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# 2021 JASPER-NEWTON BI-COUNTY NATURAL HAZARD MITIGATION PLAN

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## Introduction

Located at the eastern edge of the Great Plains' tall-grass prairie region, Jasper County and Newton County, Missouri have a minimized exposure to a limited array of natural disasters unlike other areas of North America. The counties are virtually unknown to hurricanes, tsunamis, tidal surges, landslides, and forest fires. Furthermore, the geology of the region reduces the risk of an earthquake to a minimal threat. However, both counties are susceptible to other natural hazards. Tornadoes and severe thunderstorms, severe winter storms, drought, and heat waves are all hazards that impact the county on a routine basis, endangering both lives and property.

Mitigation is the means by which business and residential development can mitigate the impacts of a disaster if action is taken before the event occurs. The first action to reduce the effects of a disaster is the preparation and implementation of a comprehensive mitigation strategy. Given the area's history of principally ice storms, floods, and tornadic disasters, Jasper and Newton Counties are involved in intentional planning processes to make themselves more resistant to the long-term, negative impacts of these events. This process has helped both counties develop a more established partnership, a working mitigation plan through providing information to the public, and encouraging all parties throughout these jurisdictions to develop their own mitigation plans. Both Jasper and Newton County passed their first individual Natural Hazard Mitigation plans in 2005. An update was completed for each county in 2010. When planning began for the previous five-year update in 2015, it was decided that a bi-county plan would best serve the region due to the geographic location of Joplin which is bisected by the county line. This updated 2021 plan continues to build on the foundation established by the previous plans, but also continues to focus on the creation and implementation of an inter-county plan which considers both existing and potential mitigation actions that can continue to improve resilience and readiness to natural disasters for both counties and their internal jurisdictions.

Section 1 of this plan provides general background data for Jasper and Newton counties. This includes population statistics, identification of critical facilities, and general information regarding the county's infrastructure. Understanding "where you are" is a fundamental component of the planning process. This section provides a snapshot of each county to assist in the implementation of this plan.

Section 2 identifies and explores the types and likelihood of hazards occurring in Jasper and Newton counties. It also provides a general overview of each of the identified natural hazard and attempts to explain the impact upon each county should such a hazard occur, given experience from previous events.

Section 3 provides a capability assessment of Jasper and Newton counties regarding a natural disaster. It outlines the counties' disaster response capabilities and seeks to identify those agreed upon areas which the counties may improve in disaster mitigation. Specifically, it identifies key personnel, organizational leaders, and existing plans regarding emergency planning. In addition, it provides a brief assessment of each municipality's readiness regarding hazard mitigation.

Section 4 provides mitigation goals, objectives, and plans in response to each identified natural

disaster. Each disaster has specific challenges identified with its respective occurrence, overall goals to reduce a disaster's effect, specific objectives towards achieving those goals, and implementation plans for the county to pursue.

For this plan to be successfully implemented, it must be periodically reviewed and updated as circumstances and technological capabilities advance. Adoption of this plan is not the end, but rather the continuation of a long-term commitment to disaster mitigation planning. The Jasper-Newton Bi-County Mitigation Plan is a multi-jurisdictional plan that represents multiple local governments and entities within each county. The following local governments participated in the 2021 plan revision either by participating in planning meeting discussions and calls, and/or completing the jurisdictional survey, and acknowledge the plan through formal adoption:

**Jasper County:**

- Airport Drive
- Alba
- Avilla
- Brooklyn Heights
- Carl Junction
- Carterville
- Carthage
- Carytown
- Duenweg
- Duquesne
- Fidelity
- Jasper
- Jasper County
- Joplin
- La Russell
- Neck City
- Oronogo
- Purcell
- Sarcoxie
- Waco
- Webb City

**Newton County:**

- Dennis Acres
- Diamond
- Fairview
- Granby
- Grand Falls Plaza
- Leawood
- Loma Linda
- Neosho
- Newton County
- Newtonia
- Redings Mill
- Ritchey
- Saginaw
- Seneca
- Wentworth



The following school districts and institutions of higher education also participated in the 2021 revision. They also acknowledge the plan through formal adoption:

**Jasper County:**

- Avilla R-XIII
- Carl Junction R-I
- Carthage R-IX
- Jasper Co. R-V
- Joplin Schools
- Missouri Southern State University
- Sarcoxie R-II
- Webb City R-VII

**Newton County:**

- Crowder College – Not 2021
- Diamond R-IV
- East Newton Co. R-VI
- Neosho R-V
- Seneca R-VII
- Westview C-6 – Not 2021
- Joplin School

The following private schools chose not to participate in the 2021 plan, although their 2015 data has been retained to provide a comprehensive assessment of the bi-county region.

- College Heights Christian School
- Joplin Area Catholic School System (McAuley Catholic High School)Lighthouse Christian Academy
- Martin Luther School
- Neosho Christian School
- Ozark Christian College
- St. Ann’s Catholic School
- Vatterott College in Joplin was closed in 2017.

The following jurisdictions did not to participate in the 2021 plan development, although their 2015 data was retained to provide a comprehensive assessment of the bi-county region .

- **Asbury**
  - Though Asbury participated in the 2010 plan, they chose not to participate in 2015 or 2021.
- Reeds
  - Reeds did not participate in the 2010 or 2015 plan, nor did they participate in 2021.
- Cliff Village
  - Cliff Village did not participate in the 2010 plan, nor did they participate in 2015 or

2021.

- La Russell
  - Though La Russell participated in the 2010 plan, they chose not to participate in 2015 or 2021.
- Shoal Creek Estates
  - Shoal Creek Estates did not participate in the 2010 plan, nor did they participate in 2015 or 2021.
- Stark City
  - Though Stark City participated in the 2010 plan, no response was received for participation in 2015 or 2021 despite numerous attempts to contact their leadership.
- Stella
  - Stella participated in the 2010 plan, no response was received for participation in 2015 or 2021 despite numerous attempts to contact their leadership.
- Waco
  - Chose not to participate this planning cycle.
- Wentworth
  - Chose not to participate this planning cycle.

## Prerequisites

### Requirement §201.6(c)(5)

**For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.**

The following jurisdictions participated in the plan update process and have formally adopted the updated Hazard Mitigation Plan. Adoption resolutions are included in Appendix A.

#### Jasper County:

- Airport Drive
- Alba
- Avilla
- Brooklyn Heights
- Carl Junction
- Cartersville
- Carthage
- Carytown
- Duenweg
- Duquesne
- Fidelity
- Jasper
- Jasper County
- Joplin
- Neck City
- Oronogo
- Purcell
- Sarcoxie
- Webb City
- Avilla R-XIII
- Carl Junction R-I
- Carthage R-IX
- Jasper Co. R-V
- Joplin Schools
- Missouri Southern State University
- Sarcoxie R-II
- Webb City R-VII

#### Newton County:

- Dennis Acres
- Diamond
- Fairview
- Granby
- Grand Falls Plaza
- Leawood
- Loma Linda
- Neosho
- Newton County
- Newtonia
- Redings Mill
- Ritchey
- Saginaw
- Seneca
- Shoal Creek Drive
- Wentworth
- Diamond R-IV
- East Newton Co. R-VI
- Neosho R-V
- Seneca R-VII
- Joplin Schools

**Requirement §201.6(c)(5) Multi-Jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process.**

The Harry S Truman Coordinating Council (HSTCC), on behalf of Jasper County and Newton County, invited incorporated cities, school districts, area colleges, and private non-profit entities in the County to participate in the Jasper-Newton Bi-County Multi-Jurisdictional Hazard Mitigation Plan update. The Disaster Mitigation Act of 2000 (DMA 2000) requires that jurisdictions represented by a multi-jurisdictional plan participate in the planning process and formally adopt the plan. Each participating jurisdiction was required to meet plan participation requirements as defined by HSTCC at the beginning of the planning process.

Minimum participation requirements are defined as follows:

- Provide information to support plan update through **at least one** of the following methods:
  - Completion of data worksheets regarding hazard mitigation; or
  - Attendance at public meetings specific to this planning process.
- Formal adoption of the mitigation plan.

These minimum requirements were established as such due to the nature of the counties' jurisdictions. Many jurisdictions, particularly those with a population less than 1,000, do not have full time city staff nor paid leadership. Requiring attendance at a meeting places a difficult burden on these small cities and had the potential to negate their participation. By allowing participation in a virtual way (i.e. completion of worksheets, phone interviews, and review of the plan draft), HSTCC ensured that the majority of jurisdictions, despite their size, were able to continue their participation in hazard mitigation planning.

Per its contract with the State Emergency Management Agency (SEMA), Jasper County, and Newton County, the Harry S. Truman Coordinating Council organized meetings, compiled data, and drafted the plan update which was submitted to the committee for approval. All of the jurisdictions listed as participants in the plan update met the minimum participation requirements as indicated in the table below. Documentation in the form of sign-in sheets for attendance at group meetings as well as time sheets for meetings with HSTCC staff is included in *Appendix B: Documentation of Public Participation*. The summary of all jurisdictional input is included in Section 4, Table 4.2, *Jasper - Newton Bi-County Objective Assessment*.

**Table A: Hazard Mitigation Participation by Jurisdiction**

Participant	County	Completion of Data Worksheets	Meeting Attendance /Interviews	Formal plan adoption 2021	Not participating
Airport Drive	Jasper	X			
Alba	Jasper	X			
Asbury	Jasper				
Avilla	Jasper				
Brooklyn Heights	Jasper				
Carl Junction	Jasper				
Cartersville	Jasper	X			
Carthage	Jasper		X		
Carytown	Jasper				
Cliff Village	Newton				
Dennis Acres	Newton	X			
Diamond	Newton	X			
Duenweg	Jasper	X	X		
Duquesne	Jasper				
Fairview	Newton				
Fidelity	Jasper				
Granby	Newton				
Grand Falls Plaza	Newton	X			
Jasper	Jasper				
Jasper County	Jasper				
Joplin	Jasper / Newton		X		
La Russell	Jasper				
Leawood	Newton	X	X		
Loma Linda	Newton				
Neck City	Jasper				
Neosho	Newton		X		
Newton County	Newton				
Newtonia	Newton	X			
Oronogo	Jasper	X			
Purcell	Jasper				
Redings Mill	Newton				
Reeds	Jasper				X
Ritchey	Newton	X			
Saginaw	Newton	X	X		
Sarcoxi	Jasper	X			
Seneca	Newton	X			
Shoal Creek Drive	Newton				
Shoal Creek Estates	Newton				
Stark City	Newton				
Stella	Newton				
Waco	Jasper				X
Webb City	Jasper		X		
Wentworth	Newton				
Avilla R-XIII	Jasper				
Carl Junction R-I	Jasper	X			

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Carthage R-IX	Jasper	X			
College Heights Christian School	Jasper				X
Crowder College	Newton				X
Diamond R-IV	Newton	X			
East Newton R-VI	Newton	X			
Jasper R-V	Jasper				
Joplin Schools	Jasper/Newton	X	X		
Lighthouse Christian Academy	Newton				X
Martin Luther School	Jasper				X
McCauley Catholic High School	Jasper				X
Missouri Southern State University	Jasper	X			
Neosho Christian School	Newton				X
Ozark Christian College	Jasper	X	X		
Sarcoxic R-II	Jasper		X		
Seneca R-VII	Newton	X			
St. Ann's Catholic School	Jasper				X
Webb City R-VII	Jasper				
Westview C-6	Newton				X

The planning committee was composed of members drawn from local entities, city and county representatives, as well as private citizens from each jurisdiction. Table B on the following page provides the names of committee members and the jurisdictions represented in the planning process. Representatives worked to provide information about their jurisdictions through worksheets and meeting attendance. Input from the general public, as well as surrounding jurisdictions, was also solicited prior to each meeting through press releases and public announcements. The Public Survey was released in February 2019 and received 31 responses from citizens and community organizations. In June 2019, approximately 100 Organizational Surveys were sent out with **xx responses**. Sample survey worksheets submitted are provided as part of *Appendix B: Documentation of Public Participation*.

Beginning in January 2019 and continuing through July 2019, the Hazard Mitigation Committee met to provide information for the update of the Jasper-Newton Bi-County Hazard Mitigation Plan. At the initial meeting in January, the committee reviewed and discussed the applicability of each portion in the original Hazard Mitigation Plan and opted to accept identified hazards and goals, actions, and objectives of the plan. Committee members were asked to provide updated information on critical response capabilities and assets, as well as report progress on 2015 goals within their jurisdictions for the March and May 2019 meetings.

<b>Table B Hazard Mitigation Committee Members</b>		
<b>Jurisdiction</b>	<b>Name</b>	<b>Title</b>
Jasper County	Keith Stammer	Emergency Management Director
Newton County	Charla Geller Greg Hickman	Emergency Management Director Emergency Management
Airport Drive	Sue Hirshey	Trustee
Alba	Brenda Gardner	City Clerk
Brooklyn Heights	Vera Rector	Trustee
Carl Junction	Steve Lawyer	City Administrator
Cartersville	William L. Cline	City Administrator
Carthage	Roger Williams Morgan Housh David Myers	Fire Chief / EMD City Administrator Carthage Fire
Dennis Acres	Jim Parrill	Trustee
Diamond	Shelley Loyd	Mayor
Duenweg	Ron Klein	City Administrator
Fairview	Tammy O'Brien	Admin
Fidelity	Teri Neil	Trustee
Granby		
Grand Falls Plaza	Fred Pugh	Village Clerk
Joplin	James Ferguson Matthew Stewart	Fire Chief Police Chief
Leawood	Denny Desmond	Village Chairman
Loma Linda	Bruce Anderson	Chairman/ Mayor
Neck City	Wayne Snyder	Mayor
Neosho	Rachel Holcomb	Asst. City Manager/City Clerk
Newtonia	Janette Kleindle	Trustee
Oronogo	Chris Carrigan	Chief of Police
Redings Mill	Rence Jung	Trustee
Ritchey	Diana Hawkins	City Clerk
Saginaw	Jed Schlegel Tony Robyn	Chairman Trustee
Sarcoxic	Bert Carnes	Fire Department
Seneca	Mark Bennett	Trustee
Webb City	Don Melton	Police
Avilla R-XIII	Russ Cruzan	Superintendent
Carl Junction R-I	Gary Reed	Asst. Superintendent
Carthage R-IX	Gregg Wolf Melony Houlihan	Administrator Administrator
Diamond R-IV	Steve Hubbard	Superintendent
East Newton R-VI	Rusty McDermott	Facilities Director
Joplin Schools	Jim Hounschell	Director of Safety and
Missouri Southern State University	Robert Harrington	Operations
Ozark Christian College	Monte Shoemake	Vice President
Sarcoxic R-II	Dr. Kevin T. Goddard	Superintendent
Seneca R-VII	Brandon Eggleston	Superintendent



Harry S Truman Coordinating Council	Jill Cornett Nikki Hill Thomas Hughes Tony Robyn Madison Kienzle	Director Transportation Planner Transportation Planner Environmental/Recovery Planner Planning Intern
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Tony Robyn, planner, and Madison Kienzle, planning intern, compiled and drafted the 2021 Plan with the assistance and input of the committee.

Additional participants, independent of local jurisdictions, also assisted in plan development, and included: Heidi Carver and Jennifer Storey, SEMA, Nikki Hill, Jasper County GIS Technician, and those public and organizational survey respondents

The second committee meeting was held in March 2019. The committee discussed information submitted by each jurisdiction and reviewed and approved the identified hazards and existing goals, actions, and objectives from the previous plan. Utilizing their information and suggestions, HSTCC continued the plan update. Section 1 combined information from both counties and all their included jurisdictions in terms of critical response capabilities as well as including the most recent census data. Section 2 also combined information from both counties. It was also updated with historical data as well as the latest storm and hazard records available through 2019. Vulnerabilities were reassessed in this section.

May through July 2019, the committee assessed progress from 2015 as well as discussed critical facilities. Section 3 also combined information from both counties. It was minimally updated, focusing on clarification of existing plans, hazard mitigation implementation at the local level, and other recommendations for improvement. Section 4 received the most significant focus from the planning committee. Though the mitigation strategy and overarching goals did not change, the objectives and actions were reassessed. Each objective and action was discussed during meetings, with discussion focused on the implementation, sufficiency, and applicability of each objective and action. A summary of the discussion concerning objectives and actions is located in Section 4. Because of the new nature of this combined plan in 2015, objectives and actions were not significantly altered in 2021. Many mitigation actions were completed following the 2011 Joplin tornado disaster and jurisdictions in the region continue to focus on infrastructure changes to mitigate future disasters. Additionally, in order to ensure the viability and use of this plan, the committee focused on plan maintenance and implementation. After discussion, the committee chose to assess the Jasper-Newton Bi-county Hazard Mitigation Plan on an annual basis using a committee-created assessment worksheet. Annual assessments will be conducted by each county's Emergency Management Director (EMD) and open to the public as part of a regular commission meeting. Press releases in local newspapers will be used to encourage public participation in the assessment process. Plan copies will be publicly accessible in each local jurisdiction for review and comment by county citizens. Additionally, the EMD will present their findings to the County Commission for official approval of the plan review.

In October 2019, the general public, surrounding communities, and local/regional agencies were invited to review the Jasper-Newton Bi-County Natural Hazard Mitigation Plan draft. The draft was made available in print form at the office of the Harry S Truman Coordinating Council

as well as online through the HSTCC website (<http://www.hstcc.org>). Invitations were sent via mail, email, and print media. Documentation is provided in Appendix B.

<i>Table C</i>	<i>Summary of Update Review and Analysis by Plan Section</i>
<b>Plan Section</b>	<b>Update Review and Analysis</b>
Introduction	<ul style="list-style-type: none"> <li>• Order of contents revised</li> <li>• Executive Summary revised, Prerequisites added, tables added for clarity</li> <li>• Planning process rewritten to include update process information</li> </ul>
Section 1	<ul style="list-style-type: none"> <li>• Demographic changes made utilizing Census 2010 information and ACS data.</li> <li>• Updates of critical response and other service providers and addresses were included.</li> </ul>
Section 2	<ul style="list-style-type: none"> <li>• Potential hazards revisited; No new hazards added.</li> <li>• Discussion of Dam Failure expanded.</li> <li>• Climactic information updated.</li> <li>• Discussion of each hazard's impact revised to include jurisdiction-specific information where applicable. (Flood, Dam Failure, etc.)</li> <li>• County-wide vulnerability assessments revised using HAZUS data and the Missouri Structures project as well as local information from the county assessor's office.</li> </ul>
Section 3	<ul style="list-style-type: none"> <li>• Municipal Policies and Development Trends revisited and expanded with jurisdiction-specific information.</li> <li>• Tables revised for added clarification.</li> </ul>
Section 4	<ul style="list-style-type: none"> <li>• 2015 mitigation actions reviewed by committee for maintenance, revision, and/or elimination.</li> <li>• 2015 Goals, objectives, and actions revisited and reaffirmed for 2021.</li> <li>• Monitoring and evaluation plan drafted and included.</li> </ul>

## Model Resolution for the Jasper-Newton Bi-County Hazard Mitigation Plan

The following resolution was adopted by \_\_\_\_\_ on \_\_\_\_\_, 2020.

Resolution No. \_\_\_\_\_

### A RESOLUTION OF INTENT TO PARTICIPATE IN NATURAL HAZARD MITIGATION AND TO WORK TOWARD BECOMING A SAFER COMMUNITY.

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

WHEREAS, the \_\_\_\_\_ may have previously pursued measures such as building codes, fire codes, floodplain management regulations, zoning ordinance, and stormwater management regulations to minimize the impact of natural hazards; and

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

WHEREAS, by participating in the Natural Hazards Mitigation program, the \_\_\_\_\_ will be eligible to apply for post-disaster mitigation funds; and

WHEREAS, the \_\_\_\_\_ desires to commit to working with government partners and community partners to implement the Natural Hazards Mitigation Plan; and

WHEREAS, the \_\_\_\_\_ will implement pertinent precepts of the mitigation plan by incorporation into other community plans and mechanisms where appropriate; and

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

NOW, THEREFORE, BE IT RESOLVED BY THE \_\_\_\_\_ OF THE \_\_\_\_\_ AS FOLLOWS:

The \_\_\_\_\_ hereby adopt the Jasper-Newton Bi-County Multi-Jurisdictional Natural Hazard Mitigation Plan attached hereto for the purpose of building a safer community by reducing natural hazard vulnerability.

\_\_\_\_\_  
Presiding Official

\_\_\_\_\_  
Date

\_\_\_\_\_  
Secondary Official

\_\_\_\_\_  
Date

\_\_\_\_\_  
Tertiary Official

\_\_\_\_\_  
Date

## Executive Summary

Following the severe weather, tornado, and flood disasters declared in the spring of 2002 (DR-141), Missouri's State Emergency Management Agency (SEMA) received flood buyout proposals from 23 communities across the state. Fortunately, they were able to help some of these communities with federal mitigation grant funding provided through the Federal Emergency Management Agency (FEMA). After November 1, 2004, communities like these are still eligible for federal disaster public assistance and individual assistance, but are not eligible for mitigation assistance unless they have an approved hazard mitigation plan on file. Under the rules for federal mitigation funding established by the Disaster Mitigation Act of 2000, local governments are required to have FEMA-approved hazard mitigation plans in place as a condition for receiving federal mitigation grant funding for any presidentially-declared disaster occurring after the 2004 deadline.

To accomplish the significant task of creating hazard mitigation plans for Missouri's 114 counties and nearly 1,000 municipalities, SEMA approached the Missouri Association of Councils of Government (MACOG) to help meet the challenge of developing county and municipal plans throughout the state. The 19 regional planning commissions of MACOG largely provide an effective way for local governments to work together to share technical staff and address common problems in need of an area-wide approach. Funded appropriately, they also can effectively deliver programs that might be beyond the resources of an individual county or municipal government. The intent of regional planning commissions in Missouri is to be of service to their member counties and municipalities and to bring an organized approach to addressing a broad cross-section of area-wide issues. They are also available to assist their member entities in coordinating the needs of the area with state and federal agencies or with private companies or other public bodies.

The role of a regional planning commission varies across the state, depending upon available funding, and the desires of the member counties and municipalities and their representatives. Nonetheless, the primary role of the regional planning commission is to provide a technical staff capable of providing sound advice to its membership and working for coordination of various planning and infrastructure needs among the various counties and municipalities, as appropriate.

In order to facilitate the five-year update process, SEMA once again worked with MACOG to ensure a thorough, local process which reflects the needs of Jasper and Newton Counties and their interior jurisdictions. The Harry S. Truman Coordinating Council worked with Jasper County, Newton County, and their communities to facilitate the hazard mitigation update planning process as required by FEMA's FY2011 Hazard Mitigation Assistance Unified Guidance (<http://www.fema.gov/media-library/assets/documents/19022>). The Jasper-Newton Bi-County hazard mitigation plan was prepared by the staff of the HSTCC, which serves the southwest Missouri counties of Barton, Jasper, Newton, and McDonald.

Due to time and funding limitations, the plans developed by Missouri's regional planning commissions address only natural hazards. Man-made and/or technological hazards are not addressed in this plan, except in the context of cascading damages.

Citizens and public organizations have participated throughout the hazard mitigation planning process. This effort will be sustainable over the long-term because it enjoys grassroots support that stems from a sense of local and individual ownership. With the new bi-county Hazard Mitigation Plan in place, Jasper County, Newton County, and the participating jurisdictions within the counties will be eligible for future mitigation assistance from FEMA and will be able to more effectively carry out mitigation activities to lessen the adverse impact of future disasters within the county. Those jurisdictions that chose to not participate will not be eligible for Hazard Mitigation funding.

### **Assurance Statements of Compliance with Federal Regulations**

This hazard mitigation plan complies with all planning guidance from SEMA and FEMA; FEMA regulations, rules, guidelines, and checklists; Code of Federal Regulations; existing Federal and State laws; and such other reasonable criteria as the President/Governor, Federal/State congresses and SEMA/FEMA may establish in consultation with city/county governments while the plan is being developed.

This plan also meets the minimum planning requirements for all FEMA mitigation programs, such as the Flood Mitigation Assistance (FMA) Program, the Pre-Disaster Mitigation (PDM) Program, the Hazard Mitigation Grant Program (HMGP), and where appropriate, other FEMA mitigation-related programs such as the National Earthquake Hazards Reduction Program (NEHRP), the National Flood Insurance Program (NFIP), and the Community Rating System (CRS).

### **Basis for Planning Authority**

The basis for authority to create a natural hazard mitigation plan lies in Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C. 5165. This act was enacted under Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000), P.L. 106-390. Section 104 is the legal basis for FEMA's Interim Final Rule for 44 CFR Parts 201 and 206, published in the Federal Register on February 26, 2002.

### **Acknowledgments and Special Thanks**

Special thanks go to the Newton and Jasper County Commissioners. Further thanks go to the respective county Emergency Management Directors Keith Stammer and Charla Geller who helped with the details of the plan, as well as Tony Robyn, HSTCC Environmental Planner and plan drafter. Madison Kienzle, Planning Intern, spent many hours reaching out to jurisdictions gathering data, surveys, and creating all charts and graphs. Thomas Hughes, HSTCC Transportation Planner, assisted with all mapping and research in valuations. The Harry S. Truman Coordinating Council would also like to thank the Hazard

Mitigation Committee and jurisdictions whom spent many hours meeting and working to research and compile information for this project. Members included area fire and emergency personnel, local community representatives, Jasper County representatives, Newton County representatives, local school administration members, as well as the public.

### **Planning Process**

Data for this plan was gathered in part through a series of public meetings held within Jasper and Newton Counties, as well as public and organizational surveys, emails, phone interviews, and one-on-one meetings. The planning process for the Jasper-Newton Bi-County Hazard Mitigation Plan began early in 2019, with support from the public, jurisdictions and the county commissions. Individuals, business and community leaders, and non-profits were invited to attend these meetings, with a special effort to invite participants representing various business and service interests throughout the included communities and counties. Participants were asked to participate in various surveys and identify critical infrastructure, rank the likelihood of disaster occurrence, perform a susceptibility analysis based on these factors, and determine appropriate mitigation strategies for each individual disaster. This data was recorded and assimilated into this plan by HSTCC staff.

Background and statistical data for this plan were collected from a variety of sources, including the United States Census Bureau, the United States Geological Society, the United States Army Corps of Engineers, the Missouri Department of Natural Resources, the Missouri Department of Conservation, the Center for Agricultural, Resources and Environmental Systems at the University of Missouri-Columbia, and the National Climatic Data Center. The Missouri State Hazard Mitigation Plan was last updated in 2013 and provided information regarding tornado, earthquake, and flood hazards affecting Jasper and Newton Counties. The last flood insurance study for Jasper County was conducted in 2012, while Newton County was completed in 2010. Flood hazard data from the 2013 HAZUS-MH loss run for Jasper and Newton counties was incorporated into the plan providing updated information on vulnerable structures, shelter requirements, and loss estimates. Other sources of information that include Comprehensive Land Use Plans, Zoning Ordinances, Building Codes, Storm Water Regulations, and Subdivision Regulations were reviewed for applicability to the plan and are summarized in Section 3 – Capability and Vulnerability Assessment.

Many of the following recommendations should not be considered final solutions, but rather short-term efforts that will ultimately have long-term strategic implications. To be sure, this process should be an ongoing effort that is periodically reviewed to ensure that information is still relevant and appropriate for the region. The goals and recommendations in the plan include broad implementation strategies, possible partners, and time frames for completion.

### **Participants and Jurisdictions Represented**

The Harry S. Truman Coordinating Council, in conjunction with Jasper County, Newton County, SEMA, and FEMA, produced this document. Participants providing the data for this project included the county commissions, emergency management directors, local business



leaders, nonprofit organizations and interested members of the public from both counties. In addition, officials from each municipality, school district, and public higher education institutions within each county were directly invited to participate in these meetings.

In accordance to Missouri’s “sunshine law” (RSMo 610.010, 610.020, 610.023, and 610.024), the public was notified each time the plan, or sections of the plan, was presented for review. Input from each public official (city, school, and county) was solicited by mailing or emailing an explanatory letter and copy of the particular information to review. These mailings were disbursed on a bi-monthly schedule that allowed officials sufficient time to review the information prior to the next public County Commission or City Council meeting. Participation was solicited from each of the following jurisdictions:

**Jasper County:**

- Airport Drive
- Alba
- Asbury
- Avilla
- Brooklyn Heights
- Carl Junction
- Carterville
- Carthage
- Carytown
- Duenweg
- Duquesne
- Fidelity
- Jasper
- Jasper County
- Joplin
- La Russell
- Neck City
- Oronogo
- Purcell
- Reeds
- Sarcoxie
- Waco
- Webb City
- Avilla R-XIII
- Carl Junction R-I
- Carthage R-IX
- Jasper Co. R-V
- Joplin Schools
- Missouri Southern State University
- Sarcoxie R-II
- Webb City R-VII

**Newton County:**

- Cliff Village
- Dennis Acres
- Diamond
- Fairview
- Granby
- Grand Falls Plaza
- Leawood
- Loma Linda
- Neosho
- Newton County
- Newtonia
- Redings Mill
- Ritchey
- Saginaw
- Seneca
- Shoal Creek Drive
- Shoal Creek Estates
- Stark City
- Stella
- Wentworth
- Crowder College
- Diamond R-IV
- East Newton Co. R-VI
- Neosho R-V
- Seneca R-VII
- Westview C-6
- Joplin Schools

Each jurisdiction was encouraged to send representatives as well local businesses with an interest in contributing to the planning process. Input from the general public was solicited through reminders at public gatherings and community surveys. Likewise, local utility companies, emergency response organizations, and other interested parties were invited to attend plan development meetings and complete surveys. Beginning in September 2019, public participation and draft review was encouraged through a regional press release in local newspapers, which collectively serve the two-county region. Social media was also utilized via the HSTCC web account. Surrounding jurisdictions were invited to review the county's plan draft via the HSTCC website. Sample letters, emails, and press releases are included at the end of this document as part of *Appendix B: Documentation of Public Participation*. Numerous citizens, public organizations, and elected officials have participated in this process. Implementation, monitoring, and evaluation will be sustainable over the long-term because it enjoys a grassroots support that stems from a sense of county.

The following individuals, businesses, and organizations also participated by completing the *SEMA Hazard Mitigation Public Survey* of potential hazards. Their responses were incorporated into the planning process.

Bemis Packaging	Branco Construction
Carl Junction Police	Empire Electric
City of Joplin Planning	Habitat for Humanity
Clevenger Financial	Compass Quest Veteran Support
Citizen - Edster	Economic Security Council Jasper/Newton Counties
Village of Leawood	HSTCC
Hutson Real Estate	Jasper County Commission
Jasper Products	AG Martin Engineering
Joplin Veterans Administration	City of Carl Junction
Ozark Nursery and Landscaping	Newton County Commission
Region M - MORA	Ozark Center
Village of Saginaw Board	R.E. Smith Construction

### Time Frame for Preparation

The data and results in this plan represent many months of effort. Jurisdiction officials were contacted in January of 2019 and plans were made regarding how and when to gather the necessary information for the formation of this plan. A series of meetings were held from January to September to gather organizational public input. A draft of this plan was submitted to SEMA on November 1, 2020 for review and comment.

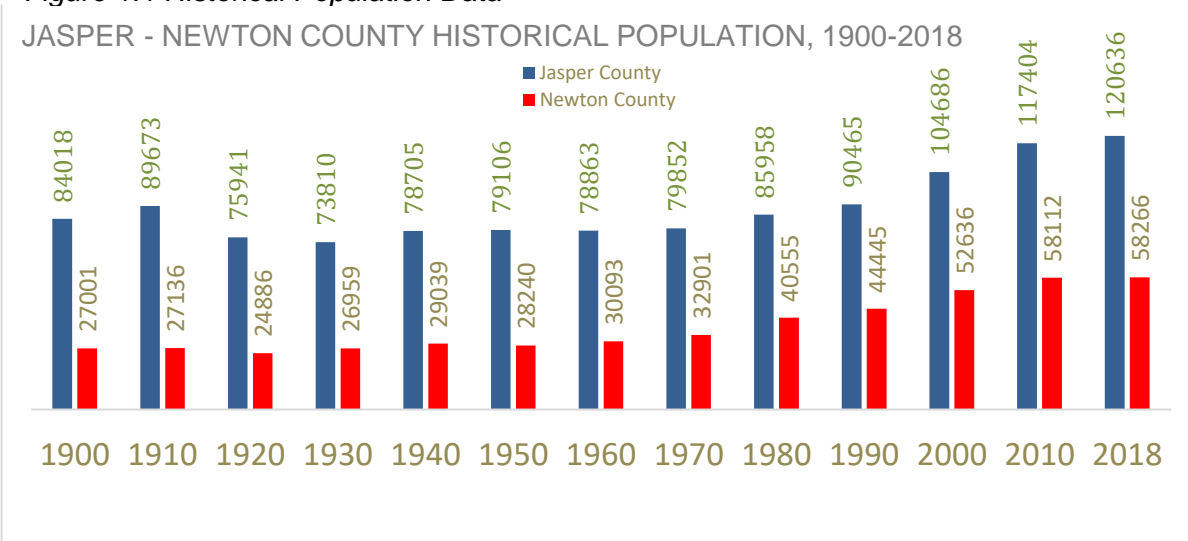
## Section 1- Community Profiles

### Origins of Jasper County and Newton County

Jasper County and Newton County were collectively established in 1838 when a reorganization of the territory prompted the splitting of the larger Barry County into four separate areas: Jasper, Newton, Barry, and Dade. The four regions remained tied together until 1841 when the Missouri Legislature passed a bill separating the four into independent counties. Jasper and Newton Counties were thus established as independent entities and named after heroes from the Revolutionary War. Carthage was adopted as Jasper County's county seat while Neosho was adopted for Newton County.

Soon after the counties' inception, the Civil War brought turmoil and division to the counties. There were several skirmishes in the area. After the Civil War, development began to flow into both counties when the Atlantic and Pacific Railroad (now the Burlington Northern Santa Fe – BNSF Railroad) brought a continental connection to the region. Other railroads subsequently entered the counties, and development and business has followed national and global trends ever since.

*Figure 1.1 Historical Population Data*



Over the past century, the population of both Jasper and Newton counties has steadily increased, with significant growth taking place from 1980 – 2018 (Figure 1.1).<sup>1</sup> Since 1900, the population of Jasper County has ultimately increased, as well as Newton County's population, more than doubling its size. Like the counties themselves, many jurisdictions within the counties have also seen growth. Fourteen of the counties', villages and cities have experienced population decreases, all locations with less than 1,000 people (Tables 1.1 and 1.2).

<sup>1</sup> <http://www.census.gov/population/cencounts/mo190090.txt>

*Table 1.1 Jasper County Community-Level Population*

Community	1980	1990	2000	2010	Percentage change (2000-2010)
Airport Drive	702	818	622	698	12.20%
Alba	474	465	588	555	-5.60%
Asbury	210	220	218	207	-5.00%
Avilla	151	99	137	126	-8.00%
Brooklyn Heights	126	116	125	100	-20.00%
Carl Junction	2,937	4,123	5,294	7,445	40.60%
Cartersville	1,973	2,013	1,850	1,891	2.20%
Carthage	11,104	10,747	12,668	14,502	14.50%
Carytown	150	149	217	271	24.90%
Cliff Village	24	19	33	40	21.20%
Dennis Acres	56	157	68	76	11.80%
Diamond	766	775	808	902	11.60%
Duenweg	703	940	1,034	1,121	8.40%
Duquesne	1,252	1,229	1,640	1,763	7.50%
Fidelity	274	235	252	257	2.00%
Jasper	1,012	994	1,012	931	-8.00%
Joplin	39,126	40,961	45,504	50,150	10.20%
La Russell	126	114	138	114	-17.40%
Neck City	151	132	119	186	56.30%
Oronogo	525	595	976	2,381	144.00%
Purcell	322	354	357	408	14.30%
Reeds	105	88	103	95	-7.80%
Sarcoxie	1,381	1,330	1,354	1,341	-1.00%
Waco	129	86	86	87	1.20%
Webb City	7,309	7,449	9,811	10,996	12.10%

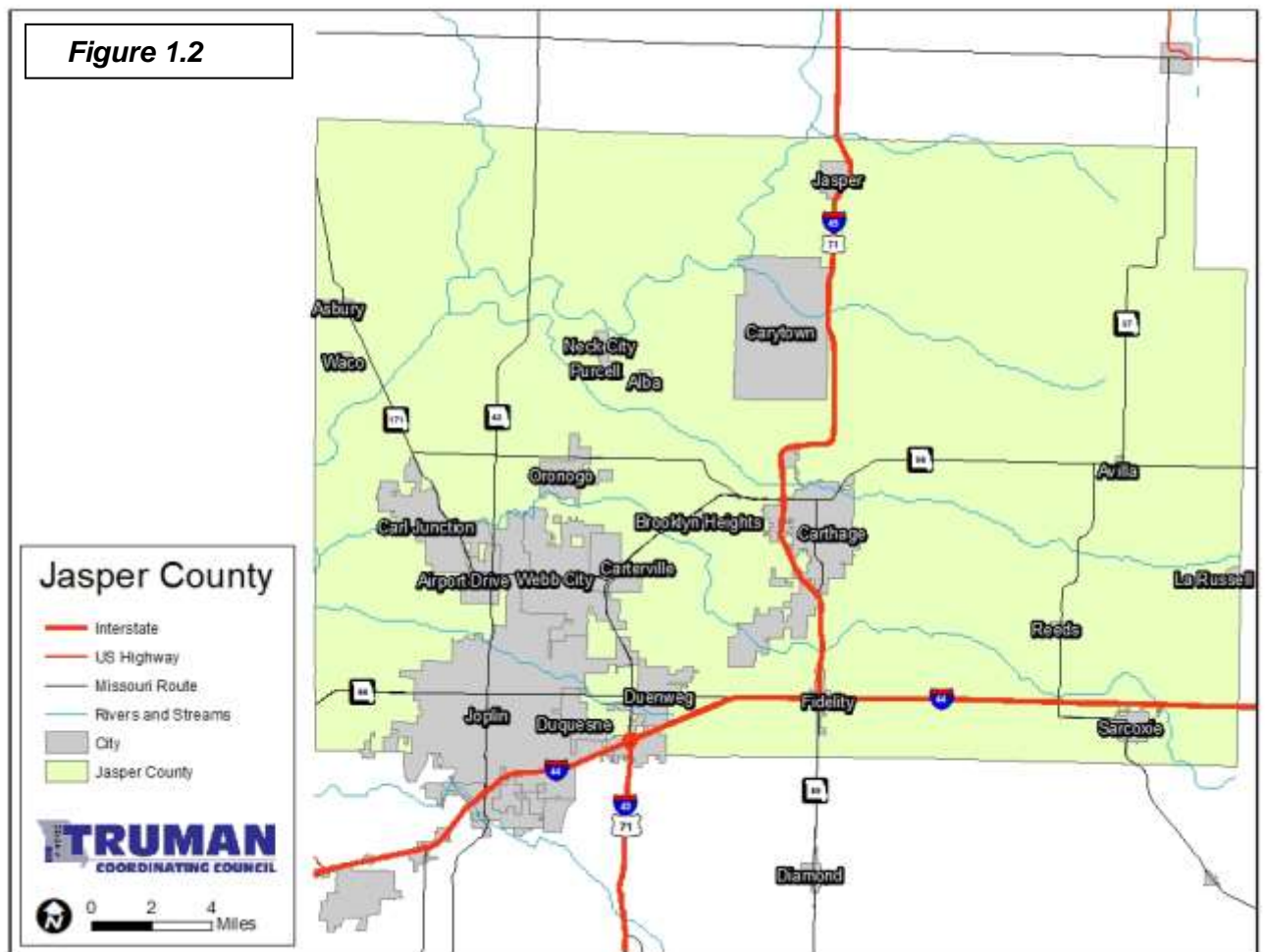
*Table 1.2 Newton County Community – Level Population*

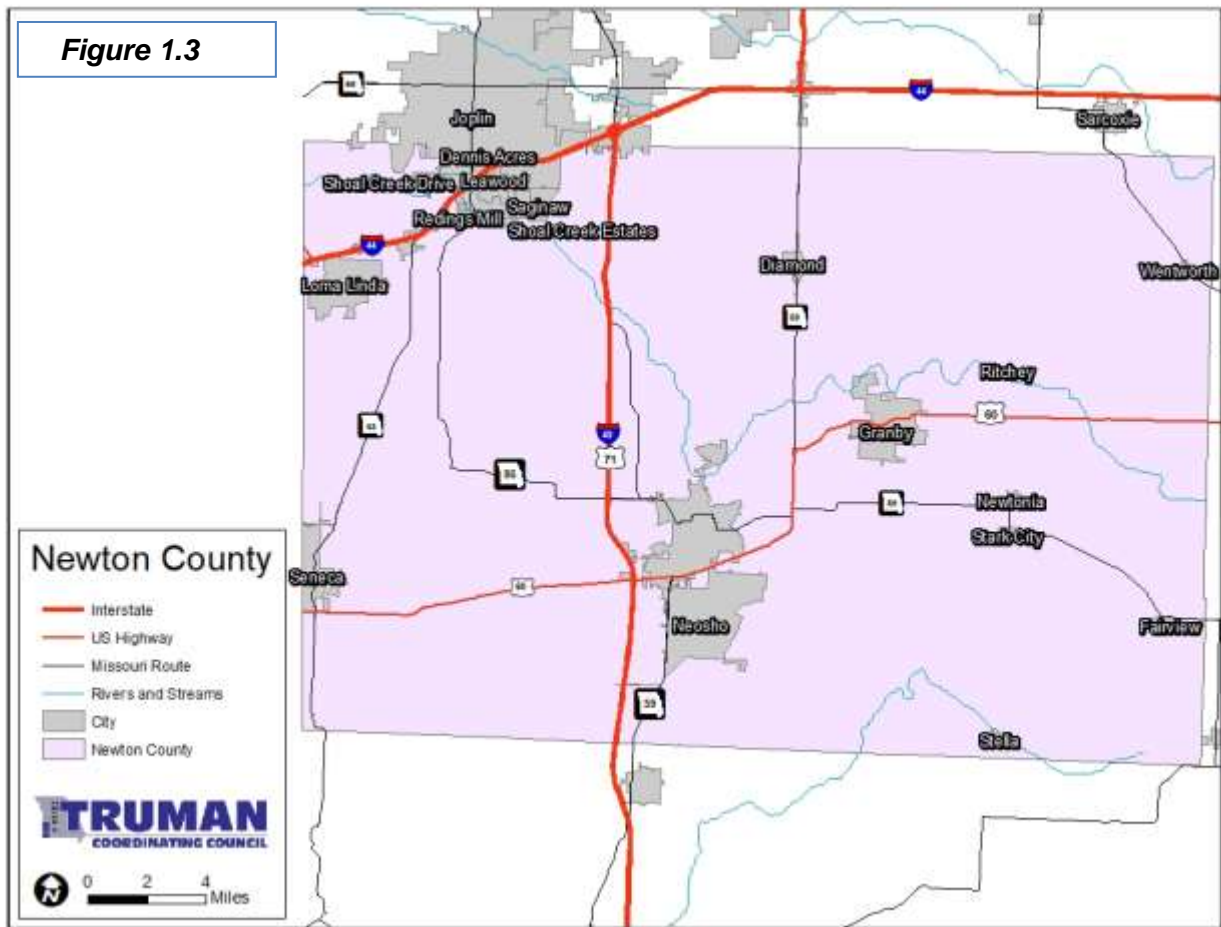
Community	1980	1990	2000	2010	Percent Change (2000-2010)
Cliff Village	24	19	33	40	21.20%
Dennis Acres	56	157	68	76	11.80%
Diamond	766	775	808	902	11.60%
Fairview	282	298	395	383	-3.00%
Granby	1,678	1,908	2,121	2,134	0.60%
Grand Falls Plaza	N/A	N/A	104	114	9.60%
Leawood	631	736	904	682	-24.60%
Loma Linda	N/A	N/A	507	725	43.00%
Neosho	9,493	9,254	10,505	11,835	12.70%
Newtonia	224	204	231	199	-13.90%
Redings Mill	222	204	159	151	-5.00%
Ritchey	126	62	76	82	7.90%
Saginaw	293	384	276	297	7.60%
Seneca	1,853	1,885	2,135	2,336	9.40%
Shoal Creek Drive	244	509	346	337	-2.60%
Shoal Creek Estates	89	21	51	96	88.20%
Stark City	132	127	156	139	-10.90%
Stella	230	132	178	158	-11.20%
Wentworth	118	138	141	151	7.10%

Source: U.S. Census Bureau, 1980 Census; 1990 Census; 2000 Census; 2010 Census

## Geography, Geology, and Climate

Jasper County encompasses 641 square miles while Newton County encompasses 626 square miles. Both counties lie east of the Kansas border in the southwest corner of the state. Figures 1.2 and 1.3 provide the base maps for each county, including cities, rivers, and major transportation corridors.





Jasper County and Newton County each have a warm humid temperate climate with hot summers and no dry season. In Jasper County, the average winter temperature is 35.2 degrees. The lowest temperature ever recorded is -15 degrees which was reported in Joplin in 1989. January is the coolest month on average. The average summer temperature is 77.6 degrees, and July is the hottest month on average. The highest temperature ever recorded in Jasper County was 115 degrees in 1954.

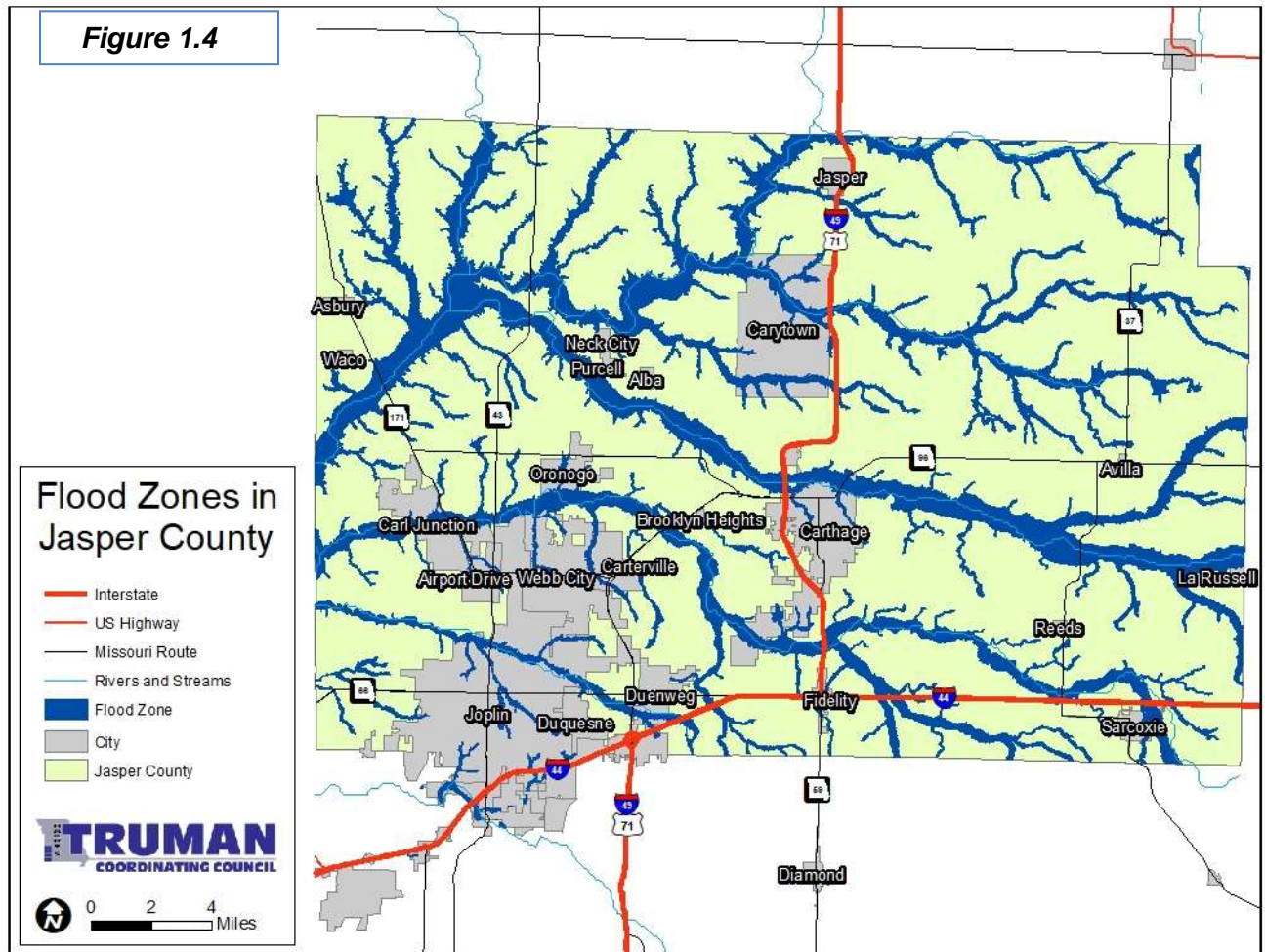
In Newton County, the average winter temperature is 35.2 degrees. The lowest temperature ever recorded is -31 degrees which was reported in Neosho in 1930. January is the coolest month on average. The average summer temperature is 80.04 degrees, and July is the hottest month on average. The highest temperature ever recorded in Newton County was 112 degrees in 1954 in Neosho. The annual average temperature is 57° in Jasper County and 57.2° in Newton County.

Annual precipitation averages 46.38 inches in Jasper County and 45.54 inches in Newton County. Seventy percent of the rainfall usually falls between April and October, with May averaging the most precipitation in each county. Thunderstorms occur approximately 52 days annually in both counties. Damaging tornadoes and thunderstorms occur locally and are usually short in duration. Hailstorms also occur occasionally during the summer. Snowfall averages



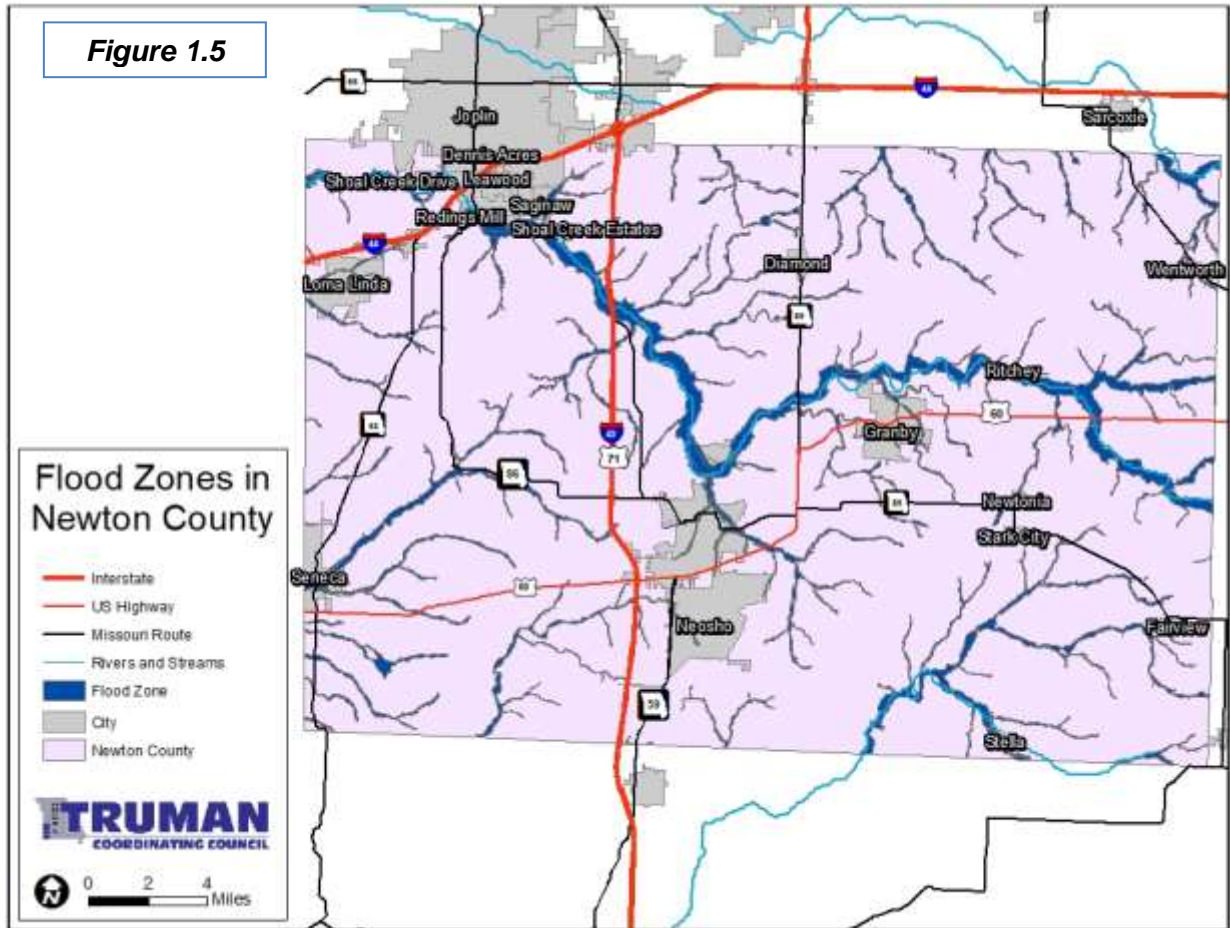
10.11 inches in Jasper County and 10.2 inches in Newton County. The prevailing wind is from the south, and the average wind speed is 20.38 miles per hour in Jasper County but only 16.82 miles per hour in Newton County.<sup>2</sup>

Jasper County has two major floodplains while Newton County has one major floodplain (Figures 1.4 and 1.5). These floodplains are drained by two rivers and their associated tributaries: the Spring River and Shoal Creek, each flowing largely from northeast to southwest into the Spring River, which joins the Neosho River before flowing into Grand Lake, OK and eventually the Mississippi River in Arkansas. Many smaller streams and tributaries drain into these two rivers.



<sup>2</sup> National Weather Service (<http://w2.weather.gov/climate/xmacis.php?wfo=sgf>); <http://www.usa.com/jasper-county-mo-weather.htm>; <http://www.usa.com/newton-county-mo-weather.htm>





## Form of Government

Both Jasper County and Newton County function through their County Commissions, three-member boards with final authority. Jasper County operates as a first-class county, while Newton County operates as a second-class county. Both counties can administer county structures, infrastructure, and finances. In addition, they also have the authority to administer a master plan, zoning codes, subdivision regulations, floodplain and stormwater regulations, but has no authority over building regulations. Jasper County's county seat is located in Carthage, while Newton County's county seat is located in Neosho. The Harry S. Truman Coordinating Council (HSTCC) is the regional government entity that helps member communities with support related activities to facilitate community goals and projects through local, state and federal funding programs. The incorporated municipalities in each county have autonomy from county regulation and conduct their own business on varying scales and through varying structures.

## Media Relations

Both Jasper and Newton counties support a variety of media outlets which can be used to supply information to the public concerning local disasters as well as local planning issues. Multiple newspapers service the two-county region. In 2018 the Carthage Press announced its cessation of printing.

- Carl Junction Standard
- Jasper County Citizen
- Joplin Globe
- Joplin Independent
- Missouri Southern State University's Chart
- Neosho Daily News
- Neosho Post
- Newton County News
- Sarcoxie Record
- Seneca New Dispatch
- Webb City Sentinel

Numerous radio stations provide local coverage in Jasper and Newton Counties. Table 1.3 lists those stations and their location of origin. Additional radio stations available in the region originate from other counties in Missouri as well as from Kansas and Arkansas.

Radio Station	City of Origin	County
KW XD 103.5 FM	Asbury	Jasper
KDMO 1490 AM	Carthage	Jasper
KMXL 95.1 FM	Carthage	Jasper
KIXQ 102.5 FM	Joplin	Jasper
KOBC 90.7 FM	Joplin	Jasper
KOCR 1310 AM	Joplin	Jasper
KQYX 1450 AM	Joplin	Jasper
KSYN 92.5 FM	Joplin	Jasper
KWAS 1230 AM	Joplin	Jasper
KXMS 88.7 FM	Joplin	Jasper
WMBH 1560 AM	Joplin	Jasper
KBTN 1420 AM	Neosho	Newton
KBTN 99.7 FM	Neosho	Newton
KNEO 91.7 FM	Neosho	Newton
KJMK 93.9 FM	Webb City	Jasper
KKLL 1100 AM	Webb City	Jasper
KXDG 97.9 FM	Webb City	Jasper

Four public television stations located in Jasper and Newton County service the immediate region. The City of Joplin is home to KODE-TV Channel 12, KOZJ-TV Channel 26, KFJX-TV Channel 15, and KSN-TV Channel 16. The City of Neosho also supports a local station, KCL-TV Channel 332. One additional public station from Pittsburgh, Kansas, KOAM-TV, also provides residents with news and weather updates.

In addition, many local residents use social media sites to receive and share information about severe weather. As social media becomes a major source of information for Jasper and Newton County residents, it is important that emergency management officials adapt to new modes of communications in order to reach a large audience of all ages. Facebook, Twitter, and Instagram are popular sources of information with many people following

local meteorologist pages. The Federal Emergency Management Agency (FEMA) also maintains a mobile application, Facebook, Instagram, and Twitter pages.

## Demographic Information

The 2010 U.S. Census and American Community Survey (ACS) was used to construct a profile of the average Jasper and Newton County residents. The average age for a Jasper County resident is 35 years while Newton County's average is 39 years. The median household income for Jasper County from 2013-2017 was \$45,328 while Newton County's median household income for the same period was \$46,723. The average commute to work is 17.7 minutes for individuals over 16 years of age living in Jasper County, while Newton County is slightly higher at 21.7 minutes.

<i>Table 1.4 Jasper - Newton County Population by Age Cohort 2017</i>				
	Jasper County		Newton County	
Age Cohort	Population	Percent	Population	Percent
Under 5 years old	8,346	7%	3,630	6.20%
5-9 years	8,221	6.90%	3,338	5.70%
10-14 years	8,454	7.10%	4,594	7.90%
15-19 years	7,921	6.70%	4,000	6.90%
20-24 years	8,352	7.00%	3,627	6.20%
25-29 years	8,392	7.10%	3,450	5.90%
30-34 years	8,039	6.80%	3,313	5.70%
35-39 years	7,811	6.60%	3,718	6.40%
40-44 years	7,055	6.00%	3,164	5.40%
45-49 years	7,025	5.90%	3,658	6.30%
50-54 years	7,392	6.20%	4,063	7.00%
55-59 years	7,517	6.30%	4,015	6.90%
60-64 years	6,853	5.80%	3,652	6.30%
65-69 years	5,725	4.80%	3,407	5.90%
70-74 years	3,860	3.30%	2,394	4.10%
75-79 years	3,283	2.80%	1,806	3.10%
80-84 years	2,027	1.90%	1,421	2.40%
85+ years	2,069	1.70%	987	1.70%

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

Table 1.4 highlights a robust young adult age group as well as older adults nearing retirement age). Tables 1.5 and 1.6) highlight a predominately white ethnicity with smaller mixes of other ethnicities in both counties.

<i>Table 1.5 Jasper County Ethnic Diversity</i>						
Race	Census 1990	2000	2010	Percent	ACS Estimate 2017	Percent
White	87,093	96,880	103,596	88.20%	107,188	93.10%
Black	1,153	1,391	2,267	1.90%	2,572	2.17%
American Indian/Alaska	2,219	1,420	1,778	1.50%	1,651	1.39%
Asian/ Pacific Islander	715	641	1,400	1.20%	1502	1.26%
Two or more races	N/A	2,493	3,735	3.20%	3,513	2.96%

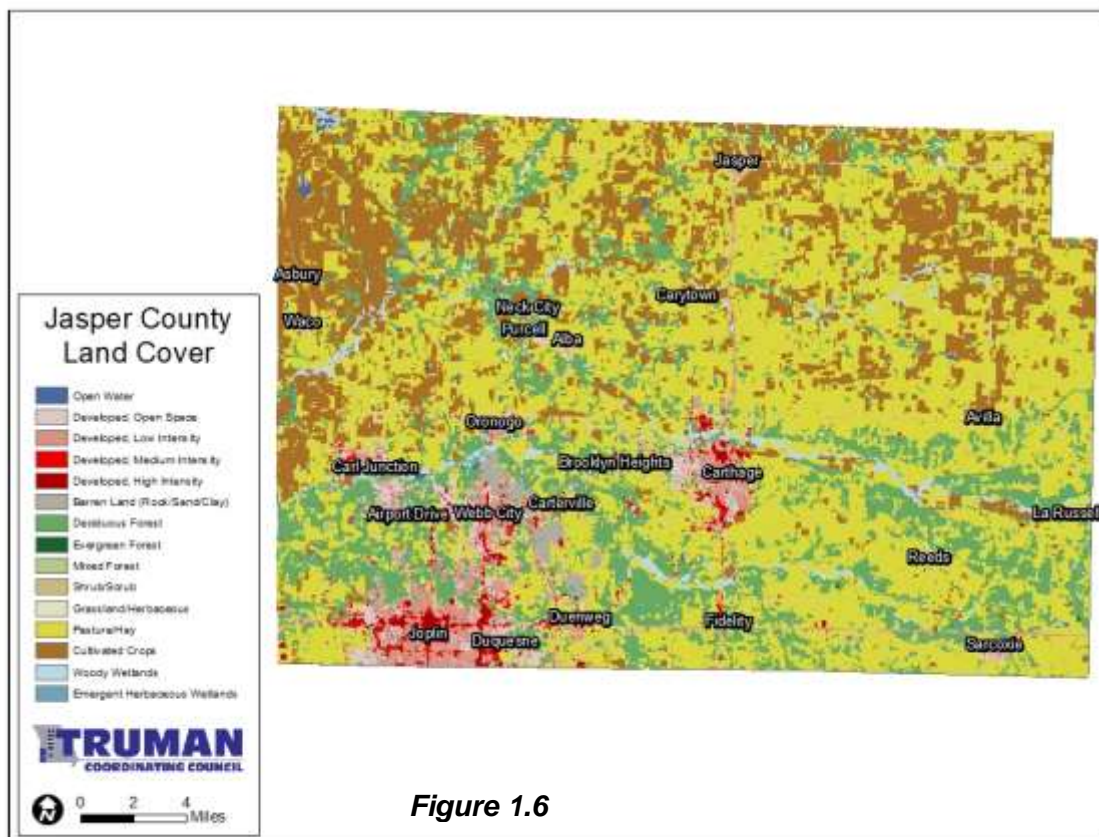
*Table 1.6 Newton County Ethnic Diversity*

Race	Census				ACS Estimate	
	1990	2000	2010	Percent	2017	Percent
White	43,000	49,095	51,914	89.30%	52,828	90.70%
Black	174	282	438	0.70%	558	0.95%
Am Indian/ Alaska	1,271	1,155	1,339	2.30%	1,371	2.30%
Asian/ Pacific Islander	309	340	1,277	2.20%	1,319	2.26%
Two or more races	N/A	1,206	1,787	3.10%	1,850	3.17%

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

## Land Use Information

Jasper County is 641.6 square miles, representing 638.49 square miles of land and 1.6 square miles of water. 246,707 acres of land are currently used for agriculture. The 2010 Census recorded 183.9 persons per square mile in Jasper County. Figure 1.6 depicts the land use by type in Jasper County.



**Figure 1.6**



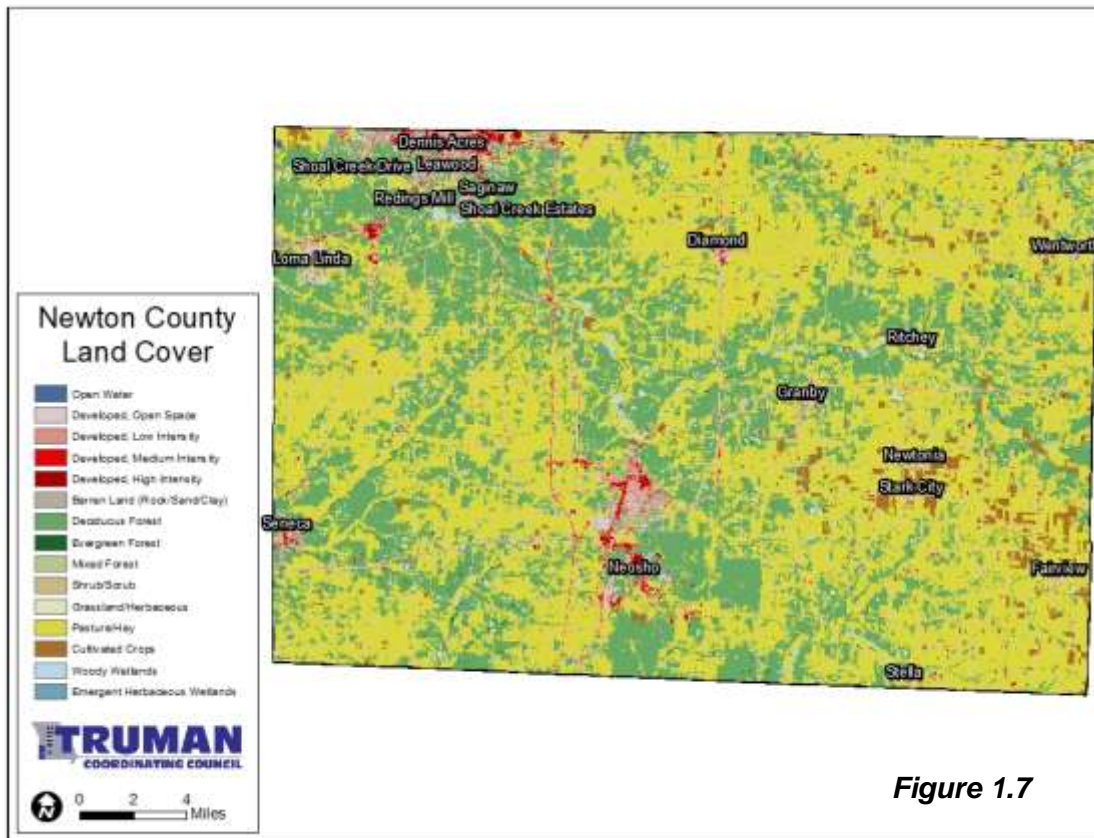


Figure 1.7

Newton County is 626.2 square miles, representing 626 square miles of land and 0.2 square miles of water. Of the land mass, 247, 762 acres are currently used for agriculture. The remainder of the land is forested, urbanized, or water (Figure 1.7).



## NFIP Participation

Both Jasper and Newton Counties participate in the National Flood Insurance Program. Jasper County has 126 policies while Newton County has 82 policies issued and in force. Independent jurisdictions also have separate NFIP policies.<sup>3</sup>

- Airport Drive – 1 policy
- Carl Junction – 8 policies
- Carthage – 46 policies
- Diamond -
- Duenweg – 3 policies
- Duquesne – 10 policies
- City of Joplin – 106 policies
- Granby – 9 policies
- Grand Falls Plaza – 16 policies
- Loma Linda – 1 policy
- Neosho – 85 policies
- Oronogo – 5 policies
- Saginaw – 18 policies
- Sarcoxie – 9 policies
- Seneca – 80 policies
- Webb City – 28 policies
- Unincorporated Jasper County – 68
- Unincorporated Newton County – 62 policies

There are also a number of Repetitive Loss Properties within Jasper and Newton County. Table 1.7 provides a summary of the Repetitive Loss Properties.

*Table 1.7 Jasper and Newton County Repetitive Losses*

County	Number of Losses	Total Properties	Number of Commercial Properties	Number of Residential Properties	Building Total	Content Total
Jasper	16	7	0	7	\$405,952.14	\$116,293.20
Newton	35	12	1	11	\$1,404,129.18	\$303,546.50

## Endangered Species, Historic Properties and Districts, and Archaeological Sites

Jasper and Newton Counties have a number of endangered and threatened species, both animal and plant, which reside within their borders. Endangered species include the Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), and Running Buffalo Clover

<sup>3</sup> <https://bsa.nfipstat.fema.gov/reports/1011.htm#MOT>

(*Trifolium stoloniferum*). These species should be protected from habitat infringement or other risk to existence. Threatened species include the Northern long-eared bat (*Myotis septentrionalis*), Neosho madtom (*Noturus placidus*), Ozark cavefish (*Amblyopsis rosae*), Geocarpion (*Geocarpion minimum*), and the Western Prairie Fringed Orchid (*Platanthera praeclara*). Newton County also holds the largest remaining areas of the globally unique chert glades habitat found on earth in Joplin's Wildcat Park.

The National Register of Historic Places includes thirty-five Jasper County locations and twelve in Newton County. Tables 1.8 and 1.9 summarize these locations and their dates of addition to the register.

*Table 1.8 National Register of Historic Places – Jasper County*

Property	Date listed	Location	City
66 Drive-In	4/2/2003	17231 Old 66 Boulevard	Carthage
Buchanan, Lucius P., House	08/22/2016	3708 E. University Pkwy.	Joplin
Carthage Courthouse Square Historic District	5/15/1980	Bounded by E. Central Ave, S. Maple, Lincoln, and W. 5 <sup>th</sup> streets	Carthage
Carthage South Historic District	5/6/1982	City limits	Carthage
Cassill Place Historic District	1/2/1986	First half-block of W. Central east of Blanch St.	Carthage
Cave Spring School and Cemetery	7/17/2012	4323 Cty. Rd. 4	Sarcoxie
Colonial Apartments	8/14/2001	406 Walnut St.	Carthage
Elks Club Lodge No. 501	6/3/1985	318 – 320 W. 4 <sup>th</sup> St.	Joplin
Fifth and Main Historic District	7/5/2006	501 – 513 S. Main St.; 502 – 508 Virginia St.	Joplin
Fox Theater	7/30/1990	415 S. Main St.	Joplin
Gentry Apartments	8/8/2006	318 S. Wall St.	Joplin
Inter-State Grocer Company Building	10/24/2008	1027 – 1035 S. Main St.	Joplin
Jasper County Courthouse	2/8/1973	Courthouse Square	Carthage
Joplin and Wall Avenues Historic District	10/12/2010	Portions of S. Joplin and Wall Aves., W. First, Second, Third Sts.	Joplin
Joplin Carnegie Library	7/10/1979	9 <sup>th</sup> and Wall Sts.	Joplin
Joplin Connor Hotel (demolished)	2/28/1973	324 Main St.	Joplin
Joplin Downtown Historic District	7/16/2008	S. Main St., between E. 4 <sup>th</sup> and E. 6 <sup>th</sup> Sts.	Joplin
Joplin Furniture Company Building	8/7/2012	702 – 708 Main St.	Joplin
Joplin Supply Company	7/3/2007	228 S. Joplin Ave.	Joplin
Joplin Union Depot	3/14/1973	Broadway and Main St.	Joplin
Main and Eighth Streets Historic District	4/15/2011	Portions of the 800 and 900 block of S. Main St.	Joplin
Middle West Hotel	9/16/1982	1 S. Main St.	Webb City
Murphysburg Historic District	5/18/15	Roughly bounded by S. Sergeant, S. Pearl & S. Byers Aves., W. 1 <sup>st</sup> , W. 4 <sup>th</sup> , & W. 7 <sup>th</sup> Sts.	Joplin
Newman Brothers Building	7/23/1990	602 – 608 S. Main St.	Joplin
Olivia Apartments	6/20/2008	320 Moffet Ave.	Joplin
Pennington Drug Company	10/10/17	512-520 Virginia Ave.	Joplin
Phelps Country Estate	8/29/1983	RR 1, Newcastle Rd. just west of CR 100	Carthage
Rains Brothers Building (destroyed by fire in 2012)	7/19/1990	906 – 908 S. Main St.	Joplin
Ridgway Apartments	8/8/2006	402 and 404 S. Byers Ave.	Joplin
St. Louis and San Francisco Railroad Building	10/22/2002	605 Main St.	Joplin
St. Peter the Apostle Catholic Church and Rectory	6/28/1991	812 Pearl St.	Joplin
Sarcoxie Public Square Historic District	10/20/2014	Along 5 <sup>th</sup> , 6 <sup>th</sup> , Center, and Cross Sts.	Sarcoxie
Scottish Rite Cathedral	6/21/1990	505 Byers Ave.	Joplin
South Main Street Historic District	10/12/2010	Western side of S. Main St., between W. First and W. Second Sts.	Joplin
Downtown Webb City Historic District	7/18/2014	Roughly N. & S. Main, E. & W. Broadway, Daugherty, E. Church, N. Tom, N. Liberty, N. & S. Webb	Webb City



*Table 1.9 National Register of Historic Places – Newton County*

Property	Date listed	Location	City
First Battle of Newtonia Historic District	12/23/2004	Junction of Routes 86 and O	Newtonia
Bonnie & Clyde Garage Apartment	5/15/2009	3 miles south of Monument	Joplin
George Washington Carver National Monument	10/15/1966	3 miles south of Monument	Diamond
Jolly Mill	10/13/1983	Southwest of Pierce City	Pierce City
Lentz-Carter Merchandise Store	8/19/2008	744 Ozark St.	Stella
Neosho Colored School	4/17/2017	639 Young St.	Neosho
Neosho Commercial Historic District	8/12/1993	Along sections of Main, Spring, Washington, and Wood Sts.; also 114, 116, 118-120, 120, and 124 – 126 S. Wood St.	Neosho
Neosho High School	8/30/2002	W. McCord and N. Wood Sts.	Neosho
Neosho Wholesale Grocery Company	4/16/2013	224 N. Washington St.	Neosho
Matthew H. Ritchey House	12/5/1978	Mill St.	Newtonia
Second Baptist Church	1/4/1996	430 W. Grant St.	Neosho
Second Battle of Newtonia Site	12/23/2004	Roughly an area northwest, southwest, and southeast of the junction of Routes 86 and O	Newtonia

To date, the Archaeological Survey of Missouri had documented 37,759 sites in Missouri, with data collected from over 17,500. 213 sites are located in Jasper County and 283 are located in Newton County. The exact locations cannot be shown in order to protect the individual resources.

## Nonprofit Sector

Jasper and Newton Counties enjoy a robust nonprofit sector with 766 registered 501c3 organizations according to the IRS. While this is not a perfect measure of the effectiveness of the sector, it demonstrates presence of many organizations that may be a valuable resource in hazard mitigation and recovery efforts. Collaboration with nonprofit partners increases the overall preparedness of the region through the opportunity to share resources, information, and a network of volunteers. A survey was distributed to nearly 100 area nonprofits on the subject of their organizational preparedness, challenges to hazard planning, as well as their perceived role in the event of a natural disaster. The following tables demonstrate the responses of organizations that participated.

<i>Has your organization engaged in any of the following activities?</i>								
Organization	Obtained education brochures or printed information on hot natural hazards affect the area.	Attended meetings, discussions, or heard talks about how a major hazard would affect the area.	Distributed information to your clients/members on how a major hazard would affect the region.	Discussed potential natural hazards in an organizational meeting.	Formed a disaster preparedness committee.	Provided training and educational materials to staff concerning their roles during a disaster.	Developed a written disaster plan for your organization.	Developed a plan for how your organization would continue operations after an emergency/disaster (contingency plan or business continuity plan).
Adult and Teen Challenge								
Boys and Girls Club of Southwest Missouri		X		X	X	X	X	X
Bright Futures Joplin		X	X	X	X	X	X	X
Breast Cancer Foundation of the Ozarks								
Children's Center								
Community Clinic of Southwest Missouri	X	X	X	X	X	X	X	X
Compass Quest Veterans Advocacy Group								
Downtown Joplin Alliance				X				
Hope Kitchen								
Joplin Area Habitat for Humanity	X	X	X			X	X	X
Joplin NALA Read	X	X	X					
Joplin Sports Authority						X	X	
Joplin Trails Coalition								
Joplin Workshops							X	
Lafayette House		X	X	X	X	X	X	X
One Joplin	X	X	X	X		X		
Ozark Center Jasper County	X	X	X	X	X	X	X	X

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Ozark Center Newton County	X	X	X	X	X	X	X	X
The Independent Living Center	X	X	X	X			X	X
The Light at Joplin Church		X				X	X	x
The University of Missouri Extension	X	X				X		
The United Way of Southwest Missouri		X					X	

<i>What challenges and barriers have you experienced in your organizational disaster preparedness efforts?</i>								
Organization	Limited Staff/Volunteer time.	Lack of financial resources for disaster preparedness.	Competing urgent demands associated with serving clients.	Unclear Organizational benefits from disaster planning and mitigation.	Non-immediacy of disaster.	Lack of guidance and/or structured information specific to your organizational context.	Unclear organization context.	Lack of convincing information about the potential impact of a disaster event.
Adult and Teen Challenge	X	X						
Boys and Girls Clubs of Southwest Missouri	X	X			X			X
Breast Cancer Foundation of the Ozarks	X		X					
Bright Futures Joplin			X					
Children's Center	X	X	X					
Community Clinic of Southwest Missouri	X	X	X					
Compass Quest Veterans Advocacy Group	X		X					
Downtown Joplin Alliance	X	X				X		
Hope Kitchen								
Joplin Area Habitat for Humanity								
Joplin NALA Read	X	X						
Joplin Sports Authority	X	X	X	X				
Joplin Trails Coalition	X	X		X	X	X		X
Joplin Workshops		X	X					

# 2021 JASPER-NEWTON BI-COUNTY NATURAL HAZARD MITIGATION PLAN

Lafayette House								
One Joplin	X		X				X	
Ozark Center Jasper County	X		X					
Ozark Center Newton County	X		X					
Saint Paul's United Methodist Church	X		X					
The Community Clinic of Southwest Missouri	X	X	X					
The Independent Living Center								
The Light at Joplin Church								
The University of Missouri Extension								
The United Way of Southwest Missouri		X	X		X			

*In the event of a natural disaster/ hazard, what do you see as your organization's role?*

Organization	Disaster Response	Providing Shelter	Assisting with Coping	Serving and Protecting Clients and Staff	Post-Disaster Recovery
Adult and Teen Challenge	X				X
Boys and Girls Club of Southwest Missouri				X	
Breast Cancer Foundation of the Ozarks				X	
Bright Futures Joplin			X	X	X
Children's Center			X	X	
Community Clinic of Southwest Missouri			X	X	X
Compass Quest Advocacy Group			X		
Downtown Joplin Alliance				X	X

# 2021 JASPER-NEWTON BI-COUNTY NATURAL HAZARD MITIGATION PLAN

Hope Kitchen			X		X
Joplin Area Habitat for Humanity				X	X
Joplin NALA Read				X	
Joplin Sports Authority	X			X	
Joplin Trails Coalition					X
Joplin Workshops		X	X	X	
Lafayette House				X	
One Joplin				X	
Ozark Center Jasper County	X	X	X	X	X
Ozark Center Newton County	X		X	X	X
Saint Paul's United Methodist Church	X	X	X		X
The Community Clinic of Southwest Missouri			X	X	X
The Independent Living Center				X	
The Light at Joplin Church	X	X		X	x
The University of Missouri Extension				X	
The United Way of Southwest Missouri	X				X

## **Economy, Employment, and Industry**

### **Labor Force, Unemployment, and Commuting Patterns**

Table 1.10 and 1.11 highlight employment in each county as well as an employment breakdown by industry. Jasper County has a potential labor force of 91,819 persons, of those, 59,667 are estimated to be in the labor force or 64.9% of the potential labor force. Newton County has a potential labor force of 45,945, and an active labor force of 28,688 or 62.4%. They also provide an employment breakdown by industry. Manufacturing dominates the local economies of both counties. Education, Health, and Social along with Trade are closely behind.

*Table 1.10 Jasper County Employment*

Economic Indicators	Number	Percent
Civilian labor force	59,667	64.9%
Employed	56,319	61.3%
Unemployed	3,262	3.6%
Per capita Income (dollars) 2013-2017	23,390	N/A
Individuals below poverty level, 2013-2017	N/A	12.3%
Industry	Number Employed	Percent
Agriculture, forestry, fishing and hunting	695	1.2%
Construction	3,429	6%
Manufacturing	9,586	17%
Wholesale trade	1,136	2%
Retail trade	7,225	12.8%
Transportation, warehousing, and utilities	3,635	6.4%
Information	1,192	2.1%
Finance, insurance, and real estate	2,328	4.1%
Professional, scientific, and management	4,217	7.4%
Educational services, health care, and social assistance	7,702	13.6%
Art, entertainment, recreation, accommodation, food services	5,682	10%
Other services, except public administration	3,351	5.9%
Public administration	1,347	2.3%

*Table 1.11 Newton County Employment*

Economic Indicators	Number	Percent
Civilian labor force	28,688	62.4%
Employed	27,120	59%
Unemployed	1,543	3.4%
Per capita income (dollars)	25,837	N/A
Individuals below poverty level	N/A	9.4%
Employment by industry	Number	Percent
Agriculture, forestry, fishing and hunting, and mining	820	3%
Arts, entertainment, recreation, accommodation, and food	2,080	7.7%



services		
Construction	1,909	7%
Educational, health and social services	5,955	22%
Finance, insurance, real estate, and rental leasing	799	2.9%
Information	454	1.7%
Manufacturing	4,755	17.5%
Other services (except public administration)	1,184	4.4%
Professional, scientific, management, administrative, and waste management services	2,349	8.7%
Public Administration	873	3.2%
Retail trade	3,228	11.9%
Transportation and warehousing, and utilities	2,024	7.5%
Wholesale trade	690	2.5%

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

Table 1.12 summarizes income, poverty, and employment for Jasper County and Newton County as compared to the state. When compared with the state of Missouri as a whole, Jasper County has a lower income and higher percentage of citizens in poverty in spite of the fact that unemployment remains slightly lower than the state percentages. Newton County also has a lower income, but a lower percentage of persons below the poverty line than the state average. Unemployment is also equal to Missouri's for Jasper, but slightly lower for Newton County.

*Table 1.12 Income and Poverty in Jasper and Newton Counties, Missouri*

	Jasper County	Newton County	Missouri
Per Capita Income, 2013-2017	\$23,390	\$25,837	\$28,282
Median Household Income, 2013-2017	\$45,328	\$46,723	\$64,776
Percent Below Poverty Level, 2013-2017	12.30%	9.40%	10.30%
Percent Unemployed Persons	3.60%	3.40%	3.60%

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

## Existing Community Plans

Jasper and Newton counties are both proactive counties with jurisdictions who use planning to help encourage and manage growth. Both counties have their own Emergency Operations Plans (EOP) which have established policies and procedures to help save lives, minimize injuries, protect property, and preserve both government and economic activities essential to survival and recovery in the event of a disaster. Additionally, 11 cities in Jasper County and 4 cities in Newton County have developed and adopted Master Plans (see [Community Profiles at the end of this section](#)). Those cities without master plans rely on their county's EOP. EOPs are maintained by the county's Emergency Management

Director, and are updated both annually and as necessary with the assistance of the Local Emergency Planning Committee (LEPC). Below highlights the planning capabilities of each participating community as recorded by jurisdictional surveys.

Beyond the communities, a number of entities within the county have emergency operations plans, including each school district, Missouri Southern State University, Crowder College, hospitals, county Health Departments, and many large manufacturing industries. Table 1.14 highlights the planning elements of the participating school districts as documented through district surveys.

*Table 1.13. Planning Capabilities by Community.*

Community	Comprehensive Plan	Builders Plan	Capital Improvement Plan	City Emergency Operations Plan	County Emergency Operations Plan	Local Recovery Plan	County Recovery Plan	City Mitigation Plan	County Mitigation Plan	Debris Management Plan	Economic Development Plan	Transportation Plan	Land-use Plan	Flood Mitigation (FMA) Plan	Watershed Plan	Fire Mitigation Plan	Critical Facilities Plan	Mitigation/ Response/ Recovery
Airport Drive	X			X		X		X					X					
Alba														X				
Carl Junction	X											X	X					
Cartersville	X			X									X					
Diamond		X	X	X				X	X									
Dennis Acres																		
Duenweg	X		X	X	X							X						
Fairview					X													
Fidelity								X										
Grand Falls Plaza																		
Joplin			X	X	X	X	X	X	X	X								
Leawood																		
Loma Linda														X		X		
Newtonia										X				X		X		
Oronogo	X										X				X			
Ritchey				X														
Saginaw													X	X		X		

*Table 1.14 Planning Elements by School District*

Planning Elements				
School District	Master Plan	Capital Improvement Plan	School Emergency Plan	Weapons Policy
Carl Junction R-I	X	X	X	X
Carthage R-IX	X	X	X	X
Diamond R-IV			X	
East Newton R-VI		X	X	
Joplin Schools		X	X	X
Martin Luther School	X		X	X
Missouri Southern State University	X	X	X	X
Ozark Christian College	X		X	X

Additional plans include the *City of Joplin Vision 2020*, *Joplin's 2014 Economic Recovery Strategy*, JATSO Long Range Transportation Plan, City of Neosho *Park and Recreation Plan/Floodplain Buyout Plan*, and Neosho's *Project Impact*. The HSTCC has also recently completed the *2019 Comprehensive Economic Development Strategy for Barton, Jasper, Newton and MacDonald counties*. *Vision 2020* puts forth long-term goals for the City of Joplin, focusing on areas which will enhance vitality and livability of the city through economic development, arts and culture, downtown development, and other beneficial structures. Joplin's EDA funded *2014 Disaster Recovery Plan* identified development and funding opportunities for the city and region after the 2011 Joplin tornado, while the JATSO is the long-range transportation plan for the Joplin metro area which seeks to direct and fund transportation needs in the future. The *Neosho Floodplain Buyout Plan* has purchased nearly 150 properties to date in order to create a greenway to help contain the 50-year flood and eliminate repetitive damages by creating recreation areas in the floodplain. As a result of 2017-2019 repeat flooding along Hickory Creek, additional buyouts are underway there. Finally, *Neosho's Project Impact* has worked to create a more disaster resistant community through participation in FEMA programs.

Both Jasper and Newton counties are included in the Missouri Department of Transportation's State Transportation Improvement Plan (STIP). The STIP provides both short- and long-term planning for the surface transportation network.

## Development Trends

The population of the two-county region has steadily grown over time. Only in the early part of the twentieth century did either county experience a dip in the population. Since the 1970 Census, both Jasper and Newton counties' populations have continued to grow. As seen in Table 1.1, most jurisdictions in both counties have largely followed the same pattern, although some smaller jurisdictions have not. Both counties are positioned to continue increased population growth as urbanization trends continue nationwide and regional trade and industry sectors located in the region continue to grow. The City of Joplin which spans both counties continues to grow at a significant rate. Nearly \$200 million in state, federal and private dollars has helped accelerate housing, infrastructure, amenities, and community facilities after the 2011 tornado disaster. As in most rapidly developing cities, problems of development such as urban sprawl and traffic congestion are something with which the city and counties must contend with. The existence of solid planning and zoning helps to effectively minimize the effects of rapid growth.

## Identified Assets

This section provides a survey of existing assets such as infrastructures, critical facilities, employment centers, commercial centers, and recreation centers. Performing a routine inventory of these characteristics is a vital role in hazard mitigation planning.

### Inventory of Infrastructure

Infrastructures include transportation, communications, water and sewer, electricity and natural gas, solid waste disposal, law enforcement, emergency medical services, fire protection, and emergency services.

### Roadways

Roadways are the main source of transportation within the region that facilitates the movement of people and goods. The Missouri Department of Transportation (MoDOT) provides and maintains all federal and state roadways. The MoDOT Southwest District headquarters is in Springfield and includes 21 counties, of which Jasper and Newton County are two. The following table highlights county vs. state-maintained roadways.

County	Total Road Miles	Non-MoDOT Road Miles	MoDOT Road Miles
Jasper	1911	1,525	385
Newton	1,605	1,275	330

County	Total Bridges/Culverts	Non-MoDOT Bridges/Culverts	MoDOT Bridges/Culverts
Jasper	462	243	219
Newton	296	166	130

Any remaining roadways are maintained as municipal streets by communities, townships, or special road districts.

Jasper County and Newton County have two primary interstates that provide transportation corridors within the county and into the surrounding counties. Interstate 44 provides east-west access, while Interstate 49 provides north-south access in both counties. U.S. Highways 86 and 60 provides east-west access in Newton County as well. State Routes 43, 171, and 96, and 37 are also popular routes for regional and local collector access. Each county has a series of special road districts that are responsible for local transportation needs.

## Railroads

Railroads exist in both Jasper and Newton counties. Trains predominantly carry freight on the Kansas City Southern, Union Pacific, Missouri Northern Arkansas, and Burlington Northern Santa Fe Railroad lines.

## Airports

The Joplin Regional airport is the only local public airport in the region, serving both Jasper and Newton County. It is owned and operated by the City of Joplin, providing commercial, military, cargo, corporate, and general aviation needs of the region. As of 2019, the airport provided two flight destination points, Dallas-Forth Worth and Chicago O'Hare Airports. The Joplin Regional Airport has two runways, both 6,500 linear feet.

## Public Transportation

The Joplin Metro Area Public Transit System (MAPS) is a curb-to-curb, accessible public transportation system within the cities of Joplin, Webb City, Carterville, Carl Junction, and Duquesne. This system operates between 8am and 5pm, Monday through Friday. The Sunshine Lamp Trolley also provides public transportation within the city limits of Joplin. The Trolley operates on a system of deviated fixed routes, meaning that riders can get on or off at a designated stop or they may also schedule a deviated pick-up or drop-off at a location with  $\frac{3}{4}$  mile from the trolley route. The city contracts with adjacent communities to provide this service as well.

OATS, Inc. is a publicly-funded, public transit system designed to meet the transportation needs of those who have little or no access to alternative means of travel. The OATS vehicles utilize a flexible schedule to meet the demands of its riders, regardless of age or disability. OATS operates in both Jasper and Newton County, running routes in the rural areas.

## Telecommunications

The following list of communication facilities is not all-inclusive, but represents the major providers of the counties' communications infrastructure.

Telecommunication Providers:	Internet Service providers:
AT&T	AT&T U-verse
CenturyLink	Cable One
Cellular One	Carthage Water & Electric
Craw-Kan Telephone Cooperative	CenturyLink
GTC Broadband	Craw-Kan
Le-Ru Telephone Company	Freedom
SGO Broadband	GTC Broadband
Sprint	Le-Ru Telephone Company
Verizon	Mediacom
AT&T	Rural iNet
Cable / Satellite Television	SGO Broadband
AT&T U-verse	Stougger Communications
Cable One	Suddenlink
Mediacom	Total Highspeed
Multiple Satellite Service Providers (Dish Network, DirectTV, etc.)	Wyerless

## Sewer and Water Facilities

Water and sewer facilities are provided through several districts in Jasper and Newton County. The counties themselves do not provide public water. Water service is provided by municipal provisions or via rural water districts. In addition, the households not served by a district or city may rely on private wells. Two primary rural water districts serve the area: Jasper County Public Water District No. 1 and Jasper County Public Water District # 2. One rural water district, Newton County Water District #1, serves Newton County. Municipalities in both counties have civic water providers or utilize Missouri American Water for their needs.

Wastewater needs are serviced by either public sewer systems, lagoons, or individual septic systems. Smaller communities within the county have relied on Community Development Block Grants (CDBG) and USDA-Rural Development to help fund wastewater infrastructure projects. The Missouri Department of Natural Resources (DNR) has also been a source of funding.

### **Electricity and Natural Gas**

*Service Providers:*

Carthage LP Co.

Algonquin Power & Utilities Corp, operating as Empire District

Empire Gas Inc.

Spire Gas

New-Mac Electric

Smallwood Gas

Synergy Gas Co.

### **Solid Waste Disposal**

The private waste haulers serving Jasper County and Newton County are listed below. Household Hazardous Waste collection is also completed as funded by the Region M Solid Waste Management District.

*Service Providers:*

Allied Waste Services of Galena

American Disposal Services

Big John's Heavy Equip Inc.

C & R Disposal

City of Joplin Recycling Center

Cupp's Trash Service

GDSI

Jasper County Sanitation Service

Joplin Hauling

Jordan Disposal Service LLC

Reliable Roll-Offs

Republic Waste Service

Waste Corporation of Missouri Inc.

## Law Enforcement

Jasper County has one Sheriff's Department and twelve local police departments. The Sheriff's Department operates out of Carthage, with satellite offices in Joplin and Airport Drive. Newton County also has one Sheriff's Department and five municipal police departments. The Missouri State Highway Patrol Troop D is stationed in Newton County. Table 1.17 provides information on each of the law enforcement agencies in Jasper and Newton counties. The City of Purcell relies on the sheriff's department for support.

<i>Table 1.17 Jasper – Newton Law Enforcement</i>				
Department	County	Station Location(s)	Vehicles	Personnel
Carl Junction Police Department	Jasper	Carl Junction	7	11
Carthage Police Department	Jasper	Carthage	25	45
Cartersville Police Department	Jasper	Cartersville	4	5
Diamond Police Department	Newton	Diamond	2	3
Duenweg Police Department	Jasper	Duenweg	3	4
Duquesne Police Department	Jasper	Duquesne	4	10
Granby Police Department	Newton	Granby	3	8
Jasper County Sheriff's Department	Jasper	Carthage, Airport Drive, Joplin	50	60
Jasper Police Department	Jasper	Jasper	3	4
Joplin Police Department	Jasper	Joplin (2)	100	111
Missouri Southern State University Police Department	Jasper	Joplin	3	11
Neosho Police Department	Newton	Neosho	16	21
Newton County Sheriff's Department	Newton	Neosho	52	31
Oronogo Metropolitan Police Department	Jasper	Oronogo	3	5
Purcell Police Department	Jasper	Purcell	0	0
Sarcoxis Police Department	Jasper	Sarcoxis	2	5
Seneca Police Department	Newton	Seneca	6	5

## Emergency Medical Services

Ambulance and emergency medical services in Jasper County are provided by McCune Brooke / Carthage Ambulance Services (Carthage), Metro Emergency Transport Services (METS), Aero Med Express, and the Debra Royce Clinic. The Newton County Ambulance Service supports all emergency transport to medical facilities in Newton County. The Newton County First Responders Unit also provides emergency and medical response service in the area. Freeman Hospital and Mercy Hospital both provide emergency helicopter evacuation services for the region.

## Fire Protection



There are numerous fire departments serving Jasper County and Newton County, Missouri. Jasper County supports eleven departments, while Newton County supports nine. The following provides a list of all departments located in the region.

- Avilla Fire Department
- Asbury Fire Protection
- Carl Junction Fire
- Cartersville Fire District
- Carthage Fire
- Diamond Fire Protection
- Duenweg Volunteer Fire
- Fairview Fire Protection
- Granby Fire / East Newton
- Jasper Volunteer Fire
- Joplin Fire
- Neosho Fire Department / Neosho District
- Oronogo Volunteer Fire
- Redings Mill Fire Protection
- Sarcoxie Volunteer Fire
- Seneca Fire Department
- Seneca Rural Fire District
- Stark City Volunteer District
- Stella Rural Volunteer Fire
- Tri-Cities Fire Protection
- Webb City Fire

Figure 1.8 shows the service areas for each district in Jasper County. Figure 1.9 shows the station locations for each district in Newton County

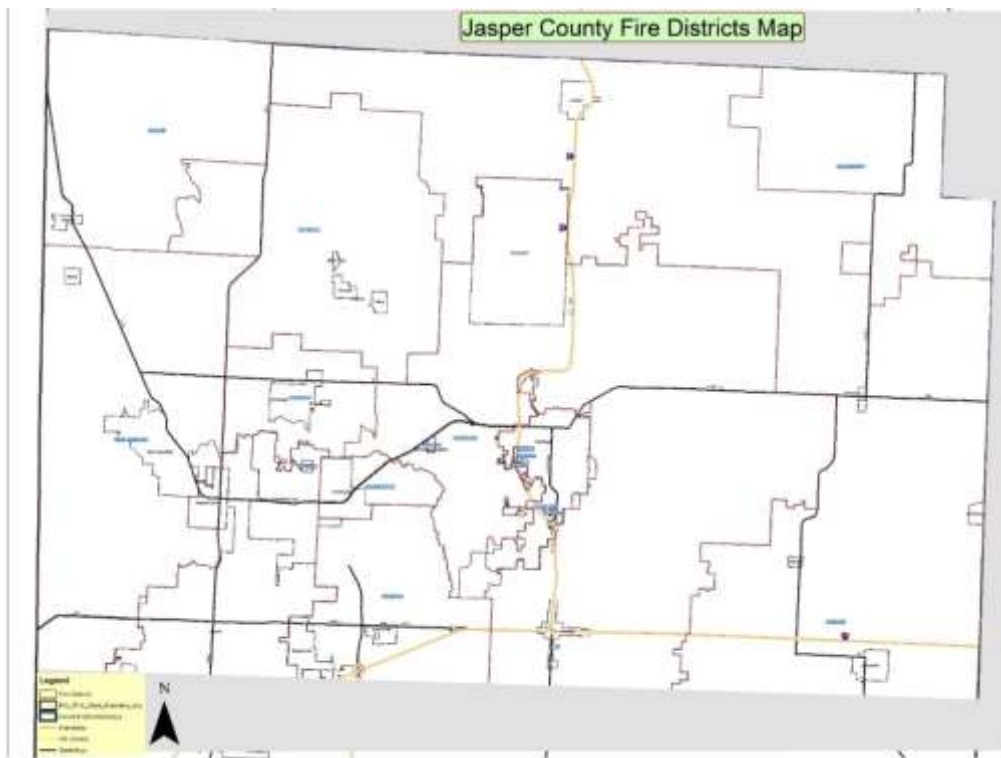




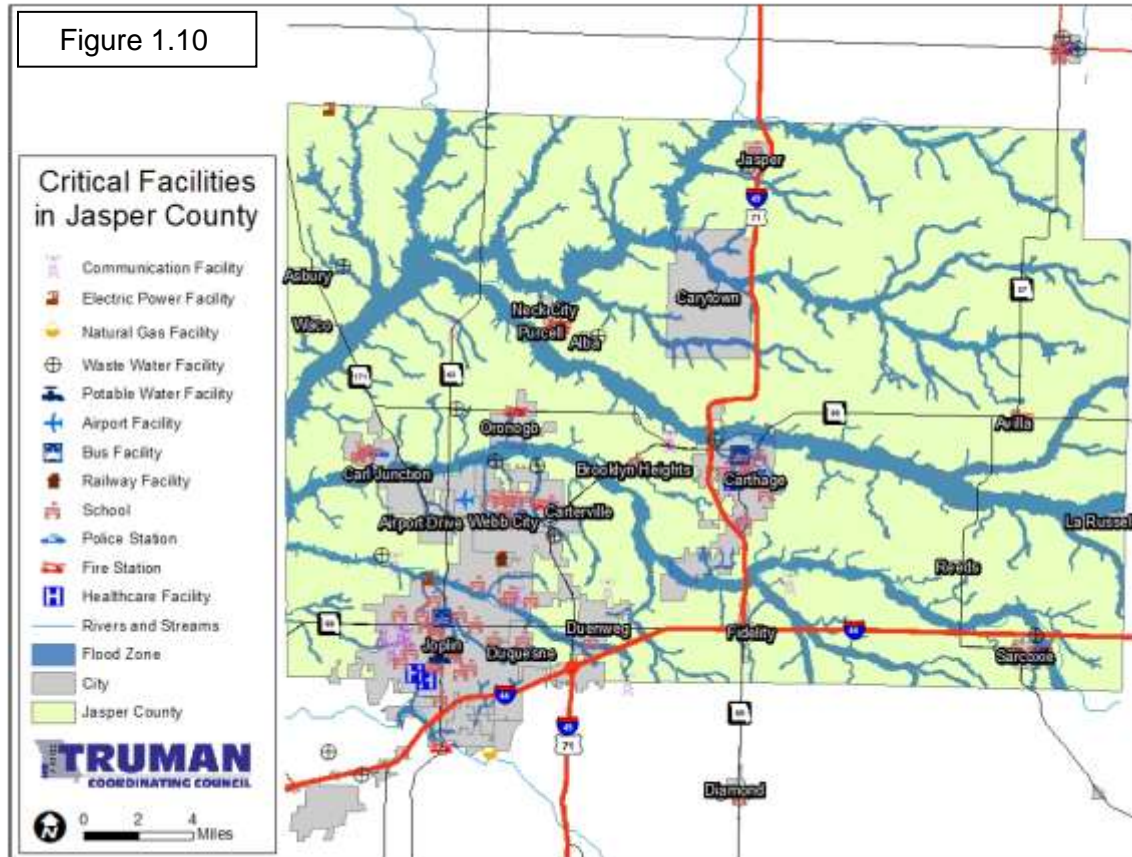
Figure 1.9

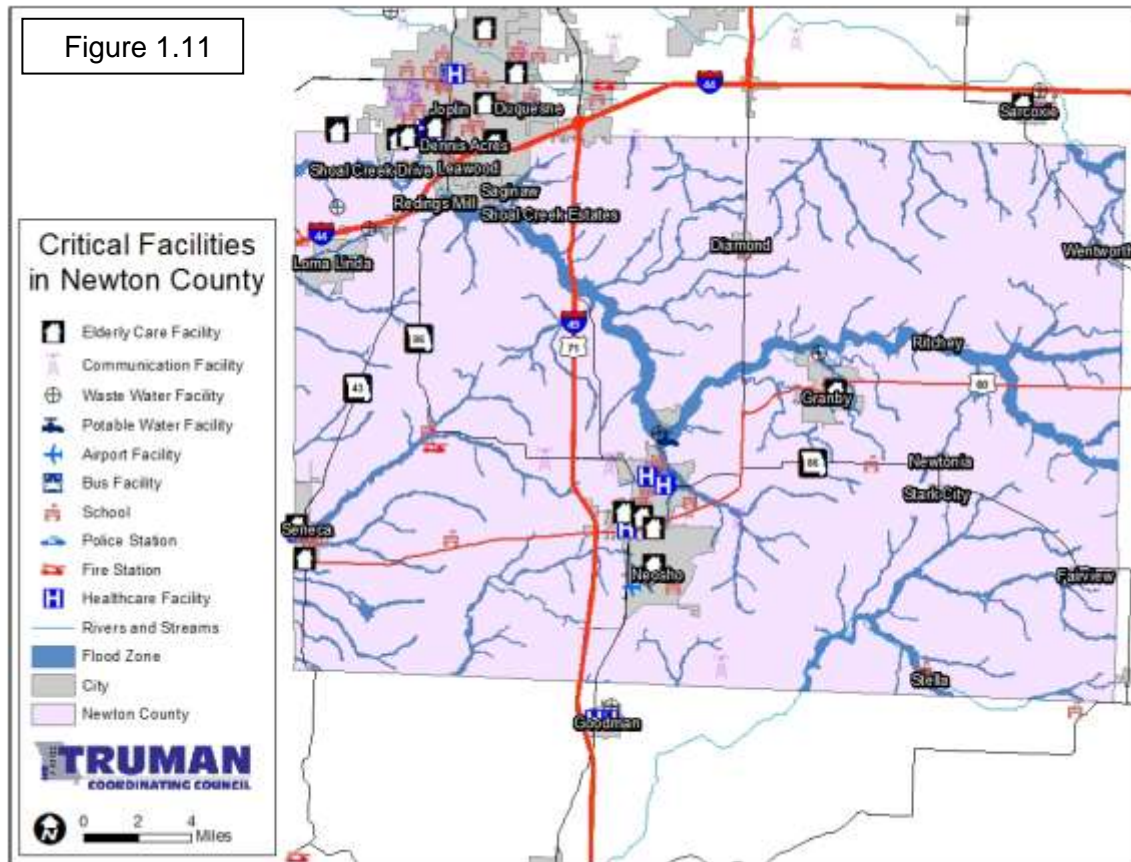
### Emergency Services (911)

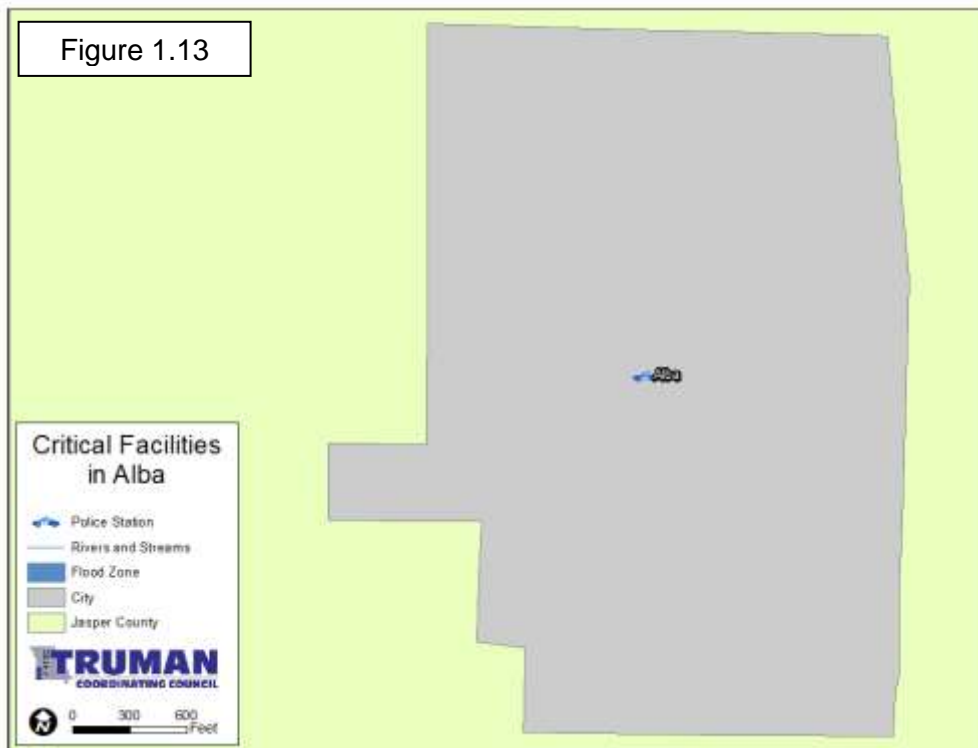
Jasper County, Newton County, and the City of Joplin are served by fully-staffed 911 Emergency systems, 24 hours a day, 7 days a week, 365 days a year. This system allows those living anywhere in the region to quickly summon emergency services such as fire, police, or ambulance personnel.

## Inventory of Critical / Essential Facilities

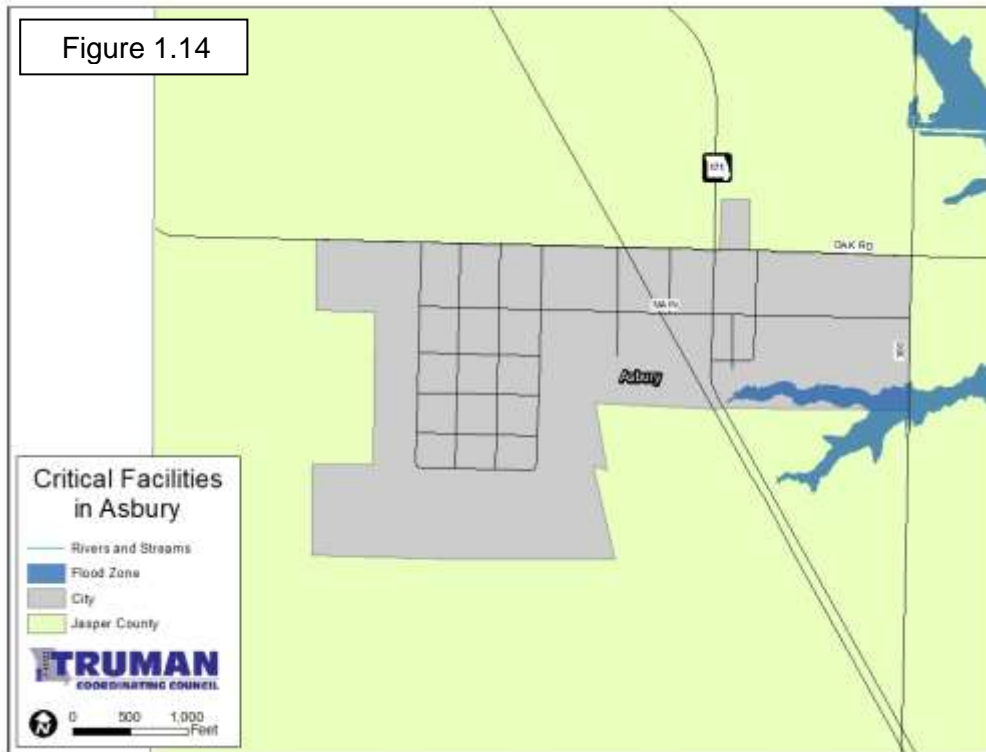
Relevant critical/essential facilities include medical facilities, schools, long-term care facilities, daycare centers, and government structures. These facilities represent resources for care and shelter, including populations requiring a higher level of care, and installations critical to community services (Figures 1.10 and 1.11). These facilities are at a higher risk during natural hazards due to the large population and their individual needs. Critical facilities are located in each jurisdiction as well. Figures 1.12 – 1.52 demonstrate the critical facilities located within the boundaries of each city or village.











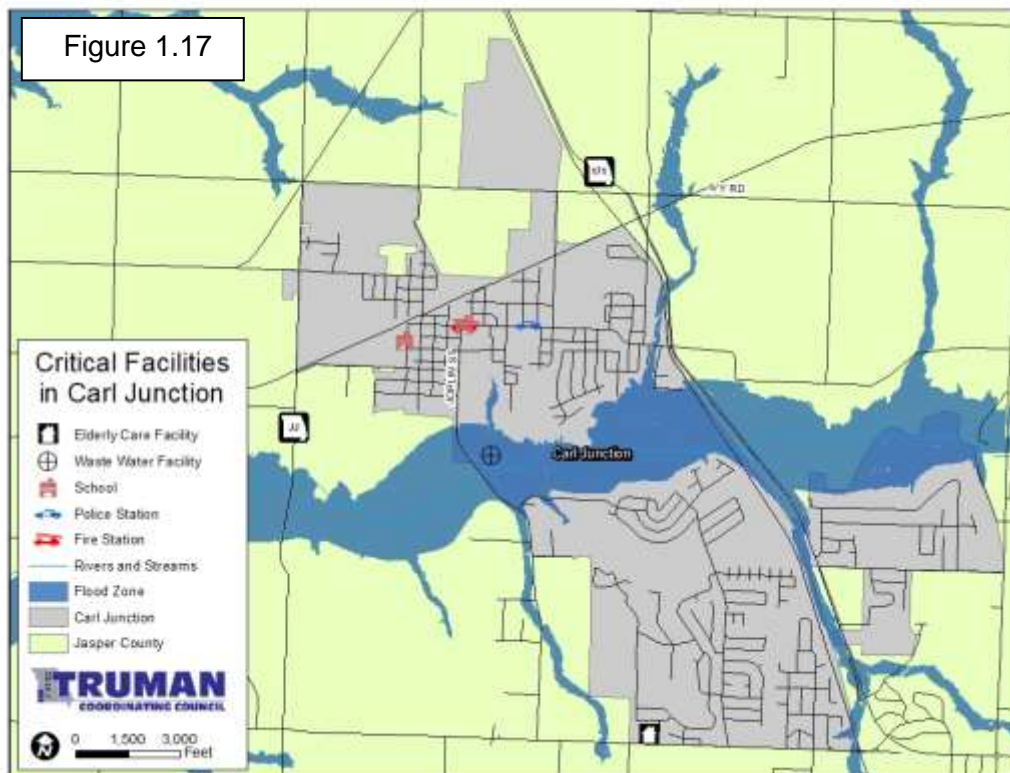
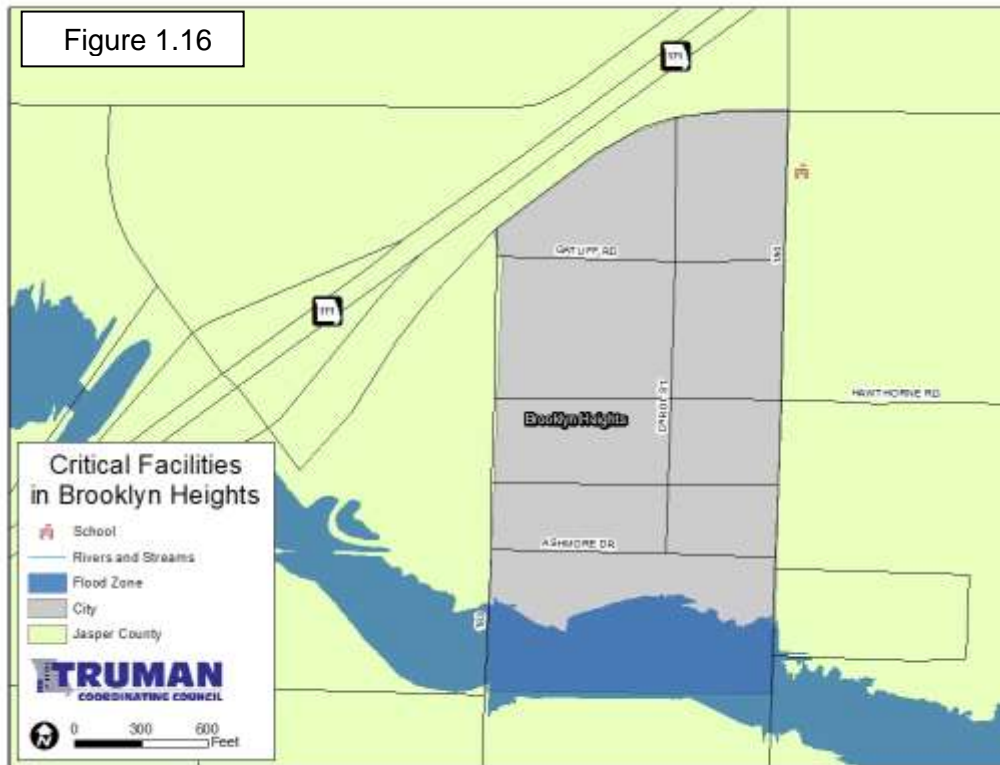




Figure 1.18

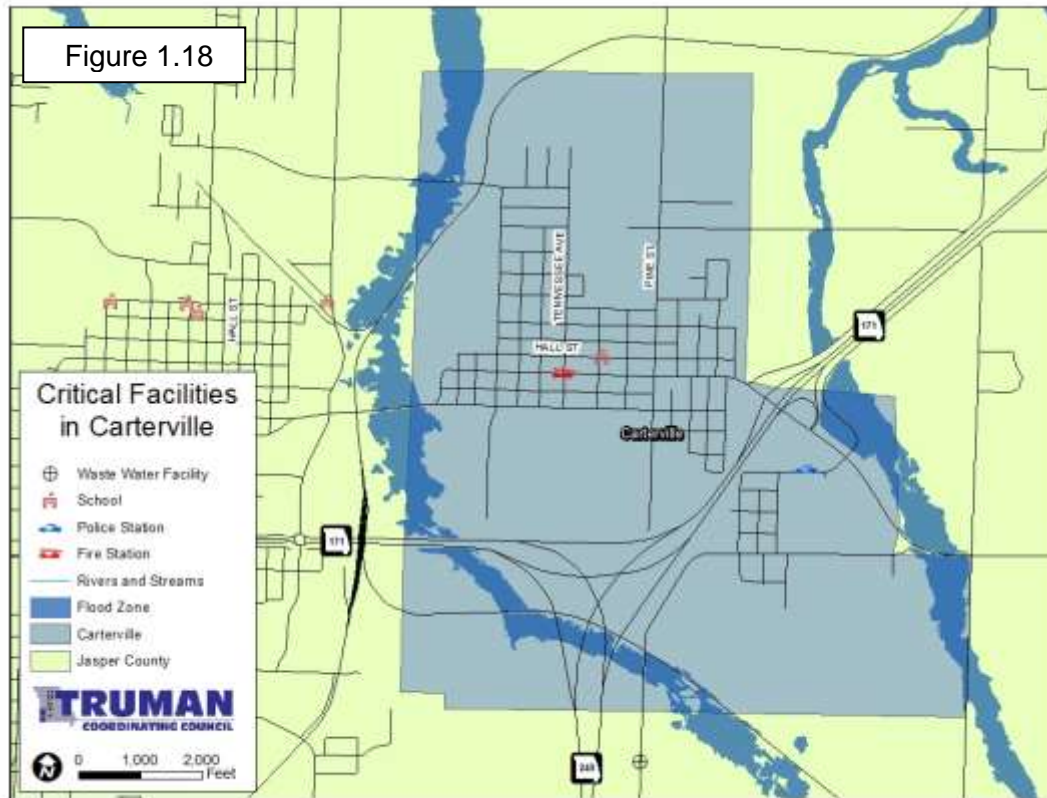
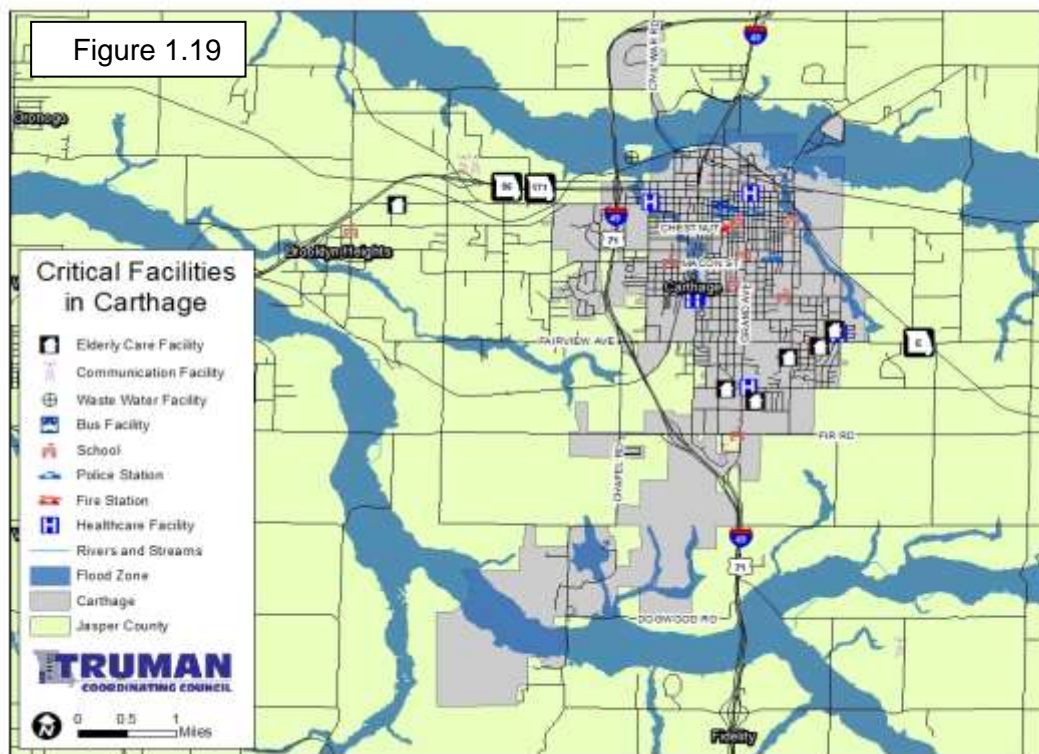
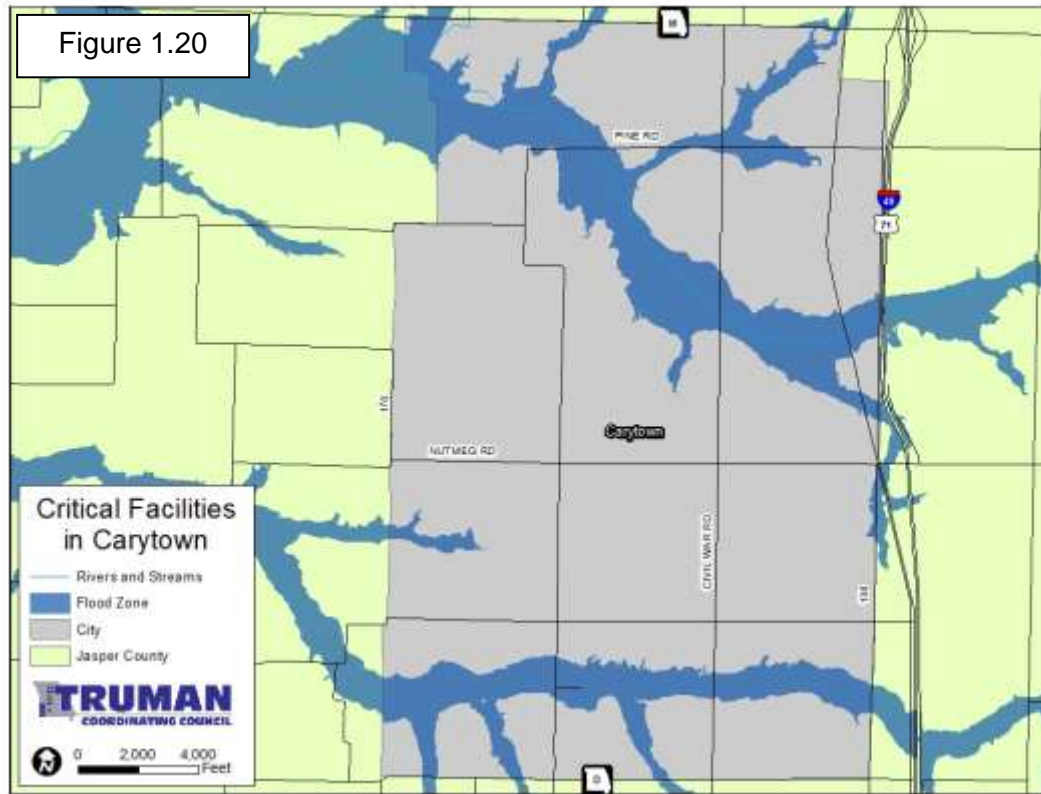
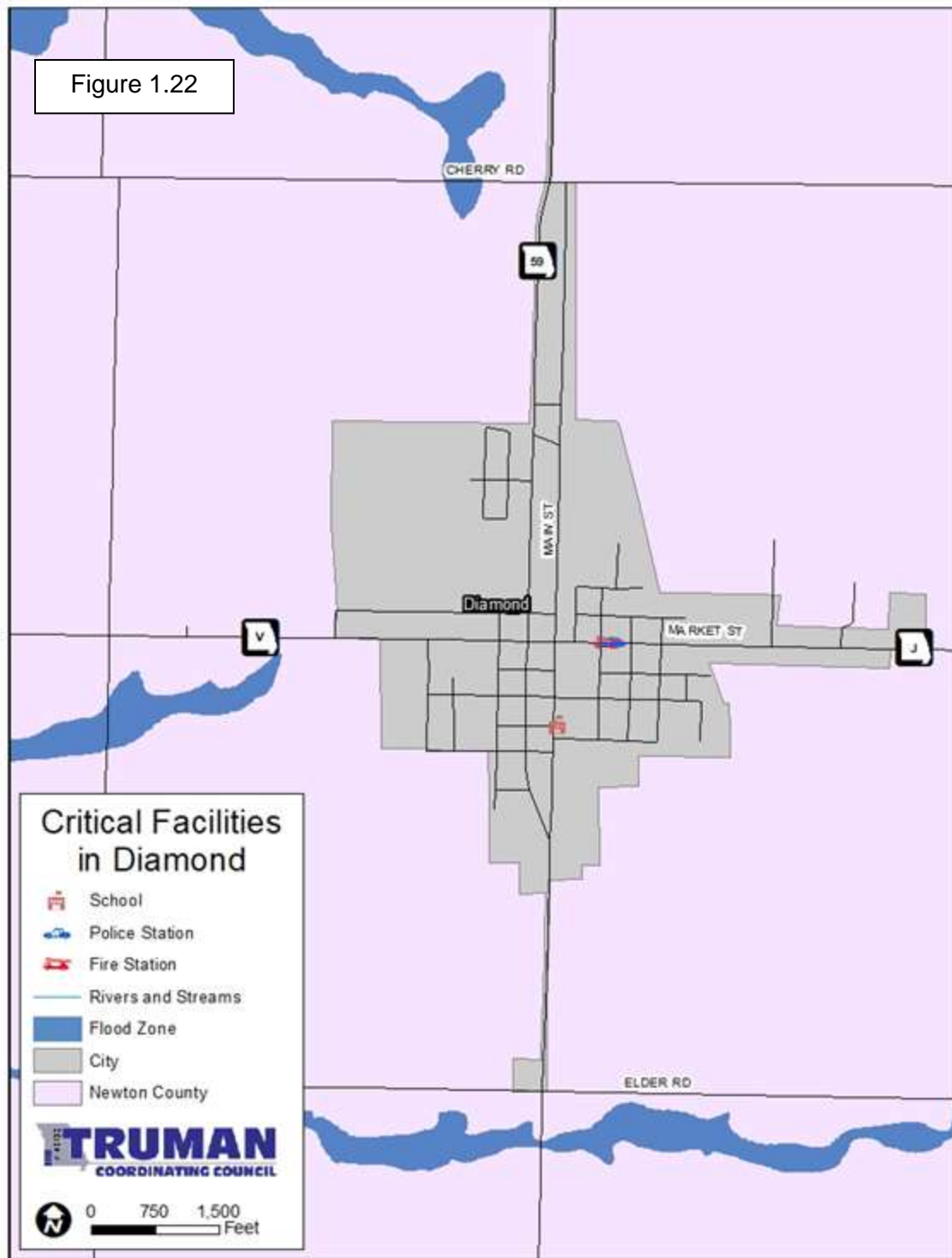


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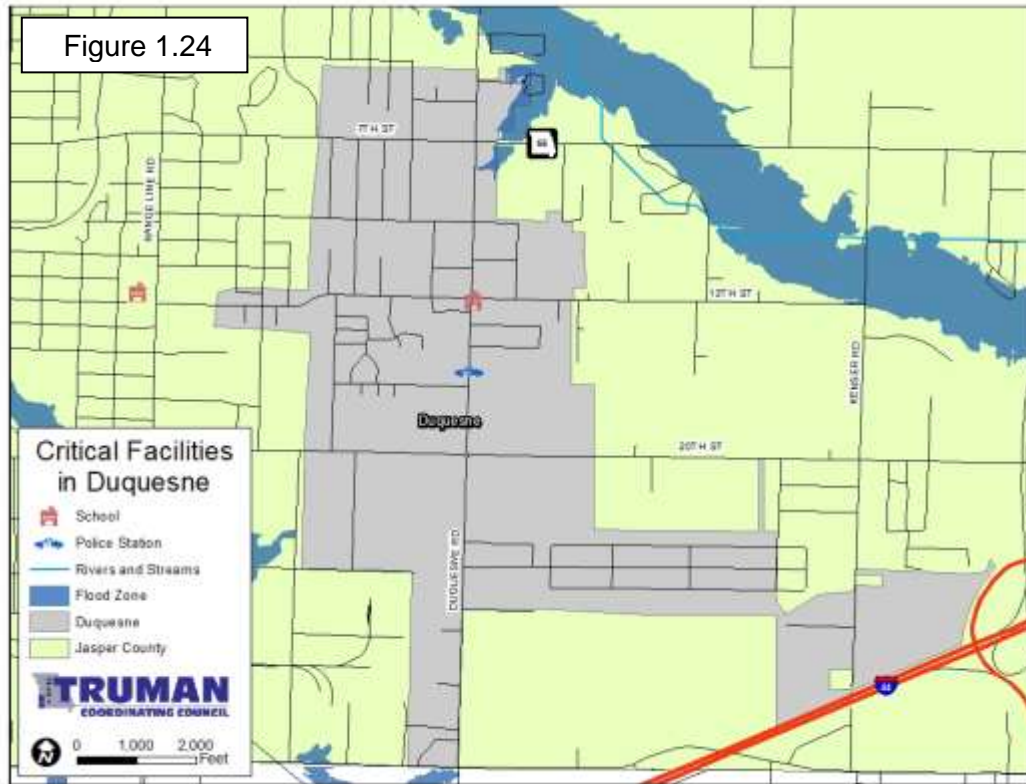


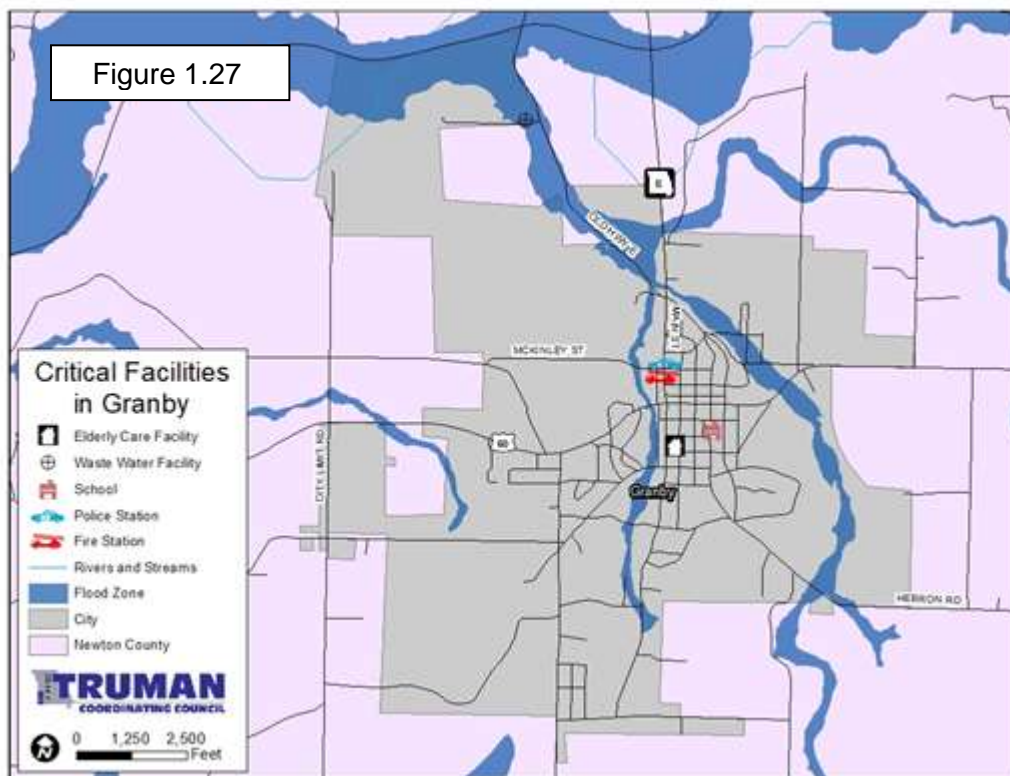












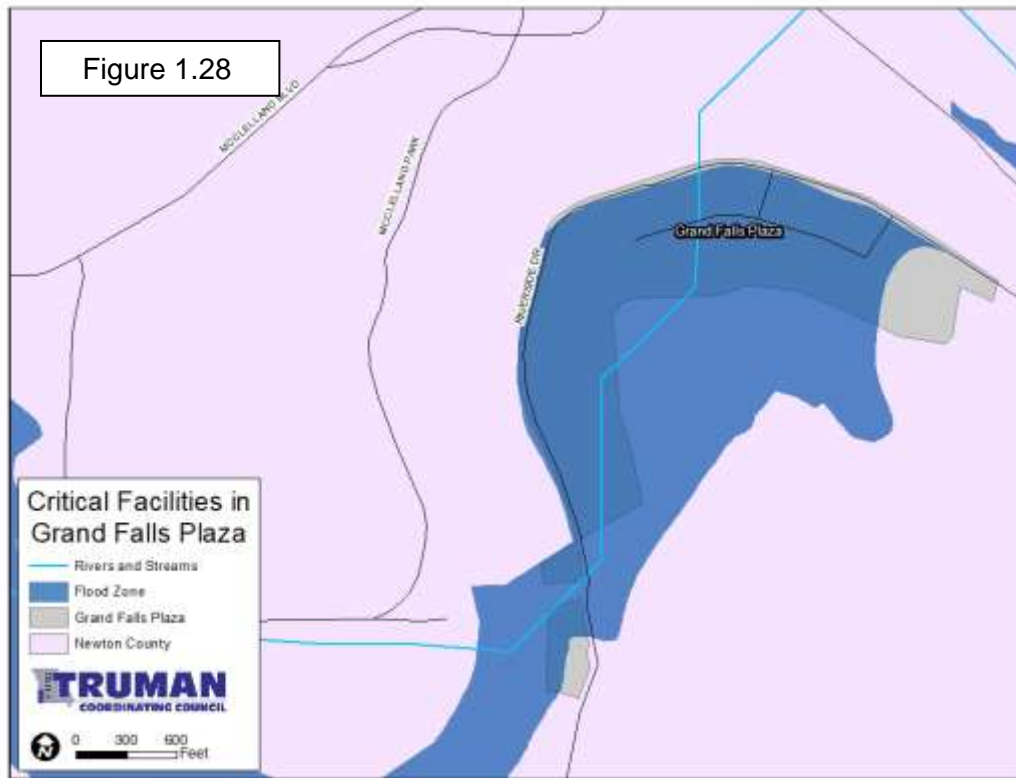




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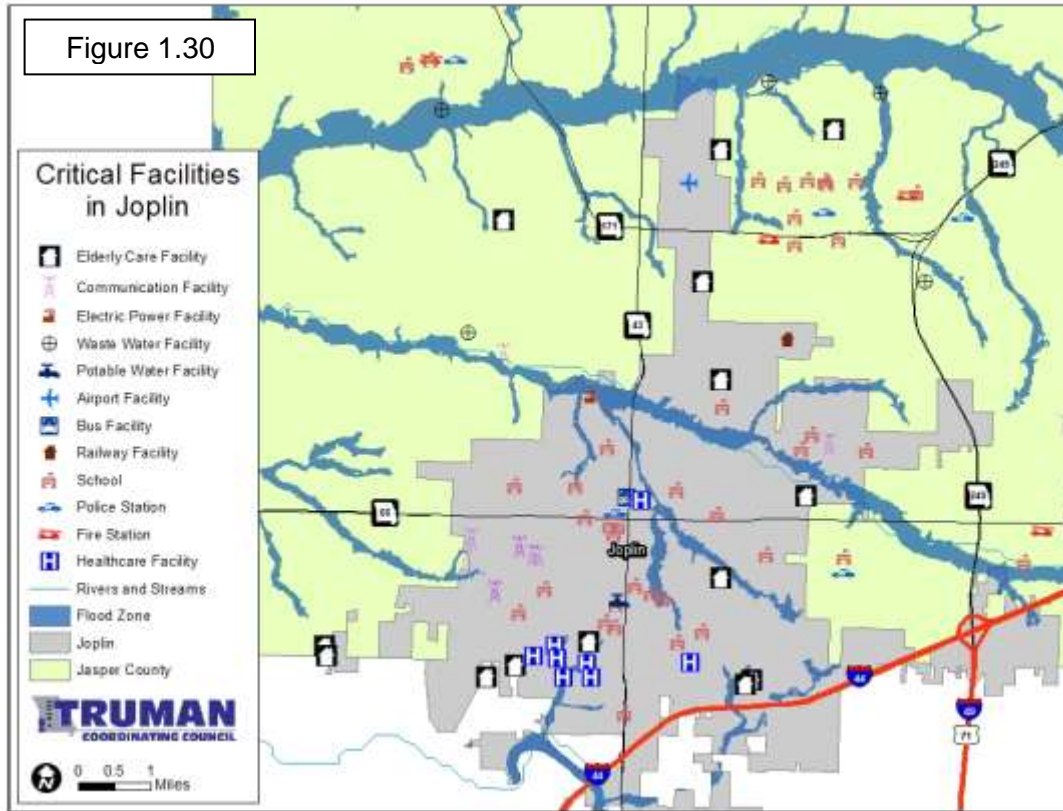
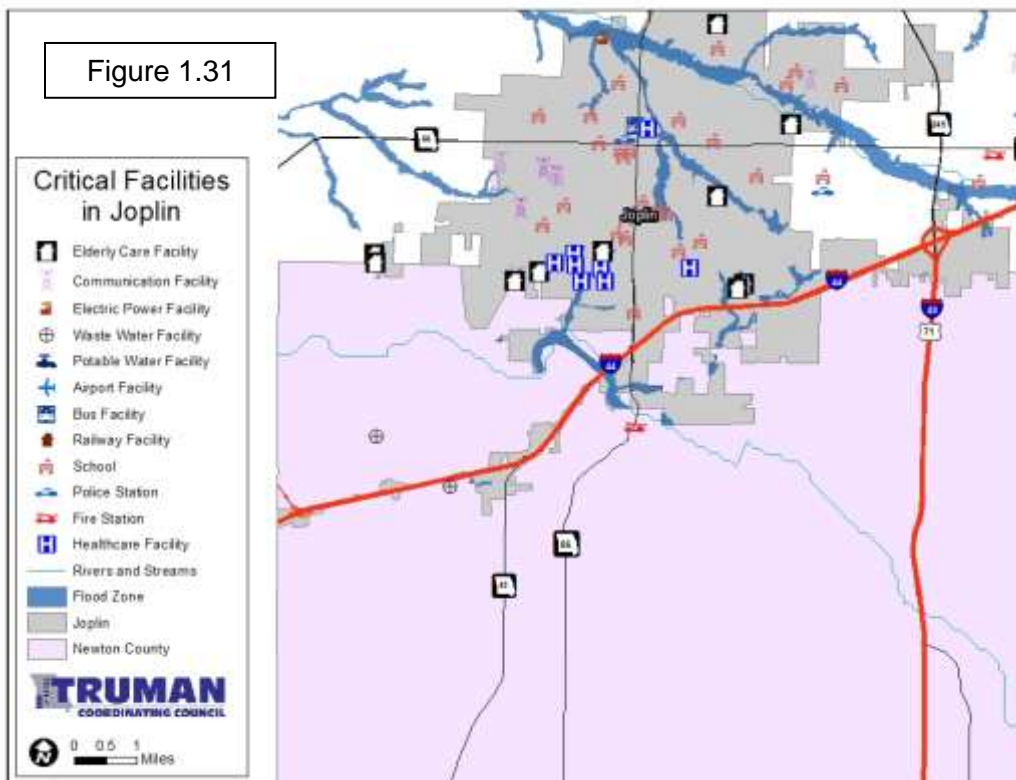
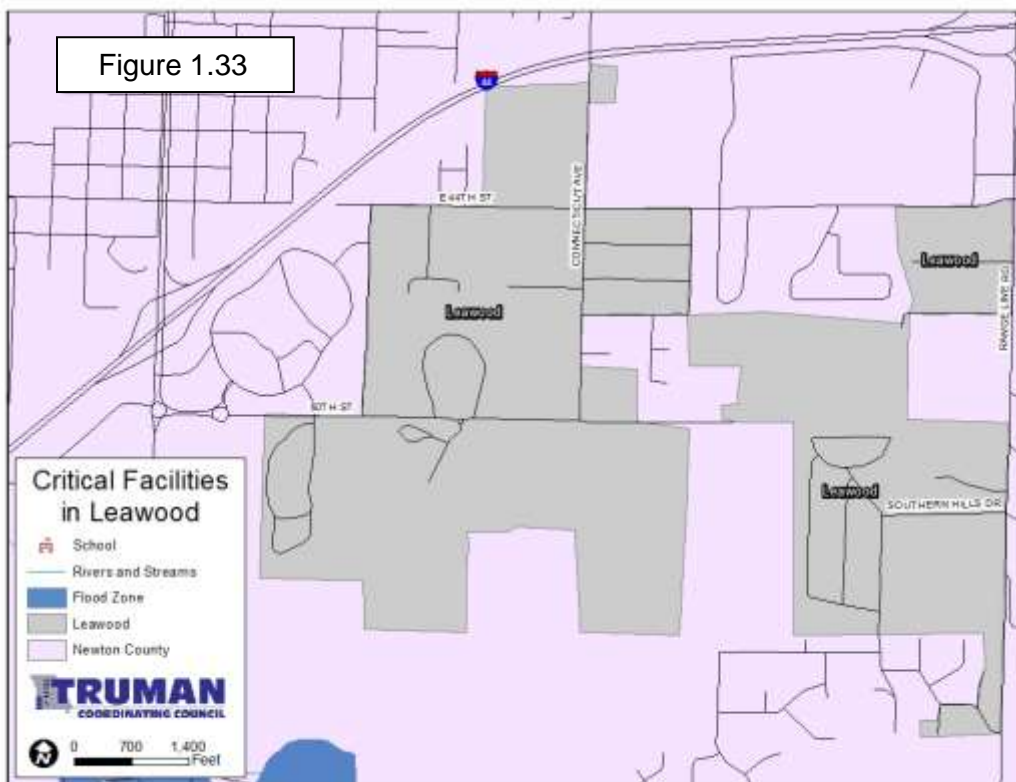
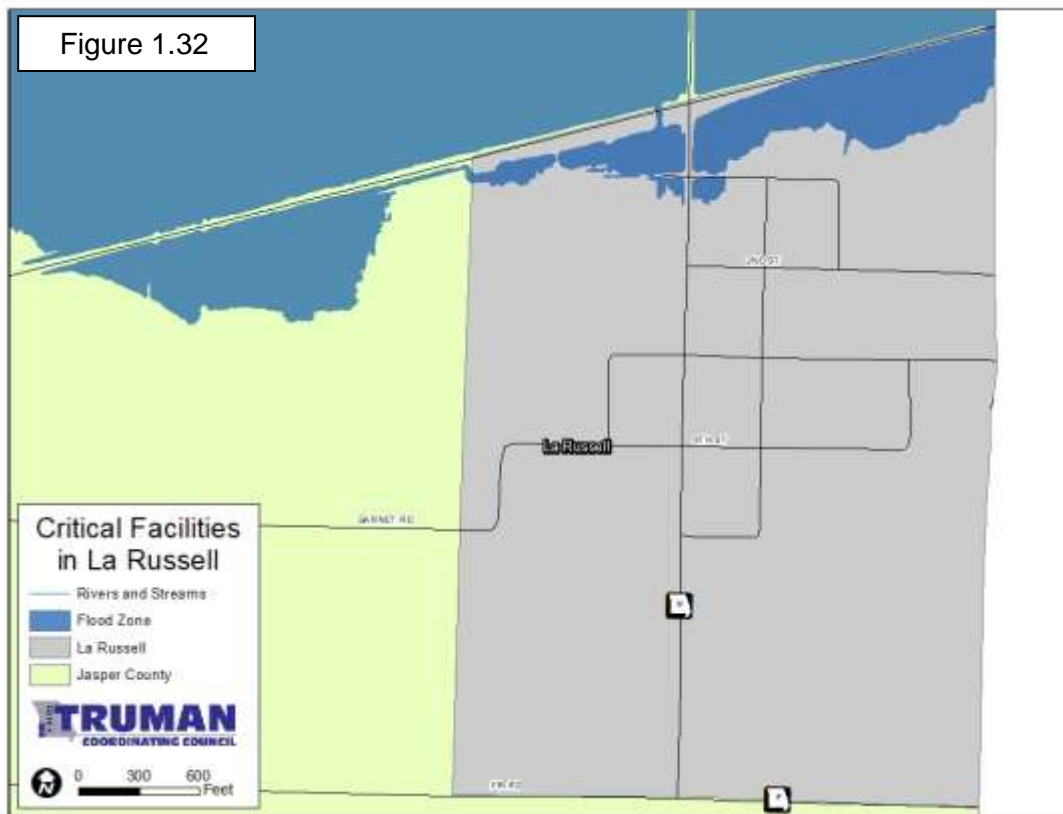
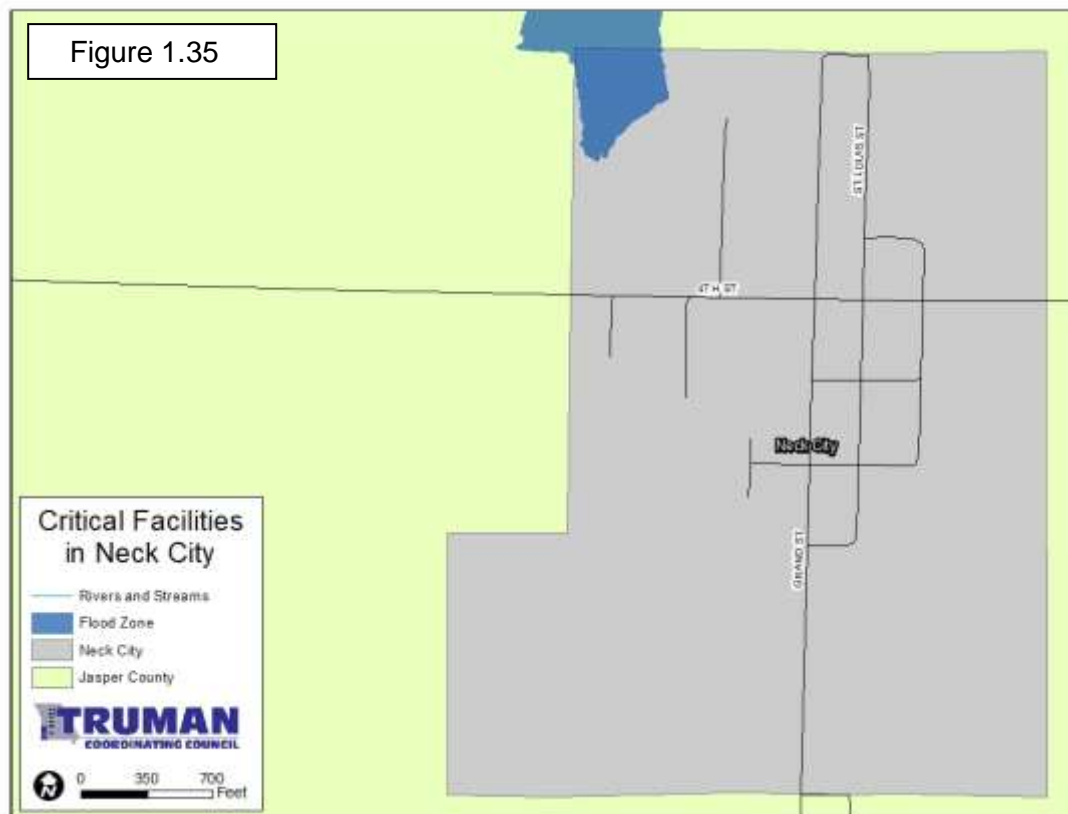
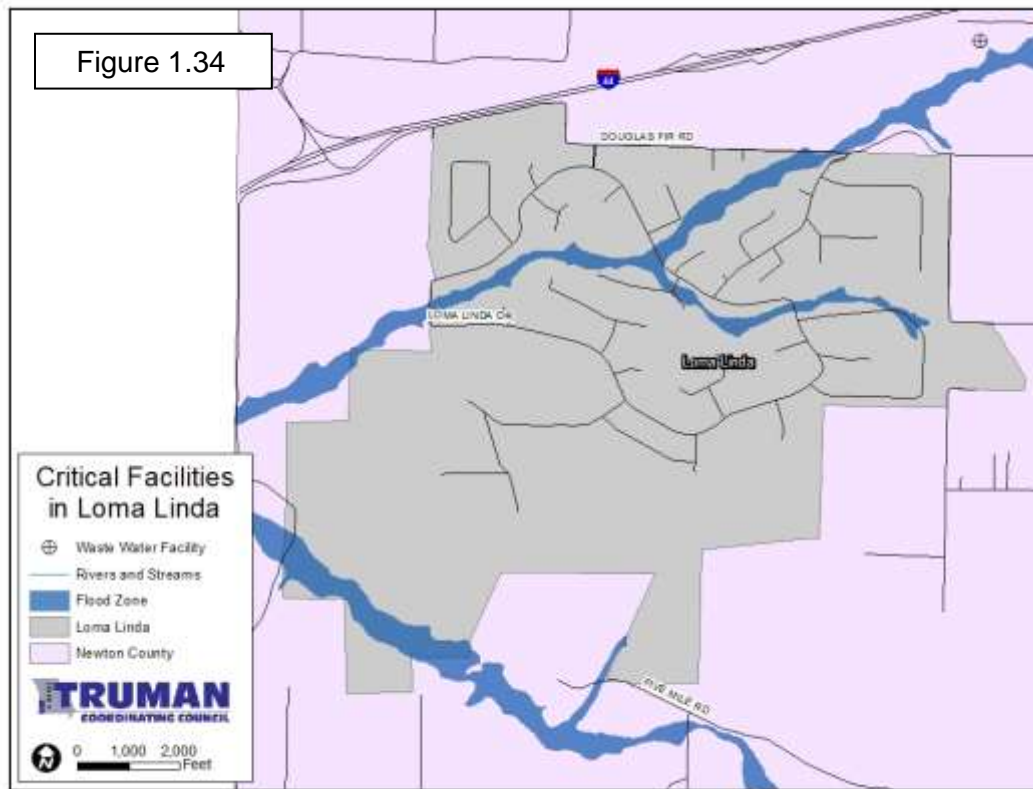
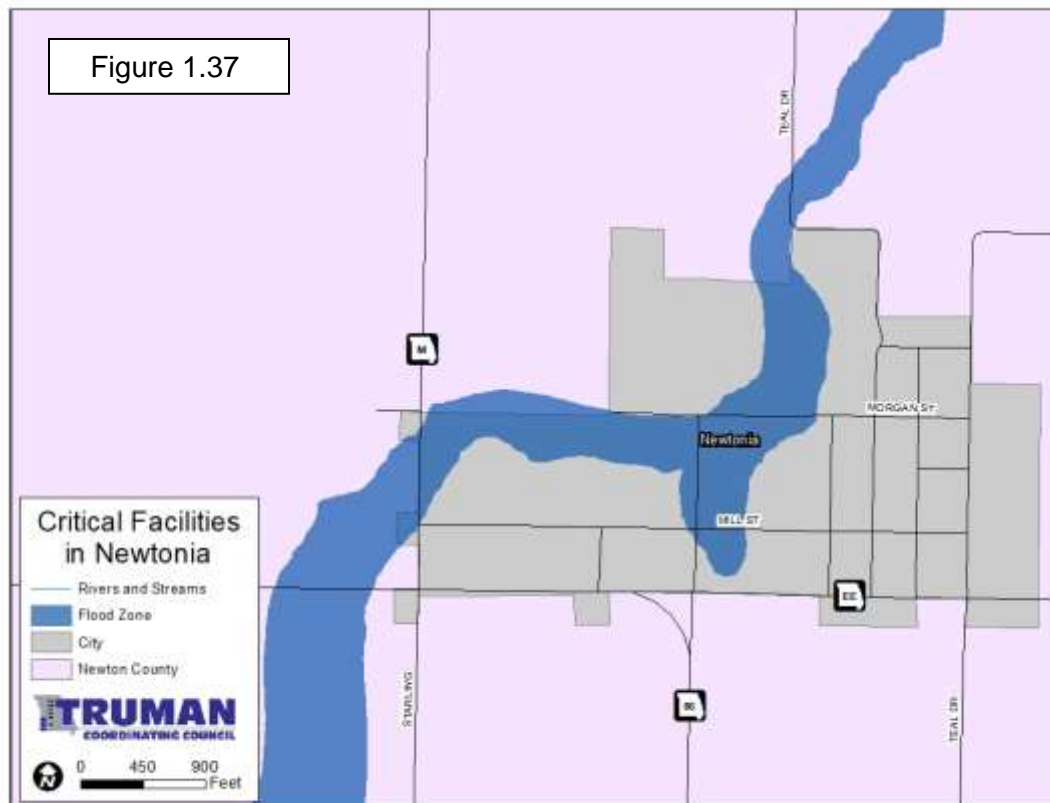
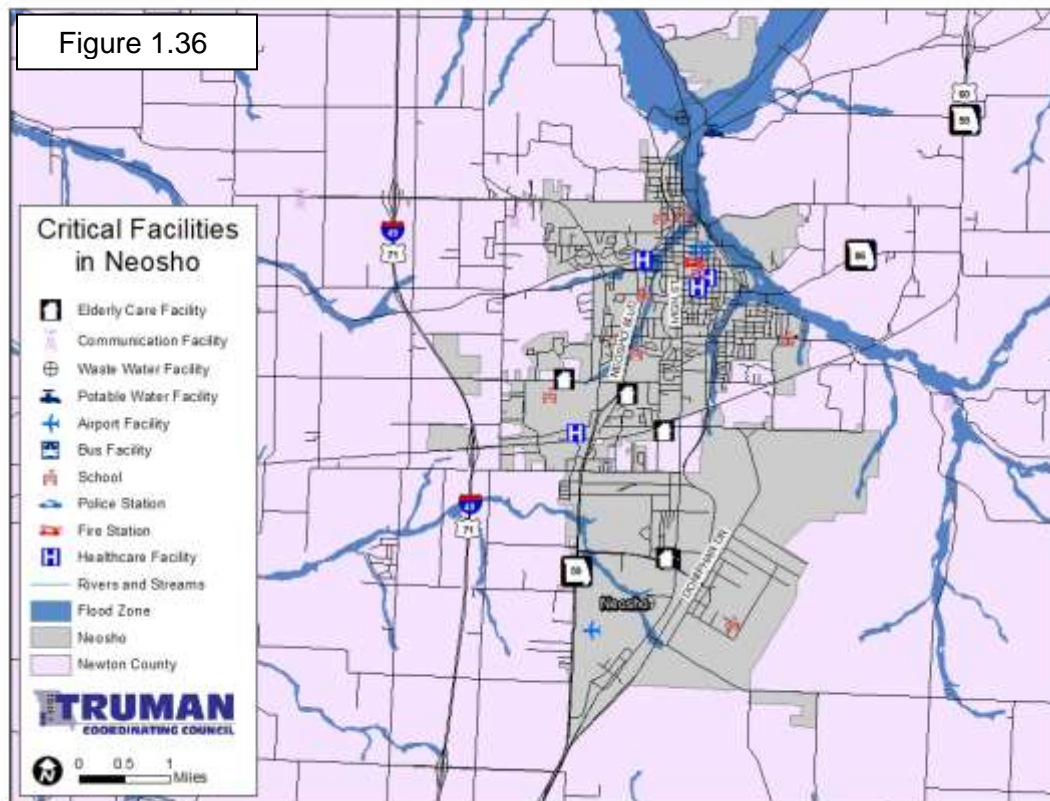


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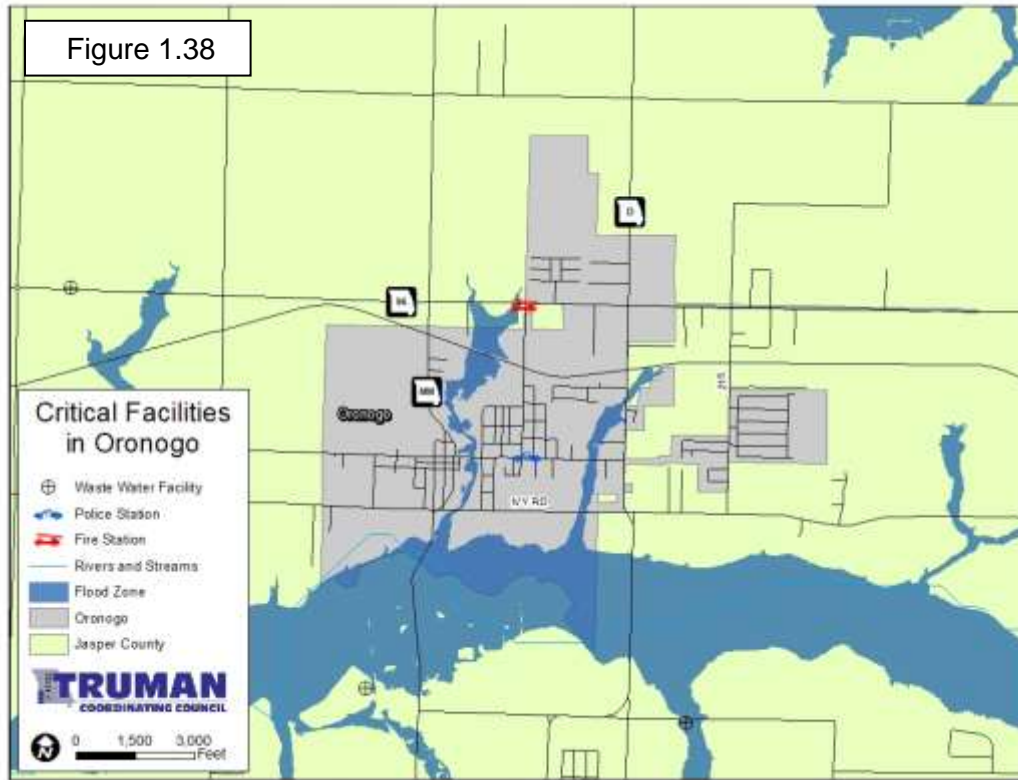


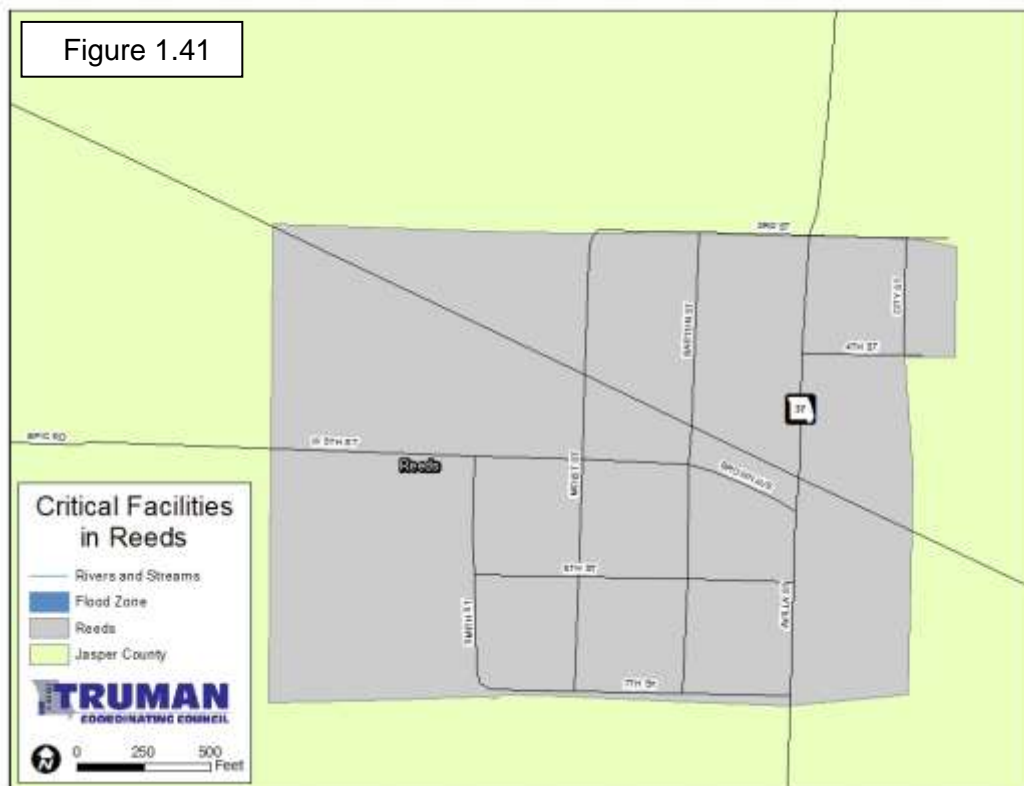
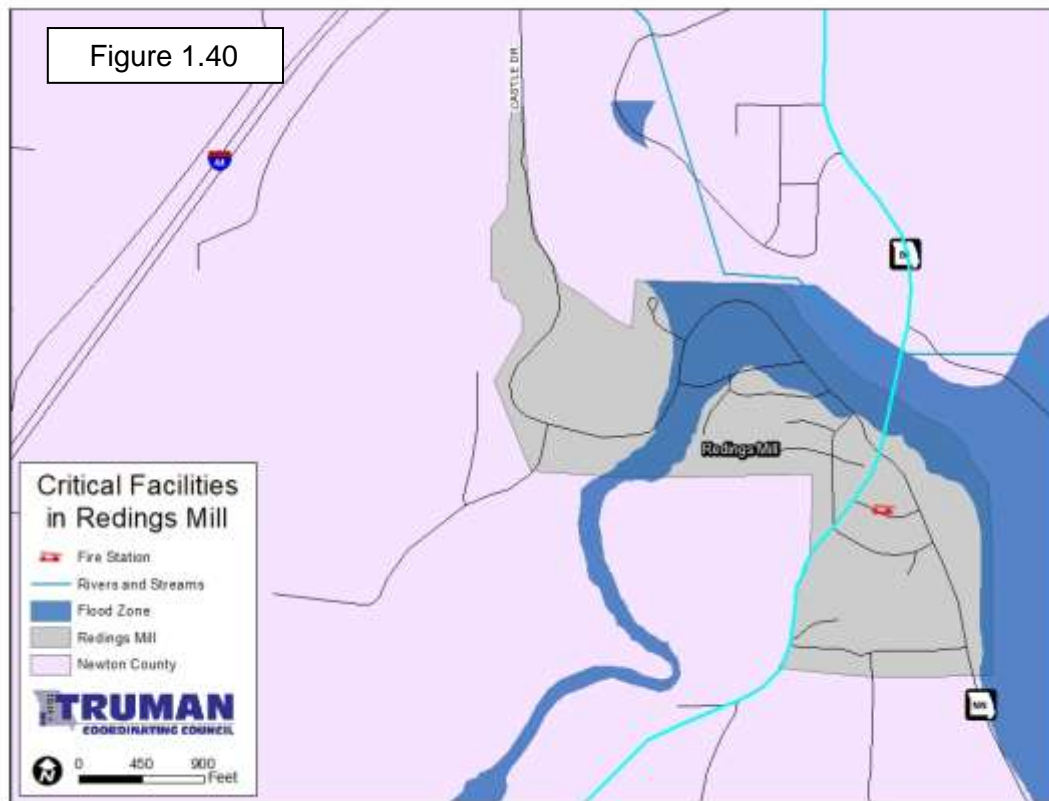


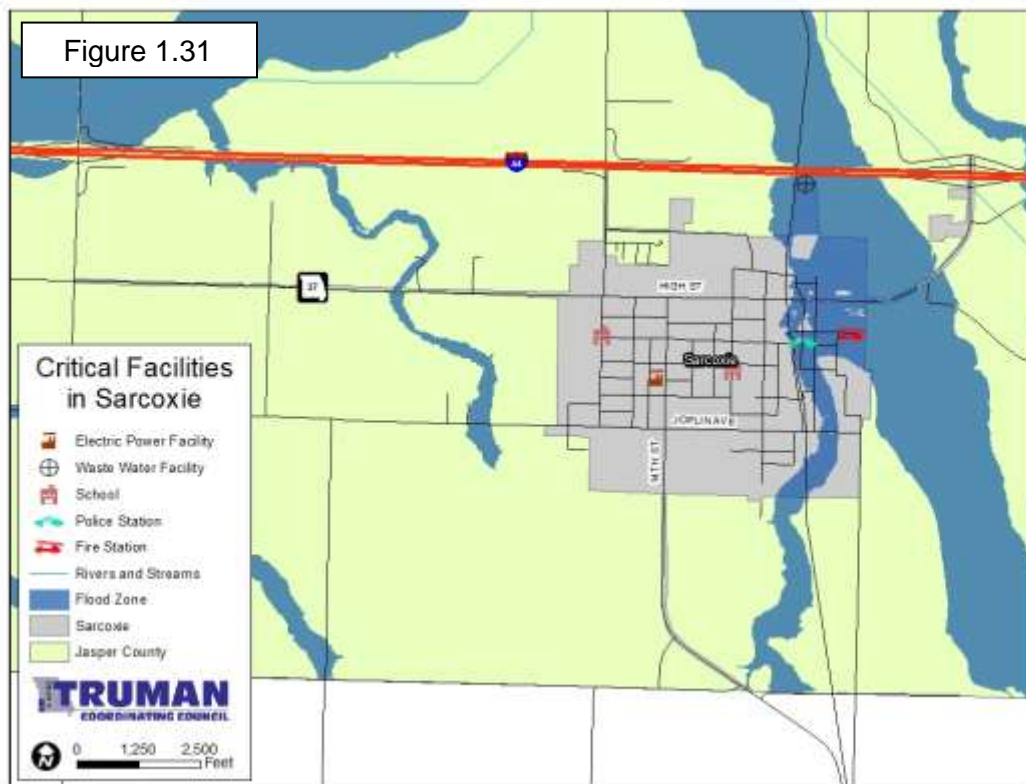
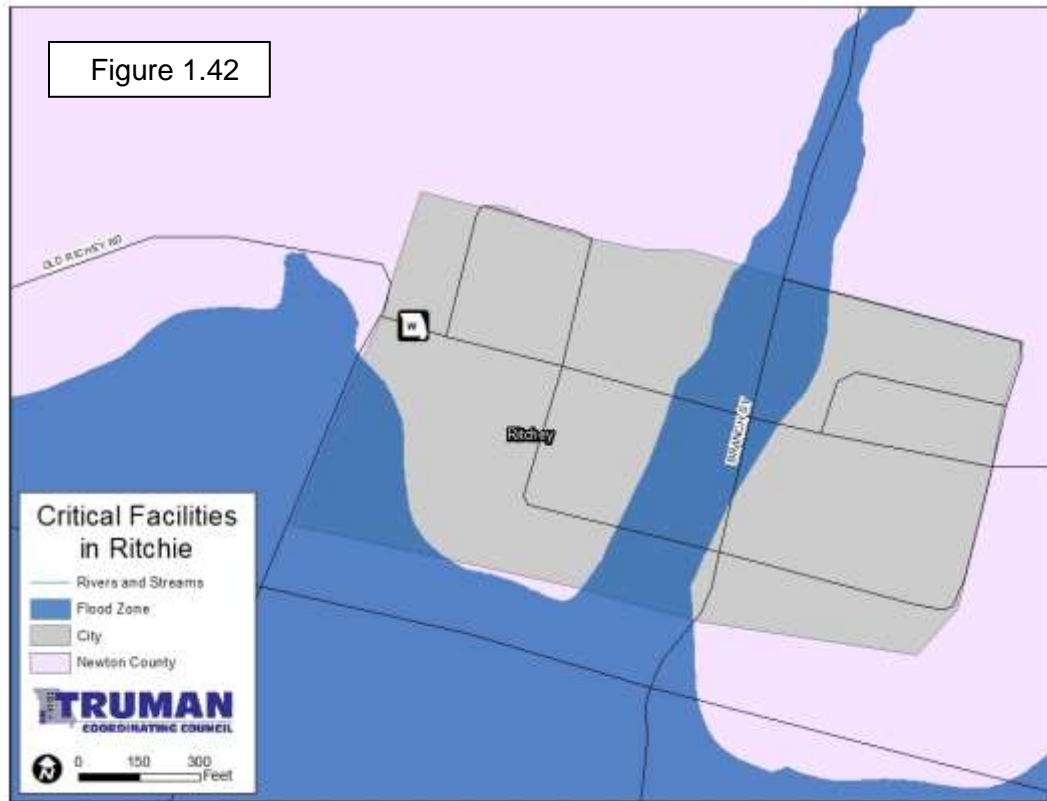














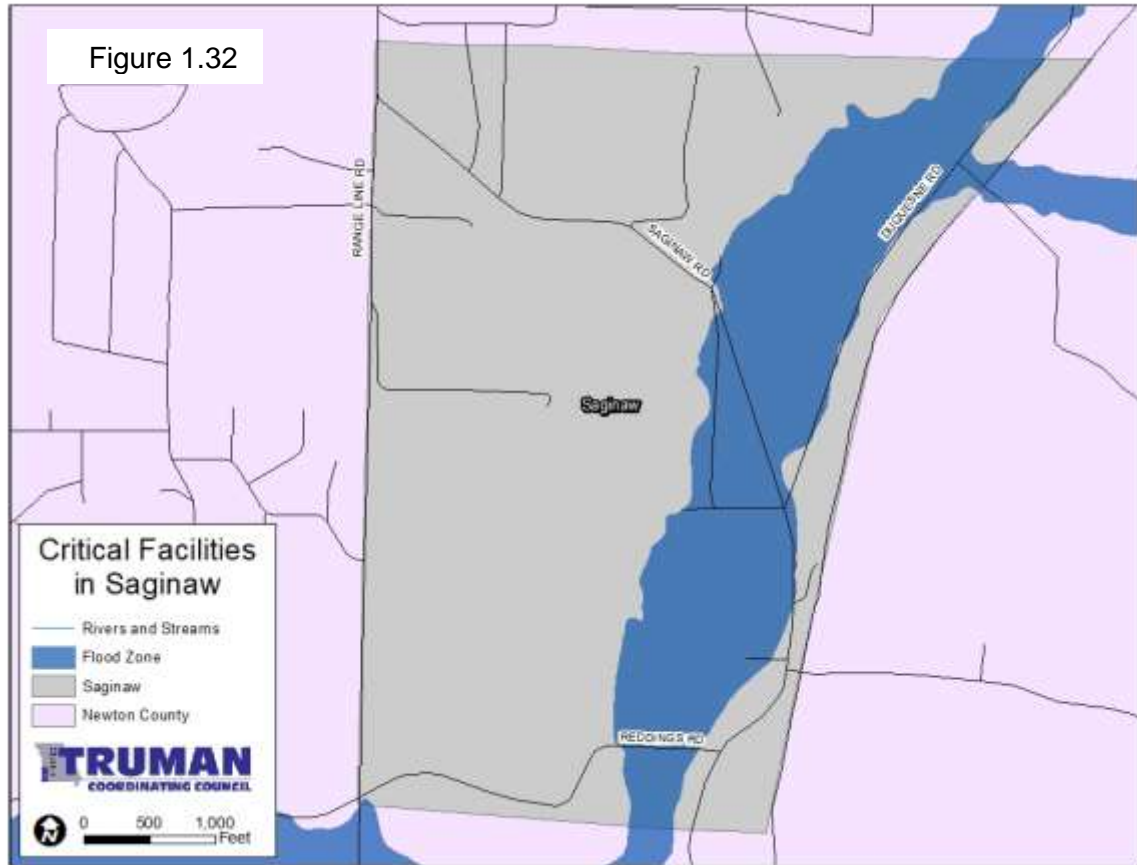
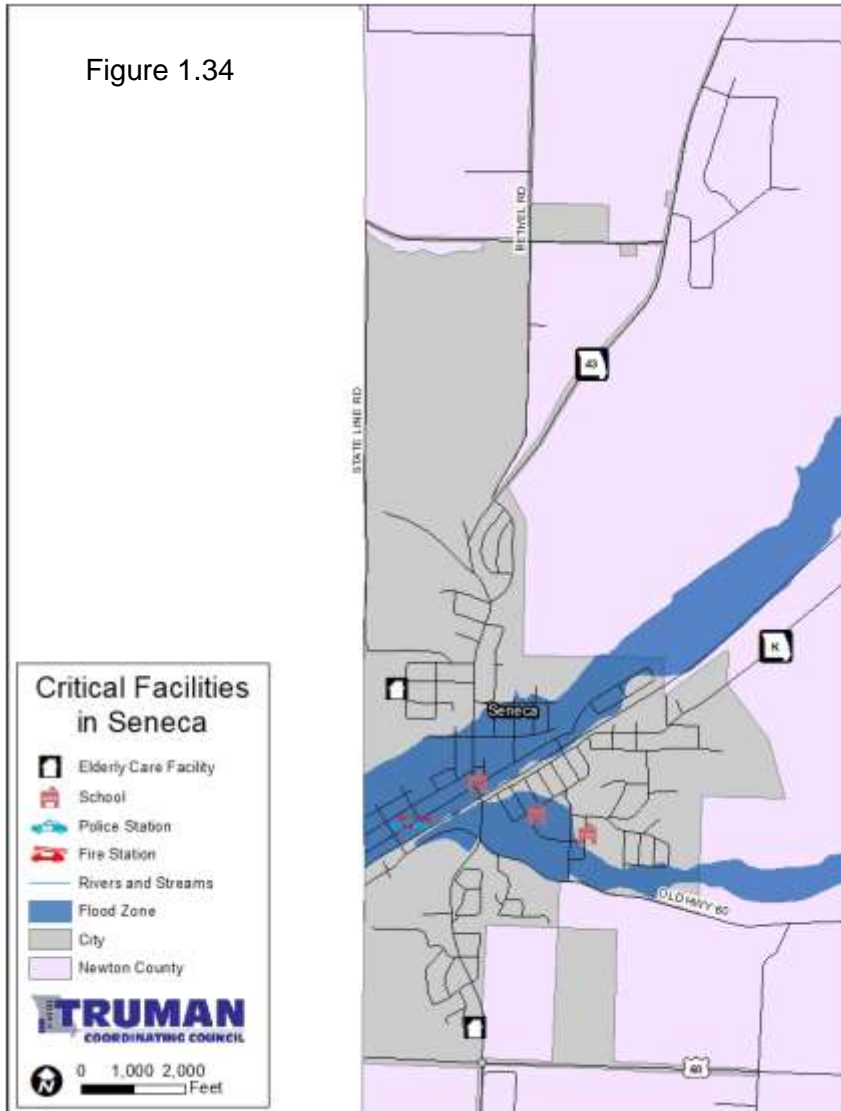
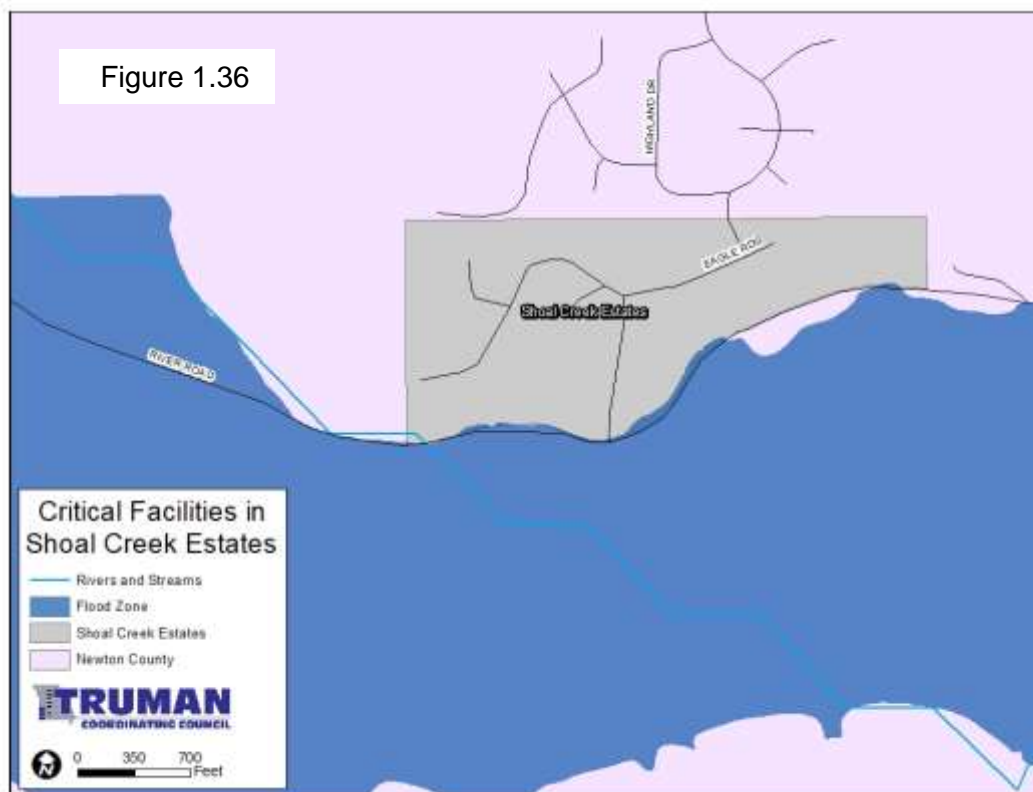
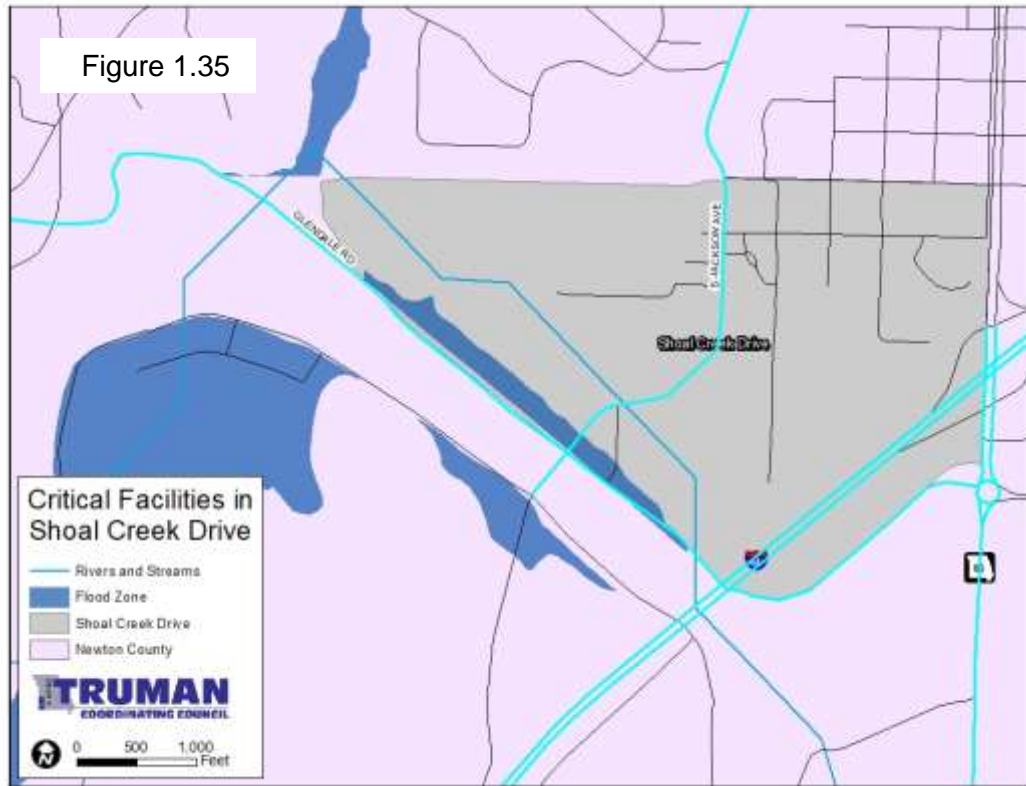


Figure 1.34





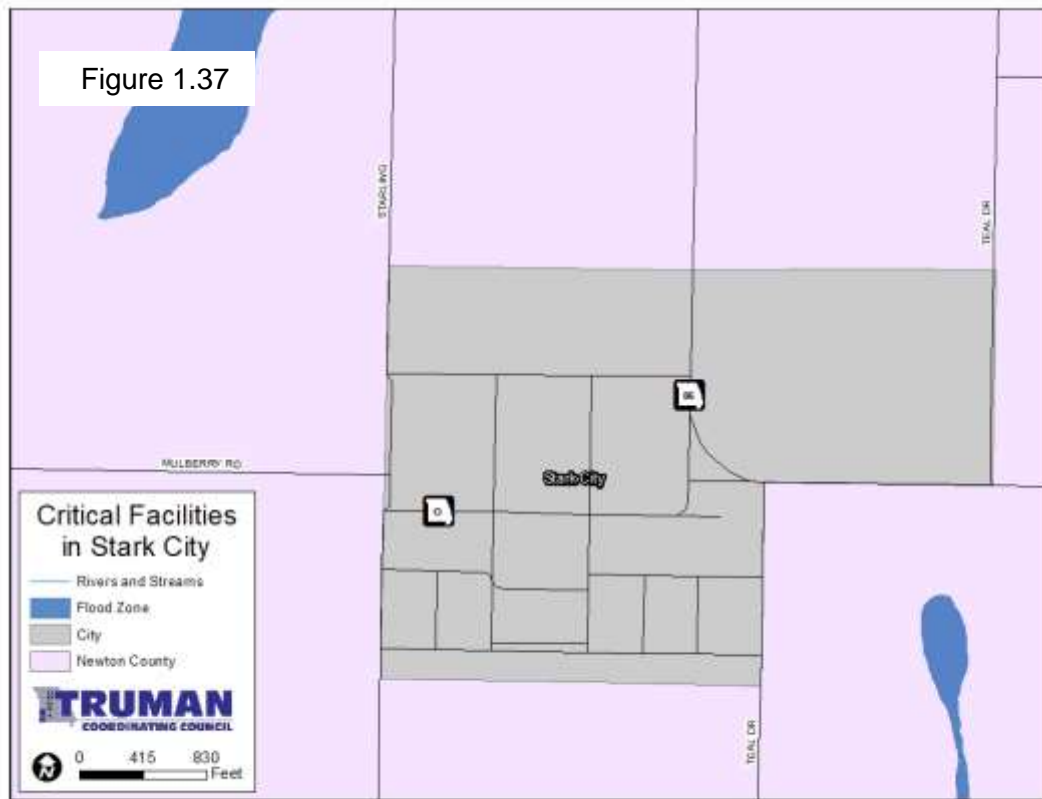


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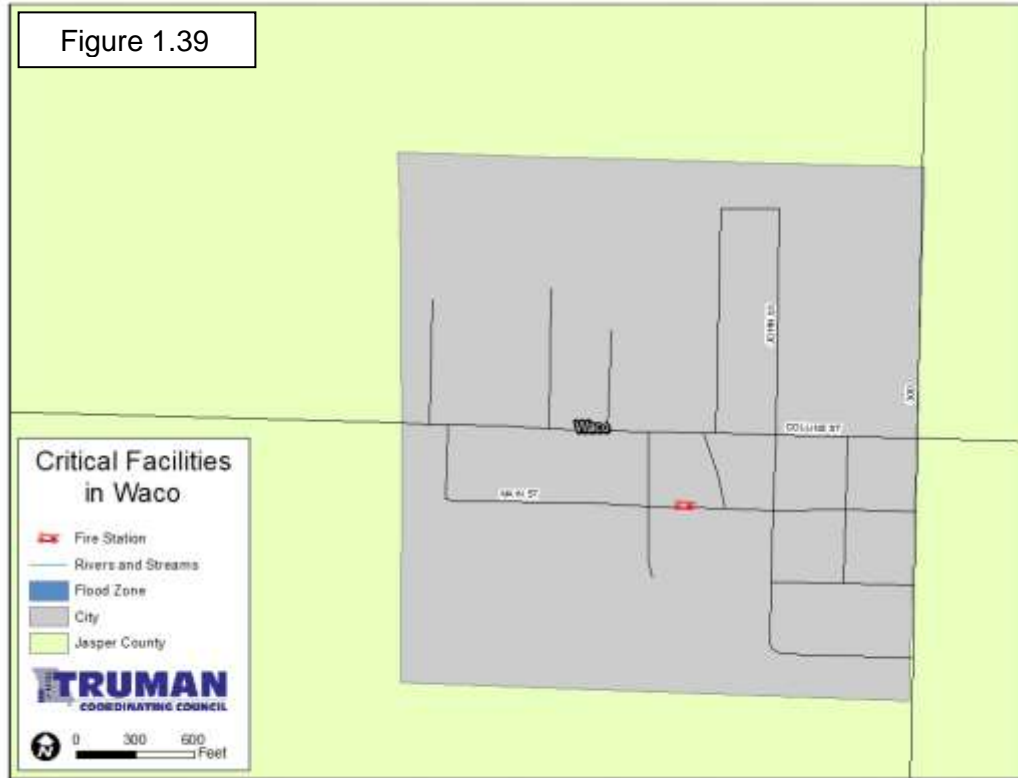
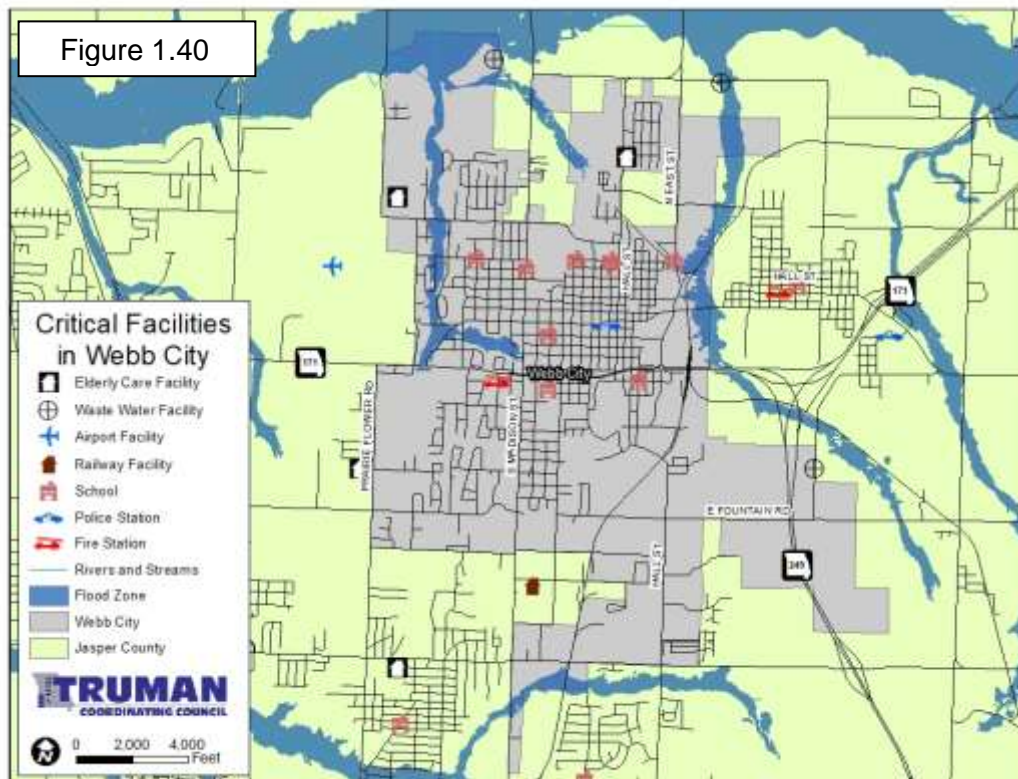
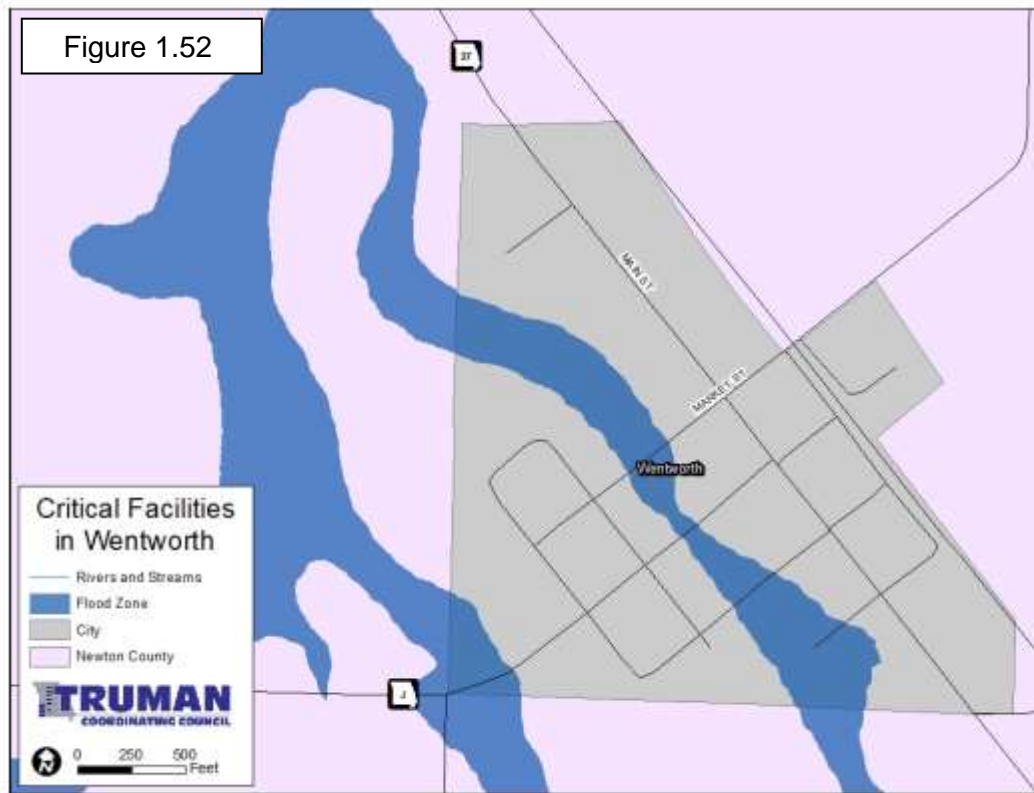


Figure 1.40







## Medical Facilities

Jasper and Newton counties are served by a number of hospitals and clinics throughout the region. The following hospitals serve Jasper and Newton counties:

• Freeman Hospital West	1102 W. 32 <sup>nd</sup> St.	Joplin
• Freeman Hospital East	702 E. 34 <sup>th</sup> .	Joplin
• Freeman Neosho Hospital	113 W. Hickory St.	Neosho
• Mercy McCune-Brooks Hospital	3125 Dr. Russell Smith Way	Carthage
• Mercy Hospital	100 Mercy Way	Joplin
• Ozarks Community Hospital	112 N. Webb St.	Webb City
• Kansas University of Medicine and Biosciences	2817 Saint John Blvd	Joplin

Doctors' offices are also located throughout the region. The following clinics serve Jasper and Newton counties:

• Carthage Family Medical Center	1615 Hazel Street	Carthage
• Freeman Neosho Physicians Group	336 S. Jefferson St.	Neosho
• Hawthorn Center	2727 McClelland Blvd	Joplin
• Ozark Center	1500 South Case Street	Carthage
• St. John's Medical Group, Family Practice	2550 Lusk Dr.	Neosho
• St. John's Mercy Clinic	1715 S. Madison St., #13	Webb City

This list does not include specialists or independent practices, but only general practice groups. Additional services and specialties are also available in both counties.



## Schools, Long-Term Facilities, and Day Care Centers

There are eight public school districts in both Jasper County and Newton County. Joplin R-VII extends into both counties due to its geographic location. Joplin R-VII, Carthage R-IX, Neosho R-V, and Webb City R-VII are the largest education providers in the two counties. Table 1.18 summarizes information on all elementary and secondary institutions in the two counties, including private schools.

A number of higher education institutions also exist in the two counties. Missouri Southern State University, a public, four-year institution located in Jasper County, recorded an enrollment of 3,111 students in 2017-2018. Vatterott College, a for-profit college and vocational training institute, ceased operations in Joplin in late 2018. Crowder College, a two-year state community college, is primarily located in Newton County, but also has satellite locations in Jasper County, including the Advanced Technical Training Center in partnership with the Joplin Chamber of Commerce, a combined total enrollment of 5,710 in 2017-2018. Ozark Christian College, a private four-year institution, is in Jasper County and recorded an enrollment of 587 in 2017-2018. The Kansas City University of Medicine and BioSciences opened a Joplin campus in 2017 and is the largest provider of physicians in Missouri and Kansas with a Joplin 2019 enrollment of 326.

**Table 1.18** School Districts, Buildings and Enrollment<sup>9</sup> UPDATE SPRING 2020

School District	County	Buildings	2020-2021 Enrollment	Primary District Address
Avilla R-XIII	Jasper	1 (elementary only)	154	400 Sarcoux St., Avilla
Carl Junction R-I	Jasper	6 (4 elementary, 1 junior high, 1 high school)	3,320	206 S. Roney, Carl Junction
Carthage R-IX	Jasper	9 (5 elementary, 1 middle school, 1 junior high, 1 high school)	4,484	710 Lyon St., Carthage
College Heights Christian School	Jasper	1	529	4311 Newman Road, Joplin
Diamond R-IV	Newton	3 (1 elementary, 1 middle school, 1 high school)	879	401 S. Main, Diamond
East Newton County R-VI	Newton	3 (2 elementary, 1 high school)	1,518	22808 E. Highway 86, Granby
Jasper County R-V	Jasper	2 (1 elementary, 1 high school)	466	201 W. Mercer, Jasper
Joplin R-VII	Jasper/ Newton	18 (11 elementary, 3 middle schools, 1 high school)	7,568	3901 E. 32 <sup>nd</sup> St., Joplin
Martin Luther School	Jasper	1	128	2616 Connecticut Ave., Joplin
McAuley Catholic High School	Jasper	1	94	930 S. Pearl Ave., Joplin

Neosho Christian School	Newton	1	96	903 W. South St., Neosho
Neosho R-V	Newton	10 (6 elementary, 1 middle school, 1 junior high, 1 high school)	4,696	418 Fairground Road, Neosho
Sarcoxie R-II	Jasper	2 (1 elementary, 1 high school)	775	101 S. 17 <sup>th</sup> St., Sarcoxie
Seneca R-VII	Newton	4 (2 elementary, 1 middle school, 1 high school)	1,466	914 Frisco Street, Seneca
St. Ann's School	Jasper	1	76	1156 S. Grand Ave., Carthage
St. Mary's Catholic Elementary	Jasper	1	224	931 Byers Ave., Joplin
St. Peter's Middle School	Jasper	1	80	802 Byers Ave., Joplin
Webb City R-VII	Jasper	11 (7 elementary, 1 middle school, 1 junior high, 1 high school)	4,303	411 N. Madison, Webb City
Westview C-6	Newton	1 (elementary only)	195	1741 Westview Rd. Neosho

Day care centers represent yet another population that requires special consideration. Most centers cater to children ages 2-5, although some day care centers serve older adults. These facilities represent specialized mitigation needs. Numerous daycare and pre-school facilities serve Jasper and Newton counties. Table 1.19 summarizes these facilities and their locations by county and city, but does not include private day care providers.

<i>Table 1.19 Jasper and Newton Day Care Facilities</i>		
Day Care Facility	County	City of Location
ABC Daycare and Preschool	Newton	Neosho
Building Blocks Daycare Center LLC	Jasper	Carl Junction
Camp Grandma's	Jasper	Carl Junction
Cardinal Corner	Jasper	Webb City
Classy Corner Academy	Jasper	Carthage
County Care Preschool	Jasper	Neosho
Creative Beginnings LLC	Jasper	Carthage
Curiosity Corner	Jasper	Airport Drive
Curiosity Corner Learning Center, LLC	Jasper	Joplin
Dana's Childcare	Newton	Granby
Dinosaur Academy	Jasper	Joplin
Eastvue Baptist Love and Learn Childcare	Jasper	Joplin
Exploration Station	Jasper	Joplin
Fair Acres Family	Jasper	Carthage
First United Methodist Preschool	Jasper	Joplin
Footprints and Friends Preschool LLC	Jasper	Joplin
Four State Christian School	Jasper	Joplin
Growing with Grace Preschool and	Jasper	Joplin

Daycare		
H & H Grand	Jasper	Carl Junction
Heritage Youth Development Center	Jasper	Webb City
Joyland Learning Center	Jasper	Carthage
Kathy's Kritters Preschool and Daycare	Jasper	Sarcoxie
Kidd's Camp	Jasper	Carl Junction
Kids Day Out and Awesome Adventure Preschool	Jasper	Joplin
Kids Down Under Daycare	Jasper	Airport Drive
Kids First Child Development	Jasper	Carthage
Kids Korner Daycare LLC	Jasper	Joplin
Kidstuff – Mom's Day Out	Jasper	Joplin
Kidz Playhouse	Jasper	Joplin
Krayon Kampus	Newton	Granby
La Petite Academy	Jasper	Joplin
Ladybugs and Jellybeans	Jasper	Joplin
Learning Junction Educational Center LLC	Jasper	Joplin
Lil Cardinal's Nest	Jasper	Webb City
Lil Tigers Daycare	Jasper	Carthage
Lisa's Daycare	Jasper	Carl Junction
Little Buckaroos	Jasper	Diamond
Little Folks	Jasper	Carthage

Little Ray of Sunshine	Newton	Neosho
Little Sprouts Preschool	Jasper	Carthage
Maple Leaf Academy	Jasper	Carthage
Megan's Little Preschool on the Prairie LLC	Jasper	Webb City
Mini World Daycare	Jasper	Webb City
Miracles	Jasper	Joplin
Miss Marcie's Daycare	Jasper	Carthage
MSSU Child Development Center	Jasper	Joplin
Munchkin Manor	Jasper	Airport Drive
Neosho Freeman Family YMCA	Newton	Neosho
Plaid Giraffe Preschool LLC	Jasper	Webb City
Playfull Preschool LLC	Newton	Granby
Pogue's Daycare	Newton	Seneca
Pumpkin Patch Family Self Help Center Inc.	Jasper	Joplin
Roadster's Daycare	Jasper	Webb City
Sonshine Center Daycare	Jasper	Sarcoxie
Stepping Stone Day Care	Jasper	Duquesne
Stepping Stone Discovery Center LLC	Jasper	Joplin
Stone Crest Daycare	Jasper	Airport Drive
Strong Village Children's Center	Jasper	Airport Drive
Sunshine Corner Preschool	Jasper	Neosho
The Tot Spot	Jasper	Webb City
Twin Hills Child Care Center LLC	Jasper	Joplin
Webb City Development Center	Jasper	Webb City
Wee Bear Daycare and Preschool	Jasper	Joplin
Wee Tots Daycare Center	Jasper	Joplin

Twenty-four long-term care providers serve the two-county region. Long term care facilities require special consideration during a natural disaster. These facilities fulfill a range of needs including retirement, assisted living, intermediate care, and continuing care. Residents may have mobility and/or cognition issues that require special consideration. The primary providers of long-term care in the area are listed in Table 1.20.

*Table 1.20 Jasper and Newton County Primary Long-term Care Providers*

Provider	County	City	Provider	County	City
Autumn Place Residential Care	Jasper	Joplin	National Healthcare of Joplin	Jasper	Joplin
Bristol Manor	Jasper	Carthage, Webb City	Ozark Center Residential Care Facility	Jasper	Joplin
Carl Junction Residential Care	Jasper	Carl Junction	Sarcozie Nursing Center	Jasper	Sarcozie
Carthage Health and Rehab	Jasper	Carthage	Seneca Home Place	Newton	Seneca
Clear Path	Newton	Neosho	Seneca House	Newton	Seneca
Communities of Wildwood Ranch	Jasper	Joplin	Silver Creek Assisted Living Center	Jasper	Joplin
Foxberry Terrace Assisted Living	Jasper	Webb City	Spring Hill	Newton	Neosho
Gran Villas	Newton	Neosho	Spring River Christian Village Inc. Assisted Living and Skilled Nursing Facility	Jasper	Joplin
Granby House	Newton	Granby	St. Luke's Nursing Center Assisted Living and Residential Care	Jasper	Carthage
Joplin Health and Rehab Center	Jasper	Joplin	Sunnyhills Residential Care Facility	Jasper	Carthage
Maple Tree Terrace Assisted Living	Jasper	Carthage	Webb City Health and Rehabilitation Center	Jasper	Webb City
Medicalodge	Newton	Neosho	Whispering Pines Senior Living	Jasper	Joplin

## Government-Owned Structures and Key Facilities

Government-owned structures include county and city government centers, police stations, fire stations, ambulance bases, and the counties' 911 Emergency Operations Centers. The following is a list of additional key facilities located in Jasper and Newton Counties as reported by the jurisdictions.

### Jasper County:

- American Red Cross of SWMO – Joplin
- Civil War Museum - Carthage
- Crosslines Pantry and Community Outreach - Joplin
- Gene Taylor Community Building – Sarcozie
- Jasper County Courthouse – Carthage
- Jasper County Jail – Carthage
- Juvenile Justice Center - Joplin
- Joplin City Hall - Jasper
- Memorial Hall - Carthage
- Memorial Hall – Joplin
- Municipal Building – Joplin
- Precious Moments – Carthage
- Public Library – Carthage
- Public Library – Joplin
- Public Library – Sarcozie
- Salvation Army Office – Joplin

- Senior Center Office
- Senior Center - Joplin
- Souls Harbor Center - Joplin Shelter – Joplin
- Spiva Center for the Arts –Joplin
- U.S. Post Office – Duenweg

### Newton County:

- Neosho City / County Library – Neosho
- Camp Crowder Training Facility – Neosho
- Newton County Courthouse – Neosho
- Municipal Auditorium – Neosho
- Newton County Jail – Neosho
- Center for Seniors – Neosho
- Civic Auditorium – Neosho
- National Fish Hatchery – Neosho
- Shoal Creek Conservation Center - Joplin

## Large Industrial Centers and Employers

Jasper County and Newton County are home to a number of large industrial centers and organizations employing over 150 employees within the county. Table 1.21 illustrates the economic indicators of both counties.

*Table 1.21 Jasper-Newton Economic Indicators*

	Jasper County		Newton County	
	Number	Percent	Number	Percent
Civilian Labor Force	59667	64.9	28688	62.4
Unemployment	3262	3.6	1543	3.4
Industry Sectors	Establishments	Employees	Establishments	Employees
Agriculture, forestry, fishing, and hunting	3	12	5	10
Mining, quarrying, and oil and gas extraction	6	35	4	19
Utilities	7	383	8	257
Construction	185	1470	114	804
Manufacturing	160	9526	63	2952
Wholesale trade	161	2321	54	1990
Retail trade	507	8342	201	2135
Transportation and Warehousing	105	5271	90	718
Information	34	544	18	592
Finance insurance	201	1164	90	535
Real estate and rental leasing	121	512	36	122
Professional, Scientific, and technical services	181	1017	71	414
Management of companies and enterprises	25	N/A	6	82
Educational Services	19	722	6	53
Health care and social assistance	349	6337	165	6086
Arts, entertainment, and recreation	39	296	10	198
Accommodation and food services	258	4894	89	1873
Other services (except public administration)	340	2242	130	563
Industries not classified	22	16	5	7

U.S. Census Bureau, 2016 County Business Patterns.

The following list summarizes the largest employers in the two-county region:

- Aegis Communications
- Able Manufacturing
- Americold Logistics
- Butterball Turkey
- Cardinal Scale
- Con-way Trucking
- Crowder Industries, Inc.
- Ducommun Inc.
- EaglePicher Technologies
- Empire District Electric Co.
- Freeman Health Systems
- General Mills Bakeries and Food Service
- Heartland Pet Products
- H.E. Williams, Inc.
- Jasper Products
- Joplin School District
- La-Z-Boy Midwest
- Legacy Farm and Home
- Leggett & Platt, Inc.
- Lozier Corp
- McCune-Brooks Hospital

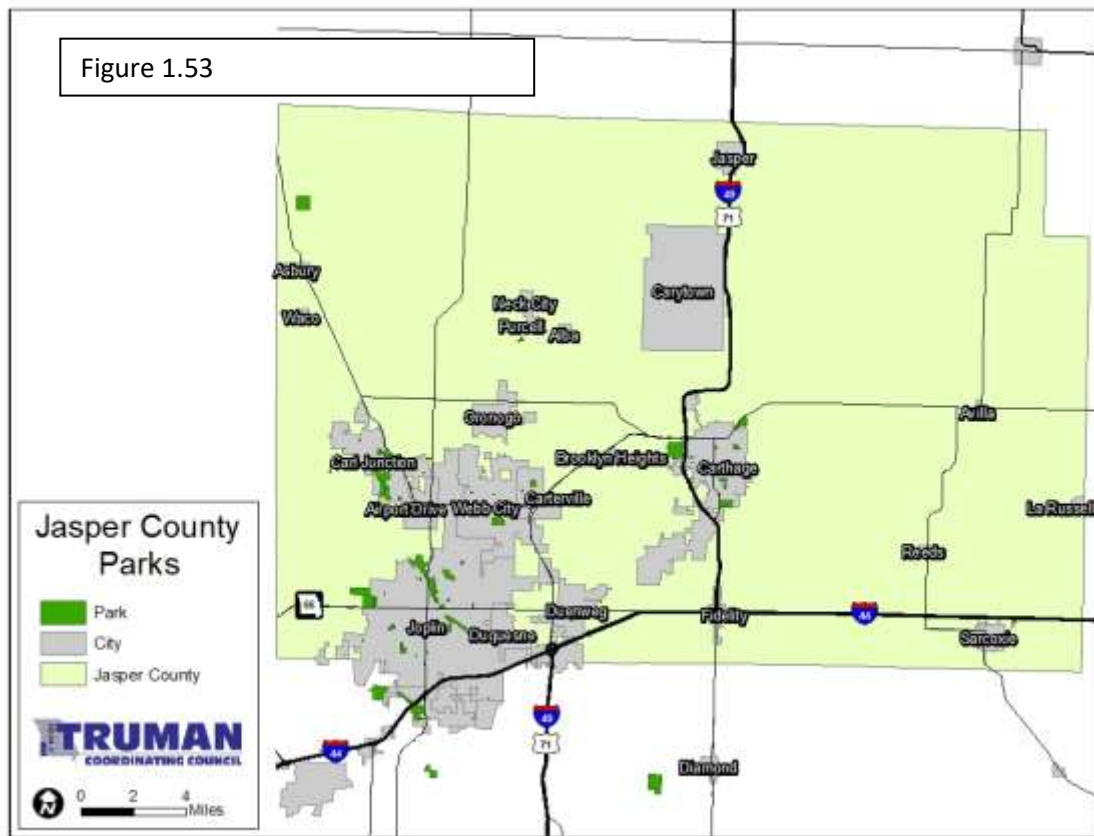
- Mercy Hospital Systems
- Metro Builders
- Nutra-Blend LLC
- PILR
- Premiere Truck Parts
- R & R Trucking
- Schaeffler Group USA
- Schreiber Foods
- Seward's Insulation
- St. John's Health Centers
- Sunbeam Outdoor Products
- TAMKO Roofing Products
- Trade-X
- Tri-State Motor Transit Co
- Tyson Foods, Inc.
- Wal-Mart, Inc.
- Weise Materials

### **Recreational Facilities**

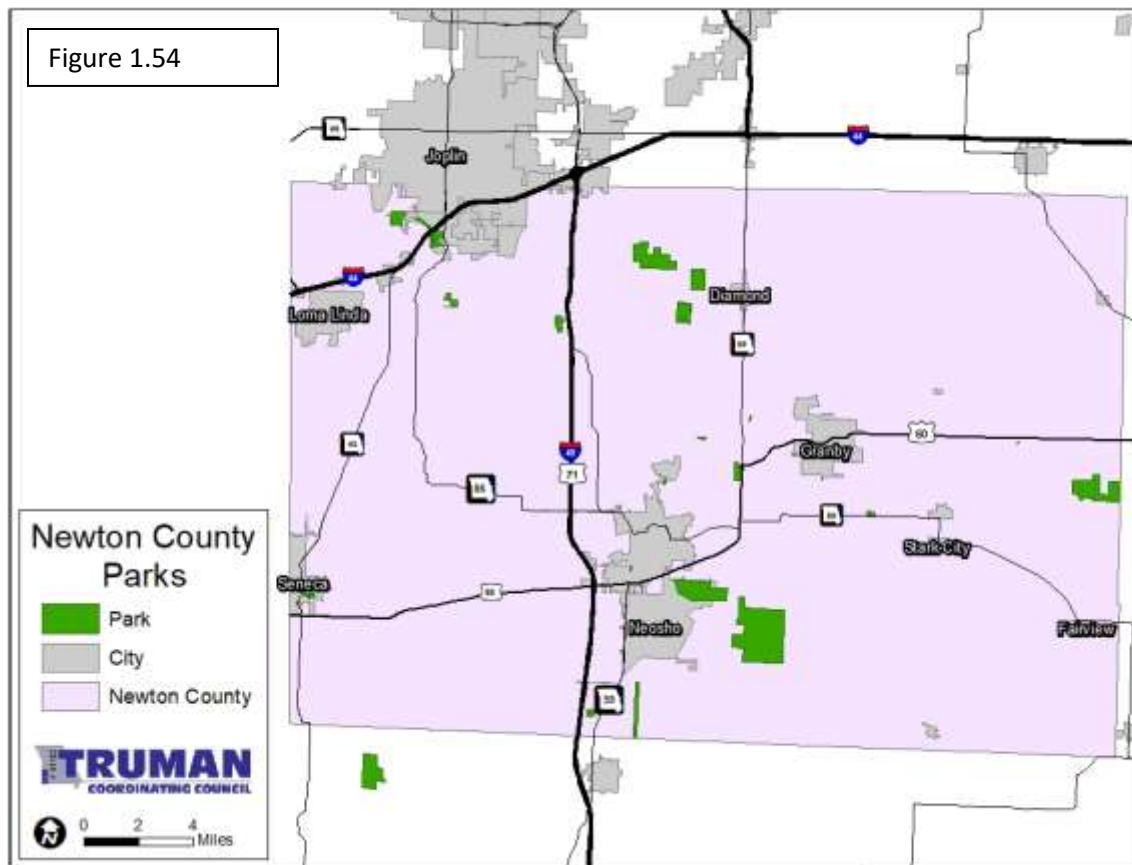
Jasper and Newton counties have 18 areas recognized by the Missouri Department of Conservation. Below is a short list of recreation facilities in Jasper and Newton counties. Figures 1.53 and 1.54 identify their locations.

- Allen Bridge Access
- Bicentennial Conservation Area
- Capps Creek Conservation Area
- Carl Junction Access
- Carthage (Kellogg Lake)
- Cherry Corner Access
- Diamond Grove Prairie Conservation Area
- Fort Crowder Conservation Area
- Goodman Towersite
- Lime Kiln Access
- Neosho (Morse Park)
- Neosho District Headquarters
- Neosho Towersite
- Smack-Out Access
- Stones Corner Access
- Tipton Ford Access
- Wah-Sha-She Prairie
- Walter Woods Conservation Area
- Shoal Creek Conservation Center

The Parks and Recreation Departments of Joplin, Carthage, Webb City, Neosho and other surrounding community parks serve the public of both counties with their recreational needs.







## Inventory of Housing Structures

The 2017 American Community Survey provides data for both Jasper and Newton Counties in terms of housing structures and usage. Jasper County has a total of 51,995 housing units. Of that total:

- 46,009 are occupied (88.5%)
- 5,986 are vacant (11.5 percent)
- 29,707 (64.%) are owner occupied
- 16,302 (35.4%) are renter-occupied.

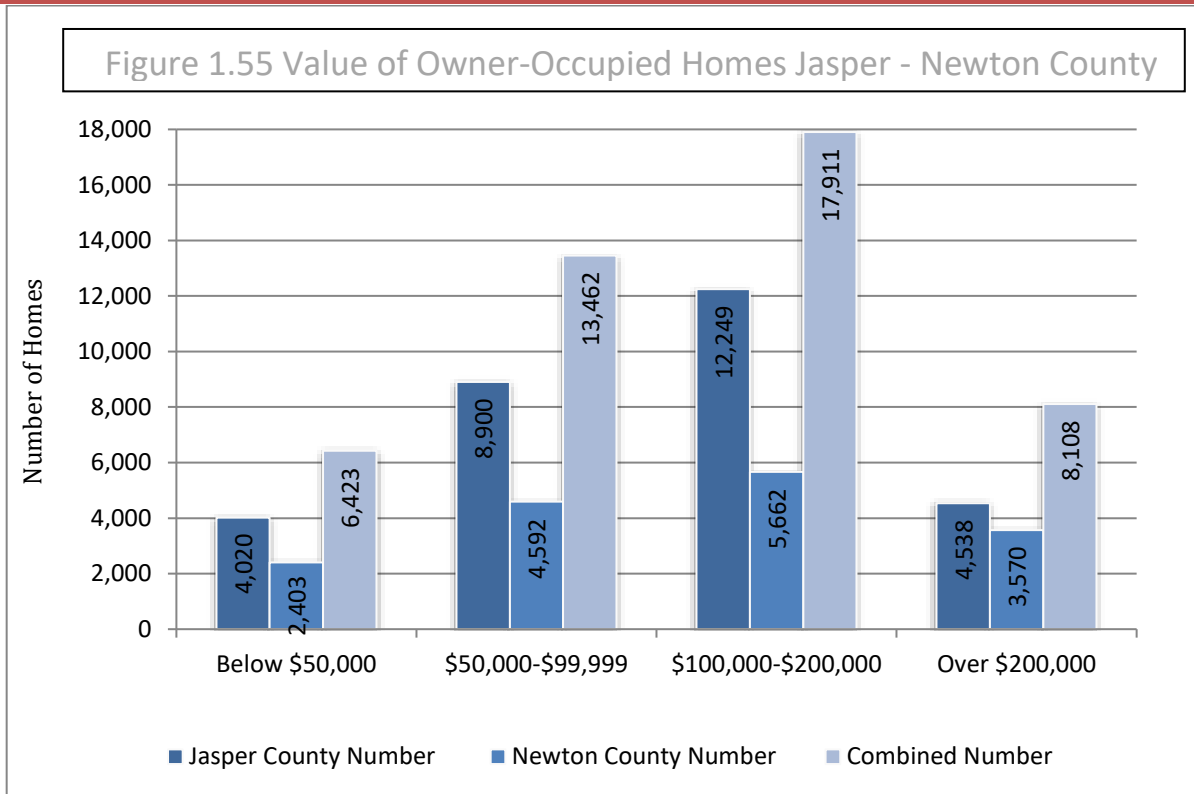
Newton County has a total of 24,612 housing units. Of that total:

- 22,151 are occupied (90%)
- 2,461 are vacant (10%)
- 15,867 (70.6%) are owner occupied
- 6,284 (28.4%) are renter-occupied.

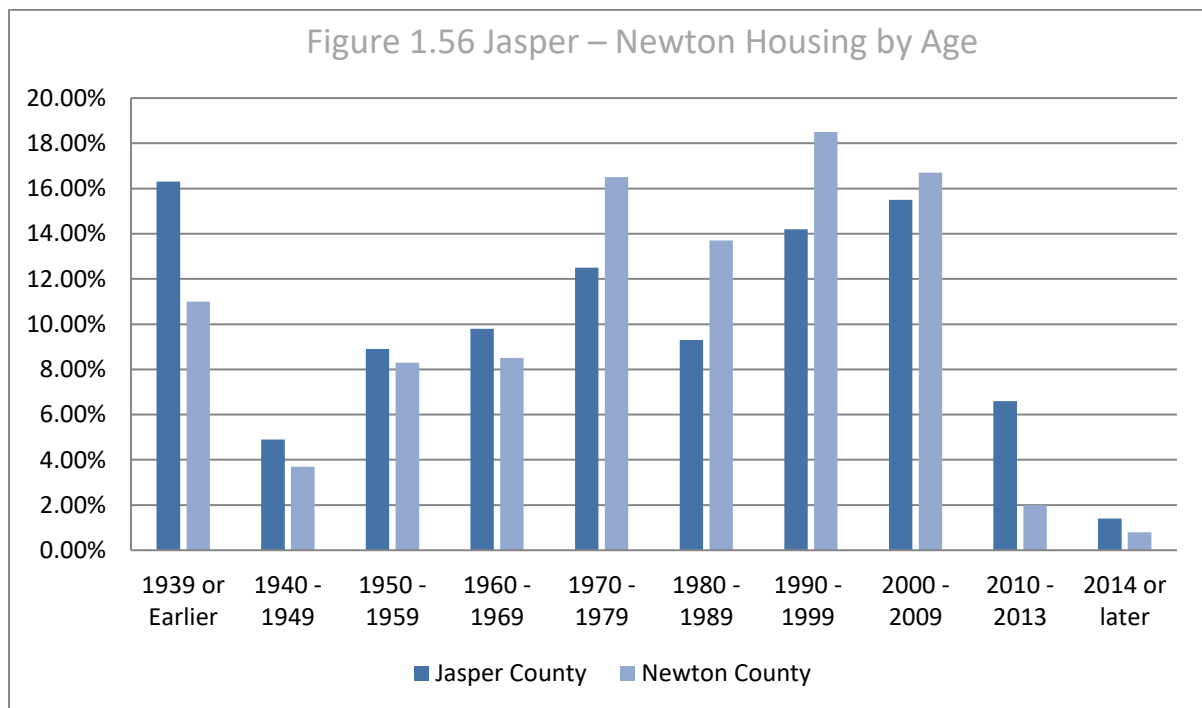
Table 1.21 summarizes housing units in the county by type.

<i>Table 1.21 Jasper – Newton County Housing Categories 2017</i>				
	Jasper County		Newton County	
Housing Types	Number	Percent	Number	Percent
Single-family	39,716	78.30%	18,639	76.90%
Multifamily	7,931	15.70%	1,732	7.20%
Mobile Homes	2,989	5.90%	3,799	15.70%
Total Housing Units	50,686	100.00%	24,226	100%

The 2017 median value for an owner-occupied house is valued at \$ \$112,700 in Jasper County and \$118,200 in Newton County. Figure 1.55 highlights the distribution of home values in Jasper and Newton County



Figures 1.56 summarizes the age of the counties' housing units.



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

## Jasper County Community Profiles

### Village of Airport Drive:

Total Population	792
Leadership structure	Board of Trustees, Clerk
Median household income, 2017	\$68,487
Total housing units	395
Housing units built prior to 1939	7 (1.8%)
Median gross rent	\$778
Median Owner-Occupied Housing Value, 2017	\$167,700
Water service	Missouri American Water, Jasper Public Water 1, City of Carl Junction
Sewer service	City of Carl Junction
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Carl Junction Fire District
Ambulance service	METS
Master Plan	Yes
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

### City of Alba:

Total Population	566
Leadership structure	Mayor, Council
Median household income, 2017	\$40,865
Total housing units	269
Housing units built prior to 1939	50 (18.6%)
Median gross rent	\$575
Median Owner-Occupied Housing Value, 2017	\$74,100
Water service	City of Alba
Sewer service	City of Alba
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Tri-City Fire Department
Ambulance service	METS
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	No
Floodplain Regulations	No

### City of Asbury:

Total Population	186
Leadership structure	Mayor, Council
Median household income, 2017	\$46,667
Total housing units	93

Housing units built prior to 1939	38 (40.9%)
Median gross rent	\$821
Median Owner-Occupied Housing Value, 2017	\$70,700
Water service	City of Asbury
Sewer service	City of Asbury
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Asbury Fire Protection District
Ambulance service	METS
Master Plan	Yes
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Village of Avilla:**

Total Population	84
Leadership structure	Mayor, Council
Median household income, 2017	\$38,333
Total housing units	44
Housing units built prior to 1939	21 (47.7%)
Median gross rent	No data available
Median Owner-Occupied Housing Value, 2017	\$105,000
Water service	Private resident wells
Sewer service	Septic Tanks
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Avilla Fire Department
Ambulance service	1 <sup>st</sup> Responders / McCune Brooks Carthage Ambulance
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Village of Brooklyn Heights:**

Total Population	114
Leadership structure	Board of Trustees, Clerk
Median household income, 2017	\$42,083
Total housing units	53
Housing units built prior to 1939	14 (26.4%)
Median gross rent	No data available
Median Owner-Occupied Housing Value, 2013	\$78,300
Water service	Carterville Rural Water
Sewer service	Septic Tanks
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Carthage Fire Department

Ambulance service	McCune-Brooks Carthage
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**City of Carl Junction:**

Total Population	7,722
Leadership structure	Mayor, Administrator, Council
Median household income, 2017	\$70,000
Total housing units	2,741
Housing units built prior to 1939	102 (3.7%)
Median gross rent	\$959
Median Owner-Occupied Housing Value, 2017	\$136,600
Water service	City of Carl Junction
Sewer service	City of Carl Junction
Electric service	Empire District
Law enforcement	Carl Junction Police Department
Fire service	Carl Junction Fire Protection District
Ambulance service	METS
Master Plan	Yes
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**City of Carterville:**

Total Population	1,738
Leadership structure	Mayor, Council
Median household income, 2017	\$40,438
Total housing units	760
Housing units built prior to 1939	144 (18.9%)
Median gross rent	\$646
Median Owner-Occupied Housing Value, 2017	\$70,300
Water service	City of Carterville
Sewer service	City of Carterville
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Carl Junction Fire District
Ambulance service	METS
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes



**City of Carthage:**

Total Population	\$14,280
Leadership structure	Mayor, Administrator, and Council
Median household income, 2017	\$38,300
Total housing units	5,858
Housing units built prior to 1939	1,656 (28.3%)
Median gross rent	\$ \$746
Median Owner-Occupied Housing Value, 2017	\$87,200
Water service	Carthage Water and Electric
Sewer service	Carthage Water and Electric
Electric service	Carthage Water and Electric
Law enforcement	Carthage Police Department
Fire service	Carthage Fire Department
Ambulance service	Mercy / McCune-Brooks
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**Village of Carytown:**

Total Population	248
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$50,000
Total housing units	136
Housing units built prior to 1939	16 (11.8%)
Median gross rent	\$656
Median Owner-Occupied Housing Value, 2017	\$124,400
Water service	Individual Resident Wells
Sewer service	Septic tanks
Electric service	Empire District; Barton County Coop
Law enforcement	Jasper County Sheriff's Department
Fire service	Carthage Fire; Jasper Fire Department
Ambulance service	Carthage EMS
Master Plan	Yes
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**City of Diamond:**

Total Population	1,259
Leadership structure	Mayor, Council
Median household income, 2017	\$37,308
Total housing units	631
Housing units built prior to 1939	53 (8.4%)

Median gross rent	\$603
Median Owner-Occupied Housing Value, 2017	\$77,400
Water service	City of Duenweg
Sewer service	City of Duenweg
Electric service	Empire District
Law enforcement	Duenweg Police Department
Fire service	Duenweg Volunteer Fire Dept.
Ambulance service	METS
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**City of Duenweg:**

Total Population	1,259
Leadership structure	Mayor, Council
Median household income, 2017	\$37,308
Total housing units	631
Housing units built prior to 1939	53 (8.4%)
Median gross rent	\$603
Median Owner-Occupied Housing Value, 2017	\$77,400
Water service	City of Duenweg
Sewer service	City of Duenweg
Electric service	Empire District
Law enforcement	Duenweg Police Department
Fire service	Duenweg Volunteer Fire Dept.
Ambulance service	METS
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**City of Duquesne:**

Total Population	1,877
Leadership structure	Mayor, Council
Median household income, 2017	\$41,815
Total housing units	942
Housing units built prior to 1939	48 (5.1%)
Median gross rent	\$801
Median Owner-Occupied Housing Value, 2017	\$130,300
Water service	Missouri American Water
Sewer service	City of Joplin
Electric service	Empire District
Law enforcement	Duquesne Police Department
Fire service	Duenweg Fire Protection
Ambulance service	METS
Master Plan	No
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes

Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	No

**Village of Fidelity:**

Total Population	240
Leadership structure	Mayor, Council
Median household income, 2017	\$36,875
Total housing units	110
Housing units built prior to 1939	6 (5.5%)
Median gross rent	\$788
Median Owner-Occupied Housing Value, 2017	\$126,600
Water service	Individual Resident Wells
Sewer service	Septic Tanks
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Carthage Fire District
Ambulance service	McCune Brooks / METS
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**City of Jasper:**

Total Population	908
Leadership structure	Board of Trustees, Clerk
Median household income, 2017	\$35,588
Total housing units	450
Housing units built prior to 1939	83 (18.4%)
Median gross rent	\$597
Median Owner-Occupied Housing Value, 2017	\$65,500
Water service	City of Jasper
Sewer service	City of Jasper
Electric service	Empire District
Law enforcement	Jasper Police Department
Fire service	Jasper Volunteer Fire Dept
Ambulance service	Barton County Ambulance
Master Plan	No
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	No

**City of Joplin:**

Total Population	51,540
Leadership structure	Mayor, Manager, Council
Median household income, 2017	\$41,063
Total housing units	24,842
Housing units built prior to 1939	4,367 (17.6%)
Median gross rent	\$753

Median Owner-Occupied Housing Value, 2017	\$120,000
Water service	Missouri American Water
Sewer service	City of Joplin
Electric service	Empire District
Law enforcement	Joplin Police Department
Fire service	Joplin Fire Department
Ambulance service	METS / Newton County Ambulance
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**Village of La Russell:**

Total Population	174
Leadership structure	Mayor, Council
Median household income, 2017	\$30,625
Total housing units	63
Housing units built prior to 1939	25 (39.7%)
Median gross rent	\$838
Median Owner-Occupied Housing Value, 2017	\$50,600
Water service	Individual Residential Wells
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Avilla Volunteer Fire Dept.
Ambulance service	METS
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**City of Neck City:**

Total Population	157
Leadership structure	Mayor, Board of Alderman
Median household income, 2017	\$67,750
Total housing units	59
Housing units built prior to 1939	13 (22%)
Median gross rent	\$833
Median Owner-Occupied Housing Value, 2017	\$88,300
Water service	Jasper County Public Water District
Sewer service	Septic Tanks
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Tri-Cities Fire District
Ambulance service	METS
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No

Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	Yes

**City of Oronogo:**

Total Population	2,462
Leadership structure	Board of Trustees, Clerk
Median household income, 2 2017	\$66,354
Total housing units	792
Housing units built prior to 1939	51 (6.4%)
Median gross rent	\$904
Median Owner-Occupied Housing Value, 2017	\$121,900
Water service	City of Oronogo
Sewer service	City of Oronogo
Electric service	Empire District
Law enforcement	Oronogo Police Department
Fire service	Oronogo Fire Protection District
Ambulance service	METS
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**City of Purcell:**

Total Population	421
Leadership structure	Mayor, Council
Median household income, 2017	\$50,313
Total housing units	159
Housing units built prior to 1939	43 (27%)
Median gross rent	\$856
Median Owner-Occupied Housing Value, 2017	\$76,900
Water service	City of Purcell
Sewer service	City of Purcell
Electric service	Empire District
Law enforcement	Purcell Police Department
Fire service	Tri-Cities Fire Protection District
Ambulance service	METS
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Village of Reeds:**

Total Population	96
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$38,750
Total housing units	39
Housing units built prior to 1939	5 (12.8%)
Median gross rent	\$744

Median Owner-Occupied Housing Value, 2017	\$50,000
Water service	Individual resident wells
Sewer service	Septic Tanks
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Sarcoxie Volunteer Fire Department
Ambulance service	McCune Brooks
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**City of Sarcoxie:**

Total Population	\$1,337
Leadership structure	Mayor, Council
Median household income, 2017	\$45,739
Total housing units	578
Housing units built prior to 1939	149 (25.8%)
Median gross rent	\$591
Median Owner-Occupied Housing Value, 2017	\$68,900
Water service	City of Sarcoxie
Sewer service	City of Sarcoxie
Electric service	Empire District
Law enforcement	Sarcoxie Police Department
Fire service	Sarcoxie Fire Department
Ambulance service	Mercy
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	Yes

**City of Waco: (Did not participate in 2021 Plan)**

Total Population	100
Leadership structure	Mayor, Council
Median household income, 2014	\$34,715
Total housing units	43
Housing unit, avg age of unit	35
Median gross rent	No data available
Median Owner-Occupied Housing Value, 2013	\$89,130
Water service	Jasper County Public Water No. 2
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Jasper County Sheriff's Department
Fire service	Carl Junction Fire Protection District
Ambulance service	Carl Junction
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No



Floodplain Regulations	No
<b>City of Webb City:</b>	
Total Population	11,148
Leadership structure	Mayor, Administrator, Council
Median household income, 2017	\$48,318
Total housing units	4,788
Housing units built prior to 1939	950 (19.8%)
Median gross rent	\$722
Median Owner-Occupied Housing Value, 2017	\$102,000
Water service	City of Webb City
Sewer service	City of Webb City
Electric service	Empire District
Law enforcement	Webb City Police Department
Fire service	Webb City Fire Department
Ambulance service	METS
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes
<b>Jasper County:</b>	
Total population	118,522
Classification	First-Class
Leadership structure	County Commission
Median household income, 2013-2017	\$45,328
Total housing units	51,995
Housing units built prior to 1939	8,494 (16.3%)
Median gross rent	\$748
Median owner-occupied housing value, 2013-2017	\$112,700
Water/Sewer service	Municipal water service, Missouri American Water, Jasper County PWSD No. 1, Jasper County PWSD No. 2
Electric / Natural Gas service	Carthage LP Co. Empire District Missouri Gas Energy
Law enforcement	Jasper County Sheriff, Carl Junction Police, Carthage Police, Duenweg Police, Duquesne Police, Jasper Police, Joplin Police, Oronogo Police, Purcell Police, Sarcoxie Police, Webb City Police, Missouri Southern University Police Department, Missouri Highway Patrol
Fire service	7 Area Departments
Ambulance service	8 Area Departments
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No

Floodplain Regulations

Yes

## Newton County Community Profiles

### Village of Cliff Village:

Total Population	24
Leadership structure	Board of Trustees, Clerk
Median household income, 2017	\$51,042
Total housing units	13
Housing units built prior to 1939	8 (61.5%)
Median gross rent	No data available
Median Owner-Occupied Housing Value, 2017	\$108,900
Water service	Individual Resident Wells
Sewer service	Septic Tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Protection District
Ambulance service	Newton County Ambulance
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

### Village of Dennis Acres:

Total Population	21
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$28,125
Total housing units	18
Housing units built prior to 1939	5 (27.8%)
Median gross rent	\$900
Median Owner-Occupied Housing Value, 2017	No data available
Water service	Missouri American Water
Sewer service	Septic Tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Department
Ambulance service	Newton County Ambulance
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	Yes
Floodplain Regulations	Yes

### City of Diamond:

Total Population	828
Leadership structure	Mayor, City Council
Median household income, 2017	\$41,190

Total housing units	443
Housing units built prior to 1939	46 (10.4%)
Median gross rent	\$486
Median Owner-Occupied Housing Value, 2017	\$82,800
Water service	City of Diamond
Sewer service	City of Diamond
Electric service	Empire District, New Mac Electric
Law enforcement	Diamond Police Department
Fire service	Diamond Fire District
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	No

**City of Fairview:**

Total Population	412
Leadership structure	Mayor, City Council
Median household income, 2017	\$26,458
Total housing units	180
Housing units built prior to 1939	38 (21.1%)
Median gross rent	\$667
Median Owner-Occupied Housing Value, 2017	\$63,000
Water service	City of Fairview
Sewer service	City of Fairview
Electric service	Empire District
Law enforcement	Fairview Police Department
Fire service	Midway Fire Protection
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**City of Granby:**

Total Population	2,106
Leadership structure	Mayor, City Council
Median household income, 2017	\$37,209
Total housing units	614
Housing units built prior to 1939	163 (17.8%)
Median gross rent	\$663
Median Owner-Occupied Housing Value, 2017	\$75,700
Water service	City of Granby
Sewer service	City of Granby
Electric service	Empire District
Law enforcement	Granby Police Department
Fire service	Granby Fire Department
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	No

Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	Yes
Stormwater Regulations	No
Floodplain Regulations	Yes

**Grand Falls Plaza:**

Total Population	99
Leadership structure	Chairman, Board of Trustees
Median household income, 2 2017	\$74,063
Total housing units	58
Housing units built prior to 1939	4 (6.9%)
Median gross rent	\$1,125
Median Owner-Occupied Housing Value, 2017	\$131,800
Water service	Missouri American Water
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Protection District
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	Yes

**City of Joplin:**

Total Population	51,540
Leadership structure	Mayor, Manager, Council
Median household income, 2017	\$1,063
Total housing units	24,842
Housing units built prior to 1939	4,367 (17.6%)
Median gross rent	\$753
Median Owner-Occupied Housing Value, 2017	\$120,000
Water service	Missouri American Water
Sewer service	City of Joplin
Electric service	Empire District
Law enforcement	Joplin Police Department
Fire service	Joplin Fire Department
Ambulance service	METS / Newton County Ambulance
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**Village of Leawood:**

Total Population	550
Leadership structure	Chairman, Board of Trustees

Median household income, 2017	\$61,458
Total housing units	251
Housing units built prior to 1939	0 (0%)
Median gross rent	\$577
Median Owner-Occupied Housing Value, 2017	\$171,600
Water service	Missouri American Water
Sewer service	Septic Tanks, City of Joplin
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Protection District
Ambulance service	Newton County Ambulance District
Master Plan	Yes
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**Village of Loma Linda:**

Total Population	840
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$75,000
Total housing units	362
Housing units built prior to 1939	0 (0%)
Median gross rent	\$1,216
Housing Value, 2017	Median Owner-Occupied \$235,600
Water service	Missouri American Water
Sewer service	Village of Loma Linda / City of Joplin
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Protection District
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**City of Neosho:**

Total Population	11,983
Leadership structure	Mayor, Manager, Council
Median household income, 2017	\$37,962
Total housing units	4,812
Housing units built prior to 1939	719 (14.9%)
Median gross rent	\$652
Median Owner-Occupied Housing Value, 2017	\$92,800
Water service	City of Neosho
Sewer service	City of Neosho
Electric service	Empire District, New Mac Electric
Law enforcement	Neosho Police Department
Fire service	Neosho Fire District

Ambulance service	Newton County Ambulance District
Master Plan	Yes
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**Village of Newtonia:**

Total Population	230
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$34,792
Total housing units	72
Housing units built prior to 1939	24 (33.3%)
Median gross rent	\$575
Median Owner-Occupied Housing Value, 2017	\$67,300
Water service	Newton County Rural Water Dist. 1
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Stark City Volunteer Fire District
Ambulance service	Newton County Ambulance
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	Yes

**Village of Redings Mill:**

Total Population	134
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$49,750
Total housing units	61
Housing units built prior to 1939	20 (23.8%)
Median gross rent	No data available
Median Owner-Occupied Housing Value, 2013	\$108,900
Water service	Village Water Works
Sewer service	Septic systems
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Protection District
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	Yes

**Village of Ritchey:**



Total Population	61
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$35,625
Total housing units	50
Housing units built prior to 1939	25 (50%)
Median gross rent	No data available
Median Owner-Occupied Housing Value, 2013	\$48,000
Water service	Individual Resident Wells
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Granby Fire Department
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	Yes
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Village of Saginaw:**

Total Population	374
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$39,219
Total housing units	171
Housing units built prior to 1939	19 (11.1%)
Median gross rent	\$719
Median Owner-Occupied Housing Value, 2017	\$128,000
Water service	Missouri American Water
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Protection District
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	Yes
Floodplain Regulations	Yes

**City of Seneca:**

Total Population	2,521
Leadership structure	Mayor, City Council
Median household income, 2017	\$35,519
Total housing units	981
Housing units built prior to 1939	150 (15.3%)
Median gross rent	\$658
Median Owner-Occupied Housing Value, 2017	\$82,600
Water service	City of Seneca
Sewer service	City of Seneca
Electric service	Empire District, New Mac Electric
Law enforcement	Seneca Police Department

Fire service	City of Seneca Fire Department
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	Yes
Stormwater Regulations	No
Floodplain Regulations	Yes

**Village of Shoal Creek Drive:**

Total Population	401
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$55,563
Total housing units	162
Housing units built prior to 1939	10 (6.2%)
Median gross rent	\$925
Median Owner-Occupied Housing Value, 2017	\$97,700
Water service	Missouri American Water
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Protection District
Ambulance service	Newton County Ambulance Service
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	Yes
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Village of Shoal Creek Estates:**

Total Population	58
Leadership structure	Chairman, Board of Trustees
Median household income, 2014	\$125,251
Total housing units	22
Housing unit, avg age of unit	29
Median gross rent	No data available
Median Owner-Occupied Housing Value, 2013	\$96,351
Water service	Missouri American Water
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Redings Mill Fire Protection District
Ambulance service	Newton County Ambulance Service
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	Yes
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Village of Stark City:**

Total Population	113
Leadership structure	Mayor, City Council
Median household income, 2017	\$36,250
Total housing units	58
Housing units built prior to 1939	15 (25.9%)
Median gross rent	No data Available
Median Owner-Occupied Housing Value, 2017	\$41,300
Water service	Newtonia Water District; Rural Water District #1
Sewer service	Septic tanks
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Stark City Volunteer Fire District
Ambulance service	Newton County Ambulance Service
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Village of Stella:**

Total Population	160
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$24,375
Total housing units	61
Housing units built prior to 1939	27 (44.3%)
Median gross rent	\$490
Median Owner-Occupied Housing Value, 2017	\$49,000
Water service	Village of Stella
Sewer service	Village of Stella
Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Stark City Volunteer Fire Department
Ambulance service	Newton County Ambulance Service
Master Plan	Yes
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Village of Wentworth:**

Total Population	111
Leadership structure	Chairman, Board of Trustees
Median household income, 2017	\$50,625
Total housing units	64
Housing units built prior to 1939	29 (45.3%)
Median gross rent	No data available
Median Owner-Occupied Housing Value, 2017	\$47,900
Water service	Individual Resident wells
Sewer service	Village of Wentworth

Electric service	Empire District
Law enforcement	Newton County Sheriff's Department
Fire service	Pierce City, Missouri Rural Fire
Ambulance service	Newton County Ambulance District
Master Plan	No
Emergency Operations Plan	No
Zoning Regulations	No
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	No

**Newton County:**

Total population	58,237
Classification	Second-Class
Leadership structure	County Commission
Median household income, 2013-2017	\$46,723
Total housing units	24,612
Housing units built prior to 1939	2,728 (11.1%)
Median gross rent	\$666
Median owner-occupied housing value,	\$118,200
Water/Sewer service	Municipal water service, Missouri American Water, Newton County Rural Water
Electric / Natural Gas service	Empire District New Mac Electric Missouri Gas Energy
Law enforcement	Newton County Sheriff, Diamond Police Department, Fairview Police Department, Granby Police Department, Joplin Police Department, Neosho Police Department, Seneca Police Department, Missouri State Highway Patrol
Fire service	8 Area Departments
Ambulance service	1 Area Department
Master Plan	Yes
Emergency Operations Plan	Yes
Zoning Regulations	Yes
Building Regulations	No
Subdivision Regulations	No
Stormwater Regulations	No
Floodplain Regulations	Yes

## Section 2 — Identified Hazards

### Natural hazard identification/elimination process

Natural hazards in southwest Missouri vary dramatically with regard to intensity, frequency, and the scope of impact. Some hazards, like earthquakes, happen without warning and do not provide any opportunity to warn the general public. Other hazards, such as tornadoes, flooding, or severe winter storms, provide a period of warning which allows for public preparation prior to their occurrence. The following natural hazards have been identified as potential threats for Jasper County and Newton County:

- Tornadoes
- Severe Thunderstorms, Hail, and High Winds
- Flood
- Severe Winter Weather
- Drought
- Heat Wave
- Earthquakes
- Dam Failure
- Wildfire
- Sinkholes / Land Subsidence

Several resources were investigated for the accumulated data relating to natural hazards. The primary sources used for this data include the Federal Emergency Management Agency (FEMA), the Missouri State Emergency Management Agency (SEMA), National Climatic Data Center (NCDC) and National Oceanic and Atmospheric Administration (NOAA) websites and databases. United States Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) were the primary sources for earthquake information. Other sources included county officials, existing county, regional, and state plans, and information from local officials and residents.

### Community-wide hazard profile and list of hazards identified

As noted, both Jasper County and Newton County are located in southwest Missouri. This location precludes many natural hazards from occurring or having a significant impact. The natural hazard not included in this hazard mitigation plan is levee failure. No coordinated levee systems exist within either Jasper or Newton County according to the United States Army Corps of Engineers (USACE). While it is possible that low-head agricultural levees may exist, no records indicate that a breach or overtopping would impact any property other than that of the owner. As such, damage to residential structures is unlikely. Other risks that are not included in this plan are landslides, coastal storms, tsunamis, hurricanes, avalanches, volcanic activity, and tropical storms. These do not occur in the area due to location and geological structure. During the review process, no new natural hazards were added that were not identified for either Jasper or Newton

County during the development of the original plan.

Though these natural hazards do not affect Jasper or Newton County, the region has potential susceptibility to other natural hazards – namely tornadoes, severe thunderstorms, floods, severe winter weather, drought, heat wave, earthquake, dam failure, sinkholes / land subsidence, and wildfire. Severe Thunderstorms, Hail, and Wind have been separated from Tornadoes in order to present a more precise picture of the potential damage types associated with these storms. The previously identified natural disaster list was not altered with this exception.

<i>Table 2.1</i>		<i>Cascading Hazards Resulting from Natural Disasters</i>					
Disaster	Health and/or Environmental Hazards	Water Supply Interruption	Power Interruption	Transportation Interruption	Civil Unrest	Business Interruption	Computer Failure and/or Loss of Records
Tornado	X	X	X	X	X	X	X
Severe Thunderstorm / Hail / High Winds	X	X	X	X	X	X	X
Flood	X	X	X	X		X	X
Severe Winter Weather	X		X	X		X	
Drought	X	X					
Heat Wave	X	X	X		X		
Earthquake	X	X	X	X	X	X	X
Dam Failure	X	X	X	X		X	
Wildfire	X	X					X
Sinkholes	X	X	X	X		X	X
<i>X = More than 50% chance of cascading effect in instance of disaster</i>							

All disasters can precipitate cascading hazards, or those hazards caused as a result of a natural disaster. Cascading hazards could include interruption of power supply, water supply, business, and transportation. Natural disasters also can cause civil unrest, computer failure, and environmental health hazards. Any of these in combination could possibly impact emergency response activities. Table 2.1 shows the relationships between Jasper and Newton County's natural disasters and categories of possible cascading disasters. Examples of specific disasters include hazardous materials release, mass transportation accidents, and disease outbreak due to unsanitary conditions.

Using a rating system of High (H), Medium (M), or Low (L) probability, severity and vulnerability, Tables 2.2 and 2.3 provides a general vulnerability assessment for Jasper County and Newton County and each jurisdiction within the county using an averaged scale of probability and severity. High vulnerability is defined as more than 50% of the jurisdiction is



vulnerable; Medium vulnerability is defined as 21-50% of the jurisdiction is vulnerable; Low vulnerability is defined as 0-20% of the jurisdiction is vulnerable. Each jurisdiction has been rated using the following formula: Probability, Severity = Overall vulnerability.

**Table 2.2 Jasper County Generalized Vulnerability Assessment by Potential Hazard for Local Jurisdictions**

	Tornado	Severe Thunderstorm, Hail, and Wind	Severe Winter Weather	Drought	Flood	Heat Wave	Earthquakes	Dam Failure	Wildfires	Sinkholes
Jasper County	H, M=H	H, L=M	H, L=M	H, L=M	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Airport Drive	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Alba	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Asbury	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Avilla	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Avilla R-XIII	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Brooklyn Heights	H, M=H	H, L=M	H, L=M	H, L=L	H, L=H	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Carl Junction	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Carl Junction R-I	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Cartersville	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Carthage	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Carthage R-IX	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Carytown	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
College Heights Christian School	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Duenweg	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Duquesne	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Fidelity	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Jasper	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Jasper County R-V	H, M=H	H, L=M	H, L=M	H, L=L		H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Joplin	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Joplin R-VII	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
La Russell	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Martin Luther School	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
McAuley Catholic High	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Missouri Southern State Univ.	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
	Tornado	Severe Thunderstorm, Hail, and Wind	Severe Winter Weather	Drought	Flood	Heat Wave	Earthquakes	Dam Failure	Wildfires	Sinkholes
Neck City	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L

## 2021 JASPER-NEWTON BI-COUNTY NATURAL HAZARD MITIGATION PLAN

Oronogo	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Ozark Christian College	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Purcell	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Reeds	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Sarcoxie	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Sarcoxie R-II	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
St. Ann's School	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
St. Mary's Catholic Elementary	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
St. Peter's Middle School	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Waco	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Webb City	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Webb City R-VII	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L

**Table 2.3** *Newton County Generalized Vulnerability Assessment by Potential Hazard for Local Jurisdictions*

	<b>Tornado</b>	<b>Severe Thunderstorm, Hail, and Wind</b>	<b>Severe Winter Weather</b>	<b>Drought</b>	<b>Flood</b>	<b>Heat Wave</b>	<b>Earthquakes</b>	<b>Dam Failure</b>	<b>Wildfires</b>	<b>Sinkholes</b>
Newton County	H, M=H	H, L=M	H, L=M	H, L=M	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Cliff Village	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Dennis Acres	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Diamond	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Diamond R-IV	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
East Newton County R-VI	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Fairview	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Granby	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Grand Falls Plaza	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Joplin	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Joplin R-VIII	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Leawood	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Loma Linda	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Neosho	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Neosho Christian	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Neosho R-V	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Newtonia	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Redings Mill	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Ritchey	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Saginaw	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Seneca	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Seneca R-VII	H, M=H	H, L=M	H, L=M	H, L=L	H, L=M	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Shoal Creek Drive	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Shoal Creek Estates	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Stark City	H, M=H	H, L=M	H, L=M	H, L=M	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Stella	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Wentworth	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Vatterott College	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L
Westview C-6	H, M=H	H, L=M	H, L=M	H, L=L	L, L=L	H, L=L	L, L=L	L, L=L	H, L=M	H, L=L

## Multi-jurisdictional risk assessment in the county and municipalities

All municipalities and government subunits within Jasper County and Newton County participated in the creation of this hazard mitigation plan, and unless otherwise noted, the actions prescribed within pertain to all jurisdictions without bias. Jasper and Newton County hazards tend to be either geographically random or regional in scope. Using historical events and data compiled from the National Weather Service and United States Geological Survey (USGS), data is provided for each identified natural hazard affecting both counties in the following pages. The 2011 tornado was, without a doubt, the most significant natural disaster in the counties' histories. The counties and most of the incorporated areas have experienced limited damage from winter storms, thunderstorms, heat waves, drought, dam failure, sinkholes, and wildfires. All location-specific vulnerabilities are noted in the following Hazard Profile Worksheets as well as the following pages.

### Probability of Occurrence

In determining the potential frequency of occurrences, a simple formula was used. The number of recorded events for the county was divided by the number of years of record. This number was then multiplied by 100 to provide a percentage. This formula was used to determine future probability for each hazard. For events that have not occurred, a probability of less than 10% was automatically assigned.

Likewise, when discussing the probable risk of each hazard based upon historical occurrences, the following scale was utilized:

<b>Unlikely</b>	Less than 10% chance of an event occurrence in any given year.
<b>Possible</b>	10-25% chance of an event occurrence in any given year
<b>Likely</b>	26-50% chance of an event occurrence in any given year
<b>Highly Likely</b>	More than 50% chance of an event occurrence in any given year

### Extent / Severity

Vulnerability Assessment tables are included on the following pages. These tables detail loss estimates for each hazard affecting the county. Loss estimates were calculated using a combination of information from the community profiles, historical loss data in the hazard profiles, and general knowledge of the jurisdiction as well as HAZUS data provided through SEMA. Rough economic estimates were included and specific data have been derived as follows:

- The number of buildings was estimated by totaling the buildings and residences listed in the community profile, using MSDIS Structures data, and using Census data.
- The number of people was derived from population statistics and an estimate of the number of persons per household.
- Dollar figures were primarily based upon the average assessed valuation from the county assessors' offices and HAZUS data provided through the state.
- Projected figures were calculated using the above numbers and factoring in population projection percentages from the community profile.

Vulnerability Assessment tables for the existing jurisdictions within Jasper County and Newton County have been included in this plan update using a combination of Missouri Spatial Data Information Systems (MSDIS) Structures data, HAZUS, and a estimated growth potential of 1% (Jasper County) and 1% (Newton County) over the next five years. These growth numbers were based on an average of growth for all jurisdictions from 2010-2015. The following tables provide potential total vulnerability numbers for present and future Jasper County and Newton County population and structures. Vulnerability is also assessed for each jurisdiction, though using only present structures information. Available data does not allow for a more jurisdiction-specific assessment at the present time. School district vulnerability is included as part of its local jurisdiction, with site-specific hazards addressed for each district. Both counties will continue to work towards more refined values by jurisdiction during the next five year update. These totals were used to determine the hazard-specific vulnerability assessments for population and building counts listed below.

Additionally, please note that the NCDC tries to use the best available information, but because of time and resource constraints, information from these sources may be unverifiable. For this reason, the accuracy or validity of the information is not guaranteed by the NCDC. The damage amount information is received from a variety of sources, including those listed above. Throughout this plan, NCDC data will represent only those events that were reported, and are not to be construed as the number of events that actually occurred. Finally, the NCDC website cautions that property and crop damage information “should be considered as a broad estimate” and utilizes estimates based in 2007 dollars.

### **Vulnerability**

When discussing the vulnerability for each hazard, the following scale was utilized:

- |                              |   |
|------------------------------|---|
| • <b>Light Damage</b>        | Less than or equal to 10% potential damages to the land area and structures of a given jurisdiction |
| • <b>Moderate Damage</b>     | 16-24% potential damages to the land area and structures of a given jurisdiction                    |
| • <b>Considerable Damage</b> | 25-49% potential damages to the land area and structures of a given jurisdiction                    |
| • <b>Severe Damage</b>       | 50% or more potential damages to the land area and structures of a given jurisdiction               |

These scales are utilized within the narrative, but also served as the basis for percentages identified in the associated tables and worksheets.

**Table 2.4**  
**Total Jasper County Vulnerability Assessment**

	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of buildings	Estimated value*
Residential	117,404	50,240	\$4,527,406,000	14,088	6,029	\$543,288,720
Commercial	23,246	1,745	\$1,443,518,000	2,790	209	\$173,222,160
Industrial	7,044	233	\$438,005,000	845	28	\$52,560,600
Agricultural	704	10,798	\$45,571,000	84	1,296	\$5,468,520
Government	1,056	9	\$67,918,000	126	1	\$8,150,160
Education	9,745	105	\$604,383,000	1,169	13	\$139,733,773
Religious / Other	2,818	262	\$172,749,000	67	31	\$20,729,880
<b>Total Planning Area Assessment</b>	<b>117,404</b>	<b>63,392</b>	<b>\$7,299,550,000</b>	<b>19,169</b>	<b>7,607</b>	<b>\$943,193,813</b>

\*Approximate value estimates are based on the total replacement cost as reported in the U.S. Department of Homeland Security's HAZUS Building Stock Exposure data, and MSDIS structures project data along with information from the Jasper County Assessor's office, and the Department of Elementary and Secondary Education. Future Growth Projections are based on the same data with a 12% project growth rate.

**Table 2.5 Jasper County Total Building Count by Jurisdiction<sup>4</sup>**

Jurisdiction	Current Building Count	Future Building Growth
Airport Drive	742	89
Alba	456	55
Asbury	288	35
Avilla*	174	21
Brooklyn Heights	160	19
Carl Junction*	4,514	542
Carterville	1,850	222
Carthage*	9,649	1,158
Carytown	480	58
Duenweg	804	96
Duquesne	1,874	225
Fidelity	359	43
Jasper	908	109
Joplin*	28,938	3,473
La Russell	176	21
Neck City	133	16
Oronogo	1,053	126
Purcell	356	43
Reeds	109	13
Sarcoxie*	1,193	143
Waco	133	16
Webb City*	8,088	971
Unincorporated Jasper County	955	115
*Values for this jurisdiction include school district valuations for buildings.		

<sup>4</sup> Building Counts for Jasper County and by jurisdiction were derived from the MSDIS Structures Project data using GIS software.

*Table 2.6 Total Newton County Vulnerability Assessment*

	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of buildings	Estimated value*
Residential	58,845	26,600	\$2,109,962,000	4,708	2,128	\$168,796,960
Commercial	12,887	3,668	\$747,605,000	1,031	293	\$59,808,400
Industrial	4,304	1,710	\$163,775,000	344	137	\$13,102,000
Agricultural	733	13,942	\$21,072,000	59	1,115	\$1,685,760
Government	1,024	49	\$39,103,000	82	4	\$3,128,240
Education	16,797	193	\$259,532,000	1,344	15	\$20,762,560
Religious / Other	243	981	\$77,425,000	19	78	\$6,194,000
<b>Total Planning Area Assessment</b>	<b>58,845</b>	<b>47,143</b>	<b>\$3,418,474,000</b>	<b>7,587</b>	<b>3,770</b>	<b>\$273,477,920</b>

\*Approximate value estimates are based on the total replacement cost as reported in the U.S. Department of Homeland Security's HAZUS Building Stock Exposure data, and MSDIS structures project data along with information from the Newton County Assessor's office and the Department of Elementary and Secondary Education. Future Growth Projections are based on the same data with an 8% project growth rate.

*Table 2.7 Newton County Total Building Count by Jurisdiction<sup>5</sup>*

Jurisdiction	Current Building Count	Future Building Growth
Cliff Village	42	3
Dennis Acres	56	5
Diamond*	752	60
Fairview	465	37
Granby*	2,265	181
Grand Falls Plaza	71	6
Joplin*	3,425	411
Leawood	303	24
Loma Linda	468	37
Neosho*	6,880	550
Newtonia	259	21
Redings Mill	127	10
Ritchey	91	7
Saginaw	312	25
Seneca*	1,547	124
Shoal Creek Drive	271	22
Shoal Creek Estates	43	3
Stark City	152	12
Stella	197	16
Wentworth	191	15
Unincorporated Newton County	29,226	2,338
*Values for this jurisdiction include school district valuations for buildings.		



## Tornadoes

Tornadoes are localized, violently destructive, rotating windstorms occurring over land. Accompanying storm activities include severe thunder/electrical storms, downbursts, straight-line winds, lightning, hail, and heavy rain. The average forward speed of a tornado is about 30 miles per hour (mph), but may vary from nearly stationary to 70 mph. The pathway may vary in any direction, but in the northern hemisphere the average tornado moves from southwest to northeast. Tornadoes are most likely to occur between 3 p.m. and 9 p.m., but may ensue at any hour of the day. Any person or structure at any location could be impacted by a tornado. The amount of damage depends on 1) the strength of the tornado, 2) the tornado's proximity to the person/structure, 3) the strength of the structure, 4) how well a person is sheltered, etc. Damage can range from negligible to catastrophic.

Tornadoes are classified according to the EF-scale developed by Dr. Theodore Fujita. The EF-scale ranks tornadoes according to wind speed, and the severity of damage caused within the wind speed ranges. The various damage levels are shown in Table 2.8.

<i>Table 2.8 The Enhanced Fujita Tornado Damage Scale</i>			
EF-Scale Number	Wind speed (mph)	Relative Frequency*	Potential damage
EF0	65-85	53.5%	Light damage. Peels surface off some roofs; some damage to gutters or siding; 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 damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	10.7%	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe damage. Entire stories 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 damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	0.1%	Total destruction. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 feet; steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation; incredible phenomena will occur.
*Relative Frequency compares the number of EF scale tornadoes in each category with the total number of confirmed tornadoes. For example, 53.5% of all tornado occurrences are rated as EF0.			

## Previous Events

Since 1950, according to the National Climatic Data Center (NCDC), tornadoes in Jasper County and Newton County have:

- Occurred in every month, with the majority occurring in March, April, May, and June;
- Resulted in 180 deaths and 1,497 injuries;
- Created unknown employment impacts; and
- Damaged property valued at more than \$2.917 Billion.

*Table 2.9 Jasper & Newton County Tornadoes, Historical Record*

Location	Date	Time (CST)	F-Scale	Death	Injury	Property Damage in \$
JASPER CO.	7/4/1951	0100	F2	0	1	250K
NEWTON CO.	3/24/1954	2300	F1	0	0	2.5K
JASPER CO.	3/24/1954	2200	F1	0	0	2.5K
JASPER CO.	5/26/1955	0700	F1	0	0	<\$50
NEWTON CO.	2/24/1956	2230	F1	0	0	25K
JASPER CO.	4/3/1956	0050	F4	0	2	250K
NEWTON CO.	5/31/1958	2315	F2	0	0	25K
JASPER CO.	9/16/1958	1330	F1	0	0	2.5K
JASPER CO.	2/9/1959	1410	F1	0	0	25K
JASPER CO.	2/9/1959	1420	F1	0	1	25K
JASPER CO.	6/11/1959	1900	F1	0	0	25K
NEWTON CO.	3/12/1961	1810	F2	0	6	250K
JASPER CO.	4/25/1961	0030	F2	0	0	25K
NEWTON CO.	6/2/1962	1945	F1	0	0	25K
NEWTON CO.	6/9/1962	0900	F0	0	0	<\$50
JASPER CO.	7/5/1962	1900	F0	0	0	.25K
JASPER CO.	7/26/1964	0445	F1	0	0	25K
JASPER CO.	4/5/1965	1600	F1	0	0	25K
NEWTON CO.	1/27/1967	0200	F2	0	0	250K
NEWTON CO.	4/19/1968	2100	F1	0	0	25K
JASPER CO.	5/15/1968	1700	F1	0	3	25K
NEWTON CO.	10/26/1970	1445	F1	0	0	2.5K
JASPER CO.	2/4/1971	0845	F1	0	0	25K
NEWTON CO.	2/4/1971	0810	F1	0	0	2.5K
JASPER CO.	5/5/1971	1755	F3	1	60	2.5M
JASPER CO.	6/2/1971	1105	F0	0	1	.25K
NEWTON CO.	12/14/1971	2215	F1	0	0	250K
JASPER CO.	4/21/1973	2135	F2	0	2	25K
NEWTON CO.	4/13/1974	1600	F2	0	0	2.5K
NEWTON CO.	6/8/1974	2130	F1	0	6	2.5M

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JASPER CO.	6/8/1974	2140	F0	0	0	25K
NEWTON CO.	4/24/1975	1840	F4	3	22	25M
NEWTON CO.	3/26/1976	1600	F3	0	0	250K
JASPER CO.	3/26/1976	1610	F3	1	1	250K
JASPER CO.	3/15/1982	2045	F3	0	0	250K
NEWTON CO.	4/29/1983	2120	F0	0	0	.25K
NEWTON CO.	5/29/1985	1315	F1	0	0	250K
NEWTON CO.	5/29/1985	1400	F1	0	0	250k
JASPER CO.	4/7/1986	1845	F1	0	0	.25K
JASPER CO.	11/15/1988	1550	F1	0	0	25K
JASPER CO.	3/14/1990	0749	F1	0	0	25K
JASPER CO.	10/8/1993	1651	F2	0	0	5M
JASPER CO.	10/8/1993	1703	F2	0	0	500K
NEWTON CO.	10/8/1993	1720	F1	0	0	.50K
JASPER CO.	4/9/1994	2210	F0	0	0	.50K
NEWTON CO.	9/25/1994	1755	F0	0	0	<\$50
JASPER CO.	4/28/1996	0145	F1	0	12	12M
JASPER CO.	4/28/1996	0148	F1	0	0	1M
NEWTON CO.	9/26/1996	0220	F1	0	0	30K
JASPER CO.	6/28/1999	0920	F1	0	0	220K
NEWTON CO.	4/15/2001	0017	F1	0	0	4M
NEWTON CO.	4/15/2001	0010	F1	0	1	2M
NEWTON CO.	5/20/2001	1930	F0	0	0	10K
NEWTON CO.	12/17/2002	2224	F0	0	0	50K
JASPER CO.	12/18/2002	0148	F1	0	0	50K
JASPER CO.	5/4/2003	1715	F3	2	15	21.2M
NEWTON CO.	5/4/2003	1750	F2	0	0	500K
NEWTON CO.	7/4/2004	0605	F1	0	0	150K
NEWTON CO.	3/12/2006	2125	F1	0	1	200K
NEWTON CO.	3/12/2006	2136	F0	0	0	10K
JASPER CO.	4/6/2006	1855	F1	0	0	100K
NEWTON CO.	3/31/2008	1259	EF0	0	3	100K
NEWTON CO.	3/31/2008	1248	EF1	0	0	50K
NEWTON CO.	5/10/2008	1654	EF4	14	200	3.5M
JASPER CO.	5/10/2008	1708	EF1	1	10	1M
JASPER CO.	5/22/2011	1640	EF5	158	1150	2.8B
NEWTON CO.	5/22/2011	1710	EF2	0	0	700K
NEWTON CO.	5/22/2011	1700	EF2	0	0	100K
NEWTON CO.	5/22/2011	1634	EF2	0	0	2K
JASPER CO.	5/19/2013	2306	EF1	0	0	200K
NEWTON CO.	5/20/2013	1741	EF1	0	0	100K
NEWTON CO.	9/1/2014	2213	EF1	0	0	50k
NEWTON CO.	9/1/2014	2236	EF0	0	0	10K
JASPER CO.	4/2/2015	2009	EF0	0	0	10K

NEWTON CO.	5/16/2015	2353	EF0	0	0	200k
NEWTON CO.	4/26/2016	2321	EF1	0	0	50K
NEWTON CO.	4/4/2017	1754	EF0	0	0	100K
NEWTON CO.	5/10/2017	2334	EF0	0	0	100K
NEWTON CO.	5/19/2017	1410	EF0	0	0	50K
NEWTON CO.	8/19/2018	1651	EF0	0	0	20K

Of the 94 total tornadoes in Jasper (43 tornadoes) and Newton (51 tornadoes) counties since 1950, five impacted both counties. All listed tornadoes recorded impacted multiple jurisdictions. All tornadoes ranged from EF0 to EF5. The historical data since 1950 is shown in Table 2.9.

## Probability of Occurrence

The level of tornado impacts is generally predictable in regard to EF-scale and distance from the path of the storm. Based on the seventy-two previous tornado events, the future probable severity is shown below.

### **Future Probable Severity by EF-Scale:**

EF0	negligible	Less than \$100,000
EF1	limited	\$100,000-\$5,000,000
EF2	limited	\$100,000-\$5,000,000
EF3	critical	\$5,000,000 - \$50,000,000
EF4	catastrophic	Over \$50,000,000
EF5	catastrophic	Over \$50,000,000

Generally, the risk of tornado is of particular significance for both Jasper and Newton County. Both Jasper and Newton County fall within the top 5% of tornado-affected counties. The probable risk is calculated by dividing the number of events by the number of years, multiplying by 100 to create a risk percentage. The following table includes all recorded events and demonstrates the likelihood of tornado type during any given event.

<u>EF#</u>	<u>Events</u>	<u>Risk</u>	<u>Probability of Occurrence, By EF-Scale</u>
EF0	12	16.6%	highly likely
EF1	39	54.1%	highly likely
EF2	10	14%	possible
EF3	5	7%	unlikely
EF4	5	7%	unlikely
EF5	1	1.3%	unlikely

This likelihood table provides a general risk assessment for the two-county area rather than independently. Between the years 1950 – 2018, Jasper and Newton counties experienced 94 events. Therefore, the probability for a tornadic event in any given year for Jasper and Newton counties is 100%. (94 events / 68 years \*100 = 144.61%)<sup>6</sup>

As probability cannot exceed 100%, all potential frequencies throughout the plan have been modified <sup>7</sup>  
<http://drought.unl.edu/AboutUs/CurrentResearch/EstimatingtheImpactsofComplexClimaticEvents.aspx>

## **Extent / Severity**

The enormous power and destructive ability of tornadoes are beyond humankind's capabilities to control. Severity, risk of death, injuries, and property damages will continue to be high; however, technological advances will facilitate earlier warnings than previously available. This, combined with a vigorous public education program and improved construction techniques, provides the potential for significant reductions in the number of deaths and injuries, as well as a reduction in property damage. To date, ninety-four tornadoes in Jasper and Newton counties have caused an estimated \$2,917,000,000 in property damage, for an average damage cost per event of \$31,031,914 .

It is important to note that the 2011 Joplin tornado which impacted both counties has a significant impact upon the average damage cost per event because of its catastrophic nature. This EF-5 tornado devastated the region, injuring 1,150 people, killing 158 people, and destroying homes, businesses, hospitals, and other critical facilities. When this event and its associated cost (\$2,800,000,000) are removed from consideration, the average damage cost per event is reduced to \$1,075,268. This average cost remains, however, substantial when compared to other natural disasters in the two-county region.

## **Vulnerability**

All jurisdictions (municipalities, school districts, and unincorporated county areas) are equally vulnerable to damage stemming from tornadic activity. Vulnerable structures, including critical facilities and mobile homes, exist in each jurisdiction. In the event of any given tornado, 10-25% of any given jurisdiction may be at risk for damage. Based upon historical data, EF0 and EF1 tornadoes are the most likely occurrence, making up more than 70% of recorded tornadoes to date. The Enhanced Fujita Scale includes light to moderate damage during an EF0 or EF1 event. The committee estimates light to moderate damage to be less than 25% of any given structure. Since the passage of the 2010 plan, significant development and rebuilding with tornado mitigation in mind has taken place throughout the counties, particularly in cities with more 1,000 residents. Additional homes and businesses have been constructed. Critical facilities like hospitals have begun using reinforcement in construction to limit the potential damages. Safe rooms have been constructed in nearly all local public schools. Hospital construction now utilizes reinforced building practices to minimize the impact of flying debris. In spite of these improvements, the potential damage from any given tornado remains fairly constant in most jurisdictions.

**Table 2.10 Tornado: Jasper County Vulnerability Assessment**

(The estimates below are based on an EF1 tornado affecting 25% of the planning area. This estimate assumes up to 35% damage to 25% of any given jurisdiction's buildings.)

	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of buildings	Estimated value*
Residential	29,351	12,560	\$418,785,055	3,522	1,507	\$47,537,763
Commercial	5,812	436	\$126,307,825	698	52	\$15,156,939
Industrial	1,761	58	\$38,325,438	211	7	\$4,599,053
Agricultural	176	2,700	\$3,987,463	21	324	\$341,783
Government	264	2	\$5,942,825	32	1	\$713,139
Education	2,436	26	\$52,883,513	292	3	\$8,733,361
Religious/ Other	704	66	\$15,115,538	17	8	\$1,295,618
<b>Total Planning Area Assessment</b>	<b>40,504</b>	<b>15,848</b>	<b>\$661,347,657</b>	<b>4,793</b>	<b>1,902</b>	<b>\$78,377,656</b>

**Table 2.11 Tornado: Building Count Vulnerability by Jasper County Jurisdiction**

(Estimates based on an EF1 tornado causing damage in 25% of the planning area buildings.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	147	90	57	34	32	894	368	1911	95	159	371	71
Commercial	5	3	2	1	1	31	13	66	3	6	13	2
Industrial	0	0	0	0	0	5	2	10	0	1	2	0
Agricultural	32	19	12	7	7	79	79	410	20	34	80	15
Government	1	1	1	1	1	2	1	4	1	1	1	1
Education	0	0	0	1	0	2	0	5	0	0	0	0
Religious / Other	1	1	1	0	0	5	2	10	0	1	2	0
Total Planning Area Assessment	186	114	73	44	41	1018	465	2416	119	202	469	89
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	180	5,729	35	26	208	71	22	236	26	1,601	189	
Commercial	6	165	1	1	7	2	1	33	1	56	7	
Industrial	1	29	0	0	1	0	0	1	0	8	1	
Agricultural	39	1,230	7	6	48	15	5	51	6	344	41	
Government	1	12	1	1	1	1	1	1	1	3	0	
Education	1	14	0	0	0	0	0	1	0	4	0	
Religious / Other	1	29	0	0	1	0	0	1	0	8	1	
Total Planning Area Assessment	229	7208	44	34	266	89	29	324	34	2024	239	

AD	Airport D	DQ	Duquesne	WA	Waco
AL	Alba	FI	Fidelity	WC	Webb City*
AB	Asbury	JA	Jasper*	UJC	Unincorporated Jasper County
AV	Avilla*	JO	Joplin*		
BH	Brooklyn Heights	LR	La Russell		
CJ	Carl Junction*	NC	Neck City		

CA	Carterville	OR	Oronogo
CR	Carthage*	PU	Purcell
CY	Carytown	RE	Reeds
DW	Duenweg	SA	Sarcoixie*

**Table 2.12****Tornado: Newton County Vulnerability Assessment**

(The estimates below are based on an EF1 tornado affecting 25% of the planning area. This estimate assumes up to 35% damage to 25% of any given jurisdiction's buildings.)

	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of building	Estimated value*
Residential	14,711	6,650	\$184,621,675	1,177	532	\$14,769,734
Commercial	3,222	917	\$65,415,438	258	73	\$5,233,235
Industrial	1,076	427	\$14,330,313	86	34	\$1,146,425
Agricultural	183	3,486	\$1,843,800	15	279	\$147,504
Government	256	13	\$3,421,513	21	16	\$273,721
Education	4,199	48	\$22,709,050	336	4	\$1,816,724
Religious / Other	61	245	\$6,774,688	5	20	\$541,975
<b>Total Planning Area Assessment</b>	<b>23,708</b>	<b>11,786</b>	<b>\$299,116,475</b>	<b>1,897</b>	<b>958</b>	<b>\$23,929,318</b>



**Table 2.13****Tornado: Building Count Vulnerability by Newton County Jurisdiction**

(Estimates based on an EF1 tornado causing damage in 25% of the planning area buildings.)

Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	6	8	106	66	319	10	483	43	66	970	37
Commercial	1	1	15	9	44	1	67	6	9	134	5
Industrial	0	0	7	4	20	1	31	3	4	62	2
Agricultural	3	4	56	34	168	5	253	22	35	509	19
Government	1	1	1	0	1	0	1	0	0	2	0
Education	0	0	1	0	2	0	3	0	0	7	0
Religious / Other	0	0	4	2	11	0	17	2	2	35	1
Total Planning Area Assessment	11	14	190	115	565	17	855	76	116	1,719	64
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	18	13	44	218	38	6	21	28	27	4,121	
Commercial	2	2	6	30	5	1	3	4	4	568	
Industrial	1	1	3	14	2	0	1	2	2	263	
Agricultural	9	7	23	114	20	3	11	15	14	2,163	
Government	0	0	0	0	0	0	0	0	0	7	
Education	0	0	0	2	0	0	0	0	0	0	
Religious / Other	1	0	2	8	1	0	1	1	1	146	
Total Planning Area Assessment	31	23	78	386	66	10	37	50	47	7,268	

CV Cliff Village  
 DA Dennis Acres  
 DI Diamond\*  
 FA Fairview  
 GR Granby\*  
 GF Grand Falls Plaza  
 JO Joplin\*  
 LE Leawood  
 LO Loma Linda  
 NE Neosho\*

NW Newtonia  
 RM Redings Mill  
 RI Ritchey  
 SA Saginaw  
 SE Seneca\*  
 SCD Shoal Creek Drive  
 SCE Shoal Creek Estates  
 SC Stark City  
 ST Stella  
 WE Wentworth

UNC Unincorporated  
 Newton County

\*These cities include educational buildings for the local school districts. (See page 31).

## Severe Thunderstorms, Hail and Straight-line Winds

As defined by the National Weather Service, a severe thunderstorm is a storm with hail equal to or greater than  $\frac{3}{4}$  of an inch in diameter or convective wind gusts greater than or equal to 58 miles per hour. Thunderstorms develop when moisture, a rising unstable air mass, and updraft combine. Four types of thunderstorms generally impact Jasper and Newton counties:

- **Single cell storm:** The single cell storm lasts approximately 20-30 minutes and does not typically reach severe thresholds.
- **Multi-cell cluster:** Multi-cell clusters are the most common type of thunderstorms. They consist of a group of storm cells which move as a single unit. Multi-cell storms may produce moderate size hail, flash flooding, and relatively weak tornadoes.
- **Multi-cell line:** Also known as a squall line, the multi-cell line storm is comprised of a long line of storms with a well-developed updraft at its leading edge. These storms may produce golf ball-sized or larger hail, heavy rainfall, and tornadoes, but most often cause significant damage from heavy non-tornadic winds.
- **Supercell:** With a strong rotating updraft reaching speeds of 150-175 miles per hour, the supercell thunderstorm is capable of producing hail more than two inches in diameter, strong downbursts of more than 80 miles per hour, torrential rain, and strong, long-track tornadoes.

Lightning may be produced by any of the four types of storms, but is most prevalent in the multi-cell and super-cell storms. Lightning can cause significant injury and death as well as property damage from cascading effects such as fire.

### Previous Events

Since 1955, the National Weather Service has recorded a total of 582 hail events (291 events in Jasper County; 291 events in Newton County) as well as 488 thunderstorm and high wind events (313 events in Jasper County; 175 events in Newton County) in the two-county region. Fortunately, none of these storms resulted in any deaths and only 10 injuries. However, property damage occurred with many of the most severe events. Table 2.14 lists the thunderstorms, hail, and high wind events with reported property or crop damage.

<i>Table 2.14</i>		<i>Jasper &amp; Newton County Damage-causing Thunderstorm, Hail. and High Wind Events, 1955- 2018</i>						
Location or County	Date	Time	Type	Magnitude/ Size	Deaths	Injuries	Property Damage	Crop Damage
Granby	03/30/1993	1418	Hail	0.75 inches	0	0	50K	0
Joplin	04/24/1993	1940	Tstm Wind	58 knots	0	0	110K	0
Diamond	04/24/1993	2016	Hail	0.75 inches	0	0	0.5K	0
Alba	05/17/1993	2200	Tstm Wind	0 knots	0	0	5K	0
Richland	09/19/1993	1745	Tstm wind	0 knots	0	0	0.5K	0
Neosho	09/19/1993	1810	Hail	0.75	0	0	5K	0
Joplin	03/06/1994	2038	Hail	1.75 inches	0	0	0.5K	0
Seneca	03/06/1994	2128	Hail	0.75 inches	0	0	0.5K	0
Neck City	04/09/1994	2211	Hail	1.75 inches	0	0	50K	5K
Seneca	04/10/1994	1650	Hail	0.75 inches	0	0	5K	0
Joplin	04/10/1994	1720	Hail	1.75 inches	0	0	0.5K	0
Redings Mill	04/10/1994	1728	Hail	1.75 inches	0	0	5K	0
Joplin	04/26/1994	1708	Tstm Wind	4 knots	0	0	5K	0
Carthage	04/26/1994	1715	Tstm Wind	0 knots	0	0	5K	0
Neosho	04/26/1994	2255	Hail	0.75 inches	0	0	0.05K	0
Joplin	04/26/1994	2345	Hail	0.75 inches	0	0	0.5K	0
Webb City, Carthage	06/07/1994	1540	Tstm Wind	0 knots	0	0	20K	0
Carthage	06/08/1994	0515	Tstm Wind	0 knots	0	0	5K	0
Carthage	07/21/1994	1904	Tstm Wind	0 knots	0	0	5K	0
Neosho	05/07/1995	2155	Tstm Wind	0 knots	0	0	10K	0
Joplin	05/27/1995	2030	Tstm Wind	0 knots	0	0	5K	0
Neosho	06/09/1995	2345	Tstm wind	0 knots	0	0	10K	0
Webb City	07/4/1995	1925	Tstm Wind	0 knots	0	0	30K	0
Joplin	07/25/1995	2005	Tstm Wind	0 knots	0	0	30K	0
Carthage	04/21/1996	1754	Hail	2.75 inches	0	0	5K	0
Sarcoxi	04/21/1996	1800	Hail	1.75 inches	0	0	5K	0
Redings Mill	04/28/1996	0200	Tstm wind	60 knots	0	0	3K	0
Carthage	06/01/1996	0237	Tstm Wind	0 knots	0	0	5K	0
Granby	06/18/1996	2035	Tstm wind	0 knots	0	0	5K	0
Redings Mill	07/08/1996	0420	Tstm wind	0 knots	0	0	5K	0
Neosho	03/25/1997	0100	Tstm wind	0 knots	0	0	5K	0
Stark City	05/26/1997	2100	Tstm wind	0 knots	0	0	5K	5K
Joplin	07/08/1997	2215	Tstm Wind	0 knots	0	0	10K	0
Joplin	07/11/1997	1700	Tstm Wind	0 knots	0	0	0.5K	0

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Neosho	07/21/1997	2330	Tstm wind	0 knots	0	0	5K	0
Neosho, Diamond	08/17/1997	0310	Tstm wind	0 knots	0	0	44K	0
Joplin	08/17/1997	0215	Tstm Wind	0 knots	0	0	5K	0
Carthage	08/17/1997	0245	Tstm Wind	0 knots	0	0	25K	0
Joplin	04/14/1998	2355	Hail	1.5 inches	0	0	15K	0
Seneca	05/25/1998	0025	Tstm wind	0 knots	0	0	5K	0
Sarcoxie	06/08/1998	2045	Tstm Wind	0 knots	0	0	3K	0
Joplin	06/15/1998	1610	Hail	1.75 inches	0	0	10K	0
Newton County	06/18/1998	0750	Tstm wind	75 knots	0	0	30K	0
Spring City	06/18/1998	1925	Tstm wind	0 knots	0	0	10K	0
Webb City	06/29/1998	2310	Tstm Wind	0 knots	0	0	3K	0
Jasper County	06/30/1998	0205	Tstm Wind	0 knots	0	0	50K	0
Newton County	06/30/1998	0305	Tstm wind	0 knots	0	0	35K	0
Saginaw	11/09/1998	2325	Tstm wind	0 knots	0	0	3K	0
Carthage	11/09/1998	2350	Tstm Wind	0 knots	0	0	5K	0
Asbury	12/06/1998	1207	Tstm Wind	0 knots	0	0	30K	0
Joplin	05/04/1999	0100	Tstm Wind	0 knots	0	0	4K	0
Carl Junction, Carthage	07/01/1999	0900	Tstm Wind	0 knots	0	0	10K	0
Joplin	08/12/1999	1940	Tstm Wind	70 knots	0	0	500K	0
Neosho	09/07/1999	1950	Tstm wind	0 knots	0	0	3K	0
Seneca	11/22/1999	2015	Tstm wind	0 knots	0	0	4K	0
Carthage	04/20/2000	0030	Tstm Wind	0 knots	0	0	8K	0
Stark City	04/20/2000	0030	Tstm Wind	0 knots	0	0	2K	0
Duenweg	05/24/2000	1900	Tstm Wind	0 knots	0	0	3K	0
Newton County	05/24/2000	1910	Tstm wind	0 knots	0	0	15K	0
Jasper	05/27/2000	0145	Tstm Wind	52 knots	0	0	1K	0
Stark City, Newtonia, Fairview	06/30/2000	1915	Tstm wind	65 knots	0	0	58K	0
Granby	02/24/2001	1320	Tstm wind	0 knots	0	0	5K	0
Stella	04/11/2001	0840	Tstm wind	0 knots	0	0	25K	0
Seneca, Neosho, Granby	04/15/2001	0005	Tstm wind	52 knots	0	0	85K	0
Joplin	04/15/2001	0020	Tstm Wind	0 knots	0	10	1.0M	0
Sarcoxie, Jasper, Webb City, Carl Junction	08/29/2001	1542	Tstm wind	52 knots	0	0	30K	0
Granby	10/10/2001	0958	Tstm wind	52 knots	0	0	10K	0
Carthage	04/19/2002	1538	Tstm wind	52 knots	0	0	10K	0
Joplin	05/07/2002	1720	Tstm wind	60 knots	0	0	100K	0

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Carl Junction	06/12/2002	2113	Tstm wind	52 knots	0	0	20K	0
Seneca	06/12/2002	2124	Tstm wind	62 knots	0	0	20K	0
Neosho	08/23/2002	1440	Tstm wind	50 knots	0	0	5K	0
Joplin	05/02/2004	1234	Tstm wind	70 knots	0	0	15K	0
Neck City	06/16/2004	1630	Tstm wind	50 knots	0	0	10K	0
Jasper County, Newton Coutny	07/04/2004	0620	Tstm wind	65 knots	0	0	150K	0
Webb City	06/30/2005	2230	Tstm wind	60 knots	0	0	30K	0
Joplin	06/30/2005	2110	Hail	1.75 inches	0	0	40K	0
Neosho	06/30/2005	2113	Hail	1.75 inches	0	0	20K	0
Joplin	07/23/2005	1523	Tstm wind	55 knots	0	0	10K	0
Newton County	11/27/2005	1730	High wind	65 knots	0	0	60K	0
Joplin	04/23/2006	2315	Tstm wind	50 knots	0	0	5K	0
Dudenville	07/10/2006	1555	Tstm wind	60 knots	0	0	10K	0
Neosho	08/06/2006	1655	Tstm wind	55 knots	0	0	5K	0
Joplin	08/10/2006	2125	Tstm wind	55 knots	0	0	15K	0
Avilla	09/17/2006	0715	Tstm wind	65 knots	0	0	65K	0
Duquesne	07/09/2007	1755	Tstm wind	50 knots	0	0	1K	0
Joplin, Duquesne	01/08/2008	0133	Tstm wind	55 knots	0	0	30K	0
Joplin	05/24/2008	0508	Tstm wind	60 knots	0	0	50K	0
Joplin	06/03/2008	2230	Tstm wind	50 knots	0	0	5K	0
Avilla	06/23/2008	0335	Tstm wind	50 knots	0	0	3K	0
Carthage	06/28/2008	0205	Tstm wind	50 knots	0	0	14K	0
Duenweg	02/09/2009	0907	Tstm wind	50 knots	0	0	4K	0
Waco	03/24/2009	0400	Tstm wind	60 knots	0	0	100K	0
Neosho	04/09/2009	1805	Tstm wind	56 knots	0	0	5K	0
Belle Center, Seneca	05/08/2009	0603	Tstm wind	78 knots	0	0	3.0M	0
Neosho	06/09/2009	2110	Tstm wind	61 knots	0	0	35K	0
Avilla	06/26/2009	1544	Tstm wind	61 knots	0	0	20K	0
Racine, Neosho	07/13/2009	0205	Tstm wind	52 knots	0	0	70K	0
Neosho Airport	10/29/2009	1505	Tstm wind	52 knots	0	0	75K	0
Belfast	03/10/2010	1732	Hail	1.5	0	0	5K	0
Belfast	03/10/2010	1735	Hail	1.75 inches	0	0	5K	0
Neosho	03/10/2010	1745	Hail	1.75 in.	0	0	20K	0
Duenweg	03/10/2010	1800	Hail	1.75 inches	0	0	10K	0
Diamond	03/10/2010	1801	Hail	1.25 inches	0	0	5K	0
Center Point	05/13/2010	0545	Tstm wind	52 knots	0	0	1K	0
Diamond	05/16/2010	1555	Hail	1.75 inches	0	0	5K	0
Carl Junction	06/02/2010	2020	Tstm wind	65 knots	0	0	35K	0
Pepsin	06/27/2010	1520	Tstm wind	52 knots	0	0	5K	0

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Seneca	07/16/2010	1730	Tstm wind	56 knots	0	0	1K	0
Jasper	09/02/2010	1745	Tstm wind	52 knots	0	0	2K	0
Carthage, Neosho	10/25/2010	2305	Tstm Wind	52 knots	0	0	4K	0
Neosho Airport	04/22/2011	1545	Hail	2.5 inches	0	0	20K	0
Oronogo	05/12/2011	1720	Tstm Wind	52 knots	0	0	10K	0
Granby	05/24/2011	2122	Tstm wind	52 knots	0	0	2K	0
Asbury	06/18/2011	2150	Tstm wind	52 knots	0	0	7.5K	0
Jasper	06/21/2011	0000	Tstm wind	52 knots	0	0	15K	0
Lakeside	07/12/2011	2225	Tstm wind	60 knots	0	0	5K	0
Prosperity	07/12/2011	2247	Tstm wind	87 knots	0	0	110K	0
Sarcoxic	07/24/2011	2025	Tstm wind	52 knots	0	0	2K	0
Alba	07/25/2011	1638	Tstm wind	56 knots	0	0	1K	0
Webb City	11/08/2011	0034	Tstm wind	65 knots	0	0	10K	0
Brooklyn Heights	02/28/2012	2328	Tstm wind	52 knots	0	0	5K	0
Webb City	05/29/2012	0008	Tstm wind	52 knots	0	0	5K	0
Titpton Ford	07/07/2012	1815	Tstm wind	61 knots	0	0	2K	0
Joplin, Saginaw	08/04/2012	1712	Tstm wind	60 knots	0	0	20K	0
Jasper	08/04/2012	1735	Tstm wind	70 knots	0	0	100K	0
Hornet	08/08/2012	1640	Tstm wind	52 knots	0	0	10K	0
Waco, Joplin	09/05/2012	0458	Tstm wind	52 knots	0	0	41K	0
Neosho	09/07/2012	1524	Tstm wind	52 knots	0	0	15K	0
Saginaw	04/18/2013	0106	Tstm wind	52 knots	0	0	1K	0
Carthage	05/19/2013	2302	Tstm wind	65 knots	0	0	11K	0
Wela Park	05/20/2013	1755	Tstm wind	52 knots	0	0	2K	0
Kendricktown, Carl Junction	06/05/2014	0030	Tstm wind	52 knots	0	0	30K	0
Oronogo	06/05/2014	0840	Tstm wind	52 knots	0	0	10K	0
Neosho, Wentworth	06/28/2014	1538	Tstm wind	56 knots	0	2	20K	0
Saginaw, Fredville	09/01/2014	2214	Tstm wind	61 knots	0	2	275K	0
Seneca	05/16/2015	2355	Tstm wind	56 knots	0	0	10K	0
Diamond	05/17/2015	0015	Tstm wind	56 knots	0	0	20K	0
Sarcoxic	05/17/2015	0029	Tstm wind	52 knots	0	0	5K	0
Neosho	08/23/2015	0345	Tstm wind	52 knots	0	0	2K	0
Oronogo	03/30/2016	2043	Tstm wind	52 knots	0	0	5K	0
Brooklyn Heights	03/30/2016	2045	Tstm wind	52 knots	0	0	5K	0
Seneca	04/26/2016	2321	Tstm wind	52 knots	0	0	5K	0
Carthage	04/26/2016	2235	Tstm Wind	52 knots	0	0	50K	0
Carthage	04/26/2016	2331	Tstm Wind	78 knots	0	0	15K	0
Neosho	05/24/2016	2340	Tstm Wind	52 knots	0	0	5K	0
Spurgeon	05/24/2016	1305	Tstm Wind	52 knots	0	0	2K	0

# 2021 JASPER-NEWTON BI-COUNTY NATURAL HAZARD MITIGATION PLAN

Carthage	05/30/2016	1150	Tstm Wind	52 knots	0	0	5K	0
Carthage	06/12/2016	1215	Tstm Wind	52 knots	0	0	2K	0
Morgan Heights	06/30/2016	1805	Tstm Wind	52 knots	0	0	2K	0
Webb City	07/07/2016	2325	Tstm Wind	52 knots	0	0	10K	0
Redings Mill	07/07/2016	2331	Tstm Wind	52 knots	0	0	20K	0
Neosho	07/07/2016	2345	Tstm Wind	52 knots	0	0	15K	0
Carterville	07/09/2016	2303	Tstm Wind	52 knots	0	0	2K	0
Joplin	08/25/2016	1709	Tstm Wind	52 knots	0	0	3K	0
Carthage	03/01/2017	0030	Tstm Wind	52 knots	0	0	5K	0
Alba	03/06/2017	2202	Tstm Wind	56 knots	0	0	5K	0
Jasper	03/09/2017	1651	Hail	2.5 inches	0	0	100K	0
Webb City	03/09/2017	1715	Hail	1.75 inches	0	0	25K	0
Lakeside	03/09/2017	1725	Hail	2.75 inches	0	0	200K	0
Morgan Heights	03/09/2017	1740	Hail	1.75 inches	0	0	25K	0
Wentworth	03/09/2017	1805	Hail	2.75 inches	0	0	100K	0
Wela Park	03/09/2017	1904	Hail	1.75	0	0	10K	0
Neosho Airport	04/04/2017	1757	Tstm Wind	52 knots	0	0	100K	0
Fredville	05/10/2017	2340	Tstm Wind	52 knots	0	0	1K	0
Neosho	05/19/2017	1411	Tstm Wind	52 knots	0	0	2K	0
Neosho	05/19/2017	1411	Hail	2.5 inches	0	0	2K	0
Carthage	05/27/2017	2346	Hail	2.5 inches	0	0	100K	0
Carthage	05/27/2017	2350	Hail	2.5 inches	0	0	100K	0
Carthage	10/21/2017	22210	Tstm Wind	52 knots	0	0	1K	0
Jasper	10/21/2017	2210	Tstm Wind	52 knots	0	0	1K	0
Webb City	05/02/2018	2320	Tstm Wind	52 knots	0	0	2K	0
Webb City	05/02/2018	2322	Tstm Wind	52 knots	0	0	10K	0
Duquesne	05/02/2018	2325	Tstm Wind	52 knots	0	0	2K	0
Seneca	05/20/2018	0500	Tstm Wind	52 knots	0	0	1K	0
Carthage	06/26/2018	1451	Tstm Wind	52 knots	0	0	4K	0
Neosho	06/26/2018	1512	Tstm Wind	52 knots	0	0	5K	0
Sarcoxi	07/19/2018	1718	Tstm Wind	52 knots	0	0	5K	0
Aroma	08/16/2018	1717	Hail	2.5 inches	0	0	2K	0
Central City	10/09/2018	1321	Tstm Wind	52 knots	0	0	2K	0



## Probability of Occurrence

Thunderstorms, hail, and straight-line winds are regular occurrences in both Jasper County and Newton County. The severities of these storms vary greatly. These statistics suggest a probable future risk for the two-county region. The probable risk is calculated by dividing the number of events by the number of years, multiplying by 100 to create a risk percentage. 488 thunderstorm and high wind events occurred in Jasper and Newton County between 1955 and 2018. 582 hail events occurred between 1955 and 2018. During this period of time, a total of 1,070 events occurred in 63 years. Therefore, the probability for a thunderstorm or hail event in any given year for Jasper and Newton Counties is 100%. In other words, a severe thunderstorm is statistically likely to occur in any given year ( $1,070 \text{ events} / 63 \text{ years} * 100 = 1,698.4\%$ ).

## Extent / Severity

Thunderstorms hail, and straight-line winds can cause significant property damage, crop damage, injury, and even death. Improvements in meteorological forecasting and warning systems for such storms have increased the potential for advance public preparation. These improvements, however, may or may not provide sufficient warning time depending upon the speed of storm development. The use of advanced forecasting, warning systems, vigorous public education, and improved construction techniques may reduce property damage as well as the number of deaths and injuries. Of 488 thunderstorm and high wind events from 1993-2018, 111 169 storms caused \$10,254,500 in property damage as well as \$5,000 in crop damage, for an average damage cost per thunderstorm / high wind event of \$60,707. 33 of 582 hail events were responsible for \$947,100 in property damage as well as \$5,000 in crop damage, for an average damage cost per hail event of \$ 28,851.

## Vulnerability

All jurisdictions (municipalities, educational institutions, and unincorporated areas) within the county are equally susceptible to damage stemming from thunderstorms, wind, and hail events. Vulnerable structures, including critical facilities and mobile homes, exist in each municipality and throughout the county. In the event of a severe storm or high winds, 25-50% of any given jurisdiction may be at risk for damage, but this damage will likely be light to moderate from any given storm as the average damage cost per event is less than \$30,000 for hail and less than \$100,000 for thunderstorm/high wind. Light damage is less than or equal to 10%. Since the adoption of the original plan, no significant changes concerning building development or population shifts have taken place.

**Table 2.15**  
**Severe Thunderstorm, Hail, High Wind: Jasper County Vulnerability Assessment**  
(The estimates below are based severe thunderstorm with hail affecting 25% of the planning area. This estimate assumes 5% damage to 25% of any given jurisdiction's buildings.)

	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of building	Estimated value*
Residential	29,351	12,560	\$56,592,575	3,522	1,507	\$6,791,109
Commercial	5,812	436	\$18,043,975	698	52	\$2,165,277
Industrial	1,761	58	\$5,475,062	211	7	\$657,008
Agricultural	176	2,700	\$569,638	21	324	\$68,357
Government	264	2	\$848,975	32	1	\$101,877
Education	2,436	26	\$7,554,788	292	3	\$1,746,672
Religious / Other	705	66	\$2,159,363	17	8	\$259,124
<b>Total Planning Area Assessment</b>	<b>40,505</b>	<b>15,848</b>	<b>\$91,244,376</b>	<b>4,793</b>	<b>1,902</b>	<b>\$11,789,424</b>

AD  
Airport Drive  
DQ  
Duquesne  
WA

**Table 2.16**  
**Severe Thunderstorm, Hail, and Wind: Building Count Vulnerability by Jasper County Jurisdiction**  
(Estimates based on a thunderstorm with hail causing damage in 25% of the planning area buildings.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	147	90	57	34	32	894	368	1911	95	159	371	71
Commercial	5	3	2	1	1	31	13	66	3	6	13	2
Industrial	0	0	0	0	0	5	2	10	0	1	2	0
Agricultural	32	19	12	7	7	79	79	410	20	34	80	15
Religious	1	1	1	1	1	2	1	4	1	1	1	1
Government	0	0	0	1	0	2	0	5	0	0	0	0
Education	1	1	1	0	0	5	2	10	0	1	2	0
Total Planning Area Assessment	186	114	73	44	41	1018	465	2416	119	202	469	89
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	180	5,729	35	26	208	71	22	236	26	1,601	189	
Commercial	6	165	1	1	7	2	1	33	1	56	7	
Industrial	1	29	0	0	1	0	0	1	0	8	1	
Agricultural	39	1,230	7	6	48	15	5	51	6	344	41	
Religious	1	12	1	1	1	1	1	1	1	3	0	
Government	1	14	0	0	0	0	0	1	0	4	0	
Education	1	29	0	0	1	0	0	1	0	8	1	
Total Planning Area Assessment	229	7208	44	34	266	89	29	324	34	2024	239	

AL  
AB Alba  
Asbury

FI  
JA Fidelity  
Jasper\*

WC  
UJC Webb City\*  
Unincorporated Jasper County

AV	Avilla*	JO	Joplin*
BH	Brooklyn Heights	LR	La Russell
CJ	Carl Junction*	NC	Neck City
CA	Carterville	OR	Oronogo
CR	Carthage*	PU	Purcell
CY	Carytown	RE	Reeds
DW	Duenweg	SA	Sarcoixie*

\*These cities include educational buildings for the local school districts.

**Table 2.17**  
**Severe Thunderstorm, Hail, High Wind: Newton County Vulnerability Assessment**

(The estimates below are based severe thunderstorm with hail affecting 25% of the planning

	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of building	Estimated value*
Residential	14,711	6,650	\$26,374,525	1,177	532	\$2,109,962
Commercial	3,222	917	\$9,345,063	258	73	\$747,605
Industrial	1,076	427	\$2,047,188	86	34	\$163,775
Agricultural	183	3,486	\$263,400	15	279	\$21,072
Government	256	13	\$488,788	21	16	\$39,103
Education	4,199	48	\$3,244,150	336	4	\$259,532
Religious / Other	61	245	\$967,813	5	20	\$77,425
<b>Total Planning Area Assessment</b>	<b>23,708</b>	<b>11,786</b>	<b>\$62,145,595</b>	<b>1,897</b>	<b>958</b>	<b>\$3,418,474</b>

**Table 2.18****Severe Thunderstorm, Hail, and Wind: Building Count Vulnerability by Newton County Jurisdiction**

(Estimates based on a thunderstorm with hail causing damage in 25% of the planning area buildings.)

Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	6	8	106	66	319	10	483	43	66	970	37
Commercial	1	1	15	9	44	1	67	6	9	134	5
Industrial	0	0	7	4	20	1	31	3	4	62	2
Agricultural	3	4	56	34	168	5	253	22	35	509	19
Religious	1	1	1	0	1	0	1	0	0	2	0
Government	0	0	1	0	2	0	3	0	0	7	0
Education	0	0	4	2	11	0	17	2	2	35	1
Total Planning Area Assessment	11	14	190	115	565	17	855	76	116	1,719	64
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	18	13	44	218	38	6	21	28	27	4,121	
Commercial	2	2	6	30	5	1	3	4	4	568	
Industrial	1	1	3	14	2	0	1	2	2	263	
Agricultural	9	7	23	114	20	3	11	15	14	2,163	
Religious	0	0	0	0	0	0	0	0	0	7	
Government	0	0	0	2	0	0	0	0	0	0	
Education	1	0	2	8	1	0	1	1	1	146	
Total Planning Area Assessment	31	23	78	386	66	10	37	50	47	7,268	

OCV	Cliff Village	NW	Newtonia	UNC	Unincorporated
DA	Dennis Acres	RM	Redings Mill		Newton County
DI	Diamond*	RI	Ritchey		
FA	Fairview	SA	Saginaw		
GR	Granby*	SE	Seneca*		
GF	Grand Falls Plaza	SCD	Shoal Creek Drive		
JO	Joplin*	SCE	Shoal Creek Estates		
LE	Leawood	SC	Stark City		
LO	Loma Linda	ST	Stella		
NE	Neosho*	WE	Wentworth		

\*These cities include educational buildings for the local school districts.

## Flood

A flood is a partial or complete inundation of normally dry land areas. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice. There are several types of riverine floods including headwater, backwater, interior drainage, and flash flooding. The National Weather Service has categorized three levels of flood response (Table 2.19). These three categories are designed to encourage individuals to take precaution in flood related situations.

Flash flooding is characterized by rapid accumulation or runoff of surface waters from any source and can occur separately from riverine flooding in areas with poor drainage that are low-lying. This type of flooding can occur within six hours of a rain event, after a dam or levee failure, or following a sudden release of water held by an ice or debris jam. Flash floods often catch people unprepared and often develop in a short period of time, with most flood-related deaths resulting from this type of flooding event. In addition, flash flooding can occur separately from riverine flooding in areas that have no nearby rivers, areas that are low-lying, and those with poor drainage.

<b>Table 2.19 National Weather Service (NWS) Flood</b>		
<b>Warning Level</b>		<b>Meaning</b>
Flood Watch		Flash flooding or flooding is possible within the designated area
Flood Warning		Flash flooding or flooding has been reported or is imminent; take the necessary precautions at once
Flood Advisory		Flooding of small streams, streets and low-lying areas, such as railroad underpasses and urban storm drains, is occurring

Several factors contribute to flooding. Two key elements are rainfall intensity and duration. Intensity is the rate of rainfall, and duration is how long the precipitation lasts. Topography, soil conditions, and ground cover also play important roles. Most flash flooding is caused by slow-moving thunderstorms or heavy rains. Widespread floods, on the other hand, can be fast-rising, but generally develop over a period of hours or days.

Urbanization further aggravates the flooding potential by increasing runoff two to six times over what would occur on natural terrain. As land is converted from fields or woodlands to buildings and pavement, it loses its ability to absorb rainfall. During periods of urban flooding, streets can become swift moving rivers, while basements and viaducts can fill with water, creating a potentially dangerous situation.

The areas adjacent to rivers and stream banks that serve to carry excess floodwater during rapid runoff are called floodplains. A floodplain is defined as the lowlands and relatively

flat areas adjoining rivers and streams. 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.

Floodplains are a vital part of a larger entity called a basin or watershed. A basin is defined as all the land drained by a river and its branches. In some cases, flooding may not necessarily be directly attributable to a river, stream, or lake. Rather, it may be the combination of excessive rainfall/snowmelt, saturated ground, and inadequate drainage.

## Previous Events

Historically, both Jasper County and Newton County have been subject to damage from floods and flood-related events (Table 2.20). Loss of agricultural lands, homes, businesses, and infrastructures, as well as the temporary closing of some local businesses, contribute to economic losses. Flooding that does occur in the county is predominantly caused by intense rainfall associated with passing thunderstorms. Because there are no major waterways, such as the Missouri River, in southwest Missouri, the most prevalent flooding activity occurs in the form of flash floods. This does not hinder the severity of flooding within the counties, however. Flooding does occur along streams and rivers throughout the county. These rainfall events can cause minor localized flooding in urban areas and over low-water crossings. Figures 2.1 and 2.2 illustrate the 100-year floodplain for Jasper and Newton counties and all communities that are located within or border the 100-year floodplain.

In the two county regions, 316 flood events have been recorded since 1996. Of these 316 events, 243 were flash flooding events. The largest disaster to impact Jasper and Newton counties in recent years was the flooding event of 2002 which caused \$10,000 in damages in both counties. Most instances of riverine flooding in the two county region are limited in scope and impact due to the size of local rivers and streams. Flash flooding potentially impacts every jurisdiction and has caused the most significant losses. The 2008 flash flood event in Hornet, for example, caused \$2 million in damages.

The FEMA repetitive loss list shows a number of repetitive losses in both counties as of June 1, 2019. Table 2.20 summarizes these losses.

*Table 2.20 Jasper and Newton County Repetitive Losses*

County	Number of Losses	Total Properties	Number of Commercial Properties	Number of Residential Properties	Building Total	Content Total
Jasper	16	7	0	7	\$405,952.14	\$116,293.20
Newton	35	12	1	11	\$1,404,129.18	\$303,546.50

To date, buyout plans have been pursued by individual jurisdictions. The City of Joplin and Village of Saginaw, for example, have completed buyout plans and utilized that land for public parks. All jurisdictions that participate in NFIP require building permits and elevation certificates for new construction. Both counties participate in the National Flood Insurance Program.



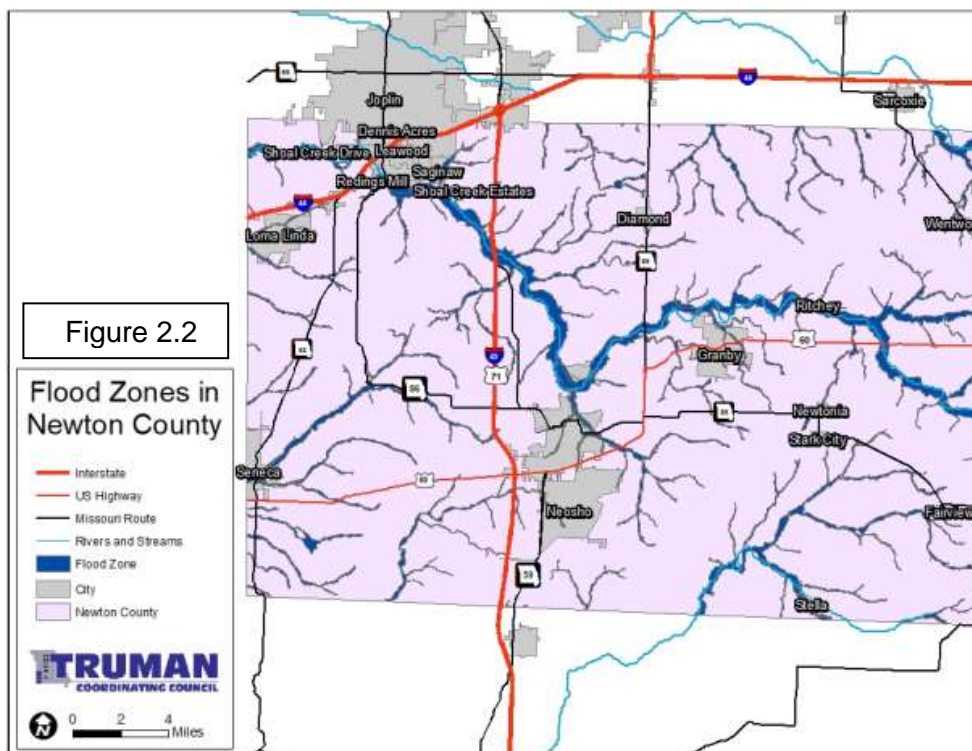
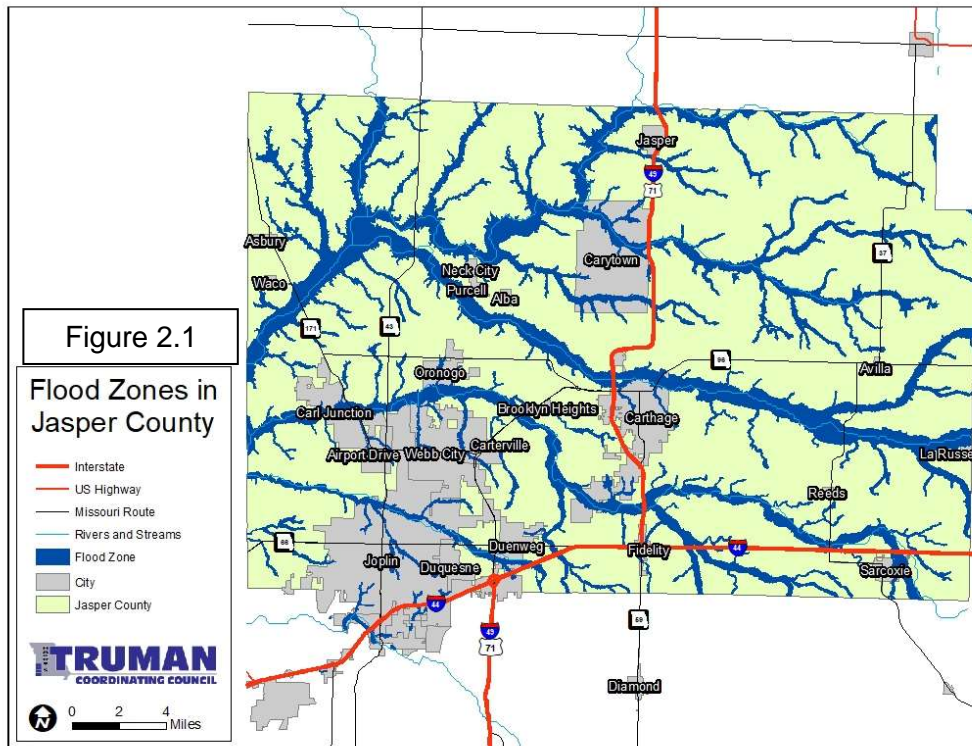




Table 2.21		Jasper- Newton County Damage-Causing Flood Events, 1993- 2018					
Location or County	Date	Time	Type	Death	Injuries	Property Damage	Crop Damage
Joplin	06/27/1996	0630	Flash Flood	0	0	15K	0
Neosho	05/26/1997	2200	Flash Flood	0	0	10K	0
Jasper County	05/04/1999	1100	Flash Flood	0	0	70K	0
Newton County	06/20/2000	2245	Flash Flood	0	0	100K	0
South Portion (JC)	06/03/2001	0655	Flash Flood	0	0	50K	0
South Portion (JC)	10/10/2001	0200	Flash Flood	0	0	4K	0
Jasper County / Newton County	05/08/2002	0000	Flood	1	0	10K	0
Neosho	06/10/2003	2330	Flash Flood	0	0	20K	0
Maple Grove	06/12/2007	0645	Flash Flood	0	0	150K	0
Hornet	03/17/2008	2300	Flash Flood	0	0	2.0M	0
Asbury	03/18/2008	0300	Flash Flood	0	0	200K	0
Diamond	05/16/2010	1630	Flood	0	0	5K	0
Duquesne	07/13/2010	0545	Flash Flood	0	0	2K	0
Neosho	07/16/2010	1629	Flash Flood	0	0	10K	0
Kendricktown	04/25/2011	1309	Flash Flood	0	0	250K	0
Racine	04/25/2011	0630	Flash Flood	0	0	500K	0
Seneca	05/23/2011	1500	Flash Flood	0	0	500K	0
Neosho	05/23/2011	1742	Flash Flood	0	0	500K	0
Seneca	05/24/2011	0000	Flash Flood	0	0	25K	0
Prosperity	06/15/2013	1714	Flash Flood	0	0	250K	0
Carthage	07/30/2013	0112	Flash Flood	0	0	20K	0
Neosho	07/09/2015	1521	Flood	0	0	500K	0
Neosho	12/27/2015	1041	Flood	0	0	2.0 M	0
Carthage	12/27/2015	1306	Flood	0	0	1.0M	0
Racine	04/30/17	0100	Flash Flood	0	0	1.0M	0
Duquesne	04/30/17	0100	Flash Flood	0	0	500K	0
Neosho	5/28/201	0600	Flood	0	0	11.2 M	0

## Probability of Occurrences

Most flood events in Jasper and Newton counties have minimal impact on quality of life. Historically, no critical facilities or services were shut down for more than a few hours, and property damage was less than 10%. During this period of time, a total of 316 events occurred in 22 years. Therefore, the probability for any flood event in any given year for Jasper and Newton counties given historic events is 100%. ( $316 \text{ events} / 22 \text{ years} * 100 = 1,436\%$ )

## Extent / Severity

Jasper County and Newton County face minimal risk factors for flooding, particularly when compared to counties located along the Missouri River to the north. The land that forms Jasper and Newton County includes the river basin of the Spring River and its tributaries (Jasper County) and Shoal Creek and its tributaries (Newton County). Both rivers generally run west to east through the each county. Flood Insurance Rating Maps (FIRMs) demonstrate that a fair portion of both counties lie within the 100-year floodplain. Jasper County has a more significant 100-year floodplain, with large portions located inside of independent jurisdictions.

Table 2.22		<i>Jasper– Newton County Flood Events by Month 1996-2018</i>	
Month	Jasper County Number of Events	Newton County Number of Events	
January	5	9	
February	2	5	
March	10	13	
April	20	20	
May	27	39	
June	29	21	
July	19	12	
August	4	6	
September	7	14	
October	5	6	
November	7	10	
December	5	6	

It can be concluded that the floodplain areas are highly likely to experience one or more flood events while the remaining portions of the county are unlikely to experience at least one flood event during these months. In Jasper County, Airport Drive, Carl Junction, Carthage, Duenweg, Duquesne, Joplin, Oronogo, Sarcoxie, and Webb City have floodplains that fall within the A and AE zone as do portions of rural Jasper County. In Newton County, Granby, Grand Falls Plaza, Loma Linda, Neosho, Redings Mill, Saginaw, and Seneca have floodplains that fall within the A and AE zone as well, as do portions of rural Newton County. Based on previous events, the probable severity of future floods would most likely result in light damage in the floodplain areas.

## Vulnerability

HAZUS estimates the number of structures within the floodplains for both counties. Jasper County has approximately 670 buildings in the floodplain, while Newton County has approximately 496. Those jurisdictions which at least partially lie in the 100 year floodplain are most susceptible to the potential damage from a flooding event. A total of five school districts, two fire stations, and 2 police stations may also be impacted with minor damages and loss of use. To date, HAZUS data is only available on a countywide basis. No data is presently available for individual jurisdictions. FIRMette maps have been created for the municipalities of Airport Drive, Carl Junction, Carthage, Duenweg, Duquesne, Joplin, Oronogo, Sarcoxie, and Webb City in Jasper County as well as Granby, Grand Falls Plaza, Loma Linda, Neosho, Redings Mill, Saginaw, and Seneca in Newton County (Figures 2.3 – 2.40). Most remaining areas located within the floodplains are largely constituted by unincorporated county lands.

<i>Table 2.23 HAZUS Direct Economic Losses for Buildings - Flood</i>				
<b>Capital Stock Losses</b>				
County	Building Loss	Contents Loss	Inventory Loss	Building Loss Ratio %
Jasper	\$62,238,000	\$94,428,000	\$2,115,000	3.10
Newton	\$34,140,000	\$54,514,000	\$2,715,000	2.30
<b>Income Losses</b>				
	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss
Jasper	\$193,000	\$526,000	\$1,675,000	\$22,000
Newton	\$51,000	\$118,000	\$680,000	\$3,000
<b>Total Losses</b>				
Jasper	\$ 161,197,000			
Newton	\$ 92,221,000			

Figure 2.3 Airport Drive FIRMette A

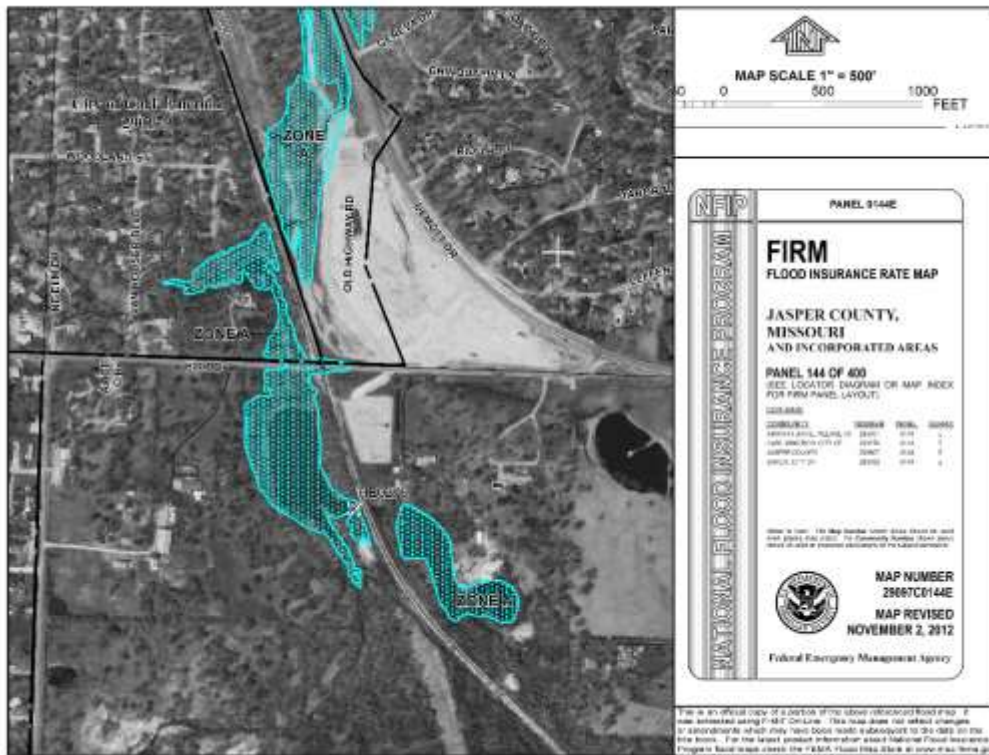


Figure 2.4 Airport Drive FIRMette B





Figure 2.5 Airport Drive FIRMette C



Figure 2.6 Airport Drive FIRMette D







Figure 2.9 Carl Junction FIRMette C

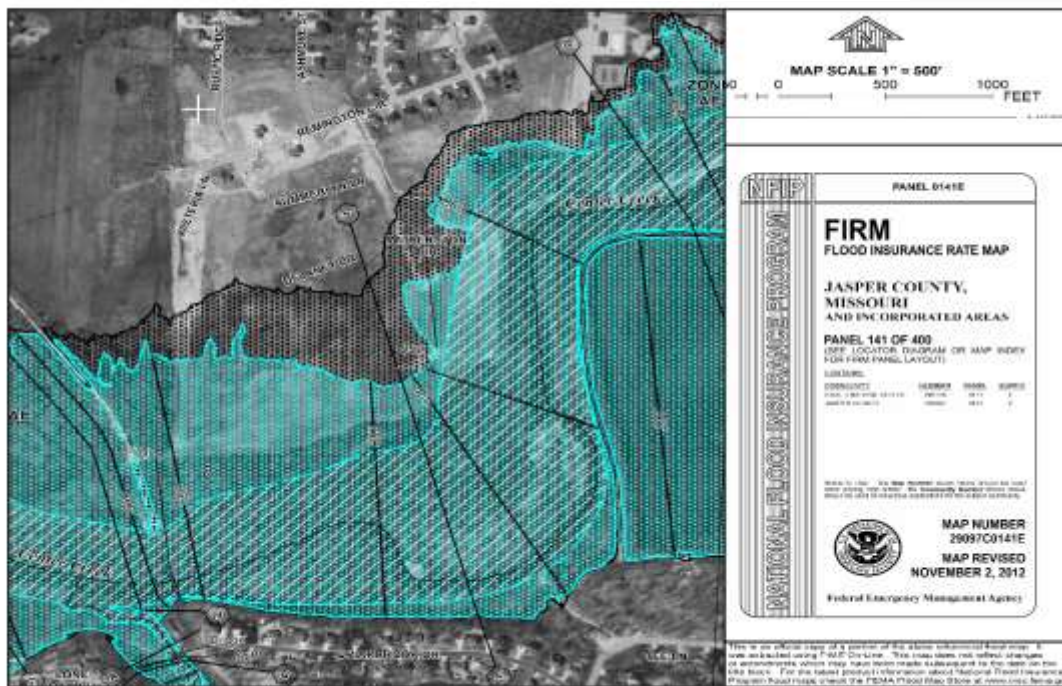


Figure 2.10 Carl Junction FIRMette D

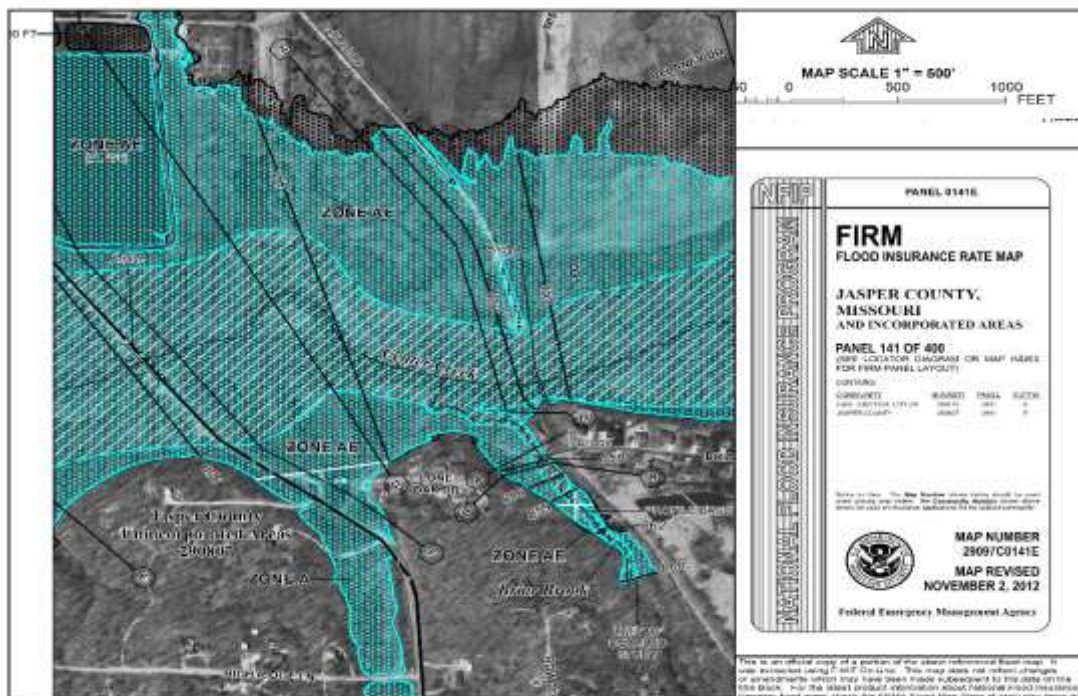




Figure 2.11 Carl Junction FIRMette E



Figure 2.12 Carl Junction FIRMette F

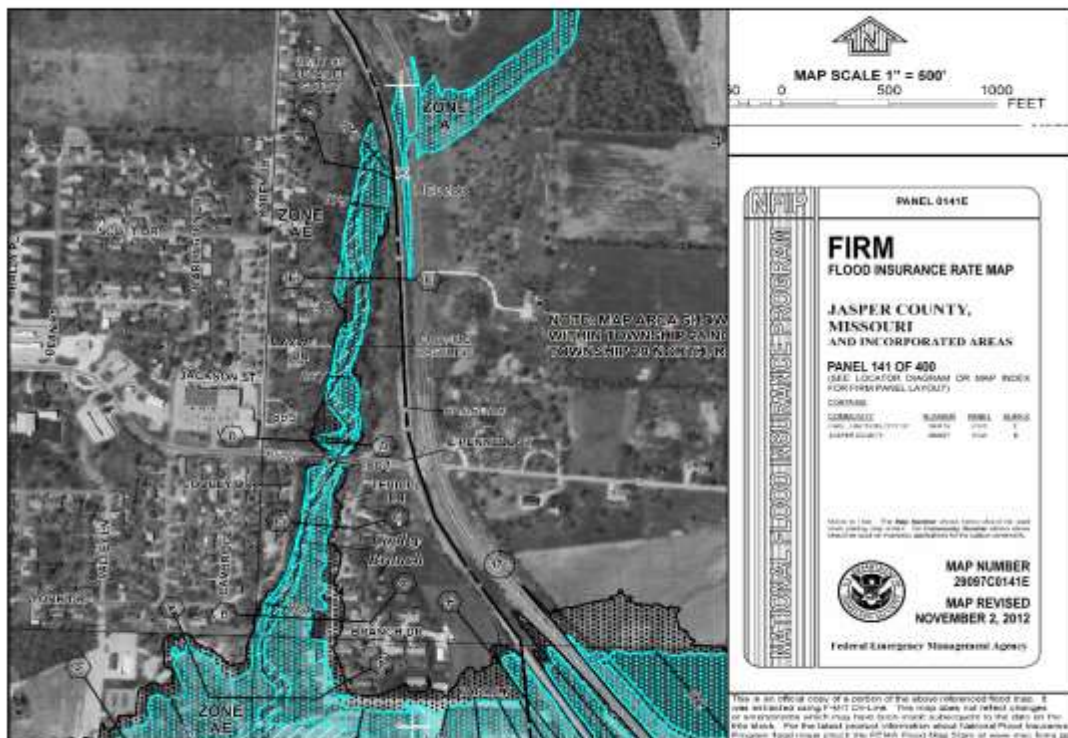


Figure 2.13 Carl Junction FIRMette G

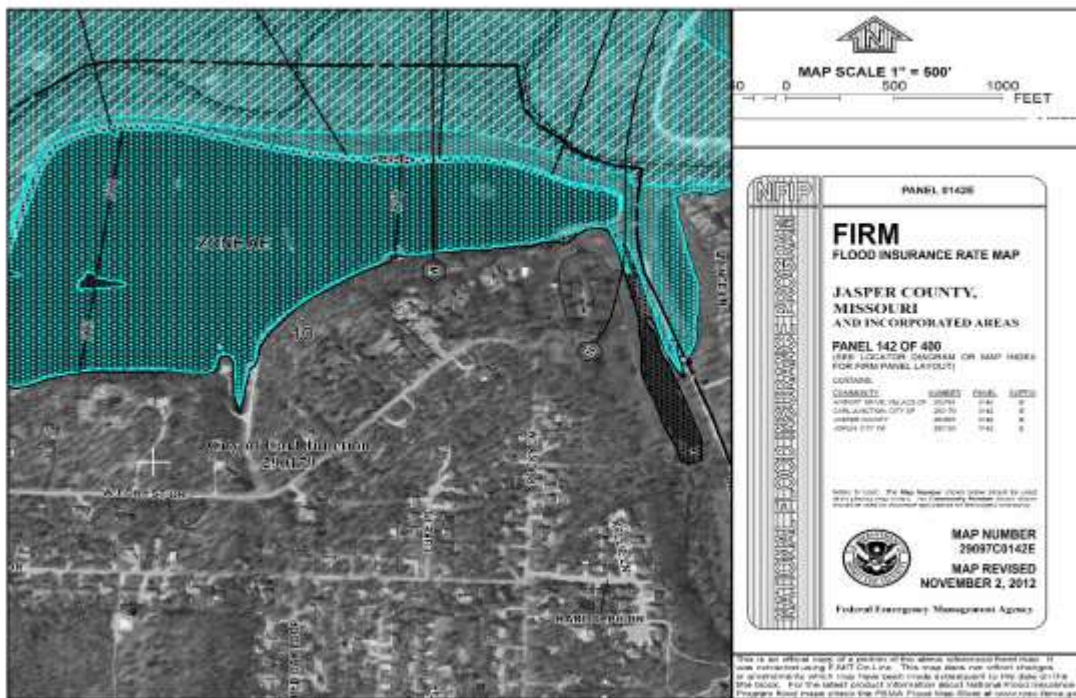


Figure 2.14 Carl Junction FIRMette H





Figure 2.15 Carl Junction FIRMette I



Figure 2.16 Carl Junction FIRMette J

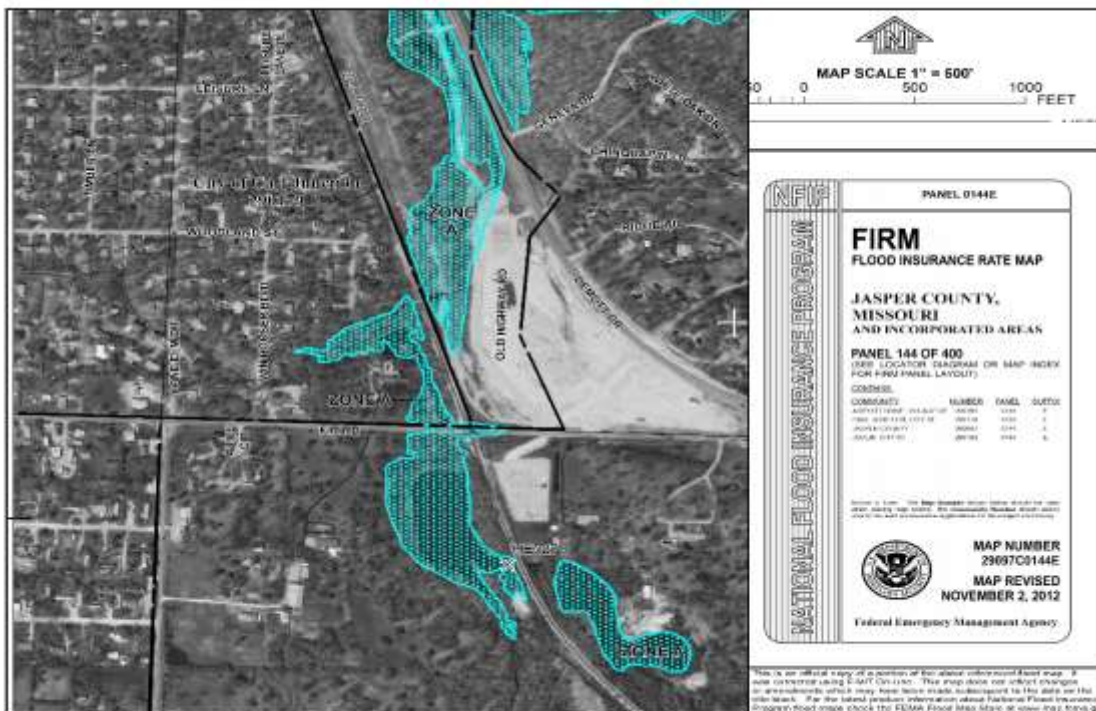


Figure 2.17 Carthage FIRMette A

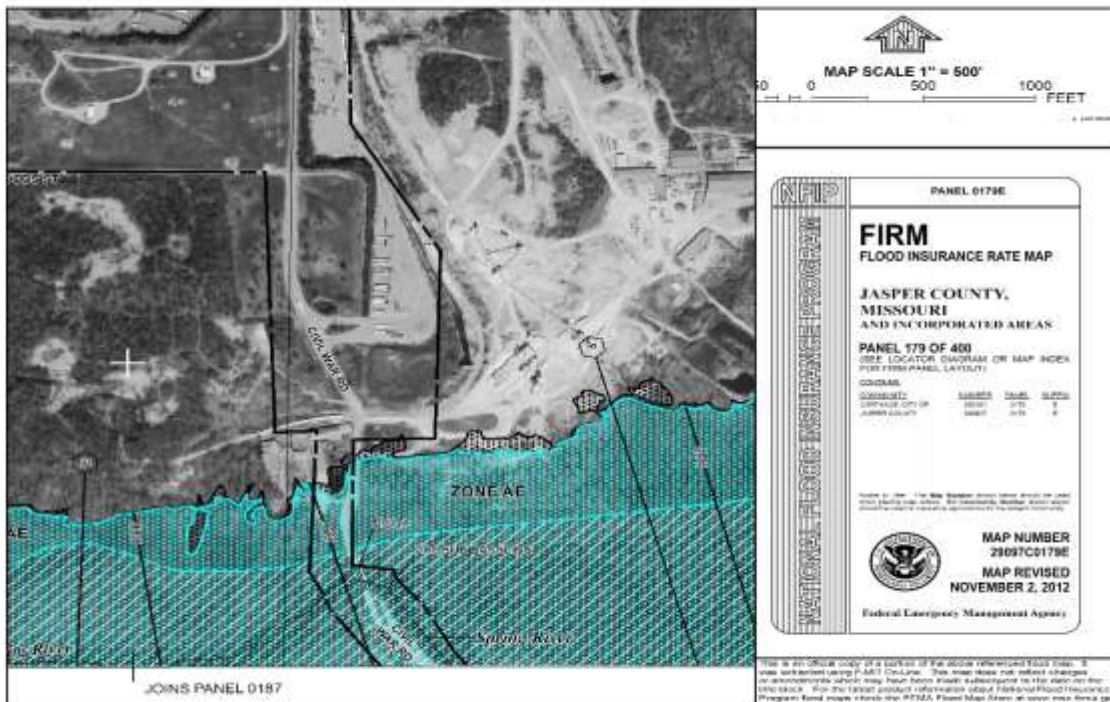


Figure 2.18 Carthage FIRMette B

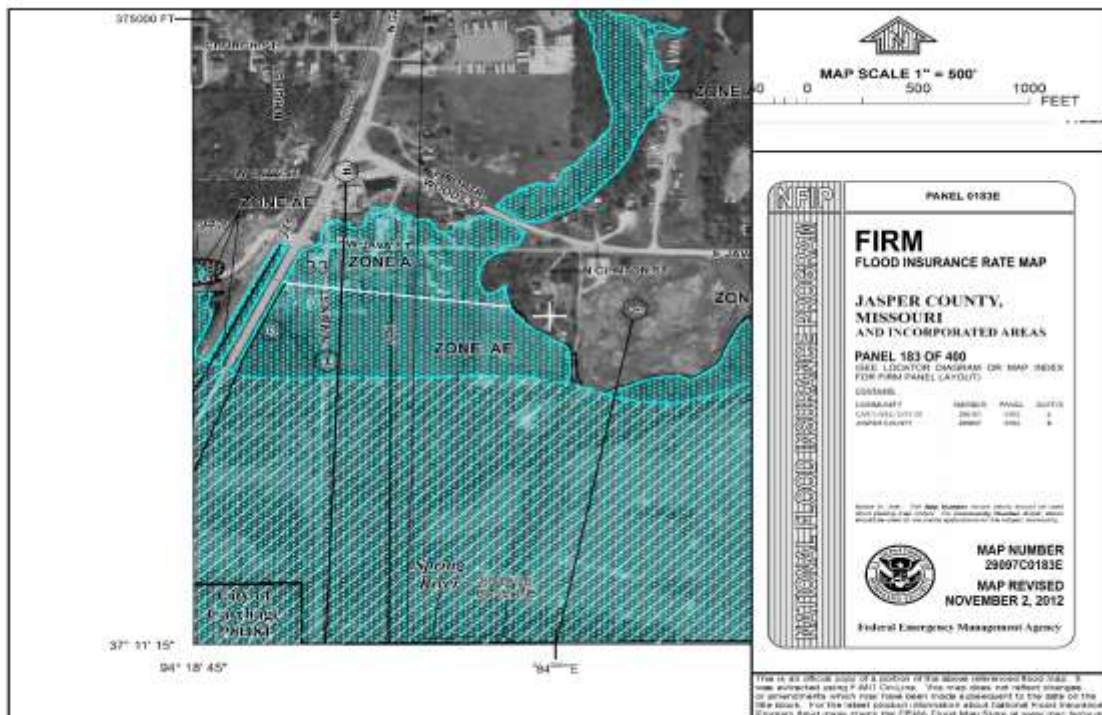




Figure 2.19 Carthage FIRMette C

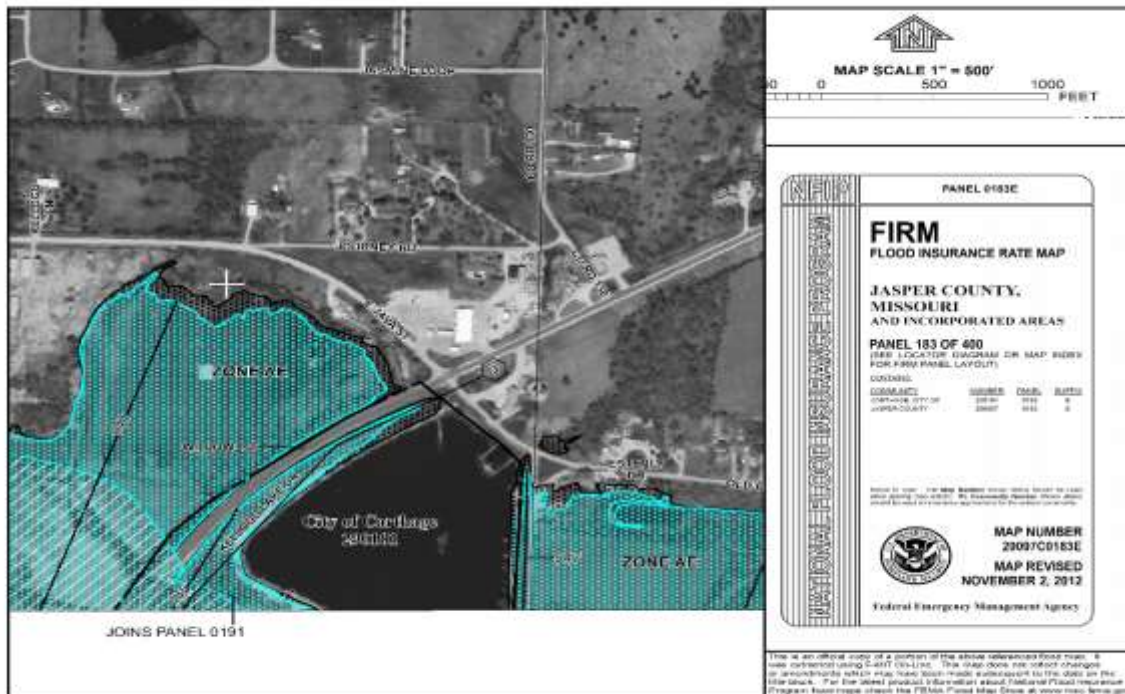


Figure 2.20 Carthage FIRMette D

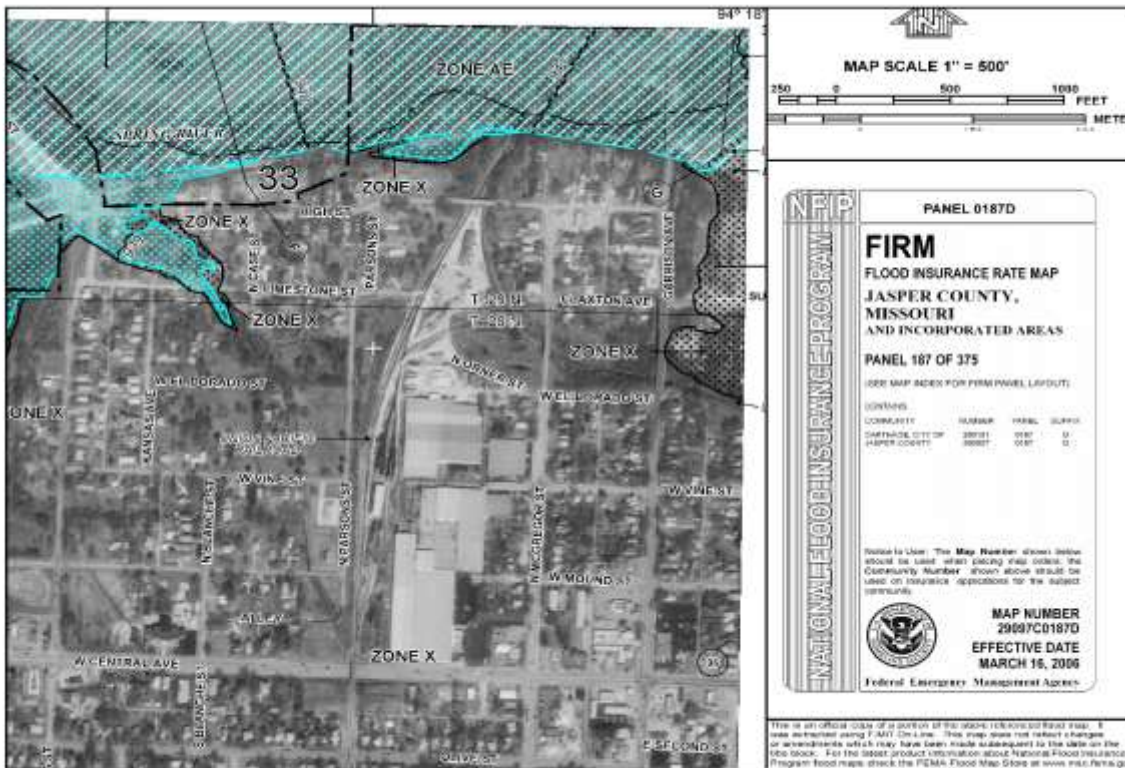


Figure 2.21 Carthage FIRMette E

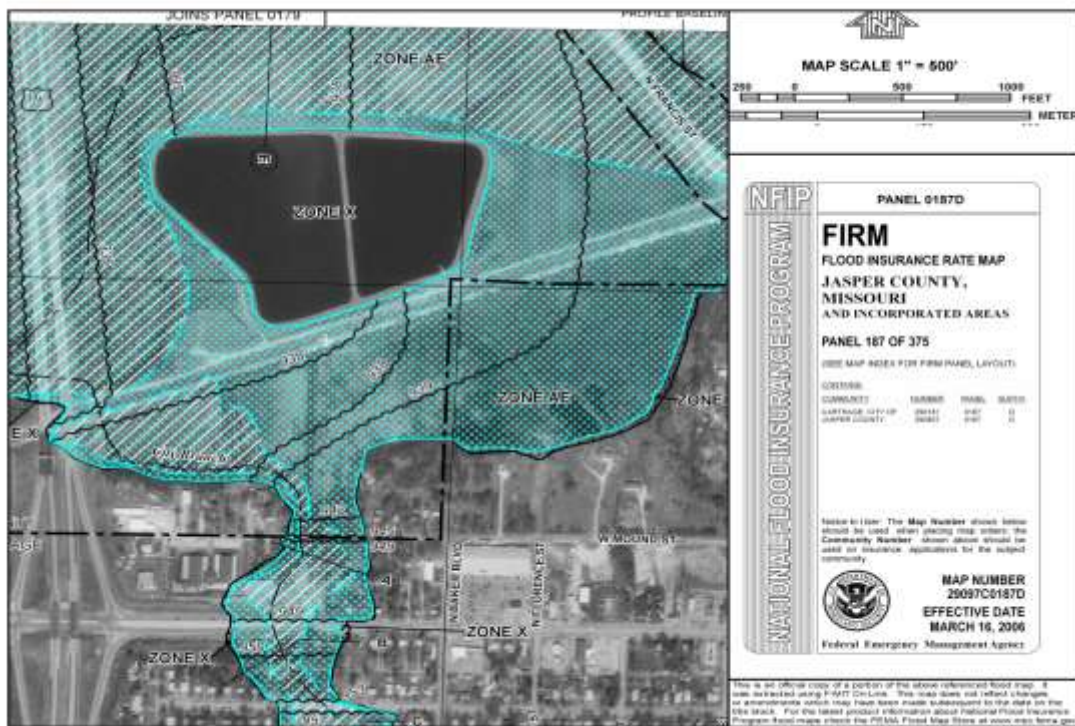


Figure 2.22 Carthage FIRMette F





Figure 2.23 Carthage FIRMette G



Figure 2.24 Carthage FIRMette H

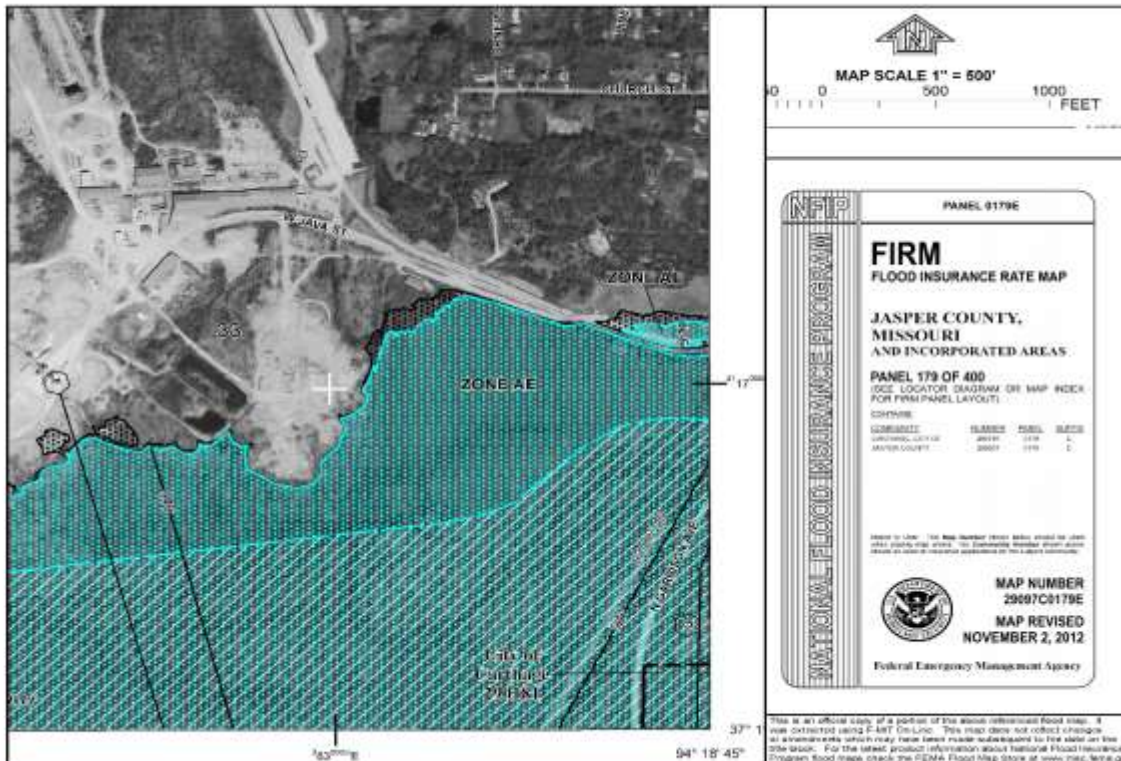








Figure 2.27 Carthage FIRMette K

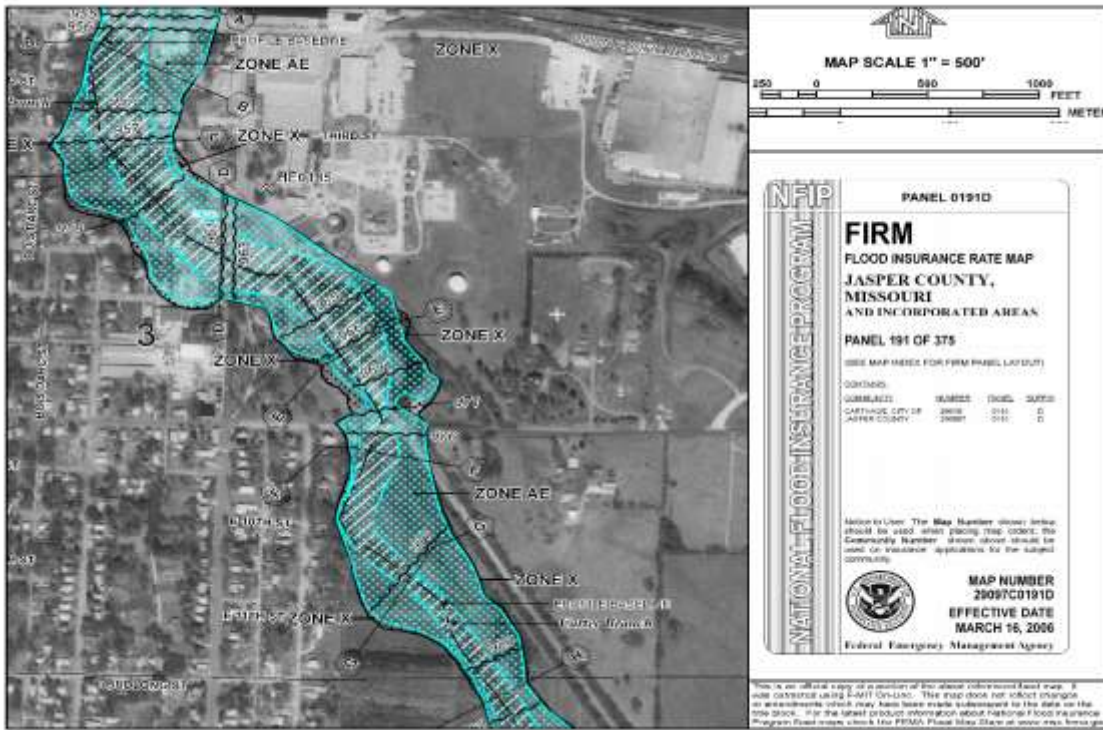
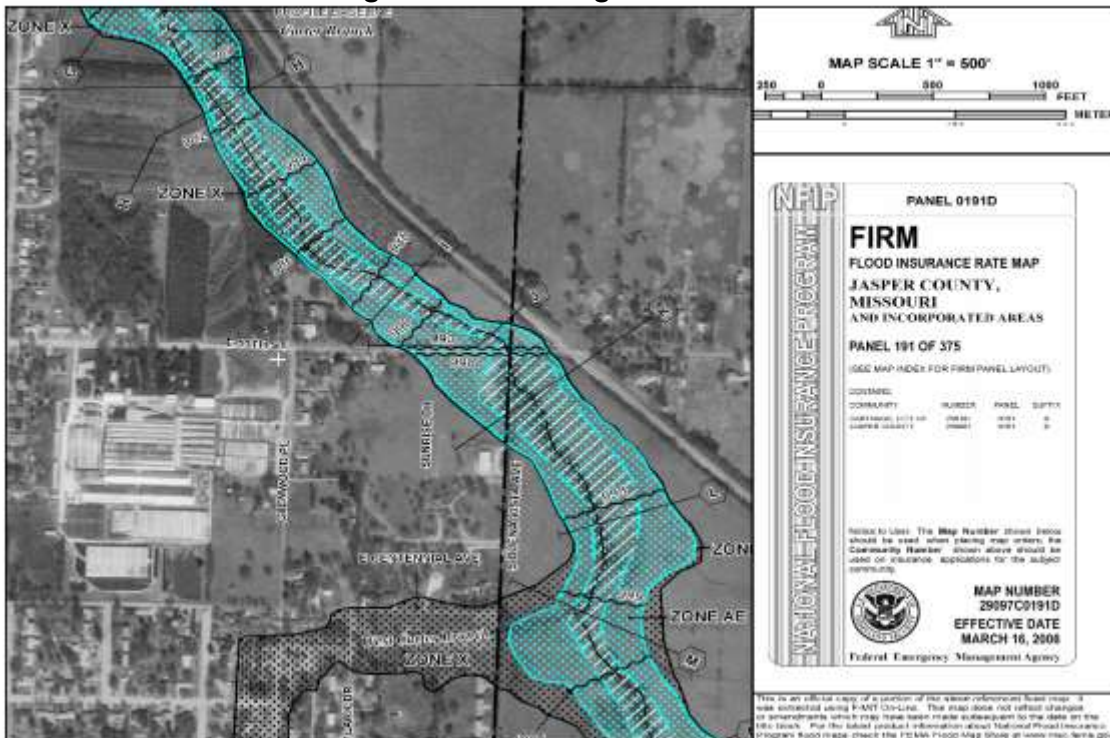


Figure 2.28 Carthage FIRMette L





**Figure 2.31 Carthage FIRMette O**



**Figure 2.32 Duenweg FIRMette A**





Figure 2.33 Duenweg FIRMette B

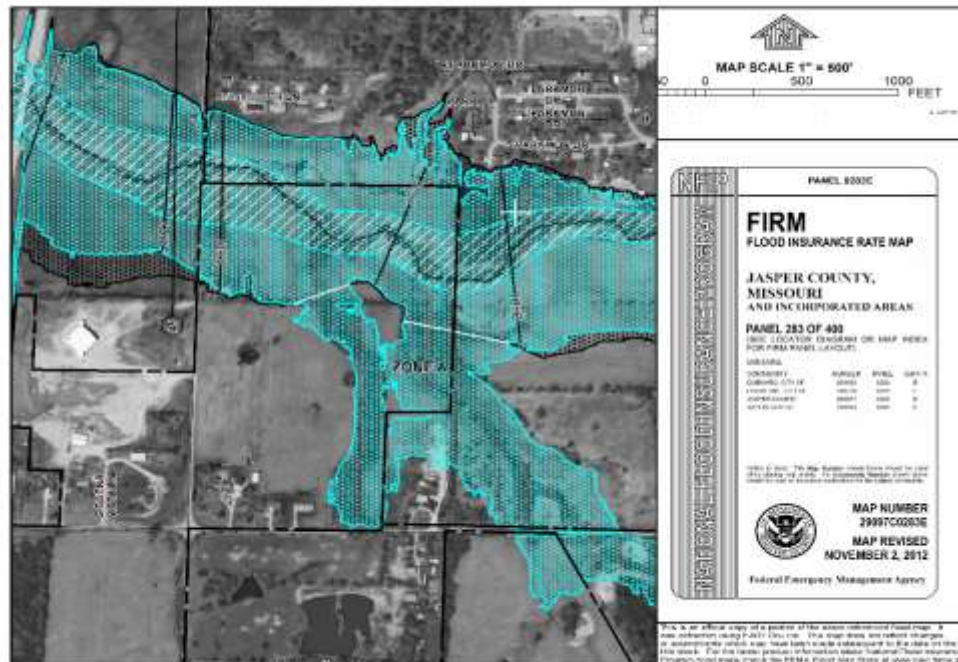


Figure 2.34 Duquesne FIRMette

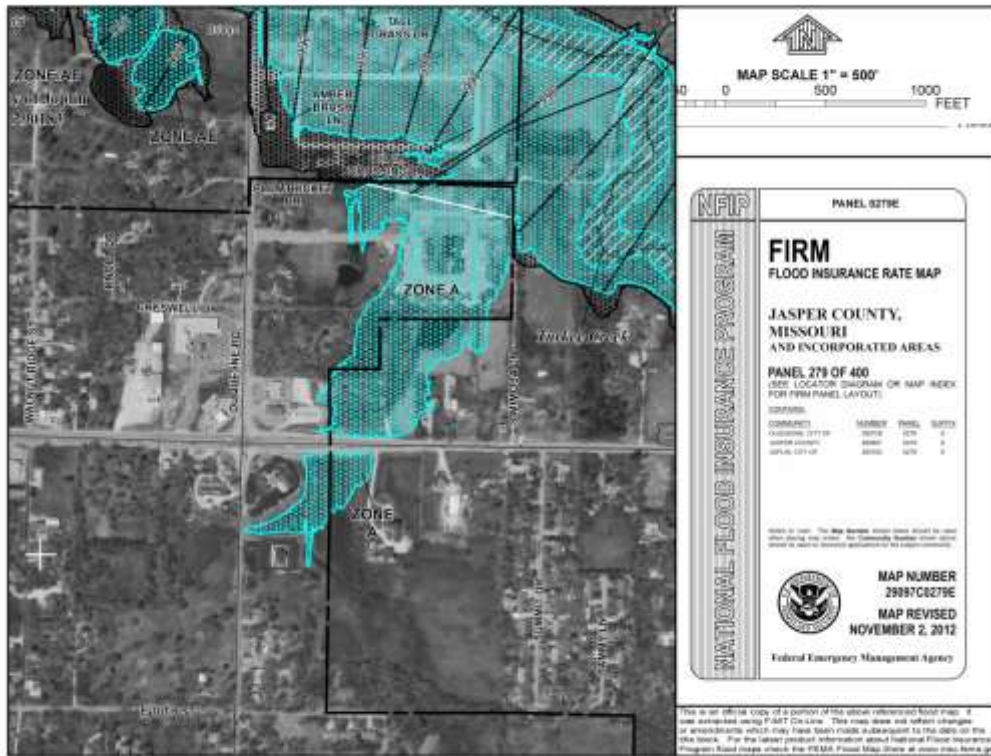


Figure 2.35 Granby FIRMette A



Figure 2.36 Granby FIRMette B



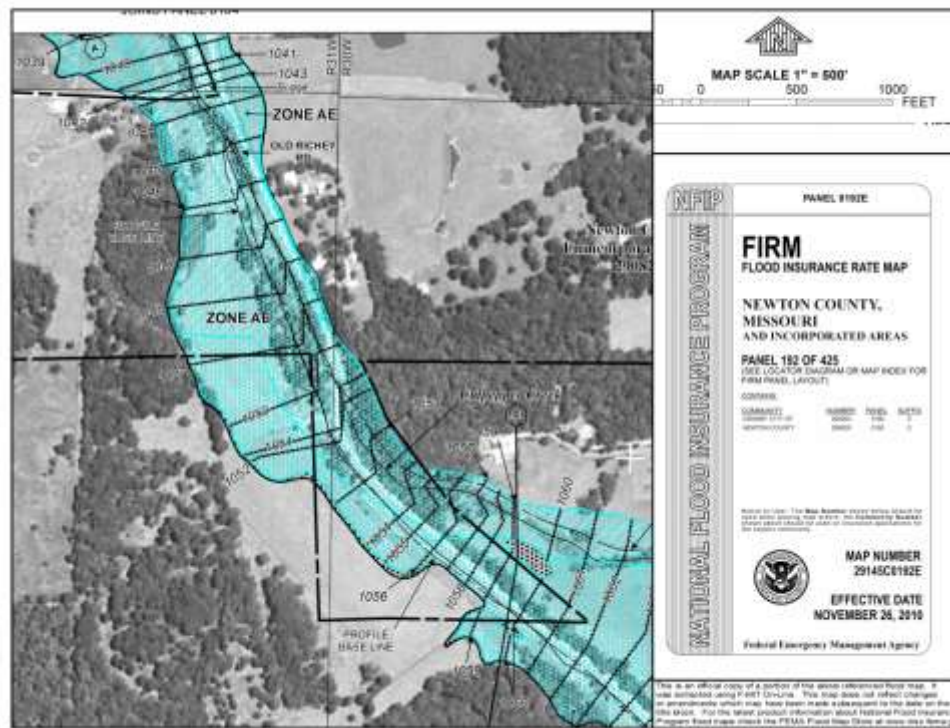


Figure 2.39 Granby FIRMette E





Figure 2.40 Granby FIRMette F

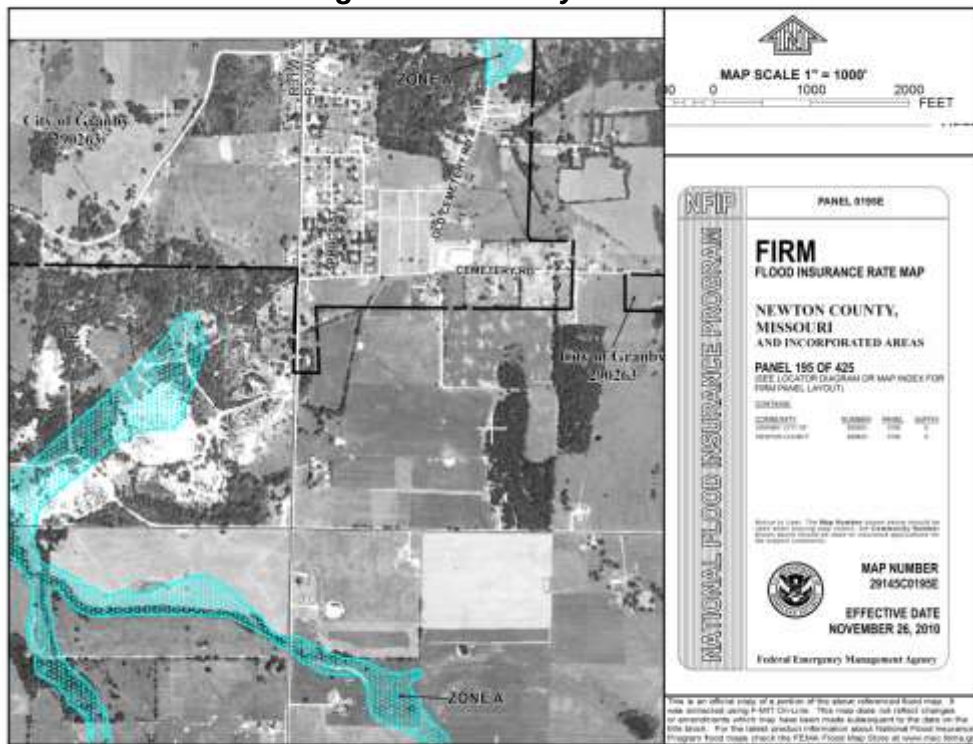


Figure 2.41 Granby FIRMette G

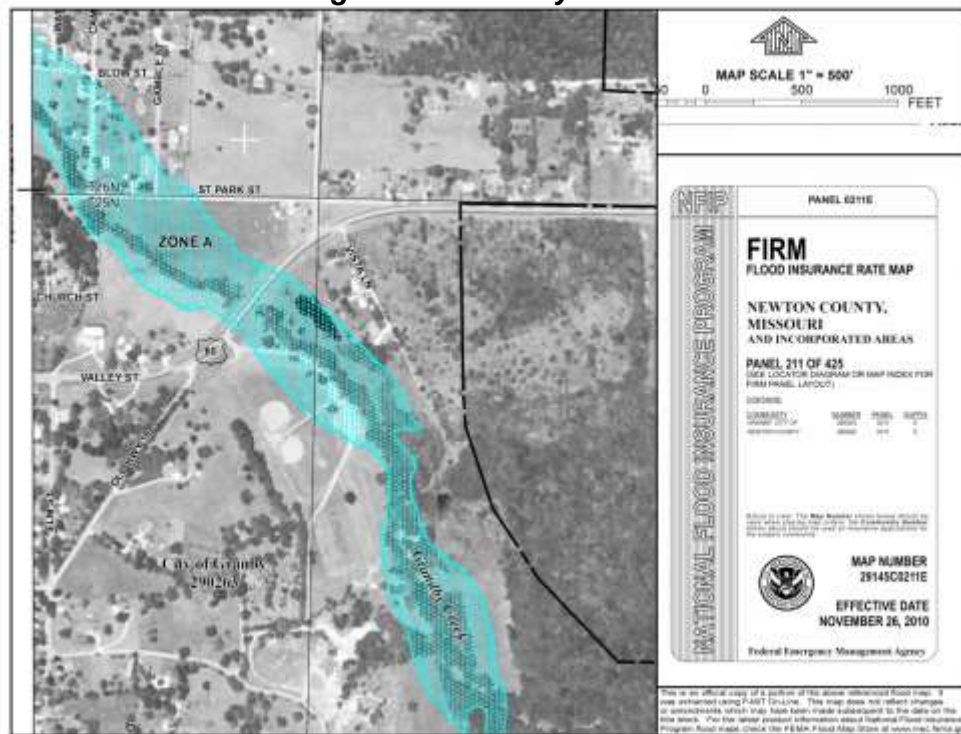


Figure 2.42 Granby FIRMette H

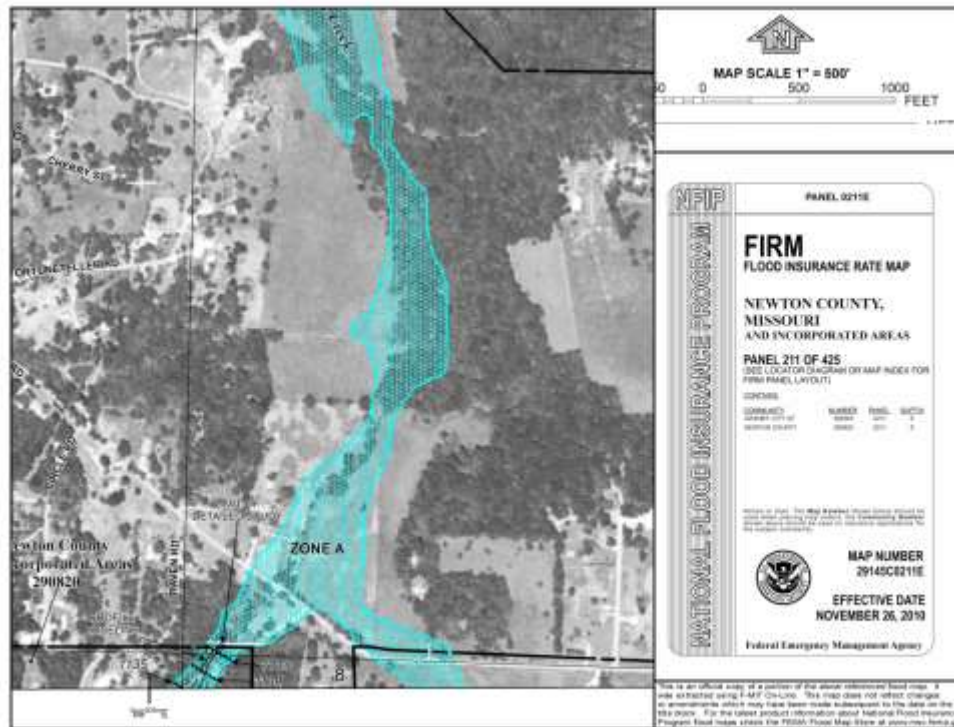


Figure 2.43 Grand Falls Plaza FIRMette A

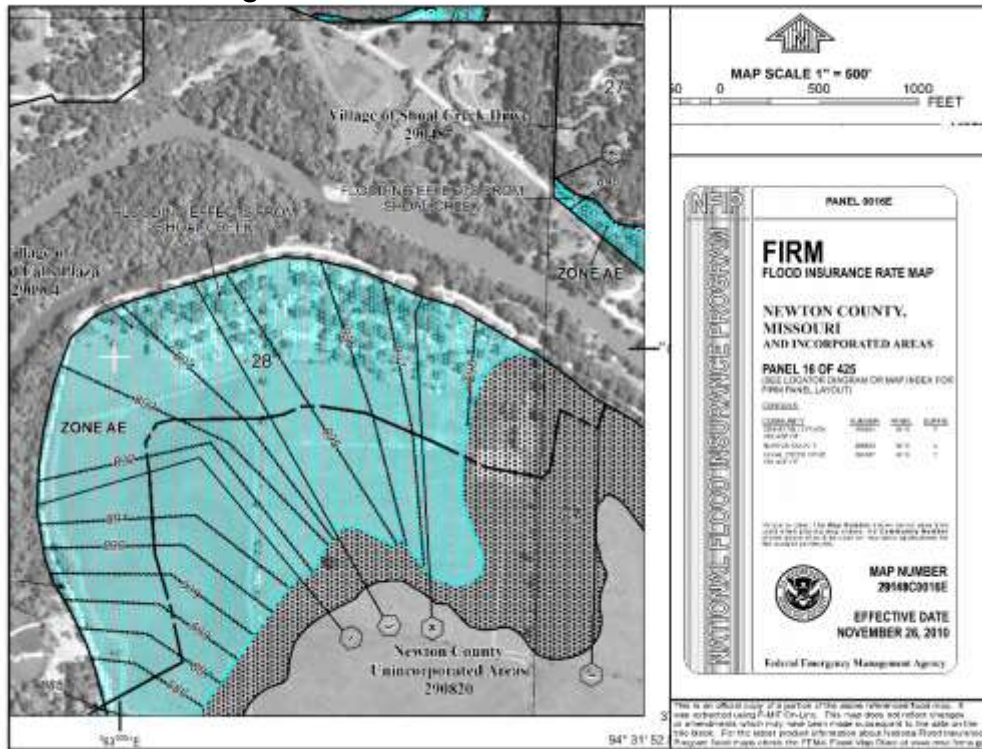


Figure 2.44 Grand Falls Plaza FIRMette B

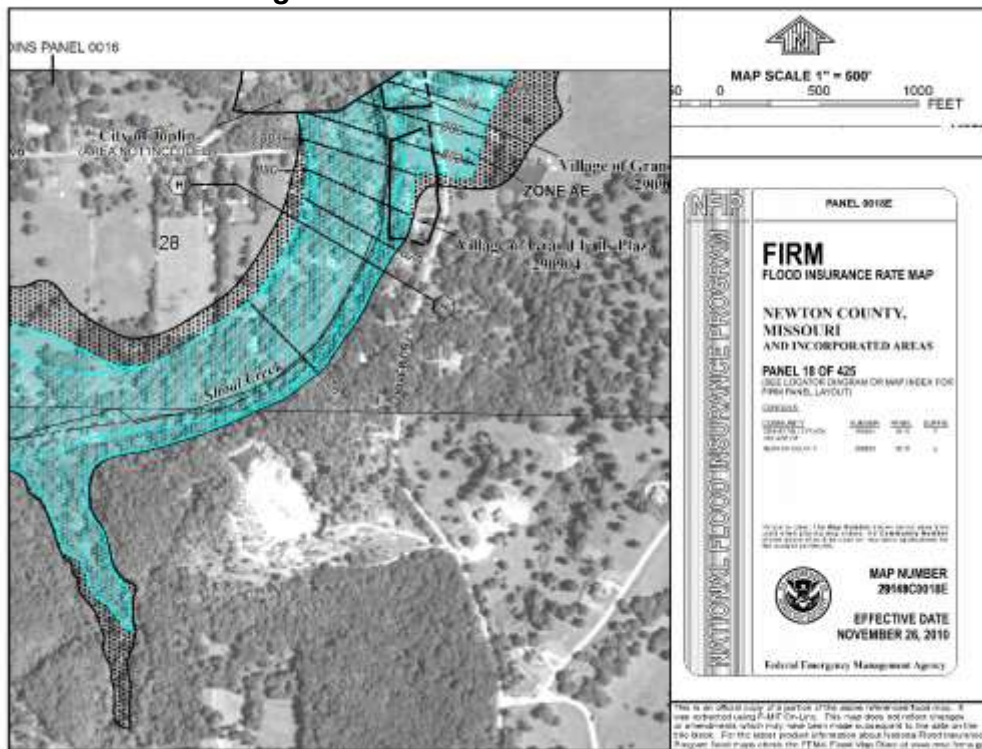




Figure 2.45 Joplin FIRMette A

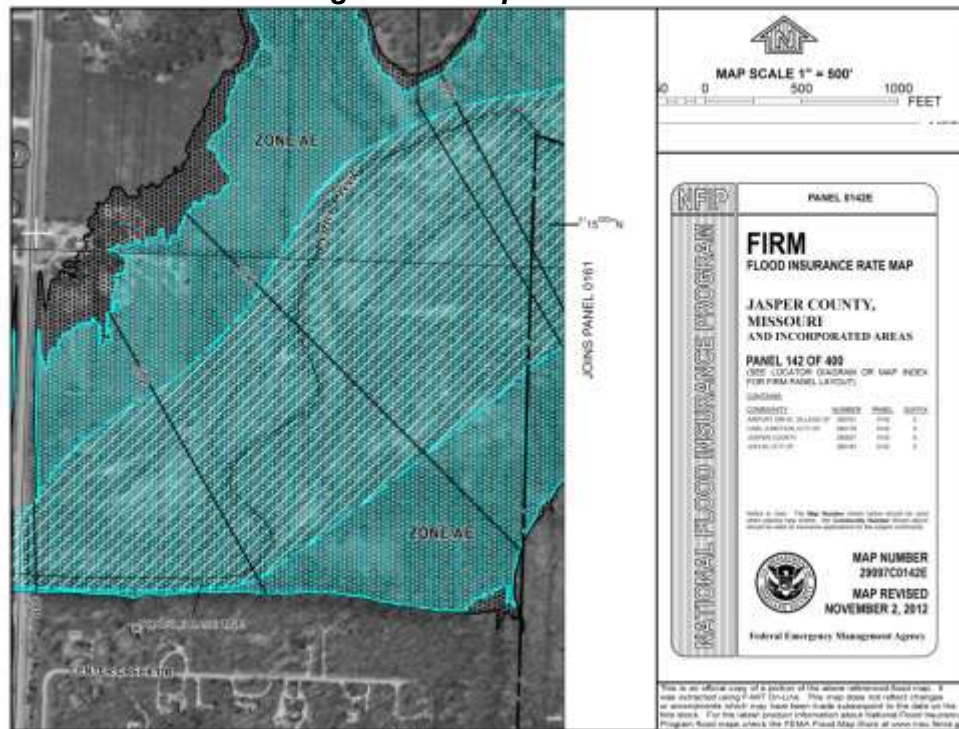


Figure 2.46 Joplin FIRMette B





Figure 2.47 Joplin FIRMette C



Figure 2.48 Joplin FIRMette D



Figure 2.49 Joplin FIRMette E

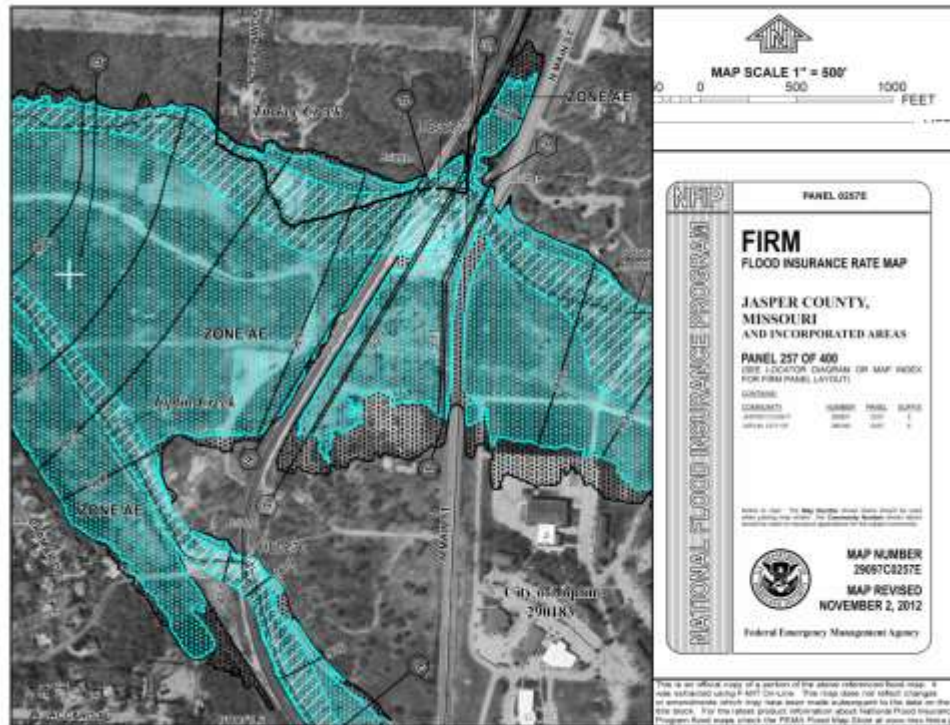


Figure 2.50 Joplin FIRMette F





Figure 2.51 Joplin FIRMette G

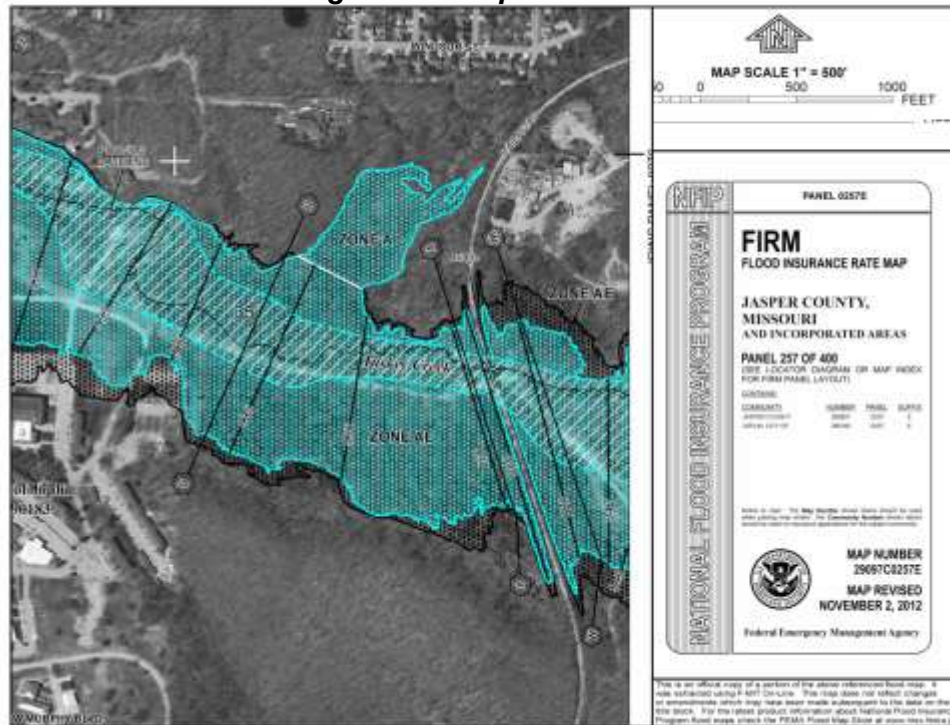


Figure 2.52 Joplin FIRMette H



Figure 2.53 Joplin FIRMette I



Figure 2.54 Joplin FIRMette J





Figure 2.55 Joplin FIRMette K

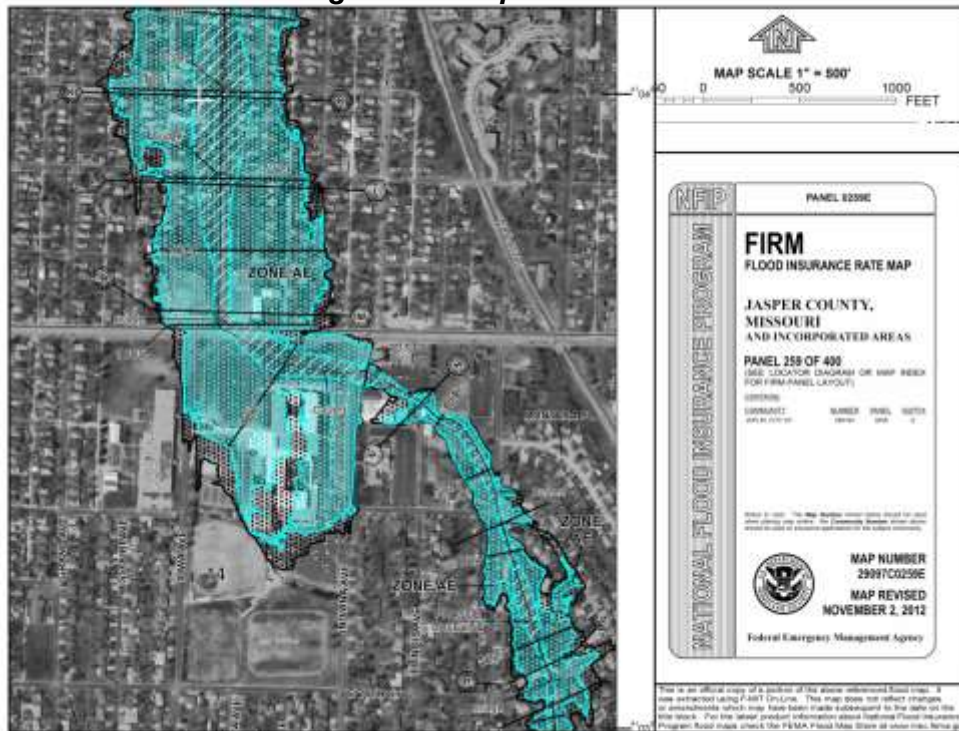


Figure 2.56 Joplin FIRMette L





Figure 2.57 Joplin FIRMette M



Figure 2.58 Joplin FIRMette N



Figure 2.59 Joplin FIRMette O



Figure 2.60 Joplin FIRMette P





Figure 2.61 Joplin FIRMette Q



Figure 2.62 Joplin FIRMette R



Figure 2.63 Joplin FIRMette S



Figure 2.64 Joplin FIRMette T





Figure 2.65 Joplin FIRMette U



Figure 2.66 Joplin FIRMette V





Figure 2.67 Joplin FIR Mette W



Figure 2.68 Joplin FIR Mette X



Figure 2.69 Joplin FIRMette Y

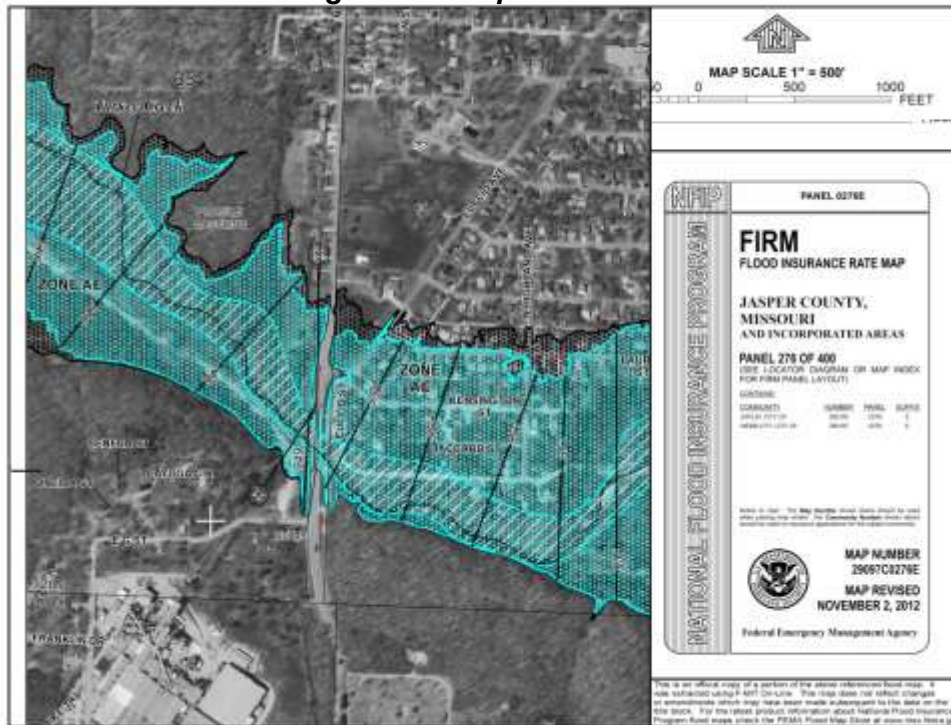


Figure 2.70 Joplin FIRMette Z





Figure 2.71 Joplin FIRMette AA



Figure 2.72 Joplin FIRMette AB



Figure 2.73 Joplin FIRMette AC



Figure 2.74 Joplin FIRMette AD





Figure 2.75 Joplin FIRMette AE



Figure 2.76 Joplin FIRMette AF





Figure 2.77 Joplin FIRMette AG



Figure 2.78 Joplin FIRMette AH



Figure 2.79 Joplin FIRMette AI



Figure 2.80 Joplin FIRMette AJ

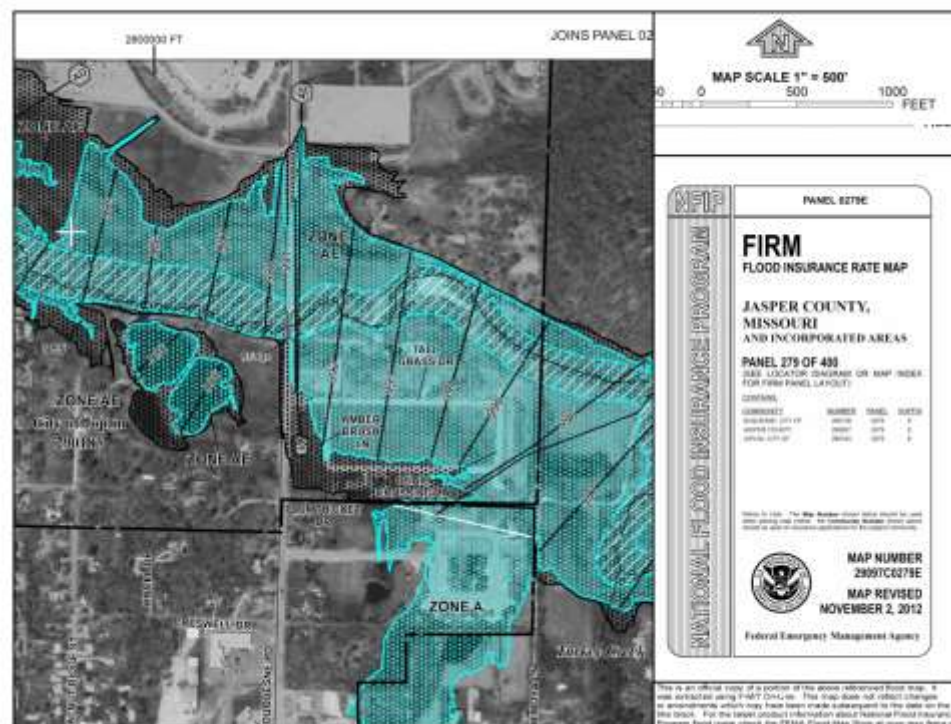




Figure 2.81 Joplin FIRMette AK



Figure 2.82 Joplin FIRMette AL



Figure 2.83 Joplin FIRMette AM



Figure 2.84 Joplin FIRMette AN





Figure 2.85 Joplin FIRMette AO



Figure 2.86 Joplin FIRMette AP





Figure 2.87 Joplin FIRMette AQ



Figure 2.88 Joplin FIRMette AR



Figure 2.89 Loma Linda FIRMette

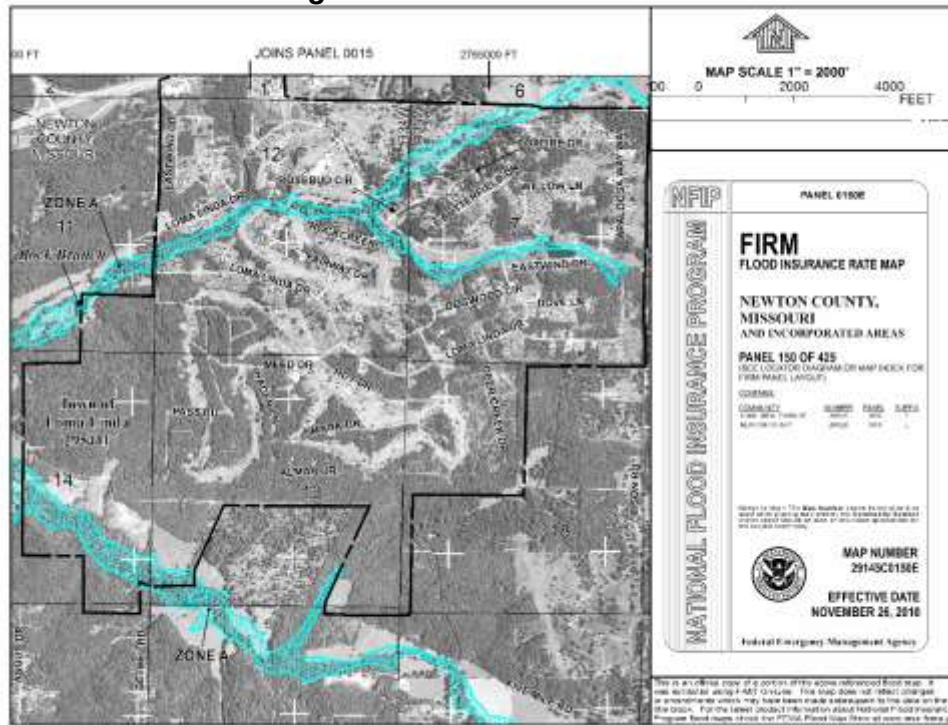


Figure 2.90 Neosho FIRMette A

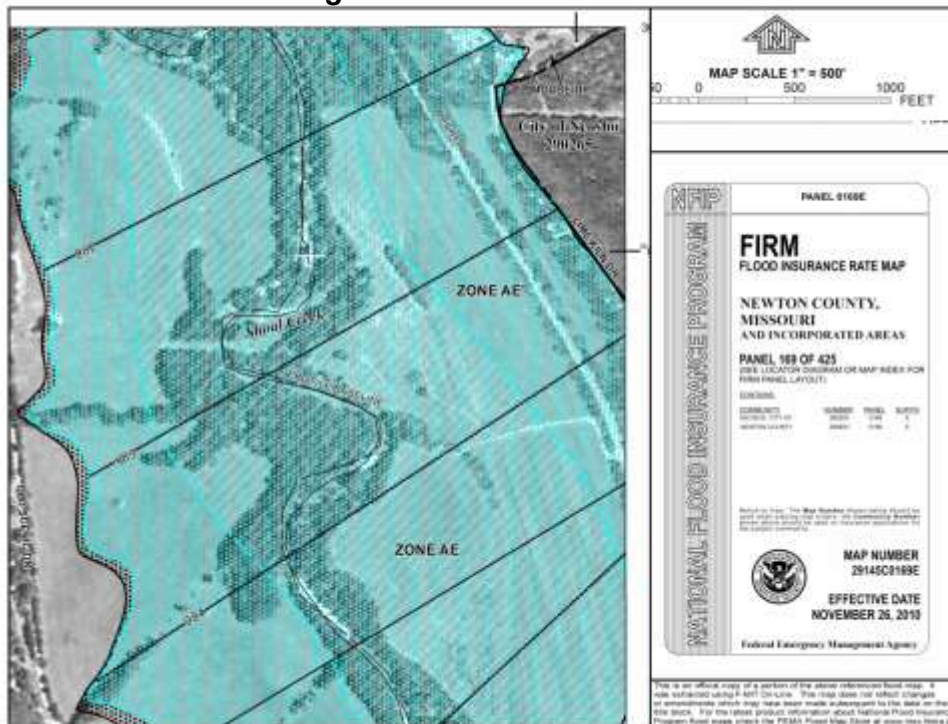




Figure 2.91 Neosho FIRMette B

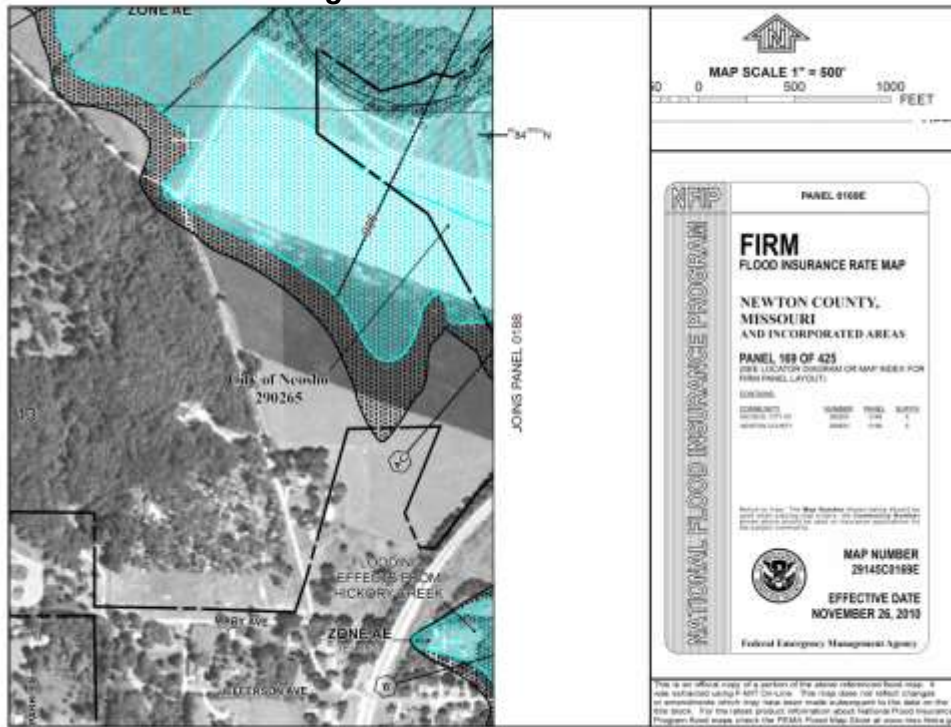


Figure 2.92 Neosho FIRMette C



Figure 2.93 Neosho FIRMette D

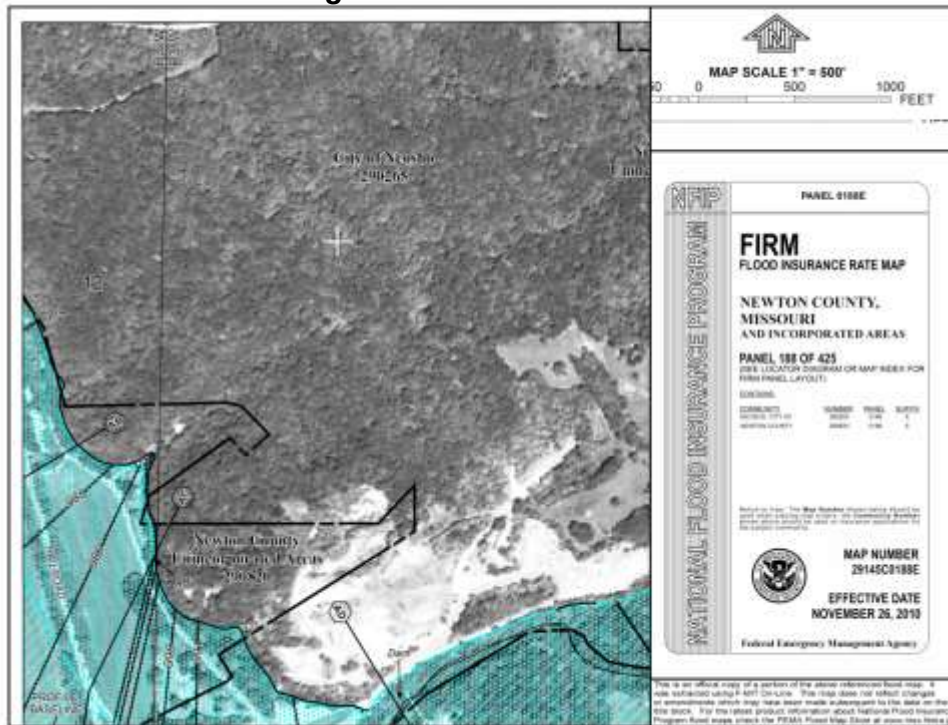


Figure 2.94 Neosho FIRMette E

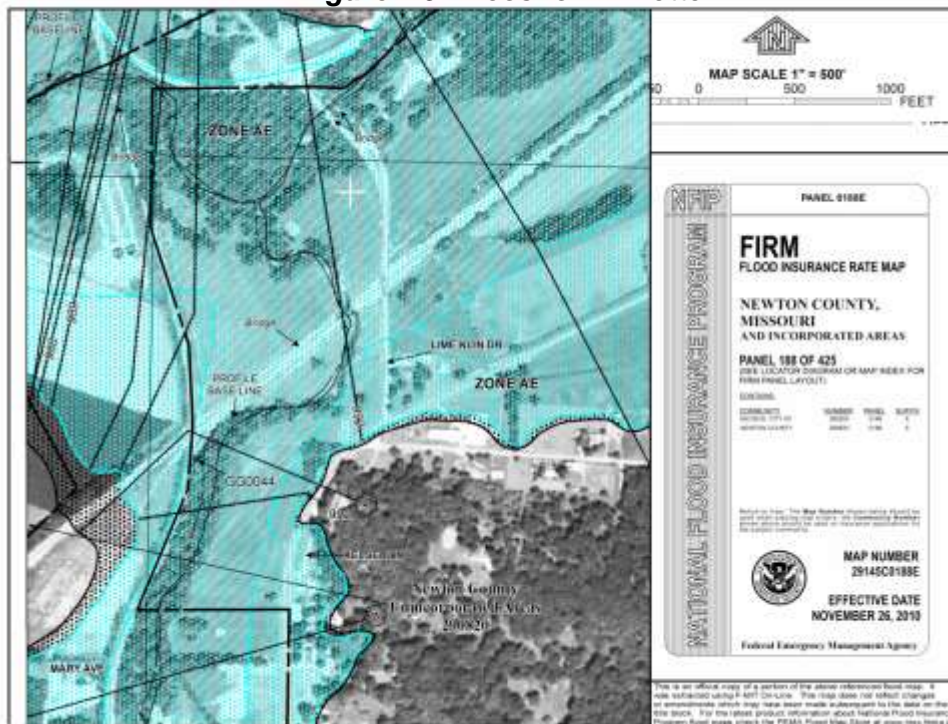




Figure 2.95 Neosho FIRMette F

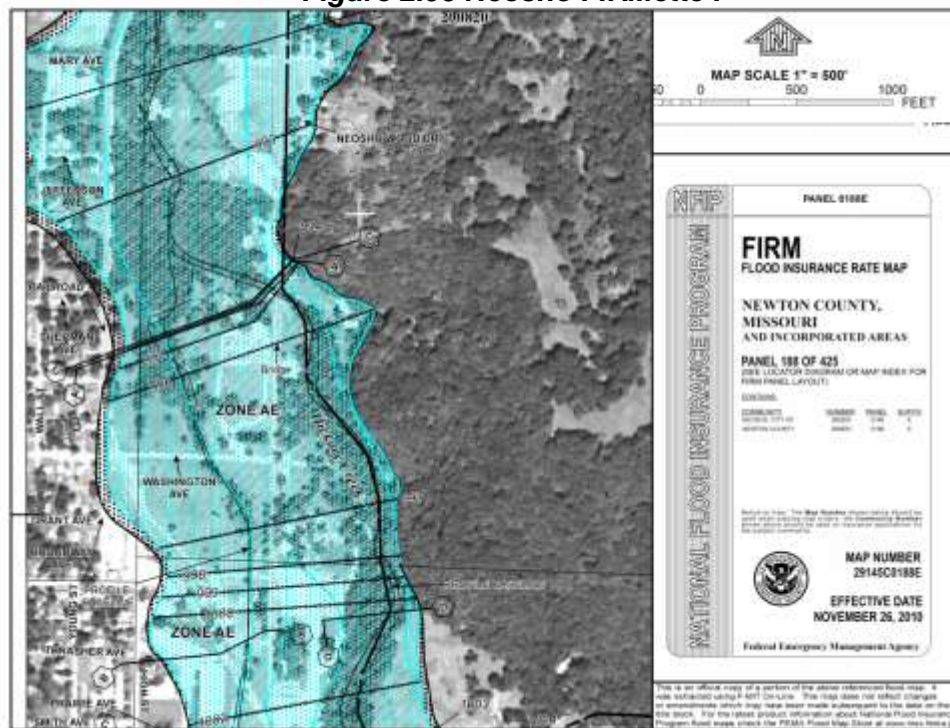
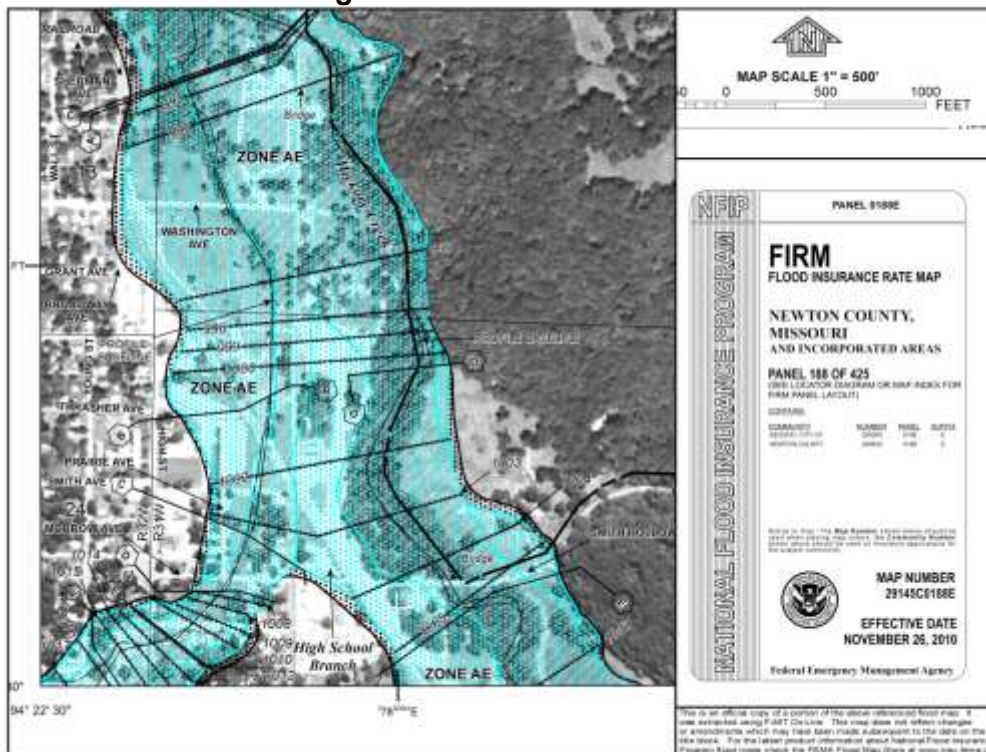


Figure 2.96 Neosho FIRMette G





**Figure 2.97 Neosho FIRMette H**



**Figure 2.98 Neosho FIRMette I**



Figure 2.99 Neosho FIRMette J

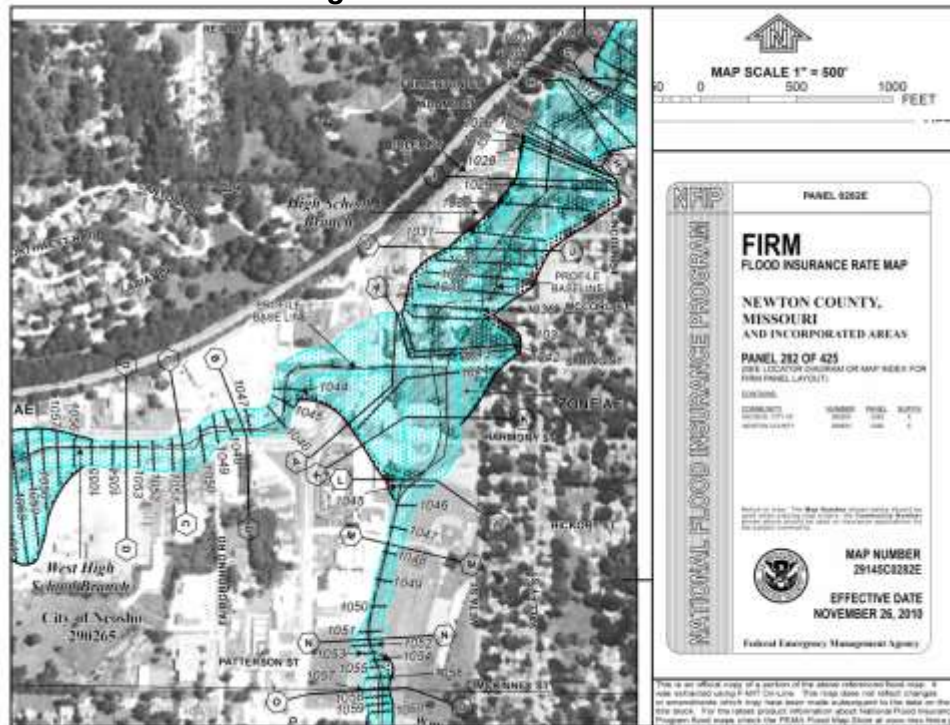


Figure 3.00 Neosho FIRMette K





Figure 3.01 Neosho FIRMette L



Figure 3.02 Neosho FIRMette M



Figure 3.03 Neosho FIRMette N



Figure 3.04 Neosho FIRMette O





Figure 3.05 Neosho FIRMette P



Figure 3.06 Neosho FIRMette Q





Figure 3.07 Neosho FIRMette R

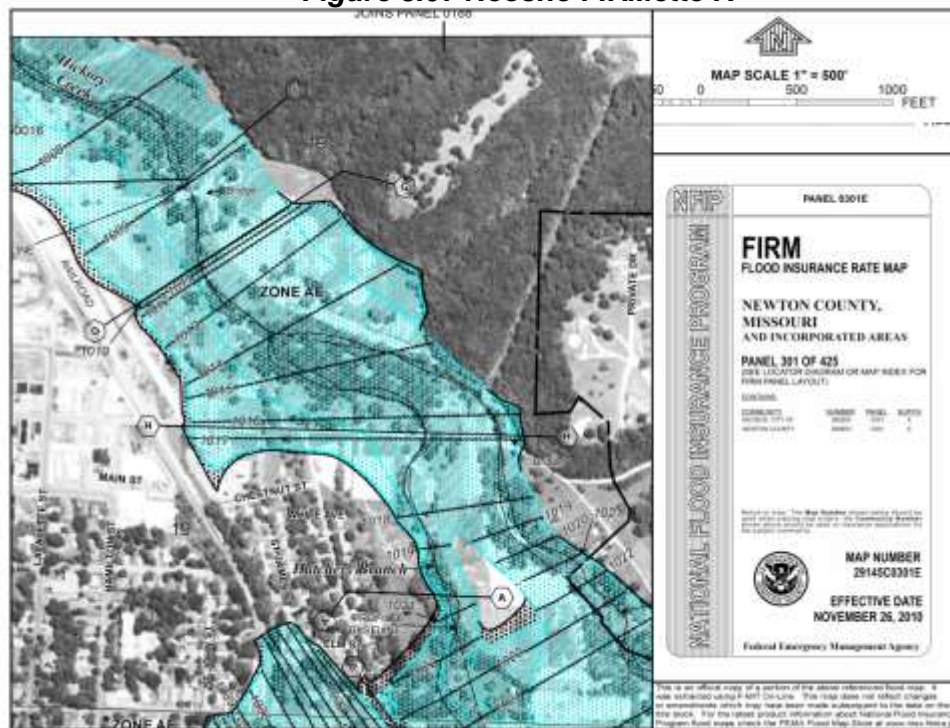


Figure 3.08 Neosho FIRMette S



Figure 3.09 Neosho FIRMette T



Figure 3.10 Neosho FIRMette U





Figure 3.11 Neosho FIRMette V



Figure 3.12 Neosho FIRMette W

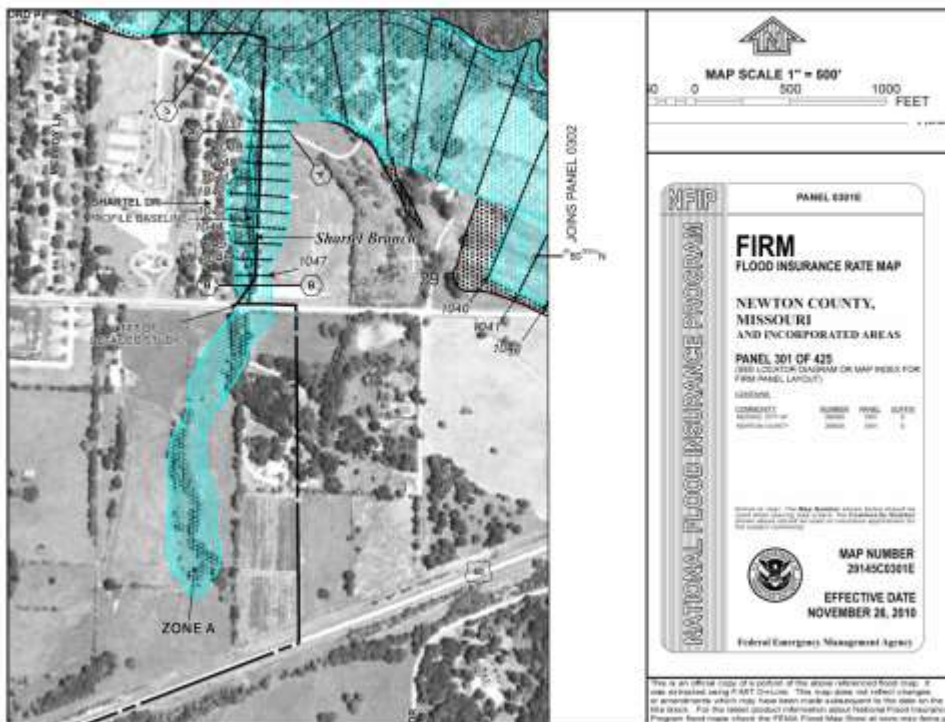


Figure 3.13 Neosho FIRMette X

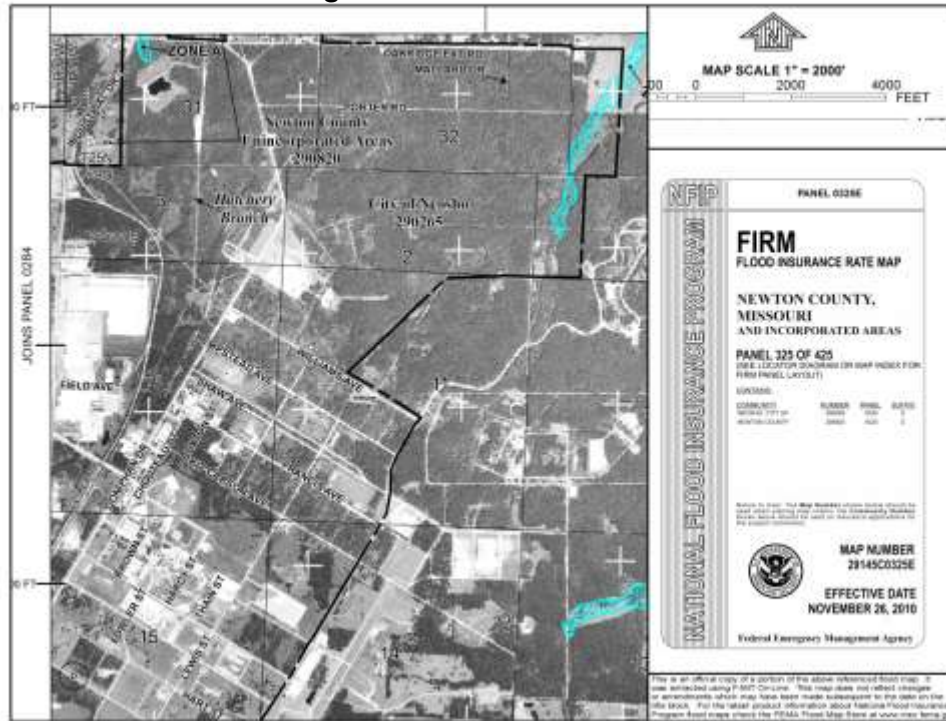


Figure 3.14 Oronogo FIRMette A

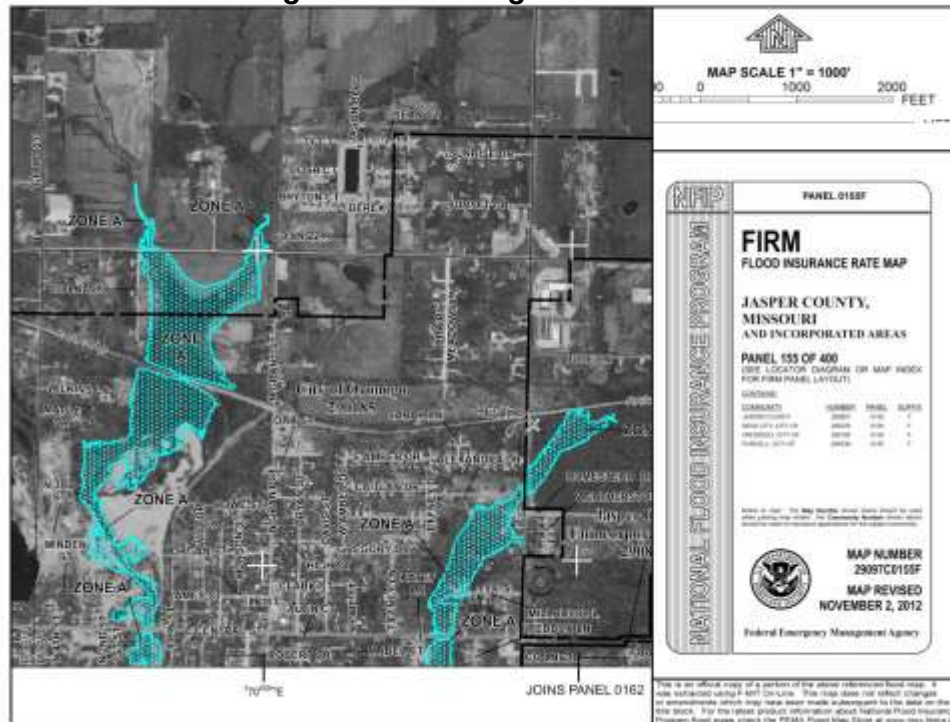




Figure 3.15 Oronogo FIRMette B



Figure 3.16 Oronogo FIRMette C

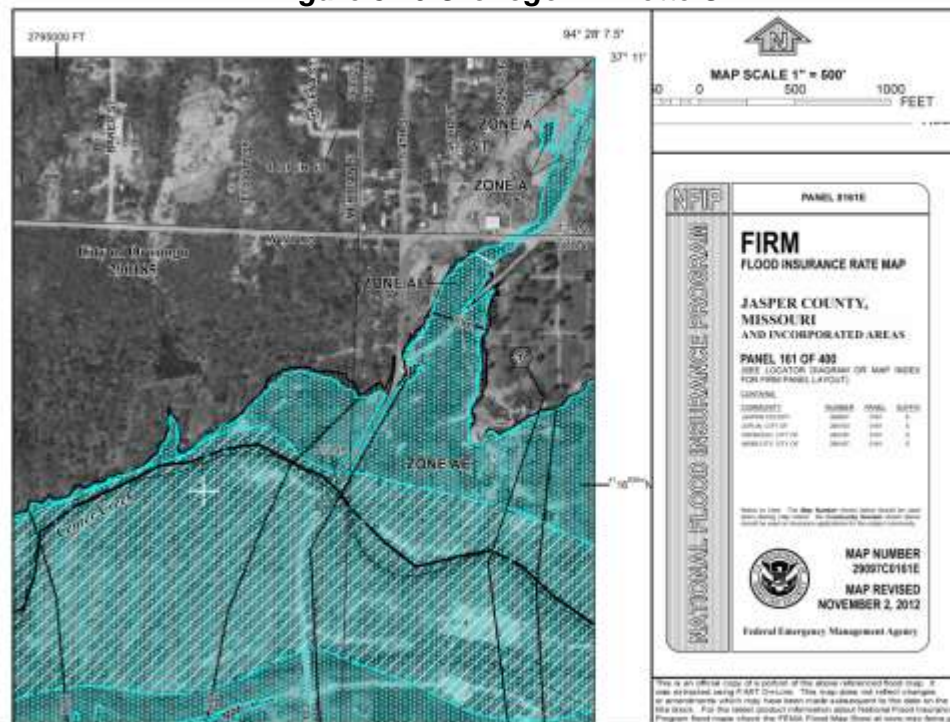




Figure 3.17 Oronogo FIRMette D

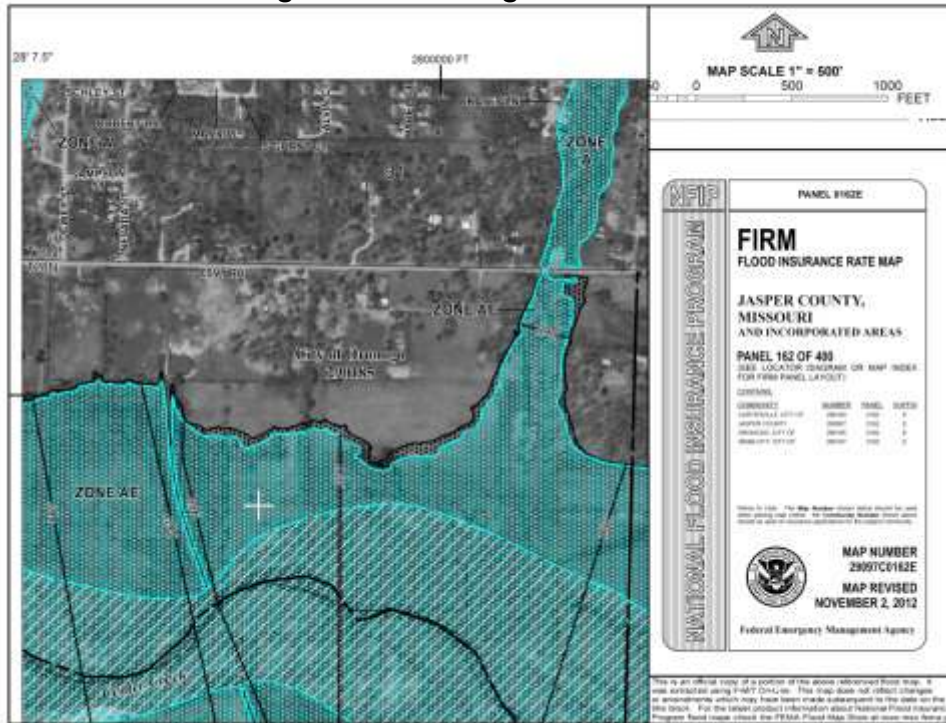


Figure 3.18 Oronogo FIRMette E

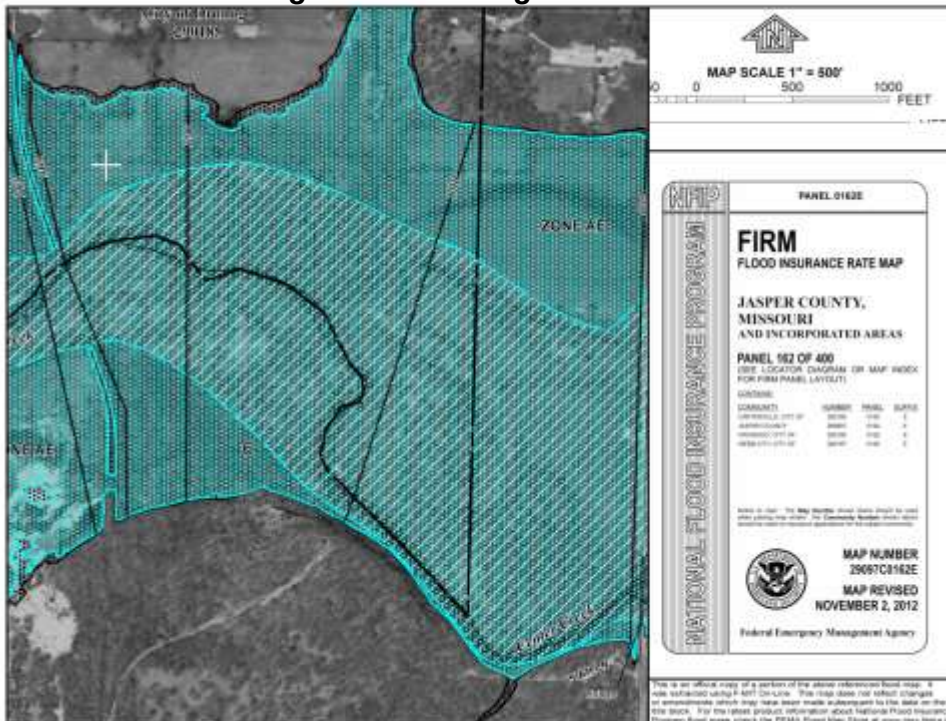


Figure 3.19 Redings Mills FIRMette

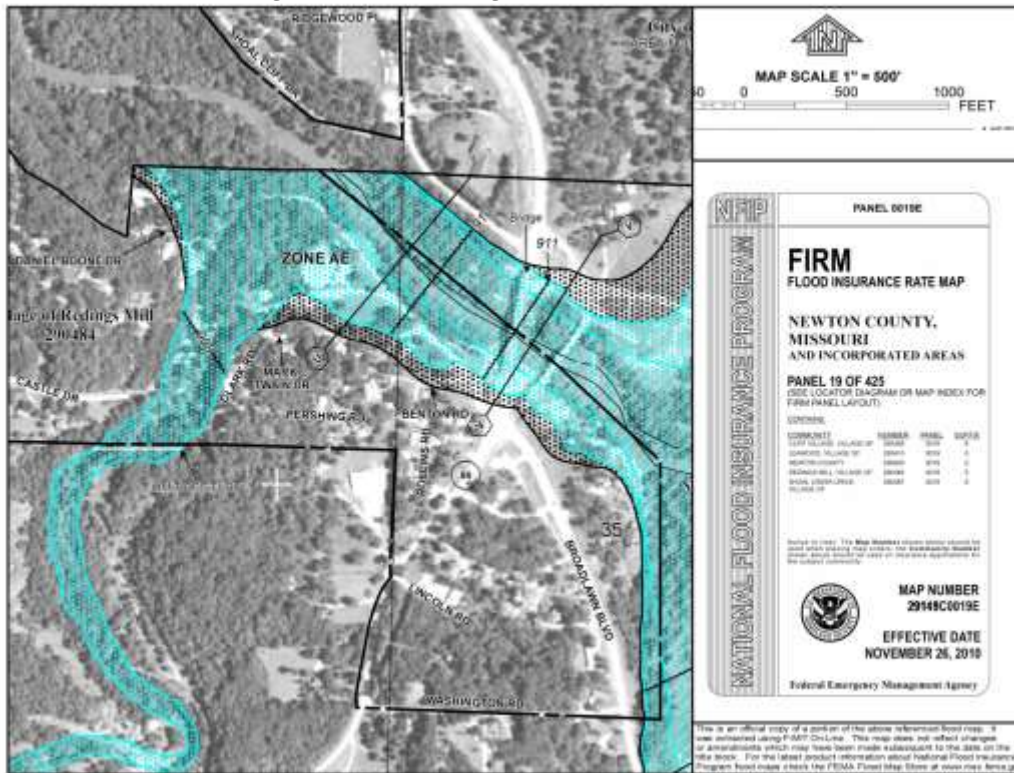


Figure 3.20 Saginaw FIRMette A





**Figure 3.21 Saginaw FIRMette B**



**Figure 3.22 Saginaw FIRMette C**

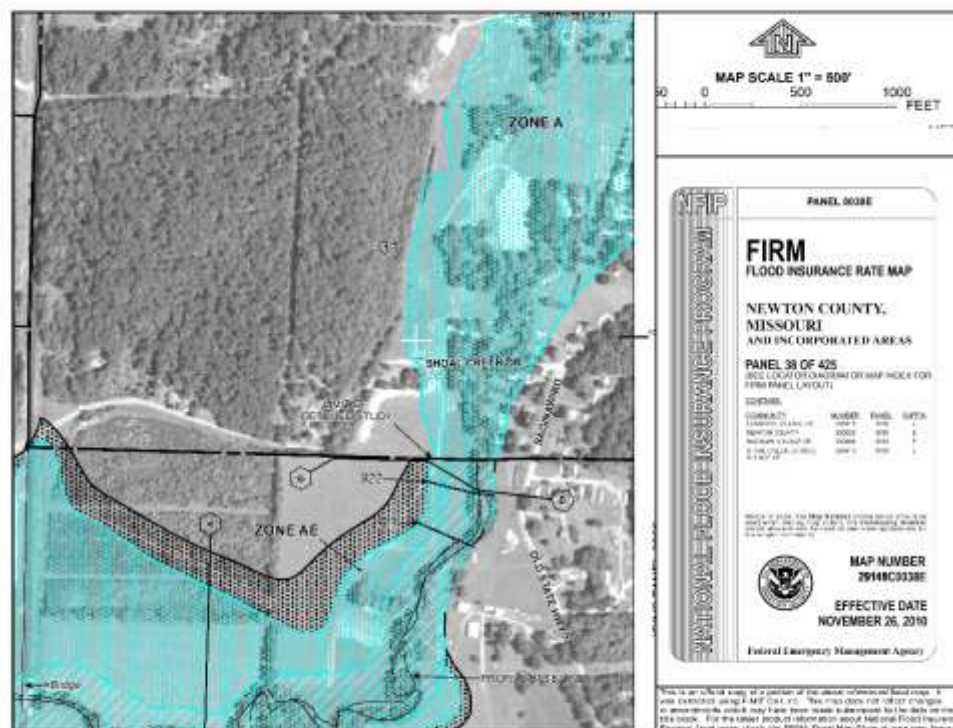


Figure 3.23 Saginaw FIRMette D

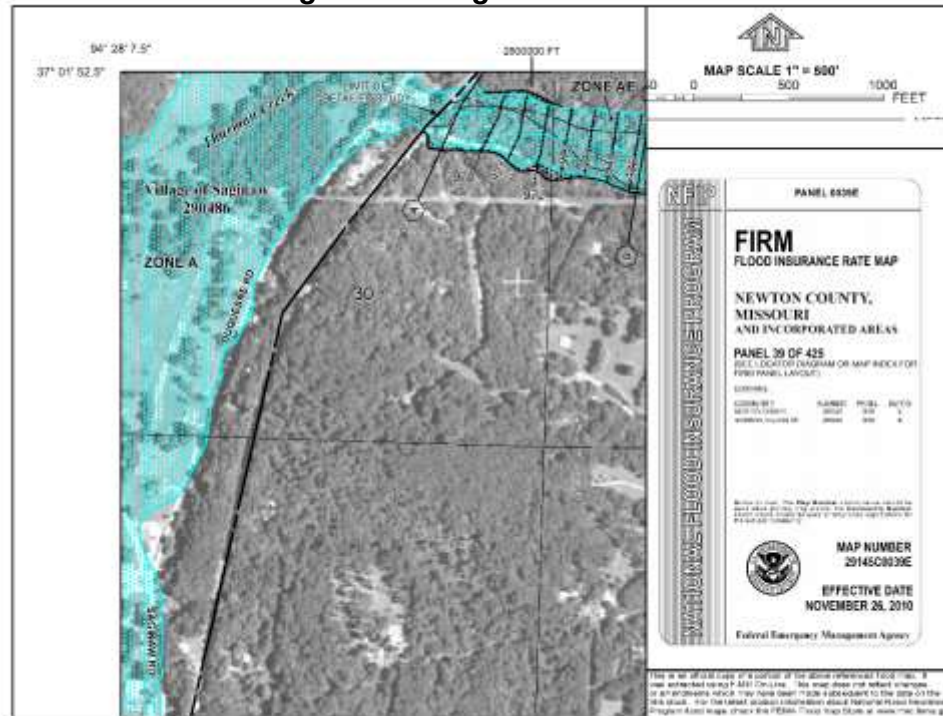
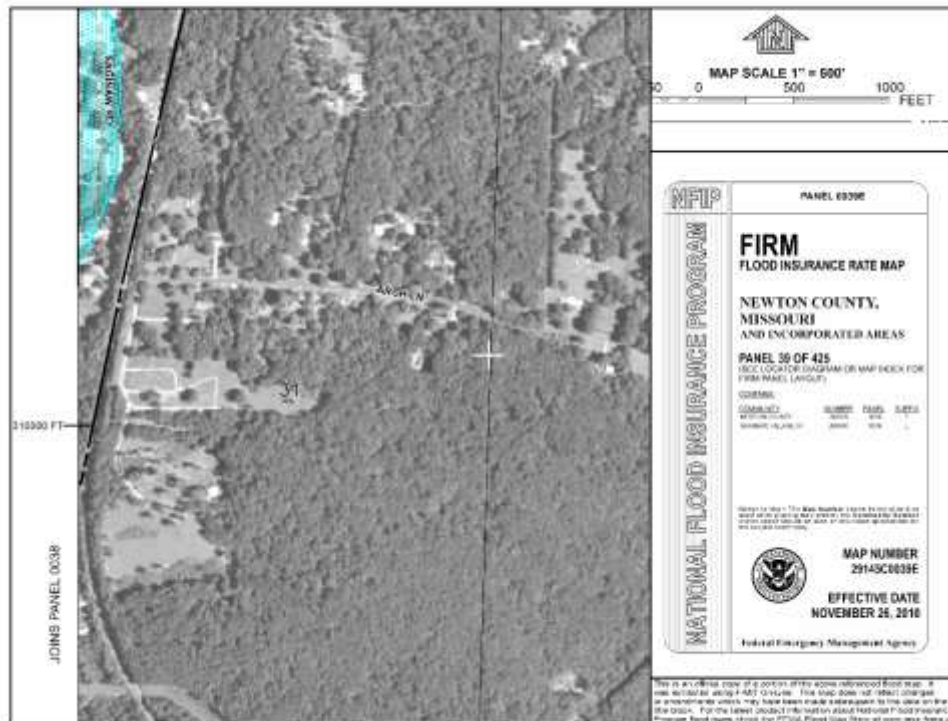
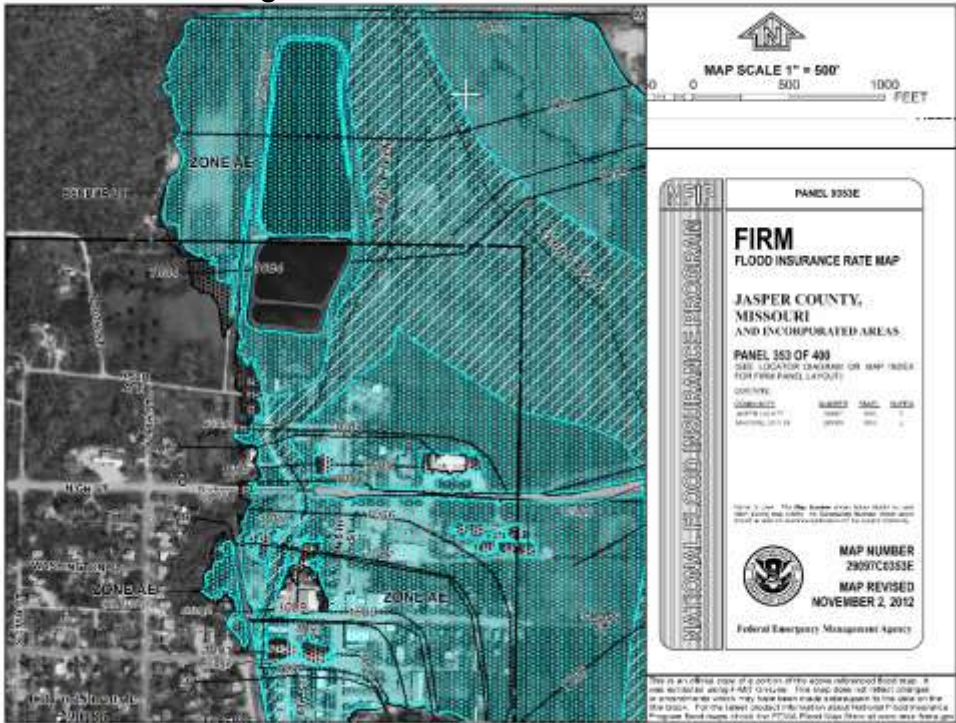


Figure 3.24 Saginaw FIRMette E





**Figure 3.25 Sarcoxie FIRMette A**



**Figure 3.26 Sarcoxie FIRMette B**

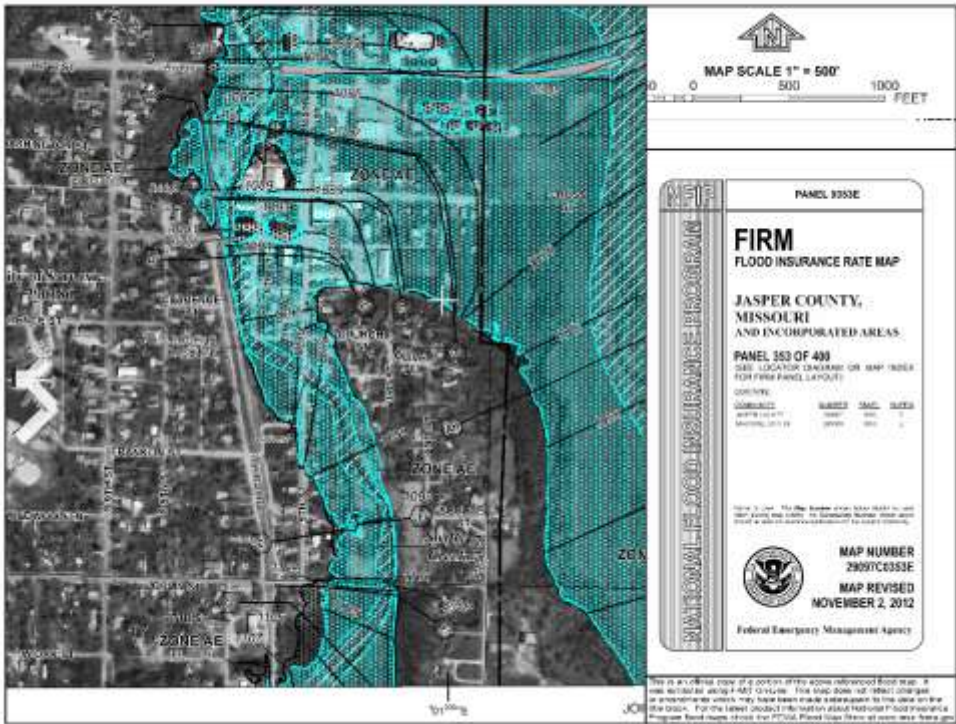




Figure 3.27 Sarcoxie FIRMette C

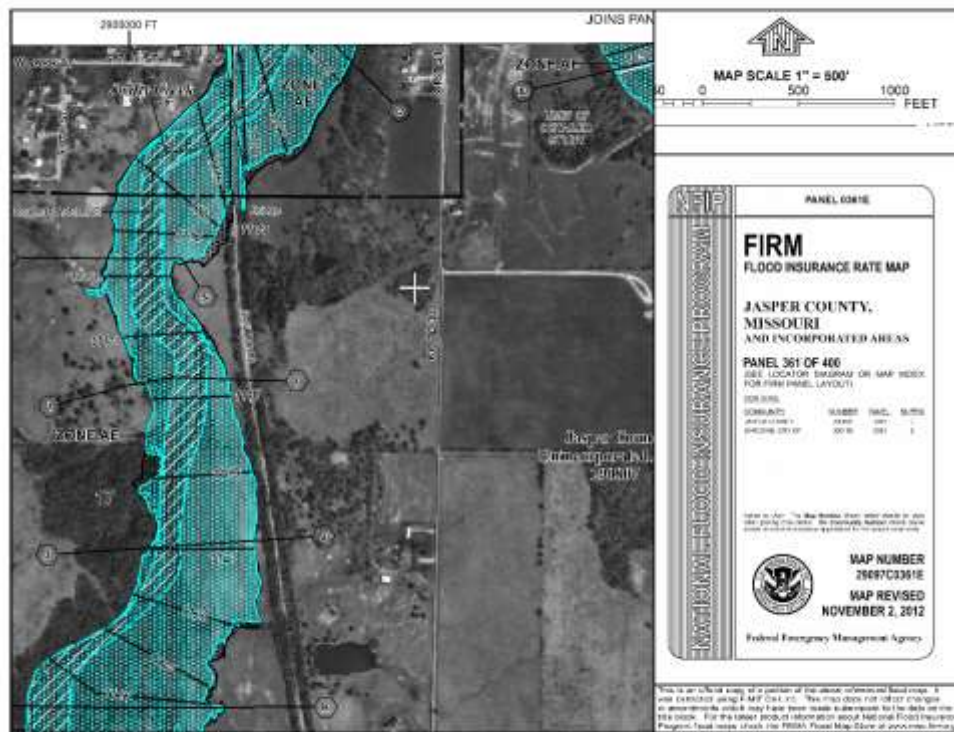


Figure 3.28 Seneca FIRMette A







Figure 3.31 Seneca FIRMette D

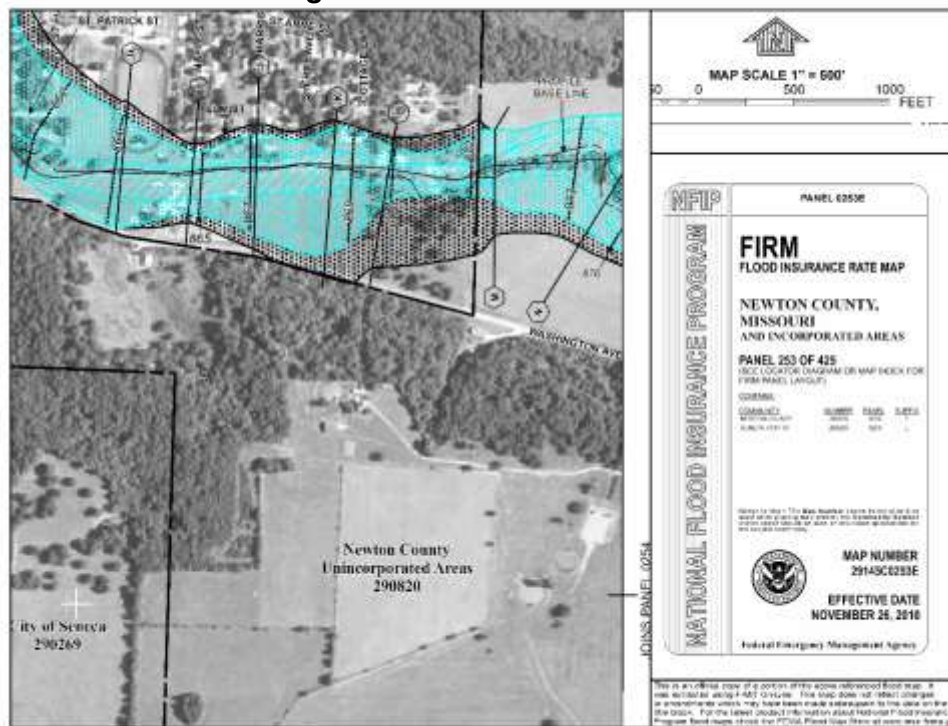


Figure 3.32 Webb City FIRMette A



Figure 3.33 Webb City FIRMette B



Figure 3.34 Webb City FIRMette C





**Figure 3.35 Webb City FIRMette D**



**Figure 3.36 Webb City FIRMette E**



Figure 3.37 Webb City FIRMette F



Figure 3.38 Webb City FIRMette G



Figure 3.39 Webb City FIRMette H



Figure 3.40 Webb City FIRMette I





**Figure 3.41 Webb City FIRMette J**



**Figure 3.42 Webb City FIRMette K**

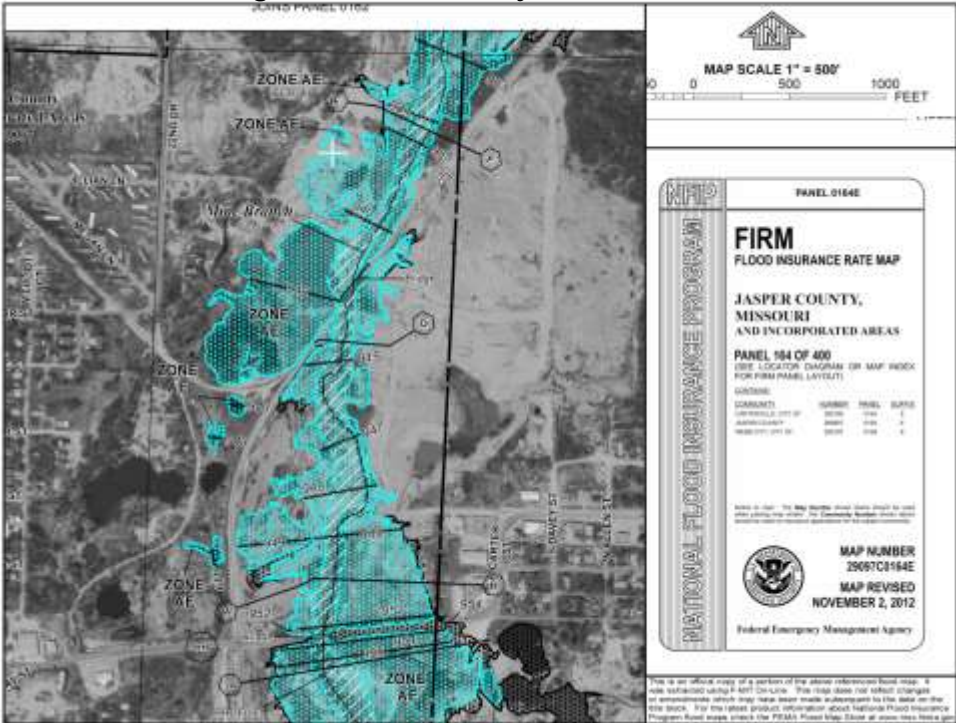






Figure 3.45 Webb City FIRMette N



As previously stated, jurisdictions with 100 year floodplains have the highest risk of flood-related damage. In the case of a flood event, significant portions of the previously identified jurisdictions and unincorporated portions of the county may be at risk for flood-related damage in a 100 year event based upon existing floodplains throughout the county. HAZUS data suggests that 26% of buildings in Jasper County and 28% of buildings in Newton County within the floodplain may sustain damage of some variety during a 100-year event.

Since the adoption of the 2010 plan, significant changes in building development and population shifts have taken place in nearly every jurisdiction. However, because of the existence of floodplain regulations, no new development has taken place in the floodplains without elevation certificates and building permits. As such, damages to future structures have been eliminated from consideration.

<b>Table 2.24</b> <b>Flood: Jasper County Vulnerability Assessment</b> (Using historic flooding statistics and HAZUS-MH Flood Event Report, this estimates losses to approximately 26% of buildings in the floodplain.)						
	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of buildings	Estimated value*
Residential	2,280	252	\$158,648,432	0	0	\$0
Commercial	0	1	\$637,142	0	0	\$0
Industrial	0	0	\$0	0	0	\$0
Agricultural	0	0	\$0	0	0	\$0
Government	0	2	\$1,274,284	0	0	\$0
Education	0	1	\$637,142	0	0	\$0
Religious / Other	0	0	\$0	0	0	\$0
<b>Total Planning Area Assessment</b>	<b>2,280</b>	<b>256</b>	<b>\$167,197,000</b>	<b>0</b>	<b>0</b>	<b>\$0</b>

**Table 2.25****Flood: Building Count Vulnerability by Jasper County Jurisdiction**

(Using historic flooding statistics and HAZUS-MH Flood Event Report, this estimates losses to approximately 26% of buildings in the floodplain.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	1	0	0	0	0	10	0	49	0	4	7	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	1	0	0	0	0	10	0	49	0	4	7	0
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	0	95	0	0	7	0	0	4	0	28	47	
Commercial	0	1	0	0	0	0	0	0	0	0	0	
Industrial	0	0	0	0	0	0	0	0	0	0	0	
Agricultural	0	0	0	0	0	0	0	0	0	0	0	
Government	0	1	0	0	0	0	0	0	0	0	1	
Education	0	1	0	0	0	0	0	0	0	0	0	
Religious / Other	0	0	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	0	98	0	0	7	0	0	4	0	28	48	

AD Airport Drive

AL Alba

AB Asbury

AV Avilla\*

BH Brooklyn Heights

CJ Carl Junction\*

CA Carterville

CR Carthage\*

CY Carytown

DW Duenweg

DQ

FI Duquesne

JA Fidelity

JO Jasper\*

LR Joplin\*

NC La Russell

OR Neck City

PU Oronogo

RE Purcell

SA Reeds

SA Sarcoxie\*

WA

WC Waco

WC Webb City\*

UJC Unincorporate Jasper

UJC County

\*These cities include educational buildings for the local school districts.



**Table 2.26**  
**Flood: Newton County Vulnerability Assessment**

(Using historic flooding statistics and HAZUS-MH Flood Event Report, this estimates losses to approximately 28% of buildings in the floodplain.)

	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of building	Estimated value*
Residential	1,423	179	\$88,750,321	0	0	\$0
Commercial	0	0	\$0	0	0	\$0
Industrial	0	1	\$495,811	0	0	\$0
Agricultural	0	0	\$0	0	0	\$0
Government	0	2	\$991,624	0	0	\$0
Education	0	4	\$1,983,244	0	0	\$0
Religious / Other	0	0	\$0	0	0	\$0
<b>Total Planning Area Assessment</b>	<b>1,423</b>	<b>186</b>	<b>\$92,221,000</b>	<b>0</b>	<b>0</b>	<b>\$0</b>

**Table 2.27**  
**Flood: Building Count Vulnerability by Newton County Jurisdiction**

(Using historic flooding statistics and HAZUS-MH Flood Event Report, this estimates losses to approximately 28% of buildings in the floodplain.)

Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	0	0	0	0	2	11	0	0	1	57	0
Commercial	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0
Religious	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	1	0
Education	0	0	0	0	1	0	1	0	0	1	0
Total Planning Area Assessment	0	0	0	0	3	11	0	0	1	59	0
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	1	0	12	60	0	0	0	0	0	37	
Commercial	0	0	0	0	0	0	0	0	0	0	
Industrial	0	0	0	0	0	0	0	0	0	0	
Agricultural	0	0	0	0	0	0	0	0	0	0	
Religious	0	0	0	0	0	0	0	0	0	0	
Government	0	0	0	0	0	0	0	0	0	1	
Education	0	0	0	1	0	0	0	0	0	0	
Total Planning Area Assessment	1	0	12	61	0	0	0	0	0	38	

CV	Cliff Village	NW	Newtonia	UNC	Unincorporated
DA	Dennis Acres	RM	Redings Mill		Newton County
DI	Diamond*	RI	Ritchey		
FA	Fairview	SA	Saginaw		
GR	Granby*	SE	Seneca*		
GF	Grand Falls Plaza	SCD	Shoal Creek Drive		
JO	Joplin*	SCE	Shoal Creek Estates		
LE	Leawood	SC	Stark City		
LO	Loma Linda	ST	Stella		
NE	Neosho*	WE	Wentworth		

\*These cities include educational buildings for the local school districts.

## Severe Winter Weather (Snow, Ice, and Extreme Cold)

Like thunderstorms, severe winter weather events tend to occur over wide geographic areas, encompassing an entire county or a large group of counties. Severe winter weather events such as snow, ice storms and extreme cold can cause injuries, deaths and property damage in a variety of ways. Winter storms are considered deceptive killers because most deaths are not obviously related to the storm. Causes of death range from traffic accidents during adverse driving conditions to heart attacks caused by overexertion while shoveling snow. Hypothermia or frostbite may be considered the most direct cause of death and injuries attributed to winter storms and/or severe cold.

Economic costs are difficult to measure. Heavy accumulations of ice can bring down trees, electric power lines and poles, telephone lines and communications towers. Crops, trees and livestock can be killed or injured due to deep snow, ice or severe cold. Buildings and automobiles may be damaged from falling tree limbs, power lines and poles. Local governments, homeowners, business owners, and power companies can cumulatively spend millions of dollars for restoration of services, debris removal and landfill hauling. Severe winter weather events that caused damage from 1993-2018 for Jasper and Newton counties are detailed in Table 2.28.

### Previous Events

Based upon Jasper and Newton County's event history and the risk indicators, severe winter weather events are likely to have limited impact. Since 1993, according to the NCDC, severe winter weather in the two-county region has:

- Occurred primarily in the months of December and January;
- Occurred as late as the month of March;
- Caused one death;
- Damaged property valued at \$500,000.

Severe winter weather events which caused damage for the two county region are detailed in Table 2.28.

Table 2.28		Jasper - Newton County Severe Winter Weather Damage-Causing Events 1998-2018						
Location or County	Date	Time	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Jasper County	01/01/1999	0500	Winter Storm	N/A	0	0	125K	0
Newton County	03/13/1999	1500	Winter Storm	N/A	0	0	25K	0
Jasper County / Newton County	11/30/2006	1200	Winter Storm	N/A	0	0	250K	0
Jasper County / Newton County	01/08/1997	1200	Heavy Snow	N/A	0	0	65K	0
Jasper County	12/12/2000	2100	Heavy Snow	N/A	0	0	10K	0
Newton County	02/01/2011	0000	Blizzard	N/A	1	0	25K	0

Jasper County/ Newton County	12/16/2016	0500	Winter Storm	N/A	0	0	150K	0
Newton County	11/24/1996	0400	Ice Storm	N/A	0	0	250K	0
Jasper County	12/09/2007	0100	Ice Storm	N/A	0	0	5M	0
Newton County	12/10/2007	0400	Ice Storm	N/A	0	0	250K	0
Jasper County	01/12/2007	1500	Ice Storm	N/A	0	0	225K	0
Newton County	01/12/2007	1600	Ice Storm	N/A	0	0	40M	0
Jasper County	11/24/1996	0800	Ice Storm	N/A	0	0	75K	0



In Newton County, one death occurred in 2011 during a February blizzard. In 2006, a winter storm resulted in \$ 400,000 in property damages in the two counties. When much of the state of Missouri was contending with devastating ice storms in 2007 and 2008, Newton and Jasper County largely escaped these impacts. Of 34 events, 13 resulted in property damages. However, those four (extreme cold, ice, and heavy snow) warrant ratings of limited for future probable severity due the extent of households affected.

Excessive winter weather can prove devastating. Primary concerns include the potential loss of heat, power, telephone service and a shortage of supplies if storm conditions continue for more than a day. Further, employees may be unable to get to work due to icy conditions, unplowed roadways or facility damage.

Winter weather warnings are organized by stages of severity by the National Weather Service. These stages are shown below.

**WINTER WEATHER ADVISORY:**

Winter weather conditions are expected to cause significant inconveniences and may be hazardous. If caution is exercised, these situations should not become life-threatening. The greatest hazard is often to motorists.

**WINTER STORM WATCH:**

Severe winter conditions, such as heavy snow and/or ice, are possible within the next day or two.

**WINTER STORM WARNING:**

Severe winter conditions are imminent in the warned area.

**BLIZZARD WARNING:**

Snow and strong winds will combine to produce a blinding snow (near zero visibility), deep drifts, and life-threatening wind chill. Seek refuge immediately.

**FROST/FREEZE WARNING:**

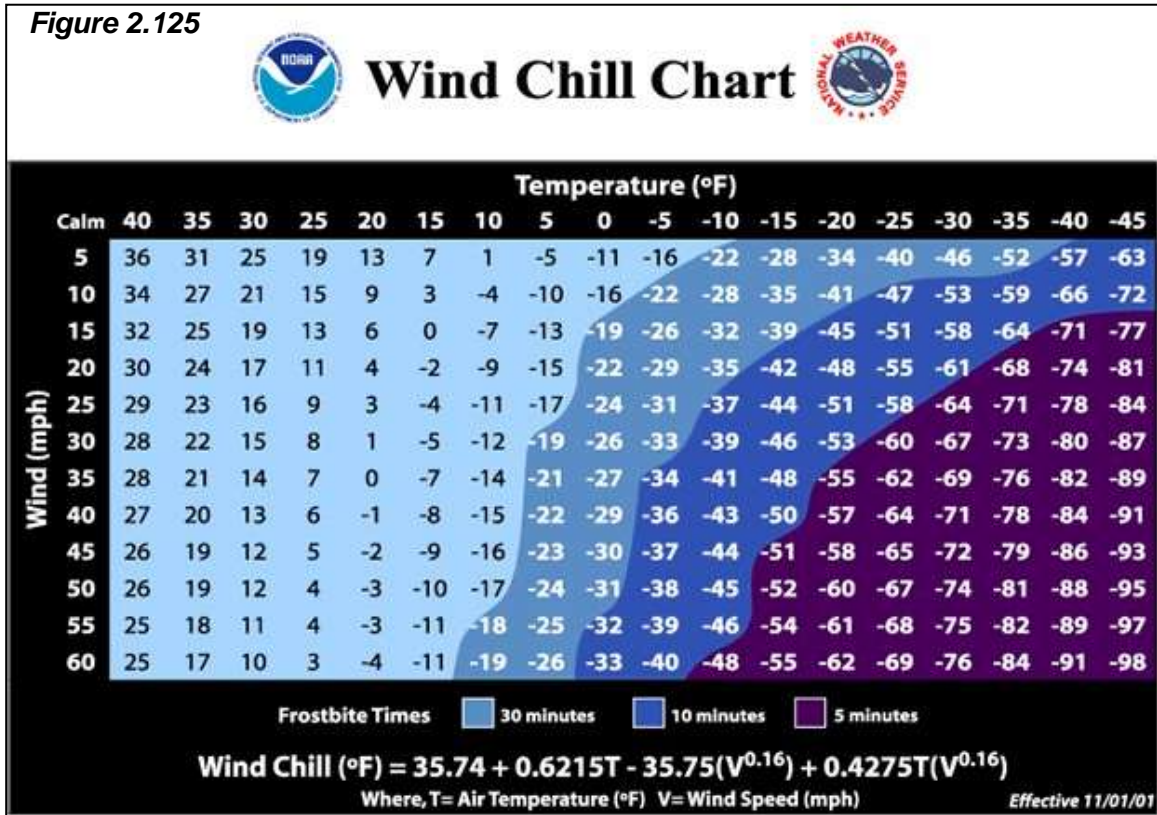
Below freezing temperatures are expected during the growing season and may cause significant damage to plants, crops, or fruit trees. In areas unaccustomed to freezing temperatures, people who have homes without heat need to take added precautions.

In addition to snow, the effects of temperature and wind chill increase the severity of a winter storm. Wind blowing across exposed skin drives down the skin temperature and eventually the internal body temperature. The faster the wind blows, the faster the heat is carried away, the greater the heat loss and the colder it feels. Exposure to low wind chills can be life threatening to humans and animals.

To use the Wind Chill Temperature Index, find the air temperature along the top of the table and the wind speed along the left side.

Figure 3.46

Figure 2.125



### Probability of Occurrence

Based upon the county's event history and the risk indicators discussed above, severe winter weather events are likely to be fairly limited for the two county region. Overall, there is a likely risk of impacts due to winter weather, based upon the counties' history and number of events by month of occurrence. Historical records indicate that snow events of significance are rare, given that the average annual snowfall is approximately 12 inches for the City of Joplin. In addition, ice events and periods of extreme cold temperatures are also possible, though rarely occur. From 1993 to 2018, a total of 34 events occurred in 25 years. Therefore, the probability for any severe winter weather event in any given year for the two county region is 100%. ( 34 events / 25 years \* 100 = 136%)

### Extent / Severity

Winter weather certainly occurs in Jasper and Newton County. Often, however, these events are regional in scope and affect all jurisdictions within the county. Because of advanced weather forecasting, warnings in excess of 24 hours are usually provided to citizens. However, the destructive and disruptive power of winter weather is beyond the control of humankind. Severity, risk of death and/or injuries, and property damages will continue to

occur due to the reduction in access to basic services caused by such storms. Thirty-four events in 25 years have caused approximately \$46,450,000 in damages, for an average damage cost per event of approximately \$1,366,176 as well as one death. Based on previous occurrences, the committee estimates that future severity could range from light to moderate damage.

## Vulnerability

All jurisdictions within the county (municipalities, educational institutions, and unincorporated areas) are equally susceptible to damage stemming from severe winter weather, particularly snow and ice events. In the event of a severe winter storm, 26-50% of any given jurisdiction may be at risk for damage, with damages estimated to range from light (less than 10%) to moderate (up to 25%) for structures. Since the adoption of the 2010 plan, significant development and population shifts have taken place in nearly every jurisdiction. While this means that a greater number of people and structures are at risk, the risk for damage has not changed dramatically. In the case of extreme cold temperatures, special consideration must be given to the potential impact upon the young, disabled, and elderly populations.

<b>Table 2.29</b> <b>Severe Winter Weather: Jasper County Vulnerability Assessment</b> (The estimates below are based on an affecting 25% of the planning area. This estimate assumes up to 15% damage to 25% of any given jurisdiction's buildings.)						
	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of buildings	Estimated value*
Residential	29,351	12,560	\$169,777,725	3,522	1,507	\$20,373,327
Commercial	5,811	436	\$54,132	698	52	\$6,495,831
Industrial	1,761	58	\$16,425,188	211	7	\$1,971,023
Agricultural	176	2670	\$1,708,912	21	324	\$205,070
Government	264	2	\$2,546,925	32	1	\$305,631
Education	2,436	26	\$22,664,363	292	3	\$5,240,016
Religious / Other	704	65	\$6,478,088	17	8	\$777,370
<b>Total Planning Area Assessment</b>	<b>29,351</b>	<b>15,817</b>	<b>\$219,655,333</b>	<b>3,522</b>	<b>1,902</b>	<b>\$35,368,268</b>

**Table 2.30**  
**Severe Winter Weather: Building Count Vulnerability by Jasper County Jurisdiction**  
 (The estimates below are based on an affecting 25% of the planning area.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	147	90	57	34	32	894	368	1911	95	159	371	71
Commercial	5	3	2	1	1	31	13	66	3	6	13	2
Industrial	0	0	0	0	0	5	2	10	0	1	2	0
Agricultural	32	19	12	7	7	79	79	410	20	34	80	15
Government	1	1	1	1	1	2	1	4	1	1	1	1
Education	0	0	0	1	0	2	0	5	0	0	0	0
Religious / Other	1	1	1	0	0	5	2	10	0	1	2	0
Total Planning Area Assessment	186	114	73	44	41	1018	465	2416	119	202	469	89
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	180	5,729	35	26	208	71	22	236	26	1,601	189	
Commercial	6	165	1	1	7	2	1	33	1	56	7	
Industrial	1	29	0	0	1	0	0	1	0	8	1	
Agricultural	39	1,230	7	6	48	15	5	51	6	344	41	
Government	1	12	1	1	1	1	1	1	1	3	0	
Education	1	14	0	0	0	0	0	1	0	4	0	
Religious / Other	1	29	0	0	1	0	0	1	0	8	1	
Total Planning Area Assessment	229	7208	44	34	266	89	29	324	34	2024	239	

AD Airport Drive

AL Alba

AB Asbury

AV Avilla\*

BH Brooklyn Heights

CJ Carl Junction\*

CA Carterville

CR Carthage\*

CY Carytown

DW Duenweg

DQ

FI Fidelity

JA Jasper\*

JO Joplin\*

LR La Russell

NC Neck City

OR Oronogo

PU Purcell

RE Reeds

SA Sarcoxie\*

WA

WC Webb City\*

UJC Unincorporated Jasper County

\*These cities include educational buildings for the local school districts.



<b>Table 2.31</b> <b>Severe Winter Weather: Newton County Vulnerability Assessment</b> (The estimates below are based on an affecting 25% of the planning area. This estimate assumes up to 15% damage to 25% of any given jurisdiction's buildings.)						
	Current Data			Future Growth Projections		
	Number of people	Number of buildings	Approximate value*	Number of people	Number of building	Estimated value*
Residential	14,711	6,650	\$79,123,575	1,177	532	\$6,329,886
Commercial	3,222	917	\$28,035,188	258	73	\$2,242,815
Industrial	1,076	428	\$6,141,563	86	34	\$491,325
Agricultural	183	3,485	\$790,200	15	279	\$63,216
Government	256	12	\$1,466,363	20	1	\$117,309
Education	4,199	48	\$9,732,450	336	4	\$778,596
Religious / Other	61	245	\$2,903,437	5	20	\$232,275
<b>Total Planning Area Assessment</b>	14,711	11,785	\$128,192,776	1,177	943	\$10,255,422

<b>Table 2.32</b> <b>Severe Winter Weather: Newton County Vulnerability Assessment</b> (The estimates below are based on an affecting 25% of the planning area.)											
Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	6	8	106	66	319	10	483	43	66	970	37
Commercial	1	1	15	9	44	1	67	6	9	134	5
Industrial	0	0	7	4	20	1	31	3	4	62	2
Agricultural	3	4	56	34	168	5	253	22	35	509	19
Religious	1	1	1	0	1	0	1	0	0	2	0
Government	0	0	1	0	2	0	3	0	0	7	0
Education	0	0	4	2	11	0	17	2	2	35	1
Total Planning Area Assessment	11	14	190	115	565	17	855	76	116	1,719	64
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	18	13	44	218	38	6	21	28	27	4,121	
Commercial	2	2	6	30	5	1	3	4	4	568	
Industrial	1	1	3	14	2	0	1	2	2	263	
Agricultural	9	7	23	114	20	3	11	15	14	2,163	
Religious	0	0	0	0	0	0	0	0	0	7	
Government	0	0	0	2	0	0	0	0	0	0	
Education	1	0	2	8	1	0	1	1	1	146	
Total Planning Area Assessment	31	23	78	386	66	10	37	50	47	7,268	

CV	Cliff Village	NW	Newtonia	UNC	Unincorporated
DA	Dennis Acres	RM	Redings Mill		Newton County
DI	Diamond*	RI	Ritchey		
FA	Fairview	SA	Saginaw		
GR	Granby*	SE	Seneca*		
GF	Grand Falls Plaza	SCD	Shoal Creek Drive		
JO	Joplin*	SCE	Shoal Creek Estates		
LE	Leawood	SC	Stark City		
LO	Loma Linda	ST	Stella		
NE	Neosho*	WE	Wentworth		

\*These cities include educational buildings for the local school districts. (See page 31).

## Drought

The impacts of drought are not limited to agriculture, but can intensify to encompass the whole economy. Impacts can adversely affect a small town's water supply, the corner grocery store, commodity markets or a large municipality's tourism. On average, droughts negatively impact the U.S. economy by seven to nine billion dollars a year, according to the National Drought Mitigation Center.<sup>7</sup> While there are no cost estimates for the drought events of 1999-2000 and 2011-2012 that gripped Missouri and much of the nation, losses from the severe drought event of the 1988-1989 were assessed at \$39 billion.

The drought impact on society results from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand development places on groundwater reservoirs. A drought situation often is exacerbated by development practices that decrease the percolation of surface water into groundwater reservoirs. The resulting economic and environmental impacts associated with recent droughts have underscored society's vulnerability to this hazard.

The dictionary definition of drought is a period of prolonged dryness. Current drought literature commonly distinguishes between three categories of drought:

- Agricultural drought, defined by soil moisture deficiencies;
- Hydrological drought, defined by declining surface water and groundwater supplies; and
- Meteorological drought, defined by precipitation deficiencies.

Agricultural drought is the type most likely to wreak economic losses in the two-county region.

The most commonly used indicator of drought and drought severity is the Palmer Drought Severity Index (PDSI), published jointly by NOAA and the United States Department of Agriculture.<sup>8</sup> The PDSI

measures the departure of water supply (in terms of precipitation and stored soil moisture) from demand (the amount of water required to recharge soil and keep rivers, lakes, and reservoirs at normal levels). The result is a scale from +4 to -4, ranging from an extremely moist spell to extreme drought. By relating the PDSI number to a regional index, one can compile data that reflects long-term wet or dry tendencies.

<b>Table 2.33 Palmer Drought Severity Index</b>	
Rating	Description
Above 4.0	Extreme Moist Spell
3.0 to 3.9	Very Moist Spell
2.0 to 2.9	Unusually Moist Spell
1.0 to 1.9	Moist Spell
0.5 to 0.9	Incipient Moist Spell
0.4 to -0.4	Near Normal Conditions
-0.5 to -0.9	Incipient Drought
-1.0 to -1.9	Mild Drought
-2.0 to -2.9	Moderate Drought
-3.0 to -3.9	Severe Drought
Below -4.0	Extreme Drought

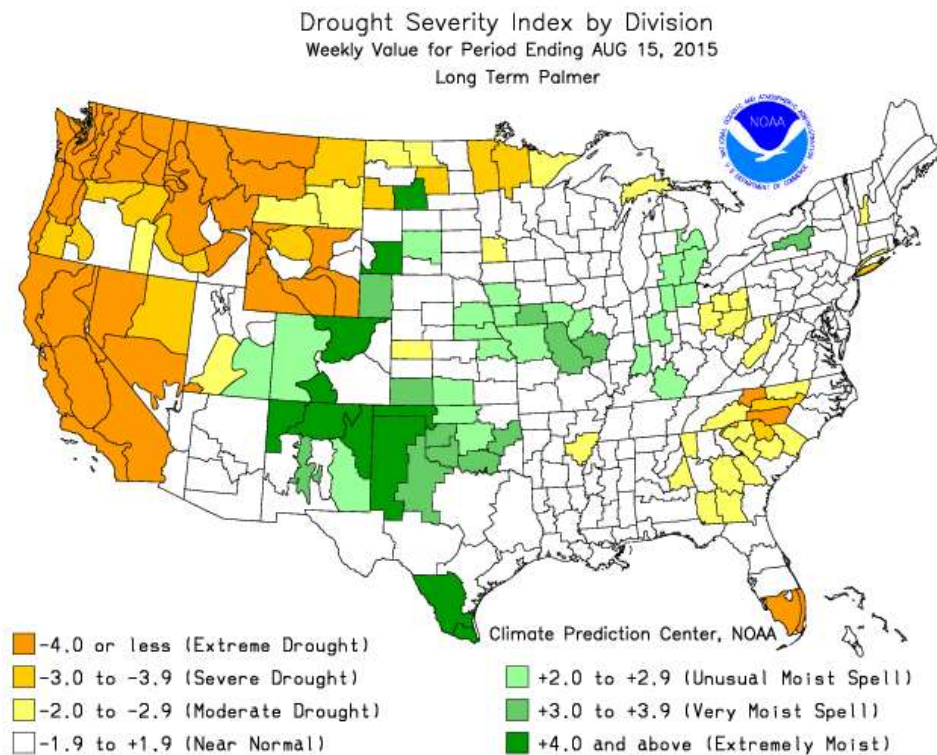
Regional indicators such as the PDSI are limited in that they respond slowly to deteriorating conditions. On the other hand, observing surface conditions and

<sup>7</sup> <http://drought.unl.edu/AboutUs/CurrentResearch/EstimatingtheImpactsofComplexClimaticEvents.aspx>

<sup>8</sup> <http://www.drought.unl.edu/whatis/indices.htm>

groundwater measurements may provide only a snapshot of a limited area. Therefore, the use of a variety of drought indicators is essential for effective assessment of drought conditions, with the PDSI being the primary drought severity indicator. The PDSI regions and severity scale are shown in Table 2.33.

Figure 3.47



## Previous Events

In Missouri, minor droughts happen regularly, and extreme drought occurs occasionally. The 1999-2000 droughts began in July of 1999 and developed rapidly into a widespread drought just three months later. The entire state was placed under a Phase I Drought Advisory level by the Missouri Department of Natural Resources (DNR) and the Governor declared an Agricultural Emergency. In October, the U.S. Agriculture Secretary declared a federal disaster, making low-interest loans available to farmers in Missouri and neighboring states. The NCDC reported the driest month on record for Jasper and Newton County in April of 2000. By June of 2000, the entire state was under a Phase II Alert for drought conditions.

Most recently, the impacts of drought ravaged Midwestern states, including Missouri from



2012-2013, with PDSI ratings of -4.0, or Extreme Drought. The 2012 Missouri harvest saw a 27.5% reduction in corn and a 7% reduction in soybeans. 54% of pastures were rated poor or very poor. As a result, livestock were placed on feed earlier than normal. Livestock were also subject to heat stress, raising feed costs, and reduced inventories, particularly in poultry and hogs. These costs were then passed on to the regular consumer as the price of groceries was impacted, especially for dairy and meat products. Drought affected not only agricultural production in the county, but also threatened the water supplies of local. To date, the economic impacts of this drought continue to be collected as impacts beyond agriculture are considered.

Crops are the first to show the impact of drought. As a drought intensifies, livestock water supplies become scarce and, finally, deep wells begin to fail. When good water becomes a scarce commodity and people must compete for the available supply, the importance of drought severity and duration increases dramatically. According to the Missouri Drought Plan, Jasper County and Newton County have “abundant groundwater resources, making [them] less susceptible to problems caused by prolonged periods without rain. The agricultural needs for water... are not typically as great in this region ... because row-crop farming is not extensive in southern Missouri.”<sup>9</sup> However, increased seasonal use due to tourism combined with rapid residential and commercial growth in the region does cause concern over depletion of region aquifers. The population growth of the past decade in the two-county region has a potential impact on local water resources.

Precipitation-related impacts on time scales ranging from a few days to a few months can include effects on wildfire danger, non-irrigated agriculture, topsoil moisture, pasture conditions, and unregulated stream flows. Lack of precipitation over a period of several months or years adversely affects reservoir stores, irrigated agriculture, groundwater levels, and well water depth. Groundwater resources in the county are adequate to meet domestic and municipal water needs, but should be monitored as the population continues to grow.

The Missouri Department of Natural Resources’ drought response system has four phases. Phase 1 begins when water monitoring analysis indicates anticipated drought consequences. The situation moves into Phase 2 when the PDSI reads -1 to -2 and the stream flow, reservoir levels, and groundwater levels are below normal over a period of several months. Phase 3 is based on a PDSI between -2 to -4 and various other factors. Phase 4, or activation of drought emergency procedures, generally begins when the PDSI exceeds -4.

Therefore, using the Department of Natural Resources’ drought response system, the probable severity levels of a future drought could be:

<b><u>Phase:</u></b>	<b><u>Probable Severity:</u></b>
Phase 1, Advisory	negligible
Phase 2, Alert	limited
Phase 3, Conservation	critical

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<sup>9</sup> Missouri Department of Natural Resources, *Missouri Drought Plan, Water Resources Report Number 69*, <http://www.dnr.mo.gov/pubs/WR69.pdf>, 12.

### Probability of Occurrence

It is possible for the two-county region to experience drought in any given year. Predicting droughts and the severity of each occurrence, however, is difficult as it is largely dependent upon regional climatic conditions but does not conform to any historical pattern. Additionally, local and historical data for drought is still in development, resulting in a limited risk assessment. Agricultural and meteorological drought are often linked, but agricultural drought is the most likely type to significantly impact the region. From 1999 until 2013, six years included drought designations of varying severity. Therefore, the probability for a drought event in any given year for the two-county region is 42.8%. (6 events / 14 years = 42.8%)

### Extent / Severity

As stated previously, drought data for local jurisdictions is limited and still under development. However, the majority of drought impact lies in agricultural business. For the most part, both residents and buildings of the two-county region are not directly affected by agricultural drought to any measurable extent. As such, the extent of a potential agricultural drought lies largely in the number of acres dedicated to agricultural use. Based on information from the Jasper and Newton County Assessors, local USDA representatives, and the Hazard Mitigation Committee, the committee assumes that any given drought may result in light damages, largely focused on crops and livestock, but may also impact the availability of local water resources as well.

### Vulnerability

All jurisdictions within the county are equally susceptible to damage stemming from drought, particularly in phases 3 and 4. Most municipalities do not encompass agricultural land. Unincorporated Jasper and Newton counties, however, are largely composed of such. As of 2013, Jasper County had 70,122 acres involved in crop production, while Newton County had 12,307 acres involved in crop production. These numbers do not take into account land used for pasture or left unplanted. In the event of a severe drought, 26-50% of all agricultural land in use may be at risk for damage. Since the adoption of the 2010 plan, local agricultural producers have been encouraged to research and implement steps which reduce water usage in the event of a drought. Municipalities have also been encouraged to consider total usage, both seasonal and constant, in order to address issues as they may occur. The committee assumes that damages would be moderate, ranging from 10-24% of all agricultural production.

**Table 2.34****Drought: Jasper County Vulnerability Assessment**

(Using regional drought data and assuming the planning area would sustain 20% damage to 50% of agricultural lands with a base valuation of \$4,000 per acre.)

	Current Data			Future Growth Projections		
	Number of people	Acres of Land Use	Approximate value*	Number of people	Acres of Land	Estimated value*
Residential	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Industrial	0	0	0	0	0	0
Agricultural	0	35,061	\$140,244,000	0	0	0
Government	0	0	0	0	0	0
Education	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0
<b>Total Planning Area Assessment</b>	0	35,061	\$140,244,000	0	\$0	<b>\$0</b>

**Table 2.35****Drought: Building Count Vulnerability by Jasper County Jurisdiction**

(The estimates below are based on a drought affecting 50% of the agricultural land in the planning area.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0	0
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	0	0	0	0	0	0	0	0	0	0	0	
Commercial	0	0	0	0	0	0	0	0	0	0	0	
Industrial	0	0	0	0	0	0	0	0	0	0	0	
Agricultural	0	0	0	0	0	0	0	0	0	0	0	
Government	0	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	0	
Religious / Other	0	0	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0	

AD Airport Drive

AL Alba

AB Asbury

AV Avilla\*

BH Brooklyn Heights

CJ Carl Junction\*

CA Carterville

CR Carthage\*

CY Carytown

DW Duenweg

DQ

FI

JA

JO

LR

NC

OR

PU

RE

SA

Duquesne

Fidelity

Jasper\*

Joplin\*

La Russell

Neck City

Oronogo

Purcell

Reeds

Sarcoxie\*

WA

WC

UJC

Waco

Webb City\*

Unincorporated Jasper

County

\*These cities include educational buildings for the local school districts.



**Table 2.36**  
**Drought: Newton County Vulnerability Assessment**

(Using regional drought data and assuming the planning area would sustain 20% damage to 50% of agricultural lands with a base valuation of \$4,000 per acre.)

	Current Data			Future Growth Projections		
	Number of people	Acres of Land Use	Approximate value*	Number of people	Acres of Land	Estimated value*
Residential	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Industrial	0	0	0	0	0	0
Agricultural	0	6,154	\$12,308,000	0	0	0
Government	0	0	0	0	0	0
Education	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0
<b>Total Planning Area Assessment</b>	0	6,154	\$12,308,000	0	0	<b>\$0</b>

**Table 2.37**  
**Drought: Building Count Vulnerability by Newton County Jurisdiction**  
 (The estimates below are based on a drought affecting 50% of the agricultural land in the planning area.)

Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0
Religious	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	0	0	0	0	0	0	0	0	0	0	
Commercial	0	0	0	0	0	0	0	0	0	0	
Industrial	0	0	0	0	0	0	0	0	0	0	
Agricultural	0	0	0	0	0	0	0	0	0	0	
Religious	0	0	0	0	0	0	0	0	0	0	
Government	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	

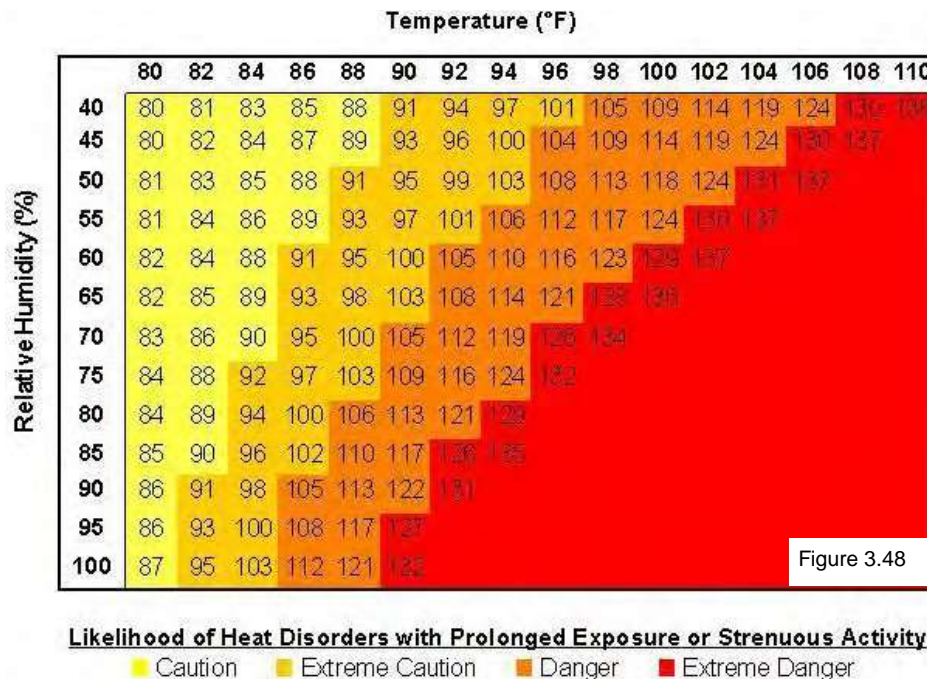
CV	Cliff Village	NW	Newtonia	UNC	Unincorporated
DA	Dennis Acres	RM	Redings Mill		Newton County
DI	Diamond*	RI	Ritchey		
FA	Fairview	SA	Saginaw		
GR	Granby*	SE	Seneca*		
GF	Grand Falls Plaza	SCD	Shoal Creek Drive		
JO	Joplin*	SCE	Shoal Creek Estates		
LE	Leawood	SC	Stark City		
LO	Loma Linda	ST	Stella		
NE	Neosho*	WE	Wentworth		

\*These cities include educational buildings for the local school districts.

## Heat Wave

According to NOAA, heat is the number two killer among natural hazards; only the cold temperatures of winter take a greater toll.<sup>10</sup> In contrast to the visible, destructive, and violent nature of floods, hurricanes, and tornadoes, a heat wave is a silent killer. Heat kills by overloading the human body's capacity to cool itself. In the disastrous heat wave of 1980, more than 1,250 people died nationwide. In a normal year, about 175 Americans succumb to the bodily stresses of summer heat.

Air temperature is not the only factor to consider when assessing the likely effects of a heat wave. High humidity, which often accompanies heat in Missouri, can increase the harmful effects. Relative humidity must also be considered, along with exposure, wind, and activity. The Heat Index devised by the National Weather Service (NWS) combines air temperature and relative humidity. Also known as the apparent temperature, the Heat Index is a measure of how hot it actually feels. For example, if the air temperature is 102 degrees, and the relative humidity is 55%, then it feels like 130 degrees; 28 degrees hotter than the actual ambient temperature. To find the Heat Index from Figure 3.48, find the air temperature along the top of the table and the relative humidity along the left side of the chart. Where the two intersect is the Heat Index for any given time of day.



<sup>10</sup> <http://www.nws.noaa.gov/om/heat/index.shtml>

## Previous Events

The National Climatic Data Center reports eleven regional heat events which have included Jasper and Newton counties between 1993 and 2018. These heat waves resulted in the following regional impacts:

- 4 deaths;
- Property damage valued at \$324,000.

No deaths, injuries, or property damage have taken place in either Jasper County or Newton County as a result of heat wave. This, however, does not remove the possibility of similar effects. Heat events affecting the two-county region from 1993 to 2018 are noted in Table 2.38.

<i>Table 2.38 Jasper County and Newton County Heat Events, 1993-2018</i>							
Location or County	Date	Type	Magnitude	Deaths	Injuries	Crop Damage	Property Damage
Regional	7/23/1999	Excessive Heat	N/A	3	0	0	0
Regional	08/01/1999	Excessive Heat	N/A	0	0	0	0
Regional	08/27/2000	Excessive Heat	N/A	0	0	0	0
Regional	09/01/2000	Excessive Heat	N/A	0	0	0	0
Regional	07/17/2001	Excessive Heat	N/A	0	0	0	0
Regional	08/01/2001	Excessive Heat	N/A	1	0	0	0
Regional	08/01/2011	Excessive Heat	N/A	0	0	0	0
Regional	08/03/2011	Excessive Heat	N/A	0	0	0	\$324K
Regional	06/01/2012	Excessive Heat	N/A	0	0	0	0
Regional	07/01/2012	Excessive Heat	N/A	0	0	0	0
Regional	08/01/2012	Excessive Heat	N/A	0	0	0	0

## Probability of Occurrence

In Jasper and Newton counties, days with temperatures of 90 degrees and above generally occur during the summer months of June, July and August. Based on NWS historical records, an extended heat wave (7 or more consecutive days with temperatures near 100 degrees) may occur only once or twice per decade. A review of climatic data reveals the county's risk of experiencing heat waves, shown below according to Heat Index severity levels.

<b><u>Index:</u></b>	<b><u>Probable Severity:</u></b>
Caution	highly likely
Extreme Caution	likely
Danger	possible
Extreme Danger:	unlikely

A review of the data for 1999-2018 shows the two-county region could experience a brief heat wave every year. However, on average, only three instances could qualify as extended heat waves—dependent upon the relative humidity during those times. During this period of time, three events occurred in 15 years. Therefore, the probability for a meteorologically heat wave event in any given year for Jasper and Newton counties is 73.3%. (11 events / 15 years \*100 = 73.3%)



## Extent / Severity

The levels of severity, by Heat Index apparent temperature, are:

**EXTREME DANGER:**

Heat stroke or sunstroke highly likely at 130°F or higher.

**DANGER:**

Sunstroke, muscle cramps, and/or heat exhaustion likely at 105°F to 129°F.

**EXTREME CAUTION:**

Sunstroke, muscle cramps, and/or heat exhaustion possible at 90°F to 104°F.

**CAUTION:**

Fatigue possible at less than 90°F.

The NWS uses these levels in weather warning messages to alert the public to the dangers of exposure to extended periods of heat, especially when high humidity acts along with the high temperatures to reduce the body's ability to cool itself.

Although most heat-related deaths occur in cities, residents of rural areas are at risk due to factors that can include age, outdoor activities, or lack of air conditioning. 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. Excessive heat can lead to illnesses and other stresses on people with prolonged exposure to these conditions.

In addition to the human toll, the Midwestern Climate Center notes other possible impacts such as electrical infrastructure damage and failure, highway damage, crop damage, water shortages, livestock deaths, fish kills, and lost productivity among outdoor-oriented businesses.

Jasper and Newton counties are most likely to see a direct affect from meteorologically-defined heat waves in risks to its population and agricultural livestock. Though possible, damage to buildings and infrastructure is unlikely based upon historical data. The committee assumes that any damages associated with this type of hazard event will be light.

## Vulnerability

All jurisdictions (municipalities, educational institutions, and unincorporated areas) within the county are equally susceptible to damage stemming from a heat wave as these types of events tend to be regional in nature. In the event of a heat wave, the HMP planning committee determined that 25% of any given jurisdiction's population may be at risk for injury. Both Jasper County and Newton County utilize mitigation strategies which include the opening of cooling centers in case of a severe heat event, but up to 10% of all jurisdictions' populations may still be susceptible to the effects of heat wave. As with extreme cold temperatures, special consideration must be given to the potential impact upon the young, disabled, and elderly populations. Since the adoption of the 2010 plan, significant population growth has occurred. While this growth does not directly affect the potential impact of a heat wave, it presents a potential need for additional county services like cooling centers. Both counties utilize a registry process which allows the elderly and disabled or their families to place these individuals on a list for emergency responders which includes information related to medications, oxygen use, and other data. This allows emergency responders

and law enforcement to have sufficient knowledge of individual needs and their location to provide aid during extreme heat or cold events.

<b>Table 2.39</b> <b>Heat Wave: Jasper County Vulnerability Assessment</b> (Using regional heat wave statistics, the planning area could see 10% of the planning area's population at risk for heat related issues.)						
	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Number of Buildings	Number of people	Number of Building	Estimated value*
Residential	11,740	0	0	1,409	0	0
Commercial	2,325	0	0	279	0	0
Industrial	704	0	0	85	0	0
Agricultural	70	0	0	8	0	0
Government	106	0	0	13	0	0
Education	975	0	0	117	0	0
Religious /	282	0	0	7	0	0
<b>Total Planning Area Assessment</b>	<b>11,740</b>	<b>0</b>	<b>\$0</b>	<b>1,409</b>	<b>0</b>	<b>\$0</b>

**Table 2.40****Heat Wave: Building Count Vulnerability by Jasper County Jurisdiction**

(The estimates below are based on a heat wave affecting 10% of the population in the planning area.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0	0
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	0	0	0	0	0	0	0	0	0	0	0	
Commercial	0	0	0	0	0	0	0	0	0	0	0	
Industrial	0	0	0	0	0	0	0	0	0	0	0	
Agricultural	0	0	0	0	0	0	0	0	0	0	0	
Government	0	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	0	
Religious / Other	0	0	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0	

AD	Airport Drive	DQ	Duquesne	WA	Waco
AL	Alba	FI	Fidelity	WC	Webb City*
AB	Asbury	JA	Jasper*	UJC	Unincorporated Jasper County
AV	Avilla*	JO	Joplin*		
BH	Brooklyn Heights	LR	La Russell		
CJ	Carl Junction*	NC	Neck City		
CA	Carterville	OR	Oronogo		
CR	Carthage*	PU	Purcell		
CY	Carytown	RE	Reeds		
DW	Duenweg	SA	Sarcoxie*		

\*These cities include educational buildings for the local school districts.

**Table 2.41**  
**Heat Wave: Newton County Vulnerability Assessment**

(Using regional heat wave statistics, the planning area could see 10% of the planning area's population at risk for heat related issues.)

	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Number of Buildings	Number of people	Number of Building	Estimated value*
Residential	5,885	0	0	471	0	0
Commercial	1,289	0	0	103	0	0
Industrial	430	0	0	34	0	0
Agricultural	73	0	0	6	0	0
Government	102	0	0	8	0	0
Education	1,680	0	0	134	0	0
Religious /	24	0	0	2	0	0
<b>Total Planning Area Assessment</b>	<b>5,885</b>	<b>0</b>	<b>\$0</b>	<b>471</b>	<b>0</b>	<b>\$0</b>



**Table 2.42**  
**Heat Wave: Building Count Vulnerability by Newton County Jurisdiction**

(The estimates below are based on a heat wave affecting 10% of the population in the planning area.)

Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0
Religious	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	0	0	0	0	0	0	0	0	0	0	
Commercial	0	0	0	0	0	0	0	0	0	0	
Industrial	0	0	0	0	0	0	0	0	0	0	
Agricultural	0	0	0	0	0	0	0	0	0	0	
Religious	0	0	0	0	0	0	0	0	0	0	
Government	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	

CV	Cliff Village	NW	Newtonia	UNC	Unincorporated
DA	Dennis Acres	RM	Redings Mill		Newton County
DI	Diamond*	RI	Ritchey		
FA	Fairview	SA	Saginaw		
GR	Granby*	SE	Seneca*		
GF	Grand Falls Plaza	SCD	Shoal Creek Drive		
JO	Joplin*	SCE	Shoal Creek Estates		
LE	Leawood	SC	Stark City		
LO	Loma Linda	ST	Stella		
NE	Neosho*	WE	Wentworth		

\*These cities include educational buildings for the local school districts.

## Earthquakes

The Earth's crust is made up of gigantic sections, commonly referred to as tectonic plates. These plates form what is known as lithosphere and vary in thickness from 6.5 miles (beneath oceans) to 40 miles (beneath mountain ranges) with an average thickness of 20 miles. These plates "float" over a partly melted layer of crust called the asthenosphere. The plates are in motion and where one plate joins another, they form boundaries. Stress is built up and stored at the boundary of these tectonic plates, and the sudden release of stress is often felt as an earthquake. The duration can be from a few seconds up to five minutes, while a period of tremors and shocks can last up to several months. The larger shocks can cause ground failure, landslides, uplifts, liquefaction (disintegration of alluvial soils), and sand blows.<sup>11</sup>

The Richter scale is one of the most commonly mentioned intensity scales. Developed in 1935 by Dr. Charles F. Richter, this scale is used to compare the size of earthquakes by measuring seismic waves. "The Richter Scale is not used to express damage. An earthquake in a densely populated area which results in many deaths and considerable damage may have the same magnitude as a shock in a remote area that does nothing more than frighten the wildlife. Large-magnitude earthquakes that occur beneath the oceans may not even be felt by humans."<sup>12</sup>

Another scale is needed to describe the potential of a fault event to cause damage. The Mercalli Intensity Scale gets far less attention, but is a better representative of the impact an event can have upon an area (Table 2.43). Damages from earthquakes occur from one of several causes. Ground shaking is the most common phenomenon. Different kinds of seismic waves propagate outward in all directions from the focus, with the frequency of any given wave ranging from 0.1 to 30 Hertz. Buildings vibrate because of ground shaking, and damage takes place if the buildings cannot withstand these vibrations. Depending on the type of waves, the motion may be horizontal, vertical, or a mixture of the two. Because the different types of waves have different frequencies of vibration, they are weakened differently as they pass through the ground. High frequency waves arrive before the others, which leads observers to notice different ground motions at different times. Low-frequency waves tend to travel farther, arrive later, and are more likely to cause tall buildings to vibrate. Buildings are more susceptible to damage from horizontal motion than from vertical motion, so more damage may come from one type of wave than from another. Also, different frequencies affect buildings differently.

Surface faulting is the second cause of earthquake damage. This phenomenon is described as the offset or tearing of the earth's surface by a differential movement across a fault. Structures built across the fault tend to be damaged if the fault is active. Surface faulting may be an issue in Missouri as faults in the southeast region are considered to be active.

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<sup>11</sup> <http://sema.dps.mo.gov/docs/programs/Logistics,%20Resources,%20Mitigation%20&%20Floodplain/mitigation/MO%20State%20HMP.pdf>

<sup>12</sup> <http://earthquake.usgs.gov/learn/topics/richter.php>

**Table 2.43** Abbreviated description of the 12 levels of Modified Mercalli intensity.<sup>13</sup>

Intensity	Description
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings 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.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	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.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rail bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

## Previous Events

Jasper and Newton counties are located near the middle of the North America, far away from mountains, volcanoes, and historic earthquake zones, resulting in many people incorrectly assuming that its communities are not subject to the risk of an earthquake. While very infrequent and usually only barely detectable, earthquakes can, do, and will occur in the two-county area.

Jasper and Newton counties are located in between the NeMaha Fault (which runs roughly from Oklahoma City, Oklahoma north to Lincoln, Nebraska) and the New Madrid Fault (which runs through the southeast corner of Missouri as well as portions of Arkansas, Illinois, and Indiana). In 1993, the NeMaha fault produced a discernable earthquake, rating a 2.9 on the Richter Scale of Earthquake Intensity. Additional quakes took place February 11, 1995 (3.1 rating); July 16, 2004 (3.5 rating); March 23, 2003 (3.1 rating).

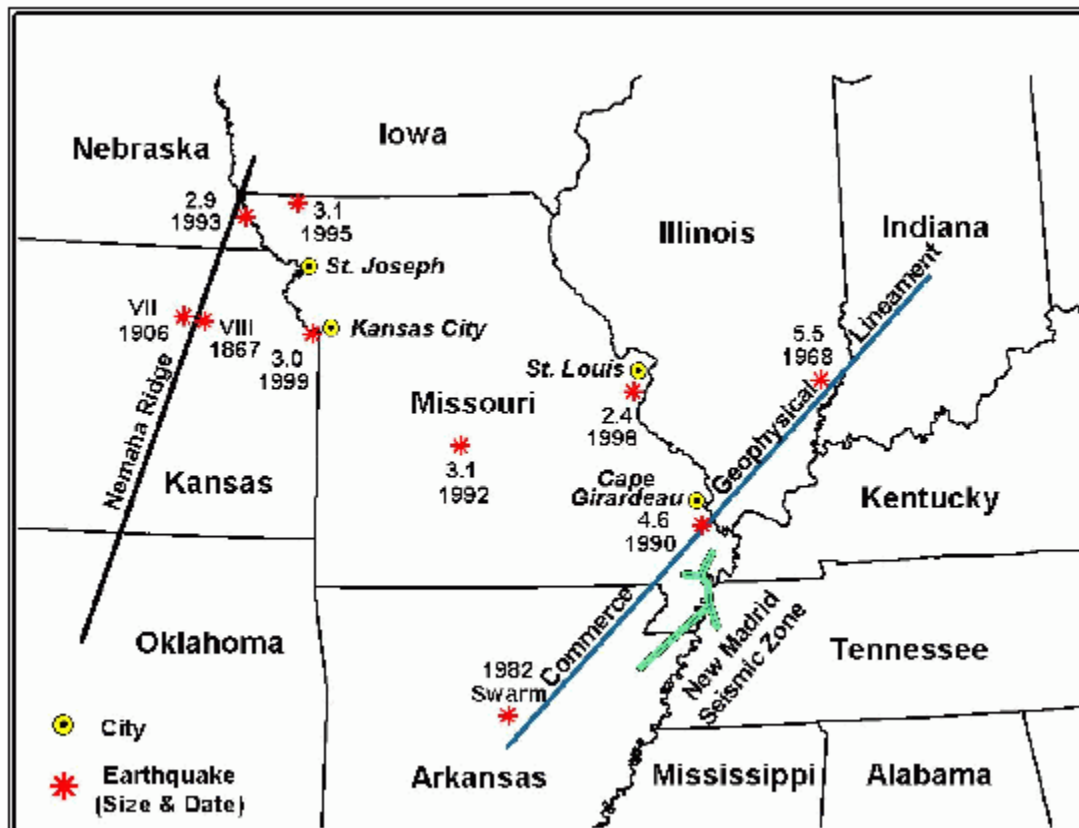
<sup>13</sup> <http://pubs.usgs.gov/gip/earthq4/severitygip.html>

More recently, an earthquake rating 3.6 was recorded on December 17, 2009. Although relatively quiet most of the time, the NeMaha fault nonetheless has the potential to produce an earthquake which could negatively impact the two-county region.<sup>14</sup>

In addition, the region is subject to effects of the New Madrid Fault located in extreme southeast Missouri, which has, according to many experts, the potential to produce the largest earthquakes in North America. Undoubtedly, this fault has the potential to affect the two-county region and the infrastructure that serves it (gas lines, electricity, highways, etc.). In addition, there have been several small, virtually undetectable earth movements in the region in recent history, which may or may not be attributed to the aforementioned fault lines or other, very small faults located nearby.

Scientists from the U.S. Geological Survey (USGS) and the Center for Earthquake Research and Information at the University of Memphis (CERI) recently estimated the probability of a magnitude 6.0 or greater earthquake from the New Madrid Fault is 25-40% through the year 2053. The probability of an earthquake increases with each passing day, which makes it difficult to rate. However, based on the data, the probability of an earthquake event is rated as moderate and the severity is rated as high.

**Figure 3.49**



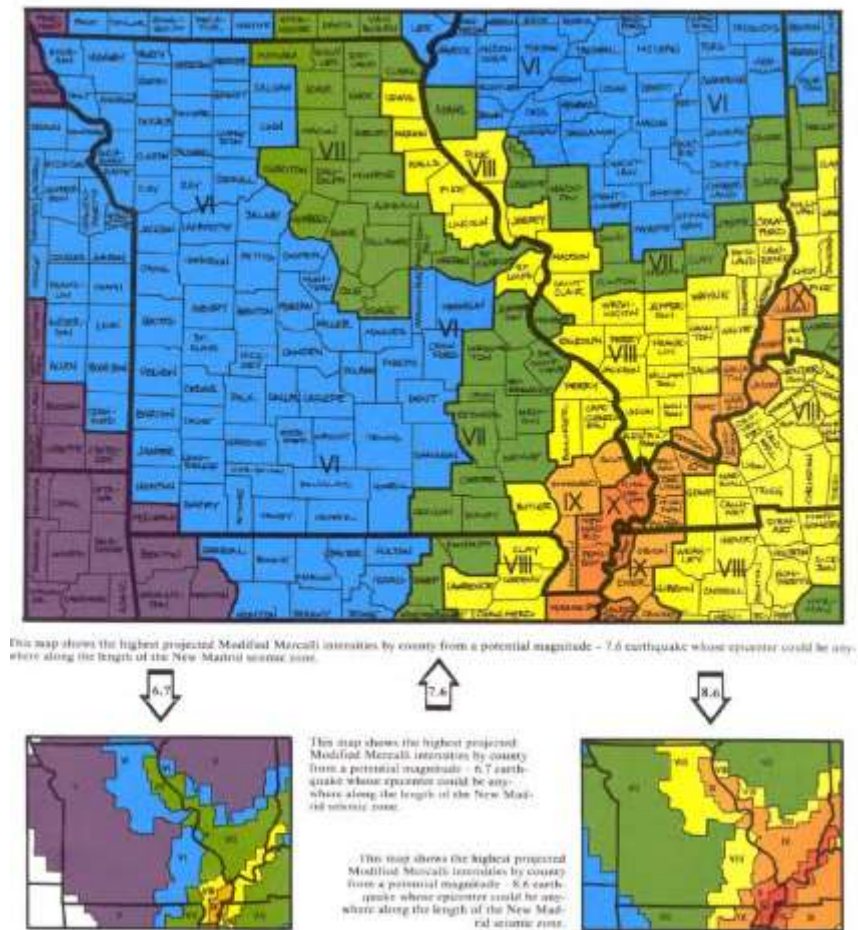
<sup>14</sup> <http://earthquake.usgs.gov/earthquakes/eqarchives/epic/>



New Madrid earthquake damage covers more than 20 times the area of the typical California earthquake because of the Midwest's underlying geology. Ground shaking affects structures close to the earthquake epicenter and also those at greater distances. Certain types of buildings at a significant distance from the earthquake epicenter may be damaged. Unreinforced masonry structures are specifically susceptible to any large earthquakes. Owners of these structures should be aware of potential damage from seismic activity.

According to SEMA, both Jasper and Newton counties are at risk for a Level V impact on the Modified Mercalli Intensity Scale for a 6.7 magnitude earthquake along the New Madrid Fault; Level VI for a 7.6 magnitude earthquake; and Level VII in the event of an 8.6 magnitude earthquake (Figure 3.49).<sup>15</sup>

**Figure 3.50**



<sup>15</sup> [http://sema.dps.mo.gov/docs/programs/Planning,%20Disaster%20&%20Recovery/State%20of%20Missouri%20Hazard%20Analysis/2012-State-Hazard-Analysis/Annex\\_F\\_Earthquakes.pdf](http://sema.dps.mo.gov/docs/programs/Planning,%20Disaster%20&%20Recovery/State%20of%20Missouri%20Hazard%20Analysis/2012-State-Hazard-Analysis/Annex_F_Earthquakes.pdf)

Indirect hazards may also occur at great distances from large earthquakes. Liquefaction, landslides, and life-line disruptions will most affect areas closest to the epicenter, but may occur at significant distances. Subsurface conditions of the Mississippi and Missouri River valleys tend to amplify earthquake ground shaking. As a result, much of Missouri is at risk from earthquakes.

The impact on the general public, small-to medium-size businesses, life-line services, and the infrastructure may be radically lessened if precautions are undertaken at multiple levels. Increased education, concern, and subsequent action can reduce the potential effects of earthquakes, and this can be done in conjunction with preparations for other natural hazards. A program that recognizes the risk of flooding, landslides, and other dangers, incorporating earthquake issues will be the most beneficial to citizens of the two-county region.

Individuals and all levels of government have roles in reducing earthquake hazards. Individuals can reduce their own vulnerability by taking some simple and inexpensive actions with their own households. Local government can take action to lower the threat through the proper regulation of certain sites, assuring that vital or important structures (police, fire, and school buildings) resist hazards, and developing infrastructure in a way that decreases risk. State agencies and the legislature can provide education and assistance to minimize earthquake effects.

### **Probability of Occurrence**

To date, zero earthquake events have impacted either Jasper or Newton County. While the NeMaha fault is still active, historical records demonstrate the limited impact of said earthquakes with no quakes to date exceeding a 5.5 on the Modified Mercalli Scale. Its cascading effects have been largely restricted to more localized regions, but even then the damage caused has been minimal. By contrast, the New Madrid fault has the potential to cause devastating effects throughout the state of Missouri and beyond. Scientists from the U.S. Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis recently estimated the probability of a magnitude 6.0 or greater earthquake from the New Madrid Fault is 25-40 percent through the year 2053. The probability of an earthquake increases with each passing day, which makes it difficult to rate. However, based on information from the CERI, the probability of an earthquake event is rated as moderate and the severity is rated as high. Most likely, aftershocks are the biggest potential threat to the two-county region.

Historical data from the USGS National Earthquake Information Center reports zero measured earthquake events in the southwest Missouri area from 1973-2010. No earthquakes have been reported in the two-county region, nor have small regional earthquakes of less than a 5.0 magnitude had any impact. However, in spite of the fact that no earthquake impacts have been reported, it does not negate the possibility of such an occurrence. As such, the probability of occurrence has been set at 1% in any given year for Jasper and Newton counties.

### **Extent / Severity**

The impact on the general public, small- to medium-size businesses, life-line services, and the infrastructure may be radically lessened if precautions are undertaken at multiple levels. Increased

education, concern, and subsequent action can reduce the potential effects of earthquakes, and this can be done in conjunction with preparations for other natural hazards. A program that recognizes the risk of flooding, landslides and other dangers and which incorporates earthquake issues will be the most beneficial to Jasper County and Newton County citizens. Based on USGS projections, Jasper and Newton counties are most at risk for Modified Mercalli Level VI as likely adverse impacts which include slight damage. HAZUS-MH direct economic losses were completed for every Missouri county in 2013. Table 2.44 summarizes the findings for the two-county region.

<i>Table 2.44 HAZUS Direct Economic Losses for Buildings - Earthquake</i>					
<b>Capital Stock Losses</b>					
County	Cost Structural Damage	Cost Non-structural damage	Cost Contents Damage	Inventory Loss	Loss Ratio
Jasper	\$46,000	\$120,000	\$36,000	\$1,000	0.00
Newton	\$25,000	\$63,000	\$19,000	\$1,000	0.00
<b>Income Losses</b>					
	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
Jasper	\$33,000	\$11,000	\$16,000	\$12,000	
Newton	\$19,000	\$6,000	\$10,000	\$6,000	
<b>Total Losses</b>					
Jasper	\$ 275,000				
Newton	\$ 148,000				

As evidenced by the HAZUS data, any associated damages with an earthquake event would be minimal in the two-county region. The vulnerability assessment below utilizes 1% damages to 5% of structures in any given jurisdiction and 1% of the population potentially affected as the baseline. Though this estimate is significantly higher than the estimated losses from HAZUS, it assumes a catastrophic event from either the New Madrid or NeMaha faults.

### **Vulnerability**

All jurisdictions (municipalities, educational institutions, and unincorporated areas) within the county are equally susceptible to damage stemming from an earthquake. In the event of an earthquake, less than 10% of any given jurisdiction may be at risk for damage based upon data and predicted scenarios. Since the passage of the 2010 plan, significant population growth and building construction have taken place. While building codes in the two counties and their associated jurisdictions have been altered to include tornado resistance, very few earthquake protection measures are included.

<b>Table 2.45</b> <b>Earthquake: Jasper County Vulnerability Assessment</b> (Based on a Level VI earthquake, causing 1% damage in 5% of planning area structures.)						
	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Approximate value*	Number of people	Number of Buildings	Estimated value*
Residential	1,174	2,512	\$2,263,703	140	301	\$271,644
Commercial	232	87	\$721,759	28	10	\$86,611
Industrial	70	12	\$219,003	9	1	\$26,280
Agricultural	7	540	\$22,786	1	65	\$2,734
Government	11	0	\$33,959	1	0	\$4,076
Education	97	5	\$302,192	12	0	\$69,867
Religious / Other	28	13	\$86,375	1	0	\$10,365
<b>Total Planning Area Assessment</b>	<b>1,174</b>	<b>3,169</b>	<b>\$3,649,777</b>	<b>140</b>	<b>377</b>	<b>\$471,597</b>

<b>Table 2.46</b> <b>Earthquake: Building Count Vulnerability by Jasper County Jurisdiction</b> (Based on a Level VI earthquake, causing 1% damage in 5% of planning area structures.)												
Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	29	18	11	7	6	179	74	382	19	32	74	14
Commercial	1	1	1	0	0	6	3	13	1	1	3	1
Industrial	0	0	0	0	0	1	0	2	0	0	0	0
Agricultural	6	4	2	1	1	38	16	81	4	6	16	3
Government	0	0	0	0	0	0	0	1	0	0	0	0
Education	0	0	0	1	0	1	0	1	0	1	1	0
Religious / Other	1	0	0	0	0	1	0	2	0	0	0	0
Total Planning Area Assessment	37	23	14	9	7	226	93	482	24	40	94	18
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	36	1,146	7	6	42	14	5	48	6	320	38	
Commercial	1	40	0	0	1	1	0	2	0	11	1	
Industrial	0	6	0	0	0	0	0	0	0	2	0	
Agricultural	8	245	2	1	9	3	0	9	1	67	8	
Government	0	2	0	0	0	0	0	0	0	1	0	
Education	1	3	0	0	1	0	0	1	0	1	0	
Religious / Other	0	5	0	0	0	0	0	0	0	2	1	
Total Planning Area Assessment	45	1,447	9	7	53	18	5	60	7	404	48	

AD Airport Drive

DQ Duquesne

WA Waco



AL	Alba	FI	Fidelity	WC	Webb City*
AB	Asbury	JA	Jasper*	UJC	Unincorporated Jasper
AV	Avilla*	JO	Joplin*		County
BH	Brooklyn Heights	LR	La Russell		
CJ	Carl Junction*	NC	Neck City		
CA	Cartersville	OR	Oronogo		
CR	Carthage*	PU	Purcell		
CY	Carytown	RE	Reeds		
DW	Duenweg	SA	Sarcoxic*		

\*These cities include educational buildings for the local school districts.

<b>Table 2.47</b> <b>Earthquake: Newton County Vulnerability Assessment</b> (Based on a Level VI earthquake, causing 1% damage in 5% of planning area structures.)						
	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Approximate value*	Number of people	Number of Buildings	Estimated value*
Residential	588	1,330	\$1,054,981	47	106	\$84,398
Commercial	129	183	\$373,803	10	15	\$29,904
Industrial	43	86	\$81,888	3	7	\$6,551
Agricultural	7	697	\$10,536	1	56	\$843
Government	10	2	\$19,552	1	0	\$1,564
Education	168	10	\$129,766	13	1	\$10,381
Religious / Other	2	49	\$38,713	0	4	\$3,097
<b>Total Planning Area Assessment</b>	<b>588</b>	<b>2,357</b>	<b>\$1,709,239</b>	<b>47</b>	<b>189</b>	<b>\$136,738</b>

<b>Table 2.48 Earthquake: Building Count Vulnerability by Newton County Jurisdiction</b> (Based on a Level VI earthquake, causing 1% damage in 5% of planning area structures.)											
Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	2	3	30	18	90	3	135	12	18	272	11
Commercial	0	0	1	1	3	1	5	1	1	10	0
Industrial	0	0	0	0	0	0	0	0	0	1	0
Agricultural	0	0	6	4	19	0	29	2	4	58	2
Government	0	0	0	0	0	0	0	0	0	1	0
Education	0	0	0	0	0	0	0	0	0	1	0
Religious / Other	0	0	1	0	1	0	2	0	0	1	0
Total Planning Area Assessment	2	3	38	23	113	4	171	15	23	344	13
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	5	4	13	61	11	2	6	8	8	1,157	
Commercial	0	0	0	3	1	0	0	0	0	40	
Industrial	0	0	0	0	0	0	0	0	0	6	
Agricultural	1	1	3	13	2	0	2	2	2	248	
Government	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	
Religious / Other	0	0	0	0	0	0	0	0	0	10	
Total Planning Area Assessment	6	5	16	77	14	2	8	10	10	1,461	

CV Cliff Village  
 DA Dennis Acres  
 DI Diamond\*  
 FA Fairview  
 GR Granby\*  
 GF Grand Falls Plaza  
 JO Joplin\*  
 LE Leawood  
 LO Loma Linda  
 NE Neosho\*

NW Newtonia  
 RM Redings Mill  
 RI Ritchey  
 SA Saginaw  
 SE Seneca\*  
 SCD Shoal Creek Drive  
 SCE Shoal Creek Estates  
 SC Stark City  
 ST Stella  
 WE Wentworth

UNC Unincorporated  
 Newton County

\*These cities include educational buildings for the local school districts.

## ***Dam Failure***

A dam is defined by the National Dam Safety Act as an artificial barrier that impounds or diverts water and (1) is at least 6 feet high, and stores at least 50 acre-feet of water, or (2) is at least 25 feet high and stores at least 15 acre-feet. Of the 80,000-plus dams in the United States, less than 5% are under the control of the federal government.

In the state of Missouri, 4,100 dams come under the regulation of the state. The Missouri Department of Natural Resources (MoDNR) – Water Resources Division is the regulating authority for these dams. MoDNR regulates the design, construction, and maintenance of these non-federal, non-agricultural dams that are at least 35 feet high. Dam owners have primary responsibility for the safe design, operation, and maintenance of their dams. They are responsible for providing early warning of problems at the dam, for developing an effective emergency action plan, and for coordinating that plan with local officials.

Dams can fail for a variety of reasons. The following are the most common causes of dam failure:

- ***Overtopping*** – inadequate spillway design, debris blockage of spillways, or settlement of the dam crest;
- ***Piping Failure*** - piping failures are usually caused by embankment leakage, foundation leakage, and/or the deterioration of structures on the dam.
- ***Erosion Failure*** - erosion of dams is generally caused by the inadequate capacity of a spillway, resulting in overtopping of the dam or flow erosion and/or inadequate slope protection.
- ***Structural Failure*** - structural failures of dams may be caused by an earthquake, slope instability, or poor construction.

Dam failures are typically related to, and can cascade from, other natural events. Flash floods, earthquakes, and landslides can cause a dam failure, or accelerate the failure of an already weakened structure. Dam failures can result in the loss of crops, livestock, structures, homes, life, and property. Many communities use dams for the storage of drinking water, recreation, and natural habitat. The loss of a dam could have a significant negative impact upon a community.

## **Previous Events**

Thousands of people have been injured, many killed, and billions of dollars in property damaged by dam failures in the United States. The problem of unsafe dams in Missouri was underscored by dam failures at Lawrenceton in 1968, Washington County in 1975, Fredericktown in 1977, Taum Sauk in 2005, and a near failure in Franklin County in 1978. There have been 26 recorded dam failures in Missouri over the last 100 years. One drowning is recorded among all of these disasters. There are no known instances of

dam failure in the two-county region which caused injury, loss of life, or imposed a considerable cost. See Table 2.49 for a list of regulated dams, Table 2.50 for a list of non-regulated dams. All data stems from the Missouri Department of Natural Resources Dam Safety Program and NID.

Missouri DNR has defined three levels of hazard classes as accepted by the Interagency Committee on Dam Safety. The definitions are:

- **Class 1** – Downstream of the dam contains at least 10 or more permanent dwellings or any public building.
- **Class 2** – Downstream of the dam contains 1 to 9 public dwellings or 1 or more campgrounds with permanent water, sewer and electrical services or 1 or more industrial buildings.
- **Class 3** – No lives, campgrounds, public dwellings, public buildings or industrial buildings are threatened from a dam failure.

The NID has defined three levels of hazard classes. The definitions are:

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

Presently there is no direct correlation between the state's hazard classification and the NID classifications. However, most dams considered to be classes 1 and 2 are considered NID high hazard dams.

Missouri DNR and the National Inventory of Dams (NID) consider seven Newton County dams to be Class 1, or High Hazard dams, three being unregulated, and two Jasper County dams to be Class 1, both unregulated. In the event of a breach, very few households would be impacted, though farm ground may flood.



According to Missouri DNR's Dam Safety Division, Jasper County currently has 14 dams according listed in the National Inventory of Dams, none of which are presently regulated by the state. Newton County now has 20 dams according to the same data, seven of which are presently regulated by the state. The mean dam height is 30.7 feet in Newton County and 17 feet in Jasper County. All unregulated dams in the two-county region are less than 35 feet high. Because there are no base requirements for unregulated dams, people living downstream of these smaller unregulated dams are virtually at the mercy of the dam owner's construction and maintenance practices.

<i>Table 2.49 Regulated Dams in Newton County, Missouri</i>					
Dam Name	ID Number	Year Completed	Height (ft)	Dam Rating*	Hazard Class
Limberlost Dam	MO20219	1957	42	H	2
Lost Creek B-2	MO20730	1980	35	L	3
Lost Creek D-1	MO20731	1980	37	H	2
Lost Creek E-1	MO20511	1977	46	H	1
Lost Creek F-3	MO20514	1977	39	H	1
Lost Creek Watershed Site A-1	MO20781	1992	49	H	1
Lost Creek Watershed Site C-2	MO20782	1992	55	H	1
* Dam Ratings are labeled as H(High), Significant (S), and L(Low).					

*Table 2.50 Non-regulated Dams in Jasper and Newton Counties, Missouri*

Dam Name	County	ID Number	Year Completed	Height In Feet	Dam Rating*	Hazard Class
Asbury Fams Dam	Jasper	MO20088	1965	12	L	3
Barker Lake Dam	Jasper	MO20441	1800	15	H	2
Blackberry Hay Farm Dam	Jasper	MO20196	1965	20	H	1
Doran Lake Dam	Jasper	MO20272	1954	15	L	3
Elliot Lake Dam	Jasper	MO20202	1968	22	H	2
Grand Falls Dam	Newton	MO20006	1920	15	L	3
Hargis Lake Dam	Newton	MO11820	1977	20	L	3
Herr Lake Dam	Jasper	MO20278	1967	15	H	2
Hickory Creek Structure H-1A	Newton	MO51152	2003	21	N/A	N/A
Hickory Creek Structure H-2A	Newton	MO51159	2003	25	H	2
Hickory Creek Structure H-9A	Newton	MO51148	2000	34	H	2
Hickory Creek Structure H-10D	Newton	MO51150	2002	26	N/A	N/A
Hickory Creek Structure H-11	Newton	MO51149	2000	34	H	2
Kellogg Lake Dam	Jasper	MO20009	1953	10	L	3
Lake Mintahama Dam	Newton	MO20280	1971	25	H	1
Maple Lane Farms Lake Dam	Jasper	MO20268	1972	20	L	3
MONoName40	Newton	MO20108	1950	15	L	3
MONoName 654	Jasper	MO20277	1958	5	L	3
Newton County Structure F-1 Dam	Newton	MO20512	1977	30	H	1
Newton County Structure F-2 Dam	Newton	MO20513	1977	30	H	1
Oscie Ora Acres Lake Dam	Jasper	MO20276	1968	15	L	3
Pepper Lake Dam	Newton	MO20223	1965	20	L	3
Rainey Lake Dam	Jasper	MO20267	1952	14	H	1
Scroggs Lake Dam	Jasper	MO20087	1955	30	L	3
Shelton Lake Dam	Jasper	MO20017	1956	25	L	3
Smith, Raymond Dam	Jasper	MO20269	1965	20	L	3
Stuffle Dam	Newton	MO20107	1969	18	L	3

Figure 3.51

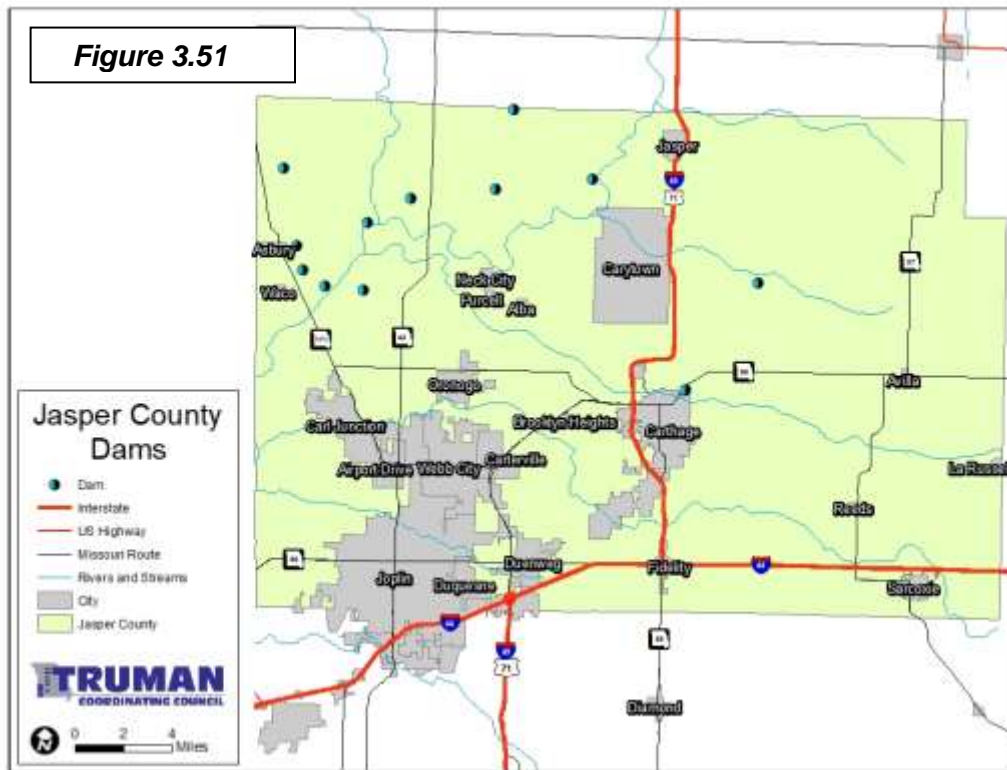
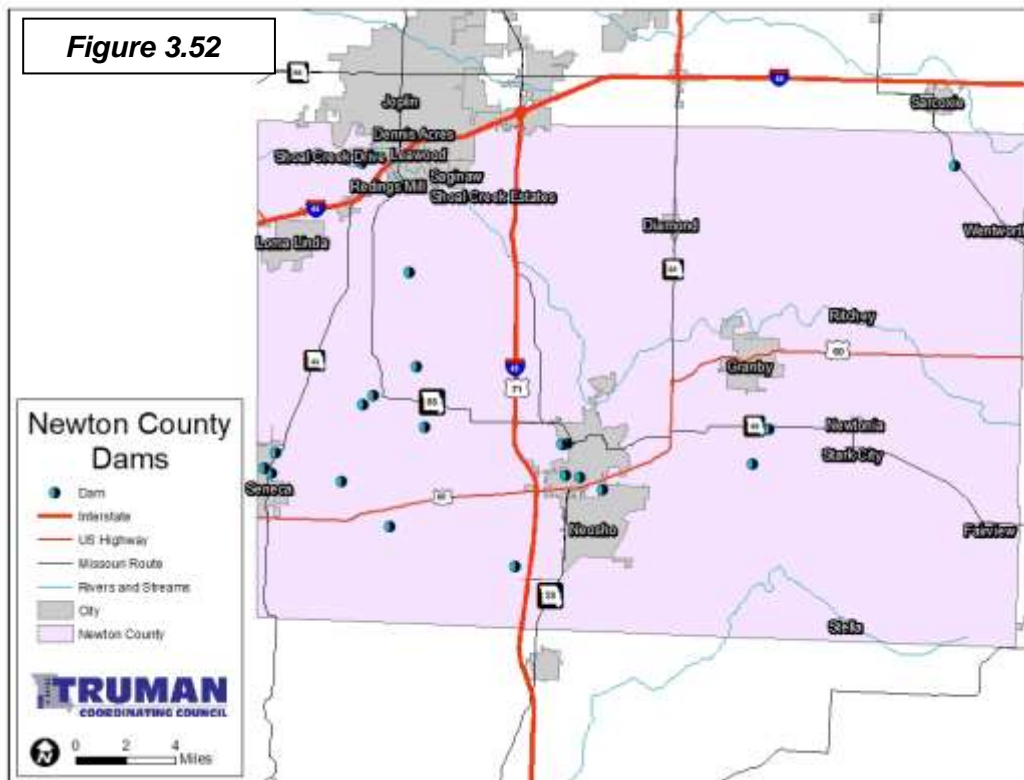


Figure 3.52



## Probability of Occurrence

Of 34 dams in the two-county region, ten are rated by Missouri DNR and the NID as “high” risk. Three of these dams are regulated by the State. High-hazard dams exhibit one or more characteristics: more than 30 years old, high ratio of maximum storage to dam height, and/or high population density downstream. Maps of all existing dams are provided above and in Appendix C. The cities of Carl Junction and Carthage in Jasper County have unregulated dams located near their boundaries. In Newton County, the cities of Grand Falls Plaza, Seneca, and Neosho each have dams within or near their borders as well. The Inundation data, however, is not currently available for any of these dams or the surrounding areas as it still being developed.

The risk of dam failure is shown below according to DNR’s classifications.

<b><u>Hazard Level</u></b>	<b><u>Probable Risk</u></b>
Low	unlikely
Significant	unlikely
High	possible

26 dam failures have occurred within the state of Missouri over the past 100 years. However, the two-county region has experienced no such event. Therefore, the probability of a dam failure within Jasper and Newton counties’ boundaries remains at 0%. (0 events/100 years= 0% probability). However, for the purposes of this assessment, dam failure and its associated impacts cannot be eliminated from the realm of possibility. In order to allow for a risk assessment, the probability of this event has been included as less than 10%.

## Extent / Severity

Based on historical data, the likely adverse impact of disaster occurring due to dam fault in Jasper or Newton County is shown below. The cities of Carl Junction, Carthage, Grand Falls Plaza, Neosho, and Seneca have the greatest potential threat from dam failure, although that statement remains conjecture until proven with inundation data. The majority of dams in the two-county region are located in rural portions of the county. The locations of dams when compared to residential areas and cities do not lend themselves to creation of a significant hazard for most local jurisdictions. The 2018 Missouri State Hazard Mitigation Plan estimates that 846 people and 466 buildings in Newton County are presently at risk from dam failure with regulated dams with an estimated loss of \$27,073,190, or 20% of the total structure value in dam inundation areas. . For the purposes of this plan, it has been estimated that 2/3 of the structures affected will be residential, and 1/3 will be agricultural. Jasper County has an estimated of 0 people and 0 buildings due to its lack of unregulated dams, though this does not take into account the failure of unregulated dams.<sup>16</sup> As such, the extent of this type of hazard event would include only light damages of less than 1%.

<sup>16</sup> 2018 Missouri State Hazard Mitigation Plan, 3.173-3.189



## Vulnerability

The assessment of dam failure impact upon the two-county region and their jurisdictions is significantly limited due to a lack of data concerning inundation. As stated above, the 2013 Missouri State Hazard Mitigation Plan demonstrates an extremely small portion of both the population and area structures are at risk. Vulnerability assessments below incorporate information from the state plan for both Jasper and Newton County as a whole. More jurisdiction-specific information is not presently available, but a mitigation strategy has been included to pursue development of such data.

<b>Table 2.51</b> <b>Dam Failure: Jasper County Vulnerability Assessment</b> (Based on a regulated dam failure, causing 0% damage in 0% of planning area structures.)						
	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Approximate value*	Number of people	Number of Buildings	Estimated value*
Residential	0	0	\$0	0	0	\$0
Commercial	0	0	\$0	0	0	\$0
Industrial	0	0	\$0	0	0	\$0
Agricultural	0	0	\$0	0	0	\$0
Government	0	0	\$0	0	0	\$0
Education	0	0	\$0	0	0	\$0
Religious / Other	0	0	\$0	0	0	\$0
<b>Total Planning Area Assessment</b>	<b>0</b>	<b>0</b>	<b>\$0</b>	<b>0</b>	<b>0</b>	<b>\$0</b>

**Table 2.52**  
**Dam Failure: Building Count Vulnerability by Jasper County Jurisdiction**  
 (Based on a regulated dam failure, causing 0% damage in 0% of planning area structures.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0	0
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	0	0	0	0	0	0	0	0	0	0	0	
Commercial	0	0	0	0	0	0	0	0	0	0	0	
Industrial	0	0	0	0	0	0	0	0	0	0	0	
Agricultural	0	0	0	0	0	0	0	0	0	0	0	
Government	0	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	0	
Religious / Other	0	0	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0	

AD	Airport Drive	DQ	Duquesne	WA	Waco
AL	Alba	FI	Fidelity	WC	Webb City*
AB	Asbury	JA	Jasper*	UJC	Unincorporated Jasper County
AV	Avilla*	JO	Joplin*		
BH	Brooklyn Heights	LR	La Russell		
CJ	Carl Junction*	NC	Neck City		
CA	Carterville	OR	Oronogo		
CR	Carthage*	PU	Purcell		
CY	Carytown	RE	Reeds		
DW	Duenweg	SA	Sarcoxie*		

\*These cities include educational buildings for the local school districts.

**Table 2.53****Dam Failure: Newton County Vulnerability Assessment**

(Based on a regulated dam failure, causing less than 10% damage in less than 1% of planning area structures.)

	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Approximate value*	Number of people	Number of Buildings	Estimated value*
Residential	487	40	\$3,029,707	0	0	\$0
Commercial	0	0	\$0	0	0	\$0
Industrial	0	0	\$0	0	0	\$0
Agricultural	0	20	\$1,514,854	0	0	\$0
Government	0	0	\$0	0	0	\$0
Education	0	0	\$0	0	0	\$0
Religious / Other	0	0	\$0	0	0	\$0
<b>Total Planning Area Assessment</b>	<b>487</b>	<b>60</b>	<b>\$4,544,561</b>	<b>0</b>	<b>0</b>	<b>\$0</b>

**Table 2.54**  
**Dam Failure: Building Count Vulnerability by Newton County Jurisdiction**  
(Based on a regulated dam failure, causing less than 10% damage in less than 1% of planning area structures.)

Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	0	0
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	0	0	0	0	0	0	0	0	0	40	
Commercial	0	0	0	0	0	0	0	0	0	0	
Industrial	0	0	0	0	0	0	0	0	0	0	
Agricultural	0	0	0	0	0	0	0	0	0	20	
Government	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	
Religious / Other	0	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	0	0	0	0	0	0	0	0	0	60	

CV Cliff Village

DA Dennis Acres

DI Diamond\*

FA Fairview

GR Granby\*

GF Grand Falls Plaza

JO Joplin\*

LE Leawood

LO Loma Linda

NE Neosho\*

NW Newtonia

RM Redings Mill

RI Ritchey

SA Saginaw

SE Seneca\*

SCD Shoal Creek Drive

SCE Shoal Creek Estates

SC Stark City

ST Stella

WE Wentworth

UNC Unincorporated

Newton County

\*These cities include educational buildings for the local school districts.



## Wildfire

Each year in the United States, about 3,700 wildfires burn more than 55,000 acres of forest and grassland in our state. Unlike Western states that have a summer fire season, Missouri's wildfires season is in the spring and fall. Dead vegetation, combined with the low humidity and high winds typical of these seasons, makes wildfire a greater risk at these times. The majority of wildfires in the world are thought to be started by people. However, the greatest cause of wild land fires is lightning. Eight million lightning strikes occur worldwide each day. One percent of these strikes result in wild land fires. In fact, dry lightning is responsible for 80 percent of all fires in wild land areas. Dry lightning occurs during thunderstorms when the humidity levels are so low that rain evaporates before it reaches the ground. Even though the rain does not reach the ground, the lightning does.<sup>17</sup>

Grass, brush, and forest fires are natural events that have occurred periodically throughout history. There are three major classes of wild land fires; ground fires, surface fires, and crown fires. Ground fires spread across the grass and low-lying vegetation. Surface fires burn the trunks of trees as well as the grass and low-lying vegetation. During crown fires, the flames move across the ground, up the trees, and across the tops of the trees. Crown fires are the most dangerous and destructive class of wild land fires.

*Table 2.55 Fire Danger Categories*

<b>Low Fire Danger</b>	Open burning is usually safe with proper containers and precautions under low fire danger conditions. However, residents should always check on local ordinances that prohibit open burning under any conditions. Escaped fires are easy to extinguish. No fire crew staffing is planned for low fire danger conditions.	<b>Burning index &lt;20.</b>
<b>Moderate Fire Danger</b>	Open burning is usually safe with the proper precautions under moderate fire danger conditions. Burning should be done in the early morning and late evening to avoid windier conditions at midday. Escaped fires can be contained with proper fire-fighting equipment. Partial fire crew staffing is planned for moderate fire danger.	<b>Burning index = 21-30.</b>
<b>High Fire Danger</b>	Any open burning is discouraged during high fire danger. Windy conditions, low humidity and dry fuels contribute to high fire danger. Fires escape control easily and containment is difficult, endangering human safety and property. Partial or full fire staffing is planned, depending on local burning conditions.	<b>Burning index = 31-45.</b>
<b>Extreme Fire Danger</b>	Open burning should not be attempted during extreme fire danger. Local authorities may impose burning bans. High winds and extended dry periods lead to extreme burning conditions. Open fires can quickly escape and are very difficult to control. Spot fires occur ahead of the main fire, and erratic burning conditions make fires difficult to control even for experienced fire fighters. Full fire crew staffing is planned for extreme burning conditions.	<b>Burning index &gt;45.</b>

<sup>17</sup> <http://sema.dps.mo.gov/docs/programs/Logistics,%20Resources,%20Mitigation%20&%20Floodplain/mitigation/MO%20State%20HMP.pdf>

Fire danger is based upon the burning index (BI). The burning index takes into account the fuel moisture, relative humidity, wind speed, temperature, and recent precipitation. The burning index is the basis for fire suppression crew staffing levels. The Missouri Department of Conservation relies upon the local news media to help warn citizens of high fire danger. A set of standardized fire danger adjectives (Table 2.55) has been developed for fire warnings. These adjectives include a brief description of burning conditions, open burning suggestions for homeowners and fire crew staffing levels. Residents should always check with their local fire department or conservationist for local burning conditions.

### **Previous Events**

No Missouri fires are listed among the significant wildfires in the U.S. since 1825. Fires covering more than 300 acres are considered large in Missouri. Missouri averages 3,200 fires a year with 52,000 acres burned, or an average fire size of 16.25 acres<sup>20</sup>. Both Jasper and Newton County have significant portions of land in urban settlement, but also large areas of rural and agricultural land. Jasper County experienced 472 wildfires from 2004 - 2016, with an average 244 acres burned per year and a total of 3,168.54 acres. Newton County experienced 1,759 wildfires from 2004 – 2016, with an average impact of 556 acres per year and a total of 7,221.89 acres.

### **Probability of Occurrence**

Although there is always a risk of fire in the two-county region, there is little historical precedent for significant wildfires threatening the County on any large scale. Due to the predominantly agricultural nature of the rural portions of Jasper and Newton County, it is likely that small-scale brush fires may occur in the County, but the threat is minimal. Local fire districts reported during the meeting process that the majority of these reported wildfires were more likely controlled burns by local farmers. Controlled burns, however, can potentially result in larger fires. Therefore, the probability of a wildfire event in Jasper and Newton Counties in any given year is near 100% ( 2,231 events / 12 years

\*100 = 223,100%<sup>18</sup> .

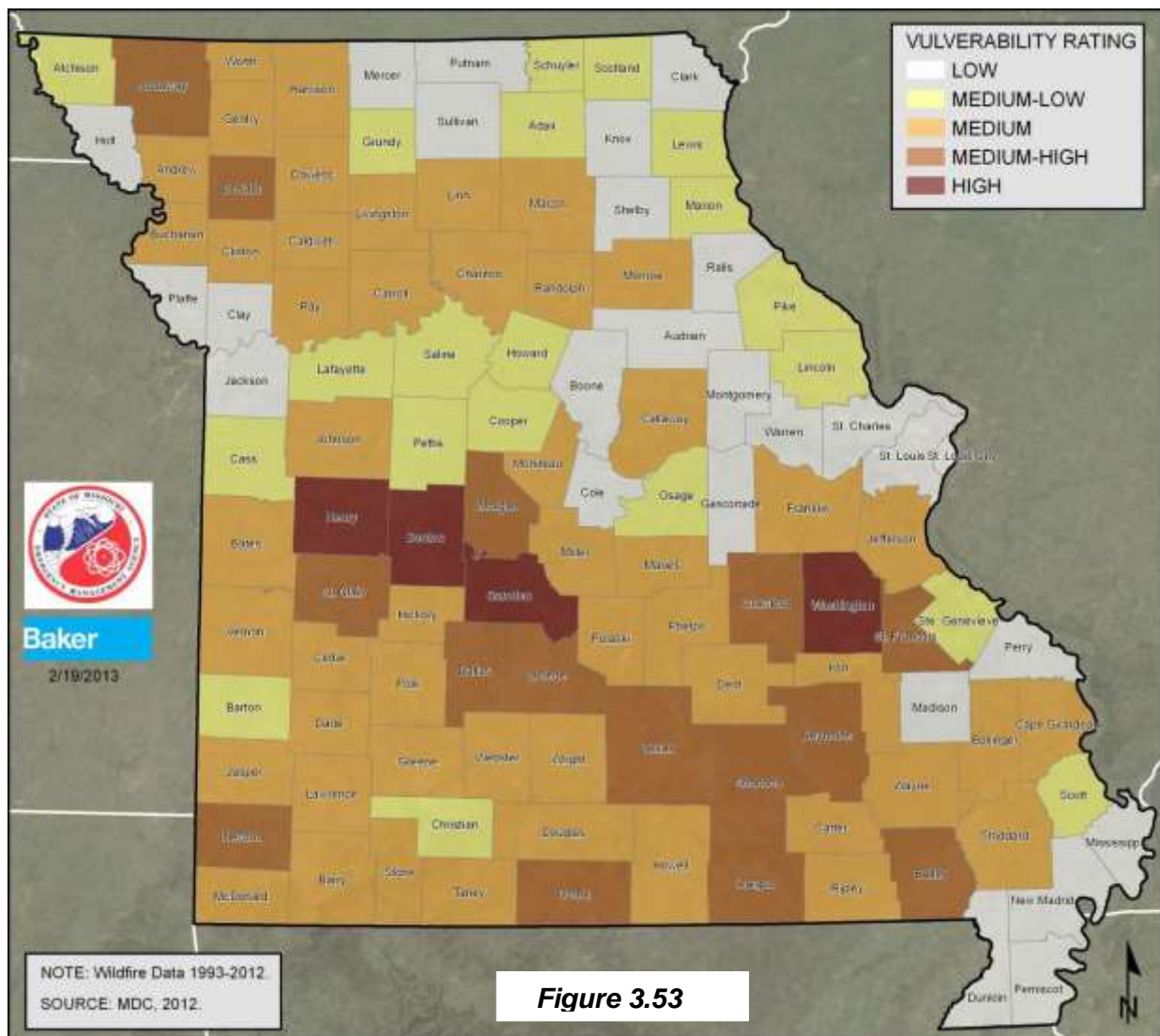
### **Extent / Severity**

The potential extent of damage caused by wildfire is difficult to determine. Like earthquakes and dam failure, wildfires have had no measurable impact upon Jasper County or Newton County. Using latest data from 2004-2016, 2,231 fires have burned a total of 10,390.43 acres, for an average of 4.6 acres affected per event. Jasper County sustained damage to 3 buildings related to wildfires during this time period, while Newton County sustained damage to 53 buildings. With an average of 33 acres per fire in Jasper County and 134.2 acres per fire in Newton County, it is unlikely that damage would exceed 1% based upon event location and the unlikeliness of an uncontrollable wildfire. However, for the purposes of this assessment, wildfire and its associated impacts cannot be eliminated from the realm of possibility. Further study will be required to create a model for damage assessments related to wildfire.

<sup>18</sup> 2018 Missouri State Hazard Mitigation Plan, 3.392

## Vulnerability

The risk of wildfire in the two-county region and its jurisdictions is minimal, particularly when compared with other areas of the state and the nation. Jasper County received a rating of Medium vulnerability, while Newton County received a rating of Medium-High in the state hazard mitigation plan. Wildfire is most likely to occur in the unincorporated areas, largely limited to agricultural land. The City of Joplin has some interface of wildfire and urban fire locations without vegetation present, but no wildfires have affected the city to date. The remaining cities and school districts are largely surrounded by agricultural land. The presence of drought may also alter the potential consequences in the region.



The data for wildfire at this time is insufficient to craft a successful loss model. For the purposes of this plan and based on the vulnerability assessment completed by the State of Missouri, it is estimated that less than 5% of any given jurisdiction may be at risk for damage before the fire is contained due to surrounding agricultural land and the potential for lost control during managed

burning. Resulting damages would most likely be light, weighing in at less than 10% for any impacted land or structure.

<b>Table 2.56</b> <b>Wildfire: Jasper County Vulnerability Assessment</b> (Based on a wildfire causing 5% damage in 2% of planning area structures.)						
	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Approximate value*	Number of people	Number of Buildings	Estimated value*
Residential	2,348	1,005	\$4,527,406	282	121	\$543,289
Commercial	465	35	\$1,443,518	56	4	\$173,222
Industrial	141	5	\$438,005	17	1	\$52,561
Agricultural	14	216	\$45,571	2	26	\$5,469
Government	21	0	\$67,918	2	0	\$8,150
Education	195	2	\$604,383	23	0	\$139,734
Religious / Other	56	5	\$172,749	1	1	\$20,730
<b>Total Planning Area Assessment</b>	<b>2,348</b>	<b>1,268</b>	<b>\$7,299,550</b>	<b>282</b>	<b>153</b>	<b>\$943,155</b>



**Table 2.57**  
**Wildfire: Building Count Vulnerability by Jasper County Jurisdiction**  
 (Based on a wildfire causing 5% damage in 2% of planning area structures.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	12	7	5	2	2	71	29	153	8	13	29	6
Commercial	0	0	0	0	0	2	2	5	0	1	2	0
Industrial	0	0	0	0	0	1	0	1	0	0	0	0
Agricultural	3	2	1	1	1	15	6	33	2	2	6	1
Government	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	1	0	1	0	0	0	0
Total Planning Area Assessment	15	9	6	3	3	90	37	193	10	16	37	7
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	14	459	3	2	16	6	2	19	2	128	16	
Commercial	1	16	0	0	1	0	0	1	0	4	1	
Industrial	0	2	0	0	0	0	0	0	0	1	0	
Agricultural	3	98	1	1	4	1	0	4	1	27	3	
Government	0	0	0	0	0	0	0	0	0	0	0	
Education	0	2	0	0	0	0	0	0	0	1	0	
Religious / Other	0	2	0	0	0	0	0	0	0	1	0	
Total Planning Area Assessment	18	579	4	3	21	7	2	24	3	162	20	

AD	Airport Drive	DQ	Duquesne	WA	Waco
AL	Alba	FI	Fidelity	WC	Webb City*
AB	Asbury	JA	Jasper*	UJC	Unincorporated Jasper County
AV	Avilla*	JO	Joplin*		
BH	Brooklyn Heights	LR	La Russell		
CJ	Carl Junction*	NC	Neck City		
CA	Carterville	OR	Oronogo		
CR	Carthage*	PU	Purcell		
CY	Carytown	RE	Reeds		
DW	Duenweg	SA	Sarcoxie*		

\*These cities include educational buildings for the local school districts. (See page 31).

**Table 2.58**  
**Wildfire: Newton County Vulnerability Assessment**  
 (Based on a wildfire causing 5% damage in 2% of planning area structures.)

	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Approximate value*	Number of people	Number of Buildings	Estimated value*
Residential	1,177	532	\$2,109,962	94	43	\$168,797
Commercial	258	73	\$747,605	21	15	\$59,808
Industrial	86	34	\$163,775	7	3	\$13,102
Agricultural	15	279	\$21,072	1	22	\$1,686
Government	20	1	\$39,103	2	0	\$3,128
Education	336	4	\$259,532	27	0	\$20,763
Religious / Other	5	20	\$77,425	0	2	\$6,194
<b>Total Planning Area Assessment</b>	<b>1,177</b>	<b>943</b>	<b>\$3,418,474</b>	<b>152</b>	<b>85</b>	<b>\$273,478</b>

**Table 2.59**  
**Wildfire: Building Count Vulnerability by Newton County Jurisdiction**  
 (Based on a wildfire causing 5% damage in 2% of planning area structures.)

Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	1	1	12	7	36	1	55	5	7	109	4
Commercial	0	0	0	0	1	0	2	0	0	4	0
Industrial	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	3	2	8	0	12	2	2	23	1
Government	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	1	0
Religious / Other	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	1	1	15	9	45	1	69	6	9	137	5
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	2	2	5	25	4	1	2	3	4	37	
Commercial	0	0	0	1	0	0	0	0	0	2	
Industrial	0	0	0	0	0	0	0	0	0	0	
Agricultural	1	0	1	5	1	0	1	1	1	8	
Government	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	
Religious / Other	0	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	3	2	6	31	5	1	3	4	4	47	

CV Cliff Village  
 DA Dennis Acres  
 DI Diamond\*  
 FA Fairview  
 GR Granby\*  
 GF Grand Falls Plaza  
 JO Joplin\*  
 LE Leawood  
 LO Loma Linda  
 NE Neosho\*

NW Newtonia  
 RM Redings Mill  
 RI Ritchey  
 SA Saginaw  
 SE Seneca\*  
 SCD Shoal Creek Drive  
 SCE Shoal Creek Estates  
 SC Stark City  
 ST Stella  
 WE Wentworth

UNC Unincorporated  
 Newton County

\*These cities include educational buildings for the local school districts. (See page 31).

## Sinkholes

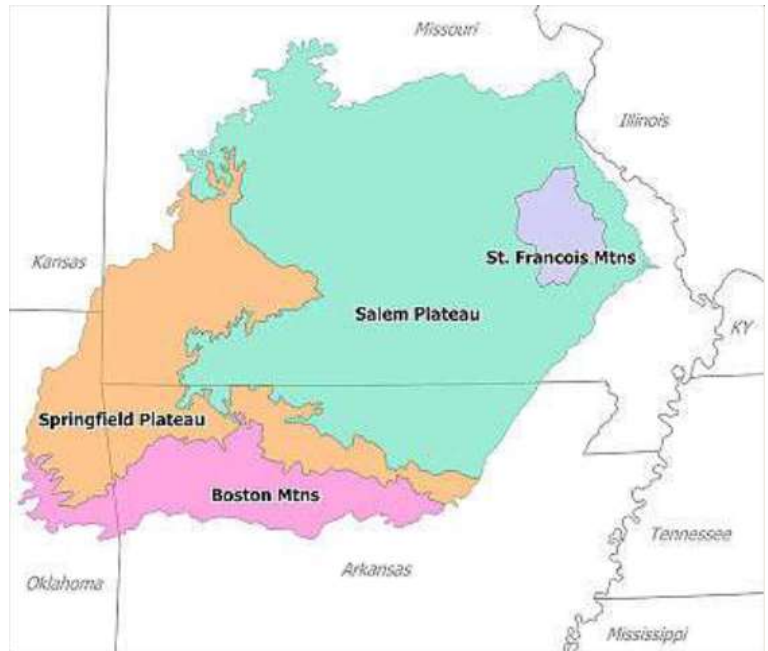
Land subsidence is sinking of the earth's surface due to the movement of earth materials below the surface. This sinking can be sudden or gradual and is generally attributed to the removal of subsurface water or the draining of organic soils. In Missouri, subsidence is primarily associated with sinkholes. In the case of sinkholes, the rock below the surface is limestone, carbonate rock, salt beds, or some other rock that can be naturally dissolved by circulating ground water. As the rock dissolves, spaces and caverns form, and ultimately the land above the space collapses. In Missouri, sinkholes usually result above openings into bedrock caves which erode and collapse. These collapses are called "cover collapses" and geologic information can be applied to predict the general regions where collapses may occur. Sinkholes range in size from several square yards to hundreds of acres. They may be quite shallow or hundreds of feet deep. In the Joplin area, the bedrock is extensively carbonate and chert overlain with alluvium, soil, and chat. Paleo-sinkholes have formed along a north-northwest line trending dissolution joints. These sinkholes are typically in-filled with shale, siltstone, sandstone, limestone, and coal. Lead and zinc ore was also deposited along these sinkholes and near the vertical faults as well as sheet ground deposits.



Sinkhole formation is most intense where the bedrock is most soluble and has been exposed to extended period of weathering and where surface materials are between 40 and 80 feet in thickness and are composed of relict bedrock formation and sinkhole formation. Both Jasper and Newton counties are in the Springfield Plateau which is a karst subprovince made of carbonate (Figure 3.54). Caves, sinkholes, and losing streams are common in carbonate karst topography.



According to the U.S. Geological Survey, the most damage from sinkholes tends to occur in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania. Fifty-nine percent of Missouri is underlain by thick, carbonate sinkholes which occur naturally in the state's karst regions. They are a common geologic hazard in southern Missouri, but also occur in the central and northeastern parts of the state. While most develop from natural causes, others are the result of human activities. Triggering factors include activities that alter the natural hydrologic conditions. These may include, but are not limited to, the collapse of storm sewers and subsurface mining.



**Figure 3.55**

### **Previous Events**

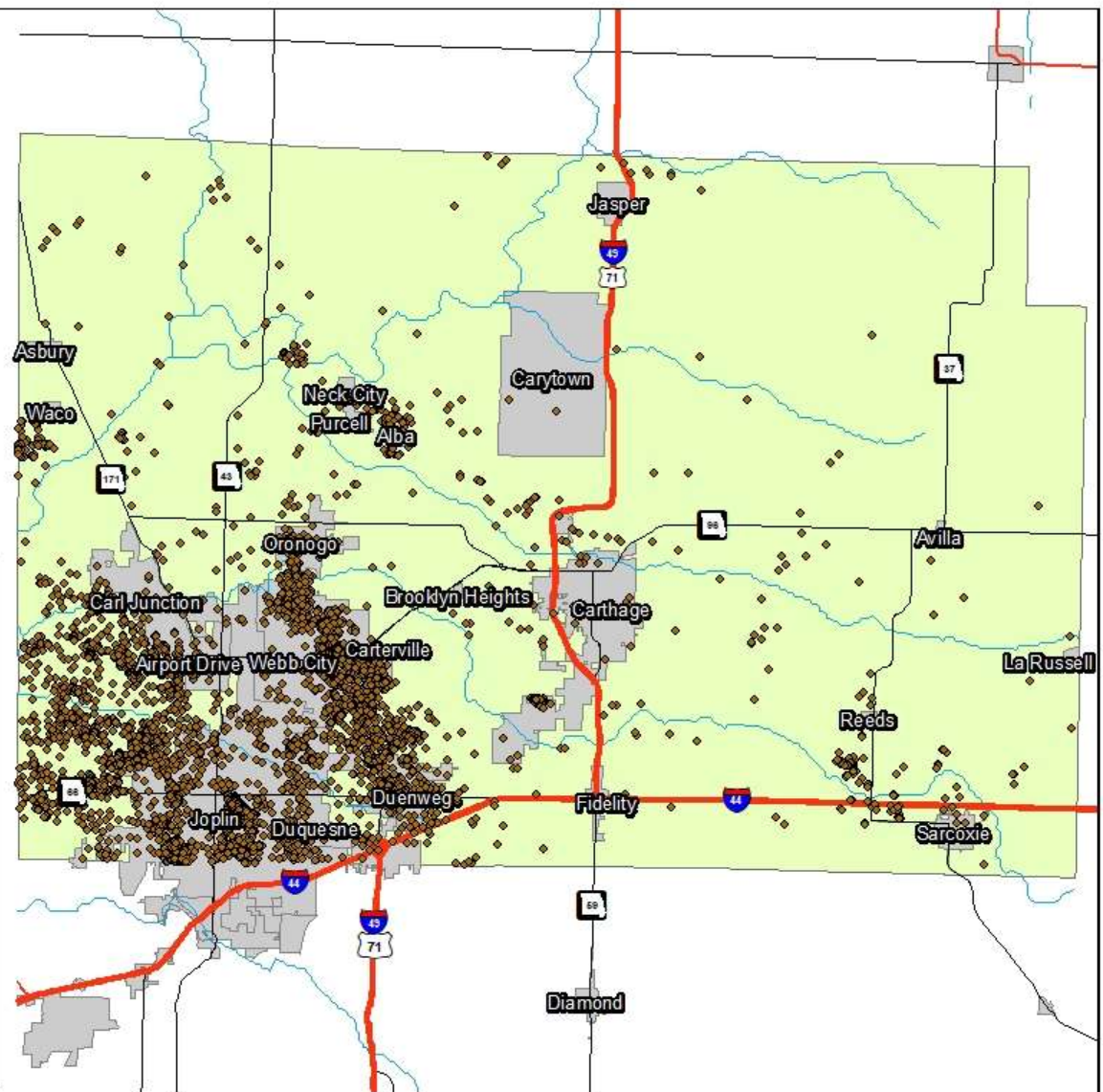
Sinkholes are a regular occurrence in Missouri, but usually occur with little significance. There have been occasional damages related to sinkholes. Sinkhole collapses have occurred in sewage lagoons in a number of towns in southern Missouri, but most were abandoned at the time of their collapse. Mining-related collapses have also occurred in the Joplin area where mining for lead and zinc once occurred. Figures 3.56 and 3.57 demonstrate the location of mines in Jasper and Newton counties.

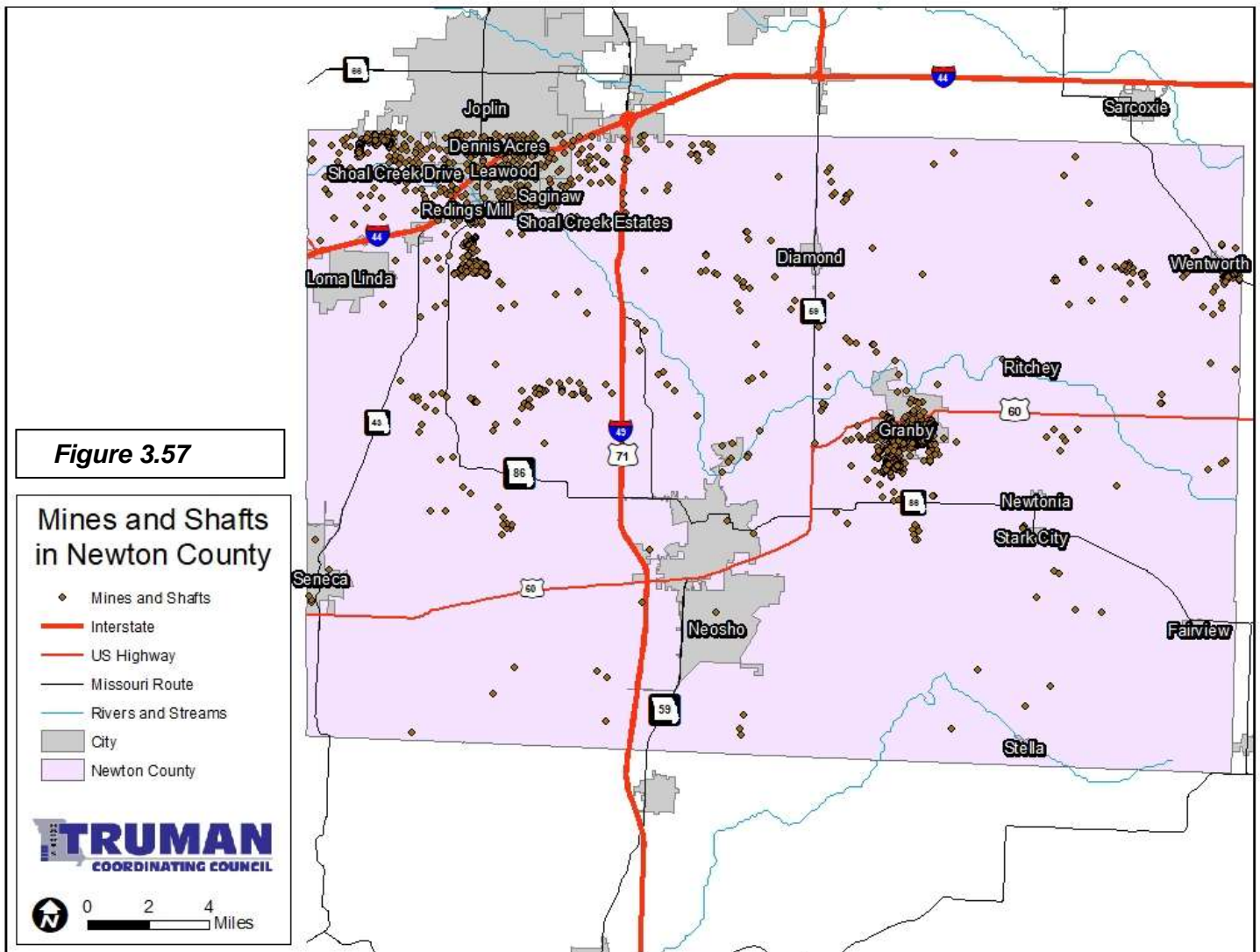
**Figure 3.56****Mines and Shafts in Jasper County**

- ◆ Mines and Shafts
- Interstate
- US Highway
- Missouri Route
- Rivers and Streams
- City
- Jasper County

**TRUMAN**  
COORDINATING COUNCIL

0 2 4 Miles

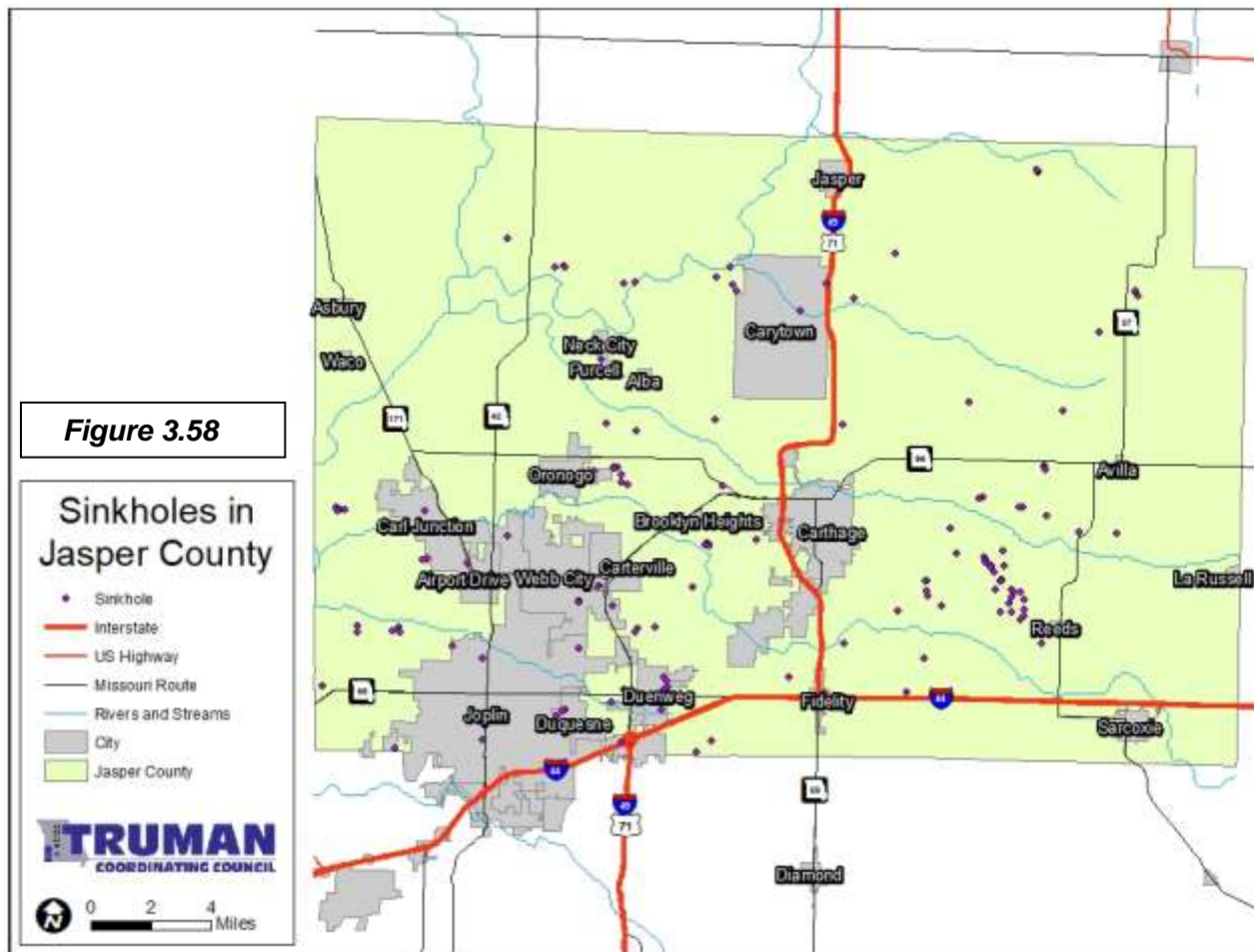




Recent events include:

- a 1998 sinkhole in Cartersville which destroyed a backyard and damaged the sewer system;
- a sinkhole which drained Lake Chesterfield in St. Louis County in 2004;
- a sinkhole the size of a football field was reported in 2005 in Barry County;
- a sinkhole collapse in Nixa in 2006 which destroyed a residence and vehicle;
- an abandoned and forgotten lead/zinc mine shaft was reopened during a 2007 MoDOT project on Rangeline in Joplin which was permanently filled with Missouri Land Reclamation funds assistance;
- a sinkhole opened north of the Webb City High School in 2008 which threatened local transportation infrastructure.
- a large sinkhole in Joplin which destroyed a backyard pool in 2009;
- a collapse near the Springfield-Branson Airport in 2012 which caused damage to the water main following the collapse of the surface concrete;
- a sinkhole was permanently filled on 15<sup>th</sup> Street in Joplin in 2014.

Previous sinkholes in Jasper and Newton counties have caused little if any damage, but a number have been reported since the 1970s. Figures 3.58 and 3.59 show the locations of reported sinkholes in the two counties.





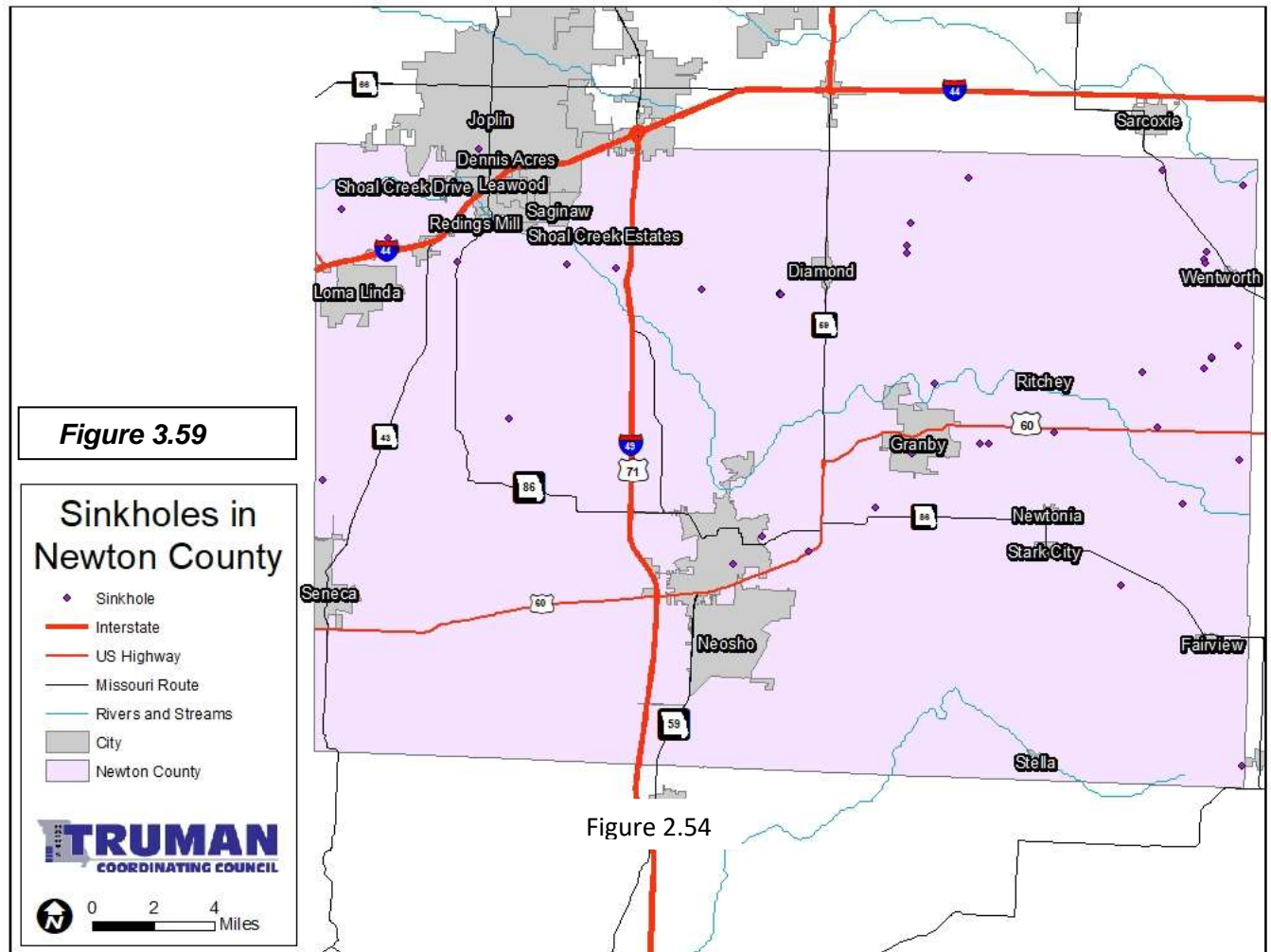


Figure 2.54

### Probability of Occurrence

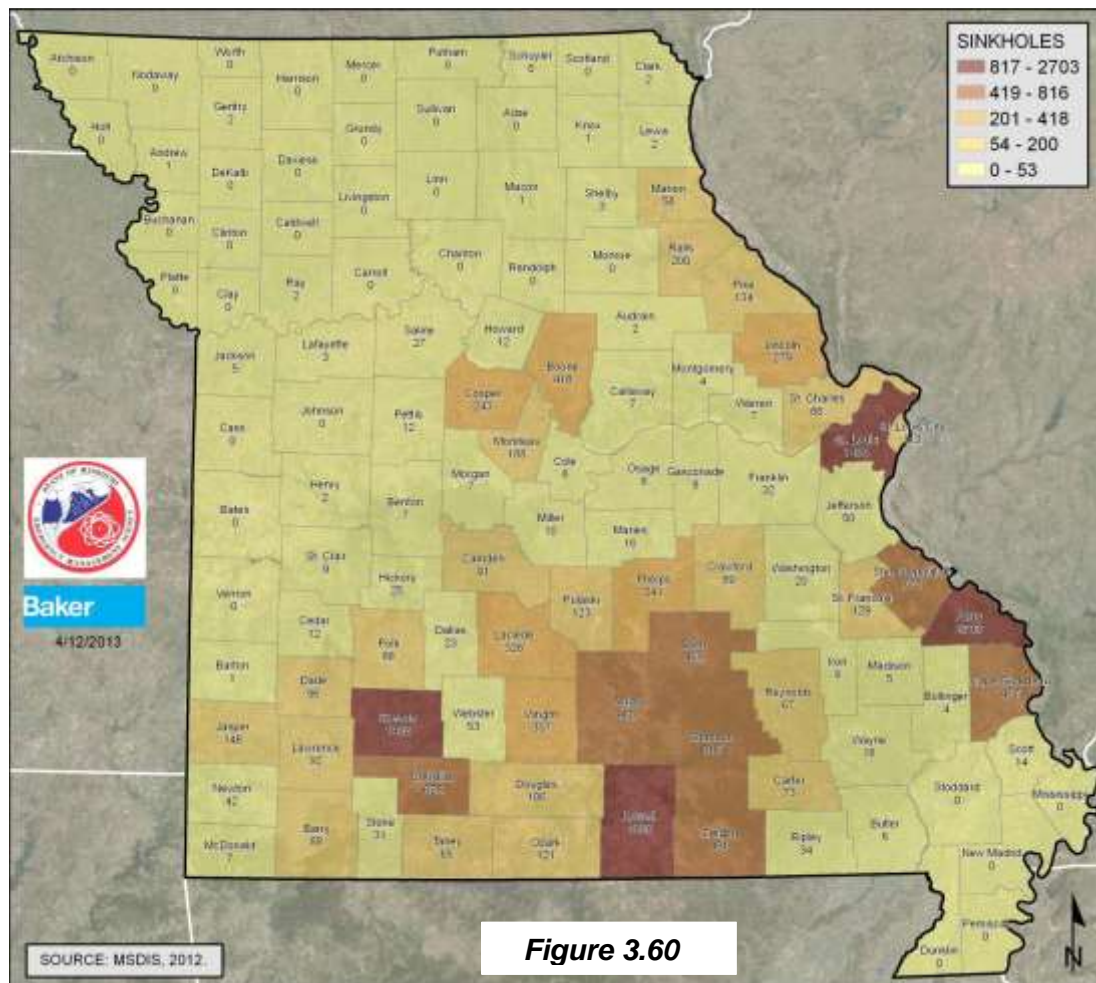
Because of the underlying geography and history of mining in the two-county region, there is always a risk of sinkholes in both Jasper and Newton counties. However, there is little historical precedent for significant impact on life or property. A total of 15,981 sinkholes have been identified in Missouri by the Geological Survey Program.<sup>19</sup> The potential threat of sinkholes is compounded during times of flooding or drought as the hydrologic patterns shift. Due to the mining history and geological makeup of the two-county region, it is likely that sinkholes may occur in the County, but the threat is relatively minimal given that buildings or infrastructure damage is localized with each occurrence. Due to the nature of this hazard, it is extremely difficult to predict future occurrences. While counties may be able to identify potential void spaces to help predict future sites, this hazard generally develops over a long period of time and can help jurisdiction make decisions about further development and potential mitigation actions. From 1970 - 2012, Jasper County has experienced 101 reported sinkholes while Newton County has reported 28, for a total of 129 events. Therefore, the probability of a sinkhole event in the two-county region in any given year is 100% ( 129 events / 48 years \* 100 = 268%).

<sup>19</sup> <http://dnr.mo.gov/geology/geosrv/envgeo/sinkholes.htm>  
2018 Missouri State Hazard Mitigation Plan, 3.218-3.233



## Extent / Severity

The potential extent or severity of sinkholes in the region is difficult to assess due to a lack of data. Like wildfires and dam failure, sinkholes have had very limited impact upon the two-county region, with no events being publicly associated with any type of damage cost. Since 2004, ten additional mine shafts have opened, increasingly the possibility for potential sinkhole development. However, the existing data insufficiency makes it almost impossible to generate a workable figure for any given sinkhole event, particularly given the fact that sinkholes usually impact single buildings or pieces of infrastructure rather than a large group. For the purposes of this plan, the assumption was made that damage would rarely exceed 1% of any given jurisdiction based upon event location. Further study will be required to create a model for damage assessments related to sinkholes.



## Vulnerability

The risk of sinkholes in the two-county region and their jurisdictions is fairly significant, particularly when compared with other areas of the state and the nation (Figure 3.60). Sinkholes are most likely to occur in areas associated with mining, particularly the southwest region of Jasper County, the northeast region of Newton County, and the City of Granby. The data for sinkholes at this time is insufficient to craft a successful loss model. For the purposes of this plan and based on the vulnerability assessment completed by the State of Missouri, it is estimated that less than 1% of any given jurisdiction may be at risk for losses related to sinkholes due to their restricted locations. Resulting damages would most likely be light, weighing in at less than 2% for any impacted land or structure. Only jurisdictions with identified mines have been included in this assessment for potential damages.

**Table 2.60**  
**Sinkholes: Building Count Vulnerability by Jasper County Jurisdiction**  
 (Based on a sinkhole causing 2% damage in 1% of planning area structures.)

Jurisdiction	AD	AL	AB	AV	BH	CJ	CA	CR	CY	DW	DQ	FI
Residential	6	4	0	0	0	36	15	76	4	6	15	0
Commercial	0	0	0	0	0	1	1	3	0	0	1	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Agricultural	1	1	0	0	0	8	3	16	1	2	3	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0	0	1	0	0	0	0
Total Planning Area Assessment	7	5	0	0	0	45	19	96	5	8	19	0
Jurisdiction	JA	JO	LR	NC	OR	PU	RE	SA	WA	WC	UJC	
Residential	0	229	0	1	9	0	0	10	0	64	8	
Commercial	0	8	0	0	0	0	0	0	0	2	0	
Industrial	0	1	0	0	0	0	0	0	0	0	0	
Agricultural	0	49	0	0	2	0	0	2	0	14	2	
Government	0	0	0	0	0	0	0	0	0	0	0	
Education	0	1	0	0	0	0	0	0	0	1	0	
Religious / Other	0	1	0	0	0	0	0	0	0	0	0	
Total Planning Area Assessment	0	289	0	1	11	0	0	12	0	81	10	

<b>Table 2.61</b> <b>Sinkholes: Jasper County Vulnerability Assessment</b> (Based on a sinkhole causing 2% damage in 1% of planning area structures.)						
	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Approximate value*	Number of people	Number of Buildings	Estimated value*
Residential	1,174	502	\$905,481	141	60	\$108,658
Commercial	232	17	\$288,704	28	42	\$34,644
Industrial	70	2	\$87,601	8	0	\$10,512
Agricultural	7	108	\$9,114	1	13	\$1,094
Government	10	0	\$13,584	1	0	\$1,630
Education	97	1	\$120,877	12	0	\$27,947
Religious / Other	28	3	\$34,550	1	0	\$4,146
<b>Total Planning Area Assessment</b>	<b>1,174</b>	<b>633</b>	<b>\$1,459,911</b>	<b>141</b>	<b>115</b>	<b>\$188,631</b>

AD	Airport Drive	DQ	Duquesne	WA	Waco
AL	Alba	FI	Fidelity	WC	Webb City*
AB	Asbury	JA	Jasper*	UJC	Unincorporated Jasper County
AV	Avilla*	JO	Joplin*		
BH	Brooklyn Heights	LR	La Russell		
CJ	Carl Junction*	NC	Neck City		
CA	Cartersville	OR	Oronogo		
CR	Carthage*	PU	Purcell		
CY	Carytown	RE	Reeds		
DW	Duenweg	SA	Sarcoxie*		

\*These cities include educational buildings for the local school districts. (See page 31).

**Table 2.62**  
**Sinkholes: Newton County Vulnerability Assessment**  
 (Based on a sinkhole causing 2% damage in 1% of planning area structures.)

	Current Data			Future Growth Projections		
	Number of people	Number of Buildings	Approximate value*	Number of people	Number of Buildings	Estimated value*
Residential	588	266	\$421,992	47	21	\$33,759
Commercial	129	37	\$149,521	10	3	\$11,962
Industrial	43	17	\$32,755	3	1	\$2,620
Agricultural	7	139	\$4,214	1	11	\$337
Government	10	0	\$7,821	1	0	\$625
Education	168	2	\$51,906	13	0	\$4,153
Religious / Other	2	10	\$15,485	0	0	\$1,239
<b>Total Planning Area Assessment</b>	588	471	<b>\$683,694</b>	47	36	<b>\$54,695</b>

<b>Table 2.63</b> <b>Sinkholes: Building Count Vulnerability by Newton County Jurisdiction</b> (Based on a sinkhole causing 2% damage in 1% of planning area structures.)											
Jurisdiction	CV	DA	DI	FA	GR	GF	JO	LE	LO	NE	NW
Residential	0	1	0	0	18	1	27	2	0	55	0
Commercial	0	0	0	0	1	0	1	0	0	2	0
Industrial	0	0	0	0	0	0	0	0	0	0	0
Agricultural	0	0	0	0	4	0	6	1	0	12	0
Government	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0
Religious / Other	0	0	0	0	0	0	0	0	0	0	0
Total Planning Area Assessment	0	1	0	0	23	1	34	3	0	69	0
Jurisdiction	RM	RI	SA	SE	SCD	SCE	SC	ST	WE	UNC	
Residential	1	0	2	12	3	1	0	0	0	231	
Commercial	0	0	0	1	0	0	0	0	0	8	
Industrial	0	0	0	0	0	0	0	0	0	1	
Agricultural	0	0	1	2	0	0	0	0	0	50	
Government	0	0	0	0	0	0	0	0	0	0	
Education	0	0	0	0	0	0	0	0	0	0	
Religious / Other	0	0	0	0	0	0	0	0	0	2	
Total Planning Area Assessment	1	0	3	15	3	1	0	0	0	292	

CV Cliff Village  
 DA Dennis Acres  
 DI Diamond\*  
 FA Fairview  
 GR Granby\*  
 GF Grand Falls Plaza  
 JO Joplin\*  
 LE Leawood  
 LO Loma Linda  
 NE Neosho\*

NW Newtonia  
 RM Redings Mill  
 RI Ritchey  
 SA Saginaw  
 SE Seneca\*  
 SCD Shoal Creek Drive  
 SCE Shoal Creek Estates  
 SC Stark City  
 ST Stella  
 WE Wentworth

UNC Unincorporated  
 Newton County

\*These cities include educational buildings for the local school districts. (See page 31).



## Section 3 - City / County Capability Assessment

### Mitigation Management Policies

The Joplin/Jasper County Emergency Management Agency and the Newton County Emergency Management Agency are in charge of preparation for emergency and/or disastrous incidents and events. This duty includes the writing of Emergency Operations Plans (EOPs), coordinating intergovernmental emergency response and preparedness agencies, and implementing measures identified in the EOPs that increase preparedness and reduce response times. Both agencies encourage the cooperation and participation of jurisdictions, county agencies, and neighboring jurisdictions for all disaster responses and preparedness measures.

The Emergency Managements Director (EMD) in each county answers directly to their respective County Commission and are responsible for coordinating emergency response efforts between the various municipalities, county organizations, interested private parties, and volunteer organizations. The EMD's duties include:

- Plan, organize, and direct County's emergency management plan with other government and business officials.
- Outreach, including speaking before various groups to promote interest and cooperation in emergency situations.
- Advise and assist businesses and industries with emergency management programs.
- Meet with state and federal officials to coordinate County program.
- Prepare necessary documentation for affected agencies.
- Responsible for co-sponsoring the planning and coordination of disaster drills.

Additionally, the EMDs, working with others, advise the County Commissions on mitigation measures and implementing those measures deemed appropriate by the Commission. Each county also utilizes a Local Emergency Planning Committee (LEPC), which meets quarterly, to facilitate disaster preparedness and response.

### Existing Emergency Plans

The Emergency Operation Plan (EOP) of each county is approved by its respective County Commission. The plan identifies critical facilities and key resources that require special consideration during a disaster, identifies key offices and personnel, defines the scope and responsibilities involved in mutual aid agreements with neighboring jurisdictions, promotes the development and maintenance of mutual aid agreements with nearby agencies, and requires participation in drills and exercises. In addition, each EOP identifies vulnerabilities in the county relating to civic infrastructure, particularly transportation, water, and wastewater facilities. Each plan also includes an evacuation plan should the need arise. During a natural hazard event, the EOP provides detailed information to emergency responders.

The National Incident Management System (NIMS) has been adopted by both Jasper and Newton Counties as well as all cities and villages within the County. All emergency responses to disasters, large or small, are conducted utilizing NIMS procedures.

A number of Emergency Operations Plans exist in the two-county region beyond the county plan. Local school districts, Missouri Southern State University, Ozark Christian College, Crowder College, Vatterott College, Newton County Health Department, Jasper County Health Department, Mercy Hospital, Freeman Health Systems, and a number of large manufacturers have also developed EOPs. Many of these agencies and organizations participate in the county's LEPC group quarterly.

Many cities have developed comprehensive plans which reference the county's Hazard Mitigation Plan. All entities have budgets and implement their plans minimally through the budget process, adding in additional costs for implementation of the Hazard Mitigation Plan actions from their council approved action list.

### **Mitigation Programs**

Mitigation entails taking actions to lessen or eliminate injury, loss of life, and property damage from natural hazards. The most common types of disasters historically are regional occurrences such as flooding, thunderstorms, and tornadoes. As such, the majority of each county's mitigation efforts focus on floodplain management, efficient warning systems, and public education towards disaster preparedness.

The first Jasper and Newton County Natural Hazards mitigation plans were adopted in 2005, with an update for each plan completed in 2010 to present. Since the adoption of the initial plan, a number of mitigation efforts have been implemented:

- Following the 2011 tornado, tornado safe rooms were installed or are currently being installed in nearly every school in the two-county region.
- Both Jasper County and Newton County receive National Weather Service (NWS) warnings, and each county's sheriff department is staffed on a 24-hour basis by dispatch personnel. Warning equipment is limited to some municipalities and the means used to alert each respective community varies. For those outside of the incorporated areas, the use of local media remains prevalent as an effective warning system. The distribution, sale, and use of NOAA weather radios have also been pursued on multiple occasions within the two counties.
- Each county works collaboratively with all municipalities in identifying critical infrastructure as well as high-risk populations during hazard events in each incorporated area. Information is continuously shared regarding any / all natural threats with those entities that are responsible for hazard response and mitigation.
- Each county works with local media (newspapers, radio, cable providers, and Internet service providers) to both provide information to the public and highlight potential disasters in an effort to raise public awareness about natural hazards and the planned responses. Various trainings, including weather spotting courses, are routinely offered to help mitigate the effects of severe weather upon the county's citizenry.

- Community Emergency Response Team training for the general public has been a continuous effort in both counties. This program has been very effective in increasing public awareness and preparedness by providing training in first aid, basic firefighting, basic search and rescue, and disaster psychology.
- Each EMD keeps a working reference library of all materials regarding disaster response and natural hazard mitigation plans. The reference material is freely shared with the public as well as interested municipal officials
- Flood insurance policies are available to citizens of Jasper County and Newton County, as well as the jurisdictions mentioned in Sections 1 and 2, through participation in the NFIP. All citizens are encouraged to choose building sites outside of the 100 year flood plain. Those wishing to build structures in the 100 year floodplain must meet the established floodplain regulations to elevate structures one foot above the base flood elevation (BFE).

## City/County Capabilities

The Emergency Operations Center (EOC) in Jasper County is located in Joplin, while the Newton County EOC is located in Neosho. Both EOCs meet FEMA established guidelines for such a center. In addition, each county's Sheriff's Department and other relevant county government offices can be found in the same physical vicinity as the EOC. Readiness capability is tested annually through simulated disasters and tabletop exercises for emergencies unique to the area which provide analysis and instruction for participating partners. Local risk assessments are incorporated into the Local Emergency Operations Plan and factored into these planned exercises throughout the year. Local planning incorporates risk assessments as they are identified.

The EOC has survivable communications from primary and secondary forces. The Emergency Alert System, commercial and public broadcast stations, SEMA, adjacent jurisdictions, incorporated areas within the two county region, and MoDOT all work together to create a communications system that is effective during a hazard event. The communications and warning equipment in each city are tested on a scheduled basis. Neither Jasper nor Newton County currently have any of their own warning sirens, but warning sirens are located in communities throughout the counties.

The cities and county have extensive communication abilities, both fixed and mobile, to coordinate the scene of an emergency. Mobile communication between departments is limited, but the Regional Homeland Security Oversight Committee (RHSOC) and Southwest MODOT district have mobile communication equipment which is available to enable interoperability between departments.

## Responsibilities and Authorities

The chief elected official (CEO) is ultimately responsible for emergency management activities within the jurisdiction. He/she is responsible for activities in unincorporated areas. The CEO in both Jasper and Newton counties is the presiding commissioner, while the chief elected official for municipalities is the mayor or chairman. The CEO of each

municipality has a similar responsibility within their corporate boundaries. The commissioner's authority may never supersede the authority of those elected officials in municipal areas unless asked to do so by local citizens, the municipal government structure becomes incapacitated, or granted such authority by the Governor. Using these definitions, the Presiding Commissioner has the legal basis for the following:

- Authorization to order an evacuation
- Redirection of funds for emergency use
- Order a curfew
- Commandeer facilities and/or equipment and materials
- Oversee authorized lines of succession for the CEOs
- Ensure records protection
- Analyze the possible impacts of potential disasters
- Approve the multi-hazard emergency operations plan,
- Approval mutual aid agreements with neighboring jurisdictions
- Protection of people with special needs.

The Governor of Missouri, SEMA, and FEMA may supersede the local CEO.

### **Intergovernmental and Interagency Coordination**

The Jasper County and Newton County Local Emergency Planning Committees (LEPC) meet quarterly and serve to maintain coordination among fire, law enforcement, emergency medical, and public health officers from the county, incorporated areas, and adjacent jurisdictions. LEPCs are crucial to the success of Emergency Planning. The LEPCs are appointed by the State Emergency Response Commissions (SERCs). LEPC committees must consist of representatives of all of the following groups and organizations:

- elected state and local officials
- law enforcement
- civil defense
- firefighting
- first aid and health
- local groups
- Representatives of facilities subject to the emergency planning and community right-to-know requirements.

In Missouri, the SERC is known as the Missouri Emergency Response Commission, or MERC.

The LEPC's initial task was to develop an emergency plan to prepare for and respond to chemical emergencies. The Environmental Protection Agency's list of extremely hazardous substances provides focus for setting priorities. The plan must be annually reviewed, tested, and updated. Because the LEPC's members represent the community, they are to be familiar with factors that affect public safety, the environment, and the economy of the community.

An emergency plan must include the identity and location of hazardous materials, procedures for immediate response to chemical accidents, ways to notify the public about

actions they must take, names of coordinators at plants, testing schedules, and procedures for testing the plan. The MERC reviews the plan, and the LEPC must test the plan through emergency exercises. The plan must also be updated at least annually.

Along with EOP maintenance, the LEPC receives emergency release and hazardous chemical inventory information submitted by local facilities. The LEPC must make this information available upon request. LEPCs have the authority to request additional information from the facilities for their own planning purposes or on behalf of others. In addition, LEPCs may visit facilities in the community to assess existing methods of reducing hazards, preparing for accidents, and reducing hazardous inventories and releases. Finally, LEPCs may take civil action against facilities if they fail to provide the information required under the act.

In addition to its formal responsibilities, the LEPC serves as a focal point in the community for information and discussions about hazardous substances, emergency planning, and health/environmental risks due to hazardous substances. The LEPC can most effectively carry out its responsibilities as a community forum by taking steps to educate the public about chemical risks, and working with facilities to minimize those risks. However, the LEPC's ability to improve the safety and health of its community is only as effective as the support it receives from an informed and active citizenry.

While each county has its own independent LEPC, the Jasper County LEPC and the Newton County LEPC often work in conjunction and cooperation with one another, particularly during disaster events.

## ***County Policies and Development Trends***

### **Commitments to a Comprehensive Mitigation Program**

Jasper County and Newton County have a history of striving to protect the life and property of the public. In the aftermath of the 2011 tornado, both counties have strengthened mitigation measures and policies as well as response coordination. This is best evidenced by the continued cooperation between the two counties in planning and disaster response.

Jasper County and Newton County implemented their first natural hazards mitigation plan in 2010. An update was completed in 2010. The 2015, and ensuing 2021 revisions of the plan seek to further decrease the impact of natural hazards through continued and improved mitigation efforts. Existing programs, such as the county's participation in the National Flood Insurance Program and building of tornado safe rooms, reduce some of this vulnerability, but a comprehensive mitigation strategy which is incorporated into all aspects of planning may help to decrease the overall impact of a natural hazard occurrence.

On a comprehensive basis, both Jasper County and Newton County maintain and regularly update the Emergency Operation Plans that includes mitigation measures for all hazards, both natural and manmade. In addition, the counties have demonstrated a desire to safeguard the lives and property of their residents by completing this hazard mitigation



plan.

### **County Laws, Regulations, and Policies Related to Development in Hazard Prone Areas**

As part of NFIP participation, floodplain regulations exist in the unincorporated areas of Jasper and Newton Counties as well as the cities of Airport Drive, Carl Junction, Carthage, Duenweg, Duquesne, Granby, Joplin, Loma Linda, Neosho, Oronogo, Redings Mill, Saginaw, Sarcoxie, Seneca, and Webb City. Any new construction in the floodplain requires structures to be elevated a minimum of one foot above the base flood elevation, but it is the general policy of each local government to discourage building in flood-prone areas.

### **County Laws, Regulations, and Policies Related to Hazard Mitigation in General**

Each county has both floodplain ordinances and stormwater regulations. Each floodplain ordinance is based on policies to protect the general welfare and health of county residents and visitors. The ordinances are designed to safeguard health, safety, and property in times of flood by regulating construction in the floodplain. Stormwater regulations are designed to minimize the negative effects of stormwater runoff caused by development. The regulations outline proper mitigation measures for erosion, detention, discharge, and conveyance of stormwater.

Jasper County has also established an Environmental Contamination ordinance based upon recommendations of the Environmental Protection Agency in areas of Superfund cleanup. The ordinance requires soil testing for regulated contaminants on Superfund designated properties associated with new construction of a dwelling, dwelling unit, or other child-occupied facility or recreational area. The ordinance also requires that all existing wells be tested for metals when the property is transferred or sold. Many of the cities in the two-county region have ordinances in place as well regarding planning and zoning, floodplain regulations, and stormwater regulation.

### **How Local Risk Assessments are Incorporated and Prioritized into Local Planning**

Jasper County and Newton County have recognized the danger and detrimental economic impact of severe storms and other natural disasters. Local risk assessments direct and guide the planning process dependent upon available funding and immediacy of need. Those hazards which are deemed to be high risk for each county are continuously assessed and addressed through the local emergency management director. Mid- and lower-level hazards are included in the mitigation planning, but addressed on a funding-contingent basis. The county works closely with schools and businesses to prepare for all types of natural disasters (i.e. tornados, blizzards, floods).

### **Current Criteria Used to Prioritize Mitigation Funding**

Mitigation funding is based primarily upon the combination of expected damage,

death/injury impacts, scope of public benefit, and available funding. For example, buildings without appropriate storm shelters will receive special mitigation consideration when the county prioritizes mitigation projects.

Another facet of each county's mitigation concerns is development pressure. Economic development in and around higher-density areas provides greater access to infrastructures and emergency measures. The availability of services allows local governments to expand emergency services with little or no cost. Out-lying development requires more monetary consideration regarding infrastructure and the need for efficient emergency services.

### **Integration of Hazard Mitigation with City/County Department's Plans**

Each county's EOP dictates that there shall be representation from all local fire departments, law enforcement, emergency medical, and health services agencies in the LEPC. Members of these organizations were also vital in creating the Jasper-Newton Bi-County Hazard Mitigation Committee. Each individual office within the county government has a specific role to play in disaster planning. The two-county region's cities rely on their county's EOP, but some have devised their own EOPs based on the county plan. These EOPs call for extensive consideration of emergency response and preparedness. Their intentions are reflected in city and county buildings, development, street, signage, land use, and floodplain codes and ordinances.

Other planning mechanisms under local jurisdictions are updated as needed. The governing bodies of each jurisdiction will encourage all other relevant planning groups and local school districts within their authority to coordinate mitigation efforts through the LEPC and in consultation with the Jasper-Newton Bi-county Hazard Mitigation Plan. A list of the two-county region's jurisdictions and relevant planning mechanisms is presented as Table 3.1. Each of the region's school districts incorporates mitigation as part of their all-hazard plans as well, holding regular fire and tornado drills as well as educating students, parents or guardians, and staff about procedures in place for disaster events.

### **How the County Determines Cost-Effectiveness of Mitigation Programs**

The State's administrative plan governs how projects are selected for funding. However, proposed projects must meet certain minimum criteria. These criteria are designed to ensure that the most cost-effective and appropriate projects are selected for funding. Both the law and the regulations require that the projects are part of an overall mitigation strategy for the disaster area.

The State prioritizes and selects project applications developed and submitted by local jurisdictions. The State forwards applications consistent with State mitigation planning objectives to FEMA for eligibility review. Funding for this grant program is limited and States and local communities must make difficult decisions as to the most effective use of grant funds.

Each county examines each mitigation program on a case-by-case basis. The determination

depends on the scope of damages, estimated savings in future hazard events, the type of mitigation project, and the probable hazard to human life in future events. FEMA-funded mitigation projects must meet the benefit/cost analysis criteria required by FEMA. FEMA has established five issues a community must consider when determining the eligibility of a proposed project:

- Does your project conform to your State's Hazard Mitigation Plan?
- Does your project provide a beneficial impact on the disaster area?
- Does your application meet the environmental requirements?
- Does your project solve a problem independently?
- Is your project cost-effective?

Mitigation programs for Jasper County and Newton County have included a wide variety of projects, including public education, information and specialized training for first responders, and brick-and-mortar projects like tornado safe rooms. The cost for the first two types of mitigation projects is relatively minimal, but has a wide impact potential. Brick-and-mortar projects, however, must consider the impacted population, project cost, and likelihood of recurrence. Cost-effectiveness, like mitigation prioritization, is determined by identifying the number of citizens susceptible to the appropriate hazard in the county and correlating the likelihood of that disaster to the potential losses. Potential losses from an unmitigated hazard are compared with the potential losses expected after mitigation. This monetary amount is then considered in light of the number of citizens which may be impacted by the mitigation effort. The larger the identified population, the better the cost-effectiveness of the action. In summation, each county prioritizes mitigation funding based on the likelihood of occurrence of a particular disaster compared to the expected dollar (property) loss and harm to humans.

### **Mitigation Funding Options Including Current and Potential Sources of Federal, State, Local, and Private**

Jasper and Newton counties and their incorporated areas have historically relied upon federal disaster declarations in cases of heavy widespread damages. Historic sources of response and recovery funding have included: FEMA, SEMA, USDA-Rural Development, the Missouri Department of Natural Resources, Department of Economic Development (DED), and various other grant programs. In addition, investments in infrastructure with mitigating effects have been funded from sources such as local tax revenues.

Since the 2010 updates to the Jasper and Newton county plans, both counties have been successful in utilizing grant funding to help expand their readiness for natural disasters. The installation of tornado saferooms, enhancements to communications, and public education and awareness campaigns regarding hazard mitigation continue to be important in encouraging residents to pay for mitigation activities. A complete listing of possible state and federal grants is included in Appendix C.

### **How County Government Meets Requirements for Hazard Mitigation Funding Programs**

Each county's EOP and municipalities work towards meeting the requirements set forth by both FEMA and SEMA in regards to Hazard Mitigation funding programs. Jasper County and Newton County continually strive to become more disaster resistant and they encourage local governments to decrease their vulnerability to disasters through early warning systems, joint planning, and other preparation efforts. Both counties and their jurisdictions have successfully utilized federal and state grant funds in the past for a variety of projects including mitigation funds for tornado saferooms and communication enhancements. The counties have several capable full-time administrators with extensive knowledge in using federal dollars in a manner consistent with federal law. Jasper and Newton counties have worked collaboratively with SEMA and FEMA during times of disaster response in the past. Therefore, both counties have both the administrative capacity and willingness to meet all necessary requirements associated with hazard mitigation funding programs.

### **Recommendations for Improvement**

During the course of three planning meetings, the Jasper-Newton County Hazard Mitigation Committee identified a number of recommendations for improving mitigation efforts in both the local jurisdictions and countywide.

Recommended improvements include expanded public education programs particularly encompassing sheltering in place, working towards Storm Ready status, and the expansion of stormwater regulations. Formalization of mutual aid agreements, expanded or improved outdoor warning systems, back-up residential electrical generators, promoting drought-resistant farming techniques, and designing methods to reduce impervious surfaces are all improvement techniques the counties may implement in the future.

Jasper and Newton counties will continue to comply with and implement the regulations of the NFIP. The implementation of the NFIP creates a need for floodplain policy and management. In addition, working with MoDNR to promote dam maintenance and increasing education to the general public are ways to begin mitigating possible damage.

One method of helping communities respond to disasters is to ask Missouri's Structural Assessment and Visual Evaluation (SAVE) Coalition for assistance. SAVE facilitates the use of volunteer engineers, architects, and qualified building inspectors who perform damage assessments of homes following disasters such as earthquakes, floods, and tornadoes. The SAVE Coalition can provide sound advice to communities and citizens concerning the safety of returning to their homes following a disaster, with the added intent of minimizing the need for sheltering by allowing people back to their homes as soon as safely feasible.

The Missouri Seismic Safety Commission (under Missouri statutes RSMo 44.227, 44.229, 44.231, 44.223, and 44.235) has developed a Strategic Plan for Earthquake Safety in Missouri that contains a number of recommendations for earthquake mitigation. The commission also sponsors Earthquake Awareness activities each year, including exhibitions at the State Capitol. The Jasper-Newton Bi-County Hazard Mitigation Committee may investigate bringing these programs to a local venue in the future.

## **Municipal Policies and Development Trends**

Jasper and Newton counties have continued to grow in population during the last 50 years, unlike many counties in Missouri. Most of the local jurisdictions have also witnessed continued growth, though there are a few exceptions. (See Section 1 for demographic information.) The primary source for growth in the two-county region is largely centered in the city of Joplin, its suburbs, and the county seats of Neosho (Newton County) and Carthage (Jasper County). With a strong commercial base, expanded manufacturing, a number of higher education institutions, multiple hospitals, the two-county region continues to develop new housing and witness new business ventures. Each municipality is responsible for developing its own respective regulations regarding the construction of new structures, subdivision development, and any new annexation. Information concerning land use, zoning, and other types of municipal planning is summarized in this Table 3.1.



## Community Policies and Development Trends

**Table 3.1** Community Regulations

Jurisdiction	Master Plan	Zoning	Building Codes	EOP	Subdivision Regulations	Storm Water Regulations	Flood Plain Regulations
Jasper County	Yes	Yes	NO	Yes	No	No	Yes
Airport Drive	Yes	Yes	Yes	No	Yes	Yes	Yes
Alba	No	No	Yes	No	Yes	No	No
Asbury	Yes	No	Yes	No	No	No	No
Avilla	No	No	No	No	No	No	No
Brooklyn Heights	No	No	No	No	No	No	No
Carl Junction	Yes	Yes	Yes	No	Yes	Yes	Yes
Carterville	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Carthage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Carytown	Yes	No	No	No	No	No	No
Dennis Acres	No	No	Yes	No	No	No	No
Diamond	No	Yes	Yes	Yes	Yes	Yes	Yes
Duenweg	Yes	Yes	Yes	Yes	No	Yes	Yes
Duquesne	No	Yes	Yes	Yes	Yes	Yes	No
Fidelity	No	No	No	No	No	No	No
Jasper	No	Yes	Yes	Yes	Yes	Yes	No
Joplin	Yes	Yes	Yes	Yes	Yes	Yes	Yes
La Russell	No	No	No	No	No	No	No
Neck City	No	No	No	No	No	No	Yes
Oronogo	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Purcell	No	No	No	No	No	No	No
Reeds	No	No	No	No	No	No	No
Ritchey	No	No	No	Yes	No	No	No
Sarcoxi	Yes	No	No	Yes	No	No	Yes
Waco	No	No	No	No	No	No	No
Webb City	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Newton County	No	No	No	No	No	No	No
Cliff Village	No	Yes	Yes	No	No	No	No
Dennis Acres	No	No	Yes	No	No	Yes	Yes
Diamond	No	Yes	Yes	No	Yes	Yes	No
Fairview	No	No	No	No	No	No	No
Granby	No	No	No	No	Yes	No	Yes
Grand Falls Plaza	No	No	Yes	No	No	No	Yes
Joplin	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Leawood	Yes	Yes	Yes	No	No	Yes	Yes
Loma Linda	No	Yes	Yes	No	No	No	No
Neosho	Yes	Yes	Yes	No	Yes	Yes	Yes
Newtonia	No	Yes	No	No	No	No	Yes
Redings Mill	No	No	Yes	No	No	No	Yes
Ritchey	No	No	No	No	No	No	No
Saginaw	No	Yes	Yes	No	Yes	No	Yes
Seneca	No	Yes	Yes	No	Yes	No	Yes
Shoal Creek Drive	No	Yes	Yes	No	No	No	No
Shoal Creek Estates	No	No	Yes	No	No	No	No
Stark City	No	No	No	No	No	No	No
Stella	Yes	No	No	No	No	No	No
Wentworth	No	No	No	No	No	No	No

## Section 4 – Mitigation Strategy

### Introduction to Mitigation

Disasters occur somewhere every day. Floods, hurricanes, fires, ice storms, earthquakes, and tornadoes are just a few examples of natural calamities that have the potential for large-scale negative effects on a community. To be sure, some of the aforementioned events are much more likely to occur somewhere far from the Midwestern United States. However, many from the same list have occurred in rural northwest Missouri. Disasters occur when human activity and development meets with sudden destruction due to natural or man-made occurrences. Certainly, these occurrences are not avoidable; however, there can be steps taken that will lessen the effects of the disaster or nullify them altogether. For example, building a flood wall around a business, raising the structure's foundation, or moving out of the floodplain altogether would certainly reduce or remove the damage potential associated with flooding to that particular building. Flooding cannot be prevented, but managing its results can be achieved with some forethought and planning.

### Definition of Mitigation

The Federal Emergency Management Agency (FEMA) defines mitigation as “sustained action taken to reduce or eliminate the long-term risk to people and property from hazards and their effects.” The jurisdictions within Jasper County and Newton County that participated in this process have the goal of taking the appropriate level of mitigation actions to meet their responsibilities for the health and safety of the residents of their counties. The goals of disaster mitigation planning, like those of disaster preparedness and disaster response, are to reduce or eliminate loss of lives and property in the next event. The first action that is necessary to reduce the effects of a disaster is the preparation and implementation of a mitigation strategy. This strategy encompasses recognition that mitigation costs are ultimately more cost-effective than disaster losses. “Cost” indicates an investment that can or may be recouped and “loss” are those expenses that will never be recovered.

### Categories of Mitigation

Mitigation includes any activities that prevent an emergency, reduce the occurrence of emergencies, or lessen their damaging effects. Efforts by federal, state, and local governments can restrict development in vulnerable areas, direct new development to less vulnerable areas, and promote ways to safeguard existing development in hazard-prone areas. Individuals can also participate by practicing sound personal safety and property damage prevention measures. Actions to reduce or eliminate injury, loss of life, and property damage from natural or man-made disasters must consider the characteristics of the hazard, human activity and development in the hazard area, and cost effectiveness. The most basic type of mitigation is avoidance of the convergence of spatially predictable

natural hazards and human activity and development. For example, disasters caused by flooding can be reduced or completely avoided by limiting or regulating development and human activity in areas known to be flood prone. Another approach to mitigation includes recognizing that some hazards do not occur in predictable intervals or spatial areas like floods. Consequently, mitigation efforts should produce development guidelines that result in a reduced exposure to natural disasters. For example, building codes that require retrofitting buildings with reinforced roofs to withstand high winds is a regulatory mitigation action that will reduce the number of high-wind damage claims in an area. Another example strategy may include shielding highly developed areas from the hazard, thus deflecting its detrimental effects away from the area of high-intensity development and investment to areas of less human activity. An example of this strategy would include flood retention walls and lessening flow restrictions.

There are six categories of mitigation that can produce safer environments:

Prevention: Prevention tools include regulatory methods such as: planning and zoning, building regulations, open space planning, land development regulations, and stormwater management.

Property Protection: Property protection measures reduce the risk of building damage through acquisition of land, relocation of buildings, modification of at-risk structures, and flood proofing at-risk structures.

Natural Resource Protection: Natural resource protection can reduce hazard impacts through measures such as erosion and sediment control or wetlands protection.

Emergency Services: Emergency services measures include: warning, response capacity, critical facilities protection, and health and safety measures.

Structural Projects: Structural mitigation controls natural hazards through projects such as reservoirs, levees, diversions, channel modifications, and storm sewers.

Public Information: Public information includes providing hazard maps and information, outreach programs, real estate disclosure, technical assistance, and education.

### **Mitigation versus Preparedness, Response, and Recovery**

Mitigation involves any activity that manipulates the human environment or affects development in an area that may involve the intersection of natural or man-made disasters. As previously mentioned, the most effective form of mitigation is avoidance of the intersection. However, many hazards and existing development patterns are not conducive to this type of mitigation strategy, and consequently, other means of reducing the damage must be sought. For example, a community cannot stop a tornado from crossing the city limits, but new construction strategies, safe rooms, and an expanded warning system would certainly reduce the effects of such an unfortunate occurrence. Further, while it

may be unreasonable to expect concentrations of human activity and development to move out of the path of predictable hazards (i.e. moving out of the inundation zone of a major dam.), reexamining existing plans and reviewing the quality of the warning system could certainly reduce the effect of this event.

Emergency management consists of four phases: 1) hazard mitigation, 2) preparedness, 3) response, and 4) recovery. Hazard mitigation is an ongoing process – one that is included in all three other phases. Hazard mitigation is intended to be proactive in that it will save valuable resources and prevent hardship in future disasters by reducing the long-term risk to property and life through planning, review, and analysis. To be most effective, mitigation must be an inherent part of the second phase, preparedness. Mitigation efforts taken during this phase will ensure that mistakes made in the past (e.g. poor building design, etc.) will not be repeated. Mitigation should also be an important part of the third phase, response, in that weaknesses and strengths of the response efforts are reviewed and analyzed so that a more appropriate course of action will occur during future disaster occurrences. Finally, the recovery phase should implement the mitigation strategies and actions previously identified to lessen the impacts of similar disasters in the future.

### **Plan development and maintenance**

The individual Jasper County and Newton County Natural Hazards Mitigation Plans were first adopted in 2005. An update was completed for both counties in 2020. During the 2020 plans' development, a Hazard Mitigation Committee was formed in each county to review existing mitigation efforts and propose a county-wide plan with goals objectives, and actions. Several mitigation actions were proposed at public meetings throughout each county. Participants received copies of the capabilities, vulnerabilities, and mitigation section of the plan prior to the meetings. All of those in attendance had the opportunity to question and make remarks regarding the documents. The committee held a discussion regarding the suggested actions. They made suggestions, and in turn, approved all the actions suggested in the proposed plan. The final mitigation recommendations included the two broad goals and the six categories of mitigation listed above. After receiving approval from SEMA and FEMA, the plans were adopted in each county and all associated jurisdictions in 2020. Table 4.1 summarizes the 2020 plans' proposed mitigation goals and objectives. Goals and objectives were listed together in the 2020 plan, but action items were divided into two categories - general and jurisdiction specific. General actions were not connected to the goals and objectives, but jurisdiction-specific actions were connected. Table 4.2 summarizes the general action items. Jurisdiction-specific action items are summarized, with their goal/objective connections in Table 4.3.

*Table 4.1 Jasper County and Newton County Mitigation Goals and Objectives, 2015*

<b>Goal 1: Increase entities' internal capabilities to mitigate the effects of natural hazards.</b>
Objective 1.1: Promote enhancement of floodplain management activities.
Objective 1.2: Promote the entities' capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities throughout the entity.
Objective 1.3: Track adequacy of emergency services to protect public health and safety.
<b>Goal 2: Enhance existing or design new entity policies that will reduce the potential damaging effects of hazards without hindering other community goals through punitive constraints.</b>
Objective 2.1: Increase the entities' control over development in the floodplain to ensure lives and properties are not at risk to future flood conditions.
Objective 2.2: Preserve the natural and beneficial functions of the entities' floodplain to ensure lives and properties are not at risk to flood conditions.
Objective 2.3: Encourage new construction is completed using severe weather / high wind resistant design techniques and materials in accordance with the minimum requirements of the International Building Codes or Building Officials and Code Administrators International Code that will limit damage caused by high winds and reduce the amount of windborne debris.
<b>Goal 3: Protect entities' most vulnerable populations, buildings, and critical facilities through implementations of cost-effective and technically feasible mitigation projects.</b>
Objective 3.1: Maximize the use of available hazard mitigation grant programs to protect the entities' most vulnerable populations and structures.
Objective 3.2: Decrease the number of FEMA identified "repetitive loss properties" located in Jasper / Newton County by 25% by the year 2015.
Objective 3.3: Ensure that all vital / critical facilities are protect from the effects of natural hazards to the maximum extent possible.
Objective 3.4: Increase the amount and range of community severe weather / tornado community shelters and private safe rooms throughout the County.
<b>Goal 4: Protect public health, safety, and welfare by increasing the public awareness of existing hazards and by fostering both individual and public responsibility in mitigating risks due to those hazards.</b>
Objective 4.1: Increase the level of knowledge and awareness of residents on the hazards that routinely threaten the area.
Objective 4.2: Promote the number of entities' residents that maintain an active NFIP flood insurance policy.



**Table 4.2 Jasper and Newton County General Action Items, 2015 plan**

Action 1: Create a Countywide Hazard Mitigation Committee to coordinate and prioritize goals, objectives, and actions identified in this plan and its subsequent updates.
Action 2: Establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.
Action 3: Conduct an inventory survey for the County's emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment, or required resources.
Action 4: Require community tornado shelters for any new manufacture / mobile home parks.
Action 5: Promote community shelters in existing manufactured / mobile home parks.
Action 6: Promote a mutual agreement among the County and all incorporated areas that establishes the minimum requirements of the International Building Codes.
Action 7: Incorporate a Geographic Information System (GIS) to maintain current building and parcel data for purposes of conducting more detailed hazard risk assessments, for tracking permitting and land use patterns in hazard prone areas.
Action 8: Identify the County's most at-risk key community facilities, and execute the potential mitigation techniques for protecting each facility to the maximum extent possible.
Action 9: Increase Warning System coverage to the most feasible extent.
Action 10: Develop and adopt a "no-rise (in base flood elevation)" clause for the County's Floodplain Ordinances.
Action 11: Advertise and promote the availability of flood insurance to county property owners by direct mail annually.
Action 12: Investigate the feasibility and funding availability for the construction of Structural Projects to alleviate future flood hazard conditions.
Action 13: Seek funding to complete a stormwater drainage study / plan for needy communities.
Action 14: Acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners.
Action 15: Regularly calculate and document the amount of flood prone property that is preserved as open space for additional credit points under the Community Rating System (CRS).
Action 16: Revise the County's Floodplain Ordinances to be in compliance with the new SEMA and FEMA standards.
Action 17: Develop an educational flyer targeting NFIP policyholders on the Increase Costs of Compliance (ICC) coverage, to be disseminated following a flood event that results in substantial damage determinations by the County.
Action 18: Incorporate the inspections and management of hazardous natural debris into the County's routine drainage system maintenance process.
Action 19: On an annual basis, contact all owners of FEMA identified repetitive loss properties and inform them of the assistance available through the federal Flood Mitigation Assistance Program, in addition to their flood protection measures.
Action 20: Research and design an appropriate stream bugger ordinance to further protect Jasper County / Newton County's resources and to limit future flood damage adjacent to waterways.
Action 21: Coordinate and conduct stream cleanup programs in populated flood hazard prone areas.
Action 22: Promote a policy for slope stabilization efforts to prevent erosion and slippage of hills located near populated areas either up or down slope.
Action 23: Coordinate seasonal educational materials on individual and family preparedness / mitigation measures, and display and distribute routinely to county citizens and officials alike.
Action 24: Annually host a public hazards workshop for the residents of Jasper / Newton County in combination with another large-scale community / regional festival or event.

**Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties**

Jurisdiction	County	Action	Goals/ Objective Connection
Airport Drive	Jasper	1. NFIP – Enforce floodplain ordinance	1.1
		2. Active Building Code Enforcement	2.3
		3. Active Code enforcement	2.3
		4. NIMS Training	1.1
		5. Portable Electric Generators	3.1, 3.1
		6. Public Education of Businesses and residents by Newsletter	4.1
		7. Promote private insurance	4.2
		8. Continue Stormwater Drainage Projects	3.1, 3.3
		9. Promote Stormwater regulations and practices	2.1-2.3, 4.2
		10. Promote NOAA weather radios and safe rooms	3.4, 4.1
		11. Encourage residents and businesses to clean up creeks	4.1
		12. Develop Emergency Management Plan	1.2, 1.3
		13. Plan for future increase of fire hydrants	3.1
Alba	Jasper	1. Enforce floodplain ordinance	2.1
		2. Apply for grant funding for a safe room/shelter for Alba residents.	3.1
		3. Apply for grant funding for a back up power source to operate the water system / sewer systems.	3.1, 3.3
		4. Storm Siren Expansion	3.4
		5. Apply for grant funding for a back up power source to operate city hall.	
		6. All-Hazards education for mitigation, preparedness, response, and recovery	4.1
		7. Portable Electric Generators	3.1, 3.3
		8. Public Education of Businesses, homeowners, and residents through continued disbursement of pamphlets and website.	4.1
		9. Expanded training for all city departments in regards to emergency management.	1.2
Asbury	Jasper	1. Update Emergency Plan, including evacuation component	1.2, 1.3
		2. Promote Reverse 911 and NOAA radios	4.1
		3. Distribute Hazard Flyers will bills	4.1
		4. Apply for funding for Saferoom	3.1, 3.4
Avilla School District	Jasper	1. Saferoom for each location	3.4
		2. Educate students and parents of hazards with informational flyers	4.1
		3. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
		4. Educate staff and students on Shelter-in-place procedures	1.2, 4.1
		5. Educate staff and students on building evacuation procedures	1.2, 4.1
		6. Educate staff and students on lock-down procedures	1.2, 4.1
		7. Educate staff on bomb threat assessment and response	1.2, 1.3
		8. An emergency response team made up of school staff members for each location	1.2
Carl Junction	Jasper	1. NFIP – Enforce floodplain ordinance	2.1
		2. Active Building Code Enforcement	2.3
		3. Active Code enforcement	2.3
		4. NIMS Training	1.2
		5. Public education of businesses and residents with flyers	4.1

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		6. Do Fire Safety Checks	3.3
<b>Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties (continued)</b>			
Jurisdiction	County	Action	Goals/ Objective Connection
Carl Junction School District	Jasper	1. Conduct safety drills and educational programs for fire, tornado, shelter-in-place, and bus evacuations	1.2, 4.1
		2. Educate staff on lock down procedures and safety of students in the event of a lock down.	1.2, 4.1
		3. Provide CPR and general first aid training to staff; create a list of designated individuals in all buildings	1.2, 4.1
		4. Educate students and staff on infectious diseases and how to prevent the spreading of germs	1.2, 4.1
Carterville	Jasper	1. Enforce floodplain ordinance	2.1
		2. Apply for grant funding for a safe room / shelter for Carterville residents	3.1, 3.4
		3. Apply for grant funding for a back up power source to operate the water system	3.1
		4. Apply for grant funding for a back up power source to operate city hall / police department	4.1
		5. Public education of businesses, homeowners, and residents through continued dispersement of pamphlets and website.	4.1
		6. All-hazards education for mitigation, preparedness, response, and recovery	4.1
		7. Storm siren expansion	3.4
		8. Portable electric generators	3.3
		9. Expanded training for all city departments in regards to emergency management.	1.2
		10. Increase training with students and teachers using campus drills and training	1.2, 4.1
Carthage	Jasper	1. Enforce Floodplain ordinance to prevent future flooding	2.1
		2. Active Building Code Enforcement	2.3
		3. Active Code Enforcement	2.3
		4. Promote Private Insurance	4.2
		5. Continue Stormwater drainage projects	3.3
		6. Promote stormwater regulations and practices	2.1, 2.1, 2.3, 4.1, 4.2
		7. Promote NOAA weather radios and safe rooms	3.4, 4.1
Carthage School District	Jasper	1. Educate students and staff members regarding buddy room system	1.2, 4.1
		2. Educate students and staff members regarding tornado safety procedures	1.2, 4.1
		3. Educate students and staff members regarding intruder lock-down safety procedures	1.2, 4.1
		4. Educate students and staff members regarding family reunification procedures	1.2, 4.1
		5. Actively participate in REMS training	1.2
		6. Improve safety/emergency lighting throughout each building	3.3
		7. Construct safe rooms / shelter at each school	3.4
Carytown	Jasper	1. Increase awareness of hazards with informational flyers	4.1
		2. Portable electric generators for saferoom	3.4

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		3. Encourage reverse 911	4.1
<b>Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties</b>			
Jurisdiction	County	Action	Goals/ Objective Connection
Crowder College	Jasper / Newton	1. All-Hazards education for mitigation, preparedness, response and recovery	4.1
		2. Additional outdoor warning sirens	3.3, 4.1
		3. Saferoom for each location	3.3, 3.4
		4. Backup generator for dorms, classrooms, and offices	1.2, 3.3
		5. Increase awareness of students and teachers with campus drills and training	4.1
		6. Educate staff and students on Lock-Down procedures	4.1
		7. Revise and update hazard planning and training on a continual basis	1.2
		8. Create an emergency response team for each location	1.2
Dennis Acres	Newton	1. Promote Reverse 911 to residents	4.1
		2. Hazard Information flyers	4.1
Diamond	Newton	1. Adopt new floodplain ordinance to meet FEMA requirements	1.1
		2. Apply for grant funding for a safe room / shelter for Diamond residents.	3.1, 3.4
		3. Apply for grant funding for a backup power source to operate the water system	3.3
		4. Apply for grant funding for a backup power source to operate city hall / police department	3.3
		5. Public Education of businesses, homeowners, and residents through continued disbursement of pamphlets and website.	4.1
		6. All-hazards education for mitigation, preparedness, response, and recovery	4.1
		7. Storm siren expansion	3.4
		8. Portable electric generators	3.3
		9. Expanded training for all city departments in regards to emergency mgmt	1.2
		10. Increase training with students and teachers using campus drills and training	1.2, 4.1
Diamond School	Newton	1. Safe spot for each location	1.2, 3.3, 3.4
		2. Educate students and parents of hazards with informational flyers	4.1
		3. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
Duenweg	Jasper	1. Acquire flooding areas on Turkey Creek	3.2
		2. Restrict building – Lead & Zinc mining waste, open pits, and shafts	1.2
		3. Training for Hazardous / Explosive Materials	1.2
		4. Hazardous Weather – Build safe room / storm shelter	3.4
		5. Active Building Code enforcement	2.3
		6. Stormwater study	1.1
		7. Emergency generator for City Hall / Police Department	3.3
		8. Public Education	4.1
Duquesne	Jasper	1. Enforce Stormwater ordinance to prevent runoff flooding	2.1, 2.2
		2. Actively Enforce Building Codes	2.3
		3. Actively Enforce Codes	2.3
		4. Promote Private Insurance	4.2
		5. Plan for road cleanup and clearance after winter and severe storms	3.3

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		6. Expand fire hydrant coverage	3.3
<b>Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties (continued)</b>			
Jurisdiction	County	Action	Goals/ Objective Connection
East Newton School	Newton	1. Saferoom for each location	3.3, 3.4
		2. Educate students and parents of hazards with informational flyers	4.1
		3. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
		4. Educate staff and students on Shelter-in-place procedures	1.2, 4.1
		5. Educate staff and students on Lock-down procedures	1.2, 4.1
		6. Educate staff on bomb threat assessment and response	1.2
		7. Emergency response team made up of school staff members for each location	1.2
Fairview	Newton	1. Stormwater improvement on streets	3.3
		2. Do fire safety checks	3.3
		3. Weather flyers	4.1
		4. Promote the purchase of insurance	4.2
Fidelity	Jasper	1. Active Building Code Enforcement	2.3
		2. Active Code enforcement	2.3
		3. Portable Electric Generators	3.3
		4. Promote private insurance	4.2
		5. Promote NOAA weather radios and safe rooms	3.4, 4.1
		6. Develop Emergency Management plan	1.2, 1.3
Granby	Newton	1. Adopt new floodplain ordinance to meet FEMA requirements	1.1
		2. Apply for grant funding for a safe room / shelter for Granby residents	3.1
		3. Apply for grant funding for a backup power source to operate the water system	3.3
		4. Public Education of businesses, homeowners, and residents through continued disbursement of pamphlets	4.1
		5. All-hazards education for mitigation, preparedness, response, and recovery.	4.1
		6. Storm-siren expansion	3.4
		7. Expanded training for all city departments in regards to emergency management	1.2
		8. Increase training with students and teachers using campus drills and training	1.2, 4.1
Jasper	Jasper	1. Adopt FEMA Floodplain program by ordinance	1.1
		2. Apply for funding to assist with building tornado shelter	3.1, 3.4
		3. Active Building Code enforcement	2.3
Jasper School District	Jasper	1. Apply for funding to assist with providing a saferoom for the school district	3.1, 3.4
		2. Educate students and parents of hazards with informational flyers	4.1
		3. Backup generator to provide electricity to central office, cafeteria, and sump pumps	3.3
		4. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
Jasper County	Jasper	1. NFIP – Enforce floodplain ordinance	2.2
		2. Increase ability of GIS to maintain current building a parcel data for hazard risk assessment	1.2, 1.3
		3. Inventory of County emergency response services	1.3
		4. Educate public on the impacts of major disease outbreak	4.1
		5. Promote community shelters in existing manufactured / mobile home parks	3.4
		6. All-hazards education for mitigation, preparedness, response, and recovery	4.1
		7. Educate the impacts of severe weather	4.1
		8. Increase warning system coverage to the most feasible extent	1.2, 3.4



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9. Reverse 911

3.4

**Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties (continued)**

Jurisdiction	County	Action	Goals/ Objective Connection
Joplin	Jasper / Newton	1. Develop and adopt a “no-rise (in base flood elevation)” clause for the City’s Floodplain Ordinances	1.1
		2. Inventory of Joplin emergency response services	1.3
		3. Educate Public on the Impacts of Major Disease Outbreak	4.1
		4. Promote community shelters in existing manufactured / mobile home parks	3.4, 4.1
		5. All-Hazards education for mitigation, preparedness, response, and recovery	1.1, 4.1
		6. Educate about the impacts of severe weather	4.1
		7. Increase warning system coverage to the most feasible extent	3.4
		8. Reverse 911	1.2
Joplin School District	Jasper / Newton	1. Saferoom for each location	3.3, 3.4
		2. Educate students and parents of hazards with informational flyers	4.1
		3. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
		4. Educate staff and students on Shelter-in-place procedures	1.2, 4.1
		5. Educate staff and students on Building Evacuation procedures	1.2, 4.1
		6. Educate staff and students on lock-down procedures	1.2, 4.1
		7. Educate staff on bomb threat assessment and response	1.2
		8. Emergency Response Team made up of school staff members for each location	1.2
La Russell	Jasper	1. Apply for grant funding for siren	3.1
		2. Arrange for storm shelter	3.4
		3. Adopt an Emergency manual	1.2
Leawood	Newton	1. NFIP – Review and join	1.1
		2. Building Code revision	2.3
		3. Add all-hazards education for mitigation, preparedness, response, and recovery information to webpage	4.1
		4. Apply for grant funding for storm siren for Southern Hills	3.1
		5. Promote basement sharing for tornado warnings	3.4
		6. Promote reverse 911 and weather radios to residents	4.1
		7. Revise emergency operations plan	1.2
		8. Do NIMS training and coordinate with area agencies	1.2
Loma Linda	Newton	1. Active Building Code enforcement	2.3
		2. All-hazards education for mitigation and preparedness	4.1
		3. Put warning signs at Low Water Bridge and Cones out during floods	4.1
		4. Promote Reverse 911 and NOAA radios	4.1
		5. Obtain emergency generator backup	3.3
Missouri Southern State University	Jasper	1. Mass notification	1.2, 4.1
		2. Update EOP	1.2, 1.3
		3. Education	4.1
		4. Engineering and design	3.3
Neck City	Jasper	1. Adopt FEMA Floodplain program by ordinance	1.1, 2.1
		2. Apply for funding to assist with building tornado shelter	3.1, 3.4
		3. Promote NOAA weather radios and Reverse 911	4.1
		4. Public Education of businesses, homeowners, and residents through a community newsletter	4.1
		5. Develop Public Works Department	1.2
		6. Portable Electric Generators	3.3

**Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties (continued)**

Jurisdiction	County	Action	Goals/ Objective Connection
Neosho	Newton	1. Active code enforcement of floodplain regulations	1.1, 2.1
		2. Adopt required revision of floodplain ordinance to comply with FEMA standards	1.1, 2.1
		3. Active Building Code enforcement	2.3
		4. Seek funding for stormwater master planning and structural upgrades and mitigation projects	1.1-1.3, 2.1, 2.2, 2.3, 3.2
		5. Present stream bugger ordinance for adoption by city council	1.1, 2.1
		6. Encourage plans and drills for private dwellings and public facilities	1.3, 4.1
		7. Promote weather warning awareness	3.3, 4.1
		8. First Responder training	1.2
Neosho School District	Newton	1. Safe-room for each location	3.3, 3.4
		2. Educate students and parents of hazards with informational flyers	4.1
		3. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
		4. Educate staff and students on Shelter-in-place procedures	1.2, 4.1
		5. Educate staff and students on Building Evacuation procedures	1.2, 4.1
		6. Educate staff and students on Lock-down procedures	1.2, 4.1
		7. Educate staff on Bomb Threat Assessment and Response	1.2
		8. An Emergency Response Team made up of school staff members for each location	1.2
Newton County	Newton	1. Continue compliance with NFIP and floodplain management by adopting new ordinance	1.1, 2.1, 2.2
		2. Habitable building buyout	1.1, 3.2
		3. Reverse 911	1.2, 4.1
		4. All-hazards education for mitigation, preparedness, response, and recovery	1.2, 4.1
		5. Educate on the impacts of lightning	3.3, 4.1
		6. Low-water crossing elimination	1.1
		7. Additional outdoor warning sirens	4.1
		8. Promote crop insurance	3.2, 3.3
		9. Educate the public on the impacts of a major disease outbreak	3.3, 4.1
Newtonia	Newton	1. Adopt new floodplain ordinance to meet FEMA requirements	1.1
		2. Promote the use of NOAA weather radios	4.1
		3. Reverse 911	4.1
		4. Provide generators for community building and church shelter	3.3
		5. Weather flyers	4.1
		6. Support the coordination of interagency debris removal	1.2
		7. Plan checking on homebound or injured	1.2
Oronogo	Jasper	1. Enforce new floodplain ordinance to prevent future flooding damages	2.1
		2. Active Building Code enforcement	2.3
		3. Active code enforcement	2.3
		4. NIMS training	1.2
		5. Apply for assistance – portable electric generators	3.1, 3.3
		6. Public education of businesses and residents by newsletter	4.1
		7. Promote private insurance	4.2
		8. Apply for stormwater drainage project funding	3.1
		9. Promote NOAA weather radios and reverse 911	4.1
		10. Encourage residents and businesses to clean up creeks	4.1

Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties (continued)

Jurisdiction	County	Action	Goals/ Objective Connection
Purcell	Jasper	1. NIMS training and coordination with other agencies	1.2
		2. Public Education through disbursement of flyers and put on yearly open house safety forum	4.1
		3. Promote Reverse 911	4.1
		4. Apply for grant funding for a backup power source to operate the water system / sewer systems	3.1, 3.3
		5. Storm siren expansion	3.4
Redings Mill	Newton	1. Revise and adopt new Floodplain ordinance to meet new FEMA req.'s	1.1, 2.1, 2.2
		2. Apply for grant funding for a backup power source to operate the water system	3.1, 3.3
		3. Apply for funding to construct a saferoom	3.1, 3.4
		4. Continue with drainage improvements	1.1, 3.2
		5. Promote weather radios	4.1
Ritchey	Newton	1. Public Education of businesses, homeowners, and residents	4.1
		2. Encourage participation of reverse 911 and weather radios	4.1
Saginaw	Newton	1. NFIP – Adopt new ordinance to meet FEMA requirements	1.1, 2.1, 2.2
		2. Streambed cleanup	3.2
		3. Develop emergency management plan	1.2
Sarcoxie	Jasper	1. Reverse 911 awareness and access	4.1
		2. Emergency shelter / fire station	3.3, 3.4
		3. Emergency power supply water towers	3.3
		4. Emergency power supply sewer system	3.3
		5. Emergency power supply city hall / police department	3.3
		6. NIMS Training continuation	1.2
		7. Emergency Operation Plan update and implementation	1.2, 1.3
		8. Stormwater program implementation	1.1
		9. Emergency shelter at local mobile home park	3.4
		10. Emergency power supply nursing home	3.3
		11. Enforce floodplain ordinance	2.1
Sarcoxie School District	Jasper	1. Saferoom for each location	3.4
		2. Educate students and parents of hazards with informational flyers	4.1
		3. Increase awareness of students and teachers with campus drills and training.	1.2, 4.1
Seneca	Newton	1. Continue compliance with NFI and floodplain management by enforcing ordinance	1.1, 2.1, 2.2
		2. Habitable building buyout	1.2, 3.2
		3. Reverse 911	1.2, 4.1
		4. All-hazards education for mitigation preparedness, response, and recovery	1.2, 4.1
		5. Education on the impacts of lightning	3.3, 4.1
		6. Low-water crossing elimination	1.1
		7. Additional outdoor warning sirens	4.1
		8. Educate the public on the impacts of a major disease outbreak	3.3, 4.1
Seneca School District	Newton	1. Safe room / tornado shelter built	3.3, 3.4
		2. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
		3. Educate staff and students on Shelter-in-Place procedures	1.2, 4.1
		4. Educated staff and students on Building Evacuation procedures	1.2, 4.1
		5. Educate staff and students on Lock-down procedures	1.2, 4.1
		6. Educate staff on Bomb Threat Assessment and Response	1.2
		7. An Emergency Response Team made up of school staff members for each location	1.2

Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties (continued)

Jurisdiction	County	Action	Goals/ Objective Connection
Silver Creek	Newton	1. Join NFIP	1.1
		2. Active Building Code Enforcement	2.3
		3. All-Hazards education for Mitigation, Preparedness, Response and Recovery	4.1
		4. Put warning signs at Low Water Bridge	3.2
		5. Apply for grant funding for storm siren for east side	3.1, 4.1
		6. Promote Basement sharing for tornado warnings	4.1
		7. Promote Reverse-911 to residents	4.1
		8. Obtain Emergency Generator Backup	3.3
		9. Obtain Emergency Communication System	3.3
Stark City	Newton	1. Develop emergency management plan	1.2
		2. NIMS Training	1.2
		3. Promote Reverse-911	4.1
		4. Distribute Hazard Flyers	4.1
Stella	Newton	1. Establish a Village of Stella Emergency Management Team	1.2
		2. Fix drainage ditches for erosion control	3.2
		3. Continue to develop Indian Creek for bank stabilization and beautification	3.2
		4. Educate the public of hazards with informational flyers	4.1
		5. Promote public on NOAA weather radios and Reverse 911	4.1
		6. Obtain a generator for powering saferoom	3.3
Waco	Jasper	1. Apply for funding for a Saferoom	3.1
		2. Promote Reverse 911 and NOAA radios	4.1
		3. Distribute hazard flyers during yearly cleanup	4.1
Webb City	Jasper	1. NFIP – Continue compliance by enforcing ordinance	2.1
		2. Apply for funding assistance for a saferoom	3.1, 3.4
		3. Apply for funding assistance for Portable Electric Generators	3.3
		4. Apply for funding assistance for storm siren expansion	3.1, 3.4
		5. Stormwater study	3.2
		6. Public Education of businesses, homeowners, and residents	4.1
		7. Apply for Funding assistance for flood control projects and stormwater upgrades	3.1
		8. Apply for funding assistance for emergency power backup for City Hall	3.1, 3.3
		9. Apply for funding assistance for saferoom for trailer park	3.1, 3.4
		10. Active code enforcement	2.3
Webb City School District	Jasper	1. Apply for grant funding for saferoom for each location	3.1, 3.4
		2. Educated students and parents of hazards with informational flyers	4.1
		3. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
		4. Educate staff and students on shelter-in-place procedures	1.2, 4.1
		5. Educate staff and students on building evacuation procedures	1.2, 4.1
		6. Educate staff and students on lock-down procedures	1.2, 4.1
		7. Educate staff on bomb threat assessment and response	1.2
		8. An Emergency Response Team made up of school staff members for each location	1.2
Wentworth	Newton	1. Adopt FEMA floodplain program by ordinance	1.1
		2. Do a stormwater project to reduce flooding	3.2
		3. Develop emergency management plan	1.2
		4. Enforce building codes on mobile homes	1.2
		5. Promote NOAA weather radios and Reverse 911	4.1
		6. Provide informational flyers on weather hazards	4.1

*Table 4.3 2015 Jurisdiction-Specific Actions, Jasper and Newton Counties (continued)*

Jurisdiction	County	Action	Goals/ Objective Connection
Westview School District	Newton	1. Educate staff and students on Building Evacuation procedures	1.2, 4.1
		2. Educate students and parents of hazards with informational flyers	4.1
		3. Increase awareness of students and teachers with campus drills and training	1.2, 4.1
		4. Educate staff and students on lock-down procedures	1.2, 4.1
		5. An emergency Response Team made up of school staff members for each location	1.2
		6. Apply for funding to incorporate a safe room in the school building	3.1, 3.3, 3.4

Throughout the spring and summer of 2015, Jasper and Newton counties hosted a number of public meetings to solicit assessments of the 2010 mitigation plan. The original goals, objectives, and actions were discussed and graded based on completion, implementation, and applicability to the two-county region. After extensive review, the Bi-County Hazard Mitigation Committee voted to maintain all existing goals as they continue to be applicable across the two-county region. The objectives and actions of the previous Jasper and Newton individual county plans were fully revised to meet the needs of a two-county plan. Each goal's associated objectives were revisited, revised, combined, and/or eliminated from this plan. Table 4.4 summarizes the 2010 goals and objectives and explains their inclusion, alteration, or elimination from the 2015 plan.



**Table 4.4 2015 Goals and Objectives Assessment**

Goal / Objective	Maintained	Altered	Eliminated	Justification for 2015 changes
<b>Goal 1:</b> Increase entities' internal capabilities to mitigate the effects of natural hazards.	X			N/A
<b>Objective 1.1:</b> Protect enhancement of floodplain management activities.		X		Combined with Objective 2.3 to create a wider overarching objective.
<b>Objective 1.2:</b> Promote the entities' capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities throughout the entity.	X			N/A
<b>Objective 1.3:</b> Track adequacy of emergency services to protect public health and safety.	X			N/A
<b>Goal 2:</b> Enhance existing or design new entity policies that will reduce the potential damaging effects of hazards without hindering other community goals through punitive constraints.		X		Goal simplified to fit more appropriately with a bi-county plan.
<b>Objective 2.1:</b> Increase the entities' control over development in the floodplain to ensure lives and properties are not at risk to future flood conditions.		X		Objective reworded to fit more appropriately in a bi-county plan.
<b>Objective 2.2:</b> Preserve the natural and beneficial functions of the entities' floodplains and wetlands through continued support of natural resource protection policies and by discouraging growth in environmentally sensitive areas.			X	Deleted to accommodate new objectives which both counties support.
<b>Objective 2.3:</b> Encourage new construction is completed using severe weather / high wind restraint design techniques and materials in accordance with the minimum requirements of the International Building Codes or Building Officials and Code Administrators International Code that will limit damage caused by high winds and reduce the amount of windborne debris.		X		Combined with Objective 1.1 to create a wider overarching objective.
<b>Goal 3:</b> Protect entities' most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation projects.	X			N/A
<b>Objective 3.1:</b> Maximize the use of available hazard mitigation grant program to protect the entities' most vulnerable populations and structures.				Deleted to accommodate new objectives which both counties support.
<b>Objective 3.2:</b> Decrease the number of FEMA identified repetitive loss properties located in Jasper / Newton County by 25% by the year 2015.			X	Deleted to accommodate new objectives which both counties support.
<b>Objective 3.3:</b> Ensure that all vital / critical facilities are protected from the effects of natural hazards to the maximum extent possible.	X			
<b>Objective 3.4:</b> Increase the amount and range of community service weather / tornado community shelters and private safe rooms through the County.		X	X	Included as an action item instead of a separate objective
<b>Goal 4:</b> Protect public health, safety, and welfare by increasing the public awareness and by fostering both individual and public responsibility in mitigating risks due to those hazards.	X			
<b>Objective 4.1:</b> Increase the level of knowledge and awareness of residents on the hazards that routinely threaten the area.			X	Deleted to accommodate new objectives which both counties support.
<b>Objective 4.2:</b> Promote the number of entities' residents that maintain an active flood insurance policy.			X	Deleted to accommodate new objectives which both counties support.

(To be completed upon jurisdiction feedback to 2021 draft, below are 2015 comments) The committee thoroughly discussed the action items included in the 2015 Jasper and Newton plans. The lack of direct connection between goals, objectives, and actions was particularly concerning to the committee. Particular focus came with the general mitigation actions which were not assigned to any jurisdiction (See Table 4.2). Additionally, many committee members saw a great deal of repetition between individual jurisdictions' actions and were troubled by the specificity of each action. The biggest concern expressed was that many committee members felt that this level of specificity tied the hands of most communities, forcing them to stick to the planned objectives and ignore potentially developing mitigation strategies. The lack of connection and the level of specificity were considered to be problematic for the 2015 plan which seeks to be more inclusive of smaller entities without burdening them while creating a bi-county plan which focuses on cooperation and support. Collectively, the committee elected to overhaul action items to eliminate repetition and create a new action strategy which is applicable to more than a single jurisdiction as in the previous plan. This decision was based upon implementation progress over the previous five years, each county's ability to implement or support actions in the future, and general public response to the action itself. Table 4.5 summarizes the previous actions and their level of completion from the 2015 plan as reported by each jurisdiction. All 2010 action items were removed from the 2015 plan. All action items included in the 2015 plan are compilations of action items from multiple entities or newly formed action items which meet the needs and wants of the two-county region.



Following the assessment of the 2015 goals, objectives, and actions and the ensuing discussion discussed above, the committee adopted the 2015 goals and objectives as comprehensive, combine and revise existing actions, and to establish new actions for the counties and their jurisdictions which are listed below. Additionally, the committee worked to establish a method and schedule for yearly plan updates and assessments. All identified actions with infrastructure improvements will be applied to both existing and new buildings and infrastructure. A short summary based on STAPLEE requirements is provided following the narrative below in Table 4.3.

### **2015 Goals, Actions, and Objectives (for jurisdictions to update progress)**

#### **GOAL 1: Increase internal capabilities to mitigate the effects of natural hazards.**

##### ***Objective 1.1: Promote enhancement of floodplain management activities and building code requirements.***

- *Action 1.1.1:* Revise and update regulatory floodplain maps in conjunction with state and federal agencies and monitor for DFIRM development.
- *Action 1.1.2:* Adopt and enforce the International Building Code (IBC) and International Residential Code (IRC).
- *Action 1.1.3:* Continue compliance and implementation of NFIP policies through ordinance and enforcement.

##### ***Objective 1.2: Promote the entities' capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities throughout the entity.***

- *Action 1.2.1:* Incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts.
- *Action 1.2.2:* Support infrastructure changes that may mitigate the impact of natural hazards (i.e. burying power lines, building reinforcements, elevation projects, stormwater drainage management, and construction of tornado safe rooms.)
- *Action 1.2.3:* Monitor for the development of inundation data for dams in the two-county region.
- *Action 1.2.4:* Monitor the development of wildfire data to better assess the potential impact on the two-county region.
- *Action 1.2.5:* Monitor the development of sinkhole data to better assess the potential impact on the two-county region.

##### ***Objective 1.3: Track adequacy of emergency services to protect public health and safety.***

- *Action 1.3.1:* Participate in the National Weather Service StormReady program.

- *Action 1.3.2:* Continually update and monitor the Emergency Operations Plan (EOP) for each county and regional disaster responses.
- *Action 1.3.3:* Execute and maintain mutual aid agreements with all relevant agencies. Develop written agreements between agencies as documentation.
- *Action 1.3.4:* Maintain a publicly accessible list of names, positions, contract information, roles, and responsibilities for all public safety positions and departments.
- *Action 1.3.5:* Review emergency access routes and evacuation routes; mitigate any problem areas.
- *Action 1.3.6:* Continue to upgrade and expand warning systems throughout Jasper and Newton counties as necessary.
- *Action 1.3.7:* Provide training for officials, county employees, and other local jurisdictions regarding the bi-county hazard mitigation plan, emergency operations plan, and other disaster preparedness programs.

***Objective 1.4: Increase regional economic resistance to disasters.***

- *Action 1.4.1* Encourage the development and maintenance of disaster plans for local businesses, schools, hospitals, and other entities as necessary that are coordinated with regional disaster plans.
- *Action 1.4.2* Maintain emergency lists with names and phone numbers of plant managers and other large area employers.

**GOAL 2: Enhance existing policies that will help reduce the potential damaging effects of hazards.**

***Objective 2.1: Take action to minimize the effects of natural disasters on people, property, and building contents.***

- *Action 2.1.1* Encourage citizens who reside in the floodplain to purchase flood insurance and reduce their risk through mitigation actions such as structure elevation.
- *Action 2.1.2* Provide an effective warning system to alert citizens in flood-prone areas and on low-lying roadways when flash flooding is imminent.
- *Action 2.1.3* Enforce NFIP policies.
- *Action 2.1.4:* Continue to support the building of community shelters and private safe rooms throughout the two-county region.

***Objective 2.2: Incorporate drills, education programs, and planning strategies that focus on disaster response by varying populations.***

- *Action 2.2.1* Conduct tornado drills in schools and other public buildings.
- *Action 2.2.2* Use local fire departments to conduct education programs in schools.
- *Action 2.2.3* Support schools in the development of all-hazard plans, education programs, and other strategies to prepare students and faculty for potential disasters.
- *Action 2.2.4* Plan for and maintain adequate road and debris clearing



capabilities.

- *Action 2.2.5:* Develop an ongoing campaign to educate the community about seasonal hazards. Coordinate this campaign with a variety of advertising resources to maximize the number of citizens reached in a timely manner.
- *Action 2.2.6:* Expand public information campaigns to focus on sheltering-in-place preparation.

**GOAL 3: Protect entities' most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation projects.**

***Objective 3.1: Identify and protect locations vulnerable to disasters.***

- *Action 3.1.1* Take inventory of areas which were subject to damage in past natural hazards and use information in future development.
- *Action 3.1.2* Maximize the use of available hazard mitigation grant programs to protect the entities' most vulnerable population and structures.

***Objective 3.2: Ensure that all vital / critical facilities are protected from the effects of natural hazards to the maximum extent possible.***

- *Action 3.2.1* Encourage installation of lightning protection devices and methods on communication infrastructure and critical facilities.
- *Action 3.2.2* Encourage the adoption of stormwater regulation and installation of infrastructure to aid with drainage.
- *Action 3.2.3:* Utilize grant funds and local resources to purchase and install back-up generators for critical infrastructure sites (i.e. water treatment plant, wastewater treatment facilities, sheltering sites).
- *Action 3.2.4:* Encourage all utility providers to assess their facilities and distribution systems for vulnerabilities and make improvements to ensure continued service during a disaster.

**Goal 4: Protect public health, safety, and welfare by increasing the public awareness and by fostering both individual and public responsibility in mitigating risks due to those hazards.**

***Objective 4.1: Increase the level of knowledge and awareness of residents on the hazards that routinely threaten the area.***

- *Action 4.1.1* Develop and implement a multi-hazard public awareness program to educate the public concerning the risks associated with each hazard, methods to mitigate the impacts of hazards, and emergency preparedness.
- *Action 4.1.2* Promote the purchase and use of NOAA weather radios by residents.
- *Action 4.1.3* Expand public information campaigns to focus on disaster readiness, including in-place sheltering, coordinated aid to the elderly, and other programs as they become available.

***Objective 4.2: Identify the citizens most vulnerable to disasters and plan accordingly.***

- *Action 4.2.1* Develop a coordinated response and accommodation schematic for disaster sheltering based on federal guidelines in conjunction with local and state agencies.
- *Action 4.2.2* Work with the Red Cross, National Guard, and other local agencies to develop an inventory of facilities with generators / emergency power that can be used as shelters in the event of a disaster.

Table 4.6 Social, Technical, Administrative, Political, Legal, Economic and Environmental Criteria, 2015 Plan Jasper-Newton Counties	S	T	A	P	L	E	E
<b>Goal 1: Increase internal capabilities to mitigate the effects of natural hazards.</b>							
<b>Objective 1.1: Promote enhancement of floodplain management activities and building code requirements.</b>							
Action 1.1.1: Revise and update regulatory floodplain maps in conjunction with state and federal agencies and monitor for DFIRM development.		X	X		X		X
Action 1.1.2: Adopt and enforce the International Building Code (IBC) and International Residential Code (IRC).		X	X		X		
Action 1.1.3: Continue compliance with and implementation of NFIP policies through ordinance and enforcement.			X		X	X	X
<b>Objective 1.2: Promote the entities' capability to conduct hazard risk assessments, demonstrate funding needs, track mitigation activities throughout the entity.</b>							
Action 1.2.1: Incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts.		X	X	X	X	X	
Action 1.2.2: Support infrastructure changes that may mitigate the impact of natural hazards (i.e. burying power lines, building reinforcements, elevation projects, stormwater drainage management, and construction of tornado safe rooms).		X	X	X	X	X	X
Action 1.2.3: Monitor for the development of inundation data for dams in the two-county region.		X	X			X	X
Action 1.2.4: Monitor the development of wildfire data to better assess the potential impact on the two-county region.		X	X			X	X
Action 1.2.5: Monitor the development of sinkhole data to better assess the potential impact on the two-county region.		X	X			X	X
<b>Objective 1.3: Track adequacy of emergency services to protect public health and safety.</b>							
Action 1.3.1: Participate in the National Weather Service StormReady program.	X	X	X		X	X	X
Action 1.3.2: Continually update and monitor the Emergency Operations Plan (EOP) for each county and regional disaster responses.		X	X	X	X		
Action 1.3.3: Execute and maintain mutual aid agreements with all relevant agencies. Develop written agreements between agencies as documentation.	X		X	X	X	X	
Action 1.3.4: Maintain a publicly accessible list of names, positions, contract information, roles, and responsibilities for all public safety positions and departments.	X		X	X	X		
Action 1.3.5: Review emergency access routes and evacuation routes; mitigate any problem areas.		X	X	X	X		X
Action 1.3.6: Continue to upgrade and expand warning systems throughout Jasper and Newton counties as necessary.		X	X		X	X	
Action 1.3.7: Provide training for officials, county employees, and other local jurisdictions regarding the bi-county hazard mitigation plan, emergency operations plan, and other disaster preparedness programs.	X	X	X	X	X	X	X

<b>Table 4.6 Social, Technical, Administrative, Political, Legal, Economic and Environmental Criteria, Jasper-Newton Bi-County Plan, 2015</b>	<b>S</b>	<b>T</b>	<b>A</b>	<b>P</b>	<b>L</b>	<b>E</b>	<b>E</b>
<b>Goal 1: Increase internal capabilities to mitigate the effects of natural hazards.</b>							
<b>Objective 1.4: Increase regional economic resistance to disasters.</b>							
Action 1.4.1: Encourage the development and maintenance of disaster plans for local businesses, schools, hospitals, and other entities as necessary that are coordinated with regional disaster plans.	X	X	X	X	X	X	X
Action 1.4.2: Maintain emergency lists with names and phone numbers of plant managers and other large area employers.			X		X	X	
<b>Goal 2: Enhance existing policies that will help reduce the potential damaging effects of hazards.</b>							
<b>Objective 2.1: Take action to minimize the effects of natural disasters on people, property, and building contents.</b>							
Action 2.1.1: Encourage citizens who reside in the floodplain to purchase flood insurance and reduce their risk through mitigation actions such as structure elevation.	X	X	X	X	X	X	X
Action 2.1.2: Provide an effective warning system to alert citizens in flood-prone areas and on low-lying roadways when flash flooding is imminent.	X	X	X	X	X	X	X
Action 2.1.3: Enforce NFIP policies.	X		X	X	X	X	
Action 2.1.4: Continue to support the building of community shelters and private safe rooms throughout the two-county region.	X	X	X	X	X	X	X
<b>Objective 2.2: Take action to minimize the effects of natural disasters on people, property, and building contents.</b>							
Action 2.2.1: Conduct tornado drills in schools and other public buildings.	X	X	X		X		X
Action 2.2.2: Use local fire departments to conduct education programs in schools.	X	X	X		X		X
Action 2.2.3: Support schools in the development of all-hazard plans, education programs, and other strategies to prepare students and faculty for potential disasters.	X	X	X	X	X	X	X
Action 2.2.4: Plan for and maintain adequate road and debris clearing capabilities.			X	X	X	X	X
Action 2.2.5: Develop an ongoing campaign to educate the community about seasonal hazards. Coordinate this campaign with a variety of advertising resources to maximize the number of citizens reached in a timely manner.	X	X	X	X	X	X	X
Action 2.2.6: Expand public information campaigns to focus on sheltering-in-place preparation.	X	X	X	X	X	X	X
<b>Goal 3: Protect entities' most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation projects.</b>							
<b>Objective 3.1: Identify and protect locations vulnerable to disasters.</b>							
Action 3.1.1: Take inventory of areas which were subject to damage in past natural hazards and use information in future development.	X	X	X		X	X	X
Action 3.1.2: Maximize the use of available hazard mitigation grant programs to protect the entities' most vulnerable population and structures.	X	X	X	X	X	X	X

<b>Table 4.6 Social, Technical, Administrative, Political, Legal, Economic and Environmental Criteria, Jasper-Newton Bi-County Plan, 2015</b>	<b>S</b>	<b>T</b>	<b>A</b>	<b>P</b>	<b>L</b>	<b>E</b>	<b>E</b>
<b>Objective 3.2: Ensure that all vital / critical facilities are protected from the effects of natural hazards to the maximum extent possible.</b>							
Action 3.2.1: Encourage installation of lightning protection devices and methods on communication infrastructure and critical facilities.		X	X	X	X	X	
Action 3.2.2: Encourage the adoption of stormwater regulations and installation of infrastructure to aid with drainage.		X	X	X	X	X	X
Action 3.2.3: Utilize grant funds and local resources to purchase and install back-up generators for critical infrastructure sites (i.e. water treatment plant, wastewater treatment facilities, sheltering sites).		X	X	X	X	X	X
Action 3.2.4: Encourage all utility providers to assess their facilities and distribution systems for vulnerabilities and make improvements to ensure continued service during a disaster.	X	X	X	X	X	X	X
<b>Goal 4: Protect public health, safety, and welfare by increasing the public awareness and by fostering both individual and public responsibility in mitigating risks due to those hazards.</b>							
<b>Objective 4.1: Increase the level of knowledge and awareness of residents on the hazards that routinely threaten the area.</b>							
Action 4.1.1: Develop and implement a multi-hazard public awareness program to educate the public concerning the risks associated with each hazard, methods to mitigate the impacts of hazards, and emergency preparedness.	X	X	X	X	X	X	X
Action 4.1.2: Promote the purchase and use of NOAA weather radios by residents	X	X	X	X	X	X	X
Action 4.1.3: Expand public information campaigns to focus on disaster readiness, including in-place sheltering, coordinated aid to the elderly, and other programs as they become available.	X	X	X	X	X	X	X
<b>Objective 4.2: Identify the citizens most vulnerable to disasters and plan accordingly.</b>							
Action 4.2.1: Develop a coordinated response and accommodation schematic for disaster sheltering based on federal guidelines in conjunction with local and state agencies.	X	X	X	X	X	X	X
Action 4.2.2: Work with the Red Cross, National Guard, and other local agencies to develop an inventory of facilities with generators / emergency power that can be used as shelters in the event of a disaster.	X	X	X	X	X	X	X



## **Plan Implementation**

### **Strategic Implementation**

The goals, objectives, and actions of this plan necessitate group involvement, including individual communities, chambers of commerce, and large employers. All actions shown above were found to be cost-effective, environmentally sound and technically feasible. The following set of underlying operating principles will improve fiscal and operational efficiency, help maintain a focus on the greater goal of overall community well-being, and ensure implementation. Each action will be implemented according to the following strategies:

- Incorporate mitigation objectives into existing and future plans, regulations, programs and projects.
- Promote and encourage collaboration between agencies and departments to create a partnership and synergy that result in benefits that would not be possible through a single agency.
- Employ sustainable principles and techniques in the implementation of each objective to attain maximum benefits.
- Create and implement a prioritization process that includes fiscal, environmental, and sociological considerations.

### **Ensure Implementation through Inclusion in Adoption Resolution**

The Jasper – Newton Bi-County Hazard Mitigation Plan will be implemented under the direction of each county’s County Commission, the governing body of each municipality, a variety of intergovernmental agencies, non-governmental cooperatives, and each of their respective staffs. The implementation process will include coordination among County departments and other relevant agencies or districts through the Counties’ Emergency Management Directors. Each County will set up a system to monitor progress and evaluate the effectiveness of implemented actions with revisions as needed. Every five years, the Counties will review the plan and include any needed updates. The updated plan will be submitted for SEMA/FEMA approval. Copies of the signed adoption resolutions are included in Appendix A. In addition, the plan will be reviewed for any necessary updates following any major disasters that occur within the two-county region.

### **Plan Maintenance**

Plan maintenance details the formal process that will ensure the Jasper-Newton Bi-County Hazard Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing a plan revision every five years with cooperation between the counties. This section describes how the counties will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how Jasper and Newton County’s governments intend to incorporate the mitigation strategies outlined

in the plan into existing planning mechanisms such as the County Local Emergency Operations Plan, the CEDS, and floodplain management.

The results of this five-year review will be summarized in a report prepared for this Mitigation Plan under direction of the each county's Emergency Management Director and the bi-county LEPC. The report will include an evaluation of the effectiveness and appropriateness of the plan, and will recommend, as appropriate, any required changes or amendments to the plan. The planning committee directed to review the plan shall be composed of representatives from each county's various governmental agencies, County officials, City employees, utility service employees, emergency responders and planners, regional planners, and any concerned county residents. The committee shall be established when the five-year review period approaches and will meet as necessary to discuss mitigation updates. Upon meeting, the committee members will also report on the status of their assigned projects. The Hazard Mitigation Committee should update the plan and submit it to the Committee members and State Hazard Mitigation Officer.

### **2015 Plan Update Adoption**

The Jasper and Newton County Commissions and their jurisdictions will be responsible for adopting the Jasper-Newton Bi-County Hazard Mitigation Plan. These governing bodies have the authority to promote sound public policy regarding natural hazards. Once the plan has been adopted, the Regional Planning Commission, HSTCC, will be responsible for submitting it to the State Hazard Mitigation Officer at Missouri State Emergency Management Agency. Missouri State Emergency Management will then submit the plan to the Federal Emergency Management Agency (FEMA) for review. Upon acceptance by FEMA, both Jasper County and Newton County will maintain eligibility for Hazard Mitigation Grant Program funds.

### **Monitoring, Evaluating, and Updating**

Jasper and Newton Counties have developed a method to ensure regular review and update of the Hazard Mitigation Plan. Each county's Emergency Management Director (EMD) will include hazard mitigation objectives monthly in meetings with the County Commission as needed. If there is a need for a new committee to work on the plan, the County Commission will appoint such. As planning begins for each objective, the public will be encouraged to participate. Each county will publicize the various objectives and the objective at hand by way of media coverage and published reminders. Because this is a bi-county plan, the expectation of cooperation between the two counties is maintained throughout this process. Regular communication between the EMDs has been well established over the course of the past five years, and will continue in the future.

Each County Commission and its EMD will be responsible for monitoring and evaluating the progress of the mitigation strategies in the plan within their county. They will review each goal and objective to determine their relevance to changing situations in the county, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. They also will review the risk assessment portion of the plan to determine if this information should be updated or modified. The parties

responsible for the various implementation actions will report on the status of their projects and will include which implementation process worked well, any difficulties encountered, how coordination efforts were proceeding, and which strategies should be revised.

The Jasper County EMD and the Newton County EMD will work together to update and make changes to the plan that are appropriate for both counties and the region as a whole. They will have three months to update and make changes to the plan before submitting it to the committee members and the State Hazard Mitigation Officer. If no changes are necessary, the State Hazard Mitigation Officer will be given a justification for this determination.

All meetings of the County Commissions, City Councils, and Boards of Aldermen are public and posted per the Sunshine Law of the State of Missouri. The Harry S Truman Coordinating Council will continue to host any hazard mitigation announcements or information, as requested, as well as a copy of the latest plan available at all times.

### **Implementation through Existing Programs**

When possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. Based on the capability assessments of the participating jurisdictions, communities in Jasper and Newton Counties will continue to plan and implement programs to reduce loss of life and property from hazards. This plan builds upon the momentum developed through previous planning efforts in the County, completed mitigation actions/efforts following the Joplin tornado, and recommends implementing actions, where possible, through the following means:

- Jasper County / Newton County Operations Plan
- General or master plans of participating jurisdictions
- Ordinances of participating institutions
- Capital improvement plans and budgets
- Other community plans within the counties (watershed plans, stormwater management plans, parks and recreation plans, etc.)

Upon adoption, the Jasper-Newton Bi-County Hazard Mitigation Plan will serve as a baseline of information on the natural hazards that impact the county and each of its cities. These goals and objectives will help local governments and other organizations plan for natural hazard mitigation in their own planning documents. The meetings of the LEPC and Hazard Mitigation Planning Committee will provide an opportunity for committee members to report back on the progress made on the integration of mitigation planning elements into county/city planning documents and procedures. The governing bodies of the jurisdictions adopting this plan will encourage all other relevant planning mechanisms under their authority to consult this plan to ensure minimization of risk to natural hazards and coordination of activities.

## **Continued Public Involvement**

Jasper and Newton Counties are dedicated to involving the public directly in review and updates of the Hazard Mitigation Plan. The LEPC and the Hazard Mitigation Planning Committee members are responsible for the annual review and update of the plan. (See Appendix B for assessment form.) The public will also have the opportunity to provide feedback about the plan through a variety of venues. Copies of the plan will be available through the following offices and locations to ensure public accessibility:

- Jasper County Commission Office
- Newton County Commission Office
- Jasper County Emergency Management Director
- Newton County Emergency Management Director
- City or Village Clerks
- Harry S Truman Coordinating Council

Public commentary on the plan itself, proposed revisions to, and annual assessment of the plan will be requested and encouraged through local media. During the five-year review, public involvement will additionally be solicited through press releases, public announcements, and by general invitations sponsored by Jasper and Newton Counties. All public meetings will provide the public with a forum where they can express concerns, opinions, or ideas about the plan and proposed updates. Jasper and Newton Counties will collectively be responsible for publicizing the meetings and maintaining public involvement through public access channels, webpages, and newspapers.

## ***Key to Table 4.10 - Five Year Action Plan Matrix***

### **Type of Strategy**

Each action of the Jasper-Newton Bi-County Hazard Mitigation Plan conforms to the six categories of mitigation as established by FEMA. The following list delineates mitigation recommendations that include the six categories of mitigation and their codes:

- Prevention (P)
- Property Protection (PP)
- Natural Resource Protection (NRP)
- Emergency Services (ES)
- Structural Projects (SP)
- Public Information (PI)

### **Action Status; Timeframe (to be updated after jurisdictional review)**

Many of these actions are composed of continuous processes that cannot be completed with a single project. As such, each action has been labeled as new and/or continuous depending upon its estimated completion.

Timeframe provides the year during which these types of actions will be pursued. Some items, particularly those items which are continuous actions, may include a range of years that includes the length of this five year plan because these actions are continuously pursued by the jurisdictions and organizations associated with this plan.

### **Analysis and Prioritization of Mitigation Actions (Cost, Benefit = Priority)**

The mitigation actions included in this plan promote and/or support the development of local hazard mitigation plans, projects, and activities. In the original plan, the STAPLEE process was used to prioritize actions. For the 2021 update, STAPLEE was used not to prioritize actions, but to provide guidance for local officials in considering the impact of actions. The prioritization of mitigation action for Jasper County, Newton County, and their jurisdictions is greatly impacted by available local funding. All mitigation actions are prioritized based upon available funding and the scope of public benefit. A timeline for such mitigation is not outlined by the counties or jurisdictions, but rather pursued as resources allow and urgent public needs surface. Excellent examples of this were seen following the 2011 Joplin tornado with enhanced building codes and requirements, the installation of tornado safe rooms, and other projects which aid the two-county region in natural disaster resistance.

Table 4.10 presents a matrix which provides an analysis and prioritization of the county's natural hazard mitigation goals, objectives, and actions. Prioritization considerations for the Hazard Mitigation Committee included:



- Jasper and Newton Counties have historically been most affected by tornadoes, thunderstorms, and flooding. The threat of severe winter storms, drought, heat wave, earthquake, dam failure, and wildfire must be addressed even though neither county has experienced these hazards to any significant degree.
- Some actions may be high priorities, but will require a lengthy process of preparatory steps and/or high implementation costs. Therefore, these types of actions will show up as a “high” priority, with a somewhat distant future target date for completion.
- Some actions impact a significant portion of or specific group within the local population. The number of persons impacted by such mitigation actions helps to determine the priority level.

The Hazard Mitigation Committee chose feasible, executable goals for the two-county region. Most goals require low or no cost actions, but education, encouragement, and planning. Examples include: instituting additional environmental measures (such as watershed protection), emergency operation plans, master plans, commercial/industrial plans, and education of the public. While some actions require a monetary investment (i.e. purchase of or construction of safe rooms/community shelters), the impact of saving lives and money far exceed any one-time costs incurred.

Each action has been rated High (H), Medium (M), and Low (L) for both potential cost and benefit. The priority is then established as an average of the cost and benefit labels. Table 4.7 demonstrates the priorities for each possible combination of cost and benefit.

<b>Cost Rating (H, M, L)</b>	<b>Benefit Rating (H, M, L)</b>	<b>Overall Priority Rating (H, M, L)</b>
L	L	L
L	M	M
L	H	H
M	L	M
M	M	M
M	H	H
H	L	L
H	M	L
H	H	M

## Jurisdictions / Organizations

Table 4.8 below defines the terms used in the larger item table identifying which organizations and jurisdiction will pursue the identified mitigation action.

<b>Table 4.8 Lead Action Agency</b>	
<b>Code</b>	<b>Agency</b>
FSD	Family Support Division
JNC-Emrg	Jasper/Newton County Emergency Services
JNC-Admin	Jasper/Newton County Commission / Administration
JNC-Shrf	Jasper/Newton County Sheriff's Department
JNC-PH	Jasper/Newton County Public Health Department
JNC-PI	Jasper/Newton County Private Industries
LEPC	Local Emergency Planning Committee
NGO	Non-Profit or other community organization
LGA-All AD, AL, BH CJ, CV, CA, CY, DA, DI, DW, DQ, FA, FI, GR, GFP, J, JO, L, LL, NC, NW, N, O, P, RM, R, S, SX, SE, SCD, W, WC, WE	Local Government Agency – All Airport Drive (AD), Alba (AL), Brooklyn Heights (BH) Carl Junction (CJ), Cartersville (CV), Carthage (CA), Carytown (CY), Dennis Acres (DA), Diamond (DI), Duenweg (DW), Duquesne (DQ), Fairview (FA), Fidelity (FI), Granby (GR), Grand Falls Plaza (GFP) Jasper (J), Joplin (JO), Leawood (L), Loma Linda (LL), Neck City (NC), Newtonia (NW), Neosho(N)Oronogo (O), Purcell (P), Redings Mill (RM), Ritchey (R), Saginaw (S), Sarcoxie (SX); Seneca (SE), Shoal Creek Drive (SCD), Waco (W), Webb City (WC), Wentworth (WE)
SD/EI ASD, CJSD CHCS DSD, ENS JSD, JoSD JACSS MLS, NSD NCS, SSD SeSD, SACS WCSD, WVSD CC MSSU OCC VC	School Districts and Education Institutions – All Avilla School District (ASD), Carl Junction School District (CJSD) College Heights Christian School (CHCS); Diamond School District (DSD), East Newton School District (ENS); Jasper School District (JSD); Joplin School District (JoSD); Joplin Area Catholic School System (JACSS) Martin Luther School (MLS); Neosho School District (NSD); Neosho Christian School (NCS); Sarcoxie School District (SSD); Seneca School District (SeSD); St. Ann's Catholic School (SACS) Webb City School District (WCSD); Westview School District (WVSD); Crowder College Missouri Southern State University (MSSU) Ozark Christian College (OCC) Vatterott College

## Potential Funding Sources

The majority of mitigation projects require some type of funding. Seven potential funding sources were identified by the committee:

- Local (Funds or labor)
- State
- Federal
- Private Funds
- N/A

## Evaluation Methods

The following are the anticipated methods that will be used to determine completeness or review for effective establishment of action items (Table 4.9).

<b>Table 4.9 Evaluation Method</b>	
<b>Code</b>	<b>Explanation</b>
LEPC Rev.	The LEPC will review the action item and note in their minutes if it is complete or established
Maps	Maps depicting the hazard or exclusion zone have been completed.
Reports	A report has been prepared and given to the County Commission by the lead agency.
Records	The proper records have been made and are available for inspection on this action item.
Ordinance	Ordinances are passed and/or enforced by the county or local jurisdiction.
Infrastructure	“Brick and mortar” projects completed (i.e. installation of generators, construction of safe rooms).

Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2015

Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2015																
Action	Type of Strategy	Action Status; Timeline	Cost, Benefit = Priority (H, M, L)	Jurisdiction / Organization	Potential Funding Sources	Evaluation	Natural Hazard									
							Dam Failure	Drought	Earthquake	Flood	Heat Wave	Thunderstorm	Winter Storm	Tornado	Fire	Sinkholes
Goal 1: Increase internal capabilities to mitigate the effects of natural hazards.																
Objective 1.1. Promote enhancement of floodplain management activities and building code requirements.																
Action 1.1.1: Revise and update regulatory floodplain maps in conjunction with state and federal agencies and monitor for DFIRM development.	P PP NRP	New / Continuous 2015-2020	M, M = M	JNC-Admin; AD, CJ, CA, DW, DQ, GR, GFP, Jo, LL, N, O, RM, S, SX, SE, WC	City County State	Maps Reports				X						
Action 1.1.2: Adopt and enforce the International Building Code (IBC) and International Residential Code (IRC).	P PP SP	New / Continuous 2015-2020	L, M = M	JNC-Admin; LGA-All	City County	Ordinance Records			X	X			X	X		
Action 1.1.3: Continue compliance and implementation of NFIP policies through ordinance and enforcement.	P PP NRP	New / Continuous 2015-2020	L, H = H	JNC-Admin; LGA-All	City County	Ordinance; Records				X						
Objective 1.2. Promote the entities’ capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities throughout the entity.																
Action 1.2.1: Incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts	P PP NRP ES	New / Continuous 2015-2020	H, M = L	JNC-Emrg; JNC-Admin; LGA-All; SD/EI; LEPC; NGO	City County State	Reports Records	X	X	X	X	X	X	X	X	X	X

Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2021

Action	Type of Strategy	Action Status; Timeline	Cost, Benefit = Priority (H, M, L)	Jurisdiction / Organization	Potential Funding Sources	Evaluation	Natural Hazard									
							Dam Failure	Drought	Earthquake	Flood	Heat Wave	Thunderstorm	Winter Storm	Tornado	Fire	Sinkholes
Action 1.2.2: Support infrastructure changes that may mitigate the impact of natural hazards (i.e. burying power lines, building reinforcements, elevation projects, stormwater drainage management, and construction of tornado safe rooms).	P PP SP	New / Continuous 2015-2020	H, H = M	JNC-Admin; NGO; LGA-All; SD/EI	City Schools County State Federal	Infrastructure	X	X	X	X	X	X	X	X	X	X
Action 1.2.3: Monitor for the development of inundation data for dams in the two-county region.	P PP	New 2015-2020	L, L = L	JNC – Admin; LGA-All	City County	Maps Reports	X									
Action 1.2.4: Monitor the development of wildfire data to better assess the potential impact on the two-county region.	P PP	New 2015-2020	L, L = L	JNC-Admin; LGA-All	City County	Maps Reports									X	
Action 1.2.5: Monitor the development of sinkhole data to better assess the potential impact on the two-county region.	P PP NRP	New 2015-2020	L, L = L	JNC –Admin; LGA-All	City County	Maps Reports										X
<b>Objective 1.3. Track adequacy of emergency services to protect public health and safety.</b>																
Action 1.3.1: Participate in the National Weather Service StormReady program.	P PP ES PI	New 2015-2016	M, M = M	JNC-Admin	County	Reports Records				X	X	X	X	X		



Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2021

Action	Type of Strategy	Action Status; Timeline	Cost, Benefit = Priority (H, M, L)	Jurisdiction / Organization	Potential Funding Sources	Evaluation	Natural Hazard									
							Dam Failure	Drought	Earthquake	Flood	Heat Wave	Thunderstorm	Winter Storm	Tornado	Fire	Sinkholes
Action 1.3.2: Continually update and monitor the Emergency Operations Plan (EOP) for each county and regional disaster responses.	P ES PI	New / Continuous 2015-2020	L, H = H	JNC-Admin; LEPC	County	LEPC Rev. Reports	X	X	X	X	X	X	X	X	X	X
Action 1.3.3: Execute and maintain mutual aid agreements with all relevant agencies. Develop written agreements between agencies as documentation.	P ES	New 2015-2016	L, M = M	JNC-Admin; LGA-All; LEPC; NGO	City County	LEPC Rev. Reports Records	X		X	X	X	X	X	X	X	
Action 1.3.4: Maintain a publicly accessible list of names, positions, contract information, roles, and responsibilities for all public safety positions and departments.	ES PI	New 2015-2016	L, L = L	JNC-Admin; JNC-Emrg; JNC-Shrf; LEPC	County	Records	X	X	X	X	X	X	X	X	X	X
Action 1.3.5: Review emergency access routes and evacuation routes; mitigate any problem areas.	P ES SP	New / Continuous 2015-2020	M, M = M	JNC-Admin; LGA-All	City County State	LEPC Rev. Reports Infrastructure	X		X	X		X	X	X	X	X
Action 1.3.6: Continue to upgrade and expand warning systems throughout Jasper and Newton counties as necessary.	ES SP	New / Continuous 2015-2020	H, M = L	JNC-Admin; LGA-All	City County State Federal	Infrastructure							X	X		
Action 1.3.7: Provide training to officials, county employees, and other local jurisdictions regarding the bi-county hazard mitigation plan, emergency operations plan, and other disaster preparedness programs.	P ES PI	New / Continuous 2015-2020	L, M = M	JNC-Admin	City County	Reports Records	X	X	X	X	X	X	X	X	X	X

Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2021

Action	Type of Strategy	Action Status; Timeline	Cost, Benefit = Priority (H, M, L)	Jurisdiction / Organization	Potential Funding Sources	Evaluation	Natural Hazard									
							Dam Failure	Drought	Earthquake	Flood	Heat Wave	Thunderstorm	Winter Storm	Tornado	Fire	Sinkholes
Objective 1.4 Increase regional economic resistance to disasters.																
Action 1.4.1: Encourage the development and maintenance of disaster plans for local businesses, schools, hospitals, and other entities as necessary that are coordinated with regional disaster plans.	P ES PI	New 2015-2020	L, M = M	JNC-Admin; LGA-All; JNC-PI; NGO	City County Private	Reports Records	X	X	X	X	X	X	X	X	X	X
Action 1.4.2: Maintain emergency lists with names and phone numbers of plant managers and other large area employers.	ES PI	New 2015-2016	L, L = L	JNC-Admin; LGA-All	City County	LEPC Rev. Reports Records	X	X	X	X	X	X	X	X	X	X
Goal 2: Enhance existing policies that will help reduce the potential damaging effects of hazards.																
Objective 2.1: Take action to minimize the effects of natural disasters on people, property, and building contents.																
Action 2.1.1: Encourage citizens who reside in the floodplain to purchase flood insurance and reduce their risk through mitigation actions such as structure elevation.	P PP SP PI	New / Continuous 2015-2020	L, M = M	JNC-Admin; LGA-All	City County	Reports Records Ordinance				X						
Action 2.1.2: Provide an effective warning system to alert citizens in flood-prone areas and on low-lying roadways when flash flooding is imminent.	P PI	New / Continuous 2015-2020	M, L = M	JNC-Admin; LGA-All	City County	Reports Records	X			X						
Action 2.1.3: Enforce NFIP policies	P PP	New / Continuous 2015-2020	M, M = M	JNC-Admin; LGA-All	City County	Reports Records Ordinance				X						

Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2015

Action	Type of Strategy	Action Status; Timeline	Cost, Benefit = Priority (H, M, L)	Jurisdiction / Organization	Potential Funding Sources	Evaluation	Natural Hazard									
							Dam Failure	Drought	Earthquake	Flood	Heat Wave	Thunderstorm	Winter Storm	Tornado	Fire	Sinkholes
Action 2.1.4: Continue to support the building of community shelters and private safe rooms throughout the two-county region.	SP	New / Continuous 2015-2020	H, H = M	LGA-All; SD/EI	City Schools County State Federal	Infrastructure								X		
<b>Objective 2.2. Incorporate drills, education programs, and planning strategies that focus on disaster response by varying populations.</b>																
Action 2.2.1: Conduct tornado drills in schools and other public buildings.	P ES	New / Continuous 2015-2020	L, M = M	JNC-Admin; LGA-All; SD/EI	City Schools	Reports								X		
Action 2.2.2: Use local fire departments to conduct education programs in schools.	P ES PI	New / Continuous 2015-2020	L, M = M	LGA-All; SD/EI	City Schools County	Reports									X	
Action 2.2.3: Support schools in the development of all-hazard plans, education programs, and other strategies to prepare students and faculty for potential disasters.	P PI	New / Continuous 2015-2020	L, H = H	JNC-Admin; LGA-All; SD/EI; LEPC	City Schools County	Reports Records			X	X	X	X	X	X	X	
Action 2.2.4: Plan for and maintain adequate road and debris clearing capabilities.	PP ES	New / Continuous 2015-2020	L, L = L	JNC-Admin; LGA-All	City County	LEPC Rev. Reports	X		X	X		X	X	X		
Action 2.2.5: Develop an ongoing campaign to educate the community about seasonal hazards. Coordinate this campaign with a variety of advertising resources to maximize the number of citizens reached in a timely manner.	P PI	New / Continuous 2015-2016	L, M = M	JNC-Admin; LGA-All	City County	LEPC Rev. Reports Records		X		X	X	X	X	X		

Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2021

Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2021																
Action	Type of Strategy	Action Status; Timeline	Cost, Benefit = Priority (H, M, L)	Jurisdiction / Organization	Potential Funding Sources	Evaluation	Natural Hazard									
							Dam Failure	Drought	Earthquake	Flood	Heat Wave	Thunderstorm	Winter Storm	Tornado	Fire	Sinkholes
Action 2.2.6: Expand public information campaigns to focus on sheltering-in-place preparation.	P PI	New 2015-2017	L, H = H	JNC-Admin; JNC- PH	City County	Reports Records			X			X	X	X		
Goal 3: Protect entities’ most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation projects.																
Objective 3.1. Identify and protect locations vulnerable to disasters.																
Action 3.1.1: Take inventory of areas which were subject to damage in past natural hazards and use information in future development.	P PP	New / Continuous 2015-2020	L, M = M	JNC-Admin; LGA-All	City County State	Reports	X	X	X	X	X	X	X	X	X	X
Action 3.1.2: Maximize the use of available hazard mitigation grant programs to protect the entities’ most vulnerable populations and structures.	P PP SP	New / Continuous 2015-2020	H, H = M	JNC-Admin; LGA-All; NGO; SD/EI	City Schools County State Federal Private	Reports Infrastructure	X	X	X	X	X	X	X	X	X	X
Objective 3.2. Ensure that all vital / critical facilities are protected from the effects of natural hazards to the maximum extent possible.																
Action 3.2.1: Encourage installation of lightning protection devices and methods on communication infrastructure and critical facilities.	P PP SP	New / Continuous 2015-2020	H, M = L	JNC-Admin; LGA-All; JNC-PI	City County State Private	Records Infrastructure						X				
Action 3.2.2: Encourage the adoption of stormwater regulation and installation of infrastructure to aid with drainage.	P PP SP	New 2015-2020	M, M = M	LGA-All	City County State Federal	Ordinance Infrastructure				X						

Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2021

Action	Type of Strategy	Action Status; Timeline	Cost, Benefit = Priority (H, M, L)	Probable Lead Organizer	Potential Funding Sources	Evaluation	Natural Hazard									
							Dam Failure	Drought	Earthquake	Flood	Heat Wave	Thunderstorm	Winter Storm	Tornado	Fire	Sinkholes
Action 3.2.3: Utilize grant funds and local resources to purchase and install back-up generators for critical infrastructure sites (i.e. water treatment plant, wastewater treatment facilities, sheltering sites).	P ES SP	New / Continuous 2015-2018	H, M = L	JNC-Admin; LGA-All; NGO	City County State Federal Private	Records Infrastructure			X		X	X	X	X		
Action 3.2.4: Encourage all utility providers to assess their facilities and distribution systems for vulnerabilities and make improvements to ensure continued service during a disaster.	P PP SP	New / Continuous 2015-2020	H, M = L	JNC-Admin; LGA-All; JNC-PI; NGO	City County State Federal Private	Records Infrastructure	X	X	X	X	X	X	X	X	X	X
<b>Goal 4: Protect public health, safety, and welfare by increasing the public awareness and by fostering both individual and public responsibility in mitigating risks due to those hazards.</b>																
<b>Objective 4.1: Increase the level of knowledge and awareness of residents on the hazards that routinely threaten the area.</b>																
Action 4.1.1: Develop and implement a multi-hazard public awareness program to educate the public concerning the risks associated with each hazard, methods to mitigate the impacts of hazards, and emergency preparedness.	P PP PI	New 2015-2017	L, H = H	JNC-Admin; LGA-All	City County	Reports Records	X	X	X	X	X	X	X	X	X	X
Action 4.1.2: Promote the purchase and use of NOAA weather radios by residents.	P PI	New / Continuous 2015-2020	L, H = H	JNC-Admin; LGA-All; JNC-Shrf; LEPC; NGO	City County State	Reports Records			X	X		X	X	X		



Table 4.10 Jasper-Newton Bi-County, Five-Year Action Plan Matrix, 2021

Action	Type of Strategy	Action Status; Completion Timeframe	Cost, Benefit = Priority (H, M, L)	Probable Lead Organizer	Potential Funding Sources	Evaluation	Natural Hazard									
							Dam Failure	Drought	Earthquake	Flood	Heat Wave	Thunderstorm	Winter Storm	Tornado	Fire	Sinkholes
Action 4.1.3: Expand public information campaigns to focus on disaster readiness, including in-place sheltering, coordinated aid to the elderly, and other programs as they become available.	P PI	New / Continuous 2015-2020	L, M = M	JNC-Admin; LGA-All; JNC-PH	City County State	Reports Records	X	X	X	X	X	X	X	X	X	X
<b>Objective 4.1: Increase the level of knowledge and awareness of residents on the hazards that routinely threaten the area.</b>																
Action 4.2.1: Develop a coordinated response and accommodation schematic for disaster sheltering based on federal guidelines in conjunction with local and state agencies.	P ES	New 2015-2017	L, M = M	JNC-Admin; JNC-PH; LGA-All; NGO	City County State Federal Private	Reports Records	X		X	X	X		X	X		
Action 4.2.2: Work with the Red Cross, National Guard, and other local agencies to develop an inventory of facilities with generators / emergency power that can be used as shelters in the event of a disaster.	P ES	New 2015-2017	L, M = M	JNC-Admin; JNC-PH; LGA-All; NGO	City County State Private	Reports Records	X	X	X	X	X		X	X		

## **Appendix     A: Adoption Resolutions**

Insert Signed Adoption Resolutions Here

**Appendix      B:**

## Public Involvement Documentation

Jasper-Newton Bi-County Annual Natural Hazard Mitigation Analysis and Report Date of Plan Review: _____		
Goal 1: Increase internal capabilities to mitigate the effects of natural hazards.		
Objective 1.1: Promote enhancement of floodplain management activities and building code requirements.		
Action Items	Status: (Continuous, in progress, deferred, or eliminated)	Comments:
1.1.1: Revise and update regulatory floodplain maps in conjunction with state and federal agencies and monitor for DFIRM development.		
1.1.2: Adopt and enforce the International Building Code (IBC) and International Residential Code (IRC).		
1.1.3: Continue compliance and implementation of NFIP policies through ordinance and enforcement.		
Objective 1.2: Promote the entities' capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities throughout the entity.		
Action Items	Status: (Continuous, in progress, deferred, or eliminated)	Comments:
1.2.1: Incorporate risk assessment and hazard mitigation principles into comprehensive planning efforts.		
1.2.2: Support infrastructure changes that may mitigate the impact of natural hazards (i.e. burying power lines, building reinforcements, elevation projects, stormwater drainage management, and construction of tornado safe rooms.)		
1.2.3: Monitor for the development of inundation data for dams in the two-county region.		



Action Items	Status: (Continuous, in progress, deferred, or eliminated)	Comments:
1.2.4: Monitor the development of wildfire data to better assess the potential impact on the two-county region.		
1.2.5: Monitor the development of sinkhole data to better assess the potential impact on the two-county region.		
<b>Objective 1.3: Track adequacy of emergency services to protect public health and safety.</b>		
Action Items	Status: (Continuous, in progress, deferred, or eliminated)	Comments:
1.3.1: Participate in the National Weather Service StormReady program.		
1.3.2: Continually update and monitor the Emergency Operations Plan (EOP) for each county and regional disaster responses.		
1.3.3: Execute and maintain mutual aid agreements with all relevant agencies. Develop written agreements between agencies as documentation.		
1.3.4: Maintain a publicly accessible list of names, positions, contract information, roles, and responsibilities for all public safety positions and departments.		
1.3.5: Review emergency access routes and evacuation routes; mitigate any problem areas.		
1.3.6: Continue to upgrade and expand warning systems throughout Jasper and Newton counties as necessary.		
1.3.7: Provide training for officials, county employees, and other local jurisdictions regarding the bi-county hazard mitigation plan, emergency operations plan, and other disaster preparedness programs.		

<b>Objective 1.4: Increase regional economic resistance to disasters</b>		
<b>Action Items</b>	<b>Status: (Continuous, in progress, deferred, or eliminated)</b>	<b>Comments:</b>
1.4.1: Encourage the development and maintenance of disaster plans for local businesses, schools, hospitals, and other entities as necessary that are coordinated with regional disaster plans.		
1.4.2: Maintain emergency lists with names and phone numbers of plant managers and other large area employers.		
<b>Goal 2: Enhance existing policies that will help reduce the potential damaging effects of hazards.</b>		
<b>Objective 2.1: Take action to minimize the effects of natural disasters on people, property, and building contents.</b>		
<b>Action Items</b>	<b>Status: (Continuous, in progress, deferred, or eliminated)</b>	<b>Comments:</b>
2.1.1: Encourage citizens who reside in the floodplain to purchase flood insurance and reduce their risk through mitigation actions such as structure elevation.		
2.1.2: Provide an effective warning system to alert citizens in flood-prone areas and on low-lying roadways when flash flooding is imminent.		
2.1.3: Enforce NFIP policies.		
2.1.4: Continue to support the building of community shelters and private safe rooms throughout the two-county region.		

<b>Objective 2.2: Incorporate drills, education programs, and planning strategies that focus on disaster response by varying populations.</b>		
<b>Action Items</b>	<b>Status: (Continuous, in progress, deferred, or eliminated)</b>	<b>Comments:</b>
2.2.1: Conduct tornado drills in schools and other public buildings.		
2.2.2: Use local fire departments to conduct education programs in schools.		
2.2.3: Support schools in the development of all-hazard plans, education programs, and other strategies to prepare students and faculty for potential disasters.		
2.2.4: Plan for and maintain adequate road and debris clearing capabilities.		
2.2.5: Develop an ongoing campaign to educate the community about seasonal hazards. Coordinate this campaign with a variety of advertising resources to maximize the number of citizens reached in a timely manner.		
2.2.6: Expand public information campaigns to focus on sheltering-in-place preparation.		
<b>Goal 3: Protect entities' most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation projects.</b>		
<b>Objective 3.1: Identify and protect locations vulnerable to disasters.</b>		
<b>Action Items</b>	<b>Status: (Continuous, in progress, deferred, or eliminated)</b>	<b>Comments:</b>
3.1.1: Take inventory of areas which were subject to damage in past natural hazards and use information in future development.		

**Objective 3.1: Identify and protect locations vulnerable to disasters.**

Action Items	Status: (Continuous, in progress, deferred, or eliminated)	Comments:
3.1.2: Maximize the use of available hazard mitigation grant programs to protect the entities' most vulnerable population and structures.		

**Objective 3.2: Ensure that all vital / critical facilities are protected from the effects of natural hazards to the maximum extent possible.**

Action Items	Status: (Continuous, in progress, deferred, or eliminated)	Comments:
3.2.1: Encourage installation of lightning protection devices and methods on communication infrastructure and critical facilities.		
3.2.2: Encourage the adoption of stormwater regulation and installation of infrastructure to aid with drainage.		
3.2.3: Utilize grant funds and local resources to purchase and install back-up generators for critical infrastructure sites (i.e. water treatment plant, wastewater treatment facilities, sheltering sites).		
3.2.4: Encourage all utility providers to assess their facilities and distribution systems for vulnerabilities and make improvements to ensure continued service during a disaster.		

<b>Goal 4: Protect public health, safety, and welfare by increasing the public awareness and by fostering both individual and public responsibility in mitigating risks due to those hazards.</b>		
<b>Objective 4.1: Increase the level of knowledge and awareness of residents on the hazards that routinely threaten the area.</b>		
<b>Action Items</b>	<b>Status: (Continuous, in progress, deferred, or eliminated)</b>	<b>Comments:</b>
4.1.1: Develop and implement a multi-hazard public awareness program to educate the public concerning the risks associated with each hazard, methods to mitigate		
4.1.2: Promote the purchase and use of NOAA weather radios by residents		
4.1.3: Expand public information campaigns to focus on disaster readiness, including in-place sheltering, coordinated aid to the elderly, and other programs as		
<b>Objective 4.2: Identify the citizens most vulnerable to disasters and plan accordingly.</b>		
<b>Action Items</b>	<b>Status: (Continuous, in progress, deferred, or eliminated)</b>	<b>Comments:</b>
4.2.1: Develop a coordinated response and accommodation schematic for disaster sheltering based on federal guidelines in conjunction with		
4.2.2: Work with the Red Cross, National Guard, and other local agencies to develop an inventory of facilities with generators / emergency power that can be used as shelters in the event of a disaster.		

The annual assessment and report of the Jasper-Newton Bi-County Natural Hazard Mitigation Plan for the year \_\_\_\_\_ was presented by the Emergency Management Director to the county commissioners on \_\_\_\_\_.

The \_\_\_\_\_ County Commissioners hereby accept and approve the annual report.

\_\_\_\_\_  
Presiding Commissioner

\_\_\_\_\_  
Emergency Management Director





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## **Appendix C:**

### **HAZUS Data**







## **Appendix D:**

### **Local Emergency Operations Plans**