation projects, their descriptions, and prioritization per jurisdiction can be found in Appendix F.

For the status of mitigation projects since the development of Benton County's previous hazard mitigation plan, please see Section 5.4.1.

The table on the following page summarizes the hazards addressed by each mitigation project and activity and the corresponding participating jurisdictions suggested to undertake the project or activity.

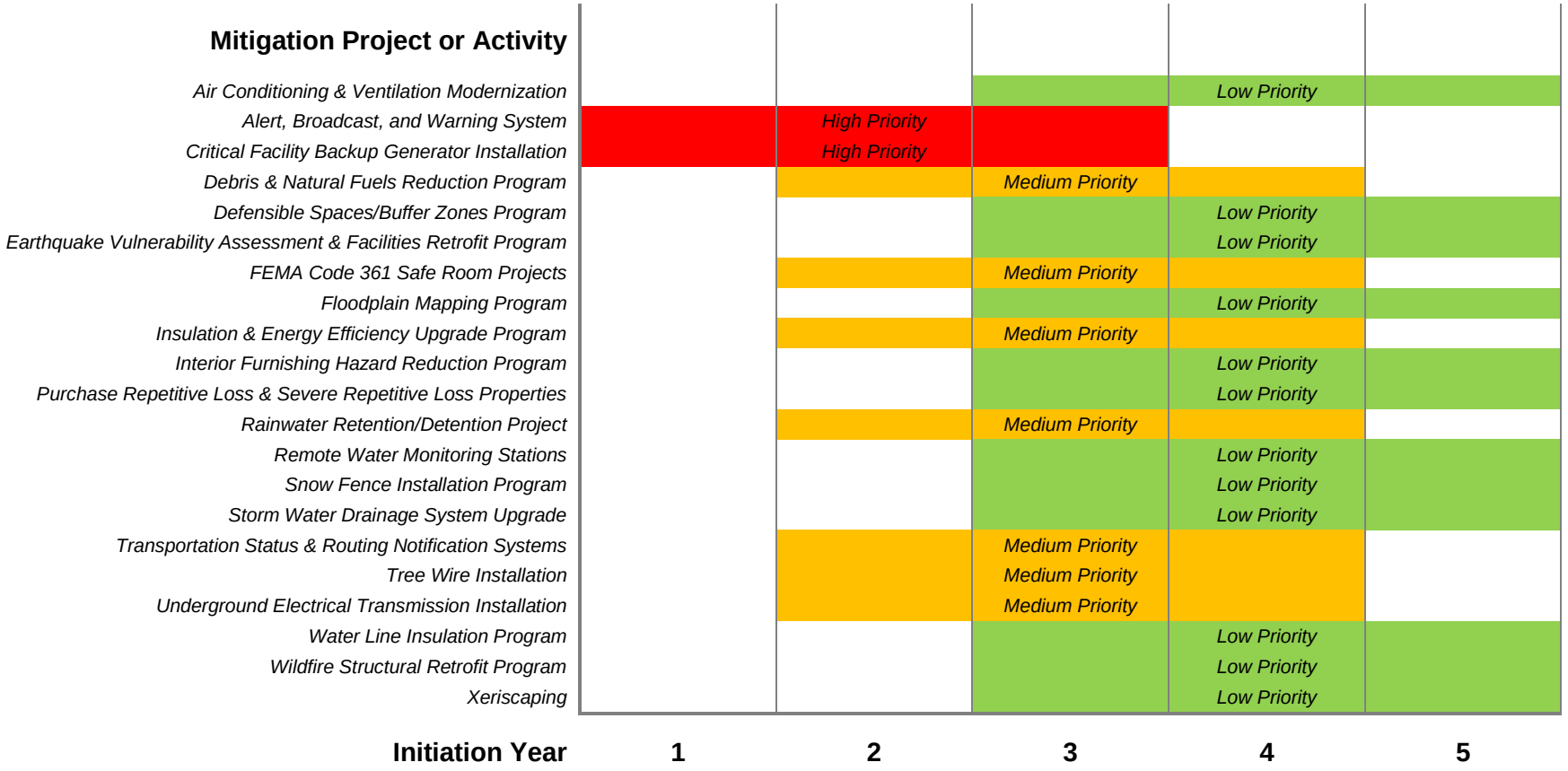
NOTE: Some projects and actions mitigate risk and vulnerability to multiple hazards. Some of these projects and action list participating jurisdictions that are only at risk from one or a few of the mitigated hazards. For instance, the project: "Transportation Status & Routing Notification Systems" mitigates against multiple hazards, including dam failure. All participating jurisdictions are interested in this project, but some will not be using it to mitigate dam failure. Instead they will be using the project to mitigate against floods, severe storms, wildfires, and winter storms.

Table 53 – Mitigation Projects Summary

Mitigation Project or Activity	Hazards Addressed	Jurisdictions
Air Conditioning & Ventilation Modernization	Excessive Heat	
Alert, Broadcast, and Warning System	Floods, Severe Storms, Tornadoes, Wildfires, Winter Storms	
Critical Facility Backup Generator Installation	Excessive Heat, Severe Storms, Tornadoes, Winter Storms	
Debris & Natural Fuels Reduction Program	Severe Storms, Tornadoes, Wildfires	
Defensible Spaces/Buffer Zones Program	Wildfires	
Earthquake Vulnerability Assessment & Facilities Retrofit Program	Earthquakes	
FEMA Code 361 Safe Room Projects	Severe Storms, Tornadoes	
Floodplain Mapping Program	Floods	
Insulation & Energy Efficiency Upgrade Program	Excessive Heat, Winter Storms	
Interior Furnishing Hazard Reduction Program	Earthquakes	
Purchase Repetitive Loss & Severe Repetitive Loss Properties	Floods	
Rainwater Retention/Detention Project	Droughts, Floods	
Remote Water Monitoring Stations	Droughts	
Snow Fence Installation Program	Winter Storms	
Storm Water Drainage System Upgrade	Floods	
Transportation Status & Routing Notification Systems	Floods, Severe Storms, Wildfires, Winter Storms	
Tree Wire Installation	Severe Storms, Tornadoes	
Underground Electrical Transmission Installation	Severe Storms, Tornadoes, Winter Storms	
Water Line Insulation Program	Winter Storms	
Wildfire Structural Retrofit Program	Wildfires	
Xeriscaping	Droughts	

5.4.1 – Mitigation Projects Timeline

The graph below is a suggested timeline for Benton County and its participating jurisdictions implementation of their mitigation projects and activities. The graph's suggestions are based on implementing higher priority projects and activities earlier than lower priority projects and activities. If a project or activity's priority varies for any participating jurisdictions, the jurisdiction is listed below the project name and in italics.



5.4.2 – Mitigation Project Updates

Table X – Mitigation Project Updates				
Project	**Jurisdiction**	**Lead Department**	**Status**	**Emphasis**
Address Flooding Issues in Sulphur Springs	Sulphur Springs			New & Existing
Adopt Water Conservation Measures for Droughts	All			New & Existing
Adopt Wind Resistant Building Codes	All			New & Existing
Acquire and Relocate RL/SRL Properties	All			New & Existing
Acquire Mitigation Funding through Grant Programs	All		Completed	New & Existing
Assure Zoning & Building Code Enforcement	All			New & Existing
Build Flood Retention Pong Upstream from Decatur	Decatur			New & Existing
Build Safe Rooms	All			New
Conduct a Comprehensive Drought Study	All			New & Existing
Conduct a comprehensive Extreme Heat Study	All			New & Existing
Conduct a Comprehensive Hail Study	All			New & Existing
Conduct a Critical Facilities and Infrastructure Assessment	All		Completed	New & Existing
Conduct a Hazard Mitigation Gap Analysis	All			New & Existing
Construct Community Storm Shelters	All			New & Existing
Construct New EOC	Benton County			New & Existing
Coordinate with Home Builders Association	All			New & Existing
Develop a Drought Education Campaign	All			New & Existing
Develop a Hazard Mitigation Website	All			New & Existing
Develop an Extreme Heat Education Campaign	All			New & Existing
Develop Reverse 911	All		Completed	New & Existing
Encourage Communities to Participate in the Firewise Program	All			New & Existing
Encourage Homeowners to Improve Earthquake Resiliency	All			New & Existing
Encourage Homeowners to Improve Landslide Resiliency	All			New & Existing
Establish Communication Interoperability Protocols	All			New & Existing
Establish Effective Dam Breach Protocol	All			New & Existing
Establish Shelters for Vulnerable Populations	All			New & Existing
Evaluate Critical Facilities' Vulnerability to Lightning	All			New & Existing
Evaluate Transportation "Smart Technologies."	All			New & Existing
Identify Areas of Coordination and Cooperation	All			New & Existing

Project	Jurisdiction	Lead Department	Status	Emphasis
Implement Improved FEMA Floodplain Maps	All		Completed	New & Existing
Improve Alert Broadcasts	All			New & Existing
Improve County-wide GIS Mapping Capabilities	All		Completed	New & Existing
Improve Critical Facilities' Hazard Resiliency	All			New & Existing
Improve Floodplain Management Training	All			New & Existing
Improve Local Drainage Systems	Pea Ridge			New & Existing
Improve NFIP Awareness	All			New & Existing
Improve Winter Storm Alerts	All			New & Existing
Install Alert Sirens	All			New & Existing
Pass Ordinances to Reduce Burning During Drought Conditions	All			New & Existing
Public Education & Awareness	All		Completed	New & Existing
Purchase Backup Generators	All			Existing
Purchase Standby Generators	All			Existing
Replace Low Water Slabs	Benton County			New & Existing
Spread Awareness of the Benton County Mitigation Plan	All			New & Existing
Support the State's Mitigation Plan	All		Completed	New & Existing

5.5 – Mitigation Project Evaluations

Benton County and its participating jurisdictions' mitigation priorities have not changed since the development of its last plan. Their primary hazards risks, and thus priorities, remain flooding, severe storms, wildfires, and winter storms.

A composite evaluation matrix was used to prioritize Benton County and its participating jurisdictions' mitigation projects and activities. The evaluation was conducted for each mitigation project and activity for each jurisdiction. The composite evaluation matrix is comprised of the three factors detailed below.

The first factor is the STAPLE+E evaluation which is best for measuring feasibility and ease of implementation. The tables in Section 5.5.1 provide the STAPLE+E evaluation criteria and the evaluation itself.

The second factor is the effectiveness of the mitigation project. How well does it mitigate the impact of a particular hazard? This is determined by its ability to protect citizens, property, and systems. For instance, installing wires to pin down trees and other objects will reduce their ability to become uprooted or take flight during hazards of high wind, but are not as effective at reducing impacts from tornadoes or strong winds as is properly constructed and reinforced buildings. This factor is rated as: Low = 0.5, Medium = 1, and High = 1.5.

The third factor is a hazard risk based evaluation. It draws on the hazard risk summary found in Section 4.4 of this plan. Each risk rating is assigned a value based on the assessment (None = 0, Low = 5, Medium = 10, and High = 15). A summary of these results are displayed in Section 5.5.2 while the full, per jurisdiction per hazard tables are located in Appendix G.

$$(HRT) = (HR_1 + HR_2 + HR_n)$$

The total evaluation score is based on the hazard risk total, multiplied by the effectiveness factor, added to the STAPLE+E score.

> ***Hazard Risk Total (HRT):*** The sum of values (low through high) of each hazard the project is designed to mitigate.
> ***Mitigation Project Effectiveness (MPE):*** A multiplier based on the projects effectiveness to mitigate against a chosen hazard.
> ***STAPLE+E Evaluation:*** A raw score comprised or positive and negative feasibility.

$$(Priority) = (STAPLE+E) + (MPE * HRT)$$

Upon completing the evaluations a composite score is calculated and prioritized based on their total score (Low = 0 – 25, Medium = 26 – 50, High = > 50).

5.5.1 – STAPLE+E

Table 55 – STAPLE+E Criteria	
Evaluation Category	**Sources of Information**
Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the communities social and cultural values.
Technical	Mitigation actions are technically most effective if they provide long term reduction of losses and have minimal secondary adverse impacts.
Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, and that are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

Table X – STAPLE+E Rankings

X = N/A - Even Impact	+ = Positive Influence											- = Negative Influence												
STAPLE+E Criteria	Social		Technical			Administrative			Political			Legal			Economic				Environmental					
Considerations	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contribute to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	Total Impact
Air Conditioning & Ventilation Modernization	+	+	+	+	+	+	-	-	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	13
Alert, Broadcast, & Warning System	+	+	+	-	+	+	-	+	X	X	X	+	+	+	+	+	+	-	X	X	X	+	+	14
Critical Facility Backup Generator Installation	+	+	+	+	+	+	-	-	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	13
Debris & Natural Fuels Reduction Program	+	+	+	-	+	-	-	-	X	X	X	+	+	+	+	+	+	+	X	X	X	+	+	13
Defensible Spaces/Buffer Zones Program	+	+	+	-	+	+	-	-	X	X	X	+	+	+	+	+	+	+	X	X	X	+	+	14
FEMA Code 361 Safe Room Projects	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	-	+	-	X	X	X	+	+	16
Earthquake Vulnerability Assessment & Facilities Retrofit Program	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	14
Insulation & Energy Efficiency Upgrade Program	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	+	+	-	X	X	X	+	+	15
Interior Furnishing Hazard Reduction Program	+	+	+	-	+	+	-	+	X	X	X	+	+	+	+	+	+	+	X	X	X	+	+	15
Purchase Repetitive Loss & Severe Repetitive Loss Properties	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	+	+	-	X	X	X	+	+	15
Rainwater Retention/Detention Project	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	14
Remote Water Monitoring Stations	+	+	+	-	+	+	-	-	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	12
Snow Fence Installation Program	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	14
Storm Water Drainage System Upgrade	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	14
Transportation Status & Routing Notification Systems	+	+	-	+	+	-	-	-	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	11
Tree Wire Installation	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	+	+	+	X	X	X	+	+	16
Underground Electrical Transmission Installation	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	14
Water Line Insulation Program	+	+	+	+	+	+	-	+	X	X	X	+	+	+	+	+	+	-	X	X	X	+	+	15
Wildfire Structural Retrofit Program	+	+	+	-	+	+	-	+	X	X	X	+	+	+	+	-	+	-	X	X	X	+	+	13
Xeriscaping	+	+	+	-	+	-	-	-	X	X	X	+	+	+	+	+	-	-	+	X	X	+	+	12

5.5.2 – Mitigation Project Prioritization Summary

Table X – Mitigation Project Prioritization Summary - Part 1									
Mitigation Project or Activity	**Jurisdiction**								
	Benton Co.	**Avoca**	**Belle Vista**	**Bentonville**	**Bethel Heights**	**Cave Springs**	**Centerton**	**Decatur**	**Garfield**
Air Conditioning & Ventilation Modernization									
Alert, Broadcast, & Warning System									
Bionet Installation Program									
Critical Facility Backup Generator Installation									
Debris & Natural Fuels Reduction Program									
Defensible Spaces/Buffer Zones Program									
Earthquake Facilities Retrofit Program									
FEMA Code 361 Safe Room Project									
Interior Furnishing Hazard Reduction Program									
Insulation & Energy Efficiency Upgrade Program									
Public Awareness & Education Program									
Rainwater Retention/Detention Project									
Remote Water Monitoring Stations									
Snow Fence Installation Program									
Storm Water Drainage System Upgrade									
Transportation Status & Routing Notification Systems									
Tree Wire Installation									
Underground Electrical Transmission Installation									
Water Line Insulation Program									
Wildfire Structural Retrofit Program									
Xeriscaping									

Table X – Mitigation Project Prioritization Summary - Part 2

Mitigation Project or Activity	Jurisdiction								
	Gateway	Gentry	Gravette	Highfill	Little Flock	Lowell	Pea Ridge	Rogers	Siloam Springs
Air Conditioning & Ventilation Modernization									
Alert, Broadcast, & Warning System									
Bionet Installation Program									
Critical Facility Backup Generator Installation									
Debris & Natural Fuels Reduction Program									
Defensible Spaces/Buffer Zones Program									
Earthquake Facilities Retrofit Program									
FEMA Code 361 Safe Room Project									
Interior Furnishing Hazard Reduction Program									
Insulation & Energy Efficiency Upgrade Program									
Public Awareness & Education Program									
Rainwater Retention/Detention Project									
Remote Water Monitoring Stations									
Snow Fence Installation Program									
Storm Water Drainage System Upgrade									
Transportation Status & Routing Notification Systems									
Tree Wire Installation									
Underground Electrical Transmission Installation									
Water Line Insulation Program									
Wildfire Structural Retrofit Program									
Xeriscaping									

Table X – Mitigation Project Prioritization Summary - Part 3

Mitigation Project or Activity	Jurisdiction									
	Springtown	Sulphur Springs	NWACC	Bentonville SD	Decatur SD	Gentry SD	Gravette SD	Pea Ridge SD	Rogers SD	Siloam Spring SD
Air Conditioning & Ventilation Modernization										
Alert, Broadcast, & Warning System										
Bionet Installation Program										
Critical Facility Backup Generator Installation										
Debris & Natural Fuels Reduction Program										
Defensible Spaces/Buffer Zones Program										
Earthquake Facilities Retrofit Program										
FEMA Code 361 Safe Room Project										
Interior Furnishing Hazard Reduction Program										
Insulation & Energy Efficiency Upgrade Program										
Public Awareness & Education Program										
Rainwater Retention/Detention Project										
Remote Water Monitoring Stations										
Snow Fence Installation Program										
Storm Water Drainage System Upgrade										
Transportation Status & Routing Notification Systems										
Tree Wire Installation										
Underground Electrical Transmission Installation										
Water Line Insulation Program										
Wildfire Structural Retrofit Program										
Xeriscaping										

5.6 – Planning Integration

The Benton County HMP will be incorporating into existing planning mechanisms in varying processes. These processes will be tailored to the unique characteristics of the planning mechanism and the governing structure of each participating jurisdiction.

Emergency Management Planning
All jurisdictions in the Benton County HMP, have deferred their emergency management authority to the Benton County Emergency Management Agency.

Emergency Operations Plans – The Benton County EOP will be reviewed and updated to reflect the most probable and dangerous hazard event scenarios from the HMP's risk assessment. Additionally, the HMP will be added in its entirety as an Appendix to the EOP. This revision is the responsibility of the Benton County EMA for all of the jurisdictions participating in this plan. Upon revision completion, all participating jurisdictions and appropriate emergency services will be notified of the revisions and sent out new copies of the EOP.

State of Arkansas Hazard Mitigation Plan – The state's HMP is required by FEMA regulation to include all local HMPs. The process of integrating the Benton County HMP into this plan is already an established process and is managed by the Arkansas Department of Emergency Management.

Infrastructure, Development & Construction Projects
All jurisdictions in Benton County approach infrastructure, development, and construction projects in the same way. The demographics of Benton County allows for planning to exist only through collaboration with their LEPC.

Benton County Local Emergency Planning Committee (LEPC)
The Benton County LEPC is a conduit for all mitigation actions and projects. It is headed by the Grant County EMA and meets quarterly, although there is flexibility in their schedule. The location of the meetings is not fixed as to increase jurisdictional participation. Members of the LEPC come from all jurisdictions and a wide variety of local agencies and departments.

Mitigation Projects & Actions Implementation
Upon adoption of a HMP or other EMA related plans, the Benton County OEM will notify all participating jurisdiction when the next LEPC meeting topic will be reviewing mitigation project and action selections. Each jurisdiction then approves a list of mitigation actions and projects they want to pursue according to the mechanism listed in the table on the following page. During the LEPC meeting, the Benton County EMA will assist the jurisdictions in determining which grant program and path will be appropriate for the project. After selection, the jurisdictions return to the Benton County EMA, through the LEPC, for assistance on funding and managing the project. If additional funding is necessary, the jurisdictions will have to return to their community and pass a resolution to secure the funding. The resolution is subject to the process listed in table on the following page.

The Benton County EMA will assist in every facet from project inception to completion as well as working with other external organizations for tasks such as grant writing, project monitoring, and project management where appropriate.

Capital Improvement & Economic Development Planning

Upon adoption of this plan, the Benton County EMA will notify each participating jurisdiction's authority. The notification will also contain a special notice to incorporate the following procedure into any capital improvement projects or economic development planning they may initiate.

Upon project conception a member of the quorum court, city council, school board, mayor, or school superintendent, will contact the Benton County EMA for funding guidance and grant assistance. In Benton County and its participating jurisdictions improvement and development projects rely on grant funding. The Benton County EMA will advise the project proposing jurisdiction on which grant program is appropriate.

Following a funding source decision, a project proposal will be written by the Benton County EMA. The proposals will then return to the project proposing jurisdiction and undergo a vote by the appropriate governing body for approval.

Upon approval by the governing body, the Benton County EMA will assist in applying for and managing the grant funding for the new improvement or development project.

Any and all economic development plans initiated or supported by a jurisdiction will undergo a hazard application process in which all hazard risk assessments from the HMP will be weighed into the cost to benefit analysis of a capital improvement project or economic development planning. This can be done at the local level prior to working with the Benton County EMA and LEPC or exist as a known future consideration and requirement. However, if done at the local level, it must be reviewed and approved by the Benton County EMA. If the hazard assessment process is not done at the local level it will be completed by the Benton County EMA.

Table X – Local Planning Mechanisms			
Organization	**Role**	**Economic Development Authority**	**Process Mechanism**
Benton County	Local Government	Quorum Court	Voting
Avoca	Local Government	Town Council	Voting
Bella Vista	Local Government	City Council	Voting
Bentonville	Local Government	City Council	Voting
Bethel Heights	Local Government	City Council	Voting
Cave Springs	Local Government	City Council	Voting
Centerton	Local Government	City Council	Voting
Decatur	Local Government	City Council	Voting
Garfield	Local Government	Town Council	Voting
Gateway	Local Government	Town Council	Voting
Gentry	Local Government	City Council	Voting
Gravette	Local Government	City Council	Voting
Highfill	Local Government	Town Council	Voting
Little Flock	Local Government	City Council	Voting
Lowell	Local Government	City Council	Voting
Pea Ridge	Local Government	City Council	Voting
Rogers	Local Government	City Council	Voting
Siloam Springs	Local Government	City Council	Voting
Springtown	Local Government	Town Council	Voting
Sulphur Springs	Local Government	City Council	Voting
NWACC	Community College	Board of Trustees	Voting
Bentonville SD	School District	School Board	Voting
Decatur SD	School District	School Board	Voting
Gentry SD	School District	School Board	Voting
Gravette SD	School District	School Board	Voting
Pea Ridge SD	School District	School Board	Voting
Rogers SD	School District	School Board	Voting
Siloam Springs SD	School District	School Board	Voting

Appendix A – Reference Documents

Earthquake Hazard in the New Madrid Seismic Zone Remains a Concern
USGS, 2009

FEDERAL METEOROLOGICAL HANDBOOK No. 1, Surface Weather Observations and Reports
U.S. Department of Commerce / NOAA, 2005

Guidelines and Specifications for Flood Hazard Mapping Partners
FEMA, 2002

Impact of New Madrid Seismic Zone Earthquakes on the Central US
Mid-America Earthquake Center / Center for Technology, Security and Policy at Virginia Tech University / Institute for Crisis, Disaster & Risk Management at George Washington University, 2009

Local Mitigation Plan Review Guide
FEMA, 2011

Local Mitigation Planning Handbook
FEMA, 2013

Mitigation Ideas A Resource for Reducing Risk to Natural Hazards
FEMA, 2013

Multi-hazard Loss Estimation Methodology – Flood Model – Hazus-MH – User Manual
FEMA, 2012

Multi-hazard Loss Estimation Methodology – Flood Model – Hazus-MH – Technical Manual
FEMA, 2012

MULTI-HAZARD MITIGATION PLANNING GUIDANCE UNDER THE DISASTER MITIGATION ACT OF 2000
FEMA, 2008

National Mitigation Framework
Department of Homeland Security, 2013

Understanding Your Risks: Identifying Hazards and Estimating Losses (FEMA 386-2)
FEMA, 2001

Winter Storms The Deceptive Killers: A Preparedness Guide
U.S. Department of Commerce / FEMA / NOAA / NWS / American Red Cross, 2008

Appendix B – Data Sources

Quantitative Data Sources
Arkansas Forestry Commission
FEMA
NOAA NCDC
U.S. Census Bureau
USACE
USGS

Geographic Data Sources
Arkansas GeoStor 6.0
BOLDplanning Inc.
ESRI
FEMA HAZUS (2.0, 2.1)
FEMA NFHL
NOAA NWS Storm Prediction Center
University of Wisconsin – Madison, Department of Forest Ecology and Management
U.S. Census Bureau
USDA SSURGO
USGS

Appendix C – Public Participation

The Benton County Hazard Mitigation Planning Committee will host two meetings on May 29th, 2013 at 10:00 AM and 2:00 PM in the Quorum Court Room located on the third floor of the Benton County Administration Building, 215 East Central, Bentonville, AR 72712. This meeting will be led by BOLD planning to kick-off the development of Benton County's hazard mitigation plan. This plan will address Benton County's natural hazards' vulnerabilities and will comply with state and federal regulations. Both meetings will cover the same information. The public is encouraged to attend and ask questions, provide input, and express any concerns they may have. #72588616 May 4, 10, 2014

Post Date: 04/05 12:00 AM
Refcode: #72588616

Similar Listings

IN THE JUVENILE COURT OF EFFINGHAM COUNTYSTATE OF GEORGIAIN THE INTEREST OF:G.S.F., SEX: Male; DOB: 09/24/11A.R.F., SEX: Female; DOB: 08/01/08Minor children under 18 years of agePETITION TO TERMINATE PARENTAL RIGHTSNOTICE OF SUMMONSTO: AMANDA NAGEL FIELDS, the mother of G.S.F., a male child born on September 24, 2011 and A.R.F., a female child born on August 1, 2008. You are hereby notified that the above styled action seeking to terminate your parental rights and place permanent custody of said children with the Georgia Department of Human Services, acting through the Effingham County Department of Family and Children Services, was filed in said Court on March 14, 2014 and that by reason of Order for Service by Publication, entered by the Court on March 25, 2014, you are hereby commanded and required to file with the Clerk of said Court and serve upon Jennifer...

Post Date: 15/04 12:00 AM **Show more**

IN THE CIRCUIT COURT OF BENTON COUNTY, ARKANSASMARTHA JOHNYNE REES, a married person, and her husband, TOM REES, JOHN ED MOSIER, a married person, and his wife, SARA JENE MOSIER, JUNE MOSIER CHAMBLESS, a married person, and her husband, WILLIAM CHAMBLESS, FRAN E. MOSIER VESTAL, a single person, MOSIER FAMILY PARTNERSHIP, MELINDA K. CRAIG, a married person, and her husband, HAL CRAIG, STEPHEN R. WHITTEN, a married person, and his wife, DARLENE WHITTEN JOHN R. WHITTEN, a married person, and his wife, SOCORRO WHITTEN, JERRY D. WHITTEN, JR. a married person, and his wife, JAMIE L. WHITTEN, WHITTEN FAMILY REVOCABLE TRUST DATED 09-26-2011, AMANDA L. IRWIN, a married person, and her husband, ROSS CHANNING REED, DOUGLAS ROBERT IRWIN, a married person, and his wife, MARIELLE IRWIN...

Post Date: 23/04 12:00 AM **Show more**

IN THE CIRCUIT COURT OF BENTON COUNTY, ARKANSASPROBATE DIVISIONIN THE MATTER OF THE ADOPTION OFALENA MAE GAINES, a minorCase No. PR-2014-81-6MELINDA BISHOP PETITIONERWARNING ORDER/NOTICE OF ADOPTION HEARINGTo: Alisha Lynn GainesYou are hereby notified that Melinda Bishop filed a Petition for Adoption in the Benton County, Arkansas, Circuit Court to adopt Alena Mae Gaines, a minor. Please contact the attorney at litem, Ken Osborne, at 509 N. College Avenue, Fayetteville, Arkansas, 72701, (479) 521-7727 for a copy of the Petition for Adoption You are further notified that a hearing will be held on the Petition for Adoption before the Probate Division of the Circuit Court of Benton County, Arkansas, in Circuit Judge Doug Schrantz's courtroom, located at 202 E. Central, Bentonville, Arkansas, 72712, on the 21st day of May, 2014, at 9:00 o'clock a.m.You should be present...

Post Date: 23/04 12:00 AM **Show more**

Terry Lewis

From: Karen Caler <kcaler@nwaonline.com>
Sent: Friday, May 02, 2014 10:08 AM
To: Terry Lewis
Subject: RE: request for ad

Hi Terry, I have the ad set for Sun. 5/4 and 5/11, cost is $84.00

Thank you,
Cathy for Karen

From: Terry Lewis [mailto:Terry.Lewis@bentoncountyar.gov]
Sent: Thursday, May 01, 2014 12:03 PM
To: kcaler@nwaonline.com
Subject: FW: request for ad

Just want to check and make sure you received this ad.

Thank you,

Terry Lewis
Properties/Accounting Specialist
P 479-464-6168
F 479-271-1748
terry.lewis@bentoncountyar.gov

From: Terry Lewis
Sent: Wednesday, April 30, 2014 9:59 AM
To: kcaler@nwaonline.com
Subject: request for ad

Morning,
We would like to advertise the attached on Sunday May 3, 2014 and May 10, 2014.
If you have any questions, please let me know.

Thank you,

Terry Lewis
Properties/Accounting Specialist
P 479-464-6168
F 479-271-1748
terry.lewis@bentoncountyar.gov

Robert T. McGowen Fire

From: Robert T. McGowen
Sent: Thursday, May 08, 2014 9:21 AM
To: 'Steve Sims'; Brent Boydston; Tom Jenkins (tjenkins@rogersark.org); Siloam Springs FD; mirwin@springdalear.gov
Subject: Hazard Mitigation Plan Update

Good morning,

I would like to thank all of you for the support and commitment you have given Benton County regarding the update of the County's Hazard Mitigation Plan. We received official notification from FEMA at the end of April that the grant to pay 75 percent of the cost was approved. Since that time we have signed a contract with BOLD Planning and scheduled the kickoff meeting. Below is the public announcement we have put on our website. We are requesting you or a representative for your city attend one of the two meetings discussed below.

The Benton County Hazard Mitigation Planning Committee will host two meetings on May 29th, 2013 at 10:00 AM and 2:00 PM in the Quorum Court Room located on the third floor of the Benton County Administration Building, 215 East Central, Bentonville, AR 72712. This meeting will be led by BOLD planning to kick-off the development of Benton County's hazard mitigation plan. This plan will address Benton County's natural hazards' vulnerabilities and will comply with state and federal regulations. Both meetings will cover the same information. The public is encouraged to attend and ask questions, provide input, and express any concerns they may have.

If you have any questions please don't hesitate to contact me.

Regards,

Robert McGowen, MS, CEM, PCP
Director
Benton County Emergency Management
Office 479-271-1004
Cell 479-270-9249
Fax 479-271-1084

Robert T. McGowen Police

From: Robert T. McGowen
Sent: Thursday, May 08, 2014 9:20 AM
To: 'Bella Vista PD'; 'Benton County SO'; 'Bentonville PD'; 'Bethel Heights'; 'Cave Springs PD'; 'Centerton PD'; 'Decatur PD'; 'Gentry PD'; 'Gravette PD'; 'Highfill PD'; 'Little Flock PD'; 'Lowell PD'; 'Pea Ridge PD'; 'Rogers PD'; 'Siloam Springs PD'; 'Sulpher Springs PD'; 'XNA PD'
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Regards,

Robert McGowen, MS, CEM, PCP
Director
Benton County Emergency Management
Office 479-271-1004
Cell 479-270-9249
Fax 479-271-1084

Robert T. McGowen Schools

From: Robert T. McGowen
Sent: Thursday, May 08, 2014 9:26 AM
To: 'mpoore@bentonvillek12.org'; 'lben@dsd.k12.ar.us'; 'Randy Barrett'; 'richard.page@gravetteschools.net'; 'rneal@prs.k12.ar.us'; 'jdarr@rps.k12.ar.us'; 'Ken.Ramey@sssd.k12.ar.us'; 'ejorgenson@nwacc.edu'; 'president@jbu.edu'
Subject: Hazard Mitigation Plan Update

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If you have any questions please don't hesitate to contact me.

Regards,

Robert McGowen, MS, CEM, PCP
Director
Benton County Emergency Management
Office 479-271-1004
Cell 479-270-9249
Fax 479-271-1084

Robert T. McGowen Mayors

From: Robert T. McGowen
Sent: Thursday, May 08, 2014 9:18 AM
To: 'Avoca Tommy Odell'; 'Bella Vista Frank Anderson'; 'Bentonville Bob McCaslin'; 'Bethel Heights Jeff Hutcheson'; 'Cave Springs Larry Smith'; 'Centerton Bill Edwards'; 'Decatur Charles Linam'; 'Elm Springs Ben Wall'; 'Garfield Laura Hamilton'; 'Gateway Frank Hackler Jr.'; 'Gentry Kevin Johnston'; 'Gravette Byron Warren'; 'Highfill Stacy Digby'; 'Little Flock Buddy Blue'; 'Lowell Eldon Long'; 'Pea Ridge Jackie Crabtree'; 'Rogers Greg Hines'; 'Siloam Springs David Allen'; 'Springdale Doug Sprouse'; 'Springtown Paul Lemke'; 'Sulphur Springs Bobby Simon'
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Regards,

Robert McGowen, MS, CEM, PCP
Director
Benton County Emergency Management
Office 479-271-1004
Cell 479-270-9249
Fax 479-271-1084


Benton County Emergency Services
4.5 (20 ratings)
5,162 likes · 363 talking about this · 24 were here
Like
Follow
Message
Government Organization
Benton County Division of Public Safety
About – Suggest an Edit
5,162
Videos
Likes
Photos
President Declare
Disaster for Bento
News Release For
Immediate Release
Notes 23
Highlights
Benton County Emergency Services
about an hour ago
The Benton County Hazard Mitigation Planning Committee will host two meetings on May 29th, 2013 at 10:00 AM and 2:00 PM in the Quorum Court Room located on the third floor of the Benton County Administration Building, 215 East Central, Bentonville, AR 72712. This meeting will be led by BOLD planning to kick-off the development of Benton County's hazard mitigation plan. This plan will address Benton County's natural hazards' vulnerabilities and will comply with state and federal regulations. Both meetings will cover the same information. The public is encouraged to attend and ask questions, provide input, and express any concerns they may have.
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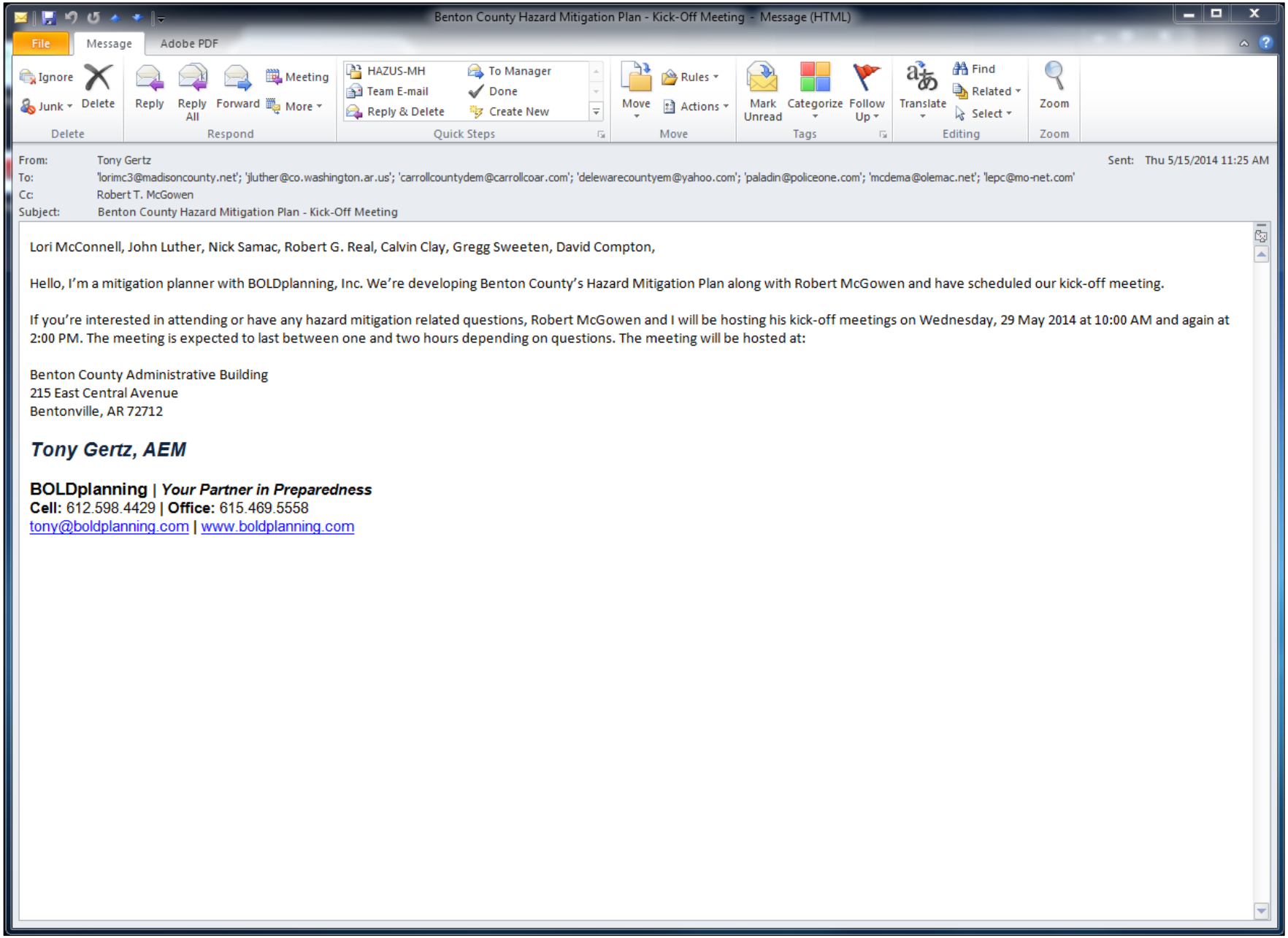
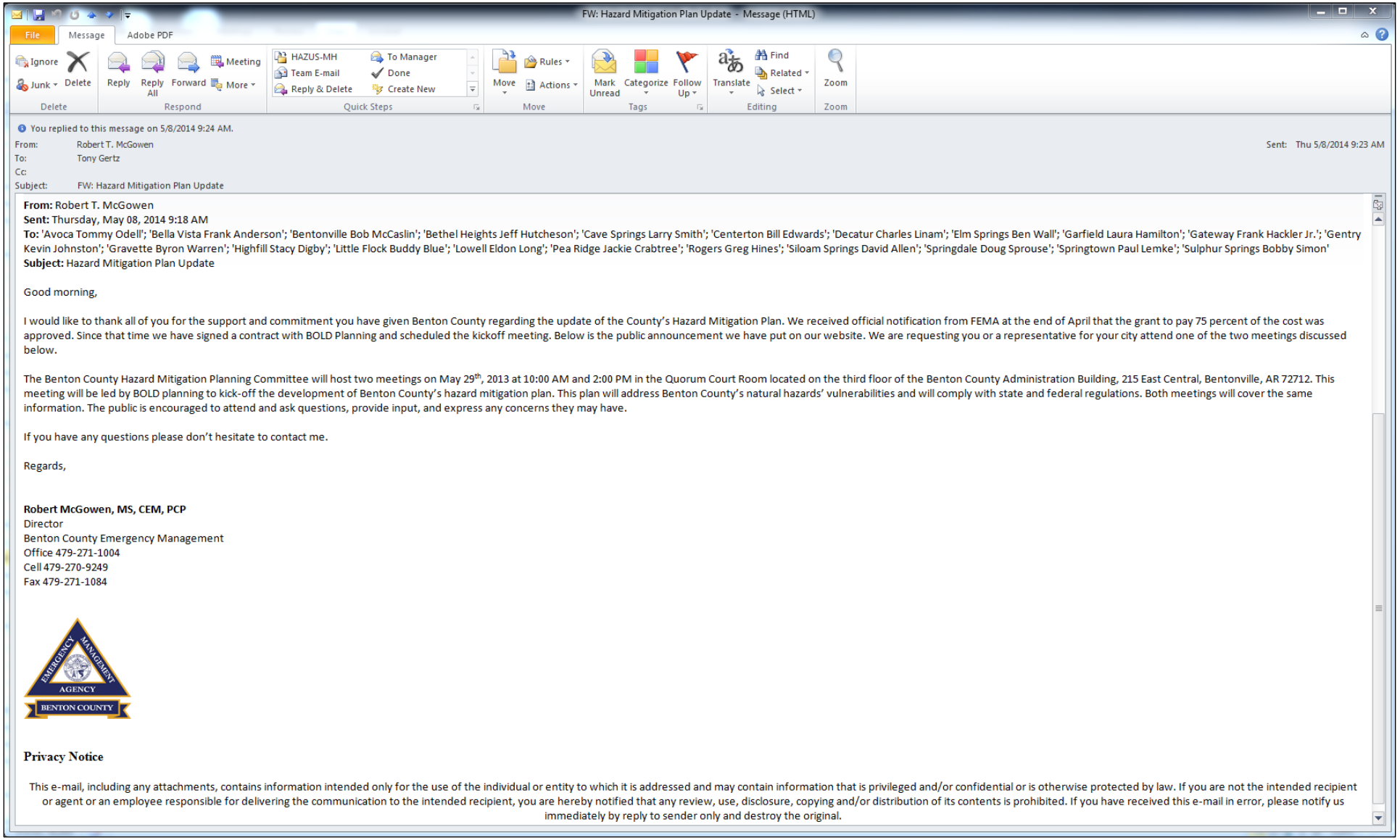

Benton County Hazard Mitigation Plan - Kick-Off Meeting - Message (HTML)
File
Message
Adobe PDF
Ignore
Junk
Delete
Reply
Reply All
Forward
Meeting
More
HAZUS-MH
Team E-mail
Reply & Delete
To Manager
Done
Create New
Move
Rules
Actions
Mark Unread
Categorize
Follow Up
Translate
Find
Related
Select
Zoom
Delete
Respond
Quick Steps
Move
Tags
Editing
Zoom
From: Tony Gertz
Sent: Thu 5/15/2014 11:25 AM
To: 'lorimc3@madisoncounty.net'; 'jluther@co.washington.ar.us'; 'carrollcountydem@carrollcoar.com'; 'delewarecountyem@yahoo.com'; 'paladin@policeone.com'; 'mcdema@olemac.net'; 'lepc@mo-net.com'
Cc: Robert T. McGowen
Subject: Benton County Hazard Mitigation Plan - Kick-Off Meeting
Lori McConnell, John Luther, Nick Samac, Robert G. Real, Calvin Clay, Gregg Sweeten, David Compton,
Hello, I'm a mitigation planner with BOLDplanning, Inc. We're developing Benton County's Hazard Mitigation Plan along with Robert McGowen and have scheduled our kick-off meeting.
If you're interested in attending or have any hazard mitigation related questions, Robert McGowen and I will be hosting his kick-off meetings on Wednesday, 29 May 2014 at 10:00 AM and again at 2:00 PM. The meeting is expected to last between one and two hours depending on questions. The meeting will be hosted at:
Benton County Administrative Building
215 East Central Avenue
Bentonville, AR 72712
Tony Gertz, AEM
BOLDplanning | Your Partner in Preparedness
Cell: 612.598.4429 | Office: 615.469.5558
tony@boldplanning.com | www.boldplanning.com



FW: Hazard Mitigation Plan Update - Message (HTML)

File | Message | Adobe PDF

Ignore | Junk | Delete | Reply | Reply All | Forward | Meeting | More | Delete | Respond

HAZUS-MH | Team E-mail | Reply & Delete | To Manager | Done | Create New | Quick Steps

Move | Rules | Actions | Move

Mark Unread | Categorize | Follow Up | Tags

Translate | Find | Related | Select | Editing

Zoom | Zoom

You replied to this message on 5/8/2014 9:24 AM.

From: Robert T. McGowen
To: Tony Gertz
Cc:
Subject: FW: Hazard Mitigation Plan Update

Sent: Thu 5/8/2014 9:23 AM

From: Robert T. McGowen
Sent: Thursday, May 08, 2014 9:18 AM
To: 'Avoca Tommy Odell'; 'Bella Vista Frank Anderson'; 'Bentonville Bob McCaslin'; 'Bethel Heights Jeff Hutcheson'; 'Cave Springs Larry Smith'; 'Centerton Bill Edwards'; 'Decatur Charles Linam'; 'Elm Springs Ben Wall'; 'Garfield Laura Hamilton'; 'Gateway Frank Hackler Jr.'; 'Gentry Kevin Johnston'; 'Gravette Byron Warren'; 'Highfill Stacy Digby'; 'Little Flock Buddy Blue'; 'Lowell Eldon Long'; 'Pea Ridge Jackie Crabtree'; 'Rogers Greg Hines'; 'Siloam Springs David Allen'; 'Springdale Doug Sprouse'; 'Springtown Paul Lemke'; 'Sulphur Springs Bobby Simon'
Subject: Hazard Mitigation Plan Update

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If you have any questions please don't hesitate to contact me.

Regards,

Robert McGowen, MS, CEM, PCP
Director
Benton County Emergency Management
Office 479-271-1004
Cell 479-270-9249
Fax 479-271-1084

Privacy Notice

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BOLD planning

AM

Sign In Sheet

Plan: Benton County — Hazard Mitigation Planning Meeting — Date: 5/29/2014

Name Jurisdiction	Department Position	Phone # e-Mail Address
JAROD MASON ROGERS	ROGERS PD LIEUTENANT	JMASON@ROGERSARK.ORG 479-986-3626
MIKE DIXON BENTON CO.	EMA DEPUTY DIRECTOR	MIKE.DIXON@BENTONCOUNTYAR.GOV 479-271-1004
BRYAN AUSTIN	SILOAM SPRINGS PD LIEUTENANT	BAUSTIN@SILOAMSPRINGS.COM 479-524-4118
Wayne Sherman	Simmons Foods	Wayne.Sherman@SimFoods.com
Jason Barrett Gentry Schools / City of Gentry	Transportation Director Alderman	479-790-5889 jbarrett@gentrypioneers.com
Steve Oler NW Arkansas Hospitals	Greater Hospital Emergency Preparedness Coord.	918 409 8561 soler@ochsner.com
~~Greg Burge~~ Rick Windham	~~Facilities Constr.~~ Business Continuity	501-729-5153 rwindham@arvest.com
Chris Dryman	Business Continuity	cdryman@arvest.com
GARY DENNIS	DIRECTOR PUBLIC SAFETY	gdennis@NWACC.edu
Jamie Baggett	Pea Ridge Fire	jamie.baggett@cityofpearidge.com
MARC TROLLINGER	Benton County	MARC.TROLLINGER@BentonCountyAR.GOV
Jennifer Bonner City of Bella Vista	Planning, Building & Code Enforcement Planner I	479-268-4980 jibonner@bellavistacity.ar.com
Norma Fujikawa	ADH - Preparedness Coord.	norma.fujikawa@arkansas.gov
Gregg Sweeten	McDonald County Emergency Mgt Director	417-529-2646 mcdema@olemac.net
~~Brent Boydston~~		
BRENT Boydston BENTONVILLE F.D	BENTONVILLE FD Chief	479-271-3151 bboydston@bentonvillear.com
Benton County Robert McGowen	Director EM	

BOLD planning

AM

Sign In Sheet

Plan: Benton County | Hazard Mitigation Planning Meeting | Date: 5/29/2014

Name Jurisdiction	Department Position	Phone # e-Mail Address
Avon Hacney		479-587-5807
Dept of Veterans Affairs Fayetteville	Emergency Manager	Avon.hacney@va.gov
Michael DeRose	Emergency Communications	479-270-4054
Benton County Emergency Communications		michael.derose@bentoncounty.or.gov.
Lonny Phillips	Regional Safety Mgr	479-215-7492
Simmons Foods		lonny.phillips@simfoods.com
David Celis	FSM Cordinator	479-599-8708
Simmons Foods		david.celis@simfoods.com
TRACY White	Battalion chief	479-524-3207
Siloam Springs Fire Dept		Twhite@siloamsprings.com

BOLD planning

Sign In Sheet

PM

Plan: Benton County | Hazard Mitigation Planning Meeting | Date: 5/29/2014

Name Jurisdiction	Department Position	Phone # e-Mail Address
Ben Wall ELMSPRINS MAYOR		
Eldon Long	MAYOR, LOWELL	
Jackie Crabtree	Mayor, Pea Ridge	
JAMES RUSTERHOLZ GRAVETTE	GRAVETTE POLICE DEPT ASST. CHIEF OF POLICE	rrusterholz@gravettepd.com
RICHARD CARVER GRAVETTE SCHOOLS	FACILITIES / TRANSPORTATION DIRECTOR	479-787-4104 RICHARD.CARVER@GRAVETTESCHOOLS.NET
Benton Co	Admin & Public Safety	Mlambert.Watson@BentonCountyAR.gov
Bella Vista / Kelly Farmer	Police Chief	KFARMER@BELLAVISTACITYAR.com
Bella Vista / Steve Sims	Fire chief	SSims@bellavistacityar.com
Bella Vista / Chris Suneson	PLANNING DIR / FLOODPLAIN ADMIN	CSuneson@bellavistacityar.com
PAUL LEMKE TOWN OF SPRINGTOWN	MAYOR FLOODPLAIN ADMINISTRATOR	TOWNOFSPRINGTOWN@YAHOO.COM
Buddy Blue Little Rock	Mayor	mayor@cityoflittlerock.com
BENTON COUNTY Joy Bailey	PLANNING DIRECTOR Benton County Health	Dinkaysingh@bentoncountyar.gov James.bailey@arkansas.gov

Appendix D – Critical Facilities

Appendix E – Hazard Event Records

Table X – Drought Records, Benton County, Arkansas						
20 Drought event(s) were reported in Benton County, Arkansas between 11/01/2005 and 04/30/2014						
Mag: Magnitude (No Indices)			Dth: Deaths	Inj: Injuries		
PrD: Property Damage (US Dollars)			CrD: Crop Damage (US Dollars)			
Location	**Date**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
Benton County	11/1/2005	-	0	0	$0	$0
Benton County	12/1/2005	-	0	0	$0	$0
Benton County	1/1/2006	-	0	0	$0	$0
Benton County	2/1/2006	-	0	0	$0	$0
Benton County	3/1/2006	-	0	0	$0	$0
Benton County	4/1/2006	-	0	0	$0	$0
Benton County	5/1/2006	-	0	0	$0	$0
Benton County	8/1/2011	-	0	0	$0	$0
Benton County	9/1/2011	-	0	0	$0	$0
Benton County	10/1/2011	-	0	0	$0	$0
Benton County	6/19/2012	-	0	0	$0	$0
Benton County	7/1/2012	-	0	0	$0	$0
Benton County	8/1/2012	-	0	0	$0	$0
Benton County	9/1/2012	-	0	0	$0	$0
Benton County	10/1/2012	-	0	0	$0	$0
Benton County	11/1/2012	-	0	0	$0	$0
Benton County	12/1/2012	-	0	0	$0	$0
Benton County	1/1/2013	-	0	0	$0	$0
Benton County	2/1/2013	-	0	0	$0	$0
Benton County	3/1/2013	-	0	0	$0	$0
		County Totals	**0**	**0**	**$0**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – Earthquake Records, Benton County, Arkansas			
8 earthquake event(s) were reported in Benton County, Arkansas between 04/29/2010 and 07/30/2010			
Location	**Date**	**Magnitude**	**Depth**
Benton County	4/29/2010	2.5	-
Benton County	5/21/2010	2.6	1.45
Benton County	6/2/2010	1.9	8.79
Benton County	6/17/2010	2.2	1.94
Benton County	7/1/2010	2.3	0.01
Benton County	7/19/2010	2	9.35
Benton County	7/19/2010	1.6	23.89
Benton County	7/30/2010	2.1	5.88
	Averages	**2.15**	**7.33**

**The data are from the USGS.*

Table X – Excessive Heat Records, Benton County, Arkansas

6 Excessive Heat event(s) were reported in Benton County, Arkansas between 07/20/1998 and 04/30/2014

Mag: Magnitude (No Indices) Dth: Deaths Inj: Injuries

PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Benton County	7/20/1998	-	2	0	$0	$0
Benton County	7/17/2006	-	0	0	$0	$0
Benton County	8/9/2006	-	1	0	$0	$0
Benton County	8/2/2011	-	0	0	$0	$0
Benton County	7/30/2012	-	0	0	$0	$0
Benton County	8/1/2012	-	1	0	$0	$0
		County Totals	**4**	**0**	**$0**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – Flash Flood Records, Benton County, Arkansas

58 Flash Flood event(s) were reported in Benton County, Arkansas between 05/09/1993 and 04/30/2014

Mag: Magnitude (No Indices) Dth: Deaths Inj: Injuries

PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Siloam Springs	5/9/1993	-	0	0	$50,000	$0
Benton County	5/18/1993	-	0	0	$50,000	$0
Benton County	5/25/1994	-	0	0	$50,000	$0
Benton County	5/13/1995	-	0	0	$0	$0
Bella Vista	6/10/1995	-	0	0	$0	$0
Maysville-Gravette	6/10/1995	-	0	0	$0	$0
Countywide	6/10/1995	-	0	0	$0	$0
S Of Siloam Springs	5/10/1996	-	0	0	$5,000	$0
Bentonville	9/26/1996	-	0	0	$0	$0
Vaughn-Bentonville	9/26/1996	-	0	0	$0	$0
Bentonville	11/6/1996	-	0	0	$0	$0
Countywide	11/7/1996	-	0	0	$0	$0
Nr War Eagle	7/10/1997	-	0	0	$0	$0
Siloam Spgs	8/19/1998	-	0	0	$0	$0
Countywide	10/5/1998	-	0	0	$0	$0
Highfill	2/6/1999	-	0	0	$0	$0
Countywide	5/4/1999	-	0	0	$0	$0
West Portion	6/30/1999	-	0	0	$100,000	$0
Countywide	6/17/2000	-	0	0	$0	$0
Countywide	6/21/2000	-	0	0	$1,200,000	$0
Countywide	6/28/2000	-	0	0	$0	$0
Healing Spgs	2/24/2001	-	0	0	$0	$0
Gentry	2/24/2001	-	0	0	$0	$0
Countywide	5/17/2002	-	0	0	$0	$0
Countywide	4/23/2004	-	0	0	$0	$0
Gentry	4/30/2004	-	0	0	$0	$0
Countywide	7/3/2004	-	0	0	$1,000,000	$0
Countywide	11/1/2004	-	0	0	$0	$0
Countywide	1/12/2005	-	0	0	$0	$0
Gravette	6/13/2005	-	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Bentonville	6/1/2007	-	0	0	$0	$0
Gravette	1/7/2008	-	0	0	$10,000	$0
Sulphur Spgs	1/8/2008	-	0	0	$0	$0
Siloam Spgs	3/3/2008	-	0	0	$0	$0
Sulphur Spgs	3/18/2008	-	0	0	$250,000	$0
Gallitin	3/31/2008	-	0	0	$0	$0
Gravette	4/10/2008	-	0	0	$0	$0
Sulphur Spgs	4/10/2008	-	0	0	$0	$0
Siloam Spgs	6/1/2008	-	0	0	$0	$0
Garfield	7/5/2008	-	0	0	$0	$0
Cave Spgs	5/1/2009	-	0	0	$0	$0
Lowell	10/9/2009	-	0	0	$20,000	$0
Bella Vista	4/25/2011	-	2	0	$0	$0
Pea Ridge	5/22/2011	-	0	0	$0	$0
Gallitin	5/23/2011	-	4	0	$0	$0
Bentonville	4/18/2013	-	0	0	$0	$0
Springtown	4/18/2013	-	0	0	$0	$0
Springtown	5/10/2013	-	0	0	$0	$0
Cave Springs	5/10/2013	-	0	0	$0	$0
Centerton	5/10/2013	-	0	0	$0	$0
Bella Vista	5/10/2013	-	0	0	$0	$0
Bentonville	5/10/2013	-	0	0	$20,000	$0
Gentry	5/10/2013	-	0	0	$0	$0
Gateway	8/8/2013	-	0	0	$1,000,000	$0
Bella Vista	8/8/2013	-	0	0	$1,000,000	$0
Bentonville	8/8/2013	-	0	0	$2,000,000	$0
Pea Ridge	8/8/2013	-	0	0	$1,000,000	$0
Highfill	8/8/2013	-	0	0	$0	$0
		County Totals	**6**	**0**	**$7,755,000**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – Riverine Flood Records, Benton County, Arkansas

5 Flood event(s) were reported in Grant County, Benton between 07/01/1999 and 04/30/2014

Mag: Magnitude (No Indices) Dth: Deaths Inj: Injuries

PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Rogers	7/1/1999	-	0	0	$0	$0
Bentonville Municipal Airport	4/18/2013	-	0	0	$0	$0
Bentonville	4/18/2013	-	0	0	$0	$0
Bella Vista	4/18/2013	-	0	0	$0	$0
Maysville	4/18/2013	-	0	0	$0	$0
		County Totals	**0**	**0**	**$0**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – Hail Records, Benton County, Arkansas

267 Hail event(s) were reported in Benton County, Arkansas between 06/27/1956 and 04/30/2014

Mag: Magnitude (Diameter in inches) Dth: Deaths Inj: Injuries

PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Benton County	6/27/1956	1.75	0	0	$0	$0
Benton County	12/6/1956	1	0	0	$0	$0
Benton County	3/20/1962	-	0	0	$0	$0
Benton County	4/3/1965	1.75	0	0	$0	$0
Benton County	5/15/1965	1.75	0	0	$0	$0
Benton County	4/25/1967	1.5	0	0	$0	$0
Benton County	6/30/1972	0.75	0	0	$0	$0
Benton County	3/29/1976	1	0	0	$0	$0
Benton County	9/22/1977	1	0	0	$0	$0
Benton County	5/26/1980	1.75	0	0	$0	$0
Benton County	5/26/1980	1.75	0	0	$0	$0
Benton County	8/3/1980	1	0	0	$0	$0
Benton County	4/16/1982	1.75	0	0	$0	$0
Benton County	4/16/1982	1.75	0	0	$0	$0
Benton County	4/16/1982	1.75	0	0	$0	$0
Benton County	4/1/1983	1.75	0	0	$0	$0
Benton County	5/22/1983	1.75	0	0	$0	$0
Benton County	5/7/1984	1.75	0	0	$0	$0
Benton County	7/6/1984	1.75	0	0	$0	$0
Benton County	4/30/1985	0.75	0	0	$0	$0
Benton County	5/28/1985	1	0	0	$0	$0
Benton County	6/4/1985	2.75	0	0	$0	$0
Benton County	11/13/1985	0.75	0	0	$0	$0
Benton County	11/19/1985	0.75	0	0	$0	$0
Benton County	11/19/1985	0.75	0	0	$0	$0
Benton County	4/4/1986	0.75	0	0	$0	$0
Benton County	4/7/1986	1	0	0	$0	$0
Benton County	4/7/1986	0.75	0	0	$0	$0
Benton County	4/7/1986	0.75	0	0	$0	$0
Benton County	4/7/1986	0.75	0	0	$0	$0
Benton County	4/7/1986	1.75	0	0	$0	$0
Benton County	4/7/1986	0.75	0	0	$0	$0
Benton County	8/2/1986	1.75	0	0	$0	$0
Benton County	3/11/1988	0.75	0	0	$0	$0
Benton County	3/24/1988	1.75	0	0	$0	$0
Benton County	4/1/1988	0.75	0	0	$0	$0
Benton County	4/5/1988	0.75	0	0	$0	$0
Benton County	6/2/1988	0.75	0	0	$0	$0
Benton County	6/8/1988	0.75	0	0	$0	$0
Benton County	5/8/1989	1	0	0	$0	$0
Benton County	5/21/1989	1.75	0	0	$0	$0
Benton County	5/21/1989	1.75	0	0	$0	$0
Benton County	5/21/1989	0.75	0	0	$0	$0
Benton County	5/21/1989	1.75	0	0	$0	$0
Benton County	5/21/1989	0.75	0	0	$0	$0
Benton County	4/16/1990	0.75	0	0	$0	$0
Benton County	4/16/1990	1	0	0	$0	$0
Benton County	4/16/1990	1.75	0	0	$0	$0
Benton County	5/21/1990	0.75	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Benton County	5/21/1990	0.75	0	0	$0	$0
Benton County	5/21/1990	1.75	0	0	$0	$0
Benton County	5/26/1990	0.75	0	0	$0	$0
Benton County	3/21/1991	0.75	0	0	$0	$0
Benton County	3/21/1991	0.75	0	0	$0	$0
Benton County	3/21/1991	0.75	0	0	$0	$0
Benton County	4/14/1991	0.75	0	0	$0	$0
Benton County	5/16/1991	1	0	0	$0	$0
Benton County	4/16/1992	0.75	0	0	$0	$0
Benton County	4/16/1992	0.75	0	0	$0	$0
Benton County	10/31/1992	1.75	0	0	$0	$0
Benton County	10/31/1992	0.75	0	0	$0	$0
Benton County	10/31/1992	0.75	0	0	$0	$0
Gentry	4/24/1993	1.75	0	0	$0	$0
Bentonville	4/24/1993	1.75	0	0	$0	$0
Highfill	4/24/1993	1	0	0	$0	$0
Siloam Springs	4/24/1993	1.75	0	0	$0	$0
Dumas	5/18/1993	0.75	0	0	$0	$0
Pea Ridge	4/10/1994	1	0	0	$0	$0
Gravette	4/10/1994	0.75	0	0	$0	$0
Sulphur Springs	4/10/1994	0.75	0	0	$0	$0
Bella Vista	4/10/1994	0.75	0	0	$0	$0
Siloam Springs	4/10/1994	0.75	0	0	$0	$0
Cherokee City	4/10/1994	1.75	0	0	$0	$0
Maysville	4/10/1994	0.75	0	0	$0	$0
Cherokee City	4/10/1994	1	0	0	$0	$0
Gentry	4/10/1994	0.75	0	0	$0	$0
Bella Vista	4/10/1994	0.75	0	0	$0	$0
Bella Vista	4/10/1994	0.75	0	0	$0	$0
Bella Vista	4/10/1994	0.75	0	0	$0	$0
Gravette	4/10/1994	1	0	0	$0	$0
Gravette	4/11/1994	0.75	0	0	$0	$0
Rogers	4/15/1994	0.88	0	0	$0	$0
Siloam Springs	5/25/1994	0.75	0	0	$0	$0
Siloam Springs	5/25/1994	0.75	0	0	$0	$0
Decatur	6/7/1994	0.75	0	0	$0	$0
Siloam Springs	6/9/1994	0.75	0	0	$0	$0
Little Flock	6/30/1994	1.75	0	0	$0	$0
Rogers	6/30/1994	0.88	0	0	$0	$0
Siloam Springs	7/23/1994	0.75	0	0	$0	$0
Siloam Springs	7/23/1994	0.88	0	0	$0	$0
Benton COunty	7/30/1994	0.88	0	0	$0	$0
Bella Vista	10/20/1994	0.88	0	0	$0	$0
Siloam Springs	1/12/1995	0.75	0	0	$0	$0
Siloam Springs	1/12/1995	0.75	0	0	$0	$0
Siloam Springs	1/12/1995	0.75	0	0	$0	$0
Gentry	4/19/1995	0.75	0	0	$50,000	$0
Gentry	4/19/1995	0.75	0	0	$0	$0
Maysville	5/13/1995	0.88	0	0	$0	$0
Nr Gravette	5/13/1995	2.75	0	0	$0	$0
Nr Bentonville	5/13/1995	1.25	0	0	$0	$0
Nr Bentonville	5/13/1995	2	0	0	$0	$0
Monte Ne	5/13/1995	4.5	0	0	$0	$0
Lowell	5/13/1995	0.75	0	0	$0	$0
Nr Bentonville	5/13/1995	1	0	0	$0	$0
Siloam Springs	6/5/1995	0.8	0	0	$0	$0
Siloam Springs	6/5/1995	1	0	0	$0	$0
Cave Springs	6/9/1995	0.75	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Decatur	8/19/1995	0.75	0	0	$0	$0
Bentonville	10/26/1995	4	0	0	$0	$0
Rogers	10/26/1995	1.75	0	0	$0	$0
Pea Ridge	10/26/1995	1.75	0	0	$0	$0
Rogers	10/26/1995	1	0	0	$0	$0
Rogers	10/26/1995	1	0	0	$0	$0
Siloam Springs	11/10/1995	1.75	0	0	$0	$0
Gateway	11/10/1995	0.75	0	0	$0	$0
Siloam Springs	11/10/1995	1.25	0	0	$0	$0
Siloam Springs	11/10/1995	0.88	0	0	$0	$0
Siloam Springs	12/10/1995	0.88	0	0	$0	$0
Siloam Springs	12/10/1995	1.25	0	0	$0	$0
Siloam Springs	12/10/1995	1.75	0	0	$0	$0
Gateway	12/10/1995	0.75	0	0	$0	$0
Sulphur Springs	3/14/1996	1.75	0	0	$0	$0
Pea Ridge	3/14/1996	0.75	0	0	$0	$0
Bentonville	3/14/1996	1.75	0	0	$0	$0
Bentonville	3/14/1996	1	0	0	$0	$0
Rogers	3/14/1996	1.75	0	0	$0	$0
Rogers	3/14/1996	1	0	0	$0	$0
Rogers	3/14/1996	1	0	0	$0	$0
Bentonville	3/14/1996	0.88	0	0	$0	$0
Pea Ridge	3/14/1996	0.75	0	0	$0	$0
Pea Ridge	3/14/1996	0.75	0	0	$0	$0
Gentry	5/14/1996	1	0	0	$0	$0
Gentry	5/14/1996	0.88	0	0	$0	$0
Gravette	6/2/1996	0.75	0	0	$0	$0
Maysville	3/27/1997	0.88	0	0	$0	$0
Rogers	5/2/1997	0.75	0	0	$0	$0
Cave Spgs	7/14/1997	0.75	0	0	$0	$0
Monte Ne	7/14/1997	1	0	0	$0	$0
Bella Vista	2/25/1998	0.75	0	0	$0	$0
Cave Spgs	5/25/1998	0.75	0	0	$0	$0
Wareagle	8/18/1998	1	0	0	$1,000	$0
Maysville	3/5/1999	0.75	0	0	$0	$0
Lowell	4/3/1999	0.75	0	0	$0	$0
Bella Vista	4/22/1999	0.88	0	0	$0	$0
Siloam Spgs	5/22/1999	0.75	0	0	$0	$0
Gentry	9/7/1999	1	0	0	$0	$0
Bentonville	1/3/2000	0.88	0	0	$0	$0
Siloam Spgs	2/26/2000	1.75	0	0	$0	$0
Maysville	2/21/2001	1.75	0	0	$0	$0
Gravette	2/21/2001	0.75	0	0	$0	$0
Maysville	2/21/2001	1	0	0	$0	$0
Sulphur Spgs	2/21/2001	0.75	0	0	$0	$0
Centerton	5/11/2001	0.75	0	0	$0	$0
Bentonville	5/20/2001	1	0	0	$0	$0
Garfield	8/10/2001	1.75	0	0	$0	$0
Wareagle	10/10/2001	0.88	0	0	$0	$0
Rogers	4/30/2002	0.75	0	0	$0	$0
Bentonville	4/30/2002	0.88	0	0	$0	$0
Siloam Spgs	5/1/2002	0.88	0	0	$0	$0
Siloam Spgs	5/1/2002	0.75	0	0	$0	$0
Rogers	5/1/2003	1	0	0	$0	$0
Gentry	5/5/2003	0.88	0	0	$0	$0
Gentry	5/13/2003	1.75	0	0	$0	$0
Wareagle	5/13/2003	0.75	0	0	$0	$0
Hiwasse	7/13/2003	0.75	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Rogers	7/13/2003	0.88	0	0	$0	$0
Bella Vista	7/13/2003	0.75	0	0	$0	$0
Siloam Spgs	7/13/2003	1.5	0	0	$0	$0
Siloam Spgs	7/13/2003	0.75	0	0	$0	$0
Decatur	3/17/2004	1.75	0	0	$0	$0
Highfill	3/17/2004	1.75	0	0	$0	$0
Cave Spgs	4/30/2004	1.75	0	0	$0	$0
Gentry	4/30/2004	0.75	0	0	$0	$0
Bentonville	7/2/2004	0.88	0	0	$0	$0
Rogers	11/26/2004	0.88	0	0	$0	$0
Bella Vista	1/4/2005	1	0	0	$0	$0
Bentonville	4/5/2005	0.75	0	0	$0	$0
Pea Ridge	5/23/2005	0.75	0	0	$0	$0
Gravette	6/13/2005	0.75	0	0	$0	$0
Bentonville	1/12/2006	0.75	0	0	$0	$0
Siloam Spgs	3/11/2006	1	0	0	$0	$0
Gateway	3/11/2006	1.75	0	0	$25,000	$0
Decatur	3/12/2006	4	0	0	$2,500,000	$0
Rogers	3/12/2006	0.75	0	0	$0	$0
Gateway	3/12/2006	1.75	0	0	$25,000	$0
Bella Vista	4/5/2006	0.88	0	0	$0	$0
Garfield	4/24/2006	0.88	0	0	$0	$0
Lowell	9/22/2006	0.75	0	0	$0	$0
Centerton	9/23/2006	1	0	0	$0	$0
Bella Vista	3/1/2007	0.88	0	0	$0	$0
Bentonville	6/1/2007	1	0	0	$0	$0
Sulphur Spgs	1/7/2008	0.75	0	0	$0	$0
Hiwasse	1/7/2008	0.75	0	0	$0	$0
Bella Vista	1/7/2008	1.75	0	0	$25,000	$0
Siloam Spgs	1/7/2008	1	0	0	$0	$0
Cherokee City	1/7/2008	1	0	0	$0	$0
Bella Vista	1/7/2008	0.75	0	0	$0	$0
Sulphur Spgs	1/7/2008	0.75	0	0	$0	$0
Bentonville	3/14/2008	1	0	0	$0	$0
Pea Ridge	3/27/2008	0.75	0	0	$0	$0
Hiwasse	3/27/2008	1.75	0	0	$0	$0
Gentry	3/31/2008	0.88	0	0	$0	$0
Garfield	4/22/2008	1	0	0	$0	$0
Pea Ridge	4/22/2008	0.75	0	0	$0	$0
Lookout	5/10/2008	0.88	0	0	$0	$0
Gravette	5/10/2008	1.75	0	0	$0	$0
Bentonville	5/10/2008	1.75	0	0	$75,000	$0
Rogers	5/10/2008	1.75	0	0	$75,000	$0
Vaughn	5/10/2008	1.75	0	0	$0	$0
Decatur	5/10/2008	1.75	0	0	$20,000	$0
Rogers	5/25/2008	0.88	0	0	$0	$0
Rogers	5/25/2008	0.88	0	0	$0	$0
Rogers	5/26/2008	0.88	0	0	$0	$0
Rogers	5/26/2008	0.75	0	0	$0	$0
Gravette	5/31/2008	0.75	0	0	$0	$0
Highfill	6/1/2008	1	0	0	$0	$0
Siloam Spgs	6/1/2008	0.75	0	0	$0	$0
Bentonville	10/31/2008	0.88	0	0	$0	$0
Rogers	10/31/2008	0.75	0	0	$0	$0
Centerton	11/6/2008	1	0	0	$0	$0
Gentry	2/17/2009	1	0	0	$0	$0
Sulphur Spgs	2/26/2009	1	0	0	$0	$0
Gentry	2/26/2009	1	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Siloam Spgs	4/18/2009	1	0	0	$0	$0
Monte Ne	5/1/2009	3	0	0	$50,000	$0
Lowell	5/1/2009	2	0	0	$25,000	$0
Cave Spgs	5/1/2009	1	0	0	$0	$0
Gentry	5/1/2009	1	0	0	$0	$0
Gentry	5/1/2009	1	0	0	$0	$0
Siloam Spgs	5/13/2009	1	0	0	$0	$0
Rogers	5/15/2009	1	0	0	$0	$0
Bentonville	8/20/2009	1	0	0	$0	$0
Siloam Spgs	9/21/2009	1	0	0	$0	$0
Avoca	5/25/2010	1	0	0	$0	$0
Lowell	4/19/2011	1	0	0	$0	$0
Lowell	4/19/2011	1	0	0	$0	$0
Lowell	4/19/2011	1	0	0	$0	$0
Rogers	4/21/2011	1	0	0	$0	$0
Siloam Spgs	4/21/2011	1	0	0	$0	$0
Bentonville	4/22/2011	2	0	0	$25,000	$0
Centerton	4/22/2011	2	0	0	$25,000	$0
Lowell	4/23/2011	1	0	0	$0	$0
Lookout	4/23/2011	1	0	0	$0	$0
Maysville	4/23/2011	1	0	0	$0	$0
Decatur	4/26/2011	1	0	0	$0	$0
Lowell	4/26/2011	1	0	0	$0	$0
Rogers	4/26/2011	1	0	0	$0	$0
Gentry	4/26/2011	2	0	0	$0	$0
Lowell	4/26/2011	1	0	0	$0	$0
Rogers	5/7/2011	1	0	0	$5,000	$0
Rogers	5/7/2011	1	0	0	$0	$0
Bella Vista	5/22/2011	1	0	0	$0	$0
Bella Vista	5/22/2011	1	0	0	$0	$0
Centerton	5/22/2011	1	0	0	$0	$0
Bella Vista	5/22/2011	2	0	0	$0	$0
Rogers	5/22/2011	2	0	0	$25,000	$0
Pea Ridge	5/22/2011	2	0	0	$25,000	$0
Lowell	5/22/2011	2	0	0	$25,000	$0
Gentry	5/22/2011	2	0	0	$25,000	$0
Siloam Spgs	5/22/2011	2	0	0	$25,000	$0
Rogers	6/21/2011	1	0	0	$0	$0
Siloam Spgs	6/24/2011	1	0	0	$0	$0
Rogers	8/8/2011	1	0	0	$0	$0
Gallitin	8/12/2012	1.25	0	0	$0	$0
Cherokee City	8/16/2012	1	0	0	$0	$0
Hiwasse	9/26/2012	1.25	0	0	$0	$0
Hiwasse	9/26/2012	1.75	0	0	$10,000	$0
Bentonville	9/26/2012	1	0	0	$0	$0
Maysville	3/30/2013	0.75	0	0	$0	$0
Bella Vista	3/30/2013	0.88	0	0	$0	$0
Pea Ridge	4/3/2014	1	0	0	$0	$0
Pea Ridge	4/3/2014	1.75	0	0	$15,000	$0
		County Totals	**0**	**0**	**$3,076,000**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – High & Strong Wind Records, Benton County, Arkansas

5 High and Strong Wind event(s) were reported in Benton County, Arkansas between 03/27/1998 and 04/30/2014

Mag: Magnitude (Wind speed in MpH) Dth: Deaths Inj: Injuries

PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Benton County	3/27/1998	-	0	0	$5,100	$0
Benton County	4/15/1999	-	0	0	$1,000	$0
Benton County	11/27/2005	60	0	0	$5,000	$0
Benton County	1/29/2008	70	0	0	$0	$0
Benton County	9/14/2008	60	0	0	$20,000	$0
		County Totals	**0**	**0**	**$31,100**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – Lightning Records, Benton County, Arkansas

2 Lightning event(s) were reported in Benton County, Arkansas between 05/17/1993 and 04/30/2014

Mag: Magnitude (No Indices) Dth: Deaths Inj: Injuries

PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Pea Ridge	5/17/1993	-	0	1	$500,000	$0
Centerton	4/19/1995	-	0	1	$0	$0
Garfield	5/9/1998	-	0	1	$0	$0
Highfill	5/4/1999	-	0	1	$0	$0
Siloam Spgs	9/8/2001	-	0	1	$0	$0
Siloam Spgs	9/9/2001	-	0	0	$10,000	$0
Bentonville	7/22/2003	-	0	1	$0	$0
Bentonville	5/13/2004	-	0	1	$0	$0
Siloam Spgs	6/4/2005	-	0	0	$50,000	$0
Siloam Spgs	8/23/2008	-	0	0	$40,000	$0
Bentonville	8/10/2009	-	0	1	$2,000	$0
Bentonville	8/10/2009	-	0	0	$5,000	$0
Bella Vista	5/14/2010	-	0	0	$150,000	$0
Rogers	5/30/2013	-	0	2	$0	$0
Bentonville	7/24/2013	-	0	0	$200,000	$0
		County Totals	**0**	**10**	**$957,000**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – Thunderstorm Wind Records, Benton County, Arkansas

351 Thunderstorm Wind event(s) were reported in Benton County, Arkansas between 12/06/1956 and 04/30/2014

Mag: Magnitude (Wind speed in MpH) Dth: Deaths Inj: Injuries

PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Benton County	12/6/1956	-	0	0	$0	$0
Benton County	11/15/1958	-	0	0	$0	$0
Benton County	4/12/1964	-	0	0	$0	$0
Benton County	9/4/1966	60	0	0	$0	$0
Benton County	12/8/1966	-	0	0	$0	$0
Benton County	2/1/1968	-	0	0	$0	$0
Benton County	4/26/1969	-	0	0	$0	$0
Benton County	7/24/1969	-	0	0	$0	$0
Benton County	11/19/1970	-	0	0	$0	$0
Benton County	11/19/1970	-	0	0	$0	$0
Benton County	5/22/1971	-	0	0	$0	$0
Benton County	10/27/1973	-	0	0	$0	$0
Benton County	11/3/1974	-	0	0	$0	$0
Benton County	6/5/1975	-	0	0	$0	$0
Benton County	6/5/1975	-	0	0	$0	$0
Benton County	6/16/1975	-	0	0	$0	$0
Benton County	6/16/1975	74	0	0	$0	$0
Benton County	8/30/1975	59	0	0	$0	$0
Benton County	7/25/1977	-	0	0	$0	$0
Benton County	4/5/1978	-	0	0	$0	$0
Benton County	4/11/1979	-	0	0	$0	$0
Benton County	5/2/1979	-	0	0	$0	$0
Benton County	7/21/1981	-	0	0	$0	$0
Benton County	5/14/1982	-	0	0	$0	$0
Benton County	6/27/1982	-	0	0	$0	$0
Benton County	8/24/1982	-	0	0	$0	$0
Benton County	8/24/1982	-	0	0	$0	$0
Benton County	8/24/1982	-	0	0	$0	$0
Benton County	8/24/1982	-	0	0	$0	$0
Benton County	9/13/1982	-	0	0	$0	$0
Benton County	9/13/1982	-	0	0	$0	$0
Benton County	9/13/1982	-	0	0	$0	$0
Benton County	9/13/1982	-	0	0	$0	$0
Benton County	5/27/1983	-	0	0	$0	$0
Benton County	7/26/1983	-	0	0	$0	$0
Benton County	7/31/1983	-	0	0	$0	$0
Benton County	5/7/1984	-	0	0	$0	$0
Benton County	8/8/1984	-	0	0	$0	$0
Benton County	9/15/1984	-	0	0	$0	$0
Benton County	10/16/1984	-	0	0	$0	$0
Benton County	11/1/1984	-	0	0	$0	$0
Benton County	4/5/1985	-	0	0	$0	$0
Benton County	5/29/1985	-	0	0	$0	$0
Benton County	11/19/1985	-	0	0	$0	$0
Benton County	4/7/1986	-	0	0	$0	$0
Benton County	4/7/1986	-	0	0	$0	$0
Benton County	4/8/1986	-	0	0	$0	$0
Benton County	6/10/1986	-	0	0	$0	$0
Benton County	6/27/1986	-	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Benton County	8/2/1986	-	0	0	$0	$0
Benton County	6/23/1987	-	0	0	$0	$0
Benton County	8/19/1987	-	0	0	$0	$0
Benton County	8/19/1987	-	0	0	$0	$0
Benton County	8/19/1987	-	0	0	$0	$0
Benton County	3/11/1988	60	0	0	$0	$0
Benton County	3/24/1988	-	0	0	$0	$0
Benton County	6/8/1988	58	0	0	$0	$0
Benton County	6/29/1988	-	0	0	$0	$0
Benton County	11/15/1988	63	0	0	$0	$0
Benton County	11/15/1988	-	0	0	$0	$0
Benton County	3/28/1989	-	0	0	$0	$0
Benton County	5/22/1989	66	0	0	$0	$0
Benton County	5/22/1989	-	0	0	$0	$0
Benton County	6/2/1989	-	0	0	$0	$0
Benton County	6/11/1989	-	0	0	$0	$0
Benton County	4/16/1990	58	0	0	$0	$0
Benton County	6/9/1990	-	0	0	$0	$0
Benton County	6/21/1990	-	0	0	$0	$0
Benton County	11/27/1990	-	0	0	$0	$0
Benton County	3/21/1991	-	0	0	$0	$0
Benton County	11/29/1991	60	0	0	$0	$0
Benton County	11/29/1991	60	0	0	$0	$0
Benton County	11/29/1991	-	0	0	$0	$0
Benton County	7/2/1992	-	0	0	$0	$0
Benton County	7/26/1992	-	0	0	$0	$0
Benton County	8/3/1992	-	0	0	$0	$0
Benton County	8/10/1992	-	0	0	$0	$0
Benton County	8/10/1992	-	0	0	$0	$0
Benton County	9/9/1992	60	0	0	$0	$0
Benton County	9/9/1992	60	0	0	$0	$0
Gentry	4/24/1993	60	0	0	$0	$0
Decatur	5/30/1993	-	0	0	$500	$0
Cherokee City	9/13/1993	-	0	0	$5,000	$0
Rogers	9/14/1993	-	0	0	$50,000	$0
Pea Ridge	10/8/1993	-	0	0	$5,000	$0
Benton	11/13/1993	-	0	0	$5,000	$0
Cherokee City	4/10/1994	-	0	0	$500	$0
Rogers	6/7/1994	60	0	0	$50,000	$0
Pea Ridge	7/7/1994	60	0	0	$0	$0
Bella Vista	7/30/1994	-	0	0	$5,000	$0
Siloam Springs	4/17/1995	-	0	0	$5,000	$0
Rogers	4/17/1995	-	0	0	$50,000	$0
Gentry	4/19/1995	8	0	0	$50,000	$0
Gentry	4/19/1995	-	0	0	$50,000	$0
Pea Ridge	4/19/1995	-	0	0	$5,000	$0
Cherokee City	5/7/1995	-	0	0	$0	$0
Sulphur Springs	5/7/1995	-	0	0	$0	$0
Hiawasse	5/7/1995	-	0	0	$0	$0
Rogers	5/27/1995	60	0	0	$0	$0
Bentonville	5/27/1995	60	0	0	$0	$0
Bentonville	7/4/1995	-	0	0	$0	$0
Lowell	7/4/1995	-	0	0	$1,000	$0
Siloam Springs	7/4/1995	60	0	0	$0	$0
Siloam Springs	7/4/1995	-	0	0	$0	$0
Siloam Springs	7/4/1995	70	0	0	$2,000	$0
Countywide	7/4/1995	-	0	0	$0	$0
Bentonville	7/25/1995	70	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Hiwasse	7/25/1995	70	0	0	$0	$0
Sulphur Springs	7/25/1995	-	0	0	$0	$0
Lowell	7/25/1995	-	0	0	$0	$0
Siloam Springs	7/25/1995	-	0	0	$0	$0
Lowell	9/30/1995	-	0	1	$3,500,000	$0
Siloam Spgs	1/17/1996	60	0	0	$0	$0
Bentonville	1/18/1996	60	0	0	$0	$0
Gravette	1/18/1996	-	0	0	$1,500	$0
Cave Springs	7/4/1996	-	0	0	$100	$0
Rogers	9/23/1996	70	0	0	$0	$0
Centerton	9/23/1996	-	0	0	$100	$0
Garfield	9/23/1996	-	0	0	$3,000	$0
Bentonville	9/23/1996	-	0	0	$5,000	$0
Bella Vista	9/23/1996	-	0	0	$100	$0
Rogers	2/20/1997	-	0	0	$120,000	$0
Cave Springs	2/20/1997	-	0	0	$20,000	$0
Rogers	2/20/1997	-	0	0	$1,000,000	$0
Maysville	3/25/1997	-	0	0	$100	$0
Pea Ridge	4/20/1997	-	0	0	$100	$0
Pea Ridge	4/20/1997	-	0	0	$100	$0
Rogers	7/9/1997	-	0	0	$100	$0
Siloam Spgs	3/30/1998	-	0	0	$100	$0
Bella Vista	3/30/1998	-	0	0	$35,000	$0
Gentry	3/30/1998	-	0	0	$2,000	$0
Cave Spgs	5/29/1998	-	0	0	$1,000	$0
Sulphur Spgs	6/30/1998	-	0	0	$500	$0
Gravette	6/30/1998	-	0	0	$15,000	$0
Garfield	8/2/1998	-	0	0	$300	$0
Pea Ridge	8/2/1998	-	0	0	$1,000	$0
Wareagle	8/18/1998	-	0	0	$500	$0
Siloam Spgs	8/19/1998	-	0	0	$5,000	$0
Siloam Spgs	8/19/1998	-	0	0	$300	$0
Gentry	10/5/1998	66	0	0	$0	$0
Maysville	10/5/1998	-	0	0	$100	$0
Garfield	10/5/1998	-	0	0	$100	$0
Cave Spgs	10/16/1998	-	0	0	$100	$0
Gravette	11/9/1998	-	0	0	$1,000	$0
Gentry	11/9/1998	-	0	0	$1,000	$0
Hiwasse	11/10/1998	-	0	0	$500	$0
Cave Spgs	11/10/1998	-	0	0	$500	$0
Decatur	11/10/1998	-	0	0	$2,000	$0
Bentonville	11/10/1998	-	0	0	$200	$0
Avoca	2/11/1999	-	0	0	$100	$0
Rogers	4/3/1999	-	0	0	$500	$0
Gentry	5/4/1999	-	0	0	$100	$0
Gentry	5/4/1999	-	0	0	$100	$0
Monte Ne	5/4/1999	-	0	0	$10,000	$0
Centerton	5/4/1999	-	0	0	$15,000	$0
Siloam Spgs	5/4/1999	60	0	0	$0	$0
Gravette	5/17/1999	-	0	0	$6,000	$0
Siloam Spgs	5/17/1999	-	0	0	$15,000	$0
Gentry	5/17/1999	-	0	0	$3,000	$0
Highfill	5/17/1999	-	0	0	$60,000	$0
Rogers	5/17/1999	-	0	0	$1,000	$0
Wareagle	5/17/1999	-	0	0	$500	$0
Rogers	5/17/1999	-	0	0	$5,000	$0
Lowell	5/23/1999	-	0	0	$500	$0
Siloam Spgs	5/31/1999	-	0	0	$100	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Cave Spgs	7/1/1999	-	0	0	$5,000	$0
Siloam Spgs	8/26/1999	-	0	0	$100	$0
Pea Ridge	9/4/1999	-	0	0	$11,000	$0
Centerton	9/4/1999	-	0	0	$2,500	$0
Rogers	4/20/2000	-	0	0	$20,000	$0
Bentonville	4/20/2000	-	0	0	$3,000	$0
Maysville	5/24/2000	70	0	0	$500	$0
Siloam Spgs	5/24/2000	-	0	0	$500	$0
Gentry	5/24/2000	-	0	0	$500	$0
Siloam Spgs	5/24/2000	-	0	0	$500	$0
Rogers	5/24/2000	60	0	0	$0	$0
Siloam Spgs	7/20/2000	-	0	0	$1,000	$0
Garfield	7/20/2000	-	0	0	$100	$0
Gentry	7/20/2000	-	0	0	$1,000	$0
Gateway	7/20/2000	-	0	0	$10,000	$0
Lowell	7/20/2000	-	0	0	$100	$0
Gentry	2/9/2001	-	0	0	$5,000	$0
Gentry	2/24/2001	-	0	0	$100	$0
Wareagle	2/24/2001	-	0	0	$500	$0
Bentonville	2/24/2001	-	0	0	$100	$0
Siloam Spgs	4/11/2001	-	0	0	$100	$0
Gravette	4/11/2001	0	0	0	$100	$0
Highfill	4/15/2001	99	0	0	$1,000,000	$0
Wareagle	4/15/2001	-	0	0	$100	$0
Siloam Spgs	4/23/2001	60	0	0	$0	$0
Bentonville	5/6/2001	-	0	0	$100	$0
Garfield	5/17/2001	-	0	0	$100	$0
Rogers	5/20/2001	-	0	0	$500	$0
Siloam Spgs	6/21/2001	70	0	0	$0	$0
Bentonville	8/9/2001	70	0	0	$3,000	$0
Highfill	8/11/2001	-	0	0	$5,000	$0
Garfield	8/29/2001	70	0	0	$1,000	$0
Gentry	9/7/2001	60	0	0	$0	$0
Siloam Spgs	9/7/2001	70	0	0	$0	$0
Siloam Spgs	11/23/2001	60	0	0	$0	$0
Highfill	11/23/2001	58	0	0	$0	$0
Pea Ridge	11/23/2001	70	0	0	$0	$0
Bella Vista	3/9/2002	70	0	0	$0	$0
Pea Ridge	5/8/2002	60	0	0	$1,000	$0
Bentonville	5/8/2002	60	0	0	$0	$0
Rogers	5/8/2002	66	0	0	$0	$0
Cave Spgs	5/9/2002	60	0	0	$0	$0
Lowell	5/12/2002	66	0	0	$0	$0
Highfill	6/12/2002	70	0	0	$5,000	$0
Rogers	6/12/2002	70	0	0	$25,000	$0
Siloam Spgs	5/6/2003	60	0	0	$0	$0
Gravette	5/16/2003	70	0	0	$0	$0
Gentry	5/16/2003	70	0	0	$50,000	$0
Siloam Spgs	5/16/2003	70	0	0	$100,000	$0
Pea Ridge	5/16/2003	81	0	0	$100,000	$0
Bella Vista	5/16/2003	70	0	0	$25,000	$0
Bentonville	5/16/2003	81	0	0	$700,000	$0
Garfield	6/10/2003	70	0	0	$0	$0
Wareagle	7/11/2003	60	0	0	$0	$0
Garfield	7/22/2003	70	0	0	$0	$0
Gentry	10/15/2003	70	0	0	$25,000	$0
Gentry	4/30/2004	70	0	0	$0	$0
Bella Vista	5/30/2004	60	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Siloam Spgs	7/2/2004	60	0	0	$0	$0
Gentry	7/2/2004	70	0	0	$0	$0
Lowell	7/4/2004	70	0	0	$0	$0
Sulphur Spgs	7/4/2004	70	0	0	$5,000	$0
Centerton	1/12/2005	81	0	1	$250,000	$0
Bella Vista	5/23/2005	70	0	0	$5,000	$0
Bentonville	5/23/2005	70	0	0	$5,000	$0
Rogers	5/23/2005	70	0	0	$5,000	$0
Gravette	5/23/2005	70	0	0	$0	$0
Rogers	6/4/2005	60	0	0	$0	$0
Siloam Spgs	6/4/2005	60	0	0	$10,000	$0
Bentonville	6/4/2005	70	0	0	$10,000	$0
Centerton	7/26/2005	81	0	0	$200,000	$0
Bentonville Muni Arp	3/12/2006	81	0	0	$750,000	$0
Siloam Spgs	4/2/2006	60	0	0	$1,000	$0
Bentonville	4/2/2006	70	0	0	$0	$0
Maysville	4/24/2006	70	0	0	$0	$0
Rogers	5/9/2006	70	0	0	$1,000	$0
Bentonville	5/9/2006	62	0	0	$1,000	$0
Gentry	5/9/2006	70	0	0	$0	$0
Bentonville	8/4/2006	70	0	2	$50,000	$0
Siloam Spgs	8/21/2006	70	0	0	$0	$0
Gentry	9/17/2006	70	0	0	$50,000	$0
Rogers	9/22/2006	60	0	0	$0	$0
Lowell	9/22/2006	70	0	0	$0	$0
Rogers	6/1/2007	60	0	0	$1,000	$0
Bella Vista	9/6/2007	70	0	0	$0	$0
Beaver Lake	10/17/2007	70	0	0	$0	$0
Rogers	10/17/2007	70	0	0	$0	$0
Beaver Lake	10/17/2007	70	0	0	$0	$0
Gentry	10/17/2007	60	0	0	$0	$0
Decatur	10/17/2007	70	0	0	$0	$0
Gravette	1/7/2008	81	0	0	$2,000	$0
Sulphur Spgs	1/8/2008	60	0	0	$0	$0
Sulphur Spgs	1/8/2008	60	0	0	$0	$0
Bella Vista	1/8/2008	70	0	0	$0	$0
Pea Ridge	1/8/2008	81	0	4	$100,000	$0
Garfield	1/8/2008	81	0	0	$25,000	$0
Wareagle	2/5/2008	60	0	0	$0	$0
Gentry	2/5/2008	70	0	0	$0	$0
Garfield	5/2/2008	70	0	0	$0	$0
Pea Ridge	5/2/2008	70	0	0	$0	$0
Highfill	5/2/2008	64	0	0	$0	$0
Siloam Spgs	5/2/2008	70	1	1	$200,000	$0
Gravette	5/7/2008	60	0	0	$0	$0
Lookout	5/10/2008	60	0	0	$0	$0
Lowell	5/10/2008	70	0	0	$1,000	$0
Siloam Spgs	6/15/2008	70	0	0	$0	$0
Garfield	7/5/2008	70	0	0	$100,000	$0
Cave Spgs	7/12/2008	70	0	0	$1,000	$0
Siloam Spgs	8/30/2008	60	0	0	$1,000	$0
Pea Ridge	11/6/2008	70	0	0	$0	$0
Siloam Spgs	2/10/2009	60	0	0	$0	$0
Rogers	5/1/2009	60	0	0	$0	$0
Bentonville	5/13/2009	60	0	0	$0	$0
Bentonville	5/13/2009	81	0	0	$100,000	$0
Siloam Spgs	5/15/2009	60	0	0	$0	$0
Gentry	6/9/2009	81	0	0	$25,000	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Bella Vista	6/9/2009	70	0	0	$0	$0
Gentry	6/9/2009	70	0	0	$0	$0
Bella Vista	6/12/2009	70	0	0	$1,000	$0
Bentonville	6/12/2009	70	0	0	$0	$0
Rogers	6/12/2009	60	0	0	$0	$0
Rogers	6/12/2009	85	0	0	$0	$0
Gravette	5/13/2010	70	0	0	$50,000	$0
Bentonville	5/13/2010	64	0	0	$0	$0
Pea Ridge	5/13/2010	60	0	0	$0	$0
Best	5/13/2010	64	0	0	$0	$0
Garfield	5/13/2010	60	0	0	$0	$0
Decatur	8/1/2010	64	0	0	$5,000	$0
Decatur	8/1/2010	64	0	0	$20,000	$0
Lookout	9/2/2010	64	0	0	$0	$0
Pea Ridge	10/25/2010	60	0	0	$0	$0
Hiwasse	10/25/2010	60	0	0	$0	$0
Decatur	5/11/2011	60	0	0	$0	$0
Bentonville	5/11/2011	60	0	0	$3,000	$0
Rogers	5/11/2011	70	0	0	$2,000	$0
Rogers Muni Arpt	5/11/2011	60	0	0	$0	$0
Rogers Muni Arpt	5/11/2011	79	0	0	$0	$0
Rogers	5/20/2011	66	0	2	$10,000	$0
Cave Spgs	5/22/2011	70	0	0	$0	$0
Gravette	6/14/2011	70	0	0	$0	$0
Sulphur Spgs	6/14/2011	70	0	0	$0	$0
Bella Vista	6/14/2011	60	0	0	$0	$0
Bentonville	6/14/2011	70	0	0	$5,000	$0
Bentonville	6/14/2011	70	0	0	$10,000	$0
Siloam Spgs	6/24/2011	70	0	0	$0	$0
Bella Vista	7/24/2011	70	0	0	$5,000	$0
Osage Mills	7/30/2011	82	0	0	$0	$0
Lowell	8/8/2011	70	0	0	$0	$0
Bella Vista	8/10/2011	60	0	0	$0	$0
Bella Vista	2/29/2012	75	0	0	$0	$0
Pea Ridge	2/29/2012	75	0	0	$0	$0
Rogers	5/29/2012	60	0	0	$0	$0
Beaver Lake	7/7/2012	60	0	0	$0	$0
Gentry	7/8/2012	75	0	0	$5,000	$0
Vaughn	7/8/2012	86	0	0	$20,000	$0
Lookout	7/26/2012	81	0	0	$0	$0
Sulphur Spgs	8/4/2012	81	0	0	$0	$0
Bella Vista	8/4/2012	81	0	0	$15,000	$0
Bella Vista	8/4/2012	81	0	0	$0	$0
Pea Ridge	8/4/2012	70	0	0	$10,000	$0
Bentonville	8/4/2012	64	0	0	$0	$0
Sulphur Spgs	8/4/2012	81	0	0	$5,000	$0
Pea Ridge	8/4/2012	64	0	0	$10,000	$0
Pea Ridge	8/4/2012	81	0	0	$0	$0
Decatur	8/16/2012	64	0	0	$0	$0
Pea Ridge	9/6/2012	70	0	0	$5,000	$0
Garfield	9/6/2012	60	0	0	$5,000	$0
Lowell	9/7/2012	70	0	0	$40,000	$0
Rogers	9/7/2012	60	0	0	$1,000	$0
Hiwasse	9/26/2012	64	0	0	$0	$0
Healing Spgs	10/13/2012	85	0	0	$0	$0
Cave Spgs	10/13/2012	70	0	0	$25,000	$0
Rogers Muni Arpt	10/13/2012	61	0	0	$0	$0
Bentonville	5/20/2013	64	0	0	$0	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Bentonville Muni Arp	5/20/2013	61	0	0	$0	$0
Lowell	5/20/2013	64	0	0	$10,000	$0
Pea Ridge	5/20/2013	81	0	0	$15,000	$0
Garfield	5/20/2013	81	0	0	$15,000	$0
Siloam Spgs	5/30/2013	75	0	0	$0	$0
Rogers Muni Arpt	7/23/2013	59	0	0	$0	$0
Pea Ridge	7/23/2013	75	0	0	$0	$0
Avoca	8/7/2013	64	0	0	$5,000	$0
Gravette	10/12/2013	60	0	0	$5,000	$0
Bella Vista	4/3/2014	60	0	0	$0	$0
Osage Mills	4/13/2014	58	0	0	$0	$0
Highfill	4/13/2014	60	0	0	$1,000	$0
		County Totals	**1**	**11**	**$9,421,800**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – Tornado Records, Benton County, Arkansas

46 Tornado event(s) were reported in Benton County, Arkansas between 03/24/1954 and 04/30/2014

Mag: Magnitude (F/EF Scale) Dth: Deaths Inj: Injuries

PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Benton County	3/24/1954	3	0	4	$2,500	$0
Benton County	3/25/1954	1	0	0	$25,000	$0
Benton County	5/16/1960	1	0	0	$25,000	$0
Benton County	3/12/1961	1	0	0	$25,000	$0
Benton County	6/12/1964	1	0	0	$0	$0
Benton County	6/12/1964	1	0	0	$25,000	$0
Benton County	4/8/1965	1	0	0	$25,000	$0
Benton County	6/1/1968	2	0	0	$2,500	$0
Benton County	4/30/1970	1	0	0	$25,000	$0
Benton County	6/11/1970	3	0	0	$2,500,000	$0
Benton County	10/8/1970	3	0	4	$250,000	$0
Benton County	11/19/1970	2	0	0	$25,000	$0
Benton County	5/1/1973	2	0	4	$250,000	$0
Benton County	5/26/1973	0	0	0	$250	$0
Benton County	5/26/1973	2	0	0	$250,000	$0
Benton County	5/9/1974	1	0	0	$25,000	$0
Benton County	4/18/1975	1	0	0	$25,000	$0
Benton County	6/12/1977	0	0	0	$0	$0
Benton County	5/7/1978	1	0	0	$2,500	$0
Benton County	5/12/1978	1	0	0	$25,000	$0
Benton County	3/14/1990	0	0	0	$0	$0
Benton County	10/28/1991	1	0	0	$25,000	$0
Siloam Springs	4/24/1993	0	0	0	$0	$0
Avoca	10/8/1993	2	0	0	$500,000	$0
Sulphur Springs	10/8/1993	0	0	0	$5,000	$0
Decatur	10/8/1993	1	0	0	$50,000	$0
Centerton	10/8/1993	0	0	0	$5,000	$0
Rogers	5/13/1995	0	0	0	$0	$0
Gentry	5/13/1995	0	0	0	$0	$0
Pea Ridge	4/20/1997	0	0	0	$0	$0
Gravette	3/30/1998	1	0	0	$100,000	$0
Cherokee City	3/12/2006	3	0	12	$5,000,000	$0

Location	Date	Mag	Dth	Inj	PrD	CrD
Bentonville	3/12/2006	2	0	0	$10,000,000	$0
Gentry	1/7/2008	1	0	0	$0	$0
Hiwasse	1/7/2008	0	0	0	$0	$0
Centerton	1/7/2008	0	0	0	$0	$0
Bentonville	5/10/2008	1	0	0	$100,000	$0
Trident	12/31/2010	2	0	2	$200,000	$0
Robinson	12/31/2010	2	0	0	$75,000	$0
Bentonville	4/22/2011	0	0	0	$0	$0
Highfill	4/22/2011	0	0	0	$0	$0
Cherokee City	4/22/2011	0	0	0	$0	$0
Gentry	5/22/2011	1	0	0	$25,000	$0
Bentonville Municipal Airport	10/13/2012	1	0	2	$100,000	$0
Siloam Springs	5/20/2013	1	0	0	$50,000	$0
Larue	5/20/2013	1	0	0	$50,000	$0
		County Totals	**0**	**28**	**$19,792,750**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Table X – Wildfire Records, Benton County, Arkansas

456 Wildfire event(s) were reported in Benton County, Arkansas between 1989 and 2013

Location	Date	Acres Burned	Fires
Benton County	1989	994	80
Benton County	1990	789	18
Benton County	1991	306	13
Benton County	1992	147	15
Benton County	1993	78	9
Benton County	1994	83	10
Benton County	1995	207	19
Benton County	1996	250	12
Benton County	1997	274	10
Benton County	1998	199	10
Benton County	1999	19	4
Benton County	2000	117	8
Benton County	2001	91	7
Benton County	2002	629	9
Benton County	2003	168	8
Benton County	2004	105	4
Benton County	2005	336	20
Benton County	2006	1,021	27
Benton County	2007	552	18
Benton County	2008	56	6
Benton County	2009	201	19
Benton County	2010	405	24
Benton County	2011	3,237	35
Benton County	2012	1,235	57
Benton County	2013	230	14
County Totals		**11,729**	**456**

**The data are from the Arkansas Forestry Commission.*

Table X – Winter Storm Records, Benton County, Arkansas

48 Winter Storms were reported in Benton County, Arkansas between 01/18/1993 and 04/30/2014

Mag: Magnitude (Event Sub-Type) Dth: Deaths Inj: Injuries
PrD: Property Damage (US Dollars) CrD: Crop Damage (US Dollars)

Location	Date	Mag	Dth	Inj	PrD	CrD
Benton County	1/18/1993	Ice Storm	0	0	$500,000	$0
Benton County	2/14/1993	Heavy Snow	0	0	$50,000,000	$0
Benton County	2/24/1993	Ice Storm	0	0	$5,000,000	$0
Benton County	1/16/1994	Winter Storm	0	0	$5,000,000	$0
Benton County	2/8/1994	Winter Storm	0	0	$500,000	$0
Benton County	3/8/1994	Winter Storm	0	0	$5,000,000	$0
Benton County	1/18/1995	Heavy Snow	0	0	$0	$0
Benton County	1/18/1995	Heavy Snow	0	0	$0	$0
Benton County	1/1/1996	Heavy Snow	0	0	$0	$0
Benton County	2/1/1996	Heavy Snow	0	0	$0	$0
Benton County	11/24/1996	Ice Storm	0	0	$0	$0
Benton County	1/8/1997	Heavy Snow	0	0	$0	$0
Benton County	1/1/1999	Winter Storm	0	0	$0	$0
Benton County	1/8/1999	Ice Storm	0	0	$0	$0
Benton County	1/23/1999	Heavy Snow	0	0	$0	$0
Benton County	3/13/1999	Heavy Snow	0	0	$20,000	$0
Benton County	1/27/2000	Heavy Snow	0	0	$0	$0
Benton County	12/12/2000	Heavy Snow	0	0	$0	$0
Benton County	12/25/2000	Ice Storm	0	0	$0	$0
Benton County	11/28/2001	Ice Storm	0	0	$1,800,000	$0
Benton County	2/5/2002	Heavy Snow	0	0	$0	$0
Benton County	3/2/2002	Heavy Snow	0	0	$0	$0
Benton County	12/3/2002	Ice Storm	0	0	$0	$0
Benton County	12/23/2002	Heavy Snow	0	0	$0	$0
Benton County	2/9/2003	Heavy Snow	0	0	$0	$0
Benton County	2/23/2003	Heavy Snow	0	0	$0	$0
Benton County	2/26/2003	Winter Weather	0	0	$0	$0
Benton County	2/18/2006	Winter Storm	0	0	$0	$0
Benton County	11/29/2006	Winter Storm	0	0	$0	$0
Benton County	1/12/2007	Winter Storm	0	0	$150,000	$0
Benton County	12/9/2007	Ice Storm	0	0	$0	$0
Benton County	1/31/2008	Heavy Snow	0	0	$0	$0
Benton County	3/3/2008	Winter Storm	0	0	$0	$0
Benton County	1/26/2009	Ice Storm	0	0	$425,000	$0
Benton County	12/24/2009	Winter Storm	0	0	$0	$0
Benton County	1/28/2010	Winter Storm	0	0	$0	$0
Benton County	2/7/2010	Winter Storm	0	0	$0	$0
Benton County	3/20/2010	Winter Storm	0	0	$0	$0
Benton County	1/20/2011	Winter Storm	0	0	$0	$0
Benton County	2/1/2011	Winter Storm	0	0	$0	$0
Benton County	2/4/2011	Winter Storm	0	0	$0	$0
Benton County	2/8/2011	Winter Storm	0	0	$0	$0
Benton County	2/20/2013	Winter Storm	0	0	$0	0
Benton County	12/5/2013	Winter Storm	0	0	$0	0
Benton County	12/20/2013	Ice Storm	0	0	$0	0
Benton County	1/5/2014	Winter Storm	0	0	$0	0
Benton County	2/2/2014	Winter Storm	0	0	$0	0
Benton County	3/2/2014	Winter Storm	0	0	$0	0
		County Totals	**0**	**0**	**$68,395,000**	**$0**

**The data are from the NOAA NCDC Storm Event Database.*

Appendix F – Mitigation Projects

Air Conditioning & Ventilation Modernization Program			
Description	By modernizing a facility's AC and ventilation system it is better equipped to resist extreme heat events and keep its occupants safe from heat related injury. Additionally, it better equips a location to handle more occupants than is typically housed allowing it to be used as a cooling station for the community.		
Hazard/s Addressed	Excessive Heat		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$25,000 - $100,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Alert, Broadcast, & Warning System			
Description	The jurisdictions will continue to improve their alert, broadcast, and warning system to give information and instructions in the face of an impending hazard impact to prevent injury and property damage.		
Hazard/s Addressed	Dam Failure, Floods, Severe Storms, Tornadoes, Wildfires, Winter Storms		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$50,000 - $200,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	

Centerton		Bentonville SD	
Decatur		Decatur SD	
Garfield		Gentry SD	
Gateway		Gravette SD	
Gentry		Pea Ridge SD	
Gravette		Rogers SD	
Highfill		Siloam Springs SD	
Little Flock			

Critical Facility Backup Generator Installation Program			
Description	Backup generators provide critical facilities with electricity in the event a community's electrical transmission grid is either damaged by earthquakes, severe storms, tornadoes, or winter storms, or overloaded by excessive use during an extreme heat or a winter storm.		
Hazard/s Addressed	Excessive Heat, Floods, Severe Storms, Tornadoes, Wildfires, Winter Storms		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$25,000 - $50,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Debris & Natural Fuels Reduction Program			
Description	Reducing the amount of debris and natural fuels in a community will deprive wildfires of the material it requires to spread quickly and prevent high winds from launching deadly and damaging debris around during a severe storm or tornado.		
Hazard/s Addressed	Severe Storms, Tornadoes, Wildfires		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$10,000 - $25,000

Lead Department/s	Chaves County OEM	**Effectiveness**	Low
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Defensible Spaces/Buffer Zones Program

Description	Creating defensible spaces and buffer zones void of vegetative fuel and covered with gravel or rock helps prevent the spread of wildfire as well as creating an area in which local emergency response serviced can safely operate. This 2-pronged approach directly mitigates damage to property and protects lives, but also indirectly mitigates the threat to life and property in the area at large.		
Hazard/s Addressed	Wildfires		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$10,000 - $50,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Earthquake Vulnerability Assessment & Facilities Retrofit Program

Description	An earthquake vulnerability assessment will detail a jurisdiction's high risk facilities, infrastructure and make retrofit recommendations. Using the assessment, a jurisdiction can retrofit their facilities and infrastructure there by reducing their structural vulnerabilities to seismic events.		
Hazard/s Addressed	Earthquakes		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$25,000 - $250,000
Lead Department/s	Chaves County OEM	**Effectiveness**	High
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

FEMA Code 361 Safe Room			
Description	FEMA Code 361 regulations ensure a structure is capable of withstanding wind speeds greater than 200 miles per hour. Additionally, these anti-tornado regulations also ensure the structure is protected against hail, lightning, high and strong winds.		
Hazard/s Addressed	Severe Storms, Tornadoes		
Status	Proposed	**Infrastructure Emphasis**	New
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$250,000 - $1,000,000
Lead Department/s	City Council, Quorum Court, or School Board	**Effectiveness**	High
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	

Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Insulation & Energy Efficiency Upgrade Program			
Description	Upgrading a facility's windows, windows frames, roofing, and insulation will allow it to better maintain a desired, warm or cool, temperature during prolonged extreme heat or winter storms. Additionally, it decreases the energy load necessary to do so, decreasing the burden on the local energy grid.		
Hazard/s Addressed	Excessive Heat, Winter Storms		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$25,000 - $75,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Interior Furnishing Hazard Reduction Program			
Description	Fastening, removing, or modifying interior furnishing prevent them from shaking, becoming unstable, or falling loose into people and other objects during seismic events.		
Hazard/s Addressed	Earthquakes		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$10,000 - $50,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	

Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Public Awareness & Education Campaign			
Description	A campaign will inform and educate the public on high risk dam failure events allowing them to better protect their property through preparation and their lives through appropriate evacuation and survival procedures.		
Hazard/s Addressed	Dam Failure		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$5,000 - $10,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Low
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Purchase Repetitive Loss & Severe Repetitive Loss Properties			
Description	Through the NFIP and other flood damage prevention programs, FEMA designates repetitive loss and severe repetitive loss properties. Relocating or purchasing these structures eliminates their presence in a floodplain severely reducing the impact of floods on a jurisdiction.		
Hazard/s Addressed	Floods		
Status	Proposed	**Infrastructure Emphasis**	Existing

Funding Source/s	FMA	**Cost Estimate**	$0
Lead Department/s	Chaves County OEM	**Effectiveness**	High
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Rainwater Retention/Detention Program

Description	Rainwater detention centers are artificial basins built in strategic locations to protect against floods and droughts by collecting and holding rainwater for an extended period of time.		
Hazard/s Addressed	Droughts, Floods		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$10,000 - $100,000
Lead Department/s	Chaves County OEM	**Effectiveness**	High
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Remote Water Monitoring Stations Program

Description	Strategically installing water monitoring stations will assist in measuring the severity of an existing or impending drought. Accurately measuring the drought will allow the community to take the necessary conservation and regulatory measures to mitigate the droughts effects.		
Hazard/s Addressed	Droughts		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$25,000 - $75,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Low
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Snow Fence Installation Program			
Description	Snow fences force drifting snow to accumulate in a desired place minimizing the amount of snowdrift on roads and railways. Controlling snow accumulation decreases the danger to a jurisdiction's citizens traveling during and after a winter storm.		
Hazard/s Addressed	Winter Storms		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$25,000 - $100,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Low
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	

Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Storm Water Drainage System Upgrade			
Description	Significant flood damage in developed communities can be prevented by upgrading their storm water drainage system. This mitigation measure will allow flood waters to drain quicker and prevent excess accumulation.		
Hazard/s Addressed	Floods		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$25,000 - $50,000
Lead Department/s	Chaves County OEM	**Effectiveness**	High
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Transportation Status & Routing Notification System			
Description	Installing a transportation status and routing system will allow a community to effectively mitigate the effects of multiple hazards on its travelling population. By having a better control of its transportation network, and thus the location of its citizens, a community detour its citizens from entering into the harm of a hazard.		
Hazard/s Addressed	Dam Failure, Floods, Severe Storms, Tornadoes, Wildfires, Winter Storms		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$50,000 - $100,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Low
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	

Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Tree Wire Installation Program			
Description	Securing trees with wire harnesses will prevent wind related events from blowing them over and potentially onto the jurisdiction's facilities and infrastructure.		
Hazard/s Addressed	Severe Storms, Tornadoes		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$5,000 - $25,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Low
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Underground Electrical Transmission Installation Program			
Description	Transferring existing utilities lines from above ground to below ground will significantly reduce the amount of property damage incurred from wind, ice, and snow related events.		
Hazard/s Addressed	Severe Storms, Tornadoes, Winter Storms		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$25,000 - $200,000

Lead Department/s	Chaves County OEM	Effectiveness	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Water Line Insulation Program

Description	Insulating a facility's water pipes helps prevent them from freezing and bursting due to sudden and prolonged low temperatures during winter storms.		
Hazard/s Addressed	Winter Storms		
Status	Proposed	Infrastructure Emphasis	Existing
Funding Source/s	HMGP, PDM, Local Budgets	Cost Estimate	$5,000 - $50,000
Lead Department/s	Chaves County OEM	Effectiveness	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Wildfire Structural Retrofit Program

Description	Retrofitting structures with screened vent enclosures, double paned glass, and spark arrestors will reduce the chances of a structure igniting from a wildfire as well as a wildfire's chance of spreading.

Hazard/s Addressed	Wildfires		
Status	Proposed	**Infrastructure Emphasis**	Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$5,000 - $50,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Medium
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Xeriscaping Program			
Description	Xeriscaping is a specific method of landscaping and gardening designed to reduce and eliminate the need for supplemental water. By practicing xeriscaping on jurisdiction owned properties the net system wide water necessary for a community to maintain itself is substantially reduced.		
Hazard/s Addressed	Droughts		
Status	Proposed	**Infrastructure Emphasis**	New & Existing
Funding Source/s	HMGP, PDM, Local Budgets	**Cost Estimate**	$5,000 - $50,000
Lead Department/s	Chaves County OEM	**Effectiveness**	Low
Benton County		Lowell	
Avoca		Pea Ridge	
Bella Vista		Rogers	
Bentonville		Siloam Springs	
Bethel Heights		Springtown	
Cave Springs		Sulphur Springs	
Centerton		NWACC	
Decatur		Bentonville SD	
Garfield		Decatur SD	
Gateway		Gentry SD	
Gentry		Gravette SD	
Gravette		Pea Ridge SD	
Highfill		Rogers SD	
Little Flock		Siloam Springs SD	

Appendix G – Mitigation Project Prioritization Tables

Appendix H – Plan Adoption Resolutions