

2020 CAMDEN COUNTY MUTI- JURISDICTIONAL HAZARD MITIGATION PLAN

PARTICIPATING JURISDICTIONS: Camden County, City of Camdenton, City of Osage Beach, City of Lake Ozark, City of Linn Creek, City of Richland, Village of Sunrise Beach, Village of Four Seasons, Camdenton R-III School District, Mack's Creek R-V School District, Climax Springs R-IV School District, and Stoutland School District.



PREPARED BY:
LAKE OF THE OZARKS
COUNCIL OF LOCAL
GOVERNMENTS
&
CAMDEN COUNTY OFFICE OF
EMERGENCY MANAGEMENT





FEMA

September 25, 2020

Mr. James Remillard, Acting Director
State Emergency Management Agency
P. O. Box 116
Jefferson City, Missouri 65102

Subject: Review of the Camden County Multi-jurisdiction Hazard Mitigation Plan Update

Dear Mr. Remillard:

The purpose of this letter is to provide the status of the above referenced Local Hazard Mitigation Plan, pursuant to the requirements of 44 CFR Part 201 - Mitigation Planning and the Local Multi-Hazard Mitigation Planning Guidance. The Local Hazard Mitigation Plan Review Tool documents the Region's review and compliance with all required elements of 44 CFR Part 201.6, as well as identifies the jurisdictions participating in the planning process. FEMA's approval will be for a period of five years effective starting with the approval date indicated below.

Prior to the expiration of the plan the community will be required to review and revise their plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding.

Plan Name	Date Submitted	Date Approved	Date of Plan Adoption	Date of Plan Expiration	Review Status
Camden County	September 8, 2020	September 25, 2020	March 9, 2020	September 25, 2025	Approved

If you have any questions or concerns, please contact Joe Chandler, Planning Team Lead, at (816) 283-7071.

Sincerely,

Catherine R. Sanders, Director
Mitigation Division

CONTRIBUTORS

Camden County Hazard Mitigation Planning Committee

Jurisdictional Representatives

Name	Title	Department	Jurisdiction/Agency/ Organization
Ron Gentry	Director	Emergency Management	Camden County
Ann Mott	Assistant Director	Emergency Management	Camden County
Bee Dampier	Administrator	Health Department	Camden County
Greg Hasty	Presiding Commissioner	County Commissioner	Camden County
Lee Schuman	County Engineer	Engineering	Camden County
Marty McGuire	Assessor	Administration	Camden County
Byron Willis	Deputy Assessor	Administration	Camden County
Patrick Wolf	Supervisor	Administration	Camden County
Andy Bayerl	Supervisor	Administration	Camden County
Tanna Wirtz	Planning Admin	Administration	Camden County
Scott Frandsen	Fire Chief	Lebanon Fire Department	Mid-County Fire Protection District
Tim Hadfield	Superintendent	Administration	Camdenton County R-III School District
Ryan Neal	Assistant Superintendent	Administration	Camdenton County R-III School District
Josh Phillips	Superintendent	Administration	R-V Macks Creek School District
Nathan Barb	Superintendent	Administration	Climax Springs R-III School
Brian Lee	Superintendent	Administration	Richland R-IV School District
Chuck Stockton	Superintendent	Administration	Stoutland R-II School District
Jeana Woods	City Administrator	Administration	City of Osage Beach
Jeff Hancock	City Administrator	Administration	City of Camdenton
Dave Van Dee	City Administrator	Administration	City of Lake Ozark
Jeff Davis	Mayor	Administration	City of Linn Creek
Gerry Murawski	Mayor	Administration	City of Lake Ozark
Jacki Miller	City Clerk	Administration	City of Linn Creek
Roger Corbin	City Planner	Administration	Village of Sunrise Beach
Todd Davis	Police Chief	Administration	City of Osage Beach
Cindy Begley	Director of Operations	Administration	Stoutland R-II Schools
Randy Gross	Engineer	Administration	Osage Beach Special Road District
Jerry Jackson	President	Administration	Horseshoe Bend Special Road District
Eugene Frank	Planner	Emergency Coordinator	Village of Four Season
Rick Hobbs	Planner	Emergency Coordinator	City of Richland

* These members of the planning team provided one-on-one interaction with the LOCLG planning team, and provided all the required information to participate in the plan. While they could not physically be at the four (4) meetings, their participation can be documented with numerous emails and phone calls and definitely participated in the planning process.

Stakeholder Representatives

Name	Title	Agency/Organization
Bill Todd		City of Lake Ozark
Devon Christiansen		City of Lake Ozark

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EXECUTIVE SUMMARY

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Camden County and participating jurisdictions and school/special districts developed this multi-jurisdictional local hazard mitigation plan update to reduce future losses from hazard events to Camden County and its communities and school/special districts. The plan is an update of a plan that was approved on October 20, 2015. The plan and the update were prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 to result in eligibility for the Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance Grant Programs.

The County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan that covers the following 12 jurisdictions that participated in the planning process:

- Unincorporated Camden County
- Camden County
- City of Camdenton
- City of Osage Beach
- City of Lake Ozark
- City of Linn Creek
- Village of Sunrise Beach
- Village of Four Seasons
- Camdenton R-III School District
- Mack's Creek R-V School District
- Climax Springs R-IV School District
- Stoutland School District
- City of Richland

Local jurisdictions that were invited, but did not participate in the plan include:

- City of Stoutland
- Horseshoe Bend Special Road District
- Osage Beach Special Road District

Camden County and the entities listed above developed a Multi-Jurisdictional Hazard Mitigation Plan that was approved by FEMA on October 20, 2015. This current planning effort serves to update that previously approved plan.

The plan update process followed a methodology prescribed by FEMA, which began with the formation of a Mitigation Planning Committee (MPC) comprised of representatives from Camden County and participating jurisdictions. The MPC updated the risk assessment that identified and profiled hazards that pose a risk to Camden County and analyzed jurisdictional vulnerability to these hazards. The MPC also examined the capabilities in place to mitigate the hazard damages, with emphasis on changes that have occurred since the previously approved plan was adopted. The MPC determined that the planning area is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Riverine and flash flooding, winter storms, severe

thunderstorms/hail/lightning/high winds, and tornadoes are among the hazards that historically have had a significant impact.

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

1. Mitigate the effects of potential natural hazards in Camden County to protect lives and assets
2. Reduce the potential impact of natural disasters to property, infrastructure, and the local economy through cost-effective and tangible mitigation projects whenever financially feasible
3. Encourage continuity of operations of government and emergency services in a disaster
4. Increase public awareness of natural hazards that have the potential to impact Camden County

To advance the identified goals, the MPC developed recommended mitigation actions, which are detailed in Chapter 4 of this plan. The MPC developed an implementation plan for each action, which identifies priority level, background information, ideas for implementation, responsible agency, timeline, cost estimate, potential funding sources, and more.

Mitigation Action Matrix

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
	Prevention Public Education							
1.1	Identify and prioritize all low water crossings in Camden County to repair and or replace to ensure the safety of motorist who travel these county roadways.	Camden County	L	1	All Hazards	✓		
1.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	Camden County	M	3	Flooding (Flash & River)	✓	✓	✓
2.1	Conduct study of the Linn Creek are in order to determine the effectiveness of current sirens	City of Linn Creek	H	2	All Hazards	✓	✓	
2.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	City of Linn Creek	M	3	Flooding (Flash & River)	✓	✓	✓

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
3.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	City of Lake Ozark	M	3	Flooding (Flash & River)	✓	✓	✓
4.1	Adopt policies requiring the incorporation of safe rooms in the Macks Creek School District	Macks Creek School District	M	2	Severe Thunderstorms & Tornadoes	✓	✓	
5.1	Seek funding for communities interested in upgrading or installing early warning systems in the City of Camdenton	City of Camdenton	L	2	All Hazards	✓	✓	
5.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	City of Camdenton	M	3	Flooding (Flash & River)	✓	✓	✓
6.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	City of Osage Beach	M	3	Flooding (Flash & River)	✓	✓	✓
7.1	Develop adequate early warning system for tornadoes, floods, and other predictable hazard events.	Village of Sunrise Beach	M	2	All Hazards	✓	✓	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
7.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates	Village of Sunrise Beach	L	3	Flooding (Flash & River)	✓	✓	✓
8.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	Village of Four Seasons	M	3	Flooding (Flash & River)	✓	✓	✓
12.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates	City of Richland	M	3	Flooding (Flash & River)	✓	✓	✓
Structure and Infrastructure Projects								
3.1	Increase the number of early warning sirens within the City of Lake Ozark when funding is available	City of Lake Ozark	M	2	All Hazards	✓	✓	
6.1	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes	City of Osage Beach	M	2	Severe Thunderstorms & Tornadoes	✓	✓	
9.1	Identify structures and roof vulnerable to high winds	Stoutland R-II	H	2	Severe Thunderstorms & Tornadoes	✓	✓	
9.2	Construction of a FEMA 361 approved Storm Shelter-Safe Room	Stoutland R-II	H	2	Severe Thunderstorms & Tornadoes	✓	✓	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
10.1	Construction of a FEMA 361 approved Storm Shelter-Safe Room	Camdenton R-III	H	2	Severe Thunderstorms & Tornadoes	✓	✓	
11.1	Construction of a FEMA 361 approved Storm Shelter-Safe Room	Climax Springs School District	H	2	Severe Thunderstorms & Tornadoes	✓	✓	
12.1	Construction of a FEMA 361 approved Storm Shelter-Safe Room	City of Richland	H	2	Severe Thunderstorms & Tornadoes	✓	✓	
	Emergency Services							
8.1	Conduct a study to determine possible solutions which would allow the residents of the Village of Four Seasons to evacuate the area in the event of a natural disaster.	Village of Four Season	M	2	All Hazards	✓	✓	
	Natural Systems Protection							
	<i>No Applicable task</i>							
	Education and Outreach							
	<i>No Applicable task</i>							

PREREQUISITES

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

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

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

- Camden County
- City of Camdenton
- City of Osage Beach
- City of Lake Ozark
- City of Linn Creek
- *City of Richland
- Village of Sunrise Beach
- Village of Four Seasons
- Camdenton R-III School District
- Mack's Creek R-V School District
- Climax Springs R-IV School District
- Stoutland School District

**The City of Richland participated in the process but did not sign a resolution due to having existing resolutions with Pulaski and LaCade Counties which they also reside.*

Model Resolution

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

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

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

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

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

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

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

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

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

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

By (Sig): _____
Print name: _____

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

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

1 INTRODUCTION AND PLANNING PROCESS

1	INTRODUCTION AND PLANNING PROCESS	1.0
1.1	<i>Purpose</i>	1.2
1.2	<i>Background and Scope</i>	1.3
1.3	<i>Plan Organization</i>	1.4
1.4	<i>Planning Process</i>	1.5
1.4.1	<i>Multi-Jurisdictional Participation</i>	1.8
	1.8
1.4.2	<i>The Planning Steps</i>	1.10

1.1 Purpose

Camden County and 11 participating jurisdictions prepared this local hazard mitigation plan to guide hazard mitigation planning for the purpose of better protecting the people and property of the county from the effects of natural hazard events. Hazard mitigation is defined by Federal Emergency Management Agency (FEMA) as “any sustained action taken to reduce or eliminate the long-term risk to human life and property from a hazard event.” Hazard mitigation planning is the process through which hazards that threaten communities are identified; likely impacts of those hazards are determined; mitigation goals are set and appropriate actions to lessen impacts are determined, prioritized and implemented. The plan is an update of a plan that was originally approved on October 20, 2015. The plan and the update were prepared by following the requirements of the Disaster Mitigation Act of 2000 to result in eligibility for the FEMA Hazard Mitigation Assistance Grant Programs.

The Camden County Hazard Mitigation Plan is to substantially and permanently reduce the county’s vulnerability to natural hazards. This plan demonstrates the counties’ and communities’ commitment to reducing risks from hazards and can serve as a tool to help decision makers decide on mitigation activities and resources for the next five years. The plan is designed to protect citizens, critical facilities, infrastructure, private property and the natural environment. This can be achieved by increasing public awareness, documenting resources for risk reduction and loss prevention and identifying activities to guide the community towards the development of a safer, more sustainable community.

This plan was also developed to make Camden County, participating jurisdictions, school districts and special districts eligible for certain federal disaster assistance programs as required by the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288) as amended by the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, referred to collectively as the Disaster Mitigation Act or DMA.). Those programs include the Federal Emergency Management Agency’s (FEMA) Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program and Flood Mitigation Assistance Program. Those jurisdictions within Camden County that do not adopt the 2020 plan will not be eligible for funding through these grant programs.

1.2 Background and Scope

The 2020 Camden County Hazard Mitigation Plan is an update of the original plan developed and approved in 2010. The most recent update was approved by FEMA on October 20, 2015. The revised plan will be valid for five years after approval by FEMA. It is a multi-jurisdictional plan that covers participating jurisdictions within Camden County. There are fifteen jurisdictions and four school district that are not totally within Camden County's boundaries. The City of Lake Ozark partially resides in Miller County. The City of Richland and the City of Stoutland partially reside in Laclede County. Only the assets located within Camden County will be considered part of this plan.

The 2015 Camden County Hazard Mitigation Plan included participation from Camden County, the City of Camdenton, City of Lake Ozark, City of Linn Creek, City of Osage Beach, City of Richland, City of Stoutland, the Village of Four Seasons, Village of Sunrise Beach, Camdenton R-III, Climax Springs R-IV School District, Mack's Creek School District, and Stoutland School District.

The jurisdictions and school districts, that participated in the 2020 approved plan are as follows:

- Camden County
- City of Camdenton
- City of Lake Ozark
- City of Linn Creek
- City of Osage Beach
- City of Richland
- Village of Four Seasons
- Village of Sunrise Beach
- Camdenton R-III School District
- Mack's Creek R-V School District
- Climax Springs R-IV School District
- Stoutland R-II School District

Local jurisdictions that were invited but did not participate in the plan include:

- City of Stoutland
- Osage Beach Special Road District
- Horseshoe Bend Special Road District

The information and guidance in this plan document will be used to help coordinate mitigation activities and decisions for local jurisdictions, school and special districts. Information in the plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recover to local communities and residents by protecting critical infrastructure, reducing liability exposure and minimizing overall community impacts and disruptions. Camden County has been affected by several natural disasters in the past and participating jurisdictions, school and special district are committed to reducing the impacts of future incidents and becoming eligible for hazard mitigation-related funding opportunities.

1.3 Plan Organization

The 2020 Camden County Hazard Mitigation Plan followed the outline below.

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

Table 1.1 Changes Made in Plan Update

Plan Section	Summary of Updates
Chapter 1 - Introduction and Planning Process	Updated participating jurisdiction members of the Mitigation Planning Committee (MPC), added the MPC capability categories, provided information on how the local planning process followed the <i>Local Mitigation Planning Guidance (March 2013)</i>, and added information on RiskMAP.
Chapter 2 - Planning Area Profile and Capabilities	Updated with data from the 2019 Jurisdictions STAPLEE to reflect any changes since the approved 2015 HMP.
Chapter 3 - Risk Assessment	Combined extreme heat and extreme cold into, extreme temperatures. Changed severe thunderstorms to include hailstorms. Utilized the State of Missouri’s Hazard Mitigation Viewer for hazard probability and vulnerability. Updated the Hazard Vulnerability Analysis for each hazard by utilizing the NOAA Storm Events Database specifically events between 1999 and 2019 (20-year timeframe).
Chapter 4 - Mitigation Strategy	Updated to reflect changes since the approved 2015 HMP modified some mitigation actions and deleted completed or not relevant actions, added new mitigation actions.
Chapter 5 – Plan Implementation & Management	Added the Incorporation into Existing Planning Mechanisms section to meet 44 CFR Requirements §201.6(c)(4)(ii) and listed the planning mechanism identified for integration by each jurisdiction.

1.4 Planning Process

The Camden County Hazard Mitigation Planning Committee database was developed and updated by Lake of the Ozarks Council of Local Governments (LOCLG) for the 2020 update and incorporating all the relevant planning partners. The LOCLG role in developing and updating the Camden County Hazard Mitigation plan included assisting in the formation of the MPC, organized and facilitated the planning meetings, soliciting public input, and producing the draft and final plan for review by the MPC, State Emergency Management Agency (SEMA) and FEMA. In addition, LOCLG compiled and presented the data for the plan, helped the MPC with the prioritization process and insured that the final document met the Disaster Mitigation Act (DMA) requirements established by federal regulations and the most current planning guidance. LOCLG facilitated the planning process for the plan update, following the most current planning guidance provided by FEMA for the purpose of insuring that the updated plan meets all of the requirements of the Disaster Mitigation Act as established by federal regulations.

The Camden County Multi-Jurisdictional Hazard Mitigation Plan 2020 was developed as the result of a collaborative effort among Camden County, the City of Camdenton, City of Lake Ozark, City of Linn Creek, City of Osage Beach, City of Richland, Village of Four Seasons, Village of Sunrise Beach, Camdenton R-III School District, Mack's Creek R-V School District, Richland R-IV Climax Springs R-IV School District, and Stoutland R-II School District.

LOCLG mailed each representative from the jurisdictions an information packed explaining the Camden County HMP 2020 update process. The information provided included:

- STAPLEE
- Actions listed in the 2015 HMP requested information on the status of the said action
- New Action Worksheet requesting information on proposed new actions to include in update
- Reference information for the FEMA publication Mitigation Ideas: A Resource for reducing risk to natural hazards
- Request for information on new development within each jurisdiction

Every effort was made to ensure that all jurisdictions within Camden County had the opportunity to participate in the MPC and to provide input into the planning process. This included MPC meeting attendance, one-on-one meetings, phone conferences, email correspondence and mail distribution of pertinent information.

The planning process included a kick-off meeting and three Mitigation Planning Committee meetings. Draft copy of the plan was posted on the Lake of the Ozarks Council of Local Governments website at www.loclg.org under the publications tab for public review and comment on February 11, 2020. A press release was announcing the availability to review the draft plan and invitation to comment was shared with local press and media outlets. Jurisdictions were asked to share the review and comment period with their government boards and local citizens.

Table 1.2 Lists the Camden County Mitigation Plan Committee Members and the entities they represent, along with their titles.

Table 1.2 Jurisdictional Representatives of Camden County Mitigation Planning Committee

Name		Title	Department	Jurisdiction/Agency/Organization
Ron	Gentry	Director	Camden County EMA	Camden County
Ann	Mott	Assistant Director	Camden County EMA	Camden County
Marty	McGuire	Assessor	Assessor's Office	Camden County
Byron	Willis	Deputy Assessor	Assessor's Office	Camden County
Jeff	Hancock	City Administrator	Administration	City of Camdenton
Dave	VanDee	City Administrator	Administration	City of Lake Ozark
Gerry	Murawski	Mayor	City of Lake Ozark	City of Lake Ozark
Jeff	Davis	Mayor	City of Linn Creek	City of Linn Creek
Jackie	Miller	City Clerk	Administration	City of Linn Creek
Jeana	Woods	City Administrator	Administration	City of Osage Beach
Todd	Davis	Police Chief EMT	Police Department	City of Osage Beach
Roger	Corbin	City Planner	Village of Sunrise Beach	Village of Sunrise Beach
Gene	Frank	Emergency Management Coordinator	Village of Four Seasons	Village of Four Seasons
Tim	Hadfield	Superintendent	Administration	Camden R-III School District
Nathan	Barb	Superintendent	Administration	Climax Springs R-IV School District
Josh	Phillips	Superintendent	Administration	Mack's Creek R-V School District
Cindy	Begley	Director of Operations	Administration	Stoutland R-II School District
Lee	Schuman	Engineer	Road and Bridge	Camden County
Patrick	Wolf	Supervisor	Road and Bridge	Camden County
Andy	Bayerl	Supervisor	Road and Bridge	Camden County
Tanna	Wirtz	Planning Administrator	Planning and Zoning	Camden County
Ryan	Neal	Assistant Superintendent	Administration	Camdenton R-III School District
Randy	Gross	Planner	Administration	Osage Beach Special Roads District
Rick	Hobbs	Planner	Emergency Coordinator	City of Richland

Sign in sheets from the planning meetings are included in **Appendix B: Planning Process**

Table 1.3 Demonstrates each member’s expertise in the six mitigation categories

Table 1.3 MPC Capability with Six Mitigation Categories

Community Department/Office	Prevention	Structure and Infrastructure Projects		Natural Systems Protection	Education and Awareness Programs	Emergency Services
		Property Protection	Structural Flood Control Projects			
County Emergency Management Agency Director Ron Gentry	✓				✓	✓
County Emergency Management Agency Assistant Director Ann Mott	✓				✓	✓
County Assessor Marty McGuire	✓					
County Deputy Assessor Byron Willis	✓					
City of Camdenton Administration City Administrator Jeff Hancock	✓				✓	
City of Lake Ozarks Administration City Administrator Dave Van Dee	✓				✓	
City of Lake Ozark Mayor Gerry Murawski	✓				✓	
City of Linn Creek Mayor Jeff Davis	✓				✓	
City of Linn Creek Administration City Clerk Jackie Miller	✓				✓	
City of Osage Beach Administration City Administrator Jeana Woods	✓				✓	
City of Osage Beach Police Dept. Police Chief Todd Davis	✓				✓	✓
Village of Sunrise Beach Administration City Planner Roger Corbin	✓				✓	✓
Village of Four Seasons EMA Coordinator Eugene Frank	✓				✓	✓
Camdenton R-III School District Administration Superintendent Tim Hadfield	✓				✓	
Stoutland R-II School District Administration Director of Operations Cindy Begley	✓				✓	
County Roads and Bridge County Engineer Lee Schuman	✓	✓	✓			
County Roads and Bridge Supervisor Patrick Wolf	✓	✓	✓			

1.4.1 Multi-Jurisdictional Participation

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

Development of the mitigation plan and mitigation programs requires the active participation and leadership of the jurisdictions involved. The minimum criteria to participate was explained to the MPC members at each planning meetings.

DMA requires each jurisdiction to participate in the planning process and officially adopt the plan.

LOCLG established a minimum criterion for participation so that each jurisdiction had a clear understanding as to what it means to participate in the plan update. Below are the Camden County MPC participation criteria:

- Representation from each participating jurisdiction to participate in the planning process. Attendance to public meetings was not required as long as the participating jurisdiction met with the project planner and provided the necessary information to be included in the plan.
- Participation by a jurisdiction designated representative, scheduled MPC meetings, emails, conference calls, one-on-one meetings, including centralized, planning area-wide MPC meetings, by either direct participation or authorized representation;
- Each participating jurisdiction must provide to the MPC sufficient information to support plan development by completion and return of STAPLEE and validating/correction critical facility inventories;
- Provide current information on actions identified in the 2015 plan, as to what status that action will move forward in the 2020 plan: eliminate from further consideration those actions from the previously approved plan that were not implemented because they were impractical, inappropriate, not cost-effective, or were otherwise not feasible;
- Review draft plan;
- Actively solicit input from the public, local officials, and other interested parties about the planning process and provide an opportunity for them to comment on the plan;
- All participants should formally adopt the mitigation plan prior to submittal to FEMA for final approval.

LOCLG staff promoted public involvement with the plan update by providing meeting press releases/public invitations, and agendas to jurisdictions, stakeholders, media, LOCLG Board Members from Camden, Laclede, Miller, and Morgan Counties, direct emails were sent to the State of Missouri Department of Health and Senior Service; Division of Senior and Disability Services Disaster Response Coordinators office, local Red Cross organizations, and the ministerial alliance association. Meeting notices, press releases/public invitations and agendas went out least two weeks prior to the meeting dates, and they were, May 15, 2019, June 5, 2019, July 10, 2019, and February 27, 2020. Meeting press releases/public invitations and agendas are included in **Appendix B: Planning Process**.

All jurisdictions in the Camden County Planning area met all participation requirements except for the City of Stoutland. These entities were contacted and encouraged to participate by LOCLG staff through direct mail, email, and telephone.

Table 1.4 shows the representation of each participating jurisdiction at the planning meetings, either public or individual meetings, providing the requested data collection questionnaire, community/public surveys, providing action worksheets and adopted resolutions. Meeting sign in sheets are included in **Appendix B: Planning Process**.

Table 1.4 Jurisdictional Participation in Planning Process and Requested Documentation Status

Jurisdiction	Meetings attended either public meetings and or individual meetings, phone interviews and email correspondence	Provided requested information and STAPLEE	Provided identified action item with action worksheet	Adopted with signed resolution
Camden County	✓	✓	✓	✓
City of Camdenton	✓	✓	✓	✓
City of Lake Ozark	✓	✓	✓	✓
City of Linn Creek	✓	✓	✓	✓
City of Osage Beach	✓	✓	✓	✓
City of Richland	✓	✓	✓	✓
Village of Four Seasons	✓	✓	✓	✓
Village of Sunrise Beach	✓	✓	✓	✓
Camdenton R-III School District	✓	✓	✓	✓
Climax Springs R-V School District	✓	✓	✓	✓
Mack's Creek R-V School District	✓	✓	✓	✓
Stoutland R-II School District	✓	✓	✓	✓

1.4.2 The Planning Steps

FEMA requires the Hazard Mitigation Plan be updated on a five-year cycle in order to remain relevant and current. Lake of the Ozarks Council of Local Governments began the updating process in May 2019 with all staff members contributing to the overall plan update in accordance with the agreement with SEMA.

The plan update framework and development process followed FEMA’s Local Mitigation Planning Handbook (March 2013), and the 10-step planning process adapted from FEMA’s Community Rating System (CRS) and Flood Mitigation Assistance Programs. The 10- step process allows the plan to meet funding eligibility and Flood Mitigation Assistance Program this can be seen in **Table 1.5** below.

Table 1.5 County Mitigation Plan Update Process

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

Step 1: Organizing the Planning Team

LOCLG developed a comprehensive database to incorporate as many community organizations and individuals who would benefit from their participation in the planning process. The database included: County Commissioners, LOCLG Board and Committee Members, Floodplain Administrators, Camden County Planning and Zoning Officials, Public Schools, Private Schools, Colleges, Churches, Day Cares, Cities, Municipalities, Human Societies, Special Designated Districts, Fire Protection Districts, Emergency Management, Veterans Groups, Communications Networks and Economic Development, and Camden County Sheriff's Department. During each of the planning meetings, all members of the comprehensive database were invited to participate in the planning process.

Kick-Off Meeting Brief Summary

On May 15, 2019 at the Mid-County Fire Protection District building in Camdenton the kick-off meeting for the Camden County Multi-Jurisdictional Hazard Mitigation Plan Update began at 2:00 p.m. with jurisdictional representatives and stakeholders in attendance. The meeting opened with attendees introducing themselves and the jurisdiction they were representing. Lake of the Ozarks Council of Local Governments provided a presentation on hazard mitigation and the plan's purpose. The presentation outlined the planning area, and the multi-jurisdictional approach to the 2020 HMP updates.

The requirement of the Disaster Mitigation Act of 2000 was explained. It was emphasized that local governments are required to adopt a multi-jurisdictional natural hazard mitigation plan to maintain eligibility for FEMA mitigation funds. A review of the hazard mitigation grant program, pre-disaster mitigation program and the flood mitigation assistance programs were discussed. The steps in the plan update process were defined.

A review of the STAPLEE was discussed and then the next steps in the planning process were given with meeting topics, dates and times.

There were 18 representatives in attendance for the meeting. The meeting notice, agenda, sign-in sheets, meeting notes, PowerPoint presentation slides, and media outreach can be found in **Appendix B Planning Process**.

Planning Meeting #2 Hazard History and Prioritization of Hazards

On June 5, 2019, the second planning meeting for the Camden County HMP update was held at the Mid-County Fire Protection District. Seventeen representatives attended this meeting. The presentation included a status update of the communities who have participated in the kick-off meeting. The jurisdictions were asked to encourage other jurisdictions that have not yet attended to attend the July 10th, 2019 meeting. Those in attendance were also encouraged to invite the public to attend the meetings as well.

The jurisdiction representatives reviewed the 2015 previous plan information. This included a review of all hazards that impact Camden County. The MPC was told that there are new hazards to consider such as terrorism, civil disorder, attack (nuclear, conventional, chemical, and biological), and cyber disruption for review. Handouts that addressed web-based information for review were provided. This included vulnerability analysis of the 2015 plan, Disaster Declarations, Classification of Dams, drought impacts, insurance indemnities payments, NCDC and NOAA disaster events for their review to make informed

opinions and decisions on each natural hazard threat.

Each jurisdiction representative was given copies of the public/community survey, and that we would like to get as many completed and returned as possible. Meeting 2 documents can be found in **Appendix B Planning Process**.

Planning Meeting #3 Finalize Hazard Vulnerability, Previous Action Review, New Mitigation Actions- Identification, Public Survey Results, and Plan Maintenance

On July 10, 2019, the third planning meeting for the Camden County HMP update was held at the Mid-County Fire Protection District. The final hazard vulnerability worksheet was explained and discussed. The differences between the vulnerability analysis from the 2015 HMP and for the 2020, plan was reviewed and discussed. The MPC also reviewed each High, Moderate, and Low hazard.

Each jurisdiction received the list of actions that they had in the 2015 HMP. There was a total of 22 different mitigation actions in the 2015 plan. It was emphasized that each participating jurisdiction would have to have at least one action item identified for the 2020 plan.

There was more discussion on how to get more of the public survey to the public. The deadline to submit the public surveys is July 31, 2019.

Plan maintenance process was discussed, and the explain that to ensure that the mitigation plan remains an active and relevant update, and regular maintenance is important. Meeting 3 documents can be found in **Appendix B Planning Process**.

Upon completion of the Camden County Hazard Mitigation Plan 2020 a draft copy was published on the Lake of the Ozarks Council of Local Governments website under the Publications tab, Camden County Hazard Mitigation Plan 2020 Draft. The comment period began on February 27, 2020 and ended on March 30, 2020.

Planning Meeting #4 Action Items Reviewed, STAPLEE Defined and Completed.

On February 27, 2020 the fourth and final meeting was held at the Mid-County Fire Protection District. The planning team met for the final time to review the draft copy of the Camden County HMP 2020 plan and finalize the STAPLEE. There was discussion on each chapter and what items needed to be updated. All the specific action items submitted by each jurisdiction were reviewed and ranked for the STAPLEE. Meeting 4 documents can be found in **Appendix B Planning Process**.

Table 1.6 Shows Camden County HMP meeting schedule and topics for each meeting.

Table 1.6 Schedule of MPC Meetings

Meeting	Topic	Date
Kick-Off Meeting #1	<ul style="list-style-type: none"> ➤ Discuss purpose of plan ➤ Discuss plan process ➤ Discuss current plan ➤ Why updates the plan ➤ Community involvement ➤ Review planning process 	May 15, 2019
Hazard History & Current Hazard Evaluation #2	<ul style="list-style-type: none"> ➤ Evaluate Natural Hazards from 2015 plan ➤ Evaluate current Natural Hazards ➤ Public/Community Assessment Survey 	June 5, 2019
Planning Meeting #3	<ul style="list-style-type: none"> ➤ Finalize Hazard Vulnerability ➤ Review and Update Mitigation Goals ➤ Previous Actions ➤ New Mitigation Actions ➤ Public Survey Results to Date ➤ Plan Maintenance ➤ Next Steps 	July 10, 2019
Planning Meeting #4	<ul style="list-style-type: none"> ➤ Finalize the STAPLEE ➤ Comment Period Begins ➤ Adopted Resolutions ➤ Plan submitted to SEMA April 2020 	February 27, 2020

Step 2: Plan for Public Involvement

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

All of the planning meetings were posted as public meetings and were posted in accordance with Missouri’s Sunshine Law (RSMo 610.010, 610.023, 610.023, and 610.024).

To encourage participation from surrounding communities and counties, all information in regard to the Camden County Hazard Mitigation update was distributed to the entire region of Camden, Laclede, Miller and Morgan Counties.

During the planning process, we had considerable media coverage with all meeting notes, press releases being reported online, in print media, and radio. Copies of the newspaper articles and web page articles can be found in **Appendix B Planning Process**.

Step 3: Coordinate with other Departments and Agencies and Incorporate Existing Information.

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

All participating jurisdictions were encouraged to provide information from existing plans, studies, reports and technical information about their communities, to encourage inclusion and reference to these plans and activates that are relevant to the Camden County HMP. Information incorporated in from the local planning documents, and this HMP update can be found in the planning capabilities' section, the action worksheets and the maintenance section of the plan.

Assessments of flood risk were conducted by using Esri products and FEMA flood plain maps. There are currently no FEMA RiskMAP Projects being conducted in the Camden County area.

Integration of Other Data, Reports, Studies, and Plans

44 CFR Requirement 201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning shall include: (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

To ensure a comprehensive approach to reducing the effects of natural disasters a review and incorporation of information from various approved SEMA websites, existing hazard mitigation plans, and technical information were solicited. The information for the various sources utilized to develop the plan update can be found in **Appendix A: References**.

The Camden County 2015 Hazard Mitigation Plan, State of Missouri Emergency Management Hazard Mitigation Plan, Laclede County Hazard Mitigation Plan, Miller County Hazard Mitigation Plan were reviewed for existing technical data. Through the research of these plans relevant information was studied and utilized where appropriate.

Other documentation was retrieved from the reports from university extensions, Flood Insurance Studies (FIS), Flood Insurance Rate Maps (FIRMs), State Department of Natural Resources (DNR) dam information, the National Inventory of Dams (NID) dam inspection reports. State fire reports, wildland/urban Interface local codes and ordinances, local comprehensive plans, economic development plans, capital improvement plans, US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics, are all sources that were utilized to retrieve information. The sites and their web addresses can be found in **Appendix A: References**.

Table 1.7 lists the stakeholders who were invited to every planning meeting. The invitation went out through email with the press release/invitation and the meeting agenda.

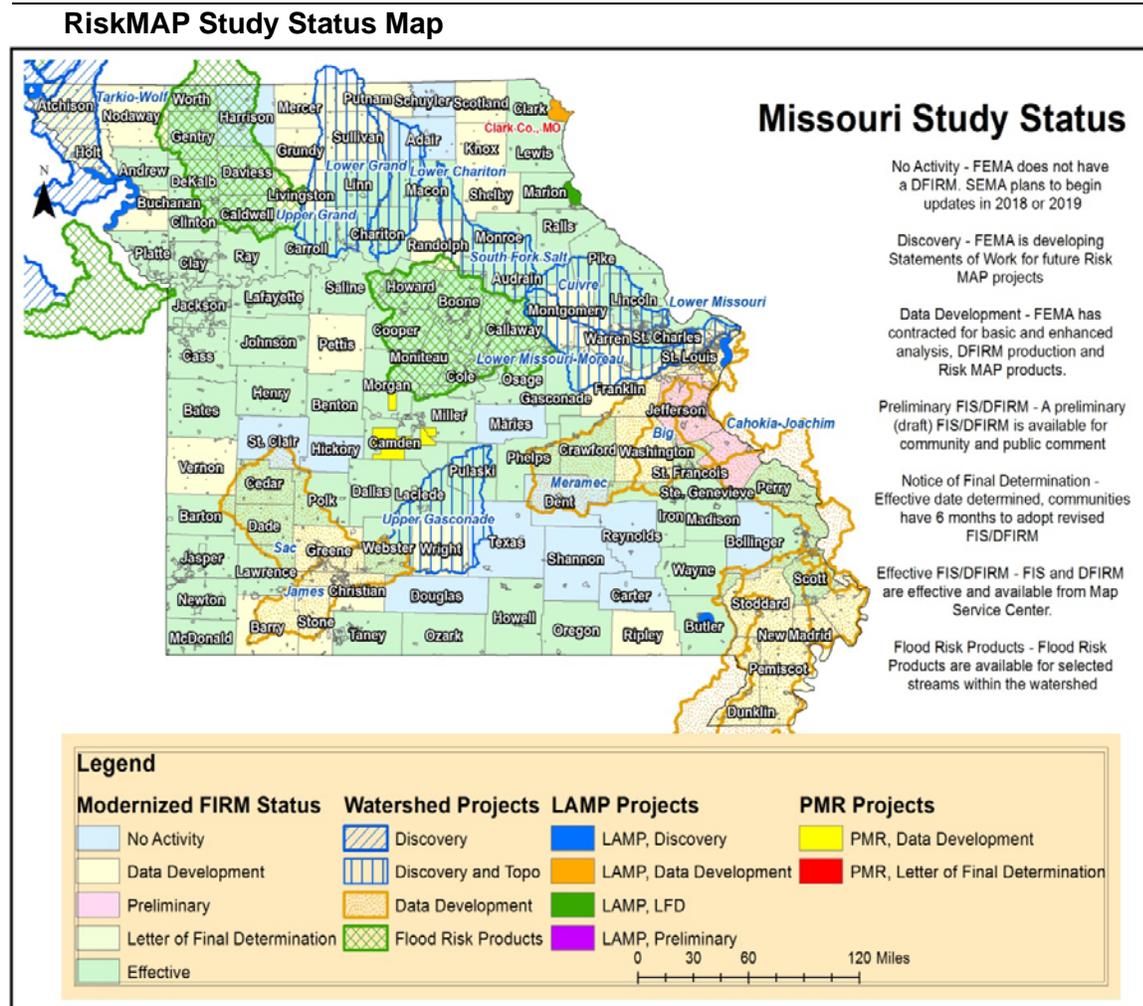
Table 1.7 Invited Stakeholders

Stakeholder	Jurisdiction
Camden County	Presiding Commissioner
Camden County	Associate Commissioner 1 st District
Camden County	Associate Commissioner 2 nd District
Camden County Flood Plain Administrator	Village of Four Seasons
Camden County Flood Plain Administrator	City of Camdenton
Camden County Flood Plain Administrator	City of Linn Creek
Camden County Flood Plain Administrator	City of Osage Beach
Camden County Flood Plain Administrator	Village of Sunrise Beach
Camden County Planning and Zoning	Niangua Township
Camden County Planning and Zoning	Jasper Township
Camden County Planning and Zoning	Pahuska Township
Camden County Planning and Zoning	Osceola Township
Camden County Planning and Zoning	Osage Township
Camden County Planning and Zoning	Kiheka Township
Camden County Planning and Zoning	Russell Township
Ambulance Districts	Lake West/Cam-Mo Ambulance
Ambulance Districts	Osage Beach Ambulance
Ambulance Districts	Mercy Camden County Ambulance
Hospitals	Lake Regional Hospital
Hospitals	Central Ozarks Medical Center
Fire Districts	Mid-County Fire Protection District
Fire Districts	Osage Beach Fire Protection District
Fire Districts	Sunrise Beach Fire Protection District
Fire Districts	Northwest Fire Protection District
Law Enforcement	Camden County Sheriff
Law Enforcement	City of Camdenton Police
Law Enforcement	Village of Sunrise Beach Police
Law Enforcement	City of Linn Creek Police
Public Organization	Citizens Against Domestic Violence
Public Organization	New Tribes Mission Missionary Training Center
Neighborhood Groups	Horseshoe Bend Emergency Preparedness Committee

Coordination with FEMA Risk MAP Project

Figure 1.1 showing locations of RiskMAP projects including deployed watersheds, outlining the planning area or indicating in text status of planning area relative to any RiskMAP projects

Please note that Camden County currently does not have any RiskMAP information available.



Step 4: Assess the Hazard: Identify and Profile Hazards

The Multi-Jurisdictional Planning Committee (MPC) identified and profiled the hazards in the second meeting on May 15th, 2019. The Risk Assessment chapter of the plan provides additional details on conclusions drawn from the data reviewed. Hand-outs were provided and can be found in **Appendix B, Planning Process**.

Handouts included:

- Previous disaster declarations in Camden County.
- Hazards Identified in the previously approved 2015 HMP.
- ArcGIS Web Maps from the State Hazard Mitigation Viewer.

- Occurrences of each hazard
- Yearend climate summaries
- Repetitive Loss Properties for Camden County
- Flash flood events.

Step 5: Assess the Problem: Identify assets and Estimate Losses

Each jurisdiction submitted a list of the identified assets that include the square footage, replacement value; contents value, and any hazards that would affect those buildings. This was determined with the assistance of Esri GIS data, HAZUS (<https://www.fema.gov/hazus>), and the Data Collection Questionnaire. Jurisdiction representatives also worked with others in their jurisdiction (City Clerks, Department Supervisors, etc.) and submitted a list that included all personnel, fiscal and technical capabilities this information was documented in the Data Collection Questionnaires. It can also be found in the Planning area Profiles and Capabilities Chapter. The vulnerability and loss estimates were either taken from the 2018 Missouri State Plan.

Step 6: Set Goals

During the second and third meetings, the MPC reviewed the goals from the previously approved plan. The MPC agreed to keep the goals the same as the 2015 plan. Each objective was reviewed and agreed to. The state mitigation actions instructions were to utilize to ensure that the objectives meet the criteria of SMART. Each objective was evaluated to remove words such as considering, ensuring, encouraging, and continuing and replaced with objectives that would be measurable. Goals include the below:

- Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County.
- Mitigation Programs-Protect Camden County's assets and populace through cost-effective and tangible mitigation projects whenever financially feasible.
- Mitigation Procedures-Encourage continuity of operations of government and emergency services in a disaster
- Mitigation Public Awareness-Increase public awareness of natural hazards that have the potential to impact Camden County.

Step 7: Review Possible Mitigation Actions and Activities

During the third planning meeting the MPC reviewed the previous approved mitigation strategy while updating the risk assessment and proposed new action. Each jurisdiction received the actions from the 2015 HMP before the kick-off meeting along with their STAPLEE. At each meeting, there was discussion about the previous actions and that implementation is not a requirement. However, if no progress has been made, perhaps that action would be appropriate to delete in the updated plan. The focus for the MPC was on long-term mitigation solutions, and consideration should be given to the potential cost of each project in relation to the anticipated future cost savings. To prioritize the actions a modified STAPLEE method was used. Meeting 3 documents can be found in **Appendix B: Planning Process**.

Step 8: Draft an Action Plan

Action worksheets, including the plan for implementation, were submitted by each jurisdiction for the updated Mitigation Strategy to incorporate into the plan update. Each jurisdiction included the responsible organization/department, supporting organization/department, a timeline for completion, potential funding sources, and a local planning mechanism to be used to implement the action, if any. They also reported on the status of the actions and a report of progress. The FEMA publication *Mitigation Ideas: A Resource for reducing Risk to Natural Hazards* (January 2013) was listed on the letter that was sent out to jurisdictions along with the STAPLEE, and mitigation action document. It was also available and referenced at the second and third meeting.

Step 9: Adopt the Plan

Each jurisdiction was given a copy of the Model Resolution. It was explained that the plan needs to be adopted by each jurisdiction's governing body in order for the jurisdiction to qualify for future FEMA grants. The adoption documentation is required to be collected and submitted with the final plan.

Step 10: Implement, Evaluate, and Revise the Plan

The MPC developed and agreed upon an overall strategy for the plan implementation and for monitoring and maintaining the plan over time. Chapter 5 includes more detailed information on the agreed-upon strategy.

2 PLANNING AREA PROFILE AND CAPABILITIES

2	PLANNING AREA PROFILE AND CAPABILITIES	1
2.1	<i>Camden County Planning Area Profile</i>	2
2.1.1	Geography, Geology and Topography	4
2.1.2	Climate	5
2.1.3	Population/Demographics	6
2.1.4	History	9
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2.1.1	Camden County	2.14
2.1.2	City of Camdenton	2.20
2.1.3	City of Lake Ozark	2.26
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2.1.10	Summary of Jurisdictional Capabilities	2.57
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2.1 Camden County Planning Area Profile

Figure 2.1 Provides a map of the entire planning area that includes the cities and villages. The population estimate is 45,815 as of July 1, 2018 according to the American Fact Finder 2018 population estimates program.

Camden County Planning Area

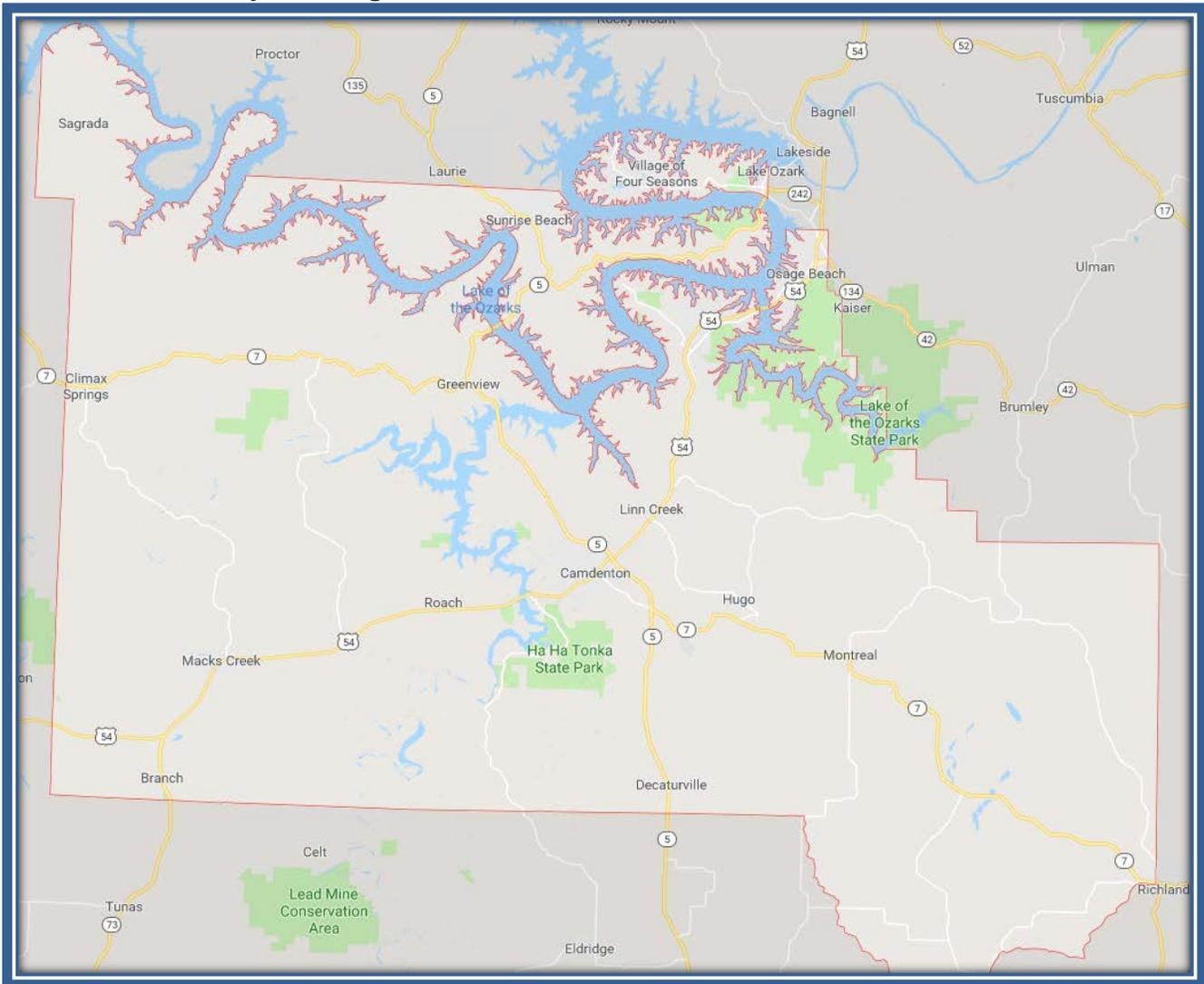


Figure 2.2 Provides a map showing where Camden County is located in the State of Missouri.

Planning area location within the State of Missouri



Source:http://en.wikipedia.org/wiki/Camden_County,_Missouri#/media/File:Map_of_Missouri_highlighting_Camden_County.svg

The planning area's population in 2000 was 37,051 growing to 45,815 according to the American Fact Finder 2018 population estimates. A growth of 24%. The State of Missouri's population in 2000 was 5,595,211 growing to 6,126,452 according to the American Fact Finder 2018 population estimates, an increase of 10%. The United States population in 2000 was 281,421,906 growing to 327,167,434 according to the American Fact Finder 2018 population estimates, an increase of 16%. Camden County, the State of Missouri, and the United States have all seen a population increase. However, Camden County has seen the largest population growth since the 2000 United States Census.

Camden County's median household income has increased by 41% since 2000. The median household income in 2000 was \$35,840 compared to \$50,496 in the 2013-2017 ACS 5-year estimate. The State of Missouri's median household income increased from \$37,934 in the 2000 census to an estimated \$51,546 in the 2013-2017 ACS 5-year estimate, 36%. The

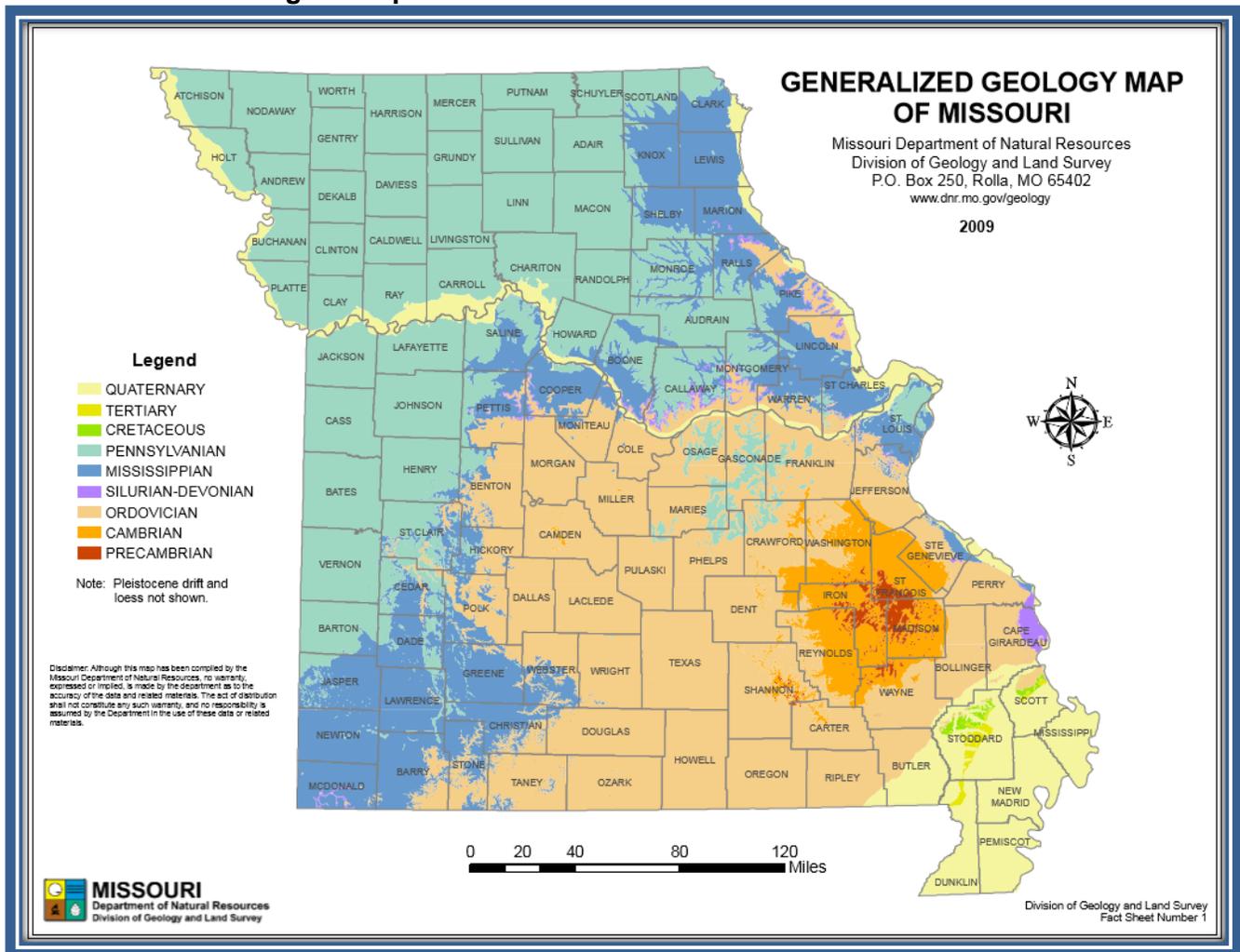
median household income for the United States increased by 37% from the 2000 census \$41,994 to \$57,652 in the 2013-2017 ACS 5-year estimate.

Since Census 2000 Camden County’s median house value has gone up 42%. However, both the State of Missouri and the United States has seen an increase of 62%. The median value of a home in Census 2000 was \$14,300.00 in Camden County, \$89,900.00 for the State of Missouri and \$119,600.00 for the United States. The 2013-2017 ACS 5 Year Estimate documents the median house value for Camden County at \$176,300.00, the State of Missouri at \$145,400.00, and the United States at \$193,500.00.

2.1.1 Geography, Geology and Topography

The Camden County Planning area is in the South-Central part of Missouri and on the Salem Plateau, a sub province of the Ozark Province. It has a total area of about 708 square miles of which about 67 miles is water. The landscape varies from steeply sloping wooded hills and narrow stony valleys in the Lake of the Ozarks region to gently rolling, prairie like uplands in the Southeastern part of the county. The bedrock within the planning area consists of dolomite, cherty dolomite, and sandstone of Cambrian and Ordovician age. **Figure 2.3** Generalized Geological Map of Missouri

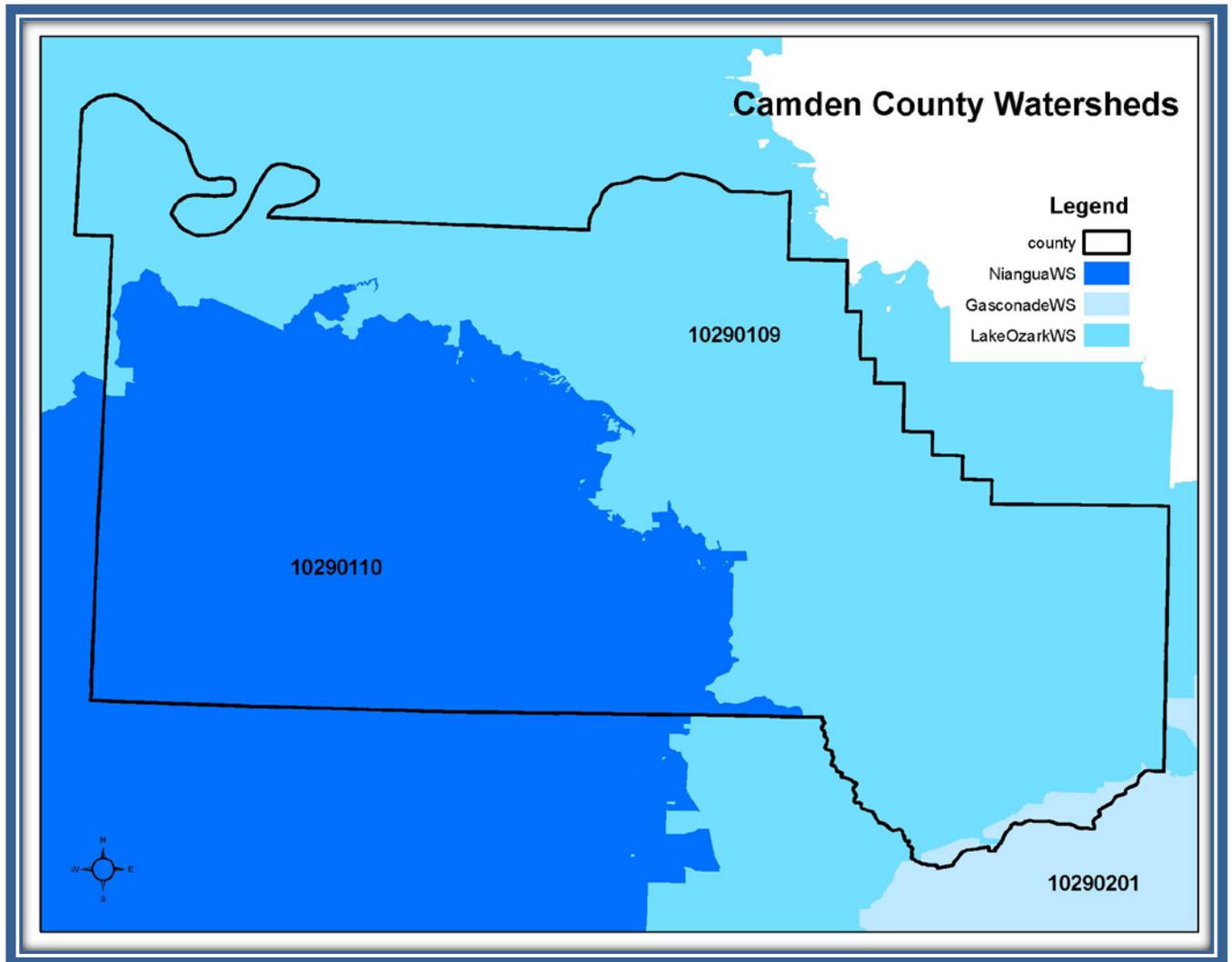
Generalized Geological Map of Missouri



Source: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPT/missouri/MO029/0/Camden_MO.pdf

Figure 2.4 Is a map of the planning area and the watershed boundaries. Camden County includes portions of three different watershed basins: Lake Ozark, Niangua, and Gasconade watersheds.

Camden County Watersheds



2.1.2 Climate

Camden County is subject to frequent changes in temperature because of its location within the United States. While winters are cold and summers are hot, prolonged periods of very cold or very hot weather are unusual. Occasional periods of mild, above freezing temperatures are noted almost every winter. Most of the snowfall in the planning area falls in December, January, and February. It is unusual for snow to stay on the ground for more than a week or two before it melts. Winter precipitation is usually in the form of rain or snow, and in these situations, freezing drizzle or freezing rain occurs. Spring, summer, and early fall precipitation come largely in the form of showers or thunderstorms. Hail can also occur during these months. The average high in July is 90 degrees, and the average low in January is 22 degrees. There were 44.96 inches of precipitation in 2018 making it the 44th wettest year in history and 6 inches of snow fell in 2018.

2.1.3 Population/Demographics

There are nine jurisdictions within Camden County. And all but one of those jurisdictions show an estimated increase in population based on the latest American Community Survey 5-year estimates. Of the nine jurisdictions four of them, the City of Lake Ozark, City of Osage Beach, City of Richland and the City of Stoutland straddle the county line. The population data for the unincorporated county population will not be completely accurate since portions of some incorporated areas overlap into adjacent counties. **Table 2.1** provides population data for Camden County between 2000 and 2018 by jurisdiction, including the percentage of change. The unincorporated area of Camden County was determined by subtracting the populations of the incorporated areas from the overall county population.

Table 2.1. Camden County Population 2000-2010 by Jurisdiction

Jurisdiction	2000 Population	2010 Population	2018 Annual Population Estimate or ACS Population	# Change (2010-2018)	% Change (2010-2018)
Unincorporated Camden County	30,556	29,400	30,373	+973	3%
City of Camdenton	2,779	3,718	4,092	+374	10%
City of Lake Ozark	1,586	1,596	1,804	+208	13%
City of Linn Creek	280	244	251	+7	3%
City of Osage Beach	3,662	4,351	4,570	+219	5%
City of Richland	1,805	1,863	1770	-93	-5%
City of Stoutland	177	192	194	+2	1%
Village of Sunrise Beach	431	368	492	+124	34%
Village of Four Seasons	1,493	2,217	2,269	+52	2%

Source: U.S. Bureau of the Census, Decennial Census, annual population estimates/ 5-Year American Community Survey 2013-17; 2018 Population Estimates. <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>

Based on the latest American Community Survey 5-year estimates 2013-2017, 4.5% of Camden County residents are under the age of 5 and 26.4% are over 65 years old. The percentage of the population under the age of 5 in the United States and Missouri is 6.5%. Those over the age of 65 represent 14% of the population in the State of Missouri and 13% of the population in the United States. Camden County has more residents over the age of 65 than the State of Missouri and the United States. The unincorporated county population will not be completely accurate since portions of the City of Lake Ozark, City of Osage Beach, City of Richland, and the City of Stoutland overlap into adjacent counties.

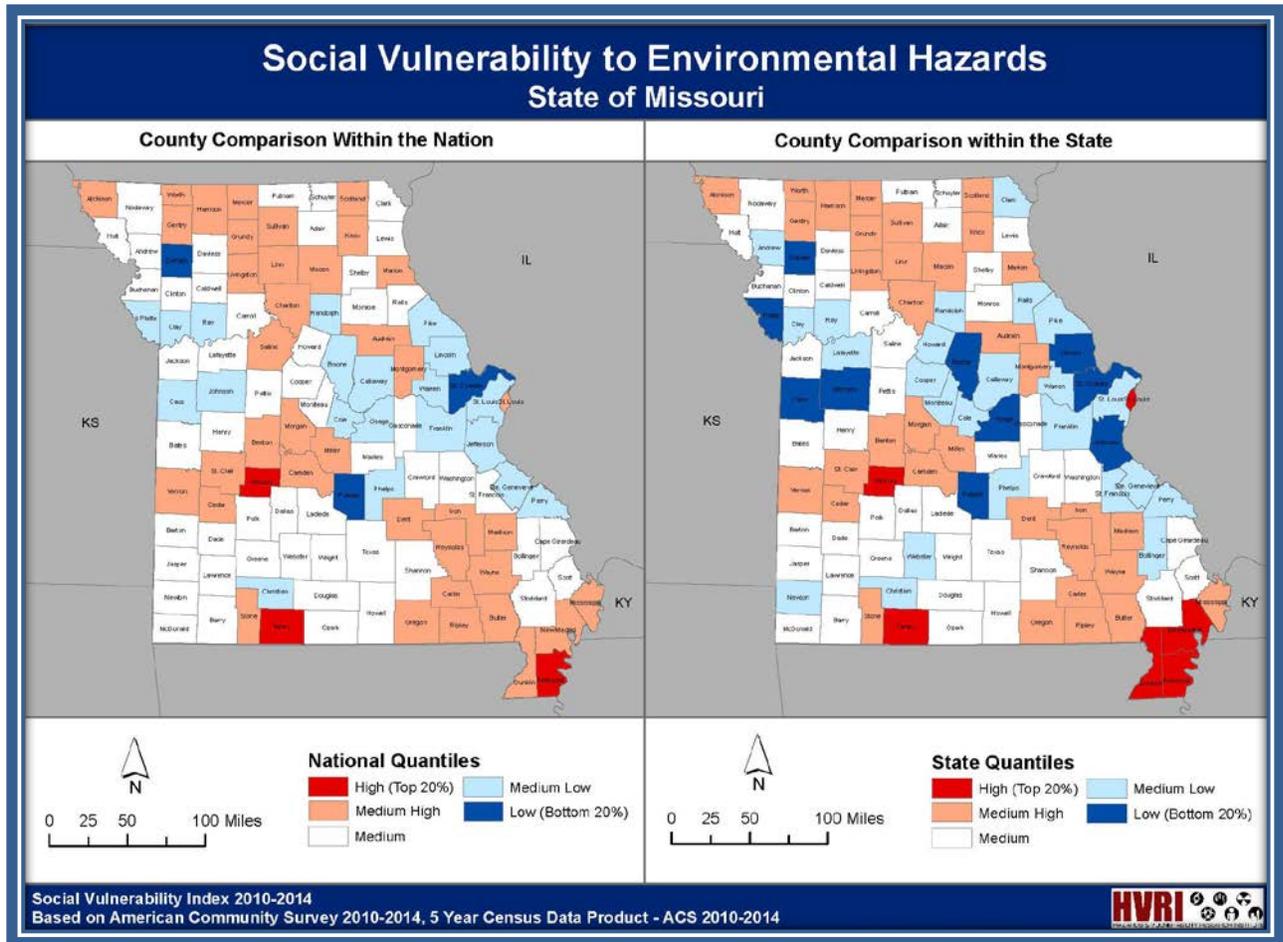
There are 19,068 households in Camden County that have an average household size of 2.27. Missouri has 2,375,611 households that have an average household size of 2.45. The United States has a total of 116,716,467 households that have an average household size of 2.58.

Social Vulnerability Index (SoVI ®)

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

Figure 2.5 Illustrates Camden County’s geographic variation in social vulnerability and shows a comparison with the United States and the State of Missouri. The planning areas SOVI® Index Ranking is Medium High.

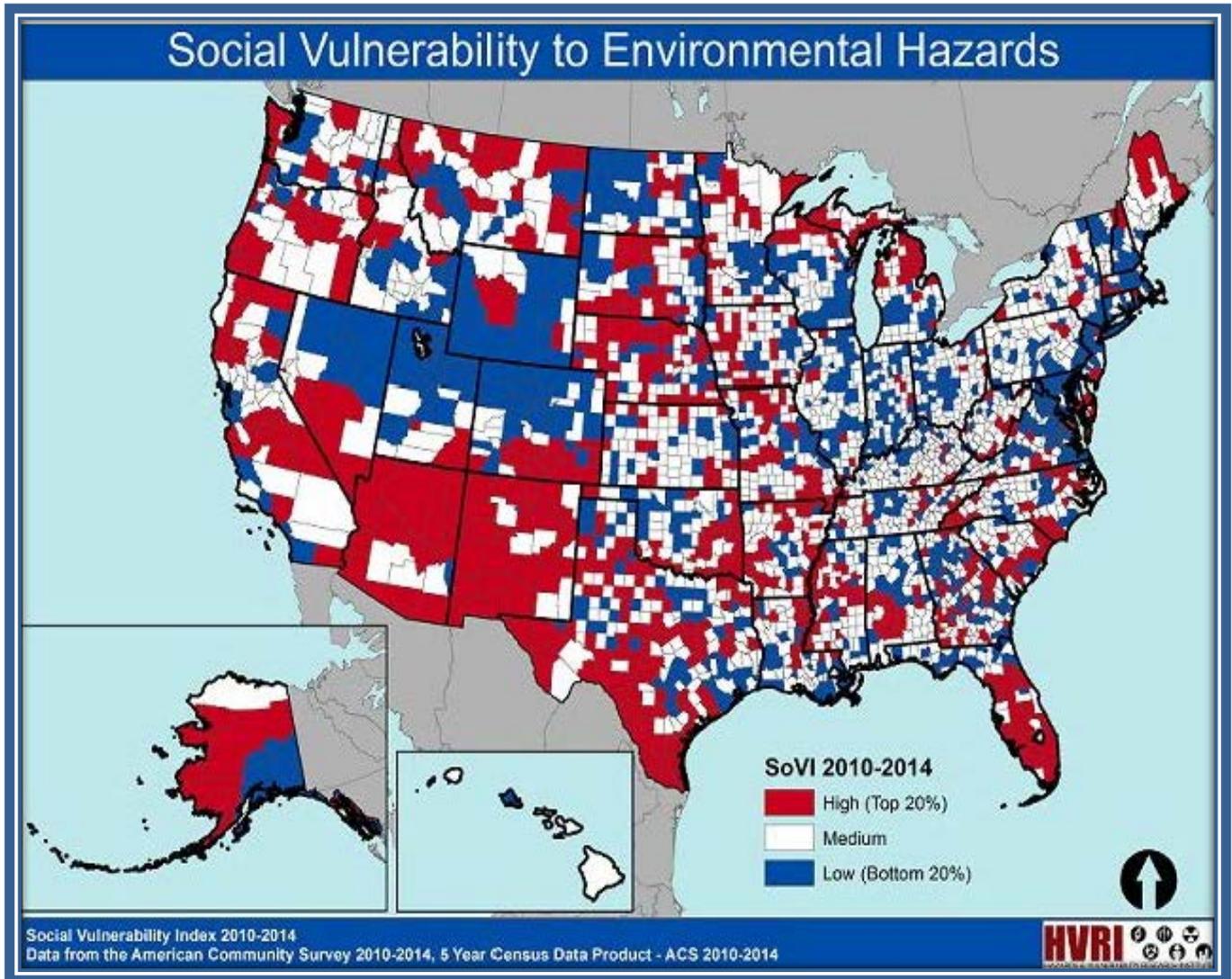
Social Vulnerability to Environmental Hazards



Source: http://artsandsciences.sc.edu/geog/hvri/sites/sc.edu.geog.hvri/files/attachments/MO_1014.pdf

Figure 2.6 depicts the Nations SOVI® to environmental hazards between 2010 and 2014.

2010-2014 U.S. Social Vulnerability to Environmental Hazards (SoVI®)



Source: http://artsandsciences.sc.edu/geog/hvri/sites/sc.edu.geog.hvri/files/attachments/MO_1014.pdf

Table 2.2 Provides additional demographic and economic indicators for Camden County as in the latest American Community Survey 5-year estimate.

Table 2.2. Unemployment, Poverty, Education, and Language Percentage Demographics,

Jurisdiction	Total in Labor Force	Percent of Population Unemployed	Percent of Families Below the Poverty Level	Percentage of Population (High School graduate)	Percentage of Population (Bachelor's degree or higher)	Percentage of population with spoken language other than English
Camden County	18,652	3.9%	11.9%	88%	21.8%	0.1%
City of Camdenton	1558	7.8%	19.8%	82.8%	15.2%	0%
City of Lake Ozark	1,322	10.3%	6.3%	92.5%	24.2%	0%
City of Linn Creek	132	0.0%	11.7%	92.5%	24.1%	0%
City of Osage Beach	1,948	2.7%	19.7%	94.3%	25%	0.4%
City of Richland	853	12.3%	30.2%	88.2%	8.6%	0%
Village of Four Seasons	926	4.0%	6.1%	95.6%	37.2%	0%
Village of Sunrise Beach	150	4.7%	15.3%	87.7%	14.8%	0%
State of Missouri	4,851,761	5.3%	10.2%	29.8%	9.6%	6.0%
United States	256,167,758	6.3%	10.6%	29.7%	9.8%	21.5%

Source: U.S. Census, American Community Survey, 5-year Estimates 2013-2017

Camden County, Missouri

2.1.4 History

The County was created by an act of the Legislature, and originally named “County of Kinderhook” after President Van Buren’s residence. The Act was approved by Governor Thomas Reynolds on January 19, 1841.

Accordingly, on the first Monday of March, 1841, David Fulbright and Miles Vernon, the county court justices met at the house of Thomas M. Pollard, and organized their court by electing Laban Ivy president. James N. B. Dodson was then appointed clerk of the court, and Martin Fulbright received his Commission from the governor of the State authorizing him to perform functions of the office of sheriff of the county, and William A. Pope was appointed assessor of revenues. The County organization was complete.

On February 23, 1843, the General Assembly of the State of Missouri changed the name of County of Kinderhook to the County of Camden.

There are nine jurisdictions in Camden County, four school districts, and two special roads districts. Each jurisdiction and special district is listed in the Executive Summary along with a list of jurisdictional contributors.

2.1.5 Occupations

Table 2.3. Occupation Statistics, Camden County, Missouri

Place	Management, Business, Science, and Arts Occupations	Service Occupations	Sales and Office Occupations	Natural Resources, Construction, and Maintenance Occupations	Production, Transportation, and Material Moving Occupations
Camden County	29.1%	19.1%	27.5%	11.1%	10.5%
City of Camdenton	14.1%	33%	27.8%	12.2%	12.9%
City of Lake Ozark	30.0%	23.15	27.1%	13.1%	6.7%
City of Linn Creek	29.5%	17.4%	19.7%	20.5%	12.9%
City of Osage Beach	37.2%	29.0%	19.9%	5.3%	8.6%
City of Richland	20.2%	23.1%	22.9%	11.5%	22.3%
Village of Four Seasons	40.4%	21.3%	26.5%	3.8%	8.0%
Village of Sunrise Beach	32.2%	20.3%	30.1%	13.3%	4.2%

Source: U.S. Census, American Community Survey, 5-year Estimates 2013-2017.

2.1.6 Agriculture

Camden County's agriculture industry reflects a small percentage (1.6%) of the overall employment number. Also, in 2012 there were 533 total farms within Camden County, covering a total of 138,617 acres. The average market value of products sold for all the farms in Camden County combined is \$17,563,000. Of that, \$17,563,000, 89% is in livestock sales and 11% in crop sales. The average income per farm in 2012 was \$32,952. Camden County ranks 79th in the State for the acreages in top crops. There are 19,301 acres of forage-land used for all hay and haylage, grass and silage, in Camden County.

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

Hazard mitigation is any action taken to reduce or eliminate the long-term risk to people and property from natural disasters. Examples of hazard mitigation projects funded by FEMA's HMA grant program include, but are not limited to buy-outs, elevations and safe rooms. **Table 2.4** gives total dollar figures and project type for previous FEMA HMA grants awarded in the planning area. The Climax Springs R-IV School District started construction on the 206.2 Safe Room on August 14, 2019.

Table 2.4. FEMA HMA Grants in Camden County from 1993-2018

Disaster Declaration	Project Type	Sub-Grantee	Date Approved	Project Total
4317	206.2 Safe Room	Climax Springs R-IV School District	7/26/2018	\$1,080,000.00
Total				\$1,080,000.00

Source: Federal Emergency Management Agency, Date 06/20/2019

2.1.8 FEMA Public Assistance (PA) Grants in Planning Area

The purpose of the Public Assistance (PA) Grant Program is to support communities' recovery from major disasters by providing them with grant assistance for debris removal, life-saving emergency protective measures, and restoring public infrastructure. Local governments, states, tribes, territories and certain private nonprofit organizations are eligible to apply. Public Assistance is FEMA's largest grant program. **Table 2.5** below gives information about all Public Assistance Grant for the Planning area. It gives the Declaration number, project type and size, the applicant, and the project total. Total PA grants is \$6,744,062.81

Table 2.5. FEMA PA Grants in Camden County from 1993-2018

Disaster Declaration	Project Type	Project Size	Applicant	Project Total
1412	Recreational or Other	Small	City of Linn Creek	\$29,460.00
1412	Roads and Bridges	Small	Camden County Road & Bridge	\$5,639.82
1412	Roads Damage/Low Water Slabs	Small	Camden County Road & Bridge	\$9,999.35
1412	Road Repair	Small	Camden County Road & Bridge	\$11,184.80
1412	Road Damage	Small	Camden County Road & Bridge	\$12,780.48
1412	Road Damage	Small	Camden County Road & Bridge	\$6,329.90
1412	Road Damage	Small	Camden County Road & Bridge	\$5,076.00
1412	Roads/Low Water Slab Damage	Large	Camden County Road & Bridge	\$54,722.61
1412	Roads/Low Water Slab Damage	Small	Camden County Road & Bridge	\$14,604.54
1412	Removal of 2 Utility Lines	Small	City of Linn Creek	\$9,900.00
1463	Debris Removal	Small	Camden County	\$13,779.82
1463	Debris Removal	Small	Camden County	\$8,596.88
1463	Debris Removal	Small	Camden County	\$6,000.00
1463	Emergency Protective Measures	Small	Mid-County Fire Protection	\$3,055.55
1463	Donated Resources	Small	Mid-County Fire Protection	\$1,018.52
1463	Donated Resources/Protective	Small	Camden County	\$12,016.06
1463	Emergency Protective Measures	Small	Camden County	\$7,671.51
1673	Emergency Protective Measures	Small	City of Osage Beach	\$14,833.06

Disaster Declaration	Project Type	Project Size	Applicant	Project Total
1673	Emergency Protective Measures	Large	Camden County	\$74,366.36
1673	Emergency Protective Measures	Small	City of Camden	\$3,038.99
1676	Emergency Protective Measures	Small	City of Linn Creek	\$4,303.00
1676	Emergency Protective Measures	Small	Sunrise Beach Fire Department	\$2,958.16
1676	Debris Removal	Small	City of Linn Creek	\$7,500.00
1676	Debris Removal	Small	City of Stoutland	\$18,400.00
1676	Public Utilities	Small	City of Camden	\$2,500.00
1676	Public Buildings & Facilities	Small	City of Osage Beach	\$1,000.00
1676	Debris Removal	Small	City of Camden	\$17,517.23
1676	Emergency Protective Measures	Large	Camden County	\$75,140.99
1676	Emergency Protective Measures	Small	City of Camden	\$6,982.41
1676	Emergency Protective Measures	Small	City of Osage Beach	\$36,091.95
1676	Debris Removal	Large	Camden County	\$103,715.12
1749	Road Washout Revised 6/20/08	Small	Camden County	\$10,326.14
1749	PA Pilot Debris Removal	Large	Camden County	\$68,761.87
1749	Road Washout	Small	Camden County Road & Bridge	\$42,232.64
1749	Road Washout Revised 6/24/08	Small	Camden County	\$7,212.72
1749	Road Culvert Washout	Small	Camden County	\$20,367.39
1749	Road Washout	Small	Camden County	\$44,859.82
1749	Road Washout Revised 6/27/08	Small	Camden County	\$9,486.35
1749	Road Washout Revised 6/24/08	Small	Camden County	\$10,413.62
1749	Road Washout	Small	Camden County	\$32,980.47
1749	Low Water Crossing Washout	Small	Camden County	\$44,508.40
1749	Road Washout	Small	Camden County	\$5,859.59
1749	Road Washout	Small	Camden County	\$7,714.76
1749	Road Washout	Small	Camden County	\$8,576.32
1749	Road Washout	Small	Camden County	\$6,329.99
1749	Low Water Crossing Washout	Small	Camden County	\$24,320.04
1749	Road Washout	Small	Camden County	\$1,246.96
1749	Road Washout	Small	Camden County	\$5,210.66
1749	Road Washout	Small	Camden County	\$6,181.80
1749	Recreational or Other	Large	Camden County	\$78,683.86
1847	Road Washouts 21 Sites	Small	Camden County	\$21,211.85
1847	Road Washouts 21 Sites	Small	Camden County	\$22,666.15
1847	Road Washouts 22 Sites	Small	Camden County	\$21,066.92
1847	CCRD021 Roads & Culverts	Small	Camden County	\$6,461.58
1847	CCRD021 Road Washouts 23 Sites	Small	Camden County	\$30,988.07
1847	CCRD015-Roads	Small	Camden County	\$20,999.97
1847	Road Washouts 20 Sites	Small	Camden County	\$21,101.57
1847	Roads/Shoulders	Small	Camden County	\$3,676.90
1847	Low Water Crossing	Small	Camden County	\$8,575.00
1847	Roads/Culverts	Small	Camden County	\$2,828.70
1961	CMMB-12-School Building	Small	029-UCUYL-00	\$1,000.00
1961	Emergency Snow Removal	Small	029-UCUYL-00	\$1,028.90
1961	CMMB 13 Roads	Small	029-UCUYL-00	\$1,080.00
1961	Emergency Snow Removal	Small	City of Camden	\$11,260.48
1961	Emergency Protective Measures	Small	Sunrise Beach Fire Protection District	\$1,194.52
1961	Emergency Protective Measures	Small	Osage Beach Fire Protection	\$1,292.51
1961	Damaged Emergency Response	Small	Osage Beach Fire Protection	\$1,763.60
1961	CMFBB1 48-hour snow emergency	Large	Camden County Road & Bridge	\$113,915.57
1961	Emergency Protective Measures 48-hour snow Removal	Small	029-03964-00	\$31,144.90
1961	Damaged Equipment	Small	029-03964-00	\$2,236.50
1961	CMGD 02 Snow Removal	Small	Village of Sunrise Beach	\$6,918.16
1961	CMGD 01-48 Hour Snow Storm	Small	City of Osage Beach	\$20,105.45

Disaster Declaration	Project Type	Project Size	Applicant	Project Total
1961	CMMB 17 Emergency Snow Removal	Small	Lake Regional Health System	\$13,275.30
1961	Emergency Protective Measures	Small	Village of Sunrise Beach	\$1,160.78
4144	HBCC01C-Culvert Repairs	Small	029-03964-00	\$11,341.57
4144	CCLC04C City of Linn Creek CAT C Roads	Small	City of Linn Creek	\$1,166.08
4144	Linn Creek Debris Removal Completed	Small	City of Linn Creek	\$2,485.56
4144	Emergency Protective Measures	Small	029-03964-00	\$3,162.06
4144	Linn Creek Debris Removal TBC	Small	City of Linn Creek	\$3,584.20
4144	Linn Creek Fence Damage	Small	City of Linn Creek	\$1,993.88
4144	Debris Removal	Small	029-03964-00	\$36,620.43
4144	CCHR03C	Small	029-03964-00	\$35,480.49
4144	CCHB03C Roads	Small	029-03964-00	\$3,317.76
4144	CCCC01A	Small	Camden County Road & Bridge	\$1,972.49
4144	CCHB02C	Large	029-03964-00	\$82,211.26
4144	Play Structure and Equipment	Small	City of Osage Beach	\$8,550.00
4144	CCCC3 C Roads and Bridge Repair	Large	Camden County Road & Bridge	\$256,490.03
4144	CCCC02C Roads and Bridge Repair	Large	Camden County Road & Bridge	\$243,396.55
4144	CCOB2G Culvert and Erosion Repair	Large	City of Osage Beach	\$315,201.87
4144	Camelot Estates Sewer	Small	Camden County Road & Bridge	\$-
4144	Roads and Bridge Repair	Large	Camden County Road & Bridge	\$87,959.25
4144	Roads and Bridge Repair	Large	Camden County Road & Bridge	\$116,660.53
4144	Low Water Crossing & Culverts 4 Roads	Large	Camden County Road & Bridge	\$134,137.71
4144	WTBC 18 Roads	Large	Camden County Road & Bridge	\$194,157.74
4144	Camelot Estates Sewer	Small	Camden County	\$8,012.70
4144	Camden County Roads	Large	Camden County Road & Bridge	\$133,567.27
4144	Low Water Crossing Slab	Small	Camden County Road & Bridge	\$31,842.00
4144	Low Water Crossing Concrete Slab	Small	Camden County Road & Bridge	\$29,143.00
4238	ERT002B Camdenton R-III Schools	Large	Camdenton R-III Schools	\$332,547.51
4238	Road and Culvert Washout	Large	Camden County Road & Bridge	\$250,319.39
4238	CAM014C Roads and Bridges	Large	Camden County Road & Bridge	\$311,046.60
4238	Damaged Gravel Roads	Large	Camden County Road & Bridge	\$270,643.56
4238	CAN012C Roads	Large	Camden County Road & Bridge	\$265,069.66
4238	CAM007C Road Damage	Large	Camden County Road & Bridge	\$396,881.21
4238	CAM010C Road Damage	Large	Camden County Road & Bridge	\$166,809.02
4238	CAM009C Gravel Roadway Repair	Large	Camden County Road & Bridge	\$122,508.79
4238	CAM011C Gravel Roadway Repair	Large	Camden County Road & Bridge	\$277,197.61
4238	CAM015C Gravel Roadway Repair	Large	Camden County Road & Bridge	\$136,244.05
4238	CAM013C Roads	Large	Camden County Road & Bridge	\$215,436.51
4238	CAM016C-Roads	Small	Camden County Road & Bridge	\$3,307.86
4238	CAM019C Gravel Roadway Repair	Small	Camden County Road & Bridge	\$27,141.91
4238	CAM019C Flippin Road Low Water	Small	Camden County Road & Bridge	\$4,328.23
4250	029SB32C Low Water Crossing	Small	Camden County Road & Bridge	\$37,332.21
4250	029SB29C Damaged Gravel Roads	Large	Camden County Road & Bridge	\$161,003.95
4250	029SB29C Low Business Park Rd.	Large	Camden County Road & Bridge	\$77,415.37
4250	029SB30C Damaged Culverts	Small	Camden County Road & Bridge	\$44,172.54
4250	029SB31 Embankment Freedom Ridge Road	Large	Camden County Road & Bridge	\$197,919.81
4317	CP01989 Completed Work Roads	Small	Camden County	\$3,341.27
4317	McCubbins Road Low Water Crossing	Small	Camden County	\$9,561.34
4317	ST02020 Low Water Slab, Shoulder, Culverts and Embank	Small	Village of Sunrise Beach	\$16,711.68
4317	ST01505 Scarey Lane Low Water Crossing	Small	Camden County	\$10,918.97
4317	ST01505 Road Repairs County Wide	Large	Camden County	\$278,936.31
			Total	\$6,744,062.81

Source: Federal Emergency Management Agency, 06/20/2019

2.1 Jurisdictional Profiles and Mitigation Capabilities

2.1.1 Camden County

Camden County remains a first-class county, governed by a three-member County Commission, comprised of a Presiding Commissioner, representing all the county's population and elected for a four-year term with additional representations by the two Associate Commissioners representing the rest of the county's population also elected on a four-year term. The commission is responsible for these key aspects of Camden County government.

- Approving and adopting an annual budget for all county operations
- Approving expenditures for each county department
- Ensuring compliance with all statutory requirements
- Establishing Camden County policies
- Supervising daily operations of Camden County
- To work in partnership with County Boards, Commissions and other Local and Regional Governmental parties

Camden County supports the following departments:

- Assessor
- Auditor
- Circuit Court
- Collector
- County Clerk
- Emergency Management
- GIS Mapping
- Health Department
- Human Resources
- Planning and Zoning
- Prosecuting Attorney
- Recorder
- Road and Bridge
- Sheriff
- Treasurer
- Waste Water

Mitigation Initiatives/Capabilities

The function of Camden County's emergency management is to provide coordination and support to response agencies and local jurisdictions in any incident that reaches beyond the normal first response. The EMA's main goal is to serve Camden County to the best of their ability. The County EMA office works with the municipalities and the other county agencies to ensure the safety and well-being of county residents.

Camden County Emergency Management Office has ongoing public education and information programs such as CERT and the Boy Scout Merit Badge program.

Camden County utilizes the Nixle system as another hazardous weather warning system.

Camden County is expecting the facility development and growth areas in the next five years to consist of a soccer field complex and medical marijuana manufacturing facilities. Development and growth are expected to stay steady. From 2015 until 2019, there have been 1,516 building permits issued by Camden County's Planning and Zoning office.

Figure 2.7 Is the Flood Zone Designation Map for Camden County.

Camden County Flood Zone Map

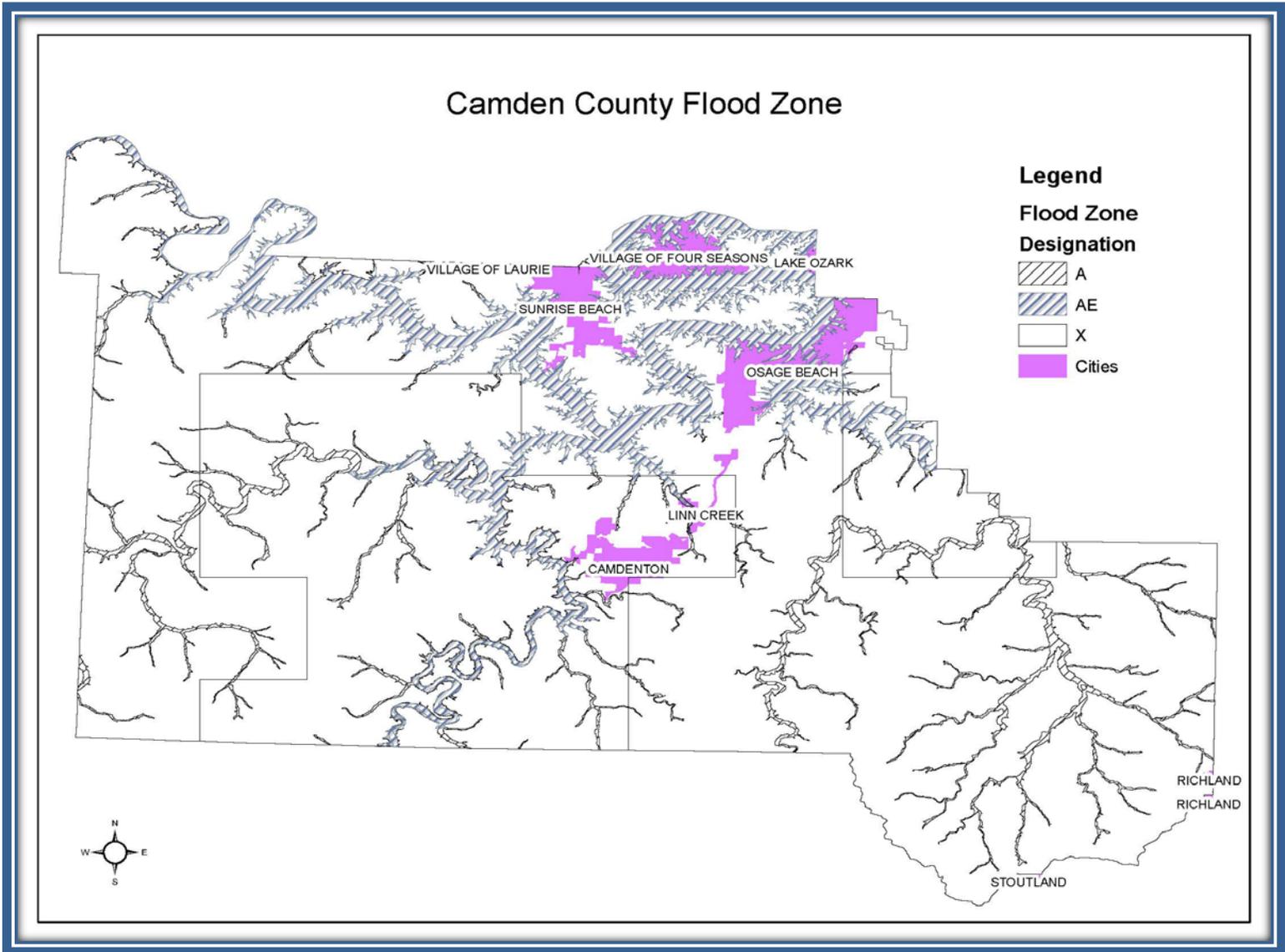


Table 2.6 Is based on data that have been collected by distribution of the Data Collection Questionnaire to Camden County EMA office.

Table 2.6. Unincorporated Camden County Mitigation Capabilities

Element	Yes, No, N/A	Comments and/or Weblink
Planning Capabilities		
<u>Comprehensive Plan</u>	Yes	2011
Builder's Plan	N/A	
Capital Improvement Plan	N/A	
City Emergency Operations Plan	N/A	
County Emergency Operations Plan	Yes	2017 and Currently being updated
Local Recovery Plan	N/A	
County Recovery Plan	N/A	LEPC Planning to develop
City Mitigation Plan	N/A	
County Mitigation Plan	Yes	2015 and Currently being updated
Debris Management Plan	No	Do not have one yet. Plans are being looked at that can be used.
<u>Economic Development Plan</u>	Yes	2018 and LOCLG CEDS 2017
Transportation Plan	Yes	LOCLG RTP 2019
Land-use Plan	Yes	2006
Flood Mitigation Assistance (FMA) Plan	No	
<u>Watershed Plan</u>	No	
Firewise or other fire mitigation plan	N/A	
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes	2016 COOP plan for County buildings
Policies/Ordinance		
Zoning Ordinance	Yes	2004 only applies to Lake Building Zones which is within 5 miles of shoreline
Building Code	N/A	
Floodplain Ordinance	Yes	2017
Subdivision Ordinance	Yes	2006
Tree Trimming Ordinance	No	
Nuisance Ordinance	No	

Element	Yes, No, N/A	Comments and/or Weblink
Stormwater Ordinance	No	
Drainage Ordinance	No	
Site Plan Review Requirements	Yes	Ongoing building permits.
Historic Preservation Ordinance	Yes	June 1 2006 ULUC
Landscape Ordinance	Yes	June 1 2006 ULUC
Program		
Zoning/Land Use Restrictions	Yes	2004 only applies to Lake Building Zones which is within 5 miles of shoreline
Codes Building Site/Design	Yes	
Hazard Awareness Program	Yes	
National Flood Insurance Program (NFIP)	Yes	
NFIP Community Rating System (CRS) program	No	
National Weather Service (NWS) Storm Ready Certification	Yes	Being recertified in 2019
Firewise Community Certification	No	
Building Code Effectiveness Grading (BCEGs)	No	
ISO Fire Rating	N/A	
Economic Development Program	Yes	
Land Use Program	Yes	
Public Education/Awareness	Yes	CERT, BS
Property Acquisition	Yes	Assessor's Office
Planning/Zoning Boards	Yes	
Stream Maintenance Program	N/A	
Tree Trimming Program	N/A	
<u>Engineering Studies for Streams (Local/County/Regional)</u>	No	US Army Corps of Engineers
Mutual Aid Agreements	Yes	
Studies/Reports/Maps		
Hazard Analysis/Risk Assessment (City)	N/A	
Hazard Analysis/Risk Assessment (County)	Yes	Camden County HMP 2015 and is currently being updated
Evacuation Route Map	No	

Element	Yes, No, N/A	Comments and/or Weblink
<u>Critical Facilities Inventory</u>	Yes	
<u>Vulnerable Population Inventory</u>	Yes	
<u>Land Use Map</u>	Yes	
Staff/Department		Full Time or Part Time?
Building Code Official	Yes	Code Enforcement and zoning Full-Time
Building Inspector	Yes	Full-Time
Mapping Specialist (GIS)	Yes	Full-Time
Engineer	Yes	Full-Time
Development Planner	Yes	Full-Time
Public Works Official	Yes	Full-Time
Emergency Management Coordinator	Yes	Full-Time
NFIP Floodplain Administrator	Yes	Full-Time
Emergency Response Team	Yes	Full-Time
Hazardous Materials Expert	Yes	Regional/State level
Local Emergency Planning Committee	Yes	Part-Time
County Emergency Management Commission	No	
Sanitation Department	No	
Transportation Department	Yes	Special Roads District
Economic Development Department	No	
Housing Department	No	
Historic Preservation	Yes	
Non-Governmental Organizations (NGOs)	Is there a local chapter? Yes or No	
American Red Cross	Yes	
Salvation Army	Yes	
Veterans Groups	Yes	
Local Environmental Organization	Yes	
Homeowner Associations	Yes	
Neighborhood Associations	Yes	
Chamber of Commerce	Yes	

Element	Yes, No, N/A	Comments and/or Weblink
Community Organizations (Lions, Kiwanis, etc.	Yes	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		No
Authority to levy taxes for specific purposes		Yes with voter approval
Fees for water, sewer, gas, or electric services		No
Impact fees for new development		No
Incur debt through general obligation bonds		Yes with voter approval
Incur debt through special tax bonds		Yes with voter approval
Incur debt through private activities		No
Withhold spending in hazard prone areas		No

Source: Data Collection Questionnaire Camden County

2.1.2 City of Camdenton

Camdenton is the county seat of Camden County, nestled on the West side of the beautiful Lake of the Ozarks frequently referred to as the “Hub city of Lake of the Ozarks”. Camdenton is home of the annual Dogwood Festival held each April and hosts the Lake of the Ozarks Air Show each September at the Camdenton Memorial Airport.

The City of Camdenton was incorporated in May 1931 with a strong commitment to continuous improvement to the “quality of life” for its residents. The city is 8 square miles with a permanent population of 3,718 residents (2010 census). The area offers expansive forest, rolling Ozark Mountains and has over 5 million visitors per year who come to enjoy the water sports, fishing, hunting, hiking, and the natural beauty of the outdoors. The Town Square is located at the major intersection of U.S. Highway 54, and Business Route 5 where almost 16,000,000 vehicles travel annually.

The City of Camdenton has four outdoor warning sirens in the community. The sirens are activated by the Camden County Dispatchers office.

The City of Camdenton does not have any designated public tornado shelters or saferooms. City Manager Jeff Hancock has expressed this hazard related concern.

The City of Camdenton is governed by a Mayor and a board of Alderman. There are six Alderman representing three wards within the city. There are two Alderman that represent each ward. The population of Camdenton has increased by 10% since the 2010 census. According to the American Community Survey 5-year estimates the population in 2018 to be 4,092.

Figure 2.8 On the following page is the designated Flood Zone map for the City of Camdenton.

City of Camdenton Flood Zone and At-Risk Structures

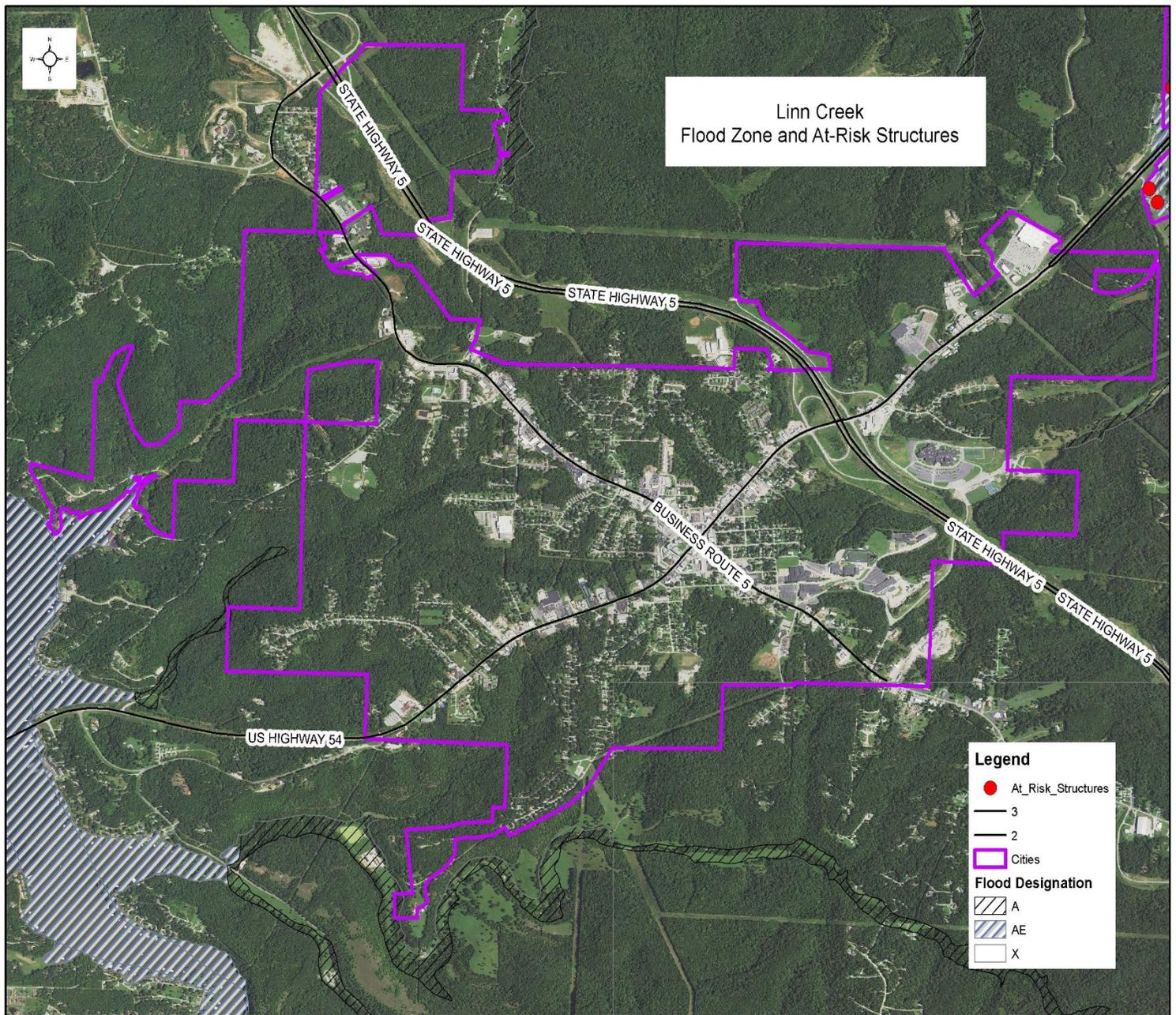


Table 2.7 shows data that has been collected by distribution of the Data Collection Questionnaire to the City Administrator.

Table 2.7. City of Camdenon Mitigation Capabilities

Element	Yes, No, N/A	Comments and/or Weblink
Planning Capabilities		
<u>Comprehensive Plan</u>	Yes	2016
Builder's Plan	No	
Capital Improvement Plan	No	
City Emergency Operations Plan	No	
County Emergency Operations Plan	Yes	2017 and Currently being updated
Local Recovery Plan	No	
County Recovery Plan	No	
City Mitigation Plan	No	
County Mitigation Plan	Yes	2015 and Currently being updated
Debris Management Plan	No	
<u>Economic Development Plan</u>	Yes	LOCLG CEDS 2017
Transportation Plan	Yes	Local Plan 2016 and LOCLG RTP 2019
Land-use Plan	Yes	2016
Flood Mitigation Assistance (FMA) Plan	No	
<u>Watershed Plan</u>	No	
Firewise or other fire mitigation plan	No	
Critical Facilities Plan (Mitigation/Response/Recovery)	No	
Policies/Ordinance		
Zoning Ordinance	Yes	2019 Code: 405.030
Building Code	Yes	2019 Code: 500.020
Floodplain Ordinance	Yes	2019 Code: 415.040
Subdivision Ordinance	Yes	2019 Code: 405.010
Tree Trimming Ordinance	No	
Nuisance Ordinance	Yes	2019 Code: 215.010
Stormwater Ordinance	Yes	2019 Code: 700.150

Element	Yes, No, N/A	Comments and/or Weblink
Drainage Ordinance	Yes	2019 Code: 405.400
Site Plan Review Requirements	Yes	2019 Code: 400.330
Historic Preservation Ordinance	No	
Landscape Ordinance	Yes	In P&Z ordinance
Program		
Zoning/Land Use Restrictions	Yes	2019 Code: 405.030
Codes Building Site/Design	Yes	2019 Code: 500.020
Hazard Awareness Program	No	
National Flood Insurance Program (NFIP)	Yes	
NFIP Community Rating System (CRS) program	No	
National Weather Service (NWS) Storm Ready Certification	No	
Firewise Community Certification	No	
Building Code Effectiveness Grading (BCEGs)	Yes	Class 4 Commercial
ISO Fire Rating	Yes	4
Economic Development Program	Yes	2016 Comprehensive Plan
Land Use Program	Yes	
Public Education/Awareness	No	
Property Acquisition	No	
Planning/Zoning Boards	Yes	2019 Code: 400.350
Stream Maintenance Program	No	
Tree Trimming Program	No	
<u>Engineering Studies for Streams (Local/County/Regional)</u>	No	
Mutual Aid Agreements	Yes	
Studies/Reports/Maps		
<u>Hazard Analysis/Risk Assessment (City)</u>	Yes	Mid-County Fire
<u>Hazard Analysis/Risk Assessment (County)</u>	Yes	2015 Camden County HMP and Currently being updated.
Evacuation Route Map	No	
<u>Critical Facilities Inventory</u>	Yes	
<u>Vulnerable Population Inventory</u>	No	

Element	Yes, No, N/A	Comments and/or Weblink
Land Use Map	Yes	
Staff/Department		Full Time or Part Time?
Building Code Official	Yes	Full-Time
Building Inspector	Yes	Full-Time
Mapping Specialist (GIS)	No	
Engineer	Yes	Contract-Consultant
Development Planner	No	
Public Works Official	Yes	Full-Time
Emergency Management Coordinator	Yes	Full-Time
NFIP Floodplain Administrator	Yes	Full-Time
Emergency Response Team	No	
Hazardous Materials Expert	Yes	Mid-County Fire Department
Local Emergency Planning Committee	No	
County Emergency Management Commission	No	
Sanitation Department	No	
Transportation Department	No	
Economic Development Department	Yes	Part-Time
Housing Department	No	
Historic Preservation	No	
Non-Governmental Organizations (NGOs)	Is there a local chapter? Yes or No	
American Red Cross	Yes	
Salvation Army	Yes	
Veterans Groups	Yes	Veterans of Foreign Wars
Local Environmental Organization	No	
Homeowner Associations	No	
Neighborhood Associations	No	
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.)	Yes	
Financial Resources		Is your jurisdiction able to? Yes or No

Element	Yes, No, N/A	Comments and/or Weblink
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		Yes
Authority to levy taxes for specific purposes		Yes with voter approval
Fees for water, sewer, gas, or electric services		Yes
Impact fees for new development		No
Incur debt through general obligation bonds		Yes with voter approval
Incur debt through special tax bonds		Yes with voter approval
Incur debt through private activities		No
Withhold spending in hazard prone areas		No

Source: Data Collection Questionnaire City of Camden

2.1.3 City of Lake Ozark

The City of Lake Ozark, incorporated in 1966, is nestled over the adjacent counties of Miller and Camden. With a population of 1,626 (ACS 2015), The City of Lake Ozark has grown considerably since its conception shortly after the Bagnell Dam was completed in 1931.

The Bagnell Dam was essentially the driving factor for the necessity to establish the town that encompasses the land south of the dam. This late-bloomer city of the area kicked off shortly after Bagnell Dam was completed; however, in the 80+ years that this location has been thriving, it has steadily increased in population, public interests, and economic development.

The City of Lake Ozark has effectively developed into the 21st century hub of attention for Miller County. It shows promise and leadership for the development of the Lake of the Ozarks. Source: Lake Ozark History <http://www.millercountymuseum.org/communities/othercomm.html>

The City of Lake Ozark is governed by a Mayor and a Board of Alderman representing three wards within the City of Lake Ozark.

Figure 2.9 On the following page is a layout of Lake Ozark Flood Zone and At-Risk Structures.

Lake Ozark Flood Zone and At Risk Structures

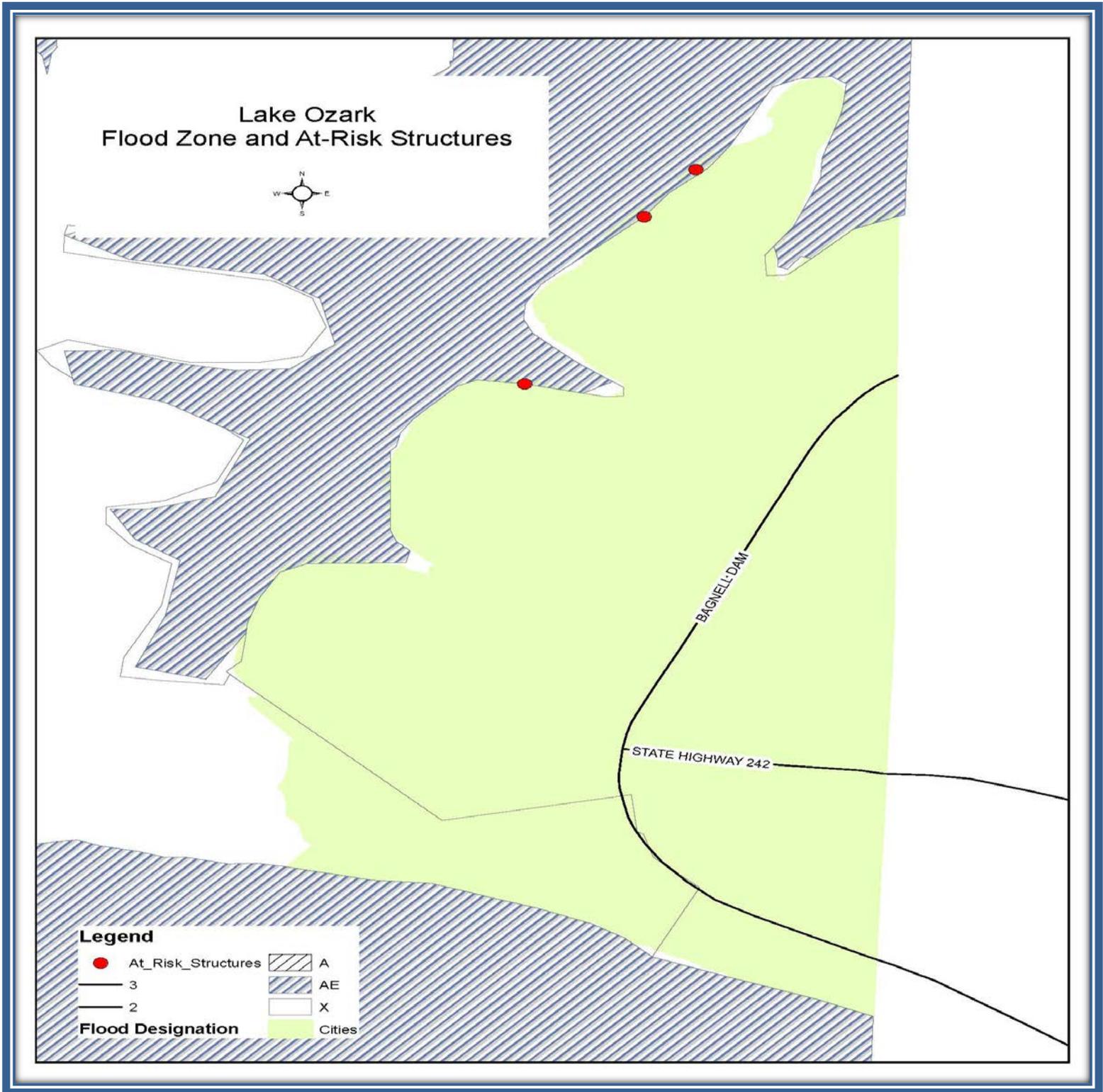


Table 2.8 Depicts the capabilities based on data that have been collected by distribution of the Data Collection Questionnaire.

Table 2.8. City of Lake Ozark Mitigation Capabilities

Element	Yes, No, N/A	Comments and/or Weblink
Planning Capabilities		
<u>Comprehensive Plan</u>	Yes	2016
Builder's Plan	No	
Capital Improvement Plan	No	
City Emergency Operations Plan	No	
County Emergency Operations Plan	Yes	2017 Camden County currently being updated
Local Recovery Plan	No	
County Recovery Plan	No	
City Mitigation Plan	No	
County Mitigation Plan	Yes	2015 Camden County HMP and Currently being updated
Debris Management Plan	No	
<u>Economic Development Plan</u>	Yes	LOCLG CEDS 2017
Transportation Plan	No	LOCLG RTP 2019
Land-use Plan	No	
Flood Mitigation Assistance (FMA) Plan	No	
<u>Watershed Plan</u>	No	
Firewise or other fire mitigation plan	No	
Critical Facilities Plan (Mitigation/Response/Recovery)	No	
Policies/Ordinance		
Zoning Ordinance	Yes	1994 Code: 405.010
Building Code	Yes	2013 Code: Chapter 515
Floodplain Ordinance	Yes	2009 Code: 415.020
Subdivision Ordinance	Yes	1994 Code: 410.010
Tree Trimming Ordinance	No	
Nuisance Ordinance	Yes	2004 Code: 210.010
Stormwater Ordinance	Yes	2008 Code: 700.360

Element	Yes, No, N/A	Comments and/or Weblink
Drainage Ordinance	Yes	2008 Code: 700.360
Site Plan Review Requirements	Yes	1994 Code: 405.010
Historic Preservation Ordinance	Yes	1994 Code: 405.730
Landscape Ordinance	Yes	
Program		
Zoning/Land Use Restrictions	Yes	1994 Code: 405.010
Codes Building Site/Design	Yes	2013, Code: Chapter 515
Hazard Awareness Program	No	
National Flood Insurance Program (NFIP)	Yes	
NFIP Community Rating System (CRS) program	No	
National Weather Service (NWS) Storm Ready Certification	No	
Firewise Community Certification	Yes	
Building Code Effectiveness Grading (BCEGs)	Yes	Class 5 Residential and Class 4 Commercial 2017
ISO Fire Rating	N/A	
Economic Development Program	Yes	
Land Use Program	Yes	1992 Code: Chapter 400
Public Education/Awareness	No	
Property Acquisition	No	
Planning/Zoning Boards	Yes	1992 Code: Chapter 400
Stream Maintenance Program	No	
Tree Trimming Program	No	
<u>Engineering Studies for Streams (Local/County/Regional)</u>	No	
Mutual Aid Agreements	Yes	
Studies/Reports/Maps		
<u>Hazard Analysis/Risk Assessment (City)</u>	No	
<u>Hazard Analysis/Risk Assessment (County)</u>	Yes	2015 Camden County HMP and Currently being updated.
Evacuation Route Map	No	
<u>Critical Facilities Inventory</u>	Yes	

Element	Yes, No, N/A	Comments and/or Weblink
<u>Vulnerable Population Inventory</u>	No	
<u>Land Use Map</u>	Yes	
Staff/Department		Full Time or Part Time?
Building Code Official	Yes	Full-Time
Building Inspector	Yes	Full-Time
Mapping Specialist (GIS)	No	
Engineer	Yes	Contract-Consultant
Development Planner	No	
Public Works Official	Yes	Full-Time
Emergency Management Coordinator	No	
NFIP Floodplain Administrator	Yes	Full-Time
Emergency Response Team	No	
Hazardous Materials Expert	No	
Local Emergency Planning Committee	No	
County Emergency Management Commission	Yes	
Sanitation Department	Yes	
Transportation Department	No	
Economic Development Department	No	
Housing Department	No	
Historic Preservation	Yes	
Non-Governmental Organizations (NGOs)	Is there a local chapter? Yes or No	
American Red Cross	No	
Salvation Army	No	
Veterans Groups	No	
Local Environmental Organization	No	
Homeowner Associations	Yes	
Neighborhood Associations	Yes	
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.	Yes	

Element	Yes, No, N/A	Comments and/or Weblink
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		No
Authority to levy taxes for specific purposes		Yes with voter approval
Fees for water, sewer, gas, or electric services		Yes
Impact fees for new development		No
Incur debt through general obligation bonds		Yes with voter approval
Incur debt through special tax bonds		No
Incur debt through private activities		No
Withhold spending in hazard prone areas		No

Source: Data Collection Questionnaire for the City of Lake Ozark

2.1.4 City of Linn Creek

Linn Creek was settled in 1841. It was named from the creek on which it is situated, and which was named for the many linn trees lining its banks. In March of 1841, Aaron Crain was granted a license to keep a ferry across the Osage, at or near the mouth of the Niangua, its location being below the mouth of the Niangua and above the mouth of Linn Creek. Later that year the clerk of the court James N. B. Dodson, issued a merchant's and grocer's license to Benjamin R. Abbott, this was the first store within Linn Creek.

Around the year 1850, business in Linn Creek became well established, until the beginning of the war. It was then the base of supplies for a large territory of country extending for hundreds of miles toward the southwest. At that time, steamboats navigated the Osage up to Linn Creek about six months in the year, and they occasionally went as high up as Warsaw, in Benton County; and when the water was too low for steamboat navigation goods were shipped up the river on flat-boats. All of Missouri lying southwest of this town, Northwester Arkansas lying north of the Boston Mountains, and a large portion of the Indian Territory received their goods and supplies from Linn Creek. The goods were hauled from Linn Creek to the many points in the southwest by ox teams. Linn Creek was then the receiving point for all the produce shipped from the territory which it supplied.

Once the railroads came, and builders of these great lines of rapid transit left the town out. The building of a railroad through the town, the improvement of the navigation of the Osage River, and the development of the mineral and other resources of the vicinity really depleted the businesses within Linn Creek.

The City of Linn Creek has two outdoor warning sirens in their community. The sirens are set off by Camden County Dispatch remotely. Linn Creek City employees and Police Department are able to set off the sirens manually should #1 siren fail.

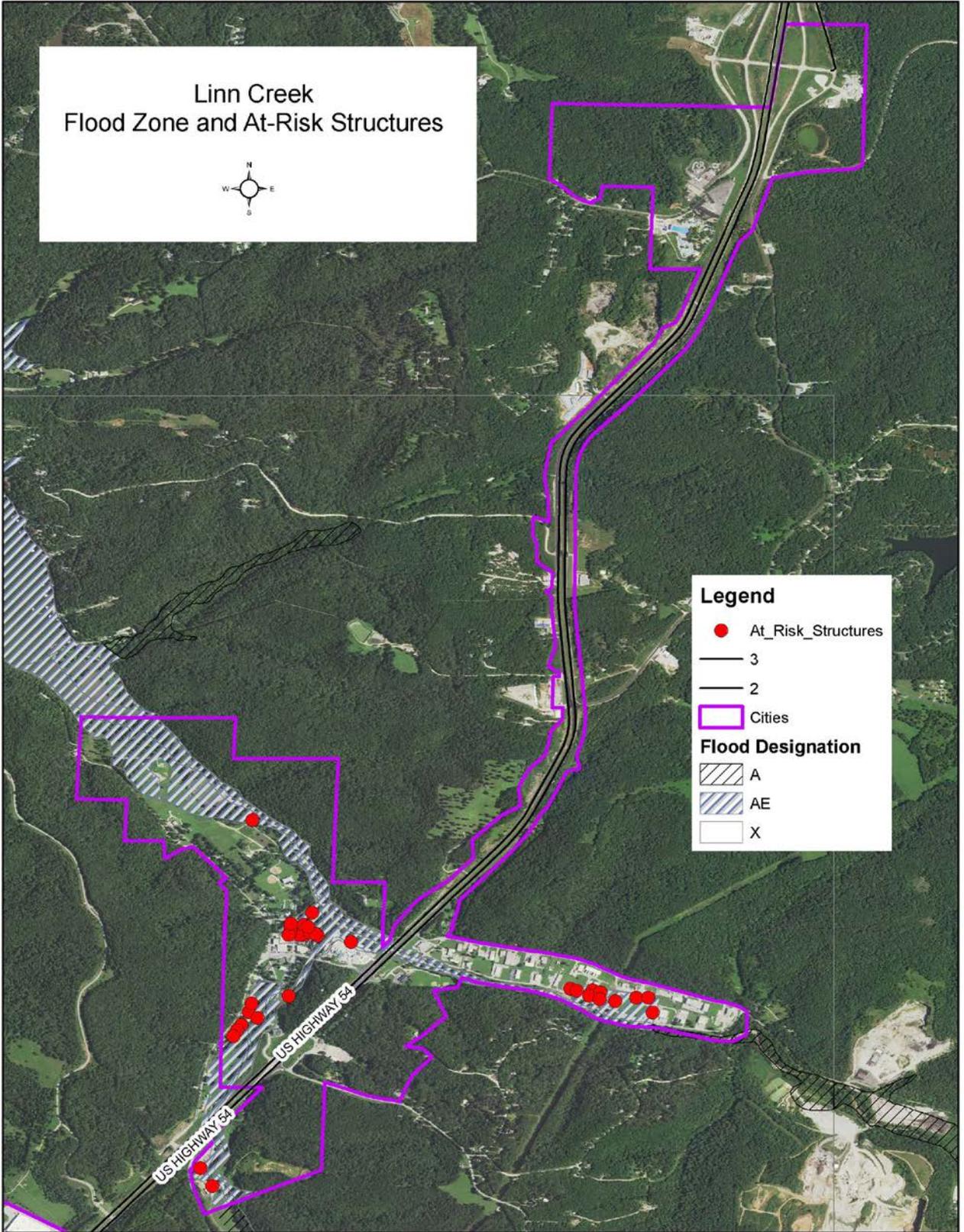
The residents of the City of Linn Creek have a designated public tornado shelter at the Linn Creek Methodist Church that is located at 101 S. Locust St. This is not constructed according to FEMA standards.

The City of Linn Creek is governed by a Mayor and a Board of Alderman. There are three aldermen representing the City of Linn Creek.

Figure 2.10 Maps the Flood Zone and at-risk structures for the City of Linn Creek.

Figure 2.10 City of Linn Creek Flood Zone and At-Risk Structures

Linn Creek Flood Zone and At-Risk Structures



Legend

- At_Risk_Structures
- 3
- 2
- Cities

Flood Designation

- ▨ A
- ▧ AE
- X

Table 2.9 Depicts the capabilities based on data that have been collected by distribution of the Data Collection Questionnaire.

Table 2.9 City of Linn Creek Mitigation Capabilities

Element	Yes, No, N/A	Comments and/or Weblink
Planning Capabilities		
Comprehensive or Land-Use Plan	Yes	
Capital Improvement Plan	No	
Transportation Plan / Highway Department	Yes	2019
Emergency Operations Plan	No	
Local Recovery Plan	No	
Debris Management Plan	No	
Firewise or other fire mitigation plan	Yes	
Economic Development Plan	No	
Policies/Ordinance		
Zoning Ordinance	Yes	
Building Code	No	
Floodplain Ordinance	Yes	
Drainage/Stormwater Ordinance	No	
Site Plan Review Requirements	No	
Historic Preservation Ordinance	No	
Program		
National Flood Insurance Program (NFIP)	Yes	
NFIP Community Rating System (CRS) program	No	
National Weather Service (NWS) Storm Ready Certification	No	
Firewise Community Certification	No	
Building Code Effectiveness Grading (BCEGs)	No	
ISO Fire Rating	N/A	
Public Education or information programs (i.e., responsible water use, fire safety, household preparedness, or environmental education)	No	

Element	Yes, No, N/A	Comments and/or Weblink
Mutual Aid Agreements	Yes	
Studies/Reports/Maps		
Critical Facilities Inventory	No	
Vulnerable Population Inventory	No	
Staff/Department		Full Time or Part Time?
Building Code Official / Building Inspector	No	
Engineer	Yes	Contract-Consultant
Development Planner	No	
NFIP Floodplain Administrator	Yes	Full-Time
Mapping Specialist (GIS)	No	
Public Works Official	No	
Emergency Management Coordinator	No	
Local Emergency Planning Committee	No	
Sanitation Department	Yes	
Highway/Transportation Department	No	
Economic Development Department	No	
Housing Department	No	
Historic Preservation	No	
Non-Governmental Organizations (NGOs)	Is there a local chapter? Yes or No	
American Red Cross	No	
Salvation Army	No	
Veterans Groups	No	
Local Environmental Organization	No	
Homeowner Associations	No	
Neighborhood Associations	No	
Chamber of Commerce	No	
Community Organizations (Lions, Kiwanis, etc.)	No	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes

Element	Yes, No, N/A	Comments and/or Weblink
Fund projects thru Capital Improvements funding		Yes
Authority to levy taxes for specific purposes		Yes
Fees for water, sewer, gas, or electric services		Yes
Impact fees for new development		No
Incur debt through general obligation bonds		No
Incur debt through special tax bonds		No
Incur debt through private activities		No
Withhold spending in hazard prone areas		No

Source: Data Collection Questionnaire City of Linn Creek

2.1.5 City of Osage Beach

Osage Beach was originally called Zebra, Missouri. Zebra's post office was established in 1886 and located on the river bottom, just east of today's Grand Glaize Bridge. Zebra was later flooded out with the building of the Bagnell Dam in 1929-1931. Once the dam was completed, the post office was rebuilt on the top of a nearby cliff, at the heart of the Lake of the Ozarks. In 1935, Zebra residents changed the post office designation to Osage Beach but official boundaries weren't formed until the early 1960s.

The City of Osage Beach was incorporated on May 22, 1959, but due to political upheaval and discontent among some in the new town's people, a petition for un-incorporation was filed. Many lobbied against stating that in order for the community to continue to grow you need sanitation, fire and police protection, street development, and sewer and water service. After years of weighing the advantages and disadvantages of incorporation, in the spring of 1965 voters finally approved the incorporation of the City of Osage Beach as a fourth-class city. Official boundaries were established; four wards were formed, two on each side of the Grand Glaize Bridge, two aldermen per ward, and a Mayor and Marshall were elected.

Osage Beach is still considered the 'Heart of the Lake of the Ozarks' and has progressed in many ways over the last century. The City has expanded its boundaries, water, sewer, and street infrastructure has been built to each end of the City, and tourism has grown tremendously. The City does not have an elected Marshall as it did in the 1960s, but the City continues to grow and seek for new progressive development. Political reconstruction has occurred over the years, and the City is supported by three wards, two aldermen per ward, and an elected Mayor. The City is managed under a City Administrator and has numerous departments to handle all of the city's functions. Currently, the City of Osage Beach employs over one hundred full-time employees and several part-time employees each summer. The governing body for the City of Osage Beach is a 6-member board of alderman.

The ongoing projects or programs designed to reduce disaster losses are an emergency spillway at the pond in the City Park. To secure the City well, there has been a fence put around the El Terra & Passover Road well. The City also has on going storm drainage projects.

There are nine outdoor warning sirens within the City of Osage Beach that are activated by the City of Osage Beach Police Department's 911 Center.

The City of Osage Beach is governed by a Mayor and a Board of Alderman. There are six Alderman representing three wards within the city. Ward 1, 2, and 3 each have two Aldermen representing the residents.

Figure 2.11 Maps the flood zone areas and the at-risk structures in the City of Osage Beach.

Osage Beach Flood Zone and At-Risk Structures

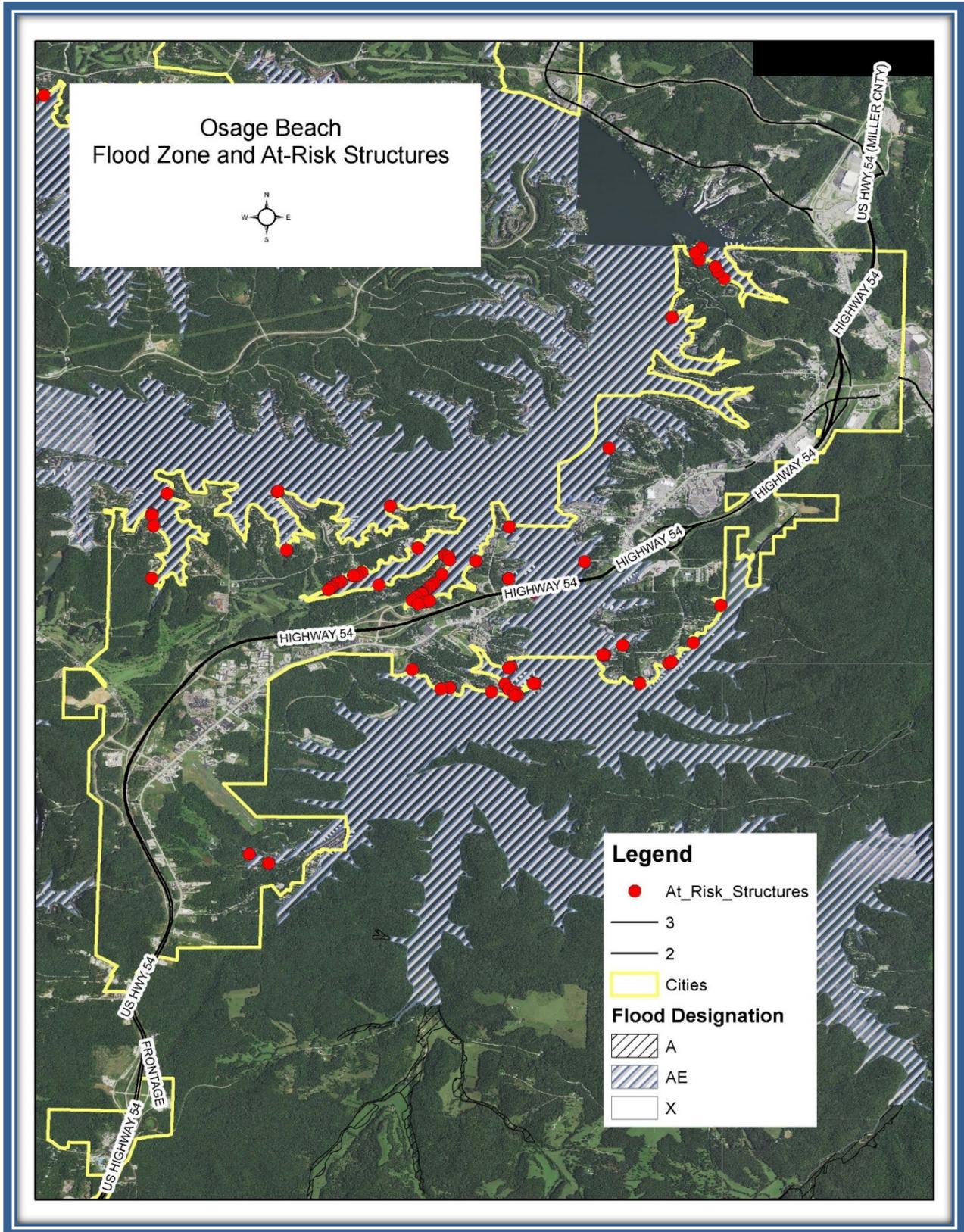


Table 2.10 Depicts the capabilities based on data that have been collected by distribution of the Data Collection Questionnaire.

City of Osage Beach Mitigation Capabilities

Element	Yes, No, N/A	Comments and/or Weblink
Planning Capabilities		
<u>Comprehensive Plan</u>	Yes	1996 Code: 410.030
Builder's Plan	No	
Capital Improvement Plan	Yes	2007 Code: 140.030
City Emergency Operations Plan	No	In progress, hope to complete by end of 2019
County Emergency Operations Plan	Yes	With Camden and Miller County EMA offices.
Local Recovery Plan	Yes	With Camden and Miller County EMA offices.
County Recovery Plan	Yes	With Camden and Miller County EMA offices.
City Mitigation Plan	No	
County Mitigation Plan	Yes	2015 Camden County HMP and Currently being updated
Debris Management Plan	No	
<u>Economic Development Plan</u>	Yes	
Transportation Plan	Yes	
Land-use Plan	Yes	
Flood Mitigation Assistance (FMA) Plan	Yes	
<u>Watershed Plan</u>	No	
Firewise or other fire mitigation plan	No	
Critical Facilities Plan (Mitigation/Response/Recovery)	No	
Policies/Ordinance		
Zoning Ordinance	Yes	
Building Code	Yes	2012
Floodplain Ordinance	Yes	
Subdivision Ordinance	Yes	
Tree Trimming Ordinance	No	
Nuisance Ordinance	Yes	

Element	Yes, No, N/A	Comments and/or Weblink
Stormwater Ordinance	Yes	Code: 710.270
Drainage Ordinance	Yes	Code: 410.340
Site Plan Review Requirements	Yes	
Historic Preservation Ordinance	No	
Landscape Ordinance	No	
Program		
Zoning/Land Use Restrictions	Yes	
Codes Building Site/Design	No	
Hazard Awareness Program	No	
National Flood Insurance Program (NFIP)	Yes	
NFIP Community Rating System (CRS) program	No	
National Weather Service (NWS) Storm Ready Certification	No	
Firewise Community Certification	No	
Building Code Effectiveness Grading (BCEGs)	Yes	
ISO Fire Rating	Yes	6
Economic Development Program	No	LOCLG CEDS 2017 and Partner with LOREDC
Land Use Program	No	
Public Education/Awareness	No	
Property Acquisition	No	Partner with LOREDC
Planning/Zoning Boards	Yes	
Stream Maintenance Program	No	
Tree Trimming Program	No	
<u>Engineering Studies for Streams (Local/County/Regional)</u>	No	
Mutual Aid Agreements	Yes	
Studies/Reports/Maps		
<u>Hazard Analysis/Risk Assessment (City)</u>	No	
<u>Hazard Analysis/Risk Assessment (County)</u>	Yes	2015 Camden County HMP and Currently being updated.
Evacuation Route Map	No	

Element	Yes, No, N/A	Comments and/or Weblink
<u>Critical Facilities Inventory</u>	No	
<u>Vulnerable Population Inventory</u>	No	
<u>Land Use Map</u>	Yes	
Staff/Department		Full Time or Part Time?
Building Code Official	Yes	Full-Time
Building Inspector	Yes	Full-Time
Mapping Specialist (GIS)	Yes	Full-Time
Engineer	Yes	Full-Time
Development Planner	Yes	Full-Time
Public Works Official	Yes	Full-Time
Emergency Management Coordinator	Yes	Full-Time
NFIP Floodplain Administrator	Yes	Full-Time
Emergency Response Team	No	
Hazardous Materials Expert	No	
Local Emergency Planning Committee	Yes	Full-Time
County Emergency Management Commission	N/A	
Sanitation Department	No	
Transportation Department	Yes	Full-Time
Economic Development Department	Yes	Full-Time
Housing Department	No	
Historic Preservation	No	
Non-Governmental Organizations (NGOs)	Is there a local chapter? Yes or No	
American Red Cross	Yes	County Chapter
Salvation Army	No	
Veterans Groups	Yes	Osage Beach Veterans of Foreign Wars (Kaiser)
Local Environmental Organization	No	
Homeowner Associations	Yes	
Neighborhood Associations	Yes	
Chamber of Commerce	Yes	

Element	Yes, No, N/A	Comments and/or Weblink
Community Organizations (Lions, Kiwanis, etc.	Yes	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		Yes
Authority to levy taxes for specific purposes		Yes
Fees for water, sewer, gas, or electric services		Yes
Impact fees for new development		Yes
Incur debt through general obligation bonds		Yes
Incur debt through special tax bonds		Yes
Incur debt through private activities		Yes
Withhold spending in hazard prone areas		Yes

Source: Data Collection Questionnaire for the City of Osage Beach

2.1.6 City of Richland

Surveyor, M. Santee, saw the need for towns along the railroad. In fall of 1869, he surveyed and laid out, on both sides of the railroad track, the site that was to become the town of Richland. One of the first buildings was a store erected by Captain H.E. Warren and Sam Gibson. This became the H.E. Warren Store that is still prominent today.

In the late 1870s, Dr James Titterington erected the Richland Steam and Flouring and Saw Mills. In 1877, the St Louis and San Francisco Railroad gained control of the Southwest Railroad Company and assured the towns being a shipping point between Springfield and St. Louis.

Livestock production and general farming became the chief occupations in the area. Richland became a tie buying center for the railroads with many farmers and loggers supplementing their income by cutting White Oak, post oak and walnut timber into ties. These were floated down the Gasconade River to the tie ford south of Richland, where they were stored in a large eddy of the river. They were then loaded into wagons and hauled to Richland for storage and shipping. Other produce shipped from the area included lumber, wheat, corn, dried fruit, hides and furs, poultry, eggs and wild game.

Richland had been incorporated as a village at the beginning of its existence and in 1884 was incorporated as a fourth-class city with its first Mayor being M.W. Rice. By 1890, Richland was a thriving business center with active stores, a bank, newspaper, public school, a private academy, churches, lodges, two flouring mills, a sawmill, broom factory, marble works, lumberyard, two hotels and many professional men.

In the early 1930s, two men from Tulsa bought several creek farms west of Richland and began to raise goldfish. In this manner, Ozarks Fisheries, Inc. was established, and it is still a flourishing business today.

The City of Richland has a Mayor/Board of Aldermen form of government with two members from each of the three wards. As of 2016, Richland has the highest percentage of families below the poverty line, at 30.2%.

Figure 2.12 Depicts the City of Richland's Floodplain.

Richland Flood Plain

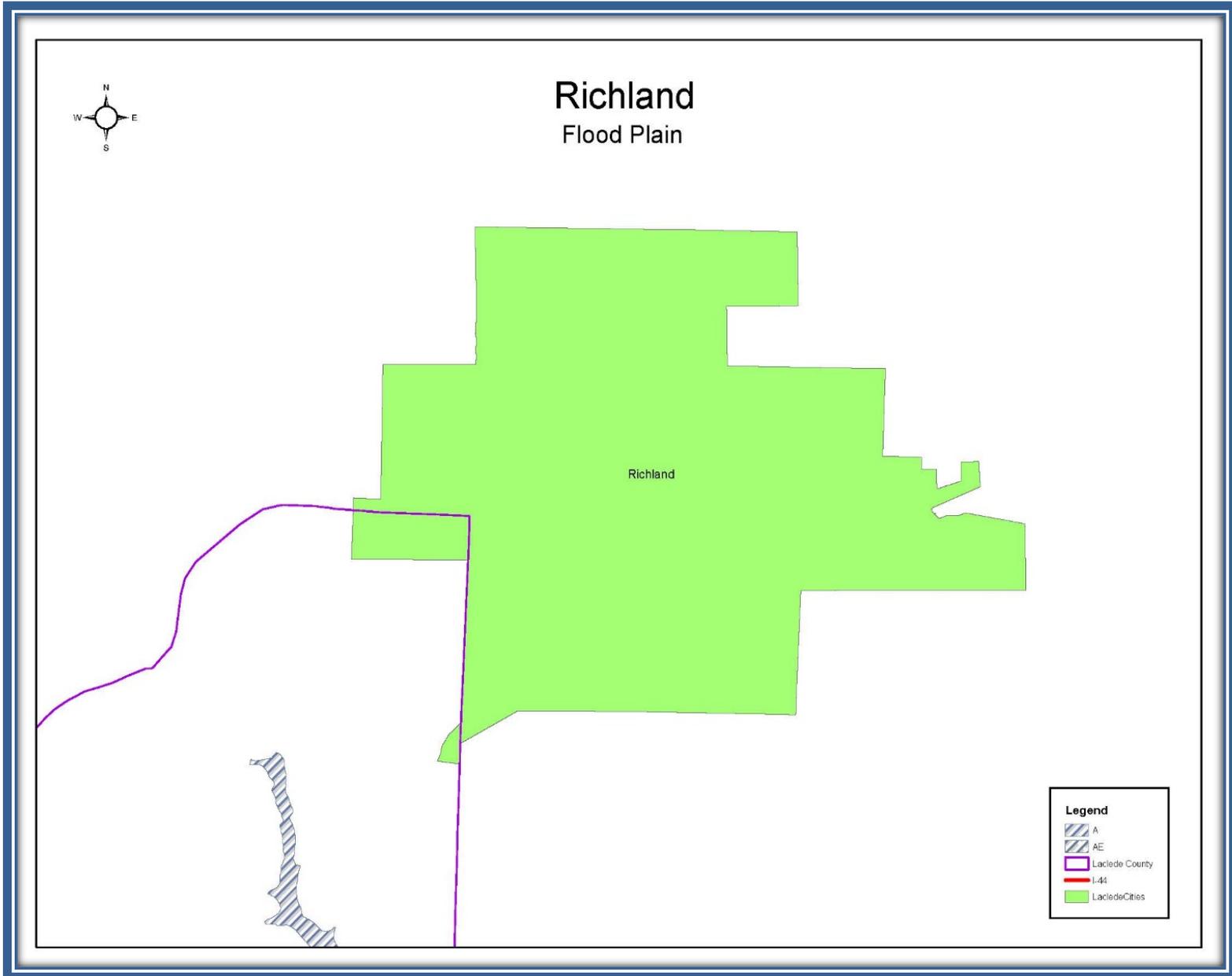


Table 2.11 Depicts the capabilities based on data that have been collected by distribution of the Data Collection Questionnaire.

City of Richland Mitigation Capabilities

Element	Yes, No, N/A	Comments and/or Weblink
Planning Capabilities		
Comprehensive or Land-Use Plan	No	
Capital Improvement Plan	No	
Transportation Plan / Highway Department	Yes	LOCLG RTP 2019
Emergency Operations Plan	No	
Local Recovery Plan	No	
Debris Management Plan	No	
Firewise or other fire mitigation plan	No. Burn ban only.	
Economic Development Plan	Yes	LOCLG CEDS 2017
Policies/Ordinance		
Zoning Ordinance	Yes	
Building Code	Yes	1998
Floodplain Ordinance	Yes	
Drainage/Stormwater Ordinance	No	
Site Plan Review Requirements	Yes	
Historic Preservation Ordinance	Yes	
Program		
National Flood Insurance Program (NFIP)	Yes	2008
NFIP Community Rating System (CRS) program	No	
National Weather Service (NWS) Storm Ready Certification	No	
Firewise Community Certification	No	
Building Code Effectiveness Grading (BCEGs)	No	
ISO Fire Rating	Yes	5
Public Education or information programs (i.e., responsible water use, fire safety, household preparedness, or environmental education)	No	

Element	Yes, No, N/A	Comments and/or Weblink
Mutual Aid Agreements	Yes	Utilities, County Law, and Roads.
Studies/Reports/Maps		
Critical Facilities Inventory	Yes	
Vulnerable Population Inventory	Yes	
Staff/Department		Full Time or Part Time?
Building Code Official / Building Inspector	Yes	
Engineer	Yes	Contract-Consultant
Development Planner	No	Part-Time
NFIP Floodplain Administrator	Yes	Part-Time
Mapping Specialist (GIS)	No	
Public Works Official	Yes	Part-Time
Emergency Management Coordinator	Yes	
Local Emergency Planning Committee	No	
Sanitation Department	Yes	Contract-Consultant
Highway/Transportation Department	No	
Economic Development Department	No	
Housing Department	No	
Historic Preservation	No	
Non-Governmental Organizations (NGOs)	Is there a local chapter? Yes or No	
American Red Cross	No	
Salvation Army	No	
Veterans Groups	Yes	American Legion
Local Environmental Organization	No	
Homeowner Associations	No	
Neighborhood Associations	No	
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.)	Yes	Masons
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes

Element	Yes, No, N/A	Comments and/or Weblink
Fund projects thru Capital Improvements funding	No	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric services	Yes	
Impact fees for new development	No	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Incur debt through private activities	Yes, lease purchase agreement	
Withhold spending in hazard prone areas	Yes	

Source: Data Collection Questionnaire for the City of Richland

2.1.7 Village of Four Seasons

The Village of Village of Four Seasons came about from the vision of Harold Koplal, who was an early developer at the Lake of the Ozarks. He had the idea to bring a planned community to the Lake of the Ozarks that pushed the area into a new era of development. By integrating declarations and bylaws into the subdivision planning it gave greater continuity to building and investment. The 3,500-acre community of Four Seasons that Harold Koplal envisioned emerged in the year of 1965. Koplal's idea was to bring a family tradition of entrepreneurship, hospitality, and entertainment to the Lake of the Ozarks.

The Village of Four Seasons is located on Horseshoe Bend in Camden County, Missouri. It was first a division of Four Seasons Lake Sites. Eventually, the community outgrew the governing Property Owners Association, and formally became the Village of Four Seasons in 1987. The Property Owners Association still remains intact and handles development, resident amenities, and community issues. Today the Village of Four Seasons continues to grow and prosper as a wonderful destination for vacationers, second home owners, and full-time residents.

The Village of Four Seasons has four outdoor warning sirens. They are activated through Camden County E-911. There are no designated public tornado shelters or saferooms in the Village of Four Seasons.

The Village of Four seasons is governed by a Board of Trustees consisting of one Chairman and four Trustees.

Figure 2.14 Depicts the Village of Four Seasons Floodplain.

Village of Four Seasons Flood Zone and At-Risk Structures

Village of Four Seasons Flood Zone and At-Risk Structures

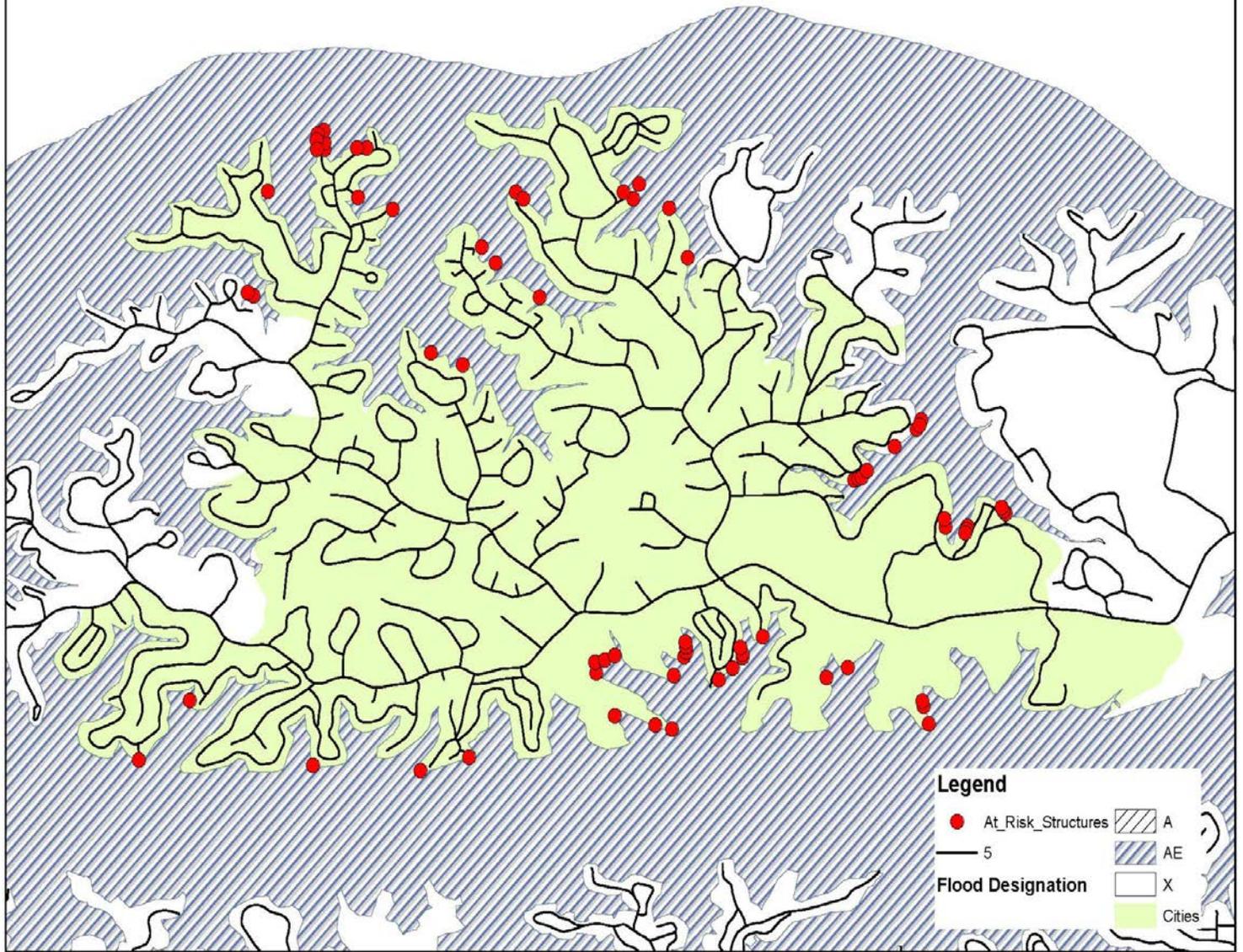


Table 2.13 Depicts the capabilities based on data that have been collected by distribution of the Data Collection Questionnaire.

Village of Four Seasons Mitigation Capabilities

Element	Yes, No, N/A	Comments and/or Weblink
Planning Capabilities		
Comprehensive or Land-Use Plan	Yes	2017
Capital Improvement Plan	N/A	
Transportation Plan / Highway Department	N/A	
Emergency Operations Plan	Yes	2019
Local Recovery Plan	No	
Debris Management Plan	No	
Firewise or other fire mitigation plan	Yes	
Economic Development Plan	No	
Policies/Ordinance		
Zoning Ordinance	Yes	
Building Code	Yes	2018
Floodplain Ordinance	Yes	
Drainage/Stormwater Ordinance	No	
Site Plan Review Requirements	N/A	
Historic Preservation Ordinance	No	
Program		
National Flood Insurance Program (NFIP)	Yes	
NFIP Community Rating System (CRS) program	No	
National Weather Service (NWS) Storm Ready Certification	No	
Firewise Community Certification	Yes	
Building Code Effectiveness Grading (BCEGs)	N/A	
ISO Fire Rating	Yes	3
Public Education or information programs (i.e., responsible water use, fire safety, household preparedness, or environmental education)	Yes	
Mutual Aid Agreements	Yes	
Studies/Reports/Maps		
Critical Facilities Inventory	N/A	

Element	Yes, No, N/A	Comments and/or Weblink
Vulnerable Population Inventory	N/A	
Staff/Department		Full Time or Part Time?
Building Code Official / Building Inspector	Yes	Part-time
Engineer	No	
Development Planner	No	
NFIP Floodplain Administrator	Yes	Part-Time
Mapping Specialist (GIS)	No	
Public Works Official	No	
Emergency Management Coordinator	Yes	Part-time
Local Emergency Planning Committee	No	
Sanitation Department	No	
Highway/Transportation Department	No	
Economic Development Department	No	
Housing Department	No	
Historic Preservation	No	
Non-Governmental Organizations (NGOs)	Is there a local chapter? Yes or No	
American Red Cross	Yes	
Salvation Army	Yes	
Veterans Groups	Yes	
Local Environmental Organization	Yes	
Homeowner Associations	Yes	
Neighborhood Associations	Yes	Four Seasons
Chamber of Commerce	Yes	
Community Organizations (Lions, Kiwanis, etc.)	Yes	
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes
Fund projects thru Capital Improvements funding		No
Authority to levy taxes for specific purposes		No
Fees for water, sewer, gas, or electric services		No
Impact fees for new development		No
Incur debt through general obligation bonds		Yes

Element	Yes, No, N/A	Comments and/or Weblink
Incur debt through special tax bonds		Yes
Incur debt through private activities		Yes
Withhold spending in hazard prone areas		Yes

Source: Data Collection Questionnaire for the Village of Four Seasons

2.1.8 Village of Sunrise Beach

In the late twenties and early thirties, Sunrise Beach and surrounding communities of today were vast acres of timber and brush with a few lanes for roads. The construction of the Dam began in 1929; the Dam was finished in 1931 with water filling up in 1932. A small tent-town was established in Lake Road 17, now 35, across the road from the home of H.A. Thickstun, father of Lovell Thickstun. The home soon became a store, restaurant and meeting place for the workmen building roads, clearing brush, and removing fire-place masonry left standing after farm homes in the lower level of the lake had been burned down to expedite their removal. The first post office was established in the store with H.A. Thickstun as postmaster with the added duty of bringing in the mail across the lake by ferry as the bridges were not available. Lovell took over the postmaster job in 1941.

The Union Electric Company donated land on Road 20, now F, for the first school. Originally, there were no busses and electricity did not arrive until 1941.

Dr. Kaiser built the first resort in the area now known as “The Three Coves” in 1933, followed soon by Cap Anderson with the one known as the “Cardinal Resort”. The first construction in today’s Sunrise Beach was a log building built in 1934-35 where Lillie Root’s Frontier Village stands near the Red Apple Restaurant. It was used as a meeting center.

The Village of Sunrise Beach is governed by a five-member Board of Trustees consisting of one chairman and four trustees.

The Village of Sunrise Beach has three outdoor warning sirens. The Morgan County Dispatch or Police activate the sirens.

There are three designated public tornado shelters. Hurricane Deck Elementary located at 16594 MO-5, Sunrise Beach, MO. 65079. Kent Memorial Lutheran Church located at 184 Sunset Hill Drive Sunrise Beach, MO. 65079. The Stables at Cannon Smoked Saloon located at 23 Spring Cove Rd. Sunrise Beach, MO. 65079. These are not constructed in accordance with FEMA standards.

The Village of Sunrise Beach has a new sewer plant that was funded by the USDA.

The Village of Sunrise Beach is expected to grow significantly over the next 20 years. The Village of Sunrise Beach does not allow development in the floodplains.

Figure 2.15 Depicts the Village of Sunrise Beach Flood Zone and At-Risk Structures.

Village of Sunrise Beach Flood Zone and At-Risk Structures

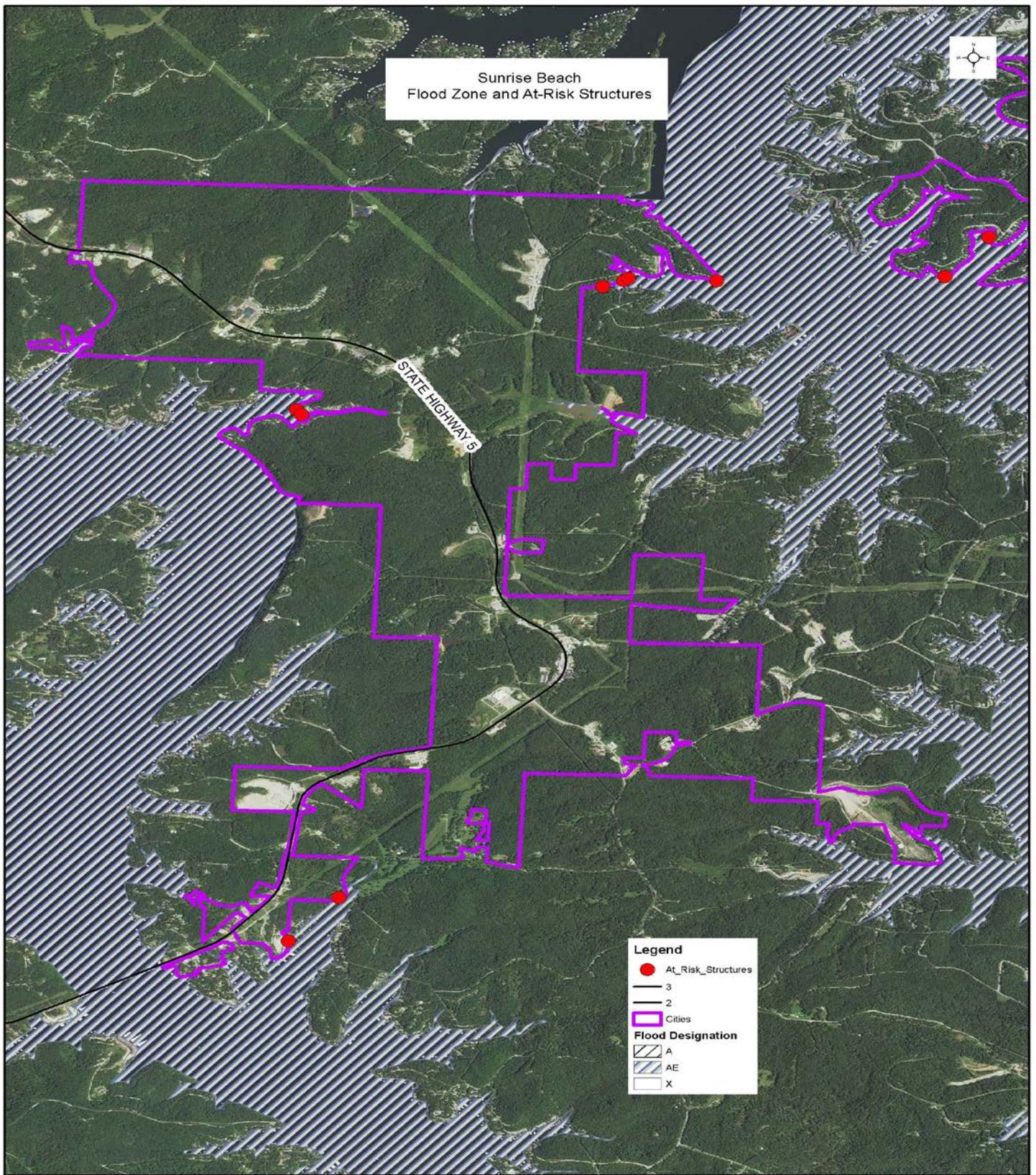


Table 2.14 Depicts the capabilities based on data that have been collected by distribution of the Data Collection Questionnaire.

Village of Sunrise Beach Mitigation Capabilities

Element	Yes, No, N/A	Comments and/or Weblink
Planning Capabilities		
Comprehensive or Land-Use Plan	Yes	2018
Capital Improvement Plan	Yes	2018 Comprehensive Plan
Transportation Plan / Highway Department	Yes	2019
Emergency Operations Plan	Yes	2016
Local Recovery Plan	No	
Debris Management Plan	No	
Firewise or other fire mitigation plan	Yes	Sunrise Beach Fire District
Economic Development Plan	Yes	2009
Policies/Ordinance		
Zoning Ordinance	Yes	2009
Building Code	Yes	International (SBFD)
Floodplain Ordinance	Yes	2008
Drainage/Stormwater Ordinance	Yes	
Site Plan Review Requirements	Yes	
Historic Preservation Ordinance	No	
Program		
National Flood Insurance Program (NFIP)	Yes	2008
NFIP Community Rating System (CRS) program	N/A	
National Weather Service (NWS) Storm Ready Certification	No	
Firewise Community Certification	Yes	Sunrise Beach Fire District
Building Code Effectiveness Grading (BCEGs)	Yes	Sunrise Beach Fire District
ISO Fire Rating	Yes	5
Public Education or information programs (i.e., responsible water use, fire safety, household preparedness, or environmental education)	No	

Element	Yes, No, N/A	Comments and/or Weblink
Mutual Aid Agreements	Yes	County Roads
Studies/Reports/Maps		
Critical Facilities Inventory	No	
Vulnerable Population Inventory	No	
Staff/Department		Full Time or Part Time?
Building Code Official / Building Inspector	Yes	Sunrise Beach Fire District
Engineer	Yes	Contract-Consultant
Development Planner	Yes	Part-Time
NFIP Floodplain Administrator	Yes	Part-Time
Mapping Specialist (GIS)	N/A	
Public Works Official	Yes	Part-Time
Emergency Management Coordinator	Yes	Part-Time
Local Emergency Planning Committee	No	
Sanitation Department	Yes	Part-Time
Highway/Transportation Department	Yes	Part-Time
Economic Development Department	Yes	Part-Time
Housing Department	No	
Historic Preservation	No	
Non-Governmental Organizations (NGOs)	Is there a local chapter? Yes or No	
American Red Cross	No	
Salvation Army	No	
Veterans Groups	Yes	American Legion
Local Environmental Organization	Yes	Lake of the Ozarks Watershed Alliance (LOWA)
Homeowner Associations	Yes	Numerous
Neighborhood Associations	N/A	
Chamber of Commerce	Yes	Lake West Chamber of Commerce
Community Organizations (Lions, Kiwanis, etc.)	Yes	Rotary, Little Theater, Lions, and Elks.
Financial Resources		Is your jurisdiction able to? Yes or No
Apply for Community Development Block Grants		Yes

Element	Yes, No, N/A	Comments and/or Weblink
Fund projects thru Capital Improvements funding		Yes
Authority to levy taxes for specific purposes		Yes
Fees for water, sewer, gas, or electric services		Yes
Impact fees for new development		No
Incur debt through general obligation bonds		Yes
Incur debt through special tax bonds		Yes T.I.F.
Incur debt through private activities		N/A
Withhold spending in hazard prone areas		N/A

Source: Data Collection Questionnaire for the Village of Sunrise Beach

2.1.5 Summary of Jurisdictional Capabilities

Mitigation Capabilities Summary Table

CAPABILITIES	Camden County	City of Camdenton	City of Lake Ozark	City of Linn Creek	City of Osage Beach	City of Richland	Village of Four Seasons	Village of Sunrise Beach
Planning Capabilities								
Comprehensive Plan	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Builder's Plan	N/A	No	No	N/A	No	No	N/A	N/A
Capital Improvement Plan	N/A	No	No	No	Yes	No	N/A	Yes
City Emergency Plan	N/A	Yes	No	No	Yes	No	Yes	N/A
County Emergency Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local Recovery Plan	N/A	No	No	No	Yes	No	No	No
County Recovery Plan	No	No	No	N/A	No	Yes	No	No
City Mitigation Plan	N/A	No	Yes	N/A	Yes	No	No	N/A
County Mitigation Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Debris Management Plan	No	No	No	No	No	Yes	No	No
Economic Development Plan	Yes	No	Yes	No	Yes	Yes	No	Yes
Transportation Plan/Highway Dept.	N/A	Yes	No	Yes	Yes	Yes	N/A	Yes
Land-use Plan	Yes	Yes	No	Yes	Yes	Yes	N/A	N/A
Flood Mitigation Assistance (FMA) Plan	No	No	No	Yes	Yes	No	No	Yes
Watershed Plan	No	No	No	No	No	No	N/A	N/A
Firewise or other fire mitigation plan	N/A	No	No	Yes	No	No	Yes	Yes

CAPABILITIES	Camden County	City of Camdenton	City of Lake Ozark	City of Linn Creek	City of Osage Beach	City of Richland	Village of Four Seasons	Village of Sunrise Beach
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes	No	No	No	No	No	No	N/A
Policies/Ordinance								
Zoning Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Building Code	N/A	Yes	Yes	No	Yes	Yes	Yes	Yes
Floodplain Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subdivision Ordinance	Yes	Yes	Yes	No	Yes	Yes	Yes	N/A
Tree Trimming Ordinance	No	No	No	No	No	No	No	N/A
Nuisance Ordinance	No	Yes	Yes	No	Yes	Yes	Yes	N/A
Storm Water Ordinance	No	Yes	Yes	No	Yes	No	No	Yes
Drainage Ordinance	No	Yes	Yes	No	Yes	No	No	Yes
Site Plan Review Requirements	Yes	Yes	Yes	No	Yes	Yes	N/A	Yes
Historic Preservation Ordinance	Yes	No	Yes	No	No	Yes	No	No
Landscape Ordinance	Yes	No	Yes	No	No	No	N/A	N/A
Program								
Zoning/Land Use Restrictions	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A
Codes Building Site/Design	N/A	Yes	Yes	No	No	Yes	Yes	Yes
Hazard Awareness Program	Yes	No	No	No	No	No	Yes	N/A
National Flood Insurance Program (NFIP)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NFIP Community Rating System (CRS) Program	No	Yes	No	No	No	No	No	N/A

CAPABILITIES	Camden County	City of Camdenton	City of Lake Ozark	City of Linn Creek	City of Osage Beach	City of Richland	Village of Four Seasons	Village of Sunrise Beach
National Weather Service (NWS) Storm Ready Certification	Yes	No	No	No	No	No	Yes	No
Firewise Community Certification	Yes	Yes	Yes	No	Yes		Yes	Yes
Building Code Effectiveness Grading (BCEGs)	No	Yes	Yes	No	Yes	No	No	Yes
ISO Fire Rating	N/A	Yes	Yes	N/A	Yes	Yes	Yes	Yes
Economic Development Program	Yes	Yes	No	N/A	No	No	No	N/A
Land Use Program	Yes	Yes	Yes	N/A	No	No	No	N/A
Public Education/Awareness	Yes	No	No	No	No	No	Yes	No
Property Acquisition	N/A	No	No	Yes	No	No	No	N/A
Planning/Zoning Boards	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stream Maintenance Program	N/A	No	No	No	No	Yes	No	N/A
Tree Trimming Program	N/A	No	No	N/A	No	Yes	No	N/A
Engineering Studies for Streams (Local/County/Regional)	No	No	No	N/A	No	N/A	N/A	N/A
Mutual Aid Agreements	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Studies/Reports/Maps								
Hazard Analysis/Risk Assessment (City)	N/A	Yes	No	N/A	No	No	No	N/A
Hazard Analysis/Risk Assessment (County)	N/A	N/A	Yes	N/A	No	No	Yes	N/A
Evacuation Route Map	No	No	No	N/A	No	No	N/A	N/A
Critical Facilities Inventory	Yes	Yes	No	No	No	Yes	No	No

CAPABILITIES	Camden County	City of Camdenton	City of Lake Ozark	City of Linn Creek	City of Osage Beach	City of Richland	Village of Four Seasons	Village of Sunrise Beach
Vulnerable Population Inventory	Yes	No	No	No	No	Yes	No	No
Land Use Map	Yes	Yes	Yes	N/A	Yes	No	No	N/A
Staff/Department								
Building Code Official	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Building Inspector	Yes	Yes	Yes	N/A	Yes	Yes	Yes	Yes
Mapping Specialist (GIS)	Yes	No	No	N/A	Yes	No	No	N/A
Engineer	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Development Planner	Yes	No	No	No	Yes	No	No	Yes
Public Works Official	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Emergency Management Coordinator	Yes	Yes	No	No	Yes	Yes	Yes	Yes
NFIP Floodplain Administrator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emergency Response Team	Yes	No	Yes	N/A	No	No	N/A	N/A
Hazardous Materials Expert	Yes	No	Yes	N/A	No	No	N/A	N/A
Local Emergency Planning Committee	Yes	No	Yes	No	Yes	No	No	No
County Emergency Management Commission	No	No	Yes	N/A	No	Yes	N/A	N/A
Sanitation Department	No	No	Yes	Yes	No	Yes	No	Yes
Transportation Department	Yes	No	No	No	Yes	No	No	Yes
Economic Development Department	No	Yes	No	No	Yes	No	No	Yes
Housing Department	No	No	No	No	No	No	No	No

CAPABILITIES	Camden County	City of Camdenton	City of Lake Ozark	City of Linn Creek	City of Osage Beach	City of Richland	Village of Four Seasons	Village of Sunrise Beach
Historic Preservation	Yes	No	Yes	No	No	No	No	No
Non-Governmental Organizations (NGOs)								
American Red Cross	Yes	Yes	No	No	Yes	No	Yes	No
Salvation Army	Yes	Yes	No	No	No	No	Yes	No
Veterans Groups	Yes	Yes	No	No	No	Yes	Yes	Yes
Local Environmental Organization	Yes	No	No	No	No	No	Yes	Yes
Homeowner Associations	Yes	No	Yes	No	Yes	No	Yes	Yes
Neighborhood Associations	Yes	No	Yes	No	Yes	No	Yes	N/A
Chamber of Commerce	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Financial Resources								
Apply for Community Development Block Grants	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund projects through Capital Improvements funding	No	Yes	No	Yes	Yes	No	No	Yes
Authority to levy taxes for specific purposes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Fees for water, sewer, gas, or electric services	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Impact fees for new development	Yes	No	No	No	Yes	No	No	No
Incur debt through general obligation bonds	Yes	Yes	Yes	N/A	Yes	Yes	Yes	Yes
Incur debt through special tax bonds	Yes	Yes	No	N/A	Yes	Yes	Yes	Yes
Incur debt through private activities	No	No	No	N/A	Yes	Yes	Yes	N/A

CAPABILITIES	Camden County	City of Camdenton	City of Lake Ozark	City of Linn Creek	City of Osage Beach	City of Richland	Village of Four Seasons	Village of Sunrise Beach
Withhold spending in hazard prone areas	No	No	No	No	Yes	Yes	Yes	N/A

Source: Data Collection Questionnaires

2.1.6 Special District

Camden County supports several Special Districts that provide critical health and safety services to the residents within the county. They are Special Roads Districts, Ambulance Districts, and Fire Districts.

Special Roads District

Camden County has two special roads districts. The Horseshoe Bend Special Roads District and Osage Beach Special Road District

Horseshoe Bend Special Road District was formed in 1962, and covers all public roads on Horseshoe Bend, as well as Flynn Road and Hidden Acres in Lake Ozark.

Currently, there are about 170 miles in the system. The roads are Camden County roads, but the district has all maintenance responsibility. Funding is primarily from a tax levy of .35 per hundred.

The Horseshoe Bend Special Roads District has not provided the Planning Committee with a completed Data Collection Questionnaire.

Horseshoe Bend Special Road District is governed by commissioners and a superintendent and they meet the second Thursday of every month.

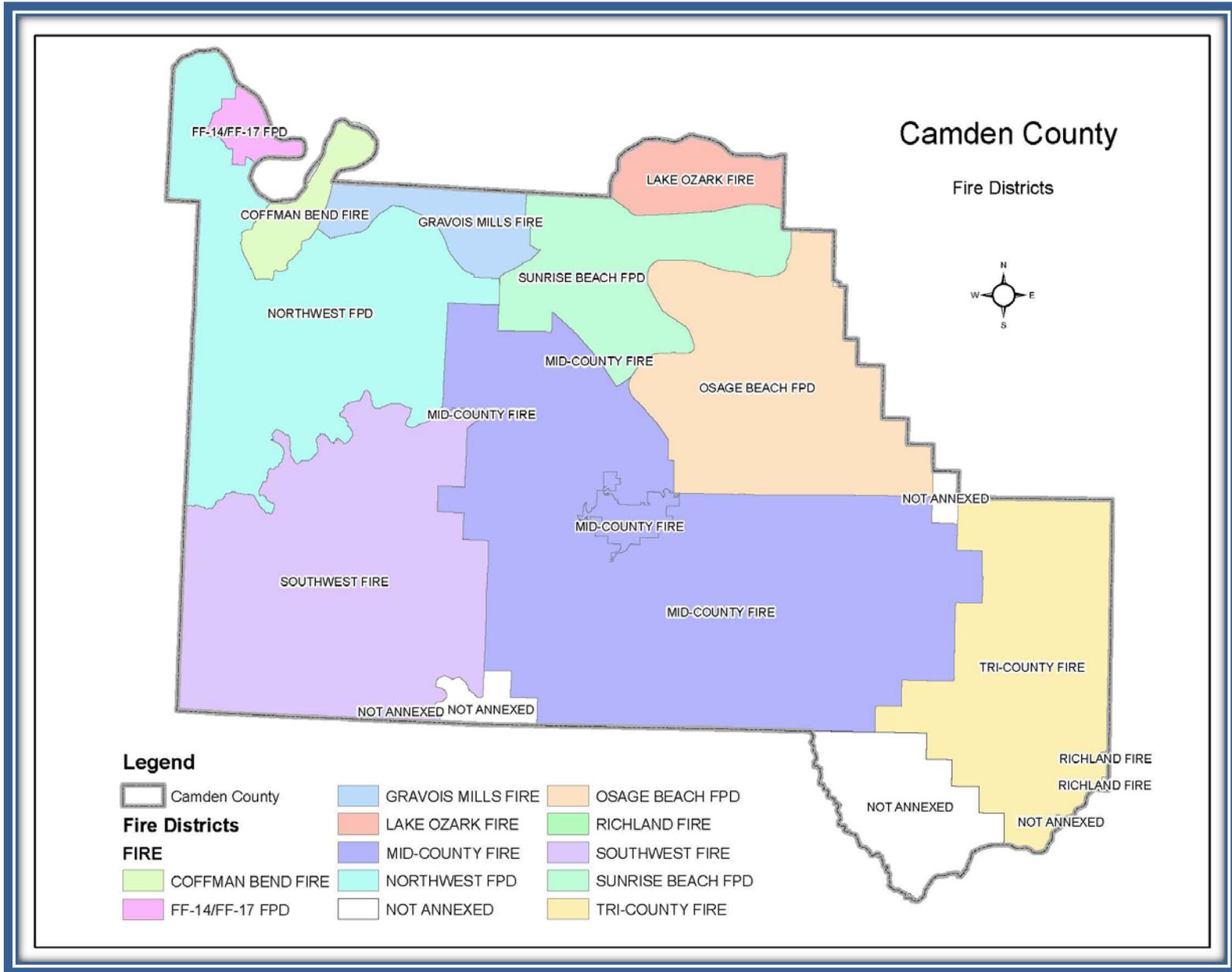
Osage Beach Special Road District was formed in 2013 and is a Camden County Special Roads District but focuses on projects in the Osage Beach area. They meet at Osage Beach City Hall once a month.

Fire Protection Districts

There are eleven rural fire departments and fire protection districts within the planning area who respond to fires, accidents, and other emergencies. The fire districts have been proactive in educational materials, safety training, and community awareness and support. All fire departments or districts have at least one station located in the planning area. The additional stations are in adjacent counties within the LOCLG regional planning area.

Figure 2.16 below reflects all the rural fire departments and fire protection districts.

Figure 2.16 Camden County Rural Fire Departments and Fire Protection Districts



Ambulance Districts

Camden County services are provided by the Lake West/Cam-Mo Ambulance District, Mercy Camden County Ambulance District and the Osage Beach Ambulance District. **Figure 2.17** below reflects the ambulance districts.

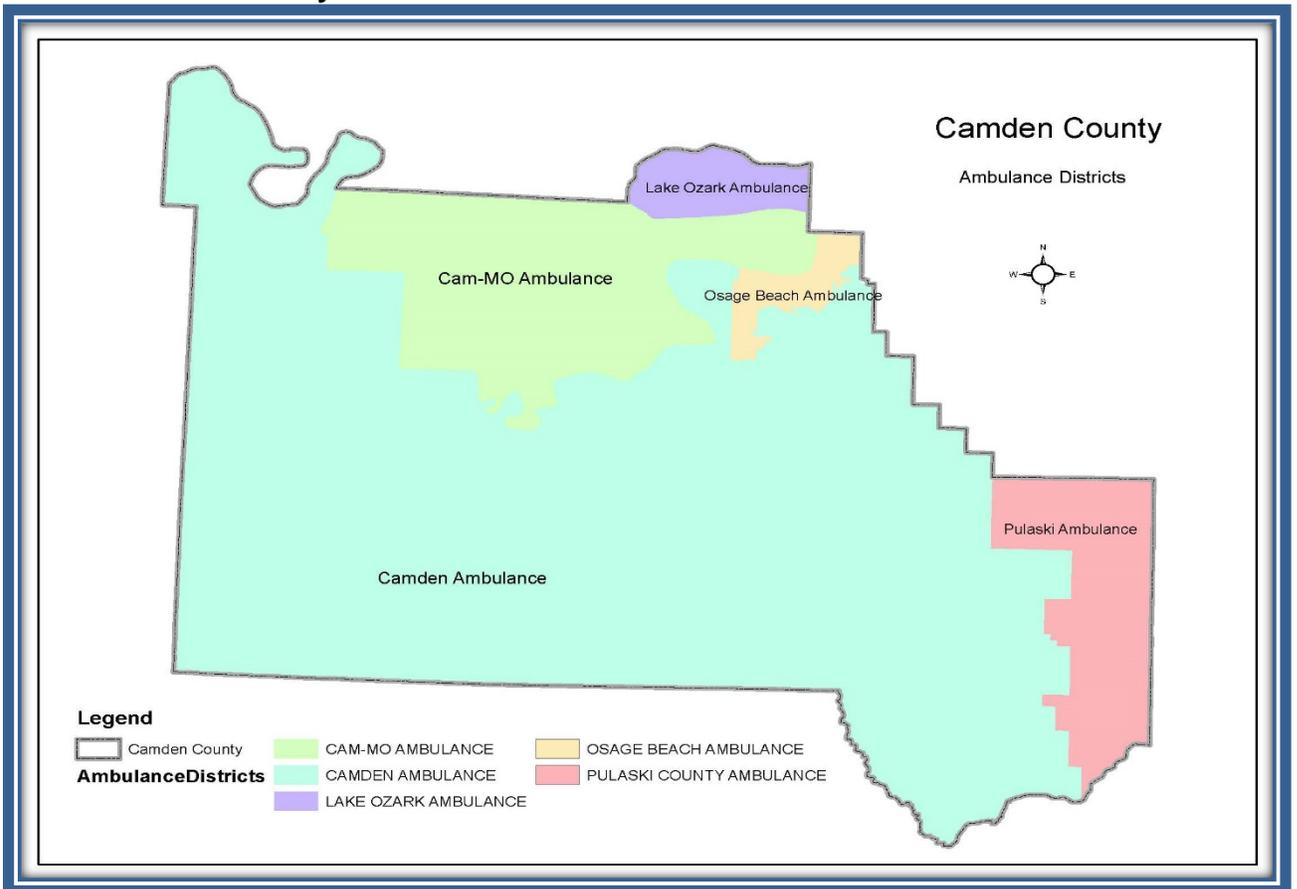
Lake West Ambulance District is located on the west side of Lake of the Ozarks and covers 244 square miles in portions of Camden and Morgan Counties. The district handles more than 1100 emergency calls each year. Responding from two stations near the towns of Sunrise Beach and Laurie. Lake West Ambulance District is governed by a 6-member board of directors.

Mercy Camden County Ambulance District have 5 units on duty and they are located throughout Camden County. Their locations are in Camdenton, Climax Springs, Montreal, Macks Creek, and Linn Creek.

Osage Beach Ambulance Service is located at 1000 City Pkwy in the City of Osage Beach. The ambulance service employs full and part-time Paramedics and Emergency Medical Technicians. They staff 24 hours a day ambulance service and a second ambulance on holiday weekends or for special events. The Osage Beach Ambulance Service Paramedics and Emergency Medical Technicians participate in various public events.

Figure 2.17 Camden County Ambulance Districts and Service Areas

Figure 2.17 **Camden County Ambulance Districts and Services**



2.1.7 Public School District Profiles and Mitigation Capabilities

Camden County has four school districts within the planning area. The school districts that have elected to participate in the Camden County Hazard Mitigation Plan update are Camdenton R-III, Macks’s Creek R-V, Climax Springs, and Stoutland R-III.

Incorporating mitigation actions specific for the student population into the Camden County plan update is vitally important, as these students are a vulnerable population. Reliant on the teachers and staff to help protect the students in the event of a natural hazard during the school hours it is important that the school districts participate and incorporate the action items into their planning process. With the participation of these schools (Camdenton R-III, Macks Creek I-V, and Stoutland R-II) they have indicated their willingness to incorporate the identified action items into their emergency planning process.

Figure 2.18 Reflects the School Districts within the planning area.

Figure 2.18 Camden County Public School Districts

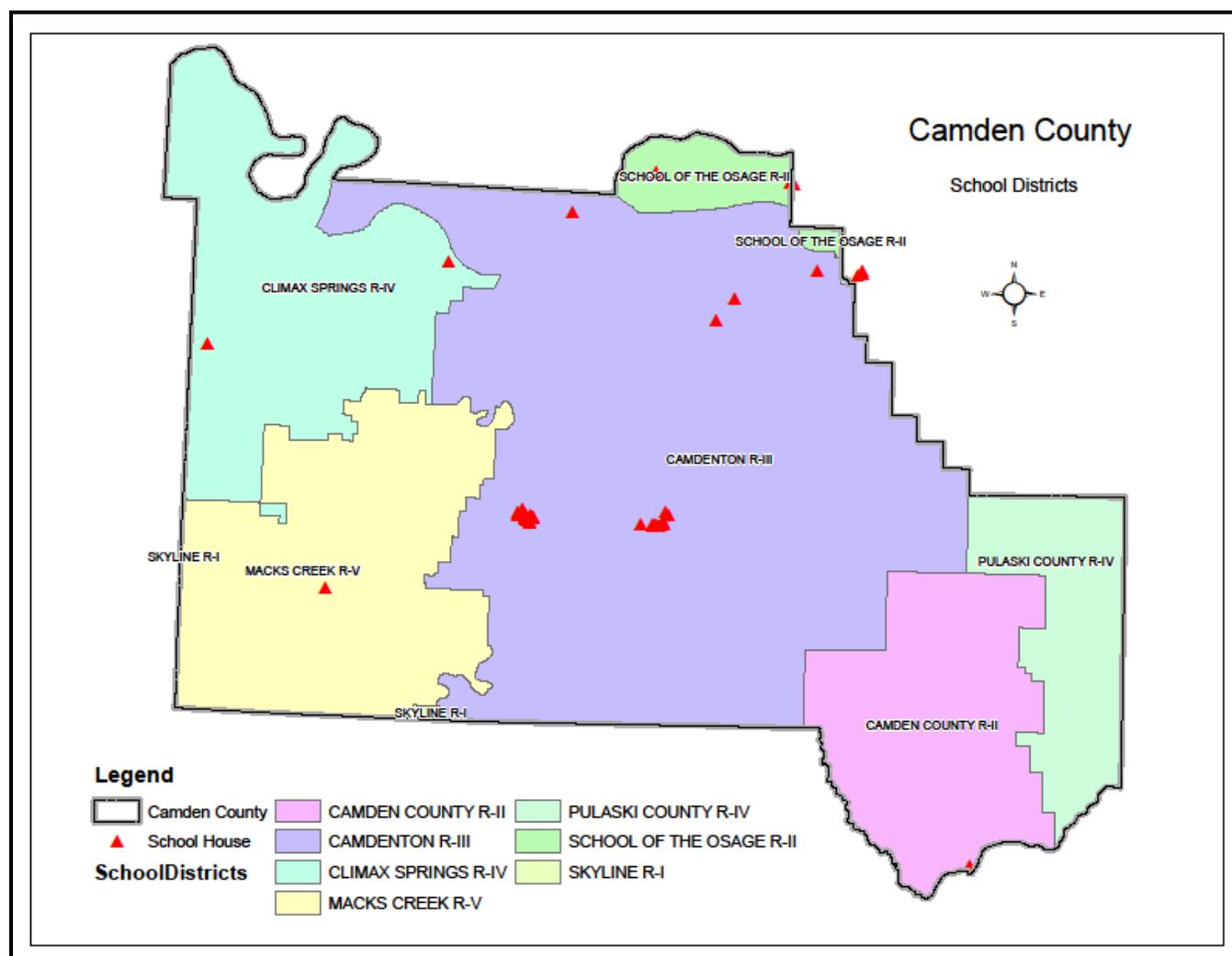


Table 2.16 depicts building enrollment for each district.

Camden County School Districts Buildings and Enrollment Data, 6/25/19

District Name	Building Name	Building Enrolment
Camdenton R-III	Camdenton High School/Horizons	1309
Camdenton R-III	Camdenton Middle School	660
Camdenton R-III	Dogwood Elementary School	573
Camdenton R-III	Hawthorn Elementary School	443
Camdenton R-III	Hurricane Deck Elementary School	155
Camdenton R-III	Oak Ridge Intermediate School	664
Camdenton R-III	Osage Beach Elementary School	287
Climax Springs R-IV	Climax Springs Elementary School	90
Climax Springs R-IV	Climax Springs High School	118
Macks Creek R-V	Macks Creek Elementary School	182
Macks Creek R-V	Macks Creek High School	136
Stoutland R-II	Stoutland Elementary School	228
Stoutland R-II	Stoutland High School	209

Source: <http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>. *Data for Stoutland R-II school district cover more than one county and represents enrollment data for the entire school and not just the portion in the planning area.

Camdenton R-III School District has eight schools within the district. Five elementary schools, one middle school, and two high schools. The district serves a projected student population of 4,091 for the upcoming school year 2020. There are 401 certified staff members in the district.

Since the 2015 Camden County Hazard Mitigation Plan Camdenton R-III School expanded and remodeled the Hurricane Deck Elementary building and built a new building, Osage Beach Elementary.

The district would like to construct a community safe room that meets the requirements set forth in FEMA 361 and the locally adopted building code to protect the students, staff, visitors, and surrounding residents of the Camdenton R-III Schools Dogwood Elementary Campus in Camdenton, Missouri.

Climax Springs R-IV serves a projected student population of 208 and there are 39 certified staff members.

Climax Springs R-IV has started construction on FEMA approved designated tornado shelter/saferoom.

Macks Creek R-V has two schools within the district. The high school that has grades 7-12 and

the elementary with grades K-6. The high school has an enrollment of 136 student and 45 certified staff members. The elementary school has 182 students enrolled and 23 certified staff members.

Since the 2015 Camden County Hazard Mitigation Plan Macks Creek R-V has added doorways to create secure entry points with buzzers and an SRO officer from the Sheriff's Department. The district is also perusing ALICE certification and are working with the ALICE training institute to improve their practices.

In the past five years the Macks Creek R-V School District has added a new elementary wing (K-3) and remodeled part of the elementary.

In the next five years the district has plans to remodel but not in any known hazard areas. The district's Superintendent, Josh Phillips states they are very interested in the construction of a tornado safe room. This could house the students during the school day and make available to the public after school hours.

Stoutland R-II School District serves a student population of 437 and there are 47 certified staff members.

The Stoutland R-II School district has submitted a grant to significantly improve, in times of crisis and emergencies, the safety, security, surveillance, and communications for their students, staff, and community. Project specifics include upgrades to the security camera system including additional cameras and improved storage and retrieval capabilities. Also included are new exterior doors with electronic blade locking systems to harden access to district school buildings.

Near term future projects for the district include roof replacements, HVAC system replacement, and energy efficient windows.

The district has also taken steps to seek Federal funds for a storm shelter for students and community members. Currently there is no storm shelter or safe rooms in the Stoutland R-II attendance area.

Table 2.17 Inventory and Valuation of School Property and Assets.**Camden County School District Asset Inventory**

District Name	Building/Asset Name	Building Square Feet	Replacement Value (Insured)	Contents Value (\$)
Camdenton R-III	Osage Beach Elementary	88,256	\$10,966,328	\$1,605,000
Camdenton R-III	Camdenton High School	271,481	\$40,225,614	\$5,429,620
Camdenton R-III	Horizons	8,580	\$1,238,725	\$171,600
Camdenton R-III	Lake Career & Technical Center	90,953	\$15,030,576	\$1,819,060
Camdenton R-III	Camdenton Middle School	135,318	\$21,283,318	\$2,706,360
Camdenton R-III	Oak Ridge Intermediate	93,471	\$13,995,984	\$1,869,420
Camdenton R-III	Dogwood Elementary	107,168	\$14,590,511	\$2,113,366
Camdenton R-III	Hurricane Deck Elementary	76,632	\$10,716,897	1,532,640
Camdenton R-III	Hawthorn Elementary	90,970	\$13,197,906	1,819,400
Camdenton R-III	Ag Building	2,400	\$108,472	\$48,000
Camdenton R-III	Bus Garage	7,650	\$487,629	\$211,647
Camdenton R-III	Administration	10,600	\$1,229,002	\$801,915
Camdenton R-III	Maintenance	10,363	\$838,907	\$257,125
Camdenton R-III	Storage Building	4,000	\$123,177	\$11,494
Climax Springs R-IV	Main School Building	54,725	\$7,784,559	\$1,132,288
Climax Springs R-IV	Bus Barn	2,800	\$192,505	\$53,637
Climax Springs R-IV	Snack Shack/ Announcer booth	488	\$36,360	\$8,619
Climax Springs R-IV	Garage #1	400	\$9,002	\$6,346
Climax Springs R-IV	Garage #2	400	\$9,002	\$21,156
Macks Creek R-V	HS Gym Library	34,693	\$5,391,885.45	\$719,895.33
Macks Creek R-V	South Wing Office Old Gym	25,995	\$2,538,179.70	\$96,272.18
Macks Creek R-V	Elementary School	12,182	\$1,593,356.10	\$346,293.79
Macks Creek R-V	Concession Stand	1,000	\$8,028.58	\$0.00
Macks Creek R-V	Vo-Ag Building	8,640	\$1,168,986.00	\$176,741.35
Macks Creek R-V	K-3 Wing	10,500	\$2,238,988.58	\$9,3912.00

Summary of Mitigation Capabilities Camden County School Districts

Capability	Camdenton R-III	Climax Springs R-IV	Macks Creek R-V	Stoutland R-II
Planning Elements				
Master Plan/ Date	Yes	No	Yes	No
Capital Improvement Plan/Date	Yes	No	Yes	No
School Emergency Plan / Date	Yes	Yes	Yes	Yes
Weapons Policy/Date	Yes	Yes	Yes	Yes
Personnel Resources				
Full-Time Building Official (Principal)	Yes	Yes	Yes	Yes
Emergency Manager	Yes	No	Yes	No
Grant Writer	Yes	Yes	Yes	No
Public Information Officer	Yes	No	Yes	Yes
Financial Resources				
Capital Improvements Project Funding	Yes	Yes	Yes	No
Local Funds	Yes	Yes	Yes	No
General Obligation Bonds	Yes	No	No	Yes
Special Tax Bonds	No	No	No	No
Private Activities/Donations	No	No	No	Yes
State and Federal Funds/Grants	Yes	No	Yes	No
Other				
Public Education Programs	Yes	Yes	Yes	N/A
Privately or Self-Insured?	N/A	N/A	N/A	N/A
Fire Evacuation Training	Yes	Yes	Yes	Yes
Tornado Sheltering Exercises	Yes	Yes	Yes	Yes
Public Address/Emergency	Yes	Yes	Yes	Yes
NOAA Weather Radios	Yes	No	Yes	Yes
Lock-Down Security Training	Yes	N/A	Yes	N/A
Tornado Shelter/ Saferoom	Yes	Yes	No	Yes
Campus Police	No	Yes	Yes	Yes

Data Collection Questionnaire

3 RISK ASSESSMENT

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

The goal of the risk assessment is to estimate the potential loss in the planning area, including loss of life, personal injury, property damage, and economic loss from a hazard event. The risk assessment process allows communities and school/special districts in the planning area to better understand their potential risk to the identified hazards. It will provide a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events. The planning team set out to create a comprehensive and accurate assessment within the planning area. The risk assessment for Camden County consists of the following that are divided into four main parts:

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

3.1 HAZARD IDENTIFICATION

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

With the participation of each jurisdiction, we asked for vital input during the planning process to ensure that we have clearly identified all potential risks. As part of this planning process each participating jurisdiction was asked to evaluate eleven natural hazards that can occur within their jurisdictions. Each event is then analyzed and evaluated for both the probability of each hazard's occurrence and the severity of damage (both physical damage and economic impact) to assess their jurisdiction's vulnerability. With the consensus of the planning team, these natural hazards have been identified as a likely risk to the planning area.

- Flooding (Flash Flood and River)
- Dam Failure
- Earthquake
- Land Subsidence/Sinkholes/Caves/Mines
- Drought
- Extreme Temperatures
- Severe Thunderstorm/High Winds, Hail and Lighting
- Severe Winter Weather
- Tornado
- Fires (Urban/Structural and Wild)

Upon the completion of the identification stage, the planning team studied and analyzed the defined natural hazards that have the potential to affect the planning area. In this section you will find a brief synopsis of each of the identified natural hazards, and an overview of the potential impact these hazards will have on Camden County. Historical data is included as a reference to the future probability and severity of the impact felt by Camden County for these natural hazards in the past. In conjunctions with each hazard, we have identified general mitigation opportunities about the hazard.

3.1.1 Review of Existing Mitigation Plans

In regard to Levee Failure, in the 2015 Camden County HMP it was determined by the planning committee that no further risk assessment needed to be done on this natural hazard. This determination was due to the fact that during the 2015 planning process the planning team's research revealed no records of levees found in the planning area. While reviewing the existing hazards for the current HMP, Levee failure was excluded from the mitigation planning process as there are no mapped levees nor associated levee protected areas within or immediately upstream of Camden County. This was also confirmed by the data found in the State of Missouri's Hazard Mitigation Viewer. The planning team agreed to follow the guidance of the original plan in regard to Levee Failure.

According to the Missouri State Hazard Mitigation Plan 2018 SEMA consulted with the Missouri Department of Natural Resources Geological Resources Section and determined that the continued exclusion of Expansive Soils would again be excluded from the 2018 plan.

Landslide/Rockfall identified mitigation falls under the jurisdiction of MoDOT and additional analysis of these limited areas would duplicate effort according to the Missouri State Hazard Mitigation Plan 2018. The planning team agreed with the finding of the State Plan and opted to follow the lead of the State

Camden County, Missouri is centrally located in the Midwest and is not affected by Coastal Erosion, Coastal Storms, Hurricanes, or Tsunamis so these natural hazards are not addressed in the Camden County Hazard Mitigation Plan. About Avalanches and Volcanoes, they also are not a threat to the planning area and not included in the assessment and or discussion.

In Missouri, local plans customarily include only natural hazards, as only natural hazards are required by federal regulations to be included. At this time, the MPC determined there were not any previous events of any man-made hazards such as terrorism, cyber threat, or active shooter hazards to mitigate.

3.1.2 Review Disaster Declaration History

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

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

Table 3.1 is a listing of the federal FEMA disaster declarations that included the planning area from 1965 to present.

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

Disaster Number	Description	Declaration Date Incident Period	Individual Assistance (IA) Public Assistance (PA)
372	Heavy Rains, Tornadoes & Flooding	4/19/1973 4/19/1973-4/19/1973	IA-Yes PA-Yes
3017	Drought	9/24/1976 9/24/1976-9/24/1976	IA-No PA-Yes
995	Severe Storms & Flooding	7/9/1993 6/10/1993-10/25/1993	IA-Yes PA-Yes
1054	Severe Storms, Tornadoes, Hail & Flooding	6/2/1995 5/13/1995-6/23/1995	IA-Yes PA-Yes
2292	Camden Fire Complex	3/9/2000 3/7/2000-3/11/2000	IA-No PA-Yes

Disaster Number	Description	Declaration Date Incident Period	Individual Assistance (IA) Public Assistance (PA)
1412	Severe Storms, Tornadoes & Flooding	5/6/2002 4/24/2002-6/10/2002	IA-Yes PA-Yes
1463	Severe Storms, Tornadoes & Flooding	5/6/2003 5/4/2003-5/30/2003	IA-Yes PA-Yes
3232	Hurricane Katrina Evacuation	9/10/2005 8/29/2005-10/1/2005	IA-No PA-Yes
1673	Severe Winter Storms	12/29/2006 11/30/2006-12/2/2006	IA-No PA-Yes
1676	Severe Winter Storms and Flooding	1/15/2007 1/12/2007-1/22/2007	IA-No PA-Yes
3281	Severe Winter Storms	12/12/2007 12/8/2007-12/15/2007	IA-No PA-Yes
1736	Severe Winter Storms	12/27/2007 12/6/2007-12/15/2007	IA-No PA-Yes
1749	Severe Storms & Flooding	3/19/2008 3/17/2008-5/9/2008	IA-Yes PA-Yes
3303	Severe Winter Storm	1/30/2009 1/26/2009-1/28/2009	IA-No PA-Yes
1847	Severe Storms, Tornadoes, and Flooding	6/19/2009 5/5/2009-5/16/2009	IA-No PA-Yes
3317	Severe Winter Storm	2/3/2011 1/31/2011-2/5/2011	IA-No PA-Yes
1961	Severe Winter Storm & Snow storm	3/23/2011 1/31/2011-2/5/2011	IA-No PA-Yes
4144	Severe Storms, Straight line Winds, & Flooding	9/6/2013 8/2/2013-8/14/2014	IA-No PA-Yes
4238	Severe Storms, Tornadoes, Straight Line Winds, & Flooding	8/7/2015 5/15/2015-7/27/2015	IA-No PA-Yes
3374	Severe Storms, Tornadoes, Straight Line Winds, & Flooding	1/2/2016 12/22/2015-1/9/2016	IA-No PA-Yes
4250	Severe Storms, Tornadoes, Straight Line Winds, & Flooding	1/21/2016 12/23/2015-1/9/2016	IA-No PA-Yes
4317	Severe Storms, Tornadoes, Straight Line Winds, & Flooding	6/2/2017 4/28/2017-5/11/2017	IA-No PA-No

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

3.1.3 Research Additional Sources

The following is a list of additional sources of data on locations and past impacts of hazards in the planning area:

- Missouri Hazard Mitigation Plans (2018)
- Previously approved planning area Hazard Mitigation Plan (October 20, 2015)
- Federal Emergency Management Agency (FEMA)
- Missouri Department of Natural Resources
- National Drought Mitigation Center Drought Reporter
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics
- National Agricultural Statistics Service (Agriculture production/losses)
- Data Collection Questionnaires completed by each jurisdiction
- State of Missouri GIS data
- Environmental Protection Agency
- Flood Insurance Administration
- Hazards US (Hazus)
- Missouri Department of Transportation
- Missouri Division of Fire Marshal Safety
- Missouri Public Service Commission
- National Fire Incident Reporting System (NFIRS)
- National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI);
- County and local Comprehensive Plans to the extent available
- County Emergency Management
- County Flood Insurance Rate Map, FEMA
- Flood Insurance Study, FEMA
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin
- U.S. Army Corps of Engineers
- U.S. Department of Transportation
- United States Geological Survey (USGS)

It should be noted that the only centralized source of data for many of the weather-related hazards is the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI). Although it is usually the best and most current source, there are limitations to the data. The NCEI documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. In addition, it is a partial record of other significant meteorological events, such as record maximum or minimum temperatures or precipitation that occurs in connection with another event. NCEI may be provided by or gathered from sources outside the National Weather Service (NWS), such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. Every effort is made to use the best available information but because of time and resource constraints, information from these sources may be unverified by the NWS.

The database currently contains data from January 1950 to March 2014, as entered by the NWS. Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type. The following timelines show the different time spans for each period of unique data collection and processing procedures.

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

The injuries and deaths caused by a storm event are reported on an area wide basis. When reviewing a table resulting from an NCEI search by county, the death or injury listed in connection with that county search did not necessarily occur in that county.

3.1.4 Hazards Identified

Understanding how each community is susceptible to a natural hazard in both the likelihood that an event will occur (Probability) and the lasting effects of an event (severity) was the underlying basis for the vulnerability rating for each jurisdiction as well as the entire planning area. When developing the vulnerability rating the planning team considered the geographic location within the planning area, the historical data, and the measures of probability and severity for each hazard about each jurisdiction.

Further consideration was given to how the impact would outweigh the number of natural hazard events. Repeated low severity events could ultimately have a much higher impact on the region as a whole. For the most part, the planning team agreed that the severity of any event would take precedence in the rating scale.

Table 3.2 below provides a summary of the jurisdictions impacted by each hazard. Symbols used are an “x” that indicates the jurisdiction is impacted by the hazard, and a “—” indicates the hazard is not applicable to that jurisdiction. Levee failure was address in **3.1.1** Review of Existing Mitigation Plans.

Table 3.2. Hazards Identified for Each Jurisdiction

Jurisdiction	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding (River and Flash)	Land Subsidence/Sinkholes	Severe Winter Weather	Thunderstorm/Lightning/Hail/High Wind	Tornado	Wildfire
Camden County	X	X	X	X	X	X	X	X	X	X
City of Camdenton	X	X	X	X	X	X	X	X	X	X
City of Lake Ozark	X	X	X	X	X	X	X	X	X	X
City of Linn Creek	X	X	X	X	X	X	X	X	X	X

Jurisdiction	Dam Failure	Drought	Earthquake	Extreme Temperatures	Flooding (River and Flash)	Land Subsidence/Sinkholes	Severe Winter Weather	Thunderstorm/Lightning/Hail/High Wind	Tornado	Wildfire
City of Osage Beach	X	X	X	X	X	X	X	X	X	X
City of Richland	X	X	X	X	X	X	X	X	X	X
City of Lake Ozark	X	X	X	X	X	X	X	X	X	X
Village of Four Seasons	X	X	X	X	X	X	X	X	X	X
Village of Sunrise Beach	X	X	X	X	X	X	X	X	X	X
Camdenton R-II School District	X	X	X	X	X	X	X	X	X	X
Climax Springs School District	X	X	X	X	X	X	X	X	X	X
Mack's Creek R-V School District	X	X	X	X	X	X	X	X	X	X
Stoutland R-II School District	X	X	X	X	X	X	X	X	X	X

3.1.5 Multi-Jurisdictional Risk Assessment

This hazard mitigation plan is an update of the 2015 Camden County Hazard Mitigation Plan. This is a multi-jurisdictional plan that applies to the participating jurisdictions of the unincorporated area of Camden County, the six communities, two villages, and four school districts. There are jurisdictions within Camden County that overlap into adjacent counties. These are the City of Lake Ozark, City of Richland, and Stoutland R-II School District. Each hazard has a profile in which the risks are assessed on a planning area wide basis. Some hazards, like flooding, vary in risk across the planning area. Discussions of the variations are included in each hazard profile. These variations are detailed in each hazard profile under a separate heading.

The planning area is subject to relatively significant fluctuations in temperature and precipitation yet staying fairly uniform climatically. The planning area is characterized by highly dissected plateaus, hills, streams, rivers, and the Lake of the Ozarks, the Midwest's premier vacation destination. The City of Osage Beach is the largest city within Camden County with the City of Camdenton as the second largest city within the county. Camden County is driven by the tourism industry that the area attracts and supports. Certain areas around the county can generate a population base that swells by 300% every weekend between Memorial Day and Labor Day. With the increase in population during the peak tourism season weather related vulnerabilities become greater. Total building permits for Camden County since the 2015 HMP is 1516. The highest record was in 2018 and there were 381 building permits recorded with the Camden County Planning and Zoning Administrators office.

The hazards that vary across the planning area in terms of risk include dam failure, drought, earthquake, extreme temperature, flooding, wildland fire, severe winter weather, sinkholes/land subsidence and thunderstorms and lightning. This will be discussed in detail further ahead in this chapter and how each of them will impact the community.

3.2 ASSETS AT RISK

This section assesses the planning area population, structures, critical facilities and infrastructure, and other important assets that may be at risk to hazards. If there have been any changes in Camden County since the previous plan, the changes will be summarized including how they impact risk in this section. The inventory of assets for each jurisdiction was derived from census block exposure data out of HAZUS, Missouri GIS Database, and local jurisdictional data collection questionnaires.

To help understand the full impact of a natural hazard event it is necessary to identify the assets that could be affected within the planning area. Knowing the value of those assets will help each jurisdiction comprehend the economic impact that a natural hazard event may cost each jurisdiction. Assets can include but are not limited to buildings, equipment, infrastructures, and furnishings.

3.2.1 Total Exposure of Population and Structures

Camden County and Cities

In the following three tables, population data is based on 2016 Census Bureau data. Building counts and building exposure values are based on parcel data provided by the State of Missouri Geographic Information Systems (GIS) which can be found at the following website, http://sema.dps.mo.gov/programs/mitigation_management.php. Contents exposure values were calculated by factoring a multiplier to the building exposure values based on usage type. The multipliers were derived from the HAZUS MH 2.1 and are defined in **Table 3.3**. Land values have been purposely excluded from consideration because land remains following disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Another reason for excluding land values is that state and federal disaster assistance programs generally do not address loss of land (other than crop insurance). It should be noted that the total valuation of buildings is based on county assessor' data which may not be current. In addition, government owned properties are usually taxed differently or not at all, and so may not be an accurate representation of true value. Note that public school district assets and special districts assets are included in the total exposure tables assets by community and county.

Table 3.3 shows the total population, building count, estimated value of buildings, estimated value of contents and estimated total exposure to parcels for the unincorporated Laclede County and each incorporated city. **Table 3.4** that follows provides the building value exposures for the county and each city in the planning area broken down by usage type. Finally, **Table 3.5** provides the building count total for the county and each city in the planning area broken out by building usage types (residential, commercial, industrial, and agricultural).

Table 3.3. Maximum Population and Building Exposure by Jurisdiction

Jurisdiction	2018 Annual Population Estimate	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
Camden County	30,373	26,374	\$5,628,327.00	\$3,094,389.00	\$8,722,716.00
City of Camdenton	4,092	1,732	\$438,113.00	\$298,392.00	\$736,505.00
City of Lake Ozark	1,804	28	\$5,403,500.00	\$760,355.00	\$6,163,855.00
City of Linn Creek	251	177	\$67,213.00	\$13,476.00	\$80,689.00
City of Osage Beach	4,570	2,989	\$1,332,275.00	\$892,312.00	\$2,224,587.00
City of Richland	1,770	69	\$7,466.00	\$3,733.00	\$11,268.00
Village of Four Seasons	2,269	2,260	\$808,038.00	\$444,941.00	\$1,252,979.00
Village of Sunrise Beach	492	280	\$51,977.00	\$26,267.00	\$78,244.00
Totals	45,815	34,062	\$13,757,949.00	\$5,547,044.00	\$19,305,215.00

Source: U.S. Bureau of the Census, Annual population estimates/ 5-Year American Community Survey 2018; Building Count and Building Exposure, Missouri GIS Database from SEMA Mitigation Management; Contents Exposure derived by applying multiplier to Building Exposure based on Hazus MH 2.1 standard contents multipliers per usage type as follows: Residential (50%), Commercial (100%), Industrial (150%), Agricultural (100%). For purposes of these calculations, government, school,

and utility were calculated at the commercial contents rate.

Table 3.4. Building Values/Exposure by Usage Type

Jurisdiction	Residential	Commercial	Industrial	Agricultural	Total
Camden County	\$2,621,919.00	\$2,260,403.00	\$146,742.00	\$6,010.00	\$3,094,389.00
City of Camdenton	\$151,581.00	\$104,343.00	\$18,986.00	\$676.00	\$298,392.00
City of Lake Ozark	\$17,256.00	\$3,527.00	\$179.00	\$0	\$6,163,855.00
City of Linn Creek	\$10,147.00	\$2,108.00	\$705.00	\$0.00	\$13,476.00
City of Osage Beach	\$479,746.00	\$329,691.00	\$55,585.00	\$2,064.00	\$892,312.00
City of Richland	\$7,466.00	\$0.00	\$0.00	\$0.00	\$7,466.00
Village of Four Seasons	\$365,807.00	\$63,845.00	\$5,711.00	\$1,069.00	\$444,941.00
Village of Sunrise Beach	\$25,338.00	\$929.00	\$0.00	\$0.00	\$26,267.00
Totals	\$3,695,055.00	\$2,769,701.00	\$227,981.00	\$10,136.00	\$10,941,098.00

Source: Missouri GIS Database, SEMA Mitigation Management Section

Table 3.5. Building Counts by Usage Type

Jurisdiction	Residential Counts	Commercial Counts	Industrial Counts	Agricultural Counts	Total
Camden County	25,836	358	140	21	26,406
City of Camdenton	1,531	150	28	4	1,732
City of Lake Ozark	1,688	30	6	0	1,724
City of Linn Creek	163	10	3	0	177
City of Osage Beach	2,568	311	77	10	2,989
City of Richland	68	0	0	0	68
Village of Four Seasons	2,172	65	10	6	2,260
Village of Sunrise Beach	278	2	0	0	280
Totals	34,449	930	264	43	35,787

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

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

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

Public School District	Enrolment	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
Camdenton R-III	4091	14	\$114,033,046.00	\$27,609,647.00	\$171,642,693.00
Climax Springs R-IV	210	5	\$78,094,428.00	\$1,222,046.00	\$79,316,474.00
Mack's Creek R-V	318	6	\$12,939,424.41	\$1,433,114.65	\$14,372,539.06
Stoutland R-II	437	2	\$11,349,470.00	\$3,060,741.00	\$14,410,211.00

Source: <http://mcids.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>, select the file for the most recent year called "20xx Building Enrollment PK-12", filter the spreadsheet by selecting only the public school districts in the planning area. The Building Exposure, Contents Exposure, and Total Exposure amounts come from the completed Data Collection Questionnaires from Public School Districts. In general, the school districts obtain this information from their insurance coverage amounts.

3.2.2 Critical and Essential Facilities and Infrastructure

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

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

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

- 2018 Missouri State Hazard Mitigation Plan and Hazard Mitigation Viewer <http://bit.ly/MoHazardMitigationPlanViewer2018>
- Chemical Facilities (Tier II Facilities) information (if included in the list of hazards identified by the participants) can be obtained by contacting the county LEPC. The LEPC will then request information (name, address, purpose for asking, etc.) and then provide the information. In order to find out who the LEPC contact is for your planning areas, see https://sema.dps.mo.gov/docs/programs/executive/MERC/LEPC_Manual/LEPC-addresses.pdf
- Hazus <https://www.fema.gov/hazus>
- The Homeland Security Infrastructure Protection Program (HSIPP) <https://www.dhs.gov/cisa/national-infrastructure-protection-plan>

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

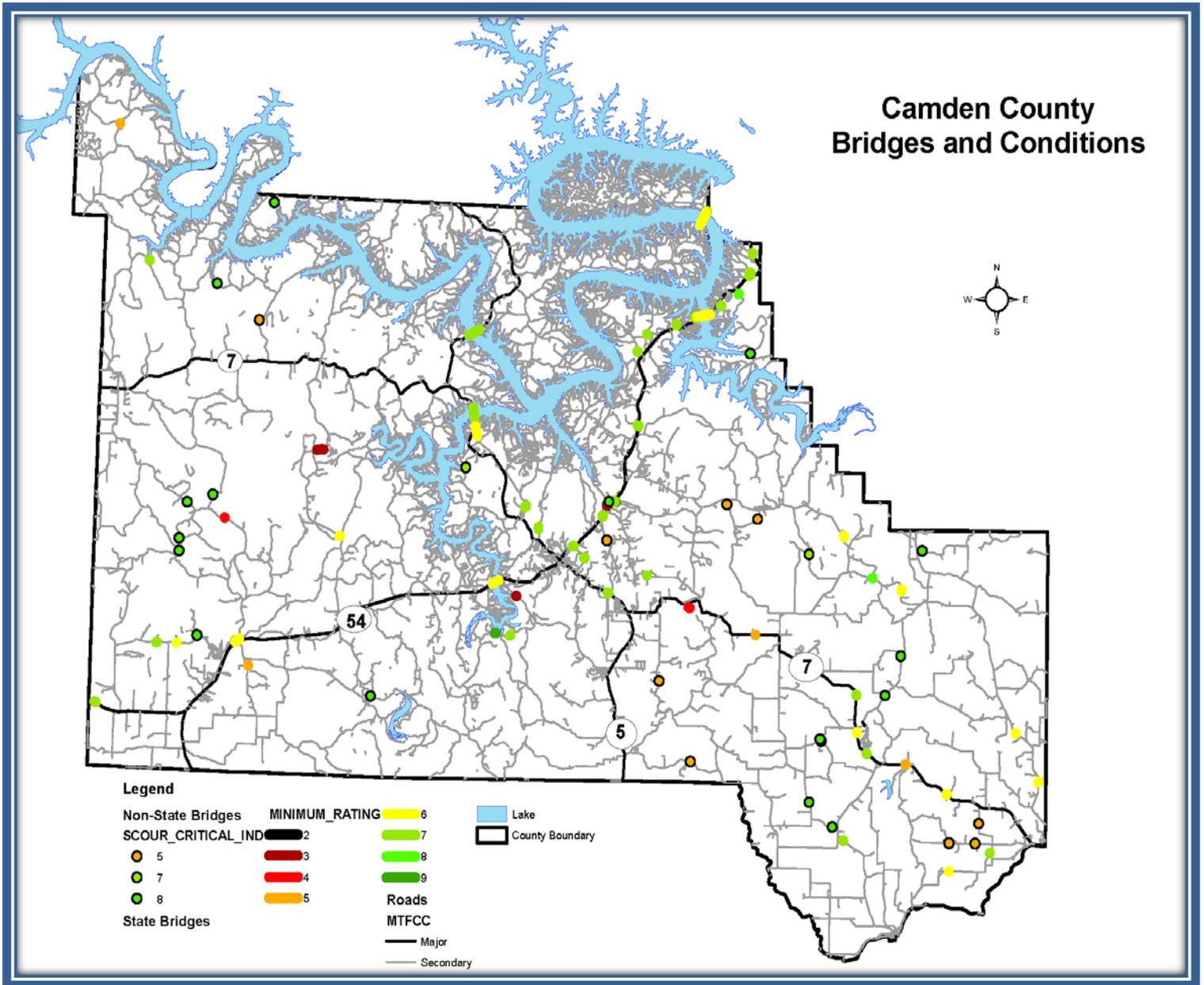
Jurisdiction	Airport Facility	Bus Facility	Childcare Facility	Communications Tower	Electric Power Facility	Emergency Operations	Fire Service	Government	Housing	Shelters	Highway Bridge	Hospital/Health Care	Military	Natural Gas Facility	Nursing Homes	Police Station	Potable Water Facility	Rail	Sanitary Pump Stations	School Facilities	Stormwater Pump Stations	Tier II Chemical Facility	Wastewater Facility	TOTAL
Camden County	0	0	0	0	0	0	10	2	41,970	1	93	0	0	0	0	1	0	0	0	0	0	113	2	113
City of Camdenton	1	0	7	1	0	1	1	3	1,419	1	2	3	0	0	2	1	1	0	1	4	34	0	1	1482
City of Lake Ozark	0	0	2	0	1	0	2	1	1,805	1	0	0	0	0	0	1	1	0	0	11	0	0	1	1,839
City of Linn Creek	0	0	2	0	0	1	0	1	*	0	0	0	0	0	0	1	2	0	0	0	0	0	0	7
City of Osage Beach	1	0	4	0	0	1	2	1	*	0	3	2	0	0	5	1	0	0	0	2	0	0	0	23
City of Richland	1	0	1	1	1	1	1	2	915	0	0	2	0	1	2	1	0	1	0	4	0	0	0	20
Village of Four Seasons	0	0	0	0	0	1	0	1	*	0	1	0	0	0	0	0	1	0	0	0	0	0	0	3
Village of Sunrise Beach	0	0	0	0	0	1	2	1	*	0	0	0	0	0	0	1	1	0	0	1	1	0	1	9
Totals	3	0	16	2	2	6	21	12	46,109	2	7	7	0	12	10	6	5	2	2	23	35	113	5	3593

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

- Indicates information not available

According to the National Bridge Inventory there are a total of 93 bridges in Camden County. The term “scour critical” refers to one of the database elements in the National Bridge Inventory. Scour critical bridges are those bridges that are vulnerable to scour during a flood. Bridge scour is the removal of sediment such as sand and rocks from around bridge abutments or piers. Scour is caused by swiftly moving water and can scoop out scour holes, compromising the integrity of the bridge. This element is quantified using a “scour index”, which is a number indicating the vulnerability of a bridge to scour during a flood. The National Bridge Inventory uses a classification system of 0-3 to indicate the potential for scour. Bridges in the 0-1 categories are those that are at or near failure due to scour, those in the 2-3 categories are vulnerable to scour and determined to be unstable. **Figure 3.1** shows the location of the bridges in the planning area and their conditions.

Figure 3.1. Camden County and State of Missouri Bridges and Conditions



According to the National Bridge Inventory there are 93 bridges in the planning area, 47 bridges are in good condition, 38 bridges are in fair condition, and 8 bridges are in poor condition.

3.2.3 Other Assets

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

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

Threatened and Endangered Species: **Table 3.8** lists federally Threatened, Endangered, Proposed and Candidate Species in the county.

Table 3.8. Threatened and Endangered Species in Camden County

Common Name	Scientific Name	Status
Grey Bat	Myotis Griesescens	Endangered
Indiana Bat	Myotis Sodalis	Endangered
Nianua Darter	Etheostoma Nianguae	Endangered
Pink Mucket (Pearlymussel)	Lampsilis Abrupta	Endangered
Scaleshell Mussel	Leptodea Leptodon	Endangered
Spectaclecase (Mussel)	Cumberlandia Monodonta	Endangered

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

Natural Resources: The Missouri Department of Conservation (MDC) provides a database of lands the MDC owns, leases, or manages for public use.

Table 3.9 Provides the names and locations of parks and conservation areas in the planning area.

Table 3.9. Parks in Camden County

Park / Conservation Area	Address & Information	City
Branch Towersite	From Macks Creek, take Highway 54 west, then Highway 73 south 2 miles.	Macks Creek
Brown Bend Access	From Climax Springs, take Highway 7 west 3.50 miles, then Route DD north 4 miles, then Route FF for 5 miles, then FF-14 for 2 miles to the 61.50 mile mark (Osage Arm) of Lake of the Ozarks.	Climax Springs
Burnt Mill Cave Conservation Area	From Macks Creek, take Route N north 5 miles, then Kolb Hollow Road east (right) 3.20 miles.	Macks Creek
Camdenton CSC	From the junction of Highways 54 and 5, take Highway 54 west to Business Highway 5, then take Business Highway 5 north to Old Route 5. Turn left and take an immediate left onto Thunder Mountain Road. Continue west 0.60 miles to office.	Camdenton
Fiery Fork Conservation Area	From Climax Springs, take Highway 7 east 4.30 miles, then take Granger Lane south 2 miles. Watch for signs.	Climax Springs
Gale (Larry R) Access	From Camdenton, take Highway 54 west 4 miles to Route AA, then north 2.50 miles. At the fire station, turn east onto Koehler Road (AA 101), and go 1 mile to Larry R. Gale Road (AA-101D). Watch for signs.	Roach
Mansfield (Alice Ahart)	From Osage Beach, take Route KK northwest, take Baydy Peak Road north to area parking lot.	Osage Beach

Shawnee Bend Access	From Sunrise Beach, take Highway 5 south, then Route F about 1 mile, then Route TT northeast about 2.30 miles to the access. The access is located at the 10.90-mile mark of the Osage Arm of the Lake of the Ozarks.	Sunrise Beach
Toronto Springs Conservation Area	From Montreal, take Route E northeast 3 miles, then Route A east 1.50 miles.	Richland

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

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

The City of Osage Beach is an Aspiring Community within the Missouri Main Street Program Tier System. The National Main Street Program is a partnership between national and state agencies and local government that focus on historic preservation. Communities that have these programs already have a good infrastructure to protect historic sites.

The National Park Service has a State Historic Preservation Program. The Preservation through Partnerships is a goal of the Certified Local Government (CLG) Program. Local, State, and Federal Governments work together in the Federal Preservation Program to help communities save the irreplaceable historic character of places. Through the certification process, communities make a local commitment to historic preservation. This commitment is key to America's ability to preserve, protect, and increase awareness of the unique cultural heritage found in the built environment across the country.

Table 3.10 lists properties in Camden County that are on the National Register of Historic Places.

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

Property	Address	County	Date Listed
Camp Hawthorne Central Area District	NE of Camdenton off of Hwy 42	Camden	2/28/1985
Camp Pin Oak Historic District	NE of Camdenton off of Hwy 42	Camden	6/27/1985
Lake of the Ozarks State Park Clover Point Recreation Hall	NE of Camdenton off of Hwy 42	Camden	3/4/1985
Lake of the Ozarks Recreational Demonstration Area Barn/Garage in Kaiser Area	NE of Camdenton off of Hwy 42	Camden	2/28/1985
Lake of the Ozarks Recreational Demonstration Area Rising Sun Shelter	NE of Camdenton off of Hwy 42	Camden	2/26/1985
Lake of the Ozarks Recreational Demonstration Area Shelter at McCubbin Point	NE of Camdenton off MO A	Camden	2/26/1985
Pin Oak Hollow Bridge, Pin Oak Hollow, Kaiser vic.	Lake Ozark State Park	Camden	9/13/1985
Urbauer Fishing Lodge Historic District	442 Riverbird Ln	Camden	2006

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

Table 3.11 Shows major non-government employers in the planning area (private industry)

Table 3.11. Major Non-Government Employers in Camden County

Employer Name	Main Locations	Product or Service
Ameren Missouri	3 Wilmore Lodge Lake Ozark	Reliable Energy
American Home Care	3797 Osage Beach Parkway Osage Beach	Home Health Care
APAC-Missouri Inc.	1369 54-68 Linn Creek	Excavating and Demolition
Big Surf Water Park	954 State Road Y Linn Creek	Water Park Family Attraction
Big Thunder Marine	3401 Bagnell Dam Blvd, Lake Ozark	Boat sales, service, pro shop, & rental

Camden on the Lake	2359 Bittersweet Rd. Lake Ozark	Yacht Club, meeting & events, condo sales & rental, hotel & Spa
Casey's General Store	Osage Beach & Camdenton	Gasoline & convenience store
Central Bank	Osage Beach, Lake Ozark, Camdenton	Mortgage lender & banking
Dierbergs Market	4655 Osage Beach Parkway Osage Beach	Supermarket, pharmacy, florist, & catering
Gerbes Market & Pharmacy	1159 US-54 Camdenton	Supermarket, pharmacy, & liquor store
Employer Name	Main Locations	Product or Service
Hy-Vee Super Market	929 Hwy D, Osage Beach	Supermarket, pharmacy, dietician services, & catering
Inn at the Grand Glaize	5142 Osage Beach Pkwy. Osage Beach	Hotel, private events, & banquet space
Kelly's Port Lake of the Ozarks	3545 Osage Beach Pkwy. Osage Beach	Boat sales, service, parts, gas dock, &
Lake Regional Health System	54 Hospital Drive Osage Beach	All aspects of healthcare, diagnostics, physical therapy, & home care
Marine Max Lake Ozark	3070 Bagnell Dam Blvd. Lake Ozark	Boat retailer & Marine Industry
McDonalds	Osage Beach & Camdenton	Fast food restaurant
Old Kinderhook Golf & Lodging	678 Old Kinderhook Dr. Camdenton	Vacation destination, hotel, golf course, dinning, and meeting space, spa
O'Reilly's Auto Parts	5970 Osage Beach Pkwy Osage Beach	Auto parts sales and delivery
Panera Bread Company	4840 Osage Beach Pkwy. Osage Beach	Bakery, café, restaurant
Performance Boat Center	1650 Yacht Club Dr. Osage Beach	Boat sales, parts, service, paint shop, & storage
Penmac Staffing	814 MO-5 Camdenton	Employment services, & placement
Osage Beach Premium Outlets	4540 Osage Beach Pkwy. Osage Beach	Fashion design, luxury brands, & name brand manufactures
Surdyke Yamaha Port 20	5863 Osage Beach Pkwy. Osage Beach	Waverunners, Boats sales, service, parts, accessories, gas dock, & rentals
Margaritaville Tan-Tar-A Resort	490 Tan Tar A Drive Osage Beach	Vacation destination, dinning, meeting space, catering, spa, & golf course
Target	919 Hwy. D, Osage Beach	Retail chain & pharmacy
The Lodge of Four Seasons	315 Four Seasons Dr. Lake Ozark	Vacation destination, dinning, meeting space, spa, & golf

UPS	844 US-54 Camden	Shipping services
Wal Mart	Osage Beach & Camden	Retail chain & pharmacy

Source: Data Collection Questionnaires and <https://www.loclg.org/LOREDC%20Demographic%20Profile%202019.pdf>

According to the Bureau of Economic Analysis (BEA) estimates, in 2012 there were 26,011 jobs in Camden County. Retail trade accounted for 16.3 percent of the total jobs (4,251). Other sectors with significant employment included:

- Accommodation and food services (3,429)
- Real estate and rental and leasing (2,661)
- Health care and social assistance (2,469)
- Construction (2,272)

Agriculture According to the USDA National Agricultural Statistics Services, 2017 Census of Agriculture there has been a decrease in farms, land acres in farms, and the average size farm. Since the 2012 Census of Agriculture the number of farms declined by 3.18%. There were 533 farms in 2012 compared to 516 farms in the 2017 report. The land in farm acres has seen a decline of 11.03%. There were 138,617 acres of farm land in 2012 but only 123,322 acres of farm land in the 2017 report. In Camden County the average size farm has gone from 260 acres in 2012 to 239 acres in the 2017 report, a decrease of 8.07%.

According to Missouri Economic Research Brief; Economic Contribution of Agribusiness the top ten agribusiness industries are meat and poultry, wholesale trade, oilseed farming, dog and cat food manufacturing, all other crop farming, management of companies and enterprises, real estate, truck transportation, and pesticide and other agricultural manufacturing. Table 3.12 below gives a breakdown of the agribusiness total employees for Camden County.

Table 3.12 provides a summary of the agricultural related jobs in Camden County.

Table 3.12. Agriculture-Related Jobs in Camden County

County	Farm Employment	Ag-Related Employment	Agribusiness Employment	Agribusiness % Total Employees
Camden County	518	88	606	2.3%

Source: https://www.missourieconomy.org/pdfs/agribusiness_economic_contribution.pdf

3.3 LAND USE AND DEVELOPMENT

3.3.1 Development Since Previous Plan Update

Since the previous Camden County Hazard Mitigation Plan in 2015 the jurisdictions within the County have seen some notable development.

Just West of Camdenton Old Kinderhook was expanded to include 84 new guest rooms, a state-of-the-art conference center with break-out spaces and meeting facilities. There is a 3,200 square foot ballroom to service conferences and social events, an expanded marina, two additional pools, and an ice-skating rink. Within the city limits of Camdenton, the Central Ozarks Medical Facility opened in March 2019. The 2,000-square foot health clinic is estimated to be a \$3.5-million investment to the previously undeveloped property on N. Business Route 5. The building houses medical, dental, and behavioral health. This new building will replace two other existing locations in the City of Camdenton. Further North on Business Route 5 the Mid-Missouri Ozark Amphitheater has been rejuvenated. The Amphitheater at full capacity can seat 10,222 attendees. Taking two years to bring the facility back to industry standards it reopened in 2015.

The City of Osage Beach has seen the beginning phases of development and the opening of the Arrowhead Senior Living Community. A Continued Care Community with three levels of care available. Assisted Living, Memory Care, and Skilled nursing. This is the first business in a massive,

\$385 million planned development on Route KK in Osage Beach.

Changes in development happens so does risk in the planning area. Special attention needs to be given to the vulnerabilities and risks to human life and property that comes with new development. Camden County has experienced a slight increase in population. With the exception of the City of Richland. At the time of the 2010 census the population was 1,863 and the American Community Survey 5-year estimate is 1,770 in 2018. **Table 3.13** provides the growth in population data for all jurisdictions in Camden County

Table 3.13. County Population Growth, 2010-2018

Jurisdiction	Total Population 2010	Total Population 2018	2010-2018 # Change	2010-2018 % Change
Unincorporated Camden County	29,400	30,373	+973	3%
City of Camdenton	3,718	4,092	+374	10%
City Lake Ozark	1,596	1,804	+208	13%
City of Linn Creek	244	251	+7	3%
City of Osage Beach	4,351	4,570	+219	5%
City of Richland	1,863	1,770	-93	-5%
Village of Four Seasons	2,217	2,269	+52	2%
Village of Sunrise Beach	368	492	+124	34%

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

Population growth or decline is generally accompanied by increases or decreases in the number of housing units.

Table 3.14 provides the change in numbers of housing units in the Camden County planning area from 2010 to 2017.

Table 3.14. Change in Housing Units, 2010-2017

Jurisdiction	Housing Units 2010	Housing Units 2017	2010-2017 # Change	2000-2017 % Change
Camden County	41,183	41,838	+655	1.59% Increase
City of Camdenton	1,591	1,324	-267	16.78% Decrease
City of Lake Ozark	1,688	1,775	+87	5.15% Increase
City of Linn Creek	116	102	-14	5.15% Decrease
City of Osage Beach	5,261	5,488	+227	4.31% Increase
City of Richland	926	795	-131	14.14% Decrease
Village of Four Seasons	2,606	2,583	-23	0.88% Decrease
Village of Sunrise Beach	418	433	+15	3.58% Increase

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

3.3.2 Future Land Use and Development

Jurisdictions reported anticipated future developments within the next five years (2019-2025). Camden County describes the development trends and growth areas to be lake front housing not in flood zones. New facilities and infrastructure planned for construction will be a soccer field complex and medical marijuana manufacturing facilities.

The City of Camdenton plans for new construction of a Community Center on a three-acre plot of land just off of Business Route 5. Phase one of the community center will bring a 22,000 square foot building with two levels. The building will include multi-purpose rooms, a gymnasium, fitness rooms, a walking track and locker rooms. There are plans to widening Highway 54.

The City of Lake Ozark is expecting significant increases in the number of new commercial developments as well as current businesses on the Bagnell Dam strip continuing to update and develop the area. The City has approved a four level ropes course with five different elements and obstacles. The City continues the process of improving the infrastructure and upgrading the building codes.

The Village of Sunrise Beach will begin Phase 2 of the waste water treatment system with the anticipation that engineers will finalize details of the system and request for bidding is projected to go out in the fall of 2019.

“Expanding the Village’s wastewater collection and treatment system will allow for further

residential and commercial development in this area of Lake of the Ozarks, while improving the lake's eco-structure. Sunrise Beach is a truly rural community of 431 in central Missouri's Camden County," explained the press release from USDA.

There are no expected development trends, expected growth areas, new facilities or infrastructure planned for construction in the Cities of Linn Creek, Osage Beach, Richland, and the Village of Four Seasons in the next five years (2019-2025).

New development can impact a jurisdiction's vulnerability to natural hazards. As the number of buildings, critical facilities, and assets increase, vulnerability increases as well. For example, real estate development can increase storm water runoff, which often increases localized flooding. However, some development such as infrastructure improvements can help reduce vulnerability risks. Unfortunately, quantitative data is not available unavailable to further examine each jurisdiction's new development and its correlation to natural hazard vulnerabilities.

School District's Future Development

Camdenton R-III school district has indicated that construction of a designated saferoom or tornado shelter. This was also documented in the 2015 Camden County Hazard Mitigation Plan. No other development has been reported by the school district.

Climax Springs R-IV school district has scheduled the construction of a designated saferoom/tornado shelter. The construction will begin in July 2019. Ongoing projects are to construct safe classrooms utilizing FEMA grant and local revenues. No other development or construction is planned for the next five years.

Mack's Creek R-IV has plans to complete the second phase of the Master Facilities Plan. This includes remodeling existing facilities to update and improve the kitchen and cafeteria. The district is very interested in constructing a saferoom/tornado shelter.

Stoutland R-II school district have determined that there are two near term future projects that will be completed within five to ten years. Roof replacement that has an estimated cost of nearly \$200,000. The roof is causing additional concerns for the district. The existing structure is facing deterioration due to the outdated roof. The district plans to replace end of life HVAC systems for a replacement cost of \$50,000. The goal to complete the HVAC system replacement is five years. Steps have also been taken by the district to seek federal funds for a designated saferoom/tornado shelter.

Special District's Future Development

Horseshoe Bend Special Roads District has not reported any future development plans.

Osage Beach Special Roads District- does not currently have any future development projects however there is ongoing analysis of multiple locations to determine if safety improvements are required.

3.4 HAZARD PROFILES, VULNERABILITY, AND PROBLEM STATEMENTS

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

Hazard Profiles

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

Each hazard identified in Section 3.1.4 in Camden County will be profiled individually in this section.

The level of information presented in the profiles will vary by hazard based on the information available. With each update of the plan new information will be incorporated to provide better evaluation and prioritization of the hazards that affect the planning area. Detailed profiles for each of the identified hazards include information categorized as follows:

- **Hazard Description:** *This section consists of a general description of the hazard and the types of impacts it may have on a community or school/special district.*
- **Geographic Location:** *This section describes the geographic areas in the planning area that are affected by the hazard. Where available, use maps to indicate the specific locations of the planning area that are vulnerable to the subject hazard. For some hazards, the entire planning area is at risk.*
- **Strength/Magnitude/Extent:** *This includes information about the strength, magnitude, and extent of a hazard. For some hazards, this is accomplished with description of a value on an established scientific scale or measurement system, such as an EF2 tornado on the Enhanced Fujita Scale. This section should also include information on the typical or expected strength/magnitude/extent of the hazard in the planning area. Strength, magnitude, and extent can also include the speed of onset and the duration of hazard events. Describing the strength/magnitude/extent of a hazard is not the same as describing its potential impacts on a community. Strength/magnitude/extent defines the characteristics of the hazard regardless of the people and property it affects.*
- **Previous Occurrences:** *This section includes available information on historic incidents and their impacts. Historic event records form a solid basis for probability calculations.*
- **Probability of Future Occurrence:** *The frequency of recorded past events is used to estimate the likelihood of future occurrences. Probability can be determined by dividing the number of recorded events by the number of years of available data and multiplying by 100. This gives the percent chance of the event happening in any given year. For events occurring more than once annually, the probability should be reported as 100% in any given year, with a statement of the average number of events annually. For hazards such as drought that may have gradual onset and extended duration, probability can be based on the number of months in*

drought in a given time-period and expressed as the probability for any given month to be in drought.

- **Changing Future Conditions Considerations:** *Includes the effects of long-term changes in weather patterns and climate on the identified hazards. NOAA Climate Explorer has been utilized.*

Vulnerability Assessments

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

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

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

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

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

Following the hazard profile for each hazard will be the vulnerability assessment. The vulnerability assessment further defines and quantifies populations, buildings, critical facilities, and other community assets at risk to damages from natural hazards. The vulnerability assessments should be based on the best available data. The vulnerability assessments can also be based on data that was collected for the 2018 State Hazard Mitigation Plan Update. With the 2018 Hazard Mitigation Plan Update, SEMA is pleased to provide online access to the risk assessment data and associated mapping for the 114 counties in the State, including the independent City of St. Louis. Through the web-based Missouri Hazard Mitigation Viewer, local planners or other interested parties can obtain all State Plan datasets. This effort removes from local mitigation planners a barrier to performing all the needed local risk assessments by providing the data developed during the 2018 State Plan Update.

The Missouri Hazard Mitigation Viewer includes a Map Viewer with a legend of clearly labeled

features, a north arrow, a base map that is either aerial imagery or a street map, risk assessment data symbolized the same as in the 2018 State Plan for easy reference, search and query capabilities, ability to zoom to county level data and capability to download PDF format maps. The Missouri Hazard Mitigation Viewer can be found at this link: <http://bit.ly/MoHazardMitigationPlanViewer2018>.

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

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

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

- **Vulnerability Overview:** This section will provide an overall summary of the vulnerability of each identified hazard. To assess the jurisdictions vulnerability each event is analyzed and evaluated for both the probability of each hazard's occurrence and the severity of damage (both physical damage and economic impact),
 - High ranking vulnerability is greater than 75% Probability, or greater than \$300,000 year severity,
 - Moderate ranking vulnerability is 25%-75% Probability or \$100,000 - \$300,000 year severity,
 - Low ranking vulnerability is less than 25% Probability, or less than \$100,000 a year severity.
- **Potential Losses to Existing Development:** This will include the potential impacts of the hazard, the consequences of effect of the hazard on the jurisdiction and its assets.
- **Previous and Future Development:** This section will include information on how changes in development have impacted the community's vulnerability to the hazard. This section will also describe how any changes in development that occurred in known hazard prone areas since the previous plan have increased or decreased the community's vulnerability. It will also identify any anticipated future development in the county, and how they may impact hazard risk in the planning area.
- **Hazard Summary by Jurisdiction:** For hazard risks that vary by jurisdiction, this section will provide an overview of the variation and the factual basis for that variation.

Problem Statements

Each hazard analysis will include a brief summary of the problems created by the hazard in the planning area, and possible ways to resolve those problems. This may include jurisdiction-specific information in those cases where the risk varies across the planning area. The focus of the problem statements sub-section is to synthesize the "problems" revealed through the risk assessment and then through the process of updating the mitigation strategy, develop mitigation actions that are aimed at "solving" the identified problems.

3.4.1 Flooding (Riverine and Flash)

Some specific sources for this hazard are:

- 2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.1, Page 3.80
https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf
- Watershed map, Environmental Protection Agency,
<https://cfpub.epa.gov/surf/locate/index.cfm>
- FEMA Map Service Center, Digital Flood Insurance Rate Maps (DFIRM) for all jurisdictions, if available, msc.fema.gov/portal
- NFIP Community Status Book, <http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>
- NFIP claims status, Bureau Net, <http://bsa.nfipstat.fema.gov/reports/reports.html>
- Flood Insurance Administration—Repetitive Loss List (this must be requested from the State Floodplain Management agency or FEMA)
- National Centers for Environmental Information, Storm Events Database,
<http://www.NCEI.noaa.gov/stormevents/>
- USDA Risk Management Agency, Insurance Claims, <https://www.rma.usda.gov/data/cause>
- FEMA Data Visualization Tool, <https://www.fema.gov/data-visualization-floods-data-visualization>
- Missouri Hazard Mitigation Viewer
<http://bit.ly/MoHazardMitigationPlanViewer2018> - Website
<https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide
 - Risk MAP, DFIRM, and Hazus based depth grids used in Hazus Analysis
 - Flood losses by County 1978-2018
 - Number of flood insurance claims by County
 - Total building exposure to flooding (1% annual chance) by County
 - Buildings impacted by flooding (1% annual chance) by County
 - Flood insurance coverage by County
 - Number of flood insurance policies by County
 - NFIP participation status by County
 - Number of state facilities impacted by flooding (1% annual chance) by County
 - Critical facilities impacted by flooding (1% annual chance) by County

Hazard Profile

Hazard Description

A flood is partial or complete inundation of normally dry land areas. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt, or ice. There are several types of riverine floods, including headwater, backwater, interior drainage, and flash flooding. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice melt. The areas adjacent to rivers and

stream banks that carry excess floodwater during rapid runoff are called floodplains. A floodplain is defined as the lowland and relatively flat area adjoining a river or stream. The terms “base flood” and “100- year flood” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year. Floodplains are part of a larger entity called a basin, which is defined as all the land drained by a river and its branches.

Flooding caused by dam failure is discussed in **Section 3.4.2** and **Section 3.4.3** respectively. It is not addressed in this section.

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

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

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

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

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

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

Geographic Location

Riverine flooding is most likely to occur in special flood hazard areas (SFHAs) and those locations in the planning area that are low lying. They also occur in areas without adequate drainage to carry away the amount of water that falls during intense rainfall events.

Floodplain mapping and participation in the National Flood Insurance Program (NFIP) both play a major role in flood mitigation. The objectives of flood mitigation are to keep people, property, and possessions out of the floodplain area where reasonably achievable.

Participation in the NFIP requires that floodplain ordinances, which regulate development in the floodplain, be adopted and enforced by each community. The standard regulations require that buildings be constructed at least 1 foot above the Base Flood Elevation (BFE). The BFE is the flood level associated with the 1% flood (formerly known as the “100-year flood”).

Table 3.15 lists flood event data results for 2001 to 2018 for Camden County. Event narratives were reviewed to obtain the most accurate information.

Table 3.15. Camden County NCEI Flood Events by Location, 2001-2018

Location	Number of Events
Unincorporated Camden County	7
Unincorporated Camden County Wet Glaize NCEI Specified Area	2
Unincorporated Camden County Climax Springs NCEI Specified Area	1
Unincorporated Camden County Freedom NCEI Specified Area	1
Unincorporated Camden County White City NCEI Specified Area	1
Unincorporated Camden County Montreal NCEI Specified Area	1
Unincorporated Camden County Damsel NCEI Specified Area	1
City of Camdenton	0
City of Lake Ozark	0
City of Linn Creek	1
City of Osage Beach	1
City of Richland	0
Village of Four Seasons	0
Village of Sunrise Beach	0

Source: National Centers for Environmental Information

Table 3.16 lists flash flood event data results for the same time frame.

Table 3.16. Camden County NCEI Flash Flood Events by Location, 2001-2018

Location	Number of Events
Unincorporated Camden County	1
Unincorporated Camden County Northwest Portion NCEI Specified Area	1
Unincorporated Camden County East Portion NCEI Specified Area	1
Unincorporated Camden County Montreal NCEI Specified Area	3
Unincorporated Camden County North Portion NCEI Specified Area	1
Unincorporated Camden County Climax Springs NCEI Specified Area	5
Unincorporated Camden County Wet Glaize NCEI Specified Area	5
Unincorporated Camden County Barnumton NCEI Specified Area	2
Unincorporated Camden County Osage Iron Works NCEI Specified Area	1
Unincorporated Camden County Hugo NCEI Specified Area	1
Unincorporated Camden County Neongwah NCEI Specified Area	1
Unincorporated Camden County Macks Creek NCEI Specified Area	2
Unincorporated Camden County Purvis NCEI Specified Area	1
City of Camdenton	12
City of Lake Ozark	2
City of Linn Creek	4
City of Osage Beach	2
City of Richland	0
Village of Four Seasons	0
Village of Sunrise Beach	1

Source: National Centers for Environmental Information, 6/14/2019

Strength/Magnitude/Extent

Missouri has a long and active history of flooding over the past century, according to the 2018 State Hazard Mitigation Plan. Flooding along Missouri's major rivers generally results in slow-moving disasters. River crest levels are forecast several days in advance, allowing community's downstream sufficient time to take protective measures, such as sandbagging and evacuations. Nevertheless, floods exact a heavy toll in terms of human suffering and losses to public and

private property. By contrast, flash flood events in recent years have caused a higher number of deaths and major property damage in many areas of Missouri.

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

National Flood Insurance Program (NFIP) Participation

Table 3.17 provides details on NFIP participation for the jurisdictions in the planning area.

Table 3.17. NFIP Participation in Camden County

Community ID #	Community Name	NFIP Participant (Y/N/Sanctioned)	Current Effective Map Date	Regular-Emergency Program Entry Date
290789B	Camden County	Y	4/18/2018	05/01/1994
290742B	City of Camdenton	Y	4/18/2018	8/4/2011
290698#	City of Lake Ozark	Y	5/18/2009	8/1/2005
290053B	City of Linn Creek	Y	4/18/2018	8/5/1986
290671B	City of Osage Beach	Y	6/16/2011	6/16/2011
290656#	City of Richland	Y	5/3/2010	9/10/1984
290979#	Village of Four Seasons	Y	6/16/2011	3/20/2012
290977#	Village of Sunrise Beach	Y	6/6/2011	3/6/2009

Source: NFIP Community Status Book, 7/25/2019 BureauNet, <http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>; M= No elevation determined – all Zone A, C, and X; NSFHA = No Special Flood Hazard Area; E=Emergency Program

Table 3.18 provides the number of policies in force, amount of insurance in force, number of closed losses, and total payments for each jurisdiction, where applicable

Table 3.18. NFIP Policy and Claim Statistics as of Date

Community Name	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
Camden County	76	51	0	25	\$1,467,273.44
Linn Creek	3	3	0	0	\$142,040.21
City of Osage Beach	1	0	0	1	\$0.00
Village of Sunrise Beach	1	0	0	1	\$0.00

Source: NFIP Community Status Book, [7/25/2019];BureauNet, <https://www.fema.gov/policy-claim-statistics-flood-insurance> <http://bsa.nfipstat.fema.gov/reports/reports.html>; *Closed Losses are those flood insurance claims that resulted in payment, CWOP Losses are the total number of losses which have a claim status of x and have been closed without payment issued.

Unincorporated Camden County has the most in insurance payments \$1,467,273.00 in the planning area.

Repetitive Loss/Severe Repetitive Loss Properties

Repetitive Loss Properties are those properties with at least two flood insurance payments of \$1,000 or more in a 10-year period. According to the Flood Insurance Administration, jurisdictions included in the planning area have a combined total of \$604,903.32 repetitive loss properties. As of February 28, 2019, two properties have been mitigated, leaving seven unmitigated repetitive loss properties.

Table 3.19 provides a summary of the repetitive loss properties in the planning area.

Table 3.19. Camden County Repetitive Loss Properties

Jurisdiction	Number of Properties	Type of Property	Number Mitigated	Building Payments	Content Payments	Total Payments	Average Payment	Number of Losses
Camden County	8	Residential	2	\$447,699.32	\$35,912.88	\$483,612.20	\$48,219.72	17
City of Osage Beach	1	Residential	0	\$107,964.82	\$13,326.30	\$121,291.12	\$30,322.78	4

Source: Flood Insurance Administration as of 2/28/2019

Severe Repetitive Loss (SRL):

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

The planning area has had nine FEMA disaster declarations that included flooding since 1973. Disaster declarations from flooding were in 1973, 1993, 1995, 2002, 2003, 2007, 2008, 2008, and 2013.

Previous Occurrences

The planning area has had nine FEMA disaster declarations that included flooding since 1973. Disaster declarations from flooding were in 1973, 1993, 1995, 2002, 2003, 2007, 2008, 2008, and 2013.

DR-372 on April 19, 1973 had heavy rains, tornadoes, and flooding. DR-995 on July 9th, 1993 featured flooding and severe storms. On June 2nd, 1995, DR-1054 had a severe Storm, tornadoes, Hail, and flooding. DR-1412 on May 6, 2002 included severe storms, tornadoes, and flooding. DR-1463 was declared on May 6, 2003 due to severe storms, tornadoes, and flooding. On January 15th, 2007, DR-1676 had severe winter storms and flooding. DR-1749 on March 19th, 2008 included severe storms and flooding. DR-1874 on June 19th, 2009 featured severe storms and flooding. DR-4144 on September 6th, 2013 had severe storms, straight line winds, and flooding.

Table 3.20 summarizes the NCEI Flash Flood Events for the Camden County planning area.

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

Year	Number of Events	Number of Deaths	Number of Injuries	Property Damages	Crop Damages
2001	1	0	0	0	0
2002	3	0	0	\$300,000.00	0
2003	5	0	0	0	0
2004	3	0	0	0	0
2005	5	0	0	0	0
2006	2	0	0	0	0
2007	5	0	0	0	0
2008	6	0	0	\$1,000,000.00	0
2009	12	0	0	\$300,000.00	0
2010	3	0	0	0	0
2013	4	0	0	0	0
2015	1	0	0	\$1,000.00	0
2017	1	0	0	\$5,000.00	0
2018	3	0	0	0	0
Total	54	0	0	\$1,606,000.00	0

Source: NCEI

Table 3.21 summarizes the Riverine Flood events in the planning area.

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

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2001	1	0	0	0	0
2002	3	0	0	\$200,000.00	0
2005	3	0	0	0	0
2008	3	0	0	0	0
2010	3	0	0	0	0
2011	3	0	0	\$100,000.00	0
2013	2	0	0	\$2,000,000.00	0

2015	6	0	0	\$2,000,000.00	0
2017	1	0	0	\$500,000.00	0
2018	1	0	0	0	0
Total	26	0	0	\$4,800,000.00	0

Source: NCEI

- On May 30th, 2001 two to four inches of rain fell across portions of southern Benton through northwest Camden and into southern Morgan County in less than two hours. Numerous low water crossings and county roads were impassable, many from Warsaw, east and northeast across Climax Springs, and into the Gravois Mills area.
- On April 19th, 2002 a complex of strong to severe thunderstorms developed over the southwestern portions of the Lake of the Ozarks region during the afternoon and early evening. The thunderstorms then moved slowly eastward over Camden, Maries, Miller, Phelps and Pulaski counties.
- On May 12th, 2002 another in a series of thunderstorm complexes moved across the area producing excessive rainfall on the already saturated soils. Most of the heavy rainfall began across central Missouri that morning and then produced another round of torrential rainfall Sunday evening.
- On July 12th, 2002 Excessive rainfall of three inches in less than one hour caused Highway Z east of Climax Springs flooded and remained impassable for a few hours.
- On April 24th, 2003 Thunderstorms that trained over areas of western Camden and southeastern Benton counties caused water to flood portions of Highway 7 near Climax Springs. Several roads within the city of Climax Springs were also inundated.
- On May 6th, 2003 local law enforcement officials observed several roads that were inundated by flash flood waters within the community of Stoutland. No property damage was noted from this event.
- On June 10th, 2003 there were several low water crossings and low-lying areas flooded over in areas near Camdenton.
- On September 1st, 2003 several low water crossings in the northwestern section of Camden County were inundated.
- During January 4th and 5th, 2005 several periods of heavy rain in conjunction with little vegetation over the winter months set the stage for widespread flooding across much of extreme southeast Kansas and southern and central Missouri. In Camden County, numerous roads and low-lying areas were inundated and impassable by motorists countywide. Some locations that were affected by flooding include, a section of Lake Road two miles south of Camdenton, numerous low water crossings throughout the county, and all roads crossing the Wet Glaize, Dry Glaize, Little Niangua, and the Big Niangua rivers.
- During January 4th – 6th, 2005 there was a flood event where the soils were nearly saturated at the onset of the event.
- On January 12th, 2005 a slow-moving storm system caused heavy rain to occur across much of southern and central Missouri. The lack of January vegetation also contributed to increased runoff and flooding. In Camden County, the primary areas that flooded were low water crossings and low-lying areas.
- On April 11th, 2005 heavy thunderstorms caused flash flooding over low water crossings

- near the community of Linn Creek.
- On June 9th, 2005 over a section of Highway “A” heavy thunderstorms caused flash flooding.
 - On May 22nd, 2006 excessive rainfall caused a low water crossing on Carroll Cave Road to become impassable to motorists from flash flooding.
 - On August 25th, 2006 heavy rain from thunderstorms caused flash flooding over a few low water crossings in the Montreal area.
 - On May 2nd, 2007 excessive rainfall caused minor flooding in a couple of spots within Camden County. The Red Bird Range low water crossing between the cities of Macks Creek and Climax Springs became impassable to motorists. Another low water crossing on Willow Creek east of Camdenton became impassable.
 - On May 10th, 2007 flash flooding occurred over numerous low waters crossing and low-lying areas throughout the county.
 - On June 29th, 2007 sections of Highways 537 and 541 were inundated with flash flooding due to slow moving thunderstorms.
 - On August 20th, 2007 heavy rain from the remnants of Tropical Storm Erin caused flooding across a few areas of Camden County. Locations that experienced flooding include low water crossings on Route BB just south of Highway 7, a section of Route H west of Route T, and numerous low water crossings across southern sections of the county.
 - On September 7th, 2007 with minor flooding occurring over a section of Ball Park Road in Camdenton. There was minor flash flooding due to thunderstorms over central Missouri.
 - On February 16th, 2008 widespread flash flooding occurred over Camden County. A couple of specific locations that experienced this flooding included a section of Ball Park Road in Camdenton and a section of U Highway near Macks Creek.
 - On March 18th, 2008 four to six inches of rain fell over Camden County. All low areas that typically flood during periods of excessive rainfall were flooded. Damage to county roads and bridges was common.
 - On April 3rd, 2008 several low water crossings across the county flooded. Sections of Highway H west of its intersection with Highway T also experienced flooding. Marginally severe thunderstorms produced hail and flash flooding over several counties in southwest and central Missouri. Wet soil conditions from record breaking rainfall caused enhanced runoff leading to an unusual onset of flash flooding.
 - On April 10th, 2008 a flash flood event occurred in the planning area.
 - On May 25th, 2008 excessive rain caused several low water crossings in eastern sections of the county to become impassable to motorists. Single cell thunderstorms developed over southwest Missouri in response to the approach of a mesoscale convective vortex. Large hail, damaging winds, and a localized area of flash flooding occurred.
 - On June 4th, 2008 excessive rain caused several low water crossings across the county to flood. Also, thunderstorms around the north areas of Interstate 44 were formed leading to large hail, damaging straight line winds, and one tornado.
 - On February 11th, 2009 large shield of showers and thunderstorms produced widespread rainfall amounts ranging from one to two inches across much of Camden County. A section of Upper Prairie Road flooded and was impassable to motorists. A low water crossing near the intersection of Highway T and Highway H became impassable also. This is a tributary of Rocky Hollow Creek, and intersects Highway H.
 - On February 10th, 2009 a squall line moved over portions of the Missouri Ozarks. Large

- hail, damaging winds and one tornado occurred with this squall line.
- On May 8th, 2009 rainfall amounts of two to four inches flooded several areas of Camden County. Two specific locations that flooded include a section of Highway 7 Southeast of Barnumton and a section of Highway BB one-mile South of Montreal.
 - On June 9th - 10th, 2009 excessive rain caused flooding over a section of Highway BB again.
 - On June 5th, 2009 two to five inches of rain fell over much of Northern Camden County. The community of Linn Creek appeared to have been impacted the greatest. Linn Creek flooded the community causing damage to 20 homes and businesses. The community of Sunrise Beach also experienced significant flash flooding.
 - On June 24th, 2009 excessive rainfall caused Linn Creek to flood low lying areas that surround that creek once again.
 - On October 8th, 2009 section of Upper Prairie Road flooded and was impassible to motorists.
 - On October 9th, 2009 roads were closed at Dodge Campground due to flooding.
 - On October 22nd, 2009 low water crossings at Cable Ridge Road near Rainy Creek flooded and were impassible.
 - On October 30th, 2009 route BB between Pritchett Road and Brown School Road was closed due to flooding.
 - On November 15th, 2008 rainfall amounts in excess of three inches occurred over portions of Southern and Central Missouri.
 - On February 21st, 2010, a low water crossing flooded on State Route H. A storm system with embedded thunderstorms and heavy rain moved across the Ozarks leading to flash flooding and flooding.
 - On May 12th, 2010 numerous roads and low water crossings in and around Osage Beach were reported as flooded and impassable. Strong to severe thunderstorms moved along the Highway 54 corridor across Kansas and Missouri. The storms produced very heavy rainfall with rainfall totals exceeding 4 ½ inches in some locations. The heavy rainfall lead to significant flooding of low water crossings, small streams and urban areas. Hail to the size of ping pong balls and winds up to 60 mph were also reported with the storms as they moved across the Ozarks.
 - On August 6th, 2014 Highway 7 near Shepherd Road was closed to traffic due to high water. Route A, near Thousand Acres Road was closed due to flooding. A stalled frontal boundary led to multiple rounds of thunderstorms which stalled over the same areas and produced intense rainfall rates and rainfall totals. Most areas received between one and five inches of rainfall with some localized area receiving 20 inches of rainfall in several days. This caused devastating floods and flash floods with some rivers reaching all-time record levels. There were several hundred rescues performed and evacuation of over 500 individuals from their homes across the Missouri Ozarks. Joint agencies from the Federal, State and local assessed over 18 million dollars in damages to property and infrastructure. Over 380 homes and over 130 businesses were damaged due to the floods.
 - On August 7th, 2014 Route H was closed in both directions near the intersection of Highway T due to flood waters.
 - On June 16th, 2015 a barn and several roads were flooded.
 - In August 2015 heavy rainfall damaged and washed away portions of Dawson Road near a grocery store in Camdenton. The damaged road broke a water main in the area.
 - On May 20th, 2018 a slow-moving weather system with a stalled out frontal boundary

- caused several rounds of thunderstorms with damaging wind and large hail.
- On July 18th, 2018 scattered thunderstorms with rainfall rates in excess of an inch per hour lingered over a few locations in the Ozarks causing localized flash flooding. Linn Creek was flowing out of its banks and flooded across Highway 54 in Linn Creek.
 - On June 13th 2019 flooding in the area set the Lake of the Ozarks which forced Ameren official to raise all flood gates on the lake and causing the Osage River to raise 10 feet and raise to the 21 feet level.
 - On January 10th much of central and southern Missouri received 2" to 5" rainfall over 36 hours, leading to flooding throughout the Lake of the Ozarks.

Probability of Future Occurrence

The probability of the future occurrence for a flash flood is calculated by taking the number of events and dividing that by the number of years. There were 54 flash flood events in 20 years for the planning area equaling a 270% probability of a future occurrence somewhere in the planning area in any given year, with an average of 2.7 events per year.

The probability of the future occurrence for riverine flooding is calculated by the 26 events recorded and dividing by the 20-year period. There is 130% probability of a future occurrence somewhere in the planning area in any given year, with an average of 1.3 events per year.

Changing Future Conditions Considerations

According to the 2018 State of Missouri Hazard Mitigation Plan, over the last half century, the average annual precipitation in most of the Midwest has increased by 5 to 10 percent. But rainfall during the four wettest days of the year has increased about 35 percent, and the amount of water flowing in most streams during the worst flood of the year has increased by more than 20 percent.

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

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

It is important to note that the threat of more frequent flood events may be a concern to the planning area due to having a dependence on the Lake of the Ozarks for tourism.

Vulnerability

Vulnerability Overview

The planning area is highly vulnerable to flash flooding events, With 54 events in 20 years and \$1,606,000.00 in damages. Flooding presents a danger to life and property, often resulting in injuries, and in some cases, fatalities. Floodwaters themselves can interact with hazardous materials. Hazardous materials stored in large containers could break loose or puncture as a result of flood activity. Examples are bulk propane tanks. When this happens, evacuation of citizens is necessary.

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

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

Potential Losses to Existing Development

Camden County has a building loss ratio of 1.14% which is low in relation with other counties in the State. Additionally, the county has 21 repetitive loss properties with two of those being mitigated, as shown in Table 3.19 Repetitive Loss Properties. With the annual average probability for flash flooding at 270% and riverine flooding at 130% Camden County's existing development is vulnerable. Especially development located in low-lying areas, near rivers or streams, or where drainage systems are not adequate are all prone to flooding.

According to the Data Collection Questionnaires from each jurisdiction there is no new or future development that will occur in the 100-year floodplain.

Impact of Previous and Future Development

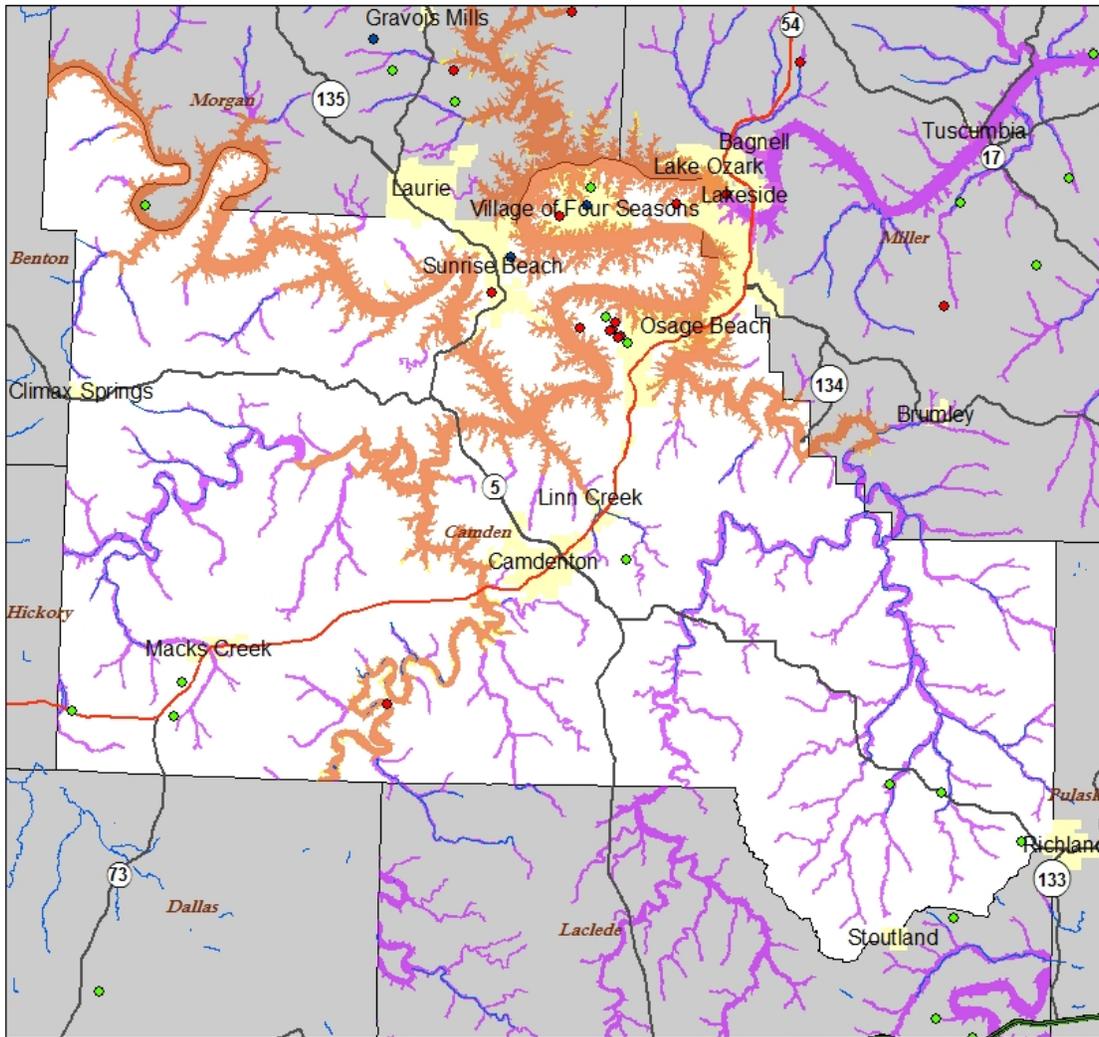
Future development could impact flash and riverine flooding in all areas of Camden County. Development in low-lying areas near rivers and streams or where interior drainage systems are not adequate during heavy rainfall events will be at risk to flooding. Future development would also increase impervious surfaces causing additional water run-off and drainage problems during heavy rainfall events.

Hazard Summary by Jurisdiction

Vulnerability to flooding slightly varies across the planning area. The figures above show each jurisdiction within Camden County. Each jurisdiction within the county has some structures at risk with the City of Linn Creek, City of Osage Beach, and the Village of Four Seasons having the greatest number of structures at risk in the flood zones.

Table 3.15 shows the events by location. School and special districts assets are located in floodplains or data from the Data Collection Questionnaire indicating heightened risk for any school or special district asset.

The map below shows the flood plains for Camden County. The map reveals an extensive network of rivers and streams that flow through the county's many valleys. The confluence of several large rivers made it feasible to create a large impoundment, leading to the economic development of the Lake region.



Legend

Dam 2010

HAZARD

- High Hazard Potential
- Low Hazard Potential
- Significant Hazard Potential

Highway201010

Representation: Highway201010_Rep

- Interstate Highway
- U.S. Highway
- State Highway
- River

NFHL Zones

- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- A
- AE
- City



Zone A

-an area inundated by 100 year flooding, for which no BFF's* have been established.

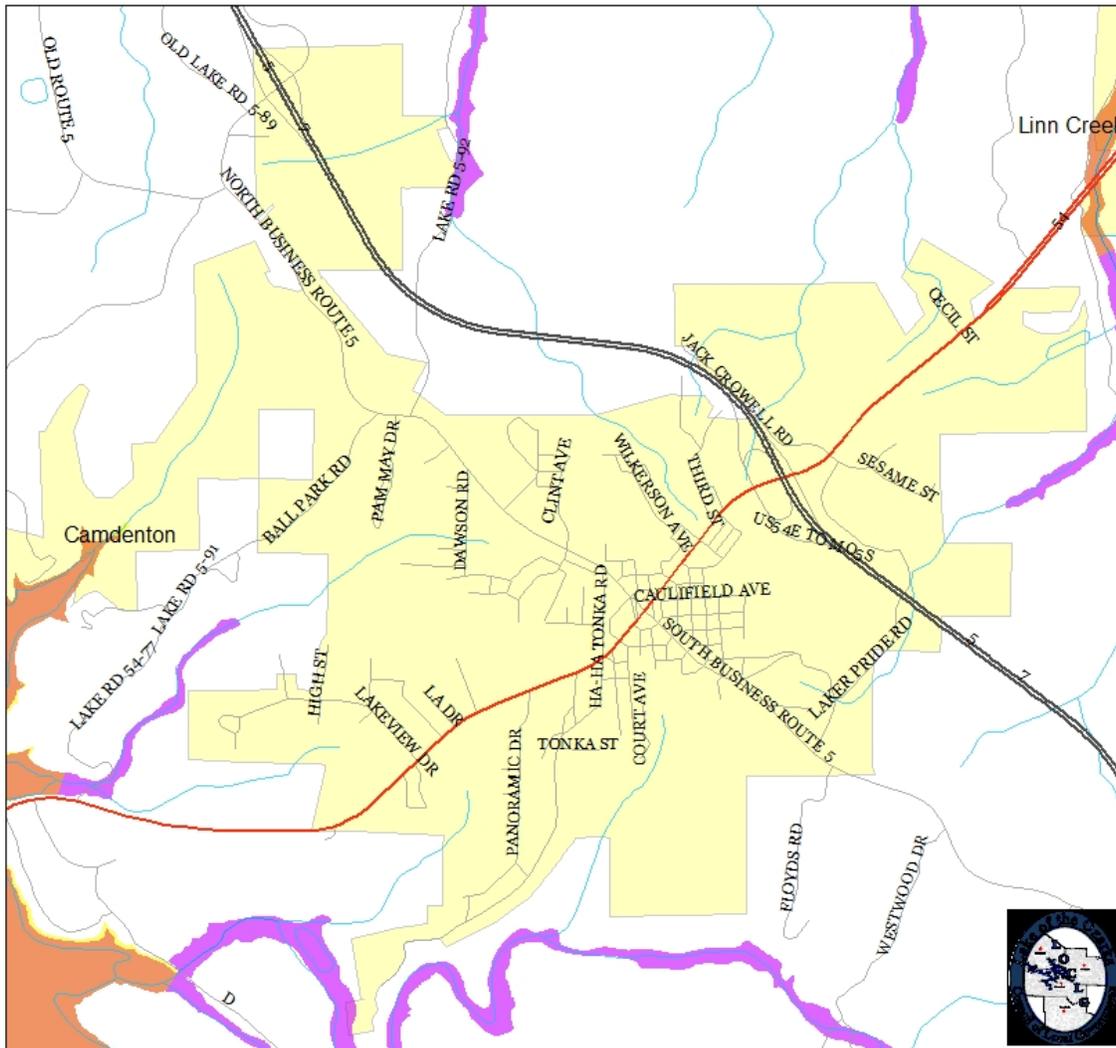
Zone AE

An area inundated by 100 year flooding, for which BFF's* have been determined.

*** BFF**

Base Flood Elevations

The City of Camdenton is only impacted by mapped flood plains on its extreme southern edge and its western edge. The developed portions of the city are free from riverine flood risk. However, portions of the city are vulnerable to flash flooding due to poor street drainage.



City of Camdenton DFIRM Flood Zones

0 0.275 0.55 1.1 Miles

Legend

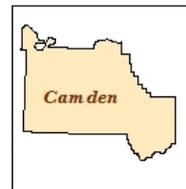
Highway201010

Representation: Highway201010_Rep

- Interstate Highway
- U.S. Highway
- State Highway
- River
- Road

NFHL Zones

- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- A
- AE
- Incorporated Area



Zone A

-an area inundated by 100 year flooding, for which no BFF's * have been established.

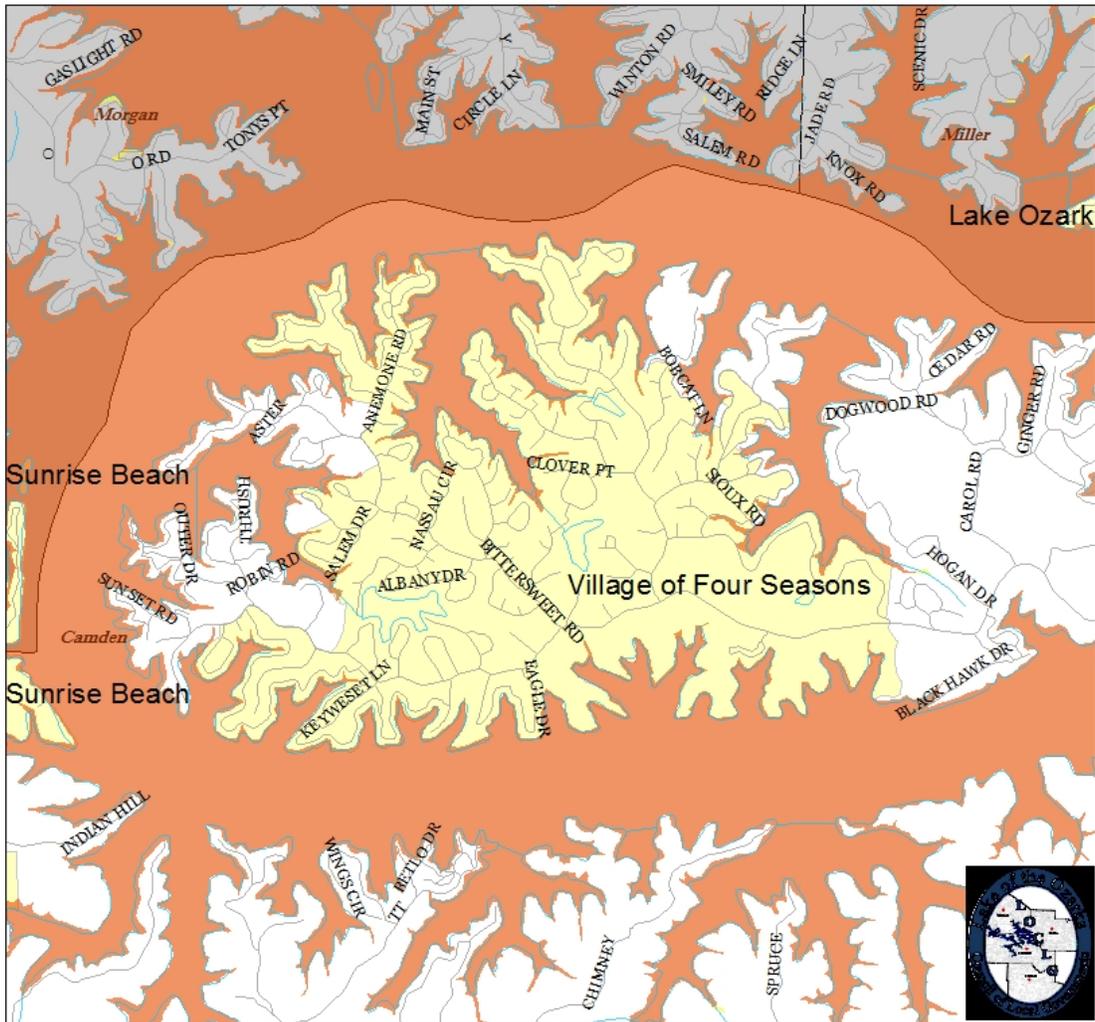
Zone AE

An area inundated by 100 year flooding, for which BFF's* have been determined.

*** BFF**

Base Flood Elevations

The flood plain of the Village of Four Seasons is shown below. The village is surrounded on three sides by the Lake of the Ozarks. Structures along the shoreline are at-risk for flooding. However, shoreline flooding is an issue that has not been addressed by this plan. Additionally, the village's hilly terrain provides many opportunities for flash flooding.



Village of Four Seasons DFIRM Flood Zones 0 0.35 0.7 1.4 Miles N

Legend

Highway201010
Representation: Highway201010_Rep
 Interstate Highway
 U.S. Highway
 State Highway
 River
 Road

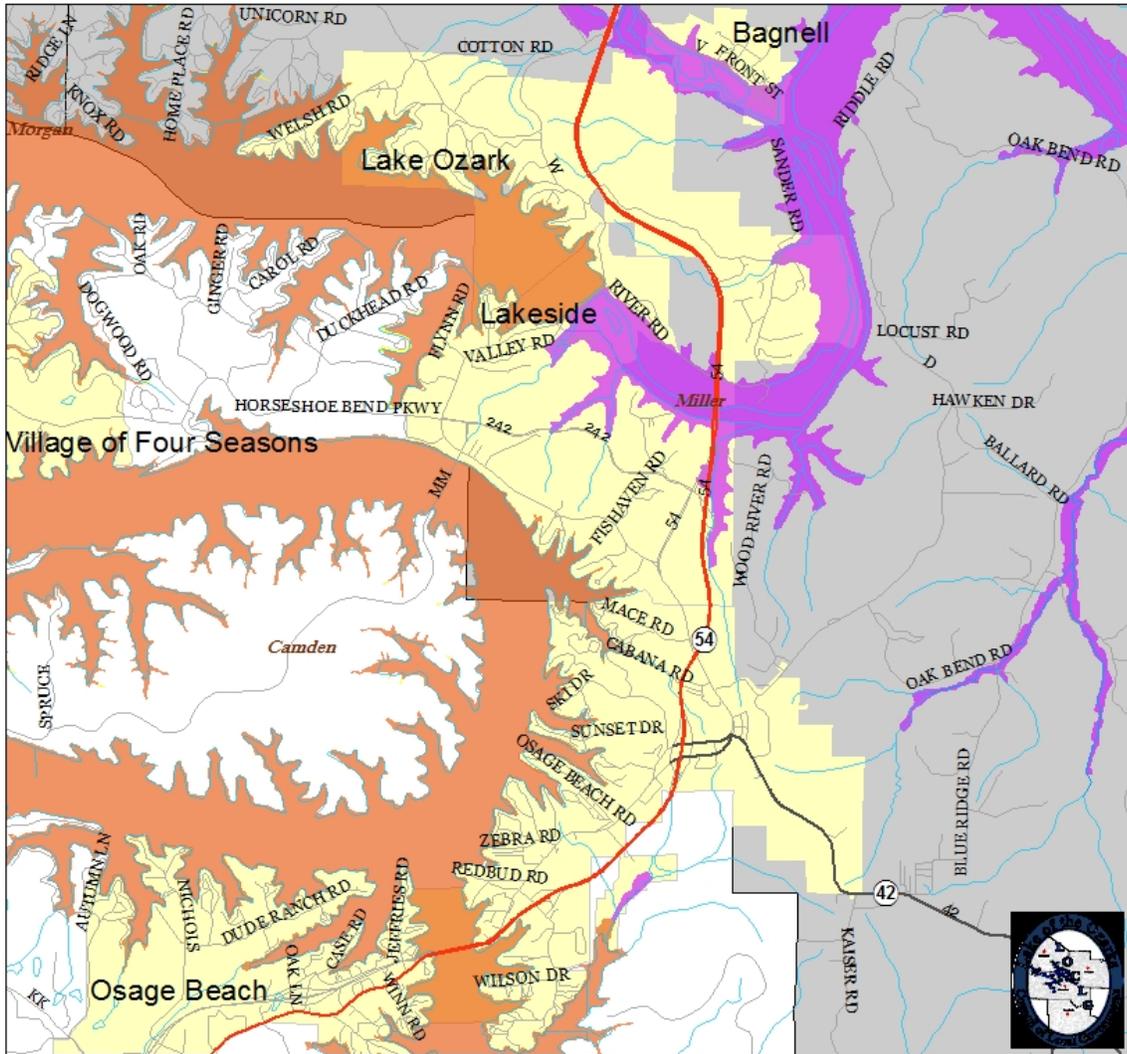
NFHL Zones
 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
 A
 AE
 Incorporated Area

Zone A
 -an area inundated by 100 year flooding, for which no BFF's* have been established.

Zone AE
 An area inundated by 100 year flooding, for which BFF's* have been determined.

*** BFF**
 Base Flood Elevations

The City of Lake Ozark is impacted by shoreline flooding and riverine flooding below Bagnell Dam. There is limited permanent development below Bagnell Dam, but there are a number of recreational parks. The city is also vulnerable to flash flooding in areas outside of the mapped flood plains due to poor street drainage.



City of Lake Ozark DFIRM Flood Zones

Legend

Highway201010

Representation: Highway201010_Rep

- Interstate Highway
- U.S. Highway
- State Highway
- River
- Road

NFHL Zones

- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- A
- AE
- Incorporated Area

Zone A

-an area inundated by 100 year flooding, for which no BFF's * have been established.

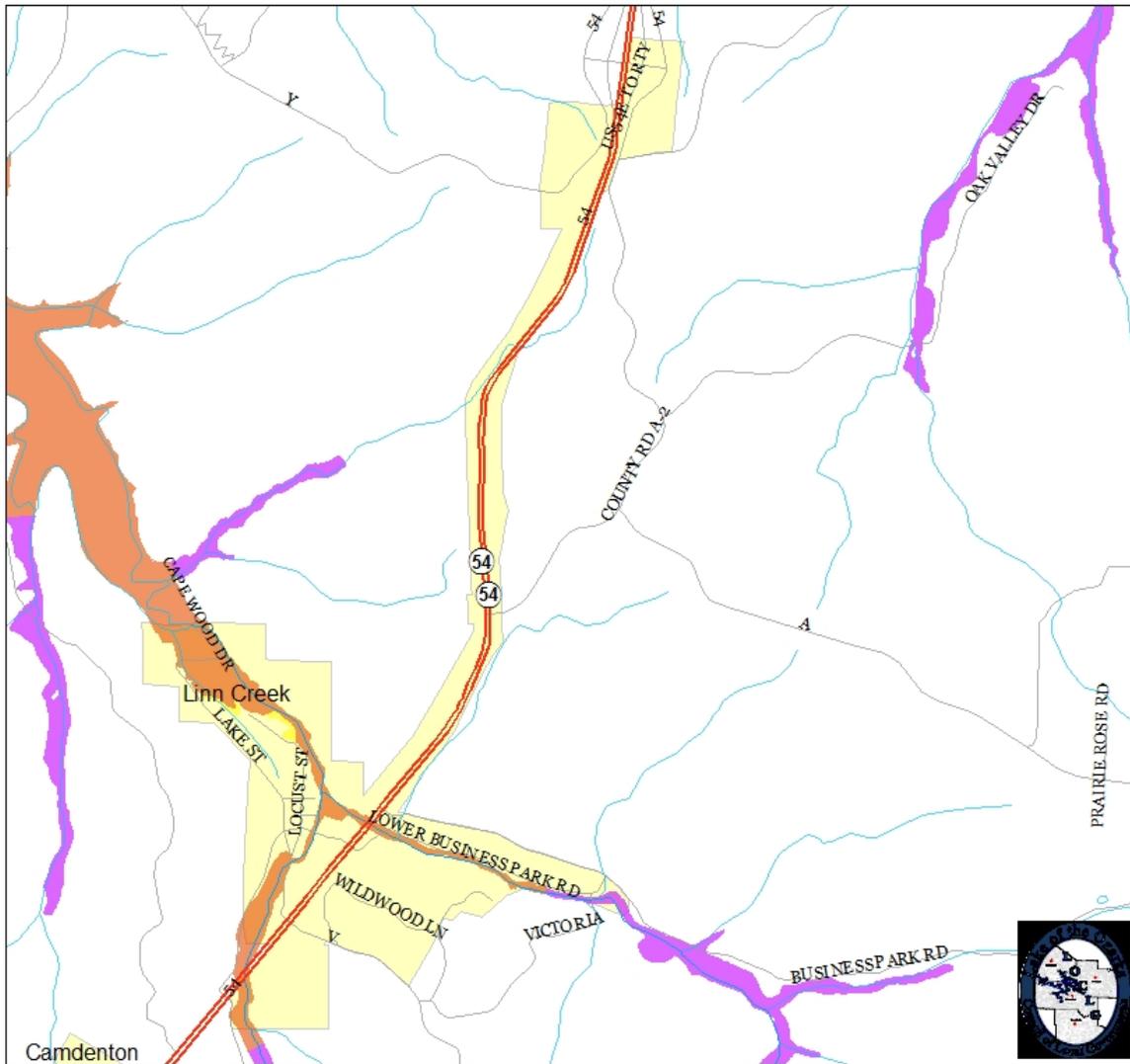
Zone AE

An area inundated by 100 year flooding, for which BFF's* have been determined.

*** BFF**

Base Flood Elevations

The City of Linn Creek is impacted by flood plains throughout its boundaries. Linn Creek, the city's namesake, presents a large flood risk to the city. Recent acquisitions of residential properties along Linn Creek have reduced the city's vulnerability to this regularly occurring risk.



City of Linn Creek DFIRM Flood Zones

Legend

Highway201010

Representation: Highway201010_Rep

- Interstate Highway
- U.S. Highway
- State Highway
- River
- Road

NFHL Zones

- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- A
- AE
- Incorporated Area

Zone A

-an area inundated by 100 year flooding, for which no BFF's* have been established.

Zone AE

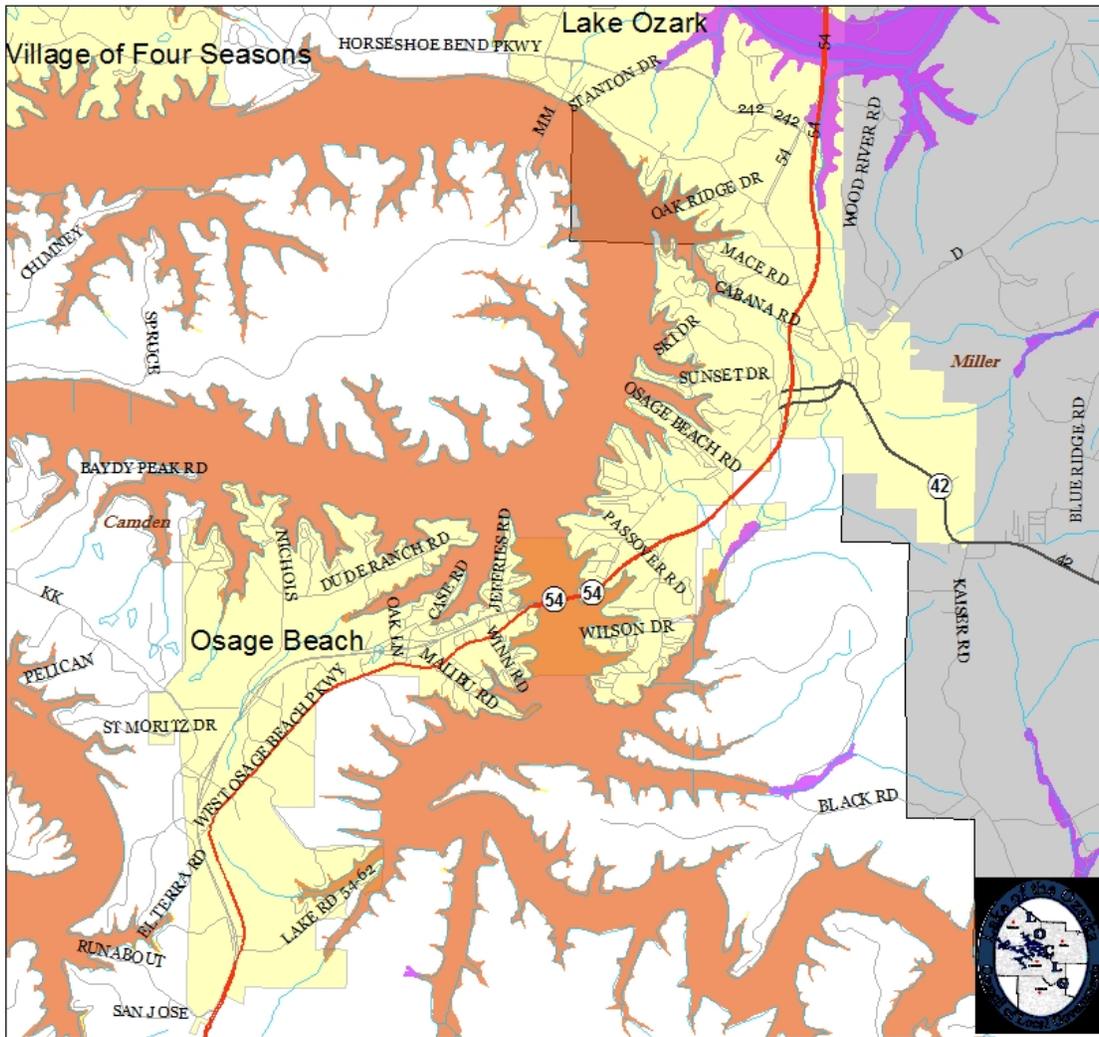
An area inundated by 100 year flooding, for which BFF's* have been determined.

*** BFF**

Base Flood Elevations



The City of Osage Beach is primarily vulnerable to shore-line flooding, though there are a number of smaller creeks that do experience flash flooding. The city is divided by the Lake of the Ozarks, resulting in an even greater amount of land near water and susceptible to flash flooding.



City of Osage Beach DFIRM Flood Zones

Legend

Highway201010

Representation: Highway201010_Rep

- Interstate Highway
- U.S. Highway
- State Highway
- River
- Road

NFHL Zones

- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- A
- AE
- Incorporated Area

Zone A

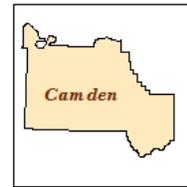
-an area inundated by 100 year flooding, for which no BFF's * have been established.

Zone AE

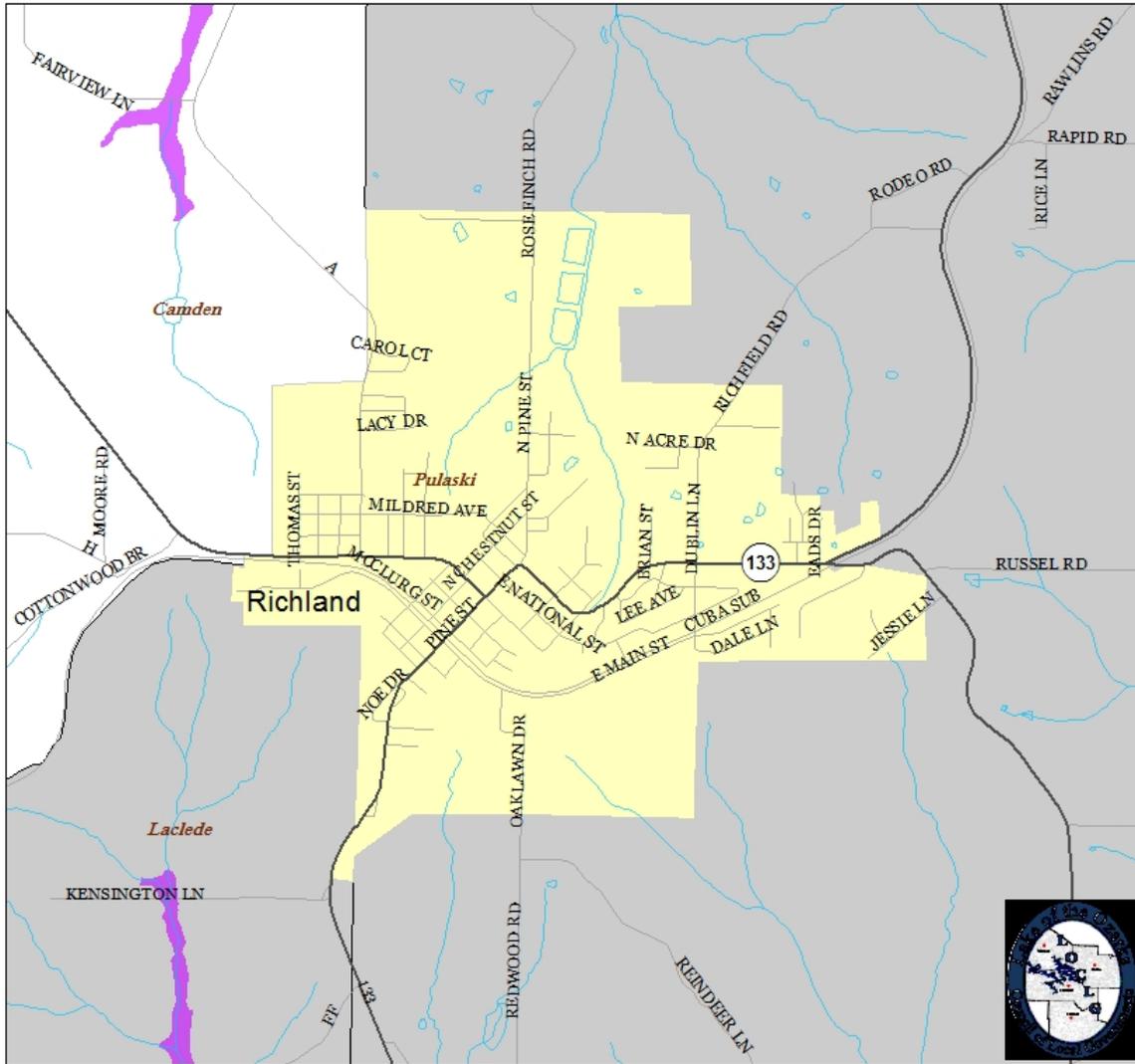
An area inundated by 100 year flooding, for which BFF's* have been determined.

*** BFF**

Base Flood Elevations



The City of Richland is primarily vulnerable to flashing flooding hazards. The city has no mapped flood plains within its boundaries. There are two creek branches that begin in the city that can flood and impact development.



City of Richland DFIRM Flood Zones

Legend

Highway201010

Representation: Highway201010_Rep

- Interstate Highway
- U.S. Highway
- State Highway
- River
- Road

NFHL Zones

- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- A
- AE
- Incorporated Area

Zone A

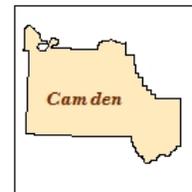
-an area inundated by 100 year flooding, for which no BFF's * have been established.

Zone AE

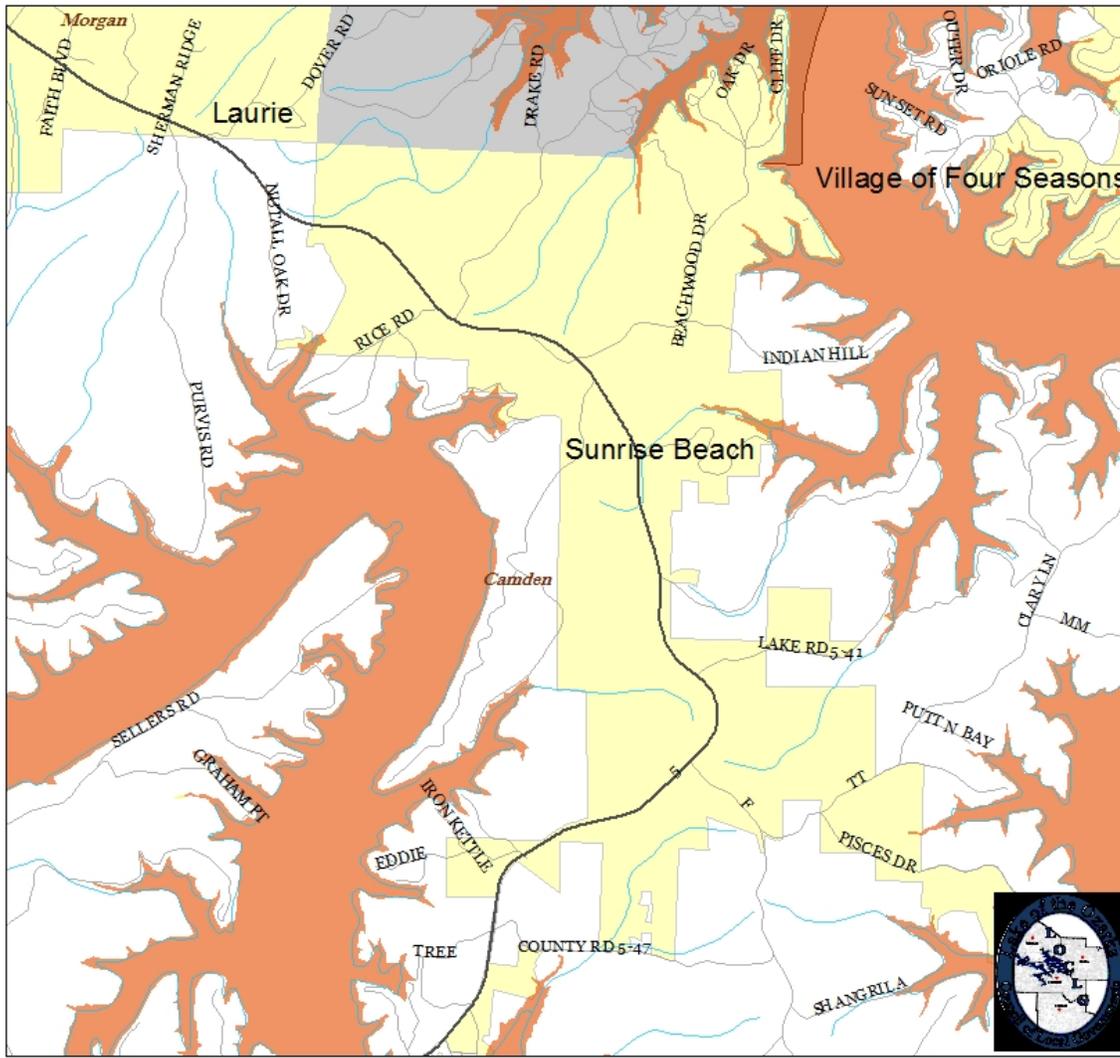
An area inundated by 100 year flooding, for which BFF's* have been determined.

*** BFF**

Base Flood Elevations



The Village of Sunrise Beach is vulnerable to flash flooding risks. The village's close proximity to the Lake of the Ozarks, and the large number of creeks that flow through the hilly terrain pose a flash flooding risk.



Village of Sunrise Beach DFIRM Flood Zones

Legend

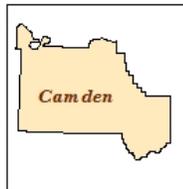
Highway201010

Representation: Highway201010_Rep

- Interstate Highway
- U.S. Highway
- State Highway
- River
- Road

NFHL Zones

- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- A
- AE
- Incorporated Area



Zone A

-an area inundated by 100 year flooding, for which no BFF's * have been established.

Zone AE

An area inundated by 100 year flooding, for which BFF's* have been determined.

*** BFF**

Base Flood Elevations

Problem Statement

Floodplain mapping and participation in the National Flood Insurance Program (NFIP) both play a major role in flood mitigation. The objectives of flood mitigation are to keep people, property, and possessions out of the floodplain area where reasonably feasible.

Participation in the NFIP requires that floodplain ordinances, which regulate development in the floodplain be adopted and enforced by each jurisdiction. The standard regulation requires that buildings be constructed at least 1 foot about the Base Flood Elevation (BFE).

Both flash floods and riverine are frequent events in Camden County and have been included in some of the disaster declarations. The greatest risk from flooding comes from rivers and creeks quickly overflowing on roadways, making them become impassable during flood events. Projects that improve river/stream embankments can reduce flooding to surrounding properties.

3.4.2 Dam Failure

Some specific sources for this hazard are:

- 2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.3, Page 3.148
https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf
- Missouri Department of Natural Resources, Dam and Reservoir Safety,
<https://dnr.mo.gov/geology/wrc/dam-safety/?/env/wrc/dam-safety/>
- Stanford University's National Performance of Dams Program;
<http://npdp.stanford.edu/>
- USACE National Inventory of Dams
http://nid.usace.army.mil/cm_apex/f?p=838:12
- National Resources Conservation Service
<http://www.nrcs.usda.gov>
- DamSafetyAction.org
<https://damsafety.org/missouri>
- Missouri Hazard Mitigation Viewer
<http://bit.ly/MoHazardMitigationPlanViewer2018-Website>
<https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide
 - Total number of Missouri NID dams by County
 - Total number of High, Significant, and Low Hazard dams by County
 - Total number of State Regulated dams by County
 - Total number of Class 1, Class 2, and Class 3 dams by County
 - Total number of structures impacted by USACE dams by County
 - Total number of structures impacted by State dams by County
 - Total value of structures impacted by USACE dams by County
 - Total value of structures impacted by State dams by County
 - Total population impacted by USACE dams by County
 - Total population impacted by State dams by County

Hazard Profile

Hazard Description

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

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

Table 3.22 defines the MoDNR Dam Hazard Classifications.

Table 3.22. MoDNR Dam Hazard Classification Definitions

Hazard Class	Definition
Class I	The area downstream from the dam that would be affected by inundation contains ten (10) or more permanent dwellings or any public building. Inspections of these dams must occur every two years.
Class II	The area downstream from the dam that would be affected by inundation contains one (1) to nine (9) permanent dwellings or one (1) or more campgrounds with permanent water, sewer and electrical services or one (1) or more industrial buildings. Inspection of these dams must occur once every three (3) years.
Class III	The area downstream from the dam that would be affected by inundation does not contain any structures identified for Class 1 or Class 2 dams. Inspection of these dams must occur once every five (5) years.

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

Table 3.23 defines the NID Dam Hazard Classifications.

Table 3.23. NID Dam Hazard Classification Definitions

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

Geographic Location**Dams Located Within the Planning Area**

Table 3.24 provides names, locations, and other pertinent information for all high hazard dams in the planning area.

Table 3.24. High Hazard Dams in the Camden County Planning Area

Dam Name	Emergency Action Plan (EAP/AP)	Dam Height (Ft)	Normal Storage (Acre-Ft)	Last Inspection Date	River	Nearest Downstream City	Distance To Nearest City (Miles)	Dam Owner
Tuner Lake Dam	Y	58	208	11/19/2015	TR-Macks Creek	Macks Creek	0	BK Turner
Good Oak Lake Dam	N	41	635	11/19/2013	TR-Osage River	Bagnell	0	Four Seasons Country Club
Treeline Lake Dam	Y	40	580	10/18/2016	TR-Osage River KJ Ozarks	Bagnell	0	Four Seasons Lake Sites
Burton Duenke #5 Dam	Y	45	45	6/4/2015	TR-Lake of the Ozarks	Bagnell	0	None Listed
Burton Duenke #3 Dam	Y	46	58	7/14/2017	TR-Osage	Lake Ozark	0	Duenke Real Est. Holding
Burton Duenke #1	Y	35	70	7/14/2017	TR-Osage	Lake Ozark	0	Burton Duenke Develop. Co.
Burton Duenke #2	Y	51	78	6/12/2015	TR-Osage	Lake Ozark	0	Duenke Real Estate Holdings, L
Burton Duenke #6	N	42	42	1/22/2015	TR-Osage	Bagnell	0	Burton Duenike Develop Co.
Burton Duenke #4	Y	43	258	3/9/2017	TR-Lake of the Ozarks	Bagnell	0	Duenke Real Est. Holding
Marschke Lake Dam	NR	18	6	NR	McFarland Hollow Creek	Linn Creek	1	Mr. Carl Marschke
Seasons Ridge Golf Course Dam	Y	48	108	6/9/2016	TR-Jenning Branch	Camden	1	Lodge of Four Seasons
Lake Stingray Dam	Y	64	1067	None Listed	Labidie Creek	N/A	0	Lloyd Lynn Dam
Hidden Lakes #5	Y	53	7.1	7/14/2017	TR-Lake of the Ozarks	Tan Tar A	0.06	None Listed

Sources: Missouri Department of Natural Resources, <https://dnr.mo.gov/geology/wrc/dam-safety/damsinmissouri.htm> and National Inventory of Dams, http://nid.usace.army.mil/cm_apex/f?p=838:12. Contact the MoDNR Dam and Reservoir Safety

Program at 800-361-4827 to request the inundation maps for your county to show geographic locations at risk, extent of failure and to perform GIS analysis of those assets at risk to dam failure.

According to the List of Field Definitions-2018 National Inventory of Dams an Emergency Action Plan (EAP) is defined as a plan of action to be taken to reduce the potential for property damage and loss of life in an area affected by a dam failure or large flood. Y for yes, N for no, and NR for

Not Required by submitting agency. There are 13 high hazard dams within the planning area. 10 of these dams have an active EAP, 2 do not and 1 is not required.

The dam height is measured in feet, number and the height of the dam, in feet to the nearest foot, which is defined as the vertical distance between the lowest point on the crest of the dam and the lowest point in the original streambed.

Normal storage, in acre-feet, which is defined as the total storage space in a reservoir below the normal retention level, including dead and inactive storage and excluding any flood control or surcharge storage.

An inspection date is the most recent inspection of the dam prior to the transmittal of the data by the submitting agency.

The designation of the river or stream may be entered in one of two ways.

- River or Stream Standard Entry: The official name of the river or stream on which the dam is built. If the stream is unnamed, identify it as a tributary to a named river, e.g. TR-Macks Creek. If the dam is located off stream, the name is entered as the name of the river or stream plus "-OS".
- River or Stream Alternative Entry: The official name of the river or stream on which the dam is built. If the stream is unnamed, identify it as a tributary to a named river, e.g. TR-Osage River. If the dam is located off stream, the name is entered as the name of the river or stream plus the word, "Off stream."

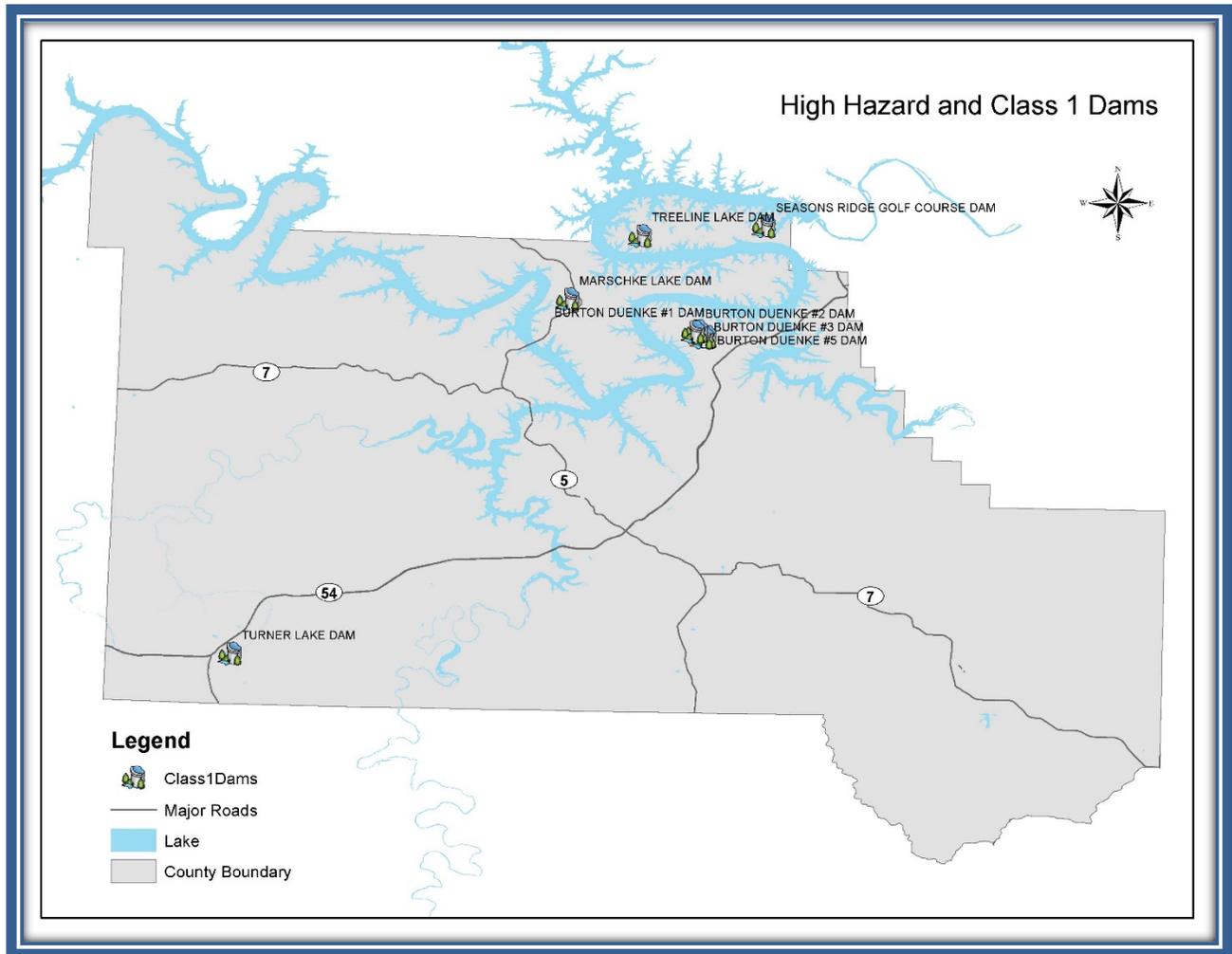
Nearest downstream city, town, or village will most likely be affected by floods resulting from the failure of the dam.

Distance to the nearest city/town/village is the distance from the dam to the nearest affected downstream city, town, or village, to the nearest mile (and tenth if appropriate).

The name(s) of the dam owners, if multiple owners, different owners are separated by a semi-colon.

Figure 3.2 provides the locations of the NID high hazard and Class 1 dams in Camden County and areas in the event of a breach.

Figure 3.2. High Hazard and Class 1 Dam Locations in Camden County and Areas Impacted in the Event of Breach



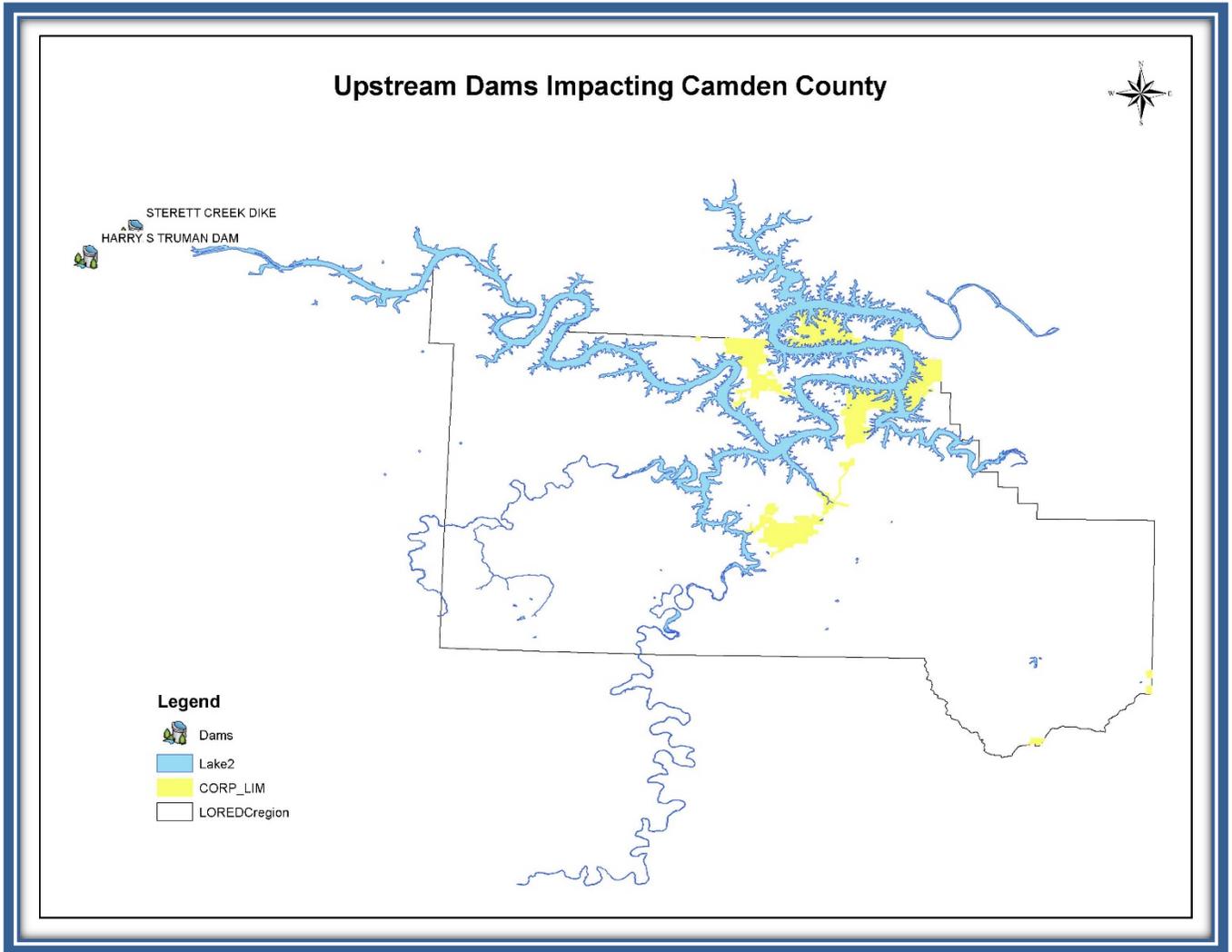
Source: ESRI

For dam failure, the geographic location affected is not the dam itself, but rather the areas that would be inundated in the event of dam failure.

Upstream Dams Outside the Planning Area

Figure 3.33 depicts the upstream dams outside of the Camden County planning area. The Harry S. Truman Dam is in West Central Benton County. The Osage River is a tributary of the Harry S. Truman Dam and the Osage River is part of the Lake of the Ozarks.

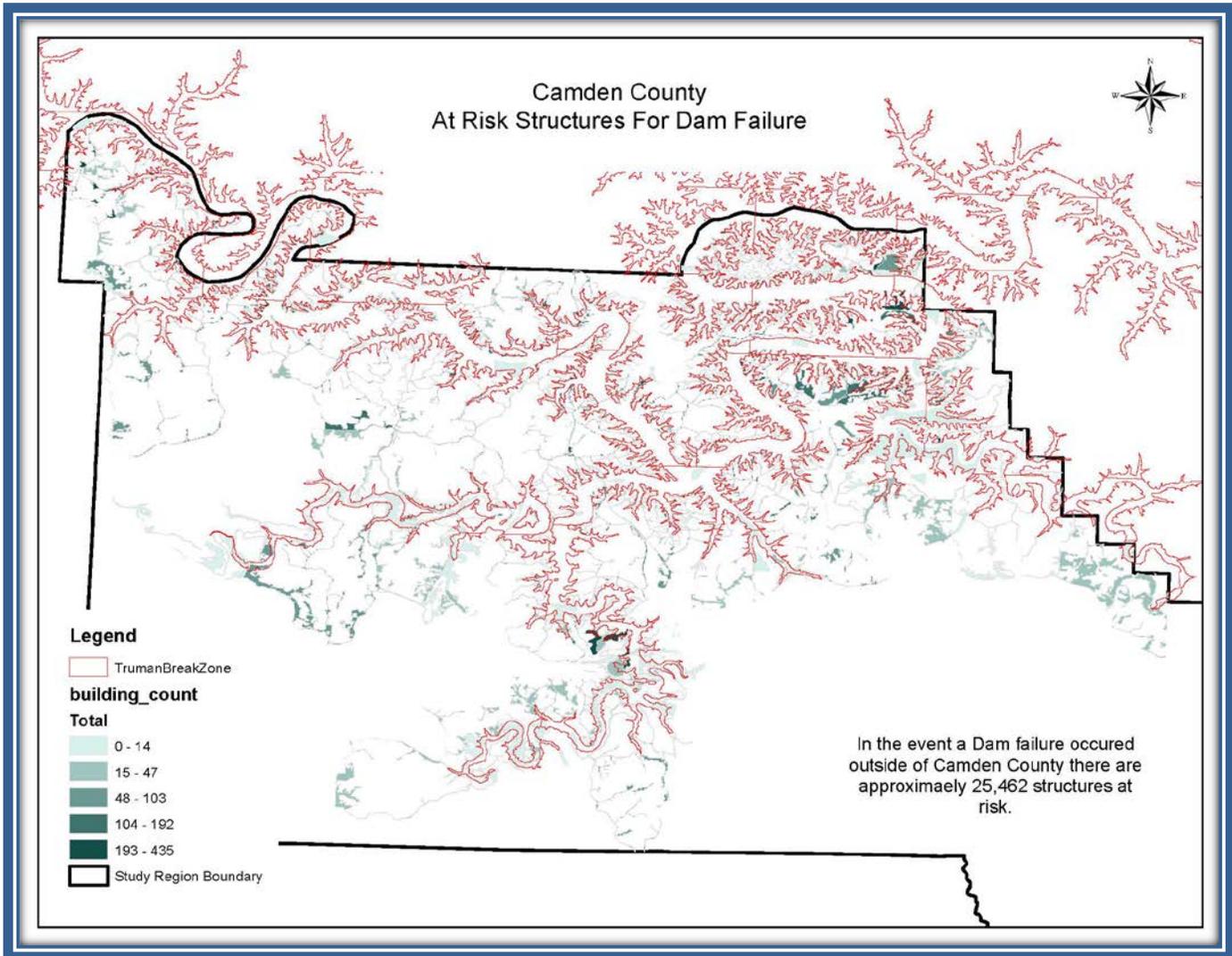
Figure 3.3. Upstream Dams Outside Camden County



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

Figure 3.4 below illustrates that in the event that an upstream dam fails there will be approximately 25,462 structures at risk.

Figure 3.4. At Risk Structures in the Event of an Upstream Dam failure



Source: ESRI

Strength/Magnitude/Extent

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

Previous Occurrences

There are no records of previous occurrences of dam failure within the county boundaries. To determine previous occurrences of dam failure within the planning area, the HMC utilized the approved Camden County 2015 HMP, the 2018 Missouri State Hazard Mitigation Plan, and the Stanford University's National Performance of Dams Program (<http://npdp.stanford.edu>).

Probability of Future Occurrence

Eleven of the thirteen dams listed in **Figure 3.24** have been inspected, one of the thirteen dams is not required to be inspected, and the other does not have an inspection date listed. The impact of regular inspection and maintenance lowers the probability of dam failure. Whereas the lack of regular inspection and maintenance can increase the probability of a future occurrence. There are no records of dam failure in the planning area on which to calculate the probability so it is determined that the probability is low.

Changing Future Conditions Considerations

The impacts of changing future conditions on dam failure will most likely be those related to changes in precipitation and flood likelihood. Changing future condition projections suggest that precipitation may increase and occur in more extreme events, which may increase risk of flooding, putting stress on dams and increasing likelihood of dam failure.

Vulnerability

Vulnerability Overview

The dam hazard classification system is a means to classify dams according to what impacts could occur in downstream inundation areas. But, this system does not indicate the structural integrity of the dam or likelihood of failure. For regulated dams, there are two main processes in place to advance dam safety:

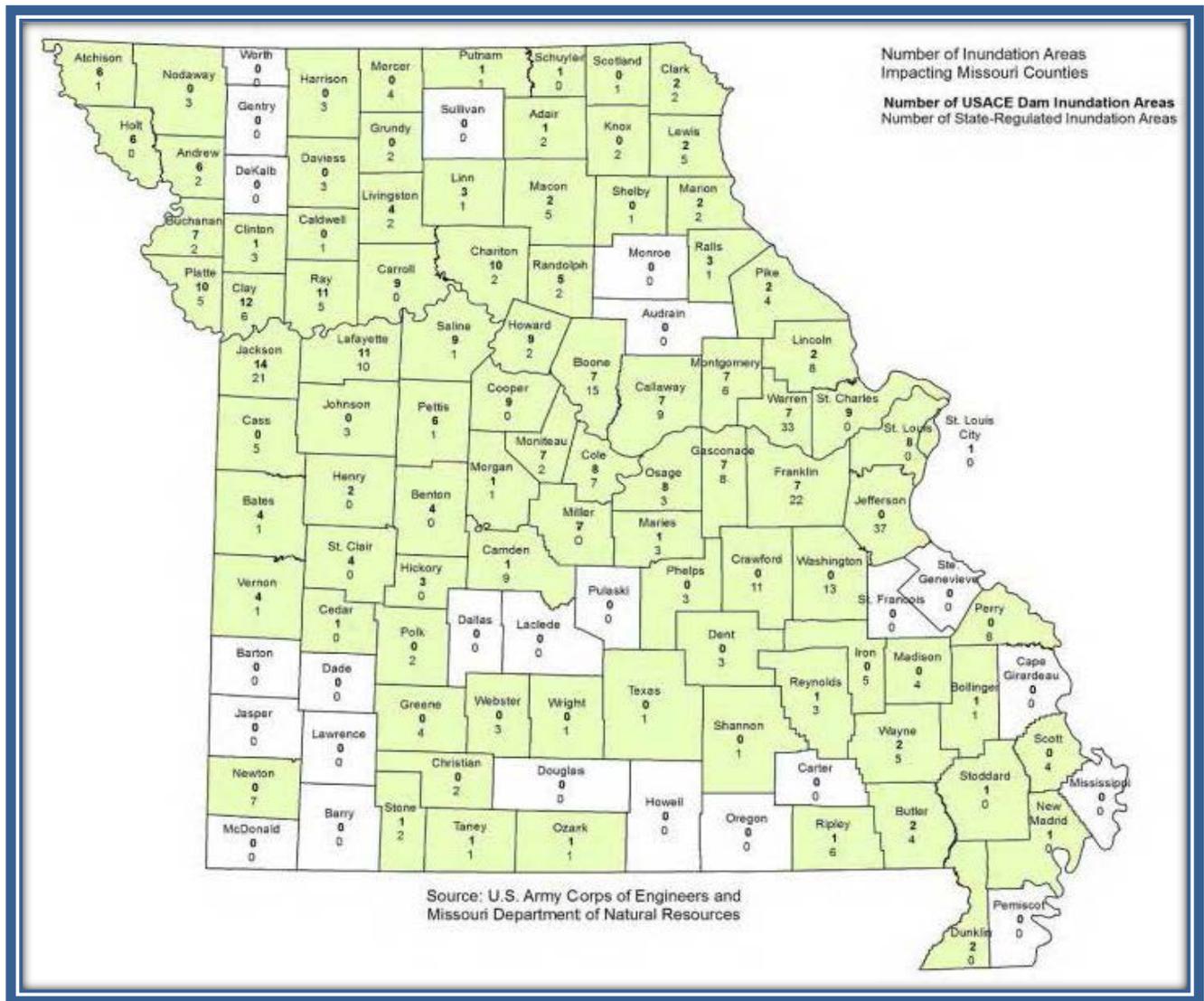
1. Inspection
2. Emergency Action Planning.

Of the thirteen dams in the planning area there are ten that have an emergency action plan (EAP), two that do not have EAP, and one that is not rated.

Figure 3.7 provides the number, by county of all state and USACE-regulated dams in Missouri for which inundation areas were made available for the State Hazard Mitigation Plan Vulnerability Analysis.

Persons at risk in inundation areas may include farm workers, hunters, anglers, hikers, campers and other recreationists. Livestock may also be endangered and crops may be damaged. In **Figure 3.5** the state of Missouri relied on available inundation maps for state and federally-regulated dams to complete an analysis of people and property vulnerable to dam failure in Missouri and the Camden County planning area is depicted below in **Table 3-26** and **Table 3-27**

Figure 3.5. State and Federally-regulated Dams with Provided Inundation Areas



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

Potential Losses to Existing Development:

Table 3.25. Estimated Numbers and Values of Structures and Population Vulnerable to Failure of State Regulated Dams with Available Inundation Areas.

County Wide	Number of Structures	Value of Structures	Population
Camden County	16	\$5,968,159.00	23

County Wide	Number of Structures	Value of Structures	Population
Agriculture	3	\$718,463.00	0
Commercial	4	\$3,226,996.00	0
Residential	9	\$2,022,700.00	23

Source: https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf

Table 3.26. Estimated Numbers and Values of Structures and Population Vulnerable to Failure of USACE Dams with Available Inundation Areas

County Wide	Number of Structures	Value of Structures	Population
Camden County	25,253	\$14,451,939,002.00	26,341
Agriculture	43	\$10,297,976.00	0
Commercial	15,073	\$12,160,125,927.00	0
Government	6	\$4,629,188.00	0
Residential	10,131	\$2,276,885,912.00	26,341

Source: https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf

Table 3.26 reflects the estimated numbers and values of structures along with population vulnerable to failure of state regulated dams with available inundation areas for the planning area.

According to the Missouri Hazard Mitigation Plan 2018, for State-regulated Class 1 and 2 dams that have available inundation maps as well as USACE dams for which inundation maps were available, GIS comparative analysis was accomplished against the building exposure data to determine the types, numbers, and estimated values of buildings at risk to dam failure. The Missouri HMP 2018 goes on to say that the building exposure data was based on the structure inventory data layer available from the Missouri Spatial Data Inventory Service (MSDIS). Furthermore, the available dam inundation areas were compared against the structure inventory to determine the numbers and types of structures at risk to dam failure in **Tables 3.26**. To calculate the estimated values of buildings at risk, buildings values available in the HAZUS census block data were used to determine an average value for each property type.

Impact of Previous and Future Development

There have been no reported dam failures in Camden County. However, as shown in **Table 3.26**, in the event that an upstream dam fails there will be approximately 25,253 structures impacted. Furthermore **Table 3.26** illustrates that previous development downstream of the USACE dams will have a catastrophic impact on the planning area in both loss of life and

structures. The impact of dam failure will have a direct correlation to the dam itself, the inspection process and frequency, along with the structures and population that lay in the path of the water. In all cases of complete dam failure, there will be considerable amount of devastation that will be associated with any incident including destroying all existing structures in the path of the water flow due to a dam failure.

Hazard Summary by Jurisdiction

The entire planning area could be most at risk if a failure in the upstream dam occurs. **Table 3.26** illustrates the devastation this upstream dam would have on the Camden County planning area in case of a failure. Specifically, that upstream dam shown in **Figure 3.4**.

Problem Statement

Overall, as documented in the Camden County Hazard Vulnerability Analysis, the risk of dam failure is relatively low in the planning area. Regular inspections and maintenance of dams may reduce the likelihood of a dam failure. Although the probability of a dam failure is unlikely, there is still potential damage that could occur if a dam in the planning area or upstream were to fail.

In **Table 3.24** the nearest city is listed for each dam. Within this table we see that the unincorporated area of Mack's Creek, Bagnell (Miller County), and the cities of Lake Ozark, and Linn Creek along with the residents within these areas and the structures should be familiar with a dam emergency action plan.

3.4.3 Earthquakes

Some specific sources for this hazard are:

- 2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.4, Page 3.192
https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf
- U.S. Seismic Hazard Map, United States Geological Survey, https://earthquake.usgs.gov/hazards/hazmaps/conterminous/2014/images/HazardMap2014_1.jpg;
- Impact of Earthquakes on the Central USA
http://www.cusec.org/documents/aar/NMSZ_CAT_PLANNING_SCENARIO.pdf
- Missouri Hazard Mitigation Viewer
<http://bit.ly/MoHazardMitigationPlanViewer2018-Website>
<https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide
 - Total population impacted by earthquakes by County
 - Total number of structures impacted by earthquakes by County
 - Total value of structures impacted by earthquakes by County
 - Property loss ratio to earthquakes by County

Hazard Profile

Hazard Description

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

The closest fault to Camden County is the New Madrid Seismic Zone (NMSZ). The NMSZ is the most active seismic area in the United States East of the Rocky Mountains. Unfortunately, the faults in the NMSX are poorly understood due to concealment by alluvium deposits. Moreover, the NMSZ is estimated to be 30 years overdue for a 6.3 magnitude earthquake according to the Missouri Department of Natural Resources.

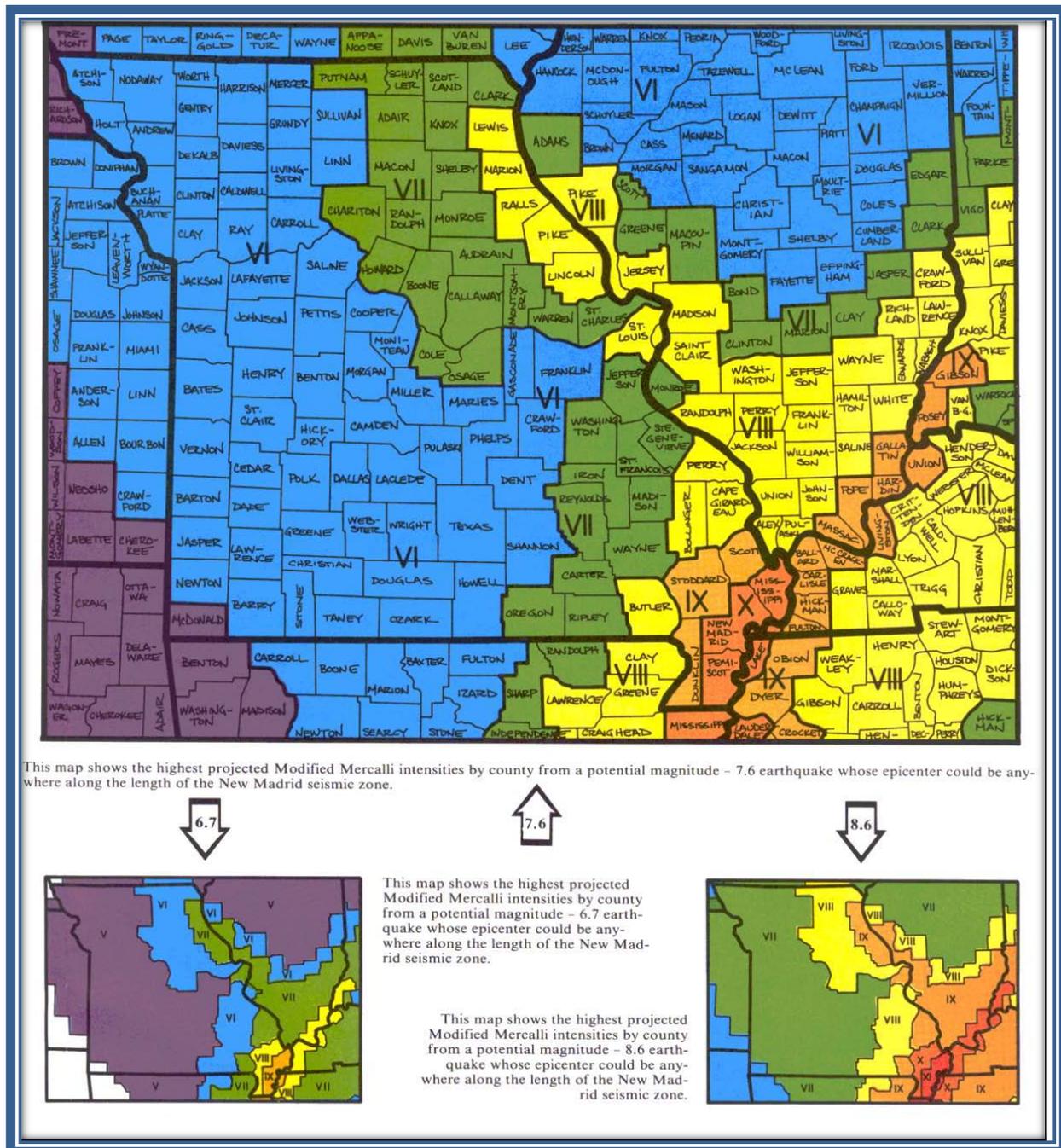
Geographic Location

There are eight earthquake source zones in the Central United States, one of which is located within the state of Missouri—the New Madrid Fault. Other seismic zones, because of their close proximity, also affect Missourians. These are the Wabash Valley Fault, Illinois Basin, and the Nemaha Uplift. The most active zone is the New Madrid Fault, which runs from Northern Arkansas through Southeast Missouri and Western Tennessee and Kentucky to the Illinois side of the Ohio River Valley.

Figure 3.6 depicts impact zones for a magnitude 7.6 earthquake along the New Madrid Fault along with associated Modified Mercalli Intensities. Furthermore, the Modified Mercalli Intensities for potential 6.7 and 8.6 magnitude earthquakes are illustrated. In the event of a 6.7 magnitude earthquake, Camden County would experience a Modified Mercalli Intensity of VI.

Figure 3.7 This intensity is categorized as being almost felt by everyone. Poorly built buildings are damaged slightly. Considerable quantities of dishes and glassware, and some windows are broken. People have trouble walking. Pictures fall off walls. Objects fall from shelves. Plaster in walls might crack. Some furniture is overturned. Small bells in churches, chapels and schools ring. Earthquake intensities will not vary across the planning area, which is the case for most Missouri Counties.

Figure 3.6. Impact Zones for Earthquake Along the New Madrid Fault



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

Figure 3.7. Projected Earthquake Intensities

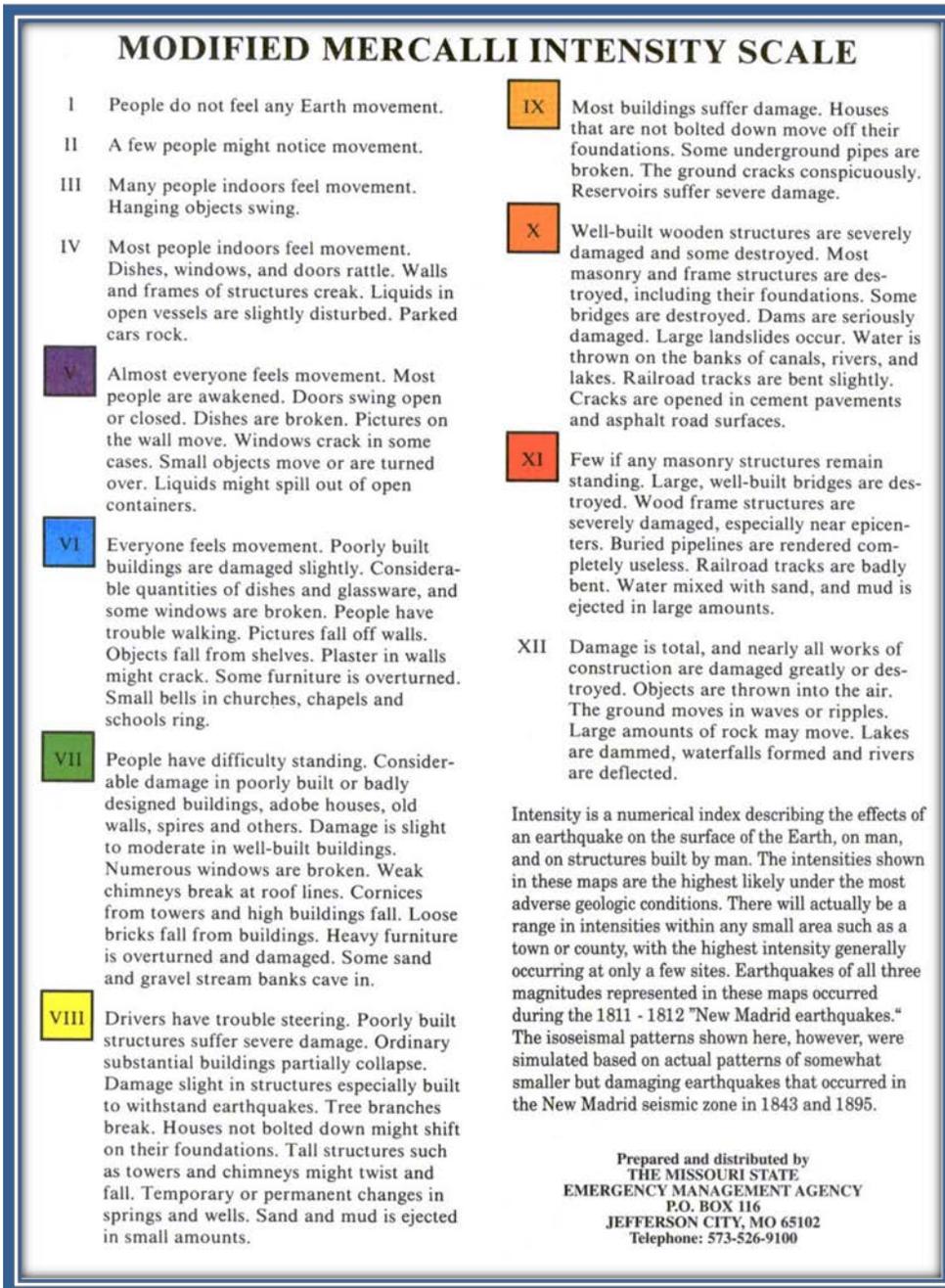
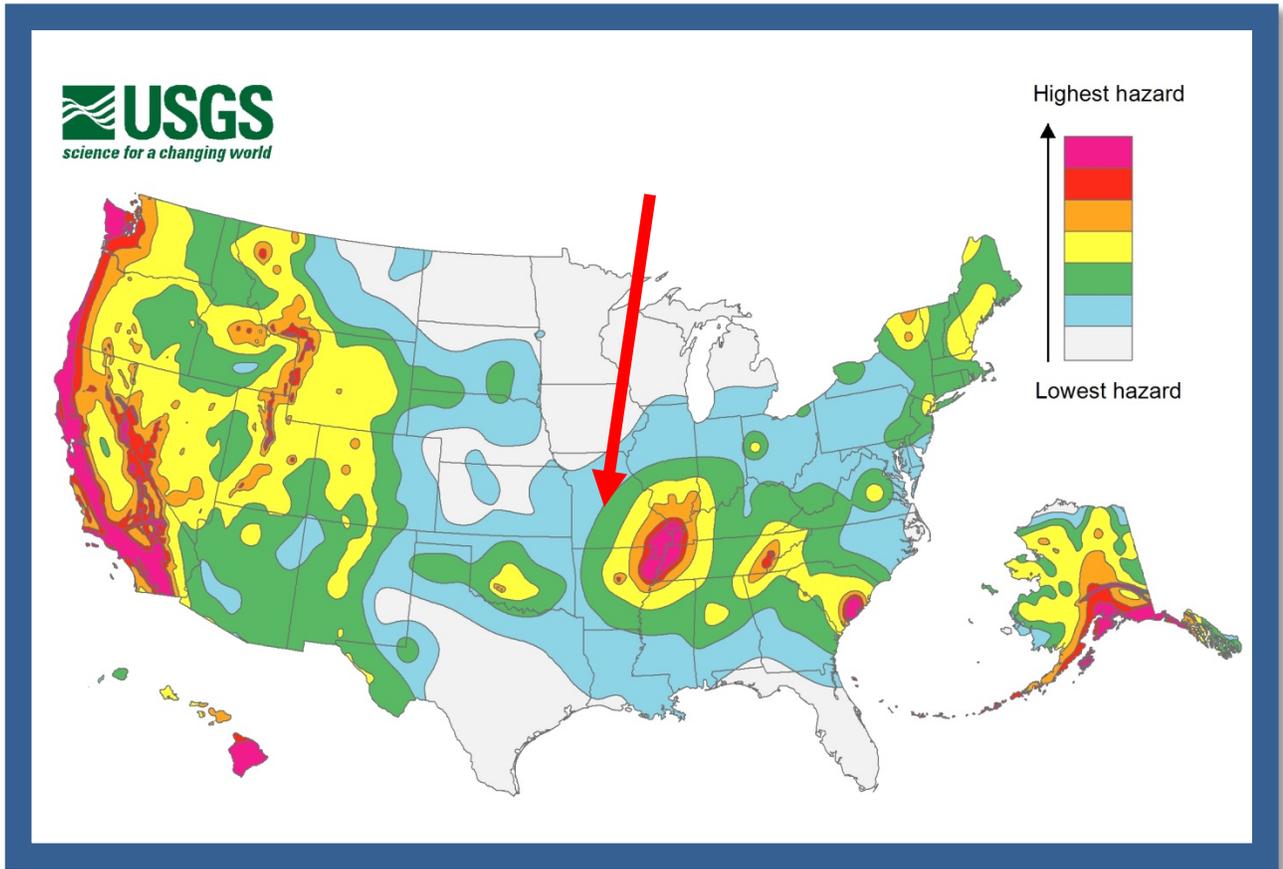


Figure 3.8 illustrates seismicity in the United States

Figure 3.8. United States Seismic Hazard Map



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

Strength/Magnitude/Extent

The extent or severity of earthquakes is generally measured in two ways:

- 1) Richter Magnitude Scale is a measure of earthquake magnitude; and
- 2) Modified Mercalli Intensity Scale is a measure of earthquake severity.

The two scales are defined as follows:

Richter Magnitude Scale

The Richter Magnitude Scale was developed in 1935 as a device to compare the size of earthquakes. The magnitude of an earthquake is measured using a logarithm of the maximum extent of waves recorded by seismographs. Adjustments are made to reflect the variation in the

distance between the various seismographs and the epicenter of the earthquakes. On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, comparing a 5.3 and a 6.3 earthquake shows that the 6.3 quake is ten times bigger in magnitude. Each whole number increase in magnitude represents a tenfold increase in measured amplitude because of the logarithm. Each whole number step in the magnitude scale represents a release of approximately 31 times more energy.

Modified Mercalli Intensity Scale

The intensity of an earthquake is measured by the effect of the earthquake on the earth's surface. The intensity scale is based on the responses to the quake, such as people awakening, movement of furniture, damage to chimneys, etc. The intensity scale currently used in the United States is the Modified Mercalli (MM) Intensity Scale. It was developed in 1931 and is composed of 12 increasing levels of intensity. They range from imperceptible shaking to catastrophic destruction, and each of the twelve levels is denoted by a Roman numeral. The scale does not have a mathematical basis, but is based on observed effects. Its use gives the laymen a more meaningful idea of the severity.

Previous Occurrences

There has been one earthquake in the Camden County planning area since 1931. On January 21, 1992 there was a 3.1 mag, at 5.0 mi. depth according to [Neighborhood Information | Homefacts, https://www.homefacts.com/earthquakes/Missouri/Camden-County.html](https://www.homefacts.com/earthquakes/Missouri/Camden-County.html)
There was no damage associated with this event.

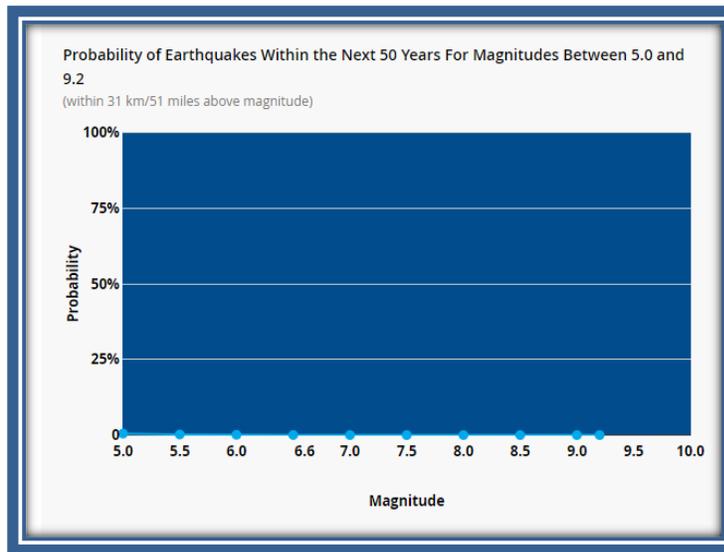
Probability of Future Occurrence

Since there has been one earthquake in Camden County in 27 years (1992) the probability of a future earthquake event of some magnitude is 3.7% (1 earthquake / 27 years = 3.7%).

The USGS database shows that there is a 0.49% chance of a major earthquake within 50km of Camden County within the next 50 years. The largest earthquake within 30 miles of Camden County was a 3.1 magnitude in 1992. **Figure 3.9** illustrates the probability of earthquakes in the next 50 years.

Figure 3.9.

Earthquake Probability for Camden County



Source: homefacts.com at https://earthquake.usgs.gov/hazards/hazmaps/conterminous/2014/images/HazardMap2014_lg.jpg

Changing Future Conditions Considerations

According to the State of Missouri HMP 2018 Scientists are beginning to believe there may be a connection between changing climate conditions and earthquakes. Changing ice caps and sea-level redistribute weight over fault lines, which could potentially have an influence on earthquake occurrences. However, currently no studies quantify the relationship to a high level of detail, so recent earthquakes should not be linked with climate change. While not conclusive, early research suggests that more intense earthquakes and tsunamis may eventually be added to the adverse consequences that are caused by changing future conditions.

Source: https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf Chpt. 3, Section 3.3.1

Vulnerability

Vulnerability Overview

The potential for an earthquake of any significant magnitude is low, as there has been only one documented earthquake since 1992.

Damages from earthquakes could cause many types of ground failures including landslides and rockslides. Ground failures also include lateral spreading and ground subsidence by soil liquefaction along rivers and lakes.

Source: <https://pubs.usgs.gov/fs/2009/3071/pdf/FS09-3071.pdf>

With the probability of future occurrences being at 3.7 % the planning committee has ranked the vulnerability as low.

Potential Losses to Existing Development

Table 3.27. Hazus-MH Earthquake Loss Estimation: Annualized Loss Scenario

Total Losses, in \$ Thousands	Loss Per Capita, in \$ Thousands	Loss Ratio, in \$ Per Million
\$217	\$0.0049	\$26

Sources: The Hazus building inventory counts are based on the 2010 census data adjusted to 2014 numbers using the Dun & Bradstreet Business Population Report. Inventory values reflect 2014 valuations, based on RSMeans (a supplier of construction cost information) replacement costs. Population counts are 2010 estimates from the U.S. Census Bureau. SEMA HMP 2018 Table 3.60

Table 3.28. HAZUS-MH Earthquake Loss Estimation 2% Probability of Exceeding in 50 Years Scenario Direct Economic Losses Results

Cost Structural Damage	Cost Non-Structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total Loss County Wide
\$25,407	\$75,023	\$23,467	\$351	1.21	\$15,754	\$4,940	\$6,219	\$7,906	\$159,068

Sources: The Hazus building inventory counts are based on the 2010 census data adjusted to 2014 numbers using the Dun & Bradstreet Business Population Report. Inventory values reflect 2014 valuations, based on RSMeans (a supplier of construction cost information) replacement costs. Population counts are 2010 estimates from the U.S. Census Bureau. SEMA HMP 2018 Table 3.63

Impact of Previous and Future Development

Future development will only be at a greater risk to earthquakes if construction does not adhere to building codes. Future development is not expected to increase the risk other than contributing to the overall exposure of what could become damaged because of an event.

Hazard Summary by Jurisdiction

Earthquake intensity is not likely to vary greatly throughout the planning area, the risk will be the same throughout. However, damages could differ if there are structural variations in the planning area built-environment. For example, if one community has a higher percentage of residences built prior to 1939 than the other participants, that community is likely to experience higher damages. **Table 3.29** gives the number of units built in 1939 or earlier for each jurisdiction in the planning area.

Table 3.29. Number and Percent of Units Built in 1939 or Earlier

Jurisdiction	Number of Units Built in 1939 or Earlier	Percent of Unites Built in 1939 or Earlier
Camden County	3,386	8.1%
City of Camdenton	14	1.1%
City of Lake Ozark	22	1.2%
City of Linn Creek	29	28.4%
City of Osage Beach	9	0.2%
City of Richland	52	6.5%
Village of Four Seasons	0	0.0%
Village of Sunrise Beach	7	1.6%

Source American Fact Finder United States Census 2013-2017 American Community Survey 5-Year Estimate

Problem Statement

The history of earthquake events within Camden County is low, with only one minor event on record. The risk for damages from earthquakes is possible, the New Madrid Seismic Zone is the most active area that could threaten the planning area. If a higher magnitude earthquake within the New Madrid Seismic Zone occurred, the City of Linn Creek and the City of Stoutland would be most affected as the number of units built in 1939 or earlier is the highest as shown in **Table 3.29**.

Potential damage to future infrastructure can be mitigated by utilizing and enforcing proper building codes. Earthquake education and preparedness should also be practiced by school districts as well as within the communities since earthquakes are unpredictable and can happen at any time.

3.4.4 Land Subsidence/Sinkholes

Some specific sources for this hazard are:

- 2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.5, Page 3.218
https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf
- <http://www.dnr.mo.gov/geology/geosrv/envgeo/sinkholes.htm>
<http://strangesounds.org/2013/07/us-sinkhole-map-these-maps-show-that-around-40-of-the-u-s-lies-in-areas-prone-to-sinkholes.html>
- <http://www.businessinsider.com/where-youll-be-swallowed-by-a-sinkhole-2013-3>
- <http://water.usgs.gov/edu/sinkholes.html>

- <http://pubs.usgs.gov/fs/2007/3060/>
- Missouri Hazard Mitigation Viewer
<http://bit.ly/MoHazardMitigationPlanViewer2018> - Website
<https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide
 - Total number of sinkholes by County
 - Vulnerability to sinkholes by County
 - Total number of mines by County
 - Vulnerability to mines by County
 - Total value of structures impacted by sinkholes by County
 - Total population impacted by sinkholes by County

Hazard Profile

Hazard Description

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

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

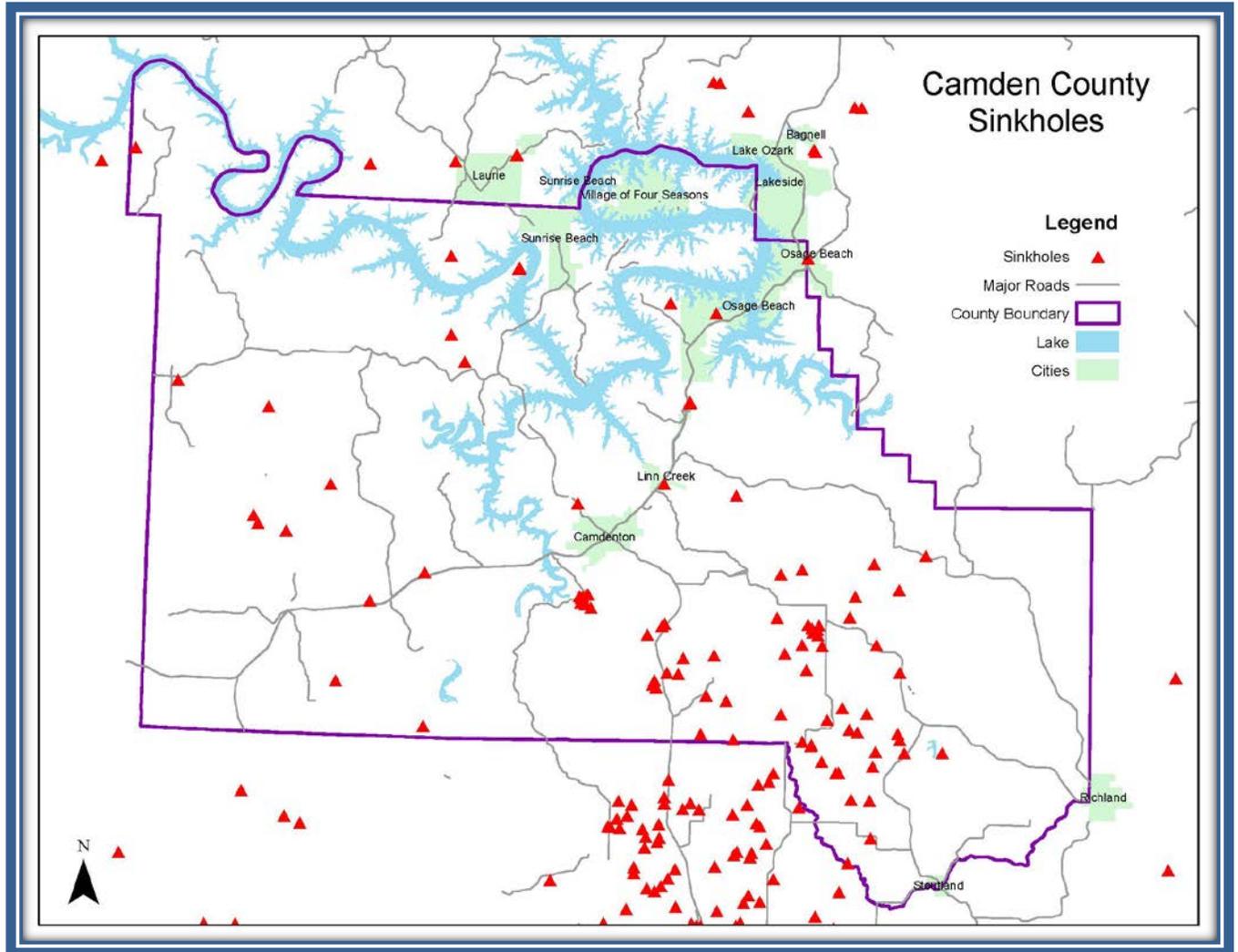
In the case of sinkholes, the rock below the surface is rock that has been dissolving by circulating groundwater. As the rock dissolves, spaces and caverns form, and ultimately the land above the spaces collapse. In Missouri, sinkhole problems are usually a result of surface materials above openings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

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

River. Sinkholes can also vary in shape like shallow bowls or saucers whereas others have vertical walls. Some hold water and form natural ponds.

Geographic Location

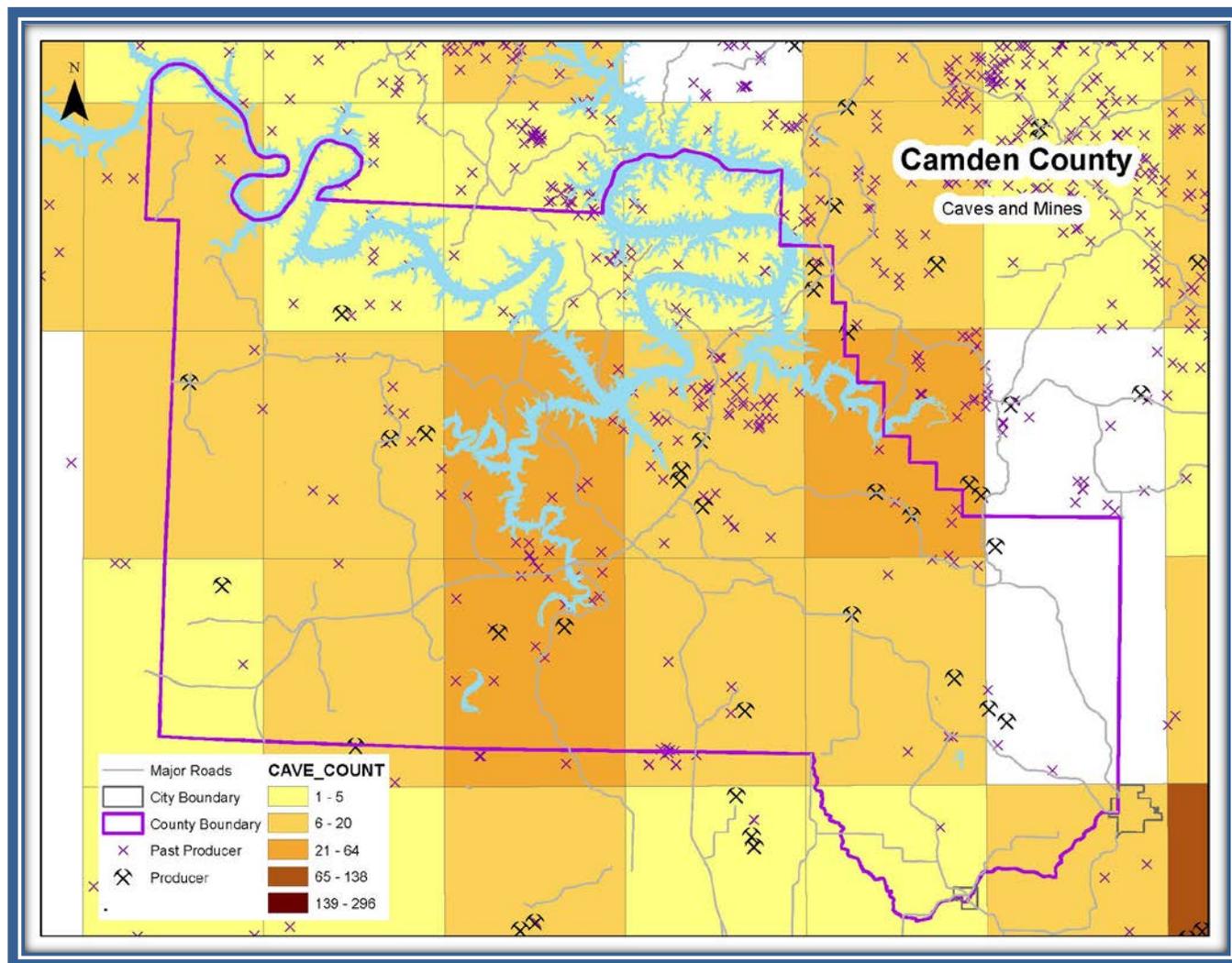
Figure 3.10. Camden County Planning Area Sinkholes



Source: ESRI

There are sinkholes throughout the county however **Figure 3.10** shows a greater concentration of sinkholes in the South Eastern portion of the Camden County planning area.

Figure 3.11. Camden County Caves and Mines



Source: ESRI

Figure 3.11 illustrates the number of caves and mines in the planning area, the major roads, City boundaries, past producers, and producer. Some areas of the planning area have as few as 1-5 caves/mines and other areas as many as 139-296

According to the State of Missouri HMP 2018 there are a total of 82 sinkholes and 167 mines in the Camden County planning area. This data is also illustrated in **Figure 3.10** and **Figure 3.11**.

Strength/Magnitude/Extent

Sinkholes vary in size and location, and these variances will determine the impact of the hazard.

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

Previous Occurrences

There have been no notable events in Camden County. The planning committee determined that the probability would be unlikely as there have been no notable sinkhole events within the planning area. As noted in the 2018 State of Missouri HMP, sinkholes are a regular occurrence in Missouri, but rarely are the events of any significance.

Probability of Future Occurrence

Historically sinkholes occur in areas away from development and typically do not cause serious damage. During planning meeting number 2 the planning committee had three things to think about: Are there any issues with sinkholes? Are there areas in the county that are more prone to sinkhole formation? Is there any development over known caves or abandoned mines? In the 2015 Camden County Hazard Mitigation Plan the vulnerability from sinkholes was low. Ron Gentry, Director, Camden County Emergency Manager said that he had a citizen call his office to report a sink hole, however when he went to check it was not a sink hole. This information can be found in **Appendix B Planning Process** Furthermore, there are no records of previous event dates in the planning area so the probabilities cannot be calculated.

Changing Future Conditions Considerations

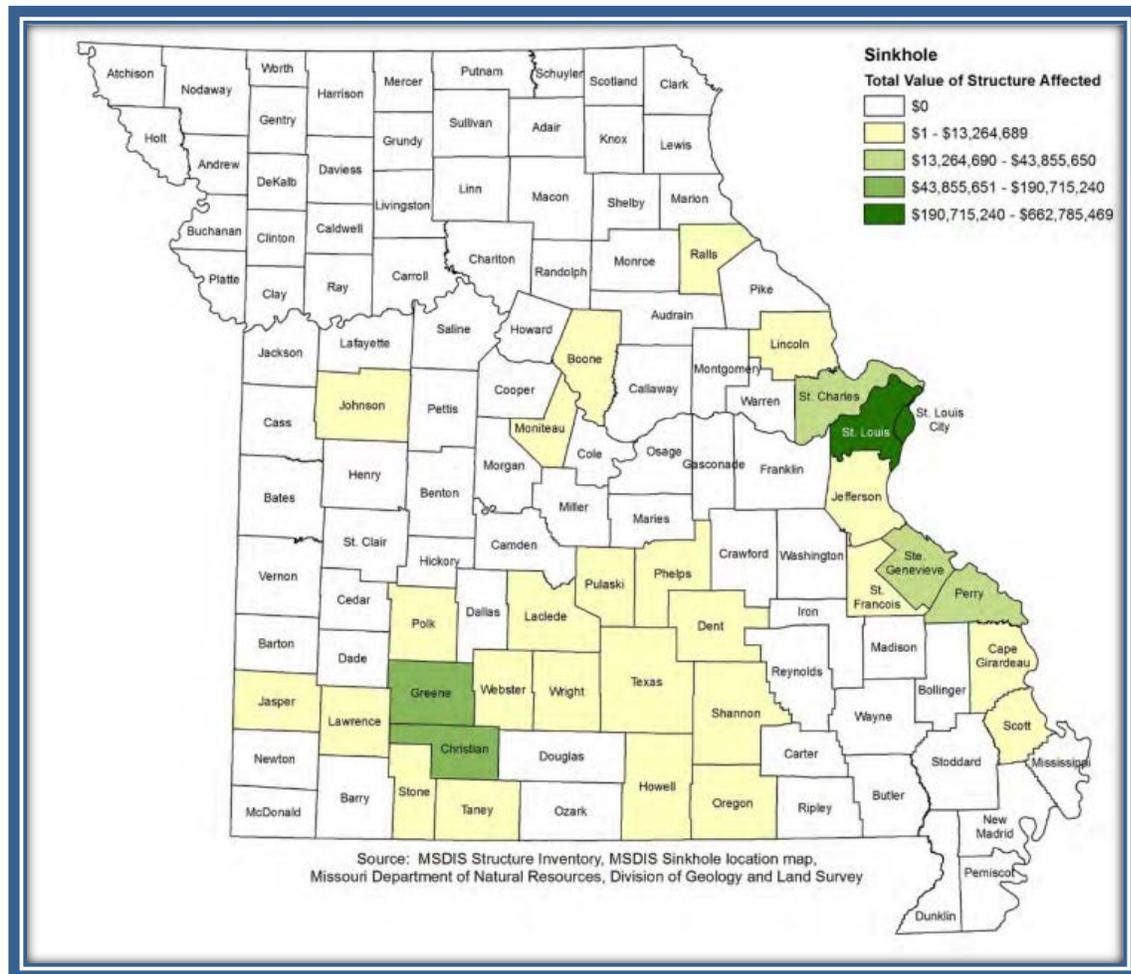
Certain weather events such as heavy precipitation following a period of drought can trigger a sinkhole due to low levels of groundwater combined with a heavy influx of rain. Effects from changing climate conditions such as an increase in droughts could contribute to an increase in sinkholes also.

Vulnerability

Vulnerability Overview

At this time there are no known hazard areas to estimate future losses based on lack of historical losses information.

Figure 3.12. Ranking of Structures Potentially Impacted by Sinkholes by County



Source: <http://www.dnr.mo.gov/geology/geosrv/envgeo/sinkholes.htm>

Potential Losses to Existing Development

In **Figure 3.12** the total value of structures potentially impacted in the Camden County planning area is \$0.

Impact of Previous and Future Development

Sinkholes vary in size and location. These factors will determine the impact of the hazard, which could manifest as the loss of a personal vehicle, a building collapse, or damage to infrastructure such as roads, water or sewer lines. Groundwater contamination is also a possible impact of a sinkhole. Because of the relationship of sinkholes to groundwater, pollutants captured in sinkholes (or dumped) can affect a community's groundwater system. Source: Missouri State HMP 2018

Hazard Summary by Jurisdiction

The risk is uniform throughout the planning area. Data limitations prevent an analysis specific enough to indicate risk to the jurisdictions, schools, and special districts assets. To date sinkholes have not historically had an impact on the jurisdictions within Camden County.

Problem Statement

Keeping the knowledge and mapping of the areas prone to sinkholes up to date is important within the planning area. The U.S. Geological Survey (USGS) recommends identification, prediction, and mitigation of sinkhole hazards in evaporates karst areas. Information about identifying potential sinkhole formation can be shared by the planning committee in public settings as appropriate.

3.4.5 Drought

Some specific sources for this hazard are:

- 2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.6, Page 3.235
https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf
- National Drought Mitigation Center (NDMC) located at the University of Nebraska in Lincoln,
<http://www.drought.unl.edu/>
- Recorded low precipitation, NOAA Regional Climate Center,
<http://www.hprcc.unl.edu>
- Water shortages, Missouri's Drought Response Plan, Missouri Department of Natural Resources, <http://dnr.mo.gov/pubs/WR69.pdf>
- MoDNR, Drought News, Conditions and Resources
<https://dnr.mo.gov/drought.htm>
- Populations served by groundwater by county, USGS-NWIS,
<http://maps.waterdata.usgs.gov/mapper/index.html>
- Census of Agriculture,
http://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Missouri/
- USDA Risk Management Agency, Insurance Claims,
<https://www.rma.usda.gov/data/cause>
- Natural Resources Defense Council,
<http://www.nrdc.org/globalWarming/watersustainability/>
- Missouri Hazard Mitigation Viewer
<http://bit.ly/MoHazardMitigationPlanViewer2018> - Website
<https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide
 - Vulnerability to drought by County
 - Crop insurance claims due to drought by County

Hazard Profile

Hazard Description

Drought is generally defined as a condition of moisture levels significantly below normal for an extended period of time over a large area that adversely affects plants, animal life, and humans. A drought period can last for months, years, or even decades. There are four types of drought conditions relevant to Missouri, according to the State Plan, which are as follows.

- **Meteorological** drought is defined in terms of the basis of the degree of dryness (in comparison to some "normal" or average amount) and the duration of the dry period. A meteorological drought must be considered as region-specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region.
- **Hydrological** drought is associated with the effects of periods of precipitation (including

snowfall) shortfalls on surface or subsurface water supply (e.g., streamflow, reservoir and lake levels, ground water). The frequency and severity of hydrological drought is often defined on a watershed or river basin scale. Although all droughts originate with a deficiency of precipitation, hydrologists are more concerned with how this deficiency plays out through the hydrologic system. Hydrological droughts are usually out of phase with or lag the occurrence of meteorological and agricultural droughts. It takes longer for precipitation deficiencies to show up in components of the hydrological system such as soil moisture, streamflow, and ground water and reservoir levels. As a result, these impacts also are out of phase with impacts in other economic sectors.

- **Agricultural** drought focus is on soil moisture deficiencies, differences between actual and potential evaporation, reduced ground water or reservoir levels, etc. Plant demand for water depends on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth, and the physical and biological properties of the soil.
- **Socioeconomic** drought refers to when physical water shortage begins to affect people.

Geographic Location

The entire planning area is at risk of drought. Drought most directly impacts the agricultural sector, so include the percentage of surface land in the county used for agriculture purposes. Farming is not concentrated in any geographical area. Within the Camden County planning area the number of farms, land in farm acres, and the average size of farms in acres has decreased since 2012. This is according to the 2017 Census of Agriculture-County data USDA, National agricultural statistics service. **Table 3.30** illustrates the changes since 2012.

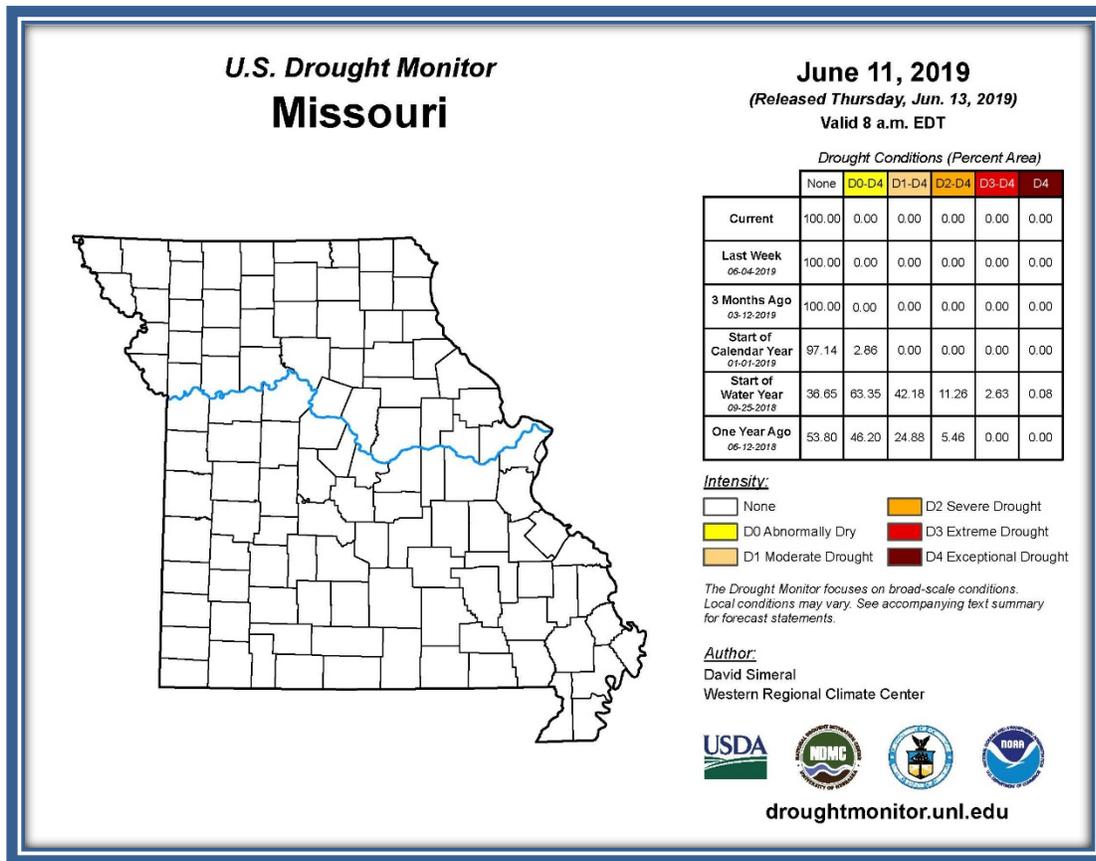
Table 3.30. Change in Number of farms-Land in Farms-Average Size of Farm 2012-2017

Number of Farms 2012	Number of Farms 2017	Land in Farms 2012 Acres	Land in Farms 2017 Acres	Average Size of Farm 2012 Acres	Average Size of Farm 2017 Acres
533	516	138,617	123,322	260	239

Source: 2017 Census of Agriculture-County Data USDA, National Agricultural Statistics Service

Figure 3.13 illustrates the US Drought Monitor Map on June 11, 2019. Furthermore, it serves as an example of the geographic area that could be in drought at any given moment in time. It is important to note that this is only a snapshot of conditions at that given moment in time. Either use an arrow to indicate the location of the planning area on the map, or use narrative to explain what the map illustrates in terms of the planning area.

Figure 3.13. U.S. Drought Monitor Map of Missouri on Date



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

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

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

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

Previous Occurrences

Table 3.31. Drought Property and Crop Damage Data 1999-2019

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
1999	1	0	0	\$0.00	\$20,000.00
2000	2	0	0	\$0.00	\$0.00
2006	1	0	0	\$0.00	\$0.00
2012	5	0	0	\$4,350,000.00	\$623,000.00
Total	9	0	0	\$4,350,000.00	\$643,000.00

Source:

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Drought&beginDate_mm=06&beginDate_dd=01&beginDate_yyyy=1999&endDate_mm=06&endDate_dd=01&endDate_yyyy=2019&county=CAMDEN%3A29&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitButton=Search&statefips=29%2CMISSOURI

The following information are from event narratives and the episode narratives from the NCDC.NOAA website.

October 1st, 1999 - drought conditions existed across central, south central and southwest Missouri from early July through October. The hardest hit areas were in south central Missouri where spring rainfall was also below normal. Dry weather along with periods of above normal temperatures reduced crop yields and greatly reduced the quality of hay, corn, and soybeans grown in 1999. Hot weather in July and August also reduced the milk yield of dairy cattle. The dry weather is also already taking a toll on the winter wheat crop.

August 10th, 2000 - drought conditions worsened across central, south central, and southwest Missouri in early August, and maintained its intensity through the month. The very abnormally high temperatures by the end of the month, averaging 6 to 12 degrees above normal, also accelerated the already dry conditions over the area. Although short-term dryness, slower crop growth, fire risk above average, and phase 1 and 2 drought conditions were introduced by the Missouri drought assessment committee, no significant losses were noted. Stock ponds in many areas dried up forcing farmers to either pump or transport water for livestock. A few shallower wells reportedly ran dry. Many ranchers sold cattle and other livestock due to the lack of an adequate water supply. Some farmers compared this drought to the last severe drought in the area which occurred in 1980.

September 1st, 2000 - drought conditions continued from August through the second week of September before much needed rainfall began to relieve the drought during the middle part of the month. Very high temperatures also continued through the first part of the week, providing additional drying of the sub-surface moisture. These conditions allowed for the continuation of short-term dryness, lower yields of soybeans, and above normal fire danger. Soybean yields were reduced from normally 26-31 bushels per acre, to 20 bushels per acre. West central and south-central

Missouri were especially hit hard during this period. No other significant losses were noted.

April 1st, 2006 - the first three weeks of April were unusually dry which worsened the ongoing drought across west central and southwest Missouri. However, during the final week of April, a few episodes of beneficial rains fell across the region with average total amounts of around two inches.

July 1st, 2012 - a persistent upper level high pressure ridge over the central portions of the country caused more extreme heat and dry conditions for the area. Severe drought remained in place across portions of Missouri as rain fell sparsely during the month. The month of July was one of the driest on record for many locations. Drought conditions ranged from severe across southwestern Missouri to extreme over south-central Missouri. Numerous heat related illnesses were reported across Missouri.

The U.S Drought Monitor continued to report Severe Drought (D2) throughout the month of July. While the region received some rainfall during the month, the coverage was very limited and sparse. The COOP station near Versailles reported 0.46 of rainfall for the month of July. This is a continuation of the drought that began across the region in June. The loss and damage estimates will be included in the August storm data section for the entire drought event.

August 1, 2012 - a persistent upper level high pressure ridge over the central portions of the country caused more dry conditions for the area. Severe to exceptional drought remained in place across southwestern Missouri through the month. Some rainfall fell by the end of the month giving some areas relief. Drought conditions ranged from extreme (D3) across central Missouri to exceptional (D4) over southwestern Missouri. For the counties of across the Missouri Ozarks and southwestern Missouri, between 50 and 75 percent of the combined corn, soybeans and hay acreage was reported as a loss due to the drought. The losses and damages to harvested yield were from the start of the planting season through the end of August.

The U.S Drought Monitor continued to report Extreme Drought (D3) to Exceptional Drought (D4) throughout the month of August. The region started seeing some rainfall by the end of the month. The KH21 AWOS station near Camdenton reported 2.49 of rainfall for the month of August. This is a continuation of the drought that began across the region in June. As a result of the limited rainfall combined with the excessive heat, the USDA Service center indicated that crop losses were 75 percent of the spring planting. Many farmers and ranchers reported having to feed hay as pastures stopped growing and became dry through the month which added to operation costs. Monetary crop loss figures are estimates using information from the National Agricultural Statistics database, local FSA and USDA offices and other local, state or federal agency information. Livestock losses, if they occurred or were reported are listed in the property section.

September 1st, 2012 - the persistent upper level high pressure ridge over the central portions of the country which caused extremely dry conditions throughout the summer weakened and a more active pattern for rainfall occurred during the month of September. The rainfall from the remnants of Hurricane Isaac in early September also helped with the rainfall deficit. Drought conditions improved over portions of the Missouri Ozarks.

The U.S Drought Monitor continued to report Severe Drought (D2) to Extreme Drought (D3)

throughout the month of September. The region saw more rainfall than previous months which helped the rainfall deficit. The KH21 AWOS station near Camdenton reported 2.33 of rainfall for the month of September. This is a continuation of the drought that began across the region in June. The loss and damage estimates will be included in August's storm data section for the entire drought event.

October 1, 2012 - a more active weather pattern occurred during the month of October with several rounds of appreciable rainfall. Drought conditions continued to slowly improve over portions of the Missouri Ozarks.

The U.S Drought Monitor continued to report Moderate Drought (D1) to Severe Drought (D2) throughout the month of October. The KVIH ASOS station near Vichy reported 3.10 of rainfall for the month of October. This is a continuation of the drought that began across the region in June. The loss and damage estimates will be included in August's storm data section for the entire drought event.

November 1st, 2012 - despite appreciable rainfall earlier in the fall season, November was drier than normal which has kept drought conditions across portions of the Missouri Ozarks.

The U.S Drought Monitor continued to report Severe Drought (D2) throughout the month of November. The KVIH ASOS station near Vichy reported 1.26 of rainfall for the month of November which was 2.61 below average. This is a continuation of the drought that began across the region in June. The loss and damage estimates will be included in August's storm data section for the entire drought event.

Probability of Future Occurrence

Table 3.32. Consecutive Weeks in Drought per Drought Severity 1999-2019

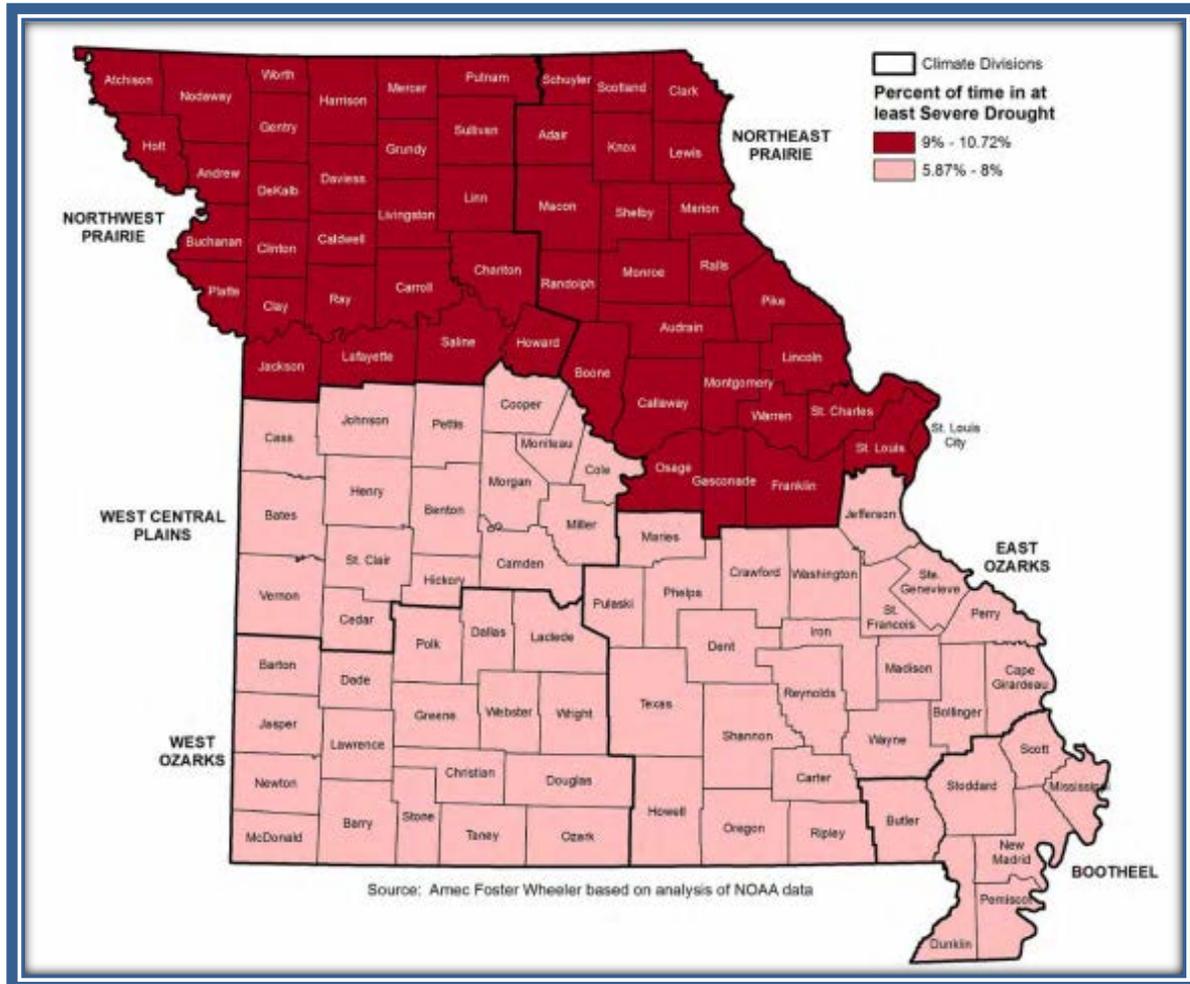
Severity	Consecutive Weeks
D0	380
D1	170
D2	73
D3	20
D4	3

Source: US Drought Monitor

There were 9 drought episodes in the planning area in 20 years **Table 3.31**. The probability of drought in the planning area in any given month is 45%. Total crop damage in the planning area due to drought in 20 years is \$249,650.00 a year **Table 3.31** this means that the planning area will experience moderate drought conditions in any given month.

The intensity or severity of the drought conditions in along with the consecutive weeks in drought can be seen in **Table 3.32** and **Figure 3.14** also shows that the percent of time in at least Severe Drought is 5.87%-8% for the planning area.

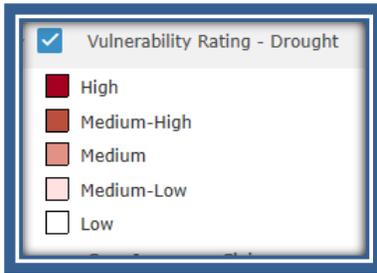
Figure 3.14. Drought Probability by Climate Division Based on Palmer Drought Severity Index 1895-2016



Source: Missouri Hazard Mitigation Plan 2018

Changing Future Conditions Considerations

A natural part of Camden County and Missouri's climate is severe drought. Future increases in evaporation rates due to higher temperatures may increase the intensity of naturally-occurring droughts.



Source Missouri Hazard Mitigation Viewer 2018

Figure 3.15 illustrates that the vulnerability rating for the Camden County planning area is low. The planning committee gave drought a moderate or medium vulnerability rating.

Potential Losses to Existing Development

Where Camden County has seen a reduction in crop land and acres in crop land **Table 3.30**. The planning area needs to think about other effects drought could bring to the area. The National Drought Monitor Center at the University of Nebraska at Lincoln summarized the potential impacts of drought as follows: Drought can create economic impacts on agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and disease to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn place both human and wildlife populations at higher levels of risk. Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Finally, while drought is rarely a direct cause of death, the associated heat, dust and stress can all contribute to increased mortality.

Impact of Previous and Future Development

The trend in farms and land in farms are decreasing over time. As seen in **Table 3.30** the number of farms in Camden County have decreased by 3.2% and the land in acres has decreased by 11.03%. Due to this the potential impact on future development in Camden County by drought is not significant.

Changing Future Conditions Considerations

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

Hazard Summary by Jurisdiction

The probability of drought is the same for the entire county, and the drought conditions experienced in the cities would be the same as those experienced in rural areas. Those who live in the unincorporated areas of Camden County rely on private wells for water. If the probability of drought begins to rise this is an area that should be closely watched. Particularly vulnerable are children, the elderly, and those with respiratory problems.

Problem Statement

Drought is a moderate risk overall to Camden County. Drought damage has occurred in the past and is most likely to occur in the future, especially when impacts from climate change are taken into consideration. The largest impact will be on the agriculture industry within the planning area and crop insurance can be purchased through private insurance companies or agents for those needing to insure against drought.

3.4.6 Extreme Temperatures

Some specific sources for this hazard are:

- 2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.7, Page 3.253
https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf
- National Centers for Environmental Information, Storm Events Database,
<http://www.NCEI.noaa.gov/stormevents/>
- Heat Index Chart & typical health impacts from heat, National Weather Service; National Weather Service Heat Index Program,
<https://www.weather.gov/safety/heat-index>
- Wind chill chart, National Weather Service,
http://www.nws.noaa.gov/om/cold/wind_chill.shtml;
- Daily temperatures averages and extremes, High Plains Regional Climate Summary,
<http://climod.unl.edu/>;
- Hyperthermia mortality, Missouri; Missouri Department of Health and Senior Service,
<http://health.mo.gov/living/healthcondiseases/hyperthermia/pdf/hyper1.pdf>;
- Hyperthermia mortality by Geographic area, Missouri Department of Health and Senior Services,
<http://health.mo.gov/living/healthcondiseases/hyperthermia/pdf/hyper2.pdf>
- Missouri Hazard Mitigation Viewer
<http://bit.ly/MoHazardMitigationPlanViewer2018> - Website
<https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide
 - Average annual occurrence for extreme heat by County
 - Vulnerability to extreme heat by County
 - Average annual occurrence for extreme cold by County
 - Vulnerability to extreme cold by County

Hazard Profile

Hazard Description

Extreme temperature events, both hot and cold, can impact human health and mortality, natural ecosystems, agriculture and other economic sectors. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index chart shown in **Figure 3.16** uses both of these factors to produce a guide for the apparent temperature or relative intensity of heat conditions.

Extreme cold often accompanies severe winter storms and can lead to hypothermia and frostbite in people without adequate clothing protection. Cold can cause fuel to congeal in storage tanks and supply lines, stopping electric generators. Cold temperatures can also overpower a building's heating system and cause water and sewer pipes to freeze and rupture. Extreme cold also increases the

likelihood for ice jams on flat rivers or streams. When combined with high winds from winter storms, extreme cold becomes extreme wind chill, which is hazardous to health and safety.

The National Institute on Aging estimates that more than 2.5 million Americans are elderly and especially vulnerable to hypothermia, with the isolated elders being most at risk. About 10 percent of people over the age of 65 have some kind of bodily temperature-regulating defect, and 3-4 percent of all hospital patients over 65 are hypothermic.

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

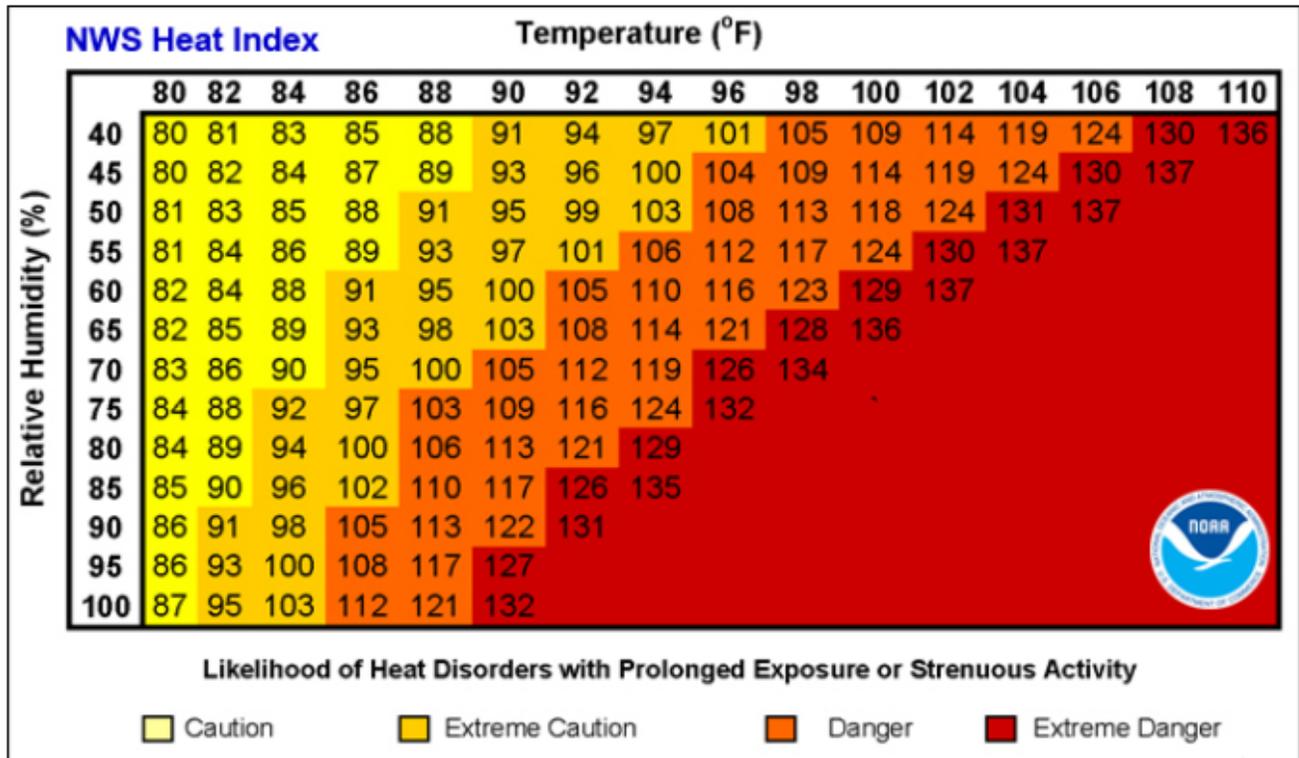
Geographic Location

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

Strength/Magnitude/Extent

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

Figure 3.16. Heat Index (HI) Chart

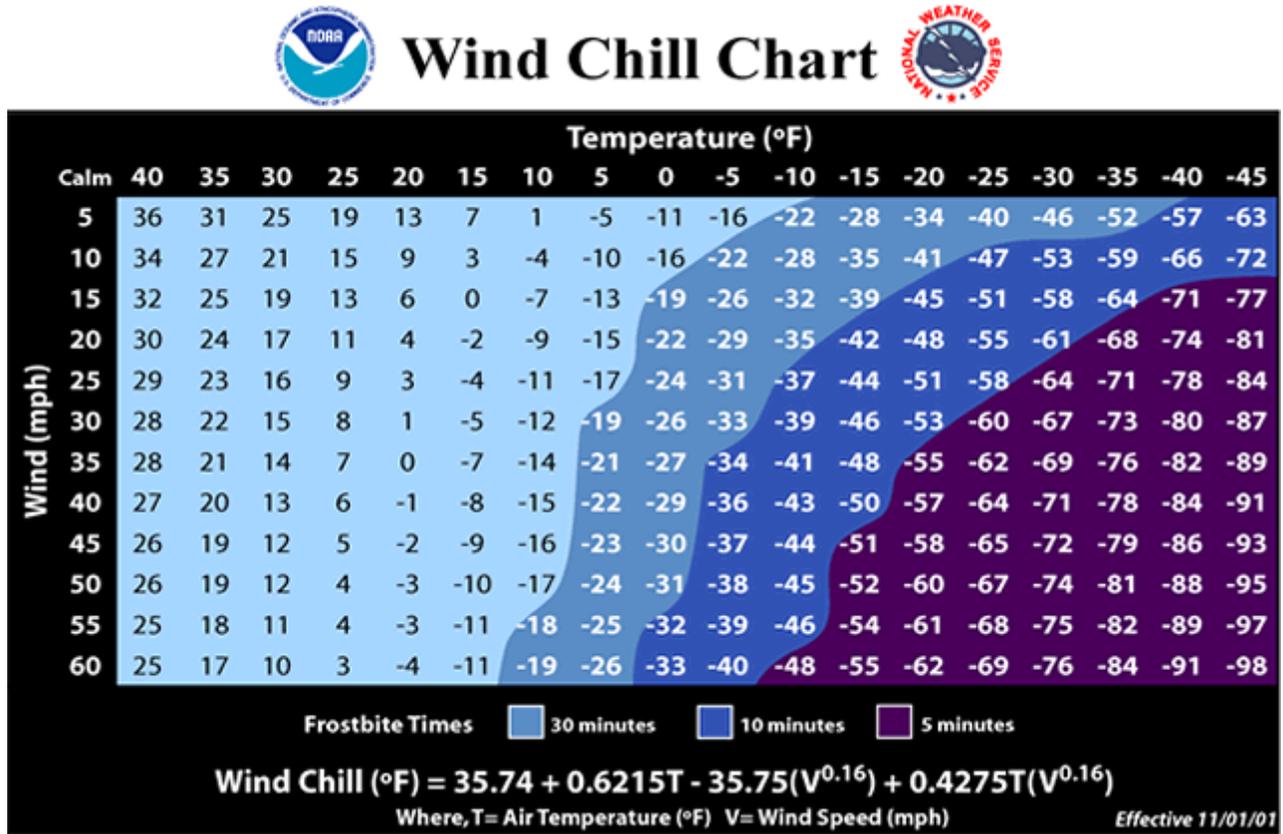


Source: National Weather Service (NWS); <https://www.weather.gov/safety/heat-index>

Note: Exposure to direct sun can increase Heat Index values by as much as 15°F. The shaded zone above 105°F corresponds to a HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

The NWS Wind Chill Temperature (WCT) index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. The figure below presents wind chill temperatures which are based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. **Figure 3.17**

Figure 3.17. Wind Chill Chart



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

Previous Occurrences

Table 3.33 Previous Occurrences of Extreme Heat 1999-2019

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
1999	2	0	0	\$0.00	\$0.00
2000	2	0	0	\$0.00	\$0.00
2001	2	0	0	\$0.00	\$0.00
2012	3	0	0	\$0.00	\$0.00
Total	9	0	0	\$0.00	\$0.00

Source: National Centers for Environmental Information (NCEI) database

The following information are from event narratives and the episode narratives from the NCDC, NOAA website.

July 23rd, 1999 - a prolonged period of excessive heat occurred in central, southwest, and south-central Missouri. Afternoon high temperatures during this period averaged 95 degrees or higher with heat index values of 105 to 115 degrees.

August 1st, 1999 - Periodic excessive heat continued from July into early and mid-August with temperatures exceeding 95 degrees F on 8 (non-consecutive) days. Daytime heat index values frequently reached 100 degrees F or greater.

August 27th, 2000 - a prolonged period of excessive heat occurred in central, southwest, and south-central Missouri. Afternoon high temperatures during this period averaged 100 degrees or higher, with heat index values of 100 to 110 degrees. In addition, August was the driest on record. Area schools were dismissed early due to the heat. 29 people were treated for heat related illnesses during the last part of August.

September 1st, 2000 - a prolonged period of excessive heat continued from late August into early September for central, south central, and southwest Missouri. Afternoon temperature averaged around 100 degrees for the first three days of September. These temperatures are about 15 to 20 degrees above normal. Record high temperatures also continued to be broken. Area schools were dismissed from their classes early due to the excessive heat. County health departments reported treating approximately a dozen people with heat related problems during the first part of the month.

July 17th, 2001 - during the middle of July a large area of high pressure began to build over the Central United States. It held together through the last week of July with a brief period of cloud cover and shower activity around the 26th, 27th and 28th of the month. Temperatures rose into the 90's with a few 100's in west central Missouri. The high temperatures combined with increased humidity levels to produce very high heat indices of 100 to 110 degrees for several consecutive days. By the 23th of the month, 23 heat related illnesses were received from the Department of Health.

August 1st, 2001 - the heat and humidity continued into the first week of August with heat indices between 100 and 110 degrees for 9 consecutive days. In addition to heat related illnesses, two heat related deaths occurred in the Ozarks.

June 1st, 2012 - several record highs were broken around the area and high temperatures reached above 100 degrees by the end of the month. The overall mean temperatures for Vichy-Rolla was 2.5 degrees above normal for the month of June. There were 12 days where the maximum temperatures reached 90 degrees or above. There were 4 days where the maximum temperature reached 100 degrees or above. Heat advisories and warnings were issued for portions of the area by the end of June.

A strong ridge of high pressure settled over the central portions of the U.S. and over the Ozarks beginning in June and became the dominant weather pattern for much of the summer of 2012.

Several record highs were broken around the area and high temperatures were reach above 100 degrees by the end of the month. A record high temperature of 101 degrees was reached both on June 27th and June 28th. There were 12 days where the maximum temperatures reached 90 degrees or above. Heat advisories and warnings were issued for portions of the area by the end of June. Even though air temperatures were extreme, the humidity levels were relatively dry causing the heat index to be closer to the actual air temperatures.

July 1st, 2012 - several record highs were broken around the area and high temperatures reached above 100 degrees 10 days. There were 29 days where the maximum temperatures reached 90 degrees or above. The hottest temperature record during the month was 104 degrees on July 31th. Heat advisories and warnings were issued for portions of the area by the end of June. Even though air temperatures were extreme, the humidity levels were relatively dry causing the heat index to be closer to the actual air temperatures.

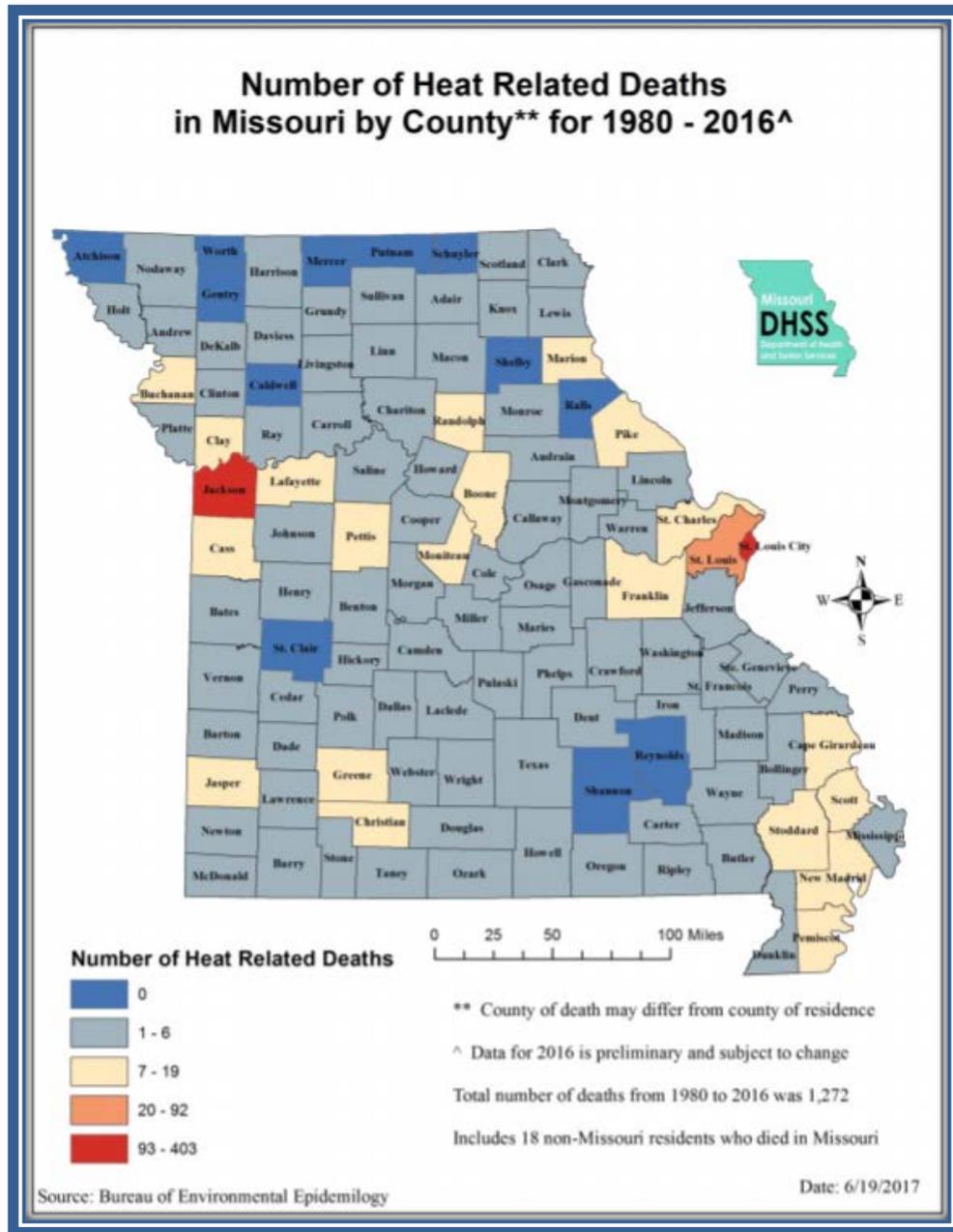
A strong ridge of high pressure settled over the central portions of the U.S. and became the dominant weather pattern for much of the summer of 2012. Several record highs were broken around the area and high temperatures reached above 100 degrees 12 days. The overall mean temperatures were 6.1 degrees above normal for the month of July. There were 29 days where the maximum temperatures reached 90 degrees or above. The hottest temperature record during the month was 106 degrees on July 29th. Heat advisories and warnings were issued for portions of the area by the end of June. Even though air temperatures were extreme, the humidity levels were relatively dry causing the heat index to be closer to the actual air temperatures.

August 1st, 2012 - a strong ridge of high pressure settled over the central portions of the U.S. beginning in June and became the dominant weather pattern for much of the summer of 2012. This weather pattern finally broke down after the first week of August and temperatures became more seasonable. The hottest temperatures occurred on August 1st at 103 degrees. There were 3 days where the maximum temperature reached 100 degrees or higher and this occurred during the first week of the month. There were 18 days where the maximum temperatures reached 90 degrees or above. Heat advisories and warnings were issued for portions of the area for the early portion of August. Even though air temperatures were extreme, the humidity levels were relatively dry causing the heat index to be closer to the actual air temperatures.

A strong ridge of high pressure settled over the central portions of the U.S. beginning in June and became the dominant weather pattern for much of the summer of 2012. This weather pattern finally broke down after the first week of August and temperatures became more seasonable. The overall mean temperatures for Springfield was 0.8 degrees below normal for the month of August. The hottest temperatures occurred on August 4th at 106 degrees. There were 3 days where the maximum temperature reached 100 degrees or higher and this occurred during the first week of the month. There were 16 days where the maximum temperatures reached 90 degrees or above. Heat advisories and warnings were issued for portions of the area for the early portion of August. Even though air temperatures were extreme, the humidity levels were relatively dry causing the heat index to be closer to the actual air temperatures.

Figure 3.18 shows the planning area graphically, and shows the number of heat related deaths per county in the State of Missouri. The county of death may differ from the county of residency.

Figure 3.18. Heat Related Deaths in Missouri 2000 - 2016



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

Extreme heat can cause stress to crops and animals. According to USDA Risk Management Agency, losses to insurable crops during the 10-year time period from 2009 to 2019 were \$0.00. Extreme heat can also strain electricity delivery infrastructure overloaded during peak use of air conditioning during extreme heat events. Another type of infrastructure damage from extreme heat is road damage. When asphalt is exposed to prolonged extreme heat, it can cause buckling of asphalt-paved roads, driveways, and parking lots.

From 1988-2011, there were 3,496 fatalities in the U.S. attributed to summer heat. This translates to an annual national average of 146 deaths. During the same period, 0 deaths were recorded in the planning area, according to NCEI data. However, **Figure 3.18** there were 1-6 heat related deaths in the Camden County Planning area.

Probability of Future Occurrence

The probability of future occurrences for Extreme Heat in the planning area the number of events recorded was divided by a twenty-year period (9 events / 20 years = 45%). There is a 45% probability or moderate ranking that Camden County will experience extreme heat events in any given year. It is important to note that data limitations, such as the fact that extreme heat events could be underreported in the NCEI could distort this probability percentage. The probability of a future occurrence of extreme cold in the planning area is 3 % (3 events / 20 years = 3%).

Changing Future Conditions Considerations

Impacts of climate change will most likely increase heat wave intensity and frequency, degraded air quality, and reduced water quality will increase public health risks according to globalchange.gov. The Midwest has a highly energy-intensive economy and can be dependent on fossil-fuel for electricity systems. With the per capita emissions of greenhouse gases more than 20% higher than the national average the Midwest has a large and increasingly utilized potential to reduce emissions that cause climate change.

Source: <https://nca2014.globalchange.gov/highlights/regions/midwest>

The impacts of extreme heat events are experienced most acutely by the elderly and other vulnerable populations such as young children and those with chronic health conditions.

Vulnerability

Vulnerability Overview

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

In the State of Missouri Hazard Mitigation Plan 2018 the methodology used to determine vulnerability to extreme temperatures across Missouri was statistical analysis of data from several sources: Nation Centers for Environmental Information (NCEI) storm events data (1996 to

December 31, 2016), total population and percentage of population over 65 data from the U.S. Census (2015 ACS), and the calculated social vulnerability index for Missouri counties from the Hazards Vulnerability Research institute in the Department of Geography at the University of South Carolina. Source: https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf

With the probability of extreme heat at 45% extreme cold at 3% in the Camden County planning area and the severity \$0.00 the planning committee determined the vulnerability of extreme heat and extreme cold for the planning area to be at a moderate ranking. (25% - 75% probability, or \$100,000.00-\$300,000.00 a year severity).

Table 3.33. Typical Health Impacts of Extreme Heat

Heat Index (HI)	Disorder
80-90° F (HI)	Fatigue possible with prolonged exposure and/or physical activity
90-105° F (HI)	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105-130° F (HI)	Heatstroke/sunstroke highly likely with continued exposure

Source: National Weather Service Heat Index Program, www.weather.gov/os/heat/index.shtml

Potential Losses to Existing Development

The heat related deaths in Camden County between 1980 and 2016 were 1-6 as seen in **Figure 3.18**. However, the losses in crops as recorded by the USDA Crop Insurance payments due to extreme heat or cold was \$0.00. This could indicate that future extreme heat events could cause more loss of life in the planning area.

Impact of Previous and Future Development

Population growth can result in increases in the age-groups that are most vulnerable to extreme heat. Population growth also increases the strain on electricity infrastructure, as more electricity is needed to accommodate the growing population. The City of Camdenton has the largest population under 5 years old and the City of Osage Beach has the largest population 65 years old and over. The planning area is going to continue to see an increase in those older adults who are 65 years and over. This is due partly because of the large number of second home owners that retire in the area and become fulltime residents.

Hazard Summary by Jurisdiction

Those at greatest risk for heat-related illness and deaths include children up to five years of age, people 65 years of age and older, people who are overweight, and people who are ill or on certain medications. To determine jurisdictions within the planning area with populations more vulnerable to extreme heat, demographic data was obtained from the 2010 census on population percentages in each jurisdiction comprised of those under age 5 and over age 65. Data was not available for overweight individuals and those on medications vulnerable to extreme heat.

Table 3.34 below summarizes vulnerable populations in the participating jurisdictions. Note that school and special districts are not included in the table because students and those working for the

special districts are not customarily in these age groups.

Table 3.34. Camden County Population Under Age 5 and Over Age 65, 2013-2017 Census Data

Jurisdiction	Population Under 5 years	Population 65 years and over
Camden County	2,028	11,856
City of Camden	329	659
City of Lake Ozark*	103	410
City of Linn Creek	16	48
City of Osage Beach*	245	1,511
City of Richland*	144	350
Village of Four Seasons	162	585
Village of Sunrise Beach	25	83

Source: U.S. Census Bureau 2013-2017 ACS 5-Year Estimate, (*) includes entire population of each city or county

Include in this section a discussion of any schools without air conditioning, other strategic buildings without air-conditioning, and special district assets susceptible to damages from extreme heat. Include information about school policies mandating closure during high heat events.

Problem Statement

All jurisdictions within the planning area are equally susceptible to damage caused by extreme heat and extreme cold temperatures since these events occur regionally. However, Camden County has a growing population of residents over 65 years, who are at a greater risk for extreme-temperature related illnesses, injuries, and death. Possible solutions include organizing outreach to the vulnerable elderly populations, including public awareness and promotion of the areas heating or cooling centers.

3.4.7 Severe Thunderstorms Including High Winds, Hail, and Lightning

Some Specific Sources for this hazard are:

- 2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.8, Page 3.280
https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf
- FEMA 320, Taking Shelter from the Storm, 3rd edition,
http://www.weather.gov/media/bis/FEMA_SafeRoom.pdf
- Lightning Map, National Weather Service,
<http://www.vaisala.com/en/products/thunderstormandlightningdetectionsystems/Pages/NLDN.aspx>
- Death and injury statistics from lightning strikes, National Weather Service.
- Wind Zones in the U.S. map, FEMA, https://www.fema.gov/pdf/library/ism2_s1.pdf ;
- Annual Windstorm Probability (65+knots) map U.S. 1980-1994, NSSL,
http://www.nssl.noaa.gov/users/brooks/public_html/bigwind.gif
- Hailstorm intensity scale, The Tornado and Storm Research Organization (TORRO),
<http://www.torro.org.uk/site/hscale.php>;
- NCEI data;
- USDA Risk Management Agency, Insurance Claims, <https://www.rma.usda.gov/data/cause>
- National Severe Storms Laboratory – hail map,
http://www.nssl.noaa.gov/users/brooks/public_html/bighail.gif
- Missouri Hazard Mitigation Viewer
<http://bit.ly/MoHazardMitigationPlanViewer2018> - Website
<https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide
 - Average annual high wind events by County
 - Average annual hail events by County
 - Average annual lightning events by County
 - Vulnerability to severe thunderstorm events by County
 - Annualized property loss for high wind events by County
 - Annualized property loss for hail events by County
 - Annualized property loss for lightning events by County
 - Annualized property loss ratio for high wind events by County
 - Annualized property loss ratio for hail events by County
 - Annualized property loss ratio for lightning events by County

Hazard Profile

Hazard Description

Thunderstorms

A thunderstorm is defined as a storm that contains lightning and thunder which is caused by unstable atmospheric conditions. When cold upper air sinks and warm moist air rises, storm

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

High Winds

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

Lightning

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

Hail

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

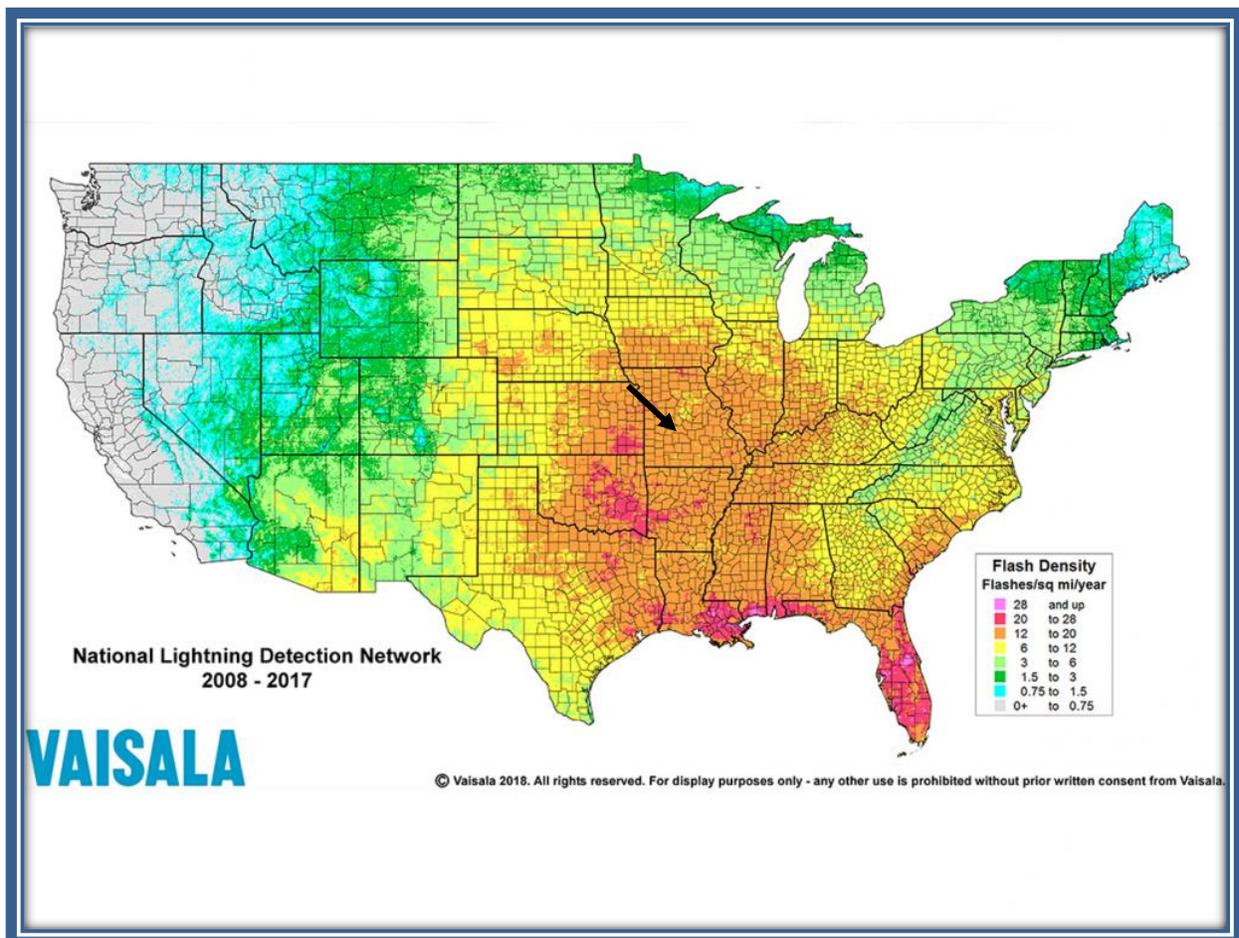
At the time when the updraft can no longer support the hailstone, it will fall down to the earth. For example, a ¼" diameter or pea sized hail requires updrafts of 24 miles per hour, while a 2 ¾" diameter or baseball sized hail requires an updraft of 81 miles per hour. According to the NOAA, the largest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

Geographic Location

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

Figure 3.19 shows the planning area has a flash density of 12 to 20 a square mi/year and is indicated with a black arrow.

Figure 3.19. Location and Frequency of Lightning in Missouri



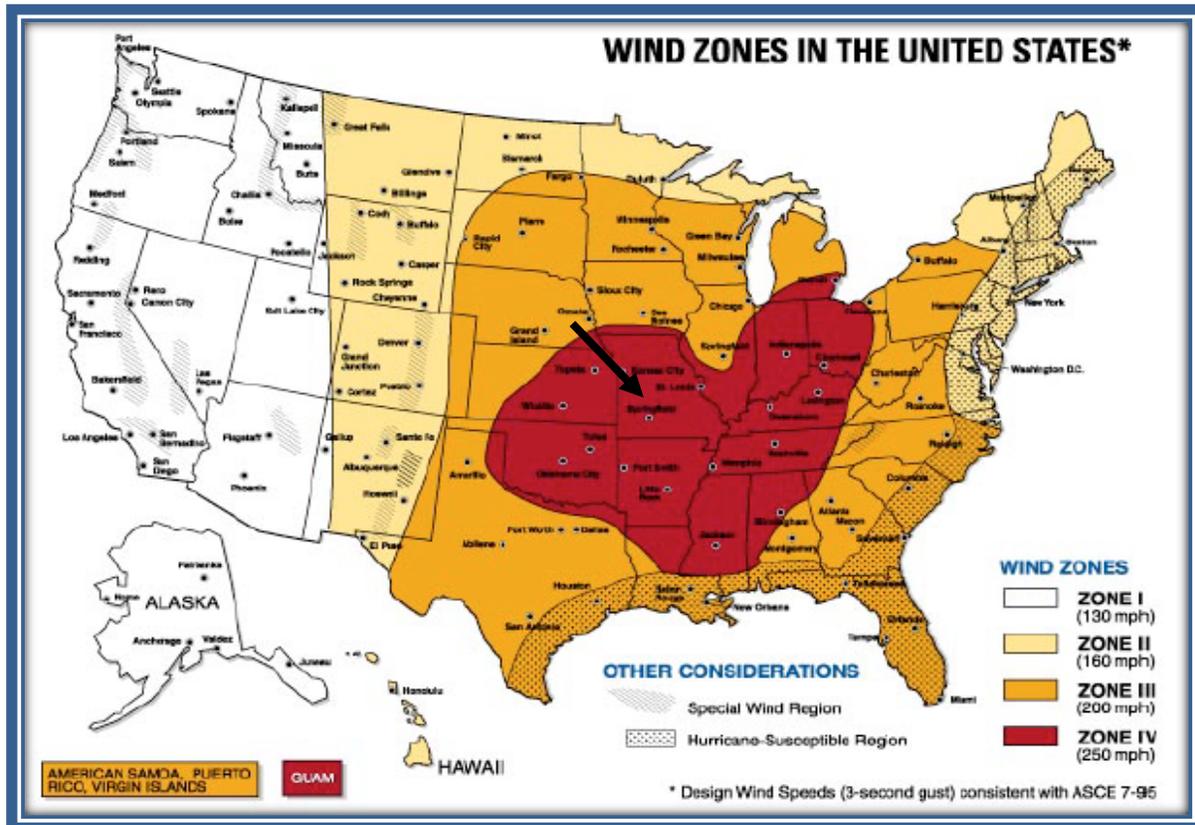
Source: National Weather Service, <http://www.vaisala.com/en/products/thunderstormandlightningdetectionsystems/Pages/NLDN.aspx>. Note: indicate location of planning area with a colored square or arrow.

The National Center for Environmental Information (NCEI) has no lightning events recorded in their

storm events data base.

Figure 3.20 on the following page shows wind zones in the United State, and the Camden County planning. The planning area is located in Zone IV and can see up to 250 mph wind gusts. A black arrow indicates the planning area.

Figure 3.20. Wind Zones in the United States and Missouri



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

Strength/Magnitude/Extent

Based on information provided by the Tornado and Storm Research Organization (TORRO)

Table 3.35 below describes typical damage impacts of the various sizes of hail.

Table 3.35. Tornado and Storm Research Organization Hailstorm Intensity Scale

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

Source: Tornado and Storm Research Organization (TORRO), Department of Geography, Oxford Brookes University

Notes: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity. <http://www.torro.org.uk/site/hscale.php>

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

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

Previous Occurrences

Table 3.36 lists the previous thunderstorm occurrences, number of deaths, and number of injuries, property damages, and crop damages for the past 20 years **Table 3.37** lists previous high wind events for the planning area. Furthermore **Table 3.38** gives the number of previous hail events in the planning area, number of deaths, and number of injuries, property damage, and crop damage.

These events did not have any recorded crop damage or deaths with them. There was only one reported injury with these hazard events.

Table 3.36. Thunderstorm Events 1999-2019

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
1999	2	0	0	\$10,000.00	\$0.00
2000	12	0	0	\$548,000.00	\$0.00
2001	8	0	0	\$80,000.00	\$0.00
2002	3	0	0	\$15,000.00	\$0.00
2003	4	0	0	\$0.00	\$0.00
2004	9	0	0	\$2,000.00	\$0.00
2005	9	0	0	\$10,000.00	\$0.00
2006	7	0	1	\$15,000.00	\$0.00
2007	2	0	0	\$0.00	\$0.00
2008	11	0	0	\$140,000.00	\$0.00
2009	7	0	0	\$30,000.00	\$0.00
2010	3	0	0	\$1,000.00	\$0.00
2011	5	0	0	\$7,000.00	\$0.00
2012	4	0	0	\$103,000.00	\$0.00
2013	5	0	0	\$100,000.00	\$0.00
2014	5	0	0	\$1,000.00	\$0.00
2015	4	0	0	\$0.00	\$0.00
2016	5	0	0	\$10,000.00	\$0.00
2017	7	0	0	\$65,000.00	\$0.00
2018	11	0	0	\$112,000.00	\$0.00
Total	125	0	1	\$1,259,000.00	\$0.00

Source: National Centers for Environmental Information, 6/14/2019

Table 3.37. High Wind Events 1999-2019

Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
2001	1	0	0	\$5,000.00	\$0.00
2003	1	0	0	\$0.00	\$0.00
Total	2	0	0	\$5,000.00	\$0.00

Source: National Centers for Environmental Information, 6/14/2019

Table 3.38. Hail Events 1999-2019

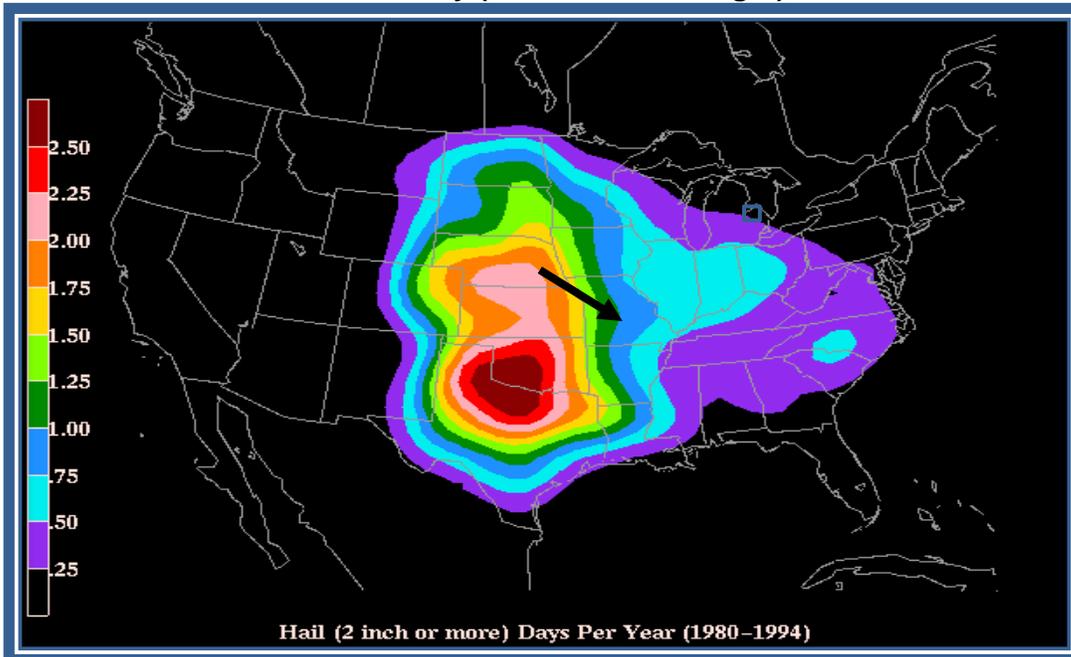
Year	# of Events	# of Deaths	# of Injuries	Property Damages	Crop Damages
1999	1	0	0	\$0.00	\$0.00
2000	6	0	0	\$0.00	\$0.00
2001	16	0	0	\$0.00	\$0.00
2002	13	0	0	\$0.00	\$0.00
2003	37	0	0	\$0.00	\$0.00
2004	23	0	0	\$150,000.00	\$0.00
2005	27	0	0	\$6,000.00	\$0.00
2006	29	0	0	\$0.00	\$0.00
2007	11	0	0	\$0.00	\$0.00
2008	17	0	0	\$0.00	\$0.00
2009	2	0	0	\$0.00	\$0.00
2010	4	0	0	\$0.00	\$0.00
2011	44	0	0	\$332,000.00	\$0.00
2012	7	0	0	\$0.00	\$0.00
2013	4	0	0	\$0.00	\$0.00
2014	14	0	0	\$0.00	\$0.00
2015	4	0	0	\$0.00	\$0.00
2016	9	0	0	\$0.00	\$0.00
2017	19	0	0	\$0.00	\$0.00
2018	6	0	0	\$0.00	\$0.00
Total	296	0	0	\$488,000.00	\$0.00

Probability of Future Occurrence

The probability of future occurrences for severe thunderstorms and high winds is 625% (127 severe thunderstorm and high wind events / 20 years = 625%) **Figure 3.37 and Figure 3.38**. and the probability of future occurrences for hail events is 1,480% probability (296 hail events / 20 years = 1,480%) **Figure 3.39**.

Figure 3.20 is based on hailstorm data from 1980-1994. It shows the probability of hailstorm occurrence (2" diameter or larger) based on number of days per year. Camden County is bisected by the dark green and dark blue zones, which means the planning area can experience hail greater than 2" in diameter 0.75 to 1.25 days per year.

Figure 3.20 Annual Hailstorm Probability (2" diameter or larger), U 1980- 1994



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

Changing Future Conditions Considerations

Predicting increases in temperature could help create atmospheric condition that are bountiful conditions for severe thunderstorms in the planning area. Possible impacts include an increased risk to life and property in both the public and private sectors. Public utilities and manufactured housing developments will be especially prone to damages. Jurisdictions already affected should be prepared for more of these events, and should prioritize mitigation actions such as construction of safe rooms for vulnerable populations, retrofitting and/or hardening existing structures, improving warning systems and public education, and reinforcing utilities and additional critical infrastructures. Source: Missouri Hazard Mitigation Plan 2018

Vulnerability

Vulnerability Overview

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

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

Most lightning damages occur to electronic equipment located inside buildings. But structural damage can also occur when a lightning strike causes a building fire. In addition, lightning strikes can cause damages to crops, if fields or forested lands are set on fire. Communications equipment and warning transmitters and receivers can also be knocked out by lightning strikes. <http://www.vaisala.com/en/products/thunderstormandlightningdetectionsystems/Pages/NLDN.aspx> and <http://www.lightningsafety.noaa.gov/>

The planning committee determined the county highly vulnerable to severe thunderstorms, high winds, lightning, and hail. This is due to the high percentage of probability and the severity of the damage from these hazards **Table 3.36, Table 3.37, Table 3.38.**

Potential Losses to Existing Development

The average annual losses that are determined from historical losses for severe thunderstorms, high winds, lightning, and hail are indicators of the possible losses to existing development. In the past twenty years severe thunderstorms and high winds have caused \$1,259,000.00 in damages while hail caused \$488,000.00 in those same twenty years.

Previous and Future Development

Camden County can expect severe thunderstorms, hail, and high winds to damage structures throughout the planning area. Structures build prior to 1939 cannot withstand the severe thunderstorms, hail, and high wind and are more vulnerable. **Table 3.29** gives the number and percentage of units built in 1939 or earlier in the county and in the jurisdictions.

Hazard Summary by Jurisdiction

Although thunderstorms/high winds/lightning/hail events are area-wide, those jurisdictions with a greater percentage of structures build before 1939 are considered more vulnerable. In the Camden County planning area those jurisdictions with the highest percentage is the City of Linn Creek with 28.4% of the structures being built before 1939 and the City of Stoutland with 36.1% of their structures being built before 1939.

The Stoutland R-II school district needs a roof replacement and in case of a severe thunderstorm, high winds, or hail the school building, students, and faculty are vulnerable to injury.

Problem Statement

Older and poorly built structures in the planning area are more vulnerable to the impacts of severe thunderstorms, high winds, lightening and hail. High winds and hail can damage roofs and further damage already vulnerable roofs and vehicles. Crops are vulnerable to hail damage however; the previous occurrences illustrate that the planning area has not had crop loss due to these hazards. People can also be at risk of injury or death from severe thunderstorms, high winds, hail, and lightening.

Property damage and injury that could include death from severe thunderstorms, high winds, hail, and lightening in Camden County. These hazards can be mitigated by identifying safe areas in public buildings, nursing facilities, and other families that house vulnerable populations.

3.4.8 Severe Winter Weather

Some specific sources for this hazard are:

- 2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.9, Page 3.321
https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf
- Average Number of House per year with Freezing Rain, American Meteorological Society. "Freezing Rain Events in the United States."
<http://ams.confex.com/ams/pdfpapers/71872.pdf>;
- USDA Risk Management Agency, Insurance Claims,
<https://www.rma.usda.gov/data/cause>
- Any local Road Department data on the cost of winter storm response efforts.
- National Centers for Environmental Information, Storm Events Database,
<http://www.NCEI.noaa.gov/stormevents/>
- Missouri Hazard Mitigation Viewer
<http://bit.ly/MoHazardMitigationPlanViewer2018> - Website
<https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide
 - Average annual severe winter weather events by County
 - Vulnerability to severe winter weather events by County
 - Annualized property loss for severe winter weather events by County
 - Annualized property loss for severe winter weather events by County

Hazard Profile

Hazard Description

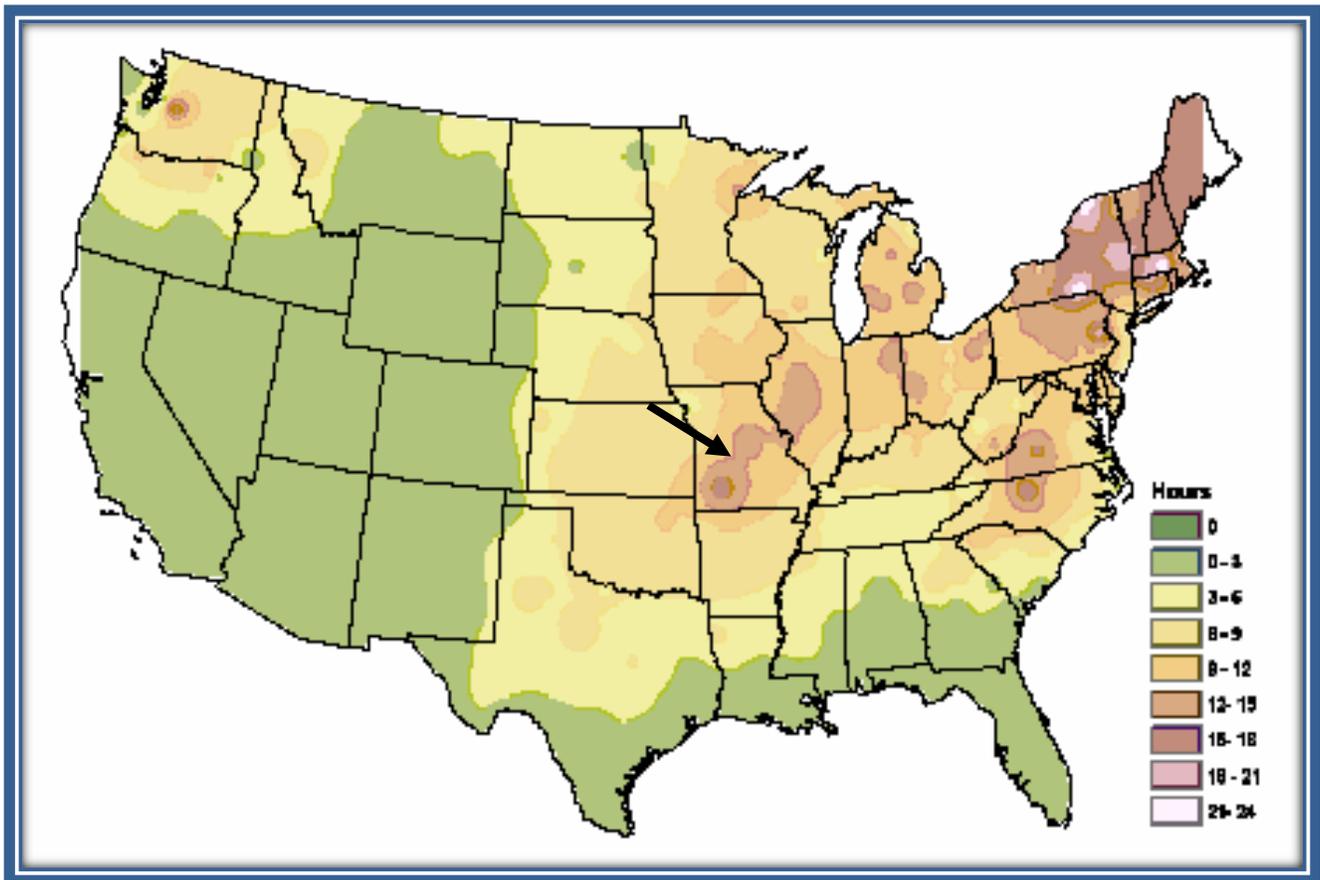
A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. The National Weather Service describes different types of winter storm events as follows.

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

Geographic Location

The entire county is vulnerable to heavy snow, ice, extreme cold temperatures and freezing rain. (Figure 3.21) Illustrates the planning area with a black arrow. The Camden County planning area is susceptible to an average of 15-18 hours per year with freezing rain.

Figure 3.21. NWS Statewide Average Number of Hours per Year with Freezing Rain



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

Strength/Magnitude/Extent

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

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

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

Previous Occurrences

Table 3.39 Includes NCEI reported events and damages for at least the past 18 years. Events that occurred on the same date have been combined.

Table 3.39. NCEI Camden County Winter Weather and Winter Storm Events Summary, 1999-2019

Type of Event	Inclusive Dates	# of Injuries	Property Damages	Crop Damages
Winter Weather	12/16/2016	2	\$150,000.00	\$0.00
Winter Weather	2/15/2019	0	\$0.00	\$0.00
Winter Storm	3/2/2002	0	\$0.00	\$0.00
Winter Storm	12/24/2002	0	\$0.00	\$0.00
Winter Storm	1/2/2003	0	\$0.00	\$0.00
Winter Storm	2/23/2003	0	\$0.00	\$0.00
Winter Storm	3/5/2003	0	\$0.00	\$0.00
Winter Storm	11/30/2006	0	\$120,000,000.00	\$0.00
Winter Storm	1/20/2007	0	\$0.00	\$0.00
Winter Storm	1/26/2009	0	\$0.00	\$0.00
Winter Storm	2/28/2009	0	\$0.00	\$0.00
Winter Storm	3/20/2010	0	\$0.00	\$0.00
Winter Storm	2/21/2013	0	\$0.00	\$0.00
Winter Storm	2/25/2013	0	\$0.00	\$0.00
Winter Storm	1/5/2014	0	\$0.00	\$0.00
Winter Storm	3/2/2014	0	\$0.00	\$0.00
Winter Storm	2/28/2015	0	\$0.00	\$0.00
Winter Storm	1/11/2019	0	\$0.00	\$0.00

Winter Weather event narratives and episode narratives are listed below.

December 16, 2016 Winter Weather Event, Two Sunrise Beach firefighters were injured when their fire truck was involved in an accident due to slick road conditions. The fire truck was totaled. The Osage Beach fire department assist in more than a dozen vehicle crashes due to slick road conditions. An Osage Beach fire truck was damaged in an accident.

Freezing drizzle caused major travel impacts and numerous accidents around the Missouri Ozarks. There were a few fatalities associated with car accidents which were indirectly caused by the icy road conditions.

February 15, 2019 Winter Weather Event, Widespread 3 to 5-inch snow amounts around the county. A public report of measured 3 inches of snow two miles northeast of Linn Creek.

A winter storm brought 3 to 5 inches of snow to portions of central Missouri, while freezing rain brought ice accumulations of one to two tenths of an inch along the Highway 60 corridor. There were a number of accidents across southern and central Missouri, including a 50-car pile-up on Highway 54. The Southwest District of the Missouri Department of Transportation spread 5000 tons of salt at a cost of nearly \$500,000.

March 2, 2002 Winter Storm Event, A late winter storm brought a variety of winter weather across southeast Kansas and portions of southwest, west central and central Missouri, during the morning and afternoon hours of March 2nd. Strong low pressure developed over Arkansas the evening of March 1st, which moved copious amounts of moisture northward across the region. An arctic air mass moved through the area that early morning, dropping temperatures 20 to 30 degrees in six hours. Before the snow started, a shallow layer of warm air aloft provided an hour or two of freezing rain, mixed with heavy sleet at times. Between one tenth and one quarter of an inch of ice accumulated on roadways before the heavy snow began. Between four to nine inches of snow fell in less than eight hours. White-out conditions were common over southwest and west central Missouri during the morning as northerly winds up to 40 mph caused considerable blowing and drifting snow. Numerous car accidents and indirectly related weather injuries were reported during the storm.

December 24, 2002 Winter Storm Event, the second of a series of winter storms to affect the Missouri Ozarks during the cool season of 2002-2003, brought significant snow accumulations to the region. The heaviest accumulation amounts were observed in a 60-mile-wide band. This area is along and 30 miles north and south of a line extending from Cassville to Salem Missouri, where accumulations ranged from 12 to 16 inches. Areas to the north and south of this band, received total accumulations of five to eight inches. Numerous vehicle accidents occurred; however, no property damages were directly correlated with the heavy snow.

January 1, 2003 Winter Storm Event, The third significant winter storm of the 2002-2003 cool season, blanketed areas of west central and central Missouri with seven inches of snow. Accumulations tapered down to less than an inch across extreme southern Missouri.

February 23, 2003 Winter Storm Event, A major winter storm tracked across the region, providing a six to twelve-inch snow band. Other than several vehicle accidents, no major property damage was noted.

March 5, 2003 Winter Storm Event, A late season ice storm brought significant freezing rain and ice accumulations to portions of southwest and central Missouri. One quarter of an inch to two inches of ice were observed along and 25 miles north and south of the highway 54 corridor. No major property damages were reported.

November 30, 2006 Winter Storm Event, A major winter storm caused a combination of freezing rain, sleet, and heavy snow to fall over sections of southwest and central Missouri. The frozen precipitation began on the 30th, the precipitation type was freezing rain and sleet, with ice accumulations up to four inches in some areas. The second wave of precipitation occurred overnight causing large amount of snow to accumulate over the ice. Storm total accumulations ranging from 13 to 17 inches occurred from the Lake of the Ozarks Region, over to Vernon and Cedar counties. Meanwhile other areas north of the Interstate 44 corridor experienced storm totals ranging from seven to 12 inches.

The combination of the ice and snow weighted down all exposed objects. As a matter of fact, some areas experienced disaster as many roofs on businesses, barns, outbuildings, and schools collapsed due to the weight of the accumulated precipitation.

On Lake of the Ozarks and Pomme De Terre Lake, numerous docks collapsed destroying a large number of boats and causing many of them to sink. It was during this event that there was a total of \$120,000,000.00 in property damage.

January 20, 2007 Winter Storm Event, A fast moving storm system brought several forms of precipitation to extreme southeast Kansas and the Missouri Ozarks. The combination of rain, freezing rain, sleet, and snow were observed in numerous counties. For areas along and north of a line from McCune, Kansas to Eldon, Missouri, mainly snow fell with accumulations ranging from five to seven inches. Elsewhere, sleet and freezing rain accumulations ranged from one quarter of an inch to around an inch.

January 26, 2009 Winter Storm Event, A significant accumulation of a wintry mix of freezing rain, sleet and snow resulted in treacherous travel conditions. Ice accretion of near one quarter inch or less was followed by 2 to 5 inches of sleet and snow.

A significant winter storm brought a combination freezing drizzle, freezing rain, sleet and snow to the Missouri Ozarks January 26 and 27, 2009. Freezing drizzle and light freezing rain developed area wide at the onset of the event causing multiple traffic accidents. Freezing rain persisted for much of the event across far southern Missouri resulting in significant ice accretion of one half to one inch. This ice storm downed tree limbs and power lines causing numerous power outages Sleet was the predominant precipitation type for much of the area with accumulations of 1 to 3 inches common. As much as 6 inches of sleet fell across far south-central Missouri. The weight of freezing rain and sleet across far southern Missouri caused the roofs of several buildings and a boat dock to collapse. The sleet transitioned to snow toward the end of the event with 2 to 4 inches of snow

common on top of the freezing rain and sleet.

February 28, 2009 Winter Storm Event, Heavy snow with accumulations of four to eight inches. A winter storm brought heavy snowfall to portions of central and south-central Missouri. A relatively narrow band of four to eight inches accumulations set up northwest to southeast from the Truman Lake area to the eastern Ozarks.

March 20, 2010 Winter Storm Event, Snow accumulations of 2 to 6 inches combined with one quarter inch of sleet and minor ice accumulations made travel dangerous.

February 21, 2013 Winter Storm Event, A winter storm brought a mix of snow and sleet accompanied by thunder. Sleet accumulations ranged from one to two inches with snow accumulations ranging from one to two inches.

February 25, 2013 Winter Storm Event, A winter storm brought snow accumulations of three to six inches.

A winter storm brought moderate to heavy snowfall to portions of southeastern Kansas and central Missouri. Total snowfall generally ranged from four to eight inches with locally higher totals of nine to eleven inches in central Missouri.

January 5, 2014 Winter Storm Event, Heavy snow with accumulations of 4 to 8 inches.

A winter storm brought heavy snow to much of the Missouri Ozarks with accumulations of 6 to 12 inches. The highest accumulations of 10 to 12 inches occurred across portions of central Missouri east of Lebanon through the Rolla area. Northwest winds of 20 to 35 mph resulted in significant blowing and drifting snow along with bitterly cold wind chills.

March 2, 2014 Winter Storm Event, Sleet accumulations of 1/4 to 1/2 inch with snow accumulations of 1 to 2 inches.

A winter storm impacted the Missouri Ozarks from Saturday night through Sunday night March 2, 2014. Precipitation began as a mixture of freezing rain and sleet Saturday night across much of the area, with rain changing to freezing rain and sleet across far southern Missouri as the night progressed. Many locations across southern Missouri also saw thunderstorms Saturday night with numerous reports of thunder sleet. Precipitation changed to snow during the day Sunday as an Arctic air mass overspread the area.

February 28, 2015 Winter Storm Event, winter storm brought significant snowfall with total snow accumulations of 4 to 6 inches.

A winter storm brought moderate to locally heavy snowfall to portions of southern Missouri. Total snow accumulations generally ranged from 4 to 6 inches. Freezing rain impacted a portion of south-central Missouri with ice accumulations up to one third of an inch.

January 11, 2019 Winter Storm Event, Rain the morning of January 11 changed to sleet and snow by early afternoon. A storm total snow from CoCoRahs station MO-CM-20, 1 mile west southwest of Laurie measured 6.0 inches of snow.

A winter storm that started as rain as it moved into central and southern Missouri, then turned to a wintry mix of sleet, freezing rain and snow before changing over to all snow in some areas. Heavy snow fell across central Missouri with accumulations between 6 and 12 inches. Portions of south-central Missouri saw significant ice accumulations that resulted in power outages and numerous trees and limbs down. As the precipitation was winding down, areas of freezing drizzle persisted through the overnight hours of January 12.

There have been seven Presidential Disaster Declarations for Winter Storms since 1965. In **Table 3.1** FEMA Disaster Declarations that included Camden County, Missouri, 1965-Present lists all Presidential Disaster Declarations. **Table 3.40** below lists the Severe Winter Storms and Snow Storms for the planning area since 1965.

Table 3.40. FEMA Disaster Declaration for Camden County Due to Sever Winter Storms 1965-Present

Disaster Number	Description	Declaration Date Incident Period	Individual Assistance (IA) Public Assistance (PA)
1673	Severe Winter Storms	12/29/2006 11/30/2006-12/2/2006	IA-No PA-Yes
1676	Severe Winter Storms and Flooding	1/15/2007 1/12/2007-1/22/2007	IA-No PA-Yes
3281	Severe Winter Storms	12/12/2007 12/8/2007-12/15/2007	IA-No PA-Yes
1736	Severe Winter Storms	12/27/2007 12/6/2007-12/15/2007	IA-No PA-Yes
3303	Severe Winter Storm	1/30/2009 1/26/2009-1/28/2009	IA-No PA-Yes
3317	Severe Winter Storm	2/3/2011 1/31/2011-2/5/2011	IA-No PA-Yes
1961	Severe Winter Storm & Snow storm	3/23/2011 1/31/2011-2/5/2011	IA-No PA-Yes

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

There were three projects completed with PA grant funds from Disaster number 1673, Severe Winter Storms Camden County, the City of Camdenton, and the City of Osage Beach completed projects for emergency protective measures totaling \$77,405.35 in grant funds.

Table 3.41. FEMA PA Grants in Camden County from 1993-2018 for Severe Winter Weather and Snow Storms

Disaster Declaration	Project Type	Project Size	Applicant	Project Total
1673	Emergency Protective Measures	Small	City of Osage Beach	\$14,833.06
1673	Emergency Protective Measures	Large	Camden County	\$74,366.36
1673	Emergency Protective Measures	Small	City of Camdenton	\$3,038.99
			Total	\$92,238.41
1676	Emergency Protective Measures	Small	City of Linn Creek	\$4,303.00
1676	Emergency Protective Measures	Small	Sunrise Beach Fire Department	\$2,958.16
1676	Debris Removal	Small	City of Linn Creek	\$7,500.00
1676	Public Utilities	Small	City of Camdenton	\$2,500.00
1676	Public Buildings & Facilities	Small	City of Osage Beach	\$1,000.00
1676	Debris Removal	Small	City of Camdenton	\$17,517.23
1676	Emergency Protective Measures	Large	Camden County	\$75,140.99
1676	Emergency Protective Measures	Small	City of Camdenton	\$6,982.41
1676	Emergency Protective Measures	Small	City of Osage Beach	\$36,091.95
1676	Debris Removal	Large	Camden County	\$103,715.12
			Total	\$276,108.86
1961	CMMB-12-School Building	Small	029-UCUYL-00	\$1,000.00
1961	Emergency Snow Removal	Small	029-UCUYL-00	\$1,028.90
1961	CMMB 13 Roads	Small	029-UCUYL-00	\$1,080.00
1961	Emergency Snow Removal	Small	City of Camdenton	\$11,260.48
1961	Emergency Protective Measures	Small	Sunrise Beach Fire Protection District	\$1,194.52
1961	Emergency Protective Measures	Small	Osage Beach Fire Protection	\$1,292.51
1961	Damaged Emergency Response	Small	Osage Beach Fire Protection	\$1,763.60
1961	CMFBB1 48-hour snow emergency	Large	Camden County Road & Bridge	\$113,915.57
1961	Emergency Protective Measures 48-hour snow Removal	Small	029-03964-00	\$31,144.90
1961	Damaged Equipment	Small	029-03964-00	\$2,236.50
1961	CMGD 02 Snow Removal	Small	Village of Sunrise Beach	\$6,918.16
1961	CMGD 01-48 Hour Snow Storm	Small	City of Osage Beach	\$20,105.45
1961	CMMB 17 Emergency Snow Removal	Small	Lake Regional Health System	\$13,275.30
1961	Emergency Protective Measures	Small	Village of Sunrise Beach	\$1,160.78
			Total	\$207,376.67

Other declared disasters due to Severe Winter Storms and Snow Storms were Disaster # 3281, 1736, 3303, and 3317 on the following web pages it says that there were public assistance dollars approved. However, if and when public assistance obligated dollar information is available for these four disasters, it will be displayed on the website and the information is updated every 24 hours.

Source: <https://www.fema.gov/disaster/3281> <https://www.fema.gov/disaster/1736> <https://www.fema.gov/disaster/3303> <https://www.fema.gov/disaster/3317>

Winter storms, cold, frost and freeze take a toll on crop production. In the Camden County planning area, there have been no crop loss or crop insurance payments due to winter storms, cold, frost or freeze in the past twenty years. Source: USDA Risk Management Agency, <https://www.rma.usda.gov/data/cause>

Probability of Future Occurrence

The probability of future occurrences for severe Winter Weather is 10% (2 winter weather Events / 20 years = 10% probability) and Winter Storms is 90% (18 winter storm events / 20 years = 90% probability). See **Table 3.40**

Changing Future Conditions Considerations

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

Vulnerability

Vulnerability Overview

With the probability of Severe Winter Weather at 10% and Winter Storms probability at 90% in the Camden County planning area and the severity \$7,500.00 a year, the planning committee determined the vulnerability of extreme heat and extreme cold for the planning area to be at a moderate ranking. (25% - 75% probability, or \$100,000.00-\$300,000.00 a year severity).

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

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

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

Secondary effects from loss of power could include burst water pipes in homes without electricity during winter storms. Public safety hazards include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables associated with this hazard. Standard values for loss of service for utilities reported in FEMA’s 2009 BCA Reference Guide, the economic impact as a result of loss of power is \$126 per person per day of lost service.

Potential Losses to Existing Development

The next severe winter storm will most likely cause impact schools and businesses causing them to close for multiple days and make roads hazardous for travel. Heavy ice accumulation may damage electrical infrastructures, causing prolonged power outages for portions of the region. In addition, Freezing temperatures can make water lines susceptible to freezing and thawing which can lead to damage and breakage. Fallen trees and limbs also will pose a threat to various structures across Camden County. According to the 2018 Missouri State plan, Camden County can expect total loses of \$5,736,667 due to severe winter weather events annually.

Previous and Future Development

Data for future development for the planning area is limited. Winter will affect the county as a whole. Any future development is a risk to damages and increased exposure. In addition, the county’s population within the cities is anticipated to increase, which would increase the number of individuals at risk during a winter weather event.

Hazard Summary by Jurisdiction

The jurisdictions that are most at risk to severe winter weather include those living below the poverty line, those aged 65 years or older, and those living in mobile homes. Those living below the poverty line are more vulnerable to winter weather because heat may not be available or affordable. Those aged 65 years or older are more vulnerable to winter weather because of potential health problems or lack of ability to endure the cold. Percentages of mobile homes within each jurisdiction is discussed in the section above.

Jurisdiction	% of Families Living Below Poverty Level	Percent of Population Aged 65 or Older
Camden County	22.9%	10.9%
City of Camdenton	22.3%	31.5%
City of Osage Beach	22.4%	31.1%
City of Lake Ozark	8.6%	21.4%
City of Linn Creek	21.1.0%	19.12%
Village of Four Season	9.4%	9.8%
Village of Sunrise Beach	19.3%	28.5%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

	Enrollment	Saferoom
Camdenton School District	4091	No
Macks Creek School District	318	No
Climax Springs School District	208	No
Stoutland School District	437	No

Problem Statement

Severe winter weather can include blizzards, heavy snow, ice storms, sleet, and extreme cold/wind chill that can be devastating to communities. Traffic accidents, damaged utility lines, structural collapse, and extremely low temperatures put the public and infrastructure at risk. People over 65 years old and those living in poverty or in areas with insufficient heat are especially at risk to hypothermia and frostbite.

Organizing outreach to at-risk populations, including establishing and promoting heating centers can help reduce risk of exposure to severe winter weather. Having an alert system in place can also allow the public time to avoid driving or other dangerous scenarios. Communities should also be sure to have sufficient snow removal and salt trucks prepared as the winter months arrive.

3.4.9 Tornado

Some specific sources for this hazard are:

2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.10, Page 3.355

https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf

NWS Enhanced F Scale for Tornado Damage including damage indicators and degrees of damage

www.spc.noaa.gov/faq/tornado/ef-scale.html;

Tornado Activity in the U.S. map (1950-2006), FEMA 320, Taking Shelter from the Storm, 3rd

edition; <https://www.fema.gov/fema-p-320-taking-shelter-storm-building-safe-room-your-home-or-small-business>

Tornado Alley in the U.S. map, <http://tornadochaser.com/education/tornado-alley/>

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

Tornado History Project, map of tornado events,

<http://www.tornadohistoryproject.com/tornado/Missouri>

Missouri Hazard Mitigation Viewer

<http://bit.ly/MoHazardMitigationPlanViewer2018> - Website

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

- Number of Tornadoes by County
- Percentage of Mobile Homes in 2015 by County
- Average annual tornado events by County
- Vulnerability to tornado events by County
- Annualized property loss for tornado events by County
- Annualized property loss for tornado events by County

Hazard Profile

Hazard Description

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

Although tornadoes have been documented in all 50 states, most of them occur in the central United States. The unique geography of the central United States allows for the development of thunderstorms that spawn tornadoes. The jet stream, which is a high-velocity stream of air, determines which area of the central United States will be prone to tornado development. The jet stream normally separates the cold air of the north from the warm air of the south. During the winter, the jet stream flows west to east from Texas to the Carolina coast. As the sun “moves” north, so does

the jet stream, which at summer solstice flows from Canada across Lake Superior to Maine. During its move northward in the spring and its recession south during the fall, the jet stream crosses Missouri, causing the large thunderstorms that breed tornadoes.

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

A typical tornado can be described as a funnel-shaped cloud that is "anchored" to a cloud, usually a cumulonimbus that is also in contact with the earth's surface. This contact on average lasts 30 minutes and covers an average distance of 15 miles. The width of the tornado (and its path of destruction) is usually about 300 yards. However, tornadoes can stay on the ground for upward of 300 miles and can be up to a mile wide. The National Weather Service, in reviewing tornadoes occurring in Missouri between 1950 and 1996, calculated the mean path length at 2.27 miles and the mean path area at 0.14 square mile.

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

Geographic Location

Across Missouri, tornadoes may occur in time of the year and in in location but most frequently occur between April and June, with April and May usually producing the most tornadoes. Tornadoes and the strong damage have been experienced in many locations across Camden County.

Strength/Magnitude/Extent

Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour and damage paths can be more than one mile wide and 50 miles long. Tornadoes have been known to lift and move objects weighing more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes also can generate a tremendous amount of flying debris or "missiles," which often become airborne shrapnel that causes additional damage. If wind speeds are high enough, missiles can be thrown at a building with enough force to penetrate windows, roofs, and walls. However, the less spectacular damage is much more common.

Tornado magnitude is classified according to the EF- Scale (or the Enhance Fujita Scale, based on the original Fujita Scale developed by Dr. Theodore Fujita, a renowned severe storm researcher). The EF-Scale (see **Table 3.43**) attempts to rank tornadoes according to wind speed based on the damage caused. This update to the original F Scale was implemented in the U.S. on February 1, 2007.

Table 3.42. Enhanced F Scale for Tornado Damage

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest ¼-mile (mph)	3 Second Gust (mph)	EF Nu	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Source: The National Weather Service, www.spc.noaa.gov/faq/tornado/ef-scale.html

The wind speeds for the EF scale and damage descriptions are based on information on the NOAA Storm Prediction Center as listed in **Table 3.44**. The damage descriptions are summaries. For the actual EF scale, it is necessary to look up the damage indicator (type of structure damaged) and refer to the degrees of damage associated with that indicator. Information on the Enhanced Fujita Scale's damage indicators and degrees of damage is located online at www.spc.noaa.gov/efscale/ef-scale.html.

Table 3.43. Enhanced Fujita Scale with Potential Damage

Enhanced Fujita Scale			
Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
EF0	65-85	53.5%	Light. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e. those that remain in open fields) are always rated EF0).
EF1	86-110	31.6%	Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	10.7%	Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes complete destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some
EF4	166-200	0.7%	Devastating. Well-constructed houses and whole frame houses completely levelled; cars thrown and small missiles generated.
EF5	>200	<0.1%	Explosive. Strong frame houses levelled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur.

Source: NOAA Storm Prediction Center, <http://www.spc.noaa.gov/efscale/ef-scale.html>

Enhanced weather forecasting has provided the ability to predict severe weather likely to produce tornadoes days in advance. Tornado watches can be delivered to those in the path of these storms several hours in advance. Lead time for actual tornado warnings is about 30 minutes. Tornadoes

have been known to change paths very rapidly, thus limiting the time in which to take shelter. Tornadoes may not be visible on the ground if they occur after sundown or due to blowing dust or driving rain and hail.

Previous Occurrences

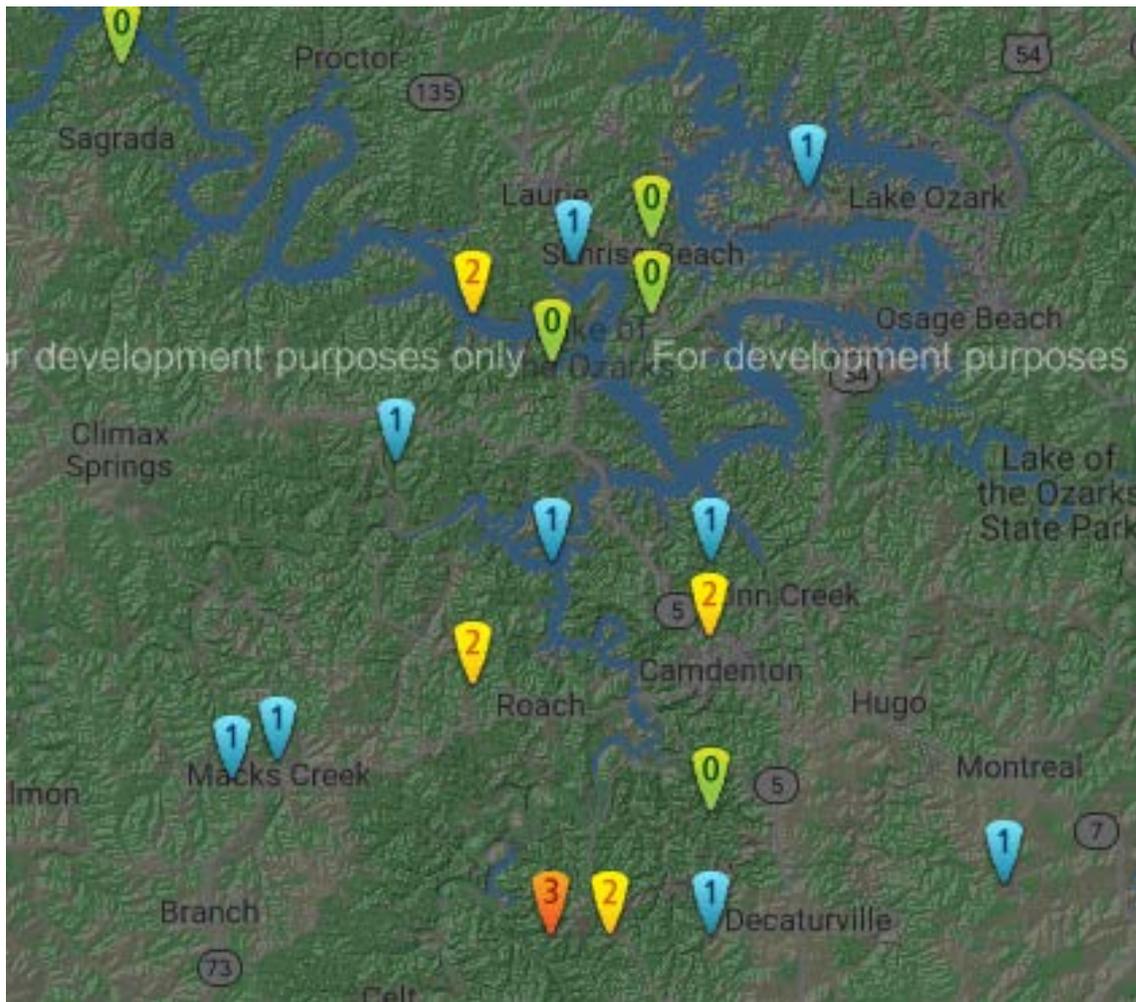
There are limitations to the use of NCEI tornado data that must be noted. For example, one tornado may contain multiple segments as it moves geographically. A tornado that crosses a county line or state line is considered a separate segment for the purposes of reporting to the NCEI. Also, a tornado that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

Table 3.44. Recorded Tornadoes in Camden County, 1993 – Present

Date	Beginning Location	Ending Location	F/EF Rating	Death	Injury	Property Damage	Crop Damages
05/21/1998	Hurricane Deck	Hurricane Deck	F0	0	0	30.00K	0.00K
05/04/2003	Decaturville	Decaturville	F3	4	27	5.000M	1.000M
05/04/2003	Camdenton	Camdenton	F0	0	0	0.00K	0.00K
05/06/2003	Climax Spgs	Climax Spgs	F0	0	0	0.00K	0.00K
05/06/2003	Barnumton	Barnumton	F0	0	0	0.00K	0.00K
05/06/2003	Sunrise Beach	Sunrise Beach	F0	0	0	0.00K	0.00K
05/06/2003	Sunrise Beach	Sunrise Beach	F0	0	0	0.00K	0.00K
05/06/2003	Montreal	Montreal	F1	0	0	10.00K	0.00K
06/03/2008	Barnumton	Barnumton	EF1	0	0	10.00K	0.00K
03/06/2017	Macks Creek	Macks Creek	EF1	0	0	100.00K	0.00K
07/20/2018	Neongwah	Neongwah	EF0	0	0	0.00K	0.00K
	Total			4	27	6.500M	1.00M

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

Figure 3.22. County A Map of Historic Tornado Events



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

According to the USDA Risk Management Agency's database, there were no records of insurance payments for crops related to damage from tornadoes.

Probability of Future Occurrence

Information obtained from the NCEI, and annual average percent probability was calculated for tornadoes in Camden County Table 3.46. There is a 55% percent annual average probability of a tornado event (11 event/20 years X 100).

Within the 2018 State Plan, vulnerability summaries were composed for each county within Missouri based on likelihood of tornado occurrence, loss ratio, population change, housing change, and overall vulnerability rating. Camden County was ranked as having moderate vulnerability. While this approach attempts to prioritize tornado vulnerable counties, it does not identify any particular geographic patterns to tornado risk. This is consistent with the random nature of tornadoes.

Changing Future Conditions Considerations

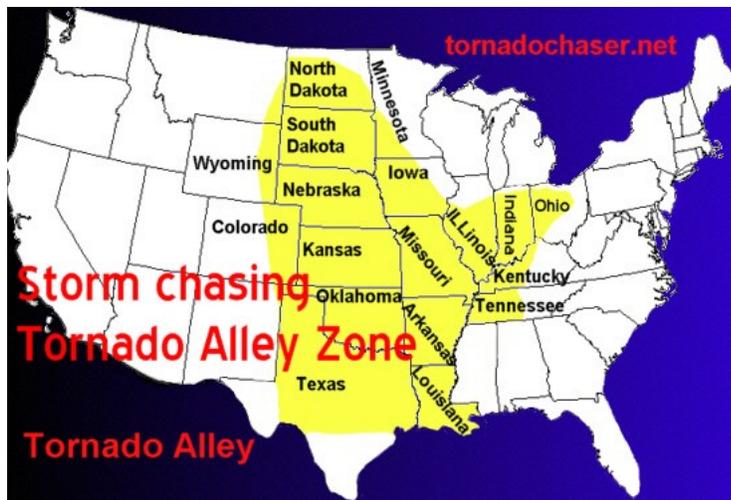
Examining information from the US Climate Resilience Toolkit and the 2018 Missouri State Plan there is no information that indicated climate change is having a measurable impact on tornado activity

Vulnerability

Vulnerability Overview

Camden County, along with the rest of Missouri, is located in a region of the U.S. with high frequency of dangerous and destructive tornadoes referred to as “Tornado Alley”. **Figure 3.24** illustrates areas where dangerous tornadoes historically have occurred.

Figure 3.23. Tornado Alley in the U.S.



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

Potential Losses to Existing Development

Potential losses were calculated in the 2018 State Plan for each county based on the total building exposure value divided by average annualized historic losses. For Camden County, this value is \$8,325,943,000

As stated previously, Camden County has experienced 11 tornado events over the last 20 years causing a total of \$6,500,000 in property damage. This means that over 25 years, the average annual loss from tornado damage is \$325,000. Out of the 11 tornado events recorded, 4 events were ranked as at least an EF1 tornado. With probability of a tornado event during a given year being 55%, it is logical to assume that a tornado event would most likely be ranked at least an EF1, which could cause an average of \$233,333 in damage.

Previous and Future Development

Development across the county and within incorporated jurisdictions increases the potential for losses. The average annual loss over the 25-year period to date is \$325,000, which would stay the same if there was no additional development. Future development and population increase will increase exposure to damage.

Hazard Summary by Jurisdiction

Problem Statement

A tornado event could occur anywhere in Camden County, but some jurisdictions would suffer heavier damages because of the age of the housing or the high concentration of mobile homes. Jurisdictions with high percentages of mobile homes will also be more at risk. According to the 2016 U.S. Census Bureau's American Community Survey, four jurisdictions have at least 10% of housing as mobile homes; Conway with 18%, Phillipsburg with 17%, Stoutland with 14%, and Richland with 11%. Communities with structures built before 1939 are also more vulnerable to tornadoes because of high winds. Refer to the ***Hazard Summary by Jurisdiction*** part of **Section 3.4.8** for discussion on jurisdictions with homes built before 1939.

3.4.10 Wildfire

The specific sources for this hazard are:

2018 Missouri State Hazard Mitigation Plan, Chapter 3, Section 3.3.11, Page 3.390

https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf

Missouri Department of Conservation Wildfire Data Search at

<http://mdc7.mdc.mo.gov/applications/FireReporting/Report.aspx>

Statistics, Missouri Division of Fire Safety;

National Statistics, US Fire Administration;

Fire/Rescue Mutual Aid Regions in Missouri;

Forestry Division of the Missouri Dept of Conservation;

National Fire Incident Reporting System (NFIRS)

<http://dfs.dps.mo.gov/programs/resources/fire-incident-reporting-system.php>

Firewise, www.firewise.org

University of Wisconsin Slivis Lab, <http://silvis.forest.wisc.edu/maps/wui/2010/download>

Missouri Hazard Mitigation Viewer

<http://bit.ly/MoHazardMitigationPlanViewer2018> - Website

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

- Likelihood of Occurrence of wildfire by County
- Average annual land burned (acres) by County
- Number of structures located within the WUI Interface/Intermix Area
- Population located within the WUI Interface/Intermix Area
- Potential loss, average annual land burned by County

Hazard Profile

Hazard Description

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

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

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

Geographic Location

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



Source: <http://silvis.forest.wisc.edu/data/wui-change/>

The Village of Four Seasons and Lake Ozark are the most vulnerable communities in Camden County to Wildland Urban Interface (WUI)

Strength/Magnitude/Extent

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

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

stories.

While very unusual, crown fires can and do occur in Missouri native hardwood forests during prolonged periods of drought combined with extreme heat, low relative humidity, and high wind. Tornadoes, high winds, wet snow and ice storms in recent years have placed a large amount of woody material on the forest floor that causes wildfires to burn hotter and longer. These conditions also make it more difficult for fire fighters suppress fires safely.

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

Currently there is no information about Wildland-urban interface wildfires in Camden County.

Previous Occurrences

According to MDC Wildfire Data, there have been 383 wildfires reported in Camden County from 2015 to December 2019. A total of about 8370 acres were burned because of these wildfires. Arson and debris are two of the most common causes of the fires. Only four fires were reported as being caused by lightning. The remaining causes were classified as equipment, smoking, campfire, miscellaneous, not reported or unknown. **Table 3.26** shows the number of wildfires reported per year.

Year	Number of Wildfires
2015	127
2016	42
2017	95
2018	79
2019	37

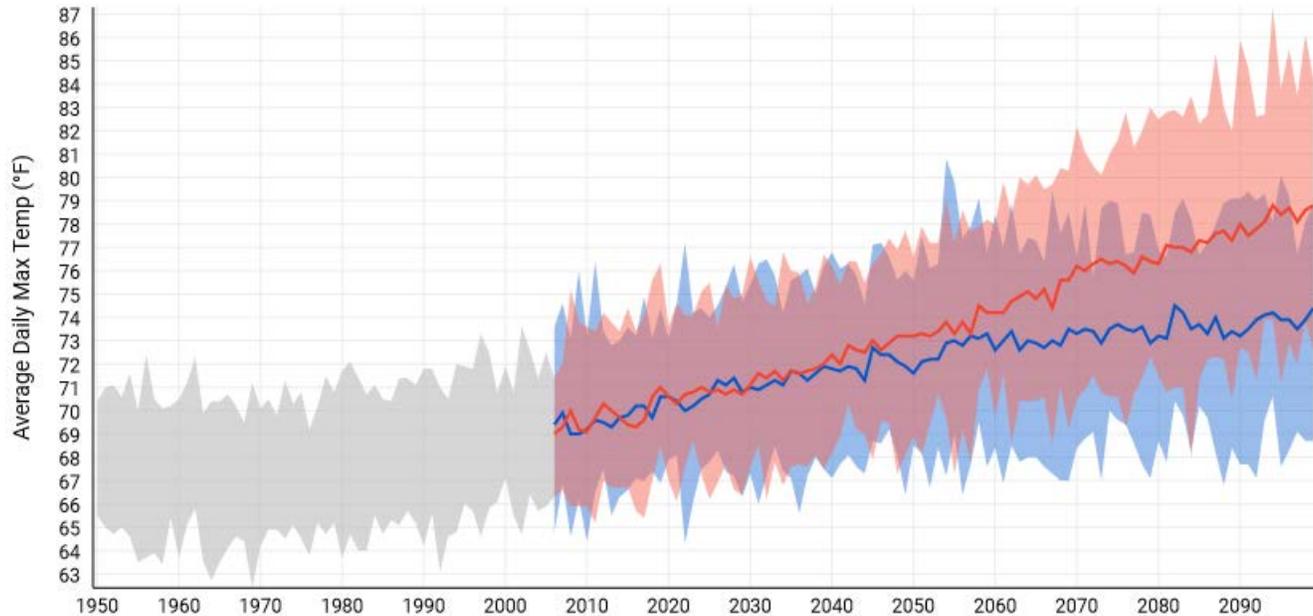
Source: <https://mdc12.mdc.mo.gov/Applications/MDCFireReporting/Home/FireReportSearch>

There are no reports of wildfires or damages from the Camden County School Districts

Probability of Future Occurrence

Location	Annual Average %	Average Number of Events
Camden County	100%	76

Changing Future Conditions Considerations



Source: <https://toolkit.climate.gov/image/1764>

Vulnerability

Vulnerability Overview

There were 2307 wildfires in Camden county between 2004-2016 burning a total of 3,997.45 acres. This can be contributed to large amounts structure in densely wooded areas. This information however is not completely accurate due to underreporting. Currently only 61 % of fire department report to National Fire Incident Reporting System (NFIRS) from which this information is sourced.

Source: 2018 Missouri State Plan, see Chapter 3, Section 3.3.11

Potential Losses to Existing Development

The 2018 State Plan also provides information about estimates of potential losses for each county. The factors considered in determining future potential loss estimates from wildfires included the average acreage burned each year because of wildfire and the average value of structures per acre in WU-Interface/Intermix areas. **Table 3.28** below shows the values of these factors along with the total estimate of potential loss

Impact of Previous and Future Development

It is anticipated that the city of Osage Beach will be the jurisdiction hosting the most growth in the near future. The future land use plan shows residential areas spreading outside of city limits and further into

the interface and intermix zones. It is expected that any WUI developments in this area will follow all necessary regulations and hopefully reduce the risk to wildfire hazards.

Hazard Summary by Jurisdiction

As long as drought conditions are not severe, future wildfire in Camden County should have a negligible adverse impact on the community, it would affect a small percentage of the population. Nonetheless, homes, businesses, and schools located in unincorporated areas are at higher risk from Wildfires due to proximity to woodland and more importantly, distance from fire services.

Problem Statement

Wildfire events occur frequently in Camden County and have caused significant damage in the past. Populations and structures in WUI areas of the county have an increased risk of wildfires due to the higher amount of material present. Because Lake Ozark sits in large interface and intermix zones, and contains large amounts development within the county, they are most vulnerable to wildfire hazards.

County officials and local fire departments can promote fire resistant construction materials and landscape design techniques to help mitigate the risk to wildfire in development that will most likely occur in the near future. Information about these materials and techniques are included in the MDC publication, *Living with Wildfire*. Education, outreach, and communication between government officials, emergency services, school districts, and residents can also help reduce the risks associated with wildfires.

4 MITIGATION STRATEGY

4	MITIGATION STRATEGY	4.1
4.1	Goals	4.1
4.2	Identification and Analysis of Mitigation Actions	4.2
4.3	Implementation of Mitigation Actions	4.9

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

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

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

4.1 Goals

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

This planning effort is an update to Camden County’s existing hazard mitigation plan approved by FEMA on October 20, 2015. Therefore, the goals from the 2015 Camden County Hazard Mitigation Plan were reviewed to see if they were still valid, feasible, practical, and applicable to the defined hazard impacts. The MPC conducted a discussion session during their third meeting to review and update the plan goals. To ensure that the goals developed for this update were comprehensive and supported State goals, the 2018 State Hazard Mitigation Plan goals were reviewed. The MPC also reviewed the goals from current surrounding county plans. As the existing goals were broad, still applicable, and supported the 2018 State Hazard Mitigation Plan goals, the MPC saw no reason to make any changes. The Camden County goals are as follows:

Goal 1: Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County.

Goal 2: Mitigation Programs-Protect Camden County’s assets and populace through cost-effective and tangible mitigation projects whenever financially feasible.

Goal 3: Mitigation Procedures-Encourage continuity of operations of government and emergency

services in a disaster.

Goal 4: Mitigation Public Awareness-Increase public awareness of natural hazards that have the potential to impact Camden County.

4.2 Identification and Analysis of Mitigation Actions

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

Some specific sources for mitigation action ideas include the following:

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

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

The MPC included problem statements in the plan update at the end of each hazard profile during the second MPC meeting. The problem statements summarize the risk to the planning area presented by each hazard and include possible methods to reduce that risk.

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

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

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

The MPC reviewed the actions from the previously approved plan for progress made since the plan had been adopted, using worksheets included in Appendix C of this plan. Prior to Meeting #1, the list of actions for each jurisdiction was emailed to that jurisdiction's MPC representative along with the worksheets. Each jurisdiction was instructed to provide information regarding the "Action Status" with one of the following status choices:

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

Additionally, the future inclusion of each mitigation action in the plan update was identified as either keep, delete, or modify. Based on the status updates, there were 5 completed actions, and 24 deleted actions.

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

Table 4.1 Action Status Summary

Jurisdiction	Completed Actions	Continuing Actions (ongoing or modify)	Deleted Actions	Total Actions
Camden County	4	7	11	22
City of Camden	0	2	1	3
City of Linn Creek	0	2	0	2
City of Lake Ozark	0	1	0	1
City of Osage Beach	0	2	0	2
Village of Four Seasons	1	1	1	3
Village of Sunrise Beach	0	2	0	2
City of Richland	0	0	1	1
Camdenton R-III School District	0	1	3	4
Climax Springs IV	0	2	2	4
Macks Creek R-V	0	2	2	4

Jurisdiction	Completed Actions	Continuing Actions (ongoing or modify)	Deleted Actions	Total Actions
Stoutland R-II	0	1	3	4

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

Goals/Objectives		
Goal 1	Mitigation Planning - Mitigate the effects of potential natural hazards in Camden County.	
Objective 1.1	Encourage Increased Analysis of Hazards and Vulnerabilities Facing Camden County	
1.1.1	Investigate the vulnerability of the seasonal population to peak-season hazards	This mitigation action was vague and did not identify a community or organization that would be responsible and therefore the action remains not completed as of this update. No community or organization proposed and action that was the same or similar so the action was deleted from the Camden County HMP 2020 Action Items. DELETED-2020
1.1.2	Conduct outreach programs that uses a direct mailing, door to door visits in certain areas, local media, and billboards advertising the use of Firewise risk analysis methodologies to better understand wildfire risk.	This mitigation action was specifically directed towards the fire districts within Camden County, some of the fire districts worked on some aspects of this action, but unable to confirm what was completed and what remains uncompleted at this time. There has been no formal action worksheet presented for the Camden County HMP 2020 therefore the action was deleted at this time. DELETED-2020

Goals/Objectives		
1.1.3	Determine need for stream gauges in creeks and streams without flood warning systems or additional stream gauges in waterways with flood warning systems already in-place	Stream gauges are in major streams and monitored by Missouri Department of Natural Resources. This action was not specific to Camden County, and no local jurisdiction have added any additional stream gauges during this planning period. No community or participated jurisdiction has moved this action forward with an Action Worksheet for the Camden County HMP 2020, therefore the action was deleted. DELETED-2020
Objective 1.2	Encourage Increased Analysis of Hazards and Vulnerabilities Facing Camden County	
1.2.1	Include policies regarding seasonal populations in future HMPs, community plans, and emergency operations plans	Camden County EMD indicated that they include this information in their emergency operations procedures. This action has been partially completed and marked completed based on the only the specific completion or a major part of this identified action in the Camden County EMA Standard Operating Procedures 2017. COMPLETED-2020
1.2.2	Encourage creation of heat wave, sinkhole, and other hazard event annexes for inclusion in local emergency operations plans	Camden County EMD indicated that this has been included in their local planning emergency operations plan. Therefore, this action is being marked completed in 2017 by Camden County. COMPLETED-2020
Goal 2	Mitigation Programs - Protect Camden County's assets and populace through cost-effective and tangible mitigation projects whenever financially feasible.	
Objective 2.1	Work to Ensure At-Risk, Elderly, and Low-Income Residents (permanent and seasonal) have Adequate Resources to Respond to Hazards	
2.1.1	Partner with community services organizations, local businesses, local CERT teams to provide materials and volunteer labor to assist at-risk groups, low income residents, and the elderly in preparing their homes for high and medium risk hazards.	Camden County EMD has established a CERT Team in 2018 and has done some of the items listed in this action, however with limited funding they have not been able to complete the action in its entirety. The action will move forward in the Camden County HMP 2020 as a modified action as adopted by participating jurisdictions. DELETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED

Goals/Objectives		
2.1.2	Identify and adequately retrofit suitable existing facilities with generators to serve as emergency shelters during severe winter weather, heat waves, and other hazard events	This action was vague and local jurisdictions have not had the appetite to retrofit existing facilities based on the cost and access to buildings. This action has been deleted from the Camden County HMP 2020 because there have been several action worksheets that are specific to building safe rooms in communities and school districts throughout Camden County. DELETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
Objective 2.2	Encourage Best Building Practices are Used by the Private Sector	
2.2.1	Consider adopting ordinances, resolutions, or incentives encouraging the construction of safe rooms in new buildings where people live, work or congregate	Several jurisdictions within Camden County have submitted action worksheets that have identified Safe Room Construction. Therefore, this action has been modified to reflect the participating jurisdictions that have identified this action as a priority for them in the Camden County HMP 2020. DELETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
2.2.2	Consider adopting ordinances, resolutions, or incentives encouraging the registration of safe rooms in new buildings where people live, work or congregate	Camden County developed a database of saferooms and their locations for information purposes. They do not have the authority to require that people register their saferooms or storm shelters but it is highly encouraged. This action will continue on a voluntary basis; therefore, the action is being marked completed as of 2019. COMPLETED-2020
2.2.3	Review and work with communities and home owners associations (HOA) to modify regulations/restrictions related to encouraging the installation of architectural features on structures to minimize their susceptibility to fire, tornadoes (e.g., enclosing soffits, reducing the overhang of bay windows, eliminating wood shingles, use of hurricane ties, etc.)	This action was not considered feasible as the variances between requirements in each HOA was difficult to navigate and build consensus amount the different types of building materials, and what is best for each type of building, ie condos, single family, multifamily. This action is being deleted because it was not accomplished and no specific jurisdiction has adopted the action in the Camden County HMP 2020. DELETED-2020
Objective 2.3	Encourage Public Sector to Take Proactive Steps to Mitigate Community Risks	

Goals/Objectives		
2.3.1	Partner with area local governments to establish a mutual aid system for sand, salt and other materials and their delivery resources (i.e., trucks, crews, etc.)	Many of the local government have mutual aid agreements in place. The planning committee felt this was the responsibility of each jurisdiction based on their specific needs and did not want to include in the Camden County HMP 2020. Since many of the jurisdictions have indicated they have what they need in place in regard to this action the action is being marked completed. COMPLETED 2020
2.3.2	Work with area property owners, environmental groups, and other stakeholders to develop and implement flood mitigation strategies that include the restoration and/or sustainability of fish and wildlife habitats	Camden County has replaced several low-water crossing with mitigation funds that are friendly to the Niangua Darter and other endangered species. This is required by Missouri Department of Natural Resources when working in waterways that are know to have endangered species. This will continue to be the practice within Camden County and therefore it is not needed to be a specific action carried forward in the plan update. This action is being marked completed based on the actions by the county to date. COMPLETED-2020
2.3.3	Consider adopting policies requiring incorporation of safe rooms/shelters in new public facility construction	Several jurisdictions within Camden County have submitted action worksheets that have identified Safe Room Construction. Therefore, this action has been modified to reflect the participating jurisdictions that have identified this action as a priority for them in the Camden County HMP 2020. DELETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
Goal 3	Mitigation Procedures - Encourage continuity of operations of government and emergency services in a disaster.	
Objective 3.1	Encourage Upgrades to Key Public Infrastructure to Ensure Continuation of Services	
3.1.1	Upgrade key public buildings to include generators, and other back-up systems to ensure critical governmental functions can continue	Many jurisdictions have developed Continuity of Operations Plans that incorporate some of these functions. There were no specific action worksheets submitted during this round that would continue this action. Therefore, the action is being marked completed, at this time. COMPLETED-2020

Goals/Objectives		
3.1.2	Encourage electric and telecommunications utilities to protect their existing infrastructure from the effects of Hazard Events	Missouri has a specific Hazard Mitigation Plan for the Electric Cooperatives within Missouri that allow these jurisdictions to apply for Mitigation funding directly. Since none of the participating jurisdictions have electric or telecommunication as a utility provider there was not action identified for the Camden County HMP 2020. DELETED-2020
Objective 3.2	Encourage Adequate Capabilities Within Emergency Service Providers to Respond to Expected Severity of Natural Hazards	
3.2.1	Identify funding sources to enhance the operational capabilities and fire prevention programs of fire departments and fire protection districts; assist fire agencies with the development of grant applications	Camden County has provided training and resources for training through the local LEPC funding and will continue to do so based on the requirement of the LEPC. With this being a specific action that is being done with the local entity that is not a participating jurisdiction the action is being marked completed. COMPLETED-2020
3.2.2	Identify alternative routes for key roads that regularly experience closures during hazard events	Camden County Road and Bridge department has identified and prioritized key low water crossings to include in the Camden County HMP based on the number of times they are closed and or repairs are needed. Please see new action worksheets that have identified specific projects to complete. COMPLETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
Goal 4	Mitigation Public Awareness - Increase public awareness of natural hazards that have the potential to impact Camden County.	
Objective 4.1	Ensure Public is Educated About Risks and Ways to Protect Themselves	
4.1.1	Collect and disseminate public information materials that address hazard mitigation activities, available insurance, local ordinances, and evacuation information to permanent and seasonal residents at city hall, chambers of commerce, and other public locations	This mitigation action was vague and did not identify a community or organization that would be responsible and therefore the action remains not completed as of this update. No community or organization proposed and action that was the same or similar so the action was deleted from the Camden County HMP 2020 Action Items. DELETED-2020

Goals/Objectives		
4.1.2	Host workshops, rent booths at local festivals, or participate in other community events in order to educate public on ways to protect themselves and their property	The Camden County CERT Team has worked on this activity and will continue as funding is available. As a separate non-profit, it will be their responsibility. This action is being marked complete and will not be included in the Camden County HMP 2020 as no specific action worksheet has been submitted to date. COMPLETED-2020
Objective 4.2	Ensure Public Can Be Quickly Notified About Potential Natural Hazards	
4.2.1	Develop adequate early warning system for tornadoes, floods, dam failures, and other predictable hazard events	The City of Lake Ozark is working on this within their community. The Village of Four Seasons has also worked on this within their community. This action is being modified and adopted by jurisdictions that have identified it on their specific action worksheet. COMPLETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
4.2.2	Encourage residents to purchase NOAA weather radios	The Camden County CERT Team have distributed NOAA Radio when funding was available. The action will continue to be completed as fund are available. The action will not move forward to the Camden County HMP 2020 as no jurisdiction provided a specific action worksheet for this action. COMPLETED-2020

Source: Previously approved County Hazard Mitigation Plan 2015; Data Collection Questionnaires.

4.3 Implementation of Mitigation Actions

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

Jurisdictional MPC members were encouraged to meet with others in their community to finalize the actions to be submitted for the updated mitigation strategy. Throughout the MPC consideration and discussion, emphasis was placed on the importance of a benefit-cost analysis in determining project priority. The Disaster Mitigation Act requires benefit-cost review as the primary method by which mitigation projects should be prioritized. The MPC decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the 2018 Missouri State Hazard Mitigation Plan. The benefit/cost review at the planning stage primarily consisted of a qualitative analysis and was not the detailed process required grant funding application. For each action, the plan sets forth a narrative describing the types of benefits that could be realized from action implementation. The cost was estimated as

closely as possible, with further refinement to be supplied as project development occurs.

It was decided that the prioritization process and methodology would remain the same as the 2015 prioritization process. Actions were prioritized independently for each jurisdiction and based on each jurisdiction's capabilities.

FEMA's STAPLEE methodology was used to assess the costs and benefits, overall feasibility of mitigation actions, and other issues impacting project. During the prioritization process, the jurisdictions used worksheets to assign scores, the worksheets posed questions based on the STAPLEE elements as well as the potential mitigation effectiveness of each action. Scores were based on the responses to the questions as follows:

Definitely YES = 3 points

Maybe YES = 2 points

Probably NO = 1 points

Definitely NO = 0 points

The following questions were asked for each proposed action.

S: Is the action socially acceptable?

T: Is the action technically feasible and potentially successful?

A: Does the jurisdiction have the administrative capability to successfully implement this action?

P: Is the action politically acceptable?

L: Does the jurisdiction have the legal authority to implement the action?

E: Is the action economically beneficial?

E: Will the project have an environmental impact that is either beneficial or neutral? (Score "3" if positive and "2" if neutral)

Will the implemented action result in lives saved? (Assign from 5-10 points based on the likelihood that lives will be saved.)

Will the implanted action result in a reduction of disaster damage? (Assign from 5-10 points based on the relative reduction of disaster damages.)

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

Figure 4.1. Blank STAPLEE Worksheet

STAPLEE Worksheet		
Name of Jurisdiction:		
Action or Project		
Action/Project Number:	Insert a unique action number for this action for future tracking purposes. This can be a combination of the jurisdiction name, followed by the goal number and action number (i.e. Joplin1.1)	
Name of Action or Project:		
Mitigation Category:	Prevention; Structure and Infrastructure Projects; Natural Systems Protection; Education and Outreach; Emergency Services	
STAPLEE Criteria		Score
Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0		
S: Is it Socially Acceptable		
T: Is it Technically feasible and potentially successful?		
A: Does the jurisdiction have the Administrative capacity to execute this action?		
P: Is it Politically acceptable?		
L: Is there Legal authority to implement?		
E: Is it Economically beneficial?		
E: Will the project have either a neutral or positive impact on the natural Environment ?		
Will historic structures be saved or protected?		
Could it be implemented quickly?		
STAPLEE SCORE		
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	
MITIGATION EFFECTIVENESS SCORE		
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		
<input type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)

Completed by
(Name, Title, Phone Number) _____

A summary table (**Table 4.3**) of mitigation actions is also recommended.

ACTION WORKSHEET

Action Worksheet	
Name of Jurisdiction:	
Risk / Vulnerability	
Hazard(s) Addressed:	
Problem being Mitigated:	
Action or Project	
Applicable Goal Statement:	
Action/Project Number:	
Name of Action or Project:	
Mitigation Category:	
Action or Project Description:	
Estimated Cost:	
Benefits:	
Plan for Implementation	
Responsible Organization/Department:	
Supporting Organization/Department:	
Action/Project Priority:	
Timeline for Completion:	
Potential Fund Sources:	
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Camden County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Individuals being trapped in an area or at danger of being washed away during flooding
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Camden County 1.1
Name of Action or Project:	Identify and prioritize all low water crossings and apply for Mitigation funds to repair the highest priority crossings
Mitigation Category:	Prevention
Action or Project Description:	Identify and prioritize all low water crossing in Camden County to repair and or replace to ensure the safety of motorist who travel these county roadways.
Estimated Cost:	TBD
Benefits:	This will ensure the protection of all motorist during periods of flooding
Plan for Implementation	
Responsible Organization/Department:	Camden County
Supporting Organization/Department:	N/A
Action/Project Priority:	Low
Timeline for Completion:	1-5 years
Potential Fund Sources:	mitigation funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	City of Linn Creek
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazards –Early Warning
Problem being Mitigated:	Lack of sufficient early warning systems and process
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Protect Camden County assets and populace through cost effective and tangible mitigation projects whenever financially feasible
Action/Project Number:	City of Linn Creek 2.1
Name of Action or Project:	Seek funding for communities interested in upgrading or installing early warning systems
Mitigation Category:	Prevention
Action or Project Description:	Conduct study of the Linn Creek area in order to determine the effectiveness of current sirens
Estimated Cost:	\$20,000 - \$50,000
Benefits:	The ability to develop better coverage of the city of Linn Creek and surrounding area with a siren notification network that provides enough early warning for people to seek shelter.
Plan for Implementation	
Responsible Organization/Department:	City of Linn Creek
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5-8 years
Potential Fund Sources:	Mitigation and district funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	Continuing
Report of Progress:	The City of Linn Creek has installed warning sirens when funding was available and would like to continue to add them when funding becomes available and the terms are within the City's financial ability.

Action Worksheet

Name of Jurisdiction:	City of Lake Ozark
Risk / Vulnerability	
Problem being Mitigated:	All Hazards –Early Warning
Hazard(s) Addressed:	All Hazards – Early Warning
Action or Project	
Action/Project Number:	City of Lake Ozark 3.1
Name of Action or Project:	Seek funding for communities interested in upgrading or installing early warning systems
Action or Project Description:	Increase the number of early warning sirens within the City of Lake Ozark when funding is available
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Estimated Cost:	\$20,000 - \$50,000
Benefits:	Additional coverage or early warning siren increases the safety of the local residents as well as the tourist that visit the Lake Ozark area.
Plan for Implementation	
Responsible Organization/Department:	City of Lake Ozark
Action/Project Priority:	High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Mitigation funding, and City funding
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status	Continuing
Report of Progress	The City of Lake Ozark has installed warning sirens when funding was available and would like to continue to add them when funding becomes available and the terms are within the City’s financial ability.

Action Worksheet	
Name of Jurisdiction:	Macks Creek School District
Risk / Vulnerability	
Hazard(s) Addressed:	Tornados
Problem being Mitigated:	Lack of adequate shelter for students and faculty during severe storms and tornadoes
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Macks Creek School District 4.1
Name of Action or Project:	Build FEMA approved saferooms
Mitigation Category:	Prevention
Action or Project Description:	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes
Estimated Cost:	\$3,000,000
Benefits:	Reduction in injuries and deaths associated with severe storms
Plan for Implementation	
Responsible Organization/Department:	Macks Creek School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	5-10 years
Potential Fund Sources:	mitigation funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	New action

Action Worksheet	
Name of Jurisdiction:	City of Camden
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	All Hazards – Early Warning
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	City of Camden 5.1
Name of Action or Project:	Storm Siren Study
Mitigation Category:	Prevention and planning
Action or Project Description:	Seek funding for communities interested in upgrading or installing early warning systems in the City of Camden
Estimated Cost:	\$20,000 - \$50,000
Benefits:	Supplemental coverage or early warning siren increases the safety of the local residents in the City of Camden and outlying areas.
Plan for Implementation	
Responsible Organization/Department:	City of Camden
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	5-10 years
Potential Fund Sources:	City funding and mitigation funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	The City of Camden has installed warning sirens when funding was available and would like to continue to add them when funding becomes available and the terms are within the City's financial ability.

Action Worksheet	
Name of Jurisdiction:	City of Osage Beach
Risk / Vulnerability	
Hazard(s) Addressed:	Tornados and severe storms
Problem being Mitigated:	Lack of adequate shelter for students and faculty during severe storms and tornadoes
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	City of Osage Beach 6.1
Name of Action or Project:	Build FEMA approved saferooms
Mitigation Category:	Prevention
Action or Project Description:	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes
Estimated Cost:	\$3,068,000
Benefits:	Reduction in injuries and deaths associated with severe storms
Plan for Implementation	
Responsible Organization/Department:	City of Osage Beach
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	8-10 years
Potential Fund Sources:	Mitigation and district funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	New action

Action Worksheet	
Name of Jurisdiction:	Village of Sunrise Beach
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Early warning for all hazards
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Village of Sunrise Beach 7.1
Name of Action or Project:	Develop adequate early warning system for tornadoes, floods, and other predictable hazard events.
Mitigation Category:	Prevention
Action or Project Description:	The Village will continue to add early warning systems for newly annexed areas.
Estimated Cost:	\$20,000.00-\$50,000.00
Benefits:	Additional coverage or early warning sirens increase the safety of the residents.
Plan for Implementation	
Responsible Organization/Department:	Village of Sunrise Beach
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	5-10 years
Potential Fund Sources:	Annual budget and mitigation funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	New action

Action Worksheet	
Name of Jurisdiction:	Village of Four Season
Risk / Vulnerability	
Hazard(s) Addressed:	Evacuation study
Problem being Mitigated:	The Village of Four Season is located on a large peninsula that which is served by a single road. In the event of an emergency and required evacuation the residents would be dependent on one road as a means to leave the peninsula
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Village of Four Seasons 8.1
Name of Action or Project:	Evacuation Study
Mitigation Category:	Prevention
Action or Project Description:	Conduct a study to determine possible solutions which would allow the residents of the Village of Four Seasons to evacuate the area in the event of a natural disaster.
Estimated Cost:	\$20,000 - \$50,000
Benefits:	Reduction in injuries and deaths due to an establish evacuation plan and identified routes
Plan for Implementation	
Responsible Organization/Department:	Village of Four Seasons
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	1-5 years
Potential Fund Sources:	Annual budget and mitigation funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	New action

Action Worksheet	
Name of Jurisdiction:	Stoutland School District
Risk / Vulnerability	
Hazard(s) Addressed:	All Hazard
Problem being Mitigated:	Weakened roofs and structure that are vulnerable to high winds
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Stoutland School District 9.1
Name of Action or Project:	Identify vulnerable roofs that need repairs
Mitigation Category:	Prevention
Action or Project Description:	Identify and prioritize roofs in need of repair in the Stoutland School District. Develop a five-year plan based on cost.
Estimated Cost:	\$500,000-\$900,000
Benefits:	Increase of structural integrity will provide better protection to building occupants during severe weather events and provide protection to occupants.
Plan for Implementation	
Responsible Organization/Department:	Stoutland School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	8-10 years
Potential Fund Sources:	Mitigation and district funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	New action

Action Worksheet	
Name of Jurisdiction:	Stoutland School District
Risk / Vulnerability	
Hazard(s) Addressed:	Tornados
Problem being Mitigated:	Lack of adequate shelter for students and faculty during severe storms and tornadoes
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Stoutland School District 9.2
Name of Action or Project:	Build FEMA approved saferooms
Mitigation Category:	Prevention
Action or Project Description:	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes
Estimated Cost:	\$3,068,000
Benefits:	Reduction in injuries and deaths associated with severe storms
Plan for Implementation	
Responsible Organization/Department:	Stoutland School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	8-10 years
Potential Fund Sources:	Mitigation and district funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	New action

Action Worksheet	
Name of Jurisdiction:	Camdenton R-II School District
Risk / Vulnerability	
Hazard(s) Addressed:	Tornados
Problem being Mitigated:	Lack of adequate shelter for students and faculty during severe storms and tornadoes
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Camdenton School District 10.1
Name of Action or Project:	Build FEMA approved saferooms
Mitigation Category:	Prevention
Action or Project Description:	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes
Estimated Cost:	\$3,068,000
Benefits:	Reduction in injuries and deaths associated with severe storms
Plan for Implementation	
Responsible Organization/Department:	Camdenton R-III School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	8-10 years
Potential Fund Sources:	Mitigation and district funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	

Action Worksheet	
Name of Jurisdiction:	Climax Springs School District
Risk / Vulnerability	
Hazard(s) Addressed:	Tornados
Problem being Mitigated:	Lack of adequate shelter for students and faculty during severe storms and tornadoes
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Climax Springs School District 11.1
Name of Action or Project:	Build FEMA approved saferooms
Mitigation Category:	Prevention
Action or Project Description:	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes
Estimated Cost:	\$3,068,000
Benefits:	Reduction in injuries and deaths associated with severe storms
Plan for Implementation	
Responsible Organization/Department:	Climax Springs School District
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	1-3 years
Potential Fund Sources:	Mitigation funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	Project has begun

Action Worksheet	
Name of Jurisdiction:	City of Richland
Risk / Vulnerability	
Hazard(s) Addressed:	Tornados
Problem being Mitigated:	Lack of adequate shelter for students and faculty during severe storms and tornadoes
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	City of Richland 12.1
Name of Action or Project:	Build FEMA approved saferooms
Mitigation Category:	Prevention
Action or Project Description:	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes
Estimated Cost:	\$3,068,000
Benefits:	Reduction in injuries and deaths associated with severe storms
Plan for Implementation	
Responsible Organization/Department:	City of Richland
Supporting Organization/Department:	N/A
Action/Project Priority:	High
Timeline for Completion:	8-10 years
Potential Fund Sources:	Mitigation funds
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	New
Report of Progress:	New action

NFIP Action Worksheets

Action Worksheet	
Name of Jurisdiction:	Camden County
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Potential Flooding and Access to Flood Insurance
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Protect Camden County assets and populace through cost effective and tangible mitigation projects whenever financially feasible
Action/Project Number:	1.2 Camden County
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Continue to participate in the NFIP and comply with the requirements of the program
Estimated Cost:	TBD
Benefits:	Allowing our residents access to flood insurance is an important way for us to provide security to our county residents. Not allowing them to build in a floodplain or floodway is also a preventative measure to ensure the safety of our county residents.
Plan for Implementation	
Responsible Organization/Department:	Camden County
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	On-going
Potential Fund Sources:	Mitigation and district funds
Local Planning Mechanisms to be Used in Implementation, if any:	Flood plain Management
Progress Report	
Action Status:	Continuing
Report of Progress:	The Camden County's Floodplain Manager has continued to do the necessary actions needed to maintain the NFIP within the county

Action Worksheet	
Name of Jurisdiction:	City of Linn Creek
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Potential Flooding and Access to Flood Insurance
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Protect Camden County assets and populace through cost effective and tangible mitigation projects whenever financially feasible
Action/Project Number:	City of Linn Creek 2.2
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Continue to participate in the NFIP and comply with the requirements of the program
Estimated Cost:	TBD
Benefits:	Allowing our residents access to flood insurance is an important way for us to provide security to our county residents. Not allowing them to build in a floodplain or floodway is also a preventative measure to ensure the safety of our county residents.
Plan for Implementation	
Responsible Organization/Department:	City of Linn Creek
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	On-going
Potential Fund Sources:	Mitigation and district funds
Local Planning Mechanisms to be Used in Implementation, if any:	Flood plain Management
Progress Report	
Action Status:	Continuing
Report of Progress:	The City of Linn Creek's Floodplain Manager has continued to do the necessary actions needed to maintain the NFIP within the city

Action Worksheet	
Name of Jurisdiction:	City of Lake Ozark
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Potential Flooding and Access to Flood Insurance
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	City of Lake Ozark 3.2
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping, including local map updates.
Estimated Cost:	\$0-\$1,000
Benefits:	Allowing our residents access to flood insurance is an important way for us to provide security to our county residents. Not allowing them to build in a floodplain or floodway is also a preventative measure to ensure the safety of our county residents.
Plan for Implementation	
Responsible Organization/Department:	City of Lake Ozark Floodplain Manager
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	On-going
Potential Fund Sources:	Part of the City's Annual Budget
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain Management
Progress Report	
Action Status:	Continuing in Progress
Report of Progress:	The City of Lake Ozark Floodplain Manager has continued to do the necessary actions needed to maintain the NFIP within the city.

Action Worksheet	
Name of Jurisdiction:	City of Camden
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Potential Flooding and Access to Flood Insurance
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	City of Camden 5.2
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping, including any local requests for map updates.
Estimated Cost:	\$0-\$1,000
Benefits:	Allowing our residents access to flood insurance is an important way for us to provide security to our county residents. Not allowing them to build in a floodplain or floodway is also a preventative measure to ensure the safety of our county residents.
Plan for Implementation	
Responsible Organization/Department:	City of Camden Floodplain Manager
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	On-going
Potential Fund Sources:	Part of the City's Annual Budget
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain Management
Progress Report	
Action Status:	Continuing in Progress
Report of Progress:	The City of Camden Floodplain Manager has continued to do the necessary actions needed to maintain the NFIP within the city.

Action Worksheet	
Name of Jurisdiction:	City of Osage Beach
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Potential Flooding and Access to Flood Insurance
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Osage Beach 6.2
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping.
Estimated Cost:	\$0-\$1,000
Benefits:	Allowing our residents access to flood insurance is an important way for us to provide security to our county residents. Not allowing them to build in a floodplain or floodway is also a preventative measure to ensure the safety of our county residents.
Plan for Implementation	
Responsible Organization/Department:	City of Osage Beach Floodplain Manager
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	On-going
Potential Fund Sources:	Part of the City's Annual Budget
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain Management
Progress Report	
Action Status:	Continuing in Progress
Report of Progress:	The City of Osage Beach Floodplain Manager has continued to do the necessary actions needed to maintain the NFIP within the city.

Action Worksheet	
Name of Jurisdiction:	Village of Sunrise Beach
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Potential Flooding and Access to Flood Insurance
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Village of Sunrise Beach 7.2
Name of Action or Project:	Flood plain enforcement
Mitigation Category:	Prevention
Action or Project Description:	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.
Estimated Cost:	\$0-\$1,000
Benefits:	Allowing our residents access to flood insurance is an important way for us to provide security to our county residents. Not allowing them to build in a floodplain or floodway is also a preventative measure to ensure the safety of our county residents.
Plan for Implementation	
Responsible Organization/Department:	Village of Sunrise Beach
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	On going
Potential Fund Sources:	Annual budget and mitigation funds
Local Planning Mechanisms to be Used in Implementation, if any:	Flood plain Management
Progress Report	
Action Status:	New
Report of Progress:	The Village of Sunrise Beach Floodplain Manager has continued to do the necessary actions needed to maintain the NFIP within the village

Action Worksheet	
Name of Jurisdiction:	Village of Four Seasons
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Potential Flooding and Access to Flood Insurance
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	Village of Four Season 8.2
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.
Estimated Cost:	\$0-\$1,000
Benefits:	Allowing our residents access to flood insurance is an important way for us to provide security to our county residents. Not allowing them to build in a floodplain or floodway is also a preventative measure to ensure the safety of our county residents.
Plan for Implementation	
Responsible Organization/Department:	Village of Four-Season Floodplain Manager
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	On-going
Potential Fund Sources:	Part of the City's Annual Budget
Local Planning Mechanisms to be Used in Implementation, if any:	Flood plain Management
Progress Report	
Action Status:	Continuing in Progress
Report of Progress:	The Village of Four Seasons Floodplain Manager has continued to do the necessary actions needed to maintain the NFIP within the village

Action Worksheet	
Name of Jurisdiction:	City of Richland
Risk / Vulnerability	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Potential Flooding and Access to Flood Insurance
Action or Project	
Applicable Goal Statement:	Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
Action/Project Number:	City of Richland 12.2
Name of Action or Project:	National Flood Insurance Program (NFIP)
Mitigation Category:	Prevention
Action or Project Description:	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.
Estimated Cost:	\$0-\$1,000
Benefits:	Allowing our residents access to flood insurance is an important way for us to provide security to our county residents. Not allowing them to build in a floodplain or floodway is also a preventative measure to ensure the safety of our county residents.
Plan for Implementation	
Responsible Organization/Department:	City of Richland Floodplain Manager
Supporting Organization/Department:	N/A
Action/Project Priority:	Medium
Timeline for Completion:	On-going
Potential Fund Sources:	Part of the City's Annual Budget
Local Planning Mechanisms to be Used in Implementation, if any:	Flood plain Management
Progress Report	
Action Status:	Continuing in Progress
Report of Progress:	The City of Richland Floodplain Manager has continued to do the necessary actions needed to maintain the NFIP within the city.

Table 4.3 Mitigation Action Matrix

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
	Prevention Public Education							
1.1	Identify and prioritize all low water crossings in Camden County to repair and or replace to ensure the safety of motorist who travel these county roadways.	Camden County	L	1	All Hazards	✓		
1.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	Camden County	M	3	Flooding (Flash & River)	✓	✓	✓
2.1	Conduct study of the Linn Creek are in order to determine the effectiveness of current sirens	City of Linn Creek	H	2	All Hazards	✓	✓	
2.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	City of Linn Creek	M	3	Flooding (Flash & River)	✓	✓	✓
3.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	City of Lake Ozark	M	3	Flooding (Flash & River)	✓	✓	✓

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
4.1	Adopt policies requiring the incorporation of safe rooms in the Macks Creek School District	Macks Creek School District	M	2	Severe Thunderstorms & Tornadoes	✓	✓	
5.1	Seek funding for communities interested in upgrading or installing early warning systems in the City of Camden	City of Camden	L	2	All Hazards	✓	✓	
5.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	City of Camden	M	3	Flooding (Flash & River)	✓	✓	✓
6.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	City of Osage Beach	M	3	Flooding (Flash & River)	✓	✓	✓
7.1	Develop adequate early warning system for tornadoes, floods, and other predictable hazard events.	Village of Sunrise Beach	M	2	All Hazards	✓	✓	
7.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates	Village of Sunrise Beach	L	3	Flooding (Flash & River)	✓	✓	✓

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
8.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates.	Village of Four Seasons	M	3	Flooding (Flash & River)	✓	✓	✓
12.2	Continue to participate in the NFIP and comply with the requirements of the program enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); Floodplain identification and mapping updates	City of Richland	M	3	Flooding (Flash & River)	✓	✓	✓
	Structure and Infrastructure Projects							
3.1	Increase the number of early warning sirens within the City of Lake Ozark when funding is available	City of Lake Ozark	M	2	All Hazards	✓	✓	
6.1	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes	City of Osage Beach	M	2	Severe Thunderstorms & Tornadoes	✓	✓	
9.1	Identify structures and roof vulnerable to high winds	Stoutland R-II	H	2	Severe Thunderstorms & Tornadoes	✓	✓	
9.2	Construction of a FEMA 361 approved Storm Shelter-Safe Room	Stoutland R-II	H	2	Severe Thunderstorms & Tornadoes	✓	✓	
10.1	Construction of a FEMA 361 approved Storm Shelter-Safe Room	Camdenton R-III	H	2	Severe Thunderstorms & Tornadoes	✓	✓	
11.1	Construction of a FEMA 361 approved Storm Shelter-Safe Room	Climax Springs School District	H	2	Severe Thunderstorms & Tornadoes	✓	✓	

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
12.1	Construction of a FEMA 361 approved Storm Shelter-Safe Room	City of Richland	H	2	Severe Thunderstorms & Tornadoes	✓	✓	
	Emergency Services							
8.1	Conduct a study to determine possible solutions which would allow the residents of the Village of Four Seasons to evacuate the area in the event of a natural disaster.	Village of Four Season	M	2	All Hazards	✓	✓	
	Natural Systems Protection							
	<i>No Applicable task</i>							
	Education and Outreach							
	<i>No Applicable task</i>							

5 PLAN MAINTENANCE PROCESS

5 PLAN MAINTENANCE PROCESS	5.1
<i>5.1 Monitoring, Evaluating, and Updating the Plan.....</i>	<i>5.1</i>
5.1.1 Responsibility for Plan Maintenance	5.1
5.1.2 Plan Maintenance Schedule	5.2
5.1.3 Plan Maintenance Process.....	5.2
<i>5.2 Incorporation into Existing Planning Mechanisms</i>	<i>5.2</i>

5.1 Monitoring, Evaluating, and Updating the Plan

44 CFR Requirement 201.6(c)(4): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

5.1.1 Responsibility for Plan Maintenance

The Mitigation Planning Committee (MPC) has served as an advisory committee during the plan update process, but is not a standing committee. Many MPC representatives and stakeholders are also representing their own jurisdictions within Camden County. During the third planning meeting, the mitigation planning committee discussed processes and how to maintain the plan during the five-year time frame. This will ensure that the mitigation plan remains an active relevant document.

Other maintenance actions are listed below and should involve all participating jurisdictions, including school and special districts:

- Meet annually, and after a disaster event, to monitor and evaluate the implementation of the plan;
- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high priority, low- or no-cost recommended actions;
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Report on plan progress and recommended changes to the County Board of Supervisors and governing bodies of participating jurisdictions; and
- Inform and solicit input from the public.

The (MPC or other designated responsible entity) is an advisory body and can only make recommendations to county, city, town, or district elected officials. Its primary duty is to see the plan successfully carried out and to report to the community governing boards and the public on the status of plan implementation and mitigation opportunities¹⁰ (a). Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information in areas accessible to the public.

5.1.2 Plan Maintenance Schedule

The MPC (or other designated responsible entity) agrees to meet annually after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. The Camden County Emergency Management Director will be responsible for initiating the plan reviews after a state or federally declared hazard event and will invite members of the MPC (or other designated responsible entity) to the meeting.

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

5.1.3 Plan Maintenance Process

Progress on the proposed actions will be monitored by evaluating changes in vulnerabilities identified in the plan. The MPC (or other designated responsible entity) during the annual mitigation action progress report process should review changes in vulnerability identified as follows:

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

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

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

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

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

Changes will be made to the plan to remedy actions that have failed or are not considered feasible. Feasibility will be determined after a review of action consistency with established criteria, time frame, community priorities, and/or funding resources. Changes will be made to the plan to remedy actions that have failed or are not considered feasible. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring of this plan. Updating of the plan will be accomplished by written changes and submissions, as the (MPC or designated responsible entity) deems appropriate and necessary. Changes will be approved by the Camden County Board of Commissioners and or the governing boards of the other participating jurisdictions.

5.2 Incorporation into Existing Planning Mechanisms

44 CFR Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Where possible, plan participants, including school and special districts, will use existing plans and/or programs to implement hazard mitigation actions. Those existing plans and programs were described in Section 2.1 of this plan. Based on the capability assessments of the participating jurisdictions, communities in Camden County will continue to plan and implement programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through the following plans:

- General or master plans of participating jurisdictions;
- Ordinances of participating jurisdictions;
- Camden County Emergency Operations Plan;
- Capital improvement plans and budgets;
- Other community plans within the County, such as water conservation plans, storm water management plans, and parks and recreation plans;
- School and Special District Plans and budgets; and
- Other plans and policies outlined in the capability assessment sections for each jurisdiction in Chapter 2 of this plan.

The MPC (or designated responsible entity) members involved in updating these existing planning mechanisms will be responsible for integrating the findings and actions of the mitigation plan, as appropriate. The MPC (or designated responsible entity) is also responsible for monitoring this integration and incorporation of the appropriate information into the five-year update of the multi-jurisdictional hazard mitigation plan.

Additionally, after the annual review of the Hazard Mitigation Plan progress reports from the MPC designated entity, the LOCLG staff will provide the results of the progress reports and the

status of each mitigation action back to the MPC’s designated entity. The designated entity for each jurisdiction will present the compiled completed progress report to their governing board (County Commissioners, City Board of Alderman, School District Superintendents, or Village Board of Trustees. The MPC designee will request that the mitigation strategy be incorporated, where appropriate, in other planning mechanisms

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

Jurisdiction	Planning Mechanisms	Integration Process for Previous Plan	Integration Process for Current Plan
Camden County	Camden County Emergency Operations Plan Annual Budget Process	N/A	Camden County EMA identified new actions or ongoing action relating to Camden County Emergency Management and will be included in the departments Emergency Operations Plan.
City of Camdenton	City EOP Annual Budget Process	N/A	City Administrator attended all planning meetings. Identified ongoing actions relating to Mutual Aid and Floodplain Management and included in the City Code of ordinances.
City of Lake Ozark	Annual Budget Process	N/A	City Administration attended all planning meeting. Identified ongoing actions and will be integrated into the annual budget process.
City of Linn Creek	City Code of Ordinances Annual Budget Process,	N/A	City Clerk and Mayor attended three planning meetings. Mitigation actions were identified and will be ongoing. The actions will be integrated into the Annual Budget Process and can be found in the Code of ordinances.
City of Osage Beach	City Code of Ordinances City EOP Annual Budget Process.	N/A	The City Administrator attended 3 of the planning meetings and the City’s Police Chief attended three of the planning meeting. They identified ongoing actions relating to the city and will be integrated into the currently being developed City EOP, the annual budget process and one action can be found in the City’s Code of Ordinances.
Village of Four Seasons	Annual Budget Process	N/A	The Village attended one planning meeting but identified ongoing actions to be integrated during their annual budget process.
City of Richland	Annual Budget Process	N/A	The City attended one planning

			meeting but identified ongoing actions to be integrated during their annual budget process
Camdenton R-III School District	Camdenton R-III School District	Camdenton R-III School District Planning Committee and Board of Education	Camdenton R-III School District Planning Committee and Board of Education
Macks Creek School District	Macks Creek School District Planning Committee and Board of Education	Macks Creek School District Planning Committee and Board of Education	Macks Creek School District Planning Committee and Board of Education
Climax Springs School District	Climax Springs School District Planning Committee and Board of Education	Climax Springs School District Planning Committee and Board of Education	Climax Springs School District Planning Committee and Board of Education
Stoutland School District	Stoutland School District Planning Committee and Board of Education	Stoutland School District Planning Committee and Board of Education	Stoutland School District Planning Committee and Board of Education

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

5.1 Continued Public Involvement

44 CFR Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

The hazard mitigation plan update process provides an opportunity to publicize success stories resulting from the plan's implementation and seek additional public comment. Information about the annual reviews will be posted in the local newspaper following each annual review of the mitigation plan.

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

Appendix A

References

FEMA-Review of Camden County Disaster Declaration History

<https://www.fema.gov/media-library/assets/documents/28318>

<https://www.fema.gov/data-visualization-summary-disaster-declarations-and-grants>

Association of State Dam Safety Officials

<https://damsafety.org/media/faq>

National Centers for Environmental Information (NOAA)

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&beginDate_mm=10&beginDate_dd=15&beginDate_yyyy=2015&endDate_mm=01&endDate_dd=31&endDate_yyyy=2019&county=CAMDEN%3A29&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitButton=Search&statefips=29%2CMISSOURI

Geologic Hazards in Missouri

<https://dnr.mo.gov/pubs/pub2467.pdf>

United States Department of Agriculture Risk Management Agency

<https://www.rma.usda.gov/SummaryOfBusiness/CauseOfLoss>

Missouri Department of Conservation

<https://mdc6.mdc.mo.gov/Applications/MDCFireReporting/Home/FireReportSearch>

National Inventory of Dams

<https://nid-test.sec.usace.army.mil/ords/f?p=105:1:.....>

National Drought Mitigation Center University of Nebraska

<https://drought.unl.edu/>

Natural Resources Conservation Services United States Department of Agriculture

<https://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/>

Lake of the Ozarks Council of Local Governments Camden County 2015 HMP

<https://www.loclg.org/publications>

NOAA-National Centers for Environmental Information

<https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=29,MISSOURI>

Missouri State Hazard Mitigation Plan 2018

https://sema.dps.mo.gov/docs/programs/LRMF/mitigation/MO_Hazard_Mitigation_Plan2018.pdf

Missouri Hazard Mitigation Viewer

<http://amecei.maps.arcgis.com/apps/webappviewer/index.html?id=d97d80d5cff04996bff54b2250e47d83>

National Register of Historic Places

<https://nationalregisterofhistoricplaces.com/mo/camden/state.html>

Missouri Economic Research and Information Center MO Department of Economic Development

https://www.missourieconomy.org/indicators/population/pop_proj_2030.stm

American Fact Finder Selected Economic Characteristics 2000

<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>

Missouri Department of Natural Resources Arc GIS

<https://modnr.maps.arcgis.com/apps/webappviewer/index.html?id=0f96557330dd40bab1a7a2e629ec6e2a>

2012 Census of agriculture-Camden County Profile

www.agcensus.usda.gov

Ag Census Data 2017

<https://www.nass.usda.gov/Publications/AgCensus/2017/index.php>

Horseshoe Bend Special Road District

<http://www.hbsrd.org/roads.asp>

Lake West Ambulance District

<http://cam-mo.com/>

Osage Beach Ambulance Services

<https://osagebeach-mo.gov/183/Ambulance-Division>

Global Climate Change

<https://nca2014.globalchange.gov/report/regions/midwest>

Mobile home housing

https://loredc.com/wp-content/uploads/2019/01/2016_10-19-Lake-of-the-Ozarks-Housing-Study_Web.pdf

Camdenton Missouri Code of Law

<https://www.ecode360.com/28877836>

City of Osage Beach Missouri Code of Law

<https://ecode360.com/27735007?highlight=aid,mutual&searchId=3910286043932685#27735007>

Climate Data: <https://w2.weather.gov/climate/getclimate.php?wfo=lsx>

<https://www.nps.gov/clg/index.html> Camdenton 2013-2017 Housing Characteristics Total Units

<https://dnr.mo.gov/shpo/nps-nr/64000392.pdf> Historic Preservation

<https://www.ameren.com/company/about-ameren> National Register Listing

https://www.missourieconomy.org/pdfs/agribusiness_economic_contribution.pdf Facts and Figures

https://www.missourieconomy.org/pdfs/agribusiness_economic_contribution.pdf Agriculture

https://www.missourieconomy.org/pdfs/agribusiness_economic_contribution.pdf

<http://mcdc.missouri.edu/reports/countypage/29029.html> Agribusiness/agriculture jobs

<https://www.ky3.com/content/news/Design-of-Camdenton-Community-Center-submitted-to-city-vote-expected-in-March-506236681.html>

<https://www.ky3.com/content/news/Design-of-Camdenton-Community-Center-submitted-to-city-vote-expected-in-March-506236681.html> Camdenton Community Building

FEMA Mitigation Action Ideas Booklet

<https://www.fema.gov/media-library/assets/documents/30627>

EPAs Hazard Mitigation for Natural Disasters: A starter guide for water and wastewater utilities— includes mitigation action ideas

<https://www.epa.gov/sites/production/files/2016-08/documents/160815-hazardmitigationfornaturaldisasters.pdf>

Central Ozark Medical in Camdenton

<https://www.lakenewsonline.com/news/20190204/central-ozarks-medical-facility-to-open-in-march>

Village of Sunrise Beach Phase 2 of Waste Water Treatment Project

<https://www.lakenewsonline.com/news/20181210/phase-2-of-sunrise-beach-sewer-project-at-hand>

Appendix B

Planning Meetings

Agendas

Press Releases

Presentation Materials

Sign-In Sheets

Media Coverage

FIRST MEETING

May 15th, 2019

Agenda

Press Release

Presentation

Sign-In Sheets



SERVING CAMDEN, LALEDE, MILLER AND MORGAN COUNTIES

**LAKE OF THE OZARKS COUNCIL OF LOCAL GOVERNMENTS
CAMDEN COUNTY HAZARD MITIGATION PLAN UPDATE
KICKOFF PLANNING MEETING NOTICE & AGENDA**

Wednesday May 15, 2019

2:00PM

Mid County Fire Protection District

184 N. Business Rt. 5

Camdenton, Missouri 65020

- I. WELCOME/INTRODUCTIONS/SIGN-IN SHEET
- II. HAZARD MITIGATION PLAN PURPOSE
- III. ACCESS TO GRANT PROGRAMS ONCE PLAN IS APPROVED
- IV. PLANNING TASKS/MULTI-JURISDICTIONAL APPROACH
- V. PARTICIPATION REQUIREMENTS
- VI. PUBLIC INVOLVEMENT
- VII. DATA COLLECTION QUESTIONNAIRES
- VIII. NEXT STEPS IN THE PLANNING PROCESS
- IX. ADJOURN

SAVE THE DATES:

Meeting #2-June 5, 2019 2:00PM Mid County Fire Protection District

Meeting #3-July 10, 2019 2:00PM Mid County Fire Protection District

Meeting #4-August 7, 2019 2:00PM Mid County Fire Protection District

PRESS RELEASE



Public Meeting Notice

Date: May 15, 2019

Time: 2 :00 PM

Location: Mid-County Fire Protection District

Address: 184 N. Business Route 5, Camdenton, MO 65020

SPONSORED BY: Lake of the Ozarks Council of Local Governments

PRESENTED BY: Dawn Kline, Planner I

SUBJECT: Camden County Hazard Mitigation Plan Update

Lake of the Ozarks Council of Local Governments (LOCLG) is beginning the process to update the Camden County Multi-Jurisdictional Hazard Mitigation Plan (HMP). This plan will better protect the people and property of Camden County from the effects of natural hazard events. You are invited to the first of four planning meetings to update the plan. The Federal Emergency Management Agency (FEMA) requires all counties to update their Hazard Mitigation Plan every five years.

We have scheduled our first meeting for May 15, 2019 at 2:00 PM in Camdenton at the Mid County Fire Protection District facility located at 184 N. Business Route 5, Camdenton, MO 65020. At this meeting, we will discuss the planning purpose, the multi-jurisdictional approach, identify and discuss the hazards, and ask for community participation.

Please invite anyone who may be interested in our planning efforts in your community. The hazard mitigation planning process is heavily dependent on the participation of local government representatives, agencies, departments, and the public. A good representation from across the county is needed to ensure that we have the support for the plan update in every community. Communities are encouraged to be a part of the planning process. Why, because to be eligible for disaster relief and disaster funding, you need to have participated in the Hazard Mitigation Plan.

The Hazard Mitigation plan will be reviewed by SEMA and submitted to FEMA for approval. Prior to the plan approval, participating jurisdictions will need to formally adopt the plan locally. If you would like to review the current plan, please refer to our website, www.loclg.org under publications to review the Camden County HMP 2015.

We look forward to developing a comprehensive and effective Hazard Mitigation plan to serve our local needs.

Meeting #2 June 5th at 2:00 PM Mid County Fire Protection District

Meeting

#3 July 10th at 2:00 PM Mid County Fire Protection District

Meeting

#4 August 7th at 2:00 PM Mid County Fire Protection District

If you need any special accommodations at the meeting, please call our office at 573-346-5692 to let us know.

Lake of the Ozarks Council of Local Government

P.O. Box 3553 Camdenton, MO 65020

Phone: 573-346-5692 Fax: 573-346-9686

CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

PLAN UPDATE KICKOFF MEETING MAY 15, 2019

Project Planner: Dawn Kline, Planner I, LOCLG



AGENDA

- Welcome/Introductions/Sign-In Sheet
- Hazard Mitigation-Plan Purpose
- Access to Grant Programs Once Plan is Approved
- Planning Tasks / Multi-jurisdictional Approach
- Participation Requirements
- Public Involvement
- Data Collection Questionnaires
- Next Steps in the Planning Process



WHAT IS MITIGATION?

- Sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects.
- Mitigation planning is a process for jurisdictions to:
 - Identify the hazards to which they are at risk;
 - Assess the potential impacts of those hazards;
 - Develop goals, objectives, and actions to reduce those impacts; and
 - Prioritize and implement mitigation actions.



MULTI-JURISDICTIONAL PLAN APPROACH THE PLANNING AREA

- Camden County
- City of Camdenton
- City of Lake Ozark
- City of Linn Creek
- City of Osage Beach
- City of Richland
- City of Stoutland
- Village of Sunrise Beach
- Village of Four Seasons
- Camdenton R-III School District
- Climax Springs R-IV School District
- Mack's Creek R-V School District
- Stoutland R-II School District
- Camden County Special Roads District
- Horseshoe Bend Special Road District



DISASTER MITIGATION ACT OF 2000 (DMA 2K)

- Requires local governments to adopt a multi-jurisdictional natural hazard mitigation plan to maintain eligibility for FEMA mitigation funds.
- Plan must be updated and approved by FEMA every 5 years.
- This is an update to the existing October 2015 Camden County Multi-jurisdictional Hazard Mitigation Plan.



PRESIDENTIAL MAJOR DISASTER DECLARATIONS IN CAMDEN COUNTY SINCE OCTOBER 2015

Number	Declared	Incident Period	Description
DR-4317	6/2/2017	4/28/17-5/11/17	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding
DR-4250	1/21/2016	12/23/15-1/9/16	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding
DR-4238	8/7/2015	5/15/15-7/27/15	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding



APPROVED HAZARD MITIGATION PLAN ESTABLISHES ELIGIBILITY FOR FEMA HMA GRANTS

- Hazard Mitigation Grant Program
- Pre-Disaster Mitigation Program
- Flood Mitigation Assistance Program



HAZARD MITIGATION GRANT PROGRAM

- The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration.
- Eligible applicants are state agencies, local governments, private non-profit organizations, or Indian tribal governments.
- An approved local multi-jurisdictional mitigation plan is required.



PRE-DISASTER MITIGATION PROGRAM

- Authorized by Section 203 of the Robert T. Stafford Disaster Relief & Emergency Assistance Act.
- FY 2020 Multi-Jurisdictional Plan is due to SEMA by 4/1/2020
- An approved local mitigation plan is required.



FLOOD MITIGATION ASSISTANCE PROGRAM

- Designed to reduce or eliminate claims under the NFIP.
- FY 2020 Multi-Jurisdictional Plan is due to SEMA by 4/1/2020
- An approved local multi-jurisdictional mitigation plan is required.



HAZARD MITIGATION ASSISTANCE GRANTS AWARDED IN CAMDEN COUNTY

- Climax Springs R-IV School District Community Safe Room Project #0039 Under Construction
- Federal share=\$810,000.00
- Non-Federal Share=\$270,000.00
- Approved net amount=\$1,080,000.00

\$810,000.00
Total in HMA Grants
Having an Approved Hazard Mitigation Plan Has Paid Off!



THE PLAN UPDATE PROCESS

- Organization-Defining the planning area, Identifying individuals, agencies, neighboring jurisdictions, businesses, and/or other stakeholders.
- Assess Risks-Identify characteristics and potential consequences of natural hazards, consider what geographic areas, people, property, or other assets may be vulnerable.
- Develop a Mitigation Strategy-Set priorities and develop long-term strategies to minimize the impacts of disasters. Address how mitigation actions will be carried out



THE PLAN UPDATE PROCESS

- **Review and Adopt the Plan**-Review process will remain open for 30 days-Plan needs to remain relevant through routine maintenance.
- **Keep the Plan Current**-Conduct periodic evaluations in case of changing risks and priorities.
- **Create a Safe and Resilient Region**



HAZARD MITIGATION PLANNING COMMITTEE THE PLANNING TEAM

- Emergency Responders
- County Clerk
- City Clerks
- Elected Officials
- Public Works Directors
- Floodplain Managers
- Stormwater Mangers
- County And City Planners
- Economic Development Directors
- GIS Staff
- School Principals
- School Facilities Directors
- School Superintendents
- Business Partners
- Private-non-profits
- Non-Government Organizations
- State Agencies
- Federal Agencies
- Academia
- Local/Regional Agencies



BENEFITS OF PARTICIPATING IN A MULTI-JURISDICTIONAL PLAN

- Enables comprehensive approach to mitigate hazards that affect multiple jurisdictions;
- Shares costs and resources;
- Avoids duplication of efforts;
- Improves coordination/communication among local jurisdictions; and
- Opportunities to protect the citizens and communities.



REQUIREMENTS FOR EACH PARTICIPATING JURISDICTION

- Designate a representative to serve on the Hazard Mitigation Planning Committee, which will meet a total of Four times during the planning process;
- Inform the public, local officials, and other interested parties about the planning process and provide opportunities for them to comment on the plan; and
- Provide data for and assist in the development of the updated risk assessment that describes how various hazards impact your jurisdiction;
- Provide data to describe current capabilities;
- Develop/update mitigation actions (at least one) specific to your jurisdiction;
- Provide comments on plan drafts as requested;
- Formally adopt the mitigation plan by resolution.



WHAT HAPPENS IF MY JURISDICTION CHOOSES NOT TO PARTICIPATE IN THE PLAN?

Jurisdictions (including public school districts) that have not participated in a FEMA-approved mitigation plan **will not be eligible** for FEMA Hazard Mitigation Assistance funding.



PUBLIC INVOLVEMENT REQUIREMENTS CREATING AN OUTREACH STRATEGY

- 1. During Drafting Stage
 - Public Engagement Meetings
 - Public Survey
 - Data Collection
- 2. Prior to approval
 - Draft Available via LOCLG Website
 - Hard Copies-available upon request
- Other Ideas/Events to Inform the Public?



DATA COLLECTION QUESTIONNAIRES

REVIEWING COMMUNITY CAPABILITIES
CONDUCT RISK ASSESSMENT

- Separate forms for local govts. and schools
- Due to LOCLG Planner by June 5th
 - Capability Assessment Section
 - Planning Capabilities
 - Policies/Ordinances
 - Programs
 - Studies/Reports/Maps/
 - Staff/Department
 - NGO's-Non-Governmental Organizations
 - Fiscal Resources
 - Method of Incorporation
 - Additional Questions
 - Vulnerability Assessment Historic Hazard Events
 - Assessment of previously proposed actions
 - Insurance coverage information
 - What has happened in your community in the past 5 years
 - What are your plans for your community in the next 5 years



HOMEWORK

- Look through Data Collection Questionnaire
- Complete what you can
- Write down any questions
- Questions will be answered individually or if impact entire planning team at our next meeting



NEXT STEPS IN THE PLANNING PROCESS

- 6/5/2019—Data Collection Questionnaires Due
- 6/5/2019—2nd Planning Meeting
 - Risk Assessment
 - Critical Facility Analysis
 - Review Questions on Data Collection
- 7/10/2019—3rd Planning Meeting
 - Review/Update Mitigation Goals
 - Updates for Previous Mitigation Actions
 - Discuss New Mitigation Actions for 2020 HMP-Action Worksheets REQUIRED
 - Mitigation Action Implementation Plans
 - 2020 HMP Plan Maintenance
- 8/7/2019—4th Planning Meeting
 - Review Draft Camden County HMP Plan 2020
 - Comment Period
 - Adoption Process

**CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET**

Project: Camden County, Missouri Multi-Jurisdictional Hazard Mitigation Plan Update	Meeting Date/Time: May 15, 2019 2:00 PM
 Lake of the Ozarks Council of Local Governments	Place/Room: Mid County Fire Protection District 184 N. Business Rt. 5 Camdenton, MO. 65020

Name of Attendee	Title	Representing	Email	Phone #	Miles Driven to Meeting Round Trip
Ann Mott	Assist Director	Camden County EMA	ann-mott@camdenmo.org	346-7108	1.5
Dawn Kline	Planner	LOCLG	dawn.kline@loclg.org	573-346-5692	3 miles
LEE SCHUMAN	COUNTY ENGINEER	CAMDEN COUNTY	LEE_SCHUMAN@CAMDENMO.ORG	346-4471	1.5
Jessica Woods	City Administrator	Ozark Beach	jwoods@ozarkbeach.org	302-2000	.5
DAVE VAN DAE	City Administrator	Lake Ozark	cityadmin@cityoflakeozark.net	365-5378	20
GERRY MURAWSKI	MAYOR	"	MAYOR@CITYOFLAKEOZARK.NET	314-496-1187	20
BILL TODD	WORKER	LAKE OZARK	BNAO@BT@CHARTER.NET	573-692-4119	20
Dawn Christensen	"	Lake Ozark	dawn@charters.net	573-216-3085	20
JEFF BOWEN	MAYOR	"	"	"	"
Jackie Miller	City Clerk	Linn Creek	linncreek@lc-ge.org	573-346-4200	2

**CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET**

Project: Camden County, Missouri Multi-Jurisdictional Hazard Mitigation Plan Update	Meeting Date/Time: May 15, 2019 2:00 PM
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Name of Attendee	Title	Representing	Email	Phone #	Miles Driven to Meeting Round Trip
Tim Hatfield	Superintendent	Camdenton RIII	thetfield@camdentonschool.org	346-9213	1 mile
Mack McGuire	Assessor				
Byron Willis	Deputy Assessor	Camden County			
Bee Dampier	Health Dept	Administrator	bee.dampier@lpha.mo.gov	573-346-5479	2 mi
Linda Conner	Executive Director	LOCLG	linda.conner@loclg.org	573-346-5692	3 miles
Patrick Wolf	Supervisor	Road + Bridge	patrick_wolf@camdenmo.org	573-525-2175	
Andy Beyerl	Supervisor	Road + Bridge	Andy.Beyerl@Camdenmo.org	573-454-1894	
Jeff Hancock	City Admin	City of Camdenton	jhancock@camdentoncity.com	573-346-3600	

Camden County adoption of hazard mitigation plan underway

LAKE SUN STAFF
newsroom@lakesunonline.com

The process of adopting a revised hazard mitigation plan for Camden County is about to get underway. The plan is required by state and federal agencies for certain types of disaster relief assistance in case of a natural disaster.

Camden County's first hazard mitigation plan was adopted in 2010.

The process to revise the plan will be spearheaded by the Lake of the Ozarks Council of Local Governments.

LOCOLG Planner Dawn Kline said the plan will better protect the people and property of Camden County from the effects of natural hazardous events such as flooding and tornadoes.

Public input is part of the process.

LOCOLG will be holding four public planning meetings to update the plan. The first meeting will be Wed., May 15 at 2:00pm at Mid-County Fire Protection District headquarters in Camdenton.

"At this meeting, we will discuss the planning purpose, the multi-jurisdictional approach, identify and discuss the hazards, and ask for community participation. Please invite anyone who may be interested in our planning efforts in your community," Kline said. "The hazard mitigation planning process is heavily dependent on the participation of local government representatives, agencies, departments, and the public. A good representation from across the county is needed to ensure that we have the support for the plan update in every community."

The federal Emergency Management Agency requires all counties to update their plan every five years in order to be eligible for disaster relief and funding.

The Hazard Mitigation plan will be reviewed by the state emergency management agency and submitted to FEMA for approval. Prior to the plan approval, participating jurisdictions will need to formally adopt the plan locally, Kline said.

Kline said members of the public and representatives of the various agencies involved can view the current plan online at www.locog.org under publications to review the Camden County HMP 2015.

•Meeting #2 June 5th at 2:00 PM Mid County Fire Protection District

•Meeting #3 July 10th at 2:00 PM Mid County Fire Protection District

•Meeting #4 August 7th at 2:00 PM Mid County Fire Protection District

Camden County adoption of hazard mitigation plan underway

By LAKE SUN STAFF / newsroom@lakesunonline.com

Posted May 13, 2019 at 10:30 AM

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Camden County adoption of hazard mitigation plan underway - News - The Lake News Online - Camdenton, MO

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Kline said members of the public and representatives of the various agencies involved can view the current plan online at www.locolg.org under publications to review the Camden County HMP 2015.

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LAKE SUN STAFF

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Input needed for update to Hazard Mitigation Plan

CAMDEN COUNTY – The Lake of the Ozarks Council of Local Governments (LOCLG) is beginning the process to update the Camden County Multi-Jurisdictional Hazard Mitigation Plan (HMP).

This plan will better protect the people and property of Camden County from the effects of natural hazard events, the LOCLG said.

Residents are invited to the first of four planning meetings to update the plan.

The Federal Emergency Management Agency (FEMA) requires all counties to update their Hazard Mitigation Plan every five years.

LOCLG has scheduled the first meeting for May 15, 2019 at 2 p.m. in Camden at the

Mid-County Fire Protection District headquarters located at 184 N. Business Route 5.

“At this meeting, we will discuss the planning purpose, the multi-jurisdictional approach, identify and discuss the hazards, and ask for community participation,” a spokesman said. “Please invite anyone who may be interested in our planning efforts in your community.”

The hazard mitigation planning process is heavily dependent on the participation of local government representatives, agencies, departments and the public.

A good representation from across the county is needed to ensure that they have the

Continued on page 3

Hazard Mitigation Plan Continued from page 1

support for the plan update in every community.

“Communities are encouraged to be a part of the planning process. Why, because to be eligible for disaster relief and disaster funding, you need to have participated in the Hazard Mitigation Plan” said the spokesman.

The Hazard Mitigation plan will be reviewed by SEMA and submitted to FEMA for approval. Prior to the plan approval, participating jurisdictions will need to formally adopt the plan locally.

If anyone would like to review the current plan, please refer to their website at www.loclg.org under publications to review the Camden County HMP 2015.

Other meetings for the plan will also take place at the Mid-County Fire Protection District headquarters in Camden at 2 p.m.

- Meeting #2 June 5
- Meeting #3 July 10

LAKE OF THE OZARKS COUNCIL OF LOCAL GOVERNMENTS CAMDEN COUNTY HAZARD MITIGATION PLAN UPDATE KICKOFF PLANNING MEETING NOTICE & AGENDA

Wednesday May 15, 2019 2:00 p.m.
Mid County Fire Protection District
184 N. Business Rt. 5
Camdenton, Missouri 65020

I. WELCOME/INTRODUCTIONS/SIGN-IN SHEET
II. HAZARD MITIGATION PLAN PURPOSE
III. ACCESS TO GRANT PROGRAMS ONCE PLAN IS APPROVED
IV. PLANNING TASKS/MULTI-JURISDICTIONAL APPROACH
V. PARTICIPATION REQUIREMENTS
VI. PUBLIC INVOLVEMENT
VII. DATA COLLECTION QUESTIONNAIRES
VIII. DISCUSSION OF HAZARDS
IX. CRITICAL FACILITIES
X. NEXT STEPS IN THE PLANNING PROCESS
XI. ADJOURN

- Meeting #4 August 7
- If you need any special accommodations at the meeting, please call 573-346-5692.

Camden County Hazard Mitigation Plan to be Updated

MAY 9, 2019 BY KRMS NEWSROOM

[LEAVE A COMMENT](#)



It may be fortuitous timing, or some may consider it ironic in wake of recent storms in the area, but the Lake of the Ozarks Council of Local Governments is ready to begin work to update Camden County's Hazard Mitigation Plan. The HMPs must be updated every five years. The plans are used to identify potential hazards that affect the region and identify ways to mitigate the impact those hazards will produce. In addition to local first responders and elected officials, they're also looking for input from the general public. Meetings are planned for May 15th, June 5th, July 10th, and August 7th. Each of those meetings will be held at the Mid-County Fire District facility on North Business Route 5.

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FILED UNDER: LOCAL NEWS

CONTACT KRMS

Local On Air: 573-302-7000
Business Phone: 573-348-2772
Fax: 573-348-2779

Mailing Address:
KRMS Radio
P.O. Box 225
Osage Beach, MO 65065

Physical Address:
5715 Osage Beach Parkway
Osage Beach, MO 65065

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LAKE SUN STAFF

newsroom@lakesunonline.com

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•Meeting #3 July 10th at 2:00 PM Mid County Fire Protection District

•Meeting #4 August 7th at 2:00 PM Mid County Fire Protection District

SECOND MEETING

June 5th, 2019

Agenda

Press Release

Presentation

Sign-In Sheet



SERVING CAMDEN, LALEDE, MILLER AND MORGAN COUNTIES

**LAKE OF THE OZARKS COUNCIL OF LOCAL GOVERNMENTS
CAMDEN COUNTY HAZARD MITIGATION PLAN UPDATE
MEETING #2 NOTICE & AGENDA**

Wednesday June 5, 2019

2:00PM

Mid County Fire Protection District

184 N. Business Rt. 5

Camdenton, Missouri 65020

- I. CALL TO ORDER
- II. INTRODUCTIONS AND SIGN-IN SHEET
- III. HAZARD MITIGATION PLAN
 - a. Update of the Current Hazard Mitigation Plan
 - i. Evaluate natural hazards as identified in the original HMP 2015
 - ii. Identify current natural hazards
 - iii. Risk Assessment-Measures of Probability and Severity
 - b. Camden County Hazard Mitigation Public Survey 2020
 - i. Public Survey in regards to impacts of natural disasters
 - ii. Deadline for completion
 - c. Planning Process Continues
 - i. Next meeting date
 - ii. Next meeting agenda
- IV. OPEN DISCUSSION
- V. CONCLUSION
- VI. ADJOURN

SAVE THE DATES:

Meeting #3-July 10, 2019 2:00PM Mid County Fire Protection District

Meeting #4-September 25, 2019 2:00PM Mid County Fire Protection District



PRESS RELEASE

For Immediate Release

May 22, 2019

SERVING CAMDEN, LACLEDE, MILLER AND MORGAN COUNTIES

Public Workshop -- Meeting Notice

Date: June 5, 2019

Time: 2:00PM

Location: Mid-County Fire Protection District

Address: 184 N. Business Route 5, Camdenton, MO. 65020

CAMDEN COUNTY MISSOURI HAZARD MITIGATION PLAN UPDATE

Lake of the Ozarks Council of Local Governments (LOCLG) will be hosting the second meeting in a series of public meetings to gain public input into the updating of the local multi-jurisdictional hazard mitigation plan for Camden County. Each identified natural hazard will be measured for probability and severity. Each jurisdiction is encouraged to attend, as we will be discussing risk assessment-measures of probability and severity.

Hazard Mitigation by definition is any actions taken to reduce or eliminate the long-term risk to human life and property from natural hazards. Natural disasters can lead to loss of life, property damages, loss of essential services, loss of critical facilities and economic disruption. The time and money spent on recovering from a natural disaster can also exhaust additional resources both personally and community wide.

According to the SEMA website, Missouri has received forty Federal major disaster declarations since 1990 https://sema.dps.mo.gov/maps_and_disasters/disasters/. Camden County recognizes the impact of these disasters on our communities and is taking a proactive approach to updating our Hazard Mitigation Plan. Through the planning process we hope to make our communities more resilient.

It is very important that we have a good representation from across the county to ensure we have the support for the plan update in each local community.

For more information about the planning process please call LOCLG at 573-346-5692. You can also review the current plan on our website, www.loclg.org under publications-Camden County HMP 2015.

If you need any special accommodations at the meeting, please call our office to let us know.

Meeting # 3 July 10th at 2:00 PM Mid-County Fire Protection District

Meeting # 4 September 25th at 2:00 PM Mid-County Fire Protection District (REVISED DATE)

Lake of the Ozarks Council of Local Governments
P.O. Box 3553 Camdenton, MO 65020
Phone: 573-346-5692 Fax: 573-346-9686

CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

**MEETING #2
JUNE 5, 2019**



AGENDA

- Call to order
- Welcome/Introductions/Sign-In Sheet
- Hazard Mitigation Plan Purpose
- Hazard Mitigation Plan
 - Update of Current Hazard Mitigation Plan
 - Evaluate natural hazards as identified in the original 2015 HMP
 - Identify current natural hazards
 - Risk Assessment-Measures of Probability and Severity
- Camden County Hazard Mitigation Public Survey 2020
 - Public Survey in regards to impacts of natural disasters
 - Deadline for completion
- Planning Process Continues
 - Next meeting
 - Next meeting agenda
- Open Discussion
- Conclusion
- Adjourn

Handouts 1-2



JURISDICTIONS

- Camden County *
- City of Camdenton *
- City of Lake Ozark *
- City of Linn Creek *
- City of Osage Beach *
- City of Richland
- City of Stoutland
- Village of Sunrise Beach
- Village of Four Seasons*
- Camdenton R-III School District *
- Climax Springs R-IV School District
- Mack's Creek R-V School District
- Stoutland R-II School District
- Camden County Special Roads District *
- Horseshoe Bend Special Road District



HAZARDS TO MITIGATE

- ✓ Dam Failure
- ✓ Drought
- ✓ Earthquakes
- ✓ Extreme Heat
- ✓ Fires (Urban/Structural and Wild)
- ✓ Flooding (Flash Flood and River)
- ✓ Land Subsidence/Sinkholes
- ✓ Levee Failure
- ✓ Thunderstorm/High Winds/Lightening/Hail
- ✓ Tornado
- ✓ Winter Weather
- Terrorism?
- Attack
 - (Nuclear, Conventional, Chemical, and Biological)?
- Civil Disorder?
- Cyber Disruption?



DAM FAILURE

- Characterized by an uncontrolled release of water from behind a dam. An enormous amount of water is suddenly released, destroying infrastructure and flooding the area downstream of the dam.
- The most common types of dam failures
 - Overtopping – Water spilling over the top of the dam.
 - Piping – Is when seepage through a dam is not properly filtered and soil particles continue to progress and form sink holes in the dam.
 - Erosion – flow erosion, and/or inadequate slope protection
 - Structural Failure – caused by an earthquake, slope instability, and/or faulty construction



DAM FAILURE CONTINUED

Things to think about:

- Is there any anticipated future development that can affect the amount of damages such as:
 - Residential development?
 - Special districts?
 - Agricultural structures?
 - Educational structures?
 - Industrial structures?

Handouts 3-4



DROUGHT

➤ The National Weather Service defines drought as "a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people."

Questions to think about:

- Could potential future development impact the risk of damages?
- Increases in acreage planted with crops would add to exposure to drought-related agricultural losses.
- Increases in population result in increased demand for treated water, adding additional strain on water supplies.
- Could a jurisdiction be more at risk because the public water supply is a single source well?

Handouts 5-7



EARTHQUAKES

➤ An earthquake is a sudden motion or trembling that is caused by a release of energy accumulated within or along the edge of the earth's tectonic plates. Earthquakes occur primarily along fault zones and tears in the earth's crust. Along these faults and tears in the crust, stresses can build until one side of the fault slips, generating compressive and shear energy that produces the shaking and damage to the built environment.

➤ The New Madrid Seismic Zone (NMSZ) is the most active seismic area in the United States, east of the Rocky Mountains. The NMSZ is located in Southeastern Missouri, northeastern Arkansas, western Tennessee, western Kentucky and southern Illinois.

Things to think about:

- Building structure-brick
- Can our area support a possible influx of population if an earthquake hit where the fault line shows?

Handouts 8-9



EXTREME HEAT

- Extreme heat can be described as temperatures that hover 10°F or more above the average high temperature for a region during the summer months. A heat wave is a period of excessive heat, which can lead to illness and other stress to people with prolonged exposure to these conditions.
- High humidity, which often accompanies heat in Missouri, can make the effects of heat even more harmful.

Things to think about

- Are there any schools without air conditioning?
- Are there policies in place for extreme heat closures? Schools or Government entities?
- Assets susceptible to loss or damage from extreme heat? (Crops)

Handouts 10-11



FIRES URBAN/STRUCTURAL AND WILDFIRES



➤ The fire incident types for wildfires include:

- natural vegetation fire
- outside rubbish fire
- special outside fire
- cultivated vegetation, crop fire

➤ Wildfires damage the environment, killing some plants, occasionally animals and can lead to loss of life.

Things to think about

- Arson-What can we do to stop it?
- Any jurisdiction at greater risk for structural or wildfire than others?

Handouts 12-13



FLOODING: TYPES OF FLOODS & FLOOD PLAIN



- A flood is partial or complete inundation of normally dry land areas.
- A floodplain is defined as the lowland and relatively flat area adjoining a river or stream.
- The terms "base flood" and "100- year flood" refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year.

Things to think about

- Any future development that could impact flooding?
- Future development if any, in low lying areas near rivers and streams or where interior drainage systems are not adequate to provide drainage?
- Any repetitive loss areas? (See handout in packet).

Handouts 14



LAND SUBSIDENCE/SINKHOLES

- Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that naturally can be dissolved by ground water circulating through them.
- As the rock dissolves, spaces and caverns develop underground. The sudden collapse of the land surface above them can be dramatic and range in size from broad, regional lowering of the land surface to localized collapse.
- sinkholes can develop as a result of subsurface void spaces created over time due to the erosion of subsurface limestone (karst).
- In Missouri, sinkhole problems are usually a result of surface materials above openings into bedrock caves eroding and collapsing into the cave opening.

Things to think about

- Are there any issues with sinkholes?
- Are there areas in the county that are more prone to sinkhole formation?
- Is there any development over known caves or abandoned mines?

Handouts 15



LEVEE FAILURE

- Levees are earth embankments constructed along rivers and coastlines to protect adjacent lands from flooding.
- Levees can be small agricultural levees that protect farmland from high-frequency flooding.
- For purposes of this discussion, levee failure will refer to both overtopping and breach as defined in FEMA's Publication "So You Live Behind a Levee"

Things to think about

There are no Federal Levees in Camden County.

Are there areas that could be affected by a levee failure?



THUNDERSTORMS/HIGH WINDS/LIGHTENING/HAIL

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

Handouts 16-17



THUNDERSTORMS/HIGH WINDS/LIGHTENING/HAIL

Things to think about:

- What are some possible solutions to reduce the impact of property damage and to save lives?



TORNADO



- Essentially, tornadoes are a vortex storm with two components of winds.
- The first is the rotational winds that can measure up to 500 miles per hour, and the second is an uplifting current of great strength.
- The dynamic strength of both these currents can cause vacuums that can overpressure structures from the inside.
- Tornadoes spawn from the largest thunderstorms.
- A typical tornado can be described as a funnel-shaped cloud that is "anchored" to a cloud, usually a cumulonimbus that is also in contact with the earth's surface.
- This contact on average lasts 30 minutes and covers an average distance of 15 miles.



TORNADO



Things to think about:

- What are some possible solutions to reduce the impact of property damage and to save lives?
- Any anticipated developments that would result in increase of population in terms of increased exposure?
- Any higher occupancy buildings?
- Mobile home parks

Handouts 17



WINTER WEATHER

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

Handouts 17



NEXT STEPS IN THE PLANNING PROCESS

7/10/2019—3rd Planning Meeting

- Finalize the vulnerability
- Review/Update Mitigation Goals
- Updates for Previous Mitigation Actions
- Discuss New Mitigation Actions for 2020 HMP-Action Worksheets

REQUIRED

- Mitigation Action Implementation Plans
- 2020 HMP Plan Maintenance

**CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
MEETING #2—SIGN-IN SHEET**

Project: Camden County, Missouri Multi-Jurisdictional Hazard Mitigation Plan Update	Meeting Date/Time: June 5, 2019 2:00 PM
 Lake of the Ozarks Council of Local Governments	Place/Room: Mid County Fire Protection District 184 N. Business Rt. 5 Camdenton, MO. 65020

Name of Attendee	Title	Representing	Email	Phone #	Miles Driven to Meeting Round Trip
Tim Hatfield	Supt.	Camdenton R-II	t.hatfield@camdenton.org	573-346-920	1
Jeff Hancock	CA	City of Camdenton	jhancock@camdenton.org	346-3801	1
Ron Gentry	Director	CAMDEN CO EMA	Ron_gentry@camdenmo.org	573-517-6239	1
Eugene Frank		Village of Fincastle		757-513-0764	
Capit McGee	Director	Stoutland School	cbegleg@stoutlandschools.org	417-346-3711	18
Bl. Kuntzman	-	Grandview		216-3085	25
Bill Zoll	-	Grandview	BV and BT@chickasaw.org	573-692-4119	36
LEE SCHUMANN	COUNTY ENGINEER	CCRB	LEE.SCHUMANN@camdenmo.org	(573) 346-4471	1.5

**CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
MEETING #2—SIGN-IN SHEET**

Project: Camden County, Missouri Multi-Jurisdictional Hazard Mitigation Plan Update	Meeting Date/Time: June 5, 2019 2:00 PM
 Lake of the Ozarks Council of Local Governments	Place/Room: Mid County Fire Protection District 184 N. Business Rt. 5 Camdenton, MO. 65020

Name of Attendee	Title	Representing	Email	Phone #	Miles Driven to Meeting Round Trip
Linda Conner	Director Executive	LOCLG	linda.conner@loclg.org	573-546-5692	3
Dawn Kline	Planner	LOCLG	dawn.kline@loclg.org	573-346-5692	3
Garrett Lynch	Planning Intern	LOCLG	garrettlynch@loclg.org	573-434-4502	3
Ann VanDae					20
SERRY MORAWSKI	MAYOR	CITY OF LAKE OF THE OZARKS	G.MORAWSKI@LAKEOZARKS.MO.GOV	314-496-1187	20
ANN MOTT	Asst Dir	CCEMA	Ann_Mott@camdenmo.org	573-410-0333	2
Kyle Corbin	City Planner	Sumner Beach	KTC@sumnerbeach.org	573-286-4455	22
Todd Davis	Police Chief	OSAGE BEACH	tdavis@osagebeach.org	573-302-2010	20
Jeanell Woods	City	OSAGE BEACH	jwoods@osagebeach.org	573-302-2000	20

MEETING 3

July 10, 2019

Agenda

Press Release

Presentation

Sign-In Sheet



SERVING CAMDEN, LACLEDE, MILLER AND MORGAN COUNTIES

**LAKE OF THE OZARKS COUNCIL OF LOCAL GOVERNMENTS CAMDEN
COUNTY HAZARD MITIGATION PLAN UPDATE MEETING 3 NOTICE
& AGENDA**

**Wednesday July 10, 2019
2:00PM
Mid County Fire Protection District
184 N. Business Rt. 5
Camdenton, Missouri 65020**

Agenda

- I. CALL TO ORDER
- II. INTRODUCTIONS AND SIGN-IN SHEET
- III. HAZARD MITIGATION PLAN (HMP)
 - a. Update of the Current Hazard Mitigation Plan
 - i. Finalize Hazard Vulnerability
 - ii. Review and Update Mitigation Goals.
 - iii. Updates for Previous Mitigation Actions
 - iv. Discuss New Mitigation Actions for 2020 HMP-Action Worksheets Required
 - v. Implementation of Mitigation Actions
 - b. Camden County Hazard Mitigation Plan Update Public Survey 2019
 - i. Review Public Results of Survey to date
 - ii. Deadline for all Public Surveys
 - c. 2020 HMP Plan Maintenance
 - i. Monitoring and Evaluating process for the 5-Year Cycle
 - d. Planning Process Continues
 - i. Next Meeting Date-September 25, 2019
 - ii. Next Meeting Agenda Present draft copy for review, comment period, adoption of resolutions submitted to SEMA with drafted plan
- IV. Open Discussion
- V. Conclusion
- VI. Adjourn

PRESS RELEASE

For Immediate Release

June 26, 2019



SERVING CAMDEN, LALEDE, MILLER AND MORGAN COUNTIES

Public Workshop -- Meeting Notice

Date: July 10, 2019

Time: 2:00PM

Location: Mid-County Fire Protection District

Address: 184 N. Business Route 5, Camdenton, MO. 65020

CAMDEN COUNTY MISSOURI HAZARD MITIGATION PLAN UPDATE

Lake of the Ozarks Council of Local Governments (LOCLG) will be hosting the third meeting of a series of public meetings to develop the update to the Camden County Multi-Jurisdictional Hazard Mitigation Plan. The meeting is planned for July 10, 2019 at 2:00PM at the Mid-County Fire Protection district, meeting room. This meeting will focus on mitigation goals and actions, public surveys, and plan maintenance.

During the meeting, we will review and update mitigation goals and actions from the previous hazard mitigation plan along with discuss new mitigation actions for the 2020 HMP. A review of the Camden County Hazard Mitigation Plan Public Survey results to date will be discussed. The plan maintenance process will be outlined and requirements for monitoring and evaluating the plan for the 5-year cycle will be reviewed.

The Disaster Mitigation Act of 2000 requires counties, municipalities, school districts and other jurisdictions to participate in an approved Hazard Mitigation Plan to be eligible for certain federal hazard mitigation funding programs.

Other stakeholders such as businesses, academic institutions, private non-profit entities and other in the Camden County area with an interest in hazard mitigation are encouraged to attend to provide input to the mitigation strategy update.

For more information about the planning process please call LOCLG at 573-346-5692. You can also review the current plan on our website, www.loclg.org under publications-Camden County HMP 2015. If you need any special accommodations at the meeting, please call our office to let us know.

Meeting # 4 September 25 at 2:00 PM Mid-County Fire Protection District

Lake of the Ozarks Council of Local Governments
P.O. Box 3553 Camdenton, MO 65020
Phone: 573-346-5692 Fax: 573-346-9686



MEETING # 3 AGENDA

- I. Call to Order
- II. Introductions & Sign-In Sheet
- III. Hazard Mitigation Plan (HMP)
 - a. Update of the Current HMP
 - I. Finalize Hazard Vulnerability
 - II. Review & Update Mitigation Goals
 - III. Updates for Previous Mitigation Actions
 - IV. Discuss New Mitigation Actions for 2020 HMP-Action Worksheets Required
 - V. Implementation of Mitigation Actions
 - b. Camden County Hazard Mitigation Plan Update Public Survey 2019
 - I. Review Public Results of Survey to Date
 - II. Deadline for all Public Surveys



MEETING # 3 AGENDA CONTINUED

- c. 2020 HMP Plan Maintenance
 - i. Monitoring & Implementation Process for the 5-Year Cycle
- d. Planning Process Continues
 - i. Next Meeting Date-September 25, 2019
 - ii. Next Meeting Agenda-Present draft copy for review, comment period, adoptions of resolutions submitted to SEMA with drafted plan
- IV. Open Discussion
- V. Conclusion
- VI. Adjourn



JURISDICTIONS-

*=NUMBER OF MEETINGS ATTENDED
BOLDED IN DARK BLUE=COMPLETED AND SUBMITTED QUESTIONNAIRES
UNDERLINED>=SUBMITTED ACTION WORKSHEET

- **Camden County****
- **City of Camdenton****
- City of Lake Ozark**
- City of Linn Creek**
- City of Osage Beach**
- City of Richland
- City of Stoutland
- Village of Four Seasons*
- Village of Sunrise Beach*
- **Camdenton R-III School District****
- Climax Springs R-IV School District
- Mack's Creek R-V School District
- Stoutland R-II School District*
- Camden County Special Roads District**
- Horseshoe Bend Special Roads District



VULNERABILITY ANALYSIS

- Probability is the frequency of occurrence within the jurisdiction
 - Number of events divided by the number of years
- Severity is determined by the monetary impacts
 - Total cost of the event divided by the number of years
- Vulnerability ranking
 - High= > 75% probability, or > \$300,000 year severity
 - Medium= 25%-75% probability, or \$100,000-\$300,000 a year severity
 - Low= < 25% probability, or < \$100,000 a year severity



HAZARD VULNERABILITY ANALYSIS WITH 2015 COMPARISON

Hazard	Impacts/Event	Probability = # of events / # of years	Severity = Total Annual Loss	Vulnerability Ranking	2015 Data Comparison
Dam Failure	county wide	City of Brink	100	L	L
Drought	county wide	8 events recorded in a 20 yr period=40% probability	\$4,000,000.00 in a 20 yr period=\$200,000.00 a year	M	H
Earthquakes	county wide	City of Brink	100	L	L
Extreme Temperatures Extreme Heat Extreme Cold	county wide	8 events recorded in a 20 yr period = 40% probability 2 events recorded in a 20 yr period = 10% probability	\$1,000,000.00 in a 20 yr period=\$50,000.00 a year \$1,000,000.00 in a 20 yr period=\$50,000.00 a year	M	M
Flash Flooding/Flash Flood	county wide	424 events in a 1 yr period = 42.4% probability	\$100,000.00 in a 20 yr period = \$5,000.00 a year	H	H
Flourishing of Invasive Species	county wide	54 events recorded in a 20 yr period = 2.7% probability	\$1,000,000.00 in a 20 yr period=\$50,000.00 a year	M	H
Forest Fires	county wide	City of Brink	100	L	L
Forest Fires	county wide	City of Brink	100	H	H
Severe Thunderstorms Flash Flooding Lightning/Fire	county wide	127 events recorded in a 20 yr period=6.35% probability 208 events recorded in a 20 yr period=10.4% probability	\$1,200,000.00 in a 20 yr period=\$60,000.00 a year \$400,000.00 in a 20 yr period=\$20,000.00 a year	H	H
Tornadoes	county wide	10 events recorded in a 20 yr period=0.5% probability	\$6,500,000.00 in a 20 yr period=\$325,000.00 a year	H	H
Severe Winter Weather Ice Storms, Heavy Snow, Blizzards	county wide	2 events in a 20 yr period = 0.1% probability 18 events recorded in a 20 yr period=0.9% probability	\$100,000.00 in a 20 yr period=\$5,000.00 a year \$100,000.00 in a 20 yr period=\$5,000.00 a year	M	H



HAZARD VULNERABILITY SUMMARY

- 2015 Drought Vulnerability ranking was High.
 - Moderate
 - Drought
 - Extreme Temperatures
- 2020 Drought Vulnerability ranking is moderate.
 - High
 - Fires Urban/Structural/Wild
 - Flooding (Flash & River)
 - Severe Thunderstorms
 - Tornadoes
 - Severe Winter Weather
 - Low
 - Dam Failure
 - Earthquake
 - Land Subsidence/Sinkholes
 - Levee Failure



REVIEW AND UPDATE MITIGATION GOALS

- **Goal 1:** Mitigation Planning-Mitigate the effects of potential natural hazards in Camden County
- **Goal 2:** Mitigation Programs-Protect Camden County's assets and populace through cost-effective and tangible mitigation projects whenever financially feasible.
- **Goal 3:** Mitigation Procedures-Encourage continuity of operations of government and emergency services in a disaster.
- **Goal 4:** Mitigation Public Awareness-Increase Public awareness of natural hazards that have the potential to impact Camden County.



UPDATES FOR PREVIOUS MITIGATION ACTIONS

- Your jurisdiction does not have to keep any mitigation actions from the 2015 HMP.
- There were 22 different mitigation actions in the 2015 HMP plan.
- Action status outreach conducted the week of July 1, 2019
 - Completed
 - Ongoing
 - Not yet started
- Future inclusion of each action needs to be identified as either
 - Keep
 - Delete
 - Modify



NEW MITIGATION ACTIONS FOR 2020 HMP~IDENTIFICATION AND ANALYSIS

- Mitigation Actions and Projects means a hazard mitigation **action, activity or process** designed to reduce or eliminate the long-term risks from hazards. Actions are specific to each jurisdiction.
- For example;
 - Storm Shelters
 - Outdoor warning sirens
 - Elevating a structure or retrofitting critical infrastructure
- All actions should be SMART actions
 - Specific
 - Measurable
 - Achievable
 - Relevant
 - Time Bound (1-3 years, 5-7 years)



NEW MITIGATION ACTIONS FOR 2020 HMP~ACTION WORKSHEET

Multi-Jurisdictional Local Hazard Mitigation Plan	
Action Worksheet	
Name of Jurisdiction	Risk / Vulnerability
Responsible Address(es)	List the hazard or hazards that will be addressed by this action
Problem being Mitigated	Provide a brief description of the problem that the action will address. Update the problem statement as needed in the next assessment.
Action or Project	
Applicable Goal Statement	Choose the goal statement that applies to this action
Action Project Number	Assign a unique action number for the action for future tracking purposes. This can be a combination of the jurisdiction name, followed by the goal number and action number (i.e. 20190110).
Name of Action or Project	
Mitigation Category	Prevention, Structural and Infrastructure Projects, Natural System Protection, Education and Outreach, Emergency Services
Action or Project Description	Describe the action or project
Estimated Cost	Provide an estimate. This can be the maximum cost action. This can be categorized with a range of estimated costs.
Benefits	Provide a brief description of the benefits that will be realized by implementing this action. (If there are several or multiple issues see below, include them in one.)
Plan for Implementation	
Responsible Organization/Department	Which organization will be responsible for making this action? Be specific to include the jurisdiction, department, or position name, if applicable.
Supporting Organization/Department	Which organization/department will assist in implementation of this action?
Action Project Priority	Include the FEMA 1502, 1503 and Priority (01-10, 11)
Timeline for Completion	How many months does it take to complete?
Potential Fund Sources	List specific funding sources that may be used to pay for the implementation of the action.
Local Policies/Mechanisms to be Used to Implement Item, if any	
Progress Report	
Action Status	Include status as "New, Continuing, Not Started, or Completed or Progress"
Report of Progress	For Continuing actions only, include the amount of progress. If the action is not started, include any barriers encountered to initiate the action. If the action is in progress, include the amount that has been completed.



MITIGATION ACTION PLANS

- Complete for Continuing and New actions
- Provides details for each action

Action Worksheet	
Name of Jurisdiction	Risk / Vulnerability
Responsible Address(es)	
Problem being Mitigated	
Action or Project	
Applicable Goal Statement	
Action Project Number	
Name of Action or Project	
Mitigation Category	
Action or Project Description	
Estimated Cost	
Benefits	
Plan for Implementation	
Responsible Organization/Department	
Action Project Priority	
Timeline for Completion	
Potential Fund Sources	
Local Policies/Mechanisms to be Used to Implement Item, if any	
Progress Report	
Action Status	
Report of Progress	



ACTION WORKSHEETS DUE

- If you have not submitted your mitigation action worksheets--
- They are due now.



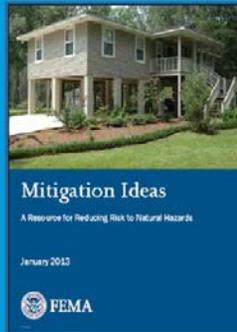
ADDITIONAL RESOURCES

➤ FEMA's Mitigation Ideas Booklet

➤ Can be downloaded at:

<https://www.fema.gov/media-library/assets/documents/30627?id=6938>

➤ If you are having trouble coming up with an action I can email you this link.



NEW MITIGATION ACTIONS FOR 2020 HMP~PRIORITIZATION & IMPLEMENTATION

➤ FEMA's STAPLEE methodology will be used to assess each action:
➤ **STAPLEE Worksheet** in your handouts.

- S: Is the action socially acceptable?
- T: Is the action technically feasible and potentially successful?
- A: Does the jurisdiction have the administrative capability to successfully implement this action?
- P: Is the action politically acceptable?
- L: Does the jurisdiction have the legal authority to implement the action?
- E: Is the action economically beneficial?
- E: Will the project have the environmental impact that is either beneficial or neutral?

PUBLIC SURVEY RESULTS 13 SURVEYS COMPLETED TO DATE!

Blank copy of the Public Survey is in your handouts

PUBLIC OPINION ON LIKELIHOOD OF OCCURRENCE

Public Survey Opinion on the likelihood (Statistical or Perceived Probability) for each hazard to their jurisdiction							
Hazard	1-Unlikely	2-Occasional	3-Likely	4-Highly Likely	Public Ranking	2020 Ranking	Total Responses
Dam Failure	61.5%	15.4%	15.4%	7.7%	L	L	13
Drought	38.5%	38.5%	23%	0.0%	L	M	13
Earthquakes	69.2%	0.0%	23.1%	7.7%	L	L	13
Extreme Temps	15.4%	30.8%	30.8%	23.1%	M	M	13
Fires (Urban/Wild)	23.1%	23.1%	23.1%	30.8%	H	H	13
Flooding (Flash/River)	7.7%	23.1%	46.2%	23.1%	M	H	13
Land Subsidence/Sinkholes	53.8%	38.5%	7.7%	0.0%	L	L	13
Levee Failure	91.7%	8.3%	0.0%	0.0%	L	N/A	12
Sever Thunderstorms	0.0%	15.4%	30.8%	53.8%	H	H	13
Tornadoes	7.7%	23.1%	30.8%	38.5%	H	H	13
Sever Winter Weather	7.7%	23.1%	46.2%	23.1%	M	H	13

PUBLIC OPINION ON POTENTIAL MAGNITUDE OF AN EVENT

Public Survey Opinion on the likelihood (Statistical or Perceived Probability) for each hazard to their jurisdiction							
Hazard	1-Unlikely	2-Occasional	3-Likely	4-Highly Likely	Public Ranking	2020 Ranking	Total Responses
Dam Failure	61.5%	15.4%	15.4%	7.7%	L	L	13
Drought	38.5%	38.5%	23%	0.0%	L	M	13
Earthquakes	69.2%	0.0%	23.1%	7.7%	L	L	13
Extreme Temps	15.4%	30.8%	30.8%	23.1%	M	M	13
Fires (Urban/Wild)	23.1%	23.1%	23.1%	30.8%	H	H	13
Flooding (Flash/River)	7.7%	23.1%	46.2%	23.1%	M	H	13
Land Subsidence/Sinkholes	53.8%	38.5%	7.7%	0.0%	L	L	13
Levee Failure	91.7%	8.3%	0.0%	0.0%	L	N/A	12
Sever Thunderstorms	0.0%	15.4%	30.8%	53.8%	H	H	13
Tornadoes	7.7%	23.1%	30.8%	38.5%	H	H	13
Sever Winter Weather	7.7%	23.1%	46.2%	23.1%	M	H	13

PUBLIC OPINION QUESTION 4: TYPES OF FEMA HMA GRANTS

PUBLIC OPINION QUESTION 5: OTHER COMMENTS

PUBLIC SURVEYS DUE BY
JULY 31, 2019



PLAN MAINTENANCE

- FEMA Regulations require complete plan update every 5 years.
- FEMA requires a formal plan maintenance process to ensure that the mitigation plan remains an active and relevant document
- Who, how, and when will plan be monitored, evaluated, and updated?
- How will public be involved in plan maintenance process?
- How will mitigation strategy be incorporated into other planning mechanisms?



PLAN IMPLEMENTATION AND MAINTENANCE-HMP CONSENSUS NEEDED

- How can your jurisdiction integrate the mitigation action into other planning mechanisms?
 - Who will be the responsible party within your jurisdictions? What department, or budget line item? Will it be included in your annual budget process, a grant application process or how do you plan to implement this action?



COMMENT PERIODS-FULL PLAN DRAFT

- September 25, 2019-October 25, 2019 – MPC & Public Comment period
 - I will need your assistance getting the word out to the public and your governing boards on the final public comment period.
- Review online at www.loclg.org/publications
 - Hard copies upon request.



HOMEWORK & NEXT STEPS

- **Action worksheets** — — — — Due Now
- **Comment Period Begins** — — 9/25/2019
- **Comment Period Ends** — — — 10/25/2019
- **Adopted Resolutions Due** — — 11/25/2019
- **Submit Plan to SEMA** — — — January 2020

CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

MEETING #3—SIGN-IN SHEET

Project:	Camden County, Missouri Multi-Jurisdictional Hazard Mitigation Plan Update	Meeting Date/Time:	July 10, 2019 2:00 PM
	Lake of the Ozarks Council of Local Governments	Place/Room:	Mid County Fire Protection District 184 N. Business Rt. 5 Camdenton, MO. 65020

Name of Attendee	Title	Representing	Email	Phone #	Miles Driven to Meeting Round Trip
Dawn Kline	Planner 1	LOCLG	dawn.kline@lorlg.org	573-346-5692	3
Tanna Wirtz	Planning Admin	Camden Co.	tanna-wirtz@camdenco.org	573 517 3860	—
MARCIA DAVIS	DR C	DHSS	MARCIA.DAVIS@HEALTH.MO.GOV	98	
Dave Van Dee	C.A.	Lake Ozark			20
GERRY MURAWSKI	mayor	" "			20
Ann Mott	Asst Dir	CCEMA	ann_mott@camdenmo.org	573-346-7108	2
Cindy Begley	H of O	Stoutland	begleyc@stoutlandschools.com	417-286-3711 141	38
Todd Davis	POLICE CHIEF	Osage Beach	tdavis@osagebeach.org	573 362-2010	24
Roger Corb	city Planner	SB	LTCRE@gnail	573-286-4265	25

CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE MEETING #3—SIGN-IN SHEET

Project:	Camden County, Missouri Multi-Jurisdictional Hazard Mitigation Plan Update	Meeting Date/Time:	July 10, 2019 2:00 PM
	Lake of the Ozarks Council of Local Governments	Place/Room:	Mid County Fire Protection District 184 N. Business Rt. 5 Camdenton, MO. 65020

Name of Attendee	Title	Representing	Email	Phone #	Miles Driven to Meeting Round Trip
Jeff Hancock	CA	City of Camdenton	jjhancock@camdentoncity.com	346-3601	1
Ryan Neal	Assistant Supr.	Camdenton Schools	rneal@camdentonschools.com	346-9208	1
Jeff Davis	Mayor	City of Linn Creek	jdavis@lc-cy.org	346-6200	3
Sachie Miller	city clerk	Linn Creek LOCLG	linncreek@lc-cy.org	346-6200	3
Linda Conner	Executive Director	LOCLG	linda.conner@lodge.org	346-5692	3
LEE SCHUMAN	COUNTY ENGINEER	CAMDEN COUNTY	LEE.SCHUMAN@CAMDENMO.ORG	346-4471	1.5

FOURTH MEETING

February 27, 2020

Agenda

Press Release



SERVING CAMDEN, LACLEDE, MILLER AND MORGAN COUNTIES

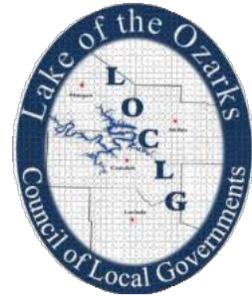
**LAKE OF THE OZARKS COUNCIL OF LOCAL
GOVERNMENTS CAMDEN COUNTY HAZARD
MITIGATION PLAN REVIEW MEETING NOTICE &
AGENDA**

**February 27th,
2020
2:00 p.m.
Mid County Fire
Protection District
184 N. Business Rt. 5
Camdenton, Missouri 65020**

- I. CALL TO ORDER
- II. INTRODUCTIONS AND SIGN – IN SHEET
- III. HAZARD MITIGATION PLAN (HMP)
 - a. Present Draft Copy of Camden County Hazard Mitigation Plan Update 2020
 - i. Identify Action Priorities for the county
 - ii. Review of completed chapters and draft plan and open discussion
 - iii. Also available for review in hard-copy during normal operating hours at 985 E. Hwy 54 Camdenton, MO. 65020
 - b. Comment Period
 - i. Begins today, February 27, 2020
 - ii. Ends March 30, 2020
 - c. Adopted Resolutions Due
 - i. March 30, 2020
 - d. Submit Plan to SEMA
 - i. April 1, 2020
- IV. CONCLUSION
- V. ADJOURN

PRESS RELEASE

For Immediate Release
February 13, 2020



SERVING CAMDEN, LACLEDE, MILLER AND MORGAN COUNTIES

Public Workshop -- Meeting Notice

Date: Tuesday, February 27th, 2020

Time: 2:00PM

Location: Mid-County Fire Protection District

Address: 184 N. Business Route 5, Camdenton, MO

SPONSORED BY: Lake of the Ozarks Council of Local Governments

SUBJECT: Camden County Hazard Mitigation Plan Update

Lake of the Ozarks Council of Local Governments (LOCLG) will be hosting the fourth meeting in a series of public meetings to gain public input into the local multi-jurisdictional hazard mitigation plan for Camden County. The meeting is planned for February 27th, 2020 at 2:00PM at the Mid-County Fire Protection District, 184 N. Business Route 5, Camdenton, MO.

A draft of the updated Camden County Hazard Mitigation Plan 2020 will be presented for review and open discussion. You are encouraged to review and comment on the updated Camden County Hazard Plan 2020 before it is finalized. The plan includes an updated strategy to reduce damage and losses caused by hazard events. The final draft review will be available in hard copy during normal operating hours at 985 E. Hwy 54 Camdenton, MO. 65020. The review and comment period will begin on February 27th, 2020 and end on March 30th, 2020. Public comments will be considered by the Hazard Mitigation Planning Committee and incorporated into the plan, as appropriate.

Each year, thousands of American families are affected by disasters, and billions of dollars are spent on disaster recovery. Some disasters are predictable and often; losses and damages can be reduced or eliminated. For these reasons, the Federal Disaster Mitigation Act of 2000 requires communities to develop an approved local hazard mitigation plan. A FEMA approved Hazard Mitigation Plan is required to access federal disaster funds.

Representatives from county departments, the incorporated cities, public school districts, and other mitigation planning stakeholders worked together to develop this plan update. The planning committee addressed hazards ranging from extreme heat to severe winter storms to tornadoes and flooding and considered the impacts of these events on local communities. Based on the results of an updated risk assessment of the hazards, committee members updated the strategies for their jurisdictions to reduce damages caused by the various hazards.

The final plan must be approved and adopted by the governing body of each participating jurisdiction by March 30, 2020.

If you need any special accommodations at the meeting, please call our office at 573-346-5692 for assistance.

The fourth meeting of the Camden County Hazard Mitigation Planning Committee was conducted at the Mid-County Fire Station in Camdenton on 27 February 2020. The meeting began at 2:00 PM and had 11 participants.

The meeting opened with a discussion the capabilities chart found in chapter 2 of the Hazard Mitigation plan. The information on hand was presented to determine if there were errors. We also discussed what information needed to be included as the required information in the guide from SEMA was vague. There were also concerns that due to some of the jurisdiction being in more than one county, should the city report their total numbers or just those that were within the county limits. It was also discussed on how this reporting would impact disaster recovery funding was requested in a future disaster.

Following the capabilities discussion there was a presentation in which participants were able to vote for the priority's actions for the county. This voting was done in order to ensure STAPLEE assessment were done properly

After voting was completed there was an opportunity for question or concerns to be discussed. There were no concerns addressed to the group or left on anonymous card for comments. Ron Gentry from the Camden County Emergency Management Agency did have some correction based on the draft plan. Scott Montgomery received those comments in order to make updates and correction to the plan before final submission.

It was also announced the LOCLG would email out the notice of interest forms and the resolution forms to the jurisdiction so that they may be completed and returned prior to the plan's submission on April 1st 2020.

The meeting concluded around 3:20 PM

**CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
MEETING #4 —SIGN-IN SHEET**

Project:	Camden County, Missouri Multi-Jurisdictional Hazard Mitigation Plan Update	Meeting Date/Time:	2:00 PM 27 FEB 2020
Facilitator:	Scott Montgomery, Planner Lake of the Ozarks Council of Local Governments	Place/Room:	Mid County Fire Protection District 185 North Business Rt 5, Camdenton, MO

Name	Title	Department/Agency	Email	Phone #	Signature
DAVE VAN OGE	City Administrator	Leebe Creek			
TODD DAVIS	Police Chief	Osage Beach	tdavis@osagebeach.org		
RON GANTZ	Director	Camden Co EMA	ron.gantz@camdenmo.org	573-317-6239	
JACKIE MILLER	City Clerk	City of Linn Creek	lmiller@linnmo.org	573-344-6200	
JEFF DAVIS	Mayor	"	"	"	
TANNA WIRTZ	P/Z Administrator FP Mgr	Camden Co	tanna_wirtz@camdenmo.org	573-317-3860	
RYAN NEAL	Assistant Superintendent	Camden Co Schools	rneal@camden.k12.mo.us	573-346-9208	
RANDY GROSS	Commissioner Osage Beach Special District	"	rgross@osagebeachmo.net	573-474-1877	
LISA THOMAS	Interested party candidate for State Rep (District 124)		lisa.t.informed@gmail.com	(573) 268-8019	
LINDA COOPER					
Scott M	Planner	LOCLG			

Appendix C

Completed/Deleted Mitigation Actions

Goals/Objectives		
Goal 1	Mitigation Planning - Mitigate the effects of potential natural hazards in Camden County.	
Objective 1.1	Encourage Increased Analysis of Hazards and Vulnerabilities Facing Camden County	
1.1.1	Investigate the vulnerability of the seasonal population to peak-season hazards	This mitigation action was vague and did not identify a community or organization that would be responsible and therefore the action remains not completed as of this update. No community or organization proposed and action that was the same or similar so the action was deleted from the Camden County HMP 2020 Action Items. DELETED-2020
1.1.2	Conduct outreach programs that uses a direct mailing, door to door visits in certain areas, local media, and billboards advertising the use of Firewise risk analysis methodologies to better understand wildfire risk.	This mitigation action was specifically directed towards the fire districts within Camden County, some of the fire districts worked on some aspects of this action, but unable to confirm what was completed and what remains uncompleted at this time. There has been no formal action worksheet presented for the Camden County HMP 2020 therefore the action was deleted at this time. DELETED-2020
1.1.3	Determine need for stream gauges in creeks and streams without flood warning systems or additional stream gauges in waterways with flood warning systems already in-place	Stream gauges are in major streams and monitored by Missouri Department of Natural Resources. This action was not specific to Camden County, and no local jurisdiction have added any additional stream gauges during this planning period. No community or participated jurisdiction has moved this action forward with an Action Worksheet for the Camden County HMP 2020, therefore the action was deleted. DELETED-2020
Objective 1.2	Encourage Increased Analysis of Hazards and Vulnerabilities Facing Camden County	

Goals/Objectives		
1.2.1	Include policies regarding seasonal populations in future HMPs, community plans, and emergency operations plans	Camden County EMD indicated that they include this information in their emergency operations procedures. This action has been partially completed and marked completed based on the only the specific completion or a major part of this identified action in the Camden County EMA Standard Operating Procedures 2017. COMPLETED-2020
1.2.2	Encourage creation of heat wave, sinkhole, and other hazard event annexes for inclusion in local emergency operations plans	Camden County EMD indicated that this has been included in their local planning emergency operations plan. Therefore, this action is being marked completed in 2017 by Camden County. COMPLETED-2020
Goal 2	Mitigation Programs - Protect Camden County's assets and populace through cost-effective and tangible mitigation projects whenever financially feasible.	
Objective 2.1	Work to Ensure At-Risk, Elderly, and Low-Income Residents (permanent and seasonal) have Adequate Resources to Respond to Hazards	
2.1.1	Partner with community services organizations, local businesses, local CERT teams to provide materials and volunteer labor to assist at-risk groups, low income residents, and the elderly in preparing their homes for high and medium risk hazards.	Camden County EMD has established a CERT Team in 2018 and has done some of the items listed in this action, however with limited funding they have not been able to complete the action in its entirety. The action will move forward in the Camden County HMP 2020 as a modified action as adopted by participating jurisdictions. DELETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
2.1.2	Identify and adequately retrofit suitable existing facilities with generators to serve as emergency shelters during severe winter weather, heat waves, and other hazard events	This action was vague and local judications have not had the appetite to retrofit existing facilities based on the cost and access to buildings. This action has been deleted from the Camden County HMP 2020 because there have been several action worksheets that are specific to building safe rooms in communities and school districts throughout Camden County. DELETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
Objective 2.2	Encourage Best Building Practices are Used by the Private Sector	

Goals/Objectives		
2.2.1	Consider adopting ordinances, resolutions, or incentives encouraging the construction of safe rooms in new buildings where people live, work or congregate	Several jurisdictions within Camden County have submitted action worksheets that have identified Safe Room Construction. Therefore, this action has been modified to reflect the participating jurisdictions that have identified this action as a priority for them in the Camden County HMP 2020. DELETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
2.2.2	Consider adopting ordinances, resolutions, or incentives encouraging the registration of safe rooms in new buildings where people live, work or congregate	Camden County developed a database of saferooms and their locations for information purposes. They do not have the authority to require that people register their saferooms or storm shelters but it is high encouraged. This action will continue on a voluntary basis; therefore, the action is being marked completed as of 2019. COMPLETED-2020
2.2.3	Review and work with communities and home owners associations (HOA) to modify regulations/restrictions related to encouraging the installation of architectural features on structures to minimize their susceptibility to fire, tornadoes (e.g., enclosing soffits, reducing the overhang of bay windows, eliminating wood shingles, use of hurricane ties, etc.)	This action was not considered feasible as the variances between requirements in each HOA was difficult to navigate and build consensus amount the different types of building materials, and what is best for each type of building, ie condos, single family, multifamily. This action is being deleted because it was not accomplished and no specific jurisdiction has adopted the action in the Camden County HMP 2020. DELETED-2020
Objective 2.3	Encourage Public Sector to Take Proactive Steps to Mitigate Community Risks	
2.3.1	Partner with area local governments to establish a mutual aid system for sand, salt and other materials and their delivery resources (i.e., trucks, crews, etc.)	Many of the local government have mutual aid agreements in place. The planning committee felt this was the responsibility of each jurisdiction based on their specific needs and did not want to include in the Camden County HMP 2020. Since many of the jurisdictions have indicated they have what they need in place in regard to this action the action is being marked completed. COMPLETED 2020

Goals/Objectives		
2.3.2	Work with area property owners, environmental groups, and other stakeholders to develop and implement flood mitigation strategies that include the restoration and/or sustainability of fish and wildlife habitats	Camden County has replaced several low-water crossing with mitigation funds that are friendly to the Niangua Darter and other endangered species. This is required by Missouri Department of Natural Resources when working in waterways that are know to have endangered species. This will continue to be the practice within Camden County and therefore it is not needed to be a specific action carried forward in the plan update. This action is being marked completed based on the actions by the county to date. COMPLETED-2020
2.3.3	Consider adopting policies requiring incorporation of safe rooms/shelters in new public facility construction	Several jurisdictions within Camden County have submitted action worksheets that have identified Safe Room Construction. Therefore, this action has been modified to reflect the participating jurisdictions that have identified this action as a priority for them in the Camden County HMP 2020. DELETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
Goal 3	Mitigation Procedures - Encourage continuity of operations of government and emergency services in a disaster.	
Objective 3.1	Encourage Upgrades to Key Public Infrastructure to Ensure Continuation of Services	
3.1.1	Upgrade key public buildings to include generators, and other back-up systems to ensure critical governmental functions can continue	Many jurisdictions have developed Continuity of Operations Plans that incorporate some of these functions. There were no specific action worksheets submitted during this round that would continue this action. Therefore, the action is being marked completed, at this time. COMPLETED-2020
3.1.2	Encourage electric and telecommunications utilities to protect their existing infrastructure from the effects of Hazard Events	Missouri has a specific Hazard Mitigation Plan for the Electric Cooperatives within Missouri that allow these jurisdictions to apply for Mitigation funding directly. Since none of the participating jurisdictions have electric or telecommunication as a utility provider there was not action identified for the Camden County HMP 2020. DELETED-2020

Goals/Objectives		
Objective 3.2	Encourage Adequate Capabilities Within Emergency Service Providers to Respond to Expected Severity of Natural Hazards	
3.2.1	Identify funding sources to enhance the operational capabilities and fire prevention programs of fire departments and fire protection districts; assist fire agencies with the development of grant applications	Camden County has provided training and resources for training through the local LEPC funding and will continue to do so based on the requirement of the LEPC. With this being a specific action that is being done with the local entity that is not a participating jurisdiction the action is being marked completed. COMPLETED-2020
3.2.2	Identify alternative routes for key roads that regularly experience closures during hazard events	Camden County Road and Bridge department has identified and prioritized key low water crossings to include in the Camden County HMP based on the number of times they are closed and or repairs are needed. Please see new action worksheets that have identified specific projects to complete. COMPLETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED
Goal 4	Mitigation Public Awareness - Increase public awareness of natural hazards that have the potential to impact Camden County.	
Objective 4.1	Ensure Public is Educated About Risks and Ways to Protect Themselves	
4.1.1	Collect and disseminate public information materials that address hazard mitigation activities, available insurance, local ordinances, and evacuation information to permanent and seasonal residents at city hall, chambers of commerce, and other public locations	This mitigation action was vague and did not identify a community or organization that would be responsible and therefore the action remains not completed as of this update. No community or organization proposed and action that was the same or similar so the action was deleted from the Camden County HMP 2020 Action Items. DELETED-2020
4.1.2	Host workshops, rent booths at local festivals, or participate in other community events in order to educate public on ways to protect themselves and their property	The Camden County CERT Team has worked on this activity and will continue as funding is available. As a separate non-profit, it will be their responsibility. This action is being marked complete and will not be included in the Camden County HMP 2020 as no specific action worksheet has been submitted to date. COMPLETED-2020

Goals/Objectives		
Objective 4.2	Ensure Public Can Be Quickly Notified About Potential Natural Hazards	
4.2.1	Develop adequate early warning system for tornadoes, floods, dam failures, and other predictable hazard events	<p>The City of Lake Ozark is working on this within their community. The Village of Four Seasons has also worked on this within their community. This action is being modified and adopted by jurisdictions that have identified it on their specific action worksheet.</p> <p>COMPLETED-MODIFIED-2020 SEE NEW ACTION ITEMS IDENTIFIED</p>
4.2.2	Encourage residents to purchase NOAA weather radios	<p>The Camden County CERT Team have distributed NOAA Radio when funding was available. The action will continue to be completed as fund are available. The action will not move forward to the Camden County HMP 2020 as no jurisdiction provided a specific action worksheet for this action.</p> <p>COMPLETED-2020</p>

STAPLEE Worksheet		
Name of Jurisdiction:	Camden County	
Action or Project		
Action/Project Number:	Camden County 1.1	
Name of Action or Project:	Identify and prioritize all low water crossings in Camden County to repair and or replace to ensure the safety of motorist who travel these county roadways.	
Mitigation Category:	Prevention	
STAPLEE Criteria	Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	Score
S: Is it Socially Acceptable		3
T: Is it Technically feasible and potentially successful?		2
A: Does the jurisdiction have the Administrative capacity to execute this action?		2
P: Is it Politically acceptable?		2
L: Is there Legal authority to implement?		2
E: Is it Economically beneficial?		1
E: Will the project have either a neutral or positive impact on the natural Environment ?		1
Will historic structures be saved or protected?		0
Could it be implemented quickly?		1
STAPLEE SCORE		13
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	6
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	5
MITIGATION EFFECTIVENESS SCORE		10
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		23
<input type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input checked="" type="checkbox"/> Low Priority (<25 points)

Completed by
(Name, Title, Phone Number)

Scott Montgomery Planner, 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	City of Linn Creek		
Action or Project			
Action/Project Number:	2.1 Linn Creek		
Name of Action or Project:	Seek funding for communities interested in upgrading or installing early warning systems		
Mitigation Category:	Prevention & Preparedness		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3 Probably NO = 1	Maybe YES = 2 Definitely NO = 0	
S: Is it Socially Acceptable			3
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			2
L: Is there Legal authority to implement?			2
E: Is it Economically beneficial?			1
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			1
Could it be implemented quickly?			1
STAPLEE SCORE			21
Mitigation Effectiveness Criteria	Evaluation Rating		Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.		10
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.		10
MITIGATION EFFECTIVENESS SCORE			20
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			41

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

Scott Montgomery, Planner, 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	City of Lake Ozark		
Action or Project			
Action/Project Number:	City of Lake Ozark 3.1		
Name of Action or Project:	Seek funding for communities interested in upgrading or installing early warning systems		
Mitigation Category:	Prevention/Preparedness		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3	Maybe YES = 2	
	Probably NO = 1	Definitely NO = 0	
S: Is it Socially Acceptable			2
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			2
L: Is there Legal authority to implement?			2
E: Is it Economically beneficial?			1
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			2
Could it be implemented quickly?			2
STAPLEE SCORE			15
Mitigation Effectiveness Criteria	Evaluation Rating	Score	
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	7	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	8	
MITIGATION EFFECTIVENESS SCORE			15
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			30
<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)	

Completed by
(Name, Title, Phone Number)

Scott Montgomery, Planner; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	Macks Creek School District		
Action or Project			
Action/Project Number:	Macks Creek School District 4.1		
Name of Action or Project:	Plan and build a saferoom which will protect people from high winds and flying debris during severe storms and tornadoes		
Mitigation Category:	Prevention and Structure Projects		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3 Probably NO = 1	Maybe YES = 2 Definitely NO = 0	
S: Is it Socially Acceptable			3
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			3
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			1
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			0
STAPLEE SCORE			16
Mitigation Effectiveness Criteria	Evaluation Rating	Score	
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	9	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	5	
MITIGATION EFFECTIVENESS SCORE			14
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			30

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

Scott Montgomery , Planner; 573-346-5692

STAPLEE Worksheet		
Name of Jurisdiction:	City of Camdenon	
Action or Project		
Action/Project Number:	City of Camdenon 5.1	
Name of Action or Project:	Conduct Storm Siren Study	
Mitigation Category:	Prevention and Planning	
STAPLEE Criteria	Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	Score
S: Is it Socially Acceptable		3
T: Is it Technically feasible and potentially successful?		3
A: Does the jurisdiction have the Administrative capacity to execute this action?		3
P: Is it Politically acceptable?		2
L: Is there Legal authority to implement?		2
E: Is it Economically beneficial?		2
E: Will the project have either a neutral or positive impact on the natural Environment ?		1
Will historic structures be saved or protected?		0
Could it be implemented quickly?		0
STAPLEE SCORE		16
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	5
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	5
MITIGATION EFFECTIVENESS SCORE		16
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		34
<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)

Completed by
(Name, Title, Phone Number)

Scott Montgomery, Planner; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	City of Osage Beach		
Action or Project			
Action/Project Number:	6.1 Osage Beach		
Name of Action or Project:	Conduct Siren Study		
Mitigation Category:	Prevention, Planning and Regulations		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3	Maybe YES = 2	
	Probably NO = 1	Definitely NO = 0	
S: Is it Socially Acceptable			3
T: Is it Technically feasible and potentially successful?			3
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			3
L: Is there Legal authority to implement?			2
E: Is it Economically beneficial?			2
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			0
STAPLEE SCORE			15
Mitigation Effectiveness Criteria	Evaluation Rating		Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.		5
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.		9
MITIGATION EFFECTIVENESS SCORE			14
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			29
<input type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)	

Completed by
(Name, Title, Phone Number)

Scott Montgomery, Planner; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	Village of Sunrise Beach		
Action or Project			
Action/Project Number:	Sunrise Beach 7.1		
Name of Action or Project:	Develop adequate early warning system for tornadoes, floods, and other predictable hazard events.		
Mitigation Category:	Prevention and Planning		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3 Probably NO = 1	Maybe YES = 2 Definitely NO = 0	
S: Is it Socially Acceptable			2
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			2
L: Is there Legal authority to implement?			2
E: Is it Economically beneficial?			1
E: Will the project have either a neutral or positive impact on the natural Environment ?			1
Will historic structures be saved or protected?			0
Could it be implemented quickly?			1
STAPLEE SCORE			13
Mitigation Effectiveness Criteria	Evaluation Rating		Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.		5
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.		7
MITIGATION EFFECTIVENESS SCORE			12
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			25

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

Scott Montgomery, Planner; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	Village of four Seasons		
Action or Project			
Action/Project Number:	Village of Sunrise Beach 8.1		
Name of Action or Project:	Evacuation Study		
Mitigation Category:	Prevention		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3 Probably NO = 1	Maybe YES = 2 Definitely NO = 0	
S: Is it Socially Acceptable			3
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			3
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			2
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			2
STAPLEE SCORE			18
Mitigation Effectiveness Criteria	Evaluation Rating		Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.		9
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.		0
MITIGATION EFFECTIVENESS SCORE			9
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			27

<input type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)
---	--	--

Completed by
(Name, Title, Phone Number)

Scott Montgomery, Planner, 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	Stoutland School District		
Action or Project			
Action/Project Number:	Stoutland School District 9.1		
Name of Action or Project:	Identify vulnerable roofs that need repairs		
Mitigation Category:	Prevention and preparedness		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3 Probably NO = 1	Maybe YES = 2 Definitely NO = 0	
S: Is it Socially Acceptable			3
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			3
P: Is it Politically acceptable?			3
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			1
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			2
STAPLEE SCORE			19
Mitigation Effectiveness Criteria	Evaluation Rating	Score	
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	6	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	9	
MITIGATION EFFECTIVENESS SCORE			15
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			34

<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)
--	---	--

Completed by
(Name, Title, Phone Number)

Scott Montgomery, Planner, 573-346-5692

STAPLEE Worksheet		
Name of Jurisdiction:	Stoutland School District	
Action or Project		
Action/Project Number:	Stoutland Schools 9.2	
Name of Action or Project:	Construction of a FEMA approved Storm Shelter-Safe Room in the Stoutland School District.	
Mitigation Category:	Prevention and Planning	
STAPLEE Criteria	Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	Score
S: Is it Socially Acceptable		3
T: Is it Technically feasible and potentially successful?		2
A: Does the jurisdiction have the Administrative capacity to execute this action?		3
P: Is it Politically acceptable?		2
L: Is there Legal authority to implement?		3
E: Is it Economically beneficial?		1
E: Will the project have either a neutral or positive impact on the natural Environment ?		2
Will historic structures be saved or protected?		1
Could it be implemented quickly?		3
STAPLEE SCORE		20
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	10
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	5
MITIGATION EFFECTIVENESS SCORE		15
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		35

<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)
--	---	--

Completed by
(Name, Title, Phone Number)

Scott Montgomery, Planner, 573-346-5692

Name of Jurisdiction:		Camdenton R- III School District	
Action or Project			
Action/Project Number:		Camdenton School District 10.1	
Name of Action or Project:		Construction of a FEMA approved Storm Shelter-Safe Room Camdenton R-III Campus	
Mitigation Category:		Infrastructure, Planning and Safety	
STAPLEE Criteria		Evaluation Rating	
		Definitely YES = 3 Probably NO = 1	Maybe YES = 2 Definitely NO = 0
S: Is it Socially Acceptable		Score	
		3	
T: Is it Technically feasible and potentially successful?		2	
A: Does the jurisdiction have the Administrative capacity to execute this action?		3	
P: Is it Politically acceptable?		3	
L: Is there Legal authority to implement?		3	
E: Is it Economically beneficial?		1	
E: Will the project have either a neutral or positive impact on the natural Environment ?		2	
Will historic structures be saved or protected?		0	
Could it be implemented quickly?		0	
STAPLEE SCORE		17	
Mitigation Effectiveness Criteria		Evaluation Rating	
Score			
Will the implemented action result in lives saved?		Assign from 5-10 points based on the likelihood that lives will be saved.	
10			
Will the implemented action result in a reduction of disaster damages?		Assign from 5-10 points based on the relative reduction of disaster damages.	
6			
MITIGATION EFFECTIVENESS SCORE		16	
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		33	

<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)
--	---	--

Completed by
(Name, Title, Phone Number)

Scott Montgomery, Planner, 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	Climax Spring School District.		
Action or Project			
Action/Project Number:	Climax Spring School District 11.1		
Name of Action or Project:	Adopt policies requiring incorporation of safe rooms/shelters in new public facility construction.		
Mitigation Category:	Prevention and local planning and regulations		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3	Maybe YES = 2	
	Probably NO = 1	Definitely NO = 0	
S: Is it Socially Acceptable			3
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			3
P: Is it Politically acceptable?			3
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			1
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			1
Could it be implemented quickly?			2
STAPLEE SCORE			20
Mitigation Effectiveness Criteria	Evaluation Rating		Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.		10
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.		6
MITIGATION EFFECTIVENESS SCORE			16
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			36
<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)	

Completed by
(Name, Title, Phone Number)

Scott Montgomery, Planner; 573-346-5692

STAPLEE Worksheet		
Name of Jurisdiction:	City of Richland	
Action or Project		
Action/Project Number:	City of Richland 12.1	
Name of Action or Project:	Identify steps for construction of a FEMA approved Storm Shelter-Safe Room in Richland area	
Mitigation Category:	Prevention and Structure Projects	
STAPLEE Criteria	Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	Score
S: Is it Socially Acceptable		3
T: Is it Technically feasible and potentially successful?		2
A: Does the jurisdiction have the Administrative capacity to execute this action?		3
P: Is it Politically acceptable?		3
L: Is there Legal authority to implement?		3
E: Is it Economically beneficial?		1
E: Will the project have either a neutral or positive impact on the natural Environment ?		2
Will historic structures be saved or protected?		0
Could it be implemented quickly?		0
STAPLEE SCORE		17
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	10
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	6
MITIGATION EFFECTIVENESS SCORE		16
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		33
<input checked="" type="checkbox"/> High Priority (30+ points)	<input type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	Camden County		
Action or Project			
Action/Project Number:	Camden County 1.2		
Name of Action or Project:	National Flood Insurance Program (NFIP)		
Mitigation Category:	Prevention and Structure Projects		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3	Maybe YES = 2	
	Probably NO = 1	Definitely NO = 0	
S: Is it Socially Acceptable			2
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			2
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			2
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			0
STAPLEE SCORE			15
Mitigation Effectiveness Criteria	Evaluation Rating		Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.		7
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.		6
MITIGATION EFFECTIVENESS SCORE			13
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			28
<input checked="" type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)	

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

STAPLEE Worksheet		
Name of Jurisdiction:	City of Linn Creek	
Action or Project		
Action/Project Number:	City of Linn Creek 2.2	
Name of Action or Project:	National Flood Insurance Program (NFIP)	
Mitigation Category:	Prevention and Structure Projects	
STAPLEE Criteria	Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	Score
S: Is it Socially Acceptable		2
T: Is it Technically feasible and potentially successful?		2
A: Does the jurisdiction have the Administrative capacity to execute this action?		2
P: Is it Politically acceptable?		2
L: Is there Legal authority to implement?		3
E: Is it Economically beneficial?		2
E: Will the project have either a neutral or positive impact on the natural Environment ?		2
Will historic structures be saved or protected?		0
Could it be implemented quickly?		0
STAPLEE SCORE		15
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	7
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	6
MITIGATION EFFECTIVENESS SCORE		13
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		28
<input checked="" type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	City of Lake Ozark		
Action or Project			
Action/Project Number:	City of Lake Ozark 3.2		
Name of Action or Project:	National Flood Insurance Program (NFIP)		
Mitigation Category:	Prevention and Structure Projects		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3	Maybe YES = 2	
	Probably NO = 1	Definitely NO = 0	
S: Is it Socially Acceptable			2
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			2
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			2
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			0
STAPLEE SCORE			15
Mitigation Effectiveness Criteria	Evaluation Rating		Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.		7
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.		6
MITIGATION EFFECTIVENESS SCORE			13
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			28
<input checked="" type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)	

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

STAPLEE Worksheet		
Name of Jurisdiction:	City of Camden	
Action or Project		
Action/Project Number:	City of Camden 5.2	
Name of Action or Project:	National Flood Insurance Program (NFIP)	
Mitigation Category:	Prevention and Structure Projects	
STAPLEE Criteria	Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	Score
S: Is it Socially Acceptable		2
T: Is it Technically feasible and potentially successful?		2
A: Does the jurisdiction have the Administrative capacity to execute this action?		2
P: Is it Politically acceptable?		2
L: Is there Legal authority to implement?		3
E: Is it Economically beneficial?		2
E: Will the project have either a neutral or positive impact on the natural Environment ?		2
Will historic structures be saved or protected?		0
Could it be implemented quickly?		0
STAPLEE SCORE		15
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	7
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	6
MITIGATION EFFECTIVENESS SCORE		13
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		28
<input checked="" type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	City of Osage Beach		
Action or Project			
Action/Project Number:	City of Osage Beach 6.2		
Name of Action or Project:	National Flood Insurance Program (NFIP)		
Mitigation Category:	Prevention and Structure Projects		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3	Maybe YES = 2	
	Probably NO = 1	Definitely NO = 0	
S: Is it Socially Acceptable			2
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			2
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			2
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			0
STAPLEE SCORE			15
Mitigation Effectiveness Criteria	Evaluation Rating	Score	
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	7	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	6	
MITIGATION EFFECTIVENESS SCORE			13
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			28
<input checked="" type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)	

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	Village of Sunrise Beach		
Action or Project			
Action/Project Number:	Village of Sunrise Beach 7.2		
Name of Action or Project:	National Flood Insurance Program (NFIP)		
Mitigation Category:	Prevention and Structure Projects		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3	Maybe YES = 2	
	Probably NO = 1	Definitely NO = 0	
S: Is it Socially Acceptable			2
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			2
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			2
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			0
STAPLEE SCORE			15
Mitigation Effectiveness Criteria	Evaluation Rating	Score	
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	7	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	6	
MITIGATION EFFECTIVENESS SCORE			13
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			28
<input checked="" type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)	

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

STAPLEE Worksheet		
Name of Jurisdiction:	Village of Four Seasons	
Action or Project		
Action/Project Number:	Village of Four Seasons 8.2	
Name of Action or Project:	National Flood Insurance Program (NFIP)	
Mitigation Category:	Prevention and Structure Projects	
STAPLEE Criteria	Evaluation Rating Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0	Score
S: Is it Socially Acceptable		2
T: Is it Technically feasible and potentially successful?		2
A: Does the jurisdiction have the Administrative capacity to execute this action?		2
P: Is it Politically acceptable?		2
L: Is there Legal authority to implement?		3
E: Is it Economically beneficial?		2
E: Will the project have either a neutral or positive impact on the natural Environment ?		2
Will historic structures be saved or protected?		0
Could it be implemented quickly?		0
STAPLEE SCORE		15
Mitigation Effectiveness Criteria	Evaluation Rating	Score
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	7
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	6
MITIGATION EFFECTIVENESS SCORE		13
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)		28
<input checked="" type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

STAPLEE Worksheet			
Name of Jurisdiction:	City of Richland		
Action or Project			
Action/Project Number:	City of Richland 12.2		
Name of Action or Project:	National Flood Insurance Program (NFIP)		
Mitigation Category:	Prevention and Structure Projects		
STAPLEE Criteria	Evaluation Rating		Score
	Definitely YES = 3	Maybe YES = 2	
	Probably NO = 1	Definitely NO = 0	
S: Is it Socially Acceptable			2
T: Is it Technically feasible and potentially successful?			2
A: Does the jurisdiction have the Administrative capacity to execute this action?			2
P: Is it Politically acceptable?			2
L: Is there Legal authority to implement?			3
E: Is it Economically beneficial?			2
E: Will the project have either a neutral or positive impact on the natural Environment ?			2
Will historic structures be saved or protected?			0
Could it be implemented quickly?			0
STAPLEE SCORE			15
Mitigation Effectiveness Criteria	Evaluation Rating	Score	
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives will be saved.	7	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	6	
MITIGATION EFFECTIVENESS SCORE			13
TOTAL SCORE (STAPLEE + Mitigation Effectiveness)			28
<input checked="" type="checkbox"/> High Priority (30+ points)	<input checked="" type="checkbox"/> Medium Priority (25 - 29 points)	<input type="checkbox"/> Low Priority (<25 points)	

Completed by
(Name, Title, Phone Number)

Scott Montgomery , Planner 1; 573-346-5692

Appendix D

Camden County Hazard Mitigation Plan Adopted

Resolutions 2020

Camden County

City of Camdenton

City of Osage Beach City of Lake Ozark

City of Linn Creek

City of Richland- resides in multiple Counties and has adopted the Laclede County Hazard Mitigation Plan

Village of Sunrise Beach

Village of Four Season

Camdenton R-III School District

Macks Creek School District

Climax Springs R-IV School District

Stoutland R-II School District

Camden County Multijurisdictional Hazard Mitigation Plan 2020

CAMDEN COUNTY, Missouri RESOLUTION NO.

A RESOLUTION OF CAMDEN COUNTY ADOPTING THE CAMDEN COUNTY MULTIJURISDICTIONAL HAZARD MITIGATION PLAN 2020

WHEREAS Camden County recognizes the threat that natural hazards pose to people and property within the county of Camden; and

WHEREAS Camden County has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Camden County Multijurisdictional Hazard Mitigation Plan 2020, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Camden County from the impacts of future hazards and disasters; and

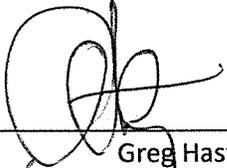
WHEREAS Camden County recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, Camden County will endeavor to integrate the *Plan* into the comprehensive planning process; and

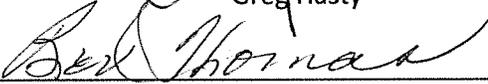
WHEREAS adoption by Camden County demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

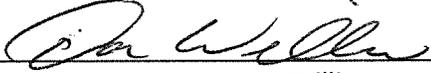
NOW THEREFORE, BE IT RESOLVED BY CAMDEN COUNTY, in the State of Missouri, THAT:

In accordance with the vote of the Camden County Commission, Camden County adopts the final *FEMA-approved Camden County Multijurisdictional Hazard Mitigation Plan 2020*

ADOPTED by a vote:

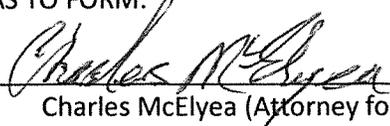
By Signature  _____
Greg Hasty

By Signature  _____
Bev Thomas

By Signature  _____
Don Williams

By Signature  _____
Rowland Todd

APPROVED AS TO FORM:

By Signature  _____
Charles McElyea (Attorney for Camden County)

Resolution 20-05

**RESOLUTION
Adopt Camden County Hazard Mitigation Plan**

WHEREAS, the City of Camdenton recognizes the threat that natural hazards pose to people and property within the City; and,

WHEREAS, the City of Camdenton has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as Camden County Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and,

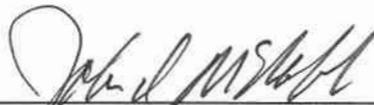
WHEREAS, the Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Camdenton from the impacts of future hazards and disasters; and,

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

WHEREAS, adoption by the City of Camdenton demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED by the Board of Alderman that the City of Camdenton adopts the final FEMA-approved Plan.

Adopted this 17 day of March 2020.



John D. McNabb, Mayor

ATTEST:



Renée Kingston, CMC/MPCC
Assistant City Administrator/City Clerk



Resolution

Camdenton R-III School District, Camdenton, Missouri

A RESOLUTION OF THE CAMDENTON R-III SCHOOL DISTRICT ADOPTING THE CAMDEN COUNTY HAZARD MITIGATION PLAN.

WHEREAS the Camdenton R-III School District recognizes the threat that natural hazards pose to people and property within the Camdenton R-III School District; and

WHEREAS the Camdenton R-III School District has participated in the preparation of a multijurisdictional local hazard mitigation plan, hereby known as the Camden County Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Camdenton R-III School District from the impacts of future hazards and disasters; and

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

WHEREAS adoption by the Camdenton R-III School District demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY THE CAMDENTON R-III SCHOOL DISTRICT, in the State of Missouri, THAT:

In accordance with local rules, the Camdenton R-III School District adopts the final FEMA-approved Plan.

ADOPTED by a vote of 7 in favor, 0 against, and 0 abstaining, this 9th day of March, 2020.

By  _____
Print Name _____

ATTEST:
By Linda Leu _____
Print Name Linda Leu _____

APPROVED AS TO FORM:
By _____
Print Name _____

CITY OF LAKE OZARK
A Missouri Municipality of the 4th Class

Resolution No. 2020R-06

***RESOLUTION ADOPTING
THE CAMDEN COUNTY HAZARD MITIGATION PLAN***

WHEREAS, the Camden County Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F.R. 201.6 and the Federal Disaster Mitigation Act of 2000; and,

WHEREAS, the City of Lake Ozark recognizes the threat that natural hazards pose to people and property within the City; and

WHEREAS, the City of Lake Ozark participated in the preparation of the Camden County Hazard Mitigation Plan that is attached hereto as Exhibit 1; and,

WHEREAS, the Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to the people and property in the City from the impacts of future hazards and disasters; and

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

WHEREAS, adoption by the City of Lake Ozark demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Plan.

WHEREAS, the citizens of the City of Lake Ozark have been afforded an opportunity to comment and provide input on the Plan and the mitigation actions therein; and,

WHEREAS, the City of Lake Ozark has reviewed the Plan and affirms that the Plan will be updated no less than every five (5) years.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF ALDERMEN OF THE CITY OF LAKE OZARK, MISSOURI AS FOLLOWS:

1. The City of Lake Ozark, Missouri adopts the Camden County Hazard Mitigation Plan attached hereto as Exhibit 1 as this jurisdiction's Hazard Mitigation Plan and resolves to work with Camden County Emergency Management to implement the Plan.

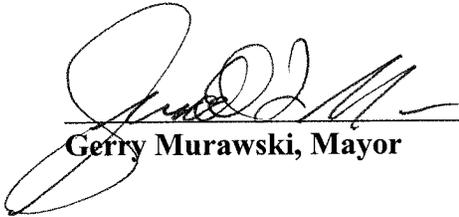
THIS RESOLUTION is hereby adopted by the City of Lake Ozark, Missouri on this 10th day of March 2020.

APPROVE:

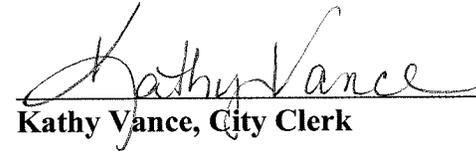
ATTEST:

MAYOR

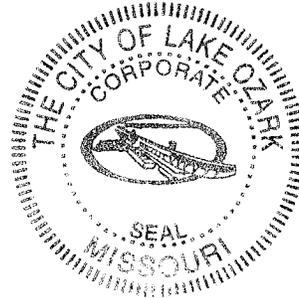
CITY CLERK



Gerry Murawski, Mayor



Kathy Vance, City Clerk



RESOLUTION NO. R20-004

**CITY OF LINN CREEK
RESOLUTION**

**RESOLUTION OF ADOPTION OF THE CAMDEN COUNTY HAZARD MITIGATION
PLAN BY THE CITY OF LINN CREEK, MISSOURI**

WHEREAS, the City of Linn Creek has deemed it important to adopt the Camden County Hazard Mitigation Plan as a means to work towards a safer community and the city has a limited capability to undertake the construction of a plan of this magnitude; and

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

WHEREAS, the City of Linn Creek has previously pursued measures such as roadway drainage; and

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

WHEREAS, by participating in the Natural Hazards Mitigation program, the City of Linn Creek will be eligible to apply for post-disaster mitigation funds; and

WHEREAS, the City of Linn Creek desires to commit to working with government partners and community partners to maintain and contribute to a local Natural Hazard Mitigation Plan; and

WHEREAS, the City of Linn Creek will implement pertinent precepts of the mitigation plan by incorporation into other community plans and mechanisms where appropriate; and

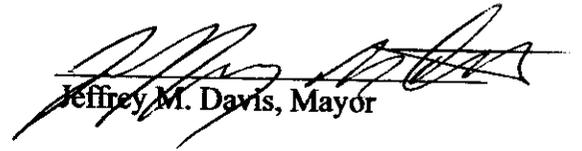
WHEREAS, all aspects pertaining to the City of Linn Creek, in the Camden County Multi-Jurisdictional Hazard Mitigation Plan attached hereto and incorporated by reference herein be approved; and

WHEREAS, the City of Linn Creek will evaluate and review the Plan regularly or after a disaster as well as participate in completing the mandated five-year update submitted to the State Emergency Management Agency and the Federal Emergency Management Agency for review; and

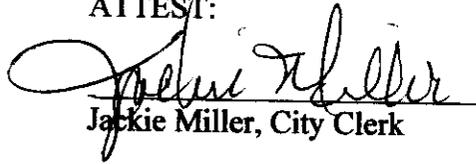
NOW, THEREFORE BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF LINN CREEK, MISSOURI AS FOLLOWS:

The City of Linn Creek will use its best efforts to become a safer community by participating in hazard identification and risk assessment to implement mitigation practices that can reduce vulnerability for residents and businesses.

THIS RESOLUTION PASSED AND APPROVED THIS 2nd DAY OF APRIL 2020.


Jeffrey M. Davis, Mayor

ATTEST:


Jackie Miller, City Clerk

Administrative Team

Josh Phillips, Ed.D.
Superintendent
Brad Kolwyck, Ph.D.
MS/HS Principal
Jori Phillips, Ed.D.
Elementary Principal

Macks Creek R-V School

245 State Road N
Macks Creek, Missouri 65786
Phone: (573) 363-5909
Fax: (573) 363-5981

**Inspiring Success: Every Child,
Every Chance, Every Day**

Board of Education

Michael Parrack, President
Byron Willis, Vice President
Stacy Trusty, Secretary
James Wehmeyer, Treasurer
Scott Gould
Cheri Nations
Sara Stoufer

Macks Creek R-V School District Resolution

A RESOLUTION OF THE MACKS CREEK R-V SCHOOL DISTRICT ADOPTING THE CAMDEN COUNTY HAZARD MITIGATION PLAN

WHEREAS the Macks Creek R-V School District recognizes the threat that natural hazards pose to people and property within the Macks Creek School District.

WHEREAS the Macks Creek School District has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Camden County Hazard Mitigation Plan hereafter referred to as the Plan, in accordance with the Disaster Mitigation Act of 2000; and

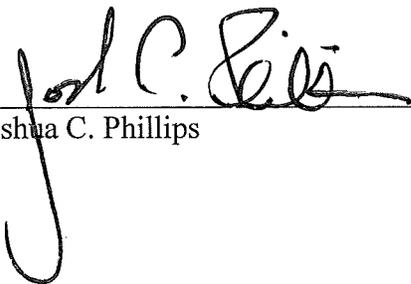
WHEREAS the Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Macks Creek R-V School District from the impacts of future hazards and disasters; and WHEREAS the Macks Creek School District recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the Macks Creek R-V School District will endeavor to integrate the Plan into the comprehensive planning process; and

WHEREAS adoption by the Macks Creek R-V School District demonstrates their commitment to hazard mitigation and achieving the goals outlined in the Plan.

NOW THEREFORE, BE IT RESOLVED BY THE Macks Creek R-V School District in the State of Missouri, THAT:

The Macks Creek R-V School District adopts the final FEMA-approved Plan.

ADOPTED this day of June 30, 2020 by the Superintendent of Schools.



Dr. Joshua C. Phillips

Mission Statement

Empowering life-long innovative learners to be responsible citizens: equipped for success in an ever-changing world.

RESOLUTION 2020-01

A RESOLUTION OF THE CITY OF OSAGE BEACH, MISSOURI ADOPTING THE CAMDEN COUNTY MULIT-JURISDICTIONAL HAZARD MITIGATION PLAN 2020.

WHEREAS the City of Osage Beach, Missouri recognizes the threat that natural hazards pose to people and property within the City of Osage Beach, Missouri; and

WHEREAS the City of Osage Beach, Missouri has participated in the preparation of the multi-jurisdictional local hazard mitigation plan, hereby known as the CAMDEN COUNTY MULIT-JURISDICTIONAL HAZARD MITIGATION PLAN 2020, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Osage Beach, Missouri for the impacts of future hazards and disasters; and

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

WHEREAS adoption by the City of Osage Beach, Missouri demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

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

The Board of Aldermen of the City of Osage Beach do hereby adopt the CAMDEN COUNTY MULIT-JURISDICTIONAL HAZARD MITIGATION PLAN 2020.

I hereby certify that the above Resolution 2020-01 was duly passed on March 17, 2020, by the Board of Aldermen of the City of Osage Beach. The votes thereon were as follows:

Ayes: 4

Nays: 0

Abstain: 0

Absent: 2

March 17, 2020

Date

Tara Berreth

Tara Berreth, City Clerk

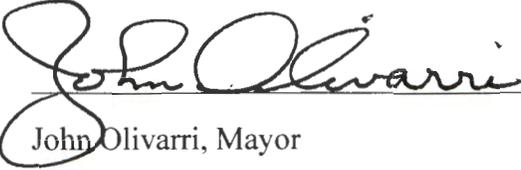
Approved as to form:

Edward B. Rucker

Edward B. Rucker, City Attorney

March 17, 2020

Date


John Olivarri, Mayor

ATTEST:


Tara Berreth, City Clerk

Stoutland R-II School District, Laclede County, Missouri, Missouri RESOLUTION NO. _____

A RESOLUTION OF THE STOUTLAND R-II SCHOOL DISTRICT, LACLEDE COUNTY, MISSOURI ADOPTING THE 2019 LACLEDE COUNTY HAZARD MITIGATION PLAN

WHEREAS the Stoutland R-II School District, Laclede County, Missouri recognizes the threat that natural hazards pose to people and property within the Stoutland R-II School District, Laclede County, Missouri; and

WHEREAS the Stoutland R-II School District, Laclede County, Missouri has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the 2019 Laclede County Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Stoutland R-II School District, Laclede County, Missouri from the impacts of future hazards and disasters; and

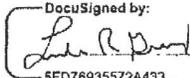
WHEREAS the Stoutland R-II School District, Laclede County, Missouri recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the Stoutland R-II School District, Laclede County, Missouri will endeavor to integrate the *Plan* into the comprehensive planning process; and

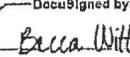
WHEREAS adoption by the Stoutland R-II School District, Laclede County, Missouri demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY THE STOUTLAND R-II SCHOOL DISTRICT, LACLEDE COUNTY, MISSOURI, in the State of Missouri, THAT:

In accordance with (local rule for adopting resolutions), the Stoutland R-II School District, Laclede County, Missouri adopts the final FEMA-approved *Plan*.

ADOPTED by a vote of 7 in favor and 0 against, and 0 abstaining, this day of March 19, 2020

By (Sig): 
Print name: LYLE GRAY

ATTEST:
By (Sig.): 
Print name: BECCA WITT

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

Model Resolution

Climax Springs School District Missouri RESOLUTION NO. _____

A RESOLUTION OF THE CLIMAX SPRING SCHOOL DISTRICT ADOPTING THE 2020 CAMDEN COUNTY HAZARD MITIGATION PLAN

WHEREAS the CLIMAX SPRING SCHOOL DISTRICT recognizes the threat that natural hazards pose to people and property within the CLIMAX SPRING SCHOOL DISTRICT and

WHEREAS the CLIMAX SPRING SCHOOL DISTRICT participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the (*plan name*), hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the CLIMAX SPRING SCHOOL DISTRICT from the impacts of future hazards and disasters; and

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

WHEREAS adoption by the CLIMAX SPRING SCHOOL DISTRICT demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY THE CLIMAX SPRING SCHOOL DISTRICT in the State of Missouri, THAT:

In accordance with (*local rule for adopting resolutions*), the CLIMAX SPRING SCHOOL DISTRICT adopts the final *FEMA-approved Plan*.

ADOPTED by a vote of ___ in favor and ___ against, and ___ abstaining, this day of August 19, 2020

By (Sig.): Caleb Pete
Print name: Caleb Pete

ATTEST:
By (Sig.): Caleb Pete
Print name: Caleb Pete

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

RESOLUTION NO: R20.01

A RESOLUTION OF THE VILLAGE OF FOUR SEASONS, MISSOURI ADOPTING THE CAMDEN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 2020.

WHEREAS, The Board of Trustees, Village of Four Seasons, Missouri recognizes the threat that natural hazards pose to people and property within The Village of Four Seasons, Missouri; and

WHEREAS, The Village of Four Seasons, Missouri has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the Camden County Multi-Jurisdictional Hazard Mitigation Plan 2020, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in The Village of Four Seasons, Missouri from the impacts of future hazards and disasters; and

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

WHEREAS adoption by The Board of Trustees, The Village of Four Seasons, Missouri demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW, THEREFORE, be it resolved by the Board of Trustees, Village of Four Seasons, Missouri, THAT:

In accordance with The Village of Four Seasons, Missouri, Code of Resolutions, The Board of Trustees, Village of Four Seasons, Missouri adopts the final *FEMA-approved Plan*.

Read two (2) times and passed this 11th day of March 2020.

ATTEST:


Shannon Sullivan, Village Clerk


Arnold Sandbothe, Chairman
Board of Trustees
Village of Four Seasons



City of Sunrise Beach

P.O. Box 348 • Sunrise Beach, Missouri 65079 • PH(573)374-8782 • FX(573)374-6456 • citysb@yahoo.com

Resolution of 2020-C

ADOPTION of the Camden County Hazard Mitigation Plan

WHEREAS, the City of Sunrise Beach has deemed it important to adopt the Camden County Hazard Mitigation Plan as a means to work towards a safer community and the city has a limited capability to undertake the construction of a plan of this magnitude; and

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

WHEREAS, the City of Sunrise Beach has previously pursued measures such as roadway drainage; and

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

WHEREAS, by participating in the Natural Hazards Mitigation program, the City of Sunrise Beach will be eligible to apply for post-disaster mitigation funds; and

WHEREAS, the City of Sunrise Beach desires to commit to working with government partners and community partners to maintain and contribute to a local Natural Hazard Mitigation Plan; and

WHEREAS, the City of Sunrise Beach will implement pertinent precepts of the mitigation plan by incorporation into other community plans and mechanisms where appropriate; and

WHEREAS, all aspects pertaining to the City of Sunrise Beach in the Camden County Multi-Jurisdictional Hazard Mitigation Plan attached hereto and incorporated by reference herein be approved; and

WHEREAS, the City of Sunrise Beach will evaluate and review the Plan regularly or after a disaster as well as participate completing the mandated five-year update submitted to the State Emergency Management Agency and the Federal Emergency Management Agency for review; and

NOW, THEREFORE BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF SUNRISE BEACH, MISSOURI AS FOLLOWS:

The City of Sunrise Beach will use its best efforts to become a safer community by participating in hazard identification and risk assessment to implement mitigation practices that can reduce vulnerability for residents and businesses.

ADOPTED this 9th day of March, 2020 at the Board meeting of the
City of Sunrise Beach, MO

Signed: Deborah K. Stoller Attest: Jeni Nelson
Deborah K Stoller , Chairman of the Board Jeni Nelson, City Clerk

