

# Cooper County Hazard Mitigation Plan 2022



The planning process for the update of the Cooper County Hazard Mitigation Plan was led by the Mid-Missouri Regional Plan Commission through a contractual agreement with the MO State Emergency Management Agency and Cooper County.

**Mid-Missouri Regional Planning Commission**  
206 East Broadway, P.O. Box 140  
Ashland, MO 65010  
Phone: (573) 657-9779  
Fax: (573) 657-2829



U.S. Department of Homeland Security  
FEMA Region VII  
11224 Holmes Road  
Kansas City, MO 64131



**FEMA**

January 27, 2022

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

Subject: Review of the Cooper 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. After the review or revisions are completed, the plan will need to be resubmitted for approval by FEMA 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 |
|---------------|------------------|------------------|-----------------------|-------------------------|---------------|
| Cooper County | January 10, 2021 | January 27, 2022 | October 28, 2021      | January 27, 2027        | Approved      |

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

Sincerely,

**CATHERINE R  
SANDERS**

Catherine R. Sanders, Director  
Mitigation Division

Digitally signed by CATHERINE R  
SANDERS  
Date: 2022.02.04 14:56:24 -06'00'

# Contributors

---

## Cooper county Hazard Mitigation Planning Committee

### Jurisdictional Representatives

| Name              | Title                             | Department | Jurisdiction/Agency<br>/Organization |
|-------------------|-----------------------------------|------------|--------------------------------------|
| Larry Oerly       | EMA Director                      | County EMA | Cooper County EMA                    |
| Ron McCord        | Deputy Director                   | County EMA | Cooper County EMA                    |
| David Gehm        | Chief                             | Fire       | Cooper County FPD                    |
| Mark Blankenship  | Fire Chief/School Board President | Admin      | Otterville FPD/R-6 School District   |
| Steve Gibson      | Chairman                          | Admin      | Windsor Place                        |
| Bobby Welliver    | Chief                             | Police     | Boonville Police                     |
| Richard Wilson    | Alderman                          | Admin      | Blackwater                           |
| Jeanne King       | Alderman                          | Admin      | Blackwater                           |
| Charlie Mckersman | Commissioner                      | Admin      | Cooper County Commission             |
| William Johnson   | Fireman                           | Fire       | Cooper County FPD                    |
| Kathryn Anderson  | Superintendent                    | Admin      | Cooper County R-IV                   |
| Gordon Shay       | Chief                             | Fire       | Pilot Grove FPD                      |
| John Fortman      | Director                          | Fire       | Pilot Grove FPD                      |
| Valarie Main      | City Clerk                        | Admin      | Otterville                           |
| Deborah Lake      | Mayor                             | Admin      | Otterville                           |
| Tom Loesing       | Fireman                           | Fire       | Prairie Home FPD                     |
| Tom Busk          | Personnel                         | County EMA | Cooper County EMA                    |
| Dennis Knipp      | Mayor                             | Admin      | Pilot Grove                          |
| Chris Class       | Sheriff                           | Sheriff    | Cooper County Sheriff                |
| Bethany Pfeiffer  | Director                          | Admin      | State Fair Community College         |
| Fred Smith        | Assistant Superintendent          | Admin      | Boonville R-I                        |
| Mary Sue Fontana  | City Clerk                        | Admin      | Prairie Home                         |
| Scott Gemes       | Superintendent                    | Admin      | Prairie Home R-V                     |
| Danny Larm        | Western District Commissioner     | Admin      | Cooper County Commission             |
| Don Baragary      | Presiding Commissioner            | Admin      | Cooper County Commission             |
| Chris Karr        | Engineer                          | Fire       | Boonville FPD                        |
| Ashley Groepper   | Superintendent                    | Admin      | Pilot Grove C-4                      |
| Tanya Brown       | Superintendent                    | Admin      | Blackwater R-II                      |
| Kelly Murphy      | Clerk                             | Admin      | Wooldridge                           |
| Kurt Heiss        | Mayor                             | Admin      | Wooldridge                           |
| Justin Hein       | Mayor                             | Admin      | Bunceton                             |
| Tim Doty          | Chief                             | Fire       | Blackwater FPD                       |
| Cindy Beltz       | Superintendent                    | Admin      | Otterville School District           |

### Stakeholder Representatives

| Name            | Title     | Department | Agency/Organization            |
|-----------------|-----------|------------|--------------------------------|
| Ron McCord      | Board     | Admin      | Harvest House Homeless shelter |
| Robert Alpers   | VP        | Admin      | O.W. Levee District            |
| Randon Leathers | President | Admin      | Cooper Co. PWSD #1             |
| Tom White       | Director  | Admin      | Cooper Co. Health Dep.         |

The Cooper County Hazard Mitigation Plan was developed by the communities and citizens of Cooper County, their elected officials, and public servants. The process was carried out by

identifying the natural hazards that impact Cooper County and its residents, assessing the probability of occurrence and severity posed by each hazard, identifying the most vulnerable areas, and evaluating all possible mitigation actions which might be effective. Potential mitigation actions were assessed and prioritized based on the perceived need, probable outcome, potential for being executed, and benefit related to cost.

# Table of Contents

---

**Executive Summary**.....1

## **Chapter 1: Introduction and Planning Process**

- 1.1 Purpose.....5
- 1.2 Background and Scope.....5
- 1.3 Plan Organization.....7
- 1.4 Planning Process.....8
  - 1.4.1 Multi- Jurisdictional Participation
  - 1.4.2 The Planning Steps

## **Chapter 2: Planning Area Profile**

- 2.1 Cooper County Planning Area Profile.....19
  - 2.1.1 Geography, Geology and Topography
  - 2.1.2 Current Land Use
  - 2.1.3 Climate
  - 2.1.4 Population/Demographics
  - 2.1.5 History
  - 2.1.6 Occupations
  - 2.1.7 Agriculture
  - 2.1.8 Hazard Mitigation Assistance Grants in Planning Area
  - 2.1.9 Public Assistance Grants in Planning Area
- 2.2 Jurisdictional Profiles and Mitigation Capabilities.....32
  - 2.2.1 Cooper County
  - 2.2.2 Blackwater
  - 2.2.3 Boonville
  - 2.2.4 Bunceton
  - 2.2.5 Otterville
  - 2.2.6 Pilot Grove
  - 2.2.7 Prairie Home
  - 2.2.8 Windsor Place
  - 2.2.9 Wooldridge
- 2.3 Other Special Districts and Organizations .....65
  - 2.3.1 Levee Districts
  - 2.3.2 Non-Governmental Organizations (NGOs)
  - 2.3.3 Fire Districts
- 2.4 Public School Profiles and Mitigation Capabilities.....68

- 2.4.1 Blackwater School District
- 2.4.2 Boonville School District
- 2.4.3 Cooper County R-IV
- 2.4.4 Otterville School District
- 2.4.5 Pilot Grove C-4
- 2.4.6 Prairie Home School District
- 2.5 Higher Education.....75
  - 2.5.1 State Fair Community College

**Chapter 3: Risk Assessment.**

- 3.1 Hazard Identification.....78
  - 3.1.1 Review of Existing Mitigation Plans
  - 3.1.2 Review Disaster Declaration History
  - 3.1.3 Research Additional Sources
  - 3.1.4 Hazards Identified
- 3.2 Assets At Risk.....82
  - 3.2.1 Total Exposure of Population and Structures
  - 3.2.2 Critical and Essential Facilities and Infrastructure
  - 3.2.3 Other Assets
- 3.3 Land Use and Development.....95
  - 3.3.1 Development Since Previous Plan Update
  - 3.3.2 Future Land Use and Development
- 3.4 Hazard Profiles, Vulnerability, and Problem Statements.....97
  - 3.4.1 Flood (Riverine and Flash)
  - 3.4.2 Levee Failure
  - 3.4.3 Dam Failure
  - 3.4.4 Earthquake
  - 3.4.5 Land Subsidence/Sinkholes
  - 3.4.6 Drought
  - 3.4.7 Extreme Temperatures
  - 3.4.8 Severe Thunderstorms (including Damaging Winds, Hail, and Lightning)
  - 3.4.9 Severe Winter Weather
  - 3.4.10 Tornado
  - 3.4.11 Wildfire

**Chapter 4: Mitigation Strategy**

- 4.1 Goals.....208
- 4.2 Identification and Analysis of Mitigation Actions.....208
- 4.3 Implementation of Mitigation Actions.....211

**Chapter 5: PLAN MAINTENANCE PROCESS**

- 5.1 Monitoring, Evaluating, and Updating the Plan.....300
  - 5.1.1 Responsibility for Plan Maintenance
  - 5.1.2 Plan Maintenance Schedule
  - 5.1.3 Plan Maintenance Process
- 5.2 Incorporation into Existing Mechanisms.....302
- 5.3 Continued Public Involvement.....304

Appendix A – Adoption Resolutions

Appendix B – Sign-in Sheets

## Executive Summary

---

Hazard mitigation focuses on anticipating and lowering risks to lives and property. Natural hazards are taking an increasing toll on lives and property in the United States. The number of FEMA declared Presidential Disasters across the nation has increased drastically over the past two decades. The year 2011 (when an EF-5 tornado devastated the Missouri town of Joplin) set a record with 242 disaster declarations. The cost of these disasters has also increased in recent years, in part because of increased population and a larger built environment but also because of the magnitude of many recent disasters. Hazard mitigation, the cornerstone of emergency management, seeks to address these issues.

Hazard mitigation can save lives and property; it also makes good economic sense. A 2005 study conducted by the National Institute of Building Science found that every dollar spent on mitigation activities saves four dollars in post-disaster recovery costs. Hazard mitigation is a good business practice for both the public and private sectors.

The Plan: The Cooper County Natural Hazard Mitigation Plan is a multi-jurisdictional plan prepared and written that covers the following jurisdictions that participated in the planning process:

- Unincorporated Cooper
- Blackwater
- Boonville
- Bunceton
- Otterville
- Pilot Grove
- Prairie Home
- Windsor Place
- Wooldridge
- Blackwater School District
- Boonville School District
- Otterville School District
- Prairie Home School District
- Cooper County R-IV
- State Fair Community College
- Blackwater Area Fire Protection District
- Cooper County Fire Protection District
- Otterville Fire Protection District
- Pilot Grove C-4
- Pilot Grove Fire Protection District

Those who were invited but chose not to participate or did not meet the established requirements for official participation are as follows:



- Boone County
- Howard County
- Moniteau County
- O.W. Levee District
- Cooper Co. PWSD #1
- Clifton
- California Rural FPD
- Clifton City FD
- Fortuna FPD
- Saline County Rural FPD
- Tipton FPD
- St Joseph School
- SS Peter & Paul School

The risk assessment (Chapter 3) profiles the natural hazards (dam failure, drought, earthquake, extreme temperatures, flood, levee failure, land subsidence/sinkhole, severe thunderstorm, severe winter weather, tornado, and wildfire) which threaten lives and/or property in some, or all, of the participating jurisdictions. All hazards were evaluated with regard to previous occurrence, probability and severity of future occurrence, existing mitigation strategies, and the potential impact on each jurisdiction.

2022 Mitigation Strategy: The current mitigation strategy, found in Chapter 4 of the plan, lays out a series of actions to be focused on during the coming five years. Each of the actions has been analyzed as to applicable jurisdiction(s), the agency or department which will lead the effort, and the means of implementing and financing the action. All of these decisions were made by jurisdictional representatives participating as members of the hazard mitigation planning committee.

The Cooper County Natural Hazard Mitigation Plan will be formally adopted by each of the participating jurisdictions before a final draft is approved by FEMA. Participation in, and formal adoption of, the plan qualifies a jurisdiction to apply for Federal Emergency Management Agency (FEMA) pre-disaster mitigation grants and the mitigation portion of post-disaster mitigation grants.

While it is to be hoped that many of the mitigation actions in the strategy will have been completed before the next five-year update, as required by FEMA, nothing in the plan is legally binding on the participating jurisdictions. It will be evaluated and maintained on an annual basis prior to this update.

The 2022 county-wide mitigation strategy is shown in its entirety below, organized by the five major mitigation goals.

- Goal 1: Mitigation Planning - Mitigate effects of future natural hazards through public and private cooperation.

- Goal 2: Mitigation Policy - Develop policies that limit the impact of natural hazards on lives and property.
- Goal 3: Mitigation Programs - Implement cost effective and feasible mitigation programs to protect lives and property of Cooper County jurisdictions.
- Goal 4: Public Awareness - Increase public awareness of natural hazards in order to make the public a greater partner in hazard mitigation planning.
- Goal 5: Future Development - Promote hazard-proof development in the jurisdictions of Cooper County.

**Planning Process:** A plan is only as good as the planning process which developed it. A thorough update of the plan was completed with the active participation of representatives from Cooper County jurisdictions and utility providers at regularly scheduled meetings over a six-month period. The draft plan was presented at 1 public meetings of the Cooper County Commission, and published on the website of the Mid-MO Regional Planning Commission, to allow for input from the general public.

The plan will be evaluated and maintained on a yearly basis with the help of the planning committee; the next complete update will be undertaken in five years.

The ultimate test of a plan is the action taken on the roadmap presented. It is to be hoped that many of the mitigation actions in this plan will have been completed before the next five-year update. Action on the strategy in this plan will help to ensure a greater, and more cost-effective, level of protection for the citizens and property of Cooper County and its jurisdictions.

The Cooper County Natural Hazard Mitigation Plan can be found online at:

<https://midmorpc.org/reports-library/hazard-mitigation-reports/>

### **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.**

The participating jurisdictions adopted the plan following FEMA’s “approval pending adoption”. Adoption resolutions and adoption letters (school districts and institutes of higher learning) are included in appendix A.

**Chapter 1: Introduction and Planning Process**

- 1.1 Purpose.....5
- 1.2 Background and Scope.....5
- 1.3 Plan Organization.....7
- 1.4 Planning Process.....8
  - 1.4.1 Multi- Jurisdictional Participation
  - 1.4.2 The Planning Steps

# Chapter 1: Introduction and Planning Process

---

## 1.1 Purpose

The Cooper County Hazard Mitigation Plan is designed as a resource for county and municipal governments, residents, developers, organizations, and others interested in controlling the potentially disastrous effects of natural hazards in Cooper County. Each year natural hazards take a great toll in the United States. Cooper County is not immune; it is subject to numerous natural hazards which can threaten life and property. A well-conceived mitigation strategy, developed through an inclusive and thoughtful planning process, is an important step in protecting citizens and reducing loss.

The Federal Emergency Management Agency (FEMA) defines mitigation as “sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects.” A 2018 study by the Institute for Building Science found that \$6 was saved in post-disaster response and recovery for every \$1 spent on pre-disaster mitigation. The process for declaring Presidential Disasters was established with the passage of the Disaster Relief Act of 1974. In 1988, the Robert T. Stafford Disaster Relief and Emergency Assistance Act created the organizational framework through which funds and assistance would be provided after a Presidential Disaster Declaration; FEMA was designated to coordinate the relief efforts.

The Cooper County Hazard Mitigation Plan was developed by the communities and citizens of Cooper County, their elected officials and public servants in accordance with FEMA’s Mitigation Planning regulations under Code of Federal Regulations (CFR), Title 44, Part 201.6, *Local Mitigation Plans*. Relevant requirements from CFR §201.6 are highlighted throughout the plan.

Multiple jurisdictions within Cooper County participated in the development of this plan. Having a current and approved hazard mitigation plan makes each of the participating jurisdictions eligible to apply for FEMA pre-disaster mitigation grants and the mitigation portion of post-disaster mitigation grants.

## 1.2 Background and Scope

In November 2003, a “current and approved” hazard mitigation plan became a FEMA eligibility requirement for local jurisdictions applying for pre-disaster mitigation grants and the mitigation portion of post-disaster grant funds. Due to this change in FEMA grant requirements, the Missouri State Emergency Management Agency (SEMA) contracted with the Missouri Council of Governments for the Regional Planning Commissions to direct hazard mitigation planning for interested counties within their respective regions. Cooper County, a member of the Mid-Missouri Regional Planning Commission (Mid-MO RPC), contracted with the Mid-MO RPC to facilitate the development of a hazard mitigation plan for the county.

The Cooper County Hazard Mitigation Plan 2017 was written to be a working document to guide participating jurisdictions in the county in mitigating potential natural hazards. To this effect, the

plan has been publicly available on the website of the Mid-MO RPC ([www.mmrpc.org](http://www.mmrpc.org)) since it was approved and adopted in 2017.

The maintenance plan in the 2017 document calls for an annual monitoring and review of the plan to be facilitated by the Mid-MO RPC. This monitoring and review was carried out in 2021. Representatives from each of the participating jurisdictions and other interested parties were contacted by email to attend a plan monitoring meeting. seventeen representatives attended the meeting; discussion centered around funding and the need for participation in the Hazard Mitigation Planning process.

Prior to the meeting, a survey was sent out to all participating jurisdictions requesting an update of any progress on the mitigation strategy outlined in the 2017 plan and any other changes in their jurisdiction; response was received from Seven communities.

The jurisdictions participating in the 2022 plan update include:

- Cooper Co
- Blackwater
- Boonville
- Bunceton
- Otterville
- Pilot Grove
- Prairie Home
- Windsor Place
- Wooldridge
- Blackwater School District
- Boonville School District
- Cooper Co. R-IV
- Otterville School District
- Pilot Grove C-4
- Prairie Home School District
- State Fair Community College
- Blackwater Area FPD
- Cooper Co. FPD
- Otterville FPD
- Pilot Grove FPD

The jurisdiction/stakeholders who were invited but did not participate:

- Howard County
- Boone County
- Moniteau County
- O.W. Levee District
- Cooper Co. PWSD #1
- Clifton California Rural FPD
- Clifton City FPD
- Fortuna Fire
- Saline County Rural FPD
- Tipton FPD

- St Joseph School
- SS Peter & Paul School

All jurisdiction who participated in the 2017 update chose to participate in the 2022 update. The Cooper County R-IV School District and State Fair Community College did not participate in the 2017 update but chose to participate in the 2022 update. The Fire Districts previously participated under the county but some chose to participate individually for this update.

Jurisdictions received email notifications of upcoming meetings and their corresponding agendas, along with any “homework” in the form of questionnaires or surveys. Meeting notices were also posted on the RPC website, meeting information was put on the RPC calendar that is emailed to the 6 county RPC region, as well as notices posted to the RPC Facebook page. Phone calls were also made by the planner and the County Office of Emergency Management to encourage participation.

### 1.3 Plan Organization

The plan is formatted into 5 Chapters with several sub-sections per section. The 2017 plan contained 6 sections. Planning Area Overview and Planning Area Assets and Capabilities were originally separate sections. For this plan the two sections were combined to match the updated outline for the local hazard mitigation plan released by the Missouri State Emergency Management Agency (SEMA) in 2017. The adjusted plan sections include:

- Chapter 1: Introduction and the Planning Process
- Chapter 2: Planning Area Overview, Assets, 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**

| <b>Plan Section</b>                                       | <b>Summary of Updates</b>  |
|---|--|
| <b>Chapter 1 – Introduction and Planning Process</b>      | Updated members of the Mitigation Planning Committee (MPC)<br>Updated chapter format           |
| <b>Chapter 2 – Planning Area Profile and Capabilities</b> | Updated chapter format   |
| <b>Chapter 3 – Risk Assessment</b>                        | Combined Extreme Heat and cold into one hazard: extreme temperatures<br>Updated chapter format |
| <b>Chapter 4 – Mitigation Strategy</b>                    | Updated chapter format<br>Changed action worksheet layout/info                                 |
| <b>Chapter 5 – Plan Implementation and Maintenance</b>    | Updated chapter format   |

|   |
|---|
| Added planning mechanisms for hazard mitigation |
|---|

## 1.4 Planning Process

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

A Hazard Mitigation Plan must be updated and adopted by the participating jurisdictions every five years to be considered current. The update of the Cooper County Hazard Mitigation Plan was directed by the emergency management planner from Mid-MO RPC (Melissa Stafford) as specified in a Memorandum of Agreement (MOA) with the Missouri State Emergency Management Agency (SEMA). The roll of Mid-MO RPC in the planning process is to:

- Assist in establishing a Mitigation Planning Committee (MPC) as defined by the Disaster Mitigation Act (DMA),
- Organize Planning Committee Meetings locations and times
- Ensure the updated plan meets the DMA requirements as established by federal regulations and follows the most current planning guidance of the Federal Emergency Management Agency (FEMA),
- Facilitate the entire plan development process,
- Identify the data that MPC participants could provide and conduct the research and documentation necessary to augment that data,
- Assist in soliciting public input,
- Produce the draft and final plan update in a FEMA-approvable document and coordinate the Missouri State Emergency Management Agency (SEMA) and (FEMA) plan reviews.

The update process consisted of 4 planning committee meetings over the update period. Meeting announcements and sign-in sheets are included in Appendix A and B.

All hazard mitigation planning meetings were open to the public and public notice was provided in accordance with Missouri’s “Sunshine Law” (Revised Statutes of Missouri 610.010, 610.020, 610.023, and 610.024.) Notice of each meeting was posted at the Mid-MO RPC in Ashland, and on the website of the Mid-MO RPC ([www.mmrpc.org](http://www.mmrpc.org)). No public comment was received.

**Table 1.2 Jurisdictional Representatives of Cooper County Mitigation Planning Committee**

| Name             | Title                             | Department | Jurisdiction/Agency<br>/Organization |
|------------------|-----------------------------------|------------|--------------------------------------|
| Larry Oerly      | EMA Director                      | County EMA | Cooper County EMA                    |
| Ron McCord       | Deputy Director                   | County EMA | Cooper County EMA                    |
| David Gehm       | Chief                             | Fire       | Cooper County FPD                    |
| Mark Blankenship | Fire Chief/School Board President | Admin      | Otterville FPD/R-6 School District   |
| Steve Gibson     | Chairman                          | Admin      | Windsor Place                        |
| Bobby Welliver   | Chief                             | Police     | Boonville Police                     |

|                    |                               |            |                              |
|--------------------|-------------------------------|------------|------------------------------|
| Richard Wilson     | Alderman                      | Admin      | Blackwater                   |
| Jeanne King        | Alderman                      | Admin      | Blackwater                   |
| Charlie Melkersman | Commissioner                  | Admin      | Cooper County Commission     |
| William Johnson    | Fireman                       | Fire       | Cooper County FPD            |
| Kathryn Anderson   | Superintendent                | Admin      | Cooper County R-IV           |
| Gordon Shay        | Chief                         | Fire       | Pilot Grove FPD              |
| John Fortman       | Director                      | Fire       | Pilot Grove FPD              |
| Valarie Main       | City Clerk                    | Admin      | Otterville                   |
| Deborah Lake       | Mayor                         | Admin      | Otterville                   |
| Tom Loesing        | Fireman                       | Fire       | Prairie Home FPD             |
| Tom Busk           | Personnel                     | County EMA | Cooper County EMA            |
| Dennis Knipp       | Mayor                         | Admin      | Pilot Grove                  |
| Chris Class        | Sheriff                       | Sheriff    | Cooper County Sheriff        |
| Bethany Pfeiffer   | Director                      | Admin      | State Fair Community College |
| Fred Smith         | Assistant Superintendent      | Admin      | Boonville R-I                |
| Mary Sue Fontana   | City Clerk                    | Admin      | Prairie Home                 |
| Scott Gemes        | Superintendent                | Admin      | Prairie Home R-V             |
| Danny Larm         | Western District Commissioner | Admin      | Cooper County Commission     |
| Don Baragary       | Presiding Commissioner        | Admin      | Cooper County Commission     |
| Chris Karr         | Engineer                      | Fire       | Boonville FPD                |
| Ashley Groepper    | Superintendent                | Admin      | Pilot Grove C-4              |
| Tanya Brown        | Superintendent                | Admin      | Blackwater R-II              |
| Kelly Murphy       | Clerk                         | Admin      | Wooldridge                   |
| Kurt Heiss         | Mayor                         | Admin      | Wooldridge                   |
| Justin Hein        | Mayor                         | Admin      | Bunceton                     |
| Tim Doty           | Chief                         | Fire       | Blackwater FPD               |
| Cindy Beltz        | Superintendent                | Admin      | Otterville School District   |

**Table 1.3 Stakeholder Representatives**

| Name            | Title     | Department | Agency/Organization            |
|-----------------|-----------|------------|--------------------------------|
| Ron McCord      | Board     | Admin      | Harvest House Homeless shelter |
| Robert Alpers   | VP        | Admin      | O.W. Levee District            |
| Randon Leathers | President | Admin      | Cooper Co. PWSD #1             |
| Tom White       | Director  | Admin      | Cooper Co. Health Dep.         |

**Table 1.4 MPC Capability with Six Mitigation Categories**

| Community Department/Office | Prevention | Structure and Infrastructure Projects |                                   | Natural Systems Protection | Education and Awareness Programs | Emergency Services |
|-----------------------------|------------|---------------------------------------|-----------------------------------|----------------------------|----------------------------------|--------------------|
|                             |            | Property Protection                   | Structural Flood Control Projects |                            |                                  |                    |
| Cooper County EOC           | X          |                                       |                                   |                            | X                                | X                  |
| Blackwater                  | X          | X                                     | X                                 |                            | X                                | X                  |
| Boonville                   | X          | X                                     | X                                 |                            | X                                | X                  |
| Bunceton                    | X          | X                                     | X                                 |                            | X                                | X                  |
| Otterville                  | X          | X                                     | X                                 |                            | X                                | X                  |
| Pilot Grove                 | X          | X                                     | X                                 |                            | X                                | X                  |
| Prairie Home                | X          | X                                     | X                                 |                            | X                                | X                  |



|                 |   |   |   |   |   |   |
|-----------------|---|---|---|---|---|---|
| Windsor Place   | X | X | X |   | X | X |
| Wooldridge      | X | X | X |   | X | X |
| Blackwater SD   | X |   |   |   | X |   |
| Boonville SD    | X |   |   |   | X |   |
| Cooper Co. SD   | X |   |   |   | X |   |
| Otterville SD   | X |   |   |   | X |   |
| Pilot Grove SD  | X |   |   |   | X |   |
| Prairie Home SD | X |   |   |   | X |   |
| State Fair CC   | X |   |   |   | X | X |
| Blackwater FPD  | X |   |   | X | X | X |
| Cooper Co. FPD  | X |   |   | X | X | X |
| Otterville FPD  | X |   |   | X | X | X |
| Pilot Grove FPD | X |   |   | X | X | X |

### 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.**

Multiple jurisdictions within Cooper County participated in the development of this plan. Having a current and approved hazard mitigation plan is a prerequisite for participating jurisdictions to be eligible to apply for FEMA pre-disaster mitigation grants and the mitigation portion of post disaster mitigation grants. Invitations to participate in the development of the plan were sent to commissioners, incorporated community leaders, public schools and colleges, special districts, and various other stakeholders multiple times throughout the update to encourage participation in some manner. Each jurisdiction who participated will have to adopt the updated plan.

- Participation in at least one meeting was required via in person or phone (group/individual meeting). Meeting participation could be in-person or by proxy.
- Each participating jurisdiction must provide sufficient information to support plan development by completion and return of surveys.
- For plan updates, eliminate from further consideration those actions from the previously approved plan that were not implemented because they were impractical, inappropriate, not cost-effective, or were otherwise not feasible.
- Review and comment on plan drafts
- Provide documentation to show time donated to the planning effort

- All participants should formally adopt the mitigation plan prior to submittal to SEMA and FEMA for final approval.

**Table 1.5 Jurisdictional Participation in Planning Process**

| Jurisdiction                     | Kick-off Meeting | Meeting #2 | Meeting #3 | individual meeting | Data Collection Questionnaire Response | Update/Develop Mitigation Actions |
|----------------------------------|------------------|------------|------------|--------------------|--|-----------------------------------|
| Cooper County                    | X                | X          |            |                    | X                                      | X                                 |
| Blackwater                       | X                | X          |            |                    | X                                      | X                                 |
| Boonville                        | X                | X          |            |                    | X                                      | X                                 |
| Bunceton                         |                  | X          |            | x                  | X                                      | X                                 |
| Otterville                       | X                | X          |            |                    | X                                      | X                                 |
| Pilot Grove                      | X                | X          |            |                    | X                                      | X                                 |
| Prairie Home                     | X                | X          |            |                    | X                                      | X                                 |
| Windsor Place                    | X                |            |            |                    | x                                      | x                                 |
| Wooldridge                       |                  |            |            | x                  | X                                      | X                                 |
| Blackwater R-2 School District   |                  |            |            | x                  | X                                      | X                                 |
| Boonville R-1 School District    | X                | X          |            | x                  | X                                      |                                   |
| Cooper Co R-4 School District    | X                | X          |            | x                  | X                                      | X                                 |
| Prairie Home R-5 school district | X                | X          |            | x                  | X                                      | X                                 |
| Otterville R-6 School District   | X                | X          |            |                    | X                                      | X                                 |
| Pilot Grove C-4 school district  |                  | X          |            | x                  | X                                      | X                                 |
| State Fair Community College     | X                |            | x          | x                  | X                                      | X                                 |
| Blackwater FPD                   |                  |            |            | x                  | x                                      | X                                 |
| Cooper Co FPD                    | X                | X          |            |                    | X                                      | X                                 |
| Otterville FPD                   | X                | X          |            |                    | X                                      |                                   |
| O.W. Levee District              | X                |            |            |                    |  |                                   |
| Cooper CPWSD #1                  | X                |            |            |                    |  |                                   |
| Pilot Grove FPD                  | X                | X          |            |                    | X                                      | X                                 |

### 1.4.2 The Planning Steps

Surveys and questionnaires were important in getting first-hand information from jurisdictions. One-on-one time, public meetings, and many emails produced a wealth of information taken into the plan.

Development of the plan followed the 10-step planning process adapted from FEMA’s Community Rating System (CRS) and Flood Mitigation Assistance programs. The 10-step process allows the plan to meet funding eligibility requirements of the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program as well as qualify for points under Activity 510 for Mitigation Plans, under the Community Rating System.

**Table 1.6 County Mitigation Plan Update Process**

| <b>Community Rating System (CRS) Planning Steps (Activity 510)</b> | <b>Local Mitigation Planning Handbook Tasks (44 CFR Part 201)</b>  |
|--|--|
| 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<br>44 CFR 201.6(b)(1)  |
| Step 3. Coordinate   | Task 4: Review Community Capabilities<br>44 CFR 201.6(b)(2) & (3)  |
| Step 4. Assess the hazard  | Task 5: Conduct a Risk Assessment<br>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<br>44 CFR 201.6(c)(3)(i); 44 CFR 201.6(c)(3)(ii); and<br>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<br>44 CFR 201.6(c)(4)  |

**Step 1. Organize**

Contact lists were made for past participating jurisdictions as well as neighboring communities to Cooper, and email notices were directly sent out to all jurisdictions and special districts in Cooper County making sure to update contacts for positions who may have changed personnel. The notice consisted of a meeting announcement and short summary of what the meeting would be covering and its importance.

A kick-off meeting was hosted August 11, 2021 at Cooper County Fire District building in Boonville with teleconferencing available. The foundation topic of this meeting was to outline the process of the hazard mitigation plan update and its importance. Surveys were passed out to each jurisdiction in attendance to identify what data the participants could provide. This meeting also served as an introduction to the types of hazards that would be included in the plan. Those in attendance were asked to sign in. Documentation can be found in the following appendices. They were instructed to either email the finished surveys to the lead planner or they had the option to return them in person at the next scheduled meeting. The date for the next meeting was set before everyone left the current meeting.

Meeting 2 took place on September 8, 2021 at the Cooper County Fire District building in Boonville with teleconferencing available. Anyone who wasn't at the first meeting was given a survey to fill out for their jurisdiction. Anyone done with their survey had the opportunity to turn it in if they had not emailed it prior to the meeting. Goals of the plan were sent out and discussed. Any suggested updates were instructed to be brought forth by the next meeting. Mitigation actions were reviewed and attendees instructed to update their list by the next meeting.

Meeting 3 took place September 22, 2021 at the Cooper County Fire District building in Boonville with teleconferencing available. New mitigation action items were discussed and questions answered. Plan Goals were reviewed and finalized. Discussion on pandemic and gaps were noted.

Meeting 4 took place October 27, 2021 at the Cooper County Fire District building in Boonville to go over the plan draft and discuss any needed additions or corrections. Jurisdictions were pressed on the importance to pass their resolutions adopting the plan so that it can go to SEMA for review in a timely manner.

**Table 1.7: Schedule of MPC Meetings**

| Meeting          | Topic  | Date       |
|------------------|--|------------|
| Kick-Off Meeting | <ul style="list-style-type: none"> <li>• Importance of Hazard Mitigation Planning</li> <li>• Why the Plan needs updated and what is included</li> <li>• Planning process</li> <li>• How to Participate</li> <li>• Handed out questionnaires</li> </ul> | 8/11/2021  |
| Meeting #2       | <ul style="list-style-type: none"> <li>• Return questionnaires</li> <li>• Discussed questions about the questionnaire</li> <li>• Discussed Risk Assessments</li> <li>• Reviewed Previous Action Items</li> </ul>                                       | 9/8/2021   |
| Meeting #3       | <ul style="list-style-type: none"> <li>• New Mitigation Actions</li> <li>• Goal Finalizing</li> </ul>  | 9/22/2021  |
| Meeting #4       | <ul style="list-style-type: none"> <li>• Draft Review</li> <li>• Address corrections/additions</li> </ul>  | 10/27/2021 |

## Step 2. 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.**

Each of the 4 meetings of the MPC were open to the public. It was advertised through the Mid-MO RPC (www.mmrpc.org) website, posted at the office, and included on the RPC Facebook page. The draft is available at the Mid-MO RPC website for anyone to review. Comments can be taken through email, phone, or in-person at the office. Individual invites and meeting notices were emailed to each jurisdiction for participation. Jurisdictions that did not show up or return email contact after the second meeting were called directly and educated on the importance of their participation. Anyone who did not come in-person to a meeting was emailed a survey to fill out for their jurisdiction. No public comments were received during the planning process. The needs and concerns of the public were considered based on the feedback given by jurisdictional representatives and their knowledge and interaction with the public outside the planning process.

### Step 3. Coordinate

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

Participants from all incorporated cities, towns, and villages were invited to every meeting, along with all school districts and colleges. Other invitees were emergency response agencies, county offices, etc. Once a draft of the plan was complete it was posted to the Mid-MO RPC website for review by all interested parties. Invitations were sent by email and notices were published to the RPC Facebook page and a calendar with meetings shared via email to jurisdictions and stakeholders throughout the 6 county RPC region.

**Table 1.8: Invited Stakeholders**

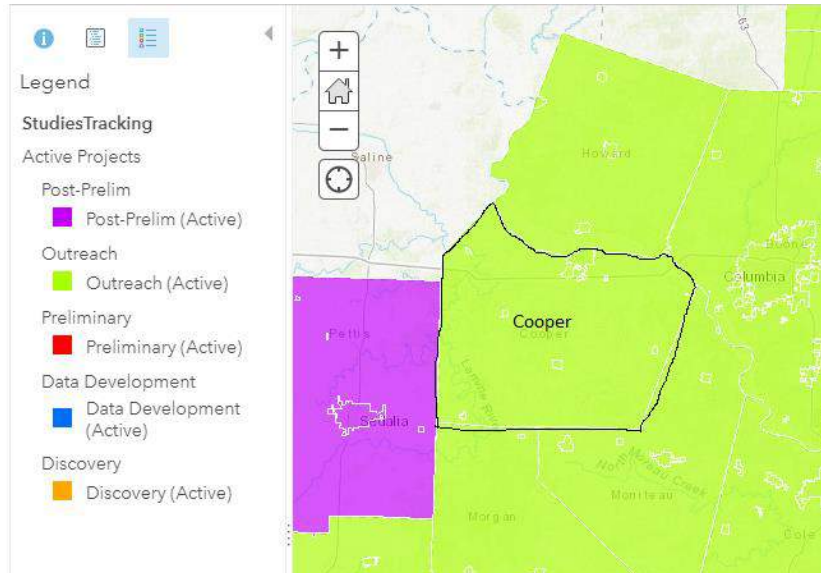
| Stakeholder/Jurisdiction        | Position/Department    |
|---------------------------------|------------------------|
| O.W. Levee District             | Board                  |
| Linneman-Weekley Levee District | Board                  |
| Cooper Co. PWSD #1              | Board                  |
| Howard County                   | Presiding Commissioner |
| Moniteau County                 | Presiding Commissioner |
| Boone County                    | Presiding Commissioner |
| Clifton                         | Mayor                  |
| California Rural FPD            | Chief                  |
| Clifton City FPD                | Chief                  |
| Fortuna FPD                     | Chief                  |
| Saline County Rural FPD         | Chief                  |
| Tipton FPD                      | Chief                  |

|                        |                |
|------------------------|----------------|
| St Joseph School       | Superintendent |
| SS Peter & Paul School | Superintendent |

### Coordination with FEMA Risk MAP Project

Figure 1.1 shows the status of Risk Mapping in Cooper County. The northern boundary of Cooper County is edged by the Missouri River which is prone to flooding. The risks of this will be more clearly defined in Section 3: Risk Assessment.

Figure 1.1 FEMA Risk Studies Tracker



Source: FEMA Mapping Information Studies Tracker

### Integration of other data, reports, studies, and plans

Many existing plans, studies, and reports were consulted in the development of this plan. These include:

- *Atlas of Missouri Ecoregions*, Missouri Department of Conservation
- *Comprehensive Economic Development Strategy for the Mid-MO Region (2018)*, Mid-MO Regional Planning Commission
- *Missouri State Hazard Mitigation Plan (2018)*, Missouri State Emergency Management Agency (SEMA)
- *Missouri Weather Patterns and Their Impact on Agriculture*, Grant L. Darkow, University Extension, University of Missouri-Columbia
- *National Climate Assessment 2014*, U.S. Global Change Research Program (GlobalChange.gov)
- *Regional Transportation Plan (2016)*, Mid-MO Regional Planning Commission
- Situation Reports (online), Missouri SEMA
- *Flood Insurance Rate Maps (FIRMs)*
- *State Department of Natural Resources (DNR) dam information*
- *The National Inventory of Dams*

- *United States Department of Agriculture – Census of Agriculture*
- *Corp of Engineers – National Levee Database*
- *Commodity Flow Study 2019*
- *Employment Wage Study 2020*

#### **Step 4: Assess the Hazard**

Risk Assessment surveys were compiled and discussed. The risk of hazards were based on previous disasters, hazards that were identified in the State Hazard Mitigation Plan, and hazards from the previously approved hazard mitigation plan. Hazards were prioritized by their likelihood and severity of impacts by each jurisdiction, then totaled to rate each hazard on a whole. Additional details about the individual hazards can be found in the chapter on Risk Assessment.

#### **Step 5: Assess the Problem**

Assets for each jurisdiction were identified through the use of HAZUS, the data questionnaire, and Census. Losses were estimated by utilizing the HAZUS database and the 2018 State Hazard Mitigation Plan when needed.

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

The goals set in the previous plan update were carried over for this plan. It was felt that the current set of goals were still relevant and necessary, when the Mitigation Actions List was discussed and updated. Those goals summarized are:

- Goal 1: Mitigation Planning - Mitigate the effects of future natural hazards throughout the County through public and private cooperation.
- Goal 2: Mitigation Policy - Develop policies that limit the impact of natural hazards on lives and property.
- Goal 3: Mitigation Programs: Implement cost effective and feasible mitigation programs to protect lives and property of Cooper County jurisdictions.
- Goal 4: Public Awareness - Increase public awareness of natural hazards in order to make the public a greater partner in hazard mitigation planning.
- Goal 5: Future Development - Promote hazard-proof development in the jurisdictions of Cooper County.

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

Mitigation Actions were discussed. Each action from the last update was reviewed and updated individually by the MPC. A link to the FEMA publication *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards* was provided prior to first meeting with the questionnaire to give everyone projects to think about for their jurisdiction. A focus for the MPC was the addition of safe rooms in schools and public places and additional sirens that may be needed to the Mitigation Action Plan across the county.

**Step 8: Draft an Action Plan**

Based on the response from the final MPC meeting an Action Plan was formed from any on-going and remaining actions identified as well as actions added to the list. Possible grant opportunities to assist in achieving the set goals and actions were also discussed at throughout the meetings. On-going efforts and mitigation achievements through projects and policy is a priority for stakeholders.

**Step 9: Adopt the Plan**

Throughout the whole update process it was reiterated in word and text that in order for participation in the plan to count a jurisdiction must participate by attending at least one meeting or returning the survey/questionnaire, and lastly by signing an adoption resolution of the plan that can be included in the draft to SEMA.

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

Plan implementation was discussed at the final meeting while discussing grant and partnership opportunities to move the actions on the mitigation list along. Future revisions will be discussed in more detail one-on-one with the participating jurisdictions. Further details regarding implementation, monitoring and maintenance can be found in chapter 5, Plan Maintenance Process.



## Chapter 2: Planning Area Profile

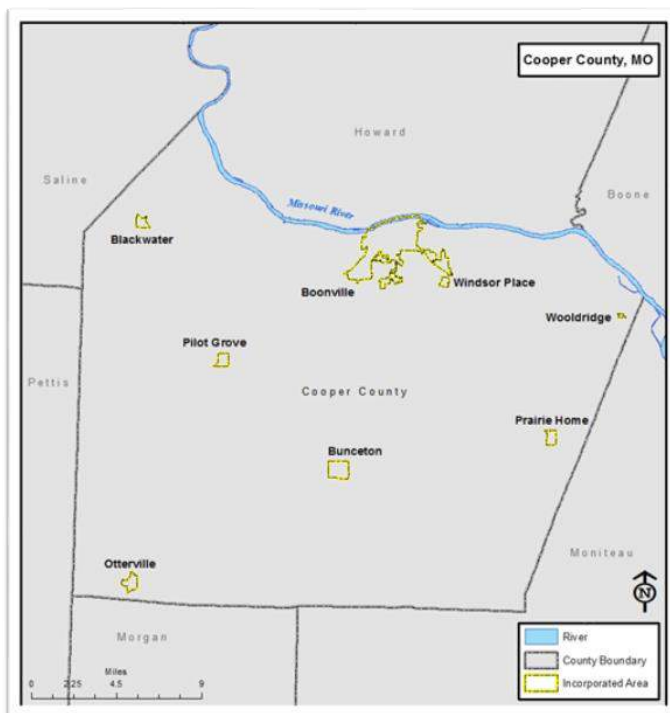
- 2.1 Cooper County Planning Area Profile.....19
  - 2.1.1 Geography, Geology and Topography
  - 2.1.2 Current Land Use
  - 2.1.3 Climate
  - 2.1.4 Population/Demographics
  - 2.1.5 History
  - 2.1.6 Occupations
  - 2.1.7 Agriculture
  - 2.1.8 Hazard Mitigation Assistance Grants in Planning Area
  - 2.1.9 Public Assistance Grants in Planning Area
  
- 2.2 Jurisdictional Profiles and Mitigation Capabilities.....32
  - 2.2.1 Cooper County
  - 2.2.2 Blackwater
  - 2.2.3 Boonville
  - 2.2.4 Bunceton
  - 2.2.5 Otterville
  - 2.2.6 Pilot Grove
  - 2.2.7 Prairie Home
  - 2.2.8 Windsor Place
  - 2.2.9 Wooldridge
  
- 2.3 Other Special Districts and Organizations .....65
  - 2.3.1 Levee Districts
  - 2.3.2 Non-Governmental Organizations (NGO's)
  - 2.3.3 Fire Protection Districts
  
- 2.4 Public School Profiles and Mitigation Capabilities.....68
  - 2.4.1 Blackwater School District
  - 2.4.2 Boonville School District
  - 2.4.3 Cooper Co. R-IV
  - 2.4.4 Otterville School District
  - 2.4.5 Pilot Grove C-4
  - 2.4.6 Prairie Home School District
  
- 2.5 Higher Education.....75
  - 2.5.1 State Fair Community College

# Chapter 2: Planning Area Profile

## 2.1 Cooper County Planning Area Profile

Cooper County is located in central Missouri with an area covering 570 square miles. It is approximately midway between Kansas City to the west and St. Louis to the east. The county is bordered on the north by the Missouri River, which separates it from Boone and Howard counties, on the west by Saline and Pettis counties, on the southwest by Morgan County, and on the south and southeast by Moniteau County.

Map 2.1



The 2020 Census indicated an overall population decrease in Cooper County of 2.8% with an overall increase in housing units. The strongest growth was in Windsor Place which saw over 9% increase in population and housing.

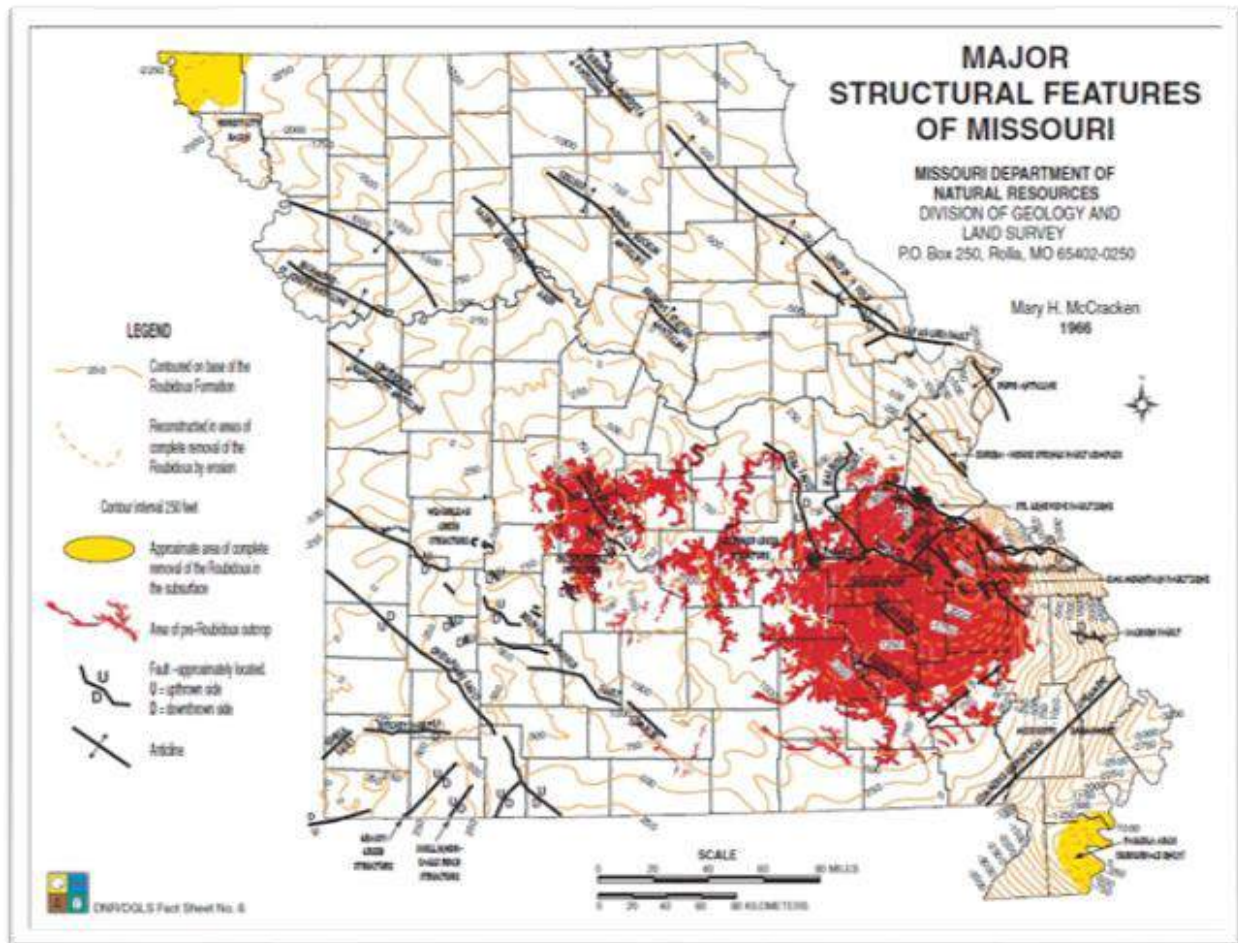
2019 ACS estimates that the median household income for Cooper County to be \$27,894 which is considerably lower than the state median household income of only \$51,542, but is behind the National average of \$68,703.

Median home prices in Cooper County are estimated around \$137,800 still fall short of the state median of \$185,247 and the national price of \$239,100.

### 2.1.1 Geography, Geology, and Topography

Geologically, a part of Cooper County has been shaped by the Ozark uplift in the southeastern part of the state. This geology has implications for the hazards analyzed in this plan. Of particular concern is possible activity in the New Madrid Seismic Zone to the southeast.

Map 2.2



The county is located in the northern part of the Ozark Highlands. The *Atlas of Missouri Ecoregions*, published by the Missouri Department of Conservation, describes the Ozark Highlands as:

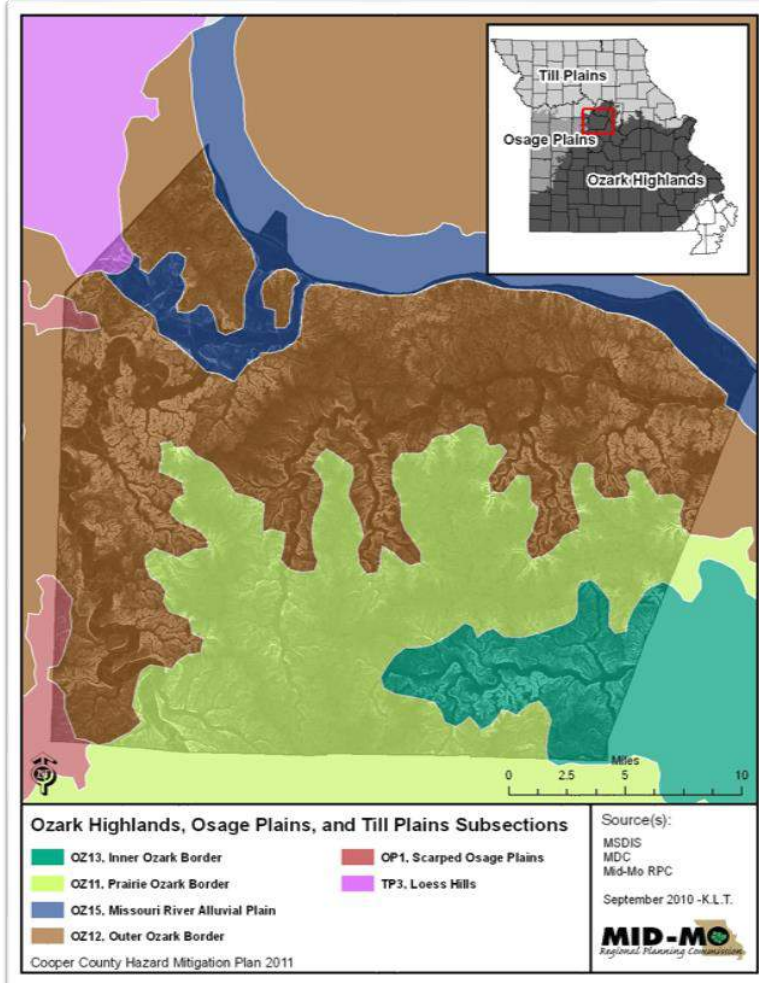
“A distinctive biogeographic region that includes most of southern Missouri and much of northern Arkansas and small parts of Illinois, Oklahoma, and Kansas. Geologically, the Ozark Highlands is a low structural dome of essentially horizontally bedded strata that has been undergoing erosion and weathering for a quarter billion years into a thoroughly dissected plateau.”

The Ozark Highlands is very diverse biologically and geographically with rugged hills, prairies, savannas, and open woodlands. The predominant underlying bedrock is carbonate (limestone and dolomite), giving rise to karst topographic features such as caves, underground streams, and sinkholes. Natural springs provide an abundance of fresh water in many areas.

The land area of Cooper County falls mainly into four different subsections of the Ozark Highlands. These subsections are distinguished by differing landforms, soils, and vegetation

(see Figure 2.1.1). In turn, these subsections give rise to differences in land use patterns, conservation needs, and vulnerability to certain natural hazards. In addition to the dominant Ozark Highlands Ecoregion, a small amount of land area in the southeastern and northeastern portion of the county falls into subsections of the Central Dissected Till Plains Ecoregion and the Osage Plains Ecoregion.

Map 2.3



The following information summarized from the *Atlas of Missouri Ecoregions* gives brief descriptions of the land types found within the Ozark Highlands subsections in Cooper County.

**Inner Ozark Border**

This subsection constitutes a small portion of the southwestern corner of the county around the Moniteau River. It consists of dissected plains and hills with local reliefs averaging 100-150 feet. Historically, the area was largely oak savanna, woodland, and forest with frequent glades and small prairie openings. Currently, the area consists of row crops, pasture, second growth forests, and overgrown glades.

**Prairie Ozark Border**

This subsection extends from the south and into the central part of Cooper County. This subsection is a high, smooth plain with less than 100 feet of local relief. The

underlying strata are limestone and dolomite and the area is blanketed with loess. This area is transitional between the wooded hills of the Ozarks and the open plains to the west; historically, it was mostly prairie with trees alongside streams. Currently, the land is mostly pasture with some significant tracts of cropland.

**Outer Ozark Border**

This subsection includes most of the northern and western parts of the county. This area is steep loess-covered hills and bluffs along the Missouri River. The underlying strata are limestone and dolomite. This area is the most rugged bluffland on the southern side of the Missouri River west of the Osage River. Prior to European settlement, oak savanna and woodlands dominated the higher areas and dense oak and mixed-hardwoods were found in the steep-sided limestone

ravines. Currently, the uplands are primarily fescue pasture and the ravines are second-growth forests and cedar thickets.

### **Missouri River Alluvial Plain**

This subsection, consisting of the Missouri River channel and its adjoining alluvial plain, is found along the northern border of the county. Soils are deep and loamy and the area is subject to riverine flooding. Historically, the vegetation was typical bottomland species such as cottonwood, willow, sycamore, silver maple, elm, and hackberry.

The Missouri River's relationship to Cooper County deserves special attention because the river is the defining physical feature in Mid-Missouri and defines the northern border of the county. It is the longest river in the country and drains approximately one sixth of the United States. The location of population centers close to the river in Cooper County, which has meant significant flood damage in the county in the recent past.

Flood control structures, power plants, and other engineering projects have profoundly changed the course of the river since Lewis and Clark first traversed it in the early 1800s. In recent years debates over the future of the Missouri River have taken place among the seven states through which it runs. Commercial river traffic, recreational use, environmental concerns, managing river levels to comply with the needs of endangered species, and the preservation of sacred and historical sites along the river and floodplain are all issues which make the management of the river a sensitive balancing act.

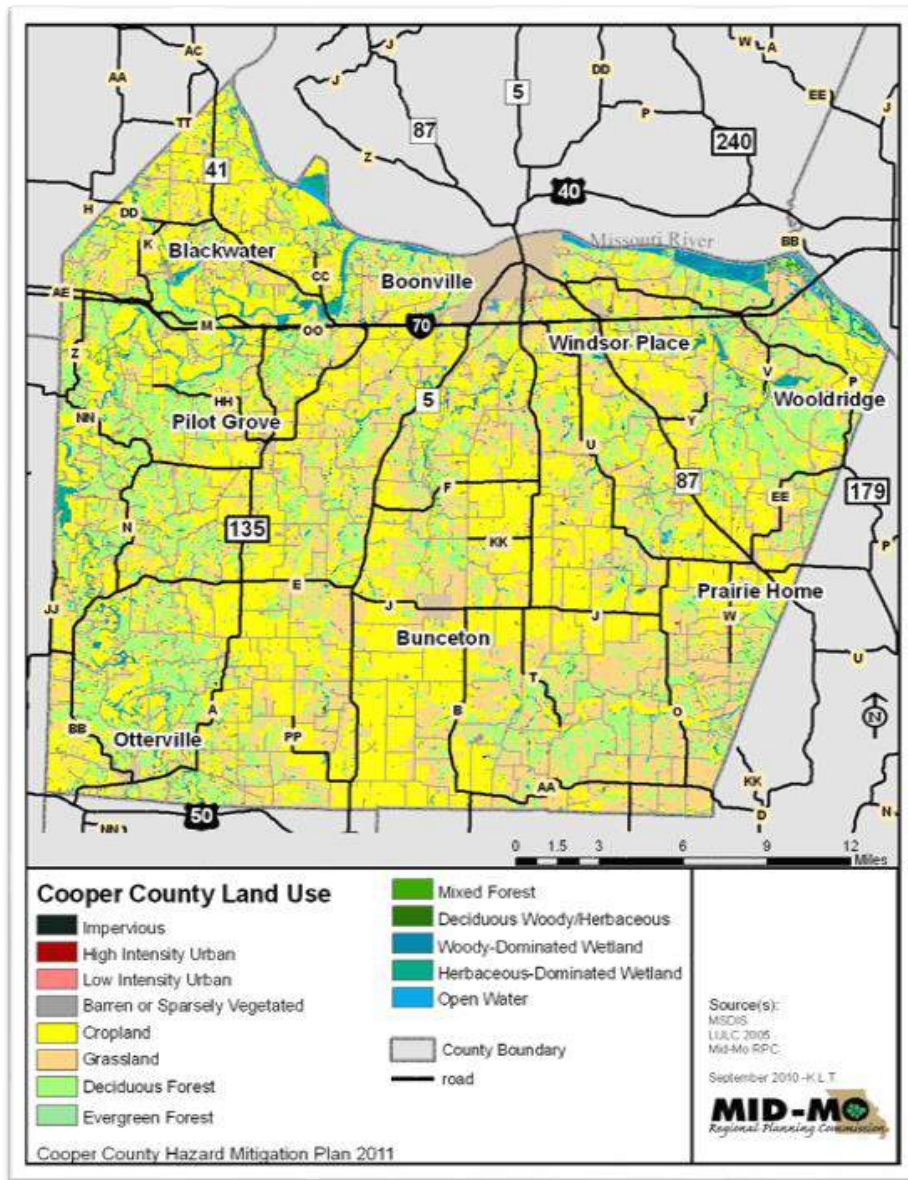
In both 1994 and 1995 the Missouri River was listed as one of the "10 Most Endangered Rivers in the Country" by American Rivers, a river conservation group (<http://www.americanrivers.org/>). This "Most Endangered" list does not reflect the rivers in the worst condition; rather, it seeks to highlight rivers "confronted by decisions in the coming year that could determine their future." The Missouri River was chosen for the list in the mid-1990s because of dam, channelization, navigation, and agricultural runoff issues.

The flooding of the river in 2011 brought the controversy over its management into sharp focus. Record snowfalls in the Rockies combined with heavy spring rains to result in record water releases from six reservoirs on the river. Flooding occurred along the river from Montana to Missouri. The U.S. Army Corps of Engineers came under sharp criticism for not releasing water earlier in the season so the reservoirs would be able to accommodate the snow melt and rains. Meetings were held throughout the Missouri River Basin where local frustration was voiced over species protection and recreation being prioritized over flood control in river management decisions.

### **2.1.2 Current Land Use**

The land use map of Cooper County (Map 2.4) shows clearly the amount of concentrated cropland throughout the entire county.

Map 2.4



### 2.1.3 Climate

Cooper County, like the rest of the state of Missouri, has variable weather patterns and extremes of temperature. With its central continental location, Missouri receives air masses bringing weather from all directions.

Warm humid air from the Gulf of Mexico can bring moisture year-round and is the principal source of precipitation in the spring, summer, and fall; in contrast, air from other directions may be hot and dry (southwest), warm and dry (west), cold (northwest and north), cool and moist (northeast). The flow from the different source regions typically changes in a matter of days,

giving rise to the commonly heard expression in Missouri, “If you don’t like the weather, wait a day.”

At times, the flow of air from one of the source regions will settle in and persist for weeks or months. These periods are associated with particular upper air flow patterns and associated surface conditions.

The Missouri State Hazard Mitigation Plan quotes Dr. Grant Darkow of the University of Missouri - Department of Atmospheric Science on the importance of understanding these weather patterns:

“The persistence of these weather patterns and the possible resulting condition is the subject of several of the natural disasters discussed in this study. Specifically, floods, droughts, fires, heat waves, severe cold, and winter storms can be the result of the persistence of one of these weather patterns, whereas tornadoes can represent the outgrowth of rapid shifts in weather patterns. Knowing these patterns may assist in alerting disaster planners and the general public to the possibility of a developing emergency situation.”

While Cooper County does have extreme variations in weather at times, there is a relative pattern of temperature and rainfall consistent with a humid continental climate. The data shown in the charts was collected at the Boonville weather station in the years 1981-2010 (Figures 2.1-2.2). The rainfall data showed an average of 43.5” of rainfall per year; average rainfall in this data set is defined as including precipitation of any form.

Figure 2.1

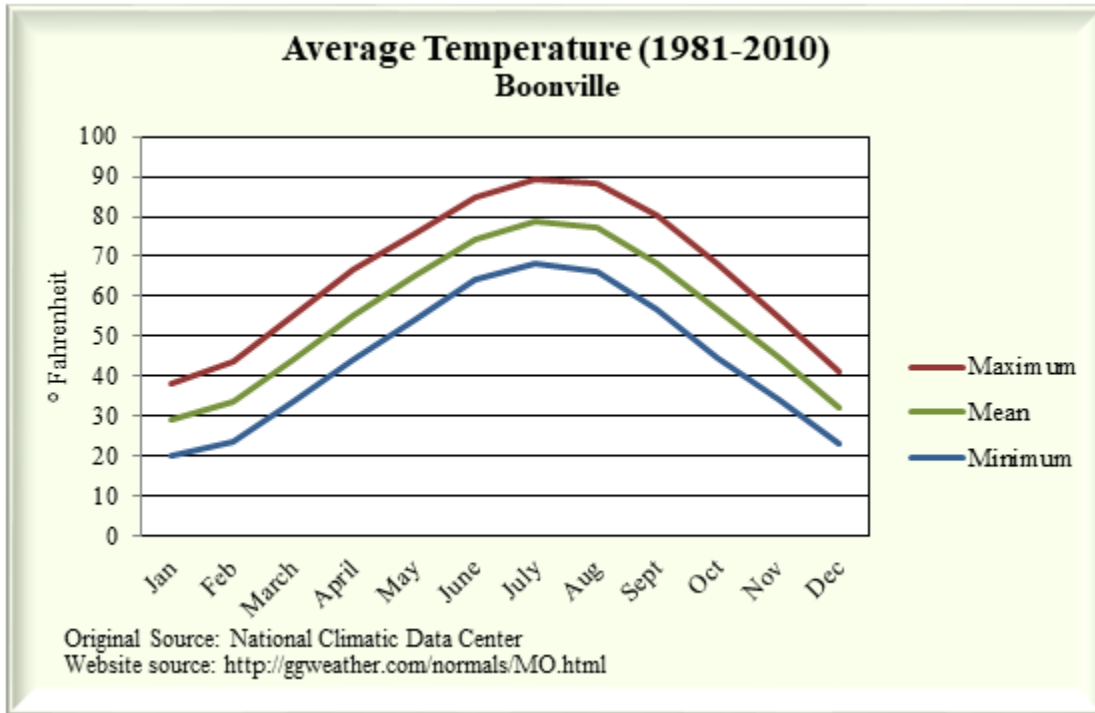
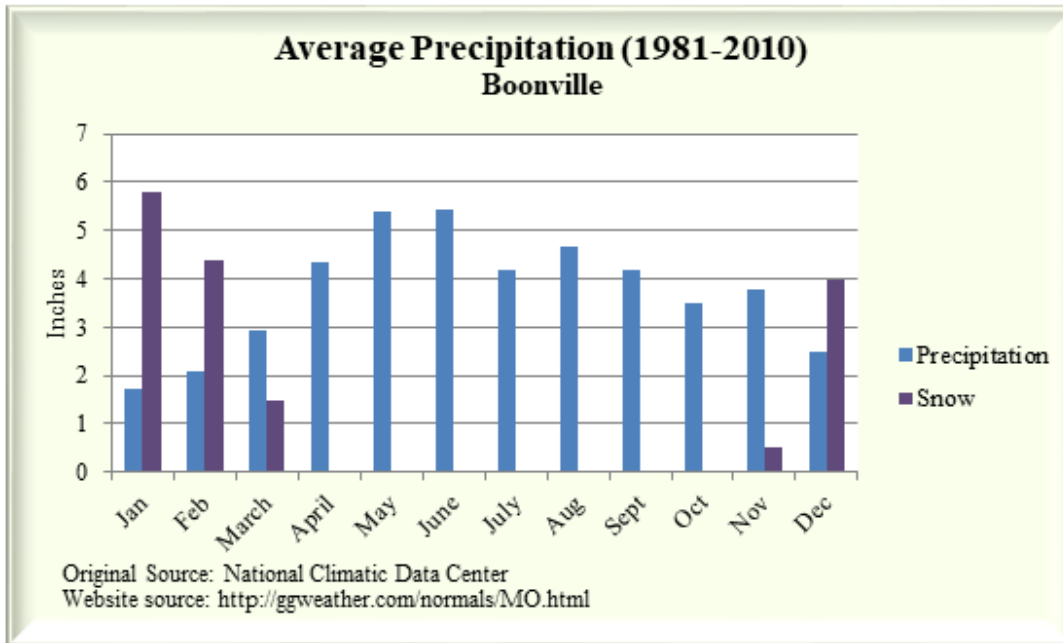


Figure 2.2

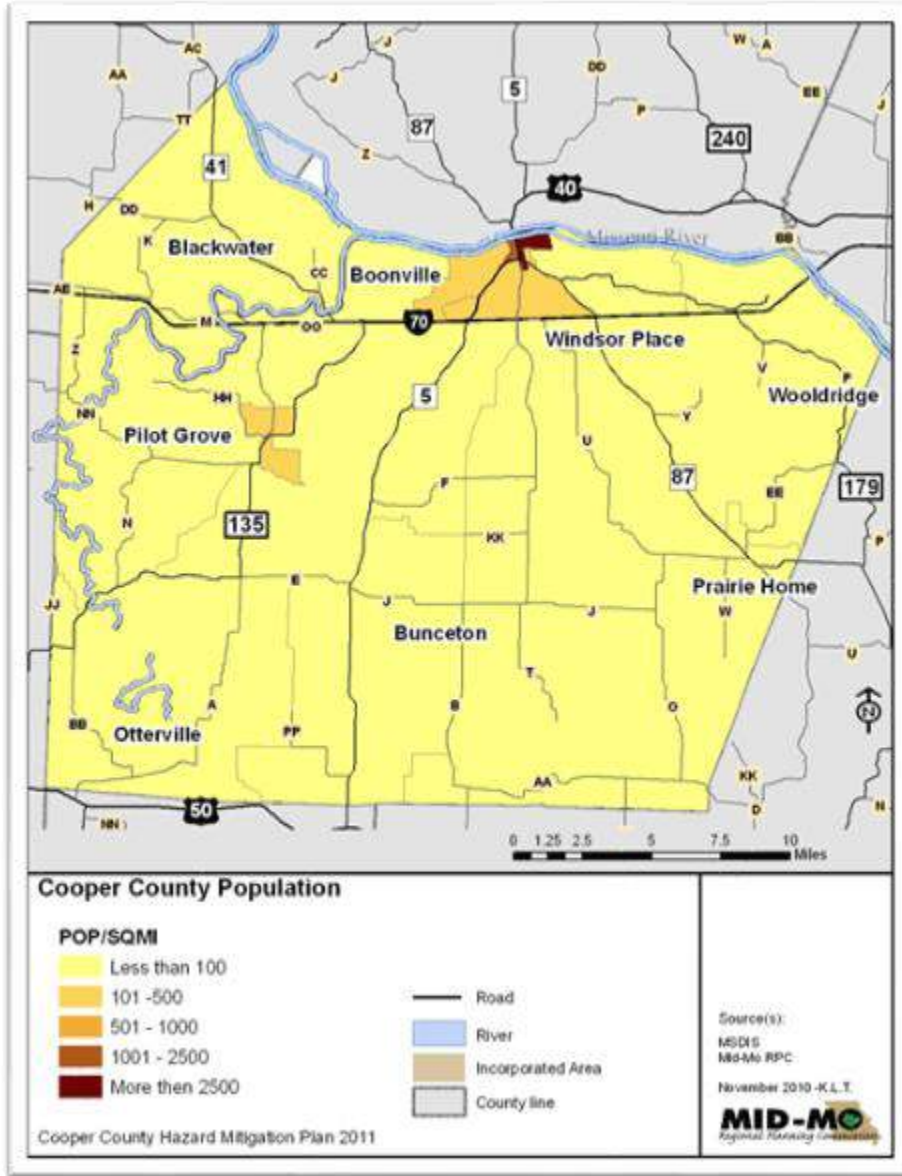




### 2.1.4 Population/Demographics

A mapping of Cooper County's population (2010 Census) by block group clearly shows that the highest population density is in the northern part of the county (Map 2.5).

Map 2.5



In Cooper County, the 2010 Census indicated a 6% increase in population and a 12% increase in housing units. The same cannot be said for 2020 where census results show a slight drop in population despite ACS estimates anticipating growth.

**Table 2.1 Cooper County Population 2010-2020 by Jurisdiction**

| Jurisdiction   | 2020 Population | 2010 Population | 2019 Annual Population Estimate or ACS Population | # Change (2010-2020) | % Change (2010-2020) |
|----------------|-----------------|-----------------|---|----------------------|----------------------|
| Unincorporated | 6,185           | 6,894           | 7,079   | -709                 | -10.28%              |
| Blackwater     | 152             | 162             | 171   | -10                  | -6.2%                |
| Boonville      | 8,501           | 8,319           | 8,418   | 182                  | 2.2%                 |
| Bunceton       | 364             | 354             | 359   | 10                   | 2.8%                 |
| Otterville     | 459             | 454             | 375   | 5                    | 1%                   |
| Pilot Grove    | 765             | 768             | 655   | -3                   | -0.39%               |
| Prairie Home   | 282             | 280             | 237   | 2                    | 0.7%                 |
| Windsor Place  | 337             | 309             | 339   | 28                   | 9%                   |
| Wooldridge     | 58              | 61              | 27  | -3                   | -5%                  |
| Total          | 17,103          | 17,601          | 17,660  | -498                 | -2.8%                |

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

Some sectors of the population are more vulnerable in general to the threat of hazardous events. Children need the help and guidance of adults, especially in the extraordinary circumstances, and this is also true for some older citizens. Approximately 21.7% of the county’s population is under the age of 18; approximately 17.2% is 65 years and older, according to 2019 estimates from the American Community Survey of the U.S. Census Bureau.

The University of South Carolina developed an index to evaluate and rank the ability to respond to, cope with, recover from, and adapt to disasters. The index synthesizes 29 socioeconomic variables which research literature suggests contribute to reduction in a community’s ability to prepare for, respond to, and recover from hazards. Cooper was given a Medium Low SOVI Index Ranking within the state of Missouri.

**Table 2.2 Unemployment, Poverty, Education, and Language Percentage Demographics, Cooper County, Missouri**

| Jurisdiction  | Total in Labor Force | Percent of Population Unemployed | Percent of Families Below the Poverty Level | Percentage of Population (High School graduate) | Percentage of Population (Bachelor’s degree or higher) | Percentage of population with spoken language other than English |
|---------------|----------------------|----------------------------------|---|---|--|--|
| Cooper County | 8,062                | 2.4%                             | 8%  | 38.6%   | 5.8%   | 2.8%   |
| Blackwater    | 68                   | 3.4%                             | 11%   | 0%  | 0%   | 1.8%   |
| Boonville     | 3,453                | 2%                               | 10%   | 35%   | 7.9%   | 2.2%   |
| Bunceton      | 184                  | 1.8%                             | 30.6%                                       | 42.5%   | 0%   | 1%   |
| Otterville    | 167                  | 2.6%                             | 7.9%  | 39%   | 0%   | 1.2%   |
| Pilot Grove   | 284                  | 0.4%                             | 10.8%                                       | 21.7%   | 0%   | 0.6%   |
| Prairie Home  | 117                  | 3%                               | 9.8%  | 0%  | 33.3%  | 1.7%   |
| Windsor Place | 178                  | 0%                               | 7.4%  | 37.8%   | 10.8%  | 2%   |
| Wooldridge    | 13                   | 3.7%                             | 0%  | 0%  | 0%   | 0%   |
| Missouri      | 3,062,657            | 5.8%                             | 10.3%                                       | 89.2%   | 28.2%  | 6%   |
| United States | 162,184,235          | 6.6%                             | 10.5%                                       | 87.3%   | 30.9%  | 21.3%  |

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

### **2.1.5 History**

According to the official Cooper County website, the County was organized in 1818 and is named after brothers Sarshall and Benjamin Cooper, local frontiersmen. Cooper County had previously been part of Howard County, which now lies north of the Missouri River. The county, when first formed, encompassed a large area which has subsequently been divided into fifteen counties.

Cooper County was originally home to the Osage and other groups of indigenous people. White settlers from Kentucky and Tennessee began settling the area around 1816. With these white settlers came their southern culture and lifestyles, which included large plantations and slavery. By the mid-1800s, Cooper County and several other counties along the Missouri River became a thriving agricultural area known as “Little Dixie”. Cooper County and the surrounding area produced such crops as hemp, tobacco, and cotton. The area was also home to several Civil War battles.

Cooper County still maintains its agricultural roots and promotes tourism of its rich historical heritage.

### **2.1.6 Occupations**

Cooper County is a rural county that borders two Metropolitan Statistical Areas (City of Columbia in Boone County and Jefferson City in Cole County). MSAs are geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. An MSA consists of a core urban area of 50,000 or more population, the county or counties containing the core urban area, and adjacent counties that have a high degree of social and economic integration with the urban core (as measured by commuting to work).

**Table 2.3 Occupation Statistics, Cooper 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 |
|---------------|---|---------------------|------------------------------|--|---|
| Cooper County | 2,600   | 1,532               | 1,549                        | 1,022  | 1,020   |
| Blackwater    | 18  | 3                   | 14                           | 16   | 13  |
| Boonville     | 1,119   | 846                 | 636                          | 341  | 362   |
| Bunceton      | 24  | 57                  | 27                           | 26   | 45  |
| Otterville    | 32  | 32                  | 40                           | 19   | 37  |
| Pilot Grove   | 82  | 44                  | 66                           | 49   | 41  |
| Prairie Home  | 31  | 4                   | 26                           | 19   | 31  |
| Windsor Place | 74  | 24                  | 43                           | 5  | 32  |
| Wooldridge    | 2   | 2                   | 0                            | 8  | 0   |

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

**2.1.7 Agriculture**

Agriculture remains an important component of the economy in Cooper County. There are 281,914 acres in farmland in the county according to the 2017 Census of Agriculture from the U.S. Department of Agriculture (USDA); this is a decrease from 307,128 acres in 2012. Farmland comprises 78% of the land area of the county. Of the total farmland, 167,345 acres are cropland, and 142,897 acres were harvested in 2017.

Soybeans, corn, and hay are the major crops in the county; poultry, cattle and pigs are the main livestock. Other crops include grain sorghum, grapes, garden vegetables, nuts, fruit, native plants, trees, and shrubs. The total market value for all agricultural products (crops and livestock) sold in 2017 was \$97,507,000.

|   | 2012          | 2017          | Change |
|---|---------------|---------------|--------|
| Approximate land area (acres)                       | 361,450       | 361,450       | -      |
| Land in farms (acres)                               | 307,128       | 281,914       | -8.21% |
| Percentage in farms                                 | 85.0%         | 78%           | -7%    |
| <b>Number of farms</b>                              | 928           | 883           | -4.85% |
| <b>Average size of farm (acres)</b>                 | 331           | 319           | -3.6%  |
| <b>Estimated market value of land and buildings</b> | \$872,598,000 | \$921,186,218 | 5.57%  |
| <b>Average value per farm</b>                       | \$940,299     | \$1,043,246   | 11%    |
| <b>Average value per acre</b>                       | \$2,841       | \$3,268       | 15%    |
| <b>Total sales</b>                                  | \$78,289,000  | \$97,507,000  | 24.5%  |
| <b>Average sales per farm</b>                       | \$84,363      | \$110,427     | 31%    |

Source: USDA Census of Agriculture 2017

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

There have been no hazard mitigation assistance grants in the planning area since the last update. There was a PDMC award to the county in 2015 for an undisclosed amount of funding.

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

There has been over \$1 million in Public Assistance (PA) grants awarded in Cooper County. Below is \$1,097,702.20 in projects that have varied in size and location through the county.

**Table 2.5 FEMA PA Grants in County from 1993-2020**

| Disaster Declaration | Applicant                | Project Type        | Project Size | Project Total |
|----------------------|--------------------------|---------------------|--------------|---------------|
| 1412                 | Cooper Co                | Roads and Bridges   | Small        | 29235.02      |
| 1412                 | Cooper Co                | Roads and Bridges   | Small        | 15738.34      |
| 1961                 | Pilot Grove              | Protective Measures | Small        | 1985.63       |
| 1961                 | Boonville R-1            | Protective Measures | Small        | 4562.3        |
| 1961                 | Cooper Co Mem. Hospital  | Protective Measures | Small        | 2115.28       |
| 1961                 | Boonville                | Protective Measures | Small        | 41009.11      |
| 1961                 | Unknown                  | Protective Measures | Small        | 47970.65      |
| 1961                 | Windsor Place            | Protective Measures | Small        | 3840          |
| 1961                 | Unknown                  | Protective Measures | Small        | 35603.37      |
| 1961                 | Pilot Grove              | Protective Measures | Small        | 8058.95       |
| 1961                 | Otterville               | Protective Measures | Small        | 3679.44       |
| 1961                 | Otterville R-VI          | Protective Measures | Small        | 1222          |
| 4012                 | Unknown                  | Debris Removal      | Small        | 15526.7       |
| 4012                 | Unknown                  | Roads and Bridges   | Small        | 16776.76      |
| 4012                 | Unknown                  | Roads and Bridges   | Small        | 26413.6       |
| 4012                 | Unknown                  | Roads and Bridges   | Small        | 11933.2       |
| 4012                 | Unknown                  | Roads and Bridges   | Small        | 16263.13      |
| 4012                 | Unknown                  | Roads and Bridges   | Small        | 2956.88       |
| 4012                 | Overton-Wooldridge Levee | Debris Removal      | Small        | 62972         |
| 4012                 | Linneman-Weekly Levee    | Debris Removal      | Small        | 14735.5       |
| 4012                 | Linneman-Weekly Levee    | Protective Measures | Large        | 109279.38     |
| 4012                 | Wooldridge               | Debris Removal      | Small        | 9577.04       |
| 4012                 | Overton-Wooldridge Levee | Protective Measures | Small        | 3331.78       |
| 4012                 | Overton-Wooldridge Levee | Protective Measures | Small        | 1900          |

|      |                             |                          |       |           |
|------|-----------------------------|--------------------------|-------|-----------|
| 4012 | Wooldridge                  | Protective Measures      | Small | 12980.63  |
| 4012 | Wooldridge                  | Protective Measures      | Small | 1186.2    |
| 4012 | Overton-Wooldridge<br>Levee | Protective Measures      | Large | 232387.79 |
| 4451 | Boonville                   | Protective Measures      | Small | 13623.51  |
| 4451 | Overton-Wooldridge<br>Levee | Debris Removal           | Small | 16835     |
| 4451 | Overton-Wooldridge<br>Levee | Water Control Facilities | Small | 11504.26  |
| 4451 | Wooldridge                  | Water Control Facilities | Small | 9500.22   |
| 4451 | Overton-Wooldridge<br>Levee | Protective Measures      | Small | 11468.85  |
| 4451 | Wooldridge                  | State Management         | Small | 475.02    |
| 4451 | Overton-Wooldridge<br>Levee | State Management         | Small | 1416.97   |
| 4490 | Cooper Co Public<br>Health  | Protective Measures      | Large | 141936.89 |
| 4490 | Cooper Co Public<br>Health  | Protective Measures      | Large | 157700.8  |

## 2.2 Jurisdictional Profiles and Mitigation Capabilities

The following is the individual profiles for each participating jurisdiction. Information regarding previous mitigation initiatives and ongoing efforts can be found in the summary tables below. These tables indicate specific capabilities of each jurisdiction that relate to their ability to implement mitigation opportunities. Unincorporated Cooper County is profiled first, followed by the incorporated communities, special districts, the public schools, and higher education.

### 2.2.1 Unincorporated Cooper County

Cooper County consists of all the unincorporated areas within the county boundary and is governed by an elected three-member Board of Commissioners composed of an Eastern Commissioner, a Western Commissioner, and a Presiding Commissioner. The Commission carries out the following responsibilities: establishes Cooper County policy, approves and adopts the annual budget for all County operations, approves actual expenditures for each department, supervises the operations of County departments, ensures County-wide compliance with numerous statutory requirements, acts as liaison with County boards, commissions, and other local and regional governmental entities

Cooper County has the following departments and offices: Assessor, Circuit Court, Collector, Commissioner, Coroner, County Clerk, Emergency Management, Juvenile, Prosecuting Attorney, Public Administrator, 911 Service, Public Works, Recorder of Deeds, Sheriff, and Treasurer.

The county has seen growth in the form of residential subdivisions and the addition CMMG, a sporting goods manufacturer to the area, and Spirit of 76, a fireworks warehouse. Growth is expected to continue as more companies are expected to come into the area.

**Table 2.6 Unincorporated Cooper County Mitigation Capabilities**

| Capabilities                     | Status Including Date of Document or Policy |
|----------------------------------|---|
| <b>Planning Capabilities</b>     |   |
| Comprehensive Plan               | No  |
| Builder's Plan                   | No  |
| Capital Improvement Plan         | No  |
| City Emergency Operations Plan   | N/A   |
| County Emergency Operations Plan | 11/05/2020                                  |
| Local Recovery Plan              | N/A   |
| County Recovery Plan             | No  |
| City Mitigation Plan             | N/A   |
| County Mitigation Plan           | 2017  |
| Debris Management Plan           | No  |
| Economic Development Plan        | No  |

|  |                      |
|--|----------------------|
| Transportation Plan  | Yes: Mid-MO RPC 2016 |
| Land-use Plan  | No                   |
| Flood Mitigation Assistance (FMA) Plan                     | No                   |
| Watershed Plan   | No                   |
| Firewise or other fire mitigation plan                     | No                   |
| School Mitigation Plan                                     | No                   |
| Critical Facilities Plan<br>(Mitigation/Response/Recovery) | No                   |
| <b>Policies/Ordinance</b>                                  |                      |
| Zoning Ordinance   | No                   |
| Building Code  | No                   |
| Floodplain Ordinance                                       | Yes                  |
| Subdivision Ordinance                                      | No                   |
| Tree Trimming Ordinance                                    | No                   |
| Nuisance Ordinance   | Yes – Adult Nudity   |
| Stormwater Ordinance                                       | No                   |
| Drainage Ordinance   | No                   |
| Site Plan Review Requirements                              | No                   |
| Historic Preservation Ordinance                            | No                   |
| Landscape Ordinance  | No                   |
| <b>Program</b>   |                      |
| Zoning/Land Use Restrictions                               | No                   |
| Codes Building Site/Design                                 | No                   |
| Hazard Awareness Program                                   | Yes-LEPC             |
| National Flood Insurance Program (NFIP)                    | Yes                  |
| NFIP Community Rating System<br>(CRS) program              | N/A                  |
| National Weather Service (NWS) Storm Ready                 | Yes 2019-2021        |
| Firewise Community Certification                           | No                   |
| Building Code Effectiveness Grading (BCEGs)                | No                   |
| ISO Fire Rating  | N/A                  |

| <b>Capabilities</b>  | <b>Status Including Date of Document or Policy</b> |
|--|--|
| Economic Development Program                               | Yes-BCDB   |
| Land Use Program   | No   |
| Public Education/Awareness                                 | Yes-Weather  |
| Property Acquisition                                       | No   |
| Planning/Zoning Boards                                     | No   |
| Stream Maintenance Program                                 | No   |
| Tree Trimming Program                                      | Yes  |
| Engineering Studies for Streams<br>(Local/County/Regional) | No   |
| Mutual Aid Agreements                                      | Yes  |
| <b>Studies/Reports/Maps</b>                                |  |
| Hazard Analysis/Risk Assessment (Local)                    | N/A  |
| Hazard Analysis/Risk Assessment (County)                   | No   |
| Flood Insurance Maps                                       | No   |
| FEMA Flood Insurance Study (Detailed)                      | No   |
| Evacuation Route Map                                       | Yes  |



|  |               |
|--|---------------|
| Critical Facilities Inventory                  | Yes           |
| Vulnerable Population Inventory                | No            |
| Land Use Map                                   | No            |
| <b>Staff/Department</b>                        |               |
| Building Code Official                         | No            |
| Building Inspector                             | No            |
| Mapping Specialist (GIS)                       | Yes           |
| Engineer                                       | Yes           |
| Development Planner                            | Yes           |
| Public Works Official                          | Yes-Full Time |
| Emergency Management Director                  | Yes-Part Time |
| NFIP Floodplain Administrator                  | Yes           |
| Emergency Response Team                        | Yes           |
| Hazardous Materials Expert                     | Yes           |
| Local Emergency Planning Committee             | Yes           |
| County Emergency Management Commission         | Yes           |
| Sanitation Department                          | No            |
| Transportation Department                      | Yes           |
| Economic Development Department                | Contracted    |
| Housing Department                             | No            |
| Historic Preservation                          | Yes           |
| <b>Non-Governmental Organizations (NGOs)</b>   |               |
| American Red Cross                             | No            |
| Salvation Army                                 | No            |
| Veterans Groups                                | Yes           |
| Local Environmental Organization               | No            |
| Homeowner Associations                         | Yes           |
| Neighborhood Associations                      | Yes           |
| Chamber of Commerce                            | Yes           |
| Community Organizations (Lions, Kiwanis, etc.) | Yes           |

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

Source: Data Collection Questionnaire, 2021

### 2.2.2 Blackwater

A 4-person city council and a Mayor form the city government for Blackwater. Since the last update two new houses were built but no structures are in floodplain. There is one storm siren and its batteries were replaced in 2019.

**Table 2.7 Blackwater Mitigation Capabilities**

| Capabilities   | Status Including Date of Document or Policy |
|--|---|
| <b>Planning Capabilities</b>                               |   |
| Comprehensive Plan   | No  |
| Builder's Plan   | No  |
| Capital Improvement Plan                                   | No  |
| City Emergency Operations Plan                             | Yes-2020                                    |
| County Emergency Operations Plan                           | 11/05/2020                                  |
| Local Recovery Plan  | No  |
| County Recovery Plan                                       | Yes   |
| City Mitigation Plan                                       | No  |
| County Mitigation Plan                                     | 2017  |
| Debris Management Plan                                     | No  |
| Economic Development Plan                                  | No  |
| Transportation Plan  | Yes: Mid-MO RPC 2016                        |
| Land-use Plan  | No  |
| Flood Mitigation Assistance (FMA) Plan                     | No  |
| Watershed Plan   | No  |
| Firewise or other fire mitigation plan                     | No  |
| School Mitigation Plan                                     | No  |
| Critical Facilities Plan<br>(Mitigation/Response/Recovery) | No  |
| <b>Policies/Ordinance</b>                                  |   |
| Zoning Ordinance   | Yes   |
| Building Code  | Yes   |
| Floodplain Ordinance                                       | Yes-1999                                    |
| Subdivision Ordinance                                      | Yes   |
| Tree Trimming Ordinance                                    | No  |
| Nuisance Ordinance   | Yes   |
| Stormwater Ordinance                                       | No  |
| Drainage Ordinance   | No  |
| Site Plan Review Requirements                              | No  |
| Historic Preservation Ordinance                            | Yes-1995                                    |
| Landscape Ordinance  | No  |
| <b>Program</b>   |   |
| Zoning/Land Use Restrictions                               | Yes   |
| Codes Building Site/Design                                 | No  |
| Hazard Awareness Program                                   | Yes-LEPC                                    |
| National Flood Insurance Program (NFIP)                    | Yes   |
| NFIP Community Rating System                               | N/A   |

|   |     |
|---|-----|
| (CRS) program                               |     |
| National Weather Service (NWS) Storm Ready  | Yes |
| Firewise Community Certification            | No  |
| Building Code Effectiveness Grading (BCEGs) | No  |
| ISO Fire Rating                             | 7   |

| <b>Capabilities</b>  | <b>Status Including Date of Document or Policy</b> |
|--|--|
| Economic Development Program                               | No   |
| Land Use Program   | Yes  |
| Public Education/Awareness                                 | Yes  |
| Property Acquisition                                       | No   |
| Planning/Zoning Boards                                     | Yes  |
| Stream Maintenance Program                                 | No   |
| Tree Trimming Program                                      | No   |
| Engineering Studies for Streams<br>(Local/County/Regional) | No   |
| Mutual Aid Agreements                                      | No   |
| <b>Studies/Reports/Maps</b>                                |  |
| Hazard Analysis/Risk Assessment (Local)                    | No   |
| Hazard Analysis/Risk Assessment (County)                   | No   |
| Flood Insurance Maps                                       | No   |
| FEMA Flood Insurance Study (Detailed)                      | No   |
| Evacuation Route Map                                       | No   |
| Critical Facilities Inventory                              | Yes  |
| Vulnerable Population Inventory                            | No   |
| Land Use Map   | Yes  |
| <b>Staff/Department</b>                                    |  |
| Building Code Official                                     | No   |
| Building Inspector   | No   |
| Mapping Specialist (GIS)                                   | Yes  |
| Engineer   | No   |
| Development Planner  | No   |
| Public Works Official                                      | No   |
| Emergency Management Director                              | County   |
| NFIP Floodplain Administrator                              | Yes  |
| Emergency Response Team                                    | No   |
| Hazardous Materials Expert                                 | No   |
| Local Emergency Planning Committee                         | Yes  |
| County Emergency Management Commission                     | Yes  |
| Sanitation Department                                      | Yes  |
| Transportation Department                                  | No   |
| Economic Development Department                            | No   |
| Housing Department   | No   |
| Historic Preservation                                      | Yes  |
| <b>Non-Governmental Organizations (NGOs)</b>               |  |
| American Red Cross   | Yes  |
| 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. | Yes |

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

### 2.2.3 Boonville

Boonville is a 3<sup>rd</sup> class city located along the Missouri River just off of I-70. It has a mayor and City Administrator as well as an 8-member council that represents 4 wards. Departments within the city include:

- Airport
- Public Safety
- Planning and Zoning
- Cemeteries
- Public Works
- Parks and Rec

They have 5 outdoor warning sirens that can be activated by 911 at any time or manually by the County EMA. In 2019 FEMA funds were received to life the electric service at lift station #1 to minimize flooding risks.

Boonville has seen commercial growth since the last update. In 2017 Spirit of 76 distribution moved to Boonville and in 2021 they expanded their operation. 2021 also saw the expansion of CMMG, a sporting goods manufacturer, Spirit of 76, a fireworks wholesale store, as well the addition of the University of Missouri Health Care Center.

Residential growth saw the addition of Boone Pointe Subdivision in 2021.

**Table 2.8 Boonville Mitigation Capabilities**

| Capabilities                           | Status Including Date of Document or Policy |
|--|---|
| <b>Planning Capabilities</b>           |   |
| Comprehensive Plan                     | 2003, amended 2020                          |
| Builder's Plan                         | No  |
| Capital Improvement Plan               | Yes, annual update                          |
| City Emergency Operations Plan         | N/A   |
| County Emergency Operations Plan       | 11/05/2020                                  |
| Local Recovery Plan                    | N/A   |
| County Recovery Plan                   | No  |
| City Mitigation Plan                   | 2017  |
| County Mitigation Plan                 | 2017  |
| Debris Management Plan                 | No  |
| Economic Development Plan              | Yes   |
| Transportation Plan                    | Yes: Mid-MO RPC 2016                        |
| Land-use Plan                          | Yes, zoning appendix C                      |
| Flood Mitigation Assistance (FMA) Plan | Yes   |
| Watershed Plan                         | No  |
| Firewise or other fire mitigation plan | No  |
| School Mitigation Plan                 | No  |
| Critical Facilities Plan               | No  |

| (Mitigation/Response/Recovery)              |           |
|---|-----------|
| Policies/Ordinance                          |           |
| Zoning Ordinance                            | Yes       |
| Building Code                               | Yes       |
| Floodplain Ordinance                        | Yes, 2011 |
| Subdivision Ordinance                       | Yes, 2017 |
| Tree Trimming Ordinance                     | No        |
| Nuisance Ordinance                          | Yes, 2001 |
| Stormwater Ordinance                        | 2008      |
| Drainage Ordinance                          | 2008      |
| Site Plan Review Requirements               | 1998/2007 |
| Historic Preservation Ordinance             | 1992      |
| Landscape Ordinance                         | 2009      |
| Program                                     |           |
| Zoning/Land Use Restrictions                | Yes       |
| Codes Building Site/Design                  | Yes       |
| Hazard Awareness Program                    | Yes-LEPC  |
| National Flood Insurance Program (NFIP)     | Yes       |
| NFIP Community Rating System (CRS) program  | Yes       |
| National Weather Service (NWS) Storm Ready  | 2021      |
| Firewise Community Certification            | No        |
| Building Code Effectiveness Grading (BCEGs) | Yes       |
| ISO Fire Rating                             | 4         |

| Capabilities  | Status Including Date of Document or Policy |
|---|---|
| Economic Development Program                            | Yes-2016                                    |
| Land Use Program  | No  |
| Public Education/Awareness                              | Yes-Weather and Fire safety                 |
| Property Acquisition                                    | Yes-donation                                |
| Planning/Zoning Boards                                  | Yes   |
| Stream Maintenance Program                              | Yes   |
| Tree Trimming Program                                   | Yes   |
| Engineering Studies for Streams (Local/County/Regional) | No  |
| Mutual Aid Agreements                                   | Yes   |
| Studies/Reports/Maps                                    |   |
| Hazard Analysis/Risk Assessment (Local)                 | Yes   |
| Hazard Analysis/Risk Assessment (County)                | No  |
| Flood Insurance Maps                                    | No  |
| FEMA Flood Insurance Study (Detailed)                   | No  |
| Evacuation Route Map                                    | Yes   |
| Critical Facilities Inventory                           | In progress                                 |
| Vulnerable Population Inventory                         | Yes   |
| Land Use Map  | Yes   |
| Staff/Department  |   |
| Building Code Official                                  | Yes   |
| Building Inspector                                      | Yes   |
| Mapping Specialist (GIS)                                | No  |

|  |               |
|--|---------------|
| Engineer                                       | Yes           |
| Development Planner                            | No            |
| Public Works Official                          | Yes-Full Time |
| Emergency Management Director                  | County        |
| NFIP Floodplain Administrator                  | Yes           |
| Emergency Response Team                        | Yes           |
| Hazardous Materials Expert                     | Yes           |
| Local Emergency Planning Committee             | Yes           |
| County Emergency Management Commission         | Yes           |
| Sanitation Department                          | Yes           |
| Transportation Department                      | No            |
| Economic Development Department                | Contracted    |
| Housing Department                             | Yes           |
| Historic Preservation                          | Yes           |
| <b>Non-Governmental Organizations (NGOs)</b>   |               |
| American Red Cross                             | Yes           |
| Salvation Army                                 | Yes           |
| Veterans Groups                                | Yes           |
| Local Environmental Organization               | No            |
| Homeowner Associations                         | Yes           |
| Neighborhood Associations                      | No            |
| Chamber of Commerce                            | Yes           |
| Community Organizations (Lions, Kiwanis, etc.) | Yes           |

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

Source: Data Collection Questionnaire, 2021

### 2.2.4 Bunceton

Bunceton has a Mayor and a City Council that is 7 members. They have the following city offices:

- City Clerk
- Collector

Bunceton does not have any current designated storm shelters but does have one storm siren for the community that is activated by the Cooper County EMA office.

**Table 2.9 Bunceton Mitigation Capabilities**

| Capabilities   | Status Including Date of Document or Policy |
|--|---|
| <b>Planning Capabilities</b>                               |   |
| Comprehensive Plan   | No  |
| Builder's Plan   | No  |
| Capital Improvement Plan                                   | No  |
| City Emergency Operations Plan                             | Yes   |
| County Emergency Operations Plan                           | 11/05/2020                                  |
| Local Recovery Plan  | No  |
| County Recovery Plan                                       | Yes   |
| City Mitigation Plan                                       | No  |
| County Mitigation Plan                                     | 2017  |
| Debris Management Plan                                     | No  |
| Economic Development Plan                                  | No  |
| Transportation Plan  | Yes: Mid-MO RPC 2016                        |
| Land-use Plan  | No  |
| Flood Mitigation Assistance (FMA) Plan                     | No  |
| Watershed Plan   | No  |
| Firewise or other fire mitigation plan                     | No  |
| School Mitigation Plan                                     | No  |
| Critical Facilities Plan<br>(Mitigation/Response/Recovery) | No  |
| <b>Policies/Ordinance</b>                                  |   |
| Zoning Ordinance   | Yes   |
| Building Code  | No  |
| Floodplain Ordinance                                       | Yes   |
| Subdivision Ordinance                                      | No  |
| Tree Trimming Ordinance                                    | No  |
| Nuisance Ordinance   | No  |
| Stormwater Ordinance                                       | No  |
| Drainage Ordinance   | No  |
| Site Plan Review Requirements                              | No  |
| Historic Preservation Ordinance                            | No  |
| Landscape Ordinance  | No  |
| <b>Program</b>   |   |
| 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  | N/A |
| National Weather Service (NWS) Storm Ready  | No  |
| Firewise Community Certification            | No  |
| Building Code Effectiveness Grading (BCEGs) | No  |
| ISO Fire Rating                             | N/A |

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

|   |     |
|---|-----|
| Local Environmental Organization              | No  |
| Homeowner Associations                        | No  |
| Neighborhood Associations                     | No  |
| Chamber of Commerce                           | No  |
| Community Organizations (Lions, Kiwanis, etc. | Yes |

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

### 2.2.5 Otterville

The city of Otterville is governed by a Mayor and a City Council that consists of 4 aldermen. Department Positions include:

- City Clerk
- Police

While Otterville has 2 warning sirens only one is functioning, which is a concern for the community since several of its members are older and cannot get warnings through their phones.

**Table 2.10 Otterville Mitigation Capabilities**

| Capabilities   | Status Including Date of Document or Policy |
|--|---|
| <b>Planning Capabilities</b>                               |   |
| Comprehensive Plan   | No  |
| Builder's Plan   | No  |
| Capital Improvement Plan                                   | 1/2021                                      |
| City Emergency Operations Plan                             | 11/2020                                     |
| County Emergency Operations Plan                           | 11/05/2020                                  |
| Local Recovery Plan  | N/A   |
| County Recovery Plan                                       | No  |
| City Mitigation Plan                                       | N/A   |
| County Mitigation Plan                                     | 2017  |
| Debris Management Plan                                     | No  |
| Economic Development Plan                                  | No  |
| Transportation Plan  | Yes: Mid-MO RPC 2016                        |
| Land-use Plan  | No  |
| Flood Mitigation Assistance (FMA) Plan                     | No  |
| Watershed Plan   | No  |
| Firewise or other fire mitigation plan                     | No  |
| School Mitigation Plan                                     | No  |
| Critical Facilities Plan<br>(Mitigation/Response/Recovery) | No  |
| <b>Policies/Ordinance</b>                                  |   |
| Zoning Ordinance   | N/A   |
| Building Code  | No  |
| Floodplain Ordinance                                       | No  |
| Subdivision Ordinance                                      | N/A   |
| Tree Trimming Ordinance                                    | N/A   |
| Nuisance Ordinance   | 9/2003                                      |
| Stormwater Ordinance                                       | Yes   |
| Drainage Ordinance   | Yes   |
| Site Plan Review Requirements                              | No  |
| Historic Preservation Ordinance                            | No  |
| Landscape Ordinance  | No  |
| <b>Program</b>   |   |

|   |     |
|---|-----|
| Zoning/Land Use Restrictions                | N/A |
| Codes Building Site/Design                  | N/A |
| Hazard Awareness Program                    | N/A |
| National Flood Insurance Program (NFIP)     | No  |
| NFIP Community Rating System (CRS) program  | No  |
| National Weather Service (NWS) Storm Ready  | Yes |
| Firewise Community Certification            | No  |
| Building Code Effectiveness Grading (BCEGs) | No  |
| ISO Fire Rating                             | 5   |

| Capabilities  | Status Including Date of Document or Policy |
|---|---|
| Economic Development Program                            | NO  |
| Land Use Program  | N/A   |
| Public Education/Awareness                              | Yes-Weather                                 |
| Property Acquisition                                    | N/A   |
| Planning/Zoning Boards                                  | No  |
| Stream Maintenance Program                              | No  |
| Tree Trimming Program                                   | No  |
| Engineering Studies for Streams (Local/County/Regional) | No  |
| Mutual Aid Agreements                                   | Yes   |
| <b>Studies/Reports/Maps</b>                             |   |
| Hazard Analysis/Risk Assessment (Local)                 | No  |
| Hazard Analysis/Risk Assessment (County)                | No  |
| Flood Insurance Maps                                    | No  |
| FEMA Flood Insurance Study (Detailed)                   | No  |
| Evacuation Route Map                                    | Yes   |
| Critical Facilities Inventory                           | Yes   |
| Vulnerable Population Inventory                         | No  |
| Land Use Map  | No  |
| <b>Staff/Department</b>                                 |   |
| Building Code Official                                  | No  |
| Building Inspector                                      | No  |
| Mapping Specialist (GIS)                                | No  |
| Engineer  | No  |
| Development Planner                                     | No  |
| Public Works Official                                   | No  |
| Emergency Management Director                           | Yes   |
| NFIP Floodplain Administrator                           | No  |
| Emergency Response Team                                 | No  |
| Hazardous Materials Expert                              | Yes   |
| Local Emergency Planning Committee                      | Yes   |
| County Emergency Management Commission                  | Yes   |
| Sanitation Department                                   | No  |
| Transportation Department                               | No  |
| Economic Development Department                         | Contracted                                  |
| Housing Department                                      | No  |
| Historic Preservation                                   | No  |
| <b>Non-Governmental Organizations (NGOs)</b>            |   |

|   |     |
|---|-----|
| American Red Cross                            | No  |
| Salvation Army                                | No  |
| Veterans Groups                               | No  |
| Local Environmental Organization              | No  |
| Homeowner Associations                        | No  |
| Neighborhood Associations                     | No  |
| Chamber of Commerce                           | Yes |
| Community Organizations (Lions, Kiwanis, etc. | No  |

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

Source: Data Collection Questionnaire, 2021

## 2.2.6 Pilot Grove

Pilot Grove is governed by a Mayor and a 4 member Board of Directors. They own and operate the City Hall that also houses the Police Station. The community offers city sewer as well as municipal water facilities.

**Table 2.11 Pilot Grove Mitigation Capabilities**

| Capabilities   | Status Including Date of Document or Policy |
|--|---|
| <b>Planning Capabilities</b>                               |   |
| Comprehensive Plan   | No  |
| Builder's Plan   | No  |
| Capital Improvement Plan                                   | No  |
| City Emergency Operations Plan                             | No  |
| County Emergency Operations Plan                           | Yes   |
| Local Recovery Plan  | N/A   |
| County Recovery Plan                                       | No  |
| City Mitigation Plan                                       | No  |
| County Mitigation Plan                                     | N/A   |
| Debris Management Plan                                     | No  |
| Economic Development Plan                                  | No  |
| Transportation Plan  | Yes: Mid-MO RPC 2016                        |
| Land-use Plan  | No  |
| Flood Mitigation Assistance (FMA) Plan                     | No  |
| Watershed Plan   | No  |
| Firewise or other fire mitigation plan                     | No  |
| School Mitigation Plan                                     | No  |
| Critical Facilities Plan<br>(Mitigation/Response/Recovery) | No  |
| <b>Policies/Ordinance</b>                                  |   |
| Zoning Ordinance   | No  |
| Building Code  | IBC   |
| Floodplain Ordinance                                       | Yes   |
| Subdivision Ordinance                                      | No  |
| Tree Trimming Ordinance                                    | No  |
| Nuisance Ordinance   | Yes   |
| Stormwater Ordinance                                       | Yes   |
| Drainage Ordinance   | No  |
| Site Plan Review Requirements                              | No  |
| Historic Preservation Ordinance                            | No  |
| Landscape Ordinance  | No  |
| <b>Program</b>   |   |
| Zoning/Land Use Restrictions                               | No  |
| Codes Building Site/Design                                 | IBC   |
| Hazard Awareness Program                                   | No  |

|   |     |
|---|-----|
| National Flood Insurance Program (NFIP)     | Yes |
| NFIP Community Rating System (CRS) program  | No  |
| National Weather Service (NWS) Storm Ready  | No  |
| Firewise Community Certification            | No  |
| Building Code Effectiveness Grading (BCEGs) | No  |
| ISO Fire Rating                             | 5   |

| <b>Capabilities</b>                                     | <b>Status Including Date of Document or Policy</b> |
|---|--|
| Economic Development Program                            | No   |
| Land Use Program  | No   |
| Public Education/Awareness                              | No   |
| Property Acquisition                                    | No   |
| Planning/Zoning Boards                                  | No   |
| Stream Maintenance Program                              | No   |
| Tree Trimming Program                                   | No   |
| Engineering Studies for Streams (Local/County/Regional) | No   |
| Mutual Aid Agreements                                   | No   |
| <b>Studies/Reports/Maps</b>                             |  |
| Hazard Analysis/Risk Assessment (Local)                 | No   |
| Hazard Analysis/Risk Assessment (County)                | No   |
| Flood Insurance Maps                                    | No   |
| FEMA Flood Insurance Study (Detailed)                   | No   |
| Evacuation Route Map                                    | No   |
| Critical Facilities Inventory                           | No   |
| Vulnerable Population Inventory                         | No   |
| Land Use Map  | No   |
| <b>Staff/Department</b>                                 |  |
| Building Code Official                                  | Yes  |
| Building Inspector                                      | Yes  |
| Mapping Specialist (GIS)                                | No   |
| Engineer  | No   |
| Development Planner                                     | No   |
| Public Works Official                                   | Yes  |
| Emergency Management Director                           | Yes  |
| NFIP Floodplain Administrator                           | Yes  |
| Emergency Response Team                                 | Yes  |
| Hazardous Materials Expert                              | No   |
| Local Emergency Planning Committee                      | No   |
| County Emergency Management Commission                  | N/A  |
| Sanitation Department                                   | Yes  |
| Transportation Department                               | No   |
| Economic Development Department                         | Yes  |
| Housing Department                                      | No   |
| Historic Preservation                                   | No   |
| <b>Non-Governmental Organizations (NGOs)</b>            |  |
| 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 |

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



### 2.2.7 Prairie Home

Prairie Home has a Mayor and a Board of Aldermen. They have held community preparedness meetings in the past where they implemented a public alert system in 2017 that functions by phone and by email for those signed up. The county has the ability to activate their only storm siren.

**Table 2.12 Prairie Home Mitigation Capabilities**

| Capabilities   | Status Including Date of Document or Policy |
|--|---|
| <b>Planning Capabilities</b>                               |   |
| Comprehensive Plan   | No  |
| Builder's Plan   | No  |
| Capital Improvement Plan                                   | No  |
| City Emergency Operations Plan                             | No-Partial                                  |
| County Emergency Operations Plan                           | Yes   |
| Local Recovery Plan  | N/A   |
| County Recovery Plan                                       | No  |
| City Mitigation Plan                                       | Yes   |
| County Mitigation Plan                                     | Yes   |
| Debris Management Plan                                     | No  |
| Economic Development Plan                                  | No  |
| Transportation Plan  | Yes: Mid-MO RPC 2016                        |
| Land-use Plan  | No  |
| Flood Mitigation Assistance (FMA) Plan                     | No  |
| Watershed Plan   | No  |
| Firewise or other fire mitigation plan                     | No  |
| School Mitigation Plan                                     | No  |
| Critical Facilities Plan<br>(Mitigation/Response/Recovery) | No  |
| <b>Policies/Ordinance</b>                                  |   |
| Zoning Ordinance   | No  |
| Building Code  | No  |
| Floodplain Ordinance                                       | No  |
| Subdivision Ordinance                                      | No  |
| Tree Trimming Ordinance                                    | No  |
| Nuisance Ordinance   | Yes   |
| Stormwater Ordinance                                       | No  |
| Drainage Ordinance   | No  |
| Site Plan Review Requirements                              | No  |
| Historic Preservation Ordinance                            | No  |
| Landscape Ordinance  | No  |
| <b>Program</b>   |   |
| Zoning/Land Use Restrictions                               | Yes   |
| Codes Building Site/Design                                 | No  |

|   |       |
|---|-------|
| Hazard Awareness Program                    | No    |
| National Flood Insurance Program (NFIP)     | No    |
| NFIP Community Rating System (CRS) program  | No    |
| National Weather Service (NWS) Storm Ready  | No    |
| Firewise Community Certification            | No    |
| Building Code Effectiveness Grading (BCEGs) | No    |
| ISO Fire Rating                             | 07/7x |

| <b>Capabilities</b>                                     | <b>Status Including Date of Document or Policy</b> |
|---|--|
| Economic Development Program                            | No   |
| Land Use Program  | No   |
| Public Education/Awareness                              | No   |
| Property Acquisition                                    | No   |
| Planning/Zoning Boards                                  | No   |
| Stream Maintenance Program                              | No   |
| Tree Trimming Program                                   | No   |
| Engineering Studies for Streams (Local/County/Regional) | No   |
| Mutual Aid Agreements                                   | No   |
| <b>Studies/Reports/Maps</b>                             |  |
| Hazard Analysis/Risk Assessment (Local)                 | Yes  |
| Hazard Analysis/Risk Assessment (County)                | No   |
| Flood Insurance Maps                                    | No   |
| FEMA Flood Insurance Study (Detailed)                   | No   |
| Evacuation Route Map                                    | No   |
| Critical Facilities Inventory                           | Yes  |
| Vulnerable Population Inventory                         | No   |
| Land Use Map  | No   |
| <b>Staff/Department</b>                                 |  |
| Building Code Official                                  | No   |
| Building Inspector                                      | No   |
| Mapping Specialist (GIS)                                | No   |
| Engineer  | No   |
| Development Planner                                     | No   |
| Public Works Official                                   | No   |
| Emergency Management Director                           | No   |
| NFIP Floodplain Administrator                           | No   |
| Emergency Response Team                                 | No   |
| Hazardous Materials Expert                              | No   |
| Local Emergency Planning Committee                      | No   |
| County Emergency Management Commission                  | N/A  |
| Sanitation Department                                   | No   |
| Transportation Department                               | No   |
| Economic Development Department                         | No   |
| Housing Department                                      | No   |
| Historic Preservation                                   | No   |
| <b>Non-Governmental Organizations (NGOs)</b>            |  |
| American Red Cross                                      | No   |
| Salvation Army  | No   |

|   |     |
|---|-----|
| Veterans Groups                               | No  |
| Local Environmental Organization              | No  |
| Homeowner Associations                        | No  |
| Neighborhood Associations                     | No  |
| Chamber of Commerce                           | No  |
| Community Organizations (Lions, Kiwanis, etc. | Yes |

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

### 2.2.8 Windsor Place

Windsor Place is governed by a Chairman and board members who serve the community as volunteers. They do not employ anyone but instead contract out any services needed such as bookkeeping, legal services, trash collection, and street cleaning or repairs. As a growing community this will likely change someday. They are in need of a storm siren as not all their residents are within hearing distance of the current one located out in the county.

**Table 2.13 Windsor Place Mitigation Capabilities**

| Capabilities   | Status Including Date of Document or Policy |
|--|---|
| <b>Planning Capabilities</b>                               |   |
| Comprehensive Plan   | No  |
| Builder's Plan   | No  |
| Capital Improvement Plan                                   | No  |
| City Emergency Operations Plan                             | No  |
| County Emergency Operations Plan                           | 11/05/2020                                  |
| Local Recovery Plan  | No  |
| County Recovery Plan                                       | No  |
| City Mitigation Plan                                       | No  |
| County Mitigation Plan                                     | 2017  |
| Debris Management Plan                                     | No  |
| Economic Development Plan                                  | No  |
| Transportation Plan  | Yes: Mid-MO RPC 2016                        |
| Land-use Plan  | No  |
| Flood Mitigation Assistance (FMA) Plan                     | No  |
| Watershed Plan   | No  |
| Firewise or other fire mitigation plan                     | No  |
| School Mitigation Plan                                     | No  |
| Critical Facilities Plan<br>(Mitigation/Response/Recovery) | No  |
| <b>Policies/Ordinance</b>                                  |   |
| Zoning Ordinance   | Yes   |
| Building Code  | No  |
| Floodplain Ordinance                                       | No  |
| Subdivision Ordinance                                      | Yes   |
| Tree Trimming Ordinance                                    | No  |
| Nuisance Ordinance   | Yes   |
| Stormwater Ordinance                                       | Yes   |
| Drainage Ordinance   | Yes   |
| Site Plan Review Requirements                              | No  |
| Historic Preservation Ordinance                            | No  |
| Landscape Ordinance  | Yes   |
| <b>Program</b>   |   |
| Zoning/Land Use Restrictions                               | Yes   |

|   |     |
|---|-----|
| Codes Building Site/Design                  | Yes |
| Hazard Awareness Program                    | No  |
| National Flood Insurance Program (NFIP)     | No  |
| NFIP Community Rating System (CRS) program  | No  |
| National Weather Service (NWS) Storm Ready  | No  |
| Firewise Community Certification            | No  |
| Building Code Effectiveness Grading (BCEGs) | Yes |
| ISO Fire Rating                             | N/A |

| <b>Capabilities</b>                                     | <b>Status Including Date of Document or Policy</b> |
|---|--|
| Economic Development Program                            | No   |
| Land Use Program  | No   |
| Public Education/Awareness                              | No   |
| Property Acquisition                                    | No   |
| Planning/Zoning Boards                                  | Yes  |
| Stream Maintenance Program                              | No   |
| Tree Trimming Program                                   | No   |
| Engineering Studies for Streams (Local/County/Regional) | No   |
| Mutual Aid Agreements                                   | No   |
| <b>Studies/Reports/Maps</b>                             |  |
| Hazard Analysis/Risk Assessment (Local)                 | No   |
| Hazard Analysis/Risk Assessment (County)                | No   |
| Flood Insurance Maps                                    | No   |
| FEMA Flood Insurance Study (Detailed)                   | No   |
| Evacuation Route Map                                    | No   |
| Critical Facilities Inventory                           | No   |
| Vulnerable Population Inventory                         | No   |
| Land Use Map  | No   |
| <b>Staff/Department</b>                                 |  |
| Building Code Official                                  | No   |
| Building Inspector                                      | No   |
| Mapping Specialist (GIS)                                | No   |
| Engineer  | No   |
| Development Planner                                     | No   |
| Public Works Official                                   | No   |
| Emergency Management Director                           | No   |
| NFIP Floodplain Administrator                           | No   |
| Emergency Response Team                                 | No   |
| Hazardous Materials Expert                              | No   |
| Local Emergency Planning Committee                      | Yes  |
| County Emergency Management Commission                  | Yes  |
| Sanitation Department                                   | No   |
| Transportation Department                               | No   |
| Economic Development Department                         | No   |
| Housing Department                                      | No   |
| Historic Preservation                                   | No   |
| <b>Non-Governmental Organizations (NGOs)</b>            |  |
| American Red Cross                                      | No   |

|   |     |
|---|-----|
| Salvation Army                                | No  |
| Veterans Groups                               | Yes |
| Local Environmental Organization              | No  |
| Homeowner Associations                        | No  |
| Neighborhood Associations                     | No  |
| Chamber of Commerce                           | No  |
| Community Organizations (Lions, Kiwanis, etc. | No  |

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

### 2.2.9 Wooldridge

Wooldridge is governed by a town council that currently consists of 3 people, however is allowed to have 5. They do not have any warning sirens or designated storm shelters. An area of concern for the community though is snow removal. They do have areas located in floodplain and have a permit process to deal with any possible attempt to build in those areas.

**Table 2.14 Wooldridge Mitigation Capabilities**

| Capabilities   | Status Including Date of Document or Policy |
|--|---|
| <b>Planning Capabilities</b>                               |   |
| Comprehensive Plan   | No  |
| Builder's Plan   | No  |
| Capital Improvement Plan                                   | No  |
| City Emergency Operations Plan                             | No  |
| County Emergency Operations Plan                           | 11/05/2020                                  |
| Local Recovery Plan  | No  |
| County Recovery Plan                                       | No  |
| City Mitigation Plan                                       | No  |
| County Mitigation Plan                                     | 2017  |
| Debris Management Plan                                     | No  |
| Economic Development Plan                                  | No  |
| Transportation Plan  | Yes: Mid-MO RPC 2016                        |
| Land-use Plan  | No  |
| Flood Mitigation Assistance (FMA) Plan                     | No  |
| Watershed Plan   | No  |
| Firewise or other fire mitigation plan                     | No  |
| School Mitigation Plan                                     | No  |
| Critical Facilities Plan<br>(Mitigation/Response/Recovery) | No  |
| <b>Policies/Ordinance</b>                                  |   |
| Zoning Ordinance   | No  |
| Building Code  | No  |
| Floodplain Ordinance                                       | Yes   |
| Subdivision Ordinance                                      | No  |
| Tree Trimming Ordinance                                    | No  |
| Nuisance Ordinance   | No  |
| Stormwater Ordinance                                       | No  |
| Drainage Ordinance   | No  |
| Site Plan Review Requirements                              | No  |
| Historic Preservation Ordinance                            | No  |
| Landscape Ordinance  | No  |
| <b>Program</b>   |   |
| Zoning/Land Use Restrictions                               | No  |
| Codes Building Site/Design                                 | No  |
| Hazard Awareness Program                                   | No  |
| National Flood Insurance Program (NFIP)                    | Yes   |

|   |     |
|---|-----|
| NFIP Community Rating System (CRS) program  | No  |
| National Weather Service (NWS) Storm Ready  | No  |
| Firewise Community Certification            | No  |
| Building Code Effectiveness Grading (BCEGs) | No  |
| ISO Fire Rating                             | N/A |

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



|   |    |
|---|----|
| Homeowner Associations                        | No |
| Neighborhood Associations                     | No |
| Chamber of Commerce                           | No |
| Community Organizations (Lions, Kiwanis, etc. | No |

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

**Table 2.15 Mitigation Capabilities Summary Table**

| CAPABILITIES                           | Uninc. Cooper | Blackwater | Boonville | Bunceton | Otterville | Pilot Grove | Prairie Home | Windsor Place | Wooldridge |
|--|---------------|------------|-----------|----------|------------|-------------|--------------|---------------|------------|
| <b>Planning Capabilities</b>           |               |            |           |          |            |             |              |               |            |
| Comprehensive Plan                     | No            | No         | 2003      | No       | No         | No          | No           | N/A           | No         |
| Builder's Plan                         | No            | No         | No        | No       | No         | No          | No           | N/A           | No         |
| Capital Improvement Plan               | No            | No         | Yes       | No       | 1/2021     | No          | No           | N/A           | No         |
| Local Emergency Plan                   | N/A           | Yes        | No        | Yes      | 11/2020    | No          | No           | N/A           | No         |
| County Emergency Plan                  | 11/5/2020     | Yes        | Yes       | Yes      | Yes        | Yes         | Yes          | Yes           | Yes        |
| Local Recovery Plan                    | N/A           | No         | No        | No       | N/A        | No          | No           | N/A           | No         |
| County Recovery Plan                   | No            | No         | No        | No       | No         | No          | N/A          | No            | No         |
| Local Mitigation Plan                  | N/A           | No         | 2017      | No       | No         | No          | No           | N/A           | No         |
| County Mitigation Plan                 | 2017          | 2017       | 2017      | 2017     | 2017       | 2017        | 2017         | 2017          | 2017       |
| Local Mitigation Plan (PDM)            | N/A           | N/A        | N/A       | N/A      | N/A        | N/A         | N/A          | N/A           | N/A        |
| County Mitigation Plan (PDM)           | N/A           | N/A        | N/A       | N/A      | N/A        | N/A         | N/A          | N/A           | N/A        |
| Debris Management Plan                 | No            | No         | No        | No       | No         | No          | No           | N/A           | No         |
| Economic Development Plan              | No            | No         | Yes       | No       | No         | No          | No           | N/A           | No         |
| Transportation Plan                    | 2016          | Yes        | Yes       | Yes      | No         | Yes         | No           | N/A           | 2016       |
| Land-use Plan                          | No            | No         | Yes       | No       | No         | No          | No           | N/A           | No         |
| Flood Mitigation Assistance (FMA) Plan | N/A           | No         | Yes       | No       | No         | No          | No           | N/A           | No         |
| Watershed Plan                         | No            | No         | No        | No       | No         | No          | No           | N/A           | No         |

| <b>CAPABILITIES</b>                                     | <b>Uninc. Cooper</b> | <b>Blackwater</b> | <b>Boonville</b> | <b>Bunceton</b> | <b>Otterville</b> | <b>Pilot Grove</b> | <b>Prairie Home</b> | <b>Windsor Place</b> | <b>Wooldridge</b> |
|---|----------------------|-------------------|------------------|-----------------|-------------------|--------------------|---------------------|----------------------|-------------------|
| Firewise or other fire mitigation plan                  | No                   | No                | No               | No              | No                | No                 | No                  | No                   | No                |
| School Mitigation Plan                                  | No                   | No                | No               | No              | No                | No                 | No                  | No                   | No                |
| Critical Facilities Plan (Mitigation/Response/Recovery) | No                   | No                | No               | No              | No                | No                 | No                  | N/A                  | No                |
| <b>Policies/Ordinance</b>                               |                      |                   |                  |                 |                   |                    |                     |                      |                   |
| Zoning Ordinance  | No                   | Yes               | Yes              | Yes             | N/A               | No                 | No                  | Yes                  | No                |
| Building Code   | No                   | Yes               | Yes              | No              | No                | IBC                | No                  | No                   | No                |
| Floodplain Ordinance                                    | Yes                  | Yes               | Yes              | Yes             | No                | Yes                | No                  | No                   | Yes               |
| Subdivision Ordinance                                   | No                   | Yes               | Yes              | No              | N/A               | No                 | No                  | Yes                  | No                |
| Tree Trimming Ordinance                                 | No                   | No                | No               | No              | N/A               | No                 | No                  | No                   | No                |
| Nuisance Ordinance                                      | Yes                  | Yes               | Yes              | No              | 9/2003            | Yes                | Yes                 | Yes                  | No                |
| Storm Water Ordinance                                   | No                   | No                | Yes              | No              | Yes               | Yes                | No                  | Yes                  | No                |
| Drainage Ordinance                                      | No                   | No                | Yes              | No              | Yes               | No                 | No                  | Yes                  | No                |
| Site Plan Review Requirements                           | No                   | No                | Yes              | No              | No                | No                 | No                  | No                   | No                |
| Historic Preservation Ordinance                         | No                   | Yes               | Yes              | No              | No                | No                 | No                  | No                   | No                |
| Landscape Ordinance                                     | No                   | No                | 2009             | No              | No                | No                 | No                  | Yes                  | No                |
| Iowa Wetlands and Riparian Areas Conservation Plan      | No                   | No                | No               | No              | No                | No                 | No                  | No                   | No                |
| <b>Program</b>  |                      |                   |                  |                 |                   |                    |                     |                      |                   |
| Zoning/Land Use Restrictions                            | No                   | Yes               | Yes              | Yes             | N/A               | No                 | Yes                 | Yes                  | No                |

| CAPABILITIES   | Uninc. Cooper | Blackwater | Boonville | Bunceton | Otterville | Pilot Grove | Prairie Home | Windsor Place | Wooldridge |
|--|---------------|------------|-----------|----------|------------|-------------|--------------|---------------|------------|
| Codes Building Site/Design                                 | No            | No         | Yes       | No       | N/A        | IBC         | No           | Yes           | No         |
| National Flood Insurance Program (NFIP) Participant        | Yes           | Yes        | Yes       | Yes      | No         | Yes         | No           | No            | Yes        |
| NFIP Community Rating System (CRS) Participating Community | N/A           | No         | 2021      | No       | N/A        | No          | No           | No            | No         |
| Hazard Awareness Program                                   | Yes           | Yes        | Yes       | No       | N/A        | No          | No           | No            | No         |
| National Weather Service (NWS) Storm Ready                 | Yes           | Yes        | Yes       | No       | Yes        | No          | No           | No            | No         |
| Building Code Effectiveness Grading (BCEGs)                | No            | No         | Yes       | No       | N/A        | No          | No           | No            | No         |
| ISO Fire Rating  | N/A           | 7          | 4         | N/A      | 5          | 5           | 07/7x        | N/A           | N/A        |
| Economic Development Program                               | Yes           | No         | Yes       | No       | N/A        | No          | No           | No            | No         |
| Land Use Program   | No            | Yes        | No        | No       | N/A        | No          | No           | No            | No         |
| Public Education/Awareness                                 | Yes           | Yes        | Yes       | No       | Yes        | No          | No           | No            | No         |
| Property Acquisition                                       | No            | No         | Yes       | No       | N/A        | No          | No           | No            | No         |
| Planning/Zoning Boards                                     | No            | Yes        | Yes       | Yes      | N/A        | No          | No           | Yes           | No         |
| Stream Maintenance Program                                 | No            | No         | Yes       | No       | N/A        | No          | No           | No            | No         |
| Tree Trimming Program                                      | Yes           | No         | Yes       | No       | No         | No          | No           | No            | No         |
| Engineering Studies for Streams (Local/County/Regional)    | No            | No         | No        | No       | N/A        | No          | No           | No            | No         |
| Mutual Aid Agreements                                      | Yes           | No         | Yes       | Yes      | Yes        | No          | No           | Yes           | No         |
| <b>Studies/Reports/Maps</b>                                |               |            |           |          |            |             |              |               |            |

| CAPABILITIES                             | Uninc. Cooper | Blackwater | Boonville   | Bunceton | Otterville | Pilot Grove | Prairie Home | Windsor Place | Wooldridge |
|--|---------------|------------|-------------|----------|------------|-------------|--------------|---------------|------------|
| Hazard Analysis/Risk Assessment (Local)  | N/A           | No         | Yes         | No       | No         | No          | Yes          | No            | No         |
| Hazard Analysis/Risk Assessment (County) | No            | No         | No          | No       | No         | No          | No           | No            | No         |
| Flood Insurance Maps                     | N/A           | N/A        | N/A         | N/A      | N/A        | N/A         | N/A          | N/A           | N/A        |
| FEMA Flood Insurance Study (Detailed)    | N/A           | N/A        | N/A         | N/A      | N/A        | N/A         | N/A          | N/A           | N/A        |
| Evacuation Route Map                     | Yes           | No         | Yes         | No       | No         | No          | No           | No            | No         |
| Critical Facilities Inventory            | Yes           | Yes        | In Progress | No       | Yes        | No          | Yes          | No            | No         |
| Vulnerable Population Inventory          | No            | No         | Yes         | No       | No         | No          | No           | No            | No         |
| Land Use Map                             | No            | Yes        | Yes         | No       | No         | No          | No           | No            | No         |
| <b>Staff/Department</b>                  |               |            |             |          |            |             |              |               |            |
| Building Code Official                   | No            | No         | Yes         | No       | No         | Yes         | No           | No            | No         |
| Building Inspector                       | No            | No         | Yes         | No       | No         | Yes         | No           | No            | No         |
| Mapping Specialist (GIS)                 | Yes           | Yes        | No          | No       | No         | No          | No           | No            | No         |
| Engineer                                 | Yes           | No         | Yes         | No       | No         | No          | No           | No            | No         |
| Development Planner                      | No            | No         | No          | No       | No         | No          | No           | No            | No         |
| Public Works Official                    | Yes           | No         | Yes         | Yes      | No         | Yes         | No           | No            | No         |
| Emergency Management Coordinator         | Yes           | Yes        | County      | County   | Yes        | Yes         | No           | No            | No         |
| NFIP Floodplain Administrator            | Yes           | Yes        | Yes         | Yes      | No         | Yes         | No           | No            | Yes        |

| <b>CAPABILITIES</b>                          | <b>Uninc. Cooper</b> | <b>Blackwater</b> | <b>Boonville</b> | <b>Bunceton</b> | <b>Otterville</b> | <b>Pilot Grove</b> | <b>Prairie Home</b> | <b>Windsor Place</b> | <b>Wooldridge</b> |
|--|----------------------|-------------------|------------------|-----------------|-------------------|--------------------|---------------------|----------------------|-------------------|
| Emergency Response Team                      | Yes                  | No                | Yes              | No              | No                | Yes                | No                  | No                   | No                |
| Hazardous Materials Expert                   | Yes                  | No                | Yes              | No              | Yes               | No                 | No                  | No                   | No                |
| Local Emergency Planning Committee           | Yes                  | Yes               | Yes              | No              | Yes               | No                 | No                  | No                   | Yes               |
| County Emergency Management Commission       | Yes                  | Yes               | Yes              | Yes             | Yes               | Yes                | Yes                 | Yes                  | Yes               |
| Sanitation Department                        | No                   | Yes               | Yes              | No              | No                | Yes                | No                  | No                   | No                |
| Transportation Department                    | Yes                  | No                | No               | No              | No                | No                 | No                  | No                   | No                |
| Economic Development Department              | Yes                  | No                | Yes              | No              | Yes               | Yes                | No                  | No                   | No                |
| Housing Department                           | No                   | No                | Yes              | No              | No                | No                 | No                  | No                   | No                |
| Historic Preservation                        | Yes                  | Yes               | Yes              | No              | No                | No                 | No                  | No                   | No                |
| <b>Non-Governmental Organizations (NGOs)</b> |                      |                   |                  |                 |                   |                    |                     |                      |                   |
| American Red Cross                           | No                   | Yes               | Yes              | No              | No                | No                 | No                  | No                   | No                |
| Salvation Army                               | No                   | No                | Yes              | No              | No                | No                 | No                  | No                   | No                |
| Veterans Groups                              | Yes                  | No                | Yes              | No              | No                | No                 | No                  | Yes                  | No                |
| Environmental Organization                   | No                   | No                | No               | No              | No                | No                 | No                  | No                   | No                |
| Homeowner Associations                       | Yes                  | No                | Yes              | No              | No                | No                 | No                  | No                   | No                |
| Neighborhood Associations                    | Yes                  | No                | No               | No              | No                | No                 | No                  | No                   | No                |
| Chamber of Commerce                          | Yes                  | No                | Yes              | No              | Yes               | No                 | No                  | No                   | No                |

| <b>CAPABILITIES</b>                                | <b>Uninc. Cooper</b> | <b>Blackwater</b> | <b>Boonville</b> | <b>Bunceton</b> | <b>Oterville</b> | <b>Pilot Grove</b> | <b>Prairie Home</b> | <b>Windsor Place</b> | <b>Wooldridge</b> |
|--|----------------------|-------------------|------------------|-----------------|------------------|--------------------|---------------------|----------------------|-------------------|
| Community Organizations (Lions, Kiwanis, etc.)     | Yes                  | Yes               | Yes              | Yes             | No               | No                 | Yes                 | No                   | No                |
| <b>Financial Resources</b>                         |                      |                   |                  |                 |                  |                    |                     |                      |                   |
| Apply for Community Development Block Grants       | Yes                  | Yes               | Yes              | Yes             | Yes              | Yes                | Yes                 | No                   | Yes               |
| Fund projects through Capital Improvements funding | Yes                  | Yes               | Yes              | Yes             | No               | Yes                | Yes                 | No                   | No                |
| Authority to levy taxes for specific purposes      | Yes                  | Yes               | Yes              | No              | Yes              | Yes                | Yes                 | Yes                  | No                |
| Fees for water, sewer, gas, or electric services   | No                   | Yes               | Yes              | Yes             | Yes              | Yes                | Yes                 | Yes                  | No                |
| Impact fees for new development                    | No                   | No                | Yes              | No              | No               | No                 | No                  | No                   | No                |
| Incur debt through general obligation bonds        | Yes                  | Yes               | Yes              | Yes             | Yes              | Yes                | Yes                 | No                   | No                |
| Incur debt through special tax bonds               | Yes                  | Yes               | Yes              | Yes             | Yes              | Yes                | Yes                 | No                   | No                |
| Incur debt through private activities              | Yes                  | No                | No               | No              | No               | No                 | No                  | No                   | No                |
| Withhold spending in hazard prone areas            | Yes                  | Yes               | Yes              | No              | No               | Yes                | No                  | No                   | Yes               |

Source: Data Collection Questionnaire, 2021

## 2.3 Special District

---

There are numerous special districts in the planning area which are vital to the health and safety of the population. In addition to providing basic services, personnel of the special districts possess a wealth of knowledge and experience valuable for hazard mitigation planning.

### 2.3.1 Levee Districts

There are two Levee Districts located in the Planning Area. Each levee district is composed of an elected board. The districts are responsible for maintaining the levees and setting an annual budget. Both levee districts are organized through the Cooper County Commission.

It should be noted that the Overton-Wooldridge levee district is also referred to in some federal and state documentation as “Cooper County Levee District No. 1”. The name Overton-Wooldridge appears on all county documentation and taxing information.

### 2.3.2 Non-Governmental and Volunteer Organizations

After the floods in 1993 the non-profit agencies in Missouri organized the **Missouri Volunteers Against Disaster (MOVOAD)**. The main goal of MOVOAD is to increase cooperation, coordination, communication, education, and to pass local, county and state disaster legislation. Their mission is to bring together National Voluntary Organizations Active in Disaster to foster more effective service through mitigation and response for the benefit of people affected (imperiled and impacted) by disaster through:

1. Cooperation: To create a climate of cooperation at all levels (including grass roots) to provide information.
2. Coordination: To coordinate policy among member organizations and to serve as a liaison, advocate and national voice.
3. Communication: To disseminate information through the newsletter, the director, research and demonstration, case study and critique.
4. Education: To increase mutual awareness and understanding of each organization.
5. Convention Mechanisms: To arrange for such meetings and conferences as necessary to accomplish the purpose of MOVOAD.
6. Legislation: To encourage effective disaster relief legislation and policy.

Organizations in Cooper County such as the American Red Cross, church agencies, and other non-profits are active in supporting the work of MOVOAD. This collaborative effort ensures



that Cooper County non-profits are well prepared to respond to a natural disaster. Through their legislative efforts, they also work to help make Missouri and Cooper County as disaster resistant as possible.

### 2.3.3 Fire Protection Districts

There are 6 fire districts in Cooper County. The majority tend to participate in hazard mitigation through the county and others choose to participate more directly. The following districts chose to participate as their district as not as part of the county.

The Blackwater Area Fire Protection District is a volunteer fire district that serves the northwestern portion of Cooper County into the southeastern portion of Saline County. The district is governed by a 5-member board.

**Table 2.16 Blackwater Area FPD Programs**

| Programs                   |              |
|----------------------------|--------------|
| Cross-Connection Program   | N/A          |
| Hydrant Flushing Program   | N/A          |
| Public Education/Awareness | October 2020 |
| Tree Trimming Program      | N/A          |
| Mutual Aid Agreements      | Yes          |

**Table 2.17 Blackwater Area FPD Asset Values**

| Name of Asset | Address                     | Area (sq.ft.) | Replacement Value (Insured) (\$) | Contents Value (\$) |
|---------------|-----------------------------|---------------|----------------------------------|---------------------|
| Station #1    | 301 Trigg St.<br>Blackwater | 1650          | \$102,644                        | \$48,667            |
| Station #2    | 201 Main St. Nelson         | 1680          | \$73,000                         | \$48,667            |

The Cooper County Fire Protection District is governed by a 5-member Board of Directors. Members are elected on a staggered biennial basis to 6-year terms. Cooper FPD has a general ISO rating of 6 within their district.

**Table 2.18 Cooper Co. FPD Programs**

| Programs                 |     |
|--------------------------|-----|
| Cross-Connection Program | N/A |

|                            |     |
|----------------------------|-----|
| Hydrant Flushing Program   | yes |
| Public Education/Awareness | yes |
| Tree Trimming Program      | N/A |
| Mutual Aid Agreements      | Yes |

**Table 2.19 Cooper Co. FPD Stations**

| Name of Station | Address                   |
|-----------------|---------------------------|
| CCFPD HQ        | 17010 Hwy 87, Boonville   |
| CCFPD Station 1 | 16994 Hwy 87, Boonville   |
| CCFPD Station 2 | 11500 Santa Fe, Boonville |
| CCFPD Station 3 | 25201 Hwy 179, Boonville  |
| CCFPD Station 4 | 14847 Hwy 5, Boonville    |
| CCFPD Station 5 | 707 E Main St, Bunceton   |
| CCFPD Station 6 | 10762, Hwy B, Bunceton    |

The Otterville Fire Protection District is manned by 22 volunteer firefighters, with a 5-member board of directors.

**Table 2.20 Otterville FPD Programs**

| Programs                   |     |
|----------------------------|-----|
| Cross-Connection Program   | yes |
| Hydrant Flushing Program   | yes |
| Public Education/Awareness | yes |
| Tree Trimming Program      | no  |
| Mutual Aid Agreements      | yes |

**Table 2.21 Otterville FPD Asset Values**

| Name of Asset | Address                   | Area (sq.ft.) | Replacement Value (Insured) (\$) | Contents Value (\$) |
|---------------|---------------------------|---------------|----------------------------------|---------------------|
| Station 1     | 3530 Old Rt. 50<br>65348  | 5400          | 327,000                          | 10,000              |
| Station 2     | 6394 Rogers Lane<br>65237 | 2500          | 147,000                          | 10,000              |

Pilot Grove Fire Protection District was approved by tax payers in 2014 and is governed by a 5-member board of directors.

**Table 2.23 Pilot Grove FPD Programs**

| Programs                   |                                |
|----------------------------|--------------------------------|
| Cross-Connection Program   | NA                             |
| Hydrant Flushing Program   | City of Pilot Grove            |
| Public Education/Awareness | Fire Awareness Week            |
| Tree Trimming Program      | City of Pilot Grove            |
| Mutual Aid Agreements      | With all area fire departments |

**Table 2.24 Pilot Grove Asset Values**

| Name of Asset | Address                     | Area (sq.ft.) | Replacement Value (Insured) (\$) | Contents Value (\$) |
|---------------|-----------------------------|---------------|----------------------------------|---------------------|
| Fire station  | 612 College St. Pilot Grove | 7000          | \$450,000                        | \$300,000           |

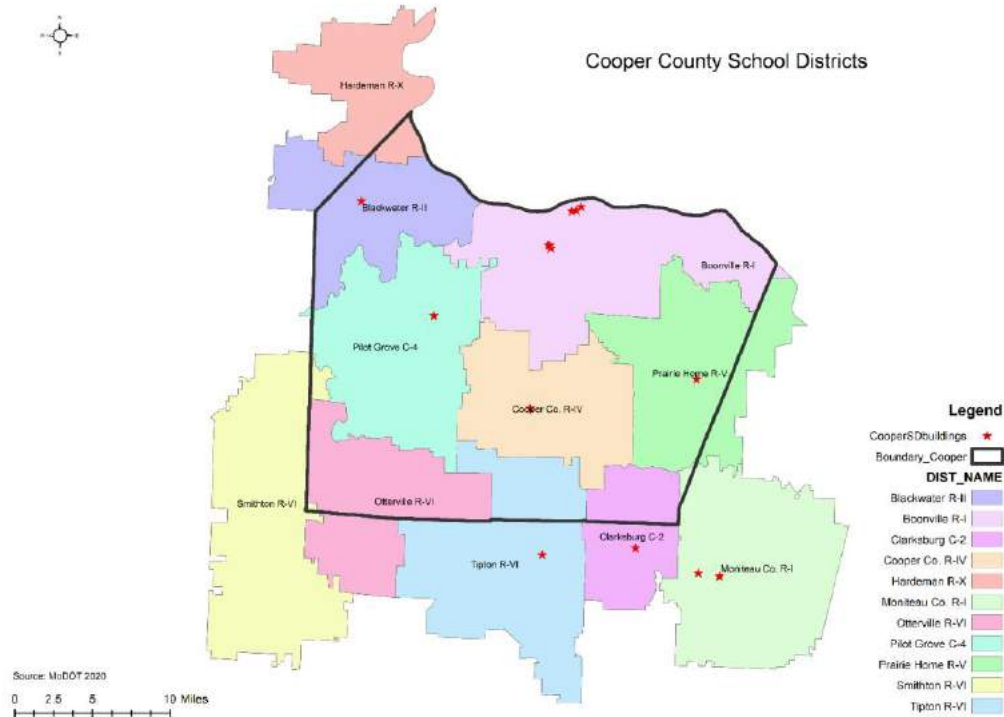
## 2.4 Public School district Profile and Mitigation Capabilities

There are 11 school districts that intersect the Cooper County boundary. Only 6 districts chose to participate in the Cooper plan update. They are:

- Blackwater School District
- Boonville School District
- Cooper Co. R-IV
- Otterville School District
- Pilot Grove School District
- Prairie Home School District

Map 2.6 displays the school districts and how they are situated within and around the Cooper County boundary.

## Map 2.6 Cooper County School Districts



### 2.4.1 Blackwater School District

The Blackwater School District owns 4 buildings. It supports grades pre-K through 8<sup>th</sup> and is located in the town of Blackwater. They have a relatively small student body that is expected to remain stable over the next 5 years.

**Table 2.25 Blackwater R-II School District Enrollment**

| School District              | Grades  | Certificated Staff | Students  |
|------------------------------|---------|--------------------|-----------|
| Blackwater Elementary School | Pre-K-8 | 14                 | 94        |
| <b>Totals:</b>               |         | <b>14</b>          | <b>94</b> |

**Table 2.26 Blackwater R-II School Districts Values**

| Building                       | Address       | Replacement Value | Contents Value |
|--------------------------------|---------------|-------------------|----------------|
| Blackwater R-II School         | 300 Doddridge | \$3,000,000       | \$540,000      |
| Blackwater Elementary Addition | 300 Doddridge | \$342,000         | \$87,000       |
| Storage Building               | 300 Doddridge | \$7,000           | \$2,500        |
| Ball Field Concession          | County Ave.   | \$140,000         | \$57,000       |

### 2.4.2 Boonville School District

Boonville has 7 main buildings but Hannah Cole Primary is the only with a FEMA rated safe room. Since the last update new electrical wiring was added to several structures and alarm systems were upgraded at David Barton elementary and Boonville Technical Center. A new connector was added between Boonville High School and the Technical Center for added security for staff and students traveling between the buildings.

A 2019-20 bond was passed that allowed for major upgrades to the current buildings, creating single-point entries and adding a camera system in all public spaces that records those who enter and leave the buildings.

| <b>Table 2.27 Boonville R-I School District Enrollment</b> |               |                           |                 |
|--|---------------|---------------------------|-----------------|
| <b>School District</b>                                     | <b>Grades</b> | <b>Certificated Staff</b> | <b>Students</b> |
| <b>Boonville R-I</b>                                       |               |                           |                 |
| David Barton Elementary School                             | 3-5           | 33                        | 332             |
| Hannah Cole Primary School                                 | Pre K-2       | 33                        | 333             |
| Laura Speed Elliott Middle School                          | 7-12          | 34                        | 341             |
| Boonville High School                                      | 9-12          | 64                        | 545             |
| <b>Totals: 4 Schools</b>                                   |               | <b>164</b>                | <b>1551</b>     |

| <b>Table 2.28 Boonville R-I School Districts Values</b> |                |                          |                       |
|---|----------------|--------------------------|-----------------------|
| <b>Building</b>   | <b>Address</b> | <b>Replacement Value</b> | <b>Contents Value</b> |
| Central Office  | 736 Main       | \$1,700,000              | \$623,179             |
| Laura Speed Elliott M.S.                                | 700 Main       | \$8,000,000              | \$1,109,774           |
| David Barton Ele.                                       | 814 Locust     | \$7,300,000              | \$1,003,674           |
| Boonville H.S.  | 1690 W. Ashley | \$10,800,000             | \$1,224,409           |
| Boonville Tech. Center                                  | 1694 W Ashley  | \$6,400,000              | \$1,145,519           |
| Hannah Cole Primary                                     | 1691 W. Ashley | \$7,750,000              | \$1,030,000           |
| Alternative School                                      | 1730 W. Ashley | \$258,920                | \$27,000              |

### 2.4.3 Cooper Co. R-IV

Cooper County R-IV, sometimes referred to as Bunceton R-IV, has a district-wide all call, a one-call now for parents, as well as utilize an intercom system and have an all-call system for halls and outside areas. Teachers and staff are also equipped with hand radios and most have cell phones. Each building also has weather radios available. Last year a new roof was installed over the older portion of the school building. Future plans include tearing down the dilapidated Annex building and replacing it with a FEMA rated saferoom structure along with the addition of a

preschool room and new bus barn. The school has had a steady increase in enrollment that has stayed in trend with the progress of the town.

| <b>Table 2.29 Cooper County School District Enrollment</b> |               |                           |                 |
|--|---------------|---------------------------|-----------------|
| <b>School District</b>                                     | <b>Grades</b> | <b>Certificated Staff</b> | <b>Students</b> |
| Cooper Co. R-IV  | Pre-K-12      | 18                        | 103             |

| <b>Table 2.30 Cooper County School Districts Values</b> |                |                          |                       |
|---|----------------|--------------------------|-----------------------|
| <b>Building</b>   | <b>Address</b> | <b>Replacement Value</b> | <b>Contents Value</b> |
| Main Building   | 500 E. Main    | \$8,039,232.95           | \$1,313,896.49        |
| Concession Building                                     | 500 E. Main    | \$104,229.94             | \$12,646.64           |

#### **2.4.4 Otterville School District**

Otterville school district has stable enrollment currently but projections anticipate a drop in enrollment in the future as the population ages and young families migrate to other school districts closer to their work. There have been no remodel or building projects since the last update but the school district expressed their interest in and the need for a saferoom for their students and the community.

| <b>Table 2.31 Otterville School District Enrollment</b> |               |                           |                 |
|---|---------------|---------------------------|-----------------|
| <b>School District</b>                                  | <b>Grades</b> | <b>Certificated Staff</b> | <b>Students</b> |
| Otterville School                                       | Pre-K-12      | 24                        | 220             |

| <b>Table 2.32 Otterville School Districts Values</b> |                   |                          |                       |
|--|-------------------|--------------------------|-----------------------|
| <b>Building</b>                                      | <b>Address</b>    | <b>Replacement Value</b> | <b>Contents Value</b> |
| Main Building  | 101<br>Georgetown | \$9,598,909              | \$1,443,819           |

#### **2.4.5 Pilot Grove School District**

Pilot Grove C-4 district has stable enrollment with slight growth anticipated in the future. There were not any remodels or new buildings constructed since the last update but plans to upgrade the school’s intercom and phone system, as well as a new fire system are in the works. The school district currently does not have a FEMA rated saferoom but is working toward an addition to their existing gymnasium that they would like to build to FEMA saferoom standards.

| <b>Table 2.33 Pilot Grove C-4 School District Enrollment</b> |               |                           |                 |
|--|---------------|---------------------------|-----------------|
| <b>School District</b>                                       | <b>Grades</b> | <b>Certificated Staff</b> | <b>Students</b> |
| Pilot Grove C-4 School                                       | Pre-K-12      | 31                        | 233             |
| <b>Totals: 1 School</b>                                      |               | 31                        | 233             |

| <b>Table 2.34 Pilot Grove C-4 School Districts Values</b> |                |                          |                       |
|---|----------------|--------------------------|-----------------------|
| <b>Building</b>   | <b>Address</b> | <b>Replacement Value</b> | <b>Contents Value</b> |
| Main Building   | 107 School St  | \$11,225,989             | \$1,574,786           |
| Vo-Ag Shop Building                                       | 107 School St  | \$759,062                | \$251,462             |
| Vo-Ag Shop/Pre K  | 107 School St  | \$966,327                | \$119,442             |

#### 2.4.6 Prairie Home School District

Prairie Home School District has one main school building that houses K-12 with stable enrollment. While they currently do not have any FEMA rated storm shelters, they do have locations designated for sheltering. Future plans include an addition to add bathrooms that could become storm shelters in the HS/JH portion of the building. Remodeling of the elementary and cafeteria, kitchen, nurse's office area are also of future interest. Since the last plan update improvements were made to the bus barn.

| <b>Table 2.35 Prairie Home School District Enrollment</b> |               |                           |                 |
|---|---------------|---------------------------|-----------------|
| <b>School District</b>                                    | <b>Grades</b> | <b>Certificated Staff</b> | <b>Students</b> |
| <b>Prairie Home R-V</b>                                   |               |                           |                 |
| Elementary Side of Building                               | K-6           | 18                        | 67              |
| High School Side of Building                              | 7-12          | 13                        | 81              |
| <b>Totals: 4 Schools</b>                                  |               | 31                        | <b>148</b>      |

| <b>Table 2.36 Prairie Home School Districts Values</b> |                |                          |                       |
|--|----------------|--------------------------|-----------------------|
| <b>Building</b>  | <b>Address</b> | <b>Replacement Value</b> | <b>Contents Value</b> |
| School Building  | 301 Highway Dr | \$7,411,965              | \$969,703             |
| Concession/Restroom                                    | Hwy J          | \$43,819                 | \$7,857               |
| Baseball Field/Track                                   | Hwy J          | \$89,911                 | \$0                   |
| Bus Barn   | 301 Highway Dr | \$50,172                 | \$270,000             |

**Table 2.37 Summary of Mitigation Capabilities- Cooper County School Districts**

| Capability                              | Blackwater SD | Boonville SD | Cooper R-IV | Otterville SD | Pilot Grove SD | Prairie Home SD |
|---|---------------|--------------|-------------|---------------|----------------|-----------------|
| <b>Planning Elements</b>                |               |              |             |               |                |                 |
| Master Plan/ Date                       | No            | Yes, 2008    | Yes, 2021   | No            | Yes-2021       | Yes, 2021       |
| Capital Improvement Plan/Date           | No            | Yes          | Yes, 2021   | Yes-2010      | Yes-2021       | Yes, 2021       |
| School Emergency Plan / Date            | Yes, 2021     | Yes, 2015    | Yes, 2020   | Yes-2015      | Yes-2021       | Yes, 2021       |
| Weapons Policy/Date                     | Yes, 2013     | Yes, 2008    | Yes         | Yes-2020      | Yes-2012       | Yes, 2013       |
| <b>Personnel Resources</b>              |               |              |             |               |                |                 |
| Full-Time Building Official (Principal) | Yes           | Yes          | Yes         | Yes           | Yes            | Yes             |
| Emergency Manager                       | No            | Yes          | No          | Yes           | Yes            | Yes             |
| Grant Writer                            | No            | Yes          | Yes         | Yes           | Yes            | Yes             |
| Public Information Officer              | No            | Yes          | No          | Yes           | Yes            | Yes             |
| <b>Financial Resources</b>              |               |              |             |               |                |                 |
| Capital Improvements Project Funding    | Yes           | Yes          | Yes         | Yes           | Yes            | Yes             |
| Local Funds                             | Yes           | Yes          | Yes         | Yes           | Yes            | Yes             |
| General Obligation Bonds                | No            | Yes          | No          | Yes           | Yes            | Yes             |
| Special Tax Bonds                       | No            | Yes          | No          | No            | Yes            | Yes             |
| Private Activities/Donations            | No            | Yes          | No          | No            | Yes            | Yes             |
| State and Federal Funds/Grants          | No            | Yes          | Yes         | Yes           | Yes            | Yes             |
| <b>Other</b>                            |               |              |             |               |                |                 |
| Public Education Programs               | Yes           | Yes          | Yes         | Yes           | Yes            | Yes             |
| Privately or Self- Insured?             | Self          | Self         | Self        | Self          | Self           | Self            |
| Fire Evacuation Training                | Yes           | Yes          | Yes         | Yes           | Yes            | Yes             |
| Tornado Sheltering Exercises            | Yes           | Yes          | Yes         | Yes           | Yes            | Yes             |
| Public Address/Emergency Alert System   | Yes           | Yes          | Yes         | Yes           | Yes            | Yes             |
| NOAA Weather Radios                     | No            | Yes          | Yes         | Yes           | Yes            | Yes             |
| Lock-Down Security Training             | Yes           | Yes          | Yes         | Yes           | Yes            | Yes             |
| Mitigation Programs                     | Yes           | Yes          | No          | Yes           | Yes            | Yes             |



|                          |     |     |     |     |     |     |
|--------------------------|-----|-----|-----|-----|-----|-----|
| Tornado Shelter/Saferoom | Yes | Yes | Yes | Yes | Yes | Yes |
| Campus Police            | No  | No  | No  | No  | No  | No  |

Source: Data Collection Questionnaire, 2021

## **2.5 Higher Education**

### **2.5.1 State Fair Community College**

State Fair Community College (SFCC) averages 150 students every semester and have anywhere between 15 to 20 adjuncts, and 5-6 teaching staff for each term.

State Fair Community College (SFCC) offers classes and services in Boonville at the former Kemper Military School, now known as The Kemper Campus. The building includes thirteen classrooms with additional office space and a student lounge space.

State Fair Community College (SFCC) has its own Emergency Operations Plan set up for their campus in Boonville, MO and for the college as a whole. The Library Learning Center was renovated in 2012 followed by the Science Hall in 2015.

### Chapter 3: Natural Hazards Risk Assessment

- 3.1 Hazard Identification.....78
  - 3.1.1 Review of Existing Mitigation Plans
  - 3.1.2 Review Disaster Declaration History
  - 3.1.3 Research Additional Sources
  - 3.1.4 Hazards Identified
  - 3.1.5 Multi-Jurisdictional Risk Assessment
  
- 3.2 Assets At Risk.....82
  - 3.2.1 Total Exposure of Population and Structures
  - 3.2.2 Critical and Essential Facilities and Infrastructure
  - 3.2.3 Other Assets
  
- 3.3 Land Use and Development.....95
  - 3.3.1 Development Since Previous Plan Update
  - 3.3.2 Future Land Use and Development
  
- 3.4 Hazard Profiles, Vulnerability, and Problem Statements.....97
  - 3.4.1 Flooding (Riverine and Flash)
  - 3.4.2 Levee Failure
  - 3.4.3 Dam Failure
  - 3.4.4 Earthquake
  - 3.4.5 Land Subsidence/Sinkholes
  - 3.4.6 Drought
  - 3.4.7 Extreme Temperatures
  - 3.4.8 Severe Thunderstorms (including Damaging Winds, Hail, and Lightning)
  - 3.4.9 Severe Winter Weather
  - 3.4.10 Tornado
  - 3.4.11 Wildfire

## Chapter 3: natural Hazard Risk Assessment

---

**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**

Risk assessment is a process of estimating the potential for injury, death, property damage, or economic loss which may result from a hazard. A risk assessment is only as valuable as the thoroughness and accuracy of the information on which it is based. As will be seen, there is a great variation between hazards in the amount and reliability of the data available for analysis.

This chapter is divided into four main parts:

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

## 3.1 HAZARD IDENTIFICATION

---

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

As part of the planning process each jurisdiction was asked to evaluate the probability and potential severity of each hazard addressed in this plan. The following natural hazards have been identified as posing potential risk to all, or portions, of the planning area:

- Flood (includes riverine flooding, flash flooding, and storm water flooding)
- Levee Failure
- Dam Failure
- Earthquake
- Land Subsidence/Sinkhole
- Severe Thunderstorms (includes Damaging Winds, Hail, and Lightning)
- Tornado
- Severe Winter Weather (Snow, Ice, and Extreme Cold)
- Drought
- Extreme Heat
- Wildfire

### 3.1.1 Review of Existing Mitigation Plans

There are certain other natural hazards which FEMA requires to be addressed in Hazard Mitigation Plans if they are applicable to the planning area. Avalanches and volcanoes have not been included in this plan as they do not pose a threat due to Cooper County's topography and geology. Coastal erosion, coastal storms, hurricanes, and tsunamis do not pose a threat to the county due to its inland location.

The Missouri State Hazard Mitigation Plan (2018) indicates that expansive soils, landslides, and rockfalls are recognized as hazards in Missouri but occur infrequently and with minimal impact. For this reason, those hazards were not profiled in the state plan nor will they be profiled in the Cooper County Plan.

### 3.1.2 Review Disaster Declaration History

Severe storms and flooding are the most common events to warrant a disaster declaration in Cooper County. In the event of flooding the declaration is brought on by mounting costs due to widespread water damage and the closure or destruction of several homes and businesses that impact the local economy of the affected area.

**Table 3.1 FEMA Disaster Declarations that included Cooper County, Missouri 1973-Present**

| <b>Year of Declaration Date</b> | <b>Declaration Title</b>   | <b>Disaster Number</b> | <b>Type of Assistance</b> |
|---------------------------------|--|------------------------|---------------------------|
| 2021                            | Severe Storms, Straight-line winds, Tornadoes, and Flooding          | 4612                   | PA                        |
| 2020                            | COVID-19 pandemic  | 4490                   | IA/PA                     |
|                                 | COVID-19   | 3482                   | PA                        |
|                                 | Missouri Severe Storms, Tornadoes, And Flooding                      | 4451                   | PA                        |
| 2019                            | Missouri Severe Storms, Tornadoes, Straight-line Winds, And Flooding | 3374                   | PA                        |
| 2016                            | Severe Winter Storm and Snowstorm                                    | 1961                   | PA                        |
| 2011                            | Severe Winter Storm and Snowstorm                                    | 3317                   | PA                        |
|                                 | Flooding   | 4012                   | PA                        |
|                                 |  | 3325                   | PA                        |
|                                 | Severe Winter Storm  | 3303                   | PA                        |
| 2009                            | Severe Storms and Flooding   | 1749                   | PA                        |
| 2008                            | Severe Winter Storms   | 3281                   | PA                        |
| 2007                            | Severe Storms, Tornadoes and Flooding                                | 1631                   | IA                        |
| 2006                            | Hurricane Katrina Evacuation   | 3232                   | PA                        |
| 2005                            | Severe Storms, Tornadoes, and Flooding                               | 1463                   | IA                        |
| 2003                            | Severe Winter Ice Storm  | 1403                   | IA                        |
| 2002                            | Severe Storms, Tornadoes and Flooding                                | 1412                   | PA                        |
|                                 | Severe Storms, Tornadoes, Hail and Flooding                          | 1054                   | IA/PA                     |
| 1995                            | Severe Storms & Flooding   | 995                    | IA/PA                     |
| 1993                            | Severe Storms & Flooding   | 779                    | IA                        |
| 1986                            | Drought  | 3017                   | PA                        |
| 1976                            | Severe Storms & Flooding   | 407                    | IA/PA                     |
| 1973                            | Heavy Rains, Tornadoes & Flooding                                    | 372                    | IA/PA                     |

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

### 3.1.3 Research Additional Sources

Sources utilized for information regarding past disaster incidents and research in the planning area include:

- Missouri Hazard Mitigation Plans (2013 and 2018)
- Previously approved Cooper County Hazard Mitigation Plan (2017)
- Federal Emergency Management Agency (FEMA)
- Missouri Department of Natural Resources
- National Drought Mitigation Center Drought Reporter
- US Department of Agriculture's Ag Census
- Data Collection Questionnaires completed by each jurisdiction
- State of Missouri GIS data
- Hazards US (Hazard)
- Missouri Department of Transportation
- County Emergency Management
- County Flood Insurance Rate Map, FEMA
- U.S. Army Corps of Engineers
- United States Geological Survey (USGS)
- National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI)

Note that the only centralized source of data for many of the weather-related hazards is the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI). 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. Some information appearing in the NCEI may be provided by or gathered from sources outside the National Weather Service (NWS), such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. An effort is made to use the best available information but because of time and resource constraints, information from these sources may be unverified by the NWS.

The NCEI damage amounts are estimates received from a variety of sources, including those listed above in the Data Sources section. Damages reported are in dollar values as they existed at the time of the storm event. They do not represent current dollar values.

The database currently contains data from January 1950 to March 2018. Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type.

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

**Table 3.2 Hazards Identified for Each Jurisdiction**

| <b>Jurisdiction</b>                  | <b>Dam Failure</b> | <b>Drought</b> | <b>Earthquake</b> | <b>Extreme Temperatures</b> | <b>Flooding (River and Flash)</b> | <b>Land Subsidence/Sinkholes</b> | <b>Levee Failure</b> | <b>Severe Winter Weather</b> | <b>Thunderstorm/Lightning/Hail/High Wind</b> | <b>Tornado</b> | <b>Wildfire</b> |
|--------------------------------------|--------------------|----------------|-------------------|-----------------------------|-----------------------------------|----------------------------------|----------------------|------------------------------|--|----------------|-----------------|
| Cooper County                        | x                  | x              | x                 | x                           | x                                 | x                                | x                    | x                            | x  | x              | x               |
| Blackwater                           |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| Boonville                            | x                  | x              | x                 | x                           | x                                 |                                  | x                    | x                            | x  | x              | x               |
| Bunceton                             |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| Oterville                            |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| Pilot Grove                          |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| Prairie Home                         |                    | x              | x                 | x                           |                                   |                                  |                      | x                            | x  | x              | x               |
| Windsor Place                        |                    |                |                   |                             |                                   |                                  |                      |                              |  |                |                 |
| Wooldridge                           |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| <b>Schools and Special Districts</b> |                    |                |                   |                             |                                   |                                  |                      |                              |  |                |                 |
| Blackwater R-II                      |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| Boonville R-I                        |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| Cooper Co. R-IV                      |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| Oterville R-VI                       |                    | x              | x                 | x                           | x                                 |                                  |                      | x                            | x  | x              | x               |
| Pilot Grove C-4                      |                    | X              | X                 | X                           | X                                 | x                                |                      | X                            | X  | X              | X               |
| Prairie Home R-V                     |                    | X              | X                 | X                           | X                                 |                                  |                      | X                            | X  | X              | X               |
| State Fair Community College         |                    | X              | X                 | X                           | X                                 |                                  |                      | X                            | X  | X              | X               |
| Blackwater Area FPD                  |                    | X              | X                 | X                           | X                                 |                                  |                      | X                            | X  | X              | X               |
| Cooper County FPD                    | X                  | X              | X                 | X                           | X                                 | X                                | X                    | X                            | X  | X              | X               |
| Oterville FPD                        |                    | X              | X                 | X                           | X                                 |                                  |                      | X                            | X  | X              | X               |
| Pilot Grove FPD                      |                    | X              | X                 | X                           | X                                 |                                  |                      | X                            | X  | X              | X               |



### **3.1.5 Multi-Jurisdictional Risk Assessment**

The 2022 Cooper County Hazard Mitigation plan is an update of an earlier plan. The hazard profiles that follow are assessed on a county-wide basis but each jurisdiction will have unique levels of impact based on population and geographical location. Boonville is the urban center of the planning area, with a variety of development and infrastructure. It also serves as the county seat. Other areas of the county are rural with little population or infrastructure to be damaged in the event of a natural hazard.

The planning area is subject to various natural hazards such as dam failure, drought, earthquake, extreme temperature, flooding, levee failure, wildland fire, severe winter weather, sinkholes/land subsidence, and thunderstorms and lightning. Each natural hazard poses different levels of risk depending on the jurisdiction and each will be discussed further in detail later in this section.

## **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. Since the last update the area has experienced some growth in population creating a need for more housing units and infrastructure such as roads, sewers, water, and electricity to provide those homes with necessary amenities. This has expanded the number of connections and structures at risk of failure during a hazard event along with an expanded population at risk. The inventory of assets for each jurisdiction was derived from census block exposure data out of HAZUS, Missouri GIS Database, and local jurisdiction data questionnaires.

### **3.2.1 Total Exposure of Population and Structures**

#### **Unincorporated County and Incorporated Cities**

The following tables provide population data based on the 2020 Census. Building counts and building exposure values are based on data developed by the State of Missouri Geographic Information Systems (GIS) database. Content exposure values were calculated by factoring a multiplier to the building exposure values based on usage type. The multipliers were derived from the Hazus and are defined below. Land values have been excluded from consideration due to the fact that land remains following disasters and any market devaluations are often short term and difficult to quantify. State and Federal assistance programs do not generally address loss of land outside that of crop insurance. The total valuation of buildings is based on county assessor's data which may not be current and government-owned properties are usually taxed differently or not at all. This may cause some inaccuracies in the representation of true value. Public school district assets and special districts are included in the total exposure tables assets by community or county.

The following tables provide a look at population, building and content exposure by jurisdiction, as well as a look at exposure by usage type and building counts per each jurisdiction. The exposure and building information for each school district is also included.

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

| Jurisdiction          | 2020 Census   | Building Count | Building Exposure (\$) | Contents Exposure (\$) | Total Exposure (\$) |
|-----------------------|---------------|----------------|------------------------|------------------------|---------------------|
| Unincorporated Cooper | 6,185         | 3310           | 772574                 | 524069                 | 1296643             |
| Blackwater            | 152           | 101            | 24487                  | 14834                  | 39321               |
| Boonville             | 8,501         | 3235           | 834680                 | 525650                 | 1360330             |
| Bunceton              | 364           | 198            | 37207                  | 24748                  | 61955               |
| Otterville            | 459           | 233            | 41002                  | 25762                  | 66764               |
| Pilot Grove           | 765           | 337            | 76708                  | 47239                  | 123947              |
| Prairie Home          | 282           | 140            | 30161                  | 18700                  | 48861               |
| Windsor Place         | 337           | 115            | 19605                  | 10474                  | 30079               |
| Wooldridge            | 58            | 39             | 8182                   | 4154                   | 12336               |
| <b>Total</b>          | <b>17,103</b> | <b>7708</b>    | <b>1844606</b>         | <b>1195630</b>         | <b>3040236</b>      |

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

**Table 3.4 Building Values/Exposure by Usage Type**

| Jurisdiction  | Residential    | Commercial    | Industrial   | Agricultural | Total          |
|---------------|----------------|---------------|--------------|--------------|----------------|
| Cooper County | 544935         | 126073        | 50560        | 33715        | 755283         |
| Blackwater    | 19307          | 2766          | 98           | 219          | 22390          |
| Boonville     | 647954         | 112617        | 25395        | 2048         | 788014         |
| Bunceton      | 25248          | 3904          | 782          | 0            | 29934          |
| Otterville    | 30926          | 4212          | 381          | 0            | 35519          |
| Pilot Grove   | 59204          | 6185          | 711          | 127          | 66227          |
| Prairie Home  | 24441          | 1003          | 345          | 0            | 25789          |
| Windsor Place | 18258          | 1031          | 240          | 76           | 19605          |
| Wooldridge    | 8055           | 127           | 0            | 0            | 8182           |
| <b>Total</b>  | <b>1378328</b> | <b>257918</b> | <b>78512</b> | <b>36185</b> | <b>1750943</b> |

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 |
|---------------|--------------------|-------------------|-------------------|---------------------|-------|
| Cooper County | 2913               | 179               | 63                | 131                 | 3286  |
| Blackwater    | 89                 | 7                 | 1                 | 1                   | 98    |
| Boonville     | 2898               | 234               | 37                | 10                  | 3179  |
| Bunceton      | 179                | 13                | 3                 | 0                   | 195   |
| Otterville    | 217                | 8                 | 2                 | 0                   | 227   |
| Pilot Grove   | 302                | 20                | 2                 | 1                   | 325   |
| Prairie Home  | 131                | 3                 | 1                 | 0                   | 135   |
| Windsor Place | 113                | 1                 | 1                 | 0                   | 115   |
| Wooldridge    | 39                 | 0                 | 0                 | 0                   | 39    |
| Total         | 6881               | 465               | 110               | 143                 | 7599  |

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

While school’s total assets are included in the tables above, additional information gathered through the data questionnaires and school websites allow for further discussion. The table below shows enrollment and building information, including counts and replacement cost (exposure).

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

| Public School District | Enrollment | Building Count | Building Exposure (\$) | Contents Exposure (\$) | Total Exposure (\$) |
|------------------------|------------|----------------|------------------------|------------------------|---------------------|
| Blackwater SD          | 94         | 4              | \$3,489,000            | \$686,500              | \$4,175,500         |
| Boonville SD           | 1551       | 7              | \$42,208,920           | \$6,163,555            | \$48,372,475        |
| Otterville SD          | 220        | 1              | \$9,598,909            | \$1,443,819            | \$11,042,728        |
| Cooper Co. R-IV        | 103        | 2              | \$8,143,462.89         | \$1,326,543.13         | \$9,470,006.02      |
| Pilot Grove C-4        | 233        | 4              | \$13,569,488           | \$1,945,690            | \$15,515,178        |
| Prairie Home R-V       | 148        | 3              | \$7,595,870            | \$1,247,560            | \$8,843,430         |
| State Fair CC          | 150        | 1              | \$0 (rented)           | N/A                    | N/A                 |

Source: 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.

**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 (station) | Government | Housing | Shelters | Hospital/Health Care | Military | Natural Gas Facility | Nursing Homes | Police Station | Potable Water Facility | Rail | Sanitary Pump Stations | School Facilities | Stormwater Pump Stations | Wastewater Facility | TOTAL |      |
|---------------|------------------|--------------|--------------------|----------------------|-------------------------|----------------------|------------------------|------------|---------|----------|----------------------|----------|----------------------|---------------|----------------|------------------------|------|------------------------|-------------------|--------------------------|---------------------|-------|------|
| Cooper County | 1                | 0            | 0                  | 5                    | 1                       | 1                    | 2                      | 1          | 2913    | 1        | 0                    | 0        | 4                    | 0             | 1              | 3                      | 1    | 0                      | 0                 | 0                        | 0                   | 0     | 2934 |
| Blackwater    | 0                | 0            | 1                  | 0                    | 0                       | 0                    | 1                      | 0          | 89      | 0        | 0                    | 0        | 0                    | 6             | 0              | 1                      | 0    | 1                      | 1                 | 0                        | 1                   | 1     | 101  |
| Boonville     | 0                | 0            | 6                  | 2                    | 0                       | 0                    | 2                      | 1          | 2898    | 0        | 4                    | 0        | 0                    | 0             | 1              | 1                      | 0    | 1                      | 1                 | 1                        | 1                   | 1     | 2919 |
| Bunceton      | 0                | 0            | 1                  | 0                    | 0                       | 0                    | 1                      | 0          | 179     | 0        | 0                    | 0        | 0                    | 0             | 0              | 1                      | 0    | 1                      | 1                 | 0                        | 1                   | 1     | 185  |
| Oterville     | 0                | 0            | 1                  | 0                    | 0                       | 0                    | 1                      | 0          | 217     | 0        | 0                    | 0        | 0                    | 0             | 1              | 1                      | 1    | 1                      | 1                 | 1                        | 0                   | 1     | 222  |
| Pilot Grove   | 0                | 0            | 2                  | 0                    | 0                       | 0                    | 1                      | 1          | 302     | 1        | 2                    | 0        | 0                    | 1             | 1              | 1                      | 0    | 1                      | 1                 | 0                        | 1                   | 1     | 315  |
| Prairie Home  | 0                | 0            | 1                  | 0                    | 0                       | 0                    | 1                      | 1          | 131     | 0        | 0                    | 0        | 0                    | 0             | 0              | 0                      | 0    | 1                      | 1                 | 0                        | 1                   | 1     | 137  |
| Windsor Place | 0                | 0            | 0                  | 0                    | 0                       | 0                    | 1                      | 0          | 113     | 0        | 1                    | 0        | 0                    | 0             | 0              | 0                      | 0    | 0                      | 0                 | 0                        | 0                   | 1     | 116  |
| Wooldridge    | 0                | 0            | 0                  | 0                    | 0                       | 0                    | 0                      | 0          | 39      | 0        | 0                    | 0        | 0                    | 0             | 0              | 0                      | 1    | 0                      | 0                 | 0                        | 0                   | 0     | 39   |
| Total         | 1                | 0            | 12                 | 7                    | 1                       | 1                    | 10                     | 4          | 6881    | 2        | 7                    | 0        | 4                    | 7             | 4              | 8                      | 1    | 6                      | 6                 | 1                        | 7                   | 7     | 6970 |

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

### 3.2.2 Critical and Essential Facilities and Infrastructure

There are four main types of facilities of concern in a hazard event. Critical Facility, essential facility, high potential loss facility, and transportation and lifeline facilities. These facilities are defined by FEMA as "... all manmade structures or other improvements that, because of their function, size, service area, or uniqueness, have the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if they are destroyed, damaged, or if their functionality is impaired."

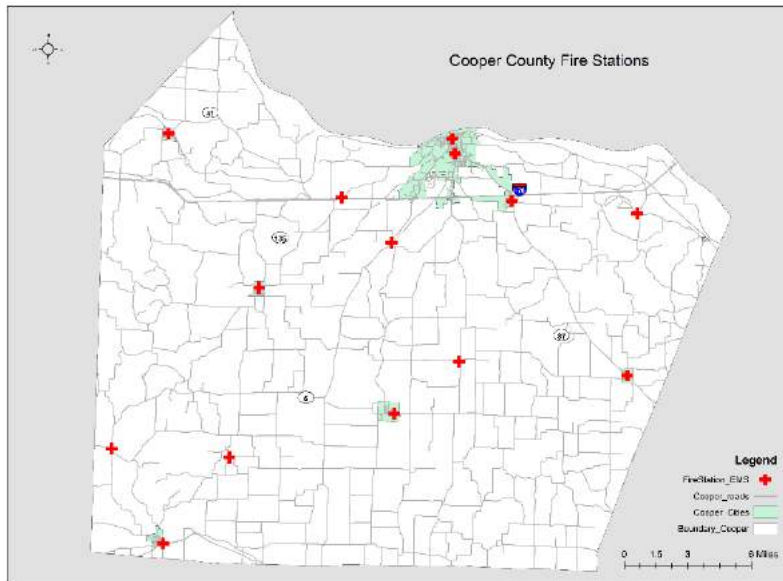
Critical facilities commonly include all public and private facilities that a community considers essential for the delivery of vital services and for the protection of the community. The adverse effects of damaged critical facilities can extend far beyond direct physical damage. For example, there are several natural gas pipelines that run through Cooper County that if they failed in an extreme cold event that could lead to loss of life. Internet is a deeply integrated asset into the functions of many essential facilities. As such, a major fiberoptic line in the County could impact far and wide if it were to be damaged. Disruption of health care, fire, and police services can impair search and rescue, emergency medical care, and even access to damaged areas.

#### GOVERNMENT

Cooper County has buildings that are critical to the functioning of the county. The Cooper County Court House in Boonville is home to many government offices, including Assessor, Clerk, Circuit Court, Juvenile, Public Administrator, Sheriff, Treasurer, Recorder, Commissioner, and Emergency Management.

#### FIRE PROTECTION

There are 6 fire protection districts which respond to fires, accidents, and other emergencies within the Cooper County planning area. Mutual aid agreements exist between all the departments and also with surrounding county departments.



**Map 3.1**

The fire districts have been proactive in public education campaigns, updating training, and general outreach efforts to ensure the community at large is safe. The fire districts are key players in hazard mitigation and preparedness activities.

The following fire districts are based outside of Cooper County, but respond to some areas of the county.

- Jamestown Rural Fire District

- Fortuna Fire District
- Tipton Rural Fire District
- California Fire Department
- Clifton City Volunteer Fire Department

Fire stations respond to fires, accidents, and other emergencies from stations located throughout the planning area.

### **WATER SUPPLY**

There are three Public Water Supply Districts (PWSD) located in the planning area. Each water district is composed of an elected board. The districts are responsible for maintaining existing water supply infrastructure and developing new infrastructure. Water districts are primarily related to mitigation activities focused on drought, wildfire, and flood. Connecting water supplies so that areas have multiple water supplies is an important mitigation strategy.

### **WASTEWATER**

Cooper County uses the Cooper County Waste Water Treatment Program. According to the Cooper County Public Health Center website, “On June 15, 1995, the Cooper County Commission passed a commission order that the County of Cooper will follow current State Of Missouri Laws on permitted wastewater treatment systems.” Each incorporated areas have own wastewater system except Wooldridge.

### **MEDICAL FACILITIES**

There is one federally qualified health center, seven nursing homes, and a health department located within Cooper County. The majority of the critical medical facilities are located in the highest populated area in the Northern region of Cooper County, within the City of Boonville. The MU Community Health Center has developed its own emergency plan, in accordance with state and federal regulations; these plans are exercised regularly and can act independently or in coordination with the LPHEP and/or the EOP.

Ambulance service for Cooper County is currently provided by the Cooper County Ambulance District located in Boonville, Missouri.

### **Emergency Management**

The Cooper County Emergency Management Agency (EMA) is in charge of protecting the lives and property of all Cooper County residents from major disasters. EMA personnel are responsible for emergency contingency planning, public education, and emergency response coordination. EMA personnel write and update the Emergency Operations Plan (EOP), conduct ongoing public education related to emergency information, and identify and fix gaps in emergency response, preparedness, and mitigation. EMA personnel have had extensive training from SEMA, FEMA, and other bodies in emergency response, preparedness, mitigation, and overall emergency management.

EMA personnel play a critical role in hazard mitigation due to their strong network of connections, awareness of hazard threats, wide-ranging experience of all facets of emergency management, and work with public education. Cooper County EMA personnel are well-trained and well-equipped to respond to disasters of all types.

## **Transportation**

Cooper County, like most of the United States, is heavily dependent upon the personal vehicle and roads. Roads are the dominant transportation arteries in Cooper County, moving most goods and services that flow in and out of the county. The Missouri Department of Transportation (MoDOT) takes care of all state and federal roads in the county; Cooper County Public Works maintains roads in unincorporated areas and the various jurisdictions maintain their own roads.

### **Roadways**

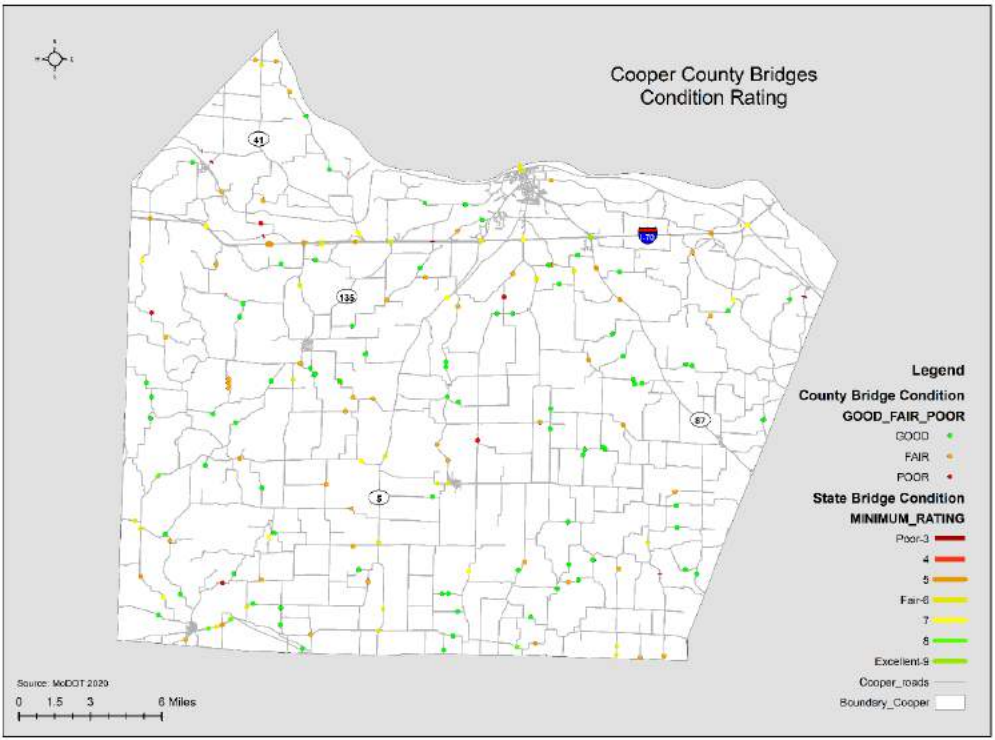
There is one interstate and five state highways in Cooper County (I-70, MO 431, MO 135, MO 5, MO 87, MO 98, and MO 179). Interstate 70 runs east to west across to northern portion of the county through the City of Boonville and is the direct route between Kansas City and St. Louis. MO 5 provides access to the Lake of the Ozarks, a major recreational and tourism area approximately directly to the south of the county. The county LEPC provides for a Commodity Flow Study every 3-5 years to assess the risk from hazardous materials traveling on the roadways.

### **Bridges**

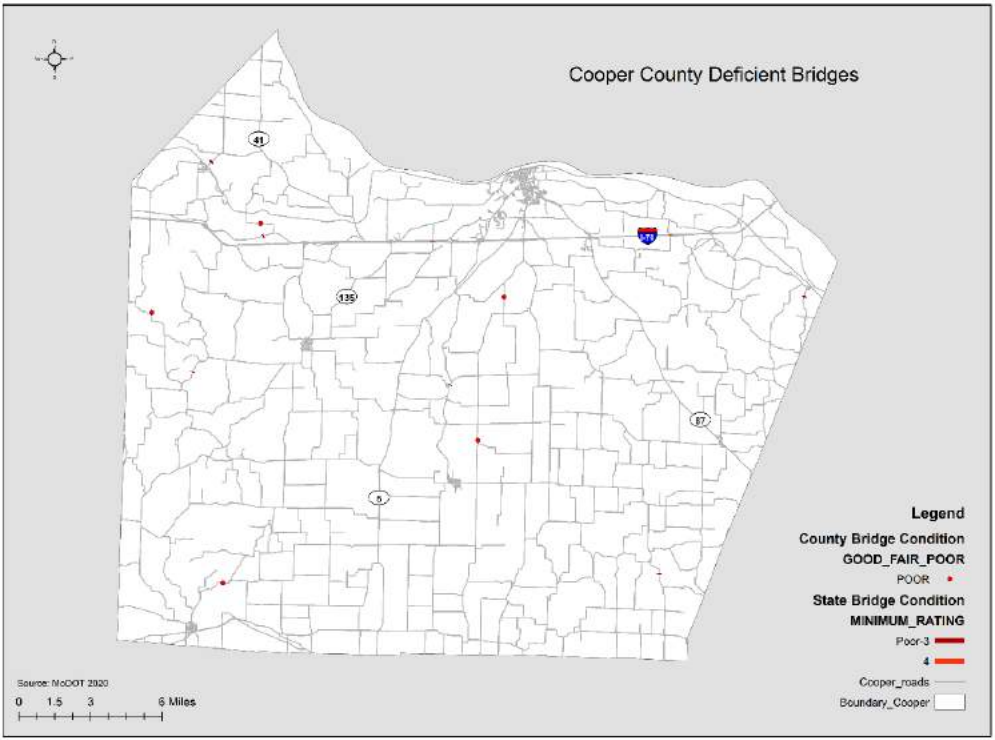
Bridge conditions are described using a “scour index”. This index rates bridges on their vulnerability to scour during a flood and is based on a scale of 0 to 9. Zero are failed bridges. Bridge with a scour index of 9 are new bridges. An index rating of 1 to 3 are in critical condition. A rating of 4 is poor. Anything 5 and higher are fair to excellent.

In 2019 legislation passed the Governor’s Focus on Bridges program. There will be two critical bridges replaced in Cooper County through this program.

**Map 3.2 Cooper County Bridges**



**Map 3.3 Cooper County Structurally Deficient Bridges**





## **Railroads**

### Passenger Rail

While Cooper County does not have a rail station, there is an Amtrak station approximately 48 miles away in Jefferson City that provides passenger service to both Kansas City (and points westward) and St. Louis (and points eastward) via the *Missouri River Runner*. Two trains traveling in each direction stop daily at the Jefferson City Amtrak Station. The Union Pacific Railroad also maintains a line that runs through Otterville and in part of the Southwest side of Cooper County. This line carries freight and is shared by Amtrak.

### Rail Freight

A large amount of freight travels by rail through Cooper County. Union Pacific operates tracks through the northern part of the county that passes through Wooldridge. According to the Missouri Department of Transportation's Long-Range Transportation Plan (LRTP), 33 percent of all product movement in Missouri is conducted by rail. Kansas City and St. Louis are ranked as the 2<sup>nd</sup> and 3<sup>rd</sup> busiest rail hubs in the nation, according to the Missouri Economic Research and Information Center (MERIC).

## **Air**

The Jesse P. Viertel Memorial Airport is owned and operated by the City of Boonville and is available for corporate and private planes, but does not support commercial services. The Columbia Regional Airport is located 45 minutes away in Boone County south of Columbia. The Columbia Regional Airport is serviced by American Airlines. Additionally, Kansas City International Airport and St. Louis Lambert International Airport are approximately 120 miles east and west of Boonville, along I-70.

## **Water**

The Missouri River and Lamine River, as well as the Blackwater River that dumps into the Lamine, have Missouri Department of Conservation public access boat ramps and several private access boat ramps. Most of these ramps and access points are designed for recreational use and allow access to the Missouri River and all points upstream and downstream. In addition to recreational use boat ramps, there is also a commercial port operated by the Howard/Cooper County Regional Port Authority. The port is located in Howard County on the north side of the Missouri River, directly across from the City of Boonville. According to the Missouri Port Authority, the facility has storage capacity for 250,000 bushels of grain and 4 million gallons of liquid chemicals. The facility is also equipped with two cranes, a dock, two dry storage buildings, several support vehicles, and a 15,000 ton outside storage pad. The port is the only Missouri River public shipping access point between Kansas City and St. Louis. While the facility lies in Howard County, it is an important resource for Cooper County and other counties in the Mid-Missouri Region.

### 3.2.2 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. 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

There are 9 plant and animal species listed as threatened or endangered that are known or are believed to occur in Cooper County.

**Table 3.8 Threatened and Endangered Species in Cooper County**

| Common Name                      | Scientific Name        | Status     |
|----------------------------------|------------------------|------------|
| Topeka shiner (fish)             | Notropis topeka        | Endangered |
| Indiana Bat (mammal)             | Myotis sodalist        | Endangered |
| Gray Bat (mammal)                | Myotis grisescens      | Endangered |
| Northern Long Eared Bat (mammal) | Myotis septentrionalis | Threatened |
| Running Buffalo Clover (plant)   | Trifolium stoloniferum | Endangered |
| Pallid Sturgeon (fish)           | Scaphirhynchus albus   | Endangered |
| Monarch Butterfly                | Danaus Plexippus       | Candidate  |

Source: U.S. Fish and Wildlife Service, <http://ecos.fws.gov/ecp/report/species-listings-by-current-range-county>

## Public Land

There are over 13,736 acres of public land in Cooper County. These areas are owned and managed by state and federal agencies.

| <b>Name</b>  | <b>Address</b>       | <b>City</b>  |
|--|----------------------|--------------|
| Blackwater Bridge Access                                     | Hwy K                | Blackwater   |
| De Bourgmont Access  | Hwy 41               | Boonville    |
| Harriman Hill Access   | Route M              | Blackwater   |
| Lamine River CA  | Hwy 50               | Otterville   |
| Prairie Home CA  | Cedron Rd            | Prairie Home |
| Roberts Bluff Access   | Buffalo Prairie Dr   | Blackwater   |
| Swinging Bridge Access                                       | Swinging Bridge Dr   | Pilot Grove  |
| Taylor's Landing Access                                      | Cumberland Church Rd | Boonville    |
| Overton Bottoms North Unit                                   | Brady Ln             | Boonville    |
| Overton Bottoms South Unit<br>(Cooper and Moniteau counties) | Cumberland Church Rd | Boonville    |
| Katy Trail State Park<br>(Cooper County Section)             | Countywide           | Countywide   |

Source: Missouri Department of Conservation (MDC), Missouri Spatial Data Server(MSDIS)

## Cooper County Properties on the National Register of Historic Places

There are 44 sites located in Cooper County that are registered on the National Register of Historic Places. This registry is an official list of registered cultural resources that are worth preserving. The National Historic Preservation Act of 1966 authorized such a list as part of a national program. The program is administered by the National Parks Service and acts as a resource to coordinate public and private efforts to find, evaluate, and preserve historically and archeologically significant sites. Properties on the list include districts, buildings, structures, and sites that have significance through history, culture, architecture, archeology, and engineering. Table 3.10 is a list of historic sites located in Cooper County.

**Table 3.10 Cooper County Properties on the National Register of Historic Places**

| <b>Property</b>                    | <b>Address</b>                     | <b>City</b> | <b>Date Listed</b> |
|------------------------------------|------------------------------------|-------------|--------------------|
| Andrews Wing House                 | 733 Main St                        | Boonville   | 1990               |
| Arrow Rock                         | Arrow Rock State Park              | Arrow Rock  | 1966               |
| William Beckett House              | 821 Third St                       | Boonville   | 1990               |
| Blackwater Commercial Hist. Dist.  | 100 Blk. Of Main                   | Blackwater  | 2005               |
| Blackwater Residential Hist. Dist. | 300-400 Trigg Ave, Scott Ave, Main | Blackwater  | 2009               |
| Albert Gallatin Blakey House       | 226 Spring St.                     | Boonville   | 1990               |

|                                   |   |                |      |
|-----------------------------------|---|----------------|------|
| Boller House                      | 223 Spring St.                          | Boonville      | 1977 |
| Cobblestone Street                | 100 Main St.                            | Boonville      | 1990 |
| Dauwalter House                   | 817 Seventh St.                         | Booneville     | 1990 |
| Dick-Kobel Homestead              | W of Jamestown                          | Jamestown      | 1982 |
| Diggs House                       | 1217 Rural St.                          | Boonville      | 1990 |
| Fessler-Secongost House           | 119 Morgan St.                          | Boonville      | 1990 |
| Andrew Gantner House              | 1308 Sixth St.                          | Boonville      | 1990 |
| Hamilton Brown Shoe Company       | 301 First St.                           | Boonville      | 1990 |
| Harley Park Archeological Site    | Restricted                              | Boonville      | 1970 |
| Historic District A               | Vine and 2 <sup>nd</sup> St.            | Boonville      | 1983 |
| Historic District B               | 4 <sup>th</sup> and Spring St.          | Boonville      | 1983 |
| Historic District C               | High and 4 <sup>th</sup> St.            | Boonville      | 1983 |
| Historic District D               | High and Main St.                       | Boonville      | 1983 |
| Historic District E               | High, Spring, and Morgan St.            | Boonville      | 1983 |
| Historic District F               | 6 <sup>th</sup> and 7 <sup>th</sup> St. | Boonville      | 1983 |
| Historic District H               | SE Morgan and Reformatory Dr            | Boonville      | 1983 |
| Imhoff Archeological Site         | Restricted                              | Blackwater     | 1972 |
| Juliet Trigg Johnson House        | 1304 Main St.                           | Boonville      | 1990 |
| Stephens Johnson House            | 821 Main St.                            | Boonville      | 1990 |
| Lyric Theater                     | Corner of Main and Vine St.             | Boonville      | 1969 |
| Meierhoffer House                 | 120 High St.                            | Boonville      | 1990 |
| Meierhoffer Sand Company Office   | 201 Second St.                          | Boonville      | 1990 |
| Mellor Village and Mounds AS      | Restricted                              | Lamine         | 1969 |
| MKT Railroad Depot                | 320 First St.                           | Boonville      | 1990 |
| Morton-Myer House                 | 1000 Eleventh St.                       | Boonville      | 1990 |
| Mount Nebo Baptist Church         | MO 135/E                                | Pilot Grove    | 1986 |
| Thomas Nelson House               | 700 Tenth St.                           | Boonville      | 1990 |
| New Lebanon Presbyterian Church   | MO A                                    | New Lebanon    | 1979 |
| New Lebanon Historic District     | MO A/New Lebanon Loop                   | New Lebanon    | 1998 |
| Phoenix American Cob Pipe Factory | Second and Vine St.                     | Boonville      | 2019 |
| Trigg Pigott House                | 1307 Sixth St.                          | Boonville      | 1990 |
| Pleasant Green                    | US 135                                  | Pilot Grove    | 1977 |
| Prairie View                      | US 135                                  | Pleasant Green | 1982 |
| Ravenswood                        | MO 5                                    | Bunceton       | 1975 |
| Roeschel-Toennes-Oswald Property  | Santa Fe Trail                          | Boonville      | 1983 |
| St. Matthew's Chapel              | 309 Spruce St.                          | Boonville      | 1990 |
| Wooldridge Archeological Site     | Restricted                              | Wooldridge     | 1970 |

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

Cooper County is a rural county that borders two Metropolitan Statistical Areas (City of Columbia in Boone County and Jefferson City in Cole County). MSAs are geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. The major employers for the planning region are shown in Table 3.11. The majority of large employers are located in or near Boonville, or within easy access of a major area road.

Table 3.11

| <b>Major Employers in Cooper County</b> |                  |                      |                  |
|---|------------------|----------------------|------------------|
| <b>Employer</b>                         | <b>Employees</b> | <b>Employer</b>      | <b>Employees</b> |
| Isle of Capri                           | 298              | Cooper County        | 75               |
| Boonville Correctional Center           | 300              | Pilot Truck Stop     | 70               |
| Caterpillar                             | 150              | C&R Market           | 70               |
| CMMG                                    | 115              | McDonalds            | 60               |
| Boonville R-1 School District           | 225              | MFA                  | 26               |
| Walmart                                 | 150              | MU Healthcare Center |                  |
| Unlimited Opportunities                 | 150              | Spirit of 76         | 15               |
| City of Boonville                       | 103              |                      |                  |

Source: Data Provided by City of Boonville, 2016

Cooper County is a heavy agriculture area. There are 883 farms listed in the 2017 Ag Census. Those farms do not usually employ several people though. The average size of a farm in Cooper County is 319 acres and employs less than 10 people.

**Table 3.12 Agriculture Employment**

| <b>Employment Information</b>                    | <b>Farms</b> | <b>Workers</b> | <b>\$1,000 Payroll</b> |
|--|--------------|----------------|------------------------|
| Hired Farm Labor                                 | 199          | 489            | 4,297                  |
| Farms with One Worker                            | 85           | 85             | -                      |
| Farms with two Workers                           | 58           | 116            | -                      |
| Farms with Three or Four Workers                 | 31           | 108            | -                      |
| Farms with Five to Nine Workers                  | 20           | 126            | -                      |
| Farms with 10 Workers or More                    | 5            | 54             | -                      |
| Reported only workers working 150 days or more   | 52           | 89             | 2,011                  |
| Reported only workers working less than 150 days | 122          | 288            | 834                    |
| Reported Both                                    | 25           | 48/64          | 1,452                  |
| Unpaid Workers                                   | 386          | 807            | -                      |

Source: 2017 Ag Census

### 3.3 Land Use and Development

#### 3.3.1 Development Since Previous Plan Update

Cooper County as a whole has shown a decline in growth. Communities with the largest growth estimated were the jurisdictions of Blackwater and Otterville but the reality of the 2020 census showed the most growth in Boonville and Windsor Place. Boonville is the location of several large employers for the county.

**Table 3.13 Cooper County Population 2010-2020 by Jurisdiction**

| Jurisdiction          | 2020 Population | 2019 Annual Population Estimate or ACS Population | # Change (2010-2020) | % Change (2010-2020) |
|-----------------------|-----------------|---|----------------------|----------------------|
| Unincorporated Cooper | 6,185           | 7,079   | -709                 | -10.28%              |
| Blackwater            | 162             | 171   | -10                  | -6.2%                |
| Boonville             | 8,501           | 8,418   | 182                  | 2.2%                 |
| Bunceton              | 364             | 359   | 10                   | 2.8%                 |
| Otterville            | 459             | 375   | 5                    | 1%                   |
| Pilot Grove           | 765             | 655   | -3                   | -0.39%               |
| Prairie Home          | 282             | 237   | 2                    | 0.7%                 |
| Windsor Place         | 337             | 339   | 28                   | 9%                   |
| Wooldridge            | 58              | 27  | -3                   | -5%                  |
| Total                 | 17,103          | 17,660  | -498                 | -2.8%                |

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

Growth translates into a need for more housing, and the expansion of local emergency capabilities to keep up with demand and added fuel to the system. While the 2020 Census showed a population decline overall in Cooper County, the heightened growth for some jurisdictions means higher need for housing in certain areas while other jurisdictions may have a decline in need.

**Table 3.14 Change in Housing Units, 2010-2019**

| Jurisdiction   | Housing Units<br>2020 | Housing Units<br>2010 | 2010-2020<br># Change | 2010-2020<br>% Change |
|----------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Unincorporated | 2,926                 | 3,052                 | -126                  | -4%                   |
| Blackwater     | 70                    | 87                    | -17                   | -19.5%                |
| Boonville      | 3,322                 | 3,294                 | 28                    | 0.85%                 |
| Bunceton       | 156                   | 182                   | -26                   | -14.3%                |
| Otterville     | 203                   | 224                   | -21                   | -9.38%                |
| Pilot Grove    | 307                   | 334                   | -27                   | -8%                   |
| Prairie Home   | 134                   | 132                   | 2                     | 1.5%                  |
| Windsor Place  | 142                   | 119                   | 23                    | 19%                   |
| Wooldridge     | 21                    | 39                    | -18                   | -46%                  |
| <b>Total</b>   | <b>7,281</b>          | <b>7,463</b>          | <b>-182</b>           | <b>-2.44%</b>         |

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

The population is expected to remain stable in Cooper County. It’s unknown how the pandemic will impact the long-term growth of rural communities. With large tracts of available land with close access to I-70, as well as rail and port access within the county there is great potential for shipping hubs and large manufacturing in the planning area which would draw workforce and in turn need for more housing with population growth. Since the last update Boonville has seen one subdivision go in and some existing manufacturers have expanded their operations.

#### School District’s Future Development

Enrollment is expected to stay stable within the planning area school districts. General updates are anticipated at some of the area schools but no major expansion is planned at this time.

#### Special District’s Future Development

With growth comes the need for upgraded equipment and additional stations to ensure that response time to new subdivisions remains acceptable. Currently no more fire stations are expected to be built but personnel are always a need and will continue to be. As population needs change or shift development will be reassessed.

### 3.4 Hazard Profiles, Vulnerability, and Problem Statements

A Risk Assessment has been conducted for each hazard identified as affecting the planning area. The remainder of this section includes these risk assessments which are discussed in alphabetical order and organized according to the following outline:

#### 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.**

**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. For some hazards, the entire planning area is at risk.

**Strength/Magnitude/Extent** - The extent of the hazard refers to the strength or magnitude of that hazard which can be expected in the planning area; extent is an attribute of the hazard alone and does not include its effect on humans or the built environment.

**Previous Occurrences** – This includes available information on historic incidents and their impacts. Historic event records form a solid basis for probability calculations.

**Probability of Future Events (Natural Hazards)** - The probability of future events is, for the most part, based on historical data while also taking into account the expected impact of climate change. It is assigned based on the following scale which was slightly modified from that found in the *Missouri State Hazard Mitigation Plan (2018)*:

- Low – The hazard has little or no chance of happening (less than 1 percent chance of occurrence in any given year)
- Moderate – The hazard has a reasonable probability of occurring (between 1 and 10 percent chance of occurrence in any given year).
- High – The probability is considered sufficiently high to assume that the event will occur (between 10 and 100 percent chance of occurrence in any given year).

In the case of earthquakes, projections made by the USGS have also been taken into account in assessing the probability.

**Analysis of Risk** - Presented by the hazard, including a **measure of severity** for each participating jurisdiction. The **measure of severity** is an estimate of the deaths, injuries, or damage (property or environmental) that could result from the hazard. It is also broadly based on the scale found in the *Missouri State Hazard Mitigation Plan (2018)*:



Low – Few or minor damage or injuries are likely.

Moderate – Personal injuries and/or damage to property or the environment are expected.

High – Major injuries and/or death and/or major damage will likely occur.

**Changing Future Conditions Considerations** – This discusses the potential future impacts climate change could have on natural hazard events and their effects on the planning area.

## **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.**

A jurisdiction’s vulnerability to a hazard is connected to the extent of that hazard, the probability of future events, the estimated measure of severity, and mitigation measures already in place for that hazard.

In many cases, the potential severity of the hazard event contributes the greatest weight to the vulnerability rating. In some cases, however, a low severity event with high frequency can cause economic strain which translates into a higher vulnerability.

**Existing Mitigation/Operating Assumptions:** Both the measure of severity and overall vulnerability are greatly impacted by the mitigation already in place in the planning area; this existing mitigation is taken as an operating assumption when evaluating the vulnerability to a particular hazard. The following mitigation activities are applicable to many or all hazards:

- The majority of jurisdictions have adopted some building codes even though the county has not.
- Resources for the public on retrofitting and protecting buildings are available through the Office of Emergency Management.
- Cooperative agreements are in place between utility providers in the county.
- Agreements are in place with local shelters in the county.
- General evacuation procedures are included in the Office of Emergency Management's (OEM) Emergency Operation Plan.
- Evacuation routes are in place in all school districts in the county.
- Buses in all school districts have two-way radios on board.

Other current mitigation activities are aimed at mitigating the effects of a specific hazard and are described under the specific hazard profile.

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

- **Vulnerability Overview** – This is an overall summary of each jurisdiction's vulnerability to the identified hazards. It identifies structures, systems, populations or other community assets that are susceptible to damage and loss for hazard events.
- **Potential Losses to Existing Development/life** – Covers how impacts and potential impacts of the hazard has consequences on existing jurisdictional assets such as buildings, critical facilities, life, etc.
- **Previous and Future Development** - This section goes over how changes in development have impacted the jurisdiction's vulnerability to the hazard.
- **Hazard Summary by Jurisdiction** – Hazards vary by jurisdiction and this section will provide an overview of such variations.

### **Problem Statements**

The problem statement consists of a brief summary of the problems created by the hazard in the planning area, and possible ways to resolve those problems.

### 3.4.1 Flooding (Riverine and Flash)

#### DESCRIPTION OF HAZARD

Flooding is defined as partial or complete inundation of usually dry areas. **Riverine flooding** refers to when a river or creek overflows its normal boundaries. The relatively flat areas adjacent to rivers and stream banks which are inundated at times of high water are called floodplains. The term base flood, or 100-year flood, is the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year, based upon historical records.

The planning area is at great risk for riverine flooding. Major waterways include the Missouri River to the north, the Osage River to the east and southeast, the Moreau River in the west and southwest, and various other creeks and branches. Flooding could potentially occur anywhere along these waterways.

The Missouri River, which forms the northern border of Cooper County, is the longest river in the United States. The Missouri River drains approximately one-sixth of the area of the continental United States, according to the USGS. It drains over half the state of Missouri as it flows eastward to join the Mississippi River at St. Louis. Since Cooper County is located less than 200 miles upstream from the mouth of this 2,540 mile river, it is obvious that flooding of the Missouri River is a major concern for the county.

In addition to the threat of riverine flooding, when a river or creek overflows its normal boundaries, the planning area is also susceptible to **flash flooding**. NOAA defines a flash flood as “an event that occurs within 6 hours following the end of the causative event (such as rains, ice jams, or dam breaks). . . .” Flash floods develop quickly and are responsible for more flood related deaths than any other type of flooding. The textual descriptions for flash flooding events in the NOAA database indicate that flash flooding in the planning area is usually triggered by 2-5 inches of rainfall within a “short period”.

In some cases, however, flooding may not be directly attributable to a river, stream or lake overflowing its banks. It may simply be the combination of excessive rainfall and/or snowmelt, saturated ground, and inadequate drainage. With no place else to go, 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.

FEMA defines sheet flooding as “a type of flood hazard with flooding depths of 1 to 3 feet that occurs in areas of sloping land.”

Local **storm water flooding** can result when tremendous flow of water occurs due to large rain events. Local flooding can create public safety issues due to flooded roadways and drainage structures.

Most flooding in Cooper County occurs in spring and summer but floods can occur in any season.

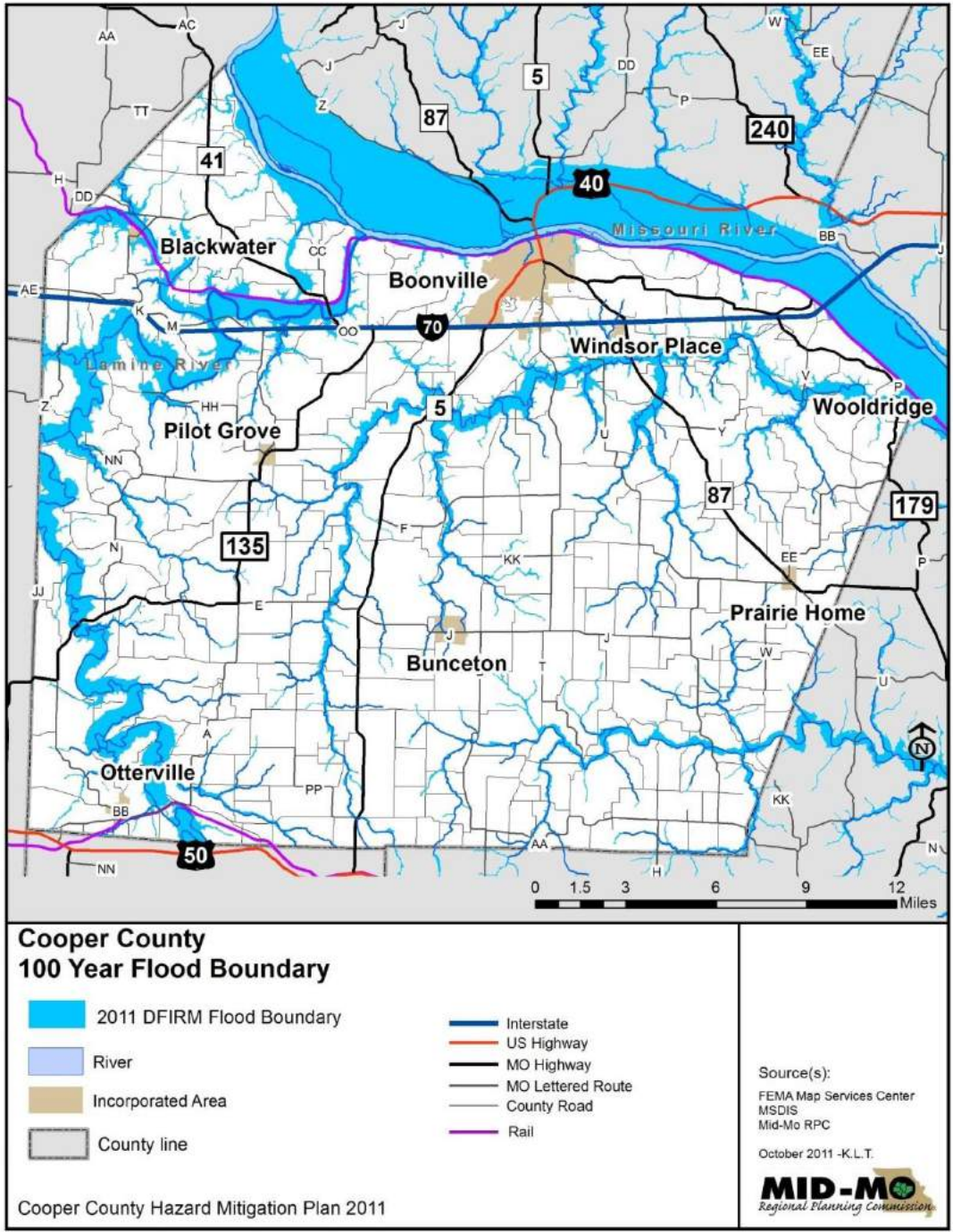
**Location**

The entire planning area is at risk from some type of flooding. Blackwater, Boonville, Bunceton, Otterville, Pilot Grove, Wooldridge, and the unincorporated areas of Cooper County near the Missouri River, Lamine River, and Petite Saline Rive are at higher risk of riverine flooding than the rest of the county and all participate in the National Flood Insurance Program.

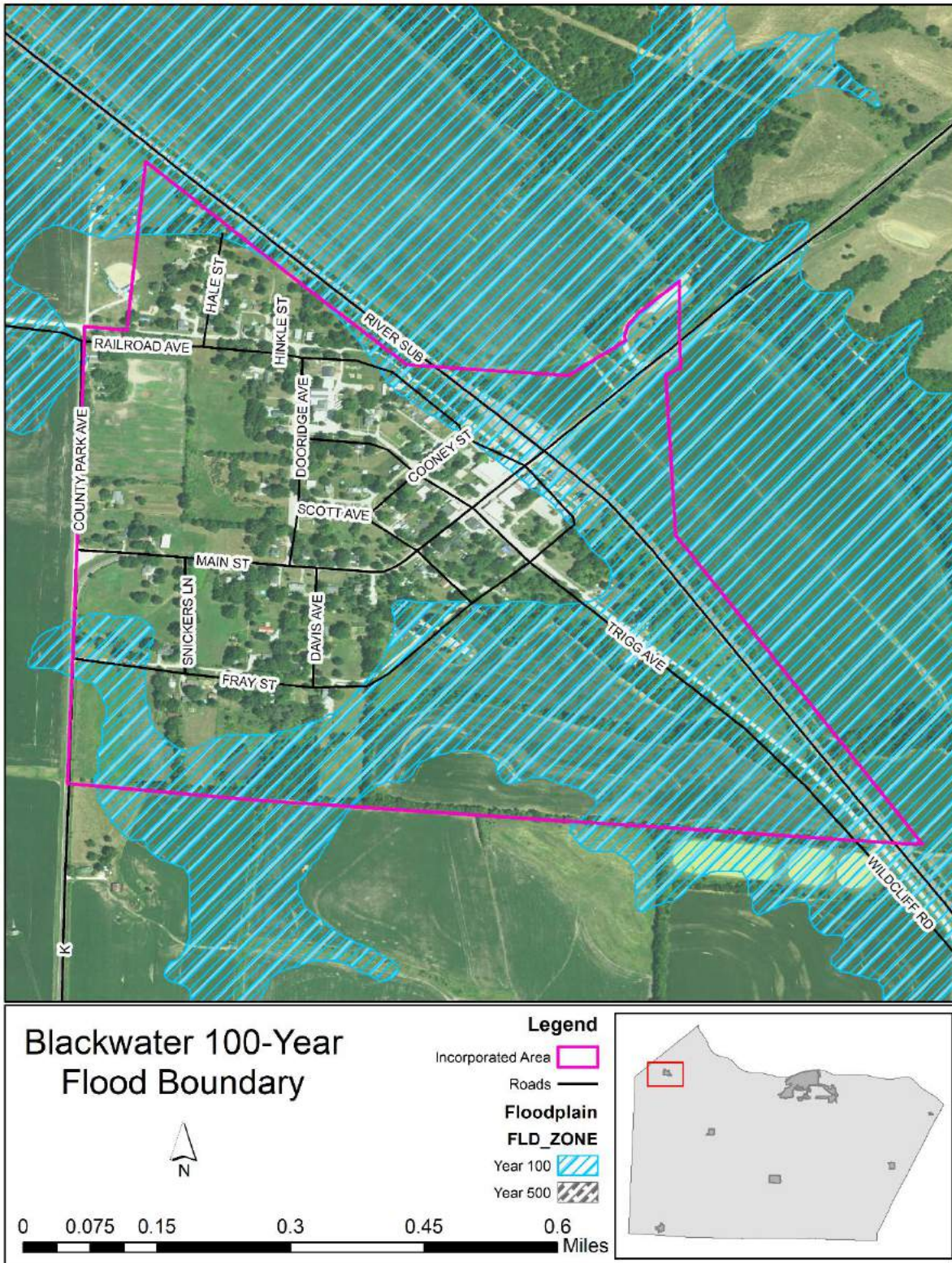
The current Flood Insurance Rate Map (FIRM) for Cooper County is dated May 3, 2011; it shows the flood zones for these jurisdictions at greater risk. Flood zones are geographic areas defined according to varying levels of flood risk; each zone reflects the severity or type of flooding in the area.

The FIRMs for the participating jurisdictions at greater risk are included (see figures 3.4a through 3.4g).

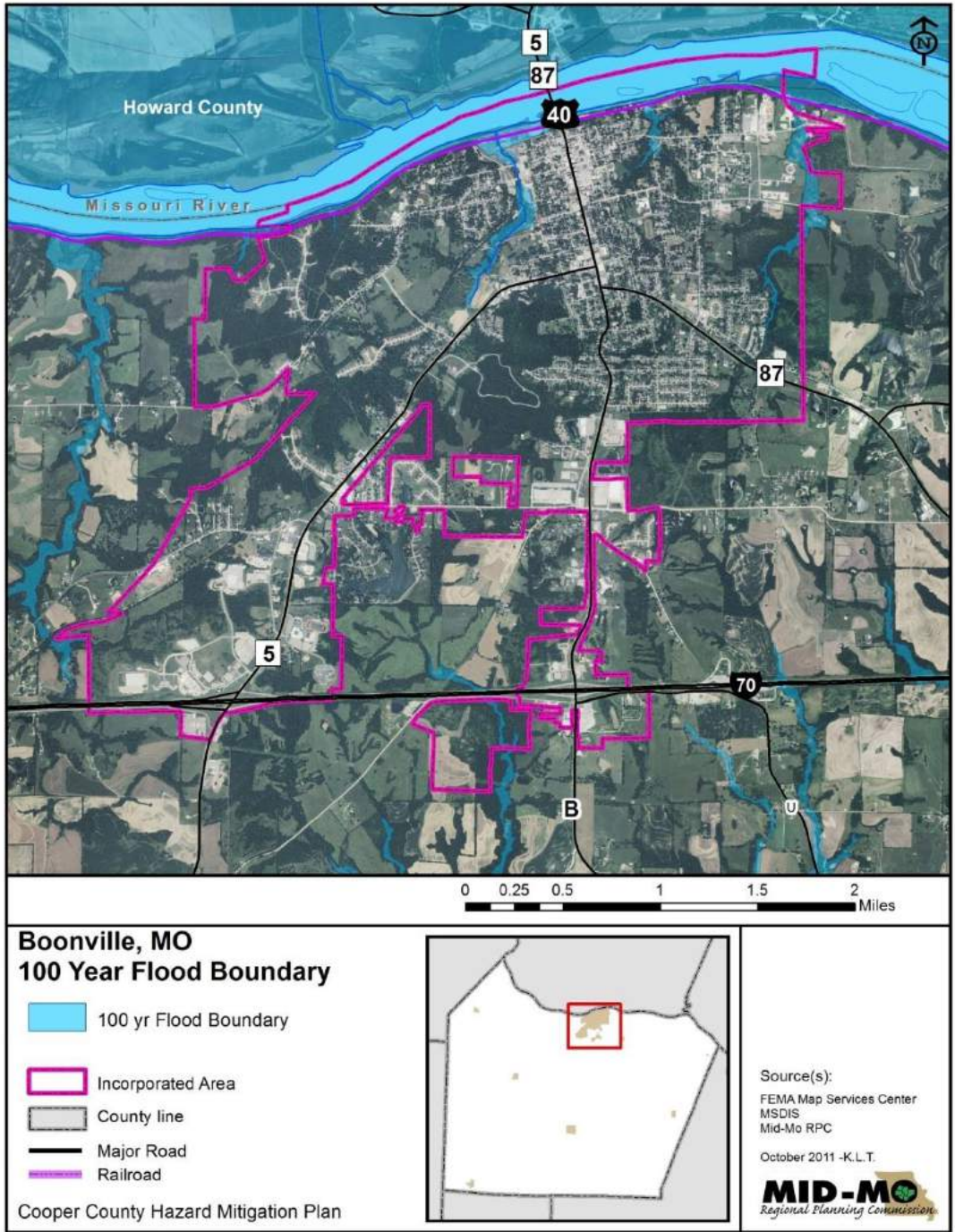
Map 3.4a



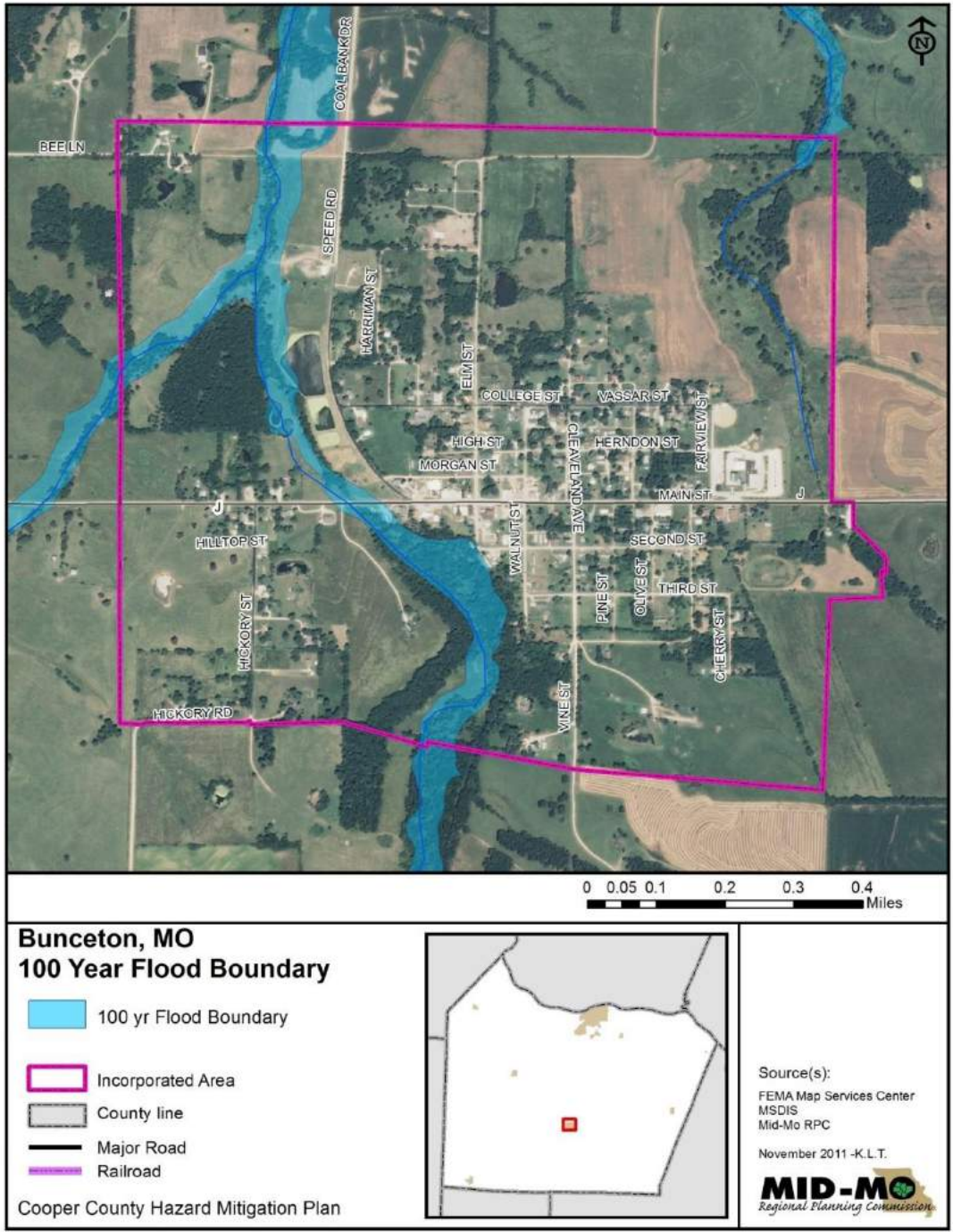
Map 3.4b



Map 3.4c

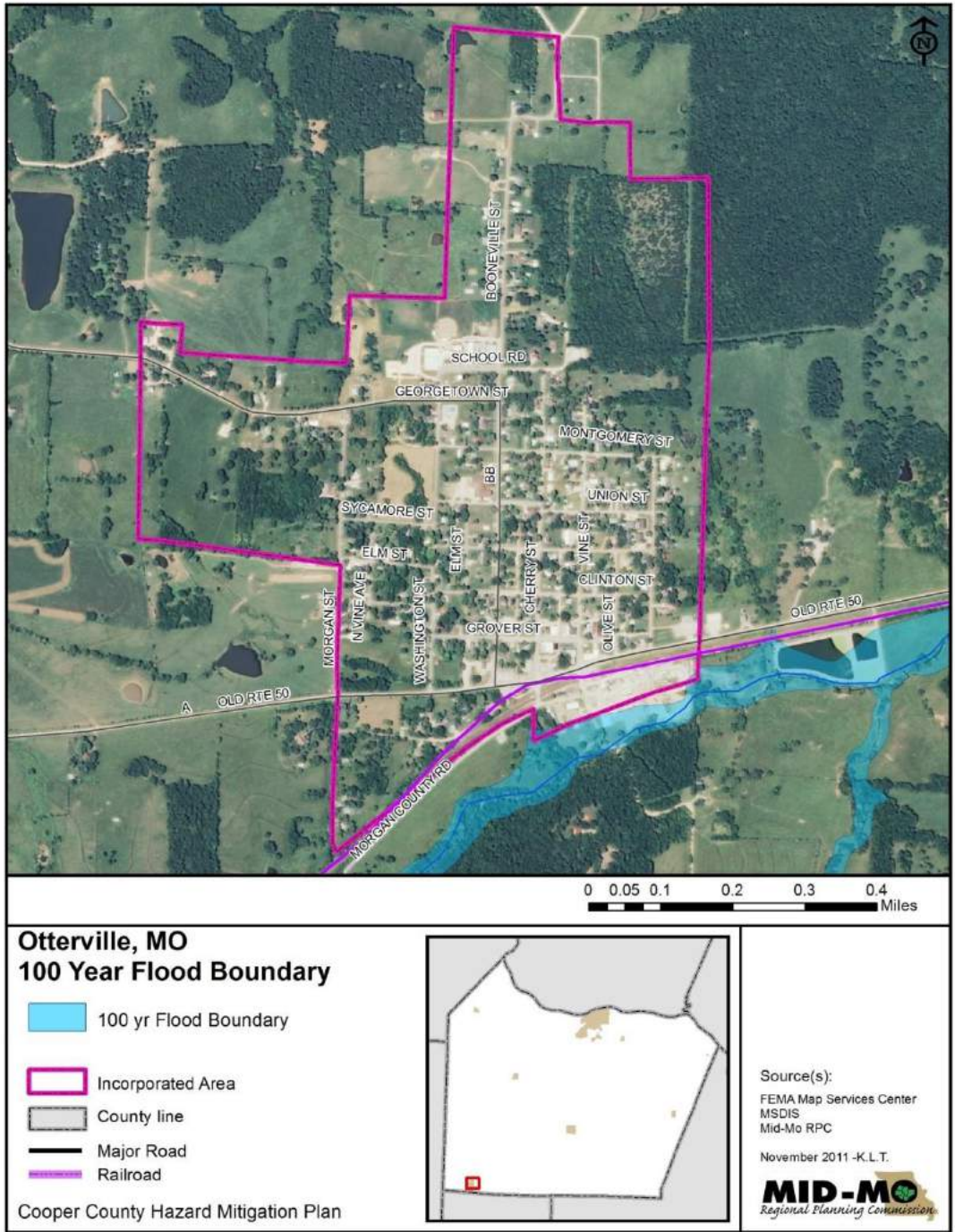


Map 3.4d

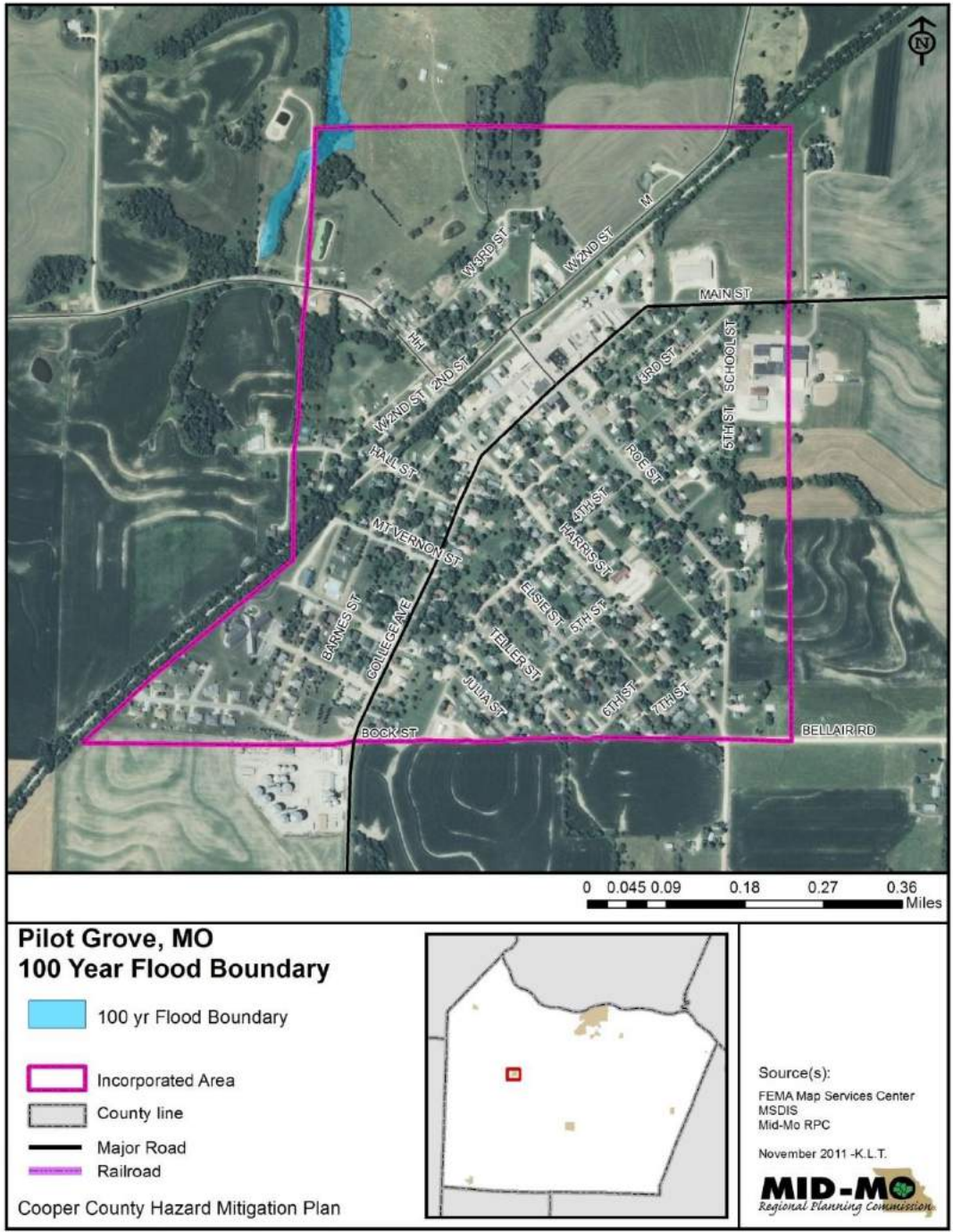




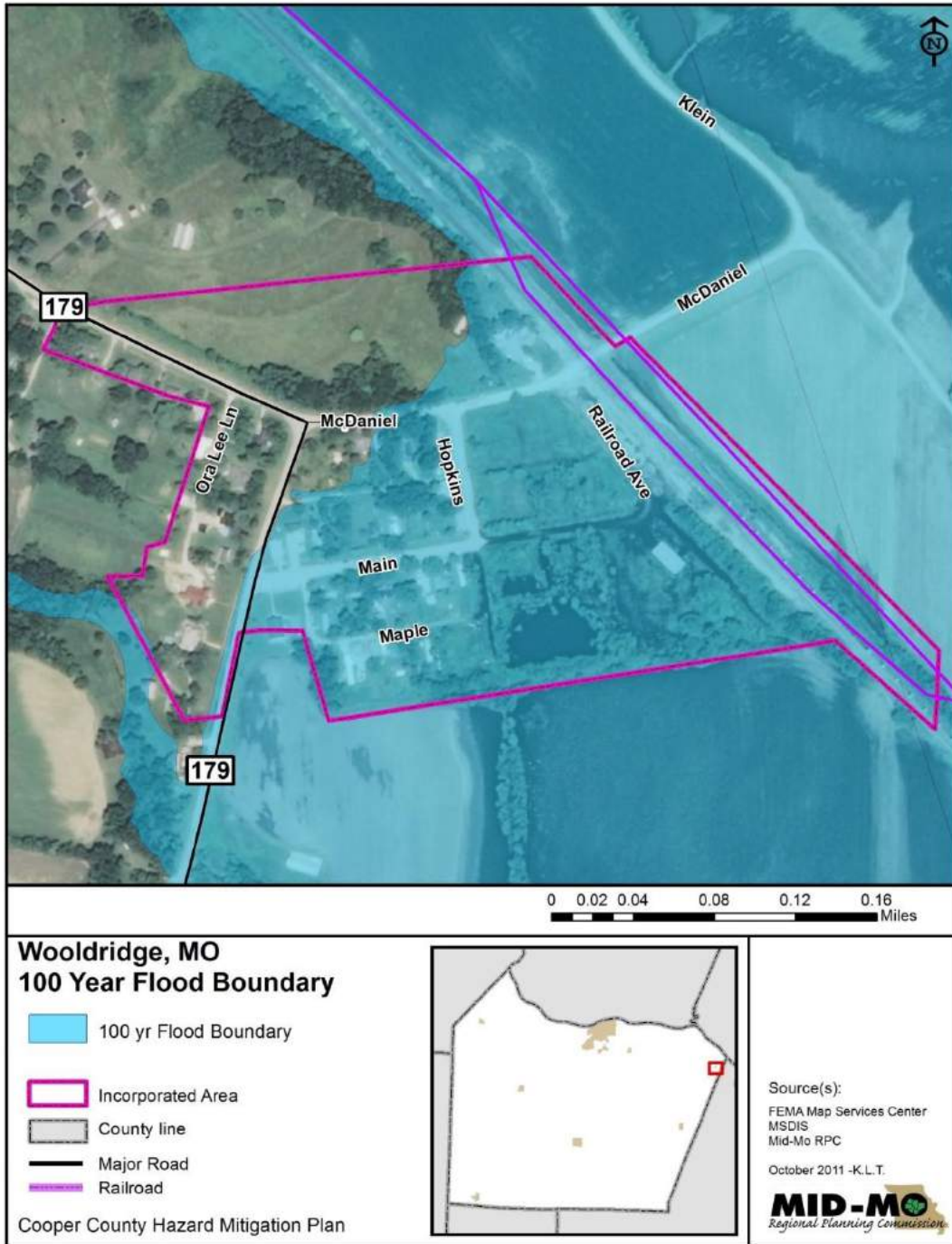
Map 3.4e



Map 3.4f

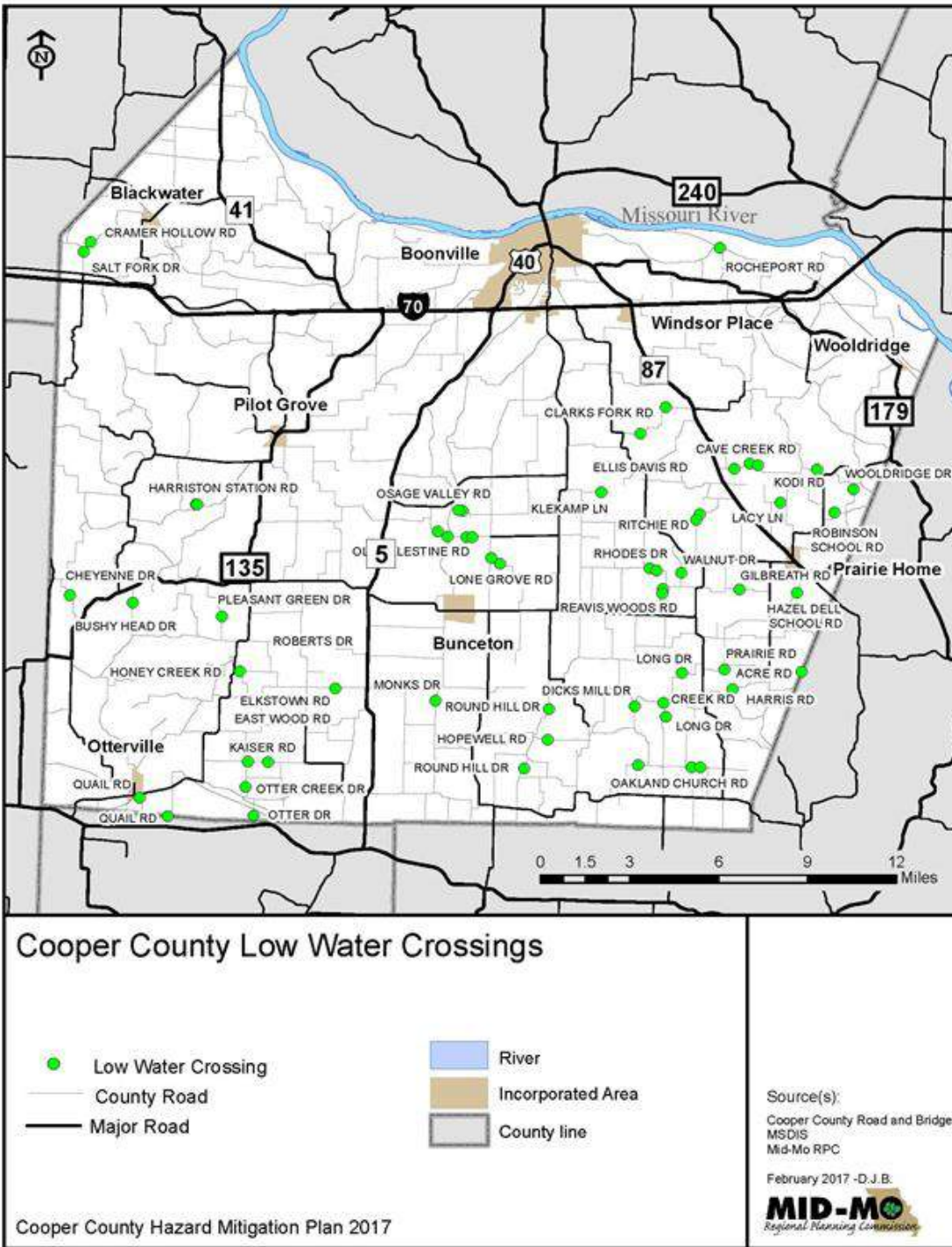


Map 3.4g



Flash flooding areas are a concern for all jurisdictions in the planning area. Flash flooding occurs throughout the planning area; as a result, low water crossings can be potentially high-risk areas for accidents due to high water. Road closures in these areas are rare due to the quick rise and fall of water levels. Figure 4.30a depicts low water crossing locations.

Map 3.5 Low Water Crossings



**Extent**

There are characteristic differences between riverine flooding and small stream/flash flooding in the planning area; these differences involve both the speed of onset and duration of flooding events.

Riverine flooding –

- Speed of onset - Riverine flooding is a hazard that allows for mitigation, preparation, and potential evacuation because of the relatively long speed of onset.
- Duration - An examination of the NOAA data for riverine flooding from January 1996, through December 2020, indicates an average duration of approximately 3.9 days per event (Table 3.15).

Small Stream and Flash Flooding –

- Speed on Onset - In contrast to riverine flooding, small stream flooding and flash flooding occur very quickly with heavy rains.
- Duration - Small stream flooding in the planning area usually takes place within the span of one day, according to the NOAA data (Table 3.15). The data of reported events in the NOAA database indicates an average duration of 4.7 hours.

| <b>Table 3.15</b>                    |                       |              |                        |
|--------------------------------------|-----------------------|--------------|------------------------|
| <b>Cooper County Historic Data</b>   |                       |              |                        |
| <b>River Flooding</b>                |                       |              |                        |
| <b>January 1996 - December, 2020</b> |                       |              |                        |
| <b>Location</b>                      | <b>Date</b>           | <b>River</b> | <b>Duration (days)</b> |
| Oterville                            | 1996: 5/6/96-5/8/96   | Lamine       | 3                      |
| Boonville                            | 1996: 5/8/96-5/16/96  | Missouri     | 9                      |
| Boonville                            | 1996: 5/25/96-5/31/96 | Missouri     | 7                      |
| Boonville                            | 1996: 6/1/96-6/11/96  | Missouri     | 11                     |
| Boonville                            | 1996: 6/18/96-6/20/96 | Missouri     | 3                      |
| Boonville                            | 1996: 6/25/96-6/30/96 | Missouri     | 6                      |
| Oterville                            | 1996: 7/21/96-7/23/96 | Lamine       | 3                      |
| Boonville                            | 1996: 7/21/96-7/24/96 | Missouri     | 4                      |
| 13 counties                          | 1997: 2/21/97-2/28/97 | Missouri     | 8                      |
| 5 counties                           | 1997: 2/26/97-2/27/97 | Lamine       | 2                      |
| 6 counties                           | 1997: 4/11/97-4/27/97 | Missouri     | 17                     |
| 6 counties                           | 1997: 5/3/97-5/11/97  | Missouri     | 9                      |
| 7 counties                           | 1997: 5/26/97-5/28/97 | Lamine       | 3                      |
| 7 counties                           | 1998: 3/8/98-3/9/98   | Lamine       | 2                      |

|             |                         |                        |    |
|-------------|-------------------------|------------------------|----|
| 14 counties | 1998: 3/31/98-3/31/98   | Missouri               | 1  |
| 12 counties | 1998: 4/1/98-4/6/98     | Missouri               | 6  |
| 10 counties | 1998: 4/10/98-4/16/98   | Missouri               | 7  |
| Otterville  | 1998: 6/4/98-6/5/98     | Lamine                 | 2  |
| 3 counties  | 1998: 6/8/98-6/9/98     | Lamine                 | 2  |
| 6 counties  | 1998: 6/15/98-6/25/98   | Missouri               | 11 |
| 10 counties | 1998: 6/20/98-6/23/98   | Lamine                 | 4  |
| 2 counties  | 1998: 7/1/98-7/1/98     | Missouri               | 1  |
| 2 counties  | 1998: 7/26/98-7/27/98   | Lamine                 | 2  |
| Otterville  | 1998: 7/29/98-7/29/98   | Lamine                 | 1  |
| 6 counties  | 1998: 7/30/98-7/31/98   | Lamine                 | 2  |
| 4 counties  | 1998: 8/1/98-8/1/98     | Missouri               | 1  |
| 9 counties  | 1998: 9/15/98-9/16/98   | Missouri               | 2  |
| 15 counties | 1998: 10/5/98-10/11/98  | Missouri               | 7  |
| 9 counties  | 1998: 10/19/98-10/21/98 | Missouri               | 3  |
| 14 counties | 1998: 11/2/98-11/14/98  | Missouri               | 13 |
| 6 counties  | 1999: 1/31/99-1/31/99   | Lamine                 | 1  |
| 5 counties  | 1999: 2/1/99-2/1/99     | Lamine                 | 1  |
| 5 counties  | 1999: 2/7/99-2/7/99     | Lamine                 | 1  |
| 6 counties  | 1999: 3/8/99-3/9/99     | Lamine                 | 2  |
| 16 counties | 1999: 4/16/99-4/21/99   | Lamine                 | 6  |
| 12 counties | 1999: 4/23/99-4/30/99   | Missouri               | 8  |
| 6 counties  | 1999: 5/1/99-5/2/99     | Missouri               | 2  |
| 12 counties | 1999: 5/4/99-5/8/99     | Missouri               | 5  |
| 6 counties  | 1999: 5/14/99-5/27/99   | Missouri               | 14 |
| 2 counties  | 1999: 6/3/99-6/3/99     | Missouri               | 1  |
| 12 counties | 1999: 6/28/99-6/30/99   | Missouri and<br>Lamine | 3  |
| 8 counties  | 1999: 7/1/99-7/5/99     | Missouri               | 5  |
| 3 counties  | 2000: 2/18/00-2/19/00   | Lamine                 | 2  |
| 2 counties  | 2000: 5/26/00-5/29/00   | Lamine                 | 4  |
| 3 counties  | 2001: 1/29/01-1/30/01   | Lamine                 | 2  |
| 16 counties | 2001: 2/24/01-2/25/01   | Lamine                 | 2  |
| 4 counties  | 2001: 4/3/01-4/5/01     | Lamine                 | 3  |
| 5 counties  | 2001: 5/7/01-5/9/01     | Missouri               | 3  |
| Otterville  | 2002: 1/31/02-1/31/02   | Lamine                 | 1  |
| 4 counties  | 2002: 5/8/02-5/17/02    | Missouri               | 10 |

|   |                         |            |      |
|---|-------------------------|------------|------|
| 4 counties  | 2002: 5/8/02-5/10/02    | Lamine     | 3    |
| Otterville  | 2003: 12/23/03-12/23/03 | Lamine     | 1    |
| Otterville  | 2004: 7/24/04-7/25/04   | Lamine     | 2    |
| Otterville  | 2004: 8/25/04-8/25/04   | Lamine     | 1    |
| Otterville  | 2004: 11/1/04-11/3/04   | Lamine     | 3    |
| Otterville  | 2004: 11/24/04-11/24/04 | Lamine     | 1    |
| Otterville  | 2004: 11/27/04-11/28/04 | Lamine     | 2    |
| Otterville  | 2005: 1/5/05-1/6/05     | Lamine     | 2    |
| Otterville  | 2005: 1/13/05-1/14/05   | Lamine     | 2    |
| Otterville  | 2005: 2/13/05-2/14/05   | Lamine     | 1    |
| Boonville   | 2005: 6/13/05-6/15/05   | Missouri   | 3    |
| Otterville  | 2005: 8/26/05-8/27/05   | Lamine     | 2    |
| Otterville  | 2007: 4/14/07-4/15/07   | Lamine     | 2    |
| Boonville   | 2007: 5/7/07-5/19/07    | Missouri   | 13   |
| Otterville  | 2007: 6/30/07-6/30/07   | Lamine     | 1    |
| 5 counties  | 2007: 7/1/07-7/1/07     | Lamine     | 1    |
| 6 counties  | 2008: 2/17/08-2/18/08   | Lamine     | 2    |
| 9 counties  | 2008: 3/18/08-3/19/08   | Lamine     | 2    |
| Otterville  | 2008: 4/10/08-4/11/08   | Lamine     | 2    |
| 7 counties  | 2008: 4/24/08-4/25/08   | Lamine     | 2    |
| Otterville  | 2008: 5/8/08-5/8/08     | Lamine     | 1    |
| Blackwater  | 2015: 12/28/15          | Blackwater | 1    |
| Cooper  | 2019: 4/1/19-4/30/19    | Missouri   | 11   |
| Overton   | 2019:5/1/19-5/31/19     | Missouri   | 30   |
| Overton   | 2019:6/1/19-6/30/19     | Missouri   | 29   |
| Bunceton  | 2020: 6/9/20            | Lamine     | 1    |
| Average duration of river flooding in planning area (days)                                      |                         |            | 4.67 |
| Source: <a href="http://www.ncdc.noaa.gov/stormevents">http://www.ncdc.noaa.gov/stormevents</a> |                         |            |      |

| <b>Table 3.16 Cooper County Historic Flash Flooding Data</b>                                    |             |                         |
|---|-------------|-------------------------|
| <b>January 1996 – December 2020</b>   |             |                         |
| <b>Location</b>   | <b>Date</b> | <b>Duration (hours)</b> |
| South portion of Cooper County  | 5/26/2000   | 8                       |
| Bunceton  | 4/10/2001   | 1                       |
| Boonville   | 5/7/2002    | 3                       |
| Boonville   | 5/8/2002    | 3                       |
| Pilot Grove   | 5/19/2004   | 3                       |
| Wooldridge  | 5/25/2004   | 3                       |
| Wooldridge  | 5/25/2004   | 3                       |
| Boonville   | 5/30/2004   | 3                       |
| Boonville   | 8/4/2004    | 6                       |
| Pilot Grove   | 1/12/2005   | 5                       |
| Prairie Home  | 6/8/2005    | 5                       |
| Boonville   | 8/18/2005   | 4                       |
| Boonville   | 8/26/2005   | 3                       |
| Bunceton  | 6/10/2007   | 4                       |
| Otterville  | 6/10/2007   | 4                       |
| Blackwater  | 6/29/2007   | 4                       |
| Prairie Home  | 9/12/2008   | 6                       |
| Bunceton  | 9/12/2008   | 6                       |
| Boonville Viertel Airport   | 9/12/2008   | 6                       |
| Blackwater  | 6/15/2009   | 6                       |
| Bunceton  | 4/29/2012   | 6                       |
| Bunceton  | 5/20/2013   | 6                       |
| Boonville   | 5/31/2013   | 6                       |
| Boonville   | 9/1/2014    | 1                       |
| Billingsville   | 6/26/2015   | 1                       |
| Pisgah  | 6/26/2015   | 1                       |
| Boonville   | 8/25/2019   | 1                       |
| Boonville   | 5/25/2020   | 1                       |
| Average duration of flash flooding in planning area (hours)                                     |             | 3.8                     |
| Source: <a href="http://www.ncdc.noaa.gov/stormevents">http://www.ncdc.noaa.gov/stormevents</a> |             |                         |

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

According to the 2018 State Hazard Mitigation Plan, Missouri has a long history of flooding. Flooding along Missouri’s major rivers generally results in slow-moving disasters. Since river crest levels are forecast several days in advance communities in these active areas are given time to take protective measures against heightened water levels through means of evacuation and/or sandbagging efforts. Flash-flooding by contrast is a rapid rise of flood waters and has a history of causing a higher number of deaths and property damage.



**Table 3.17: National Flood Insurance Program (NFIP) Participation**

| Cooper County Participation in NFIP      |               |               |               |               |
|--|---------------|---------------|---------------|---------------|
| Community ID                             | Jurisdiction  | Date of Entry | Effective Map | Sanction Date |
| 290109                                   | Blackwater    | 4/25/1975     | 5/3/2011(M)   | X             |
| 290110                                   | Boonville     | 1/23/1974     | 5/3/2011      | X             |
| 290111                                   | Bunceton      | 4/25/1975     | 5/3/2011(M)   | X             |
| 290794                                   | Cooper County | 11/16/1983    | 5/3/2011      | X             |
| 290556                                   | Otterville    | 4/25/1975     | 5/3/2011      | 04/25/76      |
| 290678                                   | Pilot Grove   | 7/25/1975     | 5/3/2011(M)   | X             |
| 290112                                   | Wooldridge    | 4/25/1975     | 5/3/2011      | x             |
| * (M) no elevation determined            |               |               |               |               |
| Source: NFIP Community Status Book, 2020 |               |               |               |               |

Otterville is the only community in Cooper County that has sanctioned NFIP status. While they show floodplain touching the outer edge of their southern border it does not currently come into their jurisdiction nor does it threaten any buildings. Changing climate with rising waters could change this in the future.

Prairie Home and Windsor Place do not have any floodplain in or near their jurisdiction and do not have any rate maps issued, therefore they do not participate in NFIP and are not considered sanctioned. While they may not be at risk for major flooding they can still be impacted by flash flooding. The long-term inundation of area roads could cut off access or force an uptick in area traffic as others impacted may look for alternate means to navigate around flooded areas.

**Table 3.18: NFIP Policy and Claim Statistics**

| Community Name | Policies in force | Insurance in force | Closed Losses | Total Payments |
|----------------|-------------------|--------------------|---------------|----------------|
| Blackwater     | 1                 | 70,000             | 0             | 0              |
| Boonville      | 3                 | 1,320,000          | 3             | 24,488.68      |
| Cooper County  | 5                 | 782,500            | 5             | 112,625.16     |
| Total          | 9                 | 2,172,500          | 8             | 137,113.84     |

Source: NFIP Community Status Book, [09/24/19]; BureauNet, <http://bsa.nfipstat.fema.gov/reports/reports.html>; \*Closed Losses are those flood insurance claims that resulted in payment. Loss statistics as of 09/30/20.

### Repetitive Loss/Severe Repetitive Loss Properties

Properties with at least two flood insurance payments of \$1,000 or more in a 10-year period are categorized as Repetitive Loss Properties. Due to federal restrictions on data sharing, the state was unable to provide full Repetitive Loss data or current Severe Repetitive Loss data. This also impacts information on Property Type and whether the properties are mitigated or non-mitigated.

Severe Repetitive Loss (SRL): A SRL property is defined as a single family property 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 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. A single-family property can consist of one-to-four residences. Cooper County does not have any repetitive loss or severe repetitive loss properties.

### **Previous Occurrences**

The floods of 1993 and 1995 were the worst repetitive flood events in Missouri history, according to the Missouri State Hazard Mitigation Plan (2007). There was also severe flooding in the state in 1994. There were five presidential disaster declarations for flooding during this period; Cooper County was included in Disaster Declaration 995 (July 9, 1993) and Disaster Declaration 1054 (June 2, 1995).

After a Presidential Disaster Declaration, Public Assistance (PA) and/or Individual Assistance (IA) is made available through FEMA. Cooper County was eligible for both PA and IA from each of these disaster declarations.

In the summer of 2011, the Missouri River flooded again, this time stemming not from significant precipitation in the Mid-Missouri Region but from high precipitation and snow melt in Montana and North Dakota. Higher than normal rain and snow in the winter and spring of 2011 caused wide scale flooding in several states, including North Dakota, South Dakota, Nebraska, Iowa, Kansas, and Missouri. According to the National Weather Service, the Upper Missouri River Valley received more rainfall in the month of May than it does in an entire year.

While Cooper County was spared from incurring damage to residences or businesses, unlike upriver neighbors, it was not spared from seepage through levee walls. All levee districts in Cooper County had to pump water from inside levee walls during the months of June and July. Cooper County was part of both the Emergency Declaration 3325 and the Presidential Disaster Declaration 1980 and eligible for PA and IA. Significant pumping was needed in all levee districts as well as sandbagging and maintenance of the levee in the Village of Wooldridge. The levee that protects a portion of Wooldridge had been in serious disrepair. As flood waters were rising, volunteers, county workers, and the National Guard worked to clear debris on the levee and then placed sandbags to add extra protection. Thankfully, the river crested without reaching the levee.

In addition to the river floods of 1993, 1995, and 2011, data from NOAA indicates numerous other flooding events in Cooper County since 1993. The Missouri River flood in April 1994 caused \$5 million in property damage and \$5 million in crop damage across 79 Missouri counties; the portion of this reported loss that occurred in Cooper County is not indicated in the NOAA data.

Flash flooding can be particularly hazardous in that there may be very little warning for travelers. The NOAA data contains specific information about two flash flooding events where travelers were endangered in Cooper County. Two cars were swept off Highway 5 near Bunceton in the flash flood on June 10, 2007. In the other incident, a car was stalled on Highway W near Prairie Home with floodwaters reaching the door of the vehicle (September 12, 2008). No indication of injury was given in the data for these incidents.

**Table 3.19 NCEI Cooper County Flash Flood Events Summary 2000-2020**

| Location             | Date      | # of Deaths | # of Injuries | Property Damages | Crop Damages |
|----------------------|-----------|-------------|---------------|------------------|--------------|
| SOUTH PORTION        | 5/26/2000 | 0           | 0             | 0                | 0            |
| BUNCETON             | 4/10/2001 | 0           | 0             | 0                | 0            |
| BOONVILLE            | 5/7/2002  | 0           | 0             | 0                | 0            |
| BOONVILLE            | 5/8/2002  | 0           | 0             | 0                | 0            |
| PILOT GROVE          | 5/19/2004 | 0           | 0             | 0                | 0            |
| WOOLDRIDGE           | 5/25/2004 | 0           | 0             | 0                | 0            |
| WOOLDRIDGE           | 5/25/2004 | 0           | 0             | 0                | 0            |
| BOONVILLE            | 5/30/2004 | 0           | 0             | 0                | 0            |
| BOONVILLE            | 8/4/2004  | 0           | 0             | 0                | 0            |
| BOONVILLE            | 8/4/2004  | 0           | 0             | 0                | 0            |
| PILOT GROVE          | 1/12/2005 | 0           | 0             | 0                | 0            |
| PRAIRIE HOME         | 6/8/2005  | 0           | 0             | 0                | 0            |
| BOONVILLE            | 8/18/2005 | 0           | 0             | 0                | 0            |
| BOONVILLE            | 8/26/2005 | 0           | 0             | 0                | 0            |
| BUNCETON             | 6/10/2007 | 0           | 0             | 2000             | 0            |
| OTTERVILLE           | 6/10/2007 | 0           | 0             | 0                | 0            |
| BLACKWATER           | 6/29/2007 | 0           | 0             | 0                | 0            |
| PRAIRIE HOME         | 9/12/2008 | 0           | 0             | 0                | 0            |
| BUNCETON             | 9/12/2008 | 0           | 0             | 0                | 0            |
| BOONVILLE VIERTEL AR | 9/12/2008 | 0           | 0             | 0                | 0            |
| BELLAIR              | 9/12/2008 | 0           | 0             | 0                | 0            |
| BLACKWATER           | 6/15/2009 | 0           | 0             | 0                | 0            |
| BUNCETON             | 4/29/2012 | 0           | 0             | 0                | 0            |
| BUNCETON             | 5/20/2013 | 0           | 0             | 0                | 0            |
| BILLINGSVILLE        | 5/30/2013 | 0           | 0             | 0                | 0            |
| BOONVILLE            | 5/31/2013 | 0           | 0             | 0                | 0            |
| GOOCH MILL           | 5/31/2013 | 0           | 0             | 0                | 0            |
| BOONVILLE            | 9/1/2014  | 0           | 0             | 0                | 0            |
| BILLINGSVILLE        | 6/26/2015 | 0           | 0             | 0                | 0            |
| PISGAH               | 6/26/2015 | 1           | 0             | 0                | 0            |

|                         |           |   |   |   |   |
|-------------------------|-----------|---|---|---|---|
| BOONVILLE VIERTEL<br>AR | 8/25/2019 | 0 | 0 | 0 | 0 |
| BOONVILLE ARPT          | 5/25/2020 | 0 | 0 | 0 | 0 |

**Table 3.20 NCEI Cooper County Riverine Flood Events Summary 2000-2020**

| Location      | Date       | # of Deaths | # of Injuries | Property Damages | Crop Damages |
|---------------|------------|-------------|---------------|------------------|--------------|
| Cooper County | 2/18/2000  | 0           | 0             | 0                | 0            |
| Cooper County | 5/26/2000  | 0           | 0             | 0                | 0            |
| Cooper County | 6/21/2000  | 0           | 0             | 0                | 0            |
| Cooper County | 8/8/2000   | 0           | 0             | 0                | 0            |
| Cooper County | 1/29/2001  | 0           | 0             | 0                | 0            |
| Cooper County | 2/9/2001   | 0           | 0             | 0                | 0            |
| Cooper County | 2/24/2001  | 0           | 0             | 0                | 0            |
| Cooper County | 3/16/2001  | 0           | 0             | 0                | 0            |
| Cooper County | 4/3/2001   | 0           | 0             | 0                | 0            |
| Cooper County | 4/10/2001  | 0           | 0             | 0                | 0            |
| Cooper County | 5/7/2001   | 0           | 0             | 0                | 0            |
| Cooper County | 6/4/2001   | 0           | 0             | 0                | 0            |
| Cooper County | 6/16/2001  | 0           | 0             | 0                | 0            |
| Cooper County | 6/21/2001  | 0           | 0             | 0                | 0            |
| Cooper County | 1/31/2002  | 0           | 0             | 0                | 0            |
| Cooper County | 2/1/2002   | 0           | 0             | 0                | 0            |
| Cooper County | 5/7/2002   | 0           | 0             | 0                | 0            |
| Cooper County | 5/8/2002   | 0           | 0             | 0                | 0            |
| Cooper County | 5/8/2002   | 0           | 0             | 0                | 0            |
| Cooper County | 5/12/2002  | 0           | 0             | 0                | 0            |
| Cooper County | 6/12/2002  | 0           | 0             | 0                | 0            |
| Cooper County | 5/10/2003  | 0           | 0             | 0                | 0            |
| Cooper County | 9/1/2003   | 0           | 0             | 0                | 0            |
| Cooper County | 12/23/2003 | 0           | 0             | 0                | 0            |
| Cooper County | 12/23/2003 | 0           | 0             | 0                | 0            |
| Cooper County | 1/18/2004  | 0           | 0             | 0                | 0            |
| Cooper County | 3/4/2004   | 0           | 0             | 0                | 0            |
| Cooper County | 3/26/2004  | 0           | 0             | 0                | 0            |
| Cooper County | 3/26/2004  | 0           | 0             | 0                | 0            |
| Cooper County | 5/19/2004  | 0           | 0             | 0                | 0            |
| Cooper County | 5/25/2004  | 0           | 0             | 0                | 0            |
| Cooper County | 7/24/2004  | 0           | 0             | 0                | 0            |
| Cooper County | 8/4/2004   | 0           | 0             | 0                | 0            |

|                         |            |   |   |   |   |
|-------------------------|------------|---|---|---|---|
| Cooper County           | 8/25/2004  | 0 | 0 | 0 | 0 |
| Cooper County           | 11/1/2004  | 0 | 0 | 0 | 0 |
| Cooper County           | 11/24/2004 | 0 | 0 | 0 | 0 |
| Cooper County           | 11/27/2004 | 0 | 0 | 0 | 0 |
| Cooper County           | 1/3/2005   | 0 | 0 | 0 | 0 |
| Cooper County           | 1/5/2005   | 0 | 0 | 0 | 0 |
| Cooper County           | 1/13/2005  | 0 | 0 | 0 | 0 |
| Cooper County           | 1/13/2005  | 0 | 0 | 0 | 0 |
| Cooper County           | 2/13/2005  | 0 | 0 | 0 | 0 |
| Cooper County           | 4/22/2005  | 0 | 0 | 0 | 0 |
| Cooper County           | 6/13/2005  | 0 | 0 | 0 | 0 |
| Cooper County           | 6/13/2005  | 0 | 0 | 0 | 0 |
| Cooper County           | 8/19/2005  | 0 | 0 | 0 | 0 |
| Cooper County           | 8/26/2005  | 0 | 0 | 0 | 0 |
| Cooper County           | 8/26/2005  | 0 | 0 | 0 | 0 |
| BOONVILLE               | 4/30/2006  | 0 | 0 | 0 | 0 |
| BOONVILLE               | 2/20/2007  | 0 | 0 | 0 | 0 |
| BOONVILLE               | 2/24/2007  | 0 | 0 | 0 | 0 |
| CLIFTON CITY            | 4/14/2007  | 0 | 0 | 0 | 0 |
| BOONVILLE VIERTEL<br>AR | 5/6/2007   | 0 | 0 | 0 | 0 |
| LAMINE                  | 5/7/2007   | 0 | 0 | 0 | 0 |
| BOONVILLE               | 6/11/2007  | 0 | 0 | 0 | 0 |
| BILLINGSVILLE           | 6/28/2007  | 0 | 0 | 0 | 0 |
| OTTERVILLE              | 6/30/2007  | 0 | 0 | 0 | 0 |
| OTTERVILLE              | 7/1/2007   | 0 | 0 | 0 | 0 |
| BOONVILLE VIERTEL<br>AR | 1/8/2008   | 0 | 0 | 0 | 0 |
| BOONVILLE VIERTEL<br>AR | 2/6/2008   | 0 | 0 | 0 | 0 |
| BOONVILLE VIERTEL<br>AR | 2/17/2008  | 0 | 0 | 0 | 0 |
| OTTERVILLE              | 2/17/2008  | 0 | 0 | 0 | 0 |
| BOONVILLE VIERTEL<br>AR | 3/3/2008   | 0 | 0 | 0 | 0 |
| BOONVILLE VIERTEL<br>AR | 3/17/2008  | 0 | 0 | 0 | 0 |
| OTTERVILLE              | 3/18/2008  | 0 | 0 | 0 | 0 |
| BOONVILLE               | 4/10/2008  | 0 | 0 | 0 | 0 |
| OTTERVILLE              | 4/10/2008  | 0 | 0 | 0 | 0 |
| BOONVILLE VIERTEL<br>AR | 4/24/2008  | 0 | 0 | 0 | 0 |

|            |            |   |   |   |   |
|------------|------------|---|---|---|---|
| OTTERVILLE | 4/24/2008  | 0 | 0 | 0 | 0 |
| OTTERVILLE | 5/8/2008   | 0 | 0 | 0 | 0 |
| BLACKWATER | 12/28/2015 | 0 | 0 | 0 | 0 |
| LAMINE     | 4/1/2019   | 0 | 0 | 0 | 0 |
| OVERTON    | 5/1/2019   | 0 | 0 | 0 | 0 |
| OVERTON    | 6/1/2019   | 0 | 0 | 0 | 0 |
| BUNCETON   | 6/9/2020   | 0 | 0 | 0 | 0 |

### Probability of Future Events

| Table 3.21                            |   |             |                    |
|---------------------------------------|---|-------------|--------------------|
| Probability of Future Flooding Events |   |             |                    |
| EF-Scale                              | # of years with flood event (2000-2020) | Probability | Probability Rating |
| River flood                           | 12                                      | 57%         | High               |
| Flash flood                           | 14                                      | 67%         | High               |

Probability: High – Cooper County, Boonville, Wooldridge, Linneman-Weekley Levee District, and the Overton-Wooldridge Levee District  
 Low – Bunceton, Otterville, Pilot Grove

### CHANGING FUTURE CONDITIONS CONSIDERATIONS

As precipitation is projected to increase, and in more extreme events, the risk of flooding could increase. This risk can be exacerbated by more and more construction that adds more impermeable surfaces that give large quantities of water nowhere to go.

### VULNERABILITY

#### VULNERABILITY OVERVIEW

Cooper County is vulnerable to Missouri River Flooding and flash flooding, as well as flooding from the Lamine River.

#### Potential Impact – Life

All types of flooding present a threat to human life. Small stream/urban stream flooding and flash flooding are particularly hazardous due to their quick onset. It is an ongoing struggle to

educate the public concerning the very real hazard presented by flooded low water crossings and other flash flooding situations.

In addition to the risk of drowning, exposure to flood waters can result in infection or injury from sewage, agricultural runoff, and industrial chemicals. Flooded buildings present health risks from mold, chemicals, and electrical hazards.

Flooding also poses a threat to the livelihood of those farming in low lands; this is especially a problem near the Missouri River. When the river level is high for an extended period, water will seep up through the soil and cause additional flooding to that already caused by heavy rains. Standing water in fields may prevent planting at the optimal time for a successful harvest or damage/destroy crops during the growing season.

### **Potential Impact on Existing Development**

Cooper County residents, structures, and infrastructure lying in or near the Missouri River Floodplain or Lamine River Floodplain are all vulnerable to the effects of a major flood. Other structures not within designated floodplains are also vulnerable to the effects of flash flooding brought on by storm water or sheet flooding.

It can be said with certainty that there are not fire stations, schools, nursing homes, hospitals, prisons, government centers, or police stations in the 100-year floodplain.

Both the City of Bunceton and the City of Otterville have their wastewater lagoons located partially within the 100-year floodplain. This has not posed a significant problem for either community.

### **Potential Losses to Previous and Future Development**

There is a high level of awareness in the planning area regarding the dangers and potential of flooding. Participation in the NFIP by Cooper County and the vulnerable communities means that floodplain ordinances are in place regulating development in the floodplain. It is also important that development projects are closely monitored to ensure compliance with all storm water requirements and regulations in order to minimize increases to flash flooding from development. This is increasingly crucial as it is now known that climate change is causing an increase in the type of heavy downpours which trigger flash flooding.

### **Hazard Summary by Jurisdiction**

The Missouri River floods of 1993 and 1995 were devastating events for many parts of the Midwest United States. Changes in river management, including major wetland restoration projects along the river's long course and the buyout of properties in the river floodplain have all helped to mitigate risk associated with riverine flooding in the planning area.

## **Unincorporated Cooper County**

Cooper County posts signs at some of their low-water crossing to warn of flooding. Also, many state routes in the county have flood warning signs.

### **Boonville**

Boonville enforces floodplain ordinances; building codes and zoning contribute to this enforcement.

### **Pilot Grove**

Pilot Grove enforces floodplain ordinances.

### **Wooldridge**

The village has performed extensive maintenance to their levee and flood gate to prepare for future events that may occur.

## **SUMMARY OF VULNERABILITY**

Large-scale floods, such as the 1993 flood, are devastating events for entire regions of the country. Not only was Mid-Missouri impacted, but the entire Midwest suffered large losses in life, property, and crop damage, which carried over to the rest of the United States. Transit routes were disrupted, people lost jobs, and crops never made it to market. Small-scale floods or flash flooding can impact a neighborhood or a city but are limited in their spatial extent.

The entire planning area is at risk from some type of flooding. The most common types of flooding in the area are flash and sheet flooding associated with heavy downpours. This type of flooding can impact a neighborhood or a city but are limited in their spatial extent. Flash flooding is of particular concern in the unincorporated parts of Cooper County, where roads can become impassable. Climate change is causing an increase in heavy downpours, and this will, in turn, most likely increase the frequency and/or severity of flash flooding.

Flooding of the Missouri River and the Lamine River (and their branches) is a potential problem for the areas near those rivers and branches.

NFIP membership, floodplain regulations, and a high awareness of the threat of potential flooding all act to help mitigate the vulnerability to this hazard.

### **Problem Statement**

Flooding and flash flooding are frequent occurrences in the planning area that pose a threat to life, livelihood, property, and infrastructure. Risk to these things vary across the planning area with highest risk being to lands and jurisdictions along the Missouri River, Lamine River, and creeks and streams that feed them. While not all jurisdictions in the planning area are part of the NFIP, all jurisdictions can be impacted by flash flooding in one way or another. As a result of



past events ordinances and guidance has been put in place to help control development in hazard areas. Proper stormwater handling, warning systems, elevated low-water crossings, and river bank restoration are all actions to aid in reduction of flood damage in the planning area.

## 3.4.2 Levee Failure

### DESCRIPTION OF HAZARD

A levee is defined by the National Flood Insurance Program as “a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.”

Federally authorized levees are typically designed and built by the US Army Corps of Engineers in cooperation with a local sponsor then turned over to a local sponsor to operate and maintain.

Non-federal levees are designed, built, and managed by a non-federal entity.

There is no single agency with responsibility for levee oversight. The Corps of Engineers has specific and limited responsibilities for approximately 2,000 levees nationwide through their Levee Program.

The responsibilities of local levee owners or sponsors are broad and may include levee safety; land use planning and development; building codes; and operations, maintenance, repair, rehabilitation, and replacement of the levee. The certification of levees for FEMA’s National Flood Insurance Program is also the responsibility of the local levee owners or sponsors.

Federally authorized and some non-federal levees may be eligible for Corps of Engineers rehabilitation assistance funding.

This assessment discusses the major levees in the planning area; these levees are owned and operated by levee districts. There are also several privately owned levees which are maintained by their owners; official data on the locations of these private levees is not available.

The USACE notes that there is a “large universe of private and other non Corps levees that have not been inventoried or inspected/assessed. We don’t know the size of this universe, where the levees are located, their condition, or the consequences of failure, loss of life being of paramount concern.”

Levee failure, according to FEMA, can occur by the following means:

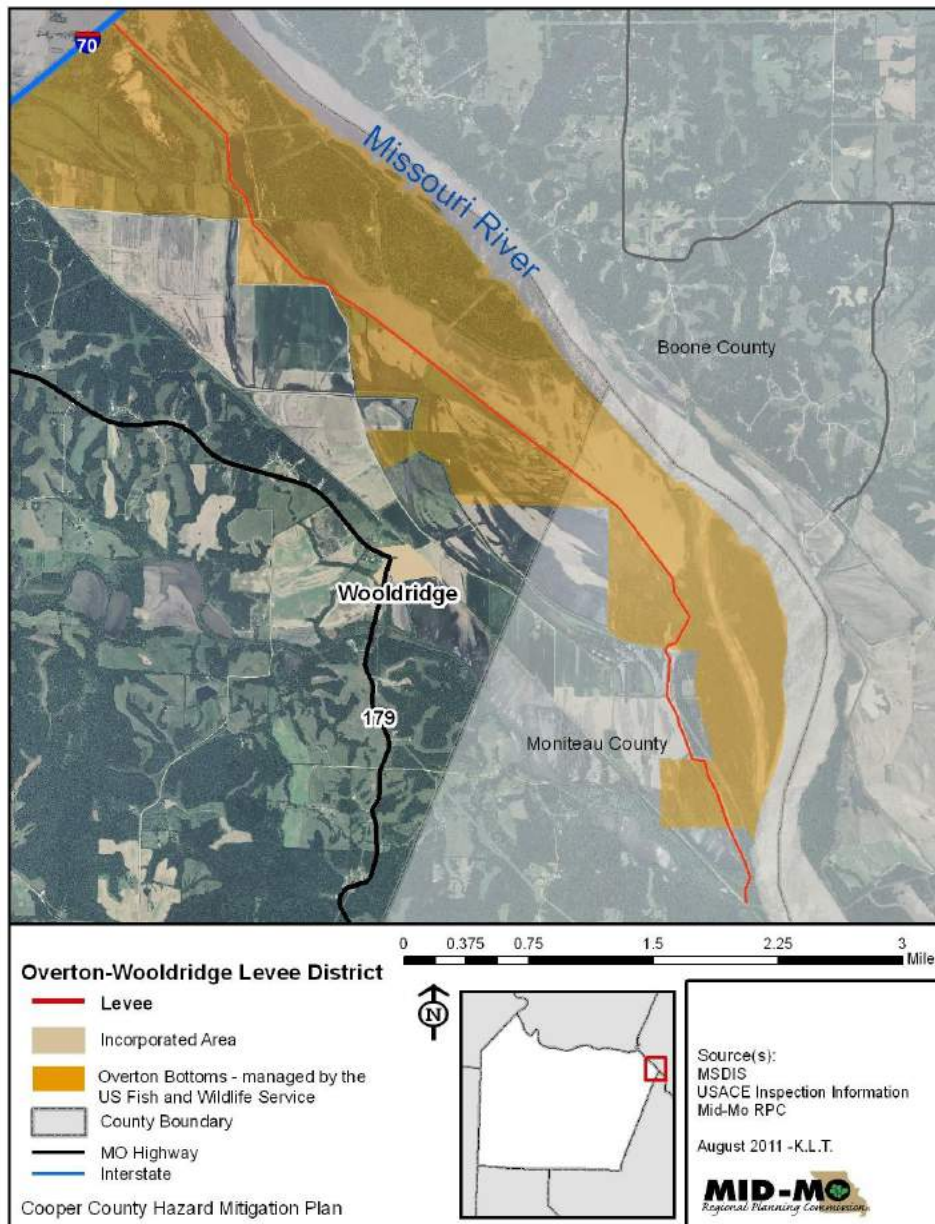
- **Overtopping** - When a large flood occurs, water can flow over a levee. The stress exerted by the flowing water can cause rapid erosion.
- **Piping** - Levees are often built over old stream beds. Flood waters will follow these sub grade channels causing a levee to erode internally thereby allowing flood waters to rupture the levee structure.
- **Seepage and Saturation** - If flood waters sit up against a levee for a long period, the levee may become saturated and eventually collapse.
- **Erosion** - Most levees are constructed of sand or soil which erodes easily under high-velocity flood waters.

- **Structural Failures** - Lack of regular maintenance is a key reason levees fail at gates, walls, or closure sites.

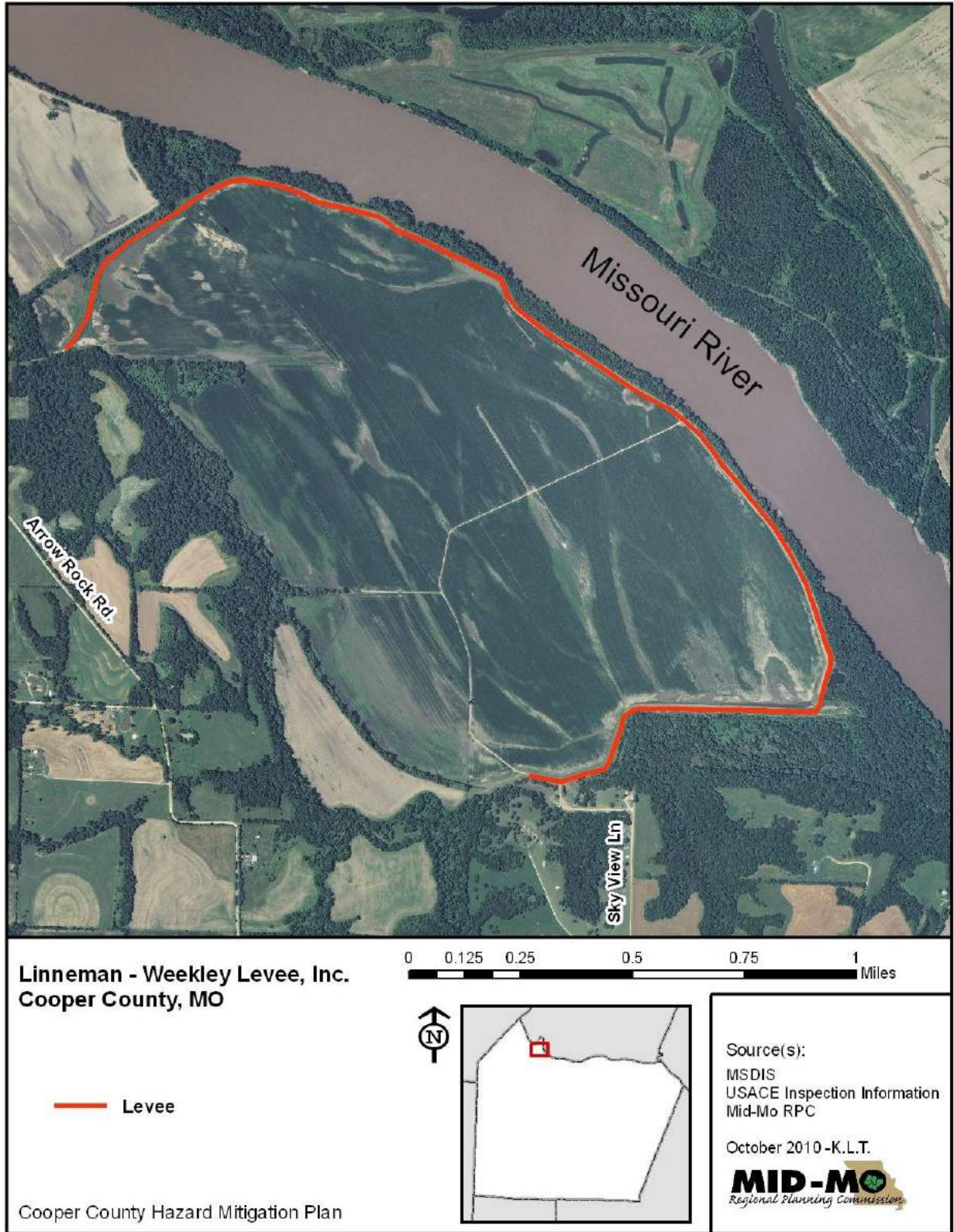
**Location**

The levee districts in Cooper County are found along the Missouri River on the northern and northeastern boundaries of Cooper County. The levee that protects a portion of the Village of Wooldridge is located in northeastern Cooper County and protects the community from riverine flooding stemming from the Petite Saline Creek. The Petite Saline Creek floods a large area of Cooper County when the Missouri River rises and backs up into this tributary.

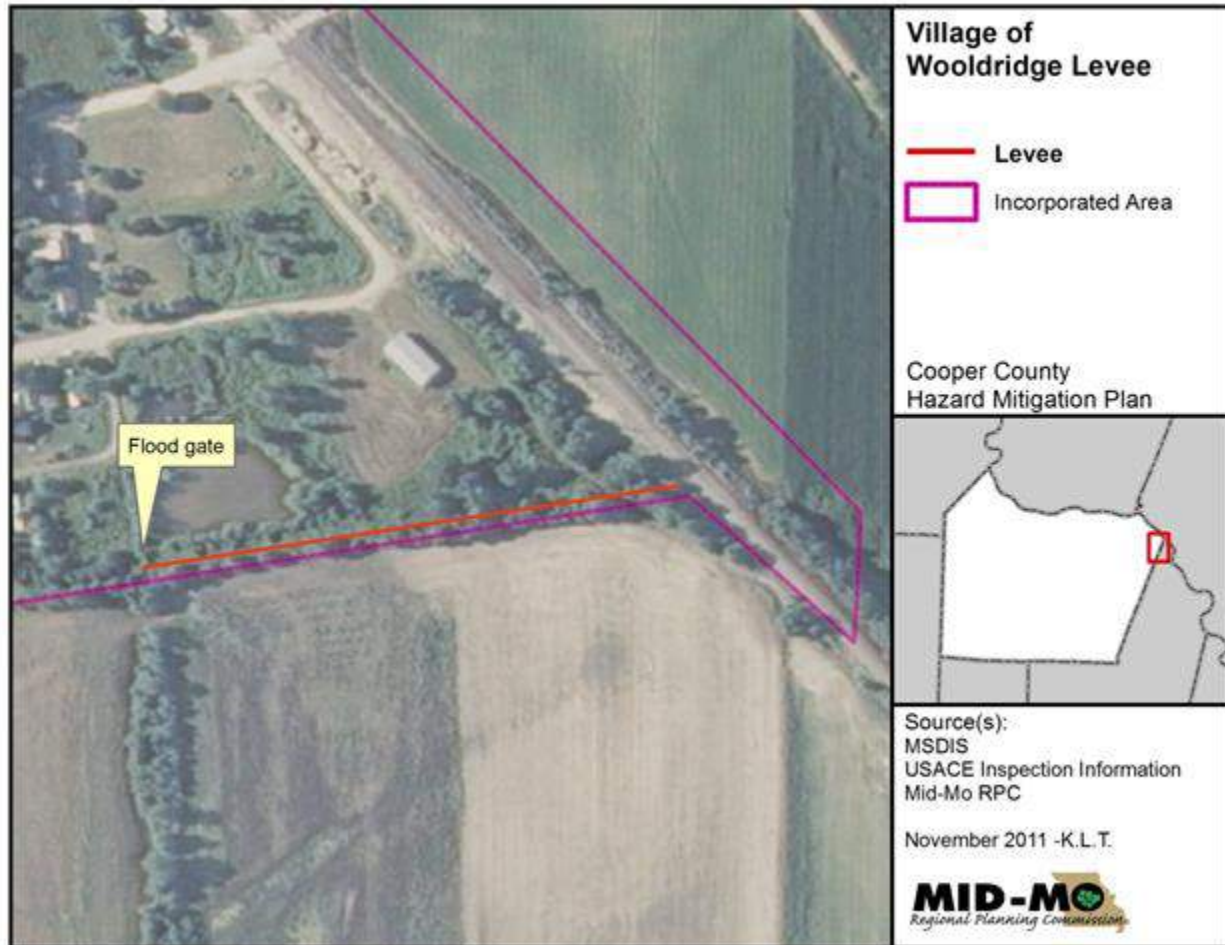
**Map 3.6 Overton-Wooldridge Levee**



Map 3.7 Linneman Weekley Levee



### Map 3.8 Wooldridge Levee



The levees are part of the U.S. Army Corps of Engineers (USACE) Rehabilitation Program. As part of this program, a levee district is eligible for USACE levee rehabilitation assistance if its levee receives damage during a flood event. The levee must maintain a *minimally acceptable* standard to remain eligible for the assistance. According to the USACE, “The rating is based on the levee inspection checklist, which includes 125 specific items dealing with operation and maintenance of levee embankments, floodwalls, interior drainage, pump stations, and channels.”

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

The levee ratings from the most recent inspections, along with other information, are shown in Table 3.22.

**Table 3.22 Major Levees in Planning Area**

| Levee Name            | Segment Length | Levee Acreage | Inspection Date | Rating |
|-----------------------|----------------|---------------|-----------------|--------|
| Linneman-Weekley      | 3.75           | 900           | 10/26/2016      | Low    |
| Overton-Wooldridge    | 7.25           | 3,500         | 2/5/2015        | Low    |
| Village of Wooldridge | 4.42           | N/A           | N/A             | N/A    |

Sources: USACE National Levee Database; USACE Levee Inspection Reports

There are other, privately owned levees in the planning area; official data on the locations of these private levees is not available. These privately owned levees are maintained by their owners and are not part of any federal rehabilitation program. Tracking of levee conditions is a point of concern, especially because there are so many of these privately owned levees.

### **Extent/Magnitude/Severity**

Levee failure is typically an additional or secondary impact of another disaster such as flooding or earthquake. Levee failure often occurs during a flood event, causing destruction in addition to what would have been caused by flooding alone. A breach on an agricultural levee can not only cause immediate crop loss but sand and silt brought in from a levee break can impact the growing medium for years to come.

Regular maintenance and inspection of the levees is critical. For the major levees in the planning area, the potential of major failure is connected to flooding of the Missouri River, a hazard with a longer speed of onset than many other hazards. This longer speed of onset allows time to mitigate and prepare for potential failure as flooding threatens.

## **Previous Occurrences**

According to the US Army Corps of Engineers, all levees in Cooper County and most of the surrounding counties failed during the 1993 Flood, resulting in the inundation of land and structures being protected.

Structures and communities that were affected by the levee breaches include the City of Boonville, Blackwater, the Blackwater Wastewater Facility, Wooldridge, and several residences and businesses. While the levees do not directly protect these areas, the breaches increased flooding in these locations.

In the summer of 2011, high levels of flooding occurred along the Missouri River, stemming from releases from the Gavin's Point Reservoir near Yankton, South Dakota. The water that was released from the reservoir and other reservoirs upstream resulted in large-scale flooding in the upper Missouri River Valley. These flooded areas included North Dakota, South Dakota, Nebraska, Iowa, Kansas, and Missouri. While flood waters from this event caused severe damage to levees in northwestern Missouri, the central portion of the state fared much better. There were no failures of levees in Cooper County.

While levee failures did not occur, there were instances of seepage coming under levees and causing damage to agricultural fields and roadways. Both the Linneman-Weekley and Overton-Wooldridge levee districts incurred damage to agricultural fields and had to maintain pumps to keep water out of protected areas.

Wooldridge also took measures to mitigate the effects of the 2011 flooding. On July 1, 2011, the Missouri National Guard arrived in Wooldridge to prepare sandbags for the levee. At that time, the Petite Saline Creek, which is a tributary to the Missouri River, was backing up into town.

In addition to major flooding events, smaller flooding events have caused damage for levee districts. The Overton-Wooldridge Levee District experiences periodic flooding stemming from seepage under their levee. Water from the adjoining wetland area seeps under the levee through sandy soil and causes pooling of water farther inland that should be protected by the levee. Levee district board members stated that this seepage did not occur until the creation of a side channel or chute in the wetland by the US Fish and Wildlife Service in 2001. According to the US Fish and Wildlife Service, the 1.5-mile chute at Overton Bottoms only receives water from the Missouri River at high river stages and is used for fish sampling.

In 2019 near historic flood levels scoured and damaged levees across the whole region.

## **Probability of Future Events**

Probability: Moderate

There haven't been any levee breaches in the planning area in the last 20 years. With regular maintenance the probability of a levee break is low but with the high rate of flooding along the Missouri river the potential for a break is never zero.

## **Changing Future Conditions Considerations**

As precipitation is projected to increase, and in more extreme events, the risk of flooding could increase. Prolonged elevated water levels can make maintenance and repairs difficult to accomplish only increasing the risk for a break through scouring and seepage.

## **VULNERABILITY**

### **Vulnerability Overview**

Portions of unincorporated Cooper County are vulnerable to Levee issues. The portions at risk though are mostly all agriculture land where risk to life is low. Failure or overtopping of a levee can damage or kill crops being grown in the fertile lowland areas and also contaminate soil with sand and other things washed in from the Missouri River which can create significant long-term impacts for farmers.

**Severity:** Moderate – Cooper County (unincorporated)

Not applicable – All other participating jurisdictions

### **Potential Losses – Life**

Levee failure presents a flooding threat to life. The longer period of onset associated with failure of levees along the Missouri River would minimize the threat of actual drowning; however, drowning could still occur. The greater threat from levee failure would be exposure to flood waters with possible resulting infection or injury from sewage, agricultural runoff, and industrial chemicals. Flooded buildings present health risks from mold, chemicals and electrical hazards.

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

Structures in Cooper County that would be vulnerable to the effects of levee failure would include those that lie in areas in or near the Missouri River floodplain and its tributaries. Since the 1993 Flood, many structures have been relocated, bought out, abandoned, elevated, or remodeled; this has reduced the amount of vulnerable structures and people in areas where levees could potentially fail.

### **Impact to Previous and Future Development**

Impact on future development is directly related to floodplain management and regulations set forth by the county and individual communities through levee management and regulations which are not clearly defined. It is important to note that levees in Cooper County are located in designated floodplains. This means that all new construction in these areas fall under Cooper County's floodplain regulations and must adhere to that coding. The US Army Corps of Engineers oversees the inspection of the Linneman-Weekley Levee District and the Overton-Wooldridge Levee District; it is up to the owner or sponsor to inspect and fix their levees. Both levee districts and the Village of Wooldridge have a maintenance plan in place.



Most areas behind the three levees in the planning area are in designated floodplains and new construction must meet floodplain regulations and/or NFIP guidelines.

## **SUMMARY OF VULNERABILITY**

**Jurisdictions:** Cooper County, Wooldridge, Overton-Wooldridge Levee District, and Linneman-Weekley Levee District

The two main levees in the planning area (Overton-Wooldridge Levee District and Linneman-Weekley Levee District) are addressed in this plan. Vulnerability assessments are not being completed for the private levees in the planning area due to the lack of official data on their locations.

The Overton-Wooldridge Levee District and Linneman-Weekley Levee District levees in the planning area are agricultural levees. Agricultural levees are usually built to withstand a 50-year flood, but these three levees fall well below that protection level at 10- to 25-year flood event levels. The Village of Wooldridge Levee is not part of the USACE Levee Rehabilitation Program and does not have an inspection report. It has been estimated by the Wooldridge Board of Trustees that there are approximately 12 to 15 residences that are protected by the levee.

The risk of flooding from levee failure remains. The warning time afforded by a hazard such as levee failure, which has a long period of onset, will allow for preparations and evacuations to take place, should the need arise.

### **Problem Statement**

Levee failure is not a common occurrence in the planning area. The last instance of levee failure in the planning area was in 1993 when records were set across the state for flooding levels. Levee failure is usually a slow process that gives people time to evacuate areas at risk. Keeping up with maintenance and frequent inspections are actions of mitigation to help prevent such breakages that could lead to property damage and crop loss.

### 3.4.3 Dam Failure

#### DESCRIPTION OF HAZARD

A dam is defined by the National Dam Safety Act as an artificial barrier which impounds or diverts water and is:

1. more than 6 feet high and stores 50 acre feet or more or
2. 25 feet or more high and stores more than 15 acre feet.

Based on this definition, there are over 80,000 dams in the United States. Over 95% are non-federal, with most being owned by state governments, municipalities, watershed districts, industries, lake associations, land developers, and private citizens.

Dam owners have primary responsibility for the safe design, operation and maintenance of their dams. They also have responsibility for providing early warning of problems at the dam, for developing an effective emergency action plan, and for coordinating that plan with local officials. The State has ultimate responsibility for public safety, and many states regulate construction, modification, maintenance, and operation of dams, and also ensure a dam safety program.

Dam construction varies widely throughout the state. A majority of dams are of earthen construction. Missouri's mining industry has produced numerous tailing dams for the surface disposal of mine waste. These dams are made from mining material deposited in slurry form in an impoundment. Other types of earthen dams are reinforced with a core of concrete and/or asphalt. The largest dams in the state are built of reinforced concrete, and are used for hydroelectric power.

**Failure** - Dams can fail for many reasons. The most common are:

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

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

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

These three types of failures are often interrelated. For example, erosion, either on the surface or internal, may weaken the dam or lead to structural failure. Similarly, a structural failure may shorten the seepage path and lead to a piping failure.

**Dam Hazard Classification** - Dams in Missouri have been classified according to both a federal and state system with regards to potential hazard posed.

The **federal classification system** is based upon the probable loss of human life and the impact on economic, environmental and lifeline interests from dam failure. It should be noted that there

is always the possibility of loss of human life when a dam fails; this classification system does not account for the possibility of people occasionally passing through an inundation area which is usually unoccupied (e.g. occasional recreational users, daytime user of downstream lands, etc.)

The **state classification system** is based upon the type and number of structures downstream from a dam. An inventory of all the dams of the state was done in the late 1970s and early 1980s, according to Glenn Lloyd, Civil Engineer and Dam Safety Inspector with the Dam Safety Program of the MO Department of Natural Resources (DNR). All of the known dams were classified by the state at that time.

A summary of the federal and state classification systems, how the two systems relate to each other, and inspection requirements for regulated dams is shown in Table 3.23

| Table 3.23<br>Dam Hazard Classification Systems |  |                |  |   |
|---|--|----------------|--|---|
| Federal   |  | State          |  |   |
| Classification                                  | Criterion  | Classification | Downstream Environment   | Inspection Requirement (Regulated Dams) |
| High hazard                                     | Probable loss of human life  | Class 1        | 10 or more permanent dwellings; or any public building   | Every 2 years                           |
|   |  | Class 2        | 1-9 permanent dwellings; or 1 or more campgrounds with permanent water, sewer and electrical services; or one or more industrial buildings | Every 3 years                           |
| Significant hazard                              | No probable loss of human life but potential economic loss, environmental damage, disruption of lifeline facilities or other impact of concern | Class 3        | Everything else  | Every 5 years                           |
| Low hazard                                      | No probable loss of human life; low economic and/or environmental loss; loss principally limited to owner's property                           |                |  |   |

Sources: Federal Guidelines for Dam Safety, Hazard Potential Classification System for Dams, April 2004, <http://www.fema.gov/library/viewRecord.do?id=1830>; <http://www.sos.mo.gov/adrules/csr/current/10csr/10c22-2.pdf>; Glenn Lloyd, Civil Engineer/Dam Safety Inspector, MO DNR, Water Resources Center, Dam Safety Program

## Dam Regulation in Missouri

Pursuant to Chapter 236 of the Revised Statutes of Missouri, a dam must be 35 feet or higher to be state regulated; regulation makes a dam subject to permit and inspection requirements. For regulated dams, the state classification system dictates the required inspection cycle. According to the Association of State Dam Safety Officials, 5,113 dams in Missouri have been classified and only 685 are regulated by the state.

The inspection cycle for regulated dams allows for a regulated dam’s classification to be updated when appropriate. Classification is a dynamic system; development can easily change the situation downstream. A regulated dam in Missouri would have its classification appraised at least once every 5 years.

In addition, the DNR database of dams in Missouri reflects only the known dams; a dam less than 35 feet in height which was built since the inventory was taken over 30 years ago may not appear in the database.

There are currently 22 dams in Cooper County according to the Department of Natural Resources database. Of these, only 2 are regulated by the state.

| Hazard Category | Regulated Dams | Unregulated Dams | All County Dams | Percentage of Total Dams |
|-----------------|----------------|------------------|-----------------|--------------------------|
| High            | 0              | 2                | 2               | 9%                       |
| Significant     | 0              | 0                | 0               | 0%                       |
| Low             | 2              | 18               | 20              | 91%                      |
| Total           | 2              | 20               | 22              | 100%                     |

Note that one of the unregulated high hazard dams is dry and thus not a threat at the present time.

One must use caution in assuming the classifications of non-regulated dams are currently accurate. It is very probable that, for most of the non-regulated dams, the classification does not take into account over 30 years of development and change in Cooper County.

Again, it is important to note that, according to information from Missouri DNR, much of this data, perhaps most of it, for the unregulated dams has not been updated since the dam survey was first conducted in the late 1970s and early 1980s. The heights of the unregulated dams may be, in some cases, the only currently reliable information.

### Location

The dams in the planning area are located in unincorporated Cooper County and Boonville (see Map 3.9).

Dam failure is not an issue for Blackwater, Bunceton, Otterville, Pilot Grove, Prairie Home, Windsor Place, Wooldridge, Blackwater R-II Schools, Boonville R-I Schools, Cooper County R-IV Schools, Otterville R-VI Schools, Pilot Grove C-4 Schools, and Prairie Home R-V Schools. Even though the Boonville R-I School District is in Boonville where there are dams, the structures of these educational institutions are not within the estimated inundation areas of the dams.

The mapping data uses a layer from the DNR Dam Database; it was compared with the National Inventory of Dams (NID) to ensure the currency of the data.

According to information from Missouri DNR, much of this data for the unregulated dams, perhaps most of it, has not been updated since the dam survey was first conducted in the late 1970s and early 1980s. The heights of the unregulated dams may be, in some cases, the only currently reliable information.

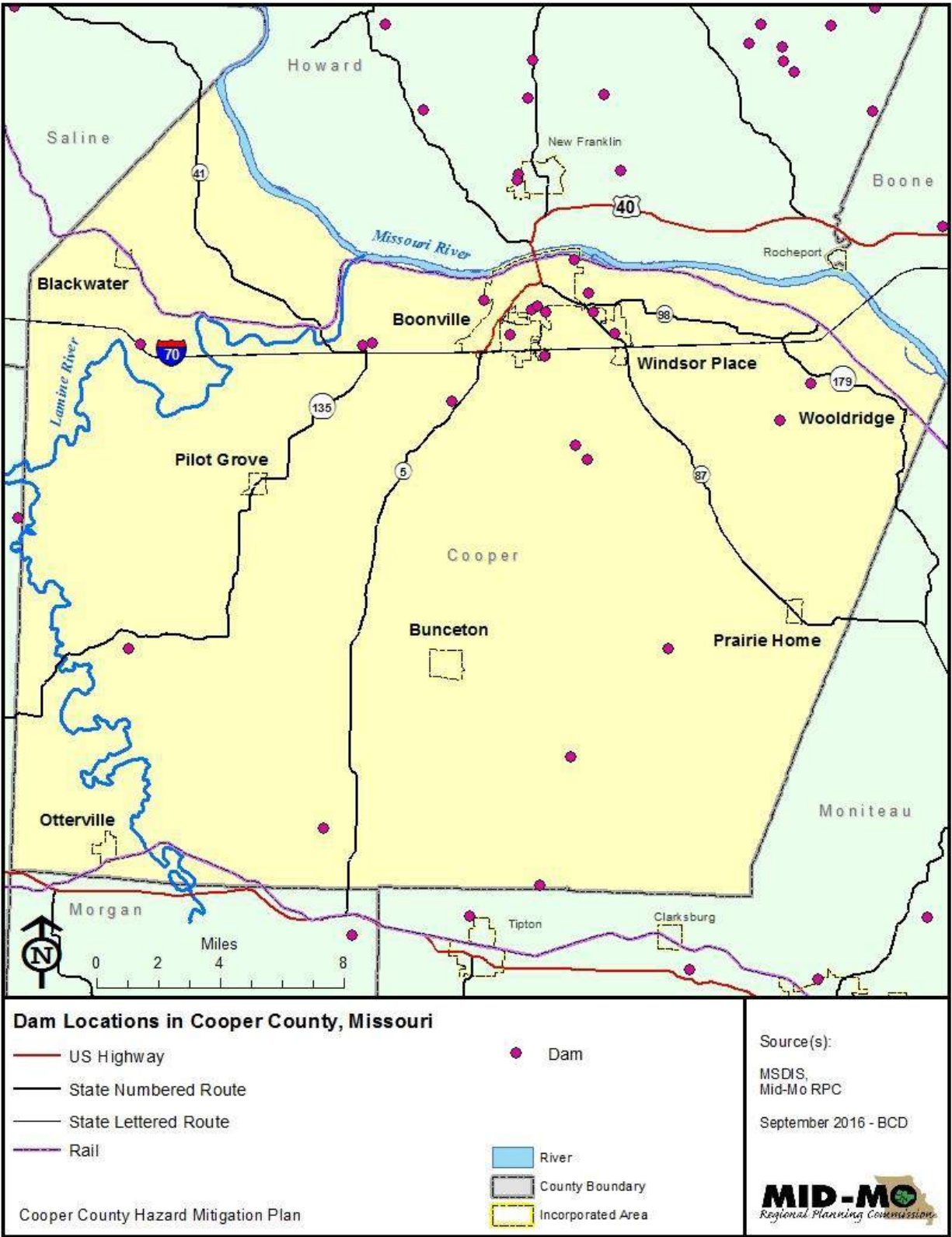
There are not any dams outside the planning area that would impact the region in the event of a failure.

**Table 3.25 High Hazard Dams in Cooper County**

| Dam Name           | Emergency Action Plan (EAP/AP) | Dam Height (Ft) | Normal Storage (Acre-Ft) | Last Inspection Date | River               | Nearest Downstream City | Distance To Nearest City (Miles) | Dam Owner    |
|--------------------|--------------------------------|-----------------|--------------------------|----------------------|---------------------|-------------------------|----------------------------------|--------------|
| Rolfing Lake Dam   | No                             | 25              | 147                      | N/A                  | TR-MO River         | Boonville               | <1                               | Dick Rolfing |
| Friedrich Lake Dam | No                             | 22              | 106                      | N/A                  | TR-Petite Saline Cr | Billingsville           | <1                               | F. Friedrich |

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](http://nid.usace.army.mil/cm_apex/f?p=838:12).

**Map 3.9 Cooper County Dams**



## **Strength/Magnitude/Extent**

The speed of onset of a dam failure can vary considerably. In most cases, regular inspections, either formal or informal, will promote a longer period of onset and allow for possible mitigation. Unfortunately, the current lack of required dam inspections increases the likelihood of dam conditions being ignored by owners – a situation which promotes a quicker speed of onset and an increased threat from the hazard.

The extent of hazard which a dam failure poses is also influenced by the reservoir size.

## **Previous Occurrences**

While there have been no dam failures in Cooper County in recent history, the issue was highlighted in the mid-Missouri region by a dam failure in nearby Boone County in 2008 and a near failure in Cole County in 2009.

The Moon Valley Lake Dam in Columbia (Boone County) failed in March 2008. This 18-foot high unregulated dam had been built in 1964; it drained 2,100 acres and had a 13-acre reservoir, according to the DNR database. Moon Valley Lake Dam was classified as high hazard, but there was no loss of life with the dam failure. The City of Columbia estimated the cost of removing the sediment and stabilizing about 2,000 feet of the stream bank to be about \$400,000.

Failure of the Renn's Lake Dam in Jefferson City (Cole County) was averted in late October and early November 2009 through the work of emergency crews and volunteers who relieved pressure on the earthen dam by pumping thousands of gallons of water from 7-acre Renn's Lake. The 30-foot high unregulated dam, built in 1950, had been weakened by the growth of trees; heavy rainfall caused a 15-foot section to erode. Renn's Lake is located immediately to the west of U.S. Highway 54, and the failure of the dam would have threatened the highway.

Boone County and Cole County are not the only counties in Missouri to experience dam failures. On December 14, 2005, there was a huge dam failure that destroyed Johnson Shut-Ins State Park in Reynolds County. AmerenUE's Taum Sauk Reservoir Dam at their hydroelectric complex failed; 1.5 billion gallons of water were released into the park in 10 minutes. There was no loss of life, even though the superintendent's family was swept out of their home. However, if this failure had occurred during the summer—a time when the popular park has many visitors—it could have resulted in a catastrophic loss of life.

All of these dam failures indicated that this is a serious problem that needs attention. Many of Missouri's smaller dams are becoming a greater hazard as they continue to age and deteriorate. While hundreds of them need to be rehabilitated, a lack of available funding and questions of ownership loom as obstacles difficult to overcome.

## **Probability of Future Events**

Probability: Low

Severity: Low

There have been zero failures in Cooper County in the last 20 years of Dams. Lack of regulation and aging systems could impact this at any point though.

### **Changing Future Conditions**

The future of climate change on dam failure is largely tied to future precipitation events. Since precipitation is predicted to increase in the future with potential for more vigorous rainfall events, this creates an elevated risk of flooding and pressure on dams and spillways to handle the extra water amounts. This elevated pressure brings about the importance for regular inspections and maintenance, as well as the need for engineering with higher flood levels in mind.

## **VULNERABILITY**

### **Vulnerability Overview**

A dam failure in Cooper County could range from very minimal environmental damage to a significant loss of life and infrastructure. All impacts are dependent upon several variables: water, debris, people, and structures.

There is one dam in Cooper County that is considered to pose high hazard should there be a dam break: Friedrich Lake Dam. This dam is privately owned and not regulated by the state and thus not subject to inspection requirements. Friedrich Lake Dam is located south of Boonville on State Highway 5.

State-regulated dams are classified by what lies downstream of the dam and what will be impacted by the failure of that dam. Non-regulated dams received their classifications nearly 30 years ago or more, and development that occurs downstream is not monitored by any agency; this potentially puts the public at risk. Also, development upstream that might increase the contents held by the dam can cause failure. Because there is no entity in charge of non-regulated dams, the original classifications for these dams may not be correct. Some dams may not exist anymore while others may pose a greater downstream threat than their classifications indicate.

### **Potential Impact – Life**

There is the very real danger of injury or loss of life with a dam failure event. This threat is recognized and built into the dam classification system.

### **Potential Impact - Existing Structures**

Boonville is the only jurisdiction, aside from unincorporated areas of Cooper County, to have dams inside or within a mile upstream of its corporate boundary. Structures downstream of these dam locations could potentially be at risk if a failure were to occur, depending on the size of the reservoir behind the dam. Throughout the county, several other dams lie upstream of structures that have the potential of being impacted.

### **Impact - Future Development**



Dam failure has the potential to impact future development in the county and its jurisdictions. Because many dams in Cooper County are privately owned and not regulated by the state, the potential for development below aging or unsafe dams is an issue that needs to be addressed. If development occurs without the knowledge of a problem dam that lies upstream, that development is put in jeopardy.

### **Existing Mitigation Strategies**

State-regulated dams are inspected, according to classification, through the Dam Safety Program of the DNR. According to the Missouri DNR, dam owners with dams over 35 feet in height are required to complete an Emergency Action Plan (EAP). The Dam and Reservoir Safety Program coordinates with dam owners, county Emergency Management Directors, and other state and federal agencies to develop plans for all regulated dams. An EAP must include the following criteria:

- Guidance for evaluating emergency situations occurring at a dam.
- Notification charts and emergency contact information.
- A list of residents, businesses, and entities within the downstream inundation zone.
- A list of resources available for responding to a dam emergency.
- An inundation zone map (estimated boundary of the maximum water elevation resulting from a dam breach).
- Basic physical and geographical data for the regulated dam.

The Cooper County emergency management director can provide critical emergency contact information and assistance in identifying structures located within the downstream inundation area. A template for creating an EAP is available through the Missouri DNR Dam Safety website.

### **Hazard Summary by Jurisdiction**

There are no dams lying upstream from any school district structures.

Most of the dams in the planning area are located in unincorporated Cooper County. The results of a dam failure could range from very minimal environmental damage to a significant loss of life and infrastructure. All impacts are dependent upon several variables: water, debris, people, and structures. A dam failure would include the breach of a dam wall or embankment allowing the water and debris to flow downstream from the dam.

The dam inventory for the state of Missouri was compiled in the late 1970s and early 1980s. The state has classified two of Cooper County's dams as "High Hazard". One of those High Hazard dams no longer holds water and does not pose a threat. Both High Hazard dams are unregulated. According to data provided by the Missouri Department of Natural Resources, none of the 20 unregulated dams have ever been documented as having been inspected. Because these are unregulated dams, the state has no jurisdiction over maintenance and leads into the overall problem of dam location and development downstream.

State-regulated dams are classified by what lies downstream of the dam and what will be impacted by the failure of that dam. Unregulated dams received their classifications nearly 30 years ago or more and development that occurs downstream is not monitored by any agency; this potentially puts the public at risk. Also, development upstream that might increase the contents held by the dam can cause failure. Because there is no entity in charge of unregulated dams, the original classifications for these dams may not be correct. Some dams may not exist anymore while others may pose a greater downstream threat than their classifications indicate.

### **Problem Statement**

Much like flash flooding, the risk in a dam failure to life and property comes from the sudden rush of water downstream. Development in the inundation zone of a high hazard dam poses a risk to life and structure.

### **3.4.4 Earthquakes**

#### **DESCRIPTION OF HAZARD**

The United States Geological Society (USGS) describes an earthquake as “a sudden movement of the earth’s crust caused by the release of stress accumulated along geologic faults or by volcanic activity.” Earthquakes can be one of the most destructive forces of nature causing death, destruction of property, and billions of dollars of damage.

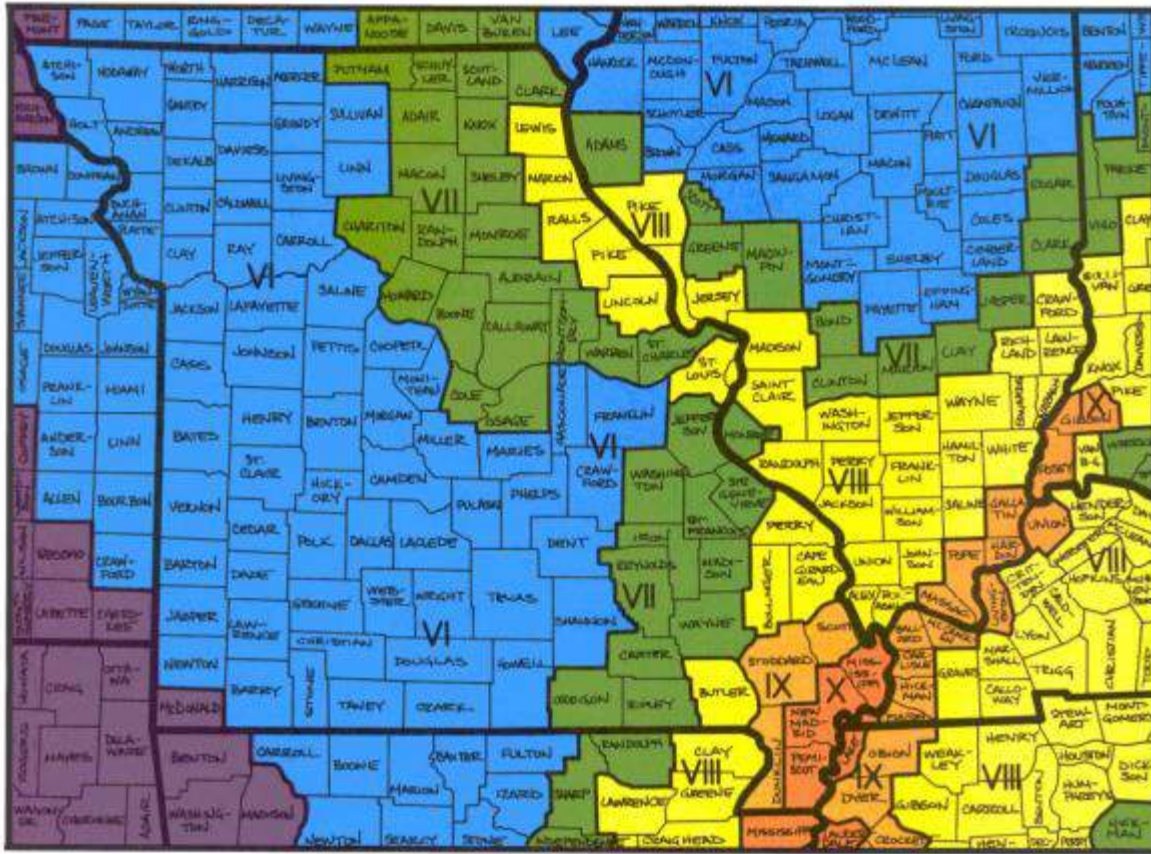
The New Madrid Seismic Zone (NMSZ), which runs through southeastern Missouri, is the most active seismic zone east of the Rocky Mountains. Any hazard mitigation planning in Missouri must, of necessity, take possible earthquakes into account.

Missouri and much of the Midwest can feel earthquakes from very far away because the geology of the area is more amenable to ground shaking than the California geology. New Madrid earthquakes can cover up to twenty times the area of typical California earthquakes because of this differing geology.

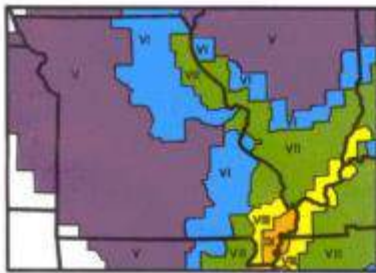
#### **Location**

The entire planning area is at risk for the effects of an earthquake along the New Madrid Seismic Zone. Areas close to the Missouri River may be particularly vulnerable. The soil, or alluvium, along river channels is especially vulnerable to liquefaction from earthquake waves; river alluvium also tends to amplify the waves.

Figure 3.1 Earthquake Intensity Zones

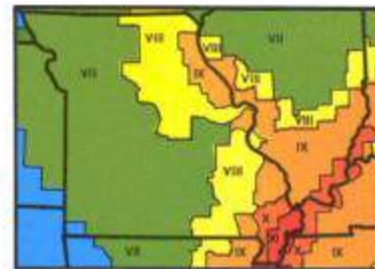


This map shows the highest projected Modified Mercalli intensities by county from a potential magnitude - 7.6 earthquake whose epicenter could be anywhere along the length of the New Madrid seismic zone.



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

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

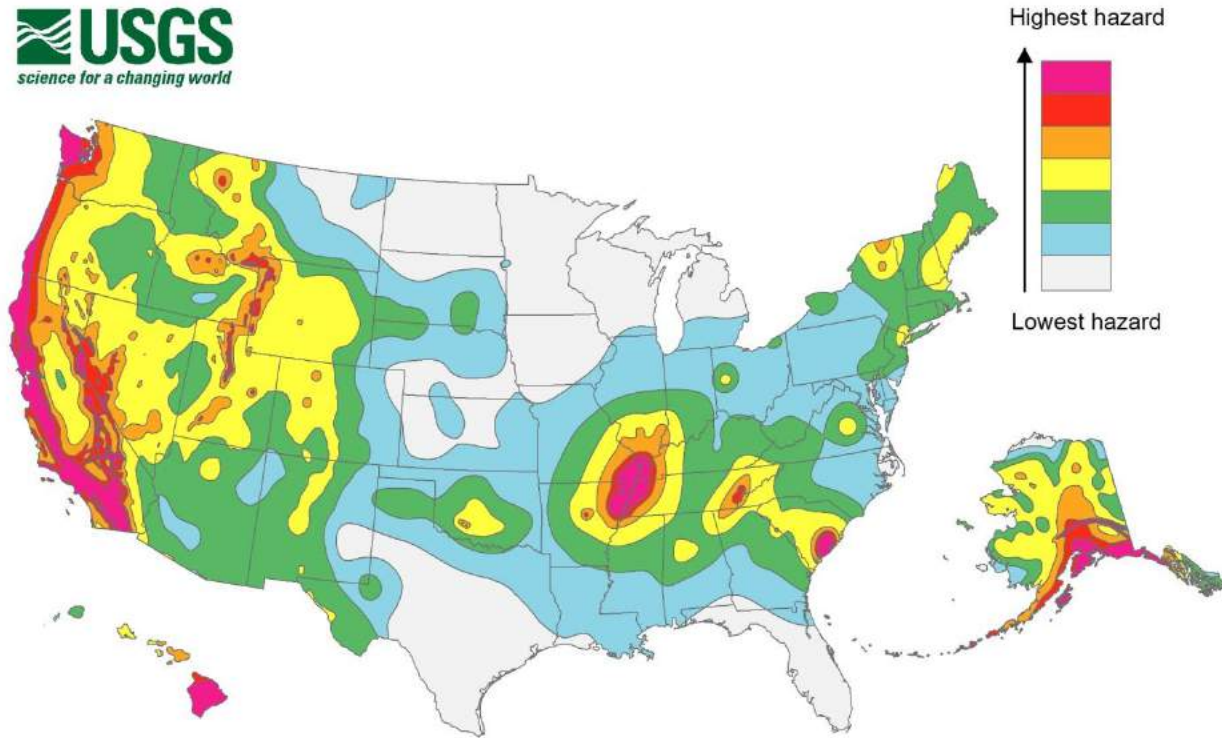


**Table 3.26 Modified Mercalli Intensity Scale**

| Figure 4.38<br><b>Modified Mercalli Intensity Scale</b>   |  |
|---|--|
| <b>I. Instrumental</b>  | Not felt by many people unless in favorable conditions.  |
| <b>II. Feeble</b>   | Felt only by a few people at best, especially on the upper floors of buildings. Delicately suspended objects may swing.  |
| <b>III. Slight</b>  | Felt quite noticeably by people indoors, especially on the upper floors of buildings. Many do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.   |
| <b>IV. Moderate</b>   | Felt indoors by many people, outdoors by few people during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rock noticeably. Dishes and windows rattle alarmingly.       |
| <b>V. Rather Strong</b>   | Felt outside by most, may not be felt by some outside in non-favourable conditions. Dishes and windows may break and large bells will ring. Vibrations like large train passing close to house.  |
| <b>VI. Strong</b>   | Felt by all; many frightened and run outdoors, walk unsteadily. Windows, dishes, glassware broken; books fall off shelves; some heavy furniture moved or overturned; a few instances of fallen plaster. Damage slight.   |
| <b>VII. Very Strong</b>   | Difficult to stand; furniture broken; damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by people driving motor cars. |
| <b>VIII. Destructive</b>  | Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture moved.                                       |
| <b>IX. Ruinous</b>  | General panic; damage considerable in specially designed structures, well designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.  |
| <b>X. Disastrous</b>  | Some well built wooden structures destroyed; most masonry and frame structures destroyed with foundation. Rails bent.  |
| <b>XI. Very Disastrous</b>  | Few, if any masonry structures remain standing. Bridges destroyed. Rails bent greatly.   |
| <b>XII. Catastrophic</b>  | Total damage - Almost everything is destroyed. Lines of sight and level distorted. Objects thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move position.   |
| Source: <a href="http://en.wikipedia.org/wiki/Mercalli_intensity_scale">http://en.wikipedia.org/wiki/Mercalli_intensity_scale</a> |  |

The below map shows the seismic hazards across the United States. The planning area located in the center of the United States is included in zone VII, which is displayed in green.

### Map 3.10 Earthquake Risk Zones



Source: United States Geological Survey at [https://earthquake.usgs.gov/hazards/hazmaps/conterminous/2014/images/HazardMap2014\\_1g.jpg](https://earthquake.usgs.gov/hazards/hazmaps/conterminous/2014/images/HazardMap2014_1g.jpg)

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

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

#### *Richter Magnitude Scale*

The 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

### *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.

Earthquakes along the New Madrid Seismic Zone with magnitudes around 6.0 or greater would be of concern for the planning area.

### **Previous Occurrences**

Historical quakes along the New Madrid Seismic Zone in southeastern Missouri have been some of the largest in U.S. history since European settlement. The Great New Madrid Earthquake of 1811-1812 was a series of over 2000 quakes, which caused destruction over a very large area. According to information from Missouri SEMA's Earthquake Program, some of the quakes measured at least 7.6 in magnitude, and five of them measured 8.0 or more.

The 1811-1812 quakes changed the course of the Mississippi River. Some of the shocks were felt as far away as Washington D.C. and Boston.

The first federal disaster relief act was a result of the Great New Madrid Earthquake of 1811-1812. President James Madison signed an act into law that issued "New Madrid Certificates" for government lands in other territories to residents of New Madrid County who wanted to leave the area.

### **Probability of Future Events - Moderate**

It is difficult to predict the probability of an earthquake occurring along the New Madrid Seismic Zone which would be significant enough to affect the planning area. The following information from MO DNR helps to illustrate why this is difficult:

The active faults in the NMSZ are poorly understood because they are not expressed at the ground surface where they can be easily studied. The faults are hidden beneath 100- to 200-foot thick layers of soft river deposited soils called alluvium.

Microseismic earthquakes (magnitude less than 1.0 to about 2.0), measured by seismographs but not felt by humans, occur on average every other day in the NMSZ (more than 200 per year).

Active faults that have generated dangerous earthquakes in historic times or the recent geologic past (the last 10,000 years) are not always microseismically active. In fact, in some settings these quiet faults are considered the most dangerous ones because

high built up stress has locked the two sides of the fault together thereby preventing the microseismic earthquakes. This is thought to happen as a prelude to a major rupture of the fault. It is not known if faults of this type exist in the NMSZ. If they do exist there is no easy way to locate them.

If one looks strictly at the historical record for earthquakes of 6.5 magnitude or greater, there have been 2 years (1811 and 1812) out of the last 204 years in which such earthquakes have occurred. This equals less than 1% probability in any given year ( $\text{Probability} = 2/204 * 100 = 0.98\%$ ). However, there were many serious quakes in just the two years of 1811 and 1812, according to MO DNR.

In 2002, U.S. Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis released the following expectations for earthquakes in the NMSZ in following 50 years:

- 25-40% percent chance of a magnitude 6.0 and greater earthquake.
- 7 -10% chance of a magnitude 7.5 - 8.0 quake (magnitudes similar to those in 1811-1812)

According to information provided by MO SEMA, the above expectations can be translated into the following likelihoods for a given year in the 50-year period:

- 1.0-1.6% likelihood of a magnitude 6.0 and greater earthquake
- 0.28-0.40% likelihood of a magnitude 7.5-8.0 earthquake

Since a magnitude 6.0 earthquake would affect the planning area the probability has been determined to be moderate.

## **VULNERABILITY**

### **Vulnerability Overview**

**Severity: High**

### **Potential Impact - Existing Structures**

The intensity of an earthquake refers to the potentially damaging effects of a quake at any particular site. An earthquake of a specific magnitude will have different intensities depending on a location's distance from the epicenter of the quake, intervening soil type, and other factors.

The pertinent information for Cooper County is summarized in Table 3.27.





*Missouri State Hazard Mitigation Plan (2018) Analysis*: Specific modeling of damage and loss from earthquake scenarios has been conducted for the state using HAZUS 2.1 software; the findings are included in the *Missouri State Hazard Mitigation Plan (2018)*. (HAZUS software is used by FEMA to compare relative risk from earthquakes and other natural hazards.)

The following analyses were done:

1. Annualized Loss Scenario based on eight earthquake return periods (100, 200, 500, 750, 1000, 1500, 2000, and 2500 years)
2. 2% Probability of Exceedance in 50 Years Scenario – a “worst case scenario”

The analyses used demographic data based on the 2010 Census; site-specific essential facility data was based on the 2011 HSIP inventory data.

The analyses for Cooper County are discussed in the following pages.

Annualized Loss Scenario

The *MO State Hazard Mitigation Plan (2018)* explains the annualized loss scenario as follows:

HAZUS defines annualized loss as the expected value of loss in any one year. The software develops annualized loss estimates by aggregating the losses and their exceedance probabilities from the eight return periods. Annualized loss is the maximum potential annual dollar loss resulting from various return periods averaged on a ‘per year’ basis. It is the summation of all HAZUS-supplied return periods multiplied by the return period probability (as a weighted calculation).

The results of the modeling for Cooper County are shown in Table 3.32.

**Table 3.28 Hazus-MH Earthquake Loss Estimate: Annualized Loss Scenario**

| County | Total Losses, in \$<br>Thousands | Loss Per Capita, in \$<br>Thousands | Loss Ratio, in \$ Per<br>Million |
|--------|----------------------------------|-------------------------------------|----------------------------------|
| Cooper | 50                               | 0.0028                              | 28                               |

While Cooper County has among the lowest loss ratios in the state, it’s estimated building damage in actual dollars ranks 66nd. (For a comparison, the modeling estimates the loss ratio in \$ per million for St. Louis County (ranked #1) at \$150 and in the City of St. Louis (ranked #2) at \$235.

In Cooper County, there is the potential for building damage even at a considerable distance from the New Madrid Fault. However, the percentage of buildings sustaining damage and/or the level of damage sustained would be much lower than in a county adjacent to the fault. The loss

ratio reflects this and gives an indication of both the potential economic impact of an earthquake and the difficulty of recovery in the county.

2% Probability of Exceedance in 50 Years Scenario

This analysis models a worst case scenario using a level of ground shaking recognized in earthquake design. The *MO State Hazard Mitigation Plan (2018)* gives the following explanation of the modeling:

The methodology is based on probabilistic seismic hazard shaking grids developed by the U.S. Geological Survey (USGS) for the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of peak ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively that have a 2% probability of exceedance in the next 50 years. The International Building Code uses this level of ground shaking for building design in seismic areas. This scenario used a 7.7 driving magnitude in HAZUS-MH, which is the magnitude used for typical New Madrid fault planning scenarios in Missouri. While the 2% probability of exceedance in the next 50 years ground motion maps incorporate the shaking potential from all faults with earthquake potential in and around Missouri, the most severe shaking is predominately generated by the New Madrid Fault.

**Table 3.29 HAZUS-MH Earthquake Loss Estimation 2% Probability of Exceedance in 50 Years Scenario Direct Economic Losses**

| County | Cost Structural Damage | Cost Non-Structural Damage | Cost Content Damage | Inventory Loss | Loss Ratio | Relocation Loss | Capital Related Loss | Wage Losses | Rental Income Loss | Total Loss |
|--------|------------------------|----------------------------|---------------------|----------------|------------|-----------------|----------------------|-------------|--------------------|------------|
| Cooper | \$4,182                | \$9,485                    | \$3,163             | \$121          | 0.76       | \$2,443         | \$608                | \$876       | \$1,041            | \$21,917   |

The modeling suggests that damages from a worst-case scenario earthquake in the NMSZ (7.7 magnitude) would be greater in Cooper County than the Modified Mercalli map of Missouri suggests. Caution indicates that mitigation and preparedness be focused on the most conservative estimates (in this case, those that predict greater injury and damage) unless these have been shown to be incorrect.

Even a significant earthquake event in the NMSZ that does not cause great damage in Cooper County could still possibly cause cascading economic losses in the county. There is the potential for disruption of road and rail traffic to the eastern part of the state, including the metropolitan area of St. Louis. Regions of the state outside of the severely damaged areas would probably be called upon for emergency and recovery assistance.

## **Potential Impact - Life**

The potential for loss of life goes up as the magnitude of the earthquake goes up. Areas with a high rate of older or historical structures with construction methods not designed to withstand such an event pose a higher risk for loss of lives that work or live within such buildings.

The potential for “emotional aftershocks” also exists with any earthquake event. Major earthquake events require mental health services for people dealing with loss, stress, anxiety, fear, and other difficult emotions. Even a smaller quake, however, has the potential for emotional repercussions; the sudden movement of something experienced as stable for one’s entire life (the earth itself) can be very traumatic.

## **Potential Impact - Future Development**

The standards followed in new construction will impact vulnerability to earthquake damage; the building codes in place in Cooper County and the incorporated communities contain a basic level of seismic safety. Building new structures according to even more stringent earthquake-resistant codes would lessen the potential damage should an earthquake occur; however, this type of mitigation activity may not be cost effective for many communities.

## **Hazard Summary by Jurisdiction**

Personnel of the Cooper County Emergency Management Agency are well-trained and well-equipped to respond to disasters of all types.

School Districts The Revised Statutes of Missouri, Section 160.451, require that, “The governing body of each school district which can be expected to experience an intensity of ground shaking equivalent to a Modified Mercalli of VII or above from an earthquake occurring along the New Madrid Fault with a potential magnitude of 7.6 on the Richter Scale shall establish an earthquake emergency procedure system in every school building under its jurisdiction.”

The educational institutions in Cooper County are not subject to these statutory requirements because the county is categorized as a VI in the Modified Mercalli Intensity Scale.

County Bridges All county bridges are inspected by MoDOT on a two-year cycle; if an earthquake impacted the planning area, MoDOT would be in charge of county bridge inspection post-earthquake.

SAVE Coalition This is a program of the Missouri State Emergency Management Agency. According to the SEMA website:

The Missouri Structural Assessment and Visual Evaluation (SAVE) Coalition is a group of volunteer engineers, architects, building inspectors, and other trained professionals that assists the Missouri State Emergency Management Agency with building damage

inspections. After a disaster, SAVE volunteers are trained to move quickly to determine which buildings are safe to use and which should be evacuated.

### **Problem Statement**

The entire planning area is vulnerable to the risk of damage from an earthquake in the New Madrid Seismic Zone (NMSZ) located in southeastern Missouri.

Studies and predictions indicate that there would be significant damage to poorly built structures in the planning area from a 7.6 magnitude (Richter) quake in the NMSZ. In addition to structural damage, and possible injury/loss of life, the planning area could be affected by an influx of people needing sheltering, disruption of the flow of goods, calls for assistance from other areas, and the psychological traumatization of the population.

There is extensive ongoing education and preparation in the planning area for the possibility of an earthquake event. Encouraging new construction buildings and infrastructure to be rated for earthquakes and taking on hardening efforts on existing structures can help minimize damage.

### 3.4.5 Land Subsidence/Sinkholes

#### HAZARD PROFILE

#### DESCRIPTION OF HAZARD

“Land subsidence is sinking of the earth’s surface due to the movement of earth materials below the surface. This sinking can be sudden or gradual...In Missouri, subsidence is primarily associated with sinkholes but...can also occur from void space left by mining and natural caves...” (*MO State Hazard Mitigation Plan, 2018*)

Gradual or sudden land subsidence is a key sign of sinkhole formation. The Stormwater Design Manual from Boone County, Cooper County’s neighbor to the north, distinguishes between two types of sinkholes associated with karst topography:

- Depression sinkholes which have a defined drainage area and are generally shown as closed contours on a topographic map; best management practices are required to protect groundwater when runoff from development drains into these areas
- Collapse sinkholes are areas of “karst-related subsidence with no defined drainage area when occurring outside of a depression sinkhole. Collapse sinkholes can occur in the bottom of a depression sinkhole and are commonly referred to as the ‘eye’ of the sinkhole”

Construction excavation and well drilling can also cause sinkholes, according to the Missouri Department of Natural Resources (DNR).

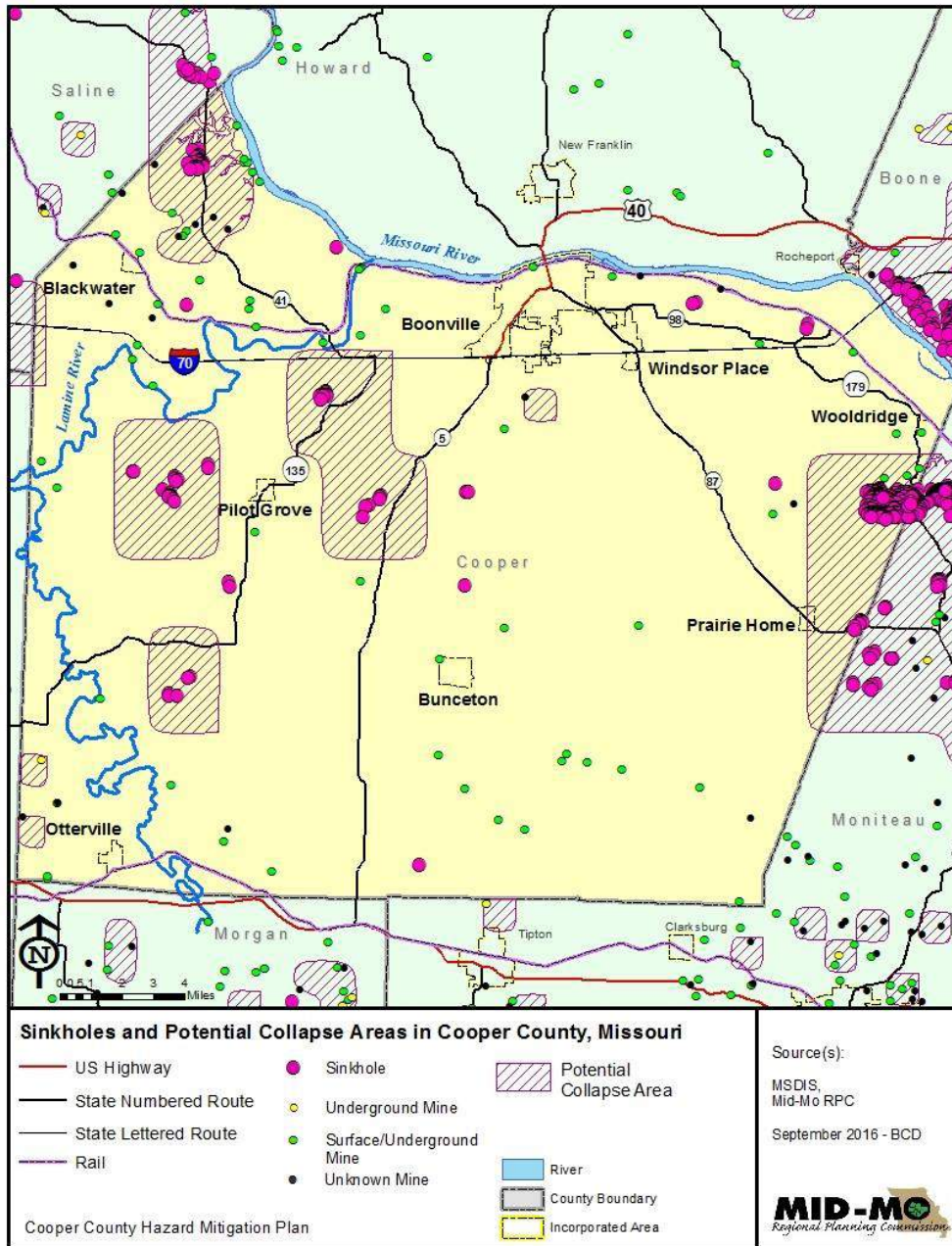
In addition to being at risk for land subsidence and sinkhole collapse associated with karst topography, the planning area is at risk from land subsidence/collapse associated with underground mining and exploratory drilling for petroleum.

#### Location

The only known sinkhole areas in the planning area are in unincorporated Cooper County (see Figure 4.71). It is important to note that future sinkhole development has the potential to occur near these areas and also in other areas that have no developed sinkholes. Gradual or sudden land subsidence is a key sign of sinkhole formation.

The map also shows potential collapse areas around the known sinkholes and underground mines; these collapse areas were mapped by the Missouri DNR. But these may not be the only potential collapse areas; further development may bring to light previously unknown sinkhole areas in the karst regions and also more abandoned underground mines.

**Map 3.12 Cooper County Sinkholes**



**Strength/Magnitude/Extent**

Sinkholes can vary “from a few feet to hundreds of acres and from less than one to more than 100 feet deep,” according to the USGS.

There have been 15,891 sinkholes identified in Missouri. One hundred and sixty sinkhole collapses examined by the Missouri Department of Natural Resources between 1970 and 2007 were less than 10 feet in diameter and less than 10 feet deep. However, there were also some

very large collapses within the state: one collapse drained a lake near St. Louis; one drained a sewage lagoon in West Plains; and one swallowed a garage with a car in it in Nixa.

### **Previous Occurrences**

There have been no *recorded* recent occurrences of sinkhole collapse in Cooper County. Just because no occurrences have been recorded does not mean that they have not happened. Previous occurrences of sinkhole development in other parts of Missouri with similar geologic features are a source of concern.

According to the Missouri DNR, sewage lagoons in West Plains and Republic in southern Missouri were drained of their contents due to the development of sinkholes. Sinkholes drain directly into underground water sources and can impact or pollute area water sources. In West Plains, sinkholes had drained the lagoon twice before the final collapse; local officials had tried to patch the collapses with cement and other materials. The final collapse in 1978 resulted in sewage draining directly into underground water sources. Mammoth Spring in Arkansas was contaminated, and more than 800 local residents reported illness, according to the Missouri DNR. While this occurred in southern Missouri, the potential exists for a similar situation to occur in the planning area.

### **Probability and Severity of Future Events**

Probability - low

Severity - low

There have been no recorded sinkhole collapses in the recent history in Cooper County and the known sinkholes are not located within city limits or near any major clustering of structures or important infrastructure.

### **CHANGING FUTURE CONDITIONS CONSIDERATIONS**

With expected rainfall events to happen more frequently and with higher intensity with climate change, instances of sinkhole collapse could go up in the planning area due to erosion from flooding and severe runoff exposing depressions below. Periods of rain followed by drought also elevate potential for sinkholes to open up with the fluctuating water table. There is also the opportunity for aging infrastructure such as water and sewer lines located underground to collapse as they get weaker with age or vehicle travel becomes more-heavy.

### **VULNERABILITY**

#### **Vulnerability Overview**

Severity: Low to High

It is very difficult to predict the severity of a sinkhole collapse due to their great variance in size, varying speeds of collapse onset, and proximity to the built environment. The severity of a sinkhole collapse will also be greater if contamination occurs.



## **Potential Impact – Life**

Sinkhole collapse poses a potential threat to human life; there have been numerous news stories in recent years of collapsing sinkholes swallowing up people. In 2013, a man hunting in southern Missouri lost his life when he stepped in a sinkhole that had possibly opened up due to recent heavy rain.

Sinkhole collapse potentially poses a threat to public health via contamination of the water supply. According to information from the Missouri DNR, a 1978 sinkhole collapse in southern Missouri drained the West Plains lagoon, resulting in sewage draining directly into underground water sources. More than 800 local residents reported illness, and Mammoth Spring in Arkansas was contaminated.

According to the *Boone County Stormwater Design Manual*, groundwater in karst systems can move as much as a mile per day; this is contrasted to non-karst areas where groundwater may only move a few feet per year. Obviously, the potential for quick and widespread contamination of groundwater is a major concern in karst areas; “a contaminant may reach some springs or wells within a few hours after entering the groundwater system.” It is important to note that due to the nature of karst topography, some of the karst sinkhole areas may drain into watersheds other than the ones in which they are located. This makes the impact of pollutants in these areas harder to quantify.

## **Potential Impact - Existing Structure**

Sinkholes vary in size and can potentially cause damage to roads, water/sewer lines, buildings, and lagoons. It is difficult to determine the potential impact of land subsidence and sinkholes on existing structures for a number of reasons:

There is a lack of data on historic damages caused by land subsidence and sinkhole collapse in Missouri.

Even with the mapping of known and possible sinkhole locations, it is difficult to predict where a sinkhole will collapse and if the collapse will be significant enough to damage any structures in the vicinity.

Because sinkhole collapse is not predictable, there is no direct way to assess a cost impact for this hazard. Vulnerable structures, roads, or property could potentially be impacted by a sudden and usually localized drop in elevation. The resulting damage incurred from the sinkhole could result in broken roads, building collapse, compromises to water sources, environmental impacts, and/or loss of life. While loss of life could occur, it would most likely be minimal.

## **Potential Impact - Future Development**

It is difficult to assess the effects of sinkholes on future development because sinkhole development is unpredictable and few sinkhole areas have been identified in the planning area. However, it should be noted that future development can affect the impact of this hazard. Construction of septic tanks, lagoons, and structures can cause shifts in soil and may

plug or disturb karst areas, allowing for the formation of a sinkhole. Also, soil disturbance can cause the drainage pattern to change, which may lead to blockage of a sinkhole and potentially cause flooding.

### **Hazard Summary by Jurisdiction**

Land subsidence and sinkhole collapse are not of great concern in the planning area. There are no known sinkholes in any areas that would impact a school district structure. The only known sinkhole areas in the planning area are in unincorporated Cooper County. It is important to note the potential for future sinkhole development near these areas and in other areas that presently do not have developed sinkholes. Gradual or sudden land subsidence is a key sign of sinkhole formation.

### **Problem Statement**

Cooper County and its jurisdictions are all vulnerable to land subsidence/sinkholes to some extent.

Sinkhole collapse in karst areas poses the threat of contamination of the groundwater over a wide region. By keeping infrastructure properly maintained and tracking new collapse occurrences jurisdictions can more easily discourage land disturbance near potential problem areas.

### 3.4.6 Drought

#### DESCRIPTION OF HAZARD

The National Weather Service defines a drought as “a period of abnormally dry weather which persists long enough to produce a serious hydrologic imbalance (for example crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency, and the duration and the size of the affected area.”

Droughts occur either through a lack of precipitation (supply droughts) or through overuse of water which outpaces what the surrounding environment can naturally support (water use droughts). Water use droughts can theoretically happen anywhere but are generally seen in arid climates, not humid places such as Missouri. At the present time, Missouri is most vulnerable to supply droughts brought on by a lack of precipitation.

The period of lack of precipitation needed to produce a supply drought will vary between regions and the particular manifestations of a drought are influenced by many factors. As an aid to analysis and discussion, the research literature has defined different categories of drought (Table 3.34). The most common type of drought in Mid-Missouri is the agricultural drought.

| Drought Categories               |   |
|----------------------------------|---|
| <b>Agricultural</b>              | Defined by soil moisture deficiencies   |
| <b>Hydrological</b>              | Defined by declining surface and groundwater supplies                                       |
| <b>Meteorological</b>            | Defined by precipitation deficiencies   |
| <b>Hydrological and land use</b> | Defined as meteorological drought in one area that has hydrological impacts in another area |
| <b>Socioeconomic</b>             | Defined as drought impacting supply and demand of some economic commodity                   |

Source: *Missouri Drought Plan, 2002* (Mo DNR)

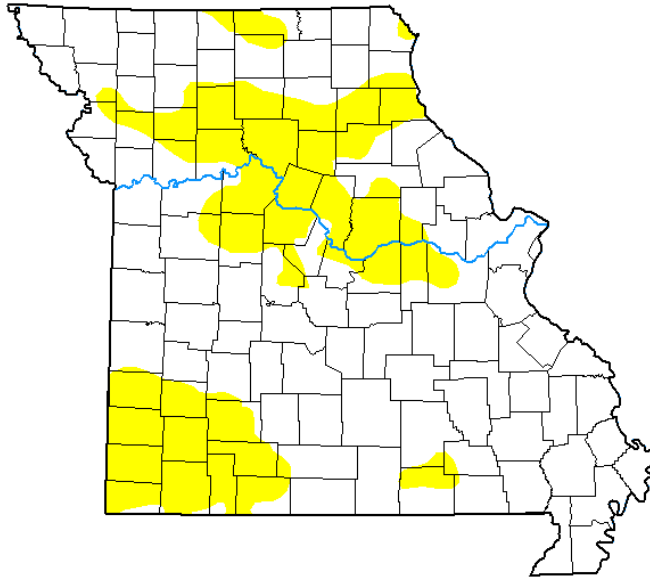
#### Location

The entire planning area is potentially at risk for drought. However, since agricultural drought is most common in Missouri, the unincorporated agricultural areas of Cooper County are most at risk. Drought can mean crop failure in these areas and the resulting immediate, and potentially severe, economic loss.

### Map 3.13 Missouri Drought Monitor

## U.S. Drought Monitor Missouri

**September 14, 2021**  
(Released Thursday, Sep. 16, 2021)  
Valid 8 a.m. EDT



*Drought Conditions (Percent Area)*

|  | None  | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4   |
|--|-------|-------|-------|-------|-------|------|
| <b>Current</b>                                     | 72.33 | 27.67 | 0.00  | 0.00  | 0.00  | 0.00 |
| <b>Last Week</b><br><i>09-07-2021</i>              | 93.69 | 6.31  | 0.00  | 0.00  | 0.00  | 0.00 |
| <b>3 Months Ago</b><br><i>06-15-2021</i>           | 84.31 | 15.69 | 1.55  | 0.00  | 0.00  | 0.00 |
| <b>Start of Calendar Year</b><br><i>12-29-2020</i> | 55.47 | 44.53 | 10.22 | 0.00  | 0.00  | 0.00 |
| <b>Start of Water Year</b><br><i>09-29-2020</i>    | 63.43 | 36.57 | 10.96 | 3.34  | 0.00  | 0.00 |
| <b>One Year Ago</b><br><i>09-15-2020</i>           | 80.17 | 19.83 | 6.33  | 1.47  | 0.00  | 0.00 |

**Intensity:**

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>*

**Author:**  
Brad Rippey  
U.S. Department of Agriculture



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

### Strength/Magnitude/Extent

Numerous indices have been developed to measure drought severity; each tool has its strengths and weaknesses.

Palmer Drought Severity Index: One of the oldest and most widely used indices is the Palmer Drought Severity Index (PDSI, Table 3.31), which is published jointly by NOAA and the U.S. Department of Agriculture (USDA).

**Table 3.31**

| <b>Palmer Drought Severity Index (PDSI)</b> |                       |              |                        |
|---|-----------------------|--------------|------------------------|
| Score                                       | Description           | Score        | Description            |
| Greater than 4                              | Extreme moist spell   | 0 to -0.4    | Near normal conditions |
| 3.0 to 3.9                                  | Very moist spell      | -0.5 to -0.9 | Incipient drought      |
| 2.0 to 2.9                                  | Unusual moist spell   | -1.0 to -1.9 | Mild drought           |
| 1.0 to 1.9                                  | Moist spell           | -2.0 to -2.9 | Moderate drought       |
| 0.5 to 0.9                                  | Incipient moist spell | -3.0 to -3.9 | Severe drought         |

|          |                        |                   |                 |
|----------|------------------------|-------------------|-----------------|
| 0.4 to 0 | Near normal conditions | <b>Below -4.0</b> | Extreme drought |
|----------|------------------------|-------------------|-----------------|

According to the National Integrated Drought Information System (NIDIS), the PDSI “...uses temperature and precipitation data to calculate water supply and demand, incorporates soil moisture, and is considered most effective for unirrigated cropland. It primarily reflects long-term drought and has been used extensively to initiate drought relief.”

Missouri is divided into six regions of similar climactic conditions for PDSI reporting; Cooper County is located in the West Central Region.

Standardized Precipitation Index: A newer index currently being used by The National Drought Mitigation Center (NDMC) is the Standardized Precipitation Index (SPI). This index is based on the probability of precipitation; the time scale used in the probability estimates can be varied and makes the tool very flexible. The SPI is able to identify emerging droughts months sooner than is possible with the PDSI.

The NDMC uses the PDSI, SPI, and three other indicators to classify the severity of droughts throughout the country on a 5-point scale ranging from DO Abnormally Dry to D4 Exceptional Drought for reports on the U.S. Drought Monitor (Table 3.36).

Based on the Drought Severity Classification from the NDMC, Cooper County is subject to droughts ranging from D1 (Moderate Drought) to D4 (Exceptional Drought). The most common droughts are in the D1-D2 range.

**Table 3.32**

**U.S. Drought Monitor - Drought Severity Classification**

| Category  | Description                | Ranges  |                      |                                       |                                      |  |  |
|-----------|----------------------------|---|----------------------|---------------------------------------|--------------------------------------|--|--|
|           |                            | Possible Impacts  | Palmer Drought Index | CPC Soil Moisture Model (Percentiles) | USGS Weekly Streamflow (Percentiles) | Standardized Precipitation Index (SPI) | Objective Short and Long-term Drought Indicator Blends (Percentiles) |
| <b>D0</b> | <b>Abnormally Dry</b>      | Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered | -1.0 to -1.9         | 21-30                                 | 21-30                                | -0.5 to -0.7                           | 21-30  |
| <b>D1</b> | <b>Moderate Drought</b>    | Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested                        | -2.0 to -2.9         | 11-20                                 | 11-20                                | -0.8 to -1.2                           | 11-20  |
| <b>D2</b> | <b>Severe Drought</b>      | Crop or pasture losses likely; water shortages common; water restrictions imposed   | -3.0 to -3.9         | 6-10                                  | 6-10                                 | -1.3 to -1.5                           | 6-10   |
| <b>D3</b> | <b>Extreme Drought</b>     | Major crop/pasture losses; widespread water shortages or restrictions   | -4.0 to -4.9         | 3-5                                   | 3-5                                  | -1.6 to -1.9                           | 3-5  |
| <b>D4</b> | <b>Exceptional Drought</b> | Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies   | -5.0 or less         | 0-2                                   | 0-2                                  | -2.0 or less                           | 0-2  |

Source: <http://droughtmonitor.unl.edu>

## Previous Occurrences

The Dust Bowl years of the 1930s and early 1940s were dry in Missouri but not as dry as the period from 1953 through 1957. A major nationwide drought in the late 1980s resulted in low water and decreased barge traffic on the Mississippi River and the Missouri River. The fall of 1999 was another serious drought period in the state; in October of that year, all counties in Missouri were declared agricultural disaster areas by the USDA.

The drought that affected the entire state in the summer of 2012 was the worst drought in 30 years, according to the *MO State Hazard Mitigation Plan (2013)*. The planning area and the surrounding region suffered agricultural losses.

Even though Cooper County averages between 38 to 42 inches of precipitation per year, it has been subject to droughts in the past.

Cooper County was in a D2 Drought Advisory from June through August of 2018.

## Probability of Future Events

In the 21-year period 2000-2020, there were 6 years without any level of drought in the planning area, according to the U.S. Drought Monitor. Based on this data, the calculated probability of having at least a Moderate (D1) drought in a year is 71.42%. (Probability calculation:  $1 - (6/21 * 100) = 71.42$ )

The probability of occurrence of the maximum drought severity in any given year, based on the 2000-2020 data, has also been calculated (Table 3.33).

| Severity Scale | Drought Description | # of years with drought event (2000-2020) | Probability | Probability Rating |
|----------------|---------------------|---|-------------|--------------------|
| D1             | Moderate            | 5   | 24%         | High               |
| D2             | Severe              | 6   | 29%         | High               |
| D3             | Extreme             | 5   | 24%         | High               |
| D4             | Exceptional         | 2   | 10%         | Low                |

## **Changing Future Conditions Considerations**

Droughts are naturally occurring events in the planning area. While overall precipitation is predicted to rise with climate change the intensity of rainfall events at a given time could mean less rainfall at other times throughout the season leading to more frequent droughts and crop failures. Raising global temperatures could lead to more severe droughts.

### **VULNERABILITY**

#### **Vulnerability Overview**

##### **Severity**

Moderate – Cooper County (unincorporated)

Low - all other participating jurisdictions

The primary effect of drought in the planning area is on the economic livelihood of those in the agricultural sector. According to the *2017 US Census of Agriculture*, 78% of Cooper County land use is tied to farming activities. In 2017 the market value of Cooper County farm products was estimated at more than \$97 Million.

#### **Potential Impact – Life**

Both crops and livestock are at risk from drought. During the Exceptional Drought conditions in 2012, there were large sell-offs of livestock in the mid-Missouri region.

The psychological and economic stresses involved for those working directly in the agricultural sector can be great in times of drought. Uncertainty, high stress and fear are not compatible with optimal health.

#### **Potential Impact - Existing Structures**

Excessive drought can cause damage to roads, streets, water mains, and building foundations. Missouri American Water thought that the 2012 drought played a role in the 29 main breaks of cast iron pipe in August of that year; the number of breaks was higher than would have been expected. However, drought damage to infrastructure is not a major concern in the planning area, due to the soil types.

The arid conditions created by drought also pose an increased risk of fire and wildfire and thus to structures.

Drought can also have far-reaching economic consequences beyond the agricultural sector; businesses dependent upon that sector can suffer serious losses. A severe drought can affect the economics of an entire region.

#### **Potential Impact on Future Development**

Future development in the county can be at risk from the effects of drought. Good land management techniques are crucial in mitigating future impacts.



Drought is primarily an issue of water supply for the rural and agricultural parts of the planning area. The majority of the land in Cooper County is agricultural, and agriculture plays an important role in the life and economy of the area. This makes drought mitigation an especially important concern as population increases. Good land management techniques are crucial in mitigating future impacts. Good land management techniques and the interconnection of water supplies will become increasingly important in mitigating the impacts of drought as growth occurs.

### **Hazard Summary by Jurisdiction**

All jurisdictions in the planning area can be impacted by drought. Incorporated cities may see a drain on their water supply in times of extreme drought and wear on roads under cracking and shrinking dry ground can become damaged. The largest impact to drought though comes to unincorporated Cooper County due to the agriculture-based nature of its economy and land usage. Crop losses deal large economic blows and the potential for wildfire pose a risk to those living nearby.

### **Problem Statement**

Drought of some degree is a common occurrence in the planning area. The unincorporated agricultural areas of Cooper County are the most vulnerable but all jurisdictions are potentially vulnerable to cascading economic effects during extended and serious drought conditions. In addition to damage to crops, produce, livestock, soil and the resulting economic consequences, the arid conditions created by drought pose an increased risk of fire. There is also the risk of damage to infrastructure from drought; while this has possibly contributed to some pipe breakage in the planning area, it is not seen as a major problem due to the soil types.

Drought conditions are carefully monitored at the state and national levels; state law requires the Missouri Department of Natural Resources to implement a drought response system to ensure the quantity and quality of available water resources.

Based on 2000-2020 data from the NDMC, the planning area is subject to droughts ranging from Moderate Drought (D1) to Exceptional Drought (D4); the most common droughts are D1 (Moderate Drought).

The planning area has decent interconnections, and backup for, water systems although there is still some room for improvement in this area. The Missouri Rural Water Association can assist with backup generators when needed and available.

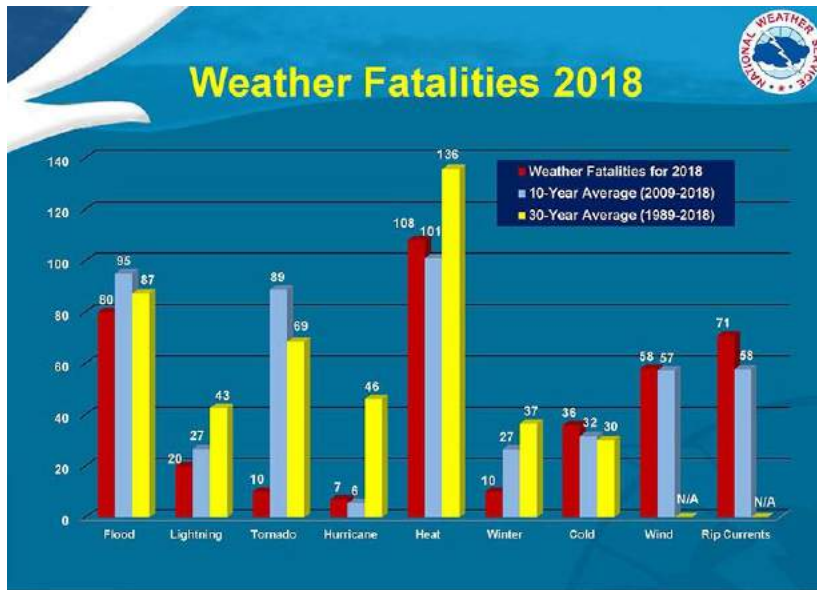
### 3.4.7 Extreme Temperatures

#### HAZARD PROFILE

#### DESCRIPTION OF HAZARD

Extreme temperature events, both hot and cold, can impact human health and mortality, natural ecosystems, agriculture, and other economic sector. Extreme heat is the number one weather-related killer in the United States, according to the National Weather Service (Figure 3.30). In contrast to the visible, destructive, and violent nature of floods, hurricanes, and tornadoes, extreme heat is a silent killer.

**Figure 3.2 Weather Fatalities**



As can be seen in the NWS graph, there are no 30-year averages for heat fatalities or a number of other weather-related fatalities. Fatality data on these hazards began to be recorded more recently than fatalities from the more dramatic causes of death such as flood, lightning, tornado, and hurricane.

As the data shows, extreme heat resulted in an average of 101 deaths per year when looked at over a 10-year period; this is 6 more deaths per year than the number cause by flood, the next most frequent cause of death.

Extreme cold often accompanies severe winter storms and can lead to hypothermia and frostbite in people without adequate clothing protection. Cold can also cause issues with power sources by

freezing fuel lines and overwhelming heating systems. It can also freeze and bust pipes in homes and businesses.

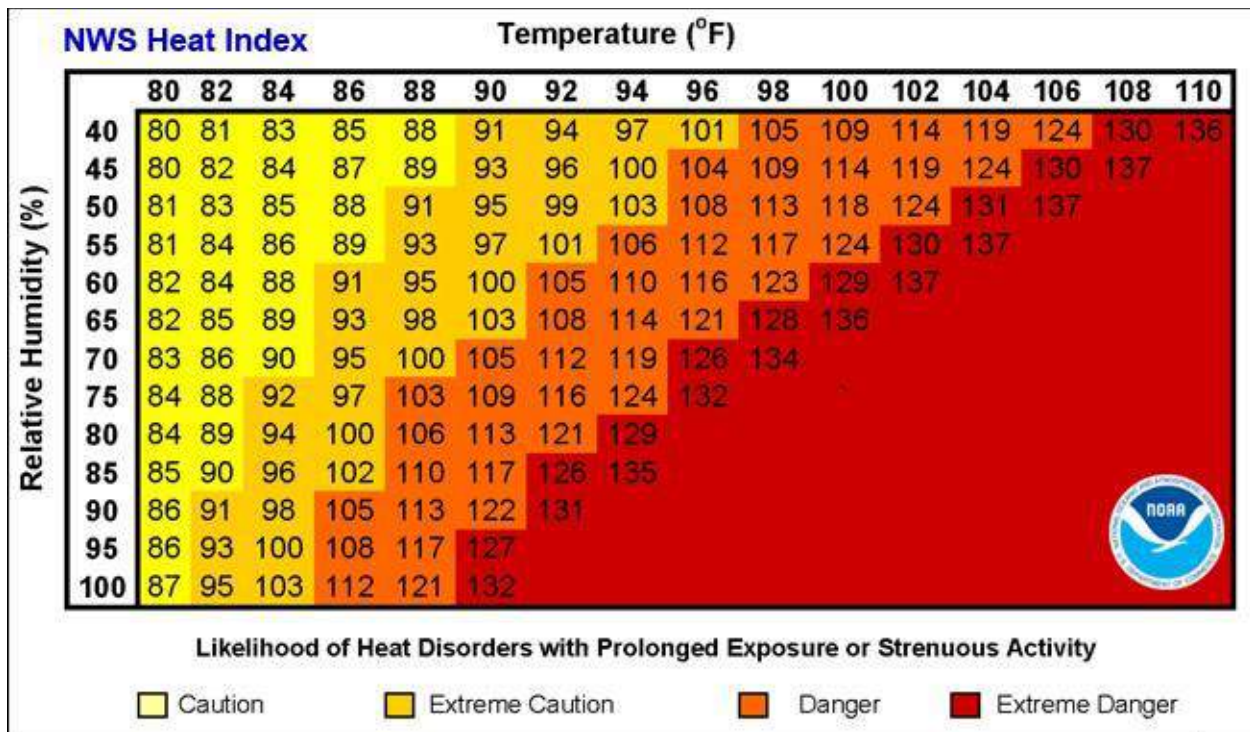
### Geographic Location

The entire planning area is at risk from extreme temperature events.

### Strength/Magnitude/Extent

The planning area routinely experiences prolonged periods with temperatures in the 90s and 100s (Figure 3.3). The duration of these periods of extreme heat can range from just one day to weeks. The National Weather Service (NWS) has an alert system in place to alert people when the Heat Index is expected to have a significant impact on public safety. The severity decides whether an advisory or a warning is issued.

Figure 3.3 Heat Index Guide



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.

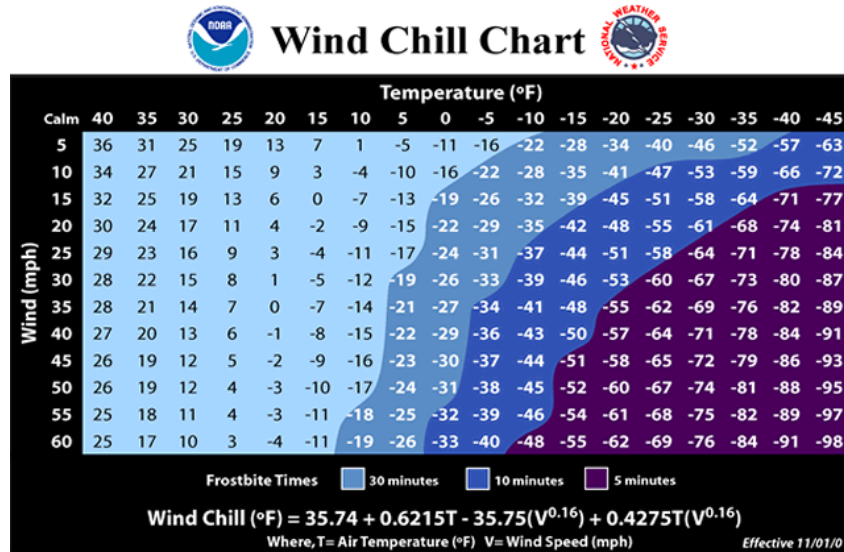
Similar to heat index the NWS also has an index for wind chill. It uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula

for calculating the dangers from winter winds and freezing temperatures. Based on estimated temperatures advisories or warnings maybe issued.

|                            |   |
|----------------------------|---|
| <b>Wind Chill Advisory</b> | Combination of low temperatures and strong winds will result in wind chill readings of -20 degrees F or lower |
| <b>Wind Chill Warning</b>  | Wind chill temperatures of -35 degrees F or lower are expected. This is a life-threatening situation.         |

The figure below shows wind chill temperatures which are based on the rate of heat loss from exposed skin caused by wind and cold. When wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure 3.4



### Previous Occurrences

Table 3.34

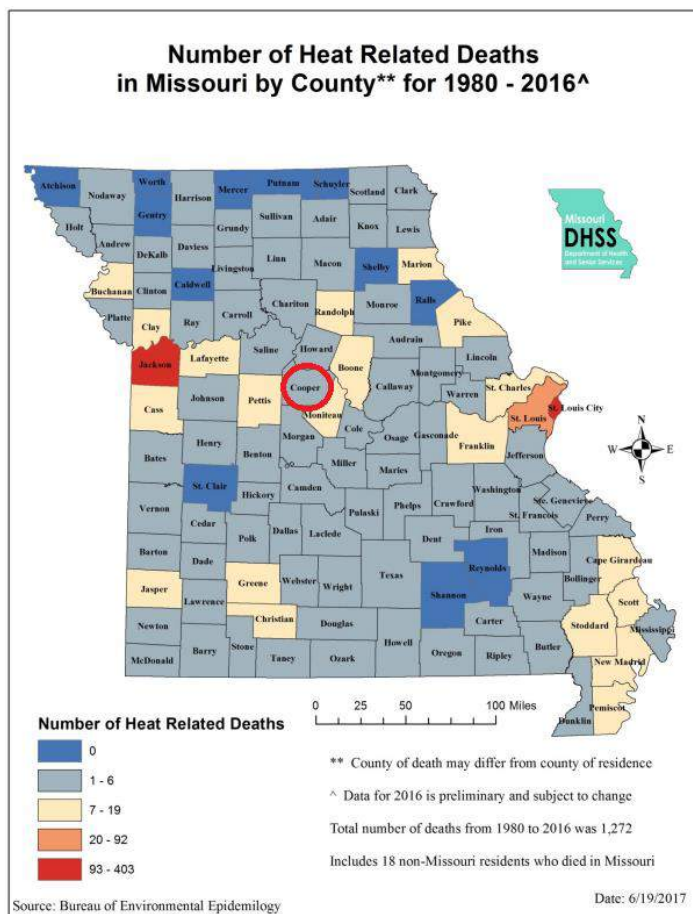
**Periods of Extreme Temperature in Cooper County, January 2000-December 2020**

| Date       | Temperature | Deaths | Injuries | Property Damage | Crop Damage | Duration (days) |
|------------|-------------|--------|----------|-----------------|-------------|-----------------|
| 8/28/2000  | 105 (hi)    | 0      | 0        | 0               |             | 4               |
| 9/1/2000   | 100         | 0      | 0        | 0               |             | 3               |
| 10/6/2000  | <20         | 0      | 0        | 0               | Unknown     | 4               |
| 12/10/2000 | <32         | 0      | 0        | 0               | Unknown     | 20              |
| 7/6/2001   | 115 (hi)    | 0      | 0        | 0               |             | 2               |

|               |          |   |   |   |         |    |
|---------------|----------|---|---|---|---------|----|
| 7/17/2001     | >100     | 0 | 0 | 0 |         | 7  |
| 8/1/2001      | >100     | 0 | 0 | 0 |         | 5  |
| 8/9/2001      | 110 (hi) | 0 | 0 | 0 |         | 1  |
| 7/4/2003      | 105 (hi) | 0 | 0 | 0 |         | 1  |
| 7/21/2005     | 110 (hi) | 0 | 0 | 0 |         | 4  |
| 7/16/2006     | 115 (hi) | 0 | 0 | 0 |         | 4  |
| 7/26/2006     | 115 (hi) | 0 | 0 | 0 |         | 2  |
| 8/1/2006      | 115(hi)  | 0 | 0 | 0 | Unknown | 2  |
| 8/6/2007      | 115 (hi) | 0 | 0 | 0 | Unknown | 12 |
| 7/18/2012     | 110 (hi) | 0 | 0 | 0 | Unknown | 8  |
| 1/6/2014      | -30 (wc) | 0 | 0 | 0 | Unknown | 1  |
| <b>TOTALS</b> |          | 0 | 0 | 0 | Unknown | 29 |

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

**Map 3.14 Missouri Heat Related Deaths**



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

### Probability of Future Occurrence

- High for all participating jurisdictions
  - NOAA data dating back to 2000 indicates 13 years without extreme temperature events. In most years during that period, there were multiple extreme heat events. Based on this historical data, the calculated probability of an extreme temperature event in any year is 38%. (Probability calculation:  $1 - (13/21) = 0.38$ )

The chances of an extreme heat event are much higher and happen much more frequently than extreme cold but cool snaps that may not bother humans can bother crops.

## VULNERABILITY

### VULNERABILITY OVERVIEW

**Measure of Severity** - Moderate for all participating jurisdictions

### Potential Impact – Life

Extreme temperatures kill by overloading a body’s capacity to regulate its internal temperature. The human body cools itself by perspiring; the evaporation of perspiration carries excess heat from the body. High humidity often accompanies heat in Missouri and increases the danger to warm-blooded humans and animals. High humidity makes it difficult for perspiration to evaporate and thus interferes with this natural cooling mechanism. The body attempts to heat itself through shivering when faced with cold.

The Heat Index devised by the NWS (Table 3.35) is a measure of how hot it really feels. The Heat Index takes into account both air temperature and relative humidity. It also gives an indication of the added risk presented by high humidity to bodies attempting to cool. One known death occurred in the planning area in August 2002. when a 59-year-old Boone County man died from heat exhaustion after collapsing while doing yard work.

**Table 3.35 Typical Health Impacts of Extreme Heat**

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

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

Many factors, such as age, general level of health, outdoor activity level, and availability of adequate shelter and clothing, affect the actual risk level. The elderly in general are vulnerable to the effects of extreme temperatures. Hypothermia sets in when internal body temperatures fall below 95 F. While this is most likely to occur when temperatures outside are extremely cold it is possible to happen slowly at temperatures as high as 40 F if the exposure is prolonged and exacerbated by chill caused by sweat, rain, or submersion into cold water.

Extreme temperature events can also result in livestock deaths and fish kills; drought in conjunction with extreme heat exacerbates the situation. Strenuous outdoor activity in extreme cold can also be life threatening. Frostbite can lead to the loss of limbs and hypothermia can result in death.

**Potential Impact - Existing Structures**

While illness and loss of life are of the most concern with extreme heat, structural impacts may also occur. Structural impacts depend on the length of the period of extreme heat and exacerbating factors such as concurrent drought. Road damage and electrical infrastructure damage may occur with intense and prolonged heat.

**Potential Impact - Future Development**

Thoughtful future development has the potential to include mitigation for extreme heat in its design. This is true on all levels ranging from actions by individual homeowners to larger redevelopment projects planned by cities. Properly placed shade trees can contribute greatly to lowering inside temperatures and the load placed on cooling systems. Planning for adequate green space as cities infill allows for air movement and shaded locations.

**Hazard Summary by Jurisdiction**

Those at greatest risk for temperature-related illness and deaths include children under 5 years of age and people over the age of 65. To determine jurisdictions within the planning area with populations more vulnerable to extreme temperatures, demographic data was obtained from the 2019 American Community Survey estimates for populations 5-years-old and younger, as well as ages 65 and older. Since students and faculty of school districts are not typically part of the vulnerable age groups they have been left out of the following table.

**Table 3.36: Cooper County Population by Age**

| Jurisdiction                 | Population Under 5 yrs | Population 65 yrs and over |
|------------------------------|------------------------|----------------------------|
| Unincorporated Cooper County | 5.5%                   | 17.2%                      |
| Blackwater                   | 3.5%                   | 11.7%                      |
| Boonville                    | 5.1%                   | 17%                        |
| Bunceton                     | 4.2%                   | 10.3%                      |
| Otterville                   | 9.3%                   | 19.2%                      |
| Pilot Grove                  | 4.7%                   | 30.7%                      |
| Prairie Home                 | 3.4%                   | 20.3%                      |
| Windsor Place                | 7.1%                   | 10.6%                      |
| Wooldridge                   | 0%                     | 33.3%                      |

Source: American Community Survey 5-year Estimates 2019

All jurisdictions are vulnerable to the effects of extreme heat. Extreme heat is already responsible for more weather-related deaths than any other hazard in the country; it is also one of the hazards shown to be increasing with changes in the climate.

Heat stroke and loss of life are the most significant consequences of extreme heat. While heat-related illness and death can occur due to exposure to intense heat in just one afternoon, heat stress on the body has a cumulative effect. The persistence of a heat wave increases the danger.

Boonville, the major population center in the planning area, is equipped with cooling centers to help protect those most vulnerable. Warnings regarding the dangers of extreme heat are widely broadcast during times of threat.

The Missouri State High School Activities Association (MSHSAA) provides coaches with educational pamphlets on the dangers of excessive heat. Schools in the planning area have air conditioning in their main buildings and many of their detached buildings, but warnings should be taken into consideration for outdoor sports and practices. Many schools in the planning area are closed for summer session during the hotter portions of the summer season.

The Missouri Department of Health and Senior Services announces statewide hot weather health alerts.

The National Weather Service (NWS) has devised a method to warn of advancing heat waves up to seven days in advance. The new Mean Heat Index is a measure of how hot the temperatures actually feel to a person over the course of a full 24 hours. It differs from the traditional Heat Index in that it is an average of the Heat Index from the hottest and coldest times of each day. The National Weather Service initiates alert procedures when the Heat Index is expected to exceed 105° - 110°F for at least two consecutive days. (The exact Heat Index temperature used depends on specifics of the local climate.)

## **PROBLEM STATEMENT**

All jurisdictions are vulnerable to the effects of extreme temperatures. Extreme heat is already responsible for more weather-related deaths than any other hazard in the country; it is also one of the hazards shown to be increasing with changes in the climate.

Heat stroke and loss of life are the most significant consequences of extreme heat. While heat-related illness and death can occur due to exposure to intense heat in just one afternoon, heat stress on the body has a cumulative effect. The persistence of a heat wave increases the danger.

The elderly in general are vulnerable to the effects of extreme temperatures; the 2019 estimates show 3,037 citizens in Cooper County (17.2% of the population) as 65 years and older. However, any residents without access to air conditioning, or shade and water if outside, are very vulnerable to this hazard. Likewise, frostbite and hypothermia can set in for those who cannot afford to heat their homes or who must be out in extremely cold temperatures. Older structures with less insulation may be at risk for frozen pipes. Outreach to raise awareness amongst the



most vulnerable populations and educating those about where warming and cooling centers are located can help mitigate the potential loss of life that can come with extreme temperatures. In addition to the human toll, prolonged extreme temperatures can result in livestock deaths, fish kills, and infrastructure damage; drought in conjunction with extreme heat exacerbates the situation. Winter weather can also take a toll on crops in the area. Unseasonable cold snaps and late frosts can kill and damage crops costing thousands of dollars in insurance claims.

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

#### DESCRIPTION OF HAZARD

A thunderstorm is a rainstorm with thunder and lightning present. Warm, humid climates, such as that in mid-Missouri, are favorable for the formation of thunderstorms. Thunderstorms can occur during any season in Missouri but they are more frequent in the spring and summer.

The average Missourian is well aware of the hazards of the thunderstorm season; these include heavy rains and, potentially, strong winds, tornadoes, hail, and lightning strikes. The effects of heavy rains will be considered in the section on flood (Section 3.4.1) and tornadoes are covered in Section 3.4.10.

Thunderstorms can range in complexity from single cell storms through multicell cluster storms, multicell line storms (squall lines), and on to supercell storms. A single cell thunderstorm typically lasts 20-30 minutes but when numerous cells are generated, as in a multicell storm, the thunderstorm can last for hours. Supercell storms include rotation and are responsible for the generation of severe tornadoes.

Severe and damaging winds in the planning area are usually, but not always, associated with thunderstorms. Thunderstorm winds can reach speeds up to 100 mph and produce damage paths for hundreds of miles. According to the National Oceanic and Atmospheric Administration (NOAA), property and crop damage from thunderstorm winds is more common, and can be more severe, than damage from tornadoes. Thunderstorm wind damage accounts for half of all the NOAA reports of severe weather events in the lower 48 states.

Thunderstorm winds are often called "straight-line" winds to distinguish them from tornadoes, which have a rotational element. The following are the distinctions made between different thunderstorm winds:

- Gust front - Gusty winds out ahead of a thunderstorm; characterized by a wind shift and temperature drop.
- Downbursts – A strong downdraft with a width of greater than 2.5 miles which results in an outward burst of damaging winds near the ground; may possibly produce damage similar to that of a strong tornado.
- Microbursts – A small concentrated downburst with a width less than 2.5 miles; generally short-lived, lasting only 5-10 minutes, with maximum wind speeds up to 168 mph.

A derecho is a widespread, massive, and violent thunderstorm wind event producing straight-line winds in excess of 70 mph and moving quickly over large areas. These are not common events, however, in the spring of 2009, a massive derecho almost as large as the state of Missouri caused extensive damage in southern Missouri and Illinois.

Much of the damage caused by high winds occurs because of falling trees; people, buildings, and vehicles may be damaged by falling trunks and branches. Power lines may be blown or knocked down and people left without electricity. In some cases, roofs are directly blown off buildings and windows are shattered.

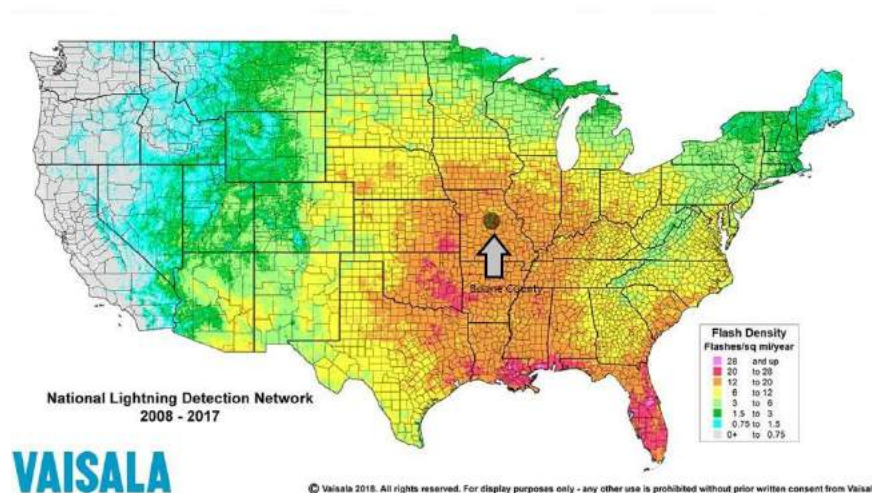
Hail is formed when updrafts in thunderstorms carry raindrops up to very high and cold areas where they freeze into ice. Hail, especially large sized hail, can cause severe damage and presents a threat to automobiles, airplanes, roofs, crops, livestock, and even humans.

Lightning, a massive electrical discharge, is produced by all thunderstorms. The electrical discharge can be within a cloud, between clouds, or between a cloud and the ground.

### Location

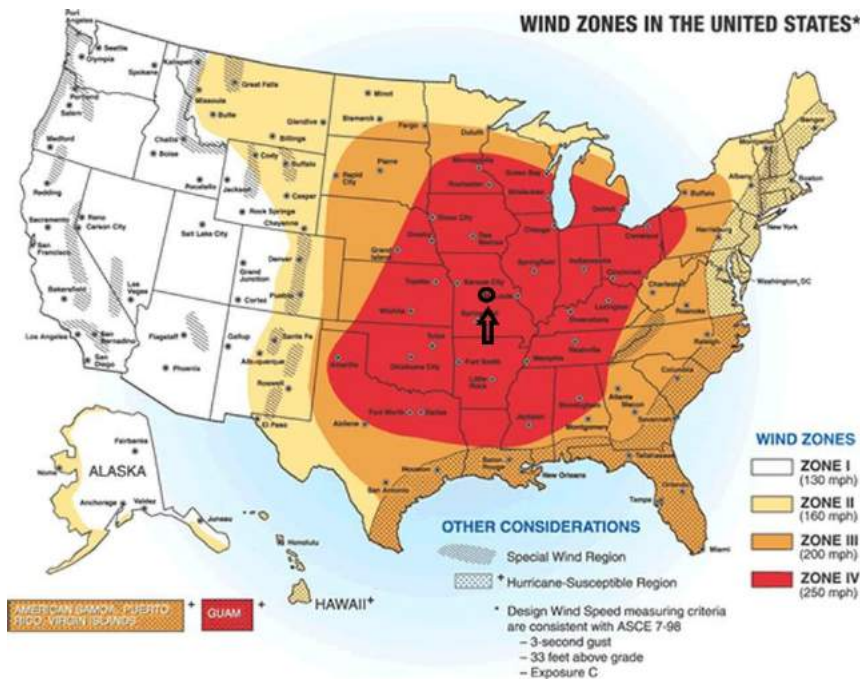
The entire planning area is at risk from severe thunderstorms and all the related threats accompanying them. Although these events occur similarly throughout the planning area damages are more likely to occur in more densely developed areas and areas with older homes. Cooper County is located in central Missouri and has a medium flash density of 6-12 Flashes/square mile/year.

**Figure 3.15: Location and Frequency of Lightning in Missouri**



The Planning area is in a high wind zone according to FEMA. All of the planning area is located in Zone IV and can see winds of 250 mph.

**Figure 3.16 Wind Zones in the United States**



**Strength/Magnitude/Extent**

The National Weather Service considers a thunderstorm “severe” when it includes one or more of the following: winds gusting in excess of 57.5 mph, hail at least 0.75 inch in diameter, or a tornado. The NOAA database records thunderstorm events which fall into this severe classification.

Based on information provided by the Tornado and Storm Research Organization (TORRO), Table 3.37 below describes typical damage impacts of the various sizes of hail.

**Table 3.37: Hail Damage by Size**

| 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 ><br>squash ball | Widespread glass damage, vehicle bodywork damage   |
| Destructive         | 41-50  | 1.6-2.0 | Golf ball ><br>Pullet's egg   | Wholesale destruction of glass, damage to tiled roofs,<br>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 ><br>cricket ball | Severe roof damage, risk of serious injuries   |
| Destructive         | 76-90  | 3.0-3.5 | Large orange ><br>> Soft ball | Severe damage to aircraft bodywork   |
| Super<br>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<br>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>

According to information from NOAA, a lightning bolt can contain 100 million to 1 billion volts of electricity and billions of watts of energy. This energy can heat the air around the lightning 18,000 to 60,000 °F.

### Previous Occurrences

The NCEI is limited in its reporting of lightning due to the fact that only lightning events that result in fatality, injury and/or property and crop damage are in the NCEI. There were no direct reports of lightning for the review period in the planning area. There were also no reports of crop damage due to thunderstorms, although hail and high wind are often associated with thunderstorms. The tables below summarize past crop damages as indicated by crop insurance claims and give insight into the magnitude of the impact on the planning area's agricultural economy.

**Table 3.38 Crop Insurance Claims Paid in Cooper County from High Winds, 2000-2020**

| Crop Year | Crop Name | Cause of Loss Description | Insurance Paid |
|-----------|-----------|---------------------------|----------------|
| 2003      | Wheat     | Excessive Wind            | 2078           |
| 2006      | Corn      | Hot Wind                  | 8039           |
| 2006      | Soybeans  | Hot Wind                  | 17221          |

|              |               |                |                |
|--------------|---------------|----------------|----------------|
| 2009         | Corn          | Excessive Wind | 46385          |
| 2011         | Corn          | Excessive Wind | 2121011        |
| 2011         | Corn          | Excessive Wind | 18921          |
| 2012         | Grain Sorghum | Hot Wind       | 3971           |
| 2013         | Corn          | Excessive Wind | 23416          |
| 2013         | Soybeans      | Hot Wind       | 4729           |
| 2014         | Corn          | Excessive Wind | 11425          |
| 2017         | Corn          | Excessive Wind | 41862          |
| <b>Total</b> |               |                | <b>2299058</b> |

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

**Table 3.39 Crop Insurance Claims Paid in Cooper County from Hail, 2000-2020**

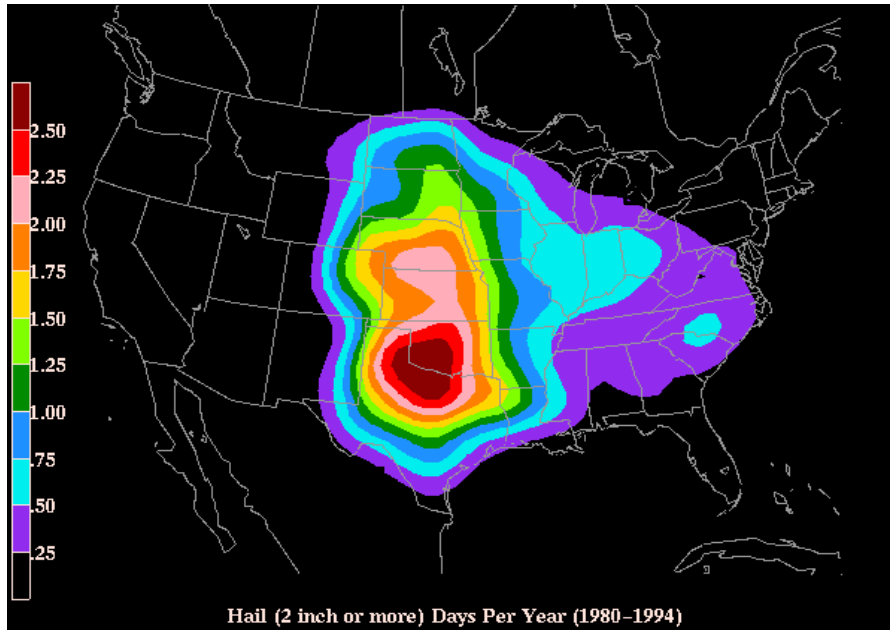
| Crop Year    | Crop Name | Cause of Loss Description | Insurance Paid |
|--------------|-----------|---------------------------|----------------|
| 2000         | Wheat     | Hail                      | 374            |
| 2000         | Wheat     | Hail                      | 630            |
| 2000         | Wheat     | Hail                      | 5087           |
| 2000         | Soybeans  | Hail                      | 5570           |
| 2000         | Soybeans  | Hail                      | 18602          |
| 2001         | Wheat     | Hail                      | 418            |
| 2001         | Wheat     | Hail                      | 2434           |
| 2001         | Soybeans  | Hail                      | 348            |
| 2001         | Soybeans  | Hail                      | 348            |
| 2005         | Soybeans  | Hail                      | 1503           |
| 2006         | Soybeans  | Hail                      | 2398           |
| 2009         | Wheat     | Hail                      | 9369           |
| 2009         | Wheat     | Hail                      | 21884          |
| 2009         | Wheat     | Hail                      | 69512          |
| 2009         | Corn      | Hail                      | 11119          |
| 2011         | Corn      | Hail                      | 30669          |
| 2011         | Corn      | Hail                      | 105383         |
| 2011         | Soybeans  | Hail                      | 35328          |
| 2012         | Wheat     | Hail                      | 19141          |
| 2012         | Corn      | Hail                      | 3854           |
| 2013         | Corn      | Hail                      | 49678          |
| 2014         | Soybeans  | Hail                      | 5316           |
| <b>Total</b> |           |                           | <b>398967</b>  |

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

### Probability of Future Occurrences

High for damaging winds and hail– All participating jurisdictions

**Figure 3.5 Annual Hailstorm Probability (2" diameter or larger) 1980-1994**

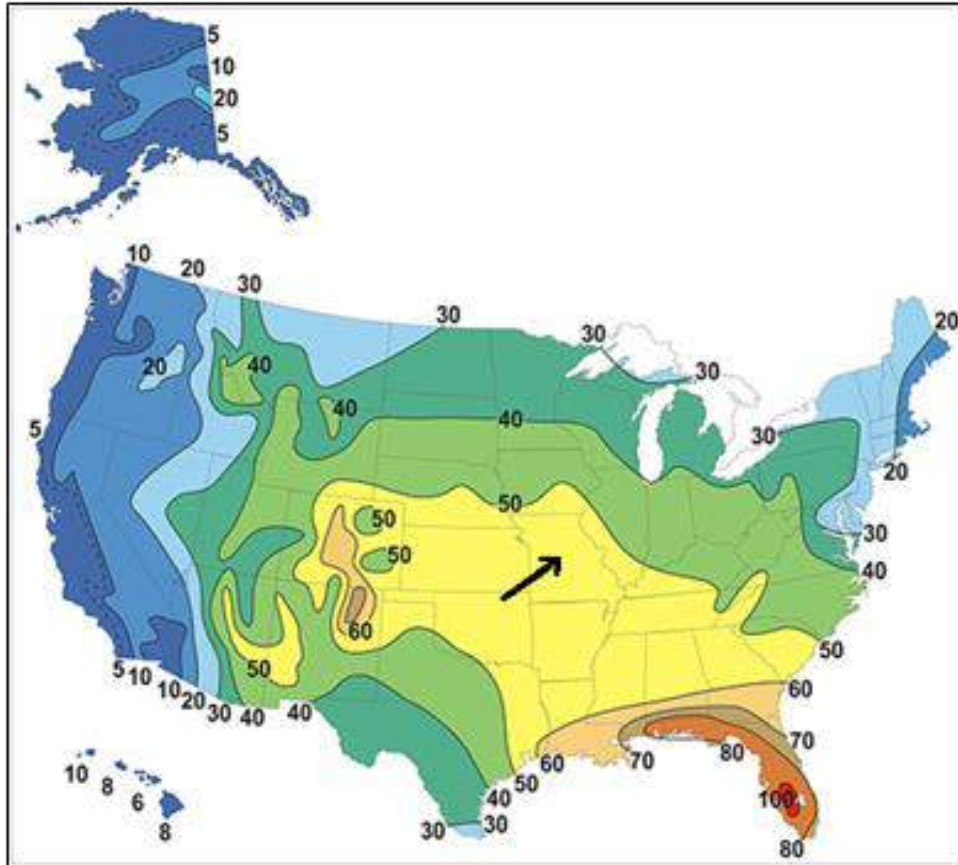


Source: NSSL, [http://www.nssl.noaa.gov/users/brooks/public\\_html/bighail.gif](http://www.nssl.noaa.gov/users/brooks/public_html/bighail.gif)

National Weather Service data indicates an average 50-60 thunderstorm days per year in Missouri (Figure 3.15).

Map 3.18

### Average Number of Thunderstorm Days Annually in U.S.



Source: NOAA

Data from NOAA for the recent 10-year period (2010-2020) indicates 17 thunderstorm wind events in Cooper County. There were three years in this period when an event was not reported. Based on this data, the calculated probability of a future severe thunderstorm wind event in any given year is 70 percent.

Data from NOAA for the same 10-year period indicates 21 reported severe hail events in the planning area (Figure 4.14). There were six years without severe hail events in the planning area during this period. Based on this data, the calculated probability of a future severe hail event in any given year is 60 percent.



## **CHANGING FUTURE CONDITIONS CONSIDERATIONS**

According to the State Hazard Mitigation Plan 2018, “Predicted increases in temperature could help create atmospheric conditions that are fertile breeding grounds for severe thunderstorms and tornadoes in Missouri.” These changing conditions will affect the entire planning area and should be considered when building new structures.

### **VULNERABILITY**

#### **Vulnerability Overview**

##### **Measure of Severity –**

Moderate to high for damaging winds, hail, and lightning – all participating jurisdictions.

##### **Potential Impact - Life**

Severe thunderstorms and their related hazards pose a threat to people and animals. Windblown debris, falling trees, falling branches, and lightning are very dangerous to those who are exposed. Excessive damage to utilities can leave people without electricity for long periods – an especially dangerous situation for vulnerable populations.

Hail also presents a potential bodily threat. In 2000, a man in Texas died from softball-size hail. According to NOAA’s National Severe Storms Laboratory, a 3.25-inch hailstone weighing 1.5 pounds has an estimated falling velocity of about 106 miles per hour.

The only injury from thunderstorm-related events reported in the recent 10-year period for the planning area was a man struck by lightning in June of 2008.

##### **Potential Impact - Existing Structures**

There is a wide range of possible impact from severe thunderstorms. Non-permanent and wood-framed structures are very vulnerable to destruction. While high winds are the force behind damage, it is the windblown debris and falling trees and branches that cause the most damage. Lightning can cause costly disruptions to electrical systems.

NOAA data, from which the annualized losses are calculated, vastly underestimates the cost of these hazards in the planning area. Local information indicates that many instances of property damage are not reflected in the NOAA data.

NOAA data only indicates damage from one hailstorm event in 2009 costing around \$10,000 in damages, common knowledge would indicate that this is not accurate. A huge storm in the spring of 2006 caused massive hail damage across the mid-Missouri region. Information from neighboring Boone County indicates that there was over \$1 million in hail damage incurred by that county’s buildings for the year 2006. Many private homes throughout the region received new roofs because of hailstorm damage that year.

While hailstorms of the magnitude that caused such damage in 2006 do not occur every year in Cooper County, hail is a costly hazard for the planning area.

### **Potential Impact - Future Development**

A larger population and more extensive built environment increase the risk of injury, loss of life, and damage from severe thunderstorms.

It would be wise to consider mitigation strategies for severe thunderstorms during the planning phase of any new development. The type of construction affects vulnerability to damaging winds, hail, lightning, and tornadoes. Design and construction choices and the inclusion of hardened areas for safe rooms can save lives.

### **Hazard Summary by Jurisdiction**

There are a variety of strategies in place in the planning area by which the public can be informed of severe weather conditions resulting from thunderstorms.

Cooper County has been recognized by the National Weather Service as a StormReady® Community. In order to become recognized as StormReady®, the Emergency Management Agency is evaluated on its abilities to do the following:

- receive real-time weather information from the NWS
- disseminate the information to the public
- transmit real-time information to the NWS
- educate the public regarding weather hazards/protection

Warning Systems The following warning systems are used in the county:

- Local television weather reports
- Local radio weather reports
- 9-1-1 call center and Public Emergency Broadcast Center
- Outdoor warning sirens

Safe Rooms Hannah Cole Elementary School in Boonville was built in 2016 with a safe room built to FEMA standards incorporated into its gymnasium.

Mobile Homes The State of Missouri regulates manufactured housing and modular units through the Missouri Public Service Commission. This includes enforcing tie down and anchoring requirements.

Shelters There are numerous Red Cross Certified Shelters in the planning area should sheltering become necessary.

Insurance Industry The insurance industry is heavily invested in finding mitigation strategies for hail damage as it is one of the most-costly hazards for the industry.

High insurance claims for hail damage, especially in the Midwestern states, are one reason for an increase in insurance premiums. The type of roofing material used in construction can greatly affect vulnerability to hail. In an effort to have a multifaceted approach to the problem of high damages and increasing premiums, the industry has supported research and testing standards in roofing materials.

### **Problem Statement**

Severe thunderstorms with damaging winds, hail, and lightning are common, dangerous, and often costly occurrences in the planning area. These weather events can be expected almost every year and every jurisdiction is highly vulnerable to these hazards.

Both human life and the built environment are at risk; the impact on the built environment has been quite costly in the past and this can be expected to continue into the future.

Public awareness education, excellent weather coverage by the local media, an excellent outdoor warning system, and regular emergency exercises in the schools help mitigate the risk to human life. However, there is a great need throughout the planning area for more safe rooms to protect from high wind events; this is especially true in the schools. Additional generators and power transfer hookups are needed in case of widespread and/or lengthy power outages. These identified needs have been targeted for action in the mitigation strategy but funding remains an issue for the costly safe rooms and generators/power transfer hookups.

### 3.4.9 Severe Winter Weather

#### Hazard Profile

#### Hazard Description

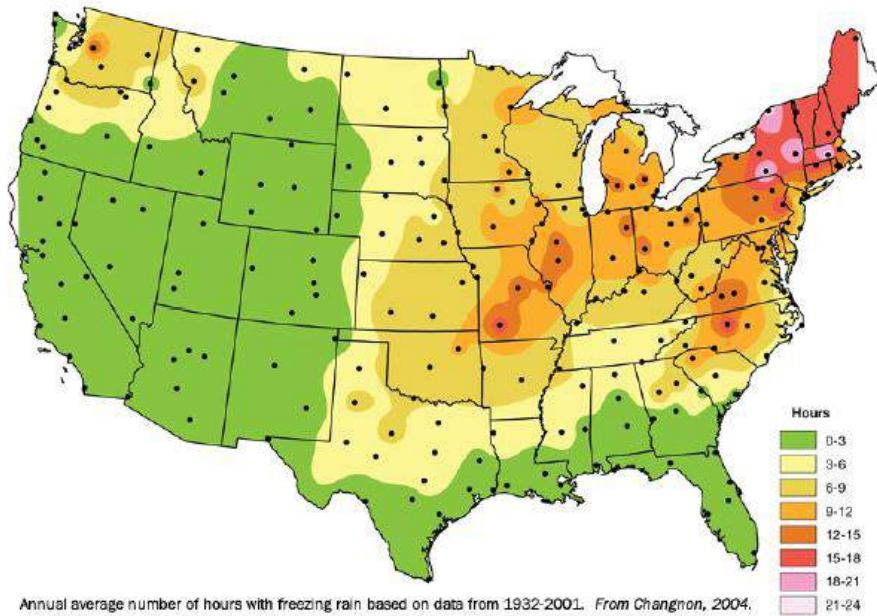
Winter storms in central Missouri contain ice, snow, severe cold, sleet, and wind; each of these associated factors has the potential to disrupt life in the region by making normal activity difficult and/or dangerous. The National Weather Service describes different types of winter storm events as follows:

- 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.

#### **Location**

The entire planning area is at risk from severe winter weather. This includes heavy snow, ice, and freezing rain. The planning area falls in the 9-12 hours a year average for freezing rain.

**Figure 3.19. NWS Statewide Average Number of Hours per Year with Freezing Rain**



Source: [https://mrcc.illinois.edu/living\\_wx/icestorms/](https://mrcc.illinois.edu/living_wx/icestorms/)

**Strength/Magnitude/Extent**

The entire planning area is at risk for a variety of winter weather. There are various levels of alerts for various conditions of winter weather. The National Weather Service may issue any of the following as conditions warrant.

| Table 3.40                               |   |
|--|---|
| National Weather Service Winter Warnings |   |
| <b>Winter Weather Advisory</b>           | Winter weather conditions are expected to cause significant inconveniences and may be hazardous. If caution is exercised, these situations should not become life-threatening. The greatest hazard is often to motorists. |
| <b>Winter Storm Watch</b>                | Severe winter conditions, such as heavy snow and/or ice, are possible within the next day or two.   |
| <b>Winter Storm Warning</b>              | Severe winter conditions have begun or are about to begin in your area.   |
| <b>Blizzard Warning</b>                  | Snow and strong winds will combine to produce a blinding snow (near zero visibility), deep drifts, and life-threatening wind chill. Seek refuge immediately.  |
| <b>Ice storm Warning</b>                 | 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.                                |

As the duration of a winter weather event goes longer, the potential for increased severity also rises. Prolonged events tax resources for residents and businesses.

### Previous Occurrences

Severe winter weather presents a risk to both life and property in the planning area. Some of the damage is direct but some comes in the form of economic losses due to closed businesses and schools and slowed or halted transportation (Table 3.44).

**Table 3.41: NCEI Cooper County Winter Weather Events Summary, 2000-2020**

| Date       | Event Type     | Magnitude | # of Injuries | Property Damages | Crop Damages |
|------------|----------------|-----------|---------------|------------------|--------------|
| 1/10/2011  | Winter Weather | N/A       | 0             | 0                | 0            |
| 3/14/2011  | Winter Weather | N/A       | 0             | 0                | 0            |
| 2/13/2012  | Winter Weather | N/A       | 0             | 0                | 0            |
| 1/28/2001  | Winter Storm   | N/A       | 0             | 0                | 0            |
| 2/9/2001   | Winter Storm   | N/A       | 0             | 0                | 0            |
| 1/2/2003   | Winter Storm   | N/A       | 0             | 0                | 0            |
| 12/10/2003 | Winter Storm   | N/A       | 0             | 0                | 0            |
| 1/25/2004  | Winter Storm   | N/A       | 0             | 0                | 0            |
| 1/12/2007  | Winter Storm   | N/A       | 0             | 0                | 0            |
| 1/19/2011  | Winter Storm   | N/A       | 0             | 0                | 0            |
| 2/21/2013  | Winter Storm   | N/A       | 0             | 0                | 0            |
| 2/25/2013  | Winter Storm   | N/A       | 0             | 0                | 0            |
| 3/23/2013  | Winter Storm   | N/A       | 0             | 0                | 0            |
| 3/1/2014   | Winter Storm   | N/A       | 0             | 0                | 0            |
| 1/11/2019  | Winter Storm   | N/A       | 0             | 0                | 0            |
| 12/15/2019 | Winter Storm   | N/A       | 0             | 0                | 0            |
| 12/13/2000 | Heavy Snow     | N/A       | 0             | 0                | 0            |
| 3/1/2002   | Heavy Snow     | N/A       | 0             | 0                | 0            |
| 11/30/2006 | Heavy Snow     | N/A       | 0             | 0                | 0            |
| 12/1/2006  | Heavy Snow     | N/A       | 0             | 0                | 0            |
| 2/28/2009  | Heavy Snow     | N/A       | 0             | 0                | 0            |
| 2/4/2014   | Heavy Snow     | N/A       | 0             | 0                | 0            |

**Table 3.42 Crop Insurance Claims Paid in Cooper County as a Result of Cold Conditions and Snow 2010-2020**

| <b>Crop Year</b> | <b>Crop Name</b> | <b>Cause of Loss</b> | <b>Insurance Paid (\$)</b> |
|------------------|------------------|----------------------|----------------------------|
| 2000             | Soybeans         | Freeze               | 2518                       |
| 2000             | Soybeans         | Freeze               | 2518                       |
| 2001             | Wheat            | Freeze               | 13074                      |
| 2001             | Wheat            | Cold Wet Weather     | 2253                       |
| 2001             | Soybeans         | Cold Wet Weather     | 40889                      |
| 2002             | Wheat            | Frost                | 26865                      |
| 2002             | Wheat            | Frost                | 1270                       |
| 2002             | Wheat            | Cold Winter          | 6032                       |
| 2002             | Wheat            | Cold Wet Weather     | 23667                      |
| 2002             | Wheat            | Cold Wet Weather     | 8426                       |
| 2002             | Wheat            | Cold Wet Weather     | 15437                      |
| 2002             | Wheat            | Cold Wet Weather     | 35007                      |
| 2003             | Wheat            | Freeze               | 8256                       |
| 2003             | Corn             | Cold Wet Weather     | 28285                      |
| 2004             | Wheat            | Frost                | 6667                       |
| 2004             | Wheat            | Freeze               | 4067                       |
| 2004             | Wheat            | Freeze               | 2074                       |
| 2004             | Wheat            | Freeze               | 3792                       |
| 2004             | Wheat            | Cold Winter          | 854                        |
| 2004             | Wheat            | Cold Wet Weather     | 10994                      |
| 2004             | Wheat            | Cold Wet Weather     | 20774                      |
| 2004             | Wheat            | Cold Wet Weather     | 9089                       |
| 2005             | Wheat            | Cold Wet Weather     | 2331                       |
| 2005             | Wheat            | Cold Wet Weather     | 2687                       |
| 2005             | Wheat            | Cold Wet Weather     | 4743                       |
| 2005             | Wheat            | Cold Wet Weather     | 16002                      |
| 2005             | Corn             | Cold Wet Weather     | 18283                      |
| 2005             | Corn             | Cold Wet Weather     | 10156                      |
| 2005             | Soybeans         | Cold Wet Weather     | 14975                      |
| 2006             | Wheat            | Frost                | 585                        |
| 2006             | Wheat            | Frost                | 585                        |
| 2006             | Wheat            | Frost                | 4853                       |
| 2006             | Wheat            | Freeze               | 364                        |
| 2006             | Wheat            | Cold Winter          | 441                        |
| 2006             | Wheat            | Cold Wet Weather     | 10585                      |
| 2006             | Corn             | Cold Wet Weather     | 39233                      |

|      |          |                  |        |
|------|----------|------------------|--------|
| 2007 | Wheat    | Frost            | 309    |
| 2007 | Wheat    | Freeze           | 399922 |
| 2007 | Wheat    | Freeze           | 42907  |
| 2007 | Wheat    | Freeze           | 4241   |
| 2007 | Wheat    | Freeze           | 5981   |
| 2007 | Wheat    | Freeze           | 1746   |
| 2007 | Wheat    | Freeze           | 126315 |
| 2007 | Wheat    | Freeze           | 61833  |
| 2007 | Wheat    | Freeze           | 62589  |
| 2007 | Wheat    | Cold Wet Weather | 3279   |
| 2007 | Corn     | Cold Wet Weather | 36378  |
| 2007 | Corn     | Cold Wet Weather | 74877  |
| 2007 | Other    | Freeze           | 58676  |
| 2008 | Wheat    | Freeze           | 24714  |
| 2008 | Wheat    | Freeze           | 9246   |
| 2008 | Wheat    | Cold Wet Weather | 62727  |
| 2008 | Wheat    | Cold Wet Weather | 6178   |
| 2008 | Wheat    | Cold Wet Weather | 7360   |
| 2008 | Corn     | Cold Wet Weather | 2683   |
| 2009 | Wheat    | Cold Wet Weather | 49046  |
| 2009 | Wheat    | Cold Wet Weather | 2198   |
| 2009 | Corn     | Frost            | 13177  |
| 2009 | Corn     | Cold Wet Weather | 107292 |
| 2009 | Corn     | Cold Wet Weather | 13227  |
| 2009 | Corn     | Cold Wet Weather | 224749 |
| 2009 | Corn     | Cold Wet Weather | 16209  |
| 2009 | Corn     | Cold Wet Weather | 71009  |
| 2009 | Corn     | Cold Wet Weather | 119788 |
| 2009 | Corn     | Cold Wet Weather | 37459  |
| 2009 | Soybeans | Cold Wet Weather | 32584  |
| 2009 | Soybeans | Cold Wet Weather | 12813  |
| 2009 | Soybeans | Cold Wet Weather | 9063   |
| 2009 | Soybeans | Cold Wet Weather | 10935  |
| 2010 | Wheat    | Frost            | 5663   |
| 2010 | Wheat    | Frost            | 5132   |
| 2010 | Wheat    | Freeze           | 685    |
| 2010 | Wheat    | Freeze           | 18298  |
| 2010 | Wheat    | Cold Winter      | 1156   |
| 2010 | Wheat    | Cold Winter      | 1365   |
| 2010 | Wheat    | Cold Winter      | 16066  |



|      |          |                  |        |
|------|----------|------------------|--------|
| 2010 | Wheat    | Cold Winter      | 5509   |
| 2010 | Wheat    | Cold Winter      | 3839   |
| 2010 | Wheat    | Cold Winter      | 5071   |
| 2010 | Wheat    | Cold Winter      | 9807   |
| 2010 | Wheat    | Cold Winter      | 25352  |
| 2010 | Wheat    | Cold Winter      | 5912   |
| 2010 | Wheat    | Cold Wet Weather | 16734  |
| 2010 | Wheat    | Cold Wet Weather | 2333   |
| 2010 | Wheat    | Cold Wet Weather | 7484   |
| 2010 | Wheat    | Cold Wet Weather | 2333   |
| 2010 | Wheat    | Cold Wet Weather | 16972  |
| 2010 | Wheat    | Cold Wet Weather | 11503  |
| 2010 | Wheat    | Cold Wet Weather | 92815  |
| 2010 | Wheat    | Cold Wet Weather | 26722  |
| 2010 | Wheat    | Cold Wet Weather | 170878 |
| 2010 | Wheat    | Cold Wet Weather | 9228   |
| 2010 | Corn     | Cold Wet Weather | 95692  |
| 2010 | Corn     | Cold Wet Weather | 27457  |
| 2010 | Corn     | Cold Wet Weather | 9604   |
| 2010 | Corn     | Cold Wet Weather | 60198  |
| 2010 | Corn     | Cold Wet Weather | 148301 |
| 2010 | Corn     | Cold Wet Weather | 135506 |
| 2010 | Corn     | Cold Wet Weather | 128113 |
| 2010 | Soybeans | Cold Wet Weather | 8976   |
| 2010 | Soybeans | Cold Wet Weather | 1810   |
| 2010 | Soybeans | Cold Wet Weather | 4511   |
| 2010 | Soybeans | Cold Wet Weather | 26960  |
| 2011 | Wheat    | Cold Winter      | 20286  |
| 2011 | Wheat    | Cold Wet Weather | 4292   |
| 2011 | Wheat    | Cold Wet Weather | 25642  |
| 2011 | Wheat    | Cold Wet Weather | 242680 |
| 2011 | Wheat    | Cold Wet Weather | 18136  |
| 2011 | Wheat    | Cold Wet Weather | 4574   |
| 2011 | Corn     | Cold Winter      | 16320  |
| 2011 | Corn     | Cold Wet Weather | 683259 |
| 2011 | Corn     | Cold Wet Weather | 337543 |
| 2011 | Corn     | Cold Wet Weather | 38522  |
| 2012 | Wheat    | Cold Winter      | 241128 |
| 2012 | Corn     | Cold Wet Weather | 9834   |
| 2012 | Corn     | Cold Wet Weather | 91905  |

|       |          |                  |         |
|-------|----------|------------------|---------|
| 2012  | Corn     | Cold Wet Weather | 6189    |
| 2013  | Wheat    | Cold Wet Weather | 27696   |
| 2013  | Wheat    | Cold Wet Weather | 13431   |
| 2013  | Corn     | Cold Wet Weather | 105893  |
| 2014  | Wheat    | Cold Winter      | 55275   |
| 2014  | Wheat    | Cold Winter      | 64595   |
| 2014  | Wheat    | Cold Winter      | 55048   |
| 2014  | Wheat    | Cold Winter      | 54302   |
| 2014  | Wheat    | Cold Winter      | 81159   |
| 2014  | Wheat    | Cold Wet Weather | 24878   |
| 2014  | Wheat    | Cold Wet Weather | 12608   |
| 2014  | Wheat    | Cold Wet Weather | 7380    |
| 2014  | Wheat    | Cold Wet Weather | 21776   |
| 2014  | Wheat    | Cold Wet Weather | 1133    |
| 2014  | Corn     | Cold Wet Weather | 131245  |
| 2014  | Soybeans | Cold Wet Weather | 5676    |
| 2014  | Soybeans | Cold Wet Weather | 7945    |
| 2015  | Wheat    | Cold Winter      | 10822   |
| 2015  | Wheat    | Cold Wet Weather | 20180   |
| 2015  | Soybeans | Cold Wet Weather | 24766   |
| 2016  | Wheat    | Cold Wet Weather | 31502   |
| 2016  | Wheat    | Cold Wet Weather | 5155    |
| 2016  | Corn     | Cold Wet Weather | 28765   |
| 2017  | Wheat    | Cold Wet Weather | 9404    |
| 2017  | Wheat    | Cold Wet Weather | 2688    |
| 2017  | Corn     | Cold Wet Weather | 137119  |
| 2019  | Wheat    | Cold Wet Weather | 12207   |
| 2019  | Corn     | Cold Wet Weather | 315710  |
| 2019  | Corn     | Cold Wet Weather | 516738  |
| 2020  | Corn     | Cold Wet Weather | 20917   |
| Total |          |                  | 6764449 |

### Probability of Future Occurrence

The historical data indicates there were only 8 years (2001, 2009, 2012, 2015, 2016, 2017, 2018, and 2020) without a severe winter weather event in the period 2000-2020, a 21-year period; most years witnessed multiple events. Based on this historical data, the calculated probability of a severe winter weather event in any year is 38%. (Probability calculation:  $1 - (8/21) = .38$ )

## **Changing Future Conditions Considerations**

As temperatures rise and shorten the winter season there could be ecological impacts to plant and animal species that could cause them to shift their native territory. An increase in precipitation events throughout the winter months and a general saturation of the ground could increase the likelihood of flooding events and freezing rain or ice storm events in the planning area.

## **Vulnerability**

### **Vulnerability Overview**

**Measure of Severity** - Moderate for all participating jurisdictions.

Severe winter weather presents a risk to both life and property in the planning area. Some of the damage is direct, but some comes in the form of economic losses due to closed businesses and schools and slowed or halted transportation.

### **Potential Impact – Life**

Many deaths and injuries from winter storms are a result of traffic accidents caused by a combination of poor driving surfaces and speeds too fast for the conditions. Accidents during winter storms can be particularly devastating because of multiple car involvement. Response times for emergency vehicles may also be slowed by poor road conditions.

Strenuous outdoor activity in extreme cold can also be life threatening. The elderly are especially vulnerable to excessive and/or prolonged cold (or heat). The 2019 ACS estimates over 17% of the population as 65 years and older in Cooper County.

Severe winter weather may require that people without power be sheltered and fed.

### **Potential Impact - Existing Structures**

Much of the property damage that occurs from severe winter weather is due to some type of utility failure:

Power Lines - Ice storms often adversely impact consistent power supplies. Ice buildup on wires can cause them to fall; downed tree limbs can knock out power lines. Prolonged power outages can be a threat for those relying on electricity for heat. This is a particular concern for more vulnerable populations such as the elderly.

Water Lines - Winter storms and the associated cold weather can be problematic for water lines, especially if a rapid freeze/thaw cycle is involved. As the ground freezes and thaws, pipes can shift and sometimes break, causing a lack of potable water. Broken pipes can cause extensive and expensive damage to property. Frozen and burst water pipes are a real concern for the homeowner.

Severe winter weather can be expected in Cooper County nearly every year. The county has been included in five disaster declarations for severe winter weather since 2002. A winter storm that brought up to three-fourths of an inch of ice in December 2007 caused widespread power outages, leaving an estimated 165,000 residents without power in Cooper County and the surrounding counties of Bates, Chariton, Howard, Johnson, Pettis, and Saline. Most recently, in 2011, a series of storms blanketed the region in near record amounts of snow and created blizzard conditions across a large portion of the state. Snow fall on February 1, 2011, caused the closure of Interstate 70 from Kansas City to St. Louis. Expenses from these storms are in excess of \$14 million, according to SEMA.

### **Potential Impact - Future Development**

There is no known future development that will have a particular impact on the vulnerability to severe weather. However, as with many non-locale specific hazards, growth and development increase the size of the population and the assets at risk. However, there is still a need for more backup generators and transfer switches in the planning area. This is a difficult issue as the expense is great and the funding possibilities are limited. In addition, there is a need to find reliable transportation for vulnerable populations in need of transfer to shelters.

### **Hazard Summary by Jurisdiction**

Cooper County and Boonville Public Works Departments both have snowplowing plans which prioritize critical roads and streets for plowing. Both Public Works Departments maintain stocks of chemicals and fuel at appropriate levels for responding to severe winter weather events. The City of Boonville is divided into sections with drivers assigned to plow all streets within the assigned section. Typically, streets are plowed radiating out from the boundaries of the sections. With major streets being a boundary and leading into and through an assigned section those streets are cleared first. The key is all streets are cleared during a snow event. The City of Boonville has a snow route ordinance. Emergency snow routes are declared by the City Administrator when a particular snow event reaches such a scale that normal snow plowing routine can't keep ahead of the storm. Depending on the scope of a forecasted snow event, the snow plowing crews are worked in 8 to 12 hour shifts with regular public works department staff being augmented by employees from other departments and/or temp hire employees.

The City of Boonville maintains a supply of road salt on-hand, currently there is approximately 2,000 tons in the salt storage shed. In the August–September time frame Public Works Department will call for bids for supplying road salt for the upcoming winter season. The amount of salt to be supplied for the bid is based on what material is on-hand and a judgment call on how much material will be used based on an evaluation of long-range weather forecasts. A provision for the City of New Franklin is included in the road salt supply bid. All material is delivered to the salt storage shed at the Boonville City Services Building.

### Utility Companies

Utility companies in Cooper County have policies regarding tree trimming and brush removal around power lines. Consistent maintenance of trees and brush around utility lines limits the

possibility of power outages during a severe winter storm. Maintenance also makes financial sense because repairing fallen utility lines and poles is costly and dangerous.

#### National Weather Service and Local Media

The Kansas City Office of the National Weather Service coordinates with local jurisdictions and media outlets to disperse information regarding severe winter storm watches and warnings. Early warning allows the public to prepare for a severe storm. If a storm reaches catastrophic proportions and officials need to communicate directly with the public, the Emergency Alert System exists to spread that information.

#### **PROBLEM STATEMENT**

Severe winter weather is one of the most common and costly natural hazards to affect the planning area. In addition, climate data indicates that winter storms are increasing due to changes in the climate. All participating jurisdictions are vulnerable to this hazard.

Some of the worst problems from severe winter weather occur when ice storms affect the area; widespread and lengthy power outages can occur. In addition, traffic accidents are a major source of injuries during severe winter weather.

The further encouragement and effort toward moving utility lines underground will help limit damage to essential utilities during severe winter weather.

### 3.4.10 Tornado

#### Hazard Profile

##### Description of Hazard

A tornado is a violently rotating column of air which is usually generated by a supercell thunderstorm. The movement speed of a tornado is typically around 10-20 mph but can range from almost stationary to more than 60 mph, according to NOAA's National Severe Storms Laboratory. They often travel from southwest to northeast but can move in any direction.

Tornadoes occur most frequently in late afternoon and early evening but can occur at any time; they tend to dissipate as fast as they form. Unlike a hurricane, which can last for multiple hours, tornadoes are often in one place for no more than a few minutes. The seasonal, temporal, and spatial uncertainties surrounding thunderstorms and tornadoes make widespread and year-round preparedness essential.

##### Location

The entire planning area is at risk from tornadoes. All of Missouri is located in the zone known as Tornado Alley where the occurrence of tornadoes of varying intensities are common.

##### Strength/Magnitude/Extent

The Enhanced Fujita or EF-Scale (Table 3.43) is currently used in the United States to classify tornadoes. It is based on engineering studies of the wind effects on 28 different types of structures (buildings, towers, poles, trees). This indirect measurement of speed is used because it is currently not possible to measure ground-level speeds in strong tornadoes; the winds destroy the instruments needed for measurement.

In addition to estimated wind speeds, averaged data from tornadoes can give an idea of the length and width of tornadoes in the different classifications.

**Table 3.43 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 Number        | 3 Second Gust (mph) | EF Number            | 3 Second Gust (mph) |
| 0            | 40-72                | 45-78               | 0                | 65-85               | 0                    | 65-85               |
| 1            | 73-112               | 79-117              | 1                | 86-109              | 1                    | 86-110              |
| 2            | 113-157              | 118-161             | 2                | 110-137             | 2                    | 111-135             |
| 3            | 158-207              | 162-209             | 3                | 138-167             | 3                    | 136-165             |
| 4            | 208-260              | 210-261             | 4                | 168-199             | 4                    | 166-200             |
| 5            | 261-318              | 262-317             | 5                | 200-234             | 5                    | Over 200            |

Source: The National Weather Service, [www.spc.noaa.gov/faq/tornado/ef-scale.html](http://www.spc.noaa.gov/faq/tornado/ef-scale.html)

The EF-Scale has been in use since February 1, 2007. It uses the same ratings as the original Fujita Scale (F-Scale) which it replaced, but the wind speeds have been adjusted to reflect current knowledge and give a more realistic estimate of wind speeds for all tornadoes, including historical ones in the NOAA database. The ratings of tornadoes prior to 2007 were not changed in the NOAA database with the adoption of the EF-Scale.

There continue to be limitations even with the EF-Scale since the scale is based on sustained damage. The table below list damage summaries for their respective EF rating.

**Table 3.44 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 distance.                              |
| 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>

Another issue with tornadoes is speed of onset. Technological advances, such as Doppler radar, computer modeling, and Emergency Warning Systems, have increased the amount of time the general public has to respond to a tornado. Despite these advances, tornadoes can still strike an area with little warning. Often people have no more than a few minutes to get to safety. Being able to quickly get to a safe place is absolutely imperative in order to prevent loss of life.

The planning area has experienced 18 tornado events since October 1966, as officially recorded by NOAA.

The historical record in the planning area over this 50-year period indicates tornadoes in the EF0 to EF2 range. While history is informative, it is not necessarily predictive of the future; there is the possibility that the planning area could experience a tornado above the EF2 level in the future.

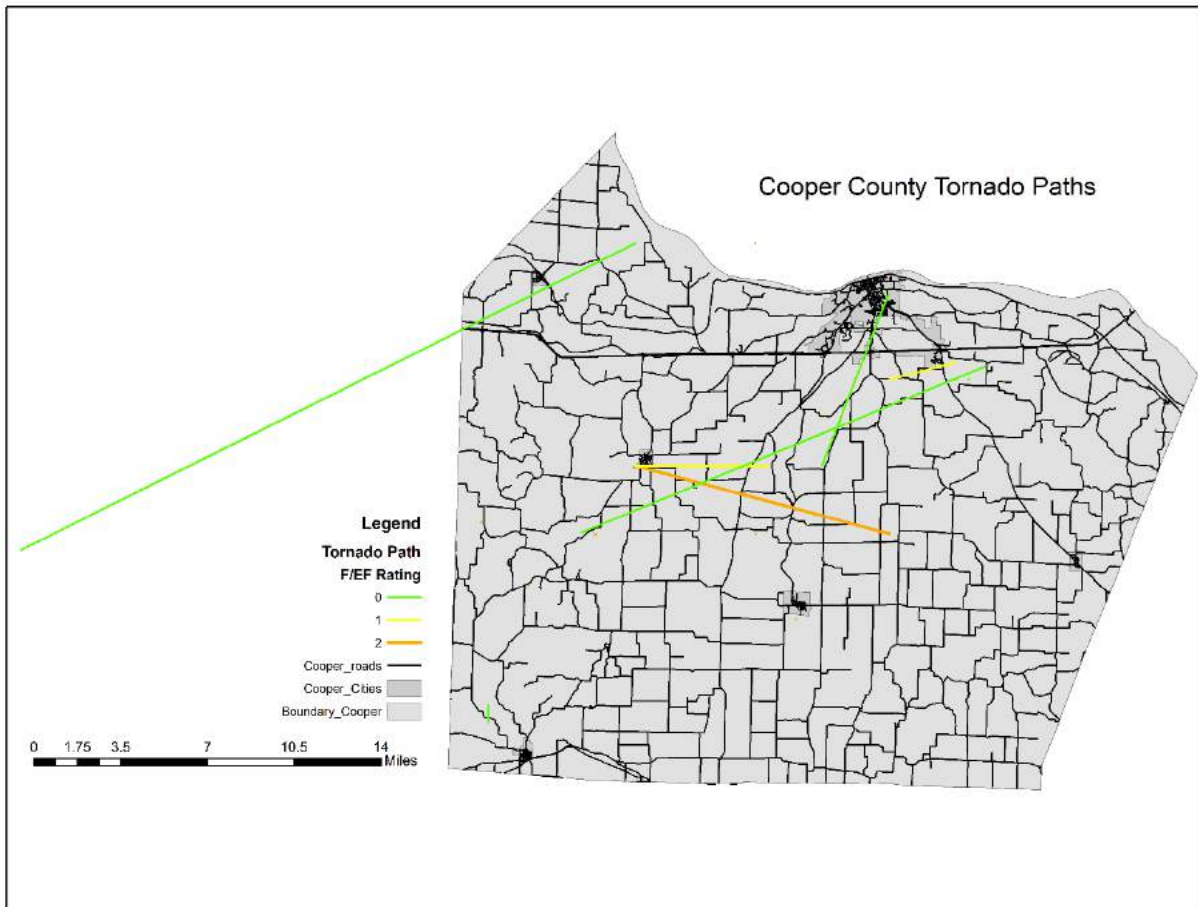
In addition, many historical tornadoes may have been stronger than the data indicates. According to the NOAA website, “Because the only way we can compare all tornadoes is by whatever damage they caused, and EF5/F5 damage is only possible when tornadoes hit well-built structures, the true ‘violence’ of most historical tornadoes is unknown—especially before the middle to late 20th century.”



**Table 3.45 Recorded Tornadoes in Cooper County, 1966 – Present**

| Date      | F/EF Rating | Death | Injury | Property Damage | Crop Damage | Length (mi) | Width (yd) | Beginning Lat | Beginning Long | Ending Lat | Ending Long |
|-----------|-------------|-------|--------|-----------------|-------------|-------------|------------|---------------|----------------|------------|-------------|
| 6/11/1968 | F0          | 0     | 0      | 30              | 0           | 0.5         | 27         | 38.83         | -92.83         | N/A        | N/A         |
| 4/20/1973 | F1          | 0     | 0      | 2500            | 0           | 0.1         | 10         | 38.9          | -92.78         | N/A        | N/A         |
| 4/20/1973 | F2          | 0     | 0      | 25000           | 0           | 2.3         | 50         | 38.83         | -92.95         | N/A        | N/A         |
| 5/21/1973 | F1          | 0     | 0      | 2500            | 0           | 0.5         | 50         | 38.8          | -93            | N/A        | N/A         |
| 7/19/1975 | F0          | 0     | 0      | 2500            | 0           | 0.3         | 30         | 38.92         | -92.68         | N/A        | N/A         |
| 4/20/1976 | F0          | 0     | 0      | 0               | 0           | 0.3         | 17         | 38.8          | -93            | N/A        | N/A         |
| 5/14/1982 | F2          | 0     | 0      | 25000           | 0           | 1           | 77         | 38.83         | -92.73         | N/A        | N/A         |
| 5/14/1982 | F1          | 0     | 0      | 25000           | 0           | 2           | 100        | 38.98         | -92.52         | N/A        | N/A         |
| 4/29/1984 | F0          | 0     | 0      | 0               | 0           | 1           | 50         | 38.78         | -92.8          | N/A        | N/A         |
| 7/11/1992 | F0          | 0     | 0      | 0               | 0           | 0.2         | 30         | 38.92         | -92.67         | N/A        | N/A         |
| 9/7/1992  | F2          | 0     | 0      | 250000          | 0           | 10.2        | 60         | 38.87         | -92.92         | 38.83      | -92.73      |
| 4/8/1999  | F1          | 0     | 0      | 750000          | 50000       | 4           | 75         | 38.9          | -92.73         | 38.93      | -92.68      |
| 4/10/2001 | F1          | 0     | 0      | 25000           | 0           | 5           | 50         | 38.87         | -92.92         | 38.87      | -92.82      |
| 8/13/2005 | F0          | 0     | 0      | 50000           | 0           | 8           | 100        | 38.87         | -92.78         | 38.97      | -92.73      |
| 3/12/2006 | F0          | 0     | 0      | 5000            | 0           | 9           | 150        | 38.95         | -93            | 39         | -92.92      |
| 3/12/2006 | F0          | 0     | 0      | 0               | 0           | 1           | 75         | 38.72         | -93.03         | 38.73      | -93.03      |
| 5/25/2011 | EFO         | 0     | 0      | 0               | 0           | 0.05        | 40         | 38.8369       | -93.0356       | 38.8369    | 93.0356     |
| 3/6/2017  | EFO         | 0     | 0      | 0               | 0           | 17.45       | 400        | 38.8323       | -92.9597       | 38.9264    | 92.6586     |

**Map 3.20 Cooper County Map of Historic Tornado Events**



### **Probability of Future Occurrence**

High - all participating jurisdictions

For the period from October 1966 through December 2020, a period of approximately 50 years, the NOAA database reports 13 years with at least one tornado event in the planning area. Based on this historical data, the calculated probability of a future tornado event of any magnitude in a year is about 24 percent.

The probabilities of occurrence of the different magnitudes of tornadoes in any given year, based on historical data, have also been calculated (Table 3.46). While the calculated probabilities for an EF3, EF4, or EF5 tornado are 0 percent, this does not mean tornadoes of these magnitudes could not occur in the planning area; it just means they have not occurred in the historical record.

**Table 3.46**

| <b>Probability of Future Tornado Events</b> |  |                    |                           |
|---|--|--------------------|---------------------------|
| <b>EF-Scale</b>                             | <b># of years with tornado event (1966-2020)</b> | <b>Probability</b> | <b>Probability Rating</b> |
| <b>All</b>                                  | 18   | 24%                | High                      |
| <b>EF0</b>                                  | 10   | 18%                | High                      |
| <b>EF1</b>                                  | 5  | 9%                 | Moderate                  |
| <b>EF2</b>                                  | 3  | 5%                 | Moderate                  |
| <b>EF3</b>                                  | 0  | 0%                 | Low                       |
| <b>EF4</b>                                  | 0  | 0%                 | Low                       |
| <b>EF5</b>                                  | 0  | 0%                 | Low                       |

### **Changing Future Conditions Considerations**

It is not confidently known how the change in climate could impact the frequency or severity of future tornadic activity. While the activity zone has not expanded according to the State Hazard Mitigation Plan 2018 the number of tornados has gone up since the 1950s. More studies will be needed to know the true impact over time.

## **Vulnerability**

### **Vulnerability Overview**

The entire planning area is highly vulnerable to the potentially devastating impact of tornadoes. Their random nature and potentially quick speed of onset pose particular risks for human life. Tornadoes of the magnitude known to historically occur in the area can wreak extensive and costly structural damage. The destructive effects of a tornado depend on the strength of the winds, proximity to people and structures, the strength of structures, and how well a person is sheltered. They are obviously a hazard with the potential to cause both great loss of life and catastrophic destruction. The whole planning area is located in “Tornado Ally” where historically dangerous and destructive tornados occur frequently.

**Map 3.21 Tornado Alley in the U.S.**



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

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

The destructive effects of a tornado depend on the strength of the winds, proximity to people and structures, the strength of structures, and how well a person is sheltered. They are obviously a hazard with the potential to cause both great loss of life and catastrophic destruction.

### **Potential Impact - Life**

While tornadoes can strike anywhere, there is a greater chance of injury and loss of life (and destruction of property) in population centers. This is especially true of a tornado with a large path.

There have been no reported injuries associated with recorded tornadoes in the planning area.

### **Potential Impact - Existing Structures**

Tornadoes cause the most-costly physical destruction when they touch ground in urban areas. High winds affect all structure types differently; non-permanent and wood-framed structures are especially vulnerable to destruction.

In addition to a direct hit on a building by a tornado, damage to trees poses a serious threat. People, buildings, power lines, and vehicles are all at risk from falling branches, uprooted trees, and windblown debris.

### **Potential Impact - Future Development**

A larger population and more extensive built environment increase the risk of injury, loss of life, and damage from tornadoes.

There has been growth in population and housing in certain parts of the planning area in recent years. While Census figures indicate an overall population decline in the planning area (Cooper County) between 2010 and 2020, the population growth in Bunceton and Windsor Place was 2.8 percent and 9 percent, respectively. Housing units in the planning area decreased by 2.4 percent during this period.

It would be wise to consider mitigation strategies for tornadoes and other high-wind situations during the planning phase of any new development. The type of construction greatly affects vulnerability to tornadoes and high winds. Design and construction choices and the inclusion of hardened areas for safe rooms can save lives.

### **Hazard Summary by Jurisdiction**

There are a variety of strategies in place in the planning area by which the public can be informed of severe weather conditions resulting from thunderstorms.

Cooper County has been recognized by the National Weather Service as a StormReady® Community. In order to become recognized as StormReady®, the Emergency Management Agency is evaluated on its abilities to do the following:

- receive real-time weather information from the NWS
- disseminate that information to the public
- transmit real-time information to the NWS
- educate the public regarding weather hazards/protection

Warning Systems The following warning systems are used in the county:

- Local television weather reports
- Local radio weather reports
- 9-1-1 call center and Public Emergency Broadcast Center
- Outdoor warning sirens

Safe Rooms Hannah Cole Elementary School in Boonville was built in 2016 with a safe room built to FEMA standards incorporated into its gymnasium.

Mobile Homes The State of Missouri regulates manufactured housing and modular units through the Missouri Public Service Commission. This includes enforcing tie down and anchoring requirements.

Shelters There are numerous Red Cross Certified Shelters in the planning area should sheltering become necessary.

### **Problem Statement**

The entire planning area is highly vulnerable to the potentially devastating impact of tornadoes. Their random nature and potentially quick speed of onset pose particular risks for human life. Tornadoes of the magnitude known to historically occur in the area can wreak extensive and

costly structural damage. Public awareness education, excellent weather coverage by the local media, an excellent outdoor warning system, and regular emergency exercises in the schools help mitigate the risk to human life. However, there is a great need throughout the planning area for more safe rooms to protect from high wind events; this is especially true in the schools. Additionally, more vigorous promotion of NOAA radio use would help protect the general public. Additional generators and power transfer hookups are needed in case of widespread and/or lengthy power outages. All of these identified needs have been targeted for action in the mitigation strategy; funding remains an issue for the more costly safe rooms and generators/power transfer hookups.

### 3.4.11 WILDFIRE

#### HAZARD PROFILE

##### DESCRIPTION OF HAZARD

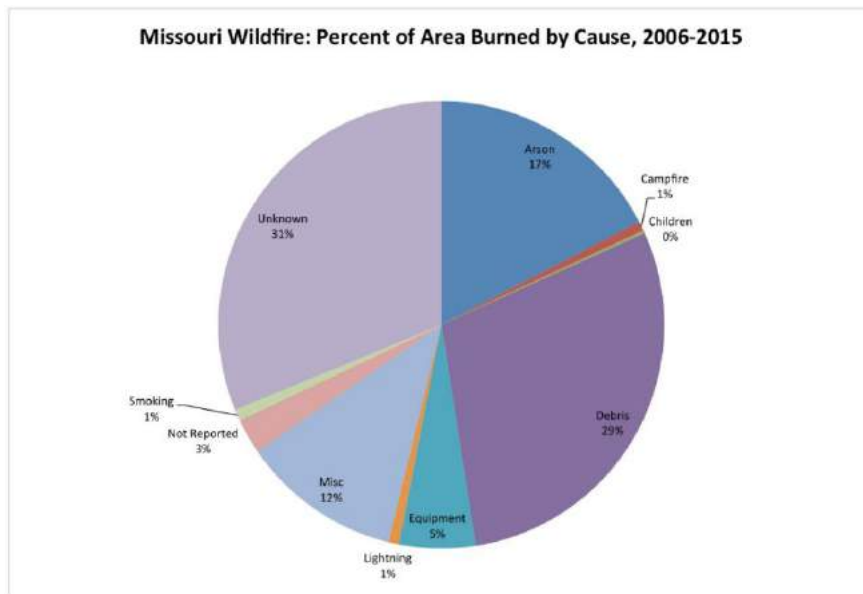
Large and widespread wildfires, such as occur in the western United States, have not been a problem in Cooper County in recent history. However, smaller wildfires/natural cover fires occur every year.

These fires may take place at any time of the year but the majority occur during the spring fire season (February 15 - May 10). Spring is the time of the year when rural residents burn garden spots and brush piles. Many landowners also believe it is necessary to burn the woods in the spring to grow more grass, kill ticks, and get rid of brush. These factors, combined with low humidity and high winds, result in higher fire danger at this time of year. The spring fire season abates with the growth of the new season's grasses and other green vegetation.

Numerous fires also occur in October and November due to the dryness associated with fall in Missouri. Many rural residents use this time of year to burn leaves and debris thus raising the possibility of a fire which burns out of control.

The major causes of wildfires in Missouri are various human activities, according to statistics from the Missouri Department of Conservation (Figure 3.3).

Figure 3.6: Missouri Wildfire Source



Source: Missouri Department of Conservation

## **Location**

The rural areas of Cooper County and the rural/urban interfaces are most at risk from wildfires. Debris burning is consistently the number one cause of wildfires in Missouri. Fires caused by lightning are rare despite 50 to 70 thunderstorm days per year.

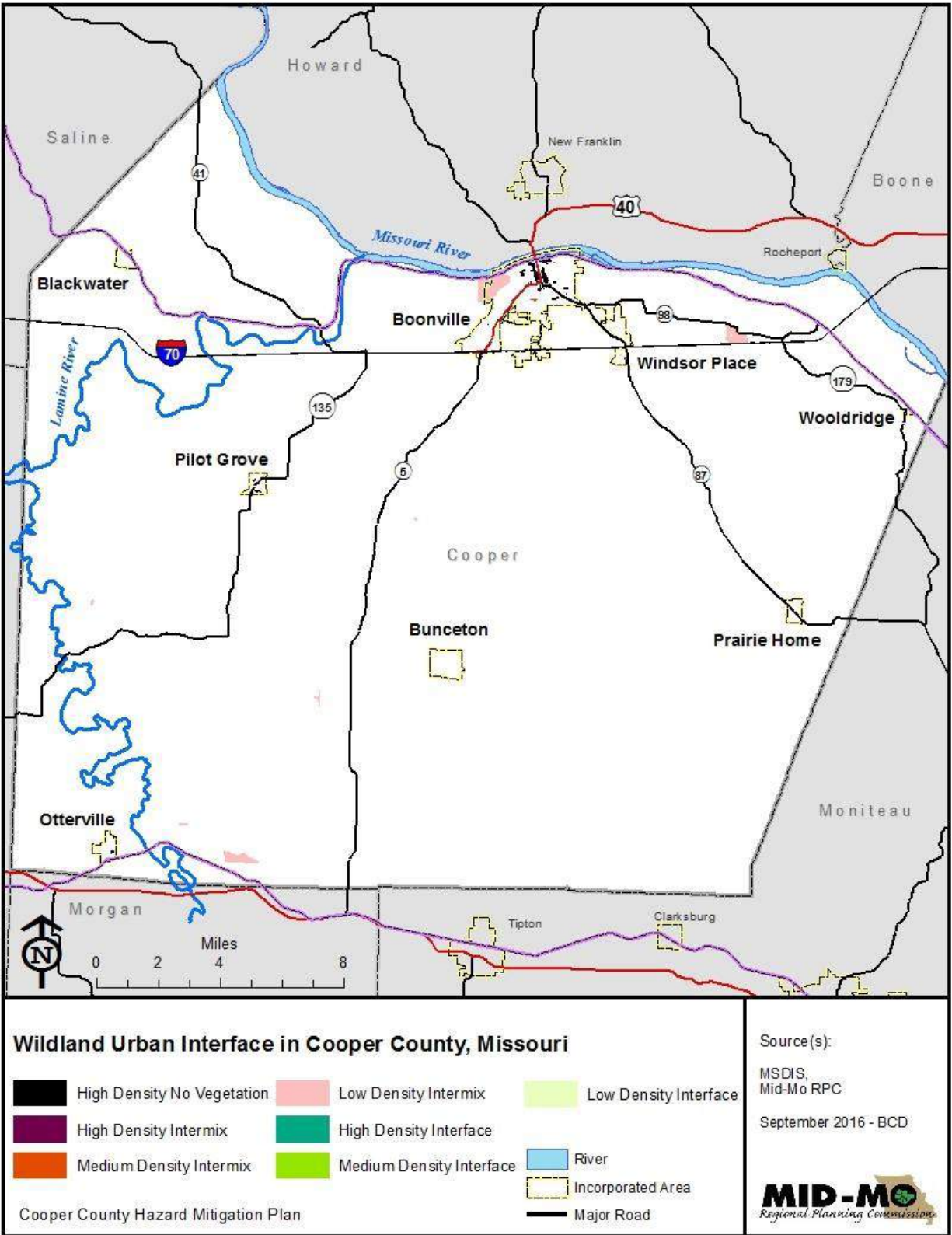
Representatives of the Cooper County Fire Department reported that the annual burning of agricultural fields is also a major contributor to wildfires.

The Wildland Urban Interface (WUI) is defined as “the area where structures and other human development meet or intermingle with undeveloped wildland” in a 2001 Federal Register report. There is a higher risk scenario for wildfire in these areas where high fuel loads and structures meet or overlap.

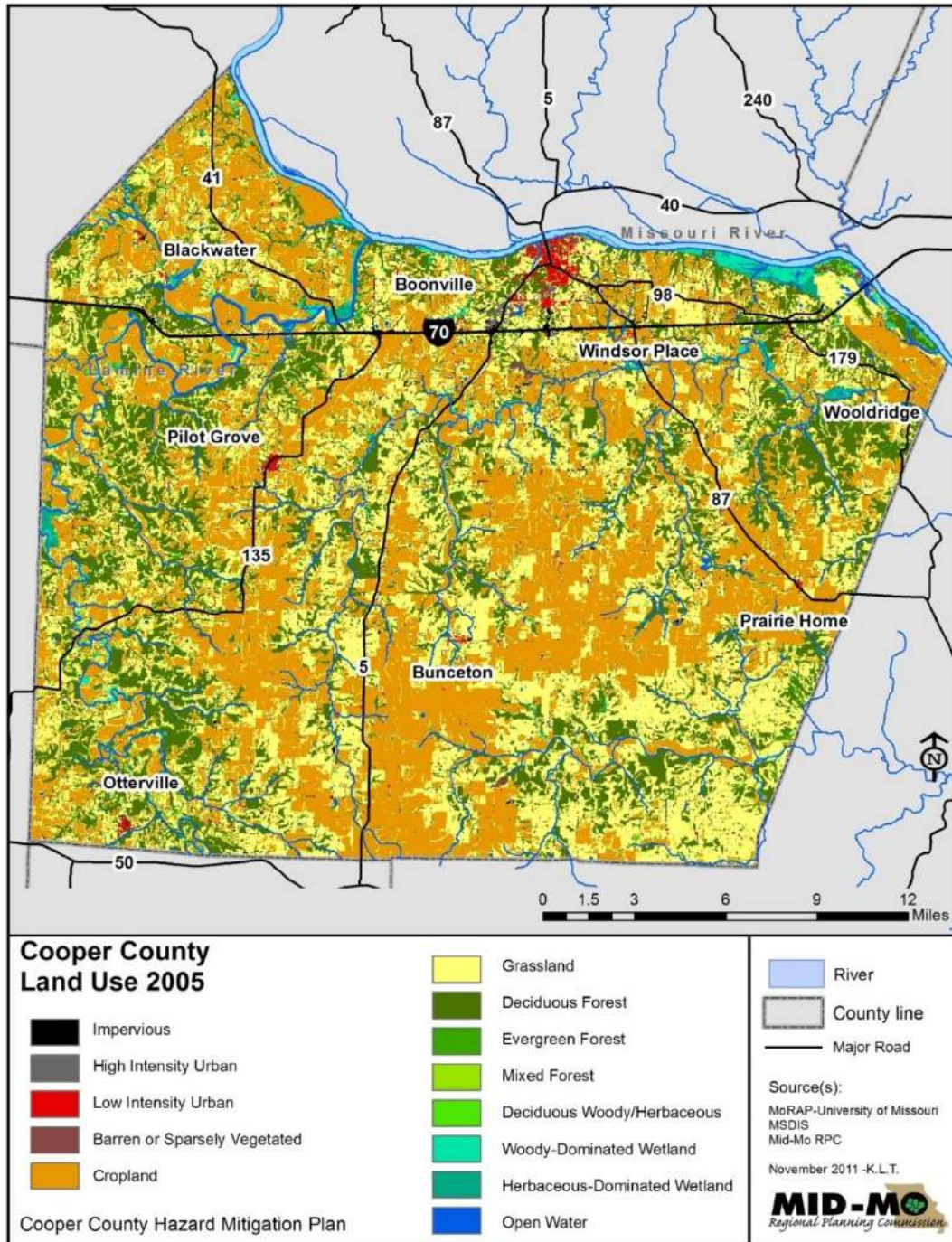
A Wildland Urban Interface (WUI) map (Map 3.22) does not depict any high-risk areas due to the lack of heavy forested areas and intense farming practices. A map of agricultural land throughout the county will be used to highlight those areas that have been classified as being the highest risk areas (Map 3.23).



Map 3.22 Cooper County WUI



Map 3.23 Cooper County Land Use



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

Most fires in the planning area are brush fires which are usually dealt with in less than a few hours.

### **Previous Occurrences**

The late 1970s and early 1980s there were many wildfire across the state of Missouri. However, large and widespread wildfires, such as occur in the western United States, have not been a problem in the planning area in recent history.

### **Probability and Severity of Future Occurrences**

Probability: low

Severity: low

The probability of wildfires increases during conditions of excessive heat, dryness, and drought. The probability is also higher in spring and late fall. The Missouri State Hazard Mitigation Plan points out that the probability of wildfires may increase to high during conditions of excessive heat, dryness, and drought. The probability is also higher in spring and late fall.

### **Changing Future Conditions Considerations**

Raising temperatures and more sporadic rains with longer periods of dry between rain events could affect vegetation and the number of days prescribed burns can safely be performed. With increased rainfall can be expected to come an abundance of plant growth that won't be able to be renewed with less prescribed burns making more fuel for fires that potentially get out of control. An increase in droughts and dry vegetation not only in the forest but around homes in the form of depleted landscaping material creates heightened risk for structures to overtaken by wildfires.

## **VULNERABILITY**

### **Vulnerability Overview**

#### **Potential Impact - Existing Structures**

While wildfires in the central Missouri area have the potential to destroy buildings, data from the entire Mid-Missouri RPC region indicates that this is more the exception than the rule. Wildfires are usually quickly suppressed, and the damage to the built environment is minimal.

The Missouri State Hazard Mitigation Plan 2010 estimates that Cooper County has a low potential for wildfire occurrence (4-year average of 23.4 occurrences a year) and a medium potential for the amount of acres that could burn (4-year average of 213 acres burned a year).

## **Potential Impact - Future Development**

Potential impacts of this hazard on future development are not quantifiable with the resources available.

## **Hazard Summary by Jurisdiction**

Wildfires in Cooper County tend to be limited in their spatial extent, thus minimizing their impact. According to the Missouri Department of Conservation, 49 percent of all wildfires in Missouri result from debris burning that gets out of hand and starts a wildfire. People and structures in the path of a wildfire are all at risk of minimum to extensive damage. Wildfire is defined as an uncontrolled fire that destroys forests and many other types of vegetation, as well as animal species.

While wildfires occur on a regular basis, they are usually easily suppressed by a quick response from the fire districts and thus limited in their spread and destruction.

The use of Red Flag Days by fire and public works departments notifies the public of heightened fire risk. Emergency response systems, well-trained fire departments, and numerous county roads improve response times to fire events, thus decreasing the chances of fire spread.

## **Problem Statement**

Wildfire is not a major threat in the planning area; however, all participating jurisdictions are potentially vulnerable. The threat is greatest in unincorporated Cooper County but jurisdictions with or near significant Wildland Urban Interface also have a heightened risk.

While wildfires occur on a regular basis, they are usually easily suppressed by a quick response from the fire districts and thus limited in their spread and destruction.

**Chapter 4: Mitigation Strategy**

- 4.1 Goals.....208
- 4.2 Identification and Analysis of Mitigation Actions.....208
- 4.3 Implementation of Mitigation Actions.....211

## Chapter 4: Mitigation Strategy

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

This section presents the mitigation strategy updated by the Mitigation Planning Committee based on the updated risk assessment. 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.

The original Project Steering Committee (2003-2004) was charged with developing a comprehensive range of mitigation actions to promote the agreed upon mitigation goals. Objectives were defined under each goal and the mitigation actions were then developed to promote each objective. The following six categories of mitigation were considered in developing the mitigation actions:

- **Prevention tools** - regulatory methods such as planning and zoning, building regulations, open space planning, land development regulations, and storm water management.
- **Property protection measures** - acquisition of land, relocation of buildings, modifying at-risk structures, and flood proofing at-risk structures.
- **Natural resource protection** - erosion and sediment control or wetlands protection.
- **Emergency services measures** – warning systems, response capacity, critical facilities protection, and health and safety maintenance.
- **Structural mitigation** - reservoirs, levees, diversions, channel modifications and storm sewers.
- **Public information** - providing hazard maps and information, outreach programs, real estate disclosure, technical assistance and education.

## 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.**

The hazard mitigation goals first developed during the 2005 were updated in 2017.

The five county hazard mitigation goals for the Cooper County Hazard Mitigation Plan (2022) are:

- Goal 1: Mitigation Planning - Mitigate effects of future natural hazards throughout the County through public and private cooperation.
- Goal 2: Mitigation Policy - Develop policies that limit the impact of natural hazards on lives and property.
- Goal 3: Mitigation Programs - Implement cost effective and feasible mitigation programs to protect lives and property of Cooper County jurisdictions.
- Goal 4: Public Awareness - Increase public awareness of natural hazards in order to make the public a greater partner in hazard mitigation planning.
- Goal 5: Future Development - Promote hazard-proof development in the jurisdictions of Cooper 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.**

### Update of Mitigation Actions

The Planning Committee were given lists of their previous action items at meeting #2 to be reviewed and evaluated. They were encouraged to review the details of the risk assessment vulnerability analysis specific to their jurisdiction.

The 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. In order to ensure that there was a comprehensive mitigation approach to each hazard the MPC reviewed the following information:

- 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.

Meeting #3 of the 2021 update, the actions in the plan were reviewed by the planning committee and categorized as follows:

- Completed with a description of the progress.
- Remove-some uncompleted actions were removed from the strategy action plan for various reasons.
- On-going with a description of the progress.

Many of the 2016 actions were kept in the 2021 strategy action plan either because they have not yet been completed or because they are ongoing actions which the committee wanted to highlight in the overall plan.

**Table 4.1 Action Status Summary**

| <b>Jurisdiction</b>  | <b>Completed Actions</b> | <b>Continuing Actions (ongoing or modify)</b> | <b>Deleted Actions</b> |
|----------------------|--------------------------|---|------------------------|
| <b>Cooper County</b> | 5                        | 11  | 13                     |
| <b>Blackwater</b>    | 0                        | 5   | 12                     |
| <b>Boonville</b>     | 2                        | 3   | 12                     |
| <b>Bunceton</b>      | 0                        | 2   | 15                     |
| <b>Otterville</b>    | 2                        | 2   | 15                     |
| <b>Pilot Grove</b>   | 0                        | 4   | 13                     |
| <b>Prairie Home</b>  | 0                        | 5   | 11                     |
| <b>Windsor Place</b> | 0                        | 1   | 14                     |



|                                     |            |            |            |
|-------------------------------------|------------|------------|------------|
| <b>Wooldridge</b>                   | <b>0</b>   | <b>2</b>   | <b>12</b>  |
| <b>Blackwater Area FPD</b>          | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |
| <b>Cooper Co. FPD</b>               | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |
| <b>Otterville FPD</b>               | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |
| <b>Pilot Grove FPD</b>              | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |
| <b>Blackwater School District</b>   | <b>0</b>   | <b>2</b>   | <b>2</b>   |
| <b>Boonville School District</b>    | <b>0</b>   | <b>1</b>   | <b>6</b>   |
| <b>Cooper Co. R-IV</b>              | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |
| <b>Otterville School District</b>   | <b>4</b>   | <b>0</b>   | <b>1</b>   |
| <b>Pilot Grove C-4</b>              | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |
| <b>Prairie Home School District</b> | <b>5</b>   | <b>0</b>   | <b>3</b>   |
| <b>State Fair Community College</b> | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |

Entities showing N/A did not participate or provide action items in the last update, thus not having any to look back on.

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

| <b>Completed Actions</b>                     | <b>Completion Details (date, amount, funding source)</b> |
|--|--|
| Identify low water crossings                 | Done by Mid-MO RPC                                       |
| Equip buses with multi-channel radios        | Schools do this  |
| Shelters have alternative heating sources    | Designated shelters have this                            |
| Secondary water connections                  | County water supply has this                             |
| Additional pumping stations                  | Levee district has installed those                       |
| Implement mechanisms to foster collaboration | Mutual Aid Agreements                                    |
| Provide Backup Power                         | Boonville has this                                       |

| Deleted Actions                                  | Reason for Deletion           |
|--|-------------------------------|
| Shelter Agreements                               | Job of Jurisdiction           |
| Encourage utility right of way maintenance       | Utilities do this already     |
| Mutual agreements between utilities              | Out of scope                  |
| Annual review of school plans                    | Not measurable                |
| Encourage participation in earthquake day        | Not measurable                |
| Continue inspecting infrastructure               | Not measurable                |
| Continue to participate in mutual aid agreements | Not measurable                |
| Alternative fuel sites                           | Out of scope                  |
| Annual infrastructure access                     | Not feasible                  |
| Remove combustible vegetation                    | Out of scope                  |
| Review evacuation routes                         | Not measurable                |
| Discourage development near sinkholes            | Out of scope                  |
| Acquire destroyed properties                     | Out of Scope                  |
| Build FEMA rated saferoom                        | Not feasible for jurisdiction |

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

### 4.3 Implementation of Mitigation Actions

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

Jurisdictional MPC members were encouraged to meet with members of their community to finalize actions to be submitted for the updated mitigation strategy. The Disaster Mitigation Act requires benefit-cost review as the primary method by which mitigation projects should be prioritized. The committee was asked to take this into account when discussing actions for their jurisdiction. It was decided that projects will be prioritized by when and where damage occurs, available funding, and political will. Details of projects at the planning stage are not in-depth benefit/cost reviews and further details will be refined as there is project development.

#### STAPLEE AND BENEFIT/COST REVIEWS

**STAPLEE Review** – The process for selecting and prioritizing action items did not change for the update. The Planning Committee conducted a STAPLEE review of the ongoing and possible new mitigation actions using key questions for each of the STAPLEE categories:

**Table 4.3 Blank STAPLEE Worksheet**

| <b>STAPLEE Worksheet</b>  |  |              |
|---|--|--------------|
| <b>Name of Jurisdiction:</b>  |  |              |
| <b>Action or Project</b>  |  |              |
| <b>Action/Project Number:</b>   | Insert a unique action number for this action for future tracking purposes. This can be a combination of the jurisdiction name, followed by the goal number and action number (i.e. Joplin1.1) |              |
| <b>Name of Action or Project:</b>   |  |              |
| <b>Mitigation Category:</b>   | Prevention; Structure and Infrastructure Projects; Natural Systems Protection; Education and Outreach; Emergency Services  |              |
| <b>STAPLEE Criteria</b>   | <b>Evaluation Rating</b><br>Definitely YES = 3 Maybe YES = 2<br>Probably NO = 1 Definitely NO = 0  | <b>Score</b> |
| <b>S:</b> Is it <b>Socially</b> Acceptable  |  |              |
| <b>T:</b> Is it <b>Technically</b> feasible and potentially successful?                                 |  |              |
| <b>A:</b> Does the jurisdiction have the <b>Administrative</b> capacity to execute this action?         |  |              |
| <b>P:</b> Is it <b>Politically</b> acceptable?  |  |              |
| <b>L:</b> Is there <b>Legal</b> authority to implement?   |  |              |
| <b>E:</b> Is it <b>Economically</b> beneficial?   |  |              |
| <b>E:</b> Will the project have either a neutral or positive impact on the natural <b>Environment</b> ? |  |              |
| Will historic structures be saved or protected?   |  |              |
| Could it be implemented quickly?  |  |              |
| <b>STAPLEE SCORE</b>  |  |              |
| <b>Mitigation Effectiveness Criteria</b>  | <b>Evaluation Rating</b>   | <b>Score</b> |
| Will the implemented action result in lives saved?  | Assign from 5-10 points based on the likelihood that lives will be saved.  |              |
| Will the implemented action result in a reduction of disaster damages?                                  | Assign from 5-10 points based on the relative reduction of disaster damages.   |              |
| <b>MITIGATION EFFECTIVENESS SCORE</b>   |  |              |
| <b>TOTAL SCORE</b><br>(STAPLEE + Mitigation Effectiveness)  |  |              |

|   |  |  |
|---|--|--|
| <input type="checkbox"/> <b>High Priority</b><br>(30+ points) | <input type="checkbox"/> <input type="checkbox"/> <b>Medium Priority</b><br>(25 - 29 points) | <input type="checkbox"/> <b>Low Priority</b><br>(<25 points) |
|---|--|--|

Completed by \_\_\_\_\_  
(Name, Title, Phone Number)

After the actions were evaluated, the following formula was used to calculate the percentage of points scored out of points available for each individual action: % score = (total points/total of applicable criteria) \* 100

### **Benefit/Cost Review**

The benefit of each action was evaluated by awarding two (2) points for each of the following *avoided* damages (8 points maximum = highest benefit):

- Injuries and/or casualties (IC)
- Property damages (PD)
- Loss-of-function (LF) – includes loss of utility services, impact of road/bridge closures, loss of income, cost of displacement
- Emergency management costs/community costs (EM)

The cost of each action was according to the following scale (-4 points maximum = highest cost):

- Already in place or easily put into work program (-1)
- Low/moderate cost – could be worked into operating budget (-2)
- Moderate/high cost –help with funding possibly needed depending on specifics of project (-3)
- High cost – outside help with funding definitely needed (-4)

### **Prioritization**

The Planning Committee reviewed the % STAPLEE score and benefit/cost review for all of the actions and prioritized them according to the following scale:

- High – Work should begin as soon as possible; action should be accomplished in the next 5 years
- Medium – Work could begin within the next 5 years, if time and resources allow
- Low – Long-range goal, if time and resources allow; work within the next 5 years is possible but not probable

It was understood that some of these priorities might be changed by the individual jurisdictions due to funding or staffing constraints as they developed their plans for action implementation.

It should be noted that a number of high priority actions scored somewhat low on both the STAPLEE review and the benefit/cost review due to their high cost which figures into both reviews. These actions remain a high priority with the hope that funding will become available. The mitigation actions suggested for the specific participating jurisdictions were handed over to the representatives or governing bodies of those jurisdictions for implementation and administration decisions.

It was recognized that participating jurisdictions might choose to either change the prioritization of or exclude some suggested mitigation actions based on current specifics of time, resources, and capabilities. In addition, new mitigation actions might be added based on specific issues.

The mitigation actions for which each participating jurisdiction is the lead are shown in the following pages. The Cooper County Office of Emergency Management is the lead on many actions which mitigate hazards for the entire planning area.

## Cooper County

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Cooper County  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)  |
| <b>Problem Being Mitigated</b>                   | Losses from flooding   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 2  |
| <b>Action/Prj. #</b>                             | 1.1.1  |
| <b>Name of Action or Project</b>                 | NFIP Continued Compliance  |
| <b>Action or Project Description</b>             | Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping. |
| <b>Estimated Cost</b>                            | Little or no cost (<\$10,000)  |
| <b>Benefits</b>                                  | Ensure future development is in a safe area.   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Floodplain Administrator   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Continued/2025   |
| <b>Potential Funding Source</b>                  | City General revenue   |
| <b>Local Planning Mechanism to be Used</b>       | Floodplain ordinance   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Ongoing  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Schools ability to resume activities  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | Goal 1: Mitigation Planning   |
| <b>Action/Prj. #</b>                             | <b>1.1.2</b>  |
| <b>Name of Action or Project</b>                 | Continuity of School Operation Plan   |
| <b>Action or Project Description</b>             | The participating School Districts will develop a emergency plan to ensure regular activities resume after an emergency as quickly as possible. |
| <b>Estimated Cost</b>                            | Less than \$10,000  |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs                  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | School Districts, Cooper County   |
| <b>Action / Project Staplee Score / Priority</b> | HIGH  |
| <b>Timeline for Completion</b>                   | Other   |
| <b>Potential Funding Source</b>                  | Internal, planning grants   |
| <b>Local Planning Mechanism to be Used</b>       | Local School Districts  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | Ongoing   |
| <b>Report on Progress</b>                        | Not started   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Loss of power at critical facilities   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Programs  |
| <b>Action/Prj. #</b>                             | <b>1.1.3</b>   |
| <b>Name of Action or Project</b>                 | Back-up Power supply   |
| <b>Action or Project Description</b>             | Establish portable back-up power supply with generators to critical County facilities as resources become available.           |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County EMA, Local jurisdiction  |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | 2-3 years  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | County Government & Cooper EMA   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | In progress - Some have been implemented   |



| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Safe shelters at camping & mobile home parks   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Programs  |
| <b>Action/Prj. #</b>                             | <b>1.1.4</b>   |
| <b>Name of Action or Project</b>                 | RV & Mobile Home Shelters  |
| <b>Action or Project Description</b>             | Recommend camping facilities and mobile home parks to have safe rooms on premise. Help with planning and implementation as resources become available. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs                         |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County EMA  |
| <b>Action / Project Staplee Score / Priority</b> | Medium   |
| <b>Timeline for Completion</b>                   |  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | Community & County Government  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | NO PROGRESS MADE DUE TO LACK OF FUNDING  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Tornado Safe Rooms   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Programs  |
| <b>Action/Prj. #</b>                             | <b>1.1.5</b>   |
| <b>Name of Action or Project</b>                 | Build a tornado safe room  |
| <b>Action or Project Description</b>             | Develop a plan to build tornado safe rooms in high population and public event areas throughout the county and implement the plan as resources become available. |
| <b>Estimated Cost</b>                            | Over \$1,000,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs                                   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County EMA  |
| <b>Action / Project Staplee Score / Priority</b> | Medium   |
| <b>Timeline for Completion</b>                   | More than 5 years  |
| <b>Potential Funding Source</b>                  | Local, Federal and State   |
| <b>Local Planning Mechanism to be Used</b>       | Community & County Governments   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | No Progress  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Emergency evacuation sites for schools   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Programs  |
| <b>Action/Prj. #</b>                             | <b>1.1.6</b>   |
| <b>Name of Action or Project</b>                 | Alternative Placement Sites (Safe Houses)  |
| <b>Action or Project Description</b>             | Create a system of temporary alternative placement sites ("safehouses") for temporary emergency evacuation and shelter of school populations and implement the plan as resources become available. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | School Districts, Cooper County EMA  |
| <b>Action / Project Staplee Score / Priority</b> | Medium   |
| <b>Timeline for Completion</b>                   | More than 5 years  |
| <b>Potential Funding Source</b>                  | Federal and State  |
| <b>Local Planning Mechanism to be Used</b>       | School Districts   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | No Progress  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Cooper County   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)   |
| <b>Problem Being Mitigated</b>                   | Damage to roadways & infrastructure   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Programs   |
| <b>Action/Prj. #</b>                             | <b>1.1.7</b>  |
| <b>Name of Action or Project</b>                 | Roadway improvement to reduce flood damage  |
| <b>Action or Project Description</b>             | Improve roadways susceptible to damage due to heavy rain and flooding reducing future costs to repair damage as well as keep public access open for emergency response vehicles and commerce. Implement the plan as resources become available. |
| <b>Estimated Cost</b>                            | Over \$1,000,000  |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs, ensure access to residents by emergency responders.   |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Cooper County Road & Bridge   |
| <b>Action / Project Staplee Score / Priority</b> | HIGH  |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | Local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | County Government, Cooper County EMA  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)  |
| <b>Problem Being Mitigated</b>                   | Low Water Crossing Safety  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Policy  |
| <b>Action/Prj. #</b>                             | <b>1.1.8</b>   |
| <b>Name of Action or Project</b>                 | Reduce number of low water crossings   |
| <b>Action or Project Description</b>             | Reduce number of low water crossings on Cooper County roadways by building bridges or culverts to carry the water under the roadway. Implement this action when funding becomes available. |
| <b>Estimated Cost</b>                            | \$500,000 to \$1,000,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County Road and Bridge Department   |
| <b>Action / Project Staplee Score / Priority</b> | HIGH   |
| <b>Timeline for Completion</b>                   | More than 5 years  |
| <b>Potential Funding Source</b>                  | Local, state, federal  |
| <b>Local Planning Mechanism to be Used</b>       | County Government & EMA  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | KEEP - Modify  |
| <b>Report on Progress</b>                        | Ongoing: Not complete due to lack of funding   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Wildfire  |
| <b>Problem Being Mitigated</b>                   | Fire Fighting Water Supply  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Programs   |
| <b>Action/Prj. #</b>                             | <b>1.1.9</b>  |
| <b>Name of Action or Project</b>                 | Install hydrants  |
| <b>Action or Project Description</b>             | Install dry hydrants and/or standard hydrants as needed throughout the county and implement the plan as resources become available. |
| <b>Estimated Cost</b>                            | \$50,000 to \$100,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs      |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Cooper County Cooper County EMA, Fire Departments   |
| <b>Action / Project Staplee Score / Priority</b> | HIGH  |
| <b>Timeline for Completion</b>                   | Other   |
| <b>Potential Funding Source</b>                  | Private, Local, Federal, and State  |
| <b>Local Planning Mechanism to be Used</b>       | Fire Districts  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | Ongoing   |
| <b>Report on Progress</b>                        | Some progress, ongoing program.   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Levee Failure   |
| <b>Problem Being Mitigated</b>                   | Levee Failure   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | Goal 5: Future Development  |
| <b>Action/Prj. #</b>                             | <b>1.1.10</b>   |
| <b>Name of Action or Project</b>                 | Widen/improve Levee System  |
| <b>Action or Project Description</b>             | Thicken and/or maintain levee as needed to improve capabilities. Cooper County to assist as requested and help to implement the plan as resources become available. |
| <b>Estimated Cost</b>                            | \$500,000 to \$1,000,000  |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs                                      |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Levee Districts, USACE  |
| <b>Action / Project Staplee Score / Priority</b> | HIGH  |
| <b>Timeline for Completion</b>                   | Other   |
| <b>Potential Funding Source</b>                  | Private, State, and Federal   |
| <b>Local Planning Mechanism to be Used</b>       | Local Levee Districts, EOP  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | KEEP - Ongoing  |
| <b>Report on Progress</b>                        | Little or no progress due to extensive levee repair needed after the flood of 2019  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | COOPER COUNTY  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Early Warning  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 4: Public Awareness   |
| <b>Action/Prj. #</b>                             | <b>1.1.11</b>  |
| <b>Name of Action or Project</b>                 | Early Warning Systems  |
| <b>Action or Project Description</b>             | Upgrade early warning weather warning systems. Continue to implement the plan as resources become available.                   |
| <b>Estimated Cost</b>                            | \$50,000 to \$100,000  |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County EMA  |
| <b>Action / Project Staplee Score / Priority</b> | HIGH   |
| <b>Timeline for Completion</b>                   | Other  |
| <b>Potential Funding Source</b>                  | Local, Federal and State   |
| <b>Local Planning Mechanism to be Used</b>       | Cooper County EMA & Communities  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Instituted Nixle 360, replaced warning siren in Bunceton   |



| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Cooper County  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Early warning for severe thunderstorms. Protect life and belongings  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 4  |
| <b>Action/Prj. #</b>                             | 2.1.1  |
| <b>Name of Action or Project</b>                 | Weather Radios   |
| <b>Action or Project Description</b>             | Purchase weather radios for the residents of the jurisdiction to make them aware of other severe threats as they come about, even more so with national weather services raising their criteria for severe thunderstorms |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | life preservation  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper Co. EMA, fire districts   |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | local, state and federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP, comp plan   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not Started  |

## Blackwater

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Blackwater   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)  |
| <b>Problem Being Mitigated</b>                   | Losses from flooding   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 2  |
| <b>Action/Prj. #</b>                             | 1.1.1  |
| <b>Name of Action or Project</b>                 | NFIP Continued Compliance  |
| <b>Action or Project Description</b>             | Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping. |
| <b>Estimated Cost</b>                            | Little or no cost (<\$10,000)  |
| <b>Benefits</b>                                  | Ensure future development is in a safe area.   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Floodplain Administrator   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Continued/2025   |
| <b>Potential Funding Source</b>                  | City General revenue   |
| <b>Local Planning Mechanism to be Used</b>       | Floodplain ordinance   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Ongoing  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Blackwater   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Loss of power at critical facilities   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Programs  |
| <b>Action/Prj. #</b>                             | <b>1.1.3</b>   |
| <b>Name of Action or Project</b>                 | Back-up Power supply   |
| <b>Action or Project Description</b>             | Establish portable back-up power supply with generators to critical County facilities as resources become available.           |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County EMA, Local jurisdiction  |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | 2-3 years  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | County Government & Cooper EMA, annual budget  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Blackwater  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Loss of life from tornados  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 1.1.5   |
| <b>Name of Action or Project</b>                 | Tornado Safe Room   |
| <b>Action or Project Description</b>             | Build a tornado safe room. There is a great need in the City as well as in the School district and surrounding community to be able to have a place to get away from modular homes. |
| <b>Estimated Cost</b>                            | > \$500,000   |
| <b>Benefits</b>                                  | I/C, EMCC   |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | EMA, School District, City Administration   |
| <b>Action / Project Staplee Score / Priority</b> | High Priority   |
| <b>Timeline for Completion</b>                   | More than 5 years   |
| <b>Potential Funding Source</b>                  | Federal and State   |
| <b>Local Planning Mechanism to be Used</b>       | Budget Process, Comprehensive Planning  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | Ongoing   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Blackwater   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Save lives through early warning                               |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 4  |
| <b>Action/Prj. #</b>                             | 1.1.11   |
| <b>Name of Action or Project</b>                 | Siren/Early Warning upgrades                                   |
| <b>Action or Project Description</b>             | Continue to maintain and upgrade early weather warning systems |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000   |
| <b>Benefits</b>                                  | Ensure early warning systems work to alert citizens            |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Public Works Director  |
| <b>Action / Project Staplee Score / Priority</b> | Medium   |
| <b>Timeline for Completion</b>                   | 2025   |
| <b>Potential Funding Source</b>                  | City general revenue, gaming funds, CIP funds                  |
| <b>Local Planning Mechanism to be Used</b>       | Public works, City Council, annual budget                      |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Blackwater   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Early warning for severe thunderstorms. Protect life and belongings  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 4  |
| <b>Action/Prj. #</b>                             | 2.1.1  |
| <b>Name of Action or Project</b>                 | Weather Radios   |
| <b>Action or Project Description</b>             | Purchase weather radios for the residents of the jurisdiction to make them aware of other severe threats as they come about, even more so with national weather services raising their criteria for severe thunderstorms |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | life preservation  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Blackwater Administration  |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | local, state and federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP, comp plan   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Blackwater  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | All   |
| <b>Problem Being Mitigated</b>                   | Fuel shortages during disasters   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | <b>2.1.2</b>  |
| <b>Name of Action or Project</b>                 | Fueling station   |
| <b>Action or Project Description</b>             | Need for additional fueling sites for emergency vehicles, especially when flooding or other events occur that may block roadways and cause lengthy detours. |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000  |
| <b>Benefits</b>                                  | I/C, PD, LF, EMCC   |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Blackwater, County EDA group  |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local and private   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP, economic development plan  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | KEEP - Modify   |
| <b>Report on Progress</b>                        | currently working with MFA to get a fueling station within the jurisdiction   |

## Boonville

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Boonville  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)  |
| <b>Problem Being Mitigated</b>                   | Losses from flooding   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 2  |
| <b>Action/Prj. #</b>                             | 1.1.1  |
| <b>Name of Action or Project</b>                 | NFIP Continued Compliance  |
| <b>Action or Project Description</b>             | Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping. |
| <b>Estimated Cost</b>                            | Little or no cost (<\$10,000)  |
| <b>Benefits</b>                                  | Ensure future development is in a safe area.   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Floodplain Administrator   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Continued/2025   |
| <b>Potential Funding Source</b>                  | City General revenue   |
| <b>Local Planning Mechanism to be Used</b>       | Floodplain ordinance   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Ongoing  |



| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Boonville   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Floods, Tornados, Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Facility damage due to storms or floods   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 3.1.2   |
| <b>Name of Action or Project</b>                 | Critical Facility Hardening   |
| <b>Action or Project Description</b>             | Review, prioritize, evaluate and monitor needed upgrades or retrofits for critical buildings and/or infrastructure to harden against natural hazards. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | Ensure buildings and infrastructure is safe and in good working order. Lessen damage costs  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Public Works/ City Administrator  |
| <b>Action / Project Staplee Score / Priority</b> | High  |
| <b>Timeline for Completion</b>                   | More than 5 years   |
| <b>Potential Funding Source</b>                  | City general revenue, gaming funds, CIP funds   |
| <b>Local Planning Mechanism to be Used</b>       | City council, building codes  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | In Progress   |
| <b>Report on Progress</b>                        | Ongoing   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Boonville  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Save lives through early warning                               |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 4  |
| <b>Action/Prj. #</b>                             | 1.1.11   |
| <b>Name of Action or Project</b>                 | Siren/Early Warning upgrades                                   |
| <b>Action or Project Description</b>             | Continue to maintain and upgrade early weather warning systems |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000   |
| <b>Benefits</b>                                  | Ensure early warning systems work to alert citizens            |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Public Works Director  |
| <b>Action / Project Staplee Score / Priority</b> | Medium   |
| <b>Timeline for Completion</b>                   | 2025   |
| <b>Potential Funding Source</b>                  | City general revenue, gaming funds, CIP funds                  |
| <b>Local Planning Mechanism to be Used</b>       | Public works, City Council, annual budget                      |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Boonville   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Floods, Tornados, Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Facility damage due to storms or floods   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 3.1.3   |
| <b>Name of Action or Project</b>                 | Critical Utility Inventory  |
| <b>Action or Project Description</b>             | Inventory critical utility infrastructure such as water lines, sewer and stormwater lines, into digital arcmap files for quicker use in an emergency and data resiliency in the event of major destruction. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | Faster response to utility outages and resilient data   |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Public Works/ City Administrator  |
| <b>Action / Project Staplee Score / Priority</b> | High  |
| <b>Timeline for Completion</b>                   | More than 5 years   |
| <b>Potential Funding Source</b>                  | City general revenue, gaming funds, CIP funds   |
| <b>Local Planning Mechanism to be Used</b>       | City council, IT policy, COOP planning  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not started   |

| <b>Action Worksheet</b>  |   |
|--|---|
| <b>Name of Jurisdiction:</b>   | Boonville   |
| <b>Risk / Vulnerability</b>  |   |
| <b>Hazard(s) Addressed:</b>  | Flooding, Flash Flooding  |
| <b>Problem being Mitigated:</b>  | Damaged infrastructure  |
| <b>Action or Project</b>   |   |
| <b>Applicable Goal Statement:</b>                                      | Goal 5  |
| <b>Action/Project Number:</b>  | 3.1.4   |
| <b>Name of Action or Project:</b>                                      | Bridge Improvements   |
| <b>Mitigation Category:</b>  | Prevention; Structure and Infrastructure  |
| <b>Action or Project Description:</b>                                  | Fix bridges to prevent further erosion damage due to high rain waters.              |
| <b>Estimated Cost:</b>   | 100,000-1,000,000   |
| <b>Benefits:</b>   | System hardening and resiliency against future flooding for critical infrastructure |
| <b>Plan for Implementation</b>   |   |
| <b>Responsible Organization/Department:</b>                            | City of Boonville, Cooper County public works/road and bridge dep                   |
| <b>Supporting Organization/Department:</b>                             | Administration, Public Works  |
| <b>Action/Project Priority:</b>  | H   |
| <b>Timeline for Completion:</b>  | 5 years   |
| <b>Potential Fund Sources:</b>   | MoDOT cost share, BRIC, HMGP  |
| <b>Local Planning Mechanisms to be Used in Implementation, if any:</b> | Regional Transportation Plan, Comprehensive Plan, HMP                               |
| <b>Progress Report</b>   |   |
| <b>Action Status:</b>  | New   |
| <b>Report of Progress:</b>   |   |

## Bunceton

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Bunceton   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)  |
| <b>Problem Being Mitigated</b>                   | Losses from flooding   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 2  |
| <b>Action/Prj. #</b>                             | 1.1.1  |
| <b>Name of Action or Project</b>                 | NFIP Continued Compliance  |
| <b>Action or Project Description</b>             | Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping. |
| <b>Estimated Cost</b>                            | Little or no cost (<\$10,000)  |
| <b>Benefits</b>                                  | Ensure future development is in a safe area.   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Floodplain Administrator   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Continued/2025   |
| <b>Potential Funding Source</b>                  | City General revenue   |
| <b>Local Planning Mechanism to be Used</b>       | Floodplain ordinance   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Ongoing  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Bunceton   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | power source   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 1.1.3  |
| <b>Name of Action or Project</b>                 | Generator  |
| <b>Action or Project Description</b>             | the generator would be used for backup power when there is no electricity for the community water supply |
| <b>Estimated Cost</b>                            | Less than \$10,000   |
| <b>Benefits</b>                                  | water supply   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Bunceton Public works  |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Local, state and federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        |  |

# Otterville

| Action Worksheet                          |  |
|---|--|
| Name of Jurisdiction                      | Otterville   |
| Risk / Vulnerability                      |  |
| Hazard(s) Addressed                       | Extreme Temperatures                               |
| Problem Being Mitigated                   | Damage to lives from extreme temperatures          |
| Action or Project                         |  |
| Applicable Goal Statement                 | 1  |
| Action/Prj. #                             | 5.1.1  |
| Name of Action or Project                 | Heating and Cooling Shelter                        |
| Action or Project Description             | Identify and/or build a shelter for extreme temps. |
| Estimated Cost                            | \$50,000 to \$100,000                              |
| Benefits                                  | I/C, PD, LF, EMCC                                  |
| Plan for Implementation                   |  |
| Responsible Organization / Department     | City Administration                                |
| Action / Project Staplee Score / Priority | High Priority                                      |
| Timeline for Completion                   | 3-5 years  |
| Potential Funding Source                  | Local, Federal, State                              |
| Local Planning Mechanism to be Used       | Annual Budget, Comprehensive Planning              |
| Action Status                             |  |
| Status                                    | In Progress  |
| Report on Progress                        | Not Started  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Otterville  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Loss of life from tornados  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 1.1.5   |
| <b>Name of Action or Project</b>                 | Tornado Safe Room   |
| <b>Action or Project Description</b>             | Build a tornado safe room. There is a great need in the City as well as in the School district and surrounding community to be able to have a place to get away from modular homes. |
| <b>Estimated Cost</b>                            | > \$500,000   |
| <b>Benefits</b>                                  | I/C, EMCC   |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | EMA, School District, City Administration   |
| <b>Action / Project Staplee Score / Priority</b> | High Priority   |
| <b>Timeline for Completion</b>                   | More than 5 years   |
| <b>Potential Funding Source</b>                  | Federal and State   |
| <b>Local Planning Mechanism to be Used</b>       | Budget Process, Comprehensive Planning  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | Ongoing   |
| <b>Report on Progress</b>                        | Not Started   |



| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Otterville  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)   |
| <b>Problem Being Mitigated</b>                   | Losses from flooding  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 2   |
| <b>Action/Prj. #</b>                             | 1.1.1   |
| <b>Name of Action or Project</b>                 | Floodplain Enforcement  |
| <b>Action or Project Description</b>             | Enforce floodplain management ordinances in accordance with NFIP participation. This will include the supplying of updated information to FEMA when Flood Insurance Rate Maps are being edited and revised. |
| <b>Estimated Cost</b>                            | Little or no cost (<\$10,000)   |
| <b>Benefits</b>                                  | Ensure future development is in a safe area.  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Building Inspector  |
| <b>Action / Project Staplee Score / Priority</b> | High  |
| <b>Timeline for Completion</b>                   | Continued/2025  |
| <b>Potential Funding Source</b>                  | City General revenue  |
| <b>Local Planning Mechanism to be Used</b>       | Planning and Zoning, City Council   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | In Progress   |
| <b>Report on Progress</b>                        | Ongoing   |

## Pilot Grove

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Pilot Grove  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)  |
| <b>Problem Being Mitigated</b>                   | Losses from flooding   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 2  |
| <b>Action/Prj. #</b>                             | 1.1.1  |
| <b>Name of Action or Project</b>                 | NFIP Continued Compliance  |
| <b>Action or Project Description</b>             | Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping. |
| <b>Estimated Cost</b>                            | Little or no cost (<\$10,000)  |
| <b>Benefits</b>                                  | Ensure future development is in a safe area.   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Floodplain Administrator   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Continued/2025   |
| <b>Potential Funding Source</b>                  | City General revenue   |
| <b>Local Planning Mechanism to be Used</b>       | Floodplain ordinance   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Ongoing  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Pilot Grove   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | outdoor hazard vulnerable to tornadoes  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | 1.1.11  |
| <b>Name of Action or Project</b>                 | Outdoor Siren   |
| <b>Action or Project Description</b>             | Add additional outdoor sirens as the warnings cannot be heard outside from one side of jurisdiction to the other during warnings. |
| <b>Estimated Cost</b>                            | Less than \$10,000  |
| <b>Benefits</b>                                  | life preservation   |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Pilot Grove Administration  |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state and federal  |
| <b>Local Planning Mechanism to be Used</b>       | HMP, Comp Plan  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Pilot Grove  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Early warning for severe thunderstorms. Protect life and belongings  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 4  |
| <b>Action/Prj. #</b>                             | 2.1.1  |
| <b>Name of Action or Project</b>                 | Weather Radios   |
| <b>Action or Project Description</b>             | Purchase weather radios for the residents of the jurisdiction to make them aware of other severe threats as they come about, even more so with national weather services raising their criteria for severe thunderstorms |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | life preservation  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Pilot Grove Administration   |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | local, state and federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP, comp plan   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Pilot Grove   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | provide safe location for those in jurisdiction during tornado                            |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 1.1.5   |
| <b>Name of Action or Project</b>                 | Safe Room   |
| <b>Action or Project Description</b>             | in need of a safe room for those within the jurisdiction to go during threat of tornadoes |
| <b>Estimated Cost</b>                            | Over \$1,000,000  |
| <b>Benefits</b>                                  | life preservation   |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Pilot Grove Administration  |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | More than 5 years   |
| <b>Potential Funding Source</b>                  | local, state and federal  |
| <b>Local Planning Mechanism to be Used</b>       | HMP, comp plan  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Pilot Grove   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms  |
| <b>Problem Being Mitigated</b>                   | provide electricity to critical infrastructures   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | 1.1.3   |
| <b>Name of Action or Project</b>                 | Generator   |
| <b>Action or Project Description</b>             | Purchase backup generator to provide electricity to our maintenance facility during power outages |
| <b>Estimated Cost</b>                            | \$50,000 to \$100,000   |
| <b>Benefits</b>                                  | critical infrastructure/services support  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Pilot Grove Administration/public works   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state and federal  |
| <b>Local Planning Mechanism to be Used</b>       | HMP, comp plan, coop plan   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

## Prairie Home

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | City of Prairie Home                                      |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Winter Weather                                     |
| <b>Problem Being Mitigated</b>                   | Lack of back-up power to all critical infrastructure      |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | 1.1.3   |
| <b>Name of Action or Project</b>                 | Back-Up Generator   |
| <b>Action or Project Description</b>             | Provide for back-up power to all critical infrastructure. |
| <b>Estimated Cost</b>                            | \$50,000 to \$100,000                                     |
| <b>Benefits</b>                                  | Reduce displacement impacts, community costs.             |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | County and City public works                              |
| <b>Action / Project Staplee Score / Priority</b> | Medium  |
| <b>Timeline for Completion</b>                   | More than 5 years   |
| <b>Potential Funding Source</b>                  | Federal, State, County, City                              |
| <b>Local Planning Mechanism to be Used</b>       | MidMoRPC, MRWA, building codes                            |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | Ongoing   |
| <b>Report on Progress</b>                        | In Progress   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | City of Prairie Home   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes, thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Lack of early warning weather systems.                           |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 4  |
| <b>Action/Prj. #</b>                             | 1.1.11   |
| <b>Name of Action or Project</b>                 | Upgrade Warning Systems  |
| <b>Action or Project Description</b>             | Maintain and upgrade early warning weather warning systems.      |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | Reduce injuries/casualties, property damage, displacement costs. |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | County and City public works                                     |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | More than 5 years  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | Budget process, comp plan, coop plan                             |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | In Progress  |



| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | City of Prairie Home   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Wildfire   |
| <b>Problem Being Mitigated</b>                   | Lack of standard hydrants for fire                               |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 5  |
| <b>Action/Prj. #</b>                             | 7.1.1  |
| <b>Name of Action or Project</b>                 | Upgrade Hydrants   |
| <b>Action or Project Description</b>             | Upgrade hydrants and piping to meet fire flow                    |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | Reduce injuries/casualties, property damage, displacement costs. |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | City public works  |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | MidMoRPC   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | In Progress  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | City of Prairie Home   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Winter Weather, tornado, thunderstorm/lightning   |
| <b>Problem Being Mitigated</b>                   | Lack of secondary water supply sources   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 7.1.2  |
| <b>Name of Action or Project</b>                 | Secondary Water Supply Sources   |
| <b>Action or Project Description</b>             | Create secondary water supply sources through interconnections or agreements in case of major damage to main system. |
| <b>Estimated Cost</b>                            | \$50,000 to \$100,000  |
| <b>Benefits</b>                                  | Reduce displacement impacts, community costs.  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | County and City administration, public works   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | Mutual aid agreements, comp plan, coop plan  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | City of Prairie Home   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Flooding/Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Destroyed or damaged properties  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 7.1.3  |
| <b>Name of Action or Project</b>                 | Hazardous Property Buyout  |
| <b>Action or Project Description</b>             | Acquire destroyed or damaged properties and relocate people voluntarily. |
| <b>Estimated Cost</b>                            | Over \$1,000,000   |
| <b>Benefits</b>                                  | Reduce injuries/casualties, property damage, displacement costs.         |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | County and City administration   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Other  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | Zoning/building ordinances, comp plan                                    |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | Not Started  |

## Windsor Place

| Action Worksheet                          |   |
|---|---|
| Name of Jurisdiction                      | Windsor Place   |
| Risk / Vulnerability                      |   |
| Hazard(s) Addressed                       | Severe Winter Weather                                     |
| Problem Being Mitigated                   | Lack of back-up power to all critical infrastructure      |
| Action or Project                         |   |
| Applicable Goal Statement                 | 3   |
| Action/Prj. #                             | 1.1.3   |
| Name of Action or Project                 | Back-Up Generator   |
| Action or Project Description             | Provide for back-up power to all critical infrastructure. |
| Estimated Cost                            | \$50,000 to \$100,000                                     |
| Benefits                                  | Reduce displacement impacts, community costs.             |
| Plan for Implementation                   |   |
| Responsible Organization / Department     | City Administration                                       |
| Action / Project Staplee Score / Priority | Medium  |
| Timeline for Completion                   | More than 5 years   |
| Potential Funding Source                  | Federal, State, County, City                              |
| Local Planning Mechanism to be Used       | MidMoRPC, MRWA, building codes                            |
| Action Status                             |   |
| Status                                    | Ongoing   |
| Report on Progress                        | In Progress   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Windsor Place   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Warning Sirens  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | 1.1.11  |
| <b>Name of Action or Project</b>                 | Warning Sirens  |
| <b>Action or Project Description</b>             | Add a warning siren to warn residents of incoming treats from tornado, severe thunderstorms, or levee breach. |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000  |
| <b>Benefits</b>                                  | offer enough time for sheltering  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | City Administration   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | FEMA, SEMA  |
| <b>Local Planning Mechanism to be Used</b>       |   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not started   |

## Wooldridge

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Wooldridge  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Warning Sirens  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | <b>1.1.11</b>   |
| <b>Name of Action or Project</b>                 | Warning Sirens  |
| <b>Action or Project Description</b>             | Add a warning siren to warn residents of incoming treats from tornado, severe thunderstorms, or levee breach. |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000  |
| <b>Benefits</b>                                  | offer enough time for sheltering  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Wooldridge administration   |
| <b>Action / Project Staplee Score / Priority</b> | <b>H</b>  |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | FEMA, SEMA  |
| <b>Local Planning Mechanism to be Used</b>       | HMP, comp plan  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not started   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Wooldridge   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Levee Failure  |
| <b>Problem Being Mitigated</b>                   | levee repair and maintenance   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 5  |
| <b>Action/Prj. #</b>                             | 9.1.1  |
| <b>Name of Action or Project</b>                 | levee repair and maintenance   |
| <b>Action or Project Description</b>             | Wooldridge maintains one levee protecting the community from 3 water way sources. It has not been well maintained over the years and needs repairs, maintenance, and upkeep. |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | protect the community from flooding  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | wooldridge Administration/Levee District   |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | FEMA, SEMA   |
| <b>Local Planning Mechanism to be Used</b>       | EOP, coop, annual budget   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not started  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Wooldridge   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)  |
| <b>Problem Being Mitigated</b>                   | Losses from flooding   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 2  |
| <b>Action/Prj. #</b>                             | 1.1.1  |
| <b>Name of Action or Project</b>                 | NFIP Continued Compliance  |
| <b>Action or Project Description</b>             | Enforce floodplain management requirements, regulate new construction in the SFHAs, floodplain identification for mapping. |
| <b>Estimated Cost</b>                            | Little or no cost (<\$10,000)  |
| <b>Benefits</b>                                  | Ensure future development is in a safe area.   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Floodplain Administrator   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Continued/2025   |
| <b>Potential Funding Source</b>                  | City General revenue   |
| <b>Local Planning Mechanism to be Used</b>       | Floodplain ordinance   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | In Progress  |
| <b>Report on Progress</b>                        | Ongoing  |



# Blackwater Area Fire Protection District

| Action Worksheet                          |   |
|---|---|
| Name of Jurisdiction                      | Blackwater FPD  |
| Risk / Vulnerability                      |   |
| Hazard(s) Addressed                       | Tornadoes, Winter Weather, Thunderstorms                      |
| Problem Being Mitigated                   | Power outage  |
| Action or Project                         |   |
| Applicable Goal Statement                 | 3   |
| Action/Prj. #                             | 1.1.3   |
| Name of Action or Project                 | Backup generator  |
| Action or Project Description             | Provide backup electricity to fire station with power outages |
| Estimated Cost                            | Less than \$10,000  |
| Benefits                                  | Power outage  |
| Plan for Implementation                   |   |
| Responsible Organization / Department     | Blackwater FPD Fire board                                     |
| Action / Project Staplee Score / Priority | H   |
| Timeline for Completion                   | 3-5 years   |
| Potential Funding Source                  | Grants  |
| Local Planning Mechanism to be Used       | Standard Operating Guidelines & HMP                           |
| Action Status                             |   |
| Status                                    | New   |
| Report on Progress                        | Not Started   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Blackwater Area Fire Protection District                        |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)                                   |
| <b>Problem Being Mitigated</b>                   | Death from flooding   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | 10.1.1  |
| <b>Name of Action or Project</b>                 | Flash flood rescue equipment                                    |
| <b>Action or Project Description</b>             | Boat with tow ropes and lights to rescue people from water      |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000  |
| <b>Benefits</b>                                  | Respond faster without getting other fire depts to bring a boat |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Blackwater FPD Fire board                                       |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | Grants, RHSOC   |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP                             |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | new   |
| <b>Report on Progress</b>                        | new item  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Blackwater Area Fire Protection District    |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes                                   |
| <b>Problem Being Mitigated</b>                   | Loss of life from late warning              |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | 2.1.1                                       |
| <b>Name of Action or Project</b>                 | More Communication, weather radios          |
| <b>Action or Project Description</b>             | More ways to alert people of Weather issues |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000                        |
| <b>Benefits</b>                                  | Alert people locally of tornados            |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Blackwater FPD Fire board                   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years                                   |
| <b>Potential Funding Source</b>                  | Grants, RHSOC                               |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP         |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | new   |
| <b>Report on Progress</b>                        | new item                                    |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Blackwater Area Fire Protection District   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Wildfire   |
| <b>Problem Being Mitigated</b>                   | Loss of structures and life from fire  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 12.1.3   |
| <b>Name of Action or Project</b>                 | Land rescue and brush firefighting equipment   |
| <b>Action or Project Description</b>             | Airbags, 4-wheeler with trailer and skid unit to fight wildfires and perform land rescues of endangered peoples. |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | To get water and personnel to hard to get places   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Blackwater FPD Fire board  |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Grants, RHSOC  |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | new  |
| <b>Report on Progress</b>                        | new item   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Blackwater Area Fire Protection District   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Land Subsidence/Sinkholes  |
| <b>Problem Being Mitigated</b>                   | Loss of life   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 10.1.2   |
| <b>Name of Action or Project</b>                 | Ropes/Harness  |
| <b>Action or Project Description</b>             | Equipment to get people out of sinkholes or ground caves that have opened up unexpectedly. |
| <b>Estimated Cost</b>                            | Less than \$10,000   |
| <b>Benefits</b>                                  | To help save people's lives if fallen down into a sinkhole                                 |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Blackwater FPD Fire board  |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 2-3 years  |
| <b>Potential Funding Source</b>                  | Grants   |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | new  |
| <b>Report on Progress</b>                        | new item   |

## Cooper County Fire Protection District

| Action Worksheet                          |   |
|---|---|
| Name of Jurisdiction                      | Cooper County Fire Protection District  |
| Risk / Vulnerability                      |   |
| Hazard(s) Addressed                       | ALL   |
| Problem Being Mitigated                   | Slow or inadequate safety response on all types of incidents, actions, or events              |
| Action or Project                         |   |
| Applicable Goal Statement                 | 1   |
| Action/Prj. #                             | 11.1.1  |
| Name of Action or Project                 | Hazard Training   |
| Action or Project Description             | Get all fire district personnel up-to-date with industry training for response to all hazards |
| Estimated Cost                            | \$100,000 to \$500,000  |
| Benefits                                  | Life Safety, Incident Stabilization, and Property Conservation                                |
| Plan for Implementation                   |   |
| Responsible Organization / Department     | Cooper County FPD Board   |
| Action / Project Staplee Score / Priority | High  |
| Timeline for Completion                   | Other   |
| Potential Funding Source                  | Local, State, Federal   |
| Local Planning Mechanism to be Used       | Training Program  |
| Action Status                             |   |
| Status                                    | Ongoing   |
| Report on Progress                        | In Progress   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Cooper County Fire Protection District   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | ALL  |
| <b>Problem Being Mitigated</b>                   | Inadequate response to hazardous events  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 11.1.2   |
| <b>Name of Action or Project</b>                 | Hazard Response Equipment  |
| <b>Action or Project Description</b>             | The Fire District does not have adequate equipment based on industry standard levels for a safety response on all types of incidents, actions, or events |
| <b>Estimated Cost</b>                            | Over \$1,000,000   |
| <b>Benefits</b>                                  | Life Safety, Incident Stabilization, and Property Conservation   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County FPD Board  |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Other  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | Bonds  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | KEEP - Ongoing   |
| <b>Report on Progress</b>                        |  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Cooper County Fire Protection District  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | ALL   |
| <b>Problem Being Mitigated</b>                   | Inadequate response during major widespread hazard events   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | 11.1.3  |
| <b>Name of Action or Project</b>                 | Hire Staff  |
| <b>Action or Project Description</b>             | The Fire District does not have adequate full-time or part-time staffing levels for a safety response on all types of incidents, actions, or events |
| <b>Estimated Cost</b>                            | \$500,000 to \$1,000,000  |
| <b>Benefits</b>                                  | Life Safety, Incident Stabilization, and Property Conservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Cooper County FPD Board   |
| <b>Action / Project Staplee Score / Priority</b> | High  |
| <b>Timeline for Completion</b>                   | Other   |
| <b>Potential Funding Source</b>                  | Local, State, Federal   |
| <b>Local Planning Mechanism to be Used</b>       | Budget  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | Ongoing   |
| <b>Report on Progress</b>                        | In progress   |



| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Cooper County Fire Protection District  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | ALL   |
| <b>Problem Being Mitigated</b>                   | Inadequate communication options during hazard events                               |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 1   |
| <b>Action/Prj. #</b>                             | 11.1.4  |
| <b>Name of Action or Project</b>                 | Communications Gaps   |
| <b>Action or Project Description</b>             | Identify and fill communications gaps for the fire district during response events. |
| <b>Estimated Cost</b>                            | \$500,000 to \$1,000,000  |
| <b>Benefits</b>                                  | Life Safety, Incident Stabilization, and Property Conservation                      |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Cooper County FPD Board/County Dispatch   |
| <b>Action / Project Staplee Score / Priority</b> | High  |
| <b>Timeline for Completion</b>                   | Other   |
| <b>Potential Funding Source</b>                  | Local, State, Federal   |
| <b>Local Planning Mechanism to be Used</b>       | Budget  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | KEEP - Ongoing  |
| <b>Report on Progress</b>                        | In progress   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Cooper County Fire Protection District                              |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | ALL   |
| <b>Problem Being Mitigated</b>                   | Faster response and better ISO rating                               |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 11.1.5  |
| <b>Name of Action or Project</b>                 | Additional Stations   |
| <b>Action or Project Description</b>             | Build additional stations for better response throughout the county |
| <b>Estimated Cost</b>                            | Over \$1,000,000  |
| <b>Benefits</b>                                  | Life Safety, Incident Stabilization, and Property Conservation      |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Cooper County FPD Board   |
| <b>Action / Project Staplee Score / Priority</b> | Medium  |
| <b>Timeline for Completion</b>                   | Other   |
| <b>Potential Funding Source</b>                  | Local, State, Federal   |
| <b>Local Planning Mechanism to be Used</b>       | Bond  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | KEEP - Ongoing  |
| <b>Report on Progress</b>                        | Not started   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Cooper County Fire Protection District  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Wildfire  |
| <b>Problem Being Mitigated</b>                   | Fire Fighting Water Supply  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | Goal 3: Mitigation Programs   |
| <b>Action/Prj. #</b>                             | <b>1.1.9</b>  |
| <b>Name of Action or Project</b>                 | Install hydrants  |
| <b>Action or Project Description</b>             | Install dry hydrants and/or standard hydrants as needed throughout the county and implement the plan as resources become available. |
| <b>Estimated Cost</b>                            | \$50,000 to \$100,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts, Emergency Management Costs/Community Costs      |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Cooper County public works, water districts   |
| <b>Action / Project Staplee Score / Priority</b> | HIGH  |
| <b>Timeline for Completion</b>                   | Other   |
| <b>Potential Funding Source</b>                  | Private, Local, Federal, and State  |
| <b>Local Planning Mechanism to be Used</b>       | Fire Districts  |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | Ongoing   |
| <b>Report on Progress</b>                        | Some progress, ongoing program.   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Cooper County Fire Protection District   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | ALL  |
| <b>Problem Being Mitigated</b>                   | Slow response to hazards   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 1  |
| <b>Action/Prj. #</b>                             | <b>11.1.6</b>  |
| <b>Name of Action or Project</b>                 | Agreements   |
| <b>Action or Project Description</b>             | Maintain mutual aid agreements with surrounding jurisdictions for emergency services |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | Life Safety, Incident Stabilization, and Property Conservation                       |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County Fire Protection District   |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Other  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | Budget   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | KEEP - Ongoing   |
| <b>Report on Progress</b>                        |  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Cooper County Fire Protection District   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornado, Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | Loss of life and property to storms  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 4  |
| <b>Action/Prj. #</b>                             | 11.1.7   |
| <b>Name of Action or Project</b>                 | Outreach   |
| <b>Action or Project Description</b>             | Create program to encourage residents to have disaster supply kits on hand to be used in the event of a disaster event |
| <b>Estimated Cost</b>                            | \$50,000 to \$100,000  |
| <b>Benefits</b>                                  | Life Safety, Incident Stabilization, and Property Conservation   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Cooper County FPD Board, Cooper EMA  |
| <b>Action / Project Staplee Score / Priority</b> | High   |
| <b>Timeline for Completion</b>                   | Other  |
| <b>Potential Funding Source</b>                  | Local, State, Federal  |
| <b>Local Planning Mechanism to be Used</b>       | Budget   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | KEEP - Ongoing   |
| <b>Report on Progress</b>                        | In progress  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Cooper County FPD   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes, Winter Weather, Thunderstorms                      |
| <b>Problem Being Mitigated</b>                   | Power outage  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | 1.1.3   |
| <b>Name of Action or Project</b>                 | Backup generator  |
| <b>Action or Project Description</b>             | Provide backup electricity to fire station with power outages |
| <b>Estimated Cost</b>                            | Less than \$10,000  |
| <b>Benefits</b>                                  | Power outage  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Cooper County FPD Fire board                                  |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | Grants  |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP                           |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

## Otterville Fire Protection District

| Action Worksheet                          |  |
|---|--|
| Name of Jurisdiction                      | Otterville Fire Protection District  |
| Risk / Vulnerability                      |  |
| Hazard(s) Addressed                       | Severe Winter Weather  |
| Problem Being Mitigated                   | Emergency Power and Warming Shelter  |
| Action or Project                         |  |
| Applicable Goal Statement                 | 3  |
| Action/Prj. #                             | 1.1.3  |
| Name of Action or Project                 | Backup Generator   |
| Action or Project Description             | Install back up generator at Station 1. The goal of this project would be to install a backup generator at station 1. We would be able to provide shelter and warmth for up to 120 people. |
| Estimated Cost                            | Less than \$10,000   |
| Benefits                                  | Emergency power, warmth and shelter for residents as well as no disruption in fire service due to outage.  |
| Plan for Implementation                   |  |
| Responsible Organization / Department     | Otterville Fire Protection District board  |
| Action / Project Staplee Score / Priority | 44 High  |
| Timeline for Completion                   | 3-5 years  |
| Potential Funding Source                  | Matching Grant or Fully Funded Grant   |
| Local Planning Mechanism to be Used       | Board of Directors, EOP  |
| Action Status                             |  |
| Status                                    | New  |
| Report on Progress                        |  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Otterville Fire Protection District  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Safe Room/Storm Shelter  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 5  |
| <b>Action/Prj. #</b>                             | 1.1.5  |
| <b>Name of Action or Project</b>                 | Storm Shelter  |
| <b>Action or Project Description</b>             | Install storm shelter that can be utilized as a training room. Adding a storm shelter that can also be utilized as a training room st one of our two stations. |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | Safe place for responders during inclement weather   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Fire Dept, County  |
| <b>Action / Project Staplee Score / Priority</b> | M  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Bond issue, matching grants  |
| <b>Local Planning Mechanism to be Used</b>       | Local Board of Directors, EOP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        |  |



| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Otterville Fire Protection District  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Wildfire   |
| <b>Problem Being Mitigated</b>                   | Wildfire Suppression   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 12.1.1   |
| <b>Name of Action or Project</b>                 | Wildfire Suppression   |
| <b>Action or Project Description</b>             | Purchase equipment for all terrain firefighting Adding all terrain apparatus for wildfire suppression. |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | Provide better suppression for hard to access area.  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Fire Dept.   |
| <b>Action / Project Staplee Score / Priority</b> | 44 High  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Grants, Tax Payer Funded   |
| <b>Local Planning Mechanism to be Used</b>       | EOP, COOP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        |  |

# Pilot Grove Fire Protection District

| Action Worksheet                          |  |
|---|--|
| Name of Jurisdiction                      | Pilot Grove Area Fire Protection District                        |
| Risk / Vulnerability                      |  |
| Hazard(s) Addressed                       | Severe Thunderstorms   |
| Problem Being Mitigated                   | Storm Damage / Wild Fire   |
| Action or Project                         |  |
| Applicable Goal Statement                 | 3  |
| Action/Prj. #                             | 12.1.1   |
| Name of Action or Project                 | 2022 Polaris General XP 4 1000 Deluxe                            |
| Action or Project Description             | ATV to search and rescue stranded people and Investigate Damages |
| Estimated Cost                            | \$10,000 to \$50,000   |
| Benefits                                  | A faster response and easy to get around with                    |
| Plan for Implementation                   |  |
| Responsible Organization / Department     | Pilot Grove Area FPD Board                                       |
| Action / Project Staplee Score / Priority | H  |
| Timeline for Completion                   | 3-5 years  |
| Potential Funding Source                  | Grants   |
| Local Planning Mechanism to be Used       | Standard Operating Guidelines & HMP                              |
| Action Status                             |  |
| Status                                    | New  |
| Report on Progress                        | Not Started  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Pilot Grove Area Fire Protection District         |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms                              |
| <b>Problem Being Mitigated</b>                   | Storm Damage / Wild Fire                          |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | <b>12.1.2</b>                                     |
| <b>Name of Action or Project</b>                 | Trailer   |
| <b>Action or Project Description</b>             | To get the ATV to the scene, Vehicle to transport |
| <b>Estimated Cost</b>                            | Less than \$10,000                                |
| <b>Benefits</b>                                  | A faster response and easy to get around with     |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Pilot Grove Area FPD Board                        |
| <b>Action / Project Staplee Score / Priority</b> | Search and rescue                                 |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | Grants  |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP               |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started                                       |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Pilot Grove Area Fire Protection District |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Wildfire                                  |
| <b>Problem Being Mitigated</b>                   | Water hauling                             |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | <b>12.1.3</b>                             |
| <b>Name of Action or Project</b>                 | Skid unit for ATV                         |
| <b>Action or Project Description</b>             | Extinguishing Fire's                      |
| <b>Estimated Cost</b>                            | Less than \$10,000                        |
| <b>Benefits</b>                                  | To help on man power                      |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Pilot Grove Area FPD Board                |
| <b>Action / Project Staplee Score / Priority</b> | Extinguishing Fire's faster               |
| <b>Timeline for Completion</b>                   | 3-5 years                                 |
| <b>Potential Funding Source</b>                  | Grants                                    |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP       |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New                                       |
| <b>Report on Progress</b>                        | Not Started                               |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Pilot Grove Area Fire Protection District  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Power outage   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 1.1.3  |
| <b>Name of Action or Project</b>                 | Backup generator   |
| <b>Action or Project Description</b>             | Lights and power to overhead doors Provide backup electricity to fire station with power outages |
| <b>Estimated Cost</b>                            | Less than \$10,000   |
| <b>Benefits</b>                                  | Power outage   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Pilot Grove Area FPD Board   |
| <b>Action / Project Staplee Score / Priority</b> | Lights and power to overhead doors   |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Grants   |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Pilot Grove Area Fire Protection District   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Flooding (Riverine and Flash)   |
| <b>Problem Being Mitigated</b>                   | assist in rescue  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 3   |
| <b>Action/Prj. #</b>                             | 12.1.4  |
| <b>Name of Action or Project</b>                 | Light Tower   |
| <b>Action or Project Description</b>             | A light tower will be used during search and rescue in areas where there is no lighting as well as being used during power outages. |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000  |
| <b>Benefits</b>                                  | Power outage and search and rescue  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Pilot Grove Area FPD Board  |
| <b>Action / Project Staplee Score / Priority</b> | A light tower will be used during search and rescue in areas where there is no lighting as well as being used during power outages. |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | Grants  |
| <b>Local Planning Mechanism to be Used</b>       | Standard Operating Guidelines & HMP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

# Blackwater School District

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Blackwater School District  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms  |
| <b>Problem Being Mitigated</b>                   | inadequate system of internal communication during threat of event  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | <b>15.1.1</b>   |
| <b>Name of Action or Project</b>                 | sound/phone system upgrade  |
| <b>Action or Project Description</b>             | The current system does not offer a safe way to communicate with staff in other rooms or building to building. The new system offers fiberoptic communication that allows for staff to office communication as well as sound alerts and/or silent alerts. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | safer school facility, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Blackwater SD Administration/Maintenance Dep.   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Blackwater School District   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Schools ability to resume activities   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 1: Mitigation Planning  |
| <b>Action/Prj. #</b>                             | <b>1.1.2</b>   |
| <b>Name of Action or Project</b>                 | Continuity Of Operation Plan   |
| <b>Action or Project Description</b>             | work with the local RPC to create a continuity of operation plan. The school district does not have a plan in place to know how we would function if displaced. This would offer direction to ensure stability in possible times of need |
| <b>Estimated Cost</b>                            | Less than \$10,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Blackwater School District Admin, Cooper County  |
| <b>Action / Project Staplee Score / Priority</b> | HIGH   |
| <b>Timeline for Completion</b>                   | Other  |
| <b>Potential Funding Source</b>                  | Internal, planning grants  |
| <b>Local Planning Mechanism to be Used</b>       | Local School Districts   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | Not started  |



| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Blackwater School District  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Loss of life due to tornado   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 1.1.5   |
| <b>Name of Action or Project</b>                 | safe room   |
| <b>Action or Project Description</b>             | building a shelter that offers safety for students, staff, and constituents |
| <b>Estimated Cost</b>                            | Over \$1,000,000  |
| <b>Benefits</b>                                  | safe sheltering, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Blackwater School board   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

# Boonville School District

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Boonville R-1   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Loss of life due to tornado   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 1.1.5   |
| <b>Name of Action or Project</b>                 | safe room   |
| <b>Action or Project Description</b>             | building a shelter that offers safety for students, staff, and constituents |
| <b>Estimated Cost</b>                            | Over \$1,000,000  |
| <b>Benefits</b>                                  | safe sheltering, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Boonville R-1 board   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Boonville R-1   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms  |
| <b>Problem Being Mitigated</b>                   | inadequate system of internal communication during threat of event  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | 15.1.1  |
| <b>Name of Action or Project</b>                 | sound/phone system upgrade  |
| <b>Action or Project Description</b>             | The current system does not offer a safe way to communicate with staff in other rooms or building to building. The new system offers fiberoptic communication that allows for staff to office communication as well as sound alerts and/or silent alerts. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | safer school facility, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Boonville Maintenance Dep   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Boonville R-1  |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Schools ability to resume activities   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | Goal 1: Mitigation Planning  |
| <b>Action/Prj. #</b>                             | <b>1.1.2</b>   |
| <b>Name of Action or Project</b>                 | Continuity Of Operation Plan   |
| <b>Action or Project Description</b>             | work with the local RPC to create a continuity of operation plan. The school district does not have a plan in place to know how we would function if displaced. This would offer direction to ensure stability in possible times of need |
| <b>Estimated Cost</b>                            | Less than \$10,000   |
| <b>Benefits</b>                                  | Avoidance of the following: Property Damage, Loss of Function/displacement impacts   |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | School Board, Cooper County EMA  |
| <b>Action / Project Staplee Score / Priority</b> | HIGH   |
| <b>Timeline for Completion</b>                   | Other  |
| <b>Potential Funding Source</b>                  | Internal, planning grants  |
| <b>Local Planning Mechanism to be Used</b>       | Local School Districts   |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | Ongoing  |
| <b>Report on Progress</b>                        | Not started  |

## Cooper County R-IV

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Cooper Co R-IV  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Loss of life due to tornado   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 1.1.5   |
| <b>Name of Action or Project</b>                 | safe room   |
| <b>Action or Project Description</b>             | building a shelter that offers safety for students, staff, and constituents |
| <b>Estimated Cost</b>                            | Over \$1,000,000  |
| <b>Benefits</b>                                  | safe sheltering, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Board of Education, building director/superintendent                        |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Cooper Co R-IV  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms  |
| <b>Problem Being Mitigated</b>                   | inadequate system of internal communication during threat of event  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | 15.1.1  |
| <b>Name of Action or Project</b>                 | sound/phone system upgrade  |
| <b>Action or Project Description</b>             | The current system does not offer a safe way to communicate with staff in other rooms or building to building. The new system offers fiberoptic communication that allows for staff to office communication as well as sound alerts and/or silent alerts. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | safer school facility, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Cooper Co R-IV Maintenance Dep  |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

# Otterville School District

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Otterville R-VI   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms  |
| <b>Problem Being Mitigated</b>                   | inadequate system of internal communication during threat of event  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | 15.1.1  |
| <b>Name of Action or Project</b>                 | sound/phone system upgrade  |
| <b>Action or Project Description</b>             | The current system does not offer a safe way to communicate with staff in other rooms or building to building. The new system offers fiberoptic communication that allows for staff to office communication as well as sound alerts and/or silent alerts. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | safer school facility, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | School board, maintenance dep   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Otterville R-VI   |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Loss of life due to tornado   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 1.1.5   |
| <b>Name of Action or Project</b>                 | safe room   |
| <b>Action or Project Description</b>             | building a shelter that offers safety for students, staff, and constituents |
| <b>Estimated Cost</b>                            | Over \$1,000,000  |
| <b>Benefits</b>                                  | safe sheltering, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | School board, superintendent  |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |



## Pilot Grove C-4

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Pilot Grove C4  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms  |
| <b>Problem Being Mitigated</b>                   | Loss of life from storms or intruders due to early warning.   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | 15.1.1  |
| <b>Name of Action or Project</b>                 | sound/phone system upgrade  |
| <b>Action or Project Description</b>             | Upgrade alert system. The current sound system is no longer able to be used with capabilities to communicate or get alerts out as need due to the current system using adobe flash that is a discontinued program |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | safer school facility and life preservation   |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Pilot Grove C4 maintenance dep  |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state and federal  |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Pilot Grove C4   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | Damage and loss of life from tornado   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 5  |
| <b>Action/Prj. #</b>                             | 1.1.1  |
| <b>Name of Action or Project</b>                 | Safe Room  |
| <b>Action or Project Description</b>             | build a FEMA rated shelter that offers safety for students, staff, and constituent |
| <b>Estimated Cost</b>                            | Over \$1,000,000   |
| <b>Benefits</b>                                  | safe sheltering and life preservation  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Pilot Grove C4 superintendent  |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | local, state and federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | Pilot Grove C4   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Wildfire   |
| <b>Problem Being Mitigated</b>                   | inadequate fire alert system   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 4  |
| <b>Action/Prj. #</b>                             | 17.1.1   |
| <b>Name of Action or Project</b>                 | Fire Alarm system  |
| <b>Action or Project Description</b>             | the current fire alarm system is insufficiently working and needs to be replaced |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000   |
| <b>Benefits</b>                                  | get the alert of fire out in time, life preservation                             |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | Pilot Grove C4 maintenance dep   |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | local, state and federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not Started  |

## Prairie Home R-V

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Prairie Home R-V  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms  |
| <b>Problem Being Mitigated</b>                   | inadequate system of internal communication during threat of event  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | <b>15.1.1</b>   |
| <b>Name of Action or Project</b>                 | sound/phone system upgrade  |
| <b>Action or Project Description</b>             | The current system does not offer a safe way to communicate with staff in other rooms or building to building. The new system offers fiberoptic communication that allows for staff to office communication as well as sound alerts and/or silent alerts. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | safer school facility, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Maintenance dep   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | Prairie Home R-V  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Tornadoes   |
| <b>Problem Being Mitigated</b>                   | Loss of life due to tornado   |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 5   |
| <b>Action/Prj. #</b>                             | 1.1.5   |
| <b>Name of Action or Project</b>                 | safe room   |
| <b>Action or Project Description</b>             | building a shelter that offers safety for students, staff, and constituents |
| <b>Estimated Cost</b>                            | Over \$1,000,000  |
| <b>Benefits</b>                                  | safe sheltering, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Superintendent, board, administration                                       |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |

## State Fair Community College

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | State Fair Community College   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Tornadoes  |
| <b>Problem Being Mitigated</b>                   | lack of sheltering space   |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 5  |
| <b>Action/Prj. #</b>                             | <b>1.1.5</b>   |
| <b>Name of Action or Project</b>                 | Safe room  |
| <b>Action or Project Description</b>             | Build Fema rated Storm shelter. There is a great need in the school as all students and staff do not currently fit into the room used for tornado sheltering |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000   |
| <b>Benefits</b>                                  | Safe room will ultimately save lives during tornado  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | State Fair Community College/Boonville city  |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Grants as they become available  |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |  |
|--|--|
| <b>Name of Jurisdiction</b>                      | State Fair Community College   |
| <b>Risk / Vulnerability</b>                      |  |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms   |
| <b>Problem Being Mitigated</b>                   | loss of power  |
| <b>Action or Project</b>                         |  |
| <b>Applicable Goal Statement</b>                 | 3  |
| <b>Action/Prj. #</b>                             | 1.1.3  |
| <b>Name of Action or Project</b>                 | generator  |
| <b>Action or Project Description</b>             | there is a need for backup power when severe weather knocks out services. This campus is the backup server/network for all State Fair College campuses |
| <b>Estimated Cost</b>                            | \$10,000 to \$50,000   |
| <b>Benefits</b>                                  | will prevent server from going down and prevent pipe breakage during extreme cold weather  |
| <b>Plan for Implementation</b>                   |  |
| <b>Responsible Organization / Department</b>     | State Fair Community College Emergency Director  |
| <b>Action / Project Staplee Score / Priority</b> | H  |
| <b>Timeline for Completion</b>                   | 3-5 years  |
| <b>Potential Funding Source</b>                  | Grants as they become available  |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP  |
| <b>Action Status</b>                             |  |
| <b>Status</b>                                    | New  |
| <b>Report on Progress</b>                        | Not Started  |

| <b>Action Worksheet</b>                          |   |
|--|---|
| <b>Name of Jurisdiction</b>                      | State Fair Community College  |
| <b>Risk / Vulnerability</b>                      |   |
| <b>Hazard(s) Addressed</b>                       | Severe Thunderstorms  |
| <b>Problem Being Mitigated</b>                   | inadequate system of internal communication during threat of event  |
| <b>Action or Project</b>                         |   |
| <b>Applicable Goal Statement</b>                 | 4   |
| <b>Action/Prj. #</b>                             | <b>15.1.1</b>   |
| <b>Name of Action or Project</b>                 | sound/phone system upgrade  |
| <b>Action or Project Description</b>             | The current system does not offer a safe way to communicate with staff in other rooms or building to building. The new system offers fiberoptic communication that allows for staff to office communication as well as sound alerts and/or silent alerts. |
| <b>Estimated Cost</b>                            | \$100,000 to \$500,000  |
| <b>Benefits</b>                                  | safer school facility, life preservation  |
| <b>Plan for Implementation</b>                   |   |
| <b>Responsible Organization / Department</b>     | Maintenance Dep, Emergency Management   |
| <b>Action / Project Staplee Score / Priority</b> | H   |
| <b>Timeline for Completion</b>                   | 3-5 years   |
| <b>Potential Funding Source</b>                  | local, state, federal   |
| <b>Local Planning Mechanism to be Used</b>       | HMP and EOP   |
| <b>Action Status</b>                             |   |
| <b>Status</b>                                    | New   |
| <b>Report on Progress</b>                        | Not Started   |



**Table 4.4 Mitigation Action Matrix**

| #  | Action   | Priority | Goals Addressed | Hazards Addressed | Address Current Development | Address Future Development | Continued Compliance with NFIP |
|--|--|----------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------------|
| <b>Prevention Public Education</b>           |  |          |                 |                   |                             |                            |                                |
| 1.1.11                                       | Upgrade Warning Sirens                             | H        | 4               | T, TS             | X                           | X                          |                                |
| 5.1.1  | Add heating/cooling center                         | H        | 1               | ET, WW            | X                           | X                          |                                |
| 2.1.1  | Purchase Weather Radios                            | H        | 4               | T, TS, FL         | X                           | X                          |                                |
| 15.1.1                                       | Phone/PA System Upgrade                            | H        | 4               | TS, T             | X                           | X                          |                                |
| 17.1.1                                       | Fire Alarm Upgrade                                 | H        | 4               | WF, T             | X                           | X                          |                                |
| 11.1.4                                       | Identify and fill communication gaps               | H        | 1               | All               | X                           | X                          |                                |
| <b>Structure and Infrastructure Projects</b> |  |          |                 |                   |                             |                            |                                |
| 1.1.5  | Build Safe Rooms                                   | H        | 1               | T,TS              | X                           | X                          |                                |
| 1.1.4  | Campground Storm Shelters                          | M        | 3               | T, TS             | X                           | X                          |                                |
| 1.1.7  | Reduce flood damage to roads                       | H        | 3               | FL                | X                           | X                          | X                              |
| 1.1.8  | Reduce Low Water Crossings                         | H        | 3               | FL                | X                           | X                          | X                              |
| 3.1.2  | Harden Critical Facilities against disasters       | H        | 5               | T, TS, WW         | X                           | X                          |                                |
| 11.1.5                                       | Add fire station                                   | H        | 5               | All               | X                           | X                          |                                |
| 3.1.4  | Fix bridges to prevent further damage from erosion | H        | 5               | FL                | X                           |                            | X                              |
| <b>Natural Systems Protection</b>            |  |          |                 |                   |                             |                            |                                |

| #      | Action   | Priority | Goals Addressed | Hazards Addressed | Address Current Development | Address Future Development | Continued Compliance with NFIP |
|--------|--|----------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------------|
| 1.1.1  | Enforce NFIP                                       | H        | 2               | FL                | X                           | X                          | X                              |
| 1.1.10 | Widen Levees                                       | H        | 5               | FL                | X                           | X                          |                                |
| 7.1.3  | Buyout hazard damage properties                    | H        | 3               | FL, T             | X                           | X                          | X                              |
| 9.1.1  | Levee Repair                                       | H        | 5               | FL                | X                           | X                          |                                |
| 3.1.3  | Critical utility inventory                         | H        | 5               | T, TS, WW         | X                           | X                          |                                |
|        | <b>Emergency Services</b>                          |          |                 |                   |                             |                            |                                |
| 1.1.3  | Backup Generators                                  | H        | 3               | WW, T, TS         | X                           | X                          |                                |
| 1.1.6  | Alternative sites for hazard displaced individuals | M        | 3               | All               | X                           | X                          |                                |
| 1.1.9  | Install Fire Hydrants                              | H        | 3               | WF                | X                           | X                          |                                |
| 7.1.1  | Upgrade pipes and hydrants for fire flow           | H        | 5               | WF                | X                           | X                          |                                |
| 7.1.2  | Backup water supply                                | H        | 3               | WF, T, TS         | X                           | X                          |                                |
| 12.1.1 | Search and Rescue ATV                              | H        | 3               | TS, WF            | X                           |                            |                                |
| 12.1.2 | ATV Trailer  | H        | 3               | TS, WF            | X                           |                            |                                |
| 12.1.3 | ATV Skid Unit                                      | H        | 3               | WF                | X                           |                            |                                |
| 12.1.4 | Mobile Light                                       | H        | 3               | WF, FL, TS        | X                           |                            |                                |
| 2.1.2  | Backup Fueling Site                                | H        | 3               | All               | X                           | X                          |                                |
| 11.1.2 | Equipment for hazard response                      | H        | 3               | All               |                             |                            |                                |
| 11.1.3 | Add employees for better disaster response         | H        | 3               | All               |                             |                            |                                |

| #      | Action                         | Priority | Goals Addressed | Hazards Addressed | Address Current Development | Address Future Development | Continued Compliance with NFIP |
|--------|--------------------------------|----------|-----------------|-------------------|-----------------------------|----------------------------|--------------------------------|
| 10.1.2 | Climbing equipment             | H        | 3               | S, LS             | X                           | X                          |                                |
| 10.1.1 | Add water rescue equipment     | H        | 3               | FL                | X                           |                            |                                |
|        | <b>Education and Outreach</b>  |          |                 |                   |                             |                            |                                |
| 1.1.2  | School COOP Plans              | M        | 3               | All               | X                           | X                          |                                |
| 11.1.1 | Hazard training for FPD        | H        | 1               | All               |                             |                            |                                |
| 11.1.6 | Maintain Mutual Aid Agreements | H        | 1               | All               |                             |                            |                                |
| 11.1.7 | Emergency supply kit program   | H        | 4               | All               | X                           | X                          |                                |

**Chapter 5: PLAN MAINTENANCE PROCESS**

- 5.1 Monitoring, Evaluating, and Updating the Plan.....300
  - 5.1.1 Responsibility for Plan Maintenance
  - 5.1.2 Plan Maintenance Schedule
  - 5.1.3 Plan Maintenance Process
- 5.2 Incorporation into Existing Planning Mechanisms.....302
- 5.3 Continued Public Involvement.....304

## CHAPTER 5: PLAN MAINTENANCE PROCESS

This chapter provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

### 5.1 Monitoring, Evaluating, and Updating the Plan

**44 CFR Requirement 201.6(c)(4): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.**

#### 5.1.1 Responsibility for Plan Maintenance

The Cooper County Hazard Mitigation Plan will be monitored and evaluated on a yearly basis following its approval and adoption. These evaluations will begin approximately one year after the final approval of the plan and continue until the next 5-year update begins.

The monitoring and evaluation will be facilitated through the Mid-MO Regional Planning Commission. It will consist of the following:

1. A meeting of the Hazard Mitigation Planning Committee convened by planners at the Mid-MO Regional Planning Commission to discuss any general hazard mitigation issues
2. A survey emailed to all participating jurisdictions on such topics as changes/developments in the jurisdictions and implementation of mitigation actions.
3. A yearly addendum to the plan summarizing information from the planning meeting and the Surveys
4. Entry of any direct changes to the plan in the “Log of Changes Made to the Plan following Approval”

#### 5.1.2 Plan Maintenance Schedule

The MPC agrees to meet annually or after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. The Cooper County Emergency Management Director will be responsible for initiating the plan reviews and will invite members of the MPC to the meeting.

In coordination with all participating jurisdictions, the Emergency Management Director will be responsible for initiating a five-year written update of the plan to be submitted to the Missouri State Emergency Management Agency (SEMA) and FEMA Region VII per Requirement

§201.6(c)(4)(i) of the Disaster Mitigation Act of 2000, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

### **5.1.3 Plan Maintenance Process**

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

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

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

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

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

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

Changes will be made to the plan to remedy actions that have failed or are not considered feasible. Feasibility will be determined after a review of action consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring of this plan. Updating of the plan will be accomplished by written changes and submissions, as the MPC deems appropriate and necessary. Changes will be approved by the Cooper County Commission and the governing boards of the other participating jurisdictions.

## 5.2: Incorporation into Existing Planning Mechanisms

**44 CFR Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.**

Where possible, plan participants, including school and special districts, will use existing plans and/or programs to implement hazard mitigation actions. Based on the capability assessments of the participating jurisdictions, communities in Cooper 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:

- Ordinances of participating jurisdictions;
- Cooper 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 members involved in updating these existing planning mechanisms will be responsible for integrating the findings and actions of the mitigation plan, as appropriate. The MPC is also responsible for monitoring this integration and incorporation of the appropriate information into the five-year update of the multi-jurisdictional hazard mitigation plan.

Additionally, after the annual review of the Hazard Mitigation Plan, the Cooper County Emergency Management Director will provide the updated Mitigation Strategy with current status of each mitigation action to the County (Boards of Supervisors or Commissions) as well as all Mayors, City Clerks, and School District Superintendents. The Emergency Manager Director will request that the mitigation strategy be incorporated, where appropriate, in other planning mechanisms.

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

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

| Jurisdiction  | Planning Mechanisms                             | Integration Process for Previous Plan                               | Integration Process for Current Plan |
|---------------|---|---|--------------------------------------|
| Cooper County | County Emergency Operations Plan, Comprehensive | Attended transportation meetings about road flooding. Annual budget | Annual budget process.               |

|                            |   |  |   |
|----------------------------|---|--|---|
|                            | Economic Development Strategy, Zoning ordinances  | process. Floodplain ordinances, building codes   |   |
| Blackwater                 | Comprehensive Plan, zoning ordinances   | Annual Budget Process  | Comprehensive plan update, annual budget process  |
| Boonville                  | Comprehensive Plan, Transportation Improvement Plan, Emergency Operations Plan, Comprehensive Economic Development Strategy | Attended transportation meetings about road flooding. Annual budget process. Floodplain ordinances, building codes | Comprehensive Plan update, annual budget process,   |
| Bunceton                   | Regional Transportation Plan  | Annual Budget Process  | Annual Budget process, capital improvement process  |
| Otterville                 | Comprehensive Plan, Zoning ordinances, Regional Transportation Plan   | Attended transportation meetings about road flooding. Annual budget process  | Comprehensive plan update, annual budget process  |
| Pilot Grove                | Regional Transportation Plan, zoning ordinances   | Annual budget process, zoning ordinances   | Annual Budget process, Capital Improvement Process  |
| Prairie Home               | Regional Transportation Plan, zoning ordinances   | Annual budget process, building codes  | Annual Budget process, Capital Improvement Process  |
| Windsor Place              | Regional Transportation Plan, zoning ordinances   | Annual budget process, zoning ordinances   | Annual Budget process, Capital Improvement Process  |
| Wooldridge                 | Transportation planning process, zoning ordinances  | Annual Budget process, zoning ordinances   | Budget, capital improvement process   |
| Blackwater School District | Blackwater SD Planning committee & board of education   | Annual Budget process, updated policy, system testing  | Attended meetings. Safety committee annual budget meeting, building policy updates, staff training  |
| Boonville School District  | Boonville SD Planning Committee & Board of Education  | Annual Budget process, updated policy, system testing  | Attended 1 meeting. Safety committee annual budget meeting, building policy updates, staff training |



|                              |   |   |   |
|------------------------------|---|---|---|
| Cooper Co. R-IV              | Cooper R-IV Planning Committee & Board of Education     | Policy updated, staff training, notification system upgrade | Attended 1 meeting. Long-Range Plan update.                                     |
| Otterville School District   | Otterville SD Planning Committee & Board of Education   | Policy updated, staff training, notification system upgrade | Attended 1 meeting Long-Range Plan update                                       |
| Pilot Grove School District  | Pilot Grove SD planning committee & Board of Education  | Policy updated, staff training, notification system upgrade | Safety committee annual budget meeting, building policy updates, staff training |
| Prairie Home School District | Prairie Home SD Planning Committee & Board of Education | Updated policy, notification system upgrade                 | Phone/Email meeting. PHSD Planning Committee & Planning/Facilities Documents    |
| State Fair Community College | Planning Committee & Board of Education                 | Updated policy, notification system upgrade                 | Emergency management department policies. Budget process.                       |
| Blackwater FPD               | Standard Operating procedures, HMP, EOP                 | Did not participate   | Standard Operating Procedure update, EOP, Fire Board, Annual Budget Review      |
| Cooper County FPD            | Standard Operating Procedures, HMP, EOP                 | Did not participate   | Standard Operating Procedure update, EOP, Fire Board, Annual Budget Review      |
| Otterville FPD               | Standard Operating Procedures, HMP, EOP                 | Did not participate   | Standard Operating Procedure update, EOP, Fire Board, Annual Budget Review      |
| Pilot Grove FPD              | Standard Operating Procedures, HMP, EOP                 | Did not participate   | Standard Operating Procedure update, EOP, Fire Board, Annual Budget Review      |

### 5.3 Continued Public Involvement

**44 CFR Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.**

The hazard mitigation plan update process provides an opportunity to publicize success stories resulting from the plan’s implementation and seek additional public comment. Information about the annual reviews will be posted on the Cooper County website following each annual review of the mitigation plan and will solicit comments from the public based on the annual review. When the MPC reconvenes for the five-year update, it will coordinate with all stakeholders

participating in the planning process. Included in this group will be those who joined the MPC after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be actively solicited, at a minimum, through available website postings and press releases to local media outlets, primarily newspapers.

## **Appendix A: Adoption Resolutions**

**The following resolution was adopted by the Cooper County Commission, Cooper County, Missouri on November 8, 2021.**

Resolution No. 2021-4

WHEREAS, the Cooper County Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 CFR 201.6; and,

WHEREAS, the Cooper County Commission participated in the preparation of the Cooper County Hazard Mitigation Plan; and,


WHEREAS, the citizens of Cooper County, Missouri have been afforded the opportunity to comment and provide input on the Plan and the mitigation actions therein; and,

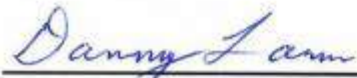
WHEREAS, Cooper County Commission has reviewed the Plan and affirms that the Plan will be updated no less than every five years.

NOW THEREFORE, BE IT RESOLVED by the Cooper County Commission adopts the Cooper County hazard Mitigation Plan as this jurisdiction’s Hazard Mitigation Plan and resolves to execute the actions in the Plan.

ADOPTED this 8<sup>th</sup> day of November, 2021 at the meeting of the Cooper County Commission.

  
 \_\_\_\_\_ 11/8/21  
 Don Baragary Presiding Commissioner (date)

  
 \_\_\_\_\_ 11-8-21  
 Charlie Melkersman Eastern District Commissioner (date)

  
 \_\_\_\_\_ 11-8-2021  
 Danny Larm Western District Commissioner (date)

The following resolution was adopted by the City of Blackwater, Cooper County, Missouri on November 9, 2021.

Resolution No. 286

WHEREAS, the Cooper County Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 CFR 201.6; and,

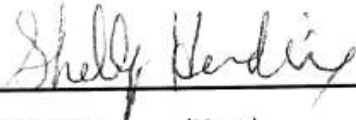
WHEREAS, the City of Blackwater participated in the preparation of the Cooper County Hazard Mitigation Plan; and,

WHEREAS, the citizens of the City of Blackwater have been afforded the opportunity to comment and provide input on the Plan and the mitigation actions therein; and,

WHEREAS, the City of Blackwater has reviewed the Plan and affirms that the Plan will be updated no less than every five years.

NOW THEREFORE, BE IT RESOLVED by the City of Blackwater adopts the Cooper County Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan, and resolves to execute the actions in the Plan.

ADOPTED this 9<sup>th</sup> day of November, 2021 at the meeting of the City Council of Blackwater.



Shelby D Hendrix

(Mayor)

November 9, 2021



Richard Wilson

Councilman

November 9, 2021



Marc Miller

Councilman

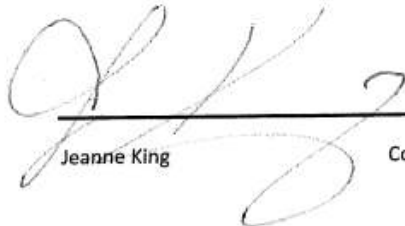
November 9, 2021



Rick Green

Councilman

November 9, 2021



Jeanné King

Councilwoman

November 9, 2021

**RESOLUTION NO. R2021-14**

**A RESOLUTION OF THE CITY OF BOONVILLE, MISSOURI, AUTHORIZING AND APPROVING PARTICIPATION IN THE COOPER COUNTY NATURAL HAZARD MITIGATION PLAN; AND PROVIDING AN EFFECTIVE DATE THEREFORE**

**WHEREAS**, the Cooper 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

**WHEREAS**, the City of Boonville, Missouri participated in the preparation of the Cooper County Hazard Mitigation Plan; and

**WHEREAS**, the citizens of the City of Boonville, Missouri have been afforded an opportunity to comment and provide input on the Plan and the mitigation actions therein; and

**WHEREAS**, the City of Boonville, Missouri has reviewed the Plan and affirms that the Plan will be updated no less than every five years.

**THEREFORE**, be it resolved by the City Council that the City of Boonville, Missouri, adopts the Cooper County Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan, and resolves to execute the actions in the Plan.

Passed this 1st day of November 2021, by the City Council of Boonville, Missouri

  
Ned Beach, Mayor

ATTEST:

  
Amber Davis, City Clerk

CITY OF BUNCETON, Missouri

RESOLUTION NO. 2021-1

A RESOLUTION OF THE CITY OF BUNCETON ADOPTING THE COOPER COUNTY HAZARD MITIGATION *PLAN 2022*

WHEREAS the City of Bunceton recognizes the threat that natural hazards pose to people and property within the city of Bunceton; and

WHEREAS the city of Bunceton has participated in the preparation of a hazard mitigation plan, hereby known as the Cooper County Hazard Mitigation Plan 2022, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2021; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the city of Bunceton from the impacts of future hazards and disasters; and

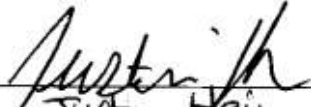
WHEREAS the city of Bunceton recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the City of Bunceton will endeavor to integrate the *Plan* into the comprehensive planning process and

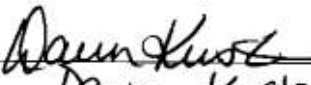
WHEREAS adoption by the city of Bunceton demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*

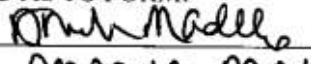
NOW THEREFORE, BE IT RESOLVED BY THE CITY OF BUNCETON, in the State of Missouri, THAT:

In accordance with local resolutions the city of Bunceton adopts the final FEMA-*approved plan*.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 2 day of November, 2021.

By (Sig.):   
Print name: Justin Hein

ATTEST:  
By (Sig.):   
Print name: Dawn Kuster

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

RESOLUTION NO 11-2021

**A RESOLUTION OF THE BOARD OF ALDERMAN OF THE CITY OF OTTERVILLE, MISSOURI ADOPTING THE COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**

WHEREAS the City of Otterville recognizes the threat that natural hazards pose to people and property within the City of Otterville; and

WHEREAS the City of Otterville has participated in the preparation of a multi-hazard mitigation plan, hereby known as the Cooper County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Otterville from the impacts of future hazards and disasters; and

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

WHEREAS adoption by the City of Otterville demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED by the City of Otterville, in the State of Missouri, THAT:

In accordance with the rules and regulations in the City of Otterville set by the Otterville City Council, the City of Otterville adopts the final FEMA-approved plan.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 8<sup>th</sup> day of November, 2021.

By (Sig.): Deborah Lake  
Print name: Deborah Lake

ATTEST:  
By (Sig.): Valerie Maize  
Print name: Valerie Maize

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



THE CITY OF PILOT GROVE, MISSOURI

Resolution Number: 2021-1

Effective December 6, 2021

A RESOLUTION OF THE CITY OF PILOT GROVE, MISSOURI, ADOPTING THE 2022 (322 PAGE) DRAFT OF THE COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS THE CITY OF PILOT GROVE, MISSOURI recognizes the threat that natural hazards posed to people and property within the CITY OF PILOT GROVE, Missouri, and

WHEREAS THE CITY OF PILOT GROVE, MISSOURI has participated in the preparation of a multi-jurisdictional hazard mitigation plan, hereby known as the 2022 Cooper County Multi-Jurisdictional Hazard Mitigation Plan, referred to hereinafter as such or 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 PILOT GROVE, MISSOURI from the impacts of future hazards and disasters; and


WHEREAS THE CITY OF PILOT GROVE, MISSOURI recognizes that land use policies may have a major impact on whether people and property are exposed to natural hazards, the CITY OF PILOT GROVE, MISSOURI will endeavor to integrate the Plan into their comprehensive planning processes, and

WHEREAS the adoption by the CITY OF PILOT GROVE, MISSOURI of this Plan demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Plan.

NOW THEREFORE BE IT RESOLVED by the CITY OF PILOT GROVE in the State of Missouri, THAT:

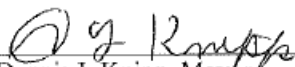
“The CITY OF PILOT GROVE, MISSOURI hereby adopts the final of the above draft of the FEMA approved plan as stated herein”

Adopted by a vote of 4 in favor and 0 against, and 0 abstaining, this 6th Day of December, 2021

Approved:   
Dennis L Knipp, Mayor

Attest:   
Amanda Mayfield City Clerk

Approved as to Form:

  
Dennis L Knipp, Mayor

BEFORE THE BOARD OF ALDERMEN OF  
THE CITY OF PRAIRIE HOME, MISSOURI

**ORDINANCE NO. 276**

**AN ORDINANCE AUTHORIZING  
THE ADOPTION OF THE COOPER COUNTY  
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**

**BE IT ORDAINED** by the Board of Aldermen of the City of Prairie Home, Missouri ("the City"), as follows:

**WHEREAS**, the City recognizes the threat that natural hazards pose to people and property within the City; and

**WHEREAS**, in accordance with the Disaster Mitigation Act of 2000, the City has participated in the preparation of a multi-hazard mitigation plan, hereby known as the "Cooper County Multi-Jurisdictional Hazard Mitigation Plan" ("the Plan"); and

**WHEREAS**, the Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property within the City from the impacts of future hazards and disasters; and

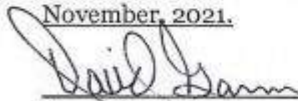
**WHEREAS**, the City recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards; and

**WHEREAS**, adoption of the Plan by the City demonstrates the City's commitment to hazard mitigation and achieving the goals outlined in the Plan.

**NOW THEREFORE**, let it be known as follows:

1. That in accordance with this Ordinance No. 276, the City hereby adopts the final FEMA-approved Plan, a copy of which is attached hereto as Exhibit A.
2. That the City will endeavor to integrate the Plan into the City's comprehensive planning process.

This Ordinance No. 276 was read two (2) times in full and passed this 18<sup>th</sup> day of November, 2021.

  
\_\_\_\_\_  
David Gann, Mayor

Attest:   
\_\_\_\_\_  
Mary Sue Fontana, City Clerk

SEAL:



BILL NO 2021-007

RESOLUTION NO 12-21-1

**A RESOLUTION OF THE VILLAGE OF WINDSOR PLACE ADOPTING THE COOPER COUNTY HAZARD MITIGATION PLAN.**

WHEREAS the Village of Windsor Place recognizes the threat that natural hazards pose to people and property within the Village of Windsor Place; and

WHEREAS the Village of Windsor Place has participated in the preparation of a multi-hazard mitigation plan, hereby known as the Cooper 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 Village of Windsor Place from the impacts of future hazards and disasters; and

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

WHEREAS adoption by the Village of Windsor Place demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*

NOW THEREFORE, BE IT RESOLVED BY THE VILLAGE OF WINDSOR PLACE, IN THE STATE OF MISSOURI, THAT:

In accordance with the Board of Trustees of the Village of Windsor Place, Missouri, the Village of Windsor Place adopts the final FEMA-approved *Plan*.

Read once by title and PASSED by the Village Board of Trustees and APPROVED by the Presiding Officer this 1<sup>st</sup> day of December, 2021.

Yeas: 3  
Nays: 0  
Absentee: 1

  
Steve Gilson, Presiding Officer

ATTEST:

  
Kathy Waibel, Village Clerk



Village of Wooldridge, Missouri

RESOLUTION NO. 2021-11

A RESOLUTION OF THE VILLAGE OF WOOLDRIDGE ADOPTING THE COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION *PLAN*

WHEREAS the Village of Wooldridge recognizes the threat that natural hazards pose to people and property within the Village of Wooldridge; and

WHEREAS the Village of Wooldridge has participated in the preparation of a multi-hazard mitigation plan, hereby known as the Cooper County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Village of Wooldridge from the impacts of future hazards and disasters; and

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

WHEREAS adoption by the Village of Wooldridge demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*

NOW THEREFORE, BE IT RESOLVED BY THE VILLAGE OF WOOLDRIDGE, in the State of Missouri, THAT:

In accordance with the Ordinances of the Village of Wooldridge, the Village Of Wooldridge adopts the final FEMA-approved plan.

ADOPTED by a vote of 2 in favor and 0 against, and 0 abstaining, this 1<sup>st</sup> day of November, 2021

By (Sig): Kelly L. Murphy  
Print name: Kelly C. Murphy

By (Sig): Alexis A. Nixon  
Print name: Alexis A. Nixon



PO Box 117  
300 Doddridge  
Blackwater MO 65322

Phone: 660-846-2461  
Fax: 660-846-2431  
E-mail [tbrown@blackwater.k12.mo.us](mailto:tbrown@blackwater.k12.mo.us)  
Superintendent/Principal: Tanya Brown

**Blackwater R-II Elementary School**

*PAW PRIDE!*

November 11, 2021

To Whom It May Concern:

The Cooper County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F.R. 201.6.

Blackwater R-II School District has participated in the preparation of, and reviewed, the Cooper County Natural Hazard Mitigation Plan.

Blackwater R-II adopts the Cooper County Natural Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the Plan.

Sincerely,

Tanya Brown  
Superintendent

Board members present:



660-882-7474  
bpsk12.net  
736 Main Street  
Boonville, MO 65233

October 28, 2021

To Whom It May Concern:

The Cooper County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F.R. 201.6.

The Boonville R-I School District has participated in the preparation of, and reviewed, the Cooper County Natural Hazard Mitigation Plan.

The Boonville R-I School District adopts the Cooper County Natural Hazard Mitigation Plan as the jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the plan.

Sincerely,

Dr. Sarah Marriott  
Superintendent  
Boonville R-I School District



# COOPER COUNTY R-IV SCHOOL DISTRICT

DR. KATHRYN ANDERSON, SUPERINTENDENT

BRIAN ENDE, HIGH SCHOOL PRINCIPAL/AD

JESSICA HUTT, ELEMENTARY PRINCIPAL

**October 28, 2021**

Hazard Mitigation Plan Adoption Resolution

To Whom It May Concern:

The Cooper County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F.R. 201.6.

The Cooper County R-IV School District has participated in the preparation of, and reviewed, the Cooper County Natural Hazard Mitigation Plan.

The Cooper County R-IV School District and its patrons have informally approved the Natural Hazard Mitigation Plan presented. The district and its plan will vote to formally adopt the resolution the Cooper County Natural Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and further resolves to execute the actions in the Plan.

Sincerely,

Dr. Kathryn A. Anderson, Superintendent

*IT'S A GREAT DAY TO BE A DRAGON!*

WWW.BUNCETON.K12.MO.US  
500 E MAIN ST. BUNCETON, MO 65237  
MAIN OFFICE 660.427.5415



## Otterville RVI School District

101 W Georgetown Street, Otterville MO 65348

Supt. Cindy Beltz, 660-366-4391

Principal, Chad Harter, 660-366-4621

Fax 660-366-4293

To Whom It May Concern:

The Cooper County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F.R. 201.6.

The Otterville RVI School District has participated in the preparation of, and reviewed, the Cooper County Natural Hazard Mitigation Plan.

The Otterville RVI School District adopts the Cooper County Natural Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the Plan.

Sincerely,

Cindy Beltz, Superintendent  
11/15/2021

Mark Blankenship, BOE President  
11/15/2021



# *Pilot Grove C-4 School*

107 SCHOOL STREETS

*Pilot Grove, Missouri 65276*

**Ashley Groepper**  
Superintendent  
Phone: 660-834-6915  
Fax: 660-834-6925

**Lindsay Leonard**  
Elementary Principal  
Phone: 660-834-4115  
Fax: 660-834-4401

**R. Randall Glenn**  
Secondary Principal  
Phone: 660-834-4415  
Fax: 660-834-4401

**Janna Lammers**  
Student Services  
Phone: 660-834-4415  
Fax: 660-834-4401

November 9, 2021

To Whom It May Concern:

The Cooper County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F.R. 201.6.

The Pilot Grove C-4 School District has participated in the preparation of, and reviewed, the Cooper County Natural Hazard Mitigation Plan.

The Pilot Grove C-4 School District adopts the Cooper County Natural Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the Plan.

Sincerely,



Ashley Groepper  
Superintendent

# *Prairie Home R-V School District*

---

301 HWY DR

Prairie Home, MO 65068

Fax: 660-841-5513

**Scott Gemes**  
Superintendent  
660-841-5296

**Mark Shore**  
Principal  
660-841-5296

November 15<sup>th</sup>, 2021

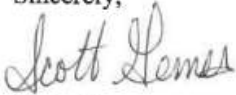
To Whom It May Concern:

The Cooper County Natural Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements at 44 C.F.R. 201.6.

The Prairie Home R-V School District has participated in the preparation of, and reviewed, the Cooper County Natural Hazard Mitigation Plan.

The Prairie Home R-V School District adopts the Cooper County Natural Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the Plan.

Sincerely,



Scott Gemes  
Superintendent

December 6, 2021

To whom it may concern:

The Cooper County Hazard Mitigation Plan is a multi-jurisdictional hazard mitigation plan prepared in accordance with FEMA requirements (Title 44 CFR 201.6, *Local Mitigation Plans*).

State Fair Community College has participated in the preparation of and reviewed the 2022 Cooper County Hazard Mitigation Plan as it relates to one of its extended campus locations in Boonville, MO, which is part of Cooper County.

State Fair Community College adopts the 2022 Cooper County Hazard Mitigation Plan as this jurisdiction's Hazard Mitigation Plan and resolves to execute the actions in the Plan.

Sincerely,



Dr. Joanna Anderson  
President

BLACKWATER AREA FIRE PROTECTION DISTRICT, Blackwater, Missouri

RESOLUTION NO. One 2021

A RESOLUTION OF THE BLACKWATER AREA FIRE PROTECTION DISTRICT ADOPTING THE  
*COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN*

WHEREAS the Blackwater Area Fire Protection District (BAFPD) recognizes the threat that natural hazards pose to people and property within the Blackwater Area Fire Protection District; and

WHEREAS the Blackwater Area Fire Protection District has participated in the preparation of a multi-hazard mitigation plan, hereby known as the Cooper County Multi-Jurisdictional Hazard Mitigation Plan, hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the Blackwater Area Fire Protection District from the impacts of future hazards and disasters; and

WHEREAS the Blackwater Area Fire Protection District recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the Blackwater Area Fire Protection District will endeavor to integrate the *Plan* into the comprehensive planning process and

WHEREAS adoption by the Blackwater Area Fire Protection District demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY THE Blackwater Area Fire Protection District, in the State of Missouri, THAT:

In accordance with Cooper County, the Blackwater Area Fire Protection District adopts the final FEMA-approved plan.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 4<sup>th</sup> day of November, 2021.

By (Sig):



Print name: Eddie Fahrendorf Jr, Chair, Blackwater Area Fire Protection District

ATTEST:

By (Sig.):



Print name: Marsha Root, Secretary, BAFPD

APPROVED AS TO FORM:

By (Sig.):



Print name: Tim Doty, chief



Cooper County Fire Protection District  
17010 Highway 87  
Boonville, MO 65233

RESOLUTION NO. \_\_\_\_\_

A RESOLUTION OF THE COOPER COUNTY FIRE PROTECTION DISTRICT ADOPTING  
THE COOPER COUNTY HAZARD MITIGATION PLAN 2022

WHEREAS the Cooper County Fire Protection District recognizes the threat that natural hazards pose to people and property within Cooper County; and

WHEREAS Cooper County, Missouri has prepared a multi-hazard mitigation plan, hereby known as Cooper County Hazard Mitigation Plan 2022 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS The Cooper County Hazard Mitigation Plan 2022 identifies mitigation goals and actions to reduce or eliminate longterm risk to people and property in Cooper County from the impacts of future hazards and disasters; and

WHEREAS adoption by the Cooper County Fire Protection District demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Cooper County Hazard Mitigation Plan 2022.

NOW THEREFORE, BE IT RESOLVED BY THE COOPER COUNTY FIRE PROTECTION DISTRICT, BOONVILLE, MISSOURI, THAT:

Section 1. In accordance with local rule for adopting resolutions, the Cooper County Fire Protection District adopts the Cooper County Hazard Mitigation Plan 2022.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, this 8<sup>th</sup> day of November, 2021.

By: Russell Gerling Pres  
Russell Gerling, Chairman

ATTEST:

By: Chris Kempf Secretary  
Chris Kempf, Secretary

APPROVED AS TO FORM:

By: David Gehm  
David Gehm, Fire Chief



## Otterville Fire Protection District

P.O. Box 67 Otterville, MO 65348

1-660-596-4705 Fax 1-660-366-4705

11-11-2021

The Otterville Fire Protection met Wednesday, November 10<sup>th</sup> 2021 at 5pm. At that meeting a motion was made to adopt the Cooper County Hazard Mitigation Draft. The motion passed by a 4-0 vote. One board member was absent.

Mark Blankenship

Chief

George Sponcler

Board President

Pilot Grove Area Fire Protection District  
PO Box 133  
612 College St.  
Pilot Grove, MO 65276



RESOLUTION NO. 0700-1-2021

A RESOLUTION OF THE PILOT GROVE AREA FIRE PROTECTION DISTRICT ADOPTING THE COOPER COUNTY HAZARD MITIGATION PLAN 2022

WHEREAS the Pilot Grove Area Fire Protection District recognizes the threat that natural hazards pose to people and property within Cooper County; and

WHEREAS Cooper County, Missouri has prepared a multi-hazard mitigation plan, hereby known as Cooper County Hazard Mitigation Plan 2022 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS The Cooper County Hazard Mitigation Plan 2022 identifies mitigation goals and actions to reduce or eliminate long term risk to people and property in Cooper County from the impacts of future hazards and disasters; and

WHEREAS adoption by the Pilot Grove Area Fire Protection District demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Cooper County Hazard Mitigation Plan 2022.

NOW THEREFORE, BE IT RESOLVED BY THE PILOT GROVE AREA FIRE PROTECTION DISTRICT, THAT:

Section 1. In accordance with the By Laws, the Pilot Grove Area Fire Protection District adopts the Cooper County Hazard Mitigation Plan 2022.

ADOPTED by a vote of 5 in favor and 0 against, this 2<sup>nd</sup> day of November, 2021.

By: Herb Twenter Herb Twenter, Chairman

ATTEST: Lance Twenter  
By: Lance Twenter Lance Twenter, Vice Chairman

By: Terry Vollmer Terry Vollmer, Secretary

By: Brian Hoff Brian Hoff, Treasurer

By: John Fortman John Fortman, Board member

APPROVED AS TO FORM:

By: Gordon Shay Gordon Shay, Fire Chief

## **Appendix B: Sign-In Sheets**



PLEASE PRINT SO WE CAN READ IT

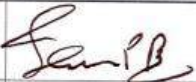


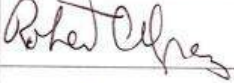






**COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE  
KICKOFF MEETING—SIGN-IN SHEET**

|                     |   |                           |   |
|---------------------|---|---------------------------|---|
| <b>Project:</b>     | Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                      | <b>Meeting Date/Time:</b> | August 11, 2021<br>5:30pm   |
| <b>Facilitator:</b> | Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-MO Regional Planning Commission | <b>Place/Room:</b>        | Cooper Co Fire Protection<br>16994 Highway 87 (16994 Highway 87, Boonville, MO 65233) |

| Name               | Title           | Department/Agency         | Email   | Phone #        | Signature   |
|--------------------|-----------------|---------------------------|---|----------------|-------------|
| Larry Oerly        | Director        | Cooper County EMA         | larry.oerly@cooper-county.mo.gov                    | 660-898-5737   | [Signature] |
| Ron McCord         | Deputy Dir.     | Cooper Cntry EMA          | ron.mccord@cooper-county.mo.gov                     | 573-239-0115   | [Signature] |
| DAVID GEHM         | FIRE Chief      | Cooper County FPD         | dgehm@dghm.com                                      | (660) 537-1332 | [Signature] |
| MARK BLANKENSHIP   | FIRE Chief.     | Ottoville FPD             | markb904@yahoo.com                                  | 660-596-4705   | [Signature] |
| MARK BLANKENSHIP   | Board President | Ottoville R-6 School Dist | markb904@yahoo.com                                  | 660-596-4705   | [Signature] |
| Steve Gilson       | Chairman        | Village of Windsor        | Steve Gilson 480<br>Burlington & Boonville, Mo. ORC | 660-888-4485   | [Signature] |
| BOBBY WELLS        | ALDERMAN        | Boonville                 |   | 660-621-0283   | [Signature] |
| RICHARD WILSON     | ALDERMAN        | BLACKWATER                |   | 660-868-1637   | [Signature] |
| Jeanne King        | Alderman        | Blackwater City Council   | jking341@gmail.com                                  | 660-537-3410   | [Signature] |
| CHARLIE MELKERSMAN | Commissioner    | COOPER COUNTY             | CHARLIE.MELKERSMAN@cooper-county.mo.gov             | 660-537-2082   | [Signature] |





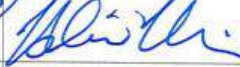



## COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE KICKOFF MEETING—SIGN-IN SHEET

|   |  |
|---|--|
| <b>Project:</b> Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                          | <b>Meeting Date/Time:</b> August 11, 2021<br>5:30pm  |
| <b>Facilitator:</b> Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-MO Regional Planning Commission | <b>Place/Room:</b> Cooper Co Fire Protection<br>16994 Highway 87 (16994 Highway 87, Boonville, MO 65233) |

| Name             | Title                   | Department/Agency                 | Email                               | Phone #                  | Signature   |
|------------------|-------------------------|-----------------------------------|-------------------------------------|--------------------------|---|
| Tom Bust         |                         | Cooper County<br>Emp              | tom.bust@coopercountymo.gov         | 573-355-0690             |    |
| Dennis Krupp     | Mayor                   | City of Pilot Grove               | mayor, city of<br>Pilot Grove@gmail | 824 3551                 |    |
| CHRIS CLASS      | SHERIFF                 | Cooper County<br>Sheriff's Office | chris.class@coopercountymo.gov      | 660<br>537-3335          |    |
| Robert Alpers    | V.P.                    | O.W. Levee<br>Dist                | ralpers1957@gmail.com               | 660-621<br>4404          |    |
| Bethany Pfeiffer | Director                | State Fair CC                     | bpfeiffer2@stfair.edu               | 660-888-2324             |    |
| Fred Smith       | Asst Supt               | Boonville R1                      | Fred.Smith@bpskb.net                | 660-888-7474<br>ext 2327 |    |
| Mary Sue Fontana | City Clerk              | Prairie Home                      | cityclerk@cityprairiehome.com       | 660 841<br>5504          |   |
| Kandon Leathers  | President               | Cooper CPWSD #1                   | rleathers@hotmail.com               | 573<br>618-3950          |  |
| Scott Gemes      | Superintendent          | Prairie Home R-V                  | sgemes@prairiehome.k2.missouri.gov  | (660)<br>841<br>5296     |  |
| Danny Lamm       | Western<br>Commissioner | Boonville                         | dannylamm@gmail.com                 | 660-621-1240             |  |

## COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE KICKOFF MEETING—SIGN-IN SHEET

|   |  |
|---|--|
| <b>Project:</b> Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                          | <b>Meeting Date/Time:</b> August 11, 2021<br>5:30pm  |
| <b>Facilitator:</b> Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-MO Regional Planning Commission | <b>Place/Room:</b> Cooper Co Fire Protection<br>16994 Highway 87 (16994 Highway 87, Boonville, MO 65233) |

| Name             | Title                    | Department/Agency                 | Email                        | Phone #                      | Signature   |
|------------------|--------------------------|-----------------------------------|------------------------------|------------------------------|---|
| William Johnson  |                          | CCFD                              | POINTTECHNOLOGY@YAHOO.COM    | 573-999-3964                 |    |
| Kathryn Anderson | Superint.                | Bunceton<br>Cooper County R-4     | kanderson@bunceton.k12.mo.us | 660-427-5947                 |    |
| Adam Shay        | Fire Chief               | Pilot Center                      | gshay19561@gmail.com         | 660-865-9606                 |    |
| John Fortman     | PG Fire<br>Book Director | PGAFPD                            | jfortman@natural.com         | 660-888-6424<br>660-366-4613 |    |
| Valarie Main     | City Clerk               | City of Otterville                | vmain@ottervillema.gov       | 660-366-4613                 |    |
| Deborah Lake     | Mayor                    | City of Otterville                | dlake@ottervillema.gov       | 660-366-4613                 |    |
| Tom Loesing      | PHRFPD                   | prairie home                      |                              | 660-992-9452                 |   |
| Ron McCord       | BOARD                    | HARVEST HOUSE<br>Homeless Shelter | SAMS AS ABOVE                |                              |  |
|                  |                          |                                   |                              |                              |   |
|                  |                          |                                   |                              |                              |   |

Please Print

| COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE<br>MEETING #2—SIGN-IN SHEET |   |  |
|--|---|--|
| <b>Project:</b>  | Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                            | <b>Meeting Date/Time:</b> September 8, 2021<br>5:30pm – 8:30pm                                 |
| <b>Facilitator:</b>  | Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-Missouri Regional Planning Commission | <b>Place/Room:</b> Cooper Co Fire Protection District 16994 Highway<br>87, Boonville, Missouri |

| Name              | Title           | Department/Agency         | Email                                | Phone #      | Drive Time in minutes | Signature   |
|-------------------|-----------------|---------------------------|--------------------------------------|--------------|-----------------------|-------------|
| Fred Smith        | ASST Supt.      | Boonville R-1             | Fred.Smith@bpsk12.net                | 660-882-7474 |                       | [Signature] |
| Don Baragery      | Commissioner    | Cooper County             | don.baragery@coopercountymo.gov      | 660-888-0697 |                       | [Signature] |
| CHARLIE MELKERMAN | Commissioner    | Cooper County             | CHARLIE.MELKERMAN@COOPERCOUNTYMO.GOV | 660-537-2082 |                       | [Signature] |
| BOBBY WELLS       | CHIEF OF POLICE | Boonville P.D.            | BOB.WELLS@BOONVILLEPA.ORG            | 660-882-2727 |                       | [Signature] |
| Dennis Knipp      | Mayor           | City of PG                | cityofpilot.com                      | 660-334-3315 | 15                    | [Signature] |
| Danny Lamm        | Commissioner    | Cooper County             | Dannylamm@coopercountymo.gov         | 660-621-1240 |                       | [Signature] |
| Chris Kirk        | ENGINEER        | Boonville Fire            |                                      | 660-882-2606 |                       | [Signature] |
| Kathryn Anderson  | Superint.       | Cooper County R-II Schols | kanderson@buneton.k12.mo.us          | 660-477-5347 | 20                    | [Signature] |
| Ashley Broepper   | Superintendent  | Pilot Grove C-4           | agroepper@pilotgrove.k12.mo.us       | 573-694-5433 | 15                    | [Signature] |
| Tom Busk          | Admin           | EMC-CC                    | tom.busk@emc-cc.com                  | 573-355-0690 | 5                     | [Signature] |



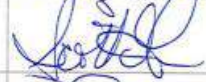




Please Print

| COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE<br>MEETING #2—SIGN-IN SHEET |   |                           |   |
|--|---|---------------------------|---|
| <b>Project:</b>  | Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                            | <b>Meeting Date/Time:</b> | September 8, 2021<br>5:30pm – 8:30pm  |
| <b>Facilitator:</b>  | Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-Missouri Regional Planning Commission | <b>Place/Room:</b>        | Cooper Co Fire Protection District 16994 Highway<br>87, Boonville, Missouri |

| Name             | Title           | Department/Agency     | Email                     | Phone #      | Drive Time in minutes | Signature |
|------------------|-----------------|-----------------------|---------------------------|--------------|-----------------------|-----------|
| Gordon Gray      | Fire Chief      | Pilot Grove           | Same                      | 5422         |                       |           |
| John Fortmann    | Fire Board      | Pilot Grove           | johnfortman@district.com  | 660-888-6424 | 30                    |           |
| Mark Blankenship | Fire Chief      | Otterville FPD        | Markblankenship@yahoo.com | 660-596-4703 | 30                    |           |
| Mark Blankenship | Board President | Otterville R-L School | Markblankenship@yahoo.com | 660-596-4703 | 30                    |           |
| Deborah Lake     | Mayor           | City of Otterville    | dlake@ottervillemo.gov    | 660-473-0790 | 30                    |           |
| Valerie Mann     | City Clerk      | City of Otterville    | vman@ottervillemo.gov     | 660-473-3365 | 30                    |           |
| Jeanne King      | Alderman        | City of Blackwater    | jinking3416@gmail.com     | 660-537-3416 | 30                    |           |
| Tim Doty         | chief           | Blackwater Fire       | timdianndoty@gmail.com    | 600-816-2297 | 30                    |           |
| Richard Wilson   | Alderman        | BLACKWATER            | —                         | 660-888-1677 | 30                    |           |

① Please Print

| COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE<br>MEETING #2—SIGN-IN SHEET |   |                           |   |
|--|---|---------------------------|---|
| <b>Project:</b>  | Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                            | <b>Meeting Date/Time:</b> | September 8, 2021<br>5:30pm – 8:30pm  |
| <b>Facilitator:</b>  | Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-Missouri Regional Planning Commission | <b>Place/Room:</b>        | Cooper Co Fire Protection District 16994 Highway<br>87, Boonville, Missouri |

| Name Print       | Title            | Department/Agency           | Email   | Phone #      | Drive Time in minutes | Signature   |
|------------------|------------------|-----------------------------|---|--------------|-----------------------|---|
| Ron McCord       | Deputy Director  | Cooper County EMA           | ron.mccord@cooper-county-mo.gov<br>RonMcCord@coopercountymo.gov | Same         | 20                    |    |
| Mary Sue Fontana | City Clerk       | City of Prairie Home        | cityclerk@city.prairiehome.com                                  | 660 841 5524 | 15                    |    |
| Scott Gemes      | Superintendent   | Prairie Home R-V            | sgemes@prairiehome.k12.mo.us                                    | 660 841-5296 | 15                    |    |
| Tom White        |                  | Cooper County Public Health | thrusk@cooper-county-mo.gov<br>PubHealth@coopercountymo.gov     | 660 621 7553 | 15                    |    |
| Larry Oerly      | Director         | Cooper Co EMA               | larry.oerly@coopercountymo.gov                                  | 660-588-5737 | 3                     |    |
| DAVID GEHM       | FIRE CHIEF       | Cooper County FPD           | dgehm@qehm.com  | 660-537-1332 | 15                    |   |
| KATHY Anderson   | Bunceton Repres. | Bunceton MO                 | Katanderson05@yahoo.com   | 660 885 1335 | 20                    |  |
|                  |                  |                             |   |              |                       |   |
|                  |                  |                             |   |              |                       |   |

**COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE  
MEETING #3—SIGN-IN SHEET**

|                     |   |                           |   |
|---------------------|---|---------------------------|---|
| <b>Project:</b>     | Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                            | <b>Meeting Date/Time:</b> | September 22, 2021<br>5:30pm – 8:30pm                                       |
| <b>Facilitator:</b> | Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-Missouri Regional Planning Commission | <b>Place/Room:</b>        | Cooper Co Fire Protection District 16994 Highway<br>87, Boonville, Missouri |

| Name – Please print | Title                        | Department/Agency               | Email                          | Phone #      | Drive Time in minutes | Signature        |
|---------------------|------------------------------|---------------------------------|--------------------------------|--------------|-----------------------|------------------|
| Bobby Welliver      | Chief of Police              | Boonville P.D.                  | Bwelliver@boonville-mo.gov     | 660-621-0273 |                       | Bobby Welliver   |
| John Fortman        | PG Board Fire Member         | Pilot Grove Area Fire Dist Dist | jfortman@pilotgrovefire.com    | 660-838-6424 |                       | John Fortman     |
| Jeanie Fortman      | Wife                         | "                               | "                              | "            |                       | Jeanie Fortman   |
| David Gehm          | Fire Chief                   | CCFPD                           | dgehm@qehm.com                 | 660-882-3485 |                       | David Gehm       |
| Dennis Knipp        | Mayor                        | City of Pilot Grove             | cityofpilotgrove@gmail.com     | 660-834-3551 |                       | Dennis Knipp     |
| Scott Gemes         | Superintendent               | Prairie Home #1                 | sgemes@prairiehome.k12.mo.us   | 660-841-5296 |                       | Scott Gemes      |
| Ashley Groepper     | Superintendent               | Pilot Grove                     | agroepper@pilotgrove.k12.mo.us | 660-834-6915 |                       | Ashley Groepper  |
| Bethany Pfeiffer    | Director                     | SFCC                            | bpfeiffer2@sfccmo.edu          | 660-888-2354 |                       | Bethany Pfeiffer |
| Tanya Brown         | Superintendent               | Blackwater R-II                 | tbrown@blackwater.k12.mo.us    | 573-694-3726 |                       | Tanya Brown      |
| Kathryn Anderson    | Buncheon Township Represent. | City of Buncheon                | 309 Cleveland<br>Buncheon, MO  | 660-885-1335 |                       | Kathryn Anderson |

**COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE  
MEETING #3—SIGN-IN SHEET**

|                     |   |                           |  |
|---------------------|---|---------------------------|--|
| <b>Project:</b>     | Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                            | <b>Meeting Date/Time:</b> | September 22, 2021<br>5:30pm – 8:30pm                                    |
| <b>Facilitator:</b> | Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-Missouri Regional Planning Commission | <b>Place/Room:</b>        | Cooper Co Fire Protection District 16994 Highway 87, Boonville, Missouri |

| Name – Please print | Title                      | Department/Agency           | Email                           | Phone #      | Drive Time in minutes | Signature |
|---------------------|----------------------------|-----------------------------|---------------------------------|--------------|-----------------------|-----------|
| Larry Oerly         | Director                   | Cooper Co EMA               | larry.oerly@coopercountymo.com  | 660-558-5737 | 17.15                 |           |
| Valarie Main        | City Clerk                 | City of Otterville          | vmain@ottervillemo.gov          | 660-366-4613 | 30min                 |           |
| Deborah Lake        | Mayor                      | " "                         | dlake@ottervillemo.gov          | 660-366-4613 | 30min                 |           |
| WILLIAM JOHNSON     |                            | CCFPD                       | POINTTECHNOLOGY@YALOO.COM       | 573-995-9904 |                       |           |
| RICHARD WILSON      | ALTERNATE                  | Blackwake                   |                                 | 660-858-1631 | 20min                 |           |
| Kathryn Anderson    | Supt. Presiding            | Cooper County R-II          | Kanderson@bunker.k12.mo.us      | 660-427-5347 | 20min                 |           |
| Don Basagery        | Commissioner               | Cooper County               | don.basagery@coopercountymo.com | 660-888-0169 | 20min                 |           |
| CHARLIE MELKERSMAN  | Commissioner               | COOPER COUNTY               | CHARLIE.MELKERSMAN@CMCMA.NET    | 660-537-2052 | 10min                 |           |
| Danny Larm          | Cooper County Commissioner | Cooper County               | danny.larm@coopercountymo.gov   | 660-621-1240 | 15 min                |           |
| Tom White           |                            | Cooper County Public Health | thomas.white@coopercountymo.gov | 660-882-2622 | 15 min                |           |



**COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE  
MEETING #4—SIGN-IN SHEET**

|                     |   |                           |  |
|---------------------|---|---------------------------|--|
| <b>Project:</b>     | Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                            | <b>Meeting Date/Time:</b> | October 27, 2021<br>5:30pm – 8:30pm                                      |
| <b>Facilitator:</b> | Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-Missouri Regional Planning Commission | <b>Place/Room:</b>        | Cooper Co Fire Protection District 16994 Highway 87, Boonville, Missouri |

| Name – Please print | Title                   | Department/Agency                  | Email                           | Phone #      | Drive Time in minutes | Signature        |
|---------------------|-------------------------|------------------------------------|---------------------------------|--------------|-----------------------|------------------|
| Missa Stafford      | Regional Planner        | RPC                                |                                 |              | 1 hr 30 min           | Melissa Stafford |
| Fred Smith          | ASST. Supt.             | BOONVILLE R-1 SCHOOLS              |                                 |              | 3 min                 | Fred Smith       |
| BOBBY WELLEN        | CHIEF P.I.C.            | BOONVILLE P.D.                     | BOONVILLE MO. 616               |              | 3 min                 | Bobby Wellen     |
| John FORTMAN        | PLA P.D. Board          | Pilot Grove Area Fire Prot Dist    | John Fortman District.com 6424  | 660 555      | 20 min                | John Fortman     |
| Gordon Gray         | Fire                    | Pilot Grove                        |                                 |              |                       | Gordon Gray      |
| William Johnson     | SAFETY OFFICER<br>CCFPD | Cooper Co Fire PROTECTION DISTRICT |                                 | 573 999 9904 | 1 hr 10 min           | William Johnson  |
| Larry Oerly         | Director                | Cooper County EMA                  | larry.oerly@coopercounty.mo.gov | 660-886-5737 | 10 min                | Larry Oerly      |
| DAVID GELM          | CHIEF                   | Cooper Co Fire                     | dgelme@gelmic.com               | 660-882-3425 | 15                    | David Gelm       |
| RON McLeod          | Deputy                  | Cooper City EMA                    |                                 | 573-259-0115 | 5                     | Ron McLeod       |
| Mary Sue Fortona    | City Clerk              | City of Prairie Home               | cityclerk@cityprairiehome.com   | 660-841-5534 | 10                    | Mary Sue Fortona |

**COOPER COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE  
MEETING #4—SIGN-IN SHEET**

|                     |   |                           |  |
|---------------------|---|---------------------------|--|
| <b>Project:</b>     | Cooper County, Missouri Multi-jurisdictional Hazard Mitigation Plan Update                            | <b>Meeting Date/Time:</b> | October 27, 2021<br>5:30pm – 8:30pm                                      |
| <b>Facilitator:</b> | Melissa Stafford, Regional Planner & Procurement Officer<br>Mid-Missouri Regional Planning Commission | <b>Place/Room:</b>        | Cooper Co Fire Protection District 16994 Highway 87, Boonville, Missouri |

| Name – Please print | Title                     | Department/Agency   | Email                          | Phone #        | Drive Time in minutes | Signature          |
|---------------------|---------------------------|---------------------|--------------------------------|----------------|-----------------------|--------------------|
| Ashley Croepper     | Superintendent            | Pilot Grove C-4     | agroepper@pilotgrove.k12.mo.us | 600-834-6715   | 15                    | Ashley Croepper    |
| Kathryn Anderson    | Superintendent            | Cooper County R-III | kanderson@boonville.k12.mo.us  | 660-427-5347   | 20                    | Kathryn Anderson   |
| Jeanne King         | Alderman                  | Blackwater          | jking3410@gmail.com            | 660-537-3410   | 30                    | Jeanne King        |
| Bethany Pfeiffer    | Director                  | SFCC - Boonville    | bpfeiffer@sfccmo.edu           | 660-888-2384   | 5                     | Bethany Pfeiffer   |
| Tim Doty            | chief                     | Blackwater Fire     | timdianndoty@gmail.com         | 660-621-9333   | 20                    | Tim Doty           |
| Tanya Brown         | Superintendent            | Blackwater R-II     | tbrown@blackwater.k12.mo.us    | 573-644-3726   | 10                    | Tanya Brown        |
| Scott Gemes         | Superintendent            | Prairie Home R-V    | sgemes@prairiehome.k12.mo.us   | (660) 811-5294 | 10                    | Scott Gemes        |
| Cindy Beltz         | <del>Superintendent</del> | Otterville SD       | cbeltz@otterville.k12.mo.us    | (660) 646-9143 | Ø                     | on conference line |
|                     |                           |                     |                                |                |                       |                    |
|                     |                           |                     |                                |                |                       |                    |

