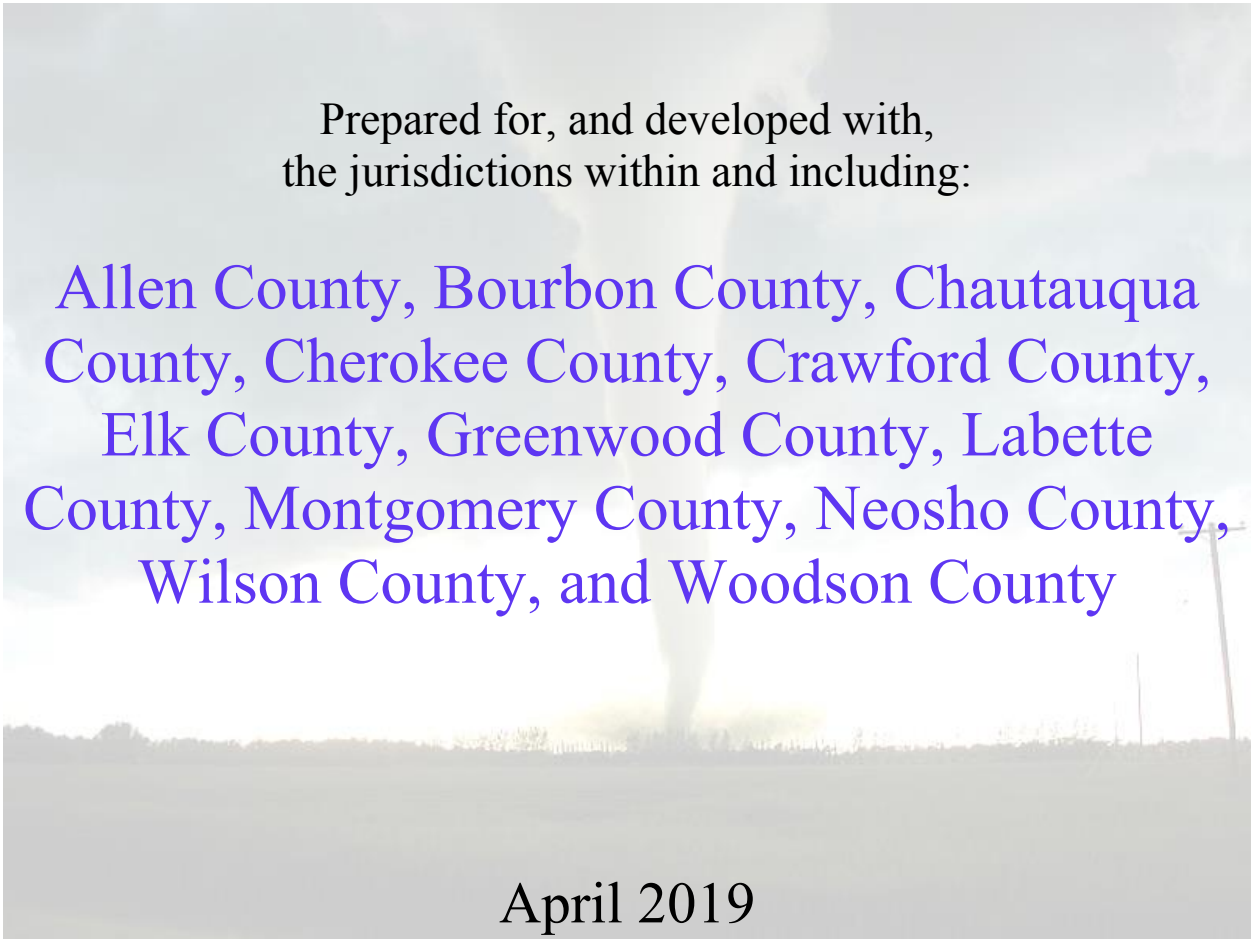
Kansas Homeland Security Region H Hazard Mitigation Plan



Prepared for, and developed with,
the jurisdictions within and including:

Allen County, Bourbon County, Chautauqua County, Cherokee County, Crawford County, Elk County, Greenwood County, Labette County, Montgomery County, Neosho County, Wilson County, and Woodson County

April 2019

Prepared By:

Blue Umbrella Solutions, LLC

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List of Commonly Used Acronyms

Acronym	Meaning
CPRI	Calculated Priority Risk Index
CDC	Centers for Disease Control and Prevention
CWD	Chronic Wasting Disease
CFR	Code of Federal Regulations
CDBG	Community Development Block Grant
CRS	Community Rating System
CWPP	Community Wildfire Protection Plans
EAB	Emerald Ash Borer
EAP	Emergency Action Plan
EMAP	Emergency Management Accreditation Program
EPZ	Emergency Planning Zone
EF	Enhanced Fujita
EPA	Environmental Protection Agency
ºF	Fahrenheit
FEMA	Federal Emergency Management Agency
HAZUS	FEMA Loss Estimation Software
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
GDP	Gross Domestic Product
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HazMat	Hazardous Materials
ISO	Insurance Service Office
KDA	Kansas Department of Agriculture
KDHE	Kansas Department of Health and Environment
KDOT	Kansas Department of Transportation
KDEM	Kansas Division of Emergency Management
KFS	Kansas Fire Service
KGS	Kansas Geological Survey
KSFM	Kansas State Fire Marshall
K.S.A	Kansas Statutes Annotated
KWO	Kansas Water Office
LEPC	Local Emergency Planning Committee
MPC	Mitigation Planning Committee
NCEI	National Centers for Environmental Information
NFIP	National Flood Insurance Program
NLCD	National Land Cover Database
NLD	National Levee Database
NLIR	National Levee Inventory Report
NLSP	National Levee Safety Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resource Conservation Service
NWS	National Weather Service

Acronym	Meaning
NSFHA	No Special Flood Hazard Area
NGO	Non-Governmental Organization
NRC	Nuclear Regulatory Commission
OHMS	Office of Hazardous Materials Safety
PDSI	Palmer Drought Severity Index
PHMSA	Pipeline and Hazardous Materials Safety Administration
PDM	Pre-Disaster Mitigation
PAL	Provisionally Accredited Levee
RL	Repetitive Loss
Risk MAP	Risk Mapping, Assessment and Planning
REC	Rural Electric Cooperative
RFD	Rural Fire District
RWD	Rural Water District
SRL	Severe Repetitive Loss
SFHA	Special Flood Hazard Area
USD	Unified School District
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WUI	Wildland Urban Interface

1.0 Introduction, Assurances and Adoption

1.1 – Introduction

Mitigation is commonly defined as sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects. Hazard mitigation planning provides communities with a roadmap to aid in the creation and revision of policies and procedures, and the use of available resources, to provide long-term, tangible benefits to the community. A well-designed hazard mitigation plan provides communities with realistic actions that can be taken to reduce potential vulnerability and exposure to identified hazards.

This Hazard Mitigation Plan (HMP) was prepared to provide sustained actions to eliminate or reduce risk to people and property from the effects of natural and man-made hazards. This plan documents the State of Kansas Homeland Security Region H (hereafter referred to as Kansas Region H) and its participating jurisdictions planning process and identifies applicable hazards, vulnerabilities, and hazard mitigation strategies. This plan will serve to direct available community and regional resources towards creating policies and actions that provide long-term benefits to the community. Local and regional officials can refer to the plan when making decisions regarding regulations and ordinances, granting permits, and in funding capital improvements and other community initiatives.

Specifically, this hazard mitigation plan was developed to:

- Update the Kansas Region H 2014 Hazard Mitigation Plan
- Build for a safer future for all citizens
- Foster cooperation for planning and resiliency
- Identify, prioritize and mitigate against hazards
- Asist with sensible and effective planning and budgeting
- Educate citizens about hazards, mitigation and preparedness
- Comply with federal requirements

As stipulated in the Disaster Mitigation Act of 2000 (DMA 2000) Section 322, federally approved mitigation plans are a prerequisite for mitigation project grants. Development and Federal Emergency Management Agency (FEMA) approval of this plan will ensure future eligibility for federal disaster mitigation funds through the Hazard Mitigation Grant Program (HMPG), Pre-Disaster Mitigation Grant Program (PDM), Repetitive Flood Claims, and a variety of other state and federal programs. This Plan was prepared to meet the requirements of the DMA 2000, as defined in regulations set forth by the Interim Final Rule (44 CFR Part 201.6).

This plan has been designed to be a living document, a document that will evolve to reflect changes, correct any omissions, and constantly strive to ensure the safety of Kansas Region H.

1.2 – Participating Jurisdictions

44 CFR 201.6(a)(4): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.

All eligible jurisdictions were invited to participate in the organization, drafting, completion and adoption of this plan. Invited jurisdictions included, but were not limited to, elected officials, relevant State of Kansas agencies, counties, cities, school districts, non-profit agencies, and businesses.

In order to have an approved hazard mitigation plan, DMA 2000 requires that each jurisdiction participate in the planning process. Each jurisdiction choosing to participate in the development of the plan were required to meet detailed participation requirements, which included the following:

- When practical and affordable, participation in planning meetings
- Provision of information to support the plan development
- Identification of relevant mitigation actions
- Review and comment on plan drafts
- Formal adoption of the plan

Based on the above criteria, the following jurisdictions participated in the planning process, and will individually as a jurisdiction adopt the approved hazard mitigation plan:

Table 1.1: Allen County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Allen County	x	x
Elsmore	x	x
Gas	x	x
Humboldt	x	x
Iola	x	x
LaHarpe	x	x
Moran	x	x
Savonburg	x	x
Allen County Community College	x	x
USD 256 - Marmaton Valley	x	x
USD 257 - Iola Public Schools	x	x
USD 258 - Humboldt	x	x
Allen County Rural Water District (RWDs) (all Districts)	x	x
American Red Cross	x	x
Southeast Kansas Community Health Center		x
Southern Star	x	x

Table 1.2: Bourbon County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Bourbon County	x	x
Bronson	x	x
Fort Scott	x	x
Fulton	x	x
Mapleton	x	x
Redfield	x	x
Uniontown	x	x
Fort Scott Community College	x	x
USD 234 - Fort Scott	x	x
USD 235 - Uniontown	x	x
Bourbon County Rural Fire District (RFD) #3	x	x
Southeast Kansas Community Health Center		x

Table 1.3: Chautauqua County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Chautauqua County	x	x
Cedar Vale	x	x
Chautauqua (city)	x	x
Elgin		x
Niotaze	x	x
Peru	x	x
Sedan	x	x
USD 285 – Cedar Vale	x	x
USD 286 – Chautauqua County	x	x
Caney Valley Electric	x	x
Chautauqua County RFDs (all Districts)		x
Chautauqua County RWDs (all Districts)		x

Table 1.4: Cherokee County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Cherokee County	x	x
Baxter Springs	x	x
Columbus	x	x
Galena	x	x
Roseland	x	x
Scammon	x	x
Weir	x	x
West Mineral	x	x
Coffeyville Community College	x	x
USD 247 - Cherokee	x	x
USD 404 - Riverton	x	x
USD 493 - Columbus	x	x
USD 499 - Galena	x	x
USD 508 - Baxter Springs	x	x

Table 1.4: Cherokee County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Heartland Electrical	x	x
Cherokee County RWDs (all Districts)	x	x
Southeast Kansas Community Health Center		x

Table 1.5: Crawford County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Crawford County	x	x
Arcadia	x	x
Arma	x	x
Cherokee	x	x
Franklin	x	x
Frontenac	x	x
Girard	x	x
Grant Township	x	x
Hepler	x	x
McCune	x	x
Osage Township	x	x
Mulberry	x	x
Pittsburg	x	x
Sheridan Township	x	x
Sherman Township	x	x
Walnut	x	x
Fort Scott Community College	x	x
Pittsburg State University	x	x
USD 246 - Arma	x	x
USD 247 - Cherokee	x	x
USD 248 - Girard	x	x
USD 249 - Frontenac	x	x
USD 250 Pittsburg	x	x
USD 609 - SE KS Education Services Center	x	x
Crawford County Rural Fire District (RFD) #1	x	x
Crawford County RFD #2	x	x
Crawford County RFD #3	x	x
Crawford County RFD #4	x	x
Crawford County RWD #2	x	x
Crawford County RWD #3	x	x
Crawford County RWD #5	x	x
Crawford County RWD #7	x	x
Girard Medical Center	x	x
Heartland Electric	x	x
Hepler Rural Fire District	x	x
Salvation Army	x	x
Southeast Kansas Community Health Center		x
Via Christi Hospital		x

Table 1.6: Elk County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Elk County	x	x
Elk Falls	x	x
Grenola	x	x
Howard	x	x
Longton	x	x
Moline	x	x
USD 282 - West Elk	x	x
USD 283 - Elk Valley	x	x
Caney Valley Electric	x	x
Elk County RFD	x	x
Elk County RWDs (all Districts)	x	x
Radiant Electric Cooperative	x	x

Table 1.7: Greenwood County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Greenwood County		x
Climax		x
Eureka		x
Fall River		x
Hamilton		x
Madison		x
Severy		x
USD 386 – Madison-Virgil		x
USD 389 - Eureka		x
USD 390 - Hamilton		x
Greenwood County RFD #1		x
Radiant Electrical Cooperative		x

Table 1.8: Labette County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Labette County	x	x
Altamont	x	x
Chetopa	x	x
Edna	x	x
Labette (city)	x	x
Mound Valley		x
Oswego	x	x
Parsons	x	x
Labette County Community College	x	x
USD 493 - Columbus	x	x
USD 503 - Parsons	x	x
USD 504 - Oswego	x	x
USD 505 - Chetopa-St. Paul	x	x

Table 1.8: Labette County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
USD 506 - Labette County	x	x
Great Plains Industrial Park	x	x
Labette County RWD #7	x	x
Public Wholesale Water Supply District (PWWSD) #4	x	x
Radiant Electric Cooperative	x	x
Southeast Kansas Community Health Center		x
Twin Valley Electric	x	x

Table 1.9: Montgomery County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Montgomery County	x	x
Caney	x	x
Cherryvale	x	x
Coffeyville	x	x
Dearing	x	x
Elk City	x	x
Havana	x	x
Independence	x	x
Liberty	x	x
Coffeyville Community College	x	x
Independence Community College	x	x
Montgomery County Private and Non-Profit Schools	x	x
USD 436 - Caney	x	x
USD 445 - Coffeyville	x	x
USD 446 - Independence	x	x
USD 447 - Cherryvale	x	x
American Red Cross	x	x
Caney Valley Electric		
Coffeyville Regional Medical Center	x	x
Labette County Medical Center	x	x
Montgomery County RWD #6	x	x
Montgomery County RWD #7	x	x
Montgomery County RWD #8	x	x
Montgomery County RWD #10	x	x
Montgomery County RWD #12	x	x
Montgomery County RWD #13	x	x
Public Wholesale Water Supply District (PWWSD) #4	x	x
Radiant Electric Cooperative	x	x
Southeast Kansas Community Health Center		x
Twin Valley Electric		x

Table 1.9: Neosho County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Neosho County	x	x
Chanute	x	x
Erie	x	x
Galesburg	x	x
Stark	x	x
St. Paul	x	x
Thayer	x	x
Neosho County Community College	x	x
USD 101 - Erie	x	x
USD 413 - Chanute	x	x
USD 447 - Cherryvale	x	x
USD 505 - Chetopa-St. Paul	x	x
Heartland Rural Electric Cooperative	x	x
Labette County Medical Center	x	x
Neosho PWWSD #23	x	x
Neosho County RWDs (all Districts)	x	x
Radiant Electric		x

Table 1.10: Wilson County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Wilson County	x	x
Altoona	x	x
Benedict	x	x
Buffalo	x	x
Fredonia	x	x
Neodesha	x	x
New Albany	x	x
USD 387 - Altoona-Midway	x	x
USD 461 - Neodesha	x	x
USD 484 - Fredonia	x	x
Radiant Electric Cooperative	x	x
Wilson County RFD	x	x
Wilson County RWDs (all Districts)	x	x

Table 1.11: Woodson County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Woodson County	x	x
Neosho Falls	x	x
Toronto	x	x
Yates Center	x	x
USD 366 - Woodson County	x	x
Heartland Electric	x	x
Lyon-Coffey Rural Electric Cooperative	x	x
Radiant Electric Cooperative	x	x

Table 1.11: Woodson County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
SEK Health	x	x
Woodson County RFD	x	x
Woodson County RWD #1	x	x

Any Kansas Region H jurisdiction not covered in this HMP is either covered under another plan or declined to participate.

1.3 – Assurances

Kansas Region H and all participating jurisdictions certify that they will comply with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c), and will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).

This hazard mitigation plan was prepared to comply with all relevant the requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, as amended by the DMA 2000. This plan complies with all the relevant requirements of:

- Code of Federal Regulation (44 CFR) pertaining to hazard mitigation planning
- FEMA planning directives and guidelines
- Interim final, and final rules pertaining to hazard mitigation planning and grant funding
- Relevant presidential directives
- Office of Management and Budget circulars
- Any additional and relevant federal government documents, guidelines, and rules.

1.4 – Authorities

For all jurisdictions within Kansas Region H all authority is subject to prescribed constraints, as all of Kansas political subdivisions must not act without proper delegation from the State. However, cities and counties in Kansas have broad home rule powers. Local governments in Kansas have a wide range of tools available to them for implementing mitigation programs, policies, and actions. A local jurisdiction may utilize any or all of the following broad authorities granted by the State of Kansas:

- Regulation
- Acquisition
- Taxation
- Spending

In addition, Kansas local governments have been granted broad regulatory authority in their jurisdictions. Kansas Administrative Regulations bestow the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances. Since

hazard mitigation can be included under the police power (as protection of public health, safety, and welfare), towns, cities, and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance-making power to abate "nuisances", which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

The Kansas Region H HMP relies on the authorities given to it by the State of Kansas and its citizens as encoded in state law. This plan is intended to be consistent with all policies and procedures that govern activities related to the mitigation programing and planning. In all cases of primacy, State of Kansas laws, statutes, and policies will supersede the provisions of the plan. This HMP attempts to be consistent following:

- Kansas Constitution, Article 12 Section 5: Home rule powers
- Kansas Administrative Regulation 56-2: Standards for local disaster agencies
- 2016 Kansas Statutes, Chapter 12, Article 7: Allows cities and municipalities to designate flood zones and restrict the use of land within these zones
- 2016 Kansas Statutes Chapter 24, Article 12: Establishes watershed districts
- 2016 Kansas Statutes, Chapter 48, Article 9: Promulgating the Kansas Emergency Management Act, requiring counties to establish and maintain a disaster agency responsible for emergency management and to prepare a county emergency response plan
- 2016 Kansas Statutes, Chapter 65, Article 57: Promulgating the Kansas Emergency Planning and Community Right to-Know Act
- The Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended by the Disaster Mitigation Act of 2000 (Public Law 106-390 – October 30, 2000)
- 44 CFR Part 201.6: Local mitigation plans

In addition, this plan will be consistent with all relevant federal authorities as well as Emergency Management Accreditation Program (EMAP) mitigation standards.

1.5 – Adoption Resolutions

44 CFR Requirement 201.6(c)(5): Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Upon review and approved pending adoption status by FEMA Region VII adoption resolutions will be signed by the participating jurisdictions and tracked by the Regional Mitigation Plan Project Manager with KDEM.

While not required, private, non-profit and charitable organizations that independently participated in this planning effort are encouraged to adopt the plan.

Adoption resolutions may be found in Appendix A.

2.0 Planning Process

2.1 – Documentation of the Planning Process

44 CFR 201.6(c)(1): Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

In September of 2018, Kansas Region H and its participating jurisdictions began the process to update the Kansas Region H 2014 HMP. It was determined that Jeanne Bunting, the State of Kansas Hazard Mitigation Planner would serve as the project manager, directing this plan update, and would act as the primary point-of-contact throughout the project.

The State of Kansas contracted with Blue Umbrella Solutions to assist in updating the 2014 Kansas Region H HMP. Blue Umbrella's roles included:

- Ensure that the hazard mitigation plan meets all regulatory requirements
- Assist with the determination and ranking of hazards
- Assist with the assessment of vulnerabilities to identified hazards
- Assist with capability assessments
- Identify and determine all data needs and solicit the information from relevant sources
- Assist with the revision and development of the mitigation actions
- Development of draft and final planning documents

Kansas Region H and its participating jurisdiction undertook the following steps to update and create a robust HMP:

- Review of the 2014 Kansas Region H HMP
- Review of current related planning documents
- Delivery of organizational and planning meetings
- Solicitation of public input as to plan development
- Assessment of potential risks
- Assessment of vulnerabilities and assets
- Development of the mitigation actions
- Development of a draft multi-hazard mitigation plan
- Implementation, adoption, and maintenance of the plan

The process established for this planning effort is based on DMA 2000 planning and update requirements and the FEMA associated guidance for hazard mitigation plans. The FEMA four step recommended mitigation planning process, as detailed below, was followed:

1. Organize resources
2. Assess risks
3. Develop a mitigation plan
4. Implement plan and monitor progress

To accomplish this, the following planning process methodology was followed:

- Inform, invite, and involve other mitigation plan stakeholders throughout the state, including federal agencies, state agencies, regional groups, businesses, non-profits, and local emergency management organizations.
- Conduct a thorough review of all relevant current and historic planning efforts
- Collect data on all related state and local plans and initiatives. Additionally, all related and relevant local plans were reviewed for integration and incorporation.
- Develop the planning and project management process, including methodology, review procedures, details about plan development changes, interagency coordination, planning integration, and the organization and contribution of stakeholders.
- Develop the profile of the county and participating jurisdictions.
- Complete a risk and vulnerability assessment using a Geographic Information System (GIS) driven approach using data from various local, state and federal agency resources.
- Develop a comprehensive mitigation strategy effectively addressing their hazards and mitigation program objectives. This included identifying capabilities, reviewing pre and post disaster policies and programs, identifying objectives and goals, identifying mitigation actions and projects, and assessing mitigation actions and projects.
- Determination and implementation of a plan maintenance cycle, including a timeline for plan upgrades and improvements.
- Submission of the plan to FEMA Region VII for review and approval and the petition all participating jurisdictional governments for a letter of formal plan adoption.

2.2 – 2019 Plan Changes

44 CFR 201.6(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding

The Kansas Region H HMP has undergone significant revision and upgrading since its last edition. Not only has the region made significant efforts to improve the functionality and effectiveness of the plan itself but is has significantly improved its hazard mitigation program. This grants the region's improved and robust hazard mitigation program a better base to further mold and improve its mitigation strategy over the next five years.

As part of this planning effort, each section of the previous mitigation plan was reviewed and completely revised. The sections were reviewed and revised against the following elements:

- Compliance with the current regulatory environment
- Completeness of data
- Correctness of data
- Capability differentials
- Current state environment

In addition to data revisions, the format and sequencing of the previous plan was updated for ease of use and plan clarity.

During this process, and after a thorough review and discussion with all participating jurisdictions and stakeholders, it was determined that the priorities of the overall community in relation to hazard mitigation planning have not changed during the five years of the previous planning cycle.

2.3 – Mitigation Planning Committee

Upon project initiation a mitigation planning committee (MPC), generally consisting of participating county emergency managers, was formed. From project inception to completion, the MPC was involved in each major plan development milestone, and fully informed through on-site meetings and electronic communication. Prior to the plan's submission to FEMA, the MPC was invited to review the plan and provide input.

In general, all MPC members were asked to participate in the following ways:

- Provide local engagement with all participating jurisdictions
- Attend and participate in meetings
- Assist with the collection of data and information
- Review planning elements and drafts
- Integrate hazard mitigation planning elements with other planning mechanisms
- Facilitate jurisdictional coordination and cooperation
- Assist with the revision and development of mitigation actions

MPC members who were unable to attend meetings due to budgetary or personnel constraints were contacted via email or phone to discuss hazard mitigation planning, including the process, goals, mitigation actions, local planning concerns and plan review.

Each MPC member was thoroughly interviewed regarding their jurisdiction's and sub-jurisdiction's mitigation related activities. These interviews were invaluable in fully integrating the resources necessary to produce this plan, document mitigation activities, and document the mitigation resources available to better increase resiliency.

Additionally, the MPC was used as a conduit to solicit input from all participating jurisdictions under the county. Where appropriate, the MPC solicited the assistance of technical experts from various agencies and groups. When the MPC updated and improved the plan's mitigation strategy, personnel from strategically selected agencies were interviewed to provide input on their mitigation capabilities.

The following participants were selected for the MPC.

Table 2.1: Kansas Region H Mitigation Planning Committee

Participant	Title	Organization
Angela Murphy	Emergency Manager	Allen County
Will Wallis	Emergency Manager	Bourbon County
Cody Collier	Emergency Manager	Chautauqua County
Jason Allison	Emergency Manager	Cherokee County
Jason Vanbecelaere	Emergency Manager	Crawford County
Beth Koehler	Emergency Manager	Elk County
Levi Vinson	Emergency Manager	Greenwood County
Charles Morse	Emergency Manager	Labette County
Rick Whitson	Emergency Manager	Montgomery County
Melanie Kent-Culp	Emergency Manager	Neosho County
Terry Lyons	Emergency Manager	Wilson County
Cortney Bartley	Emergency Manager	Woodson County
Jeanne Bunting	Mitigation Planner	State of Kansas
Matt Eyer	Plan Author	Blue Umbrella Solutions

2.4 – Local and Regional Stakeholder Participation

44 CFR Requirement 201.6(b)(2): An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process

The Kansas Region H MPC provided the opportunity for neighboring communities, counties, and local and regional development agencies to be involved in the planning process. Where applicable, these entities were kept informed of the hazard mitigation process during state, regional and local emergency management meetings, gatherings and conferences, in person by MPC members, or were solicited for planning information.

In addition, relevant federal, regional, state, local governmental, and private and non-profit entities were also invited to provide input and utilized for information and technical expertise. The following list indicates entities that were included in the outreach effort:

- Anderson County, Kansas
- Butler County, Kansas
- Chase County, Kansas
- Coffey County, Kansas
- Cowley County, Kansas
- Linn County, Kansas
- Lyon County, Kansas
- Barton County, Missouri
- Bates County, Missouri

- Jasper County, Missouri
- Vernon County, Missouri
- Nowata County, Oklahoma
- Osage County, Oklahoma
- Ottawa County, Oklahoma
- Participating County Building, Zoning and Appraisal Departments
- National Oceanic and Atmospheric Administration
- United States Department of Agriculture
- United States Geological Survey
- Kansas Adjutant General's Office
- Kansas Department of Agriculture
- Kansas Department of Transportation

2.5 – Public Participation

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

As part of the overall planning process, the public were provided with numerous opportunities to contribute and comment on the creation and adoption of the plan. These opportunities included:

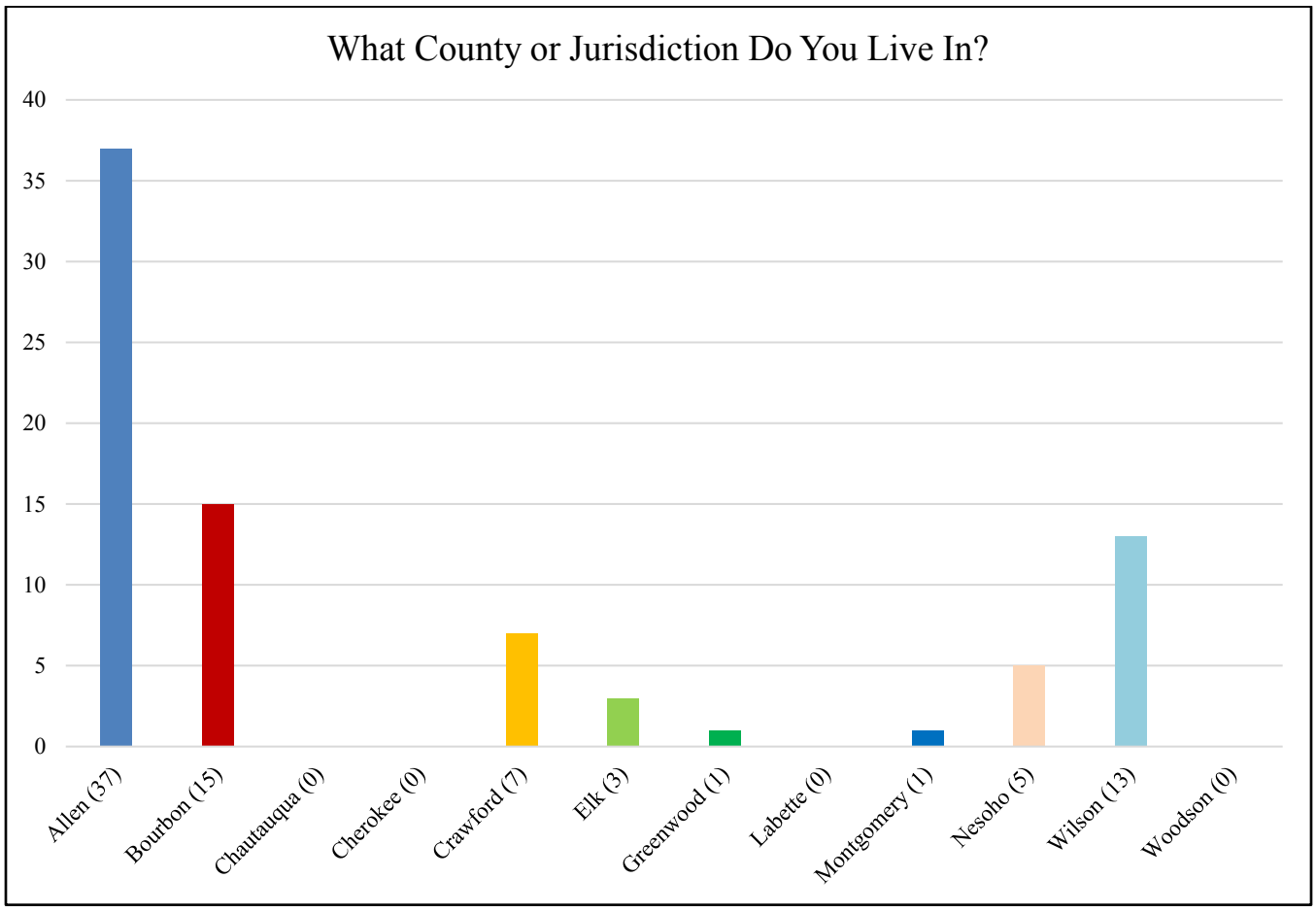
- Advertised meeting invitations on participating jurisdictional websites
- Open meeting opportunities with Kansas Region H MPC members
- Access to an online survey document to provide feedback
- Comment period upon completion of draft plan

Input from the general public provided the MPC with a clearer understanding of local concerns, increased the likelihood of citizen buy-in concerning proposed mitigation actions, and provided elected officials with a guide and tool to set regional ordinances and regulations. This public outreach effort was also an opportunity for adjacent jurisdictions and entities to be involved in the planning process.

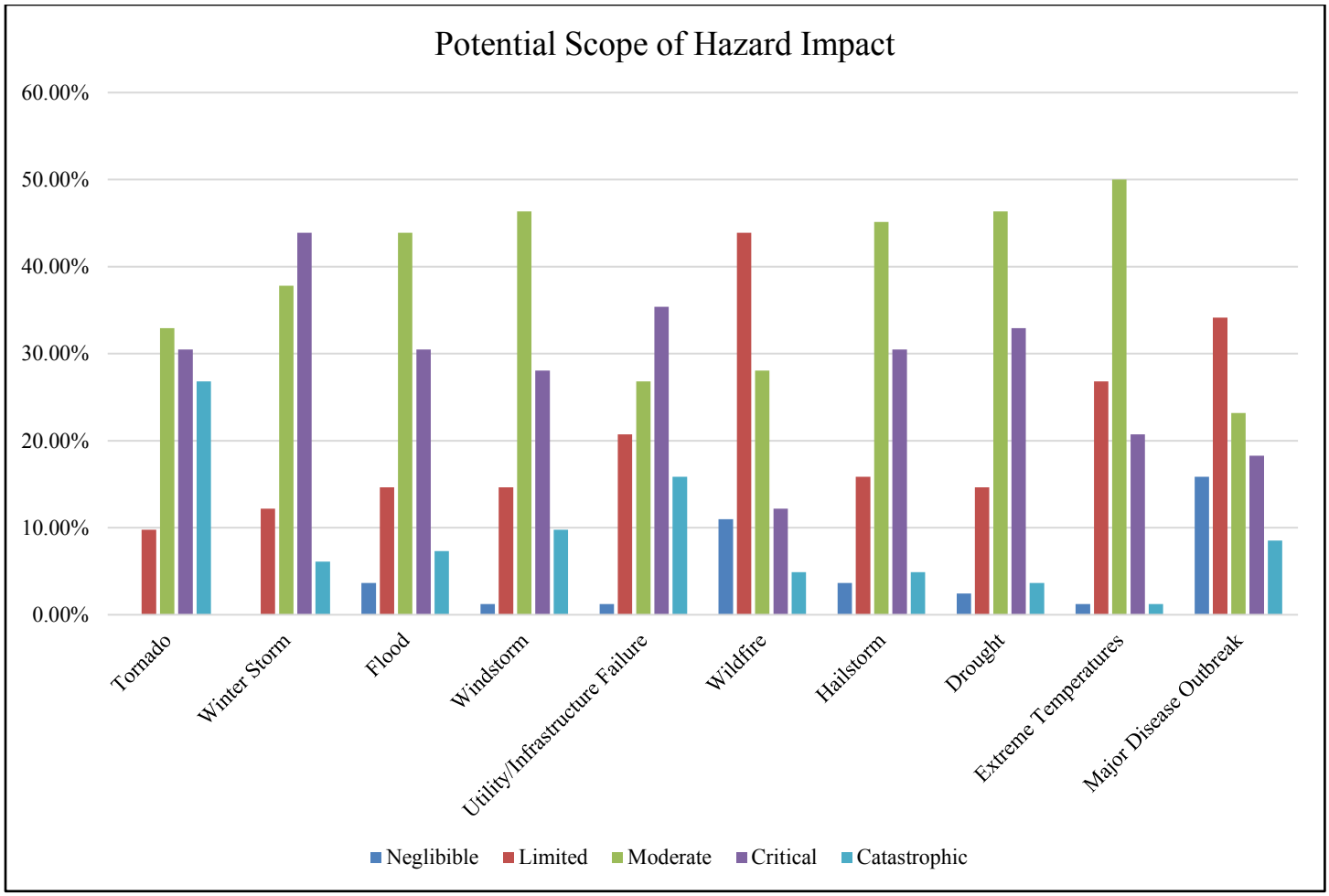
Additionally, as citizens were made more aware of potential hazards and the local process to mitigation against their impacts, it was believed that they would take a stronger role in making their homes, neighborhoods, schools, and businesses safer from the potential effects of natural hazards.

With 82 responses, the following graphics represents the feedback received from the public from the online survey document.

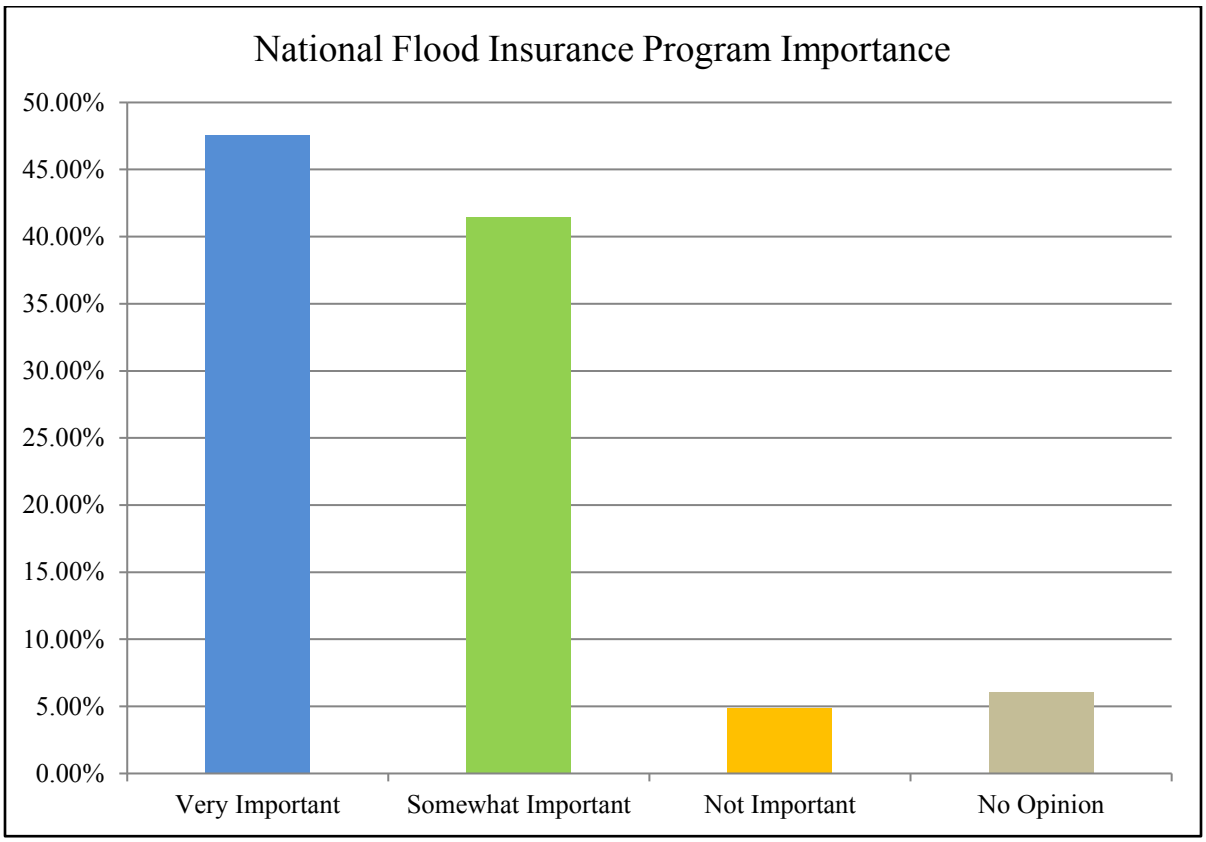
Question 1: In which county or jurisdiction do you live?



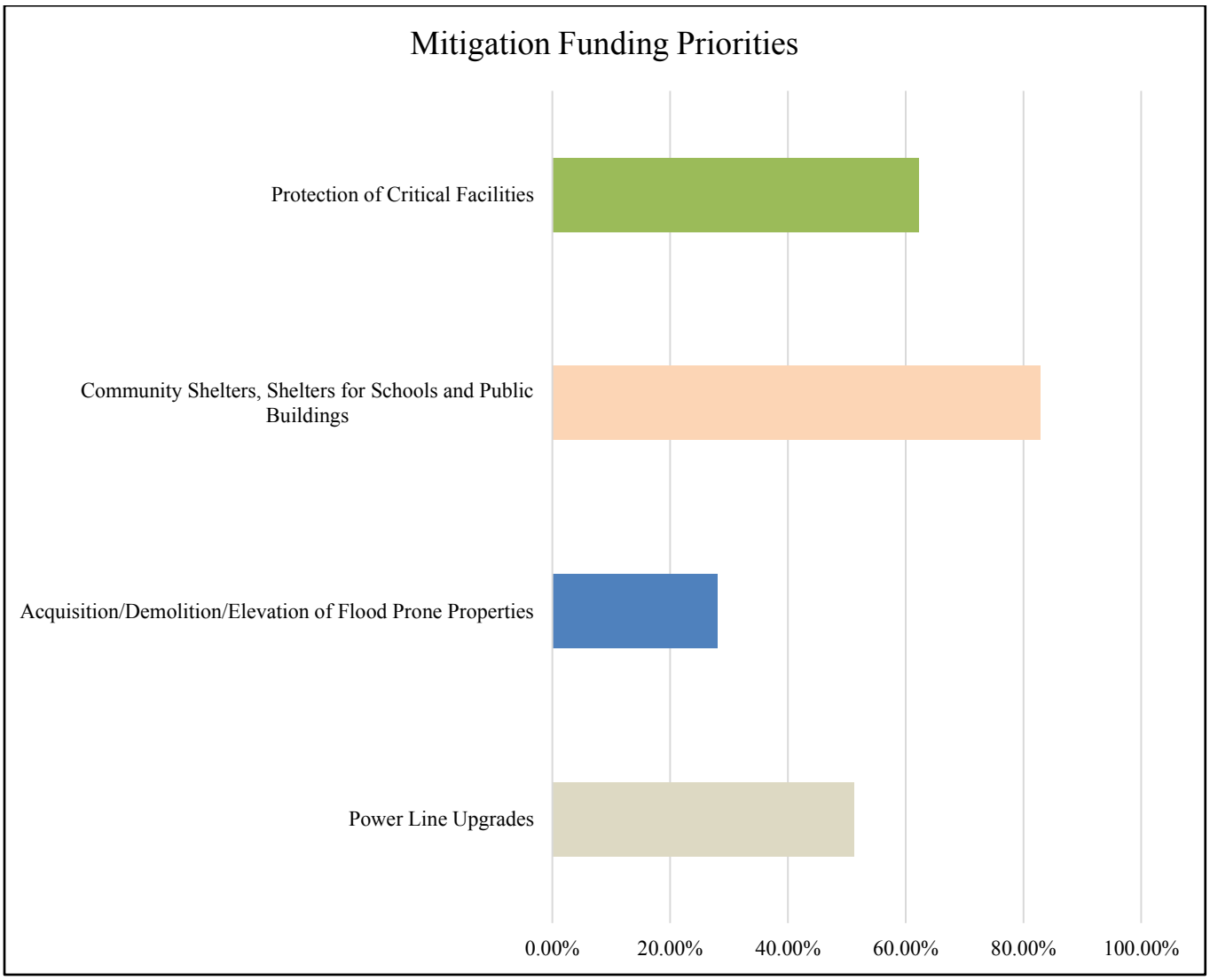
Question 2: In 2014, the Region consisting of Allen, Bourbon, Chautauqua, Crawford, Cherokee, Elk, Greenwood, Labette, Neosho, Montgomery, Wilson, and Woodson Counties, the planning committee determined that the hazards listed below are of significance to the area. Please indicate the level of risk, or extent of potential impacts, in the Region, that you perceive for each hazard.


Potential Scope of Hazard Impact
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Tornado
Winter Storm
Flood
Windstorm
Utility/Infrastructure Failure
Wildfire
Hailstorm
Drought
Extreme Temperatures
Major Disease Outbreak
Neglibible
Limited
Moderate
Critical
Catastrophic

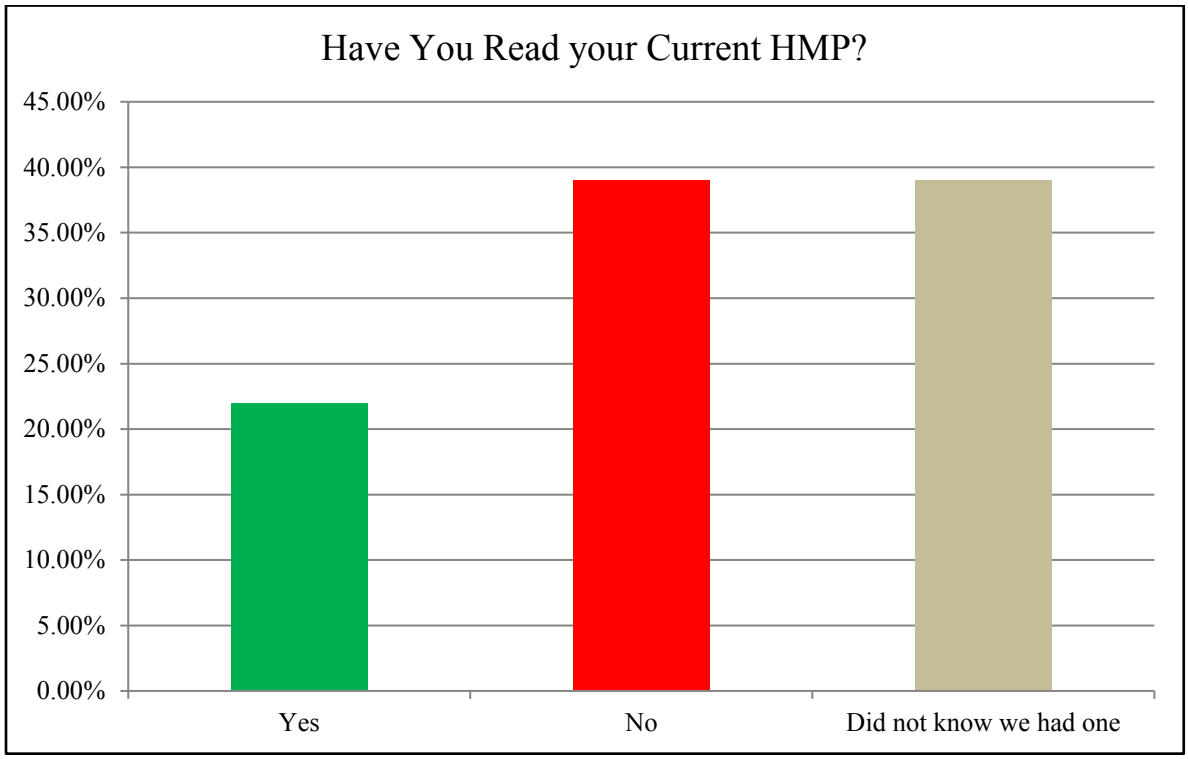
Question 3: In the Region, the planning committee has determined that a flood event is the third most critical hazard. How important is it for you to have your community participate in or continue to participate in the National Flood Insurance Program?



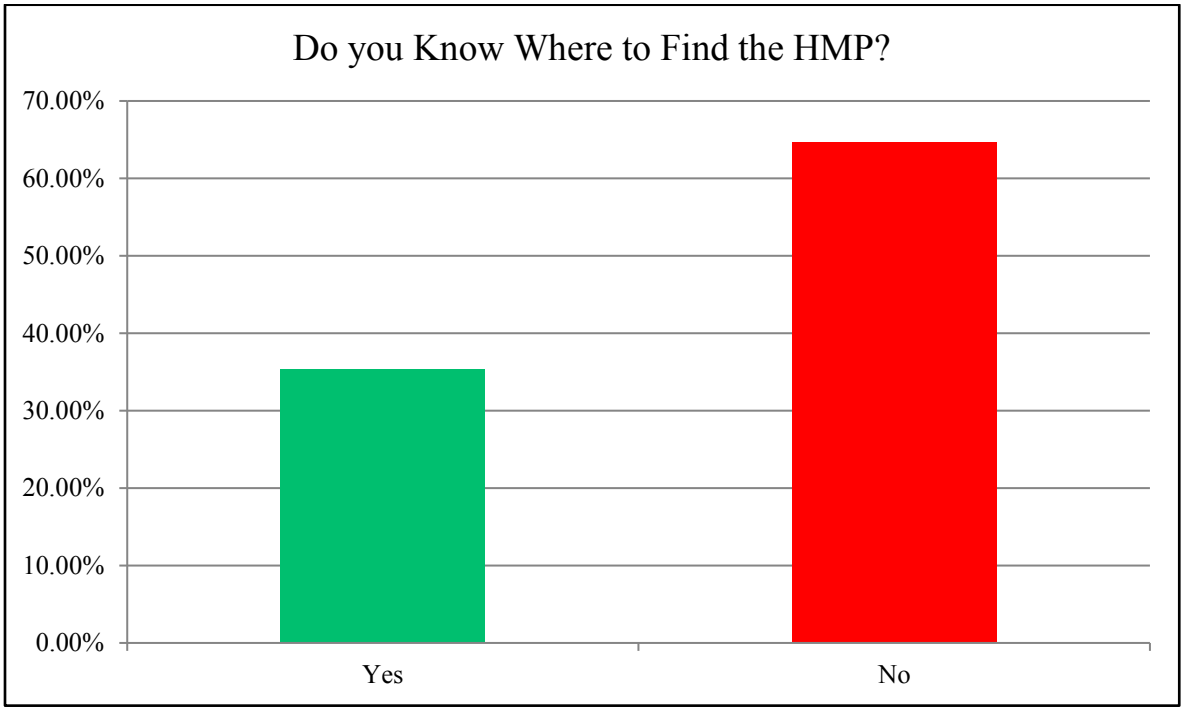
Question 4: The Kansas Division of Emergency Management currently reviews the application for funds for the FEMA Risk Mitigation Grant Program. Your current funding priorities are listed below. Please check those that could benefit your community.



Question 5: Have you had the opportunity to read your current Risk Mitigation Plan?



Question 6: Do you know where you can find the mitigation plan for your county if you would like to see it?



In addition, respondents were given the opportunity to address any local concerns or issues of concern to them. These responses were provided to the relevant MPC member for review, and if necessary, action.

Question 7: Your opinion is valuable to this planning process. Discuss any other problems that the planning committee should consider when developing a strategy to reduce future losses caused by natural hazard events.

Table 2.2: Kansas Region H Survey Comments, Areas of Concern

Jurisdiction	Comments
Allen County	Allow properties in flood zones to have outdoor, above/below ground storm shelters.
Allen County	Keep up the great work! Thank You for getting input from the community
Allen County	Storm cellars or how to better protect the south side of town from flooding.
Allen County	The lack of maintenance and upkeep of drainage, runoff, curbing and ditches have seriously eroded and undermined the integrity of the streets of Humboldt Ks
Allen County	In the rural areas outside of town tornados or any emergency with less than 1-3 hours of warning could be much more catastrophic. Satellite television options are not reliable if you can even get a channel that is local, no internet options, radio is not always aware or covering outside of town. Poor cell phone service becomes our most reliable option to receive information. With shelters up to 15 minutes away and little notice it becomes dangerous quick.
Allen County, Humboldt	Training first responders. There has been limited training
Allen County, Iola	We need more storm shelters.
Allen County, Iola	Water infrastructure, mold issues
Allen County, Iola	I am not convinced that a significant outbreak of a disease could be handled with two hospitals shutting down. Last winter the flu season overwhelmed current capacity. I was told not to go to the hospital despite needing services my primary care could not provide.
Allen County, Iola	I live in a Subdivision located just north of, and out of city limits of Iola KS. We are approximately 2 miles from the nearest tornado shelter. A public shelter in my area is desperately needed. We have over 50 homes in our area, most of which are on concrete slabs and have no tornado protection.
Bourbon County	Medical care will be needed. Also, the ditches need to be cleaned for better water flow from the down pours. Check them out, Tall weeds brush, trash, etc.
Bourbon County	For me, the failure of aging infrastructure (water, sanitary sewer, storm sewer, electric, bridges, roads) is the greatest concern and most likely to cause hazards and the most deserving of funds to help renew.
Bourbon County	I think that our EM goes to several of the workshops and I feel that he keeps us well informed.
Bourbon County	I am new at attending the LEPC meetings. I have learned a lot about their processes and know that they take their jobs very seriously.
Bourbon County, Fort Scott	Being able to communicate as effectively as possible in the event of a hazard.
Crawford County	In my area it would be to fund a storm shelters for citizens and businesses.
Crawford County	Yearly meetings to update/review the mitigation plan that is in place and understand its content.

Table 2.2: Kansas Region H Survey Comments, Areas of Concern

Jurisdiction	Comments
Elk County	Develop a coordinated set of activities that provide support for all county agencies to collaborate in the event of a pending event.

Question 8: Do you have any mitigation project that you would like to see implemented and what are they?

Table 2.3: Kansas Region H Survey Comments, Requested Projects

Jurisdiction	Comments
Allen County	Better storm shelters that handicap assemble for town houses In Iola. Need more shelters I, other parts of town that don't require hiding under a table in a school.
Allen County	Handicap sidewalks down town and safer walking trails
Allen County	Difficult for many of the elderly and disabled to get to safe place during natural disasters... Any future opportunities should consider this fact and include ADA compliant shelters.
Allen County	Internet services outside of town. The rest of the world is quickly leaving us behind with only costly satellite options that provide very poor service. Antennas do not even pick up anything in many of these areas. As everyone moves to data-based services the options to stay informed in rural areas are becoming even more sparse. Federal funds were put up to help with this but rural Allen county (most specifically the south east corner) seems to have been left behind. Rural Neosho and Crawford have access to crawkan lines in most areas with fewer per square mile. While this may seem irrelevant since we don't have much of a population someone is still paying to own the land. It's becoming more difficult to feel safe and informed as the world leaves us behind.
Allen County, Humboldt	Training
Allen County, Iola	demolition of vacant property, more housing
Bourbon County	Water coming into Uniontown on the north end, from pasture and a field!
Bourbon County	"1.
Bourbon County	I would like to have a table top on Flooding. Our dialysis clinic serves patients from all directions and would like to know how to handle a major floor like in 1986 that Fort Scott had.
Bourbon County, Bronson	Storm shelters, 3-phase generator to utilize Community Center as a critical facility to provide refuge for citizens
Bourbon County, Fort Scott	Shelter for school district.
Bourbon County, Redfield	Storm shelters and a working storm siren
Bourbon County, Uniontown	We would like to implement a stormwater system and plan.
Bourbon County, Uniontown USD 235	I would like to see a FEMA Approved Shelter at the schools in Uniontown. I would also like to see back up power (generators) at the schools so that in the case of an emergency the school can serve as a shelter with power.
Crawford County	Yes, 80/20 Grant that will allow home owners to put sin storm shelters.
Elk County	storm shelters in each community

Table 2.3: Kansas Region H Survey Comments, Requested Projects

Jurisdiction	Comments
Elk County	Our school district has discussed "safe rooms" to provide a space for students and staff to be housed in the event of a threat or event requiring a safe place to house employees and possibly community members as well.
Montgomery County	Improvement of major highways to raise them above the floodplain, ensuring movement of responders, supplies, groceries, evac routes. during a flood.
Neosho County, Chanute	anything dealing with interdepartmental communications
Wilson County	I would like to see underground power lines installed. Ice storms that take down power lines are a regular occurrence here, and this causes serious risks to the elderly and the sick.
Wilson County	Training road grader operators to maintain the roads so that rain water will flow TO the ditches and not down the sides of the road.
Wilson County	We need shelters in small towns like Benedict.

2.6 – Planning Meetings

Within Kansas Region H there are many jurisdictions and organizations who have a vested interest in participating in the creation and adoption of the hazard mitigation plan. An integral part of the planning process included the identification, development, and coordination of all of these entities. As such, a series of three organizational and planning meetings were scheduled and all past and potential future participants were notified by the State of Kansas as to the dates and locations of the meetings. In addition, communities neighboring the region were invited to participate in the planning process.

It is worth noting that all neighboring Kansas counties are undergoing a similar mitigation planning effort, and as part of this statewide process all county and state planners are working together toward common mitigation goals. During the creation and adoption of this plan communication channels were opened to facilitate the cross pollination of ideas, to incorporate neighboring regions concerns, and to ensure the overall preparedness of the State of Kansas.

A series of kick-off meetings were held with MPC members, available representatives from jurisdictions within the planning region, local and regional stakeholders, and the public invited. At the kickoff meeting, the planning process, project coordination, scope, participation requirements, strategies for public involvement, and schedule were discussed in detail. During the meeting, participants were led through a guided discussion concerning hazard data sourced from their previous hazard mitigation plans. Additionally, research was conducted prior to the meeting on recent regional hazard events to further inform the discussion. Participants were encouraged to discuss past hazard events, past impacts, and the future probability for all identified hazards. At the conclusion of the meeting, all participants were provided with a data collection form to solicit information needed to properly complete the HMP. The forms asked for information concerning data on historic hazard events, at risk populations and properties, and available capabilities. Additionally, participating jurisdictions were provided with their mitigation actions from the previous plans for review and comment and asked to identify any additional mitigation actions.

A mid-term planning meeting was held with MPC members. Based upon the initial research, discussions held during the kickoff meetings, information obtained from the data collection forms, additional research,

and subsequent discussion with MPC members, the results of the hazard identification, classification, and delineation were discussed in detail. In addition, sections of the HMP were made available for review and comment. Based on the supplied hazard information, participants were asked to assist in the development and review of mitigation goals and actions.

A final planning meeting was held with MPC members, available representatives from jurisdictions within the planning region, local and regional stakeholders, and the public invited. The completed draft HMP was made available for review and comment.

The following table presents the date and location of each planning meeting.

Table 2.4: Kansas Region H Planning Meetings

Meeting Number	Date	Location
1 (Kickoff)	10/22/2018	Greenwood County
	10/22/2018	Neosho County
	10/23/2018	Montgomery County
2 (Mid-Term)	12/06/2018	Neosho County
3 (Final)	03/04/2019	Allen County
	03/04/2019	Wilson County
	03/06/2019	Labette County

Both the minutes and sign-in sheets from all meetings may be found in Appendix C.

2.7 – Existing Plan Incorporation

44 CFR 201.6(b)(3): Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

The hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various other jurisdictional plans. In creating this plan, all the planning documents identified below were consulted and reviewed, often extensively. In turn, when each of these other plans is updated, they will be measured against the contents of the hazard mitigation plan.

Below is a list of the various planning efforts, sole or jointly administered programs, and documents reviewed and included in this hazard mitigation plan. While each plan can stand alone, their review and functional understanding was pivotal in the development of this plan and further strengthens and improves Kansas Region H's resilience to disasters.

- All participating jurisdictions Codes and Ordinances
- All participating jurisdictions Comprehensive Plans
- All participating jurisdictions Critical Facilities Plans
- All participating jurisdictions Economic Development Strategic Plans
- All participating jurisdictions Emergency Operations Plans
- All participating jurisdictions Flood Mitigation Assistance Plan

- All participating jurisdiction Land-Use Plans
- Community Wildfire Protection Plans
- Any other newly created or relevant jurisdictional plan

Information from each of these plans and programs is utilized within the applicable hazard sections to provide data and fully inform decision making and prioritization.

State and Federal Level Plan Integration

The following list illustrates local, state and federal programs integrated, where applicable, and referenced in Kansas Region H's mitigation efforts.

- State of Kansas Hazard Mitigation Plan
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program
- National Flood Insurance Program
- Pre-Disaster Mitigation Program
- Repetitive Loss & Severe Repetitive Loss Program
- FireWise Communities Program
- Relevant Dam Emergency Action Plans (if document not secured)
- Community Rating System

Integration Challenges

The 2014 plan update successfully integrated approved Kansas Region H local hazard mitigation plans into one reginal HMP. This represents a success of our streamlined program of allowing jurisdictions to participate in multi-jurisdictional regional-level plans. This program not only reduces the cost and the burden to local jurisdictions, it also allows for closer collaboration and integration of local communities in all areas or planning and response. However, and as always, challenges exist due to the day to day demands of the working environment, including scheduling conflicts, budget restrictions, and staffing changes and shortages related to both the utilization and incorporation of the HMP and completion of identified hazard mitigation projects.

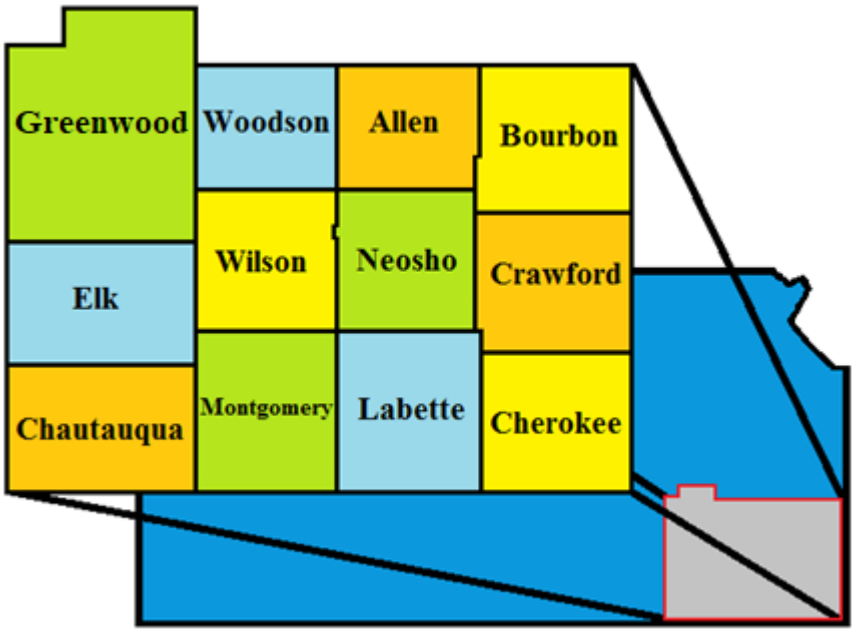
3.0 Planning Area

3.1 – Introduction

Kansas Region H consists of the following twelve participating counties and their participating jurisdictions:

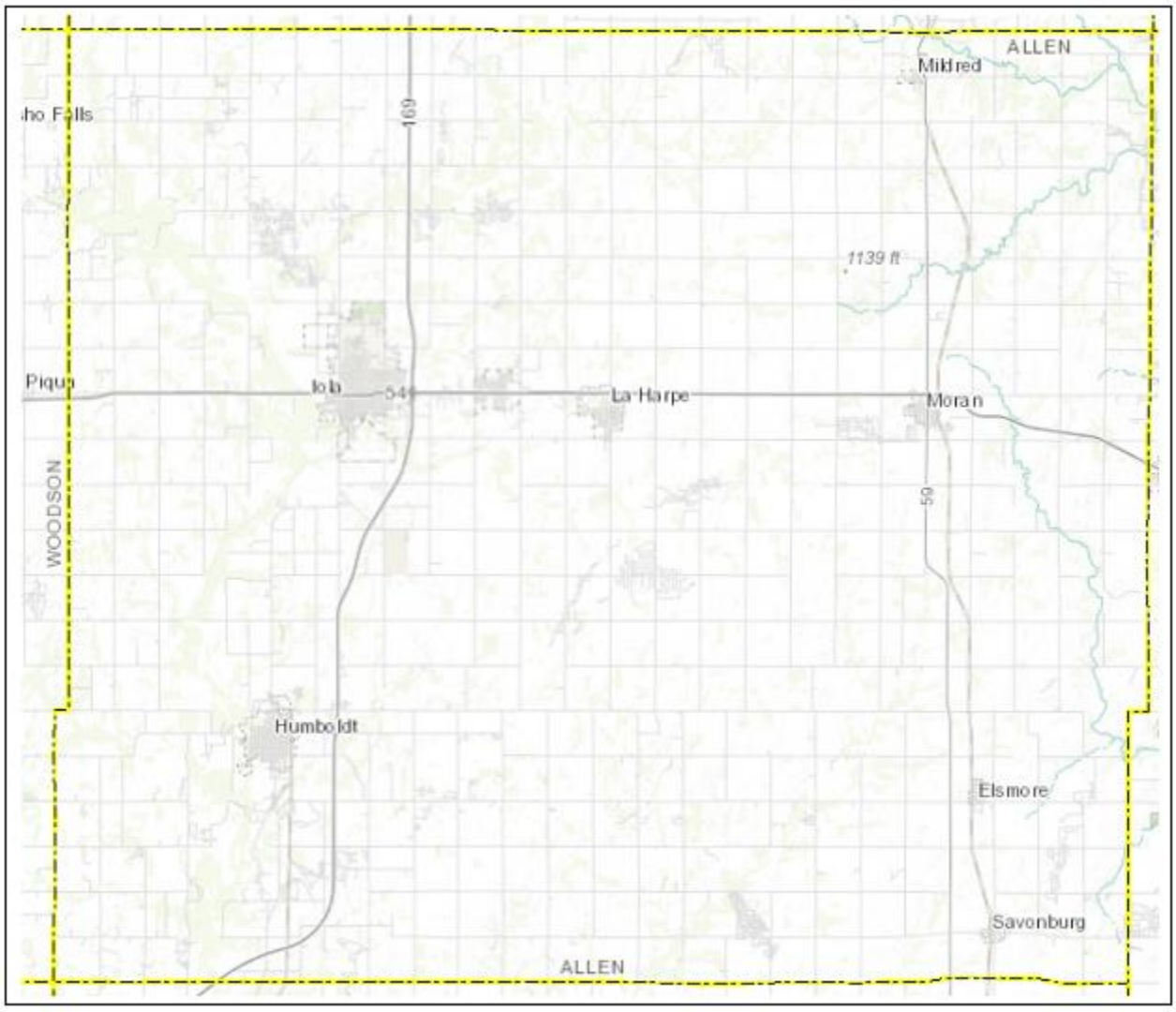
- Allen County
- Bourbon County
- Chautauqua County
- Cherokee County
- Crawford County
- Elk County
- Greenwood County
- Labette County
- Montgomery County
- Neosho County
- Wilson County
- Woodson County

The following map details the locations of these counties.



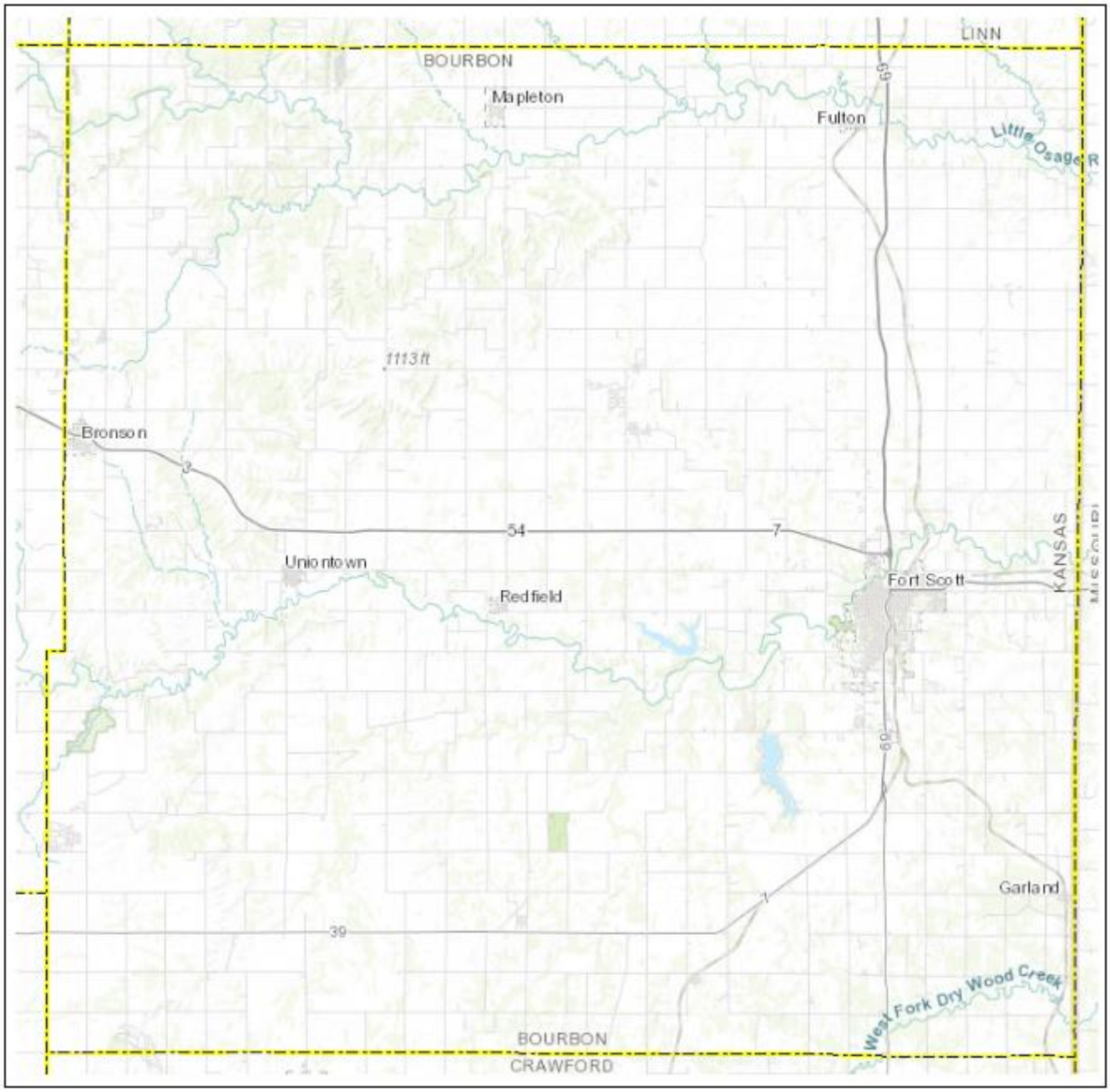
The following is a map of **Allen County,** provided by the Kansas Department of Transportation (KDOT).

Map of Allen County



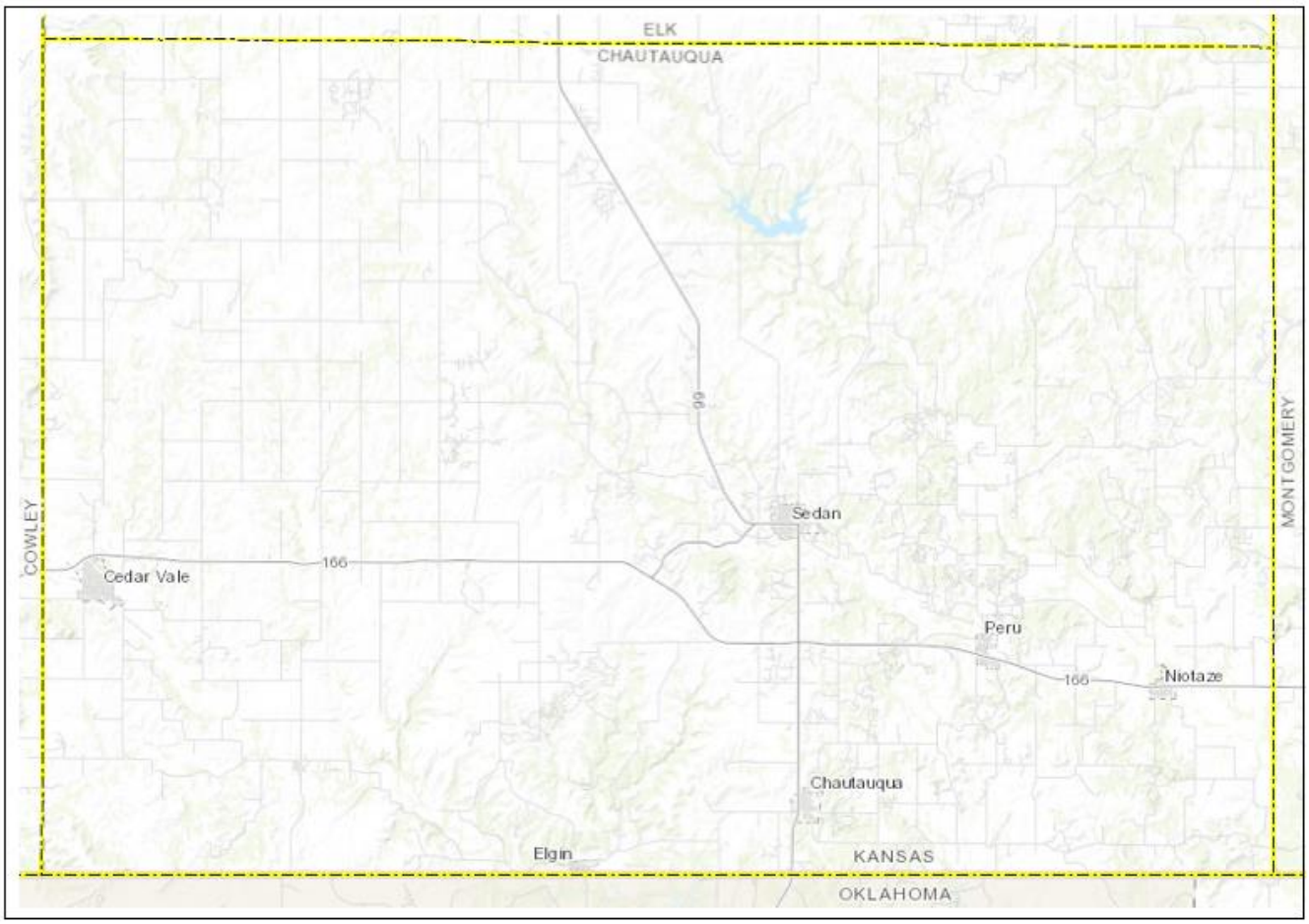
The following is a map of **Bourbon County,** provided by KDOT.

Map of Bourbon County



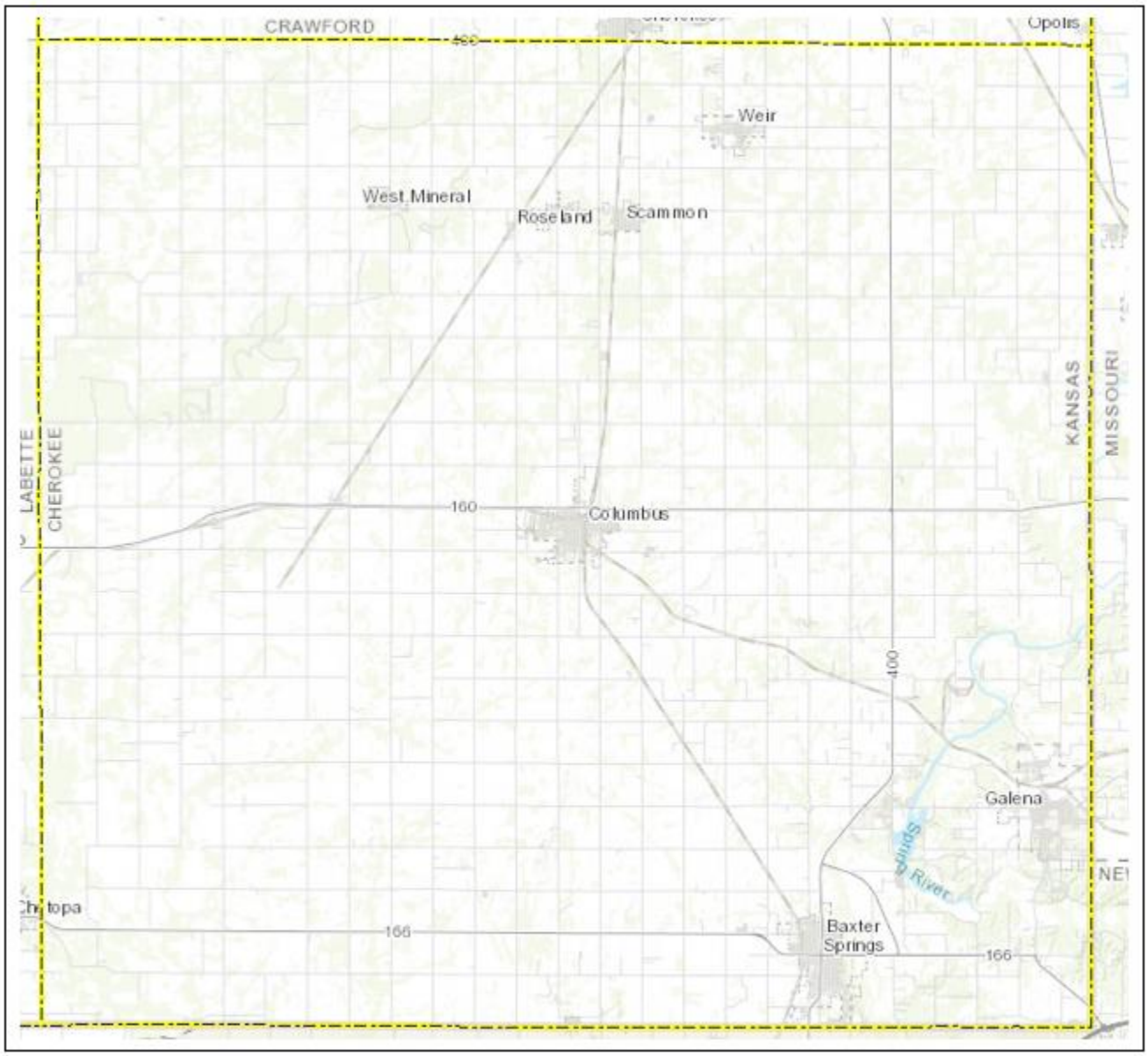
The following is a map of **Chautauqua County,** provided by KDOT.

Map of Chautauqua County



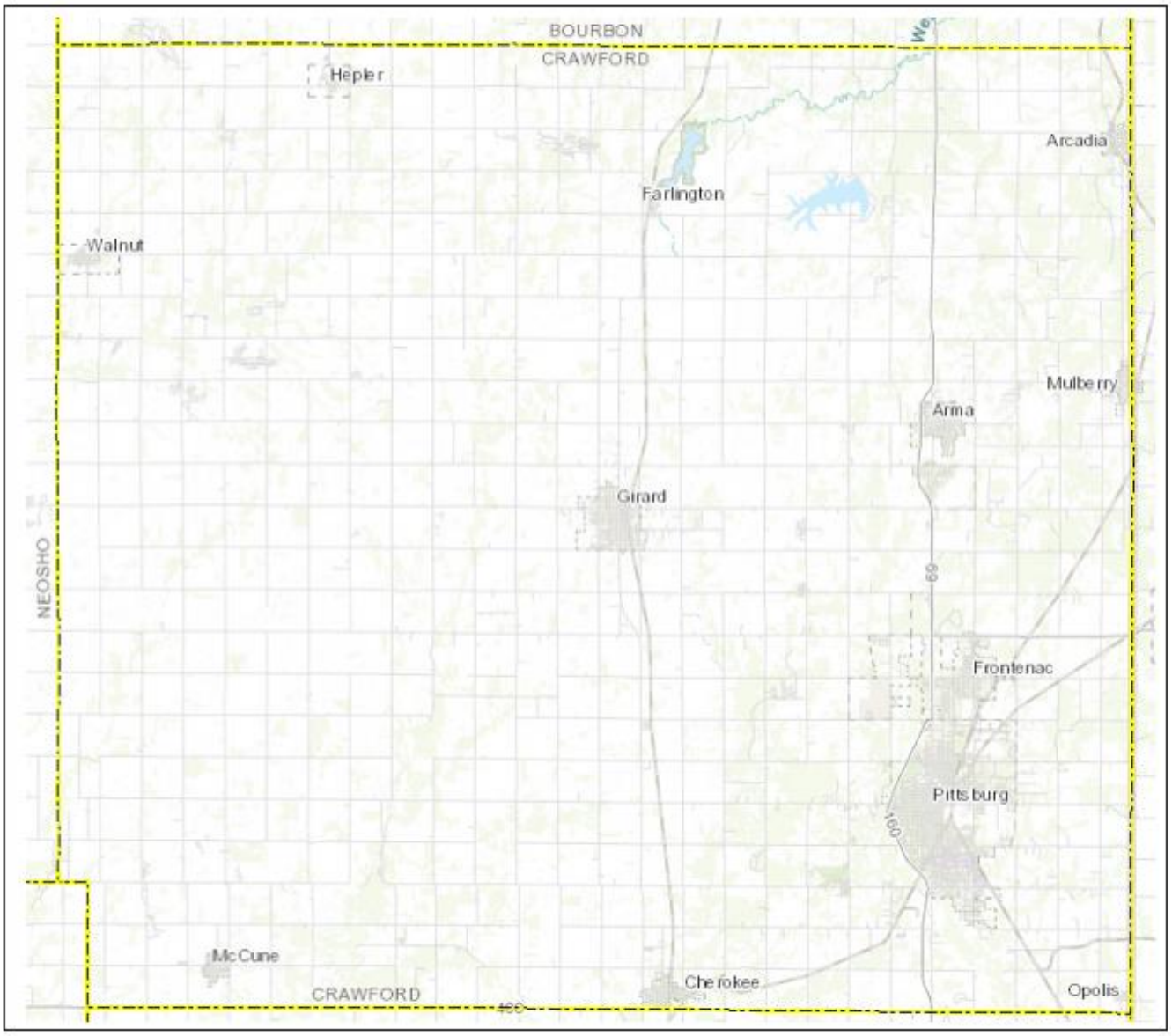
The following is a map of **Cherokee County,** provided by KDOT.

Map of Cherokee County



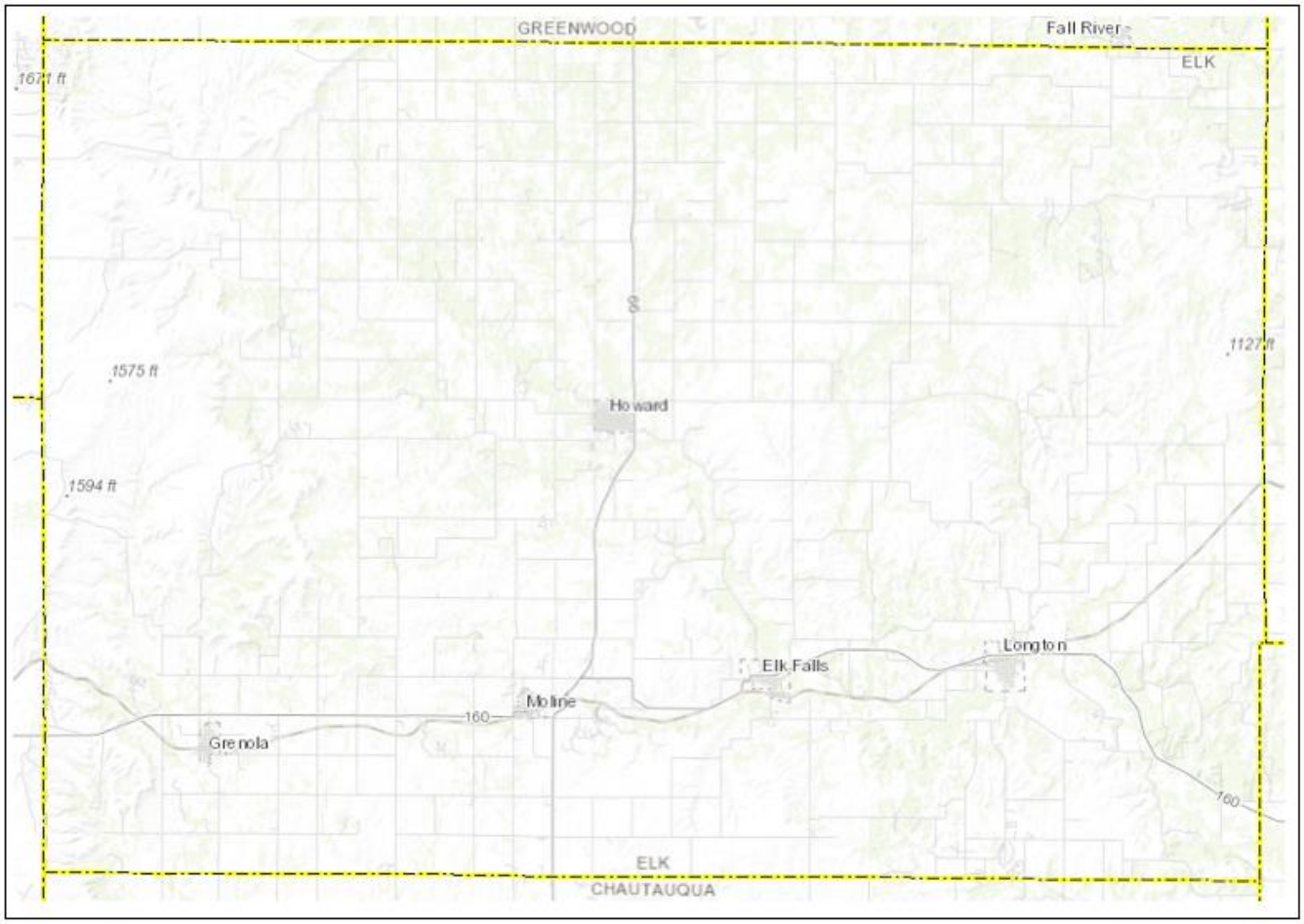
The following is a map of **Crawford County,** provided by KDOT.

Map of Crawford County



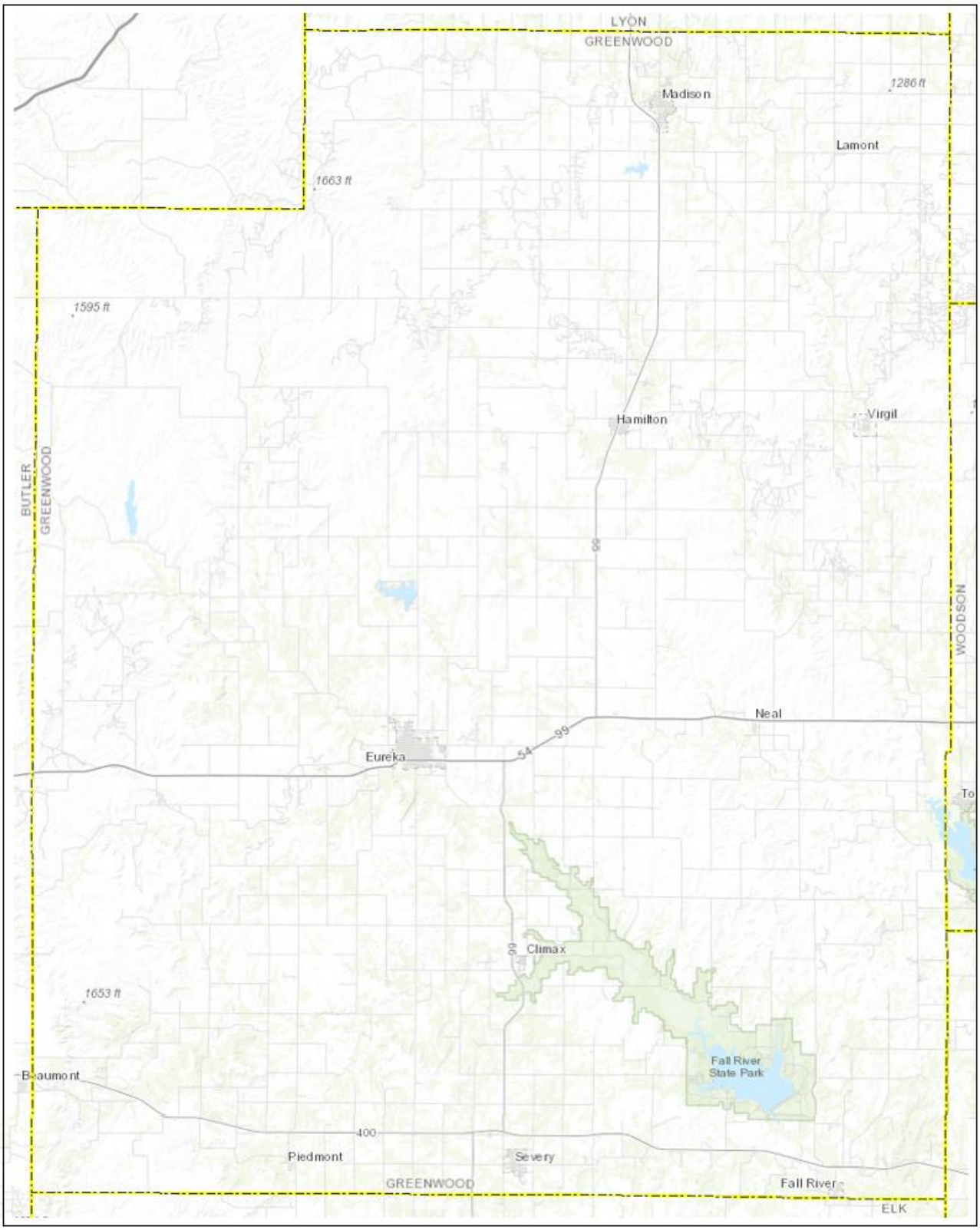
The following is a map of **Elk County,** provided by KDOT.

Map of Elk County



The following is a map of **Greenwood County,** provided by KDOT.

Map of Greenwood County

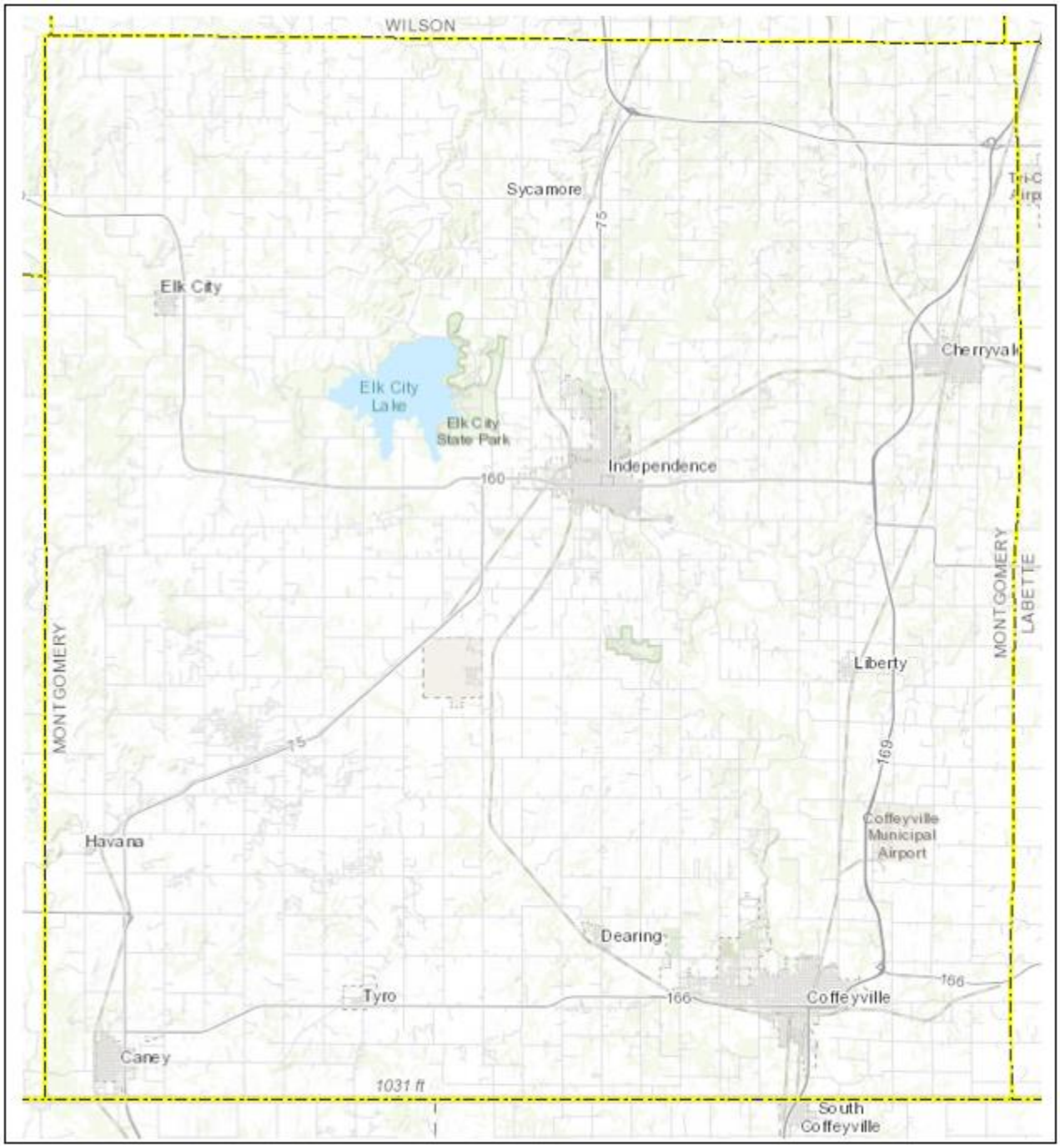


The following is a map of **Labette County,** provided by KDOT.

Map of Labette County

The following is a map of **Montgomery County,** provided by KDOT.

Map of Montgomery County

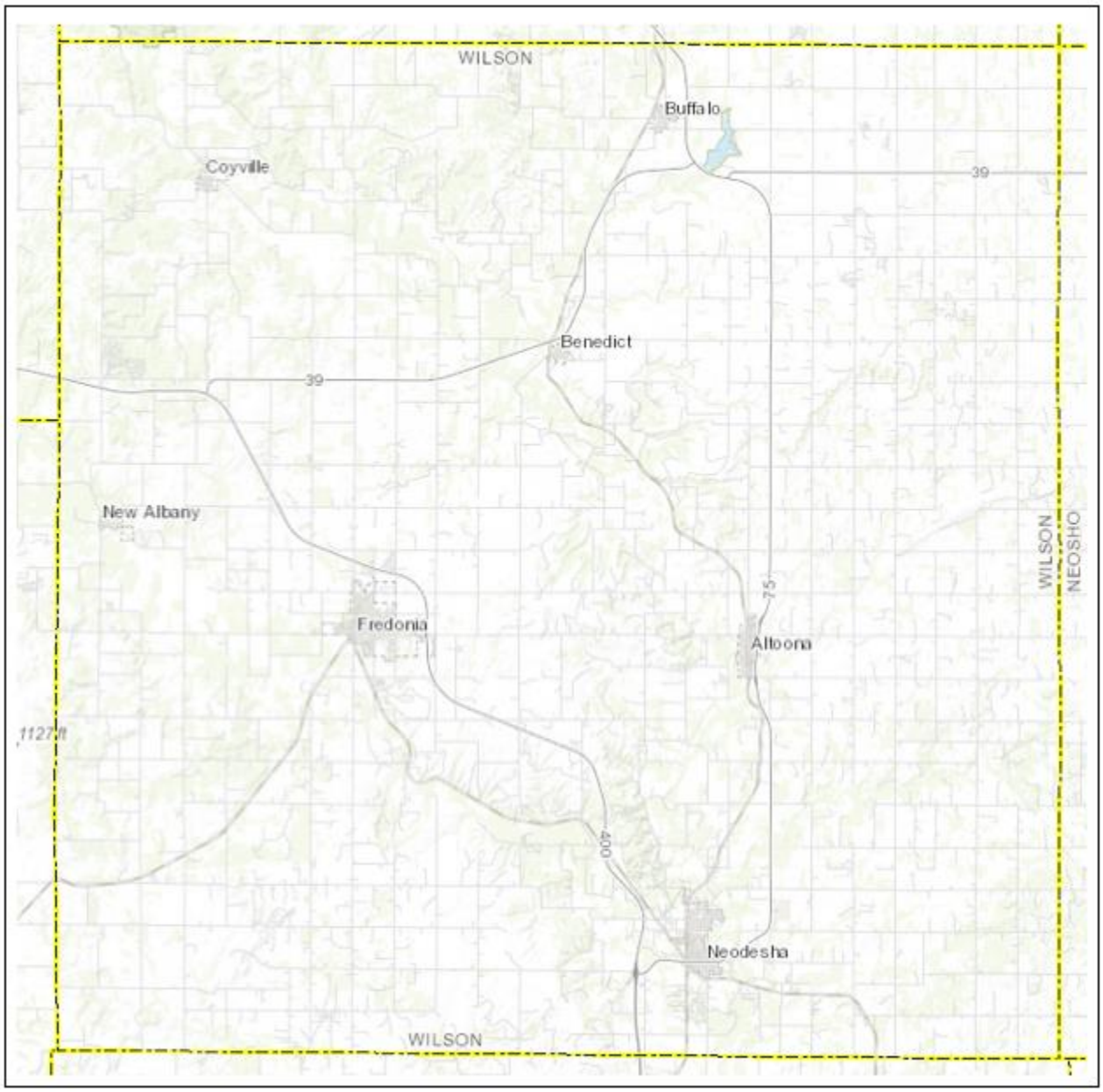


The following is a map of **Neosho County,** provided by KDOT.

Map of Neosho County

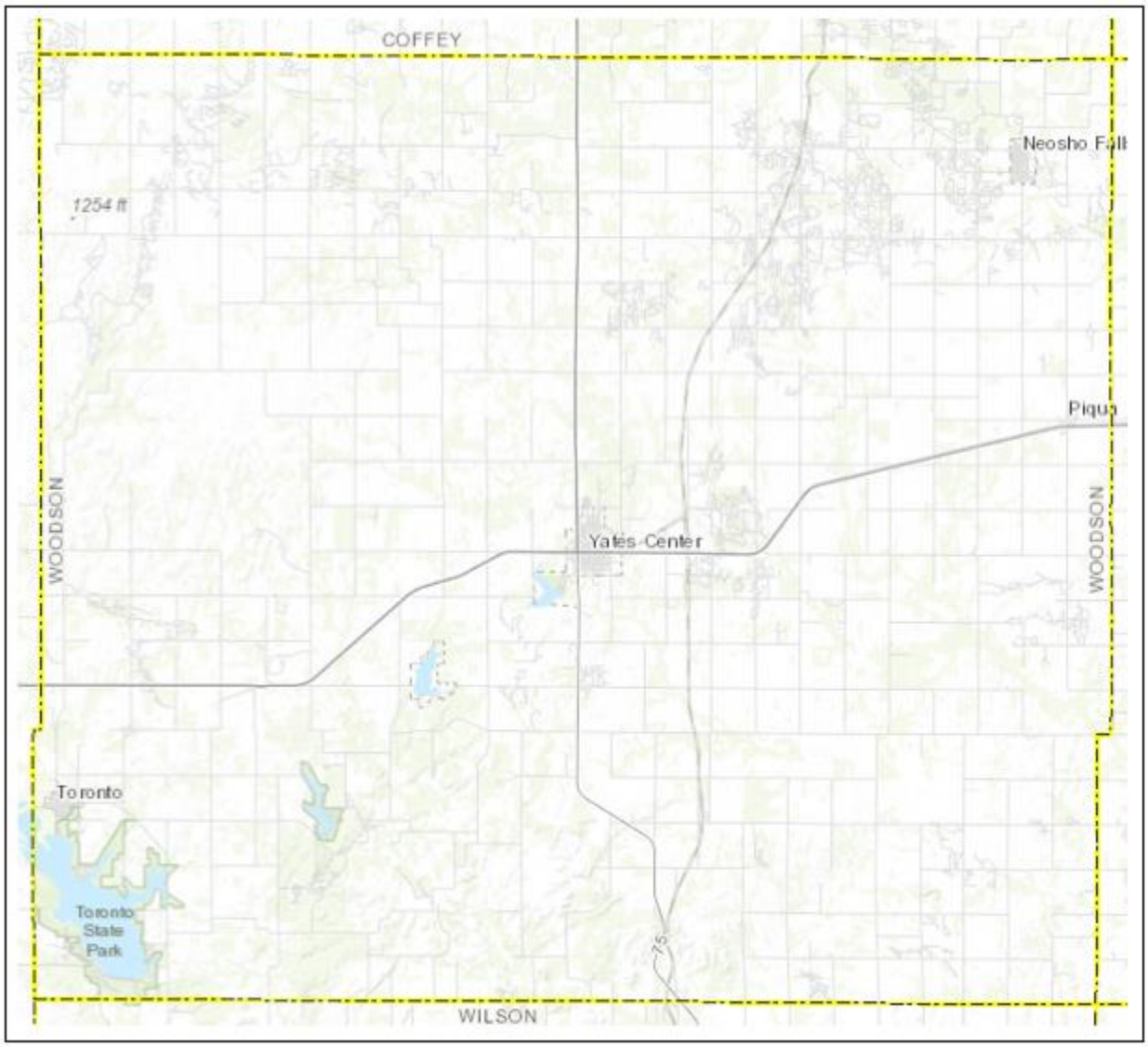
The following is a map of **Wilson County,** provided by KDOT.

Map of Wilson County



The following is a map of **Woodson County,** provided by KDOT.

Map of Woodson County



3.2 – Regional Population Data

The following tables present population data for counties and participating city jurisdictions in Kansas Region H. In general, the higher a jurisdiction's population the greater the potential vulnerability of its citizens to identified hazards.

Table 3.1: Allen County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Allen County	**14,385**	**13,371**	**12,752**	**-1,633**	**-11.4%**	**25**
Elsmore	73	77	70	-3	-4.1%	467
Gas	556	564	609	53	9.5%	834
Humboldt	1,999	1,953	1,714	-285	-14.3%	1,182
Iola	6,302	5,704	5,459	-843	-13.4%	1,135
LaHarpe	706	578	514	-192	-27.2%	598
Moran	562	558	460	-102	-18.1%	1,095
Savonburg	91	109	81	-10	-11.0%	405

Source: US Census Bureau

Of note for Allen County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Allen County, -11.4% as a whole
- Population losses were noted in six of the seven participating cities

Table 3.2: Bourbon County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Bourbon County	**15,379**	**15,173**	**14,757**	**-622**	**-4.0%**	**23**
Bronson	346	323	333	-13	-3.8%	774
Fort Scott	8,297	8,087	7,822	-475	-5.7%	1,399
Fulton	184	163	120	-64	-34.8%	632
Mapleton	98	84	79	-19	-19.4%	158
Redfield	140	146	106	-34	-24.3%	1,060
Uniontown	288	272	352	64	22.2%	1,760

Source: US Census Bureau

Of note for Bourbon County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Bourbon County, -4.0% as a whole
- Population losses were noted in five of the six participating cities

Table 3.3: Chautauqua County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Chautauqua County	**4,359**	**3,669**	**3,425**	**-934**	**-21.4%**	**5**
Cedar Vale	723	579	563	-160	-22.1%	704
Chautauqua (city)	113	111	55	-58	-51.3%	138
Niotaze	122	82	92	-30	-24.6%	230

Table 3.3: Chautauqua County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Peru	183	139	178	-5	-2.7%	593
Sedan	1,342	1,124	977	-365	-27.2%	1,221

Source: US Census Bureau

Of note for Chautauqua County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Chautauqua County, 21.4% as a whole
- Population losses were noted in all five participating cities

Table 3.4: Cherokee County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Cherokee County	**22,605**	**21,603**	**20,501**	**-2,104**	**-9.3%**	**35**
Baxter Springs	4,602	4,238	4,053	-549	-11.9%	1,267
Columbus	3,396	3,312	3,158	-238	-7.0%	1,316
Galena	3,287	3,085	2,953	-334	-10.2%	642
Roseland	101	77	112	11	10.9%	140
Scammon	496	482	595	99	20.0%	992
Weir	780	686	528	-252	-32.3%	1,760
West Mineral	243	185	164	-79	-32.5%	547

Source: US Census Bureau
-: No data available

Of note for Cherokee County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Cherokee County, -9.3% as a whole
- Population losses were noted in five of the seven participating cities

Table 3.5: Crawford County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Crawford County	**38,242**	**39,134**	**39,099**	**857**	**2.2%**	**66**
Arcadia	391	310	464	73	18.7%	1,160
Arma	1,529	1,481	1,413	-116	-7.6%	1,285
Cherokee	722	714	924	202	28.0%	1,320
Franklin	-	375	667	-	-	2,223
Frontenac	2,996	3,437	3,421	425	14.2%	671
Girard	2,773	2,789	2,733	-40	-1.4%	1,139
Hepler	154	132	116	-38	-24.7%	145

Table 3.5: Crawford County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
McCune	426	405	445	19	4.5%	1,483
Mulberry	577	520	436	-141	-24.4%	872
Pittsburg	19,243	20,233	20,278	1,035	5.4%	1,572

Source: US Census Bureau
-: No data available

Of note for Crawford County and its participating jurisdictions for the period 2000 to 2017:

- A small population gain was noted in Crawford County, 2.2% as a whole
- Population gains were noted in five of the ten participating cities

Table 3.6: Elk County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Elk County	**3,261**	**2,882**	**2,581**	**-680**	**-20.9%**	**4**
Grenola	231	216	176	-55	-23.8%	352
Howard	808	687	754	-54	-6.7%	1,077
Longton	394	348	343	-51	-12.9%	286
Moline	457	371	377	-80	-17.5%	943

Source: US Census Bureau

Of note for Elk County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Elk County, -20.9% as a whole
- Population losses were noted in all participating cities

Table 3.7: Greenwood County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Greenwood County	**7,673**	**6,689**	**6,227**	**-1,446**	**-18.8%**	**5**
Climax	64	72	66	2	3.1%	660
Eureka	2,914	2,633	2,354	-560	-19.2%	1,023
Fall River	156	162	127	-29	-18.6%	635
Hamilton	334	268	251	-83	-24.9%	837
Madison	857	701	897	40	4.7%	1,495
Severy	359	259	233	-126	-35.1%	466

Source: US Census Bureau

Of note for Greenwood County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Greenwood County, -18.8% as a whole
- Population losses were noted in four of the six participating cities

Table 3.8: Labette County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Labette County	**22,835**	**21,607**	**20,553**	**-2,282**	**-10.0%**	**31**
Altamont	1,092	1	1,134	42	3.8%	667
Chetopa	1,281	1,125	1,387	106	8.3%	991
Edna	423	442	417	-6	-1.4%	1,043
Labette (city)	68	78	62	-6	8.8%	310
Mound Valley	418	407	352	-66	-15.8%	503
Oswego	2,046	1,829	1,858	-188	-9.2%	808
Parsons	11,514	10,500	9,964	-1,550	-13.5%	931

Source: US Census Bureau

Of note for Labette County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Labette County, -10.0% as a whole
- Population losses were noted in four of the seven participating cities

Table 3.9: Montgomery County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Montgomery County	**36,252**	**33,471**	**33,463**	**-2,789**	**-7.7%**	**51**
Caney	2,092	2,203	1,982	-110	-5.3%	1,416
Cherryvale	2,386	2,367	2,231	-155	-6.5%	1,174
Coffeyville	11,021	10,295	9,706	-1,315	-11.9%	1,312
Dearing	415	431	571	156	37.6%	381
Elk City	305	325	279	-26	-8.5%	930
Havana	86	104	89	3	3.5%	890
Independence	9,846	9,483	8,983	-863	-8.8%	1,152
Liberty	95	123	115	20	21.1%	383

Source: US Census Bureau

Of note for Montgomery County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Montgomery County, -7.7% as a whole
- Population losses were noted in five of the eight participating cities

Table 3.10: Neosho County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Neosho County	**16,997**	**16,512**	**16,209**	**-788**	**-4.6%**	**28**
Chanute	9,411	9,119	9,146	-265	-2.8%	1,270
Erie	1,211	1,150	1,104	-107	-8.8%	920
Galesburg	150	126	115	-35	-23.3%	575
St. Paul	646	629	780	134	20.7%	650
Thayer	500	497	632	132	26.4%	790

Source: US Census Bureau

Of note for Neosho County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Neosho County, -4.6% as a whole
- Population losses were noted in three of the five participating cities

Table 3.11: Wilson County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Wilson County	**10,322**	**9,409**	**8,858**	**-1,464**	**-14.2%**	**15**
Altoona	485	414	254	-231	-47.6%	423
Benedict	103	73	94	-9	-8.7%	470
Buffalo	284	232	311	27	9.5%	1,037
Fredonia	2,600	2,482	2,311	-289	-11.1%	924
Neodesha	2,848	2,486	2,149	-699	-24.5%	1,535
New Albany	73	56	42	-31	-42.5%	210

Source: US Census Bureau

Of note for Wilson County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Wilson County, -14.2% as a whole
- Population losses were noted in five of the six participating cities

Table 3.12: Woodson County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Woodson County	**3,788**	**3,309**	**3,178**	**-610**	**-16.1%**	**6**
Neosho Falls	178	141	137	-41	-23.0%	228
Toronto	312	281	290	-22	-7.1%	725
Yates Center	1,599	1,417	1,256	-343	-21.5%	405

Source: US Census Bureau

Of note for Woodson County and its participating jurisdictions for the period 2000 to 2017:

- A population loss was noted in Woodson County, -16.1% as a whole
- Population losses were noted in all participating cities

3.3 – At-Risk Population Data

The National Response Framework defines at-risk populations as "populations whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to: maintaining independence, communication, transportation, supervision, and medical care."

In general, at risk populations may have difficulty with medical issues, poverty, extremes in age, and communications due to language barriers. Several principles may be considered when discussing potentially at-risk populations, including:

- Not all people who are considered at risk are at risk
- Outward appearance does not necessarily mark a person as at risk
- The hazard event will, in many cases, affect at risk population in differing ways

The following tables present information on select potential at risk populations within each participating Region H jurisdiction, by county. This information, from the U.S. Census Bureau QuickFacts, was available for cities and towns with a population greater than 5,000 persons only. In general, the higher a jurisdiction's at-risk population the greater the potential vulnerability to identified hazards.

Table 3.13: Kansas Region H Potentially Vulnerable Population Data, Jurisdictions Over 5,000 Persons

Jurisdiction	Percentage of Population 5 and Under (2017)	Percentage of Population 65+ (2017)	Percentage of Population Speaking Language Other Than English (2017)	Percentage of Population Living Below Poverty Level (2017)	Persons with a Disability, Under the Age of 65 (2017)
Allen County	**5.7%**	**22.8%**	**1.9%**	**16.7%**	**14.4%**
Iola	6.1%	22.3%	2.5%	21.1%	18.4%
Bourbon County	**5.6%**	**18.8%**	**6.3%**	**16.7%**	**10.4%**
Fort Scott	7.4%	18.9%	2.6%	18.7%	15.0%
Chautauqua County	**5.6%**	**26.0%**	**1.5%**	**16.8%**	**16.0%**
Cherokee County	**5.6%**	**18.8%**	**2.6%**	**15.8%**	**16.9%**
Crawford County	**6.2%**	**15.4%**	**5.9%**	**18.9%**	**12.0%**
Pittsburg	6.4%	12.1%	8.8%	28.6%	10.4%
Elk County	**4.8%**	**28.7%**	**2.7%**	**15.8%**	**15.7%**
Greenwood County	**5.1%**	**24.6%**	**2.1%**	**15.3%**	**15.3%**
Labette County	**6.5%**	**19.0%**	**2.9%**	**15.3%**	**15.4%**
Parsons	7.3%	15.6%	2.3%	23.1%	18.7%

Table 3.13: Kansas Region H Potentially Vulnerable Population Data, Jurisdictions Over 5,000 Persons

Jurisdiction	Percentage of Population 5 and Under (2017)	Percentage of Population 65+ (2017)	Percentage of Population Speaking Language Other Than English (2017)	Percentage of Population Living Below Poverty Level (2017)	Persons with a Disability, Under the Age of 65 (2017)
Montgomery County	**6.5%**	**29.7%**	**4.5%**	**16.8%**	**13.2%**
Coffeyville	7.6%	19.4%	9.1%	26.2%	13.9%
Independence	7.9%	18.4%	4.0%	20.6%	12.6%
Neosho County	**6.5%**	**19.4%**	**3.4%**	**15.5%**	**12.5%**
Chanute	6.8%	20.4%	5.0%	13.8%	26.1%
Wilson County	**6.0%**	**21.1%**	**2.5%**	**15.3%**	**15.4%**
Woodson County	**4.8%**	**24.1%**	**2.5%**	**15.6%**	**18.9%**

Source: US Census Bureau

Of note for Kanas Region H and its participating jurisdictions:

- Regionally, 5.2% of the total population is under the age of 5
- Regionally, approximately 20.6% of the total population is above the age of 65
- Regionally, 3.0% of the total population speak a language other than English at home
- Regionally, approximately 14.9% of the total population is living below the poverty line
- Regionally, 13.4% of persons under the age of 65 have an identified disability

3.4 – Regional Housing Data

Closely tracking population data, but tending to lag population changes, housing data is a good indicator of changing demographics and growth. Over the period 2000 to 2017 the majority of Kansas Region H has been experiencing a yearly decrease in housing stock. In general, the higher a jurisdiction's housing stock, the higher the hazard vulnerability.

Table 3.14: Allen County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Allen County	**6,449**	**6,309**	**-140**	**-2.2%**	**10.0%**	**12**
Elsmore	43	48	5	11.6%	18.8%	320
Gas	234	278	44	18.8%	30.6%	381
Humboldt	925	848	-77	-8.3%	4.8%	585
Iola	2,885	2,759	-126	-4.4%	3.2%	574
LaHarpe	298	303	5	1.7%	29.7%	352
Moran	255	209	-46	-18.0%	18.2%	498
Savonburg	45	41	-4	-8.9%	10.60%	205

Source: US Census Bureau

Of note for Allen County and its participating jurisdictions for the period 2000 to 2017:

- A housing loss was noted in Allen County, -2.2% as a whole
- Housing losses were noted in three of the six participating cities
- The cities of Gas and LaHarpe have a relatively high percentage of mobile homes

Table 3.15: Bourbon County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Bourbon County	**7,167**	**7,149**	**-18**	**-0.3%**	**8.3%**	**11**
Bronson	153	147	-6	-3.9%	12.2%	342
Fort Scott	3,914	3,941	27	0.7%	0.6%	705
Fulton	87	65	-22	-25.3%	23.1%	342
Mapleton	46	34	-12	-26.1%	29.4%	68
Redfield	59	62	3	5.1%	27.4%	620
Uniontown	138	159	21	15.2%	7.5%	795

Source: US Census Bureau

Of note for Bourbon County and its participating jurisdictions for the period 2000 to 2017:

- A very small housing loss was noted in Bourbon County, -0.3% as a whole
- Housing losses were noted in three of the six participating cities

Table 3.16: Chautauqua County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Chautauqua County	**2,169**	**2,142**	**-27**	**-1.2%**	**13.1%**	**3**
Cedar Vale	344	337	-7	-2.0%	12.5%	421
Chautauqua (city)	72	64	-8	-11.1%	17.2%	160
Niotaze	55	35	-20	-36.4%	2.9%	88
Peru	101	117	16	15.8%	19.7%	390
Sedan	652	650	-2	-0.3%	3.5%	813

Source: US Census Bureau

Of note for Chautauqua County and its participating jurisdictions for the period 2000 to 2017:

- A small housing loss was noted in Chautauqua County, -1.2% as a whole
- Housing losses were noted in four of the five participating cities

Table 3.17: Cherokee County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Cherokee County	**10,031**	**9,875**	**-156**	**-1.6%**	**12.5%**	**17**
Baxter Springs	2,106	2,066	-40	-1.9%	7.4%	646
Columbus	1,610	1,612	2	0.1%	6.5%	672
Galena	1,471	1,417	-54	-3.7%	2.7%	308
Roseland	49	60	11	22.4%	5.9%	75
Scammon	222	268	46	20.7%	10.4%	447
Weir	352	316	-36	-10.2%	21.8%	1,053
West Mineral	121	79	-42	-34.7%	29.1%	263

Source: US Census Bureau
-: No data available

Of note for Cherokee County and its participating jurisdictions for the period 2000 to 2017:

- A small housing loss was noted in Cherokee County, -1.6% as a whole
- Housing losses were noted in four of the eight participating cities

Table 3.18: Crawford County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Crawford County	**17,221**	**18,055**	**834**	**4.8%**	**5.4%**	**30**
Arcadia	179	205	26	14.5%	5.9%	513
Arma	735	739	4	0.5%	4.7%	672
Cherokee	336	372	36	10.7%	16.9%	531
Franklin	-	229	-	-	10.9%	763
Frontenac	1,329	1,380	51	3.8%	4.1%	271
Girard	1,219	1,204	-15	-1.2%	1.9%	502
Hepler	69	68	-1	-1.4%	10.3%	85
McCune	203	225	22	10.8%	17.8%	750
Mulberry	287	252	-35	-12.2%	16.7%	504
Pittsburg	8,855	9,397	542	6.1%	1.5%	728

Source: US Census Bureau
-: No data available

Of note for Crawford County and its participating jurisdictions for the period 2000 to 2017:

- A small housing gain was noted in Crawford County, 5.4% as a whole
- Housing gains were noted in six of the ten participating cities
- The cities of McCune and Mulberry have a relatively high percentage of mobile homes

Table 3.19: Elk County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Elk County	**1,860**	**1,752**	**-108**	**-5.8%**	**12.3%**	**3**
Grenola	128	137	9	7.0%	13.1%	274
Howard	452	446	-6	-1.3%	7.0%	637
Longton	193	234	41	21.2%	25.6%	195
Moline	255	241	-14	-5.5%	0.4%	603

Source: US Census Bureau

Of note for Elk County and its participating jurisdictions for the period 2000 to 2017:

- A small housing loss was noted in Elk County, -5.8% as a whole
- Housing losses were noted in two of the four participating cities

Table 3.20: Greenwood County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Greenwood County	**4,273**	**4,041**	**-232**	**-5.4%**	**11.5%**	**4**
Climax	29	52	23	79.3%	17.3%	520
Eureka	1,561	1,393	-168	-10.8%	2.9%	606
Fall River	114	102	-12	-10.5%	9.8%	510
Hamilton	164	147	-17	-10.4%	15.6%	490
Madison	418	482	64	15.3%	5.6%	803
Severy	197	170	-27	-13.7%	22.4%	340

Source: US Census Bureau

Of note for Greenwood County and its participating jurisdictions for the period 2000 to 2017:

- A small housing loss was noted in Greenwood County, -5.4% as a whole
- Housing losses were noted in four of the six participating cities
-

Table 3.21: Labette County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Labette County	**10,306**	**10,082**	**-224**	**-2.2%**	**4.9%**	**15**
Altamont	458	458	0	0.0%	2.8%	269
Chetopa	651	643	-8	-1.2%	10.0%	459
Edna	214	202	-12	-5.6%	10.9%	505
Labette (city)	34	39	5	14.7%	38.50	195
Mound Valley	190	205	15	7.9%	19.0%	293
Oswego	890	819	-71	-8.0%	2.6%	356
Parsons	5,359	5,202	-157	-2.9%	0.8%	486

Source: US Census Bureau

Of note for Labette County and its participating jurisdictions for the period 2000 to 2017:

- A small housing loss was noted in Labette County, -2.2% as a whole
- Housing losses were noted in four of the seven participating cities

Table 3.22: Montgomery County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Montgomery County	**17,207**	**16,504**	**-703**	**-4.1%**	6.50%	**25**
Caney	992	1,000	8	0.8%	2.10%	714
Cherryvale	1,142	1,089	-53	-4.6%	12.30%	573
Coffeyville	5,550	4,796	-754	-13.6%	1.00%	648
Dearing	203	225	22	10.8%	21.3%	150
Elk City	170	152	-18	-10.6%	27.6%	507
Havana	55	49	-6	-10.9%	42.9%	490
Independence	4,747	4,751	4	0.1%	1.8%	609
Liberty	62	72	10	16.1%	37.5%	240

Source: US Census Bureau

Of note for Montgomery County and its participating jurisdictions for the period 2000 to 2017:

- A small housing loss was noted in Montgomery County, -4.1% as a whole
- Housing losses were noted in four of the eight participating cities

Table 3.23: Neosho County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Neosho County	**7,461**	**7,748**	**287**	**3.8%**	**7.2%**	**13**
Chanute	4,262	4,506	244	5.7%	4.0%	626
Erie	545	500	-45	-8.3%	1.2%	417
Galesburg	72	51	-21	-29.2%	21.6%	255
St. Paul	241	294	53	22.0%	10.9%	245
Thayer	203	283	80	39.4%	21.2%	354

Source: US Census Bureau

Of note for Neosho County and its participating jurisdictions for the period 2000 to 2017:

- A small housing gain was noted in Neosho County, 3.8% as a whole
- Housing gains were noted in three of the five participating cities

Table 3.24: Wilson County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Wilson County	**4,937**	**4,657**	**-280**	**-5.7%**	**14.1%**	**8**
Altoona	232	186	-46	-19.8%	36.6%	310
Benedict	52	48	-4	-7.7%	6.3%	240
Buffalo	133	150	17	12.8%	14.0%	500
Fredonia	1,297	1,207	-90	-6.9%	5.6%	483
Neodesha	1,301	1,174	-127	-9.8%	3.7%	839
New Albany	41	17	-24	-58.5%	47.1%	85

Source: US Census Bureau

Of note for Wilson County and its participating jurisdictions for the period 2000 to 2017:

- A small housing loss was noted in Wilson County, -5.7% as a whole
- Housing losses were noted in five of the six participating cities

Table 3.25: Woodson County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
Woodson County	**2,076**	**2,020**	**-56**	**-2.7%**	**6.7%**	**4**
Neosho Falls	90	81	-9	-10.0%	33.3%	135
Toronto	245	231	-14	-5.7%	13.40%	578
Yates Center	844	828	-16	-1.9%	1.90%	267

Source: US Census Bureau

Of note for Woodson County and its participating jurisdictions for the period 2000 to 2017:

- A small housing loss was noted in Woodson County, -2.7% as a whole
- Housing losses were noted in all participating cities

3.5 – Regional Property Valuations

This section quantifies the built environment exposed to potential hazards in Kansas Region H. The following tables provide monetary value of structures, by category and where available, for each county in Kansas Region H. In addition to the population information presented above, this information forms the basis of the vulnerability and risk assessment presented in this plan. This information was derived from inventory data associated with FEMA's loss estimation software HAZUS.

Table 3.26: Kansas Region H Property Valuations, Residential, Commercial and Industrial

County	Residential	Commercial	Industrial
Allen	$1,168,503,000	$203,938,000	$83,621,000
Bourbon	$1,259,025,000	$233,149,000	$146,238,000
Chautauqua	$365,601,000	$52,602,000	$10,332,000
Cherokee	$1,666,309,000	$235,981,000	$135,630,000
Crawford	$3,103,510,000	$651,113,000	$249,504,000
Elk	$302,503,000	$25,955,000	$3,078,000
Greenwood	$681,297,000	$81,114,000	$23,267,000
Labette	$1,800,237,000	$305,616,000	$116,577,000
Montgomery	$2,950,885,000	$569,650,000	$272,528,000
Neosho	$1,245,917,000	$272,867,000	$137,453,000
Wilson	$794,936,000	$125,398,000	$118,928,000
Woodson	$286,521,000	$31,988,000	$8,832,000

Source: HAZUS

Table 3.27: Kansas Region H Property Valuations, Agriculture, Government and Education

County	Agriculture	Government	Education
Allen	$15,102,000	$8,369,000	$39,655,000
Bourbon	$13,896,000	$9,189,000	$18,850,000
Chautauqua	$46,451,000	$4,307,000	$9,140,000
Cherokee	$28,887,000	$11,920,000	$41,976,000

Table 3.27: Kansas Region H Property Valuations, Agriculture, Government and Education

County	Agriculture	Government	Education
Crawford	$32,397,000	$25,881,000	$72,941,000
Elk	$4,240,000	$4,480,000	$8,329,000
Greenwood	$12,700,000	$3,706,000	$14,560,000
Labette	$22,762,000	$19,703,000	$37,573,000
Montgomery	$18,657,000	$22,043,000	$76,459,000
Neosho	$24,753,000	$22,325,000	$34,106,000
Wilson	$18,575,000	$9,891,000	$21,318,000
Woodson	$9,306,000	$4,594,000	$10,478,000

Source: HAZUS

Table 3.28: Kansas Region H Property Total Valuations

County	Total
Allen	$1,557,716,000
Bourbon	$1,720,309,000
Chautauqua	$500,459,000
Cherokee	$2,163,015,000
Crawford	$4,211,278,000
Elk	$353,392,000
Greenwood	$834,705,000
Labette	$2,349,164,000
Montgomery	$4,012,672,000
Neosho	$1,782,409,000
Wilson	$1,128,676,000
Woodson	$357,734,000

Source: HAZUS

3.6 – Critical Facility Data

A critical facility is essential in providing utility or direction either during the response to an emergency or during the recovery operation, with facilities determined from jurisdictional feedback. The following are examples of critical facilities and assets:

- Communications facilities
- Emergency operations centers
- Fire stations
- Government buildings
- Hospitals and other medical facilities
- Police stations

Details concerning critical facilities have been deemed as sensitive information, and as such their specific information is not contained in the body of this HMP, but is included in the restricted from public view Appendix D.

3.7 – Unified School Districts

Each participating county is served by multiple Unified School Districts (USDs), with these USDs providing educational coverage for each participating jurisdiction. The following table presents participating USD enrollment information, the number of school structures, and the insured valuation of these structures and contents within (if information is available).

Table 3.29: Participating USD Information

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
Allen County			
USD 256 - Marmaton Valley	264	2	$1,230,000
USD 257 - Iola Public Schools	1,240	11	$90,000,000
USD 258 - Humboldt	591	6	$32,471,051
Bourbon County			
USD 234 - Fort Scott	264	3	$3,220,180$
USD 235 - Uniontown	452	12	$18,451,185
Chautauqua County			
USD 285 – Cedar Vale	152	6	-
USD 286 – Chautauqua County	370	8	-
Cherokee County			
USD 404 - Riverton	747	9	-
USD 493 - Columbus	954	17	$39,413,799
USD 499 - Galena	850	12	$34,000,000
USD 508 - Baxter Springs	957	6	$35,442,924
Crawford County			
USD 246 - Arma	472	6	-
USD 247 - Cherokee	489	11	$29,993,047
USD 248 - Girard	1,118	4	$35,000,000
USD 249 - Frontenac	976	9-	-
USD 250 Pittsburg	3,000	12	$127,000,000
USD 609- SE Kansas Education Services Center	200	16	$6,300,000
Elk County			
USD 282 - West Elk	374	1	$20,000,000
USD 283 - Elk Valley	106	3	$9,382,648
Greenwood County			
USD 386 – Madison-Virgil	230	-	-
USD 389 - Eureka	672	4	$35,870,580
USD 390 - Hamilton	59	-	-
Labette County			
USD 493 - Columbus	952	-	-
USD 503 - Parsons	1,298	12	-
USD 504 - Oswego	491	10	-
USD 505 - Chetopa-St. Paul	237	4	$16,823,263
USD 506 - Labette County	1,591	11	-

Table 3.29: Participating USD Information

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
Montgomery County			
USD 436 - Caney	781	8-	-
USD 445 - Coffeyville	1,851	10	-
USD 446 - Independence	2,149	12	-
USD 447 - Cherryvale	810	10	$27,741,473
Neosho County			
USD 101 - Erie	536	9	-
USD 413 - Chanute	1,871	10	-
USD 447 - Cherryvale	816	-	-
USD 505 - Chetopa-St. Paul	423	-	-
Wilson County			
USD 387 - Altoona-Midway	174	8	-
USD 461 - Neodesha	725	5	$24,550,549
USD 484 - Fredonia	694	9	-
Woodson County			
USD 366 - Woodson County	482	6	-

Source: Kansas State Department of Education and Participating USDs
-: Information unavailable

Many participating counties are served by at least one institution of higher learning. The following table presents participating college and university enrollment information, the number of school structures, and the insured valuation of these structures and contents within (if information is available).

Table 3.30: Participating College and University Information

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
Allen County			
Allen County Community College	-	-	-
Bourbon County			
Fort Scott Community College	264	3	$3,230,180
Crawford County			
Fort Scott Community College	264	3	$3,230,180
Pittsburg State University	6,000	86	$650,000,000
Labette County			
Labette County Community College	-	-	-
Montgomery County			
Coffeyville Community College	2,331	26	$88,400,000
Independence Community College	-	-	-
Neosho County			
Neosho County Community College	425	15	$50,000,000

Source: Participating Institution
-: Information unavailable

3.8 – Regional Land Use

In general, land use is determined by three major types of regulation, zoning ordinances, floodplain ordinances and building code requirements.

- 2017 Kansas Statutes, KS Stat § 12-741 (2017): This act is enabling legislation for the enactment of planning and zoning laws and regulations by cities and counties for the protection of the public health, safety and welfare, and is not intended to prevent the enactment or enforcement of additional laws and regulations on the same subject which are not in conflict with the provisions of this act.
- 2012 Kansas Statutes, Chapter 19 Counties and County Officers, Article 33 Flood Control: Allows cities and counties to develop stormwater management and flood control projects and programs, provide local funding, and enter into agreements with other agencies to develop and use flood control works.
- The Kansas State Legislature has not implemented a statewide building code, nor does it require comprehensive planning by local governments.

These three types of regulations can assist in preventing the following:

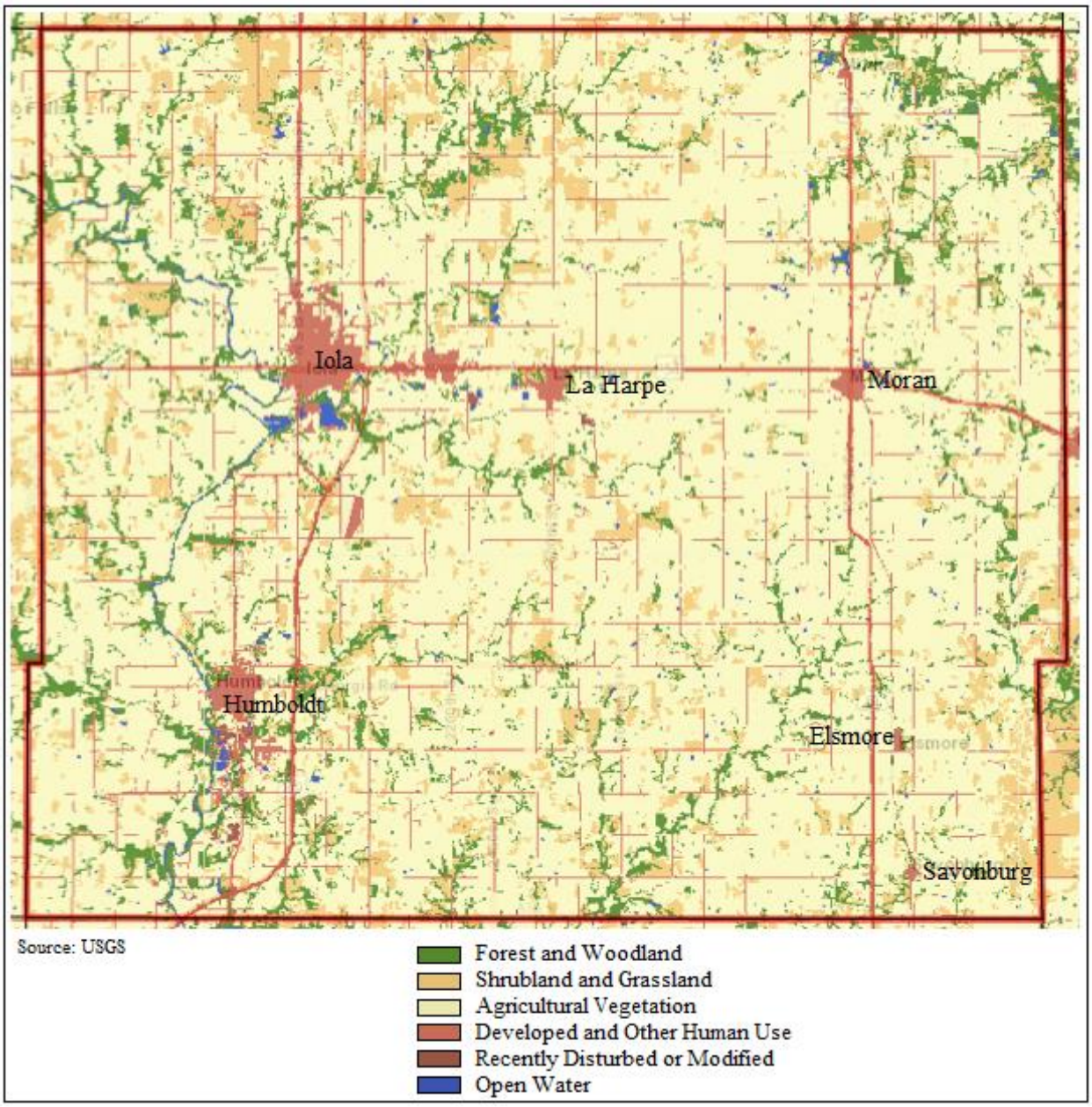
- Unrestricted residential growth which can increase a population's exposure to identified hazard prone areas
- Rapid, unchecked development that can put a strain on a community's vulnerable resources such as its energy infrastructure
- Residential development constructed quickly and inexpensively to meet consumer demand that often lacks long term mitigation measures and resiliency
- Rapid development under pressure to meet consumer demand can alter the landscape in ways affecting urban runoff, drainage, or other environmental considerations which have drastic effects on floodplains

Information on relevant codes and ordinances may be found in Section 5 of this HMP.

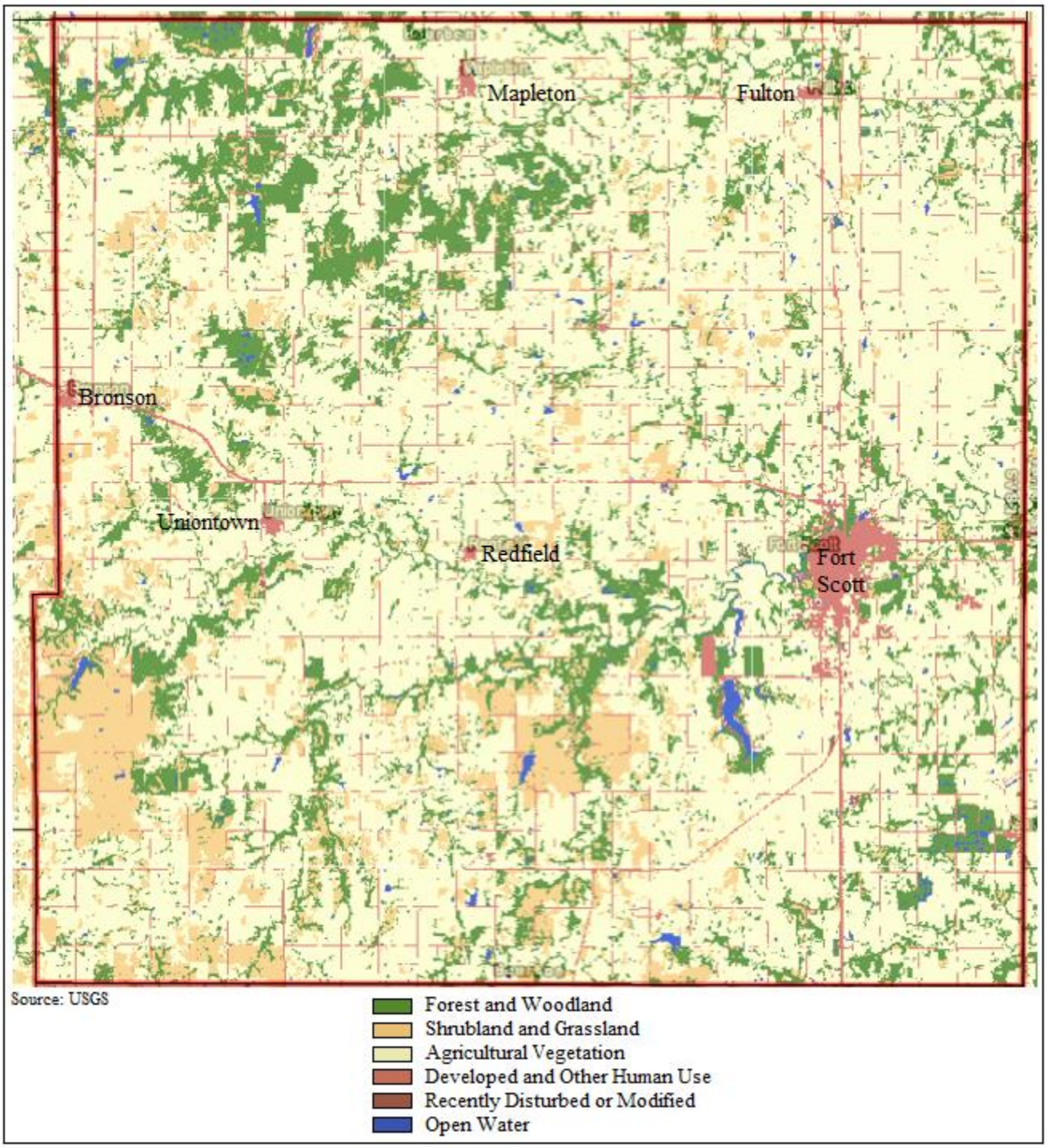
3.9 – Regional Land Cover

The 2016 USGS land cover map illustrates land usage. As indicated by the following maps, large areas of the region are grasslands and cultivated crops. Additionally, each county has at least one area of low to high intensity development corresponding with larger cities.

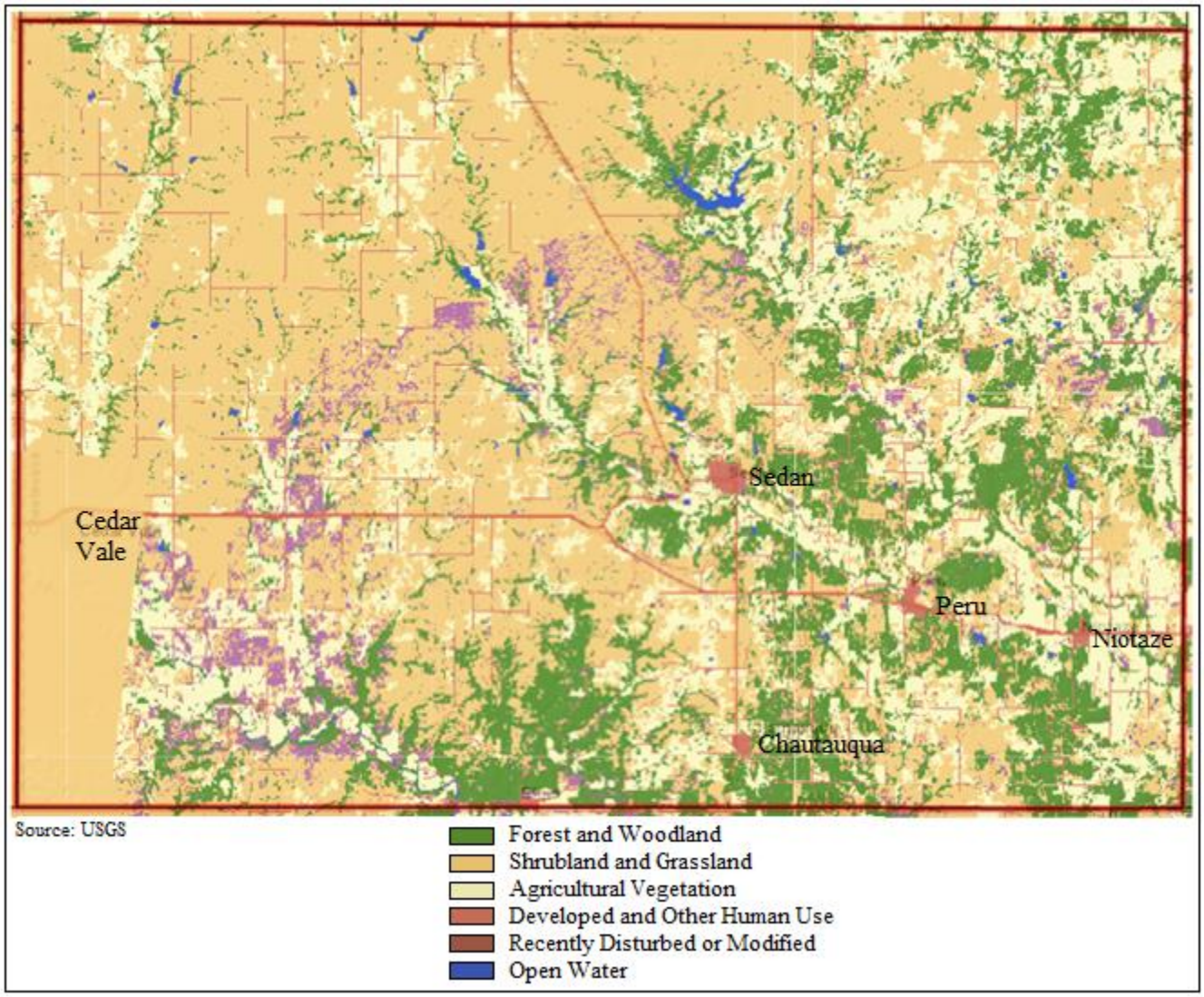
Allen County Land Cover Map



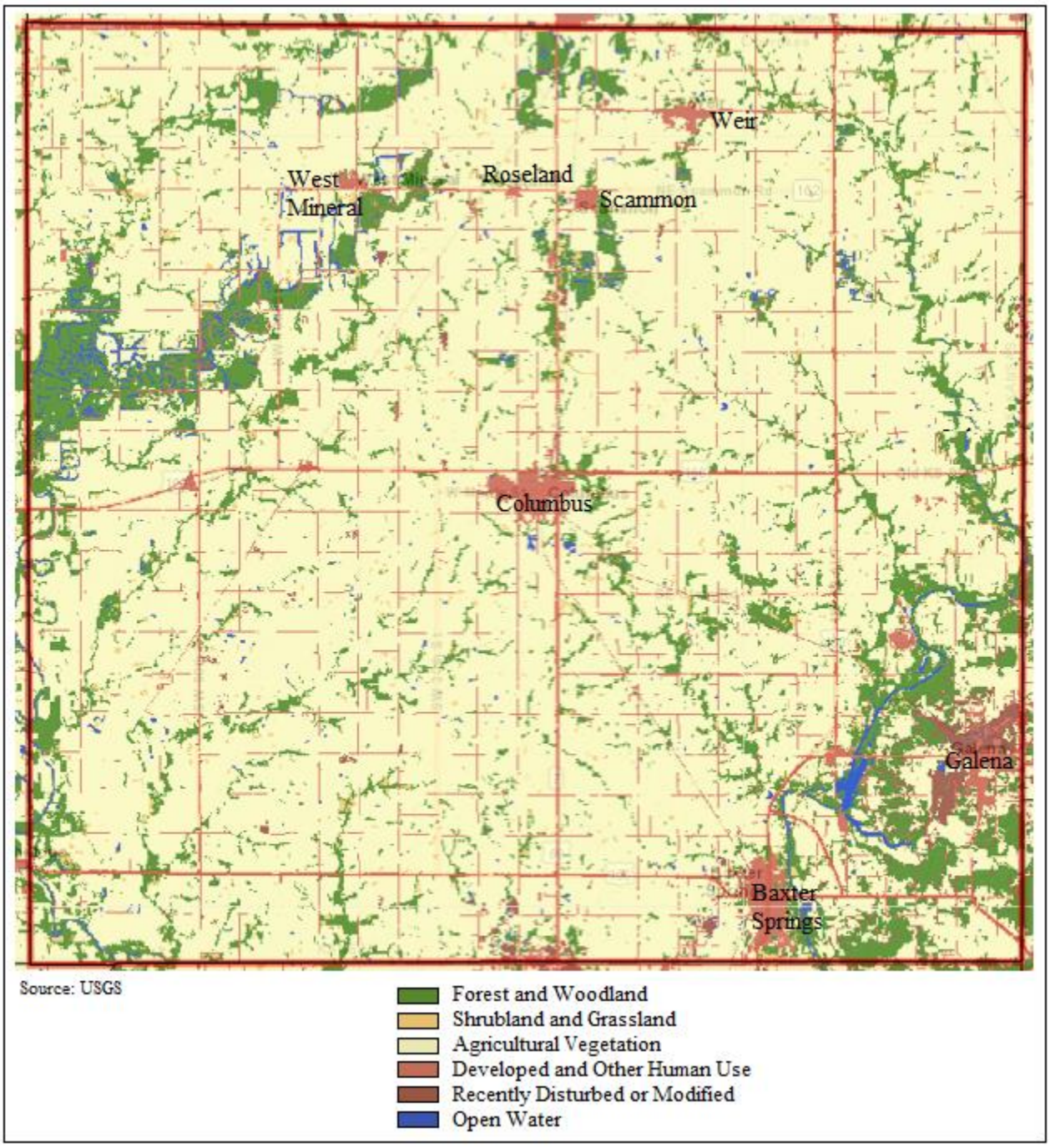
Bourbon County Land Cover Map



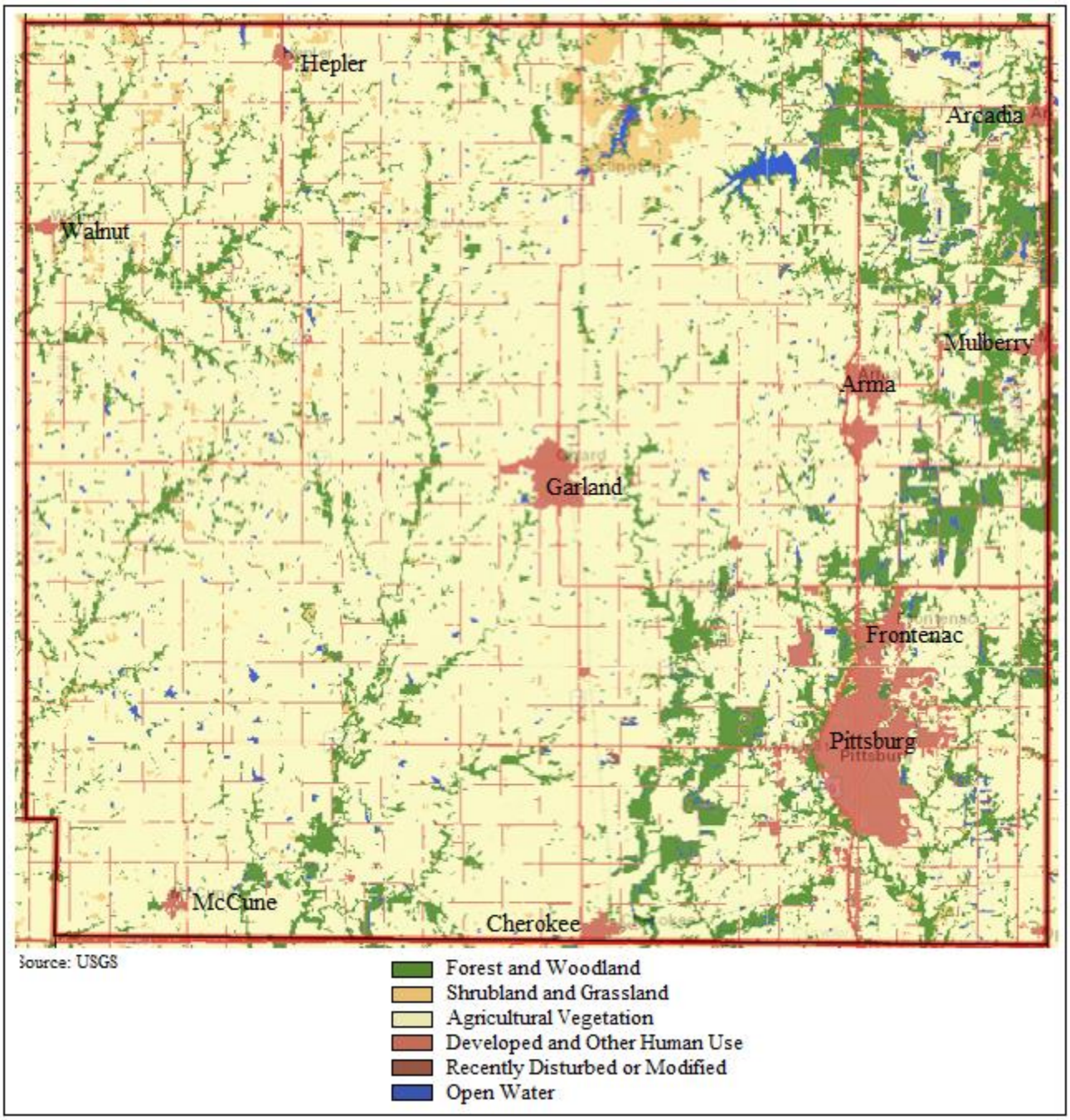
Chautauqua County Land Cover Map



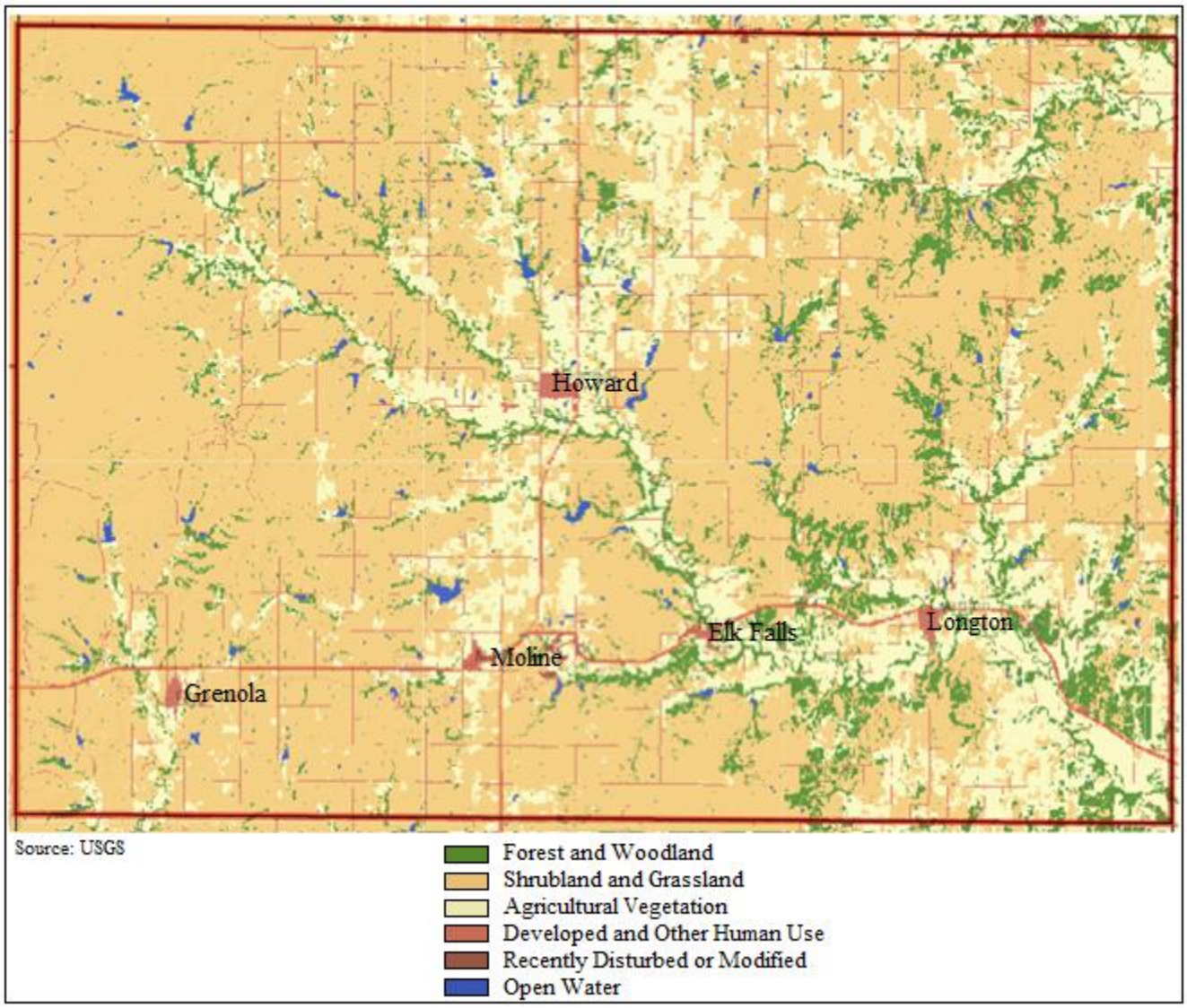
Cherokee County Land Cover Map



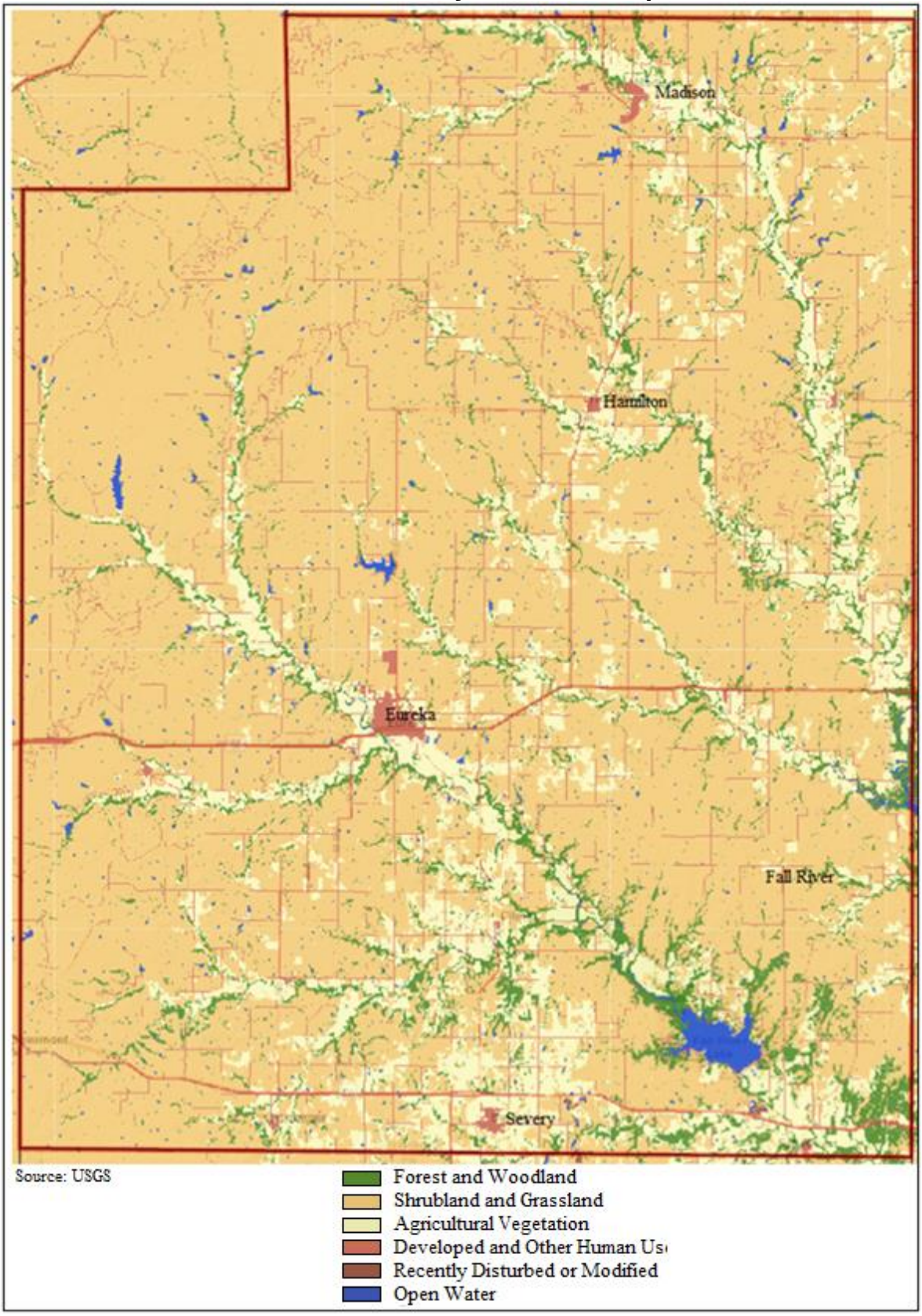
Crawford County Land Cover Map



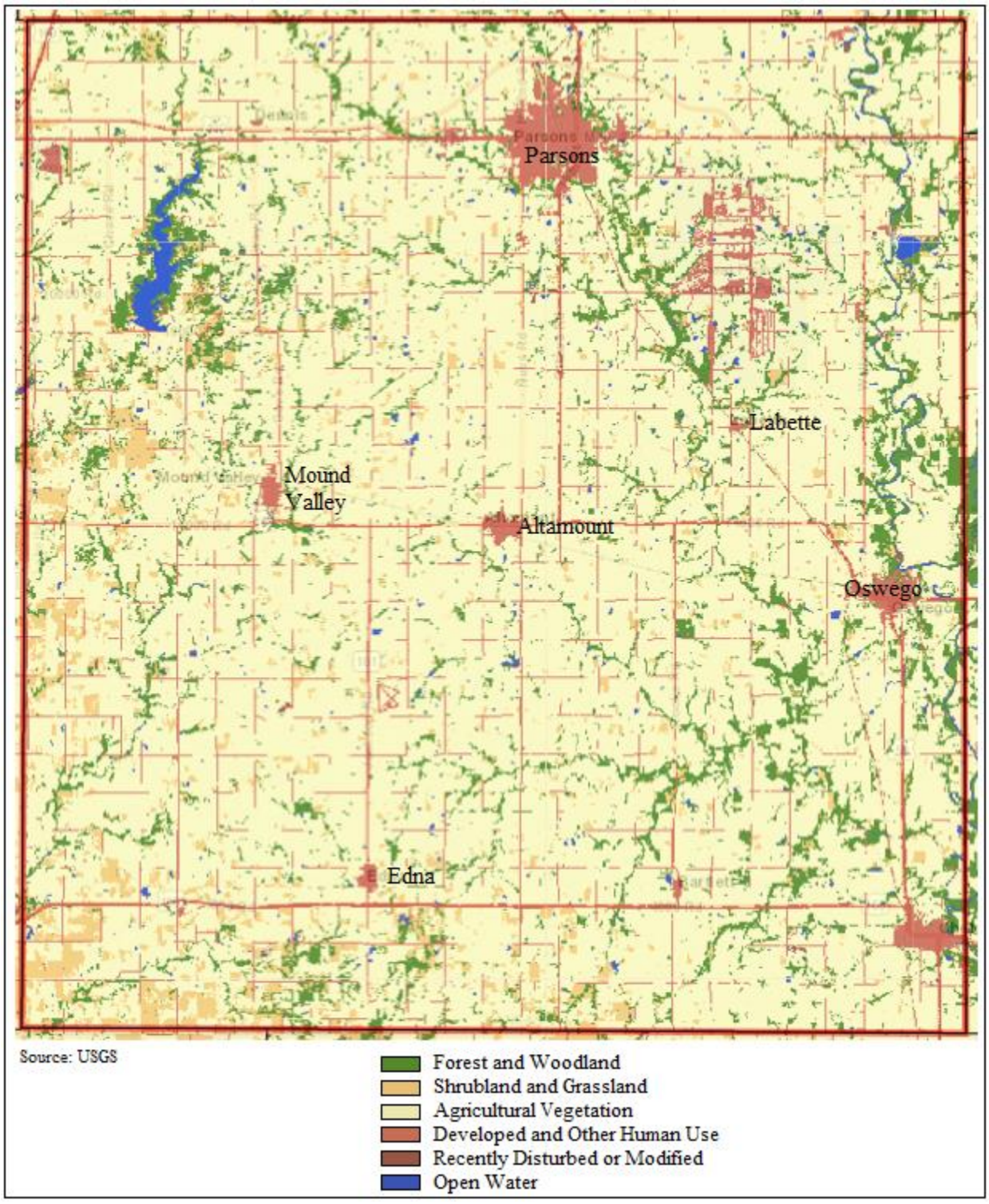
Elk County Land Cover Map



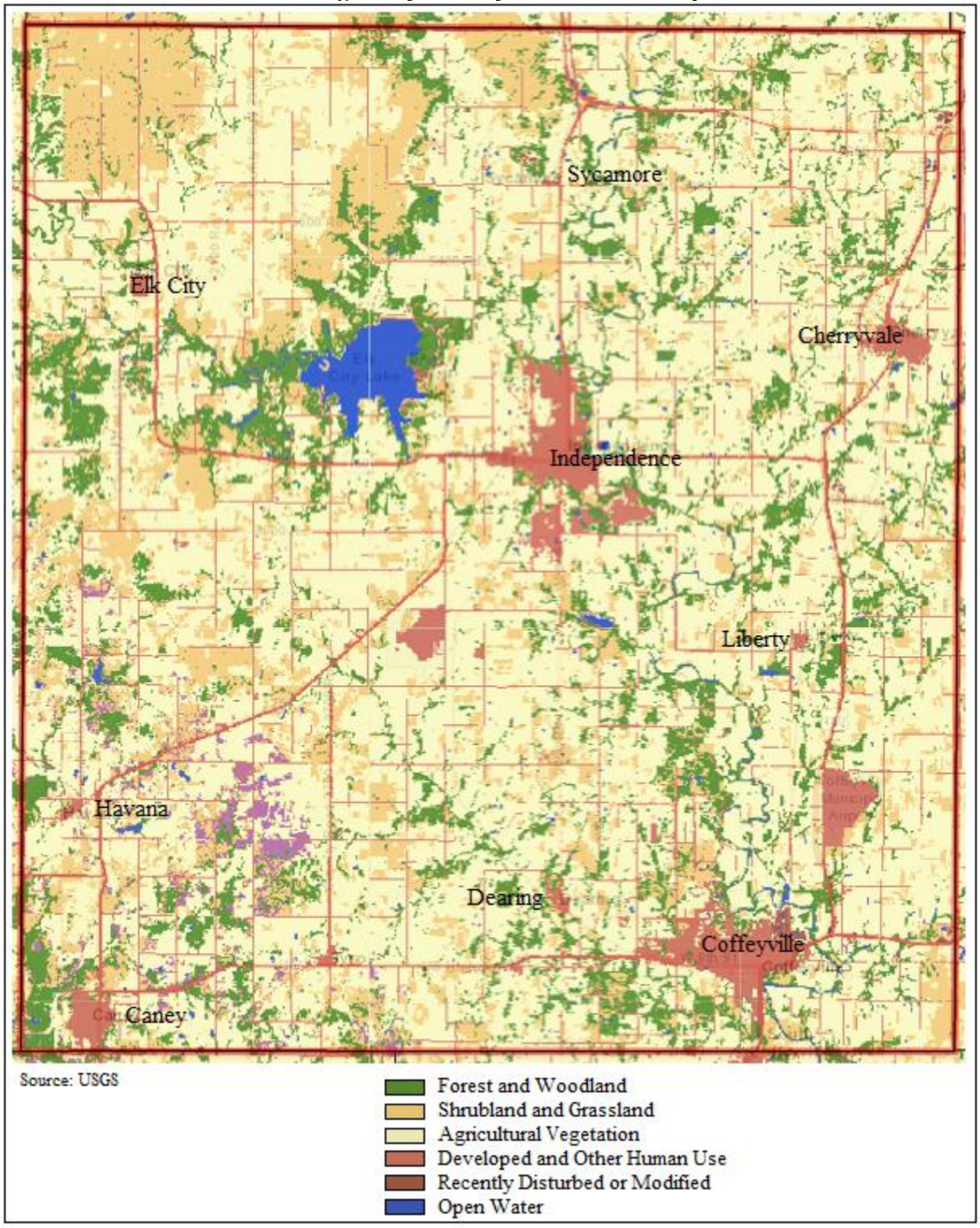
Greenwood County Land Cover Map



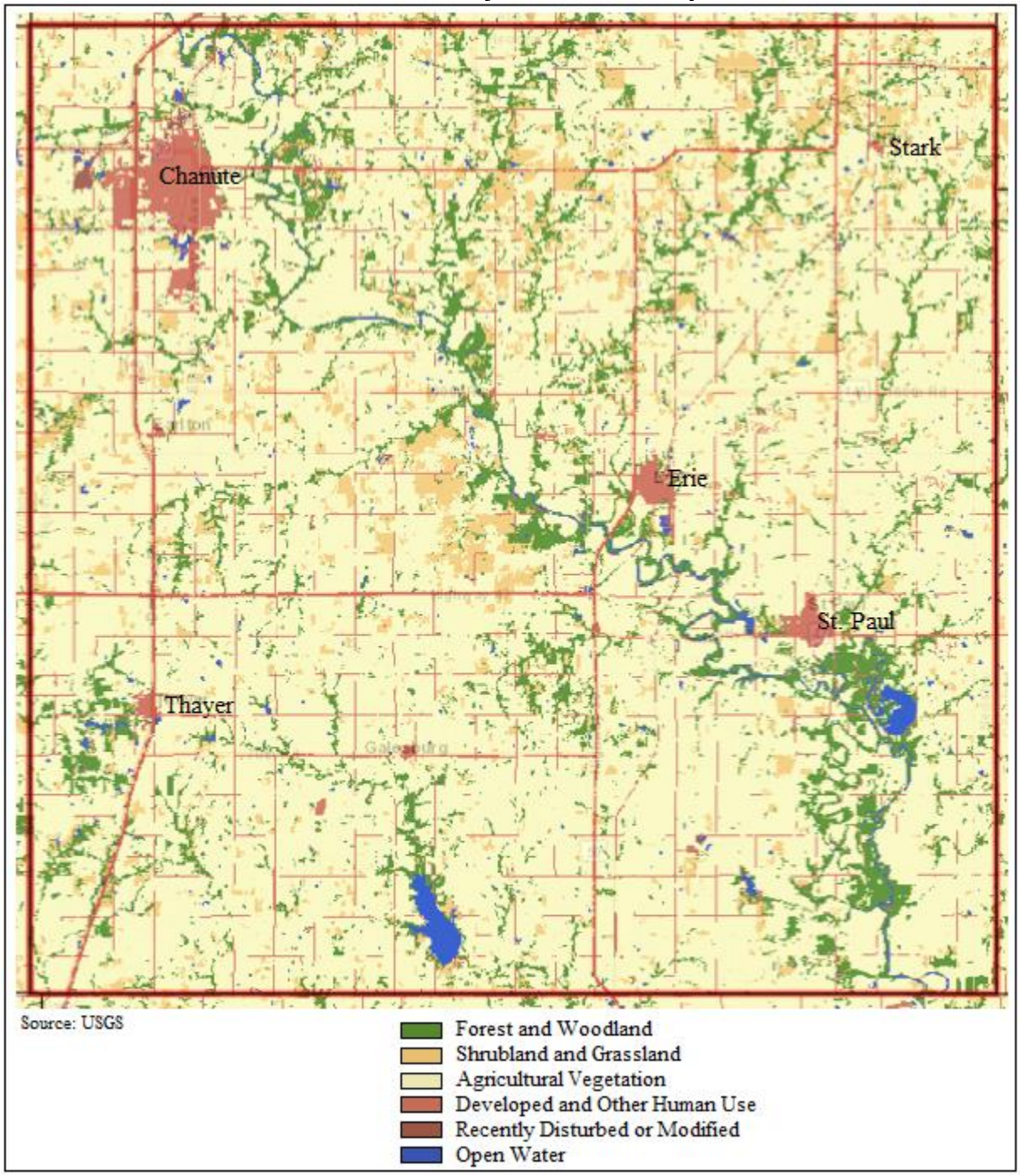
Labette County Land Cover Map



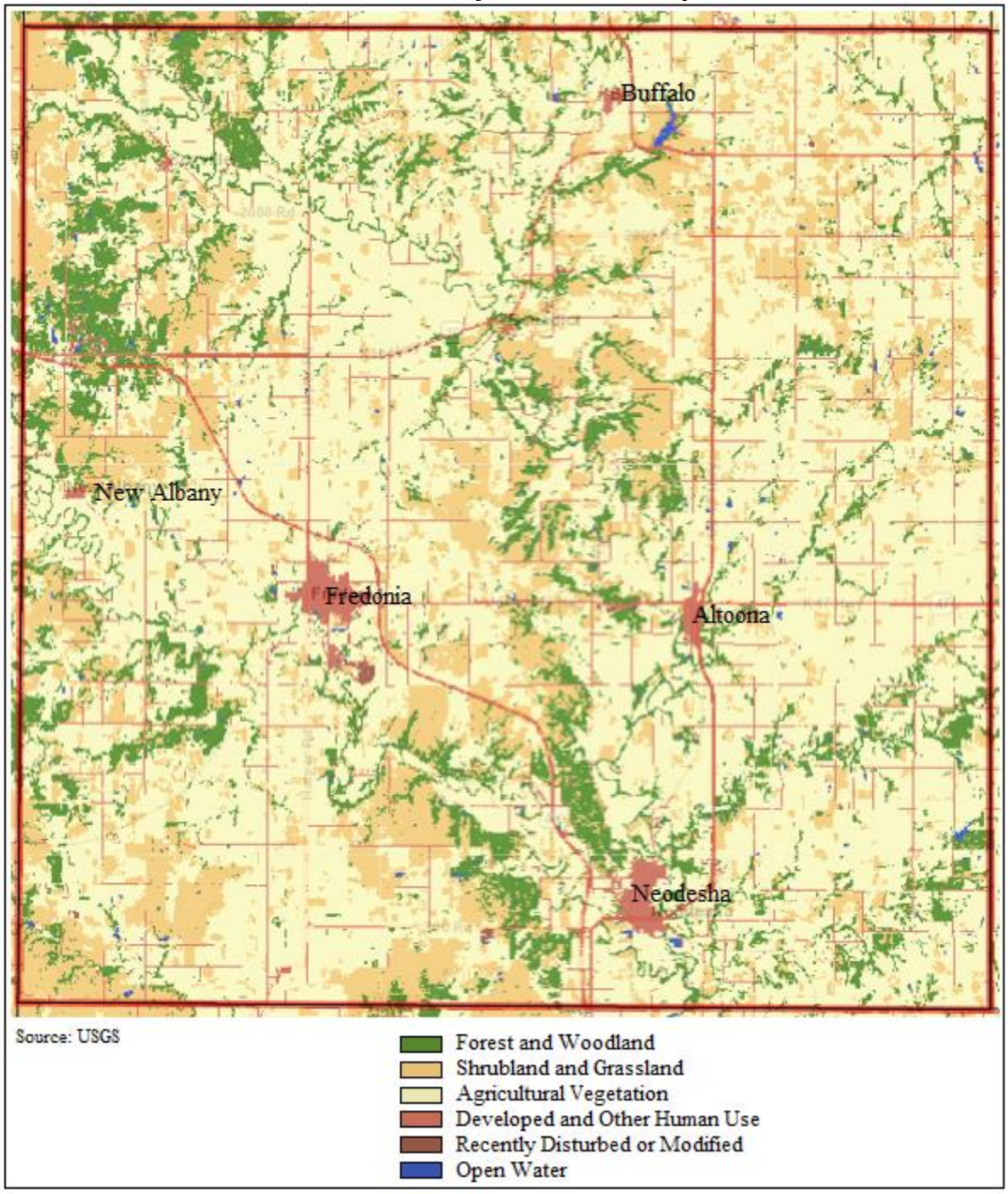
Montgomery County Land Cover Map



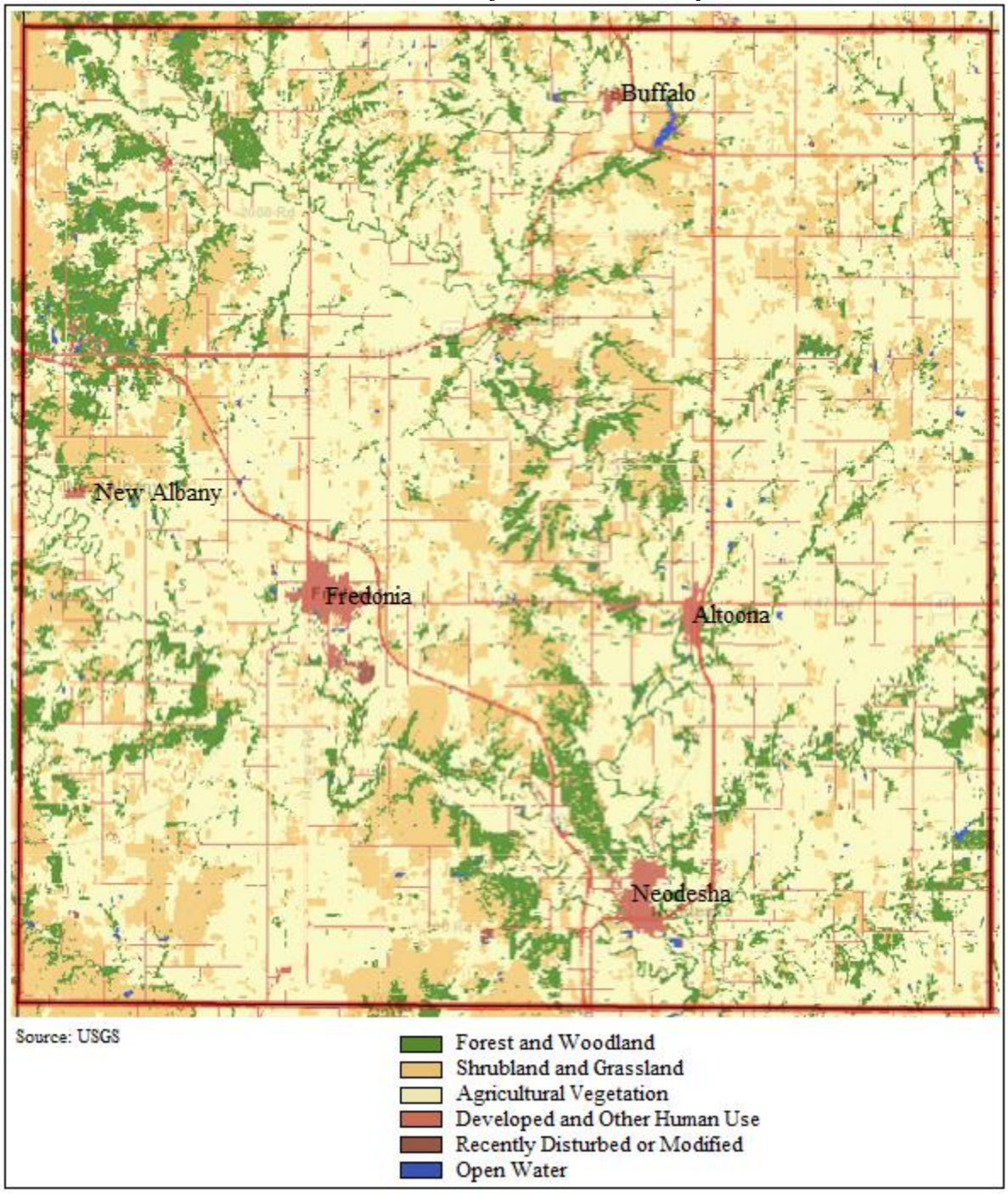
Neosho County Land Cover Map



Wilson County Land Cover Map



Woodson County Land Cover Map



3.10 – Regional Agricultural Data

Agriculture is a major component of the economy of Kansas. According to the Kansas Department of Agriculture, Agriculture is the largest economic driver in Kansas, valued at nearly $67.5 billion and accounting for 44.5 percent of the state's total economy. In Kansas, there are 46,137,295 acres of farmland, which accounts for 88 percent of all Kansas land.

The following tables present information from the USDA National Agricultural Statistics Service 2012 Census of Agriculture (the latest availed data) relating to farm totals, agricultural acreage and livestock (cattle, hogs and pigs) for Kansas Region H.

Table 3.31: Kansas Region H Farm Data, 2012 Census of Agriculture

Jurisdiction	Number of Farms	Farm Acreage	Percent of Acreage as Cropland	Percent of Acreage as Pastureland	Percent of Acreage as Other Uses	Market Value of Products Sold (Yearly)
Allen	650	245,315	52.8%	39.5%	7.8%	$38,156,000
Bourbon	903	334,301	37.8%	50.5%	11.6%	$53,376,000
Chautauqua	312	310,310	12.8%	79.9%	7.5%	$35,195,000
Cherokee	729	308,233	73.5%	18.3%	8.2%	$86,906,000
Crawford	846	323,222	59.4%	33.7%	6.9%	$75,594,000
Elk	315	316,385	16.2%	77.3%	6.4%	$42,070,000
Greenwood	551	701,012	14.8%	80.8%	4.4%	$89,554,000
Labette	977	370,531	53.1%	39.3%	7.6%	$122,778,000
Montgomery	1,012	335,669	48.6%	42.7%	8.7%	$79,420,000
Neosho	702	308,150	56.9%	34.8%	8.3%	$67,958,000
Wilson	423	254,671	55.9%	36.2%	7.9%	$55,422,000
Woodson	315	294,643	52.2%	42.2%	5.5%	$54,603,000

Source: United States Department of Agriculture National Agricultural Statistics Service

Table 3.32: Kansas Region H Livestock Data, 2012 Census of Agriculture

County	Cattle	Hogs and Pigs
Allen	31,771	-
Bourbon	55,301	-
Chautauqua	28,299	391
Cherokee	24,830	-
Crawford	40,769	-
Elk	36,354	-
Greenwood	79,768	-
Labette	77,845	-
Montgomery	33,580	-
Neosho	46,538	2,354
Wilson	16,864	-
Woodson	38,892	-

Source: United States Department of Agriculture National Agricultural Statistics Service
-: Data not reported

3.11 – Regional Development Trends

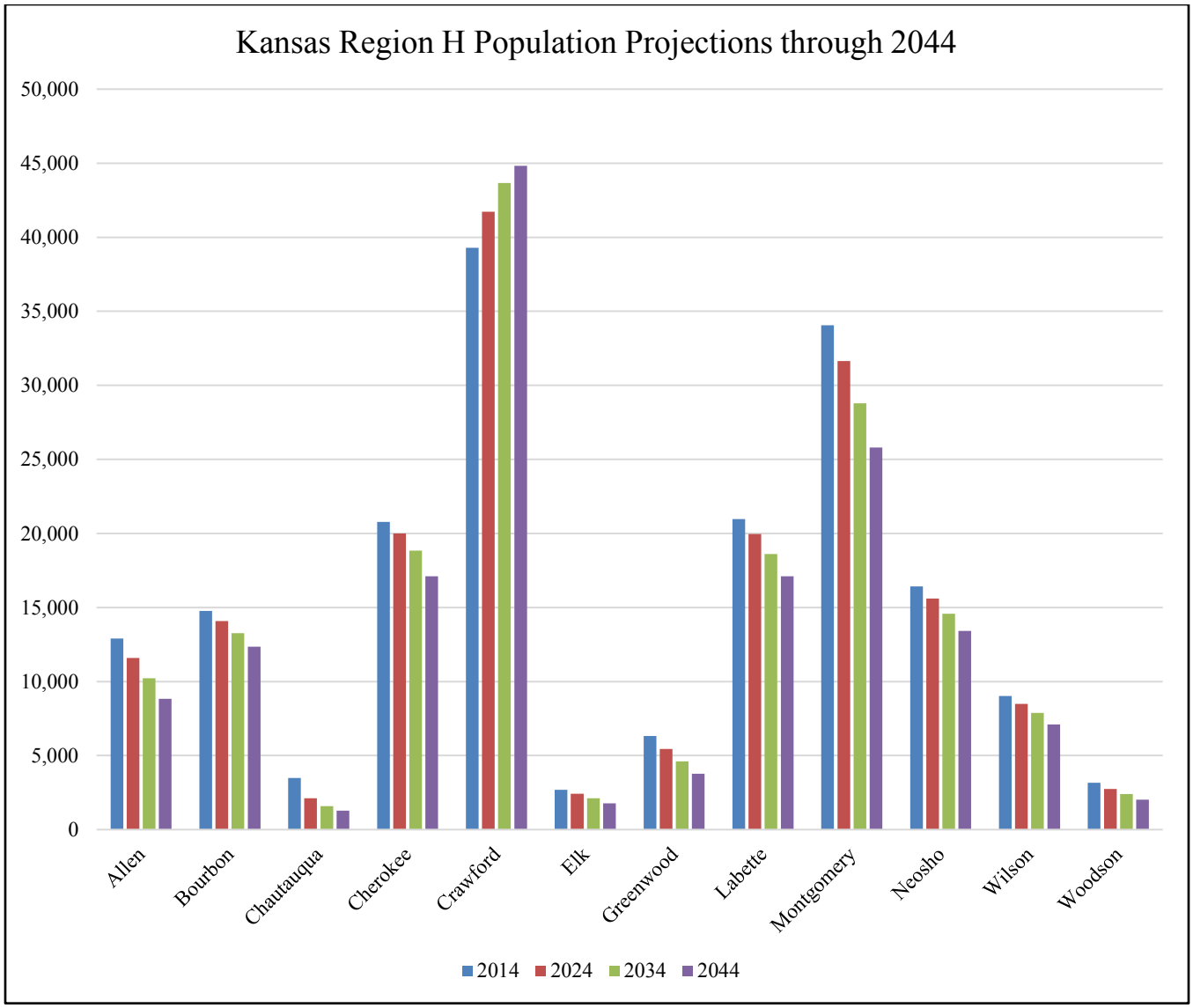
44 CFR 201.6 (c)(2)(ii)(A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas

The University of Kansas Institute for Policy and Social Research developed population projections for the region using historical and trend data. Indications are the region will experience a decline in population through the year 2044.

Table 3.33: Kansas Region H Population Projections Through 2044

County	2014	2024	2034	2044	Projected Growth Percentage Through 2044
Allen	12,909	11,588	10,228	8,839	-31.5%
Bourbon	14,772	14,091	13,257	12,359	-16.3%
Chautauqua	3,481	2,120	1,577	1,276	-63.4%
Cherokee	20,787	19,989	18,846	17,105	-17.7%
Crawford	39,290	41,720	43,665	44,818	14.1%
Elk	2,694	2,414	2,109	1,781	-33.9%
Greenwood	6,328	5,451	4,615	3,776	-40.3%
Labette	20,960	19,961	18,612	17,111	-18.4%
Montgomery	34,065	31,635	28,779	25,794	-24.3%
Neosho	16,416	15,597	14,581	13,423	-18.2%
Wilson	9,028	8,482	7,874	7,097	-21.4%
Woodson	3,157	2,754	2,407	2,014	-36.2%

Source: University of Kansas Institute for Policy and Social Research



US Census Bureau data was used to develop housing projections for the region using historical and trend data. Indications are the region will experience static to declining growth in housing through the year 2051.

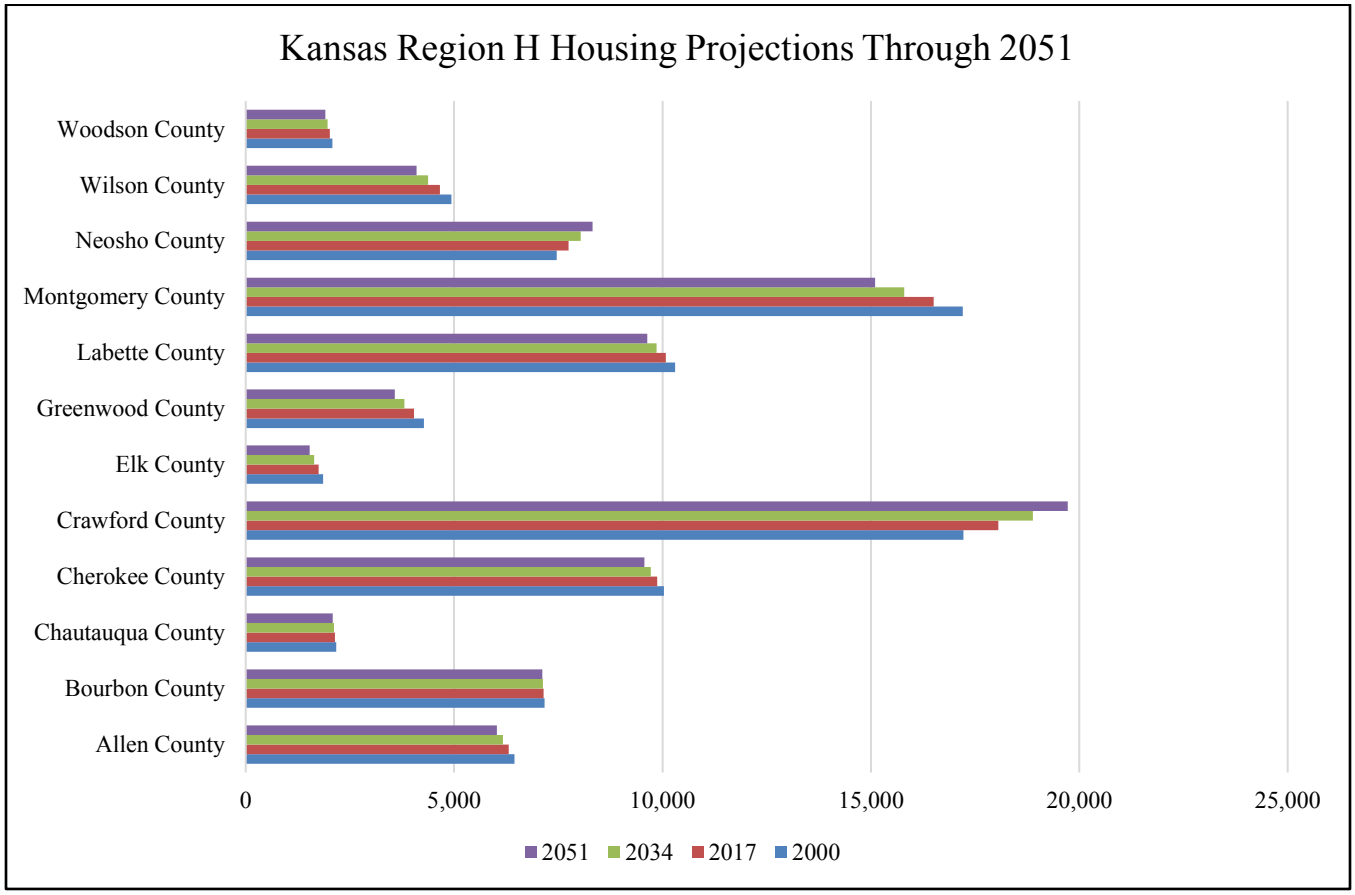
Table 3.34: Kansas Region H Housing Projections Through 2051

County	2000	2017	2034	2051	Projected Growth Percentage Through 2051
Allen	6,449	6,309	6,169	6,029	-6.5%
Bourbon	7,167	7,149	7,131	7,113	-0.8%
Chautauqua	2,169	2,142	2,115	2,088	-3.7%
Cherokee	10,031	9,875	9,719	9,563	-4.7%
Crawford	17,221	18,055	18,889	19,723	14.5%
Elk	1,860	1,752	1,644	1,536	-17.4%
Greenwood	4,273	4,041	3,809	3,577	-16.3%
Labette	10,306	10,082	9,858	9,634	-6.5%

Table 3.34: Kansas Region H Housing Projections Through 2051

County	2000	2017	2034	2051	Projected Growth Percentage Through 2051
Montgomery	17,207	16,504	15,801	15,098	-12.3%
Neosho	7,461	7,748	8,035	8,322	11.5%
Wilson	4,937	4,657	4,377	4,097	-17.0%
Woodson	2,076	2,020	1,964	1,908	-8.1%

Source: US Census Bureau



FEMA's loss estimation software HAZUS data was used to developed property valuation projections for the region using historical and trend data. Indications are the region will experience steady growth in the property valuation through the year 2040. This information can assist with determining potential increased vulnerability to identified hazards.

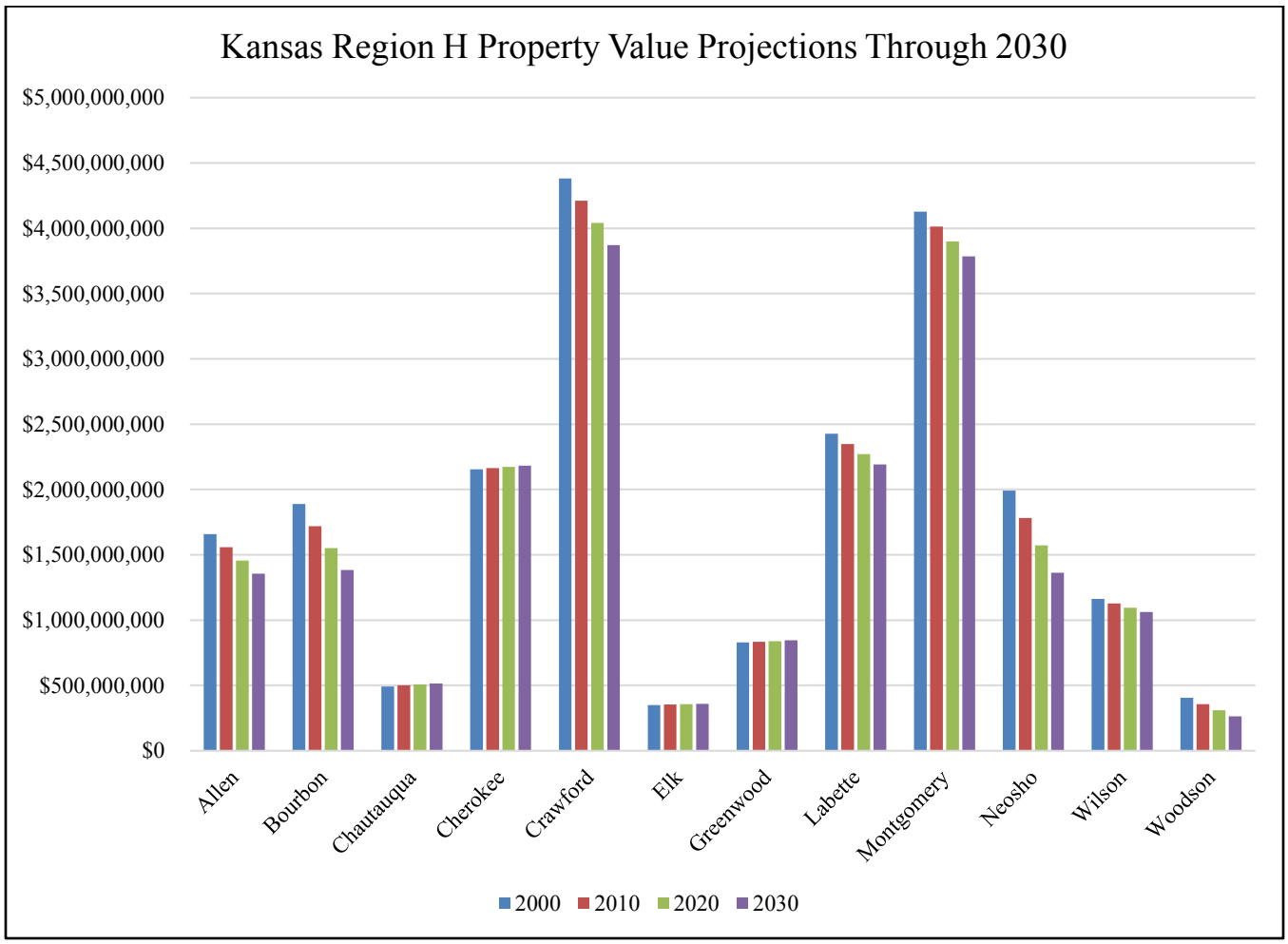
Table 3.35: Kansas Region H Property Valuation Projections Through 2030

County	2000	2010	2020	2030	Projected Growth Percentage Through 2030
Allen	$1,658,447,000	$1,557,716,000	$1,456,985,000	$1,356,254,000	-18.2%
Bourbon	$1,888,301,000	$1,720,309,000	$1,552,317,000	$1,384,325,000	-26.7%
Chautauqua	$492,605,000	$500,459,000	$508,313,000	$516,167,000	4.8%

Table 3.35: Kansas Region H Property Valuation Projections Through 2030

County	2000	2010	2020	2030	Projected Growth Percentage Through 2030
Cherokee	$2,153,762,000	$2,163,015,000	$2,172,268,000	$2,181,521,000	1.3%
Crawford	$4,381,088,000	$4,211,278,000	$4,041,468,000	$3,871,658,000	-11.6%
Elk	$350,645,000	$353,392,000	$356,139,000	$358,886,000	2.4%
Greenwood	$829,684,000	$834,705,000	$839,726,000	$844,747,000	1.8%
Labette	$2,427,560,000	$2,349,164,000	$2,270,768,000	$2,192,372,000	-9.7%
Montgomery	$4,126,390,000	$4,012,672,000	$3,898,954,000	$3,785,236,000	-8.3%
Neosho	$1,992,391,000	$1,782,409,000	$1,572,427,000	$1,362,445,000	-31.6%
Wilson	$1,161,434,000	$1,128,676,000	$1,095,918,000	$1,063,160,000	-8.5%
Woodson	$405,072,000	$357,734,000	$310,396,000	$263,058,000	-35.1%

Source: HAZUS



United States Department of Agriculture National Agricultural Statistics Service data was used to develop agricultural projections for the region using historical and trend data. Indications are the region will experience steady decline in the number of farms, a regional decrease in agricultural acreage, and an increase in the market value of agricultural goods through the year 2022.

Table 3.36: Kansas Region H Number of Farms Data Projections Through 2022

County	Number of Farms, 2007	Number of Farms, 2012	Number of Farms, 2017	Number of Farms, 2022	Projected Growth Percentage Through 2022
Allen	611	650	689	728	19.1%
Bourbon	928	903	878	853	-8.1%
Chautauqua	359	312	265	218	-39.3%
Cherokee	809	729	649	569	-29.7%
Crawford	911	846	781	716	-21.4%
Elk	361	315	269	223	-38.2%
Greenwood	539	551	563	575	6.7%
Labette	1,052	977	902	827	-21.4%
Montgomery	994	1,012	1,030	1,048	5.4%
Neosho	775	702	629	556	-28.3%
Wilson	553	423	293	163	-70.5%
Woodson	339	315	291	267	-21.2%

Source: United States Department of Agriculture National Agricultural Statistics Service

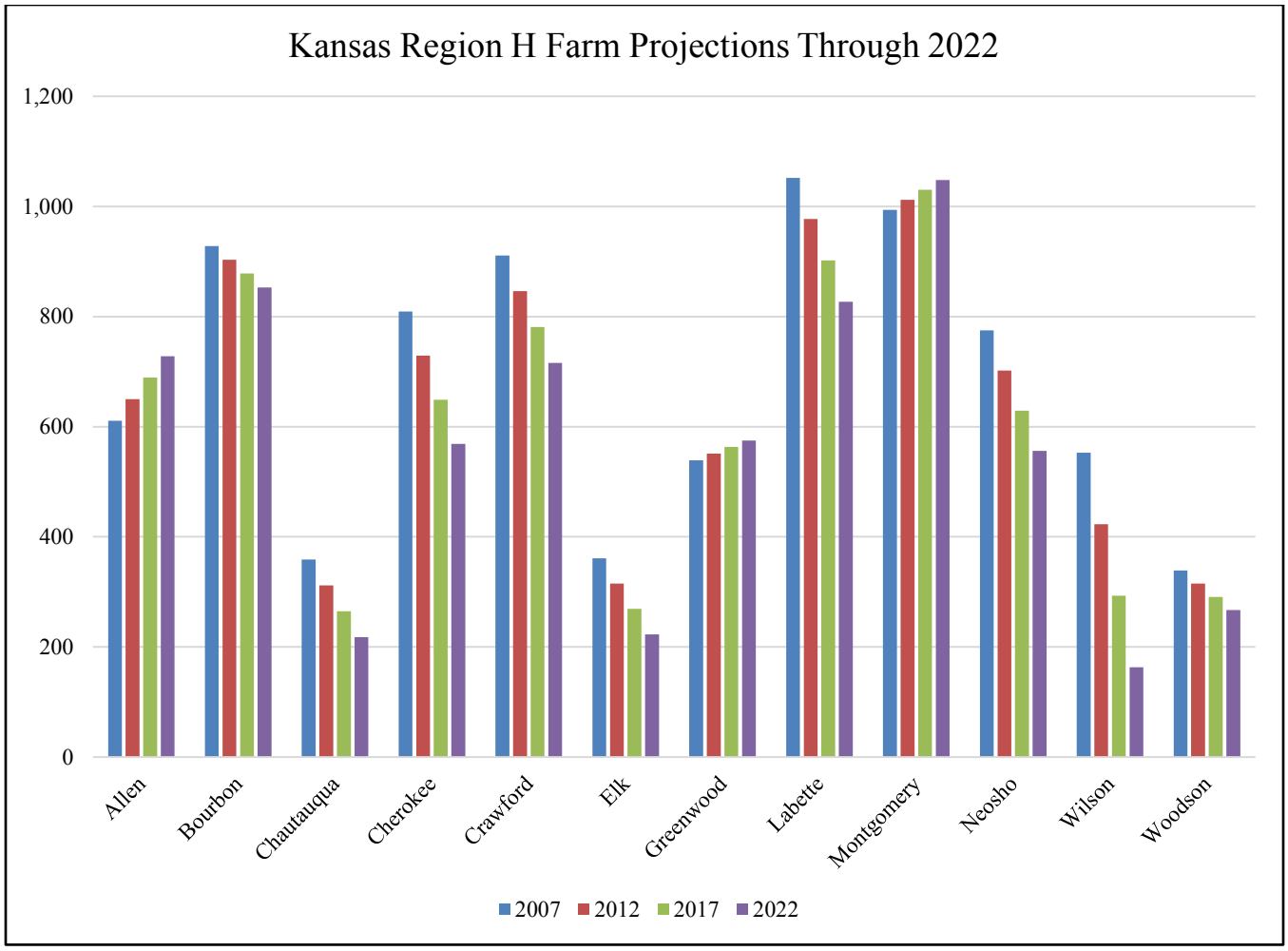


Table 3.37: Kansas Region H Farm Acreage Data Projections, 2002 to 2022

County	Farm Acreage, 2007	Farm Acreage, 2012	Farm Acreage, 2017	Farm Acreage, 2022	Projected Growth Percentage Through 2022
Allen	267,409	245,315	223,221	201,127	-24.8%
Bourbon	327,534	334,301	341,068	347,835	6.2%
Chautauqua	308,232	310,310	312,388	314,466	2.0%
Cherokee	324,383	308,233	292,083	275,933	-14.9%
Crawford	342,349	323,222	304,095	284,968	-16.8%
Elk	316,707	316,385	316,063	315,741	-0.3%
Greenwood	608,891	701,012	793,133	885,254	45.4%
Labette	371,115	370,531	369,947	369,363	-0.5%
Montgomery	313,947	335,669	357,391	379,113	20.8%
Neosho	321,520	308,150	294,780	281,410	-12.5%
Wilson	333,203	254,671	176,139	97,607	-70.7%
Woodson	261,607	294,643	327,679	360,715	37.9%

Source: United States Department of Agriculture National Agricultural Statistics Service

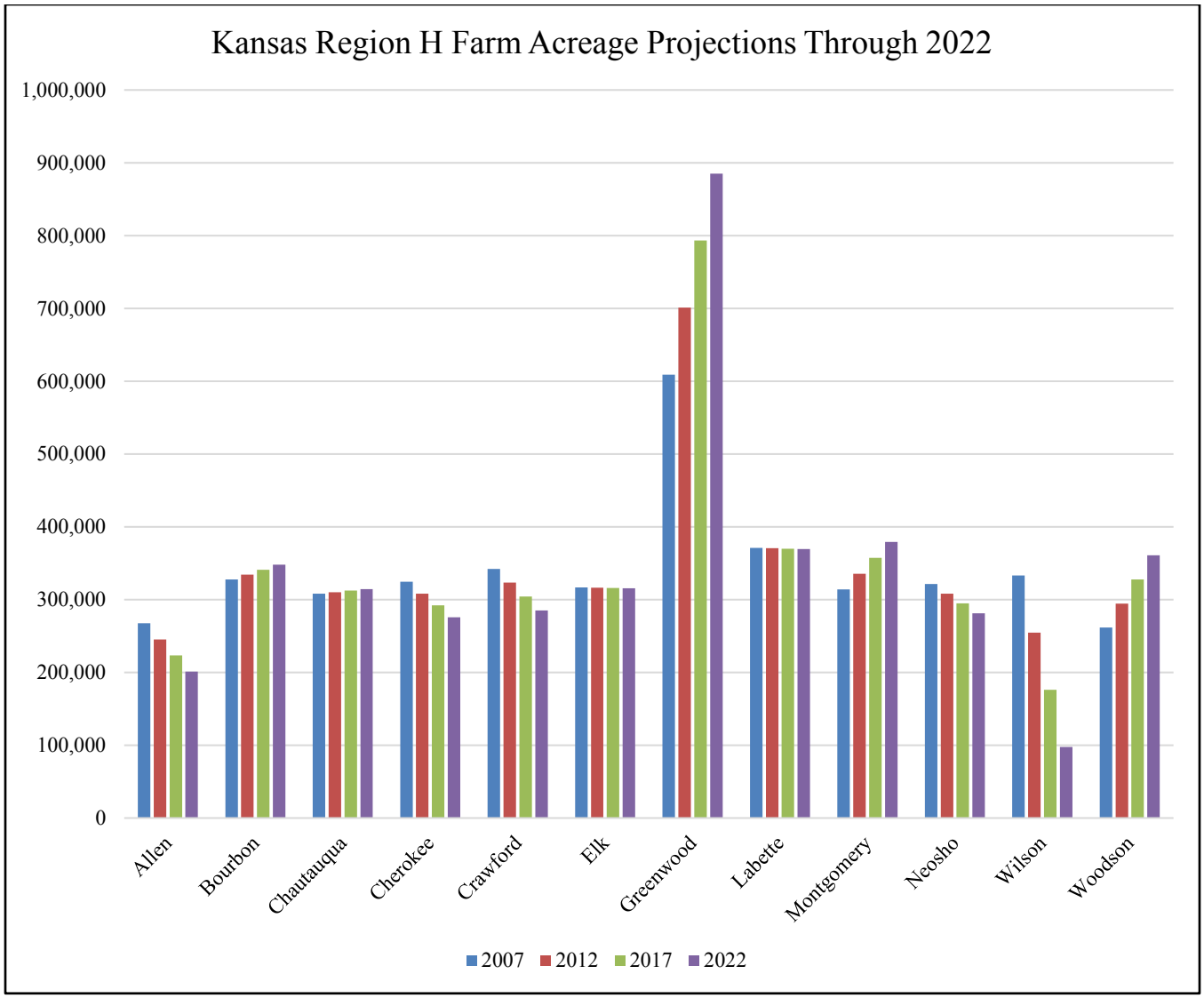


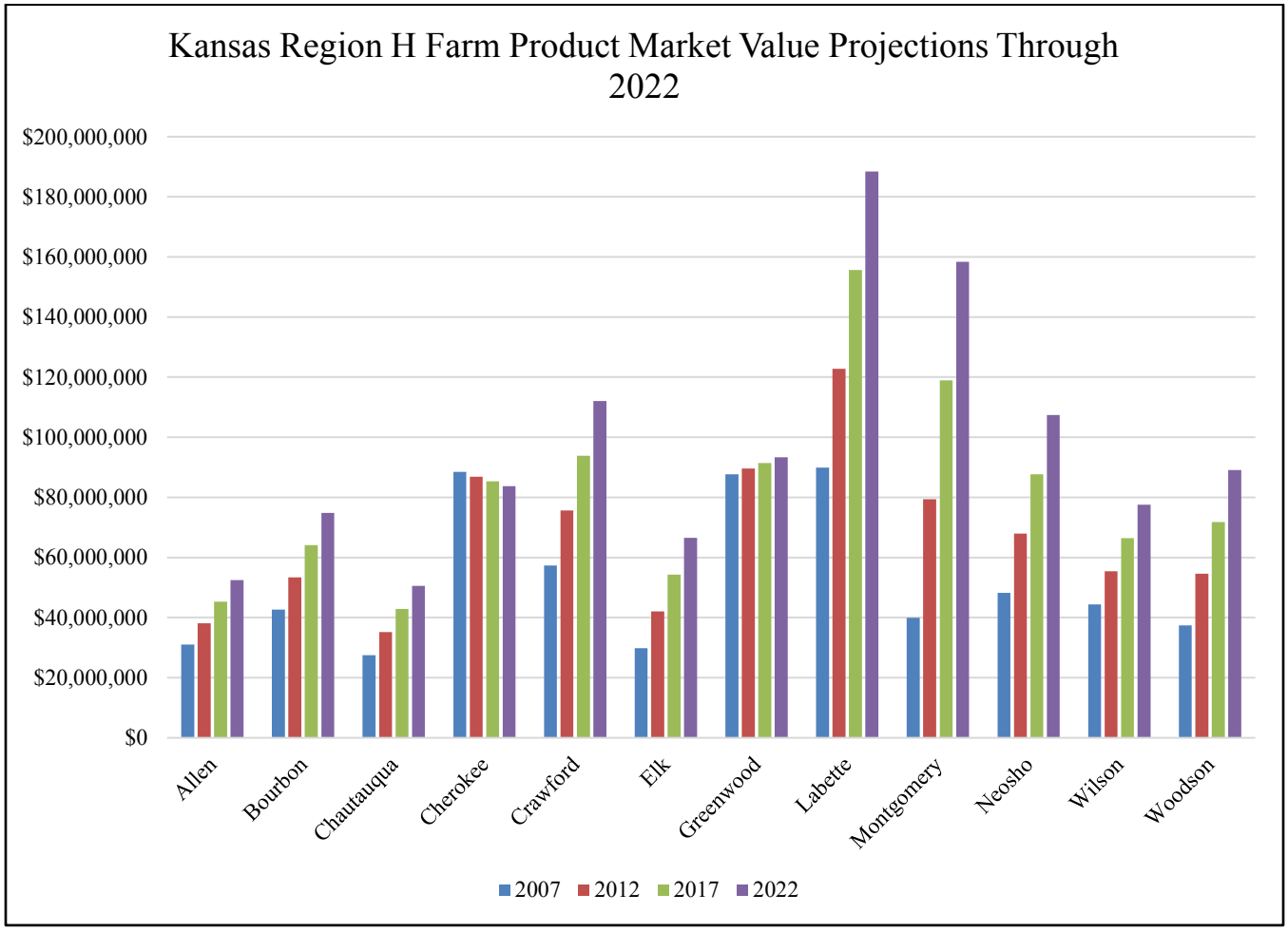
Table 3.38: Kansas Region H Agricultural Market Value Data Projections, 2002 to 2022

County	Market Value, 2007	Market Value, 2012	Market Value, 2017	Market Value, 2022	Projected Growth Percentage Through 2022
Allen	$30,993,000	$38,156,000	$45,319,000	$52,482,000	69.3%
Bourbon	$42,649,000	$53,376,000	$64,103,000	$74,830,000	75.5%
Chautauqua	$27,529,000	$35,195,000	$42,861,000	$50,527,000	83.5%
Cherokee	$88,499,000	$86,906,000	$85,313,000	$83,720,000	-5.4%
Crawford	$57,371,000	$75,594,000	$93,817,000	$112,040,000	95.3%
Elk	$29,857,000	$42,070,000	$54,283,000	$66,496,000	122.7%
Greenwood	$87,664,000	$89,554,000	$91,444,000	$93,334,000	6.5%
Labette	$89,935,000	$122,778,000	$155,621,000	$188,464,000	109.6%
Montgomery	$39,916,000	$79,420,000	$118,924,000	$158,428,000	296.9%
Neosho	$48,227,000	$67,958,000	$87,689,000	$107,420,000	122.7%

Table 3.38: Kansas Region H Agricultural Market Value Data Projections, 2002 to 2022

County	Market Value, 2007	Market Value, 2012	Market Value, 2017	Market Value, 2022	Projected Growth Percentage Through 2022
Wilson	$44,376,000	$55,422,000	$66,468,000	$77,514,000	74.7%
Woodson	$37,368,000	$54,603,000	$71,838,000	$89,073,000	138.4%

Source: United States Department of Agriculture National Agricultural Statistics Service



3.12 – Regional Economic Activity Patterns

Kansas Region H's continued economic growth can impact future vulnerability in two ways, by location-based growth in identified hazard prone areas or by the industry type itself, as is the case with chemical manufacturing.

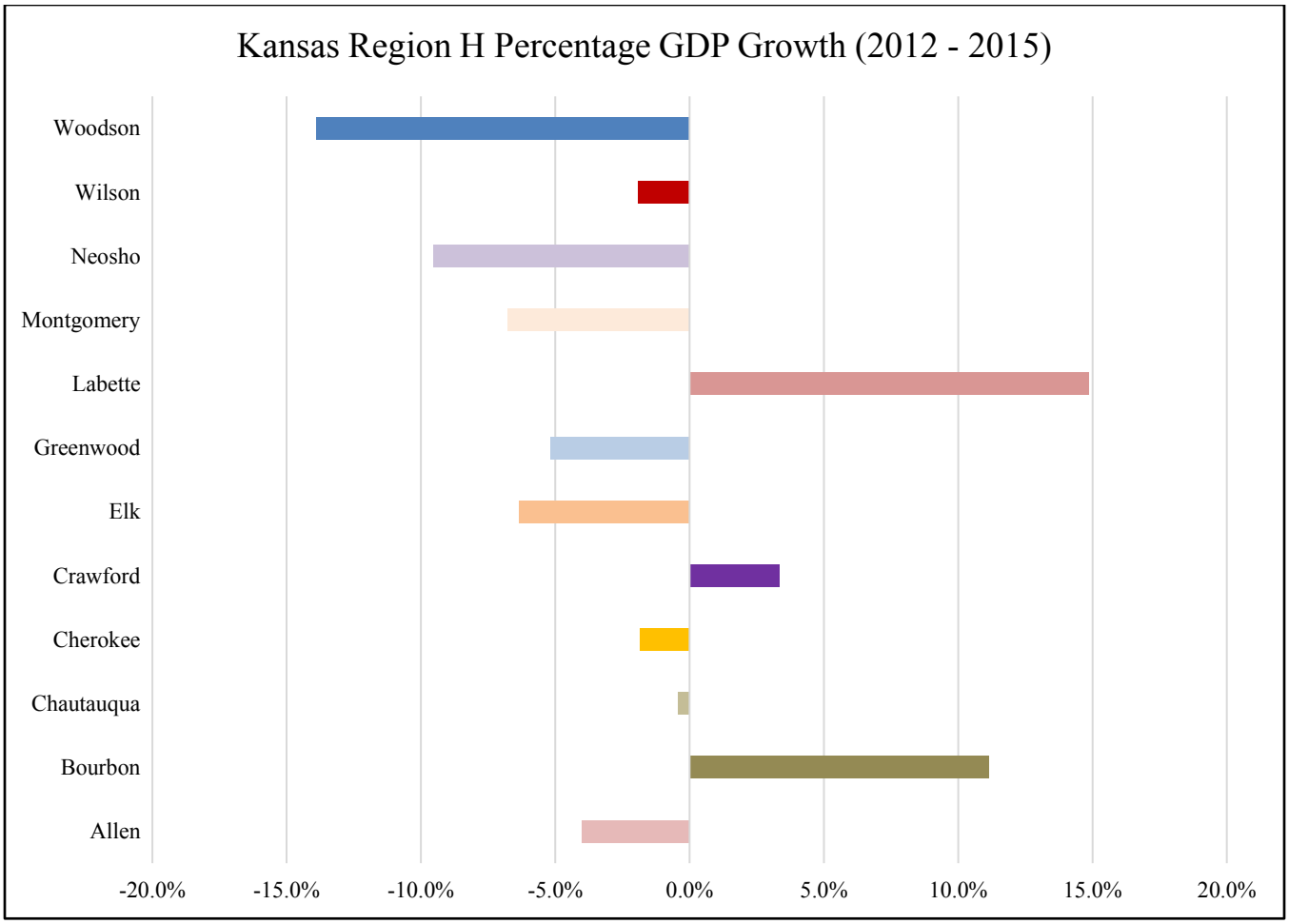
Gross domestic product (GDP) is a measure of the entire output of a defined economy, and roughly equals the total dollar amount of all goods and services produced within a defined area. GDP is the most comprehensive measure of economic activity and business growth. The following table, using data from

the Bureau of Economic Analysis, details GDP for all Kansas Region H counties for the period 2012 to 2015 (the latest available data).

Table 3.39: Kansas Region H Gross Domestic Product, 2012 to 2015

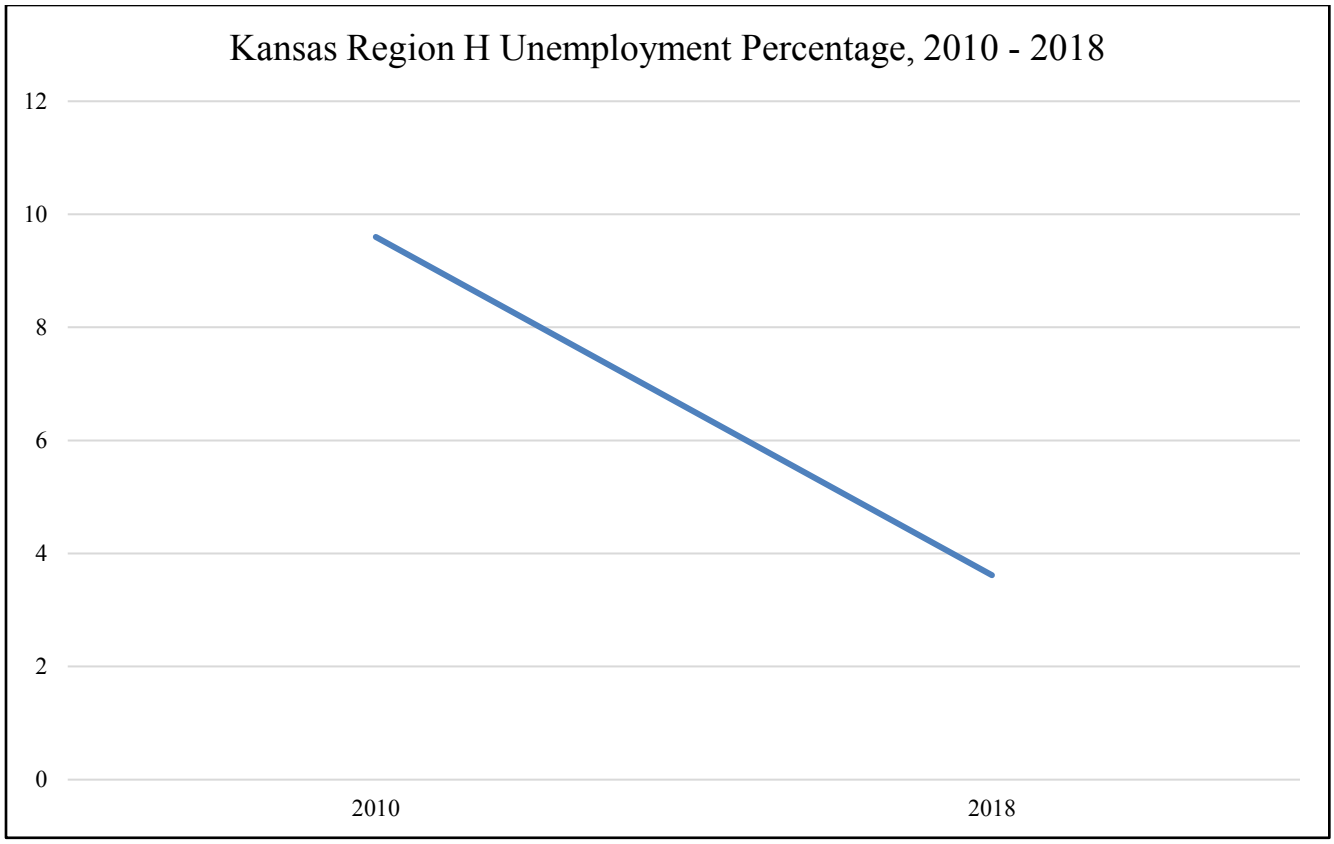
County	2012	2013	2014	2015	Percentage GDP Growth 2012-2015
Allen	$464,993	$467,582	$446,371	$446,305	-4.0%
Bourbon	$454,606	$480,804	$488,603	$505,215	11.1%
Chautauqua	$72,401	$79,412	$80,741	$72,098	-0.4%
Cherokee	$470,721	$467,499	$457,744	$462,060	-1.8%
Crawford	$1,270,200	$1,267,535	$1,274,186	$1,312,658	3.3%
Elk	$97,034	$107,469	$99,879	$90,874	-6.3%
Greenwood	$142,855	$158,902	$150,773	$135,452	-5.2%
Labette	$713,996	$759,329	$786,743	$820,032	14.9%
Montgomery	$1,313,619	$1,303,250	$1,294,438	$1,224,741	-6.8%
Neosho	$489,917	$491,726	$462,796	$443,237	-9.5%
Wilson	$273,463	$261,473	$265,880	$268,177	-1.9%
Woodson	$66,867	$73,162	$65,369	$57,560	-13.9%

Source: Bureau of Economic Analysis



Source: Bureau of Economic Analysis

The average Kansas Region H unemployment rate of 3.6% in 2018 was higher than the average State of Kansas unemployment rate of 3.4%. The following chart details the regional unemployment rate, using data from the St. Louis Federal Reserve, for the period 2010 through the end of 2018.



Source: St. Louis Federal Reserve

3.13 – Climate Change

For hazards related to weather patterns, climate change should be considered as it may cause significant changes in patterns and event frequency. There is a scientific consensus that climate change is occurring, and recent climate modeling results indicate that extreme weather events may become more common. Rising average temperatures produce a more variable climate system which may result in an increase in the frequency and severity of some extreme weather events, including:

- Longer and hotter heat waves
- An increased risk of wildfires
- Higher wind speeds
- Greater rainfall intensity
- Increased tornado activity.

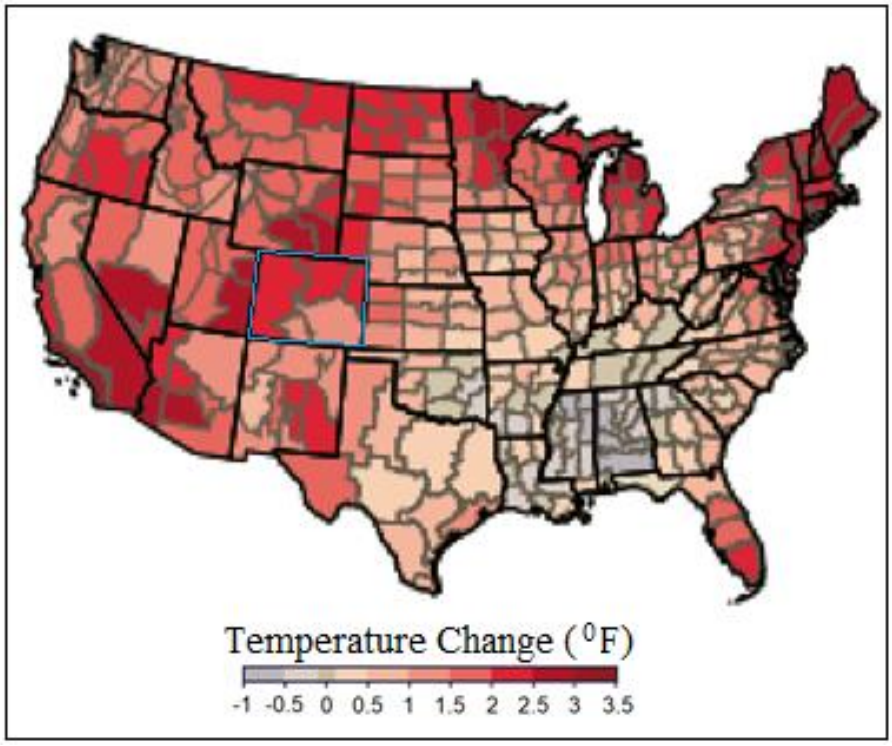
As climate modeling improves, future plan updates should include climate change as a factor in the ranking of natural hazards as these are expected to have a significant impact on Kansas Region H communities. Where applicable, potential climate change factors will be addressed in subsequent sections for relevant identified hazards.

According to the United State Environmental Protection Agency (USEPA) "What Climate Change Means for Kansas" (August 2016), "In the past century, most of the state has warmed by at least half a degree

(F). The soil is becoming drier. Rainstorms are becoming more intense, and floods are becoming more severe. Warming winters and changes in the timing and size of rainfall events have altered crop yields. In the coming decades, summers are likely to become increasingly hot and dry, creating problems for agriculture and possibly human health."

The following map, from the USEPA Climate Change Indicators in the United States, illustrates modeled temperature changes during the last century.

USEPA Modeled Temperature Changes During Last Century



Concerning potential impacts on agriculture, the report states "Rising temperatures, drier soils, and decreasing water availability are likely to present challenges for Kansas's farms. Yields would decline by about 50 percent in fields that can no longer be irrigated. Even where ample water is available, higher temperatures would reduce yields of corn. Increased concentrations of carbon dioxide, however, may increase yields of wheat and soybean enough to offset the impact of higher temperature. Although warmer and shorter winters may allow for a longer growing season, they may also promote the growth of weeds and pests, and shorten the dormancy for many winter crops, which could increase crop losses during spring freezes. The early flowering of winter wheat could have negative repercussions on livestock farmers who depend on it for feed. Livestock themselves may also be affected by more intense heat waves and lack of water. Hot weather causes cows to eat less, grow more slowly, and produce less milk, and it can threaten their health."

Concerning potential impacts on rainfall, flooding, and drought, the report states "Although summer droughts are likely to become more severe, floods may also intensify. During the last 50 years, the amount of rain falling during the wettest four days of the year has increased about 15 percent in the Great Plains. River levels associated with flooding have increased in eastern Kansas. Over the next several decades,

the amount of rainfall during the wettest days of the year is likely to continue to increase, which would increase flooding."

Concerning potential impacts on tornados, the report states "Scientists do not know how the frequency and severity of tornados will change. Rising concentrations of greenhouse gases tend to increase humidity, and thus atmospheric instability, which would encourage tornados. But wind shear is likely to decrease, which would discourage tornados. Research is ongoing to learn whether tornados will be more or less frequent in the future. Because Kansas experiences about 100 tornados a year, such research is closely followed by meteorologists in the state."

Concerning potential impacts on human health, the report states "By 2050, Kansas is likely to have four times as many days above 100°F. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor. The elderly may be particularly prone to heat stress and other heat-related health problems, including dehydration, cardiovascular strain, and respiratory problems. Those with low incomes may be particularly vulnerable due to a lack of air conditioning. Power failures due to severe weather can also present risks, especially in lightly populated areas where access to the necessary support services may be limited."

4.0 Hazard Profiles

4.1 – Introduction

The ultimate purpose of this HMP is to minimize the loss of life and property. To accomplish this, all relevant hazards and vulnerabilities the region faces have been identified. Once this identification has been completed, Kansas Region H and all participating jurisdictions can use the accumulated data to assist in the development of and prioritization of mitigation action to defend against these potential risks.

4.2 – Methodology

Each hazard that has historically, or could potentially, affect Kansas Region H is reviewed and discussed in detail. In general, each hazard details the following information:

- Location and Extent
- Previous Occurrences
- Hazard Probability Analysis
- Vulnerability Assessment

Data sets used for this HMP were designed to follow the lead of the 2013 State of Kansas Hazard Mitigation Plan. Ten-year data sets from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) (2009 to 2018, with 2009 and 2018 being full data set years) were used, where applicable, for hazard occurrence and impact data. Five-year data sets from the United States Department of Agriculture (USDA) Risk Management Agency (2014 to 2018, with 2013 and 2018 being full data set years) were used to determine agricultural losses. The five-year data set was used to reflect the change in the climate and more accurately depict changes in our state. Where data sets were unavailable for a hazard, local reporting from participating jurisdictions was relied upon.

In addition, to ensure compliance with EMAP standards, a hazard consequence analysis was conducted for each hazard detailing the following potential impacts:

- Health and Safety of the Public
- Health and Safety of Responders
- Continuity of Operations; Property, Facilities, and Infrastructure
- Environment
- Economic Conditions
- Public Confidence in the Jurisdiction's Governance.

4.3 – Declared Federal Disasters

Historical events of significant magnitude or impact can result in a Secretarial or Presidential Disaster Declaration. The MPC reviewed the historical federal disaster declarations to assist in hazard identification. Since the approval of the previous Kansas Region H hazard mitigation plan in 2014, there have been two federal disaster declarations for the region, as follows:

- DR 4319: Declared on June 16, 2017 – Severe Winter Storm, Snowstorm, Straight-Line Winds, Flooding

- DR 4287: Declared on October 20, 2016 – Severe Storms and Flooding
- DR 4230: Declared on July 20, 2015 – Severe Storms, Tornados, Straight-Line Winds and Flooding

In addition, since the 2014 plan, there has been one Fire Management Assistance Declarations, as follows:

- FM 5170: Declared on March 5, 2017 – Kansas Highland Hills Fire

For the 20-year period from 1999 to 2018 (data set includes full years for 2009 and 2018), Kansas Region H has had 20 federal disaster declarations. These declarations included the following identified hazards:

- Flooding
- Severe Storms
- Straight-Line Winds
- Severe Winter Storms
- Tornados

Information on past declared disasters are presented in the subsequent, relevant sections.

4.4 – Identified Potential Hazards

Based on the above data, and data contained in previous mitigation plans, Kansas Region H's MPC met to discuss previously identified hazards and deliberate on any changes or additions. Based on this review, no changes, additions or subtractions were indicated for any identified hazard. Additionally, a thorough and comprehensive revision of data for each hazard was completed as part of this plan update.

The MPC confirmed sixteen natural hazards that may impact Kansas Region H, as listed below:

- Agricultural Infestation
- Dam/Levee Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Temperatures
- Flood
- Hailstorm
- Land Subsidence
- Landslide
- Lightning
- Soil Erosion and Dust
- Tornado
- Wildfire
- Wind Storm
- Winter Storm

Additionally, the MPC confirmed six man-made hazards that may impact Kansas Region H, as listed below:

- Civil Disorder
- Hazardous Materials Incident
- Major Disease Outbreak
- Radiological Event
- Terrorism/Agri-Terrorism
- Utility/Infrastructure Failure

Based on discussion with the MPC, a lack of identified risk or history, and geographic improbability, numerous FEMA identified hazards such as coastal erosion, hurricane, tsunami were not included in the scope of this plan.

4.5 – Hazard Planning Significance

Previous planning efforts used the calculated priority risk index (CPRI) methodology to assign a planning significance to each of the identified hazards. CPRI considers the following four elements of risk:

- Probability of an Impactful Event
- Magnitude/Severity
- Warning Time
- Duration

Each element was then assigned a number based on pre-established rating parameters. The following tables provide a summary for each of the risk elements, including a rationale behind each numerical rating.

Table 4.1: CPRI Element Ratings

CPRI Element	Rating Number and Definition			
	1	2	3	4
Probability	Unlikely (10% chance of occurrence)	Occasional (20% chance of occurrence)	Likely (33% chance of occurrence)	Highly Likely (100% chance of occurrence)
Magnitude	Negligible (Minor injuries and <10% of property severely damaged)	Limited (Multiple injuries and 10-25% of property severely damaged)	Critical (Multiple disabling injuries and 25-50% of property severely damaged)	Catastrophic (Multiple deaths and 50% of property severely damaged)
Warning Time	24+ hours	12-24 hours	6-12 hours	<6 hours
Duration	< 6 hours	< 1 day	< 1 week	1 week +

Using the rankings, the following weighted formula was used to determine each hazard's CPRI:

(Probability x 0.45) + **(Magnitude/Severity x 0.30)** + **(Warning Time x 0.15)** + **(Duration x 0.10)**

Each planning significance category was assigned a CPRI range, with a higher score indicating greater planning criticality. The following table details planning significance CPRI ranges.

Table 4.2: CPRI Planning Significance Range

	CPRI Range	
Planning Significance	**Low CPRI**	**High CPRI**
High	3.0	4.0
Moderate	2.0	2.9
Low	1.0	1.9

The terms high, moderate and low indicate the level of planning significance for each hazard, and do not indicate the potential impact of a hazard occurring. Hazards rated with moderate or high planning significance were more thoroughly investigated and discussed due to the availability of data and historic occurrences, while those with a low planning significance were generally addressed due to lack of available data and historical occurrences. The following table shows the CPRI ratings for Kansas Region H.

Table 4.3: Kansas Region H Natural Hazard CPRI Planning Significance

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Agricultural Infestation	2.0	2.0	1.0	4.0	2.1
Dam and Levee Failure	1.5	2.5	2.0	2.5	2.0
Drought	3.0	2.5	1.0	4.0	2.7
Earthquake	1.0	1.5	3.5	1.0	1.5
Expansive Soils	1.5	1.0	1.0	4.0	1.5
Extreme Temperature	2.5	2.0	1.0	3.0	2.2
Flood	3.5	3.0	2.0	3.0	3.1
Hailstorm	4.0	1.5	3.0	1.0	2.8
Land Subsidence	2.0	1.0	2.0	4.0	1.9
Landslide	1.0	1.5	3.5	1.0	1.5
Lightning	2.5	1.0	3.0	1.0	2.0
Soil Erosion & Dust	2.0	1.0	1.0	4.0	1.8
Tornado	3.5	3.5	4.0	1.0	3.3
Wildfire	3.0	1.5	4.0	2.0	2.6
Windstorm	3.5	2.0	3.0	2.0	2.8
Winter Storm	3.92	2.5	2.0	3.0	3.2

Table 4.4: Kansas Region H Man-Made Hazard CPRI Planning Significance

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Civil Disorder	1.0	2.0	4.0	1.0	1.8
Hazardous Materials Event	1.0	2.0	4.0	1.0	1.8
Major Disease Outbreak	1.0	3.0	1.0	4.0	1.9
Radiological Event	1.0	1.0	4.0	4.0	1.8
Terrorism, Agri-Terrorism	1.0	2.0	4.0	1.0	1.8
Utility / Infrastructure Failure	3.0	2.0	4.0	3.0	2.9

In general, the average CPRI for each identified hazard remained similar to the calculated CPRI for the 2014 planning effort, where individual county rankings were combined into a regional ranking. Notable changes for calculated CPRIs include the Civil Disorder, Radiological Event and Terrorism/Agri-Terrorism CPRIs being lowered due to no reported events and a low potential of occurrence.

4.6 – Hazard Profiles

44 CFR 201.6(c)(2)(i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Each identified hazard is profiled in the subsequent sections, with the level of detail varying based on available information. Sources of information are cited in the detailed hazard profiles below.

With each update of this plan, new information will be incorporated to provide for better evaluation and prioritization of the hazards.

The following hazards are presented in alphabetical order, and not by planning significance, for ease of reference. Additionally, man-made hazards are presented, again in alphabetical order, after natural hazards.

4.7 – Agricultural Infestation

Agricultural infestation is the naturally occurring infection of vegetation, crops or livestock with insects, vermin (to include lice, roaches, mice, coyote, fox, fleas, etc.), or diseases that render the crops or livestock unfit for consumption or use. The levels and types of agricultural infestation will vary according to many factors, including cycles of heavy rains and drought. A certain level of agricultural infestation is normal; however, infestation becomes an issue when the level of an infestation escalates suddenly, or a new infestation appears, overwhelming normal control efforts. Infestation of crops or livestock can pose a significant risk to state and local economies due to the dominance of the agricultural industry.

Onset of agricultural infestation can be rapid. Controlling an infestation's spread is critical to limiting impacts through methods including quarantine, culling, premature harvest and/or crop destruction when necessary. Duration is largely affected by the degree to which the infestation is aggressively controlled but is generally more than one week. Maximizing warning time is also critical for this hazard and is most affected by methodical and accurate monitoring and reporting of livestock and crop health and vigor, including both private individuals and responsible agencies.

4.7.1 –Location and Extent

The entire planning area may be affected by agricultural infestation. While rural areas within the region are more susceptible to crop and livestock infestation, urban and suburban areas are also at risk due to landscaping, urban gardens and parks, all of which add value to homes and communities, may be susceptible to damage or loss. The magnitude and severity of an agricultural infestation is relative to the type of infestation. A foreign animal disease like foot and mouth could potentially cause the economy to crumble, whereas an infestation of fleas would be manageable. The MPC has determined that the magnitude of this hazard in the planning area would be limited, as most infestations are manageable in scope.

Animal Disease

Of key concern regarding this hazard is the potential introduction of a rapid and economically devastating foreign animal disease, including Foot and Mouth disease and Bovine Spongiform Encephalopathy (BSE) disease. Because Kansas is a major cattle state, with cattle raised locally as well as imported into the state, the potential for highly contagious diseases such as these is a continuing, significant threat. The loss of production, death of animals, and other lasting problems resulting from an outbreak could cause continual and severe economic losses, as well as widespread unemployment. It would affect not only farmers, ranchers, and butchers, but also support and related industries

Of particular concern are Confined Animal Feeding Operations (CAFO) facilities, defined as facilities with 300 or more animal units. The CAFO facilities are regulated by the Kansas Department of Health & Environment, Bureau of Water, and Livestock Waste Management. The CAFO includes beef, dairy, sheep, swine, chicken, turkey, and horses. The following is a list of the number of CAFOs per county in Kansas Region H:

- Allen County: 1
- Bourbon County: 1
- Chautauqua County: 0
- Cherokee County: 14
- Crawford County: 2
- Elk County: 2
- Greenwood County: 3
- Labette County: 2
- Montgomery County: 13
- Wilson County: 3
- Woodson County: 1

Knowing where diseased and at-risk animals are, where they've been and when, is important to ensuring a rapid response when animal disease events take place. The Kansas Department of Agriculture (KDA), Division of Animal Health monitors and reports on animal reportable diseases. Producers are required by state law to report any of the reportable animal diseases.

Crop Pests and Diseases

Many factors influence disease development in plants, including hybrid/variety genetics, plant growth stage at the time of infection, weather (e.g., temperature, rain, wind, hail, etc.), single versus mixed infections, and genetics of the pathogen populations.

Field crops in the region are also subject to various types of infestation. According to KDA, Plant Protection and Weed Control Division, the following are the highest risk crop pests to this region and the potentially impacted crop:

- Aspergillus Ear Rot (Alfatoxin): Corn
- Austro-Asian Rust: Soybean
- Black Stem Rust, Blast: Wheat
- South American strains, Stripe Rust, Leaf Rust, Karnal: Wheat

Infestation is not only a risk to crops in the field, but insect infestation can also cause major losses to stored grain. It is estimated that damage to stored grain by the lesser grain borer, Montgomery weevil, red flour beetle, and rusty grain beetle costs the United States about $500 million annually.

Tree Pests

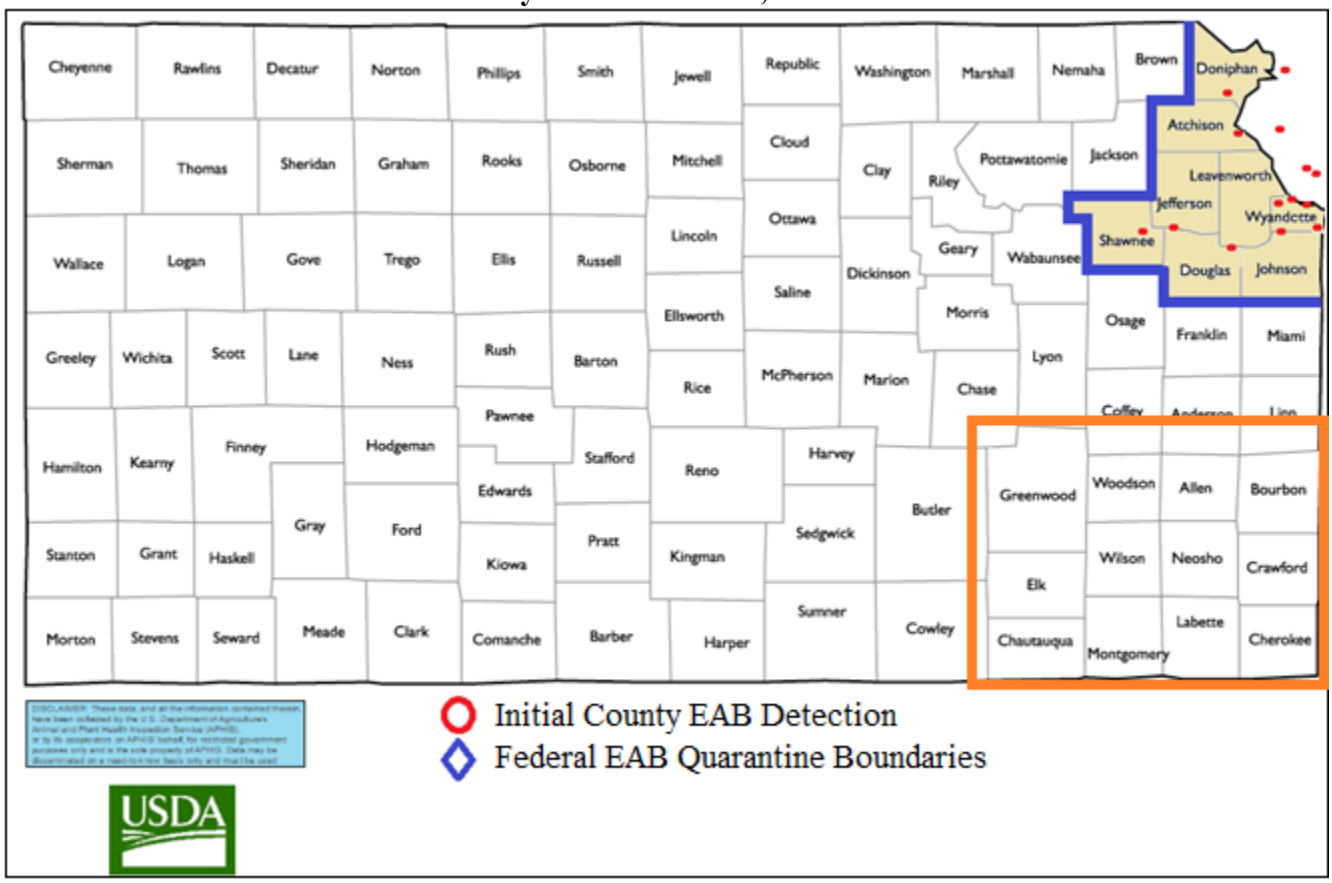
According to the KDA, Plant Protection and Weed Control Division, the following are the highest risk plant pests by host to Kansas Region H:

- Emerald Ash Borer (EAB): Ash Trees
- Asian Longhorned Beetle: Maple, Birch, Willow, Mimosa, Ash, Sycamore & Poplar Trees
- Thousand Cankers: Walnut Trees

As of this plan, neither the Asian Longhorned Beetle nor Thousand Cankers have been detected in Kansas.

As of this plan, the EAB has been discovered in numerous Kansas countries to the north of Kansas Region H, but no Kansas Region H counties. The following map from the USDA shows the Federal EAB Quarantine area for the State of Kansas in relation to Kansas Region H.

Initial County EAB Detections, December 2018



Wildlife Pests

The region's farmers also lose a significant amount of crops each year as a result of wildlife foraging. This can be particularly problematic in areas where natural habitat has been diminished or in years where weather patterns such as early/late frost deep snow, or drought has caused the wild food sources to be limited. Also of concern are the following wildlife diseases:

- Chronic Wasting Disease (CWD), affecting deer and captive elk populations.
- Hemorrhagic Disease (HD), affecting white-tailed deer

There have been 48 positive cases of CWD found in Kansas since surveillance started in 1996 and regular occurrences of HD seasonally in late summer and fall. These diseases can seriously damage the populations of the captive deer and elk farms and the wild deer populations but also affect the annual $350 million-dollar regional and statewide hunting economy.

4.7.2 – Previous Occurrences

There have been no major reported or recorded agricultural infestations, above what is considered a normal level, for Kansas Region H.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of agricultural infestation on the region's agricultural base. Crop loss data for the five-year period 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates 112 claims on 10,301 acres for $665,688.

Table 4.5: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Agricultural Infestation

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	3	904	$51,523
Bourbon	8	467	$45,474
Chautauqua	8	267	$23,699
Cherokee	6	453	$18,983
Crawford	14	2,085	$173,133
Elk	4	190	$18,050
Greenwood	7	198	$16,508
Labette	17	1,669	$121,985
Montgomery	17	2,990	$90,288
Neosho	9	110	$9,224
Wilson	16	895	$89,120
Woodson	3	73	$7,701

Source: USDA Farm Service Agency

4.7.3 – Hazard Probability Analysis

Kansas Region H experiences agricultural losses every year because of insects, vermin or diseases that impact plants and livestock. Data from the UDSA Risk Management Agency indicates that there has been at least one claimed incident of agricultural infestation for Kansas Region H for the period 2015 through 2018. Using the binomial probability equation (number of years with an event divided by total number of years in reporting period) we derive a probability 100% of a reportable agricultural infestation event in a given year. However, the large majority of events are expected to be small and limited in scope.

4.7.4 – Vulnerability Assessment

Regional populations and facilities are not directly vulnerable to losses as a result of agricultural infestation. The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. The USDA Risk Management Agency provides information on insured crop losses related to identified hazards, with data from the five-year period of 2014 to 2018 (with 2014 and 2018 being full data set years) used for analysis. The higher the percentage loss, the higher the vulnerability the county has to agricultural infestation events.

Table 4.6: Agricultural Infestation Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	181	0.07%	$38,156,000	10,305	0.03%
Bourbon	334,301	93	0.03%	$53,376,000	9,095	0.02%
Chautauqua	310,310	53	0.02%	$35,195,000	4,740	0.01%
Cherokee	308,233	91	0.03%	$86,906,000	3,797	0.00%
Crawford	323,222	417	0.13%	$75,594,000	34,627	0.05%
Elk	316,385	38	0.01%	$42,070,000	3,610	0.01%
Greenwood	701,012	40	0.01%	$89,554,000	3,302	0.00%
Labette	370,531	334	0.09%	$122,778,000	24,397	0.02%
Montgomery	335,669	598	0.18%	$79,420,000	18,058	0.02%
Neosho	308,150	22	0.01%	$67,958,000	1,845	0.00%
Wilson	254,671	179	0.07%	$55,422,000	17,824	0.03%
Woodson	294,643	15	0.00%	$54,603,000	1,540	0.00%

Source: USDA

This table only reflects insured losses that were claimed. According to the 2017 Kansas Crop Insurance Profile Report issued by the USDA Risk Management Agency, 75-94% percent of major Kansas row crops were insured. Data regarding the number or value of livestock and wildlife lost to disease or infestation was not available for this planning effort.

In addition, threats have been identified which, while currently not impacting Kansas, may present a future risk. According to the KDA, Plant Protection and Weed Control Division the following table lists the highest risk plant pests to Kansas.

Table 4.7: Potential High-Risk Plant Pests

Pest (Disease Insect, or weed)	Crop or Host Plant	Current Distribution	Type of Loss
Rust, Austro-Asian	Soybean	Australia, Japan, Pacific, Gulf of Mexico	Direct Loss to production
Aspergillus ear rot (Alfatoxin)	Corn	Worldwide, endemic to Kansas	Toxin renders the grain unusable
Black Stem Rust UG99 strain	Wheat	Africa, Asia	Direct Loss to production
Blast – South American strains	Wheat	South America	Direct Loss to production
Stripe Rust (new races)	Wheat	North America	Direct Loss to production
Leaf Rust (new races)	Wheat	North America	Direct Loss to production
Karnal Bunt	Wheat	Asia, Mexico, Arizona	International export quarantines, degradation of flour quality
Thousand Cankers	Walnut	Western US states and PA, VA, TN	Death of municipal trees, loss of nut crop, loss of timber

Table 4.7: Potential High-Risk Plant Pests

Pest (Disease Insect, or weed)	Crop or Host Plant	Current Distribution	Type of Loss
Emerald Ash Borer	Ash	North Central and North Eastern U.S., including northeast Kansas	Death of trees. Cost of removal and re-vegetation.
Asian Longhorned Beetle	Maples, Birches, Willows, Mimosa, Ash, Sycamore, Poplar trees	Small parts of Ohio, New York, and Massachusetts	Death of trees. Cost of removal and re-vegetation.
Hydrilla	Water Bodies	Southern U.S. and one park pond in Olathe	Economic and environmental.

4.7.5 – Impact and Consequence Analysis

As per EMAP standards, the information in the following table provides the Consequence Analysis.

Table 4.8: Agricultural Infestation Consequence Analysis

Subject	Impacts of Agricultural Infestation
Health and Safety of the Public	Impact in the area would be minimal. If the infestation is unrecognized, then there is the potential for the food supply to be contaminated.
Health and Safety of Responders	Impact would be minimal with protective clothing, gloves, etc as these diseases cause no risk to humans.
Continuity of Operations	Minimal expectation of execution of the COOP.
Property, Facilities, and Infrastructure	Localized impact to facilities and infrastructure in the incident area is minimal to non-existent.
Environment	Impact could be severe to the incident area, specifically, plants, trees, bushes, and crops.
Economic Conditions	Impacts to the economy will depend on the severity of the infestation. The potential for economic loss to the community and state could be severe if the infestation is hard to contain, eliminate, or reduce. Impact could be minimized due to crop insurance.
Public Confidence in the Jurisdiction's Governance	Confidence could be in question depending on timeliness and steps taken to warn the producers and public, and treat/eradicate the infestation.

4.8 – Dam and Levee Failure

A dam is a barrier across flowing water that obstructs, directs or slows down the flow, often creating a reservoir, lake or impoundments. Common reasons for dam failure include:

- Flooding
- Sub-standard construction materials/techniques
- Spillway design error
- Geological instability caused by changes to water levels during filling or poor surveying
- Flood waters exceeding design capacity
- Poor maintenance, especially of outlet pipes
- Human, computer or design error
- Internal erosion, especially in earthen dams
- Earthquakes

A levee is an artificial barrier, usually an earthen embankment, constructed along rivers to protect adjacent lands from flooding. Common reasons for levee failure include:

- Surface erosion due to water velocities
- Subsurface actions
- Flood waters exceeding the design capacity of the structure
- Animal or plant damage to structure

4.8.1 – Dam Location and Extent

In Kansas, the State has regulatory jurisdiction over non-federal dams that meet the following definition of a "jurisdictional" dam as defined by K.S.A. 82a-301 et seq, and amendments thereto:

- *any artificial barrier including appurtenant works with the ability to impound water, waste water or other liquids that has a height of 25 feet or more; or has a height of six feet or greater and also has the capacity to impound 50 or more acre feet. The height of a dam or barrier shall be determined as follows: (1) A barrier or dam that extends across the natural bed of a stream or watercourse shall be measured from the downstream toe of the barrier or dam to the top of the barrier or dam; or (2) a barrier or dam that does not extend across a stream or watercourse shall be measured from the lowest elevation of the outside limit of the barrier or dam to the top of the barrier or dam.*

The KDA Division of Water Resources (KDA-DWR) is the State agency responsible for regulation of jurisdictional dams. Within the DWR, the Water Structures Program has the following responsibilities:

- Reviewing and approving of plans for constructing new dams and for modifying existing dams
- Ensuring quality control during construction,
- Monitoring dams that, if they failed, could cause loss of life, or interrupt public utilities or services

The KDA-DWR uses a three-tiered classification system to describe the potential risk and severity associated with dam failure, with the tiers relating to potential downstream impact rather than the physical condition of the dam.

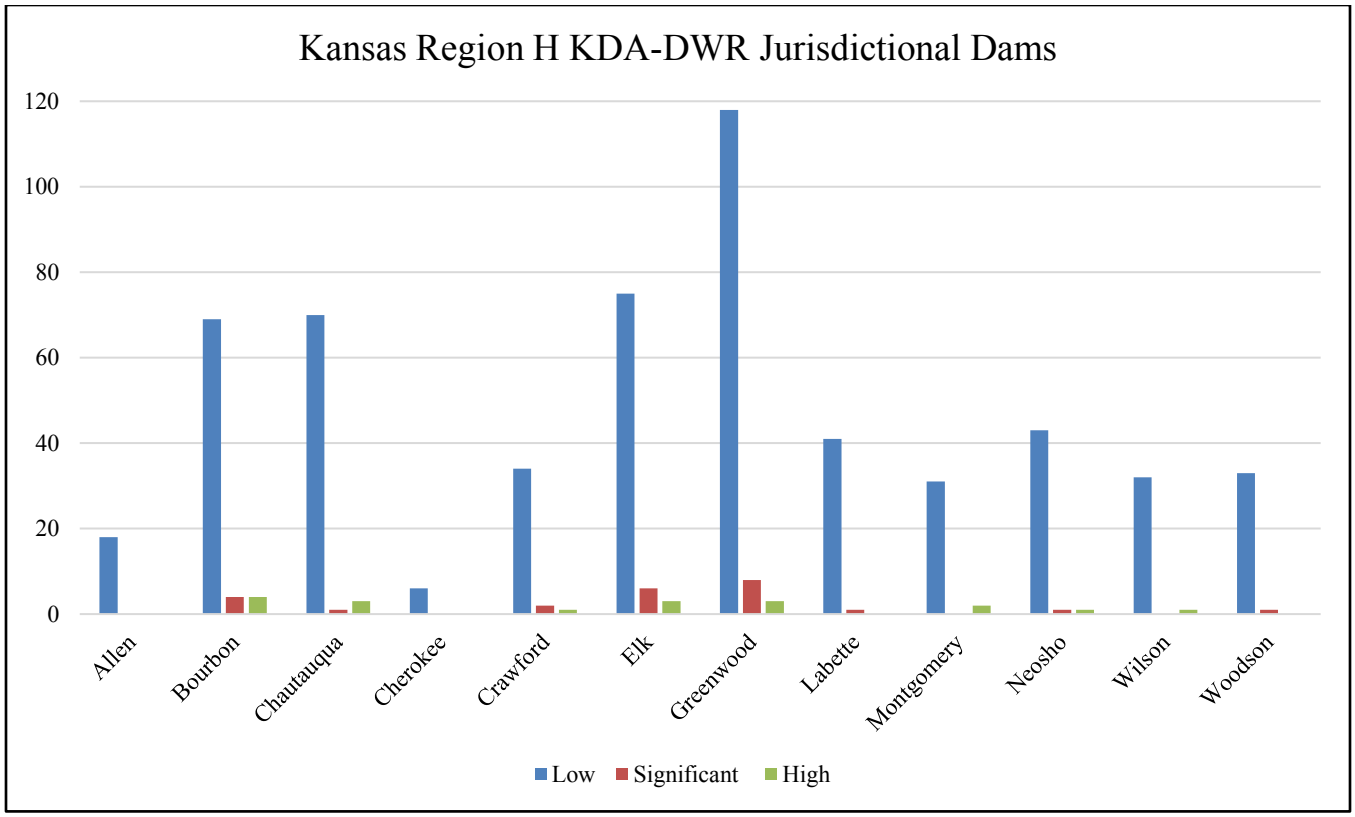
- **High Hazard (Class C):** Dams assigned the high hazard-potential classification are those where failure could result in any of the following: extensive loss of life, damage to more than one home, damage to industrial or commercial facilities, interruption of a public utility serving a large number 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 persons, or two or more individual hazards described in hazard class B. Emergency Action Plans (EAPs) are required for all High Hazard Dams.
- **Significant Hazard (Class B):** Dams assigned the significant hazard-potential classification are those dams where failure could endanger a few lives, damage an isolated home, damage traffic on moderate volume roads that meet the requirements for hazard class B dams, damage low-volume railroad tracks, interrupt the use or 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 (Class A):** Dams assigned the low hazard-potential classification are those 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 hazard class A dams.

According to the KDA-DWR, there are 476 jurisdictional dams in Kansas Region H. These dams are classified as follows.

Table 4.9: Kansas Region H KDA-DWR Jurisdictional Dams

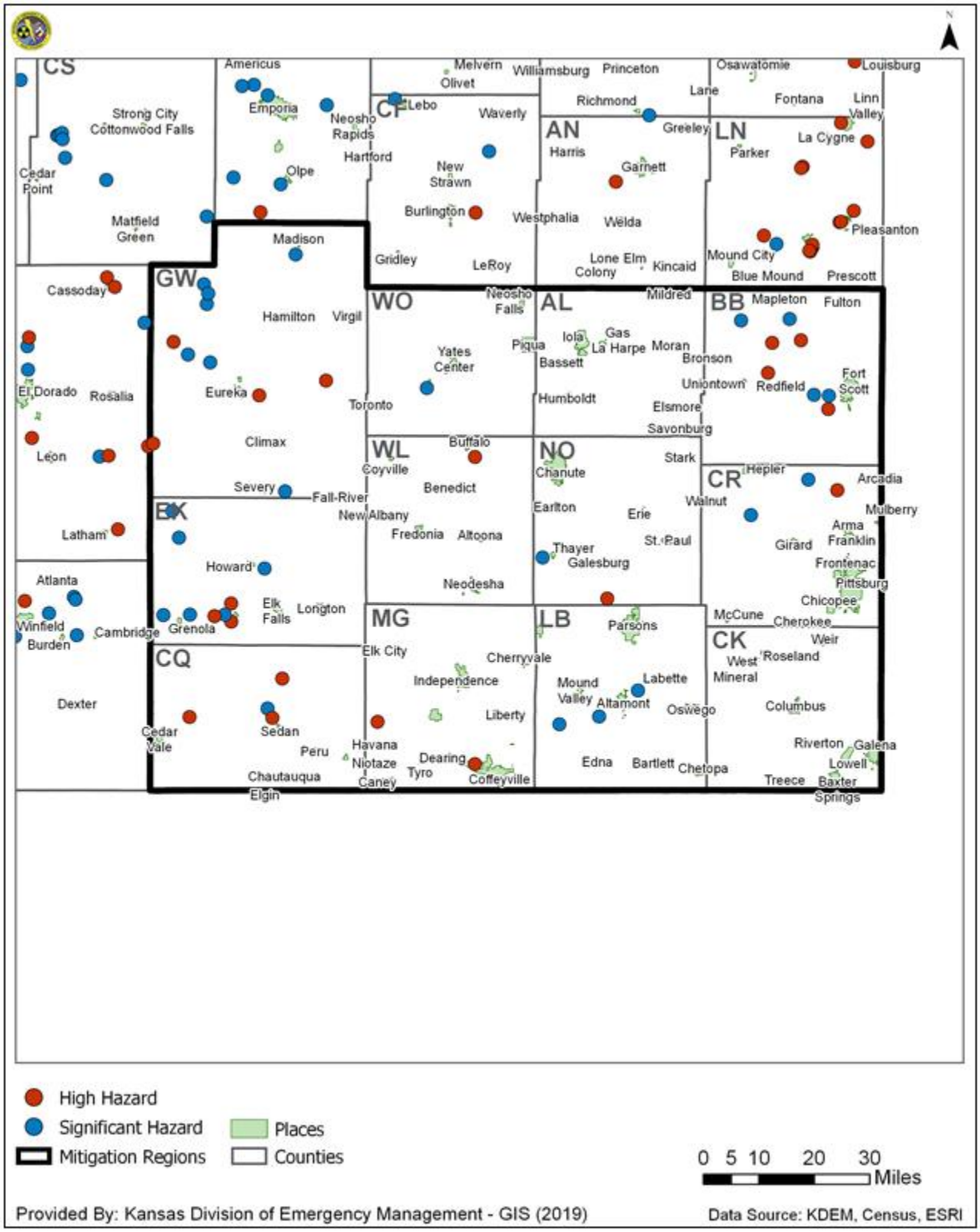
County	Low	Significant	High	High Hazard Without EAP
Allen	18	0	0	0
Bourbon	69	4	4	0
Chautauqua	70	1	3	0
Cherokee	6	0	N 0	0
Crawford	34	2	1	0
Elk	75	6	3	2
Greenwood	118	8	3	0
Labette	41	1	0	0
Montgomery	31	0	2	1
Neosho	43	1	1	0
Wilson	32	0	1	0
Woodson	33	1	0	0

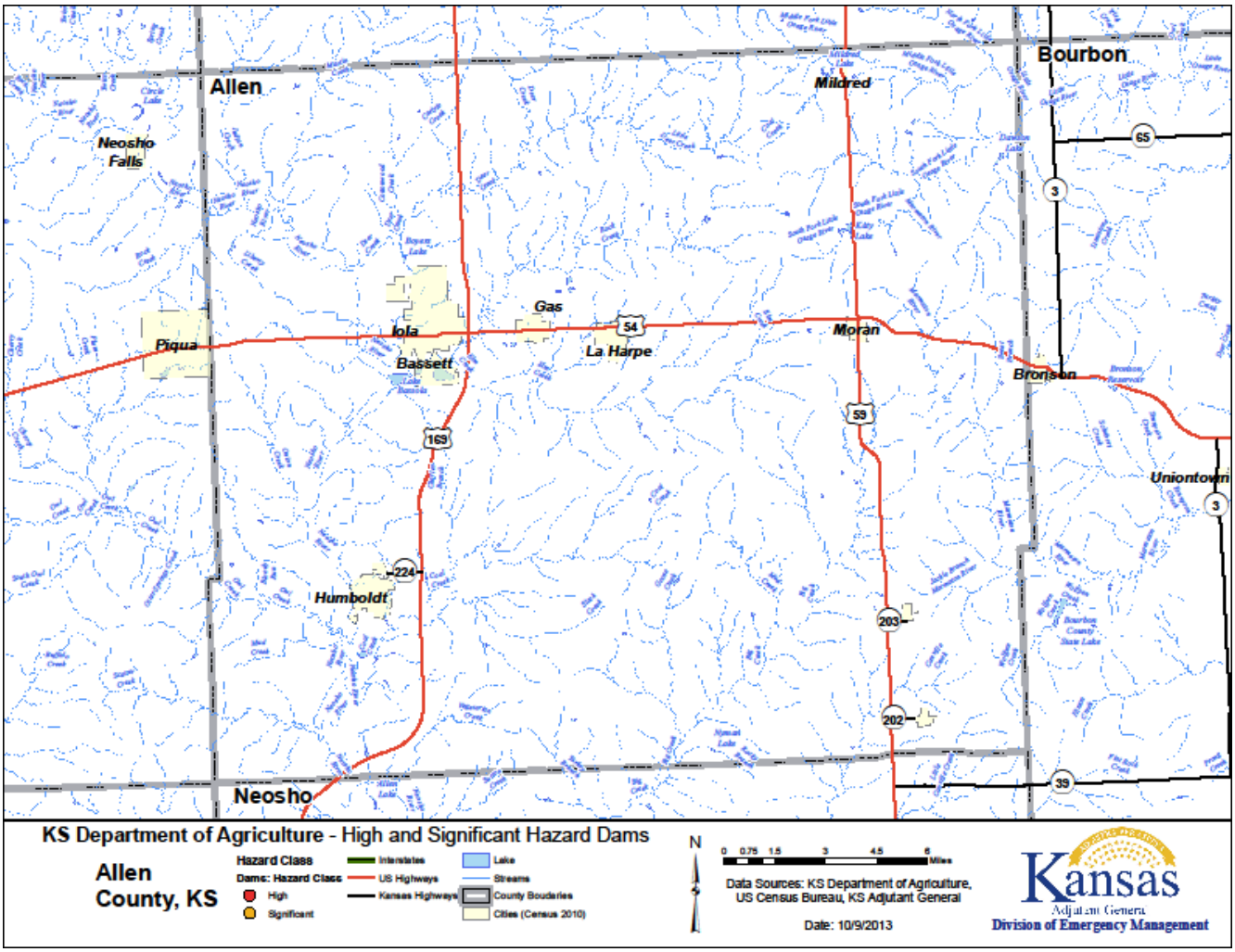
Source: KDA-DWR



The following maps show all identified dams within Kansas Region H with a Significant or High classification.

Kansas Region H Significant and High Hazard Dams




Allen
Bourbon
Neosho Falls
Mildred
Gas
Iola
Bassett
Piqua
La Harpe
Moran
Bronson
Uniontown
Humboldt
Neosho
54
169
224
59
203
202
65
3
39
KS Department of Agriculture - High and Significant Hazard Dams
Allen County, KS
Hazard Class
Dams: Hazard Class
High
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Interstates
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Streams
County Boudaries
Cities (Census 2010)
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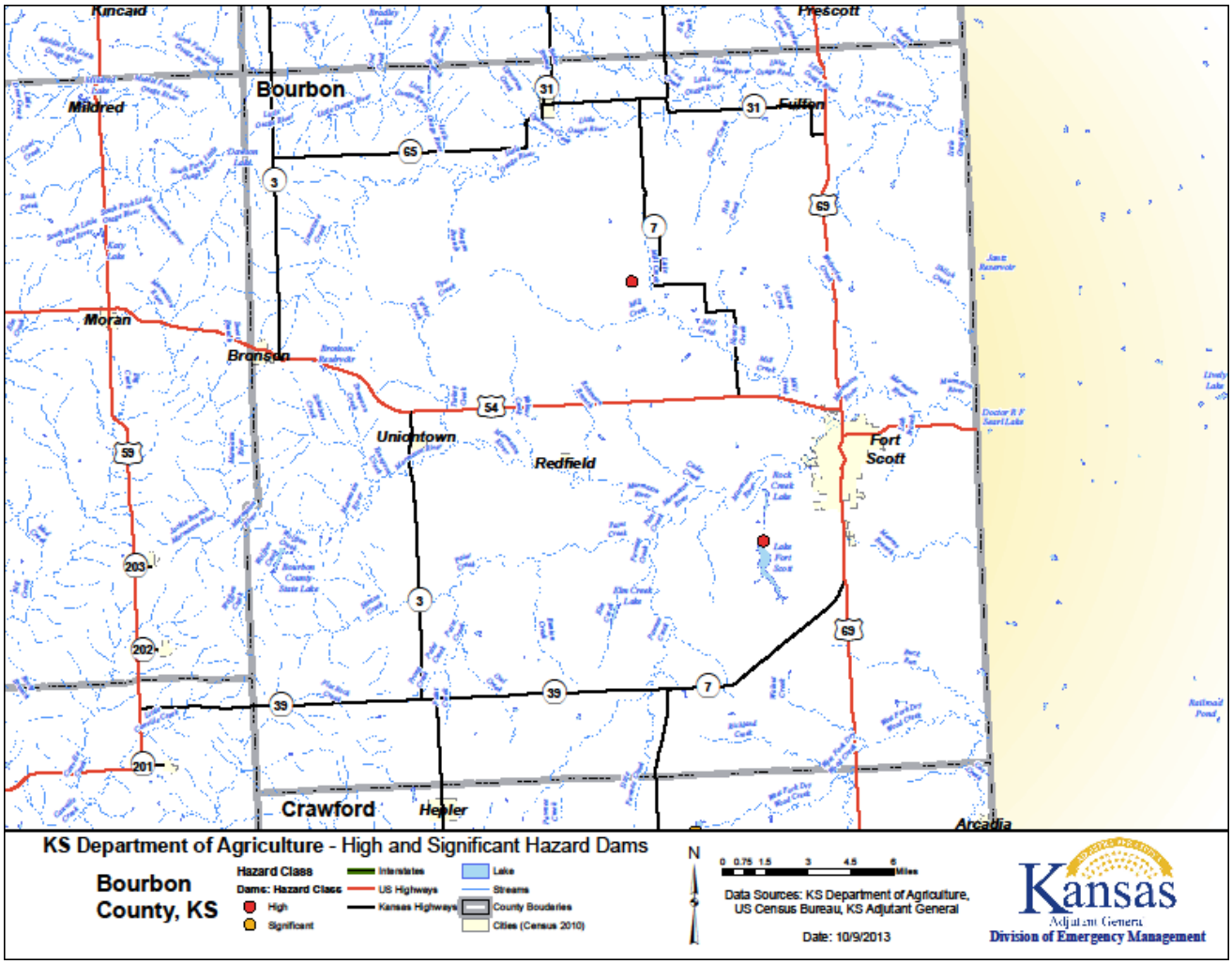
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General
Date: 10/9/2013
Kansas
Adjutant General
Division of Emergency Management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Mildred
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KS Department of Agriculture - High and Significant Hazard Dams
Bourbon County, KS
Hazard Class
Dams: Hazard Class
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Interstates
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Cities (Census 2010)
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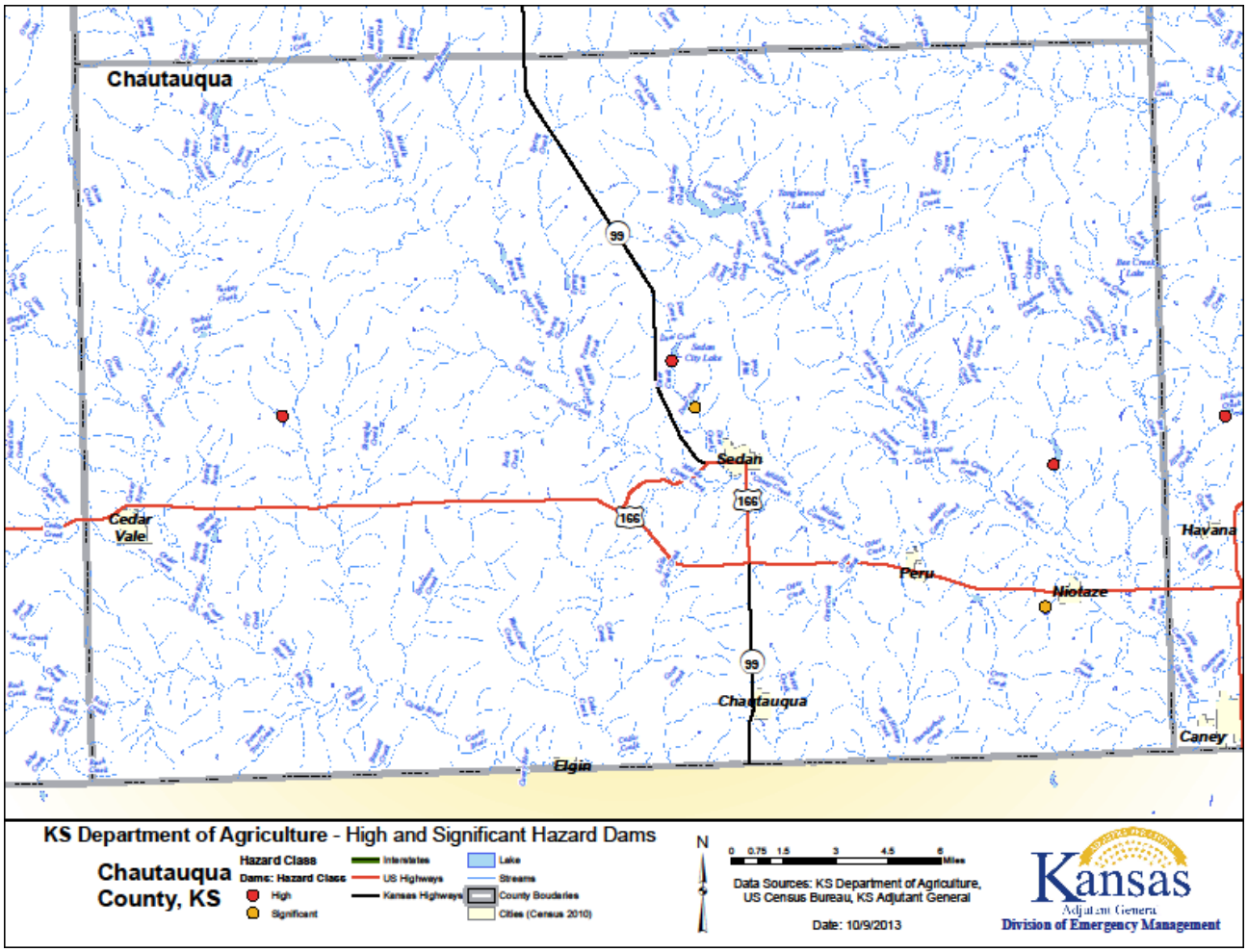
Date: 10/9/2013
Kansas
Adjutant General
Division of Emergency Management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Sedan
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Cedar Vale
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Chautauqua
Caney
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Chautauqua County, KS
Hazard Class
Dams: Hazard Class
High
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Interstates
US Highways
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Streams
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Cities (Census 2010)
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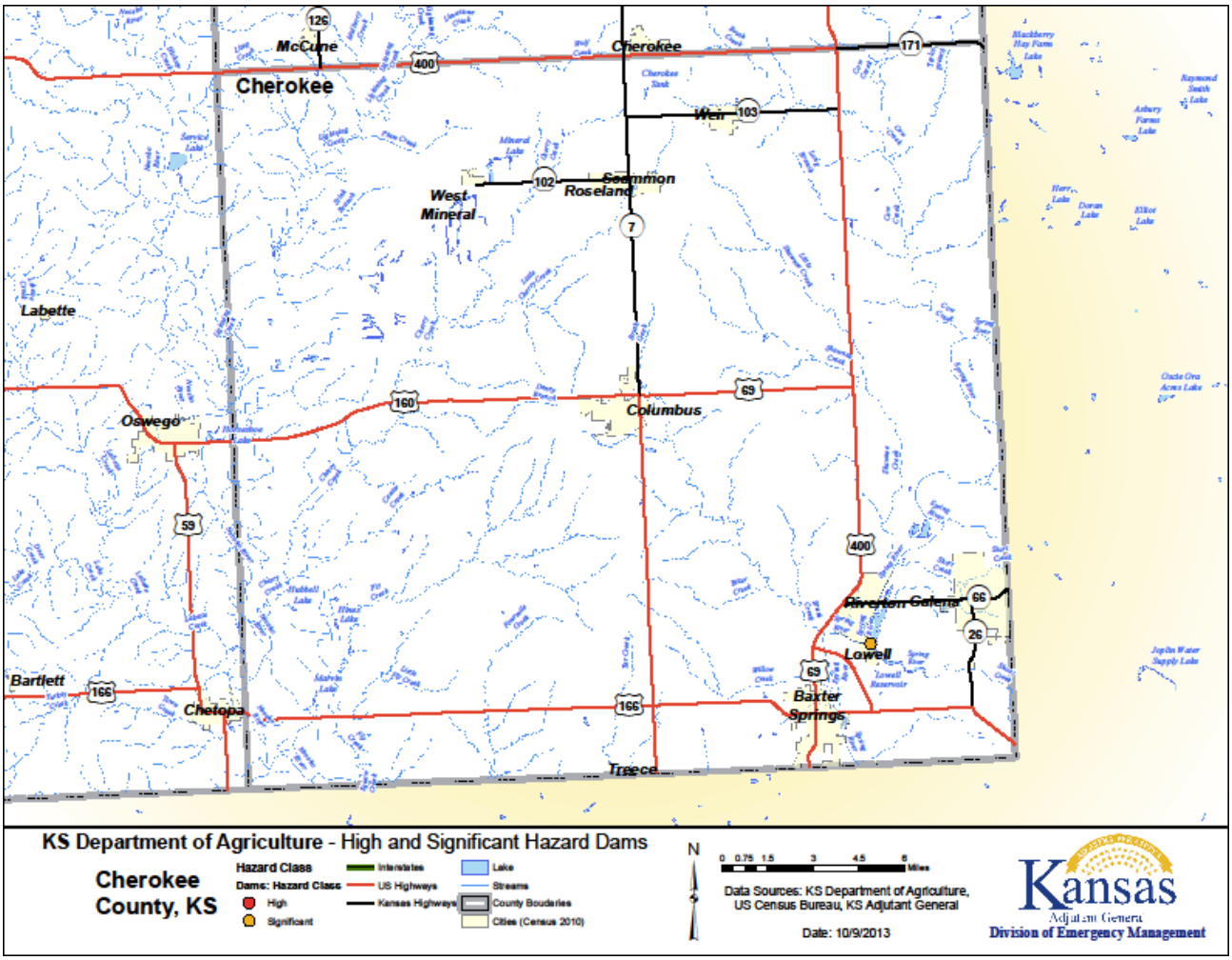
Kansas
Adjutant General
Division of Emergency Management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Bartlett
Chetopa
Treece
KS Department of Agriculture - High and Significant Hazard Dams
Cherokee County, KS
Hazard Class
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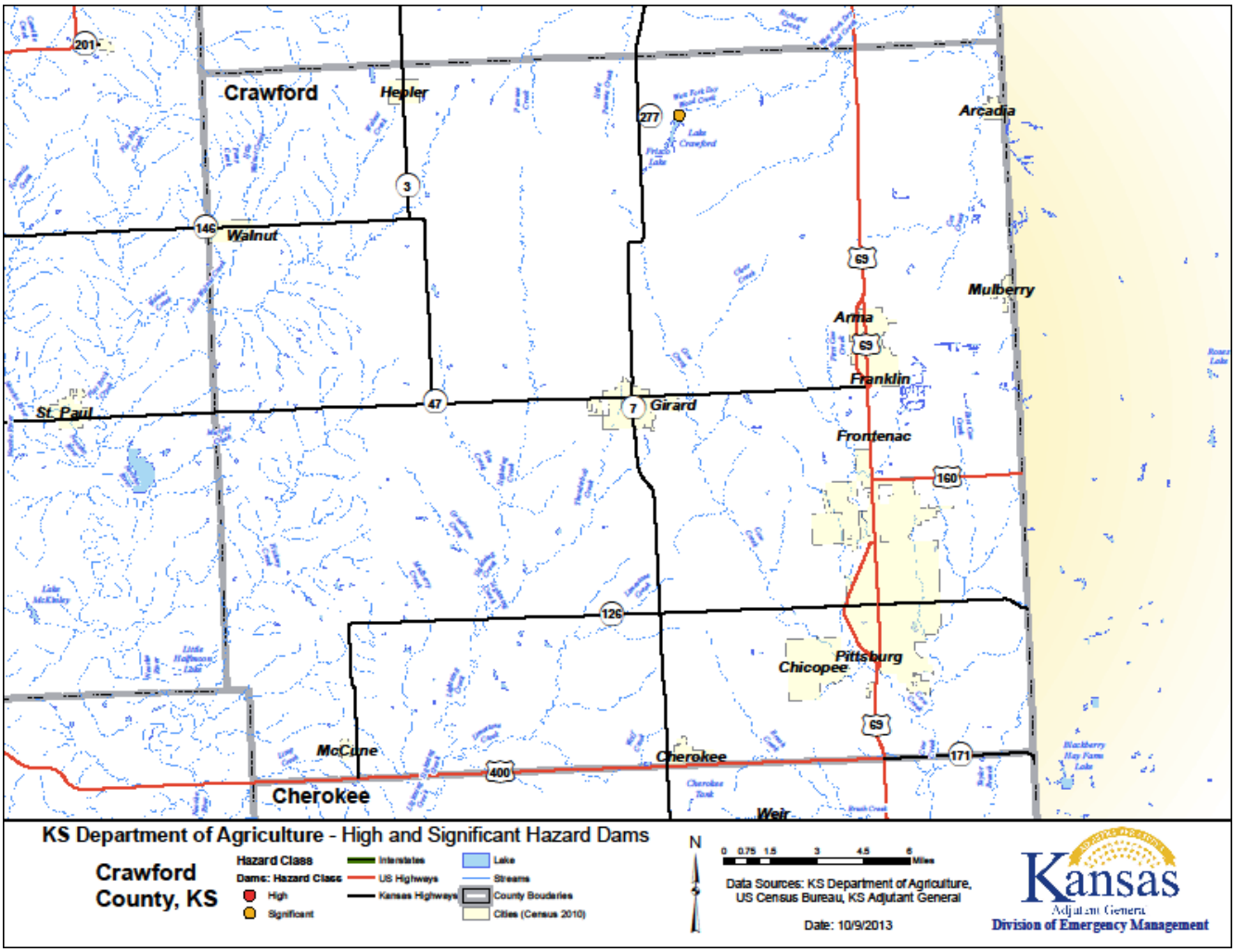
Kansas
Adjutant General
Division of Emergency Management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Cherokee
Weir
KS Department of Agriculture - High and Significant Hazard Dams
Crawford County, KS
Hazard Class
Dams: Hazard Class
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Streams
County Boudaries
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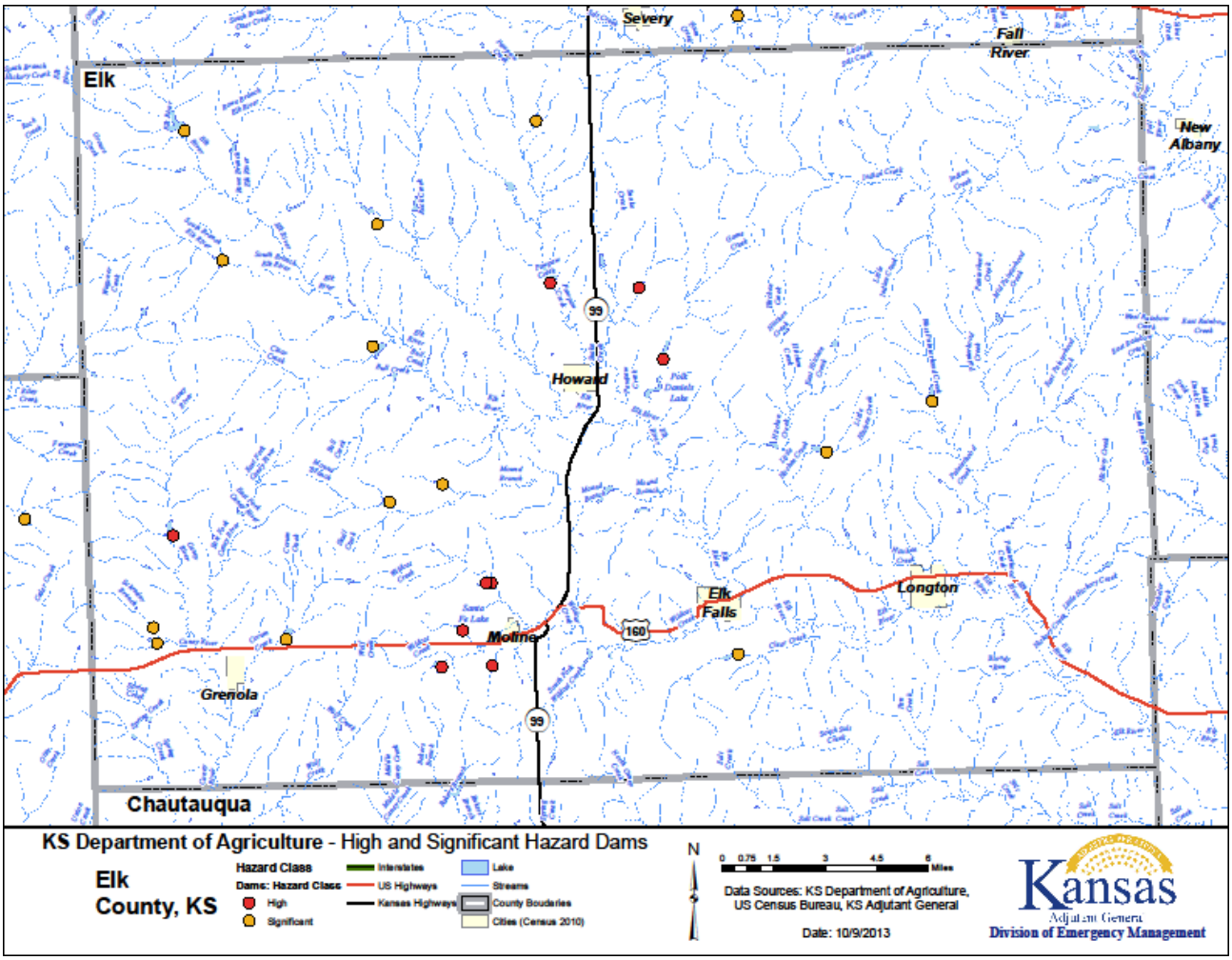
Date: 10/9/2013
Kansas
Adjutant General
Division of Emergency Management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Elk
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Howard
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Longton
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Moline
Grenola
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Chautauqua
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Elk County, KS
Hazard Class
Dams: Hazard Class
High
Significant
Interstates
US Highways
Kansas Highways
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Cities (Census 2010)
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Date: 10/9/2013
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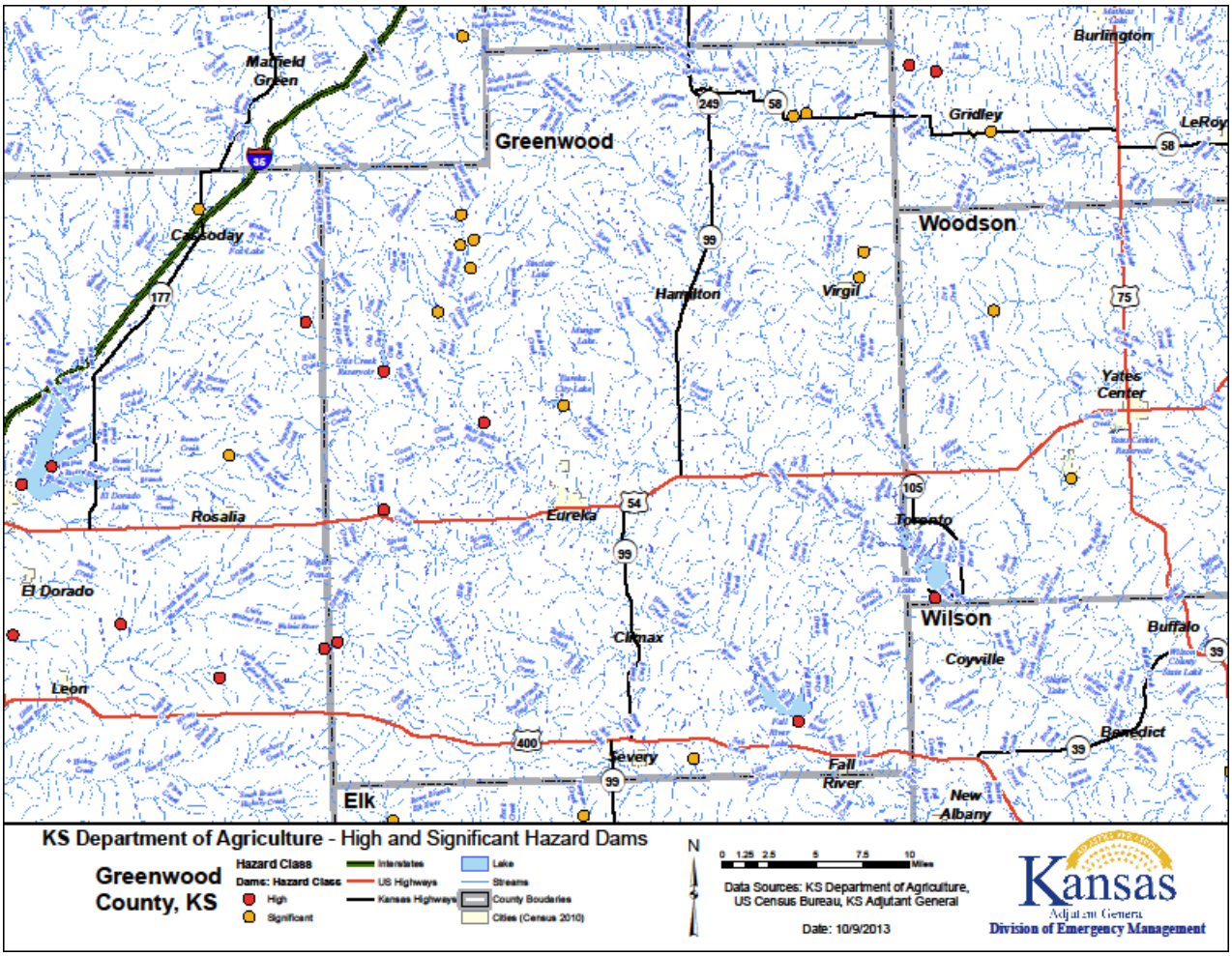
Division of Emergency Management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Burlington
Gridley
LeRoy
Yates Center
Toronto
Virgil
Hamilton
Eureka
Rosalia
El Dorado
Leon
Climax
Coyville
Buffalo
Benedict
Severy
Fall River
New Albany
Matfield Green
Cassoday
KS Department of Agriculture - High and Significant Hazard Dams
Greenwood County, KS
Hazard Class
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County Boudaries
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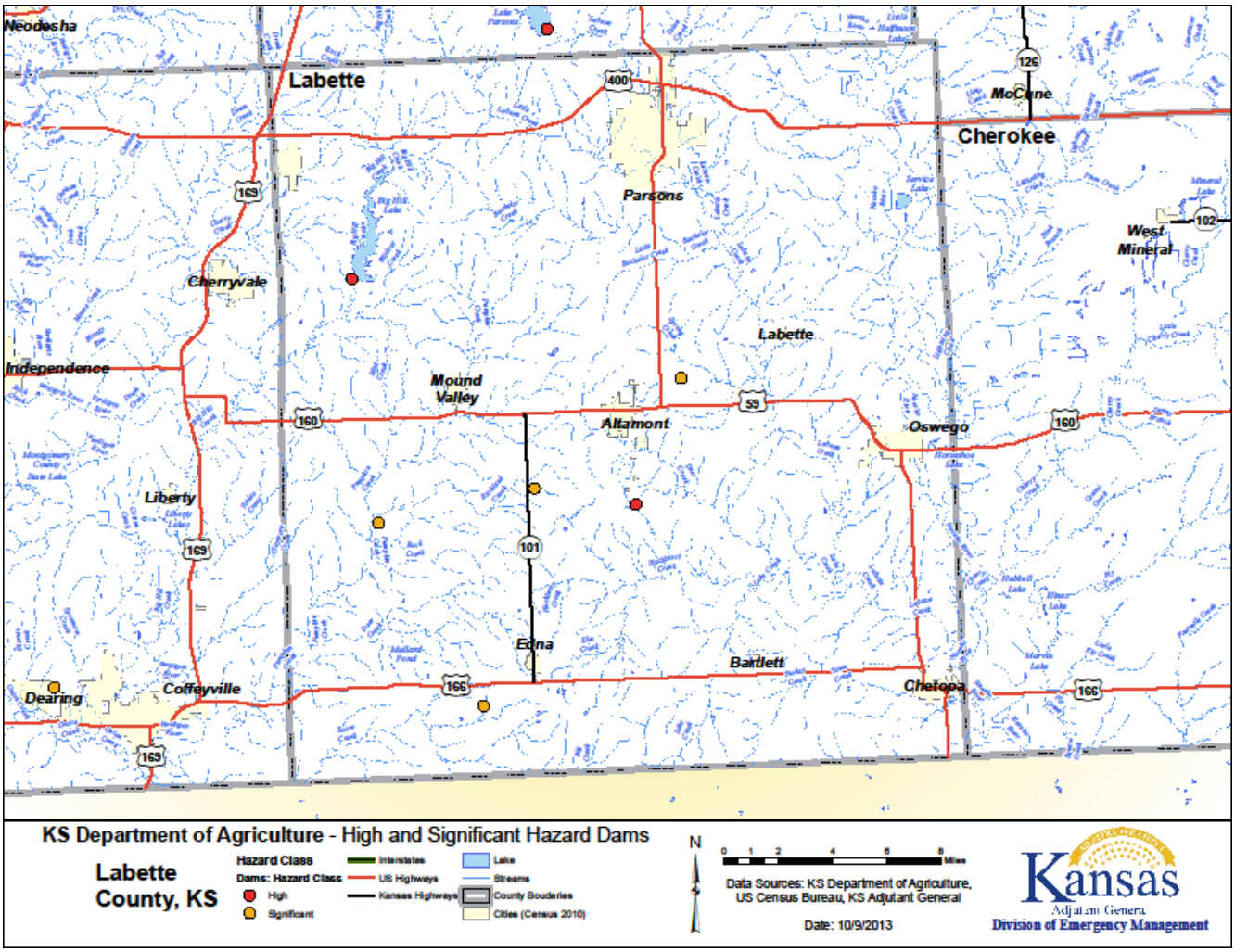
Date: 10/9/2013
Kansas
Adjutant General
Division of Emergency Management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McCune
Cherokee
Parsons
West Mineral
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Cherryvale
Labette
Independence
Mound Valley
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Altamont
Oswego
Liberty
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101
Edna
Bartlett
Chetopa
Dearing
Coffeyville
166
KS Department of Agriculture - High and Significant Hazard Dams
Labette County, KS
Hazard Class
Dams: Hazard Class
High
Significant
Interstates
US Highways
Kansas Highways
Lake
Streams
County Boudaries
Cities (Census 2010)
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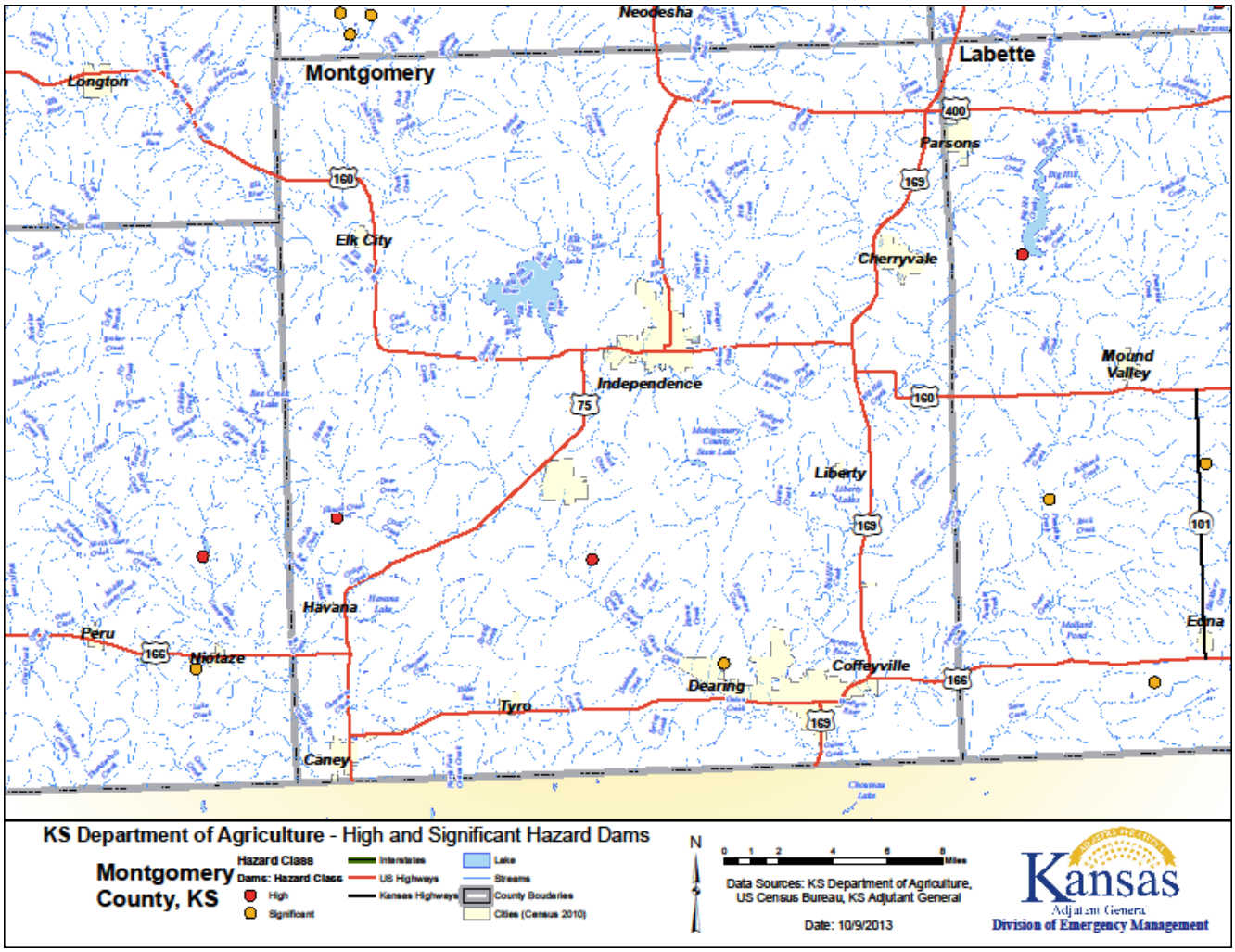
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General
Date: 10/9/2013
Kansas
Adjutant General
Division of Emergency Management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Elk City
Cherryvale
Mound Valley
Independence
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Liberty
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Havana
Peru
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Niotaze
Edna
Coffeyville
Dearing
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Tyro
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Caney
KS Department of Agriculture - High and Significant Hazard Dams
Montgomery County, KS
Hazard Class
Dams: Hazard Class
High
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Interstates
US Highways
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Lake
Streams
County Boudaries
Cities (Census 2010)
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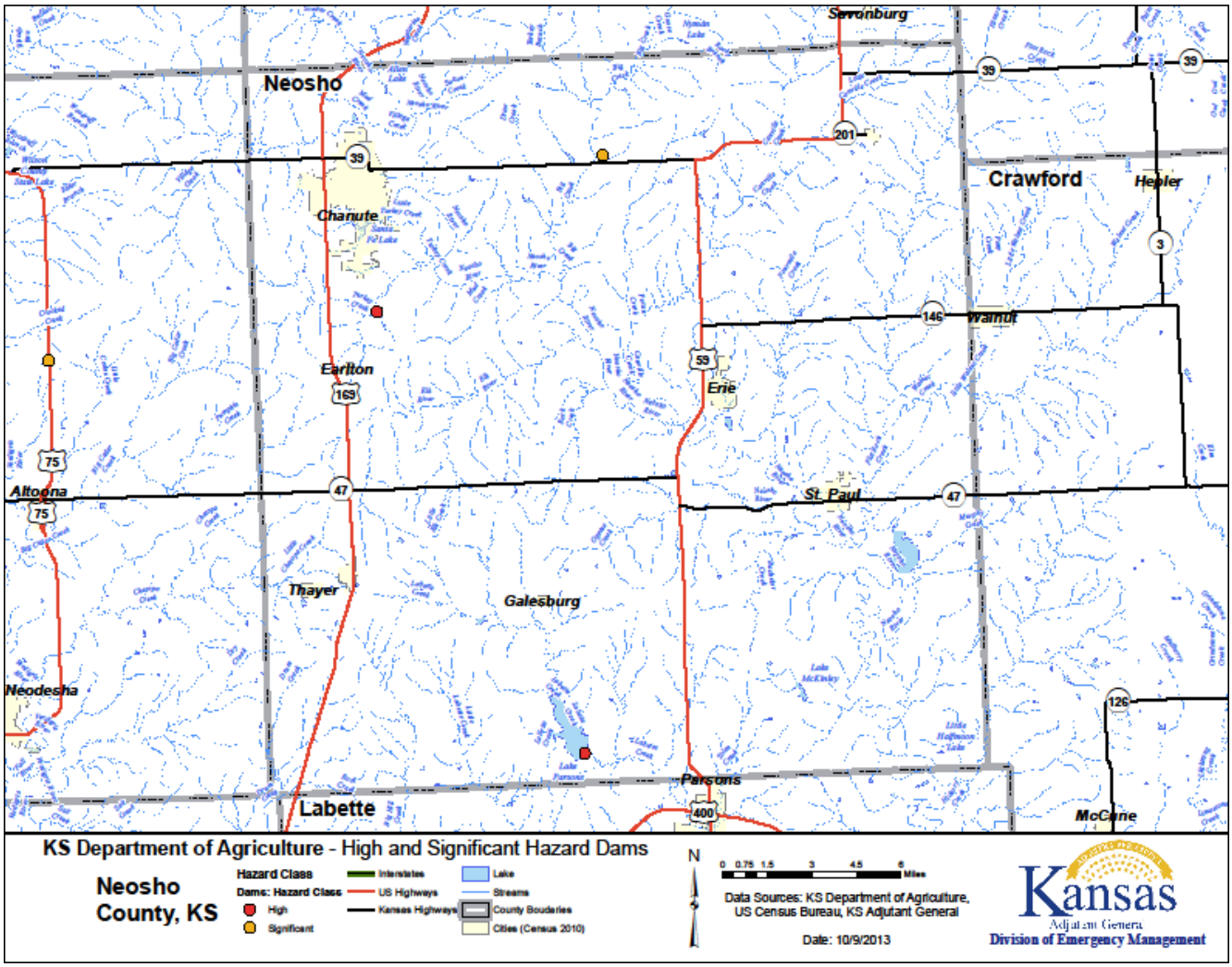
Date: 10/9/2013
Kansas
Adjutant General
Division of Emergency Management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Hepler
Chanute
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Walnut
Earlton
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Erie
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Altoona
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St. Paul
Thayer
Galesburg
Neodesha
126
Lake Parsons
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McCune
KS Department of Agriculture - High and Significant Hazard Dams
Neosho
County, KS
Hazard Class
Dams: Hazard Class
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US Highways
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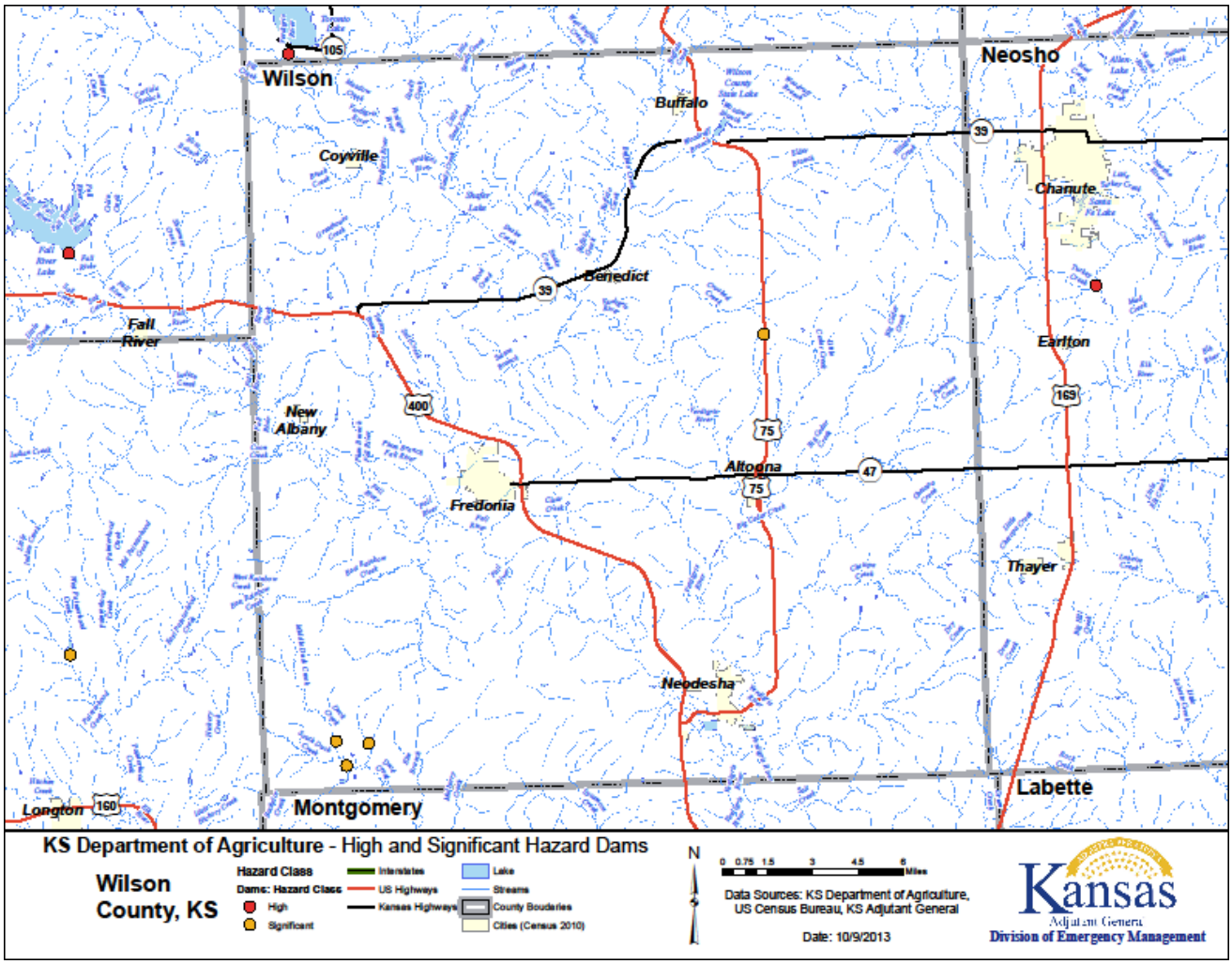
Kansas
Adjutant General
Division of Emergency Management


Wilson
Neosho
Buffalo
Coyville
Chanute
Benedict
Fall River
Earlton
New Albany
Altoona
Fredonia
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Neodesha
Longton
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Labette
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KS Department of Agriculture - High and Significant Hazard Dams
Wilson County, KS
Hazard Class
Dams: Hazard Class
High
Significant
Interstates
US Highways
Kansas Highways
Lake
Streams
County Boudaries
Cities (Census 2010)
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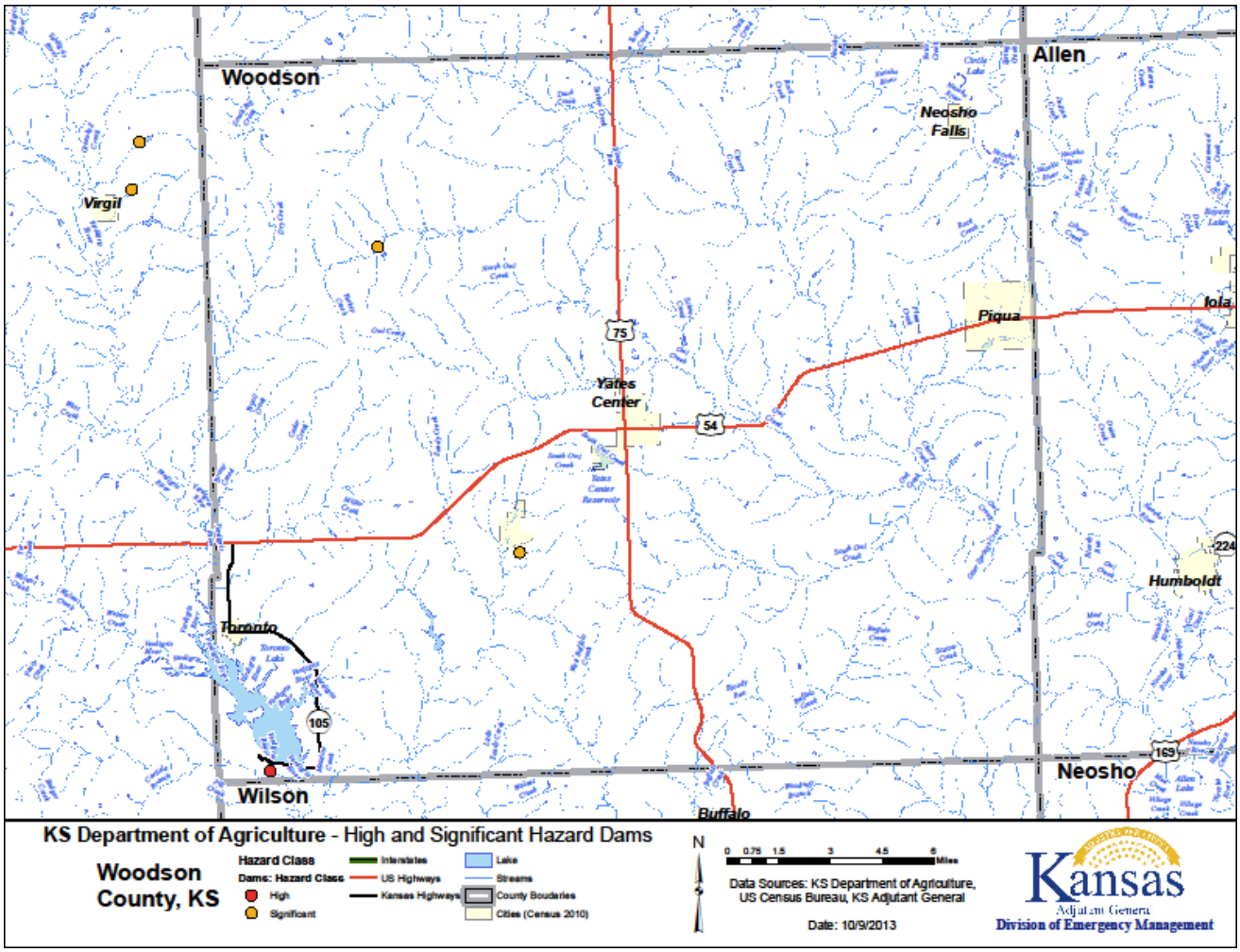
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General
Date: 10/9/2013
Kansas
Adjutant General
Division of Emergency Management



In addition, the KDA-DWR indicates that there are four dams within Kansas Region H that are operated by Federal Government agencies.

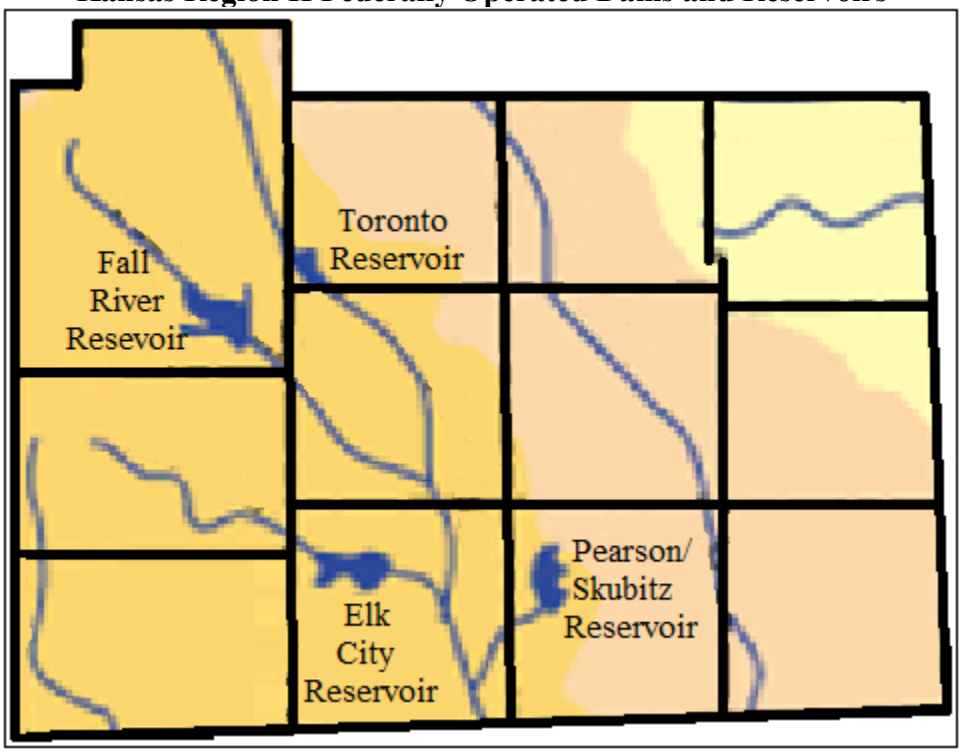
Kansas Region H Federally Operated Dams

County	Federal Reservoir Name	Operating Agency
Greenwood	Fall River	United States Army Corps of Engineers
Labette	Big Hill (Pearson-Skubitz)	United States Army Corps of Engineers
Montgomery	Elk City	United States Army Corps of Engineers
Woodson	Toronto	United States Army Corps of Engineers

Source: KDA-DWR

The following map shows the location of these federally operated dams and reservoirs.

Kansas Region H Federally Operated Dams and Reservoirs



Of additional potential concern are high hazard dams in neighboring regions. These dams, and the relevant county they are in, are as follows:

- Dickinson: Two high hazard dams
- Anderson County: One high hazard dam
- Coffey County One high hazard dam
- Linn: Twelve high hazard dams
- Lyon County: Two high hazard dams

There are also several dams in Jasper, Newton, Barton, Dade, and Lawrence Counties in Missouri that drain to Crawford and/or Cherokee County, Kansas. However, given the size of the dams and their distance upstream of the state line, it is unlikely that failure of any of these dams would have a significant impact in Kansas.

4.8.2 – Levee Location and Extent

As there is no one, comprehensive list of all levees within the region, two sources of data were reviewed to determine a list of all known levees. These sources are:

- The U.S. Army Corps of Engineers (USACE) Integrated National Levee Database (NLD), containing levees enrolled in the USACE National Levee Safety Program (NLSP).
- The FEMA National Levee Inventory Report (NLIR)

According the USACE Integrated NLD, there are 63 levees in the NLSP in Kansas Region H. The following table provides available information on these levees.

Table 4.10: Kansas Region H USACE NLD Levees

County(ies)	Jurisdiction(s)	Name	Waterway	Segments	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Allen	Iola	Iola Levee	Neosho River	2	0.91	0.09	Acceptable	City of Iola
Allen	-	LAL-002	-	1	1.88	0.19	-	-
Allen	Humboldt	LAL-0003	-	1	0.55	0.06	-	-
Allen	Iola	LAL-0004	-	1	0.23	0.17	-	-
Allen	-	LAL-0005	-	1	0.26	0.12	-	-
Chautauqua	Niotaze	LCQ-0007	-	1	1.82	0.48	-	-
Chautauqua	Niotaze	LCQ-0008	-	1	0.40	0.12	-	-
Chautauqua	Niotaze	LCQ-0009	-	1	1.99	0.30	-	-
Cherokee	-	LCK-0031	-	1	0.14	0.05	-	-
Cherokee	-	LCK-0032	-	1	0.19	0.05	-	-
Cherokee, Labette	-	LCK-0034	-	1	0.40	0.11	-	-
Cherokee	-	LCK-0048	-	1	0.51	0.11	-	-
Cherokee, Labette	-	LCK-0006	-	1	0.65	0.10	-	-
Cherokee, Labette	Oswego	LLB-0005	-	1	2.43	1.06	-	-
Elk	-	LEK-0001	-	1	0.95	0.17	-	-
Greenwood	Madison	LGW-001	-	1	0.13	0.01	-	-
Greenwood	Madison	LGW-0012	-	1	0.11	0.02	-	-
Labette	Parsons	Labette Creek Levee	Labette Creek	1	1.00	0.36	-	City of Parsons
Labette	Mound Valley	LLB-0003	-	1	0.25	0.03	-	
Montgomery	Caney	Caney Levee	Little Caney River	1	3.19	1.12	-	USACE
Montgomery	Coffeyville	Coffeyville Levee	Verdigris River	2	2.65	1.01	Minimally Acceptable	City of Coffeyville
Montgomery	Elk City	Elk City Lake-Levee A,B,C	Elk River	3	2.57	0.60	Acceptable	USACE
Montgomery	Independence	Elk City Reservoir Levee	Elk River	1	4.79	9.30	-	USACE
Montgomery	Independence	LMG-0012	-	1	0.52	0.06	-	-
Montgomery	Elk City	LMG-0075	-	1	0.40	0.04	-	-
Neosho	Chanute	Chanute Levee	Neosho River	2	1.19	0.41	-	City of Chanute

Table 4.10: Kansas Region H USACE NLD Levees

County(ies)	Jurisdiction(s)	Name	Waterway	Segments	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Neosho	St. Paul	LNO-0007, LNO-0031, LNO-0071	-	1	0.97	0.09	-	-
Neosho	Erie	LNO-0022	-	1	1.03	0.18	-	-
Neosho	St. Paul	LNO-0026, LNO-0062, LNO-0020	-	1	4.03	0.97	-	-
Neosho	Erie	LNO-0030	-	1	1.06	0.13	-	-
Neosho	Erie	LNO-0033	-	1	2.43	0.43	-	-
Neosho	St. Paul	LNO-0054	-	1	1.98	0.86	-	-
Neosho	Chanute	LNO-0055, LNO-0058	-	1	1.41	0.20	-	-
Neosho	St. Paul	LNO-0059	-	1	1.58	0.44	-	-
Neosho	Erie	LNO-0061	-	1	1.51	0.22	-	-
Neosho	Chanute	LNO-0065	-	1	1.09	0.14	-	-
Neosho	St. Paul	LNO-0068	-	1	0.94	0.16	-	-
Neosho	Chanute	LNO-0074	-	1	0.81	0.14	-	-
Neosho	St. Paul	LNO-0078, LNO-0053	-	1	1.63	0.24	-	-
Neosho	Chanute	Neosho River /Chanute Levee A	Neosho River	1	0.35	0.03	-	City of Chanute
Neosho	Chanute	Neosho River /Chanute Levee B	Neosho River	1	0.18	0.01	-	City of Chanute
Neosho	Chanute	Neosho River /Neosho County Levee	Neosho River	1	0.79	0.17	-	City of Chanute
Wilson	Neodesha	LWL-0009	-	1	0.68	0.20	-	-
Wilson	Neodesha	LWL-0015	-	1	2.44	0.95	-	-
Wilson	Benedict	LWL-0027	-	1	1.34	0.21	-	-
Wilson	Benedict	LWL-0028	-	1	1.01	0.24	-	-
Wilson	New Albany	LWL-0033	-	1	0.54	0.03	-	-
Woodson	Neosho Falls	LWO-0004	-	1	0.23	0.06	-	-
Woodson	Piqua	LWO-0009	-	1	1.14	0.41	-	-
Woodson	Neosho Falls	LWO-0012	-	1	0.37	0.05	-	-
Woodson	Piqua	LWO-0014	-	1	0.60	0.10	-	-
Woodson	Piqua	LWO-0015	-	1	0.72	0.30	-	-
Woodson	Piqua	LWO-0019	-	1	0.08	0.01	-	-
Woodson	Piqua	LWO-0028	-	1	0.14	0.02	-	-

Table 4.10: Kansas Region H USACE NLD Levees

County(ies)	Jurisdiction(s)	Name	Waterway	Segments	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Woodson	Yates Center	LWO-0029	-	1	0.26	0.10	-	-

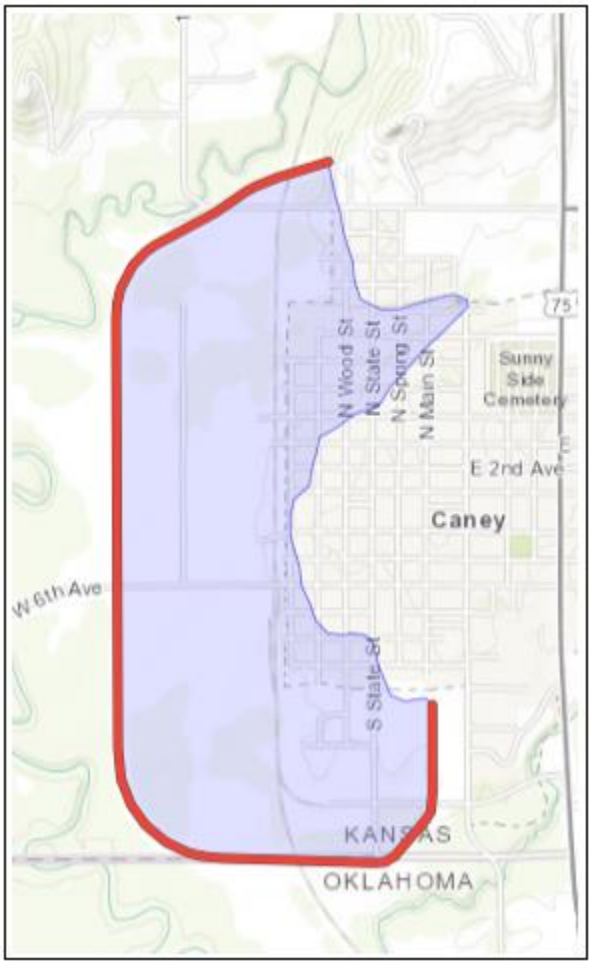
Source: USACE
-: Data not available

The following maps detail select individual levees. Additional, both the county and jurisdiction for the levee are noted in parenthesis.

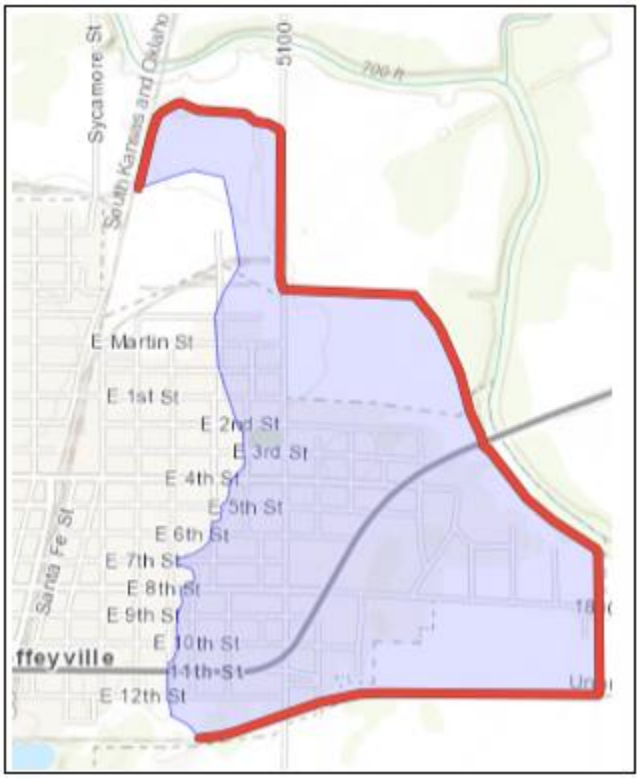
Iola Levee (Iola, Allen County)

Labette Creek Levee (Parsons, Labette County)

Caney Levee (Caney, Montgomery County)

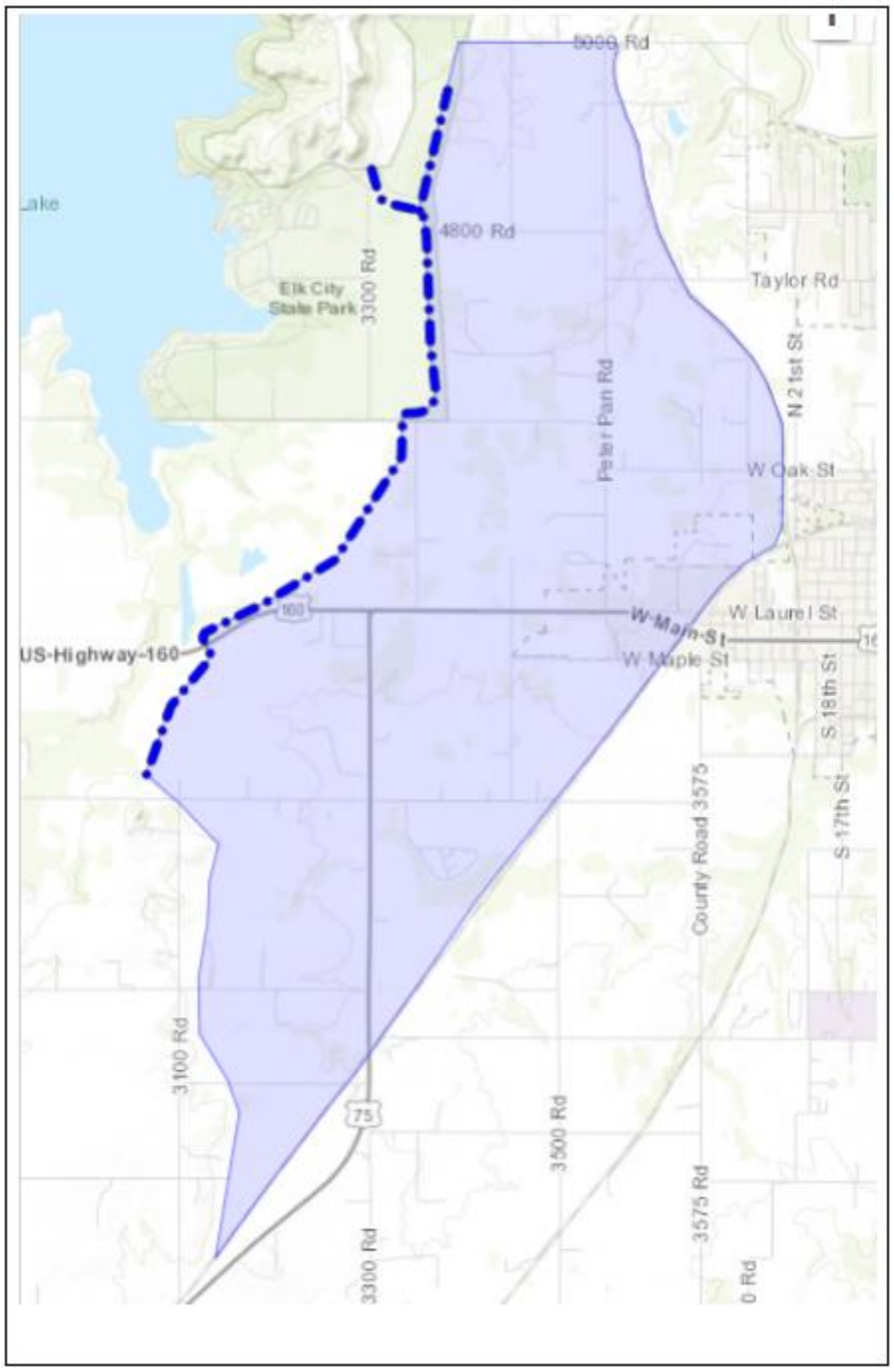


Coffeyville Levee (Coffeyville, Montgomery County)



Elk City Lake Levee (Elk City, Montgomery County)

Elk City Reservoir Levee (Elk City, Montgomery County)



LNO-0012 Levee (Independence, Montgomery County)

LNO-0065 Levee (Chanute, Neosho County)

4.8.3 – Previous Occurrences

Kansas Region H has been fortunate enough to not have any catastrophic dam failures. Additionally, there have been no reported dam failures for the region for the 20-year period, from 1999-2018.

One levee failure has been recorded for the region for the 20-year period of 1999-2018, as follows:

- **2007:** During the night of June 30, 2007, the Verdigris River overflowed the levee around Coffeyville, Kansas. River levels rose rapidly and exceeded the height of the levee by 3.9 feet. As a result of this overtopping, flood waters entered the Coffeyville Refinery and caused a release of approximately 90,000 gallons of crude oil.

4.8.4 – Hazard Probability Analysis

Due to the variability of the size and construction of the dams in Region H, estimating the probability of dam failure is difficult on any scale greater than a case-by-case basis. Historically, the limited available data indicates there have been no reported dam failure events in Kansas Region H over a 20-year period. Using the binomial probability equation (number of years with an event divided by total number of years in reporting period) we derive a zero probability of a dam failure in a given year. However, it is worth noting there is not a zero percent probability of an event occurrence due to the tremendous number of potential variables involved.

Historically, the limited available data indicates there has been one reported levee failure event in Kansas Region H over a 20-year period. Using the binomial probability equation, we derive a probability of 0% for a levee failure in a given year. However, because past non-occurrence does not guarantee future non-occurrence, both federal and nonfederal levees may be damaged in future catastrophic regional flood events.

4.8.5 – Vulnerability Assessment, Dams

Following the metric established in the State of Kansas 2018 Hazard Mitigation Plan, an analysis of vulnerability to dam failure was completed by points being assigned to each type of dam and then aggregated for a total point score for each county. This analysis does not intend to demonstrate vulnerability in terms dam structures that are likely to fail, but rather provides a general overview of the counties that have a high number of dams, with weighted consideration given to dams whose failure would result in greater damages. Points were assigned as follows:

- Low Hazard Dams: 1 point
- Significant Hazard Dams: 2 point
- High Hazard Dams: 3 points
- High Hazard Dams without an EAP: 2 points

- Federal Reservoir Dams: 3 points.

Based on these categories, an awarded point total was determined for each participating county and a vulnerability rating assigned based on the following schedule.

Table 4.11: Dam Vulnerability Rating Schedule

	Low	Medium-Low	Medium	Medium-High	High
Awarded Point Range	0 – 26	27 – 50	51 – 100	101 – 200	201 - 327

The following table presents the dam failure vulnerability rating for each Kansas Region H participating county.

Table 4.12: Kansas Region H County Vulnerability Assessment for Dam Failure

County	Low Hazard Dams	Significant Hazard Dams	High Hazard Dams	High Hazard Dams Without EAP	Federal Reservoirs	Vulnerability Rating	Vulnerability Level
Allen	18	0	0	0		18	Low
Bourbon	69	4	4	0		89	Medium
Chautauqua	70	1	3	0		81	Medium
Cherokee	6	0	0	0		6	Low
Crawford	34	2	1	0		41	Medium-Low
Elk	75	6	3	2		100	Medium
Greenwood	118	8	3	0	1	146	Medium-High
Labette	41	1	0	0	2	49	Medium-Low
Montgomery	31	0	2	1	1	42	Medium-Low
Neosho	43	1	1	0		48	Medium-Low
Wilson	32	0	1	0		35	Medium-Low
Woodson	33	1	0	0	1	38	Medium-Low

Source: Analysis by KDEM utilizing data from: Kansas Department of Agriculture, Division of Water Resources, Water Structures program; U.S. Army Corps of Engineers; Bureau of Reclamation; U.S. Army, U.S. Fish and Wildlife.

In general counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to dam failure events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.13: Kansas Region H Population Vulnerability Data for Dam Failure

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%

Table 4.13: Kansas Region H Population Vulnerability Data for Dam Failure

County	2017 Population	Percent Population Change 2000 to 2017
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

4.8.6 – Vulnerability Assessment, Levees

Data was obtained from the USACE NLD to help determine the vulnerability of participating jurisdictions to potential levee failure. Available data includes:

- Number of people at risk
- Structures at risk
- Property value for structures at risk
- Levee safety action risk classification

Additionally, for the NFIP, FEMA will only recognize a levee system in its flood risk mapping effort that meet minimum design, operation, and maintenance standards as established by 44 CFR 65.10 – Mapping of Areas Protected by Levee Systems. In general, evaluated levees are assigned to one of these categories:

- **Accredited Levee:** Area behind the levee is mapped as a moderate-risk, with no mandatory flood insurance requirement.
- **To Be Accredited:** A levee system that has been approved for accreditation.
- **Provisionally Accredited Levee (PAL):** Area behind the levee is mapped as a moderate-risk, with no mandatory flood insurance requirement, for a two-year grace period while compliance with 44 CFR 65.10 is sought
- **Non-Accredited Levee:** Area behind the levee is mapped according to FEMA protocols, likely resulting in a high-risk area designation and associate flood insurance requirements
- **To Be Non-Accredited:** A levee system that no longer meets the requirements stipulated in 44 CFR 65.10 and is scheduled to lose accredited status

Additionally, some levees are classified by the Levee Safety Action Risk Classification. Descriptions of these classifications are as follows:

- **Very High (1):** Based on risk drivers, take immediate action to implement interim risk reduction measures. Increase frequency of levee monitoring, communicate risk characteristics to the community within an expedited timeframe; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning systems and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as very high priority.

Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in very high risk.

- **High (2):** Based on risk drivers, implement interim risk reduction measures. Increase frequency of levee monitoring; communicate risk characteristics to the community within an expedited timeframe; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as high priority. Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in high risk.
- **Moderate (3):** Based on risk drivers, implement interim risk reduction measures as appropriate. Verify risk information is current and implement routine monitoring program; assure O&M is up to date; communicate risk characteristics to the community in a timely manner; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as a priority. Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in moderate risk.
- **Low (4):** Verify risk information is current and implement routine monitoring program and interim risk reduction measures if appropriate; assure O&M is up to date; communicate risk characteristics to the community as appropriate; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions to further reduce risk to as low as practicable. Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in low risk.
- **Very Low (5):** Continue to implement routine levee monitoring program, including operation and maintenance, inspections, and monitoring of risk. Communicate risk characteristics to the community as appropriate; verify emergency plans and flood inundation maps are current; ensure community is aware of flood warning and evacuation procedures; and recommend purchase of flood insurance. Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in very low risk.

The following table presents the above information for each vulnerable jurisdiction.

Table 4.14: Kansas Region H Levee Failure Vulnerability Data

County(ies)	Jurisdiction	Name	People at Risk	Structures at Risk	Property Value	Levee Safety Action Risk Classification	Levee System Status on Effective FIRM
Allen	Iola	Iola Levee	12	12	$7,490,000	Low	Non-Accredited
Allen	Piqua	LAL-002	0	0	$0	Not Screened	-
Allen	Humboldt	LAL-0003	0	0	$0	Not Screened	-
Allen	Iola	LAL-0004	0	0	$0	Not Screened	-
Allen	Piqua	LAL-0005	0	0	$0	Not Screened	-
Chautauqua	Niotaze	LCQ-0007	0	0	$0	Not Screened	-
Chautauqua	Niotaze	LCQ-0008	0	0	$0	Not Screened	-

Table 4.14: Kansas Region H Levee Failure Vulnerability Data

County(ies)	Jurisdiction	Name	People at Risk	Structures at Risk	Property Value	Levee Safety Action Risk Classification	Levee System Status on Effective FIRM
Chautauqua	Niotaze	LCQ-0009	0	0	$0	Not Screened	-
Cherokee	-	LCK-0031	0	0	$0	Not Screened	-
Cherokee	-	LCK-0032	0	0	$0	Not Screened	-
Cherokee, Labette	-	LCK-0034	0	0	$0	Not Screened	-
Cherokee	-	LCK-0048	0	0	$0	Not Screened	-
Cherokee, Labette	-	LCK-0006	0	0	$0	Not Screened	-
Cherokee, Labette	Oswego	LLB-0005	5	3	$720,000	Not Screened	-
Elk	-	LEK-0001	1	1	$240,000	Not Screened	-
Greenwood	Madison	LGW-001	0	0	$0	Not Screened	-
Greenwood	Madison	LGW-0012	0	0	$0	Not Screened	-
Labette	Parsons	Labette Creek Levee	360	211	$56,500,000	Not Screened	Non-Accredited
Labette	Mound Valley	LLB-0003	0	0	$0	Not Screened	-
Montgomery	Caney	Caney Levee	493	193	$94,400,000	Not Screened	Non-Accredited
Montgomery	Coffeyville	Coffeyville Levee	173	67	$92,400,000	Not Screened	Accredited
Montgomery	Elk City	Elk City Lake-Levee A, B, C	333	186	$40,700,000	Not Screened	Accredited
Montgomery	Independence	Elk City Reservoir Levee	968	165	$87,300,000	Not Screened	Accredited
Montgomery	Independence	LMG-0012	14	5	$2,190,000	Not Screened	-
Montgomery	Elk City	LMG-0075	0	0	$0	Not Screened	-
Neosho	Chanute	CHANUTE LEVEE	0	2	$820,000	Not Screened	Non-Accredited
Neosho	St. Paul	LNO-0007, LNO-0031, LNO-0071	0	0	$0	Not Screened	-
Neosho	Erie	LNO-0022	2	1	$350,000	Not Screened	-
Neosho	St. Paul	LNO-0026, LNO-0062, LNO-0020	0	1	$351,000	Not Screened	-
Neosho	Erie	LNO-0030	0	0	$0	Not Screened	-
Neosho	Erie	LNO-0033	7	3	$540,000	Not Screened	-
Neosho	St. Paul	LNO-0054	0	3	$703,000	Not Screened	-
Neosho	Chanute	LNO-0055, LNO-0058	0	0	$0	Not Screened	-
Neosho	St. Paul	LNO-0059	0	0	$0	Not Screened	-
Neosho	Erie	LNO-0061	0	1	$440,000	Not Screened	-
Neosho	Chanute	LNO-0065	18	9	$2,110,000	Not Screened	-
Neosho	St. Paul	LNO-0068	0	0	$0	Not Screened	-

Table 4.14: Kansas Region H Levee Failure Vulnerability Data

County(ies)	Jurisdiction	Name	People at Risk	Structures at Risk	Property Value	Levee Safety Action Risk Classification	Levee System Status on Effective FIRM
Neosho	Chanute	LNO-0074	0	0	$0	Not Screened	-
Neosho	St. Paul	LNO-0078, LNO-0053	0	0	$0	Not Screened	-
Neosho	Chanute	Neosho River/ Chanute Levee A	0	0	$0	Not Screened	-
Neosho	Chanute	Neosho River/ Chanute Levee B	4	2	$1,100,000	Not Screened	Non-Accredited
Neosho	Chanute	Neosho River/ Neosho Countty Levee	0	0	$0	Not Screened	Non-Accredited
Wilson	Neodesha	LWL-0009	0	0	$0	Not Screened	Non-Accredited
Wilson	Neodesha	LWL-0015	5	3	$773,000	Not Screened	-
Wilson	Benedict	LWL-0027	0	0	$0	Not Screened	-
Wilson	Benedict	LWL-0028	0	0	$0	Not Screened	-
Wilson	New Albany	LWL-0033	2	1	$351,000	Not Screened	-
Woodson	Neosho Falls	LWO-0004	0	0	$	Not Screened	-
Woodson	Piqua	LWO-0009	2	1	$71,000	Not Screened	-
Woodson	Neosho Falls	LWO-0012	0	0	$	Not Screened	-
Woodson	Piqua	LWO-0014	0	0	$	Not Screened	-
Woodson	Piqua	LWO-0015	0	0	$	Not Screened	-
Woodson	Piqua	LWO-0019	0	0	$	Not Screened	-
Woodson	Piqua	LWO-0028	0	0	$	Not Screened	-
Woodson	Yates Center	LWO-0029	1	1	$240,000	Not Screened	-

Source: USACE NLD
-: No data available

The following table indicates the total number of county structures and the associated percentage of the total number of county structures, and the total population and associated percentage of the total county population identified as at risk to levee failure.

Table 4.15: Kansas Region H Vulnerability Data for Levee Failure

County	Structures Identified as at Risk to Levee Failure	Percentage of Structures Identified at Risk	Population Identified as at Risk to Levee Failure	Percentage of Population Identified at Risk
Allen	12	0.2%	12	0.1%
Bourbon	0	0.0%	0	0.0%
Chautauqua	0	0.0%	0	0.0%
Cherokee	3	0.0%	5	0.0%
Crawford	0	0.0%	0	0.0%
Elk	1	0.1%	1	0.0%
Greenwood	0	0.0%	0	0.0%

Table 4.15: Kansas Region H Vulnerability Data for Levee Failure

County	Structures Identified as at Risk to Levee Failure	Percentage of Structures Identified at Risk	Population Identified as at Risk to Levee Failure	Percentage of Population Identified at Risk
Labette	211	2.1%	360	1.8%
Montgomery	616	3.7%	1,981	1.8%
Neosho	22	0.3%	31	0.2%
Wilson	4	0.1%	7	0.0%
Woodson	2	0.1%	3	0.0%

Source: US Census Bureau and FEMA

4.8.7 – Impact and Consequence Analysis

As per EMAP standards, the information in the following table provides the Consequence Analysis.

Table 4.16: Dam and Levee Failure Consequence Analysis

Subject	Impacts of Dam and Levee Failure
Health and Safety of the Public	In areas of inundation, the impact to the public is expected to be severe. Impacts to the public in adjacent or minimally impacted areas is expected to be minimal to moderate.
Health and Safety of Responders	Impact to responders is expected to be minimal with proper training. Impact could be severe if there is lack of training.
Continuity of Operations	Temporary relocation may be necessary if facilities or infrastructure is damaged.
Property, Facilities, and Infrastructure	In areas of inundation, impacts could be severe to facilities and infrastructure. .
Environment	In areas of inundation, impact to the environment are expected to be severe. Impact will lessen as distance increases.
Economic Conditions	In areas of inundation, impacts to the economy will depend on the scope of the inundation and the time it takes for the water to recede.
Public Confidence in the Jurisdiction's Governance	Perception of whether the failure could have been prevented, warning time, and response and recovery time will greatly impact the public's confidence.

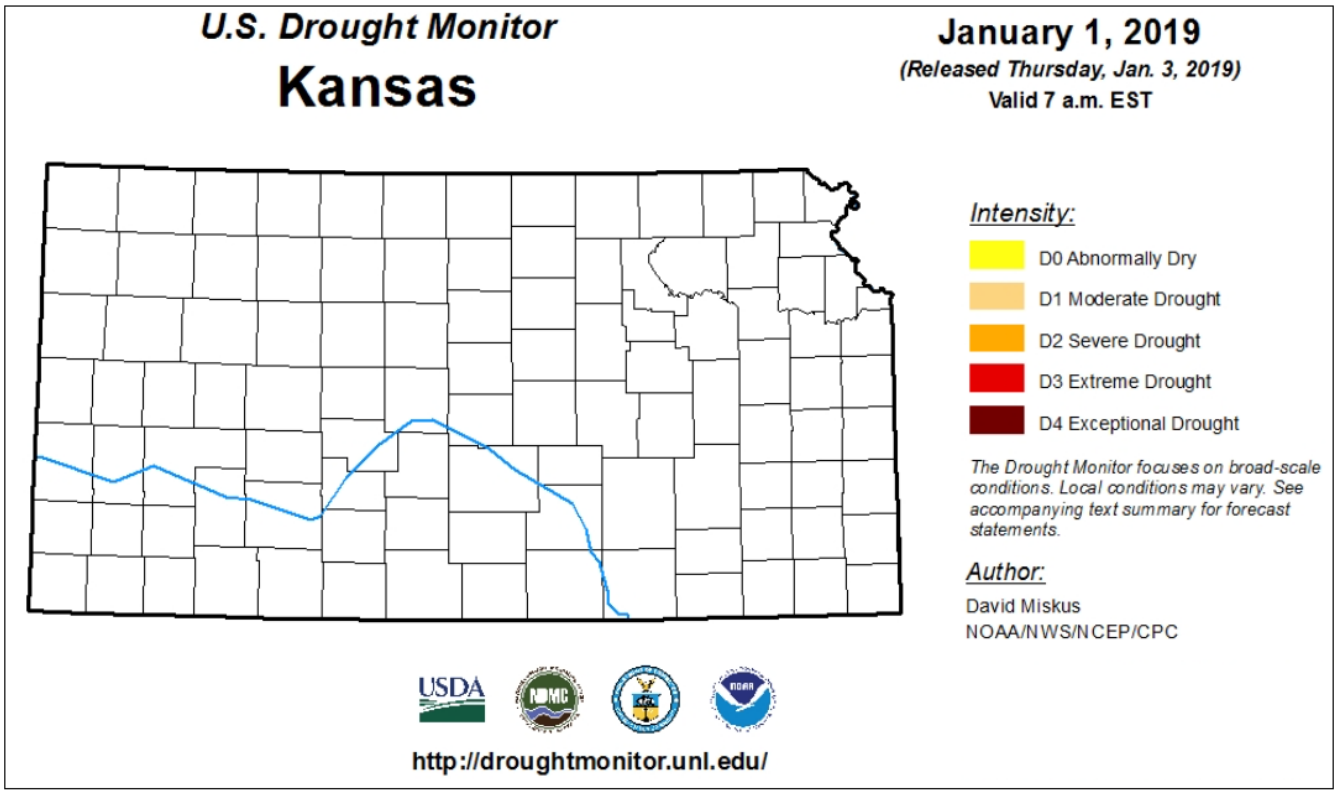
4.9 – Drought

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

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

4.9.1 – Location and Extent

While all of Kansas Region H is vulnerable to drought, it is most disastrous in the rural areas where the majority of agricultural businesses are located. The most commonly used drought index to determine the onset and the severity of a drought is the Palmer Drought Severity Index. The map below indicates the drought conditions for Kansas Region H through January 1, 2019.



4.9.2 – Previous Occurrences

One of the best indicators of historic drought periods is provided by the U.S. Drought Monitor, which lists weekly drought conditions for the State of Kansas. The following table details the U.S. Drought Monitor categories.

Table 4.17: U.S. Drought Monitor Categories

Rating	Described Condition
None	No drought conditions
D0	Abnormally Dry
D1	Moderate Drought
D2	Severe Drought
D3	Extreme Drought
D4	Exceptional Drought

Source: U.S. Drought Monitor

Historical data was gathered from the U.S. Drought Monitor weekly reports from the 10-year period 2009 through 2018 (data set includes full years for 2009 and 2018). This data was compiled and aggregated to provide a yearly estimate of the percentage of the year Kansas Region H was in each Drought Monitor category.

Table 4.18: Percentage of Kansas Region H in U.S. Drought Monitor Category, 2009-2018

Year	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2018	31.0%	69.0%	41.1%	21.6%	0.0%	0.0%
2017	57.1%	42.9%	6.7%	0.0%	0.0%	0.0%
2016	87.3%	12.7%	3.8%	0.0%	0.0%	0.0%
2015	51.9%	48.1%	19.7%	0.0%	0.0%	0.0%
2014	23.1%	76.9%	61.0%	0.2%	0.0%	0.0%
2013	33.7%	66.3%	57.7%	42.3%	13.9%	0.0%
2012	19.8%	80.2%	74.4%	50.1%	35.9%	10.9%
2011	5.1%	94.9%	61.8%	36.6%	11.4%	0.0%
2010	94.2%	5.8%	3.8%	0.0%	0.0%	0.0%
2009	98.1%	0.0%	0.0%	0.0%	0.0%	0.0%

Source: U.S. Drought Monitor

Another good indicator of historical droughts is USDA Disaster Declarations. The following table details USDA Drought Declarations during the five-year period 2014 through 2018 (with 2014 and 2018 being full data set years) for Kansas Region H.

Table 4.19: Kansas Region H Secretarial Drought Declarations, 2013 - 2018

Year	Number of Secretarial Drought Disaster Declarations
2018	10
2017	3
2016	0
2015	3
2014	9

Source: USDA

Crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of drought on the Region's agricultural base. Crop loss data for the five-year period of 2014- 2018, for the region, indicates 436 drought related claims on 129,779 acres for $8,982,653

Table 4.20: Kansas Region H USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Drought

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	31	3,724	$116,829
Bourbon	24	4,608	$430,859
Chautauqua	28	2,287	$137,777
Cherokee	34	18,557	$1,262,937
Crawford	37	15,980	$966,692
Elk	34	3,951	$261,053
Greenwood	44	6,362	$465,268
Labette	46	30,912	$2,621,472
Montgomery	42	11,478	$705,195
Neosho	38	6,170	$295,758
Wilson	42	16,222	$1,168,748
Woodson	36	9,528	$550,065

Source: USDA

4.9.3 – Hazard Probability Analysis

Reviewing historical data from the U.S. Drought Monitor weekly reports from the 10-year period of 2009 through 2018 (data set includes full years for 2009 and 2018) a yearly average can be created indicating the percentage of the region in each Drought Monitor category. This average can be used to extrapolate the potential likelihood of future drought conditions.

Table 4.21: Kansas Region H Estimated Probability of Being in U.S. Drought Monitor Category

None	D0-D4	D1-D4	D2-D4	D3-D4	D4
51.0	50.7	33.6	15.3	6.2	1.1

Source: U.S. Drought Monitor

Additionally, over the five-year period 2014 to 2018 every year recorded a USDA Declared Secretarial Drought Disaster, equating to 100% chance of occurrence.

Data was reviewed from the USDA Risk Management agency to determine vulnerability to drought. The following table summarizes drought event data for **Allen County**

Table 4.22: Allen County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	31
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	3,724
Average Number of Acres Damaged per Year	745
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$116,829
Average Crop Damage per Year	$23,366

Source: USDA

According to the USDA Risk Management Agency, Allen County can expect on a yearly basis, relevant to drought occurrences:

- Six insurance claims
- 45 acres impacted
- $23,266 in insurance claims

The following table summarizes drought event data for **Bourbon County**.

Table 4.23: Bourbon County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	24
Average Number of Claims per Year	5
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	4,608
Average Number of Acres Damaged per Year	922
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	430,859
Average Crop Damage per Year	$86,172

Source: USDA

According to the USDA Risk Management Agency, Bourbon County can expect on a yearly basis, relevant to drought occurrences:

- Five insurance claims
- 922 acres impacted
- $86,172 in insurance claims

The following table summarizes drought event data for **Chautauqua County**.

Table 4.24: Chautauqua County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	28
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	2,287
Average Number of Acres Damaged per Year	457
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$137,777
Average Crop Damage per Year	$27,555

Source: USDA

According to the USDA Risk Management Agency, Chautauqua County can expect on a yearly basis, relevant to drought occurrences:

- Six insurance claims
- 457 acres impacted
- $27,555 insurance claims

The following table summarizes drought event data for **Cherokee County**.

Table 4.25: Cherokee County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	34
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	18,557
Average Number of Acres Damaged per Year	3,711
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$1,262,937
Average Crop Damage per Year	$252,587

Source: USDA

According to the USDA Risk Management Agency, Cherokee County can expect on a yearly basis, relevant to drought occurrences:

- Seven insurance claims
- 3,711 acres impacted
- $252,587 in insurance claims

The following table summarizes drought event data for **Crawford County**.

Table 4.26: Crawford County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	37
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	15,980
Average Number of Acres Damaged per Year	3,196
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$966,692
Average Crop Damage per Year	$193,338

Source: USDA

According to the USDA Risk Management Agency, Crawford County can expect on a yearly basis, relevant to drought occurrences:

- Seven insurance claims
- 3,196acres impacted
- $193,338 in insurance claims

The following table summarizes drought event data for **Elk County**.

Table 4.27: Elk County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	34
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	3,951
Average Number of Acres Damaged per Year	790
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$261,053
Average Crop Damage per Year	$52,211

Source: USDA

According to the USDA Risk Management Agency, Elk County can expect on a yearly basis, relevant to drought occurrences:

- Seven insurance claims
- 790 acres impacted
- $52,211 in insurance claims

The following table summarizes drought event data for **Greenwood County**.

Table 4.28: Greenwood County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	44
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	6,362
Average Number of Acres Damaged per Year	1,272
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$465,268
Average Crop Damage per Year	$93,053

Source: USDA

According to the USDA Risk Management Agency, Greenwood County can expect on a yearly basis, relevant to drought occurrences:

- Nine insurance claims
- 1,272 acres impacted
- $93,053 in insurance claims

The following table summarizes drought event data for **Labette County**.

Table 4.29: Labette County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	46
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	30,912
Average Number of Acres Damaged per Year	6,182
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$2,717,091
Average Crop Damage per Year	$543,418

Source: USDA

According to the USDA Risk Management Agency, Labette County can expect on a yearly basis, relevant to drought occurrences:

- Nine insurance claims
- 6,182 acres impacted
- $543,418 in insurance claims

The following table summarizes drought event data for **Montgomery County**.

Table 4.30: Montgomery County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	42
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	11,478
Average Number of Acres Damaged per Year	2,296
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$705,195
Average Crop Damage per Year	$141,039

Source: USDA

According to the USDA Risk Management Agency, Montgomery County can expect on a yearly basis, relevant to drought occurrences:

- Eight insurance claims
- 2,296 acres impacted
- $141,039 in insurance claims

The following table summarizes drought event data for **Neosho County**.

Table 4.31: Neosho County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	38
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	6,170
Average Number of Acres Damaged per Year	1,234
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$295,758
Average Crop Damage per Year	$59,152

Source: USDA

According to the USDA Risk Management Agency, Neosho County can expect on a yearly basis, relevant to drought occurrences:

- Eight insurance claims
- 1,234 acres impacted
- $59,152 in insurance claims

The following table summarizes drought event data for **Wilson County**.

Table 4.32: Wilson County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	42
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	16,222
Average Number of Acres Damaged per Year	3,244
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$1,168,748
Average Crop Damage per Year	$233,750

Source: USDA

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to drought occurrences:

- Eight insurance claims
- 3,244 acres impacted
- $233,750 in insurance claims

The following table summarizes drought event data for **Woodson County**.

Table 4.33: Woodson County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	36
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	9,528
Average Number of Acres Damaged per Year	1,906
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$550,065
Average Crop Damage per Year	$110,013

Source: USDA

According to the USDA Risk Management Agency, Woodson County can expect on a yearly basis, relevant to drought occurrences:

- Seven insurance claims
- 1,906acres impacted
- $110,013 in insurance claims

4.9.4 Vulnerability Analysis

In general, structures and populations are not directly vulnerable to losses as a result of drought. However, there is a small potential that bridges could be impacted by shrinking soil as a result of drought conditions that could cause foundational or support damages.

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data (for the five-year period from 2014 – 2018) allows us to quantify the monetary impact of drought conditions on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to drought events.

Table 4.34: Drought Acres Impacted and Crop Insurance Paid per County from 2014-2018

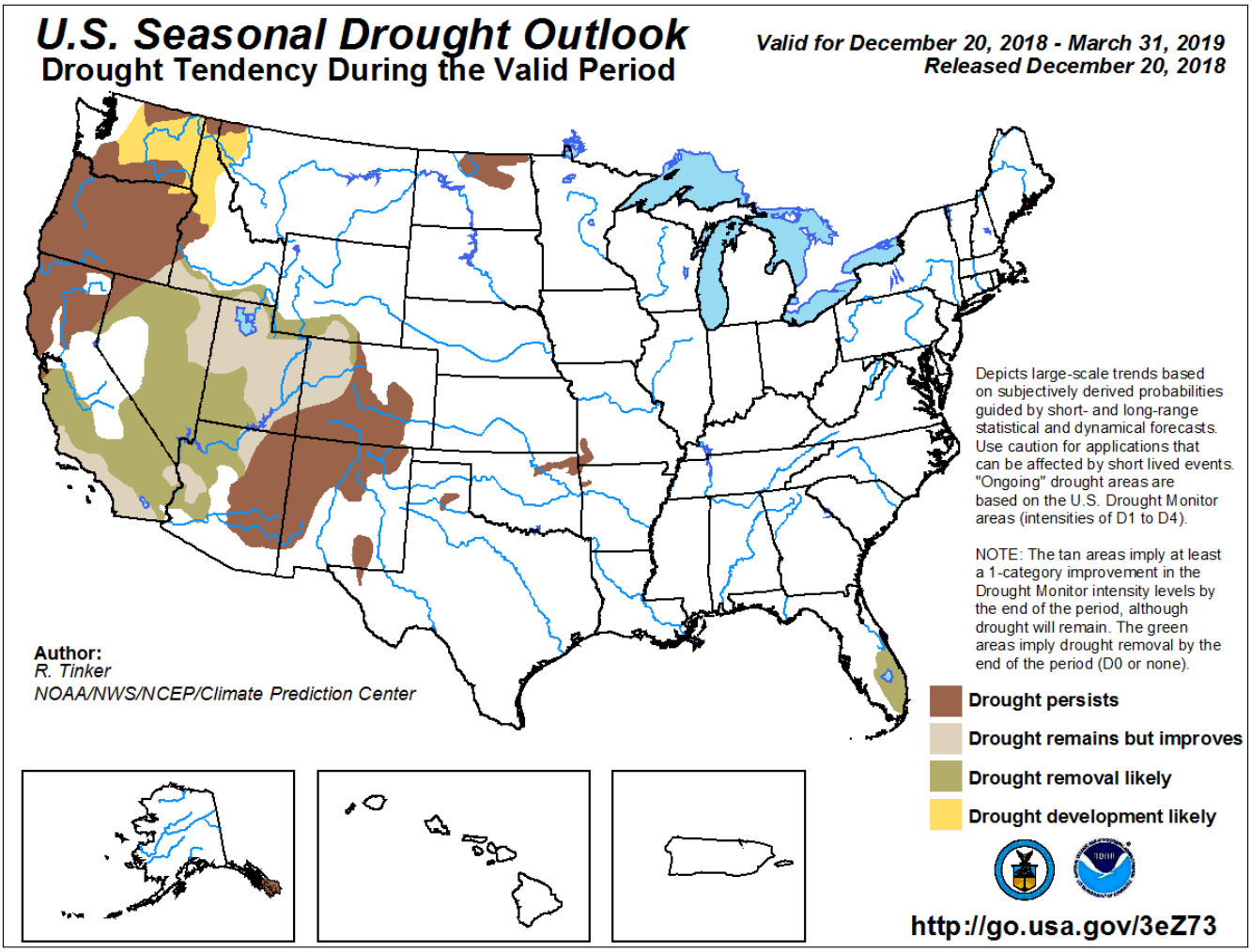
County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	745	0.30%	$38,156,000	$23,366	0.06%
Bourbon	334,301	922	0.28%	$53,376,000	$86,172	0.16%
Chautauqua	310,310	457	0.15%	$35,195,000	$137,777	0.39%

Table 4.34: Drought Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Cherokee	308,233	3,711	1.20%	$86,906,000	$252,587	0.29%
Crawford	323,222	3,196	0.99%	$75,594,000	$193,338	0.26%
Elk	316,385	790	0.25%	$42,070,000	$261,053	0.62%
Greenwood	701,012	1,272	0.18%	$89,554,000	$93,053	0.10%
Labette	370,531	6,182	1.67%	$122,778,000	$543,418	0.44%
Montgomery	335,669	2,296	0.68%	$79,420,000	$141,039	0.18%
Neosho	308,150	1,234	0.40%	$67,958,000	$59,152	0.09%
Wilson	254,671	3,244	1.27%	$55,422,000	$233,750	0.42%
Woodson	294,643	1,906	0.65%	$54,603,000	$110,013	0.20%

Source: USDA

Additional predictions about drought vulnerability can be made by reviewing data with the National Weather Service (NWS) Climate Prediction Center at www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php. The following map was the latest published data at the time of this report, and indicates no predicted drought conditions for the region.



Drought can severely challenge a public water supplier through depletion of the raw water supply and greatly increased customer water demand. Even if the raw water supply remains adequate, problems due to limited treatment capacity or limited distribution system capacity may be encountered. In addition, the water for cropland and livestock can be greatly impacted. The following are the potential water supply limitations that may result from drought conditions:

- **Basic Source Limitation** - The supplier's primary raw water source is particularly sensitive to drought as evidenced by depleted streamflow, depleted reservoir inflow and storage, or by declining water levels in wells. Restrictions imposed due to inability to use a well(s) because water quality problems were considered indicative of a basic source limitation.
- **Contractual Limitation** - The supplier's sole water source is purchased from another system that is drought vulnerable and there is a drought-cut-off clause in their water purchase contract. In such situations where there is not a drought cut-off clause, the purchaser is considered drought vulnerable under the same limitation category as the seller.
- **Distribution System Limitation** - The supplier has difficulty or is unable to meet drought-induced customer demand for water because of inadequate finished water storage capacity, inadequate finished water pumping capacity, inadequate transmission line sizes.

- **Minimum Desirable Streamflow** - The supplier reported imposing restrictions because of minimum desirable streamflow administration. Water rights junior to those granted for maintenance of established minimum desirable flows are subject to such administration.
- **Single Well Source** - The supplier relies upon a single well as its sole source for raw water. Suppliers with one active well and one emergency well were considered drought vulnerable because emergency wells are not a dependable long-term water source. Excessive hours of operation to meet drought-induced customer demand for water will result in the increased likelihood of mechanical breakdown with no alternative water supply source available.
- **Treatment Capacity Limitation** - The supplier has difficulty or is unable to meet drought-induced customer demand for water due to inadequate raw water treatment capacity.
- **Water Right Limitation** - The supplier reported imposing restrictions because the quantity of water they are authorized to divert under their water right(s) was insufficient to meet customer demands.

Water supply planning is the key to minimizing the effects of drought on the population and economy of the region. State of Kansas agencies have worked with public water suppliers to identify vulnerabilities and develop infrastructure, conservation plans, and partnerships to reduce the likelihood of running out of water during a drought. Information concerning these plans, and any current water supply limitations, may be found with the Kansas Water Office.

4.9.5 – Impact and Consequence Analysis

As per EMAP standards, the following table provides the consequence analysis for drought conditions.

Table 4.35: Drought Consequence Analysis

Subject	Impacts of Drought
Health and Safety of the Public	Drought impact tends to be agricultural however, because of the lack of precipitation water supply disruptions can occur which can affect people. Impact is expected to be minimal.
Health and Safety of Responders	Impact to responders is expected to be minimal.
Continuity of Operations	Minimal expectation for utilization of the COOP.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the length and intensity of the drought. Structural integrity of buildings and buckling of roads could occur.
Environment	The impact to the environment could be severe. Drought can severely affect farming, ranching, wildlife and plants due to the lack of precipitation.
Economic Conditions	Impacts to the economy will be dependent on how extreme the drought is and how long it lasts. Communities that depend on an agricultural economic engine will likely be severely stressed.
Public Confidence in the Jurisdiction's Governance	Confidence could be an issue during periods of extreme drought if planning is not in place to address intake needs and loss of crops.

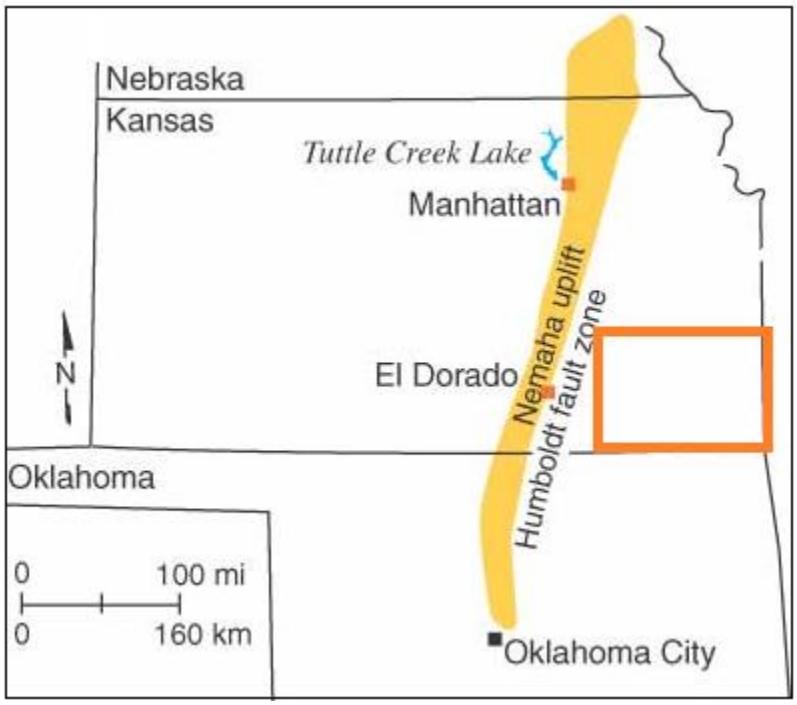
4.10 – Earthquake

An earthquake is the result of a sudden release of energy in the Earth's crust that creates seismic waves that are typically caused by the rupturing of geological faults.

4.10.1 – Location and Extent

Kansas Region H is in an area of potential seismic activity, with the Humboldt Fault (also known as the Nemaha Uplift) passing to the west of the region. Most earthquakes in the Humboldt Fault Zone are small and are detected only with instruments.

Humboldt Fault Zone



Two scales are used when referring to earthquake activity. Estimating the total force of an earthquake is the Richter scale, and the observed damage from an earthquake is the Modified Mercalli Intensity Scale. Additionally, both Acceleration (%g) and Velocity (cm/s) can be used to measure and quantify force and movement.

The following table equates the above referenced earthquake scales.

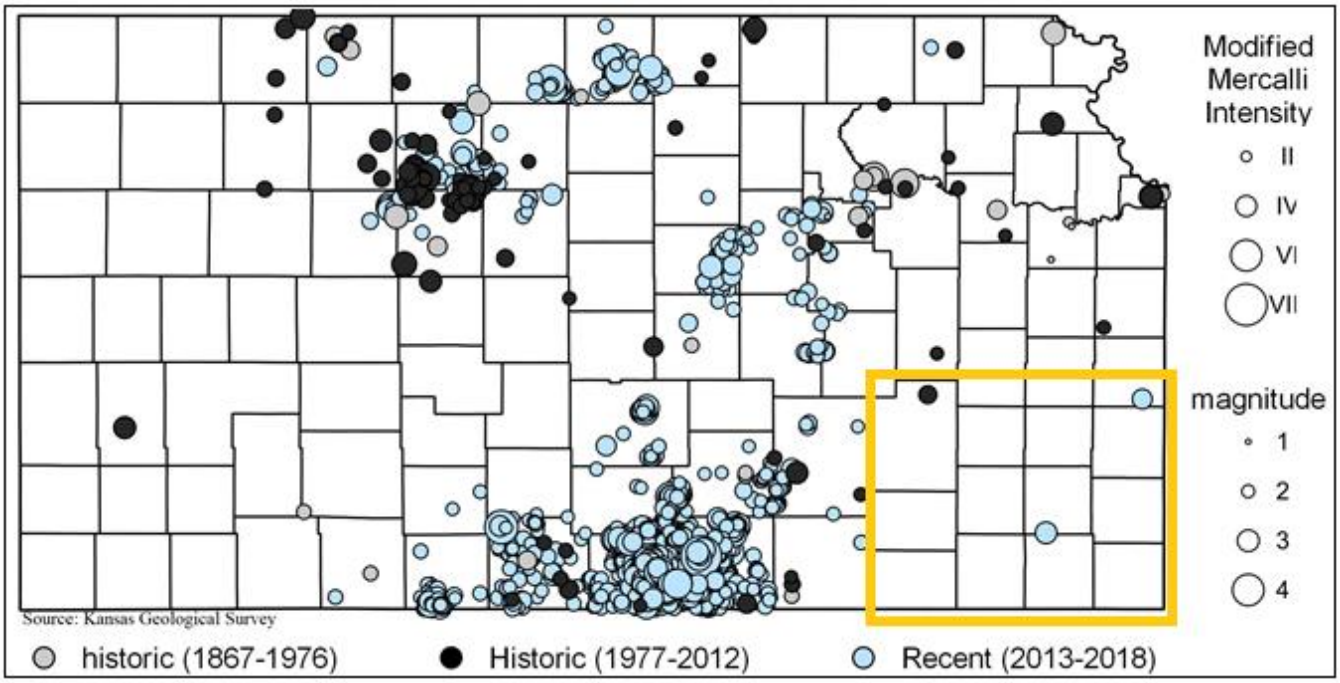
Table 4.36: Earthquake Magnitude Scale Comparison

Mercalli Scale Intensity	Verbal Description	Richter Scale Magnitude	Acceleration (%g)	Velocity (cm/s)	Witness Observations
I	Instrumental	1 to 2	0.17%	<0.1	None
II	Feeble	2 to 3	1.40%	1.1	Noticed only by sensitive people
III	Slight	3 to 4	1.40%	1.1	Resembles vibrations caused by heavy traffic
IV	Moderate	4	3.90%	3.4	Felt by people walking; rocking of free-standing objects
V	Rather Strong	4 to 5	9.20%	8.1	Sleepers awakened; bells ring
VI	Strong	5 to 6	18.00%	16	Trees sway, some damage from falling objects
VII	Very Strong	6	34.00%	31	General alarm, cracking of walls
VIII	Destructive	6 to 7	65.00%	60	Chimneys fall and some damage to building
IX	Ruinous	7	124.00%	116	Ground crack, houses begin to collapse, pipes break
X	Disastrous	7 to 8	>124.0%	>116	Ground badly cracked, many buildings destroyed. Some landslides
XI	Very Disastrous	8	>124.0%	>116	Few buildings remain standing, bridges destroyed.
XII	Catastrophic	8 or greater	>124.0%	>116	Total destruction; objects thrown in air, shaking and distortion of ground

4.10.2 – Previous Occurrences

The following map, from the KGS, shows all recorded earthquakes from 1867 through 2018.

KGS Historic Earthquake Map



The KGS Earthquake Catalog records earthquake events from 1979 through present. According to this archive Kansas Region H has had two recorded earthquakes since 1979.

The following table details the Richter Scale Magnitude of any recorded events in the catalogue.

Table 4.37: Region H Number of Earthquakes by Richter Scale Magnitude, 1979 - 2018

	0.1 -3.9	4.0 – 4.9	5.0 – 5.9	6.0 – 6.9	7.0- 7.9	8.0 +	Highest
Allen	0	0	0	0	0	0	-
Bourbon	0	0	0	0	0	0	-
Chautauqua	0	0	0	0	0	0	-
Cherokee	0	0	0	0	0	0	-
Crawford	0	0	0	0	0	0	-
Elk	0	0	0	0	0	0	-
Greenwood	1	0	0	0	0	0	2.58
Labette	0	0	0	0	0	0	-
Montgomery	0	0	0	0	0	0	-
Neosho	1	0	0	0	0	0	3.0
Wilson	0	0	0	0	0	0	-
Woodson	0	0	0	0	0	0	-

Source: KGS

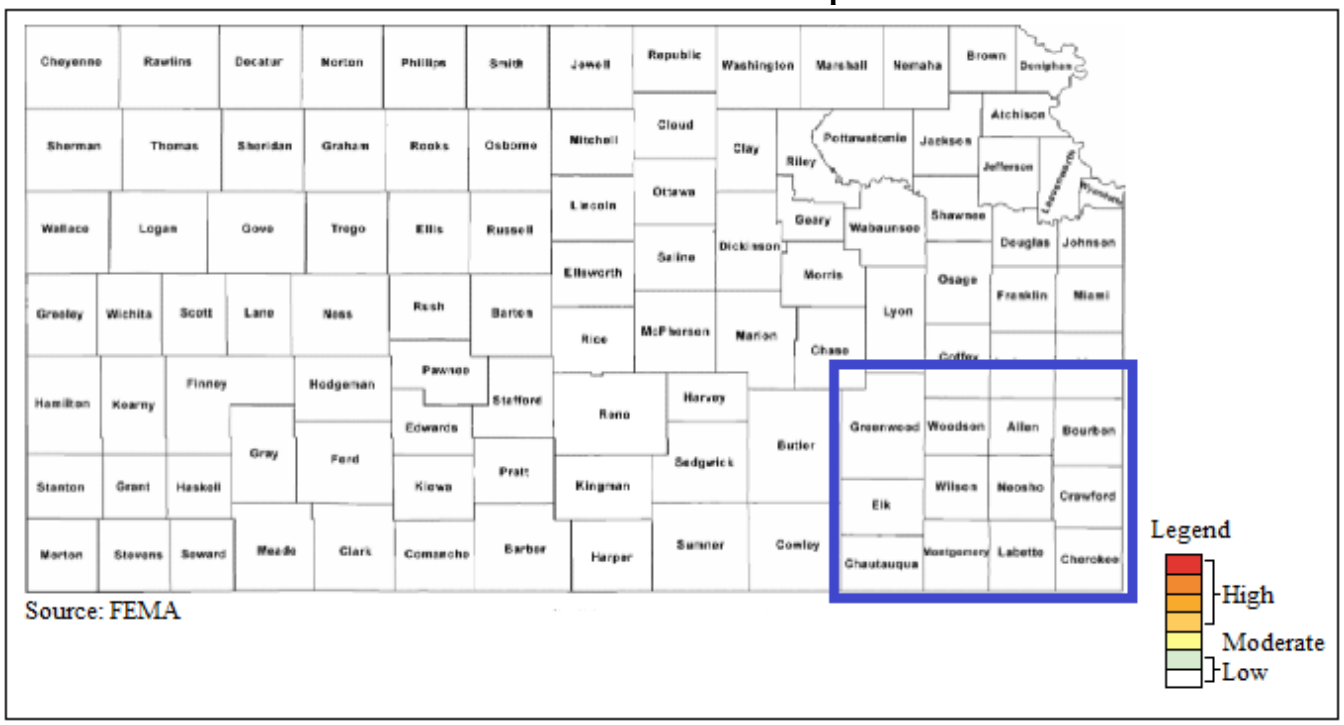
Recently, concern about earthquakes caused by oil and gas exploration and production operations, has grown. Commonly, detected seismic activity associated with oil and gas operations, also known as induced seismicity, is thought to be triggered when wastewater is injected into disposal wells. According to the KGS, linking earthquakes to wastewater injection is difficult. Complex subsurface geology and

limited data about that geology make it hard to pinpoint the cause seismic events. However, an established pattern of increased earthquake activity in an area over time may indicate a correlation between injection and seismic events. Given that only two earthquakes have been recorded in Kansas Region H since 1979, induced seismicity is currently not believed to be a potential driver of earthquakes for the region.

4.10.3 – Hazard Probability Analysis

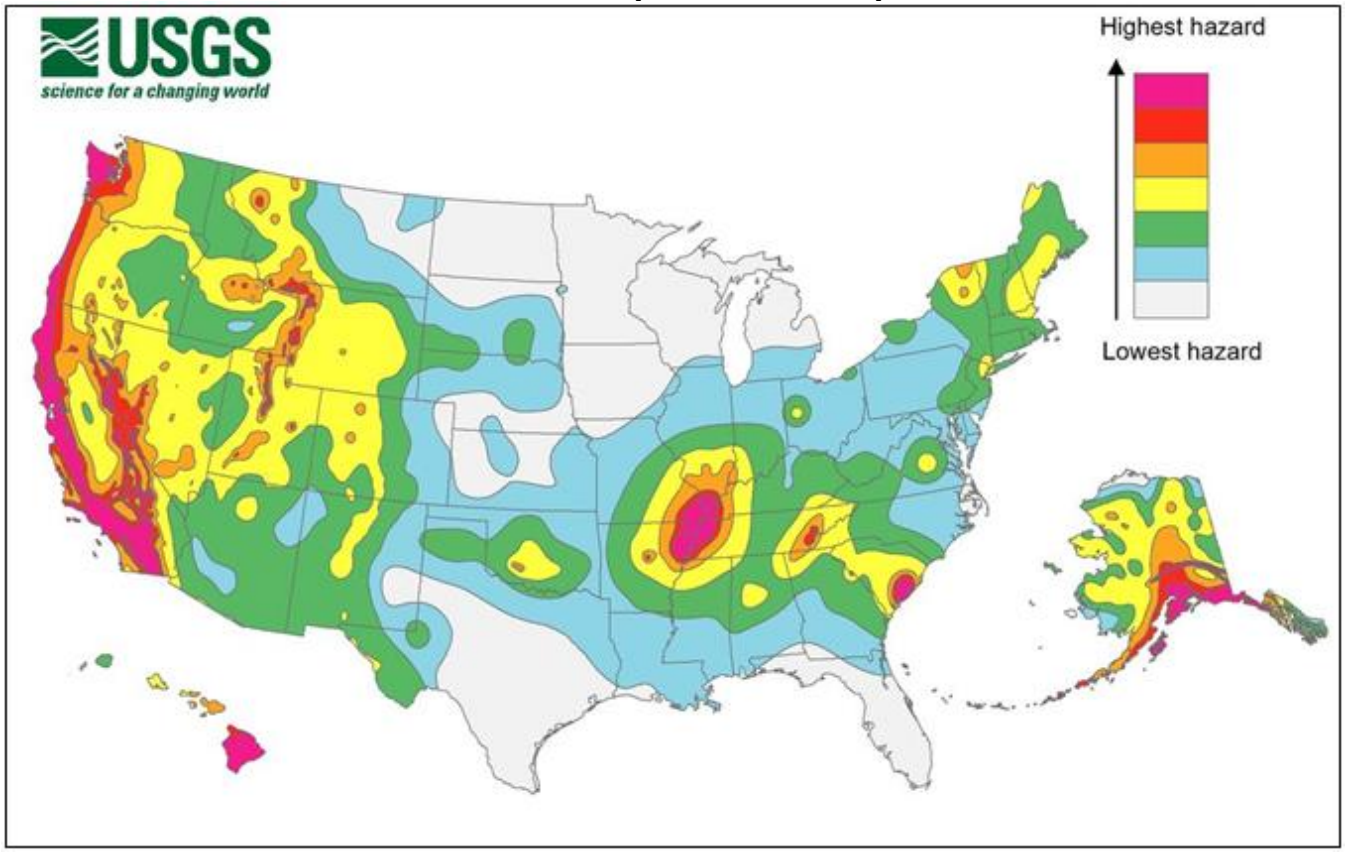
The following FEMA Seismic Risk Map for the United States indicates that all of the State of Kansas, including Kansas Region H, falls into the low hazard rankings.

FEMA Seismic Risk Map



The USGS also published a map that indicates hazard rankings based on acceleration (%g) for the United States, with the data correlating with the indicated FEMA risk. This map indicates the probability that ground shaking will exceed a certain level over a 50-year period. The low-hazard areas have a 2% chance of exceeding a designated low level of shaking and the high-hazard areas have a 2% chance of topping a much greater level.

USGS Earthquake Hazard Map

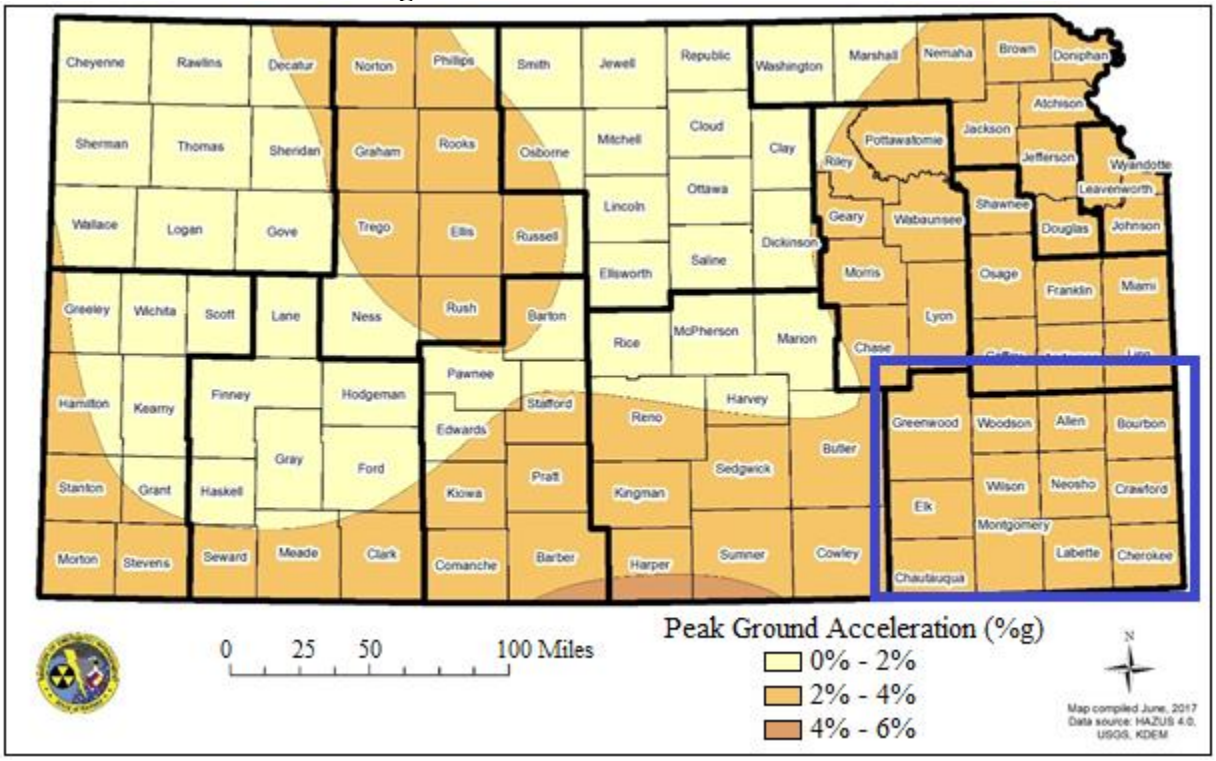


4.10.4 – Vulnerability Analysis

HAZUS, using the default inventory 2010 building valuations, was used to analyze vulnerability and estimate potential losses to earthquakes. A probabilistic, 2,500 Year 6.7 magnitude earthquake scenario was chosen to reveal areas of the region and state that are most vulnerable. These results are not meant to indicate annualized losses or damages as a result of a more typical low-magnitude event, but rather reveal vulnerabilities and losses for the worst-case scenario.

The following map, created using available HAZUS data, shows the ground shaking potential of a worst-case scenario 2,500-year 6.7 magnitude earthquake.

Regional Peak Ground Acceleration



Using available HAZUS data, the following potential losses from a worst-case scenario 2,500-year 6.7 Magnitude earthquake.

Table 4.38: Kansas Region H Probabilistic 6.7 Magnitude Earthquake Damages

County	Total Earthquake Losses	Displaced Households
Allen	$9,478	3
Bourbon	$13,060	4
Chautauqua	$3,120	<1
Cherokee	$19,437	5
Crawford	$37,916	17
Greenwood	$1,621	1
Elk	$3,629	1
Labette	$16,384	6
Montgomery	$27,324	11
Neosho	$12,093	3
Wilson	$6,784	2
Woodson	$1,839	<1

Source: KDEM and HAZUS

In general counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to earthquake events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.39: Kansas Region H Population Vulnerability Data for Earthquakes

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

Counties with a higher number of structures are to be considered to have a potentially greater vulnerability. The following table indicates the total number of housing units in each county (used as a representative figure for the total number of structures in each county, as housing numbers are closely tied to commercial structures) and the percentage change over the period 2000 to 2017.

Table 4.40: Kansas Region H Structure Vulnerability Data for Earthquakes

County	2017 Housing Units	Percent Change 2000 to 2017
Allen	6,309	-2.2%
Bourbon	7,149	-0.3%
Chautauqua	2,142	-1.2%
Cherokee	9,875	-1.6%
Crawford	18,055	4.8%
Elk	1,752	-5.8%
Greenwood	4,041	-5.4%
Labette	10,082	-2.2%
Montgomery	16,054	-4.1%
Neosho	7,748	3.8%
Wilson	4,657	-5.7%
Woodson	2,020	-2,7%

Source: US Census Bureau

In general counties with a large and/or a growing number of structures are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to earthquake events due to an decreasing number of structures.

4.10.5 – Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis

Table 4.41: Earthquake Consequence Analysis

Subject	Impacts of Earthquake
Health and Safety of the Public	Severity and location dependent. Impacts on persons near the epicenter are expected to be severe.
Health and Safety of Responders	Severity and location dependent. Impacts on persons near the epicenter are expected to be severe.
Continuity of Operations	Severity and location dependent. Event will likely require relocation, essential function prioritization based on capabilities and severe disruption of services.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the location of the facility and the severity of the event. Loss of structural integrity of buildings and infrastructure could occur.
Environment	The impact to the environment could be severe, including topological changes and severe destruction.
Economic Conditions	Impacts to the economy will be dependent severity of earthquake and proximity to the epicenter. Impacts will likely be long lasting and possibly permanent for most severely impacted businesses.
Public Confidence in the Jurisdiction's Governance	Confidence could be an issue if planning is not in place to address need of population, including mass sheltering and mass care.

4.11 – Expansive Soils

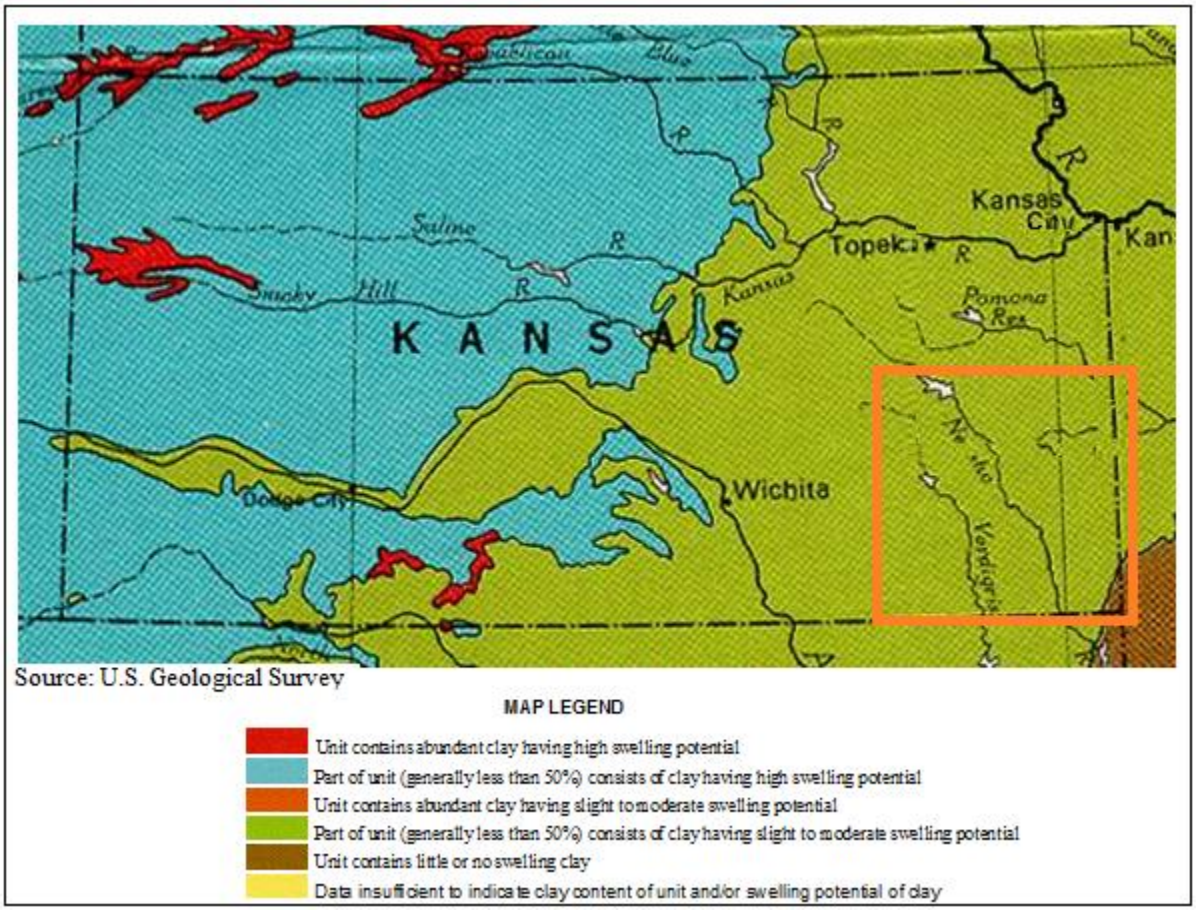
Expansive soils are slow to develop and do not usually pose a risk to public safety. The slow expansion and contraction of the clays and soils places pressure on structural foundations and subsurface dwellings. This pressure can become so great it damages foundations, cracks walls, and deforms structures.

4.11.1 – Location and Extent

Kansas Region H possesses a wide array of soils with a range of permeability from moderate to low. Generally, the permeability of the soils is related to the clay content. Clay soils tend to shrink when dry and swell when wet which has large implications on underground utility infrastructure and home foundations.

The map shows the swelling potential of soils in Kansas Region H, indicating it is located in an area where the majority of the soil unit consists of clay having slight to moderate swelling potential.

USGS Soil Swelling Potential Map



Source: U.S. Geological Survey

4.11.2 – Previous Occurrences

No statewide database of expansive soils events is available.

Locally, there have been no reported major or impactful expansive soil events within the past ten years.

4.11.3 – Hazard Probability Analysis

Currently there is limited available data on this hazard, but it is held that each year in the United States, expansive soils cause billions of dollars in damage to buildings, roads, pipelines, and other structures. But, as expansive soils cause damage over extended periods of time damages caused may be attributed to other factors such as extended drought or heavy periods of moisture, both of which may exacerbate the hazard.

Because there is high clay content, high swell soils in the region, the probability of shrink/swell occurrence is 100%. However, the probability of damage is so poorly documented that is presently not possible to quantify the potential occurrence of a major damaging expansive soils event.

4.11.4 – Vulnerability Analysis

Physical structures are potentially vulnerable to highly expansive soil. It is estimated by KDEM that approximately 10% of the homes built on expansive soils could experience significant damage. Based on this, and using current available building valuations, the following table estimates the potential damages assuming a 50% impact on the value of the structure.

Table 4.42: Kansas Region H Estimated Potential Structural Damages, Expansive Soil

County	HAZUS Property Valuation	Property Valuation for 10% of Building Stock	Estimated 50% Damage
Allen	$1,557,716,000	$155,771,600	$77,885,800
Bourbon	$1,720,309,000	$172,030,900	$86,015,450
Chautauqua	$500,459,000	$50,045,900	$25,022,950
Cherokee	$2,163,015,000	$216,301,500	$108,150,750
Crawford	$4,211,278,000	$421,127,800	$210,563,900
Elk	$353,392,000	$35,339,200	$17,669,600
Greenwood	$834,705,000	$83,470,500	$41,735,250
Labette	$2,349,164,000	$234,916,400	$117,458,200
Montgomery	$4,012,672,000	$401,267,200	$200,633,600
Neosho	$1,782,409,000	$178,240,900	$89,120,450
Wilson	$1,128,676,000	$112,867,600	$56,433,800
Woodson	$357,734,000	$35,773,400	$17,886,700

Source: US Census Bureau and HAZUS

4.11.5 – Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.43: Expansive Soils Consequence Analysis

Subject	Impacts of Expansive Soils
Health and Safety of the Public	Minimal impact.
Health and Safety of Responders	Minimal impact.
Continuity of Operations	Minimal expectation for utilization of COOP unless structures have extensive damage.
Property, Facilities, and Infrastructure	Localized impact could be moderate, including structural integrity to be lost, and roadways, railways to buckle.
Environment	Expansive soils could cause moderate damage to dams, levees, watersheds.
Economic Conditions	Economic impacts include rebuilding of the properties and infrastructure. Drought and extreme rain events could increase impact.
Public Confidence in the Jurisdiction's Governance	Confidence will be dependent on development trends and mitigation efforts at reducing the effect of expansive soils on new construction.

4.12 – Extreme Temperatures

Extreme temperature events occur when climate conditions produce temperatures well outside of the predicted norm. These extremes can have severe impacts on human health and mortality, natural ecosystems, agriculture, and other economic sectors.

4.12.1 – Location and Extent

The Midwest climate region is known for extremes in temperature. Specifically, Kansas lacks any mountain ranges that could act as a barrier to cold air masses from the north or hot, humid air masses from the south or any oceans or large bodies of water that could provide a moderating effect on the climate. The polar jet stream is often located over the region during the winter, bringing frequent storms and precipitation. Kansas summers are generally warm and humid due to the clockwise air rotation caused by Atlantic high-pressure systems bringing warm humid air up from the Gulf of Mexico.

All of Kansas Region H is vulnerable to both extreme heat and extreme cold, defined as follows.

Table 4.44: Extreme Temperature Definitions

Term	Definition
Extreme Heat	Extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Ambient air temperature is one component of heat conditions, with relative humidity being the other. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when an area of high atmospheric pressure traps moisture laden air near the ground.
Extreme Cold	Although no specific definition exists for extreme cold, an extreme cold event can generally be defined as temperatures at or below freezing for an extended period of time. Extreme cold events are usually part of Winter Storm events but can occur during anytime of the year and can have devastating effects on agricultural production.

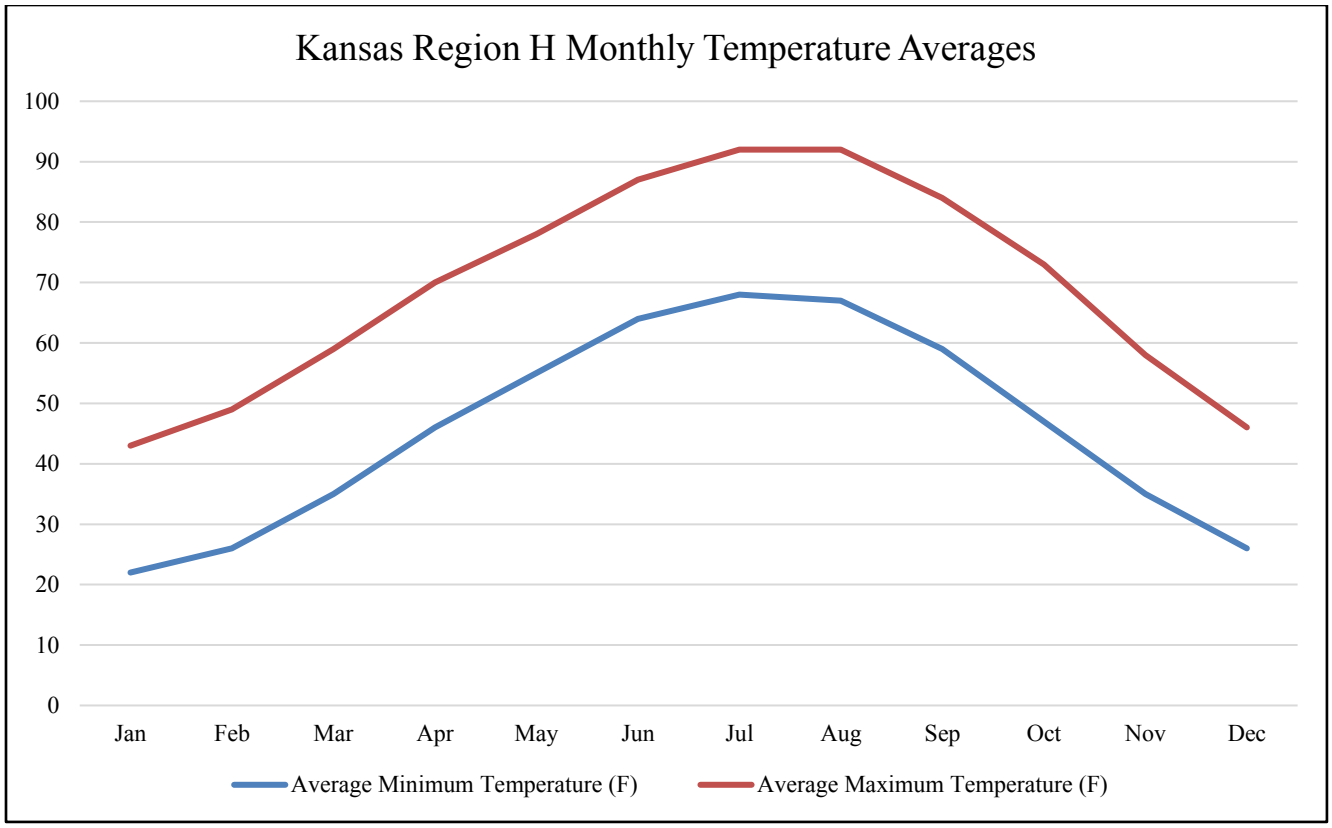
Data from the following High Plains Regional Climate Center weather stations from the first available date to present was obtained to illustrate regional temperature norms.

Table 4.45: Regional Average Temperatures

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Minimum Temperature (F)	22º	26º	35º	46º	55º	64º	68º	67º	59º	47º	35º	26º	46º
Average Maximum Temperature (F)	43º	49º	59º	70º	78º	87º	92º	92º	84º	73º	58º	46º	69º

Source: High Plains Regional Climate Center

The following graph illustrates the above data.



When discussing weather patterns climate change should be taken into account as it may markedly change future weather-related events. There is a scientific consensus that climate change is occurring, and recent climate modeling results indicate that extreme weather events may become more common. Rising average temperatures produce a more variable climate system which may result in an increase in the frequency and severity of some extreme weather events including longer and hotter heat waves (and by correlation, an increased risk of wildfires), higher wind speeds, greater rainfall intensity, and increased tornado activity.

4.12.2 – Previous Occurrences

Data from the High Plains Regional Climate Center indicates the following historic high and low temperatures.

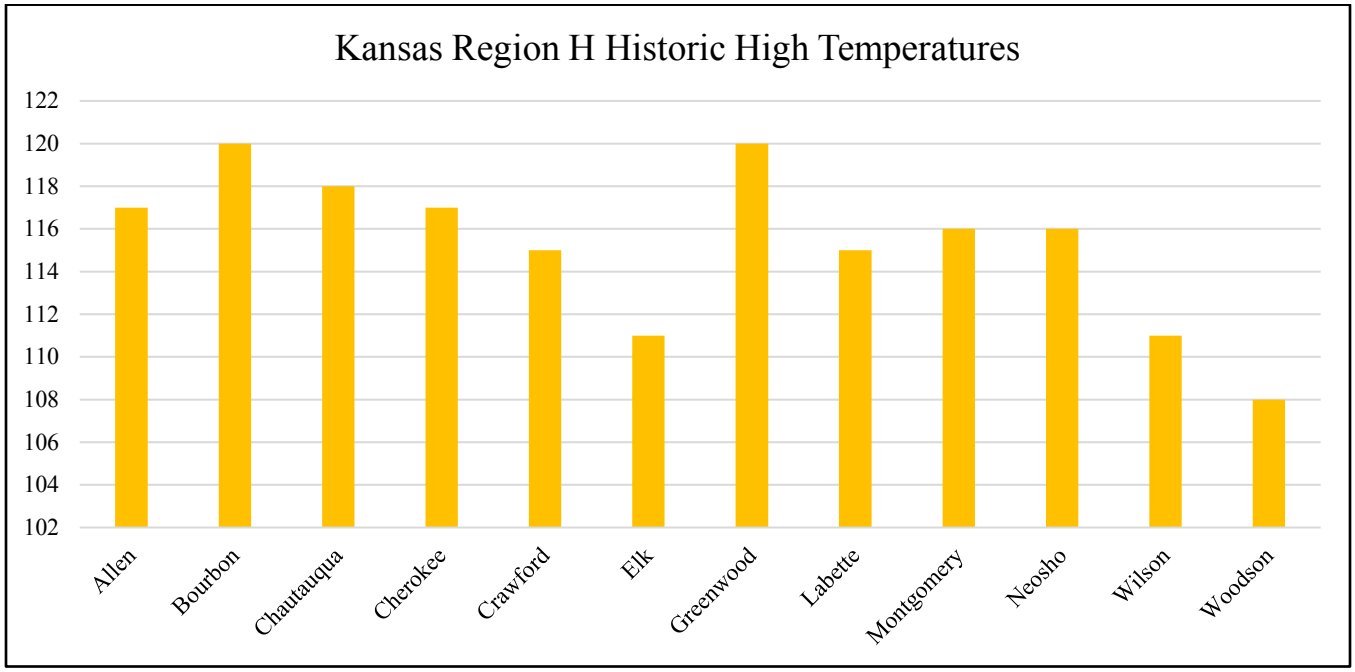
Table 4.46: Kansas Region H Historic Temperatures

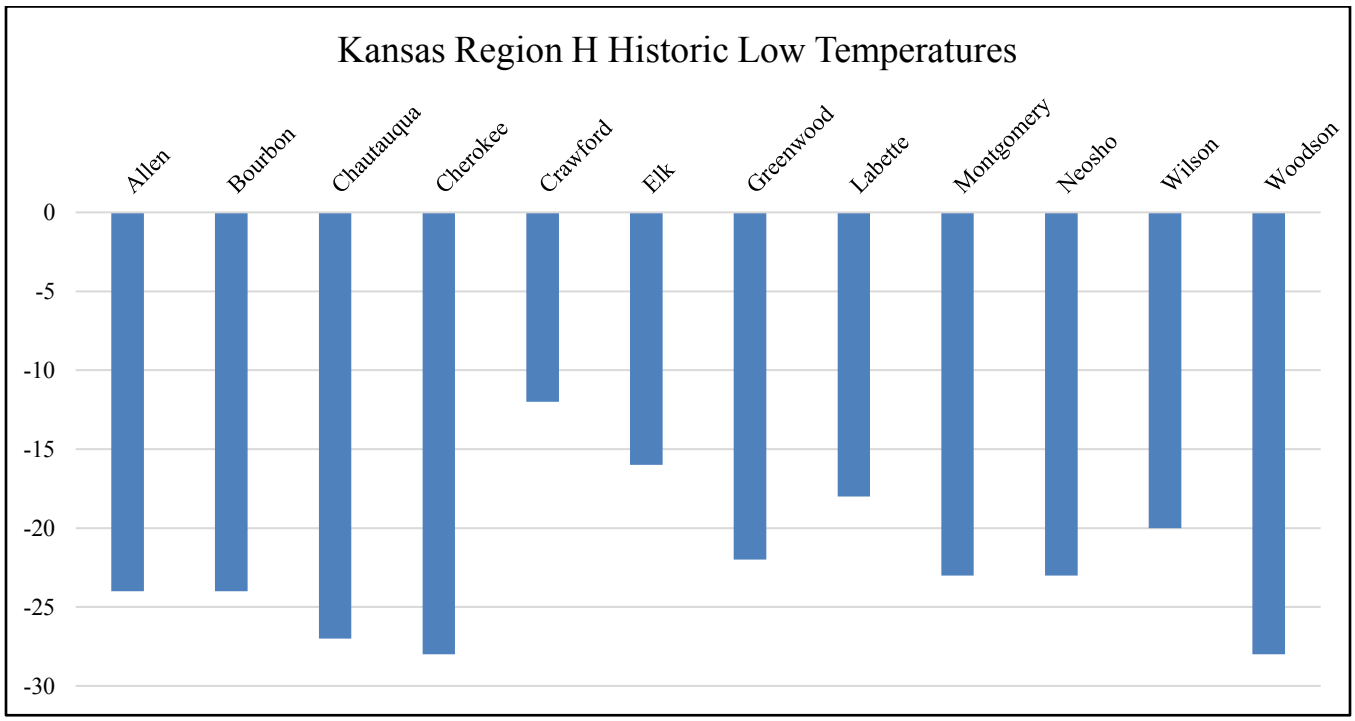
County	Historic Low Temperature (F)	Historic High Temperature (F)
Allen	-24 (2011)	117 (1954)
Bourbon	-24 (1905)	120 (1954)
Chautauqua	-27 (1949)	118 (1936)
Cherokee	-28 (1905)	117 (1954)
Crawford	-12 (1951)	115 (1954)
Elk	-16 (1918)	111 (1923)
Greenwood	-22 (1943)	120 (1936)
Labette	-18 (1930)	115 (1954)

Table 4.46: Kansas Region H Historic Temperatures

County	Historic Low Temperature (F)	Historic High Temperature (F)
Montgomery	-23 (1949)	116 (1936)
Neosho	-23 (1949)	116 (1936)
Wilson	-20 (1949)	121 (1936)
Woodson	-28 (1899)	108 (1980)

Source: High Plains Regional Climate Center





The following table presents National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) identified extreme temperature events (Excessive Heat and Extreme Cold/Wind Chill) and the resulting damage totals in Kansas Region H from the ten-year period 2009- 2018 (data set includes full years for 2009 and 2018).

Table 4.47: Kansas Region H NCEI Extreme Temperature Events, 2009 - 2018

County	Event Type	Number of Events	Property Damage	Deaths	Injuries
Allen	Cold	0	$0	0	0
	Heat	4	$0	0	0
Bourbon	Cold	0	$0	0	0
	Heat	0	$0	0	0
Chautauqua	Cold	0	$0	0	0
	Heat	0	$0	0	0
Cherokee	Cold	0	$0	0	0
	Heat	0	$0	0	0
Crawford	Cold	0	$0	0	0
	Heat	0	$0	0	0
Elk	Cold	0	$0	0	0
	Heat	0	$0	0	0
Greenwood	Cold	0	$0	0	0
	Heat	0	$0	0	0
Labette	Cold	0	$0	0	0
	Heat	0	$0	0	0
Montgomery	Cold	0	$0	0	0
	Heat	0	$0	0	0
Neosho	Cold	0	$0	0	0
	Heat	0	$0	0	0
Wilson	Cold	0	$0	0	0
	Heat	0	$0	0	0
Woodson	Cold	0	$0	0	0
	Heat	0	$0	0	0

Source: NOAA NCEI

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of extreme temperatures on the Region's agricultural base. Crop loss data for the five-year period 2014- 2018 (data set includes full years for 2014 and 2018), for the region, indicates 47 extreme temperature related claims on 3,528 acres for $324,063.

Table 4.48: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Extreme Temperatures

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	4	409	$62,412
Bourbon	4	148	$4,721
Chautauqua	0	0	$0
Cherokee	3	138	$5,949
Crawford	1	12	$1,364
Elk	3	285	$4,964

Table 4.48: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Extreme Temperatures

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Greenwood	5	960	$102,940
Labette	11	693	$57,680
Montgomery	6	362	$29,777
Neosho	0	0	$0
Wilson	0	0	$0
Woodson	10	521	$54,256

Source: USDA Farm Service Agency

4.12.3 – Hazard Probability Analysis

Although periods of extreme heat and cold occur on an annual basis, events that create a serious public health risk or threaten infrastructure capacity occur less often. An extreme heat event is more likely to occur in the months of June, July, August, and September, and an extreme cold event is more likely to occur in the months of November, December, January, February, and March. Also, the EPA has projected that with climate changes in the Great Plains, temperatures will continue to increase and impact all Kansas Region H communities.

The following table summarizes extreme temperature event data for **Kansas Region H**.

Table 4.49: Kansas Region H Extreme Temperature Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	4
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0

Source: NCEI

Data from the NCEI indicates that Kansas Region H can expect on a yearly basis, relevant to extreme temperature events:

- <1 event
- No deaths
- No injuries
- $0 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to extreme temperatures. The following table summarizes extreme temperature event data for **Allen County**

Table 4.50: Allen County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	4
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	409
Average Number of Acres Damaged per Year	82
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$62,412
Average Crop Damage per Year	$12,482

Source: USDA

According to the USDA Risk Management Agency, Allen County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- One insurance claim
- 82 acres impacted
- $12,482 in insurance claims

The following table summarizes extreme temperatures event data for **Bourbon County**.

Table 4.51: Bourbon County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	4
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	148
Average Number of Acres Damaged per Year	30
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$4,721
Average Crop Damage per Year	$944

Source: USDA

According to the USDA Risk Management Agency, Bourbon County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- One insurance claim
- 30 acres impacted
- $944 in insurance claims

The following table summarizes extreme temperatures event data for **Chautauqua County**.

Table 4.52: Chautauqua County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: USDA

According to the USDA Risk Management Agency, Chautauqua County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes extreme temperatures event data for **Cherokee County**.

Table 4.53: Cherokee County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	3
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	138
Average Number of Acres Damaged per Year	28
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$5,949
Average Crop Damage per Year	$1,190

Source: USDA

According to the USDA Risk Management Agency, Cherokee County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- One insurance claim
- 28 acres impacted
- $1,190 in insurance claims

The following table summarizes extreme temperatures event data for **Crawford County**.

Table 4.54: Crawford County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	12
Average Number of Acres Damaged per Year	2
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$1,364
Average Crop Damage per Year	$273

Source: USDA

According to the USDA Risk Management Agency, Crawford County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- <1 insurance claim
- Two acres impacted
- $273 in insurance claims

The following table summarizes extreme temperatures event data for **Elk County**.

Table 4.55: Elk County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	3
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	285
Average Number of Acres Damaged per Year	57
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$4,964
Average Crop Damage per Year	$993

Source: USDA

According to the USDA Risk Management Agency, Elk County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- One insurance claim
- 57 acres impacted
- $993 in insurance claims

The following table summarizes extreme temperatures event data for **Greenwood County**.

Table 4.56: Greenwood County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	5
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	960
Average Number of Acres Damaged per Year	192
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$102,940
Average Crop Damage per Year	$20,588

Source: USDA

According to the USDA Risk Management Agency, Greenwood County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- One insurance claim
- 192 acres impacted
- $20,588 in insurance claims

The following table summarizes extreme temperatures event data for **Labette County**.

Table 4.57: Labette County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	11
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	693
Average Number of Acres Damaged per Year	139
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$57,680
Average Crop Damage per Year	$11,536

Source: USDA

According to the USDA Risk Management Agency, Labette County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- Two insurance claims
- 139 acres impacted
- $11,536 in insurance claims

The following table summarizes Extreme temperatures event data for **Montgomery County**.

Table 4.58: Montgomery County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	6
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	362
Average Number of Acres Damaged per Year	72
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$29,777
Average Crop Damage per Year	$5,955

Source: USDA

According to the USDA Risk Management Agency, Montgomery County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- One insurance claim
- 72 acres impacted
- $5,955 in insurance claims

The following table summarizes extreme temperatures event data for **Neosho County**.

Table 4.59: Neosho County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: USDA

According to the USDA Risk Management Agency, Neosho County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes extreme temperatures event data for **Wilson County**.

Table 4.60: Wilson County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: USDA

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes extreme temperatures event data for **Woodson County**.

Table 4.61: Woodson County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	10
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	521
Average Number of Acres Damaged per Year	104
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$54,256
Average Crop Damage per Year	$10,851

Source: USDA

According to the USDA Risk Management Agency, Woodson County can expect on a yearly basis, relevant to extreme temperatures occurrences:

- Two insurance claims
- 104 acres impacted
- $10,851 in insurance claims

4.12.4 – Vulnerability Analysis

The primary concerns with this hazard are human health safety issues. Specific at-risk groups identified were outdoor workers, farmers, and senior citizens. Due to the potential for fatalities and the possibility for the loss of electric power due to increased strain on power generation and distribution for air conditioning, periods of extreme heat can affect the planning area.

Exposure to direct sun can increase Heat Index values by as much as 15°F. The zone above 105°F corresponds to a Heat Index that may cause increasingly severe heat disorders with continued exposure and/or physical activity. The following table discusses potential impacts on human health related to excessive heat.

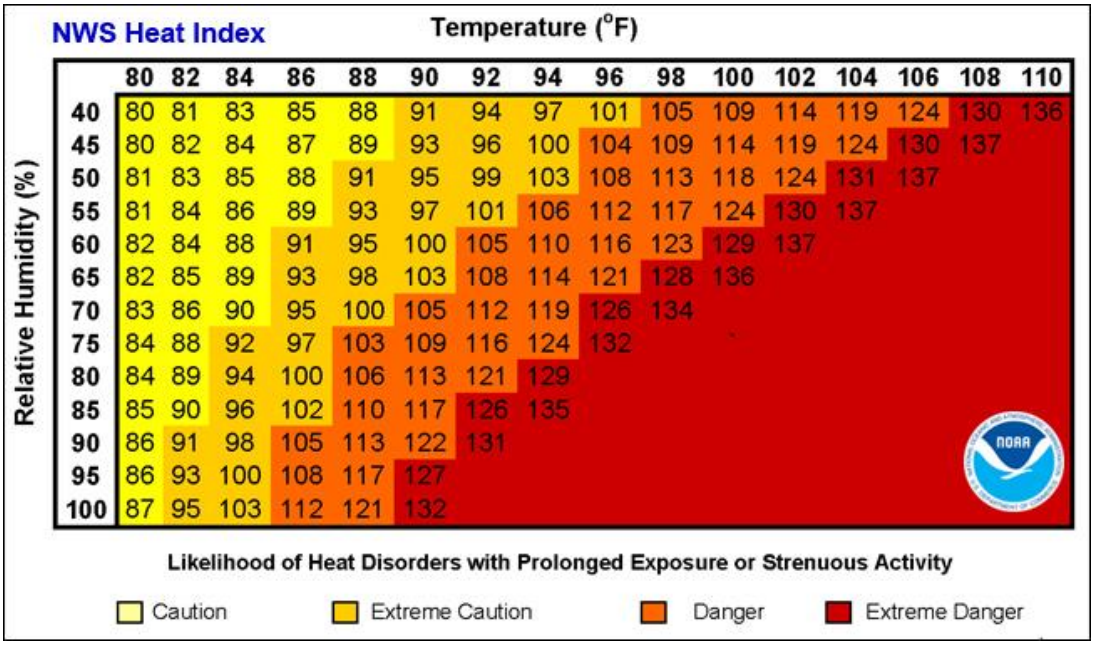
Table 4.62: Extreme Heat Impacts on Human Health

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

Source: National Weather Service Heat Index Program

The following graph, from the NWS, indicates Heat Index values.

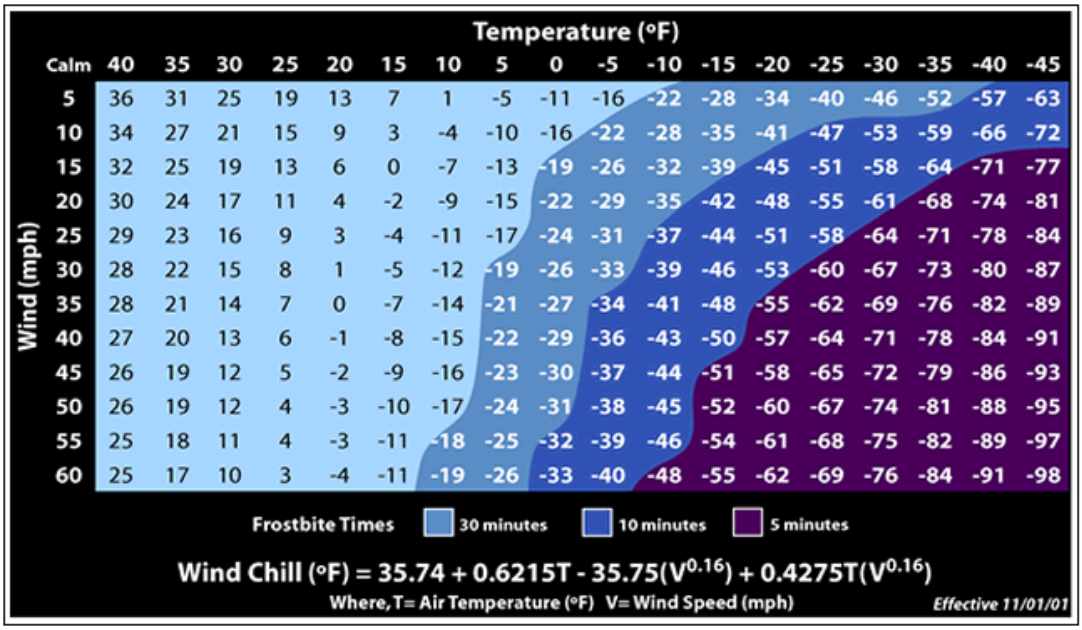
Heat Index



Extreme cold can cause hypothermia, an extreme lowering of the body's temperature, frostbite and death. Infants and the elderly are particularly at risk, but anyone can be affected. Other impacts of extreme cold include asphyxiation from toxic fumes from emergency heaters, household fires, which can be caused by fireplaces and emergency heaters, and frozen/burst water pipes. There are no specific data sources recording cold related deaths in east-central Kansas.

The following graph, from the NWS, shows wind chill values.

Wind Chill Values



Counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to extreme temperature events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.63: Kansas Region H Population Vulnerability Data for Extreme Temperatures

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	12.4%
Bourbon	14,757	-2.6%
Chautauqua	3,425	-14.5%
Cherokee	20,501	5.1%
Crawford	39,099	-15.1%
Elk	2,581	-2.9%
Greenwood	6,227	-10.3%
Labette	20,553	-3.5%
Montgomery	33,463	-10.2%
Neosho	16,209	13.4%
Wilson	8,858	-10.7%
Woodson	3,178	-16.1%

Source: US Census Bureau

Additionally, there is an increased likelihood of mortality for very young and very old populations due to extreme temperatures. The following table indicates the percentage of the total county population that may be considered especially vulnerable to extreme temperatures.

Table 4.64: Kansas Region H Vulnerable Population Vulnerability Data for Extreme Temperatures

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

In addition, extreme temperatures may exacerbate agricultural and economic losses. The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data for the five-year period 2014- 2018 (data set includes full years for 2014 and 2018) allows us to quantify the monetary impact of extreme temperature conditions on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to extreme temperature events.

Table 4.65: Extreme Temperature Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	82	0.03%	$38,156,000	$12,482	0.03%
Bourbon	334,301	30	0.01%	$53,376,000	$944	0.00%
Chautauqua	310,310	0	0.00%	$35,195,000	$0	0.00%
Cherokee	308,233	28	0.01%	$86,906,000	$1,190	0.00%
Crawford	323,222	2	0.00%	$75,594,000	$273	0.00%
Elk	316,385	57	0.02%	$42,070,000	$993	0.00%
Greenwood	701,012	192	0.03%	$89,554,000	$20,588	0.02%
Labette	370,531	139	0.04%	$122,778,000	$11,536	0.01%
Montgomery	335,669	72	0.02%	$79,420,000	$5,955	0.01%
Neosho	308,150	0	0.00%	$67,958,000	$0	0.00%
Wilson	254,671	0	0.00%	$55,422,000	$0	0.00%
Woodson	294,643	104	0.04%	$54,603,000	$10,851	0.02%

Source: USDA

4.12.5 – Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.66: Extreme Temperature Consequence Analysis

Subject	Impacts of Extreme Temperatures
Health and Safety of the Public	Depending on the duration of the event, impact is expected to be severe for unprepared and unprotected persons. Impact will be minimal to moderate for prepared and protected persons.
Health and Safety of Responders	Impact could be severe if proper precautions are not taken, i.e. hydration in heat, clothing in extreme cold. With proper preparedness and protection, the impact would be minimal.
Continuity of Operations	Minimal expectation for utilization of the COOP.
Property, Facilities, and Infrastructure	Impact to infrastructure could be minimal to severe depending on the temperature extremes.
Environment	The impact to the environment could be severe. Extreme heat and extreme cold could seriously damage wildlife and plants, trees, crops, etc.
Economic Conditions	Impacts to the economy will be dependent on how extreme the temperatures get, but only in the sense of whether people will venture out to spend money. Utility bills could increase causing more financial hardship.
Public Confidence in the Jurisdiction's Governance	Confidence will be dependent on how well utilities hold up as they are stretched to provide heat and cool air, depending on the extreme. Planning and response could be challenged.

4.13 – Flood

Floods are most common in seasons of rain and thunderstorms. Floods that threaten Kansas Region H can be generally classified under two categories:

- **Flash Flood:** The product of heavy, localized precipitation in a short time period over a given location
- **Riverine Flood:** Occurs when precipitation over a given river basin for a long period of time causes the overflow of rivers, streams, lakes and drains

4.13.1 – Location and Extent

Flash Flooding

The NWS provides the following definitions of warnings for actual and potential flood conditions for Flash Floods:

- **Flash Flood Watch**: Issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain or imminent.
- **Flash Flood Warning**: Issued to inform the public, emergency management and other cooperating agencies that flash flooding is in progress, imminent, or highly likely.
- **Flash Flood Statement**: In hydrologic terms, a statement by the NWS which provides follow-up information on flash flood watches and warnings.

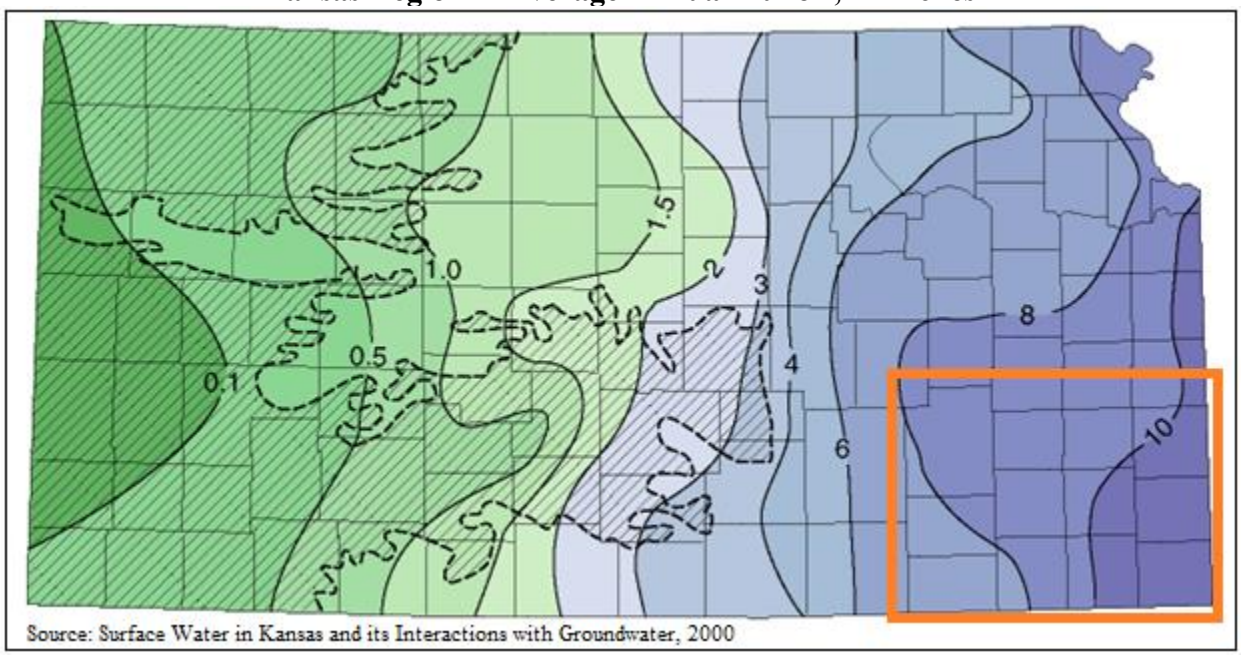
In general, flash flooding occurs in those locations in the planning area that are low-lying and/or do not have adequate drainage. Data from University of Kanas indicates that the average annual precipitation for Kansas Region H counties for 2017:

- Allen County: 37.87 inches
- Bourbon County: 44.64 inches
- Chautauqua County: 34.91 inches
- Cherokee County: 52.63 inches
- Crawford County: 52.74 inches
- Elk County: 35.03 inches
- Greenwood County: 29.80 inches
- Labette County: 47.97 inches
- Montgomery County: 46.32 inches
- Neosho County: 50.05 inches
- Wilson County: 32.78 inches
- Woodson County: 35.93 inches

This equates to a regional average of 41.72 inches of precipitation for 2017.

The following map illustrates the distribution of water runoff in Kansas. Surface runoff is water from rain or snowmelt that flows on the surface and does not percolate into the subsurface. In general, the higher the surface runoff, the higher the potential for flash flooding.

Kansas Region H Average Annual Runoff, In Inches



Riverine Flooding

In general, riverine flooding occurs from the overflow of rivers, streams, drains, and lakes due to excessive rainfall. The NWS provides the following definitions of warnings for actual and potential flood conditions for riverine flooding:

- **Flood Potential Outlook:** In hydrologic terms, a NWS outlook that is issued to alert the public of potentially heavy rainfall that could send rivers and streams into flood or aggravate an existing flood.
- **Flood Watch:** Issued to inform the public and cooperating agencies that current and developing hydro meteorological conditions are such that there is a threat of flooding, but the occurrence is neither certain nor imminent.
- **Flood Warning:** In hydrologic terms, a release by the NWS to inform the public of flooding along larger streams in which there is a serious threat to life or property. A flood warning will usually contain river stage (level) forecasts.
- **Flood Statement:** In hydrologic terms, a statement issued by the NWS to inform the public of flooding along major streams in which there is not a serious threat to life or property. It may also follow a flood warning to give later information.

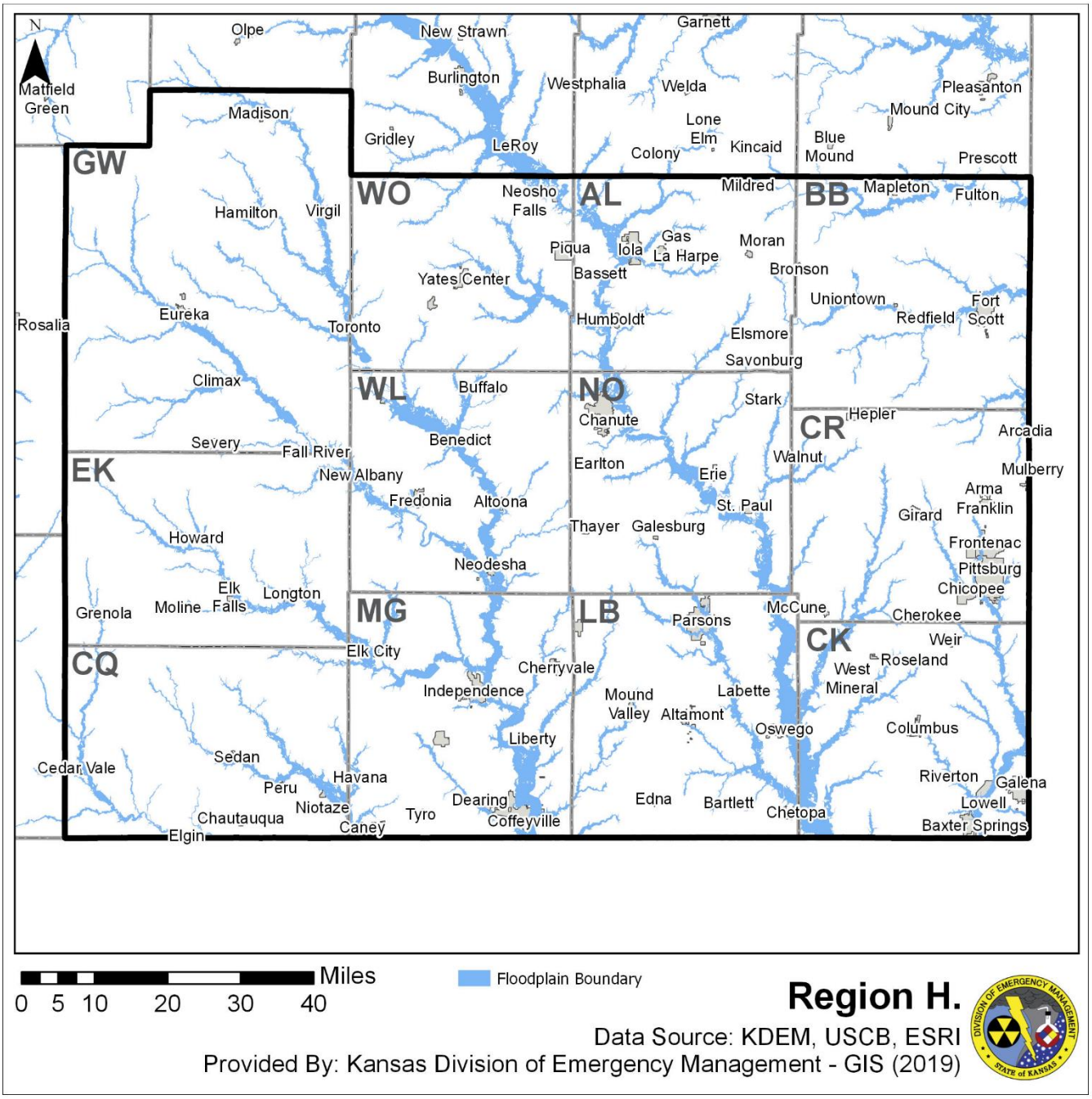
All areas of Kansas Region H located near a stream or river are at risk of riverine flooding. While riverine floods can and do occur at various levels, the one percent annual chance flood has been chosen as the basis for this risk assessment. This level is the accepted standard for flood insurance and regulatory purposes. In general, flood probability can be expressed by recurrence interval, the average period of time for a flood that equals or exceeds a given magnitude, expressed as a period of years. The probability of occurrence of a given flood can also be expressed as the odds of recurrence of one or more similar or bigger floods in a certain number of years. Large, catastrophic floods have a very low frequency or probability of occurrence, whereas smaller floods occur more often. The larger the number of years in a recurrence interval, the smaller the chances of experiencing that flood in a year. However, the odds are never zero, even very large, uncommon floods always have a very small chance of recurring every year. When reviewing flood probability, it is important to note that once a flood occurs its chance of recurring the next year remains the same.

Table 4.67: Flood Recurrence Interval Probability

Recurrence Interval, in Years	Probability of Occurrence in Any Given Year	Percent Chance of Occurrence in Any Given Year
100	1 in 100	1
50	1 in 50	2
25	1 in 25	4
10	1 in 10	10
5	1 in 5	20
2	1 in 2	50

Source: FEMA

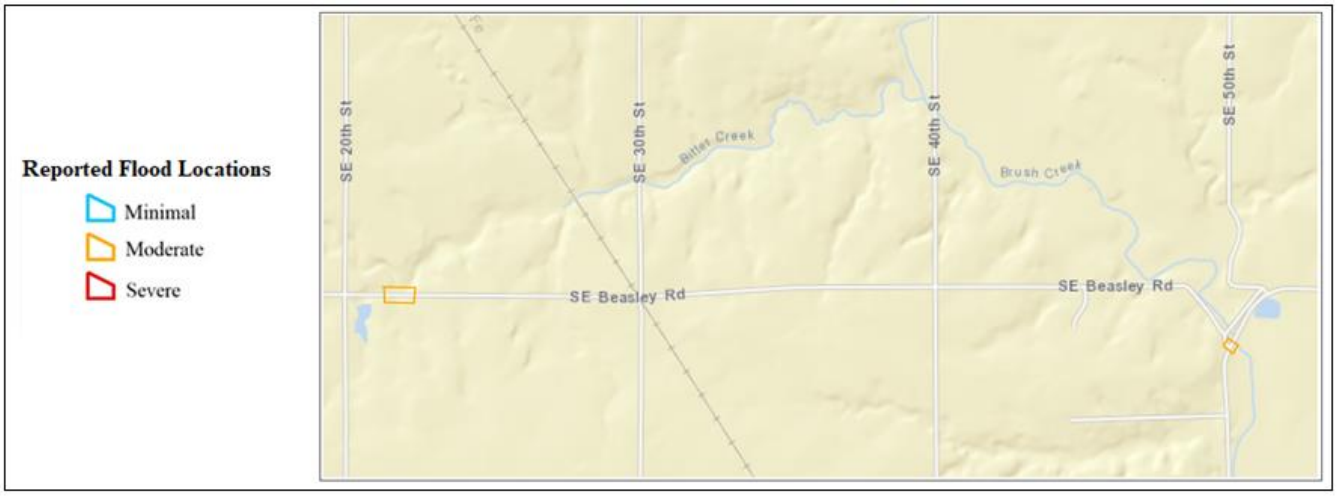
The following map, generated by KDEM using available data, depicts regional one percent annual flood areas.



Local Concerns

Many local jurisdictions are subject to areas of repeat flooding. In an effort to identify these areas the KDA, in conjunction with the USACE Silver Jackets, has created a mapping system under the Recurring Flood Identification Project. This system allows for the local mapping of known flood areas within regional jurisdictions. Three classifications of flooding areas are used, minimal moderate and severe. The following map indicates identified repeat flood areas within the region.

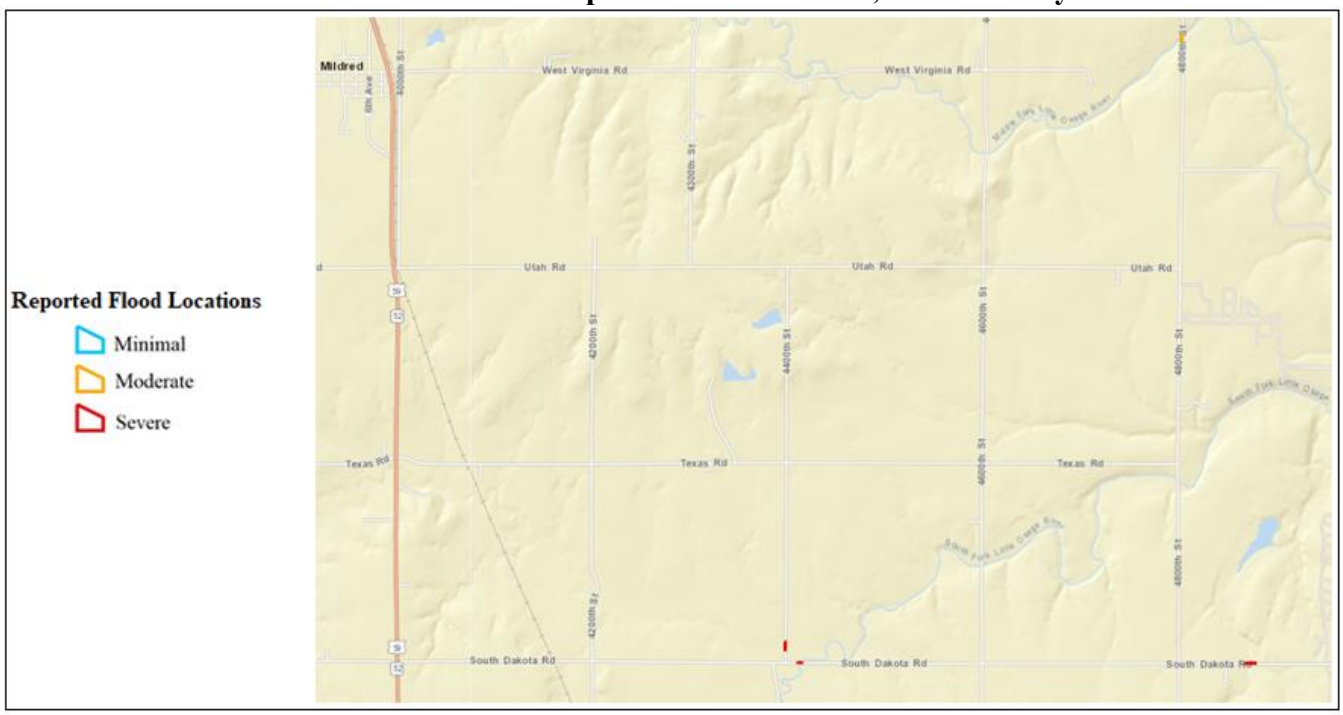
KDA/Silver Jackets Repeat Flood Location, Cherokee County



KDA/Silver Jackets Repeat Flood Location, Cherokee County

KDA/Silver Jackets Repeat Flood Location, Cherokee COunty

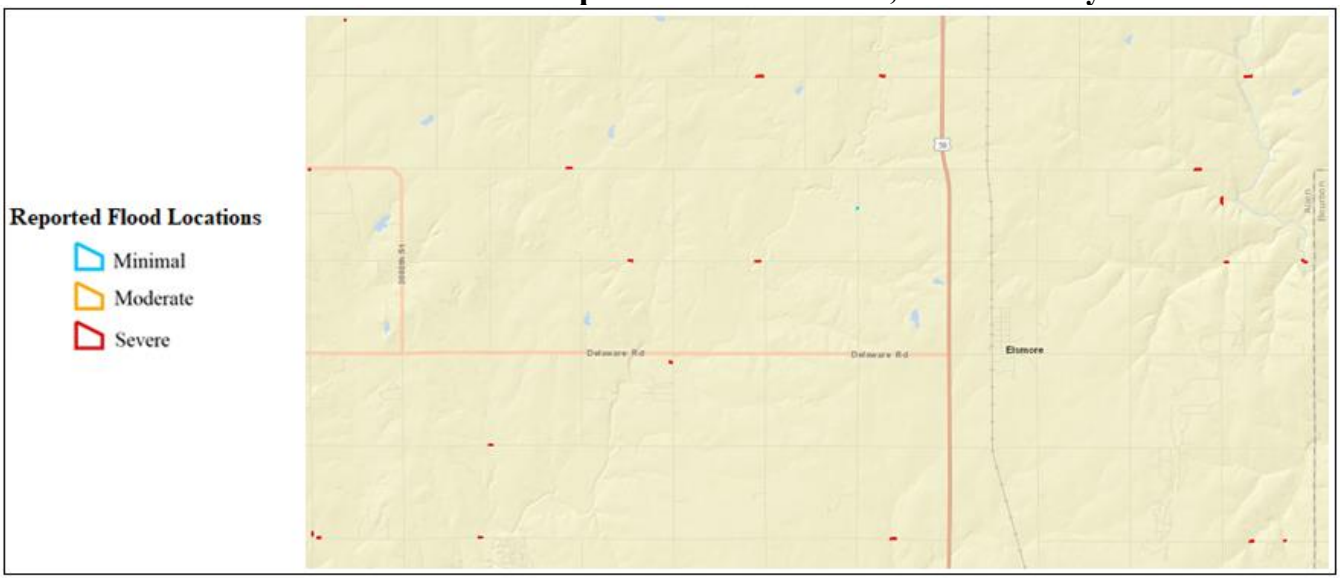
KDA/Silver Jackets Repeat Flood Locations, Allen County



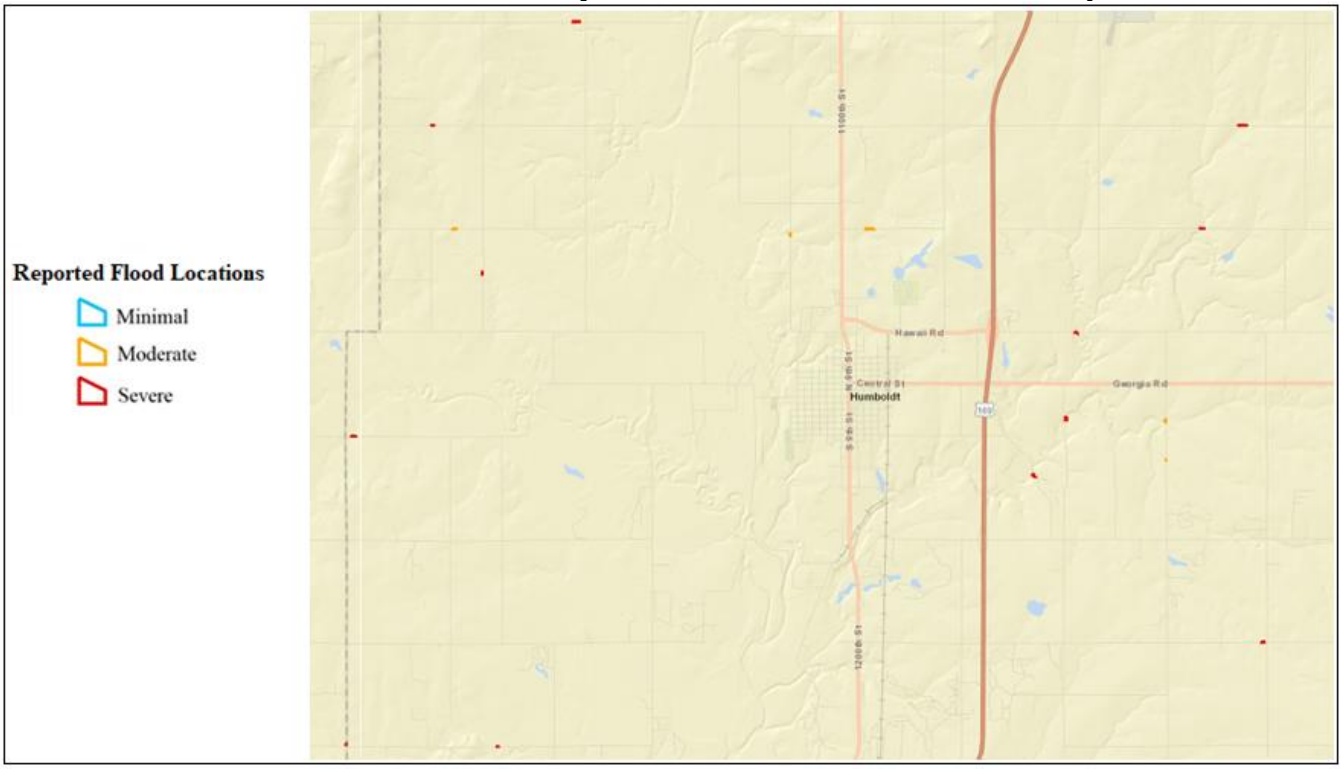
KDA/Silver Jackets Repeat Flood Locations, Allen County

KDA/Silver Jackets Repeat Flood Locations, Allen County

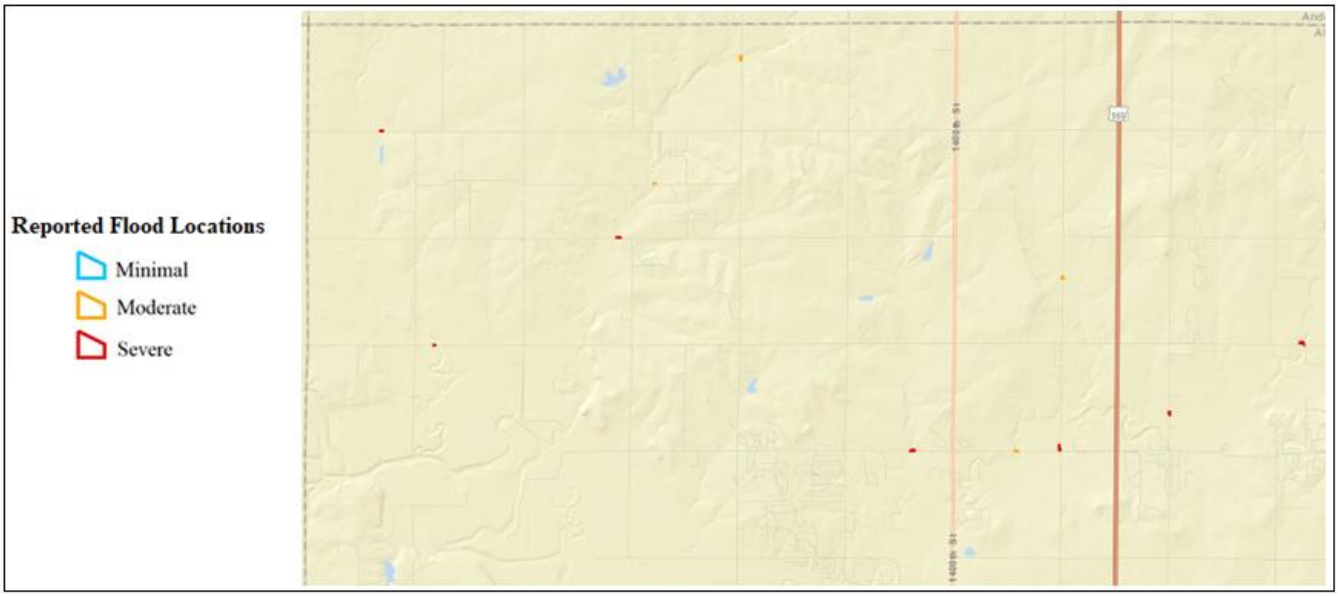
KDA/Silver Jackets Repeat Flood Locations, Allen County



KDA/Silver Jackets Repeat Flood Locations, Allen County



KDA/Silver Jackets Repeat Flood Locations, Allen County



In addition, information was solicited from participating jurisdictions on low water crossings and roads or areas of concern for flooding. The following tables details provided information.

Table 4.68: Bourbon County Low Water Crossings

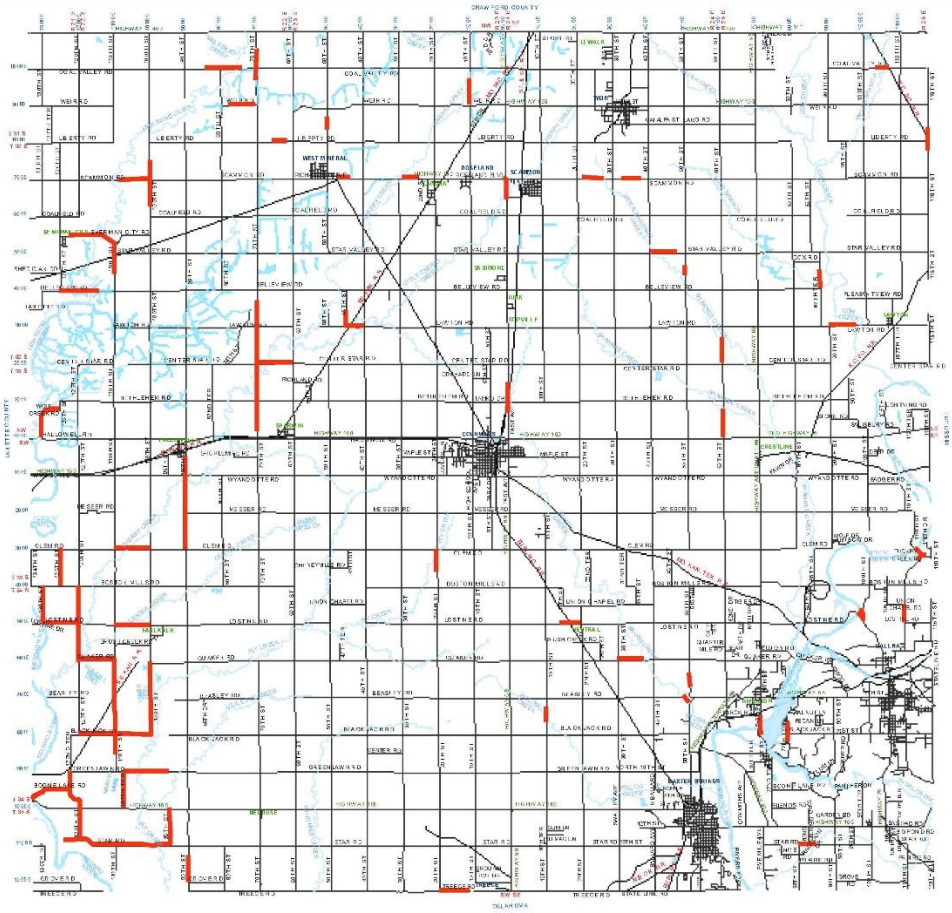
Location
Wagon Road between 215th and 205th
Overbrook between 195th and 7 Highway.
135th between Quail and Poplar
Xavier between 250th and 265th
45th between Juniper and Jayhawk
Hackberry between 80th and 95th
80th between Hackberry and Grand
Deer between 250th and 260th
Osage between 75th and 85th
Kansas and 45th go South
135th between Grand and Fern
Calvary between 250th and 260th
Calvary between 260th and 267th
260th between Calvary and Deer
145th between Arrowhead and Birch
140th between 39 Highway and Eagle
Fern East of 3 Highway
Birch between 3 Highway and 90th
60th between 39 Highway and Eagle
Grand between 50th and 60th
Grand between 50th and 40th

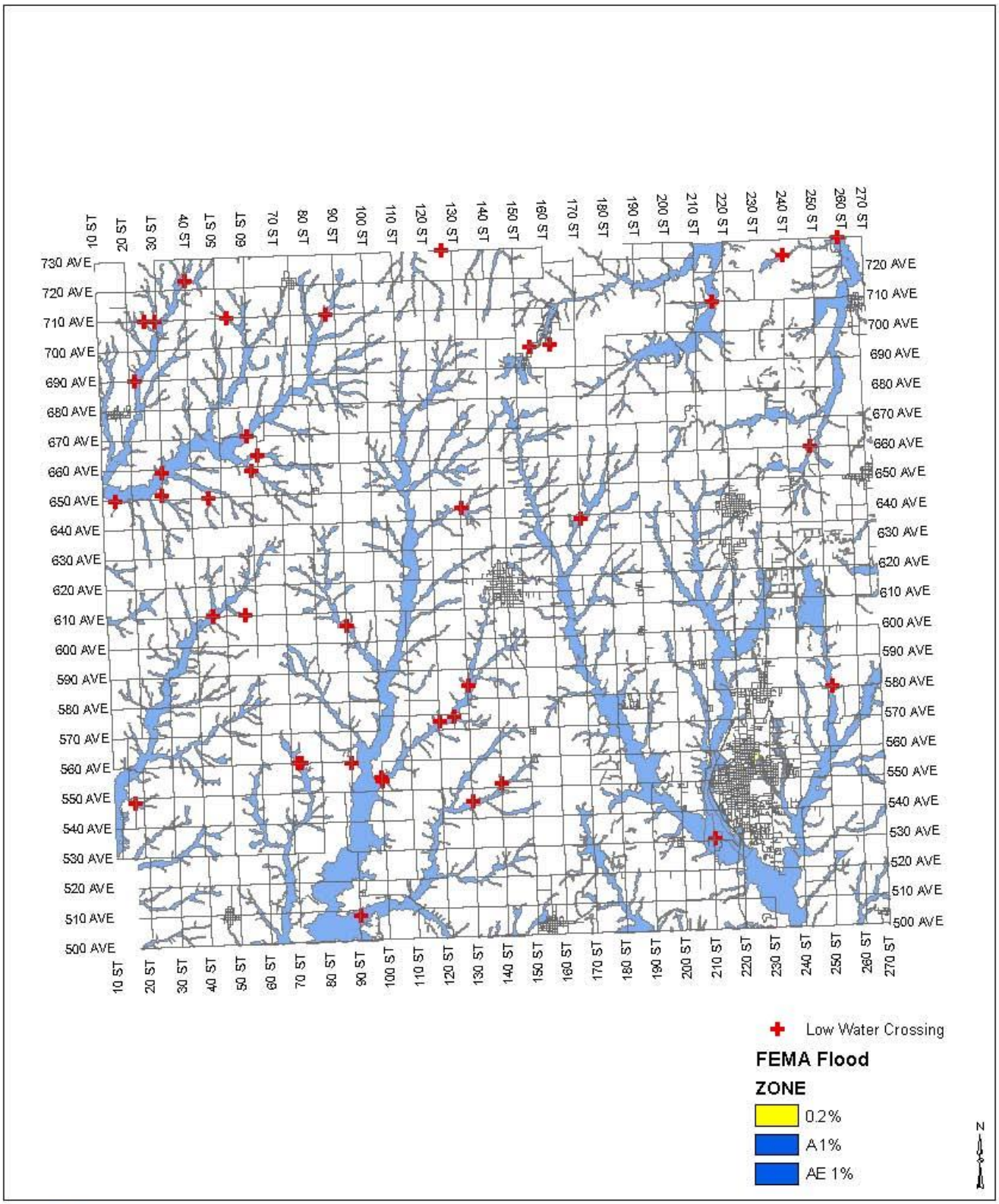
Table 4.69: Elk County Low Water Crossings, Roads, and Areas of Concern, Flooding

Local Name	Area Location	Type
Green Ranch	Pioneer Road, 2 miles west of Road 6	Bridge
Indigo	Indigo Road, 1/2 mile between 31 and 32	Creek Crossing
Road 31	1/8th mile north of Rock Road	Tube
Quail	1/4 mile east of 14	Tube
RD 24	1/2 mile north of Antler (24 and Blackjack)	Tube
Angus	1/2 mile east of Rd 10	Tube
Hawk, X2 (Augustine)	1/8 and 1/4 mile west of Rd 22	Two Bridges
River Road	1/4 mile south of Grain	Low Road Area
River Road	1/8 mile west of Junebug intersection	Low Road Area
Road 12	1 mile north of Indigo	Tube

Cherokee County High Water Roads

CHEROKEE COUNTY HIGHWATER ROADS





Crawford County
KANSAS

DISCLAIMER: This is a product of the Crawford County GIS Department. The data displayed hereon has been developed with cooperation from other county agencies, as well as other federal/state and local government agencies. Crawford County disclaims responsibility for any maps or liability that may stem from use of this map. THIS DOCUMENT DOES NOT CONSTITUTE A LEGAL SURVEY. Any resale of this information is prohibited.

Crawford County, KS
FEMA Flood Zones &
Low Water Crossings

1 inch = 21,167 feet

Projection: Lambert Conformal Conic

Date of Printing: Feb. 2019

Greenwood County Low Water Crossing Roads

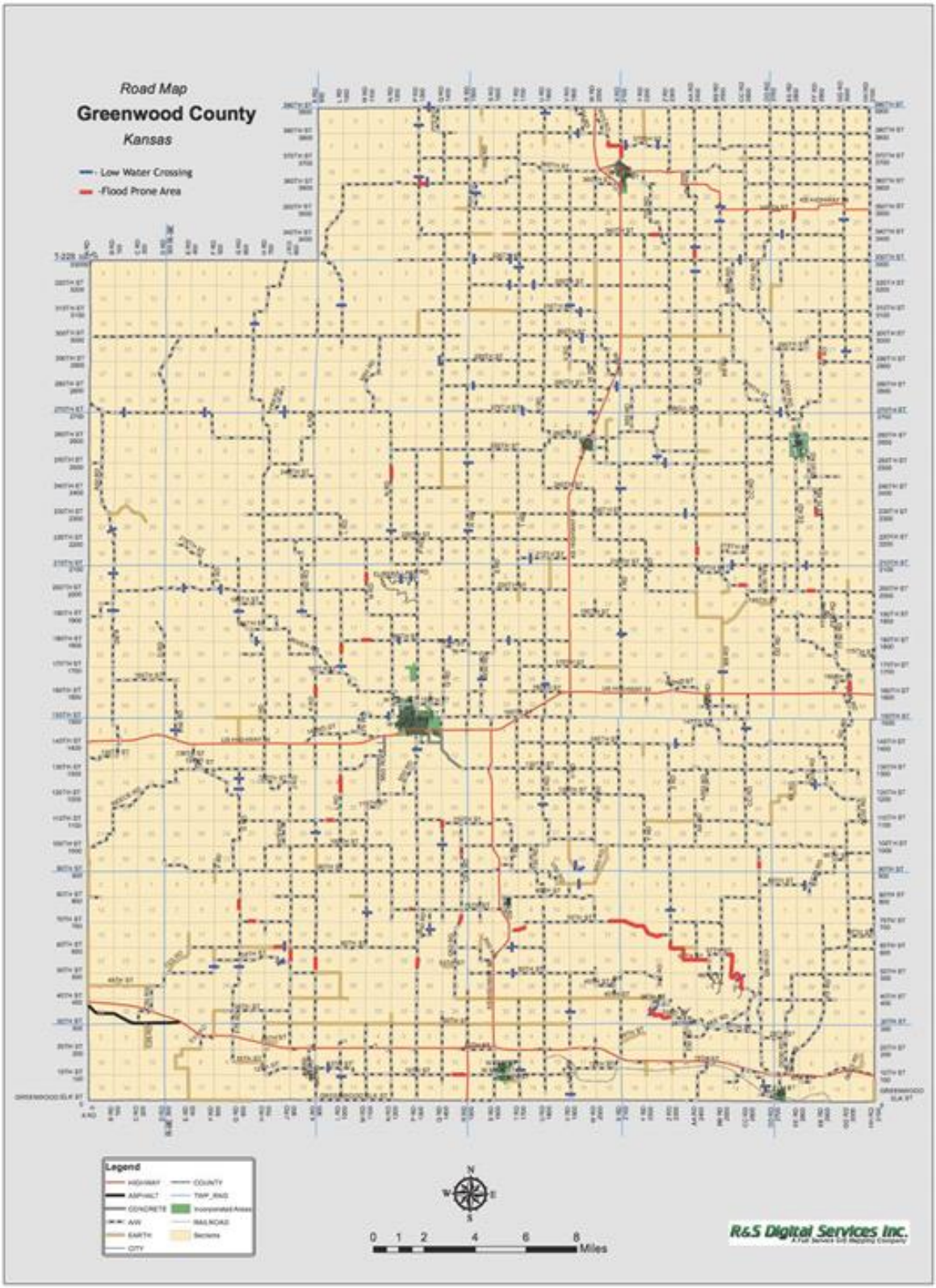


Table 4.70: Greenwood County Low Water Crossings, Roads, and Areas of Concern, Flooding

County	Road or Area	Location
Greenwood	20th	Quail Creek – Sunflower
Greenwood	60th	Limestone – Mustang
Greenwood	70th	Chisholm Trail – Diamond
Greenwood	80th	Diamond – Eagle
Greenwood	90th	Falcon – Goldenrod
Greenwood	140th	Upland – Hwy 77
Greenwood	160th	Indigo – Jade
Greenwood	190th	Quail Creek – Remington
Greenwood	250th	Upland – Ulysses
Greenwood	260th	Old Mill – Pawnee
Greenwood	290th	Old Mill – Pawnee, Pawnee – Remington, Remington – Sunflower, Upland – Vista
Greenwood	330th	Eagle – Falcon
Greenwood	Bison	300th – 310th
Greenwood	Bluestem	230th – 235th
Greenwood	Diamond	70th – 80th
Greenwood	Old Mill	150th – 160th
Greenwood	Kanza	150th – 175th
Greenwood	Lakeshore Drive	Inlet/Outlet
Greenwood	Nighthawk	110th – 130th and 170th – 190th
Greenwood	Quail Creek	170th – 180th and 290th – 300th
Greenwood	Remington	10th – 20th and 220th – 240th
Greenwood	Sunflower	160th – 180th
Greenwood	Timber	130th – 140th and 340th – 350th

Source: Local Jurisdictions

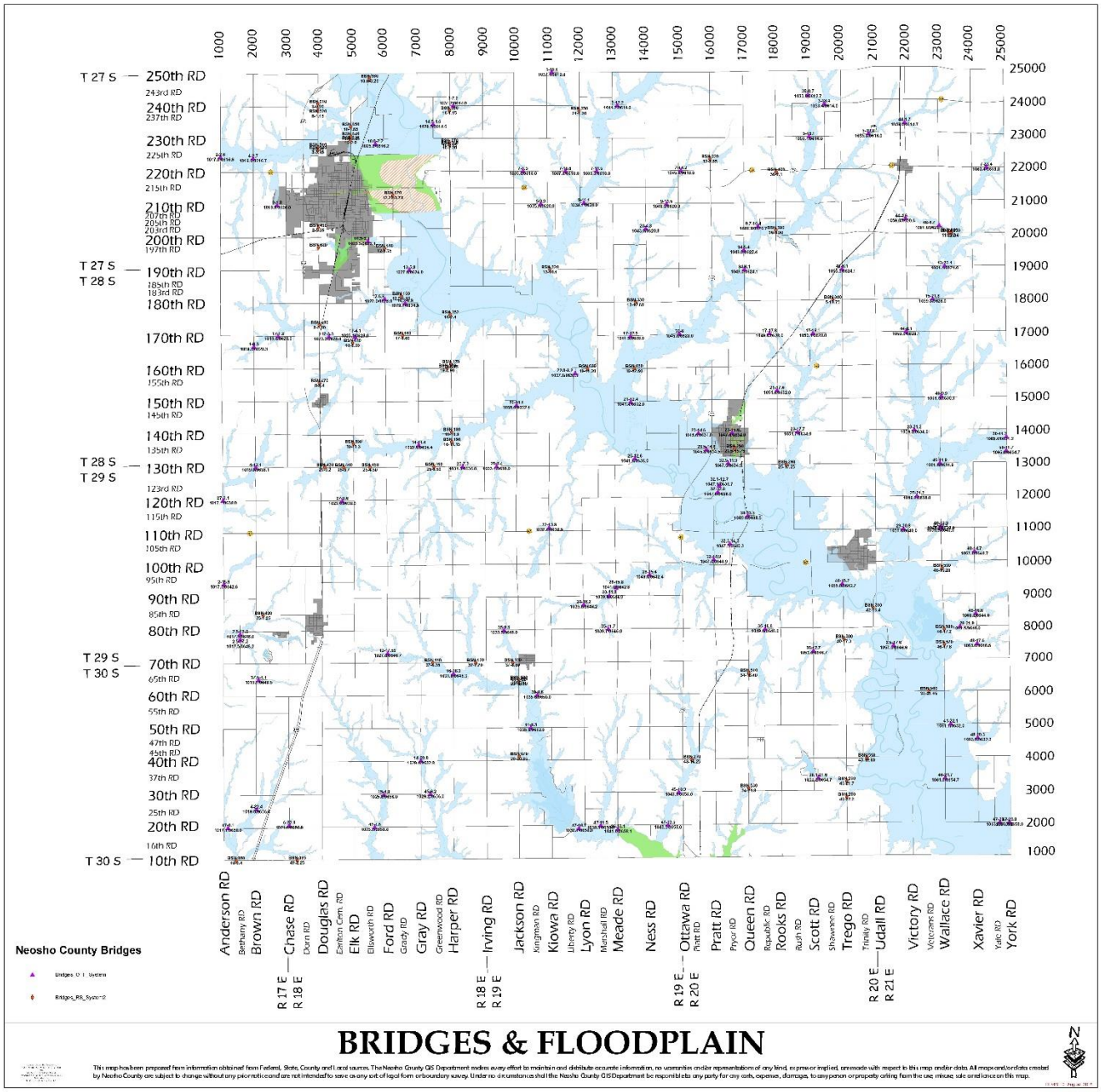

BRIDGES & FLOODPLAIN
Neosho County Bridges
T 27 S
T 28 S
T 29 S
T 30 S
250th RD
240th RD
230th RD
220th RD
210th RD
200th RD
190th RD
180th RD
170th RD
160th RD
150th RD
140th RD
130th RD
120th RD
110th RD
100th RD
90th RD
80th RD
70th RD
60th RD
50th RD
40th RD
30th RD
20th RD
10th RD
Anderson RD
Brown RD
Chase RD
Douglas RD
Elk RD
Ford RD
Gray RD
Harper RD
Irving RD
Jackson RD
Kiowa RD
Lyon RD
Meade RD
Ness RD
Ottawa RD
Pratt RD
Queen RD
Rooks RD
Scott RD
Trego RD
Udall RD
Victory RD
Wallace RD
Xavier RD
York RD
R 17 E
R 18 E
R 19 E
R 20 E
R 21 E

Table 4.71: Wilson County Low Water Crossings, Roads, and Areas of Concern, Flooding

Local Name	Area Location	Latitude	Longitude
Blinn's Crossing	NW of New Albany	37.582396	-95.956044
Cook's Bridge	W of New Albany	37.568595	-95.949095
Baker Crossing	W of Fredonia	37.53141	-95.924551
Mill Dam	SW of Fredonia	37.513662	-95.849674
Dougan's Ford	S of Fredonia	37.485733	-95.810857
-	1975 & Edwards S 3/4	37.654704	-95.887554
-	1800 & Edwards N 1 1/2	37.652207	-95.885116
-	1500 & Lane N 8/10th	37.615011	-95.762578
-	SE of Benedict	37.592868	-95.728757
-	1400 & Quinter E 3/8	37.573424	-95.654844
-	10 Rd & Lane 4/10th	37.733853	-95.754023
-	10 Rd & Lane E 1/2	37.733855	-95.752555
-	1300 & Thomas E2/3	37.558836	-95.602921
-	1200 & Scott W3/4	37.544513	95.645604
-	1400 & Udall W of Intersection	37.573271	-95.597951
-	1200 & Thomas S 1/4	37.539777	-95.61551
-	1500 & Viola S 1/4	37.583283	-95.579742
-	2100 & Wichita N of Intersection	37.675051	-95.562369
-	Hwy 39 & Wichita S 1/4	37.686683	-95.562007
-	Hwy 47 & Scott S 1/8	37.528713	-95.633759
-	950 & Reno E 3/8	37.508064	-95.644689
-	900 & Thomas S 1/4	37.49603	-95.615341
-	800 & Gove W 1/4	37.48658	-95.858053
-	700 & Gove W 3/8	37.471984	-95.8616
-	850 & Ottawa E 1/2	37.49371	-95.695731

Source: Local Jurisdictions

4.13.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 15 Presidential Disaster Declarations for Kansas Region H for floods (along with other associates hazard events such as tornados or severe storms). The following 20-year information (with 1999 and 2018 being full data years)(with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on flood events that have impacted Kansas Region H. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.72: Kansas Region H FEMA Flood Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4319	06/16/2017 (04/28/2017 – 05/03/2017)	Severe Winter Storm, Snowstorm, Straight-line Winds, **Flooding**	Crawford and Neosho (Snow Assistance, Greenwood)	$53,126,486
4287	10/20/2016 (09/02/2016 – 09/12/2016)	Severe Storms and **Flooding**	Greenwood	$6,959,536

Table 4.72: Kansas Region H FEMA Flood Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4230	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, Tornados, Straight-Line Winds, and **Flooding**	Chautauqua, Cherokee, Elk, Greenwood, and Neosho	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	Severe Storms, Straight-line Winds, Tornados, and **Flooding**	Bourbon, Butler, Cherokee, Crawford, Elk, Greenwood, Montgomery, Wilson, and Woodson	$1,102,861 (Estimate)
1932	08/10/2010 (6/7-7/21/2010)	Severe Storms, **Flooding** and Tornados	Elk, Greenwood, Wilson and Woodson	$9,279,257
1860	09/30/2009 (7/8-7/14/2009)	Severe Storms and **Flooding**	Bourbon	$3,347,662
1849	06/25/2009 (4/25-5/16/2009)	Severe Storms, **Flooding**, Straight-Line Winds, and Tornados	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Greenwood, Labette, Montgomery, and Wilson	$15,013,488
1808	10/31/2008	Severe Storms, **Flooding**, and Tornados	Greenwood	$4,167,044
1776	07/09/2008	Severe Storms, **Flooding**, and Tornados	Bourbon, Chautauqua, Cherokee, Crawford, Elk, Montgomery, and Wilson	$70,629,544
1711	7/2/2007 (6/26-30/2007)	Severe Storms and **Flooding**	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Elk, Greenwood, Labette, Montgomery, Neosho, Wilson, and Woodson	$40,238,600
1699	5/6/2007 (5/4/2007)	Severe Storms, Tornados, and **Flooding**	Cherokee	$117,565,269
1600	8/23/2005 (6/30-7/1/2005)	Severe Storms and **Flooding**	Cherokee, Crawford, Neosho	$4,344,569
1579	2/8/2005 (1/4-6/2005)	Severe Winter Storm, Heavy Rains, and **Flooding**	Chautauqua, Crawford, Elk, Greenwood, Harper, and Woodson	$106,873,672
1535	8/3/2004 (6/12-7/25/2004)	Severe Storms, **Flooding**, and Tornados	Cherokee and Woodson	$12,845,892
1462	5/6/2003 (5/4-30/2003)	Severe Storms, Tornados, and **Flooding**	Allen, Cherokee, Labette, Neosho and Woodson	$988,056

Source: FEMA
-: Data unavailable

The following provides details of the three Presidential Disaster Declarations for Kansas Region H since the last plan update in 2014.

Kansas – Severe Winter Storm, Snowstorm, Straight-Line Winds, and Flooding
FEMA-4319-DR
Declared June 16, 2017

On May 31, 2017, Governor Sam Brownback requested a major disaster declaration due to a severe winter storm, snowstorm, straight-line winds, and flooding during the period of April 28 to May 3, 2017. The Governor requested a declaration for Public Assistance for 29 counties, snow

assistance for 9 counties, and Hazard Mitigation statewide. During the period of May 8-21, 2017, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On June 16, 2017, President Trump declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe winter storm, snowstorm, straight-line winds, and flooding in Cherokee, Cheyenne, Crawford, Decatur, Finney, Gove, Graham, Grant, Greeley, Hamilton, Haskell, Kearny, Lane, Logan, Morton, Neosho, Norton, Rawlins, Scott, Seward, Sheridan, Sherman, Stanton, Stevens, Thomas, Wallace, and Wichita Counties. This declaration also authorized snow assistance for a period of 48 hours for Greeley, Hamilton, Lane, Logan, Morton, Scott, Thomas, and Wallace Counties. Finally, this declaration made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

Kansas – Severe Storms and Flooding
FEMA-4287-DR
Declared October 20, 2016

On October 10, 2016, Governor Sam Brownback requested a major disaster declaration due to severe storms and flooding during the period of September 2-12, 2016. The Governor requested a declaration for Public Assistance for 11 counties and Hazard Mitigation statewide. During the period of September 28 to October 7, 2016, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On October 20, 2016, President Obama declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms and flooding in Cheyenne, Bourbon, Ellis, Graham, Greenwood, Crawford, Norton, Rooks, Russell, Neosho, and Wilson Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

Kansas – Severe Storms, Tornados, Straight-Line Winds, and Flooding
FEMA-4230-DR
Declared July 20, 2015

On July 1, 2015, Governor Sam Brownback requested a major disaster declaration due to severe storms, tornados, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The Governor requested a declaration for Public Assistance, including direct federal assistance for 42 counties and Hazard Mitigation statewide. During the period of May 4 to June 27, 2015, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On July 20, 2015, President Obama declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, tornados, straight-line winds, and flooding in Atchison, Barton, Brown, Allen, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Bourbon, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Chautauqua, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Greenwood, Marshall, Elk, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Montgomery, Stevens, Wilson, Wabaunsee, and Washington Counties. Direct Federal assistance was also authorized. Finally, this declaration made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

In addition to the above reported events, the following table presents NOAA NCEI identified flood events and the resulting damage totals in Kansas Region H for the period 2009 - 2018 (with 2009 and 2018 being full data set years).

Table 4.73: Kansas Region H NCEI Flood and Flash Flood Events, 2009 - 2018

County	Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Allen	Flood	10	$745,600	0	0
	Flash Flood	8	$706,600	0	0
Bourbon	Flood	3	$0	0	0
	Flash Flood	18	$5,000	0	0
Chautauqua	Flood	9	$400	0	0
	Flash Flood	3	$100	0	0
Cherokee	Flood	10	$1,270,000	0	0
	Flash Flood	38	$405,000	0	0
Crawford	Flood	2	$0	0	0
	Flash Flood	18	$267,000	0	0
Elk	Flood	5	$500	0	0
	Flash Flood	3	$200	0	0
Greenwood	Flood	13	$16,300	1	0
	Flash Flood	7	$20,600	0	0
Labette	Flood	12	$500,200	0	0
	Flash Flood	11	$10,100	0	0
Montgomery	Flood	15	$25,400	1	0

Table 4.73: Kansas Region H NCEI Flood and Flash Flood Events, 2009 - 2018

County	Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
	Flash Flood	12	$30,400	2	0
Neosho	Flood	7	$200,100	0	0
	Flash Flood	6	$12,100	0	0
Wilson	Flood	5	$300	0	0
	Flash Flood	10	$150,600	0	0
Woodson	Flood	2	$100	0	0
	Flash Flood	7	$800	0	0

Source: FEMA

The following provides both **local accounts** and NOAA NCEI descriptions of notable recorded events:

- **August 14, 2018: Elk City Lake, Montgomery County**
  Torrential rains within a bowl-shaped landscape produced catastrophic flooding of Racket Creek. Rainfall amounts up to 8.5 inches fell in an isolated area in which the creek ran between a pair of elevated regions causing significant and rapid rises of the creek. Water was estimated to be approximately 4 feet above road level and rushing rapidly. It was reported that the gentlemen were driving a pickup and may have encountered an obstacle in the rushing waters causing them to stop. The rushing waters overcame the vehicle and swept it off of the road and into the creek channel. It was estimated that the depth of the creek base to the roadway was about 15 to 20 feet.

- **October 6, 2016: Iola, Allen County**
  Widespread flooding occurred in Iola. High water approached several homes. The fire department assisted evacuating residents from their homes. Multiple cars were reported stranded due to the high water. Property damage was recorded at $500,000.

- **October 6, 2016: Eureka, Greenwood County**
  The Emergency manager reported widespread flooding across the southern half of Greenwood county. Numerous rural roads were reported impassible. Water was also reported covering portions of US Highway 99 and US Highway 400. Crop damage was recorded at $100,000.

- **December 28, 2015: Cherokee County**
  There were numerous low water crossings and rural roads that were flooded. Several homes and businesses were flooded. There was significant to extreme flooding along Shoal Creek and the Spring River around Galena to Baxter Spring's. Property damage was recorded at $750,000.

- **July 30, 2013: Scammon, Cherokee County**
  At least two homes in Scammon were flooded and evacuated. Property damage was recorded at $250,000.

- **July 30, 2013: Girard, Crawford County**

Numerous travel trailers at the fairgrounds near Girard were flooded with estimated depth of three to four feet. Property damage was recorded at $250,000.

- **April 29, 2012: Caney, Montgomery County**
  Very heavy rains moved across the county causing significant travel problems due to hydroplaning and flooding of low-lying areas. Creeks and streams had risen to the top of their banks and some ponding of water on the roads was noted. Unfortunately, an individual hydroplaned off the roadway and into a creek. Their vehicle was trapped under the bridge and they lost their life.

- **April 30, 2009: Chanute, Neosho County**
  Continued runoff from a couple heavy rainfall episodes from the 26th through the 30th produced river flooding along the Neosho River, and its associated tributaries across Neosho county. Several rural and some city roads were closed due to high water. The river flooding along the Neosho extended into the early morning hours of May 2nd. Property damage was recorded at $200,000.

- **April 28, 2009: Fall River, Greenwood County**
  Heavy rainfall from numerous thunderstorms during the afternoon, evening and overnight hours on the 26th produced widespread flooding across much of Greenwood county. Numerous roads remained submerged and consequently closed through early on the 28th from the high water. A 20-year-old Yates Center man died when the vehicle he was riding in drove into a flooded section of road caused by the swollen Verdigris River near DD and 200th Road west of Quincy.

- **April 27, 2009: Parson, Labette County**
  Continued runoff from a couple heavy rainfall episodes from the 26th through the 30th produced areal flooding across portions of Labette county, as well as river flooding along the Neosho River, and its associated tributaries. Several rural and some city roads were closed due to high water. Trailer homes along the Neosho River on Highway 400 near Parsons were partially submerged. Flooding extended into the evening hours of May 4th. Sadly, two people were killed sometime during the overnight hours of the 27th or the early morning hours of the 28th, after attempting to traverse a flooded low water bridge crossing in their vehicle due to the swollen Pumpkin Creek just east of Mound Valley on 15000 Road. The strong current swept their vehicle 200 feet downstream, likely trapping the two victims. The vehicle was found overturned and submerged in about 10 feet of water.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of flooding on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates 52 flooding related claims on 3,936 acres for $522,406.

Table 4.74: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Flooding

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	6	370	$59,705
Bourbon	0	0	$0
Chautauqua	0	0	$0
Cherokee	14	1,225	$162,057
Crawford	2	19	$1,279

Table 4.74: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Flooding

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Elk	0	0	$0
Greenwood	6	801	$121,810
Labette	8	1,077	$148,282
Montgomery	1	70	$0
Neosho	6	38	$2,131
Wilson	4	114	$3,422
Woodson	5	222	$23,720

Source: USDA Farm Service Agency

4.13.3 – Hazard Probability Analysis

The following table summarizes riverine flood probability data for **Allen County**.

Table 4.75: Allen County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	10
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$745,600
Average Property Damage per Year	$74,560

Source: NCEI

Data from the NCEI indicates that Allen County can expect on a yearly basis, relevant to riverine flood events:

- One event
- No deaths or injuries
- $74,560 in property damages

The following table summarizes flash flood probability data for **Allen County**.

Table 4.76: Allen County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	8
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$706,600
Average Property Damage per Year	$70,660

Source: NCEI

Data from the NCEI indicates that Allen County can expect on a yearly basis, relevant to flash flood events:

- <1 event
- No deaths or injuries
- $70,660 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Allen County**

Table 4.77: Allen County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	6
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	370
Average Number of Acres Damaged per Year	74
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$59,705
Average Crop Damage per Year	$11,941

Source: USDA

According to the USDA Risk Management Agency, Allen County can expect on a yearly basis, relevant to flooding occurrences:

- One insurance claim
- 74 acres impacted
- $11,941 in insurance claims

The following table summarizes riverine flood probability data for **Bourbon County**.

Table 4.78: Bourbon County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0

Source: NCEI

Data from the NCEI indicates that Bourbon County can expect on a yearly basis, relevant to riverine flood events:

- <1 event
- No deaths or injuries
- $0 in property damages

The following table summarizes flash flood probability data for **Bourbon County**.

Table 4.79: Bourbon County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	18
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$5,000
Average Property Damage per Year	$500

Source: NCEI

Data from the NCEI indicates that Bourbon County can expect on a yearly basis, relevant to flash flood events:

- Two event s
- No deaths or injuries
- $500 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Bourbon County**

Table 4.80: Bourbon County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: USDA

According to the USDA Risk Management Agency, Bourbon County can expect on a yearly basis, relevant to flooding occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes riverine flood probability data for **Chautauqua County**.

Table 4.81: Chautauqua County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	9
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$400
Average Property Damage per Year	$40

Source: NCEI

Data from the NCEI indicates that County can expect on a yearly basis, relevant to riverine flood events:

- One event
- No deaths or injuries
- $40 in property damages

The following table summarizes flash flood probability data for **Chautauqua County**.

Table 4.82: Chautauqua County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$100
Average Property Damage per Year	$10

Source: NCEI

Data from the NCEI indicates that Chautauqua County can expect on a yearly basis, relevant to flash flood events:

- <1 event
- No deaths or injuries
- $10 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Chautauqua County**

Table 4.83: Chautauqua County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: USDA

According to the USDA Risk Management Agency, Chautauqua County can expect on a yearly basis, relevant to flooding occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes riverine flood probability data for **Cherokee County**.

Table 4.84: Cherokee County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	10
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$1,270,000
Average Property Damage per Year	$127,000

Source: NCEI

Data from the NCEI indicates that County can expect on a yearly basis, relevant to riverine flood events:

- One events
- No deaths or injuries
- $127,000 in property damages

The following table summarizes flash flood probability data for **Cherokee County**.

Table 4.85: Cherokee County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	38
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$405,000
Average Property Damage per Year	$40,500

Source: NCEI

Data from the NCEI indicates that Cherokee County can expect on a yearly basis, relevant to flash flood events:

- Four events
- No deaths or injuries
- $40,500 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Cherokee County**

Table 4.86: Cherokee County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	14
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	1,225
Average Number of Acres Damaged per Year	245
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$162,057
Average Crop Damage per Year	$32,411

Source: USDA

According to the USDA Risk Management Agency, Cherokee County can expect on a yearly basis, relevant to flooding occurrences:

- Three insurance claims
- 245 acres impacted
- $32,411 in insurance claims

The following table summarizes riverine flood probability data for **Crawford County**.

Table 4.87: Crawford County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	2
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0

Source: NCEI

Data from the NCEI indicates that Crawford County can expect on a yearly basis, relevant to riverine flood events:

- <1 event
- No deaths or injuries
- $0 in property damages

The following table summarizes flash flood probability data for **Crawford County**.

Table 4.88: Crawford County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	18
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$267,000
Average Property Damage per Year	$26,700

Source: NCEI

Data from the NCEI indicates that Crawford County can expect on a yearly basis, relevant to flash flood events:

- Two event s
- No deaths or injuries
- $26,700 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Crawford County**

Table 4.89: Crawford County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	2
Average Number of Claims per Year	<1
USDA Farm Serv184ice Agency Number of Acres Damaged (2014-2018)	19
Average Number of Acres Damaged per Year	4
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$1,279
Average Crop Damage per Year	$256

Source: USDA

According to the USDA Risk Management Agency, Crawford County can expect on a yearly basis, relevant to flooding occurrences:

- <1 insurance claim
- Four acres impacted
- $256 in insurance claims

The following table summarizes riverine flood probability data for **Elk County**.

Table 4.90: Elk County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	5
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$500
Average Property Damage per Year	$50

Source: NCEI

Data from the NCEI indicates that Elk County can expect on a yearly basis, relevant to riverine flood events:

- One event
- No deaths or injuries
- $50 in property damages

The following table summarizes flash flood probability data for **Elk County**.

Table 4.91: Elk County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$200
Average Property Damage per Year	$20

Source: NCEI

Data from the NCEI indicates that Elk County can expect on a yearly basis, relevant to flash flood events:

- <1 event
- No deaths or injuries
- $20 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Elk County**

Table 4.92: Elk County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: USDA

According to the USDA Risk Management Agency, Elk County can expect on a yearly basis, relevant to flooding occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes riverine flood probability data for **Greenwood County**.

Table 4.93: Greenwood County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	13
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	1
Average Number of Days with a Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$16,300
Average Property Damage per Year	$1,630

Source: NCEI

Data from the NCEI indicates that Greenwood County can expect on a yearly basis, relevant to riverine flood events:

- One event
- <1 death or injury
- $1,630 in property damages

The following table summarizes flash flood probability data for **Greenwood County**.

Table 4.94: Greenwood County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	7
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$20,600
Average Property Damage per Year	$2,060

Source: NCEI

Data from the NCEI indicates that Greenwood County can expect on a yearly basis, relevant to flash flood events:

- One event
- No deaths or injuries
- $2,060 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Greenwood County**

Table 4.95: Greenwood County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	6
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	801
Average Number of Acres Damaged per Year	160
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$121,810
Average Crop Damage per Year	$24,362

Source: USDA

According to the USDA Risk Management Agency, Greenwood County can expect on a yearly basis, relevant to flooding occurrences:

- One insurance claim
- 160 acres impacted
- $24,362 in insurance claims

The following table summarizes riverine flood probability data for **Labette County**.

Table 4.96: Labette County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	12
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$500,200
Average Property Damage per Year	$50,020

Source: NCEI

Data from the NCEI indicates that Labette County can expect on a yearly basis, relevant to riverine flood events:

- One event
- No deaths or injuries
- $50,020 in property damages

The following table summarizes flash flood probability data for **Labette County**.

Table 4.97: Labette County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	11
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$10,100
Average Property Damage per Year	$1,010

Source: NCEI

Data from the NCEI indicates that Labette County can expect on a yearly basis, relevant to flash flood events:

- One event
- No deaths or injuries
- $1,010 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Labette County**

Table 4.98: Labette County Flooding Agricultural Probability Summary

2Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	8
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	1,077
Average Number of Acres Damaged per Year	215
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$148,282
Average Crop Damage per Year	$29,656

Source: USDA

According to the USDA Risk Management Agency, Labette County can expect on a yearly basis, relevant to flooding occurrences:

- Two insurance claims
- 215 acres impacted
- $29,656 in insurance claims

The following table summarizes riverine flood probability data for **Montgomery County**.

Table 4.99: Montgomery County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	15
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	1
Average Number of Days with a Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$25,400
Average Property Damage per Year	$2,540

Source: NCEI

Data from the NCEI indicates that Montgomery County can expect on a yearly basis, relevant to riverine flood events:

- Two events
- <1 death or injury
- $2,540 in property damages

The following table summarizes flash flood probability data for **Montgomery County**.

Table 4.100: Montgomery County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	12
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	2
Average Number of Days with a Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$30,400
Average Property Damage per Year	$3,040

Source: NCEI

Data from the NCEI indicates that Montgomery County can expect on a yearly basis, relevant to flash flood events:

- One event
- <1 death or injury
- $16,683 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Montgomery County**

Table 4.101: Montgomery County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	70
Average Number of Acres Damaged per Year	14
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: USDA

According to the USDA Risk Management Agency, Montgomery County can expect on a yearly basis, relevant to flooding occurrences:

- <1 insurance claim
- 14 acres impacted
- $0 in insurance claims

The following table summarizes riverine flood probability data for **Neosho County**.

Table 4.102: Neosho County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	7
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$200,100
Average Property Damage per Year	$20,010

Source: NCEI

Data from the NCEI indicates that Neosho County can expect on a yearly basis, relevant to riverine flood events:

- One event
- No deaths or injuries
- $20,010 in property damages

The following table summarizes flash flood probability data for **Neosho County**.

Table 4.103: Neosho County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	6
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$12,100
Average Property Damage per Year	$1,210

Source: NCEI

Data from the NCEI indicates that Neosho County can expect on a yearly basis, relevant to flash flood events:

- One event
- No deaths or injuries
- $1,210 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Neosho County**

Table 4.104: Neosho County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	6
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	38
Average Number of Acres Damaged per Year	8
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$2,131
Average Crop Damage per Year	$426

Source: USDA

According to the USDA Risk Management Agency, Neosho County can expect on a yearly basis, relevant to flooding occurrences:

- Two insurance claims
- Eight acres impacted
- $426 in insurance claims

The following table summarizes riverine flood probability data for **Wilson County**.

Table 4.105: Wilson County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	5
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$300
Average Property Damage per Year	$30

Source: NCEI

Data from the NCEI indicates that Wilson County can expect on a yearly basis, relevant to riverine flood events:

- One event
- No deaths or injuries
- $30 in property damages

The following table summarizes flash flood probability data for **Wilson County**.

Table 4.106: Wilson County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	10
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$150,600
Average Property Damage per Year	$15,060

Source: NCEI

Data from the NCEI indicates that Wilson County can expect on a yearly basis, relevant to flash flood events:

- One event
- No deaths or injuries
- $15,600 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Wilson County**

Table 4.107: Wilson County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	4
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	114
Average Number of Acres Damaged per Year	23
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$3,422
Average Crop Damage per Year	$684

Source: USDA

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to flooding occurrences:

- One insurance claim
- 23 acres impacted
- $684 in insurance claims

The following table summarizes riverine flood probability data for **Woodson County**.

Table 4.108: Woodson County Riverine Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	2
Average Events per Year	0
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$100
Average Property Damage per Year	$10

Source: NCEI

Data from the NCEI indicates that Woodson County can expect on a yearly basis, relevant to riverine flood events:

- <1 event
- No deaths or injuries
- $10 in property damages

The following table summarizes flash flood probability data for **Woodson County**.

Table 4.109: Woodson County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	7
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$800
Average Property Damage per Year	$80

Source: NCEI

Data from the NCEI indicates that Woodson County can expect on a yearly basis, relevant to flash flood events:

- One event
- No deaths or injuries
- $80 in property damages

Data was reviewed from the USDA Risk Management agency to determine vulnerability to flooding. The following table summarizes drought event data for **Woodson County**

Table 4.110: Woodson County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	5
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	222
Average Number of Acres Damaged per Year	44
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$23,720
Average Crop Damage per Year	$4,744

Source: USDA

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to flooding occurrences:

- One insurance claim
- 44 acres impacted
- $4,744 in insurance claims

In addition, Kansas Region H has had 15 Presidentially Declared Disasters relating to flooding (and other causes) in the last 20 years. This represents an average of two declared flood disaster every year.

4.13.4 – Vulnerability Analysis

The results of the HAZUS analysis were utilized to estimate potential losses for riverine flooding. The intent of this analysis was to enable Kansas Region H to estimate where flood losses could occur and the degree of severity using a consistent methodology. The HAZUS model helps quantify risk along known flood-hazard corridors as well as lesser streams and rivers that have a drainage area of 10 square miles or more.

HAZUS determines the displaced population based on the inundation area, not necessarily impacted buildings. As a result, there may be population vulnerable to displacement even if the structure is not vulnerable to damage. Individuals and households will be displaced from their homes even when the home has suffered little or no damage either because they were evacuated or there was no physical access to the property because of flooded roadways.

Flood sheltering needs are based on the displaced population, not the damage level of the structure. HAZUS determines the number of individuals likely to use government-provided short-term shelters through determining the number of displaced households as a result of the flooding. To determine how many of those households and the corresponding number of individuals will seek shelter in government-provided shelters, the number is modified by factors accounting for income and age. Displaced people using shelters will most likely be individuals with lower incomes and those who do not have family or friends within the immediate area. Since the income and age factors are taken into account, the proportion of displaced population and those seeking shelter will vary from county to county.

Additionally, HAZUS takes into account flood depth when modeling damage (based on FEMA's depth-damage functions). Generated reports capture damage by occupancy class (in terms of square footage impacted) by damage percent classes. Occupancy classes include agriculture, commercial, education, government, industrial, religion, and residential. Damage percent classes are grouped by 10 percent increments up to 50%. Buildings that sustain more than 50% damage are considered to be substantially damaged.

The following table provides the HAZUS results for vulnerable populations and the population estimated to seek short term shelter as well as the numbers of damaged and substantially damaged buildings for each Kansas Region H county.

Table 4.111: Kansas Region H HAZUS Flood Scenario Displaced Population Building Damages

County	Population Vulnerable to Displacement	Population with Short Term Shelter Needs	Vulnerable Buildings	Damaged Buildings	Substantially Damaged Buildings
Allen	426	76	321	35	0
Bourbon	325	25	206	4	0
Chautauqua	163	10	83	5	1
Cherokee	543	98	410	15	3
Crawford	677	221	411	51	0
Elk	82	0	50	0	0
Greenwood	192	1	236	3	0
Labette	938	253	633	117	0
Montgomery	601	95	687	29	0
Neosho	331	85	215	26	0
Wilson	293	19	356	10	0
Woodson	89	3	56	2	0

Source: FEMA and HAZUS

The HAZUS analysis also provides an estimate the repair costs for impacted buildings as well as the associated loss of building contents and business inventory. Building damage can also cause additional losses to a community by restricting a building's ability to function properly. Income loss data accounts for losses such as business interruption and rental income losses as well as the resources associated with damage repair and job and housing losses. These losses are calculated by HAZUS using a methodology based on the building damage estimates.

The damaged building counts generated by HAZUS are susceptible to rounding errors and are likely the weakest output of the model due to the use of census blocks for analysis. Generated reports include this disclaimer: "Unlike the earthquake and hurricane models, the flood model performs its analysis at the census block level. This means that the analysis starts with a small number of buildings within each census block and applies a series of distributions necessary for analyzing the potential damage. The application of these distributions and the small number of buildings make the flood model more sensitive to rounding errors that introduces uncertainty into the building count results." Additionally, losses are not calculated for individual buildings, but instead are based on the performances of entire classes of buildings obtained from the general building stock data. In the flood model, the number of grid cells (pixels) at each flood depth value is divided by the total number of grid cells in the census block. The result is used to weight the flood depths applied to each specific occupancy type in the general building stock. First floor heights are then applied to determine the damage depths to analyze damages and losses.

The following table provides the HAZUS results for building damages and lost income due to these damages.

Table 4.112: Kansas Region H HAZUS Flood Scenario Structural Damage and Income Loss

County	Structural Damage	Contents Damage	Inventory Loss	Total Direct Loss	Total Income Loss	Total Direct and Income Loss
Allen	$10,506,000	$12,631,000	$649,000	$23,786,000	$69,000	$23,855,000
Bourbon	$6,431,000	$3,958,000	$122,000	$10,511,000	$8,000	$10,519,000
Chautauqua	$4,983,000	$3,176,000	$83,000	$8,242,000	$4,000	$8,246,000
Cherokee	$13,796,000	$10,297,000	$205,000	$24,298,000	$44,000	$24,342,000
Crawford	$10,131,000	$10,727,000	$545,000	$21,403,000	$31,000	$21,434,000
Elk	$1,809,000	$786,000	$2,000	$2,597,000	$0	$2,597,000
Greenwood	$5,061,000	$3,246,000	$66,000	$8,373,000	$15,000	$8,388,000
Labette	$18,338,000	$28,005,000	$2,015,000	$48,358,000	$190,000	$48,548,000
Montgomery	$10,337,000	$9,172,000	$617,000	$20,126,000	$43,000	$20,169,000
Neosho	$4,735,000	$3,764,000	$153,000	$8,652,000	$18,000	$8,670,000
Wilson	$4,825,000	$3,707,000	$80,000	$8,612,000	$158,000	$8,770,000

Source: FEMA and HAZUS

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years) allows us to quantify the monetary impact of flood conditions on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to flood events.

Table 4.113: Flood Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	74	0.03%	$38,156,000	$11,941	0.03%
Bourbon	334,301	0	0.00%	$53,376,000	$0	0.00%
Chautauqua	310,310	0	0.00%	$35,195,000	$0	0.00%
Cherokee	308,233	245	0.08%	$86,906,000	$32,411	0.04%
Crawford	323,222	4	0.00%	$75,594,000	$256	0.00%
Elk	316,385	0	0.00%	$42,070,000	$0	0.00%
Greenwood	701,012	160	0.02%	$89,554,000	$24,362	0.03%
Labette	370,531	215	0.06%	$122,778,000	$29,656	0.02%
Montgomery	335,669	14	0.00%	$79,420,000	$0	0.00%
Neosho	308,150	8	0.00%	$67,958,000	$426	0.00%
Wilson	254,671	23	0.01%	$55,422,000	$684	0.00%
Woodson	294,643	44	0.02%	$54,603,000	$4,744	0.01%

Source: USDA

Flood risk can also change over time because of new building and development, weather patterns and other factors. Although the frequency or severity of impacts cannot be changed, FEMA is working with federal, state, tribal and local partners across the nation to identify flood risk and promote informed planning and development practices to help reduce that risk through the Risk Mapping, Assessment and Planning (Risk MAP) program. Risk MAP uses the watershed boundaries to conduct studies. This

watershed approach allows communities to come together to develop partnerships, combine resources, share flood risk information with FEMA, and identify broader opportunities for mitigation action.

The Flood Risk Products and datasets present information that can enhance hazard mitigation planning activities, especially the risk and vulnerability assessment portion of a hazard mitigation plan, and the development of risk-based mitigation strategies. Risk MAP can also help guide land use and development decisions and help you take mitigation action by highlighting areas of highest risk, areas in need of mitigation, and areas of floodplain change. Currently Kansas Region H has no current or scheduled Risk Map projects.

Mold

In general, mold is plant-like organism that obtains nourishment it directly from surrounding organic materials. Mold can grow on a variety of materials and thrives in damp environments. As such, a recently flooded home or business provides an ideal environment for mold growth, especially on materials such as drywall and carpeting. The young, old and ill may be specifically susceptible to the effects of mold, with symptoms including:

- congestion
- cough
- breathing difficulties
- sore throat
- membrane irritation
- upper respiratory infections

As such, any instance of flood related mold should be remediated as soon as possible.

4.13.5 – National Flood Insurance Program Communities

The National Flood Insurance Program (NFIP) is a federal program, managed by FEMA, that exists to provide flood insurance for property owners in participating communities, to improve floodplain management practices, and to develop maps of flood hazard areas. The following table presents the number of NFIP participating communities in each county.

Table 4.114: Kansas Region H NFIP Communities

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
Allen County			
Allen County	5/24/1977	9/28/1990	7/18/2011
City of Bassett	-	9/28/1990	7/18/2011
City of Gas	12/20/1974	9/28/1990	(NSFHA)
City of Humboldt	12/7/1973	9/1/1978	9/25/2009
City of Iola	12/14/1973	9/15/1978	7/18/2011
City of LaHarpe	8/22/1975	9/28/1990	9/25/2009
City of Moran	3/26/1976	9/28/1990	(NSFHA)
Bourbon County			
Bourbon County	10/25/1977	6/1/1988	1/2/2009

Table 4.114: Kansas Region H NFIP Communities

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
City of Bronson	7/18/1975	1/2/2009	01/02/09(M)
City of Fort Scott	12/28/1973	9/1/1978	1/2/2009
City of Fulton	1/10/1975	1/2/2009	01/02/09(M)
City of Redfield	12/27/1974	01/08/1986	01/02/2009
Uniontown	09/26/1975	01/02/2009	(NSFHA)
City of Redfield	12/27/1974	8/1/1986	01/02/09(M)
City of Uniontown	9/26/1975	1/2/2009	(NSFHA)
Chautauqua County			
City of Sedan	8/22/1975	6/1/1988	06/01/88(L)
Cherokee County			
Cherokee County	5/10/1977	8/5/1991	11/19/2008
City of Baxter Springs	5/24/1974	3/18/1986	11/19/08(M)
City of Columbus	3/1/1974	5/15/1986	11/19/08(M)
City of Galena	5/24/1974	5/15/1986	11/19/08(M)
City of Scammon	9/19/1975	11/19/2008	11/19/08(M)
City of Weir	9/19/1975	11/19/2008	11/19/2008
City of West Mineral	-	11/19/2008	11/19/2008
Crawford County			
Crawford County	5/17/1977	5/1/1990	4/16/2009
City of Arcadia	8/15/1975	4/1/1989	04/16/09(M)
City of Arma	3/26/1976	4/16/2009	04/16/09(M)
City of Cherokee	3/26/1976	4/16/2009	04/16/09(M)
City of Frontenac	7/30/1976	4/16/2009	04/16/09(M)
City of Girard	8/8/1975	4/16/2009	04/16/09(M)
City of Hepler	-	4/16/2009	4/16/2009
City of McCune	-	4/16/2009	NSFHA
City of Pittsburg	2/15/1974	5/1/1979	4/16/2009
Elk County			
Elk County	-	-	1/1/1950
City of Grenola	9/26/1975	-	9/26/1975
City of Howard	8/8/1975	4/8/1977	04/08/77(M)
City of Longton	9/19/1975	5/1/1990	05/01/90(L)
City of Moline	2/22/1974	2/1/2008	02/01/08(L)
Greenwood County			
Greenwood County	-	-	1/1/1950
City of Eureka	4/12/1974	9/1/1991	09/01/91(L)
City of Hamilton	-	01/02/2003	01/02/2003
City of Madison	7/19/1974	3/5/1990	3/5/1990
Labette County			
Labette County	10/25/1977	9/1/1990	1/2/2009
City of Altamont	3/26/1976	1/2/2009	01/02/09(M)
City of Chetopa	9/19/1975	9/4/1985	01/02/09(M)
City of Edna	-	1/2/2009	NSFHA

Table 4.114: Kansas Region H NFIP Communities

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
City of Labette	-	1/2/2009	1/2/2009
City of Mound Valley	8/22/1975	1/2/2009	01/02/09(M)
City of Oswego	9/19/1975	1/2/2009	01/02/09(M)
City of Parsons	2/1/1974	7/16/1979	1/2/2009
Montgomery County			
Montgomery County	10/18/1977	6/1/1988	06/01/88(L)
City of Caney	2/15/1974	7/3/1986	07/03/86(M)
City of Cherryvale	2/15/1974	-	NSFHA
City of Coffeyville	5/3/1974	3/12/1976	3/12/1976
City of Dearing	7/25/1975	6/1/1988	6/1/1988
City of Elk City	10/29/1976	4/1/1989	04/01/89(L)
City of Independence	12/14/1973	6/15/1979	12/19/1995
Neosho County			
Neosho County	11/1/1977	2/1/2005	1/20/2010
City of Chanute	12/7/1973	1/3/1979	1/20/2010
City of Erie	1/23/1974	7/17/1978	1/20/2010
City of Galesburg	-	1/20/2010	NSFHA
City of St. Paul	1/19/1975	9/5/1990	01/20/10(M)
Wilson County			
Wilson County	6/7/1977	4/1/1989	04/01/89(L)
City of Altoona	7/30/1976	4/1/1989	04/01/89(L)
City of Buffalo	9/5/1975	-	1/1/1950
City of Fredonia	1/9/1974	6/17/1986	6/17/1986
City of Neodesha	1/9/1974	8/15/1978	8/15/1978
Woodson County			
Woodson County	-	-	1/1/1950
City of Neosho Falls	1/31/1975	4/1/1989	04/01/89(L)
City of Toronto	9/19/1975	-	NSFHA
City of Yates Center	8/15/1975	-	NSFHA

Notes: NSFHA: No Special Flood Hazard Area - All Zone C
(L): Original FIRM by letter - All Zone A, C and X
(M): No elevation determined - All Zone A, C and X

Additionally, the NFIP's Community Rating System (CRS) incentive rewards communities for the work they do managing their floodplains. Eligible communities that qualify for this voluntary program go above the minimum NFIP requirements and can offer their citizens discounted flood insurance in both Special Flood Hazard Areas (SFHAs) areas or non-SFHA areas. Additionally, work already being done by the state of Kansas (e.g., dam safety program and state freeboard requirements) gives communities additional discounts. The following Region H communities are currently CRS participants:

Kansas Region H CRS Participating Jurisdictions

Jurisdiction	County	CRS Entry Date	CRS Class	% Discount for SFHA	% Discount for Non-SFHA	Status
Coffeyville	Montgomery	05/01/2014	9	5%	5%	Current
Humboldt	Neosho	05/01/2017	9	5%	5%	Current

4.13.6 – FEMA Flood Policy and Loss Data

Kansas Region H flood-loss information was pulled from FEMA's "Policy and Loss Data by Community with County and State Data." There are several limitations to this data, including:

- Only losses to participating NFIP communities are represented
- Communities joined the NFIP at various times since 1978
- The number of flood insurance policies in effect may not include all structures at risk to flooding
- Some of the historical loss areas have been mitigated with property buyouts

Some properties are under-insured. The flood insurance purchase requirement is for flood insurance in the amount of federally-backed mortgages, not the entire value of the structure. Additionally, contents coverage is not required.

The following table shows the details of NFIP policy and loss statistics for each county in Kansas Region H. Loss statistics include losses through December 31, 2018.

Table 4.115: Kansas Region H NFIP Policy and Loss Statistics, As of December 31. 2018

Jurisdiction	Number of Policies in Force	Insurance in Force	Number of Closed Losses	Total Payments
Allen County				
Allen County	23	$2,884,100	13	$822,487
Gas	0	$0	1	$6,767
Humboldt	5	$740,500	1	$4,941
Iola	57	$9,087,400	61	$1,882,553
Bourbon County				
Bourbon County	19	$1,793,000	13	$266,305
Fort Scott	17	$4,952,400	41	$2,172,454
Chautauqua County				
Sedan	2	$52,000	0	$0
Cherokee County				
Cherokee County	48	$7,804,500	51	$1,130,578
Baxter Springs	9	$1,094,600	23	$325,385
Columbus	11	$1,487,200	0	$0
Galena	1	$70,000	3	$75,428
Scammon	3	$55,000	0	$0
Weir	1	$138,600	0	$0
Crawford County				
Crawford County	64	$10,845,800	53	$866,107
Arcadia	1	$45,000	1	$2,885

Table 4.115: Kansas Region H NFIP Policy and Loss Statistics, As of December 31. 2018

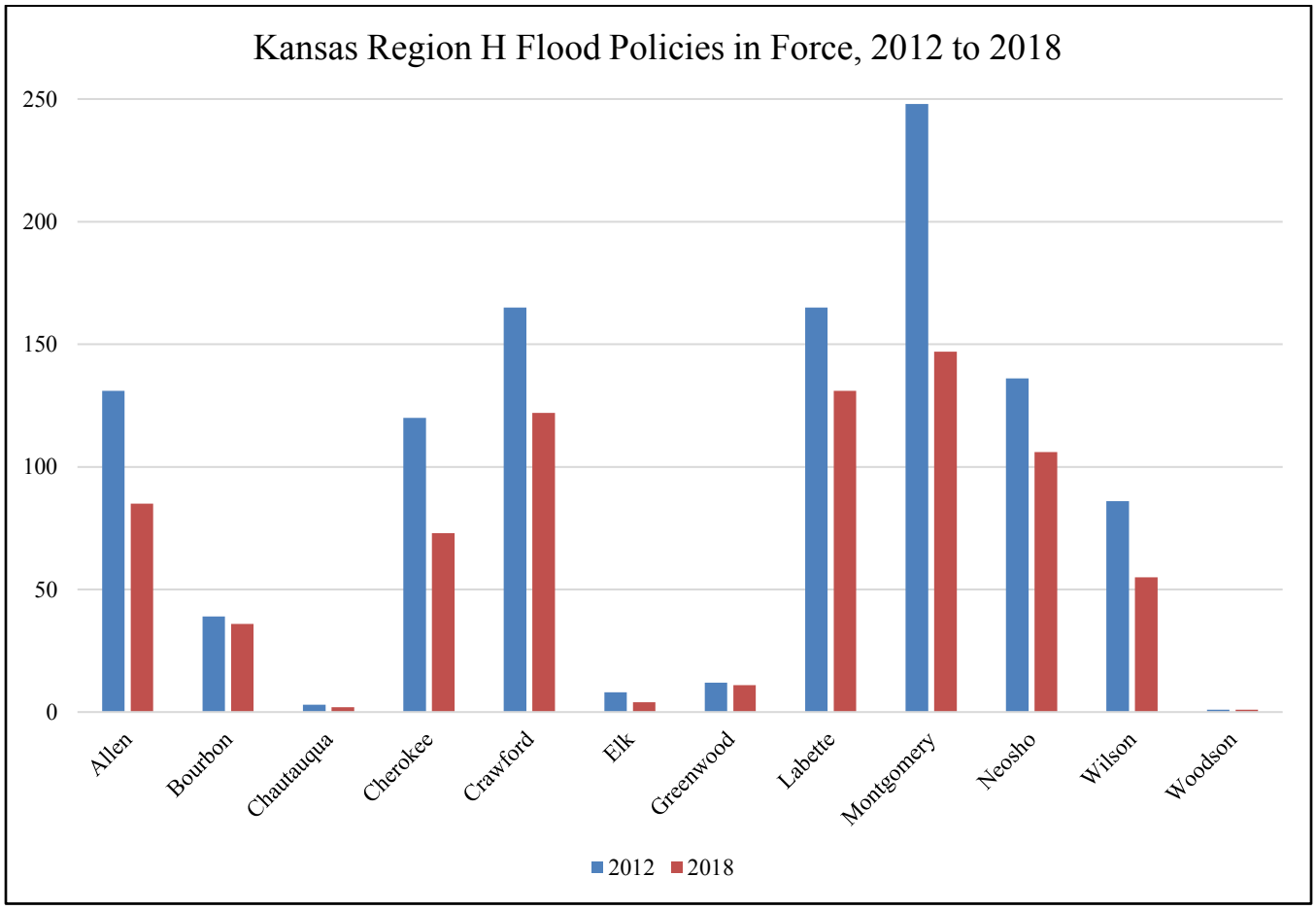
Jurisdiction	Number of Policies in Force	Insurance in Force	Number of Closed Losses	Total Payments
Arma	1	$108,000	0	$0
Cherokee	1	$70,000	0	$0
Girard	0	$0	1	$334
Frontenac	2	$215,000	0	$0
Pittsburg	53	$7,882,700	49	$810,913
Elk County				
Moline	4	$88,400	1	$25,000
Greenwood County				
Eureka	10	$1,301,800	3	$5,931
Madison	1	$350,000	0	$0
Labette County				
Labette County	47	$6,927,700	18	$386,240
Chetopa	4	$410,200	0	$0
Mound Valley	1	$109,000	0	$0
Oswego	1	$210,000	0	$0
Parsons	78	$8,244,800	52	$620,711
Montgomery County				
Montgomery County	34	$6,394,200	26	$774,216
Caney	2	$312,900	1	$227
Cherryvale	1	$70,500	1	$15,354
Coffeyville	51	$10,229,700	130	$2,645,621
Independence	59	$6,944,400	89	$2,058,243
Neosho County				
Neosho County	26	$4,958,700	14	$451,571
Chanute	40	$4,194,800	7	$558,736
Erie	40	$4,869,000	35	$145,295
St. Paul	0	$09	2	$49,445
Wilson County				
Wilson County	16	$2,61,800	4	$92,933
Altoona	9	$415,700	7	$46,055
Fredonia	9	$2,173,400	12	$295,327
Neodesha	21	$4,219,900	31	$623,528
Woodson County				
Neosho Falls	1	$28,000	0	$0

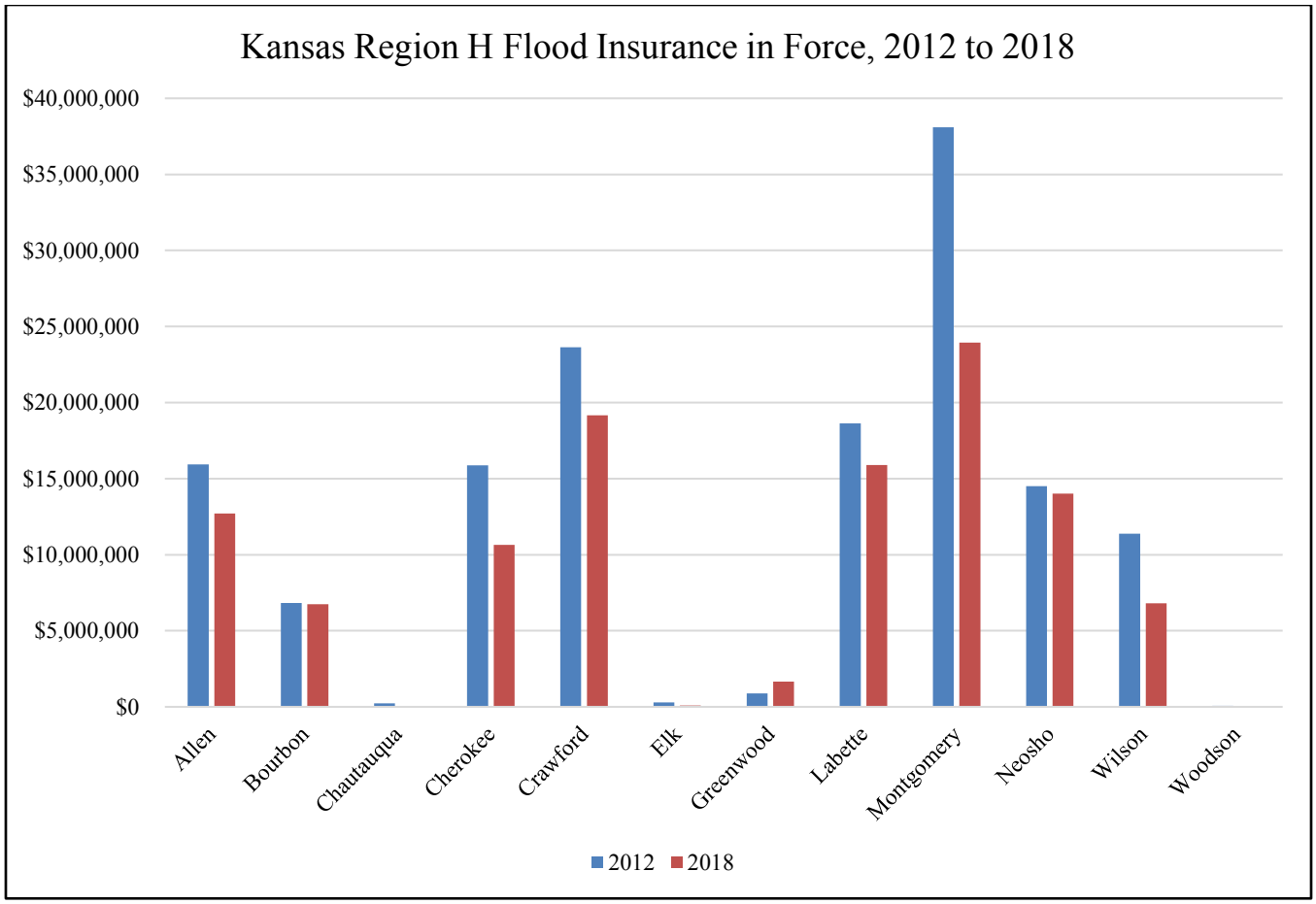
Source: FEMA, "Policy and Loss Data by Community with County and State Data"

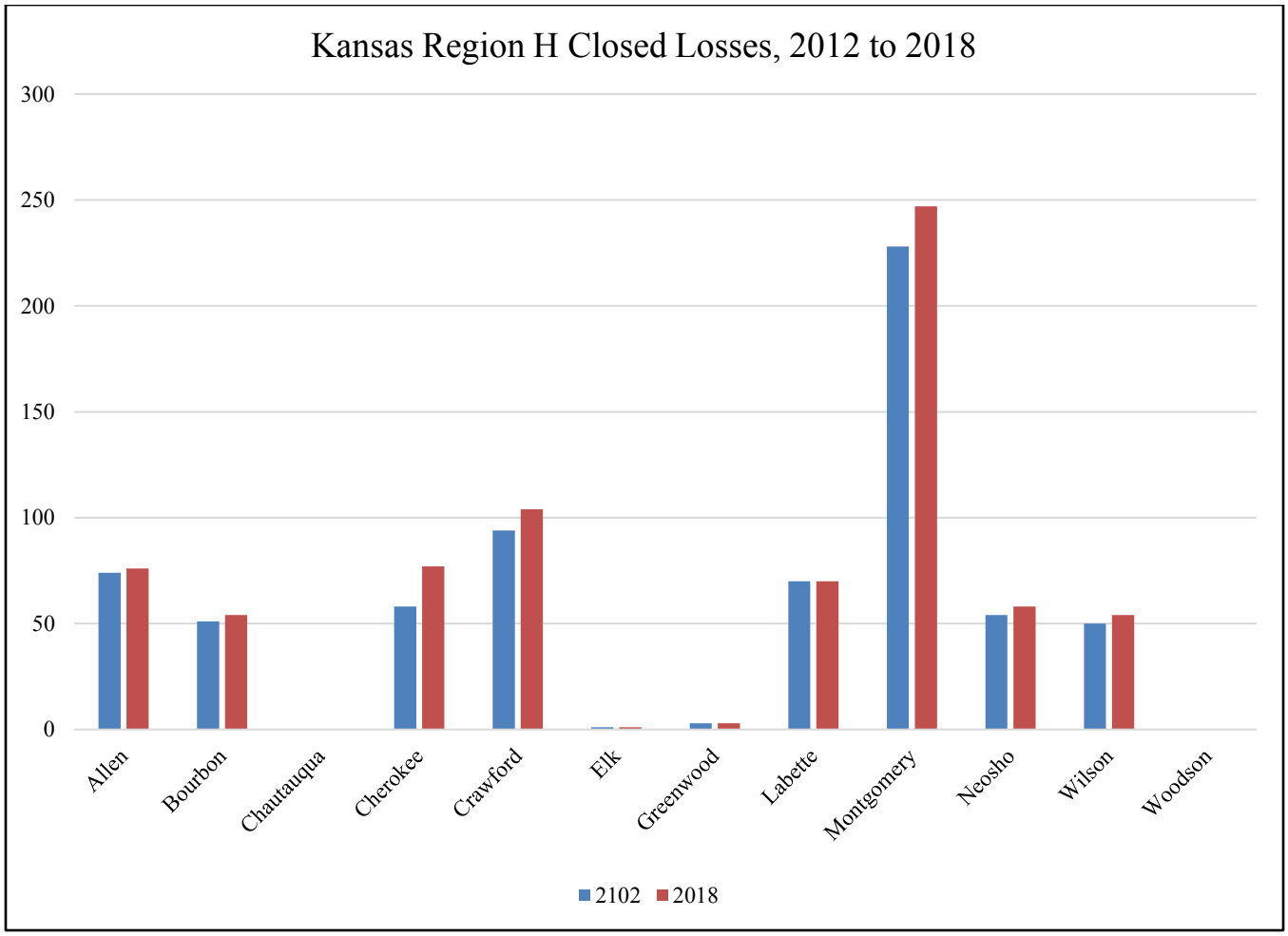
The following graphs summarize data from the above table for Kansas Region H in comparison to 2012 data. Of note:

- Regionally the number of flood policies has decreased from 2012 to 2018, from 1,114 to 773
- Regionally the amount of flood insurance in-force decreased from 2012 to 2018, from $146,365,500 to $111,778,909

- Regionally flood insurance closed losses increased from 2012 to 2018, from $15,516,375 to $17,161,570




Kansas Region H Flood Insurance in Force, 2012 to 2018
$40,000,000
$35,000,000
$30,000,000
$25,000,000
$20,000,000
$15,000,000
$10,000,000
$5,000,000
$0
Allen
Bourbon
Chautauqua
Cherokee
Crawford
Elk
Greenwood
Labette
Montgomery
Neosho
Wilson
Woodson
2012
2018



4.13.7 – Repetitive Loss Properties

A high priority to Kansas Region H is the reduction of losses to Repetitive Loss (RL) and Severe Repetitive Loss (SRL) structures. The NFIP defines a RL property as:

- Any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978

At least two of the claims must be more than 10 days apart.

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended, 42 U.S.C. 4102a. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- That has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both of the above, at least two of the referenced claims must have occurred within any ten-year period and must be greater than ten days apart.

The following table details RL and SRL properties in Kansas Region H.

Table 4.116: Kansas Region H Repetitive Loss Properties, As of December 2018

County	Number of RL Properties	Number of RL Properties Mitigated	Number of RL Properties Insured	Number of Losses	Total Paid
Allen	1	1	0	2	$4,116
Bourbon	10	2	0	27	$823,436
Chautauqua	0	0	0	0	$0
Cherokee	10	4	1	27	$548,945
Crawford	13	2	3	36	$679,746
Elk	0	0	0	0	$0
Greenwood	0	0	0	0	$0
Labette	7	3	0	18	$151,083
Montgomery	33	4	8	93	$2,032,037
Neosho	3	0	3	6	$40,135
Wilson	2	1	1	6	$231,715
Woodson	0	0	0	0	$0

Since the last plan update, no SRL properties have been mitigation although this remains a high priority in the State of Kansas. Kansas continues to reach out to the affected communities to help facilitate the mitigation of all SRL properties. The following table details SRL claims, with only those counties with SRL properties detailed.

Table 4.117: Kansas Region H Severe Repetitive Loss Property Claims

Jurisdiction	Total Paid	Losses	SRL Status
Coffeyville	$96,890	4	Validated
Coffeyville	$82,606	3	Validated

4.13.8 – Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.118: Flood Consequence Analysis

Subject	Impacts of Flood
Health and Safety of the Public	Impact dependent on the level of flood waters. Individuals further away from the incident area are at a lower risk. Casualties are dependent on warning time.
Health and Safety of Responders	Impact to responders is expected to be minimal unless responders live within the affected area.
Continuity of Operations	Temporary relocation may be necessary if inundation affects government facilities.
Property, Facilities, and Infrastructure	Localized impact could be severe in the inundation area of the incident to facilities and infrastructure. The further away from the incident area the damage lessens.

Table 4.118: Flood Consequence Analysis

Subject	Impacts of Flood
Environment	Impact will be severe for impacted area. Impact will lessen with distance.
Economic Conditions	Impacts to the economy depend on the area flooded, depth of water, and the amount of time it takes for the water to recede.
Public Confidence in the Jurisdiction's Governance	Perception of whether the flood could have been prevented, warning time, and response and recovery time will greatly impact the public's confidence.

4.14 – Hailstorms

According to NOAA, hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere causing them to freeze. The raindrops form into small frozen droplets and then continue to grow as they come into contact with super-cooled water which will freeze on contact with the frozen rain droplet. This frozen rain droplet can continue to grow and form hail.

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4.14.1 – Location and Extent

Hailstorms occur over broad geographic regions. The entire planning area, including all participating jurisdictions, is at risk to hailstorms.

Based on information provided by the Tornado and Storm Research Organization, the following table describes typical damage impacts of the various sizes of hail.

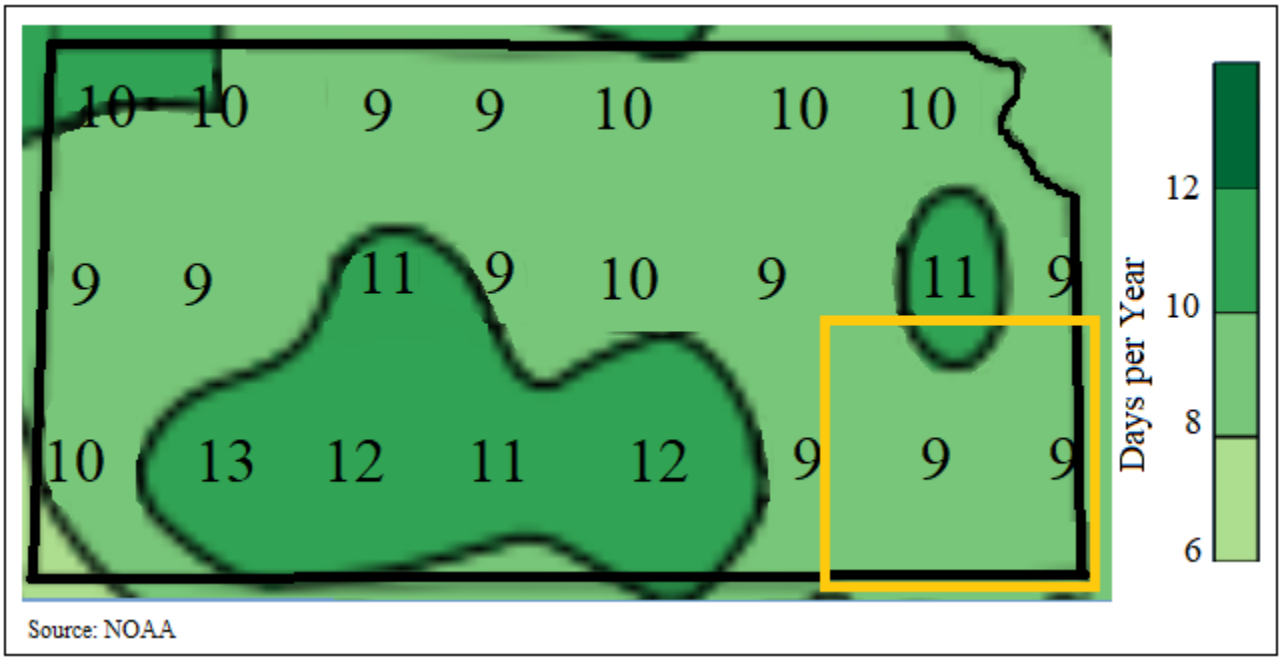
Table 4.119: Hailstorm Intensity Scale

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

Source: Tornado and Storm Research Organization

The following map, generated by data compiled by NOAA, indicates the average number of severe hail event days for Kansas Region H (9).

Kansas Region H Severe Hail Days per Year from 2003 to 2012 Reports



4.14.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 15 Presidential Disaster Declarations for Kansas Region H for severe storms (along with other associates hazard event), of which hail may be a component. The following 20-year information (with 1999 and 2018 being full data years)on past declared disasters is presented to provide a historical perspective on hail events that have impacted Kansas Region H. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.120: Kansas Region H FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4287	10/20/2016 (09/02/2016 – 09/12/2016)	**Severe Storms** and Flooding	Greenwood	$6,959,536
4230	07/20/2015 (05/04/2015 – 06/21/2015)	**Severe Storms**, Tornados, Straight-Line Winds, and Flooding	Chautauqua, Cherokee, Elk, Greenwood, and Neosho	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	**Severe Storms**, Straight-line Winds, Tornados, and Flooding	Bourbon, Butler, Cherokee, Crawford, Elk, Greenwood, Montgomery, Wilson, and Woodson	$1,102,861 (Estimate)
1932	08/10/2010 (6/7-7/21/2010)	**Severe Storms**, Flooding and Tornados	Elk, Greenwood, Wilson and Woodson	$9,279,257
1860	09/30/2009	**Severe Storms** and Flooding	Bourbon	$3,347,662

Table 4.120: Kansas Region H FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
	(7/8-7/14/2009)			
1849	06/25/2009 (4/25-5/16/2009)	**Severe Storms**, Flooding, Straight-Line Winds, and Tornados	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Greenwood, Labette, Montgomery, and Wilson	$15,013,488
1848	10/31/2008	**Severe Storms**, Flooding, and Tornados	Allen, Bourbon, Chautauqua, Cherokee, and Wilson	$4,167,044
1808	10/31/2008	**Severe Storms**, Flooding, and Tornados	Greenwood	$4,167,044
1776	07/09/2008	**Severe Storms**, Flooding, and Tornados	Bourbon, Chautauqua, Cherokee, Crawford, Elk, Montgomery, and Wilson	$70,629,544
1711	7/2/2007 (6/26-30/2007)	**Severe Storms** and Flooding	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Elk, Greenwood, Labette, Montgomery, Neosho, Wilson, and Woodson	$40,238,600
1699	5/6/2007 (5/4/2007)	**Severe Storms**, Tornados, and Flooding	Cherokee	$117,565,269
1600	8/23/2005 (6/30-7/1/2005)	**Severe Storms** and Flooding	Cherokee, Crawford, Neosho	$4,344,569
1535	8/3/2004 (6/12-7/25/2004)	**Severe Storms**, Flooding, and Tornados	Cherokee and Woodson	$12,845,892
1462	5/6/2003 (5/4-30/2003)	**Severe Storms**, Tornados, and Flooding	Allen, Cherokee, Labette, Neosho and Woodson	$988,056
1327	5/3/2000 (4/19/2000)	**Severe Storms** and Tornados	Crawford, Labette, Neosho	$2,542,209

Source: FEMA
-: Data unavailable

The following provides details of the two Presidential Disaster Declarations for Kansas Region H since the last plan update in 2014.

Kansas – Severe Storms and Flooding
FEMA-4287-DR
Declared October 20, 2016

On October 10, 2016, Governor Sam Brownback requested a major disaster declaration due to severe storms and flooding during the period of September 2-12, 2016. The Governor requested a declaration for Public Assistance for 11 counties and Hazard Mitigation statewide. During the period of September 28 to October 7, 2016, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On October 20, 2016, President Obama declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms and flooding in Cheyenne, Bourbon, Ellis, Graham, Greenwood, Crawford, Norton, Rooks, Russell, Neosho, and Wilson Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

Kansas – Severe Storms, Tornados, Straight-Line Winds, and Flooding
FEMA-4230-DR
Declared July 20, 2015

On July 1, 2015, Governor Sam Brownback requested a major disaster declaration due to severe storms, tornados, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The Governor requested a declaration for Public Assistance, including direct federal assistance for 42 counties and Hazard Mitigation statewide. During the period of May 4 to June 27, 2015, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On July 20, 2015, President Obama declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, tornados, straight-line winds, and flooding in Atchison, Barton, Brown, Allen, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Bourbon, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Chautauqua, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Greenwood, Marshall, Elk, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Montgomery, Stevens, Wilson, Wabaunsee, and Washington Counties. Direct Federal assistance was also authorized. Finally, this declaration made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

In addition to the above reported events, the following table presents NOAA NCEI identified hailstorm events and the resulting damage totals in Kansas Region H for the period 2009 - 2018 (with 2009 and 2018 being full data set years).

Table 4.121: Kansas Region H NCEI Hailstorm Events, 2009 - 2018

County	Number of Days with Events	Property Damage	Deaths	Injuries
Allen	18	$360,000	0	0
Bourbon	30	$32,005,000	0	0
Chautauqua	33	$0	0	0
Cherokee	45	$135,000	0	0
Crawford	34	$210,000	0	0
Elk	17	$1,000	0	0

Table 4.121: Kansas Region H NCEI Hailstorm Events, 2009 - 2018

County	Number of Days with Events	Property Damage	Deaths	Injuries
Greenwood	33	$1,075,000	0	0
Labette	30	$500	0	0
Montgomery	50	$5,155,000	0	0
Neosho	18	$0	0	0
Wilson	27	$0	0	0
Woodson	21	$0	0	0

Source: NOAA NCEI

The following provides both **local accounts** and NOAA NCEI descriptions of notable recorded events:

- **August 27, 2015: Crawford County**
  A picture from social media showed baseball size hail near Highway 47 and Highway 3. Several residences had damaged roofs and windows to homes. Several cars received severe damage with dents and cracked windshields. Property damage was recorded at $100,000.

- **April 7, 2013: Fort Scott, Bourbon County**
  Hen egg to tennis ball size hail was reported in Fort Scott, Kansas. It was estimated that two thirds of the homes in Fort Scott had damage because of hail. Windows to houses and cars were broken across the Fort Scott area. Damage was reported to siding and roofing of homes. The courthouse lost 66 windows as well as suffered damage to the roof, air conditioning and weather unit. One auto dealership had over a million dollar in damages to cars. Property damage was recorded at $30,000,000.

- **April 2, 2014: Allen County**
  Prolific hail producing storm dropped large hail across the city of Iola for twelve minutes. The hail ranged in size from tennis ball size (2.5 inches) to ping pong ball size (1.5 inches). There was widespread hail damage to roofs and cars across town. Property damage was recorded at $350,000.
- **February 28, 2012: Cherryvale, Montgomery County**
  Winds estimated around 70 mph in conjunction with hail ranging from golf ball to baseball size produced extensive damage across Cherryvale. The wind-driven hail produced widespread roof, siding, car and window damage across town. City and county officials indicated hundreds of structures sustained some type of damage across town. Property damage was recorded at $5,000,000.

- **March 28, 2012: Greenwood County**
  Hail stone diameters ranged from golf ball size to just over three-inches in Madison. Widespread roof and car damage likely occurred. This was the first (and largest) round of large hail to hit Madison within a two-hour period. Property damage was recorded at $1,000,000.

Additional descriptions of smaller events can be found on the NOAA NCEI website:

- **www.NCEI.noaa.gov/stormevents/ftp.jsp**

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of hail on the region's agricultural base. Crop loss data for the years

2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates 30 hail related claims on 9,983 acres for $447,590.

Table 4.122: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Hail

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	8	7,824	$346,490
Bourbon	1	276	$4,721
Chautauqua	1	95	$3,535
Cherokee	1	5	$162
Crawford	2	56	$3,423
Elk	1	206	$1,601
Greenwood	0	0	$0
Labette	0	0	$0
Montgomery	4	480	$18,422
Neosho	1	39	$1,655
Wilson	4	114	$3,422
Woodson	7	888	$64,159

Source: USDA Farm Service Agency

4.12.3 – Hazard Probability Analysis

The following table summarizes hailstorm probability data for **Allen County**.

Table 4.123: Allen County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	18
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$360,000
Average Property Damage per Year	$36,000
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	8
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	7,824
Average Number of Acres Damaged per Year	1,565
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$346,490
Average Crop Damage per Year	$69,298

Source: NCEI and USDA

Data from the NCEI indicates that Allen County can expect on a yearly basis, relevant to hail events:

- Two events
- No deaths or injuries
- $36,000 in property damages

According to the USDA Risk Management Agency, Allen County can expect on a yearly basis, relevant to hail occurrences:

- Two insurance claims
- 1,565 acres impacted
- $62,298 in insurance claims

The following table summarizes hailstorm probability data for **Bourbon County**.

Table 4.124: Bourbon County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	30
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$32,005,000
Average Property Damage per Year	$3,200,500
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	276
Average Number of Acres Damaged per Year	55
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$4,721
Average Crop Damage per Year	$944

Source: NCEI and USDA

Data from the NCEI indicates that Bourbon County can expect on a yearly basis, relevant to hail events:

- Three events
- No deaths or injuries
- $3,200,500 in property damages

According to the USDA Risk Management Agency, Bourbon County can expect on a yearly basis, relevant to hail occurrences:

- <1 insurance claim
- 55 acres impacted
- $944 in insurance claims

The following table summarizes hailstorm probability data for **Chautauqua County**.

Table 4.125: Chautauqua County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	33
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0

Table 4.125: Chautauqua County Hailstorm Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	95
Average Number of Acres Damaged per Year	19
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$3,535
Average Crop Damage per Year	$707

Source: NCEI and USDA

Data from the NCEI indicates that Chautauqua County can expect on a yearly basis, relevant to hail events:

- Three events
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Chautauqua County can expect on a yearly basis, relevant to hail occurrences:

- <1 insurance claim
- 19 acres impacted
- $707 in insurance claims

The following table summarizes hailstorm probability data for **Cherokee County**.

Table 4.126: Cherokee County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	45
Average Events per Year	5
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$135,000
Average Property Damage per Year	$13,500
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	5
Average Number of Acres Damaged per Year	1
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$162
Average Crop Damage per Year	$32

Source: NCEI and USDA

Data from the NCEI indicates that Cherokee County can expect on a yearly basis, relevant to hail events:

- Five events
- No deaths or injuries
- $13,500 in property damages

According to the USDA Risk Management Agency, Cherokee County can expect on a yearly basis, relevant to hail occurrences:

- <1 insurance claim
- One acre impacted
- $32 in insurance claims

The following table summarizes hailstorm probability data for **Crawford County**.

Table 4.127: Crawford County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	34
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$210,000
Average Property Damage per Year	$21,000
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	2
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	56
Average Number of Acres Damaged per Year	11
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$3,423
Average Crop Damage per Year	$685

Source: NCEI and USDA

Data from the NCEI indicates that Crawford County can expect on a yearly basis, relevant to hail events:

- Three events
- No deaths or injuries
- $21,000 in property damages

According to the USDA Risk Management Agency, Crawford County can expect on a yearly basis, relevant to hail occurrences:

- <1 insurance claim
- 11 acres impacted
- $685 in insurance claims

The following table summarizes hailstorm probability data for **Elk County**.

Table 4.128: Elk County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	17
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$1,000
Average Property Damage per Year	$100
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	206
Average Number of Acres Damaged per Year	41
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$1,601
Average Crop Damage per Year	$320

Source: NCEI and USDA

Data from the NCEI indicates that Elk County can expect on a yearly basis, relevant to hail events:

- Two events
- No deaths or injuries
- $100 in property damages

According to the USDA Risk Management Agency, Elk County can expect on a yearly basis, relevant to hail occurrences:

- <1 insurance claim
- 41 acres impacted
- $320 in insurance claims

The following table summarizes hailstorm probability data for **Greenwood County**.

Table 4.129: Greenwood County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	33
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$1,075,000
Average Property Damage per Year	$107,500
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Greenwood County can expect on a yearly basis, relevant to hail events:

- Three events
- No deaths or injuries
- $107,500 in property damages

According to the USDA Risk Management Agency, Greenwood County can expect on a yearly basis, relevant to hail occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes hailstorm probability data for **Labette County**.

Table 4.130: Labette County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	30
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$500
Average Property Damage per Year	$50
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Labette County can expect on a yearly basis, relevant to hail events:

- Three events
- No deaths or injuries
- $50 in property damages

According to the USDA Risk Management Agency, Labette County can expect on a yearly basis, relevant to hail occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes hailstorm probability data for **Montgomery County**.

Table 4.131: Montgomery County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	50
Average Events per Year	5
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$5,155,000
Average Property Damage per Year	$515,500
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	4
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	480
Average Number of Acres Damaged per Year	96
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$18,422
Average Crop Damage per Year	$3,684

Source: NCEI and USDA

Data from the NCEI indicates that Montgomery County can expect on a yearly basis, relevant to hail events:

- Five events
- No deaths or injuries
- $515,500 in property damages

According to the USDA Risk Management Agency, Montgomery County can expect on a yearly basis, relevant to hail occurrences:

- One insurance claim
- 96 acres impacted
- $3,684 in insurance claims

The following table summarizes hailstorm probability data for **Neosho County**.

Table 4.132: Neosho County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	18
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	39
Average Number of Acres Damaged per Year	8
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$1,655
Average Crop Damage per Year	$331

Source: NCEI and USDA

Data from the NCEI indicates that Neosho County can expect on a yearly basis, relevant to hail events:

- Two events
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Neosho County can expect on a yearly basis, relevant to hail occurrences:

- <1 insurance claim
  Eight acres impacted
- $331 in insurance claims

The following table summarizes hailstorm probability data for **Wilson County**.

Table 4.133: Wilson County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	27
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	4
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	114
Average Number of Acres Damaged per Year	23
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$3,422
Average Crop Damage per Year	$684

Source: NCEI and USDA

Data from the NCEI indicates that Wilson County can expect on a yearly basis, relevant to hail events:

- Three events
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to hail occurrences:

- One insurance claim
- 23 acres impacted
- $684 in insurance claims

The following table summarizes hailstorm probability data for W**oodson County**.

Table 4.134: Woodson County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	21
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	7
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	8886
Average Number of Acres Damaged per Year	178
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$61,159
Average Crop Damage per Year	$12,832

Source: NCEI and USDA

Data from the NCEI indicates that Woodson County can expect on a yearly basis, relevant to hail events:

- Two events
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to hail occurrences:

- One insurance claim
- 178 acres impacted
- $12,832 in insurance claims

In addition, Kansas Region H has had 15 Presidentially Declared Disasters relating to severe storms (of which hail is a potential component) in the last 20 years. This represents an average two declared severe storm (hailstorm) related disaster per year.

4.14.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to hailstorm events. In general, counties with a higher or increasing structural inventory, or having a high structural valuation are to be considered to have a potentially greater vulnerability. Additionally, population vulnerabilities to hail events are expected to be minimal. It is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to hailstorm events due to a projected decrease in the number of structures.

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region H county incurring damage over the period 2009 to 2018 from hailstorm events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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Table 4.135: Kansas Region H Structural Vulnerability Data for Hailstorms, 2009-2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Allen	$1,557,716,000	$360,000	0.02%
Bourbon	$1,720,309,000	$32,005,000	1.86%
Chautauqua	$500,459,000	$0	0.00%
Cherokee	$2,163,015,000	$135,000	0.01%
Crawford	$4,211,278,000	$210,000	0.00%
Elk	$353,392,000	$1,000	0.00%
Greenwood	$834,705,000	$1,075,000	0.13%
Labette	$2,349,164,000	$500	0.00%
Montgomery	$4,012,672,000	$5,155,000	0.13%
Neosho	$1,782,409,000	$0	0.00%
Wilson	$1,128,676,000	$0	0.00%
Woodson	$357,734,000	$0	0.00%

Source: NCEI and HAZUS

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of hailstorm conditions on the agricultural sector. In general, the higher the percentage loss, the higher the vulnerability the county has to hailstorm events.

Table 4.136: Hailstorm Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	1,565	0.64%	$38,156,000	$346,490	0.91%
Bourbon	334,301	55	0.02%	$53,376,000	$4,721	0.01%
Chautauqua	310,310	19	0.01%	$35,195,000	$3,535	0.01%
Cherokee	308,233	1	0.00%	$86,906,000	$162	0.00%
Crawford	323,222	11	0.00%	$75,594,000	$3,423	0.00%
Elk	316,385	41	0.01%	$42,070,000	$1,601	0.00%
Greenwood	701,012	0	0.00%	$89,554,000	$0	0.00%
Labette	370,531	0	0.00%	$122,778,000	$0	0.00%
Montgomery	335,669	96	0.03%	$79,420,000	$18,422	0.02%
Neosho	308,150	8	0.00%	$67,958,000	$1,655	0.00%
Wilson	254,671	23	0.01%	$55,422,000	$3,422	0.01%
Woodson	294,643	178	0.06%	$54,603,000	$64,159	0.12%

Source: USDA

4.14.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.137: Hailstorm Consequence Analysis

Subject	Impacts of Hailstorm
Health and Safety of the Public	Severity and location dependent. Impacts on persons in the areas of hail are expected to be severe if caught without proper shelter.
Health and Safety of Responders	Impacts will be predicated on the severity of the event. Damaged infrastructure will likely result in hazards such as downed utility lines, main breakages and debris on roadways. .
Continuity of Operations	Temporary relocation may be necessary if government facilities experience damage. Services may be limited to essential tasks if utilities are impacted.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the location and structural capacity of the facility. Loss of structural integrity of buildings and infrastructure could occur. Utility lines, roads, residential and business properties will be affected.
Environment	Impact could be severe for the immediate impacted area, depending on the size of the event. Impact will lessen as distance increases from the immediate incident area
Economic Conditions	Impacts to the economy will be dependent severity of the event and the impact on structures and infrastructure. Impacts could be severe if roads/utilities are affected.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems in place and the timeliness of those warnings could be questioned.

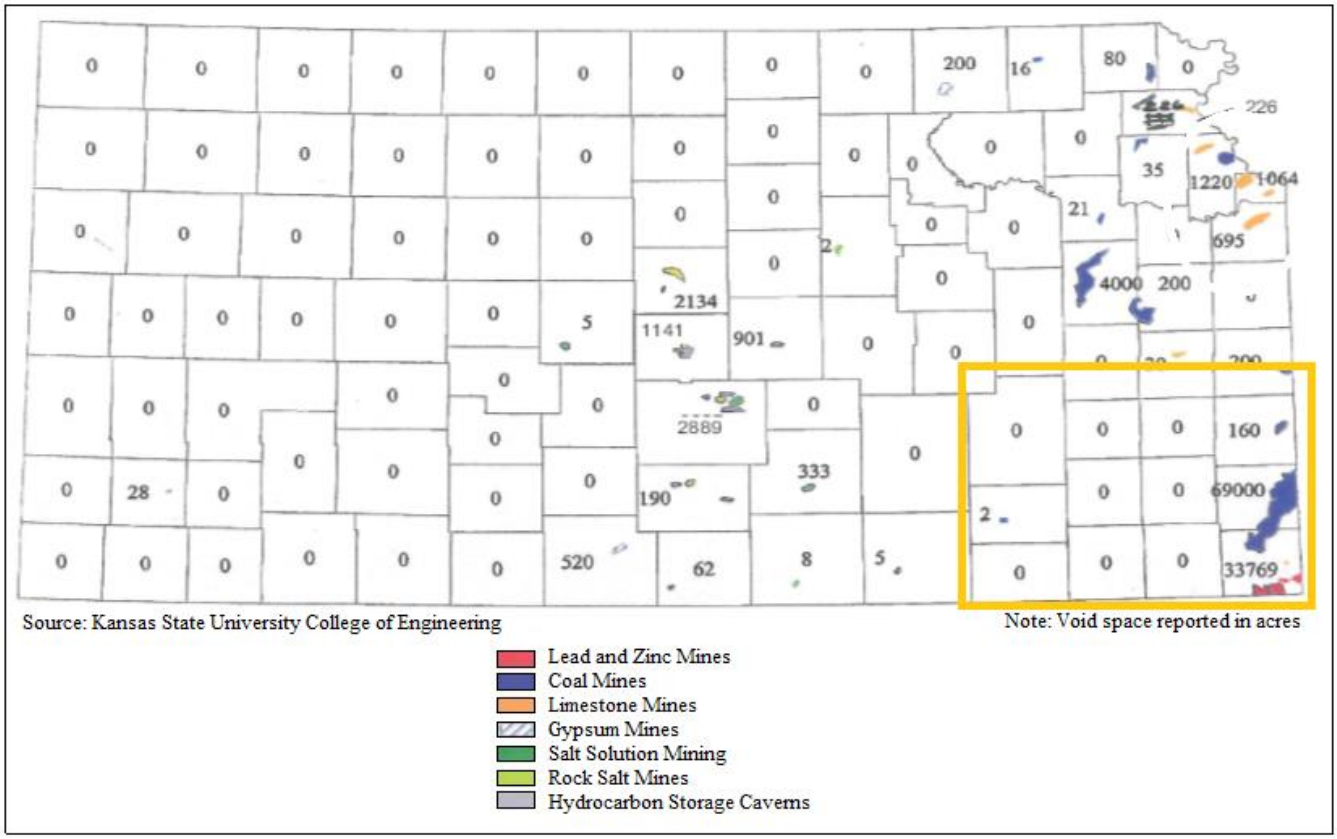
4.15 – Land Subsidence

Land subsidence is caused when the ground above manmade or natural voids collapses. Subsidence can be related to mine collapse, water and oil withdrawal, or natural causes such as shrinking of expansive soils, salt dissolution (which may also be related to mining activities), and cave collapses. The surface depression is known as a sinkhole. If sinkholes appear beneath developed areas, damage or destruction of buildings, roads and rails, or other infrastructure can result. The rate of subsidence, which ranges from gradual to catastrophic, correlates to its risk to public safety and property damage.

4.15.1 – Location and Extent

The Kansas Department of Health and Environment (KDHE) prepared a report on "Subsurface Void Space and Sinkhole/Subsidence Area Inventory for the State of Kansas." The report inventoried subsurface void space from oil and gas exploration and production, natural sources, shaft mining, and solution mining. The following map details the distribution of total acres and major cause of void spaces for all Kansas Region H counties.

KDHE Total Subsurface Void Space



The following table details the total amount of subsurface void space as calculated using data from the KDHE map.

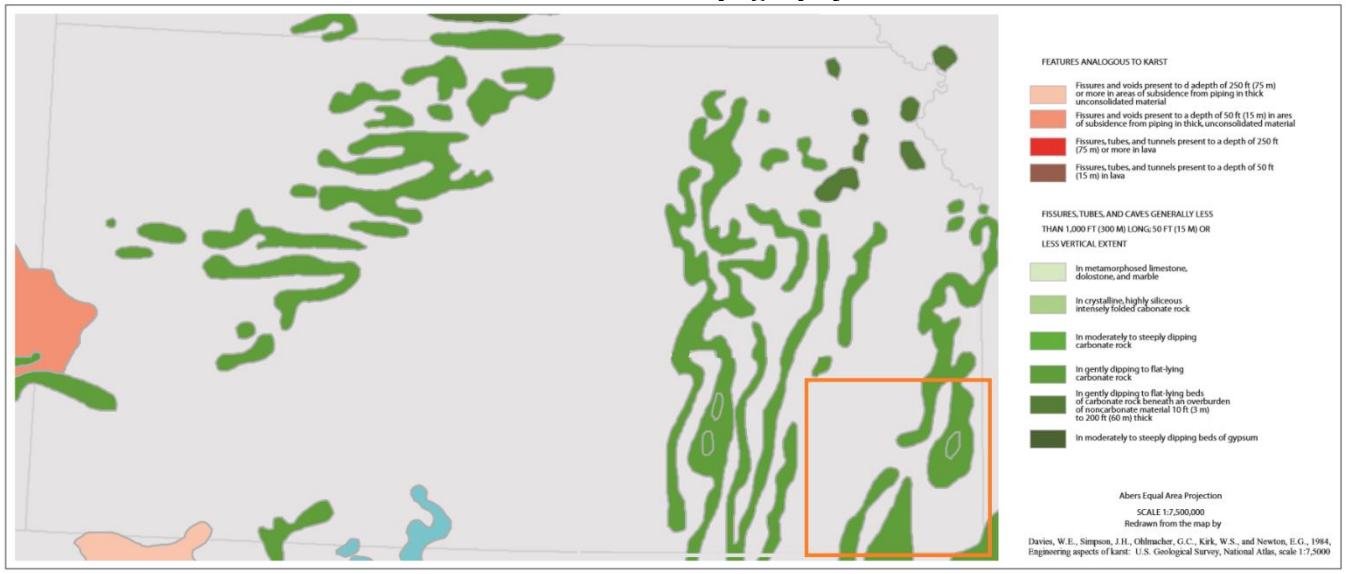
Table 4.138: Kansas Region H Sub-Surface Void Space

County	Total Sub-Surface Void Space
Allen	0
Bourbon	160
Chautauqua	0
Cherokee	33,769
Crawford	69,000
Elk	2
Greenwood	0
Labette	0
Montgomery	0
Neosho	0
Wilson	2
Woodson	0

Source: KDHE

Of additional concern to Kansas Region H is Karst topography. The following map from the United States Geologic Survey (USGS) indicates areas of Karst topography in the region. The green areas shown in the map show fissures, tubes, and caves generally less than 1,000 feet long with 50 feet or less vertical extent in gently dipping to flat-lying carbonate rock. Brown areas have similar features in gently dipping to flat lying gypsum beds. Light pink colored areas are features analogous to karst with fissures and voids present to a depth of 250 feet or more in areas of subsidence from piping in thick unconsolidated material. Darker pink areas contain fissures and voids (analogous to karst) to a depth of 50 feet. There are limited documented problems associated with natural limestone subsidence and sinkholes in Kansas Region H.

USGS Karst Topography



4.15.2 – Previous Occurrences

There has been one reported land subsidence event in Kansas Region H during the twenty-year period from 2009 to 2018.

- **2006: Cherokee County**
  A mine collapse occurred in an alley behind the Green Parrot Bar in downtown Galena, Cherokee County. Subsidence from an abandoned lead and zinc mine took the alley and the 114-year old building with it.

4.15.3 – Hazard Probability Analysis

Land subsidence events with the potential to affect Kansas Region H are incredibly difficult to quantify and forecast. Compounding the difficulty, land subsidence events occur on their own or occur as a secondary hazard with incidents of heavy rain, melting snow, and earthquakes as a primary cause. Hence, their future occurrences are highly dependent on the likelihood of the mentioned hazards.

Based on limited available data, indicating that there have been no reported events in the past ten years, and bearing in mind that many events may be unreported as they have no impact on human activities, the probability of a reported land subsidence occurrence in any given year is very low.

4.15.4 Vulnerability Analysis

In general, counties with a higher or increasing population, high, or increasing, or having a high structural valuation are to be considered to have a potentially greater vulnerability. Additionally, population vulnerabilities to land subsidence events are expected to be minimal.

Vulnerability to land subsidence in Kansas Region H was analyzed using the KDHE "Subsurface Void Space and Sinkhole/Subsidence Area Inventory for the State of Kansas" report. All documented acres of subsurface void space were classified according to these risk categories for each of the following causes of void space:

- Lead and Zinc Mines
- Coal Mines
- Limestone Mines
- Gypsum Mines
- Salt Solution Mining
- Rock Salt Mines
- Hydrocarbon Storage Caverns

Based on these classifications, a risk category was assigned to each of the subsurface void acres:

- Category I: High Risk
- Category II: Medium Risk
- Category III: Low Risk

The following table shows the classification of the void space in each of Kansas Region H counties. Please note that not all classifications with identified acreage are shown.

Table 4.139: Kansas Region H Sub-Surface Void Space Acreage

County	Coal Category I	Coal Category II	Lead/Zinc Category I	Total Sub-Surface Void Space
Allen	0	0	0	0
Bourbon	0	160	0	160
Chautauqua	0	0	0	0
Cherokee	15,517	15,550	2,700	33,796
Crawford	12,100	56,900	0	69,000
Greenwood	0	0	0	0
Elk	0	2	0	2
Labette	0	0	0	0
Montgomery	0	0	0	0
Neosho	0	0	0	0
Wilson	0	0	0	0
Woodson	0	0	0	0

Source: KDHE, "Subsurface Void Space and Sinkhole/Subsidence Area Inventory for the State of Kansas" 2006.

Based on this data, the area for each county underlain by sub-surface void acreage was determined. The higher percentage of acreage underlain by void area the higher the vulnerability.

Table 4.140: Kansas Region H Percentage of Land Underlain by Sub-Surface Void Space

County	Total County Acreage	Sub-Surface Void Space Acreage	Percentage of County Acreage Underlain by Void Space
Allen	323,200	0	0.0%
Bourbon	408,960	160	0.0%
Chautauqua	412,800	0	0.0%
Cherokee	378,240	33,796	8.9%
Crawford	380,800	69,000	18.1%
Elk	416,000	0	0.0%
Greenwood	737,920	2	0.0%
Labette	417,920	0	0.0%
Montgomery	416,640	0	0.0%
Neosho	369,920	0	0.0%
Wilson	368,000	0	0.0%
Woodson	323,200	0	0.0%

Source: KDHE

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region H county incurring damage over the period 2009

to 2018 from land subsidence events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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Table 4.141: Kansas Region H Structural Vulnerability Data for Land Subsidence, 2009-2018

County	HAZUS Building Valuation	Reported Structure Damage	Percentage of Building Valuation Damaged
Allen	$1,557,716,000	$0	0%
Bourbon	$1,720,309,000	$0	0%
Chautauqua	$500,459,000	$0	0%
Cherokee	$2,163,015,000	$300,000*	001%
Crawford	$4,211,278,000	$0	0%
Elk	$353,392,000	$0	0%
Greenwood	$834,705,000	$0	0%
Labette	$2,349,164,000	$0	0%
Montgomery	$4,012,672,000	$0	0%
Neosho	$1,782,409,000	$0	0%
Wilson	$1,128,676,000	$0	0%
Woodson	$357,734,000	$0	0%

Source: HAZUS

*: Data estimated from destruction of Green Parrot Bar in 2006

4.15.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.142: Land Subsidence Consequence Analysis

Subject	Impacts of Land Subsidence
Health and Safety of the Public	Local impact expected to be moderate to severe for the incident area, depending on the scale of the area.
Health and Safety of Responders	Impact to responders would be minimal.
Continuity of Operations	Minimal expectation of execution of the COOP, unless a facility is impacted.
Property, Facilities, and Infrastructure	Localized impact to facilities and infrastructure in the incident area has the potential to do severe damage.
Environment	Impact to the area would be minimal.
Economic Conditions	Impacts to the economy will depend on the severity of the damage.
Public Confidence in the Jurisdiction's Governance	Local development policies will be questioned

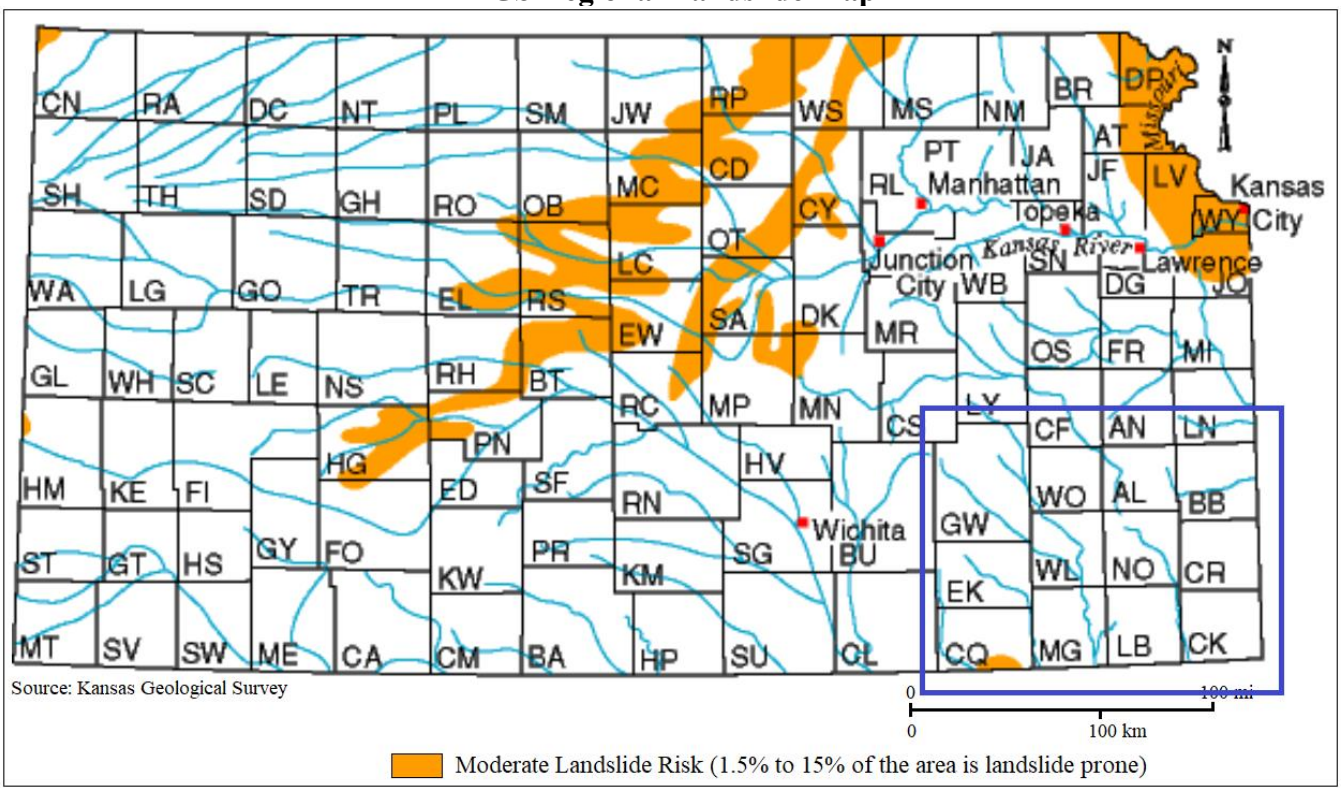
4.16 – Landslides

Landslides are the downward and outward movement of slopes. Landslides include a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on and over steepened slopes is the primary reason for a landslide, landslides are often prompted by the occurrence of other disasters. Other contributing factors include erosion, steep slopes, rain and snow, and earthquakes.

4.16.1 – Location and Extent

Landslides are classified based mostly on their character of movement and degree of internal disruption. These landslide classes are rock fall, flow, slide, and creep. Although these are clear divisions, in the real world a landslide may have components of more than one type. Areas prone to landslides can cover broad geographic regions, but occurrences are generally localized. The entire planning area, including all participating jurisdictions, is potentially at risk to landslides. However, landslides require an earth or rock covered slope, and so flatter areas have a much-decreased risk of occurrence. The following map, produced by the Kansas Geological Survey (KGS), shows areas of the region with a moderate susceptibility of landslides, equating to 1.5% to 15% of the area being landslide prone.

KGS Regional Landslide Map



4.16.2 – Previous Occurrences

At present there is no centralized and complete database containing historical records for landslides in Kansas. For Kansas Region H there have been no reported or recorded landslides impacting either participating jurisdictions or the region in the past 10 years.

4.16.3 – Hazard Probability Analysis

Landslides with the potential to affect Kansas Region H are incredibly difficult to quantify and forecast. Compounding the difficulty, landslides occur on their own or occur as a secondary hazard with incidents of heavy rain, melting snow, earthquakes, and land subsidence are their primary cause. Hence, their future occurrences are highly dependent on the likelihood of the mentioned hazards.

As indicated in the map above, small areas of Kansas Region H (in Chautauqua County) have a moderate susceptibility to landslides. However, the limited available past occurrence data indicate that there is a very low rate of occurrence. Based on limited available data, and bearing in mind that many landslides may be unreported as they have no impact on human activities, it is not likely that a major landslide will impact the region based on zero reported occurrences in 10 years.

4.16.4 Vulnerability Analysis

Based on landslide mapping by the KGS, the area for each county with a moderate landslide risk was estimated. The higher percentage of acreage in a moderate landslide risk area the higher the vulnerability. However, landslides require an earth or rock covered slope, and so flatter areas have a much-decreased risk of occurrence.

Table 4.143: Kansas Region H Percentage of Land in Moderate Landslide Risk Area

County	Total County Acreage	Estimated Acreage with Moderate Landslide Potential	Percentage of County Acreage Identified in Potential Slide Area
Allen	323,200	0	0.0%
Bourbon	408,960	0	0.0%
Chautauqua	412,800	41,280	10.0%
Cherokee	378,240	0	0.0%
Crawford	380,800	0	0.0%
Greenwood	416,000	0	0.0%
Elk	737,920	0	0.0%
Labette	417,920	0	0.0%
Montgomery	416,640	0	0.0%
Neosho	369,920	0	0.0%
Wilson	368,000	0	0.0%
Woodson	323,200	0	0.0%

Source: ADEM and HAZUS

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region H county incurring damage over the period 2009

to 2018 from landslide events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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Table 4.144: Kansas Region H Structural Vulnerability Data for Landslides, 2009-2018

County	HAZUS Building Valuation	Reported Structure Damage	Percentage of Building Valuation Damaged
Allen	$1,557,716,000	$0	0%
Bourbon	$1,720,309,000	$0	0%
Chautauqua	$500,459,000	$0	0%
Cherokee	$2,163,015,000	$0	0%
Crawford	$4,211,278,000	$0	0%
Elk	$353,392,000	$0	0%
Greenwood	$834,705,000	$0	0%
Labette	$2,349,164,000	$0	0%
Montgomery	$4,012,672,000	$0	0%
Neosho	$1,782,409,000	$0	0%
Wilson	$1,128,676,000	$0	0%
Woodson	$357,734,000	$0	0%

Source: HAZUS

Population vulnerabilities to landslide events are expected to be minimal.

4.16.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.145: Landslide Consequence Analysis

Subject	Impacts of Landslide
Health and Safety of the Public	Severity and location dependent. Impacts on persons in the path of the slide are expected to be severe.
Health and Safety of Responders	Impacts are expected to be minimal.
Continuity of Operations	Minimal expectation of execution of the COOP, unless a facility is impacted.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the location of the facility in relation to the slide. Loss of structural integrity of buildings and infrastructure could occur.
Environment	Impact to the area would be minimal other than the immediate area.
Economic Conditions	Impacts to the economy will be dependent severity of landslide and the impact on structures and infrastructure. Impacts could be severe if roads/utilities are affected. Otherwise impact would be non-existent to minimal.
Public Confidence in the Jurisdiction's Governance	Confidence could be an issue if local development policies are questioned.

4.17 – Lightning

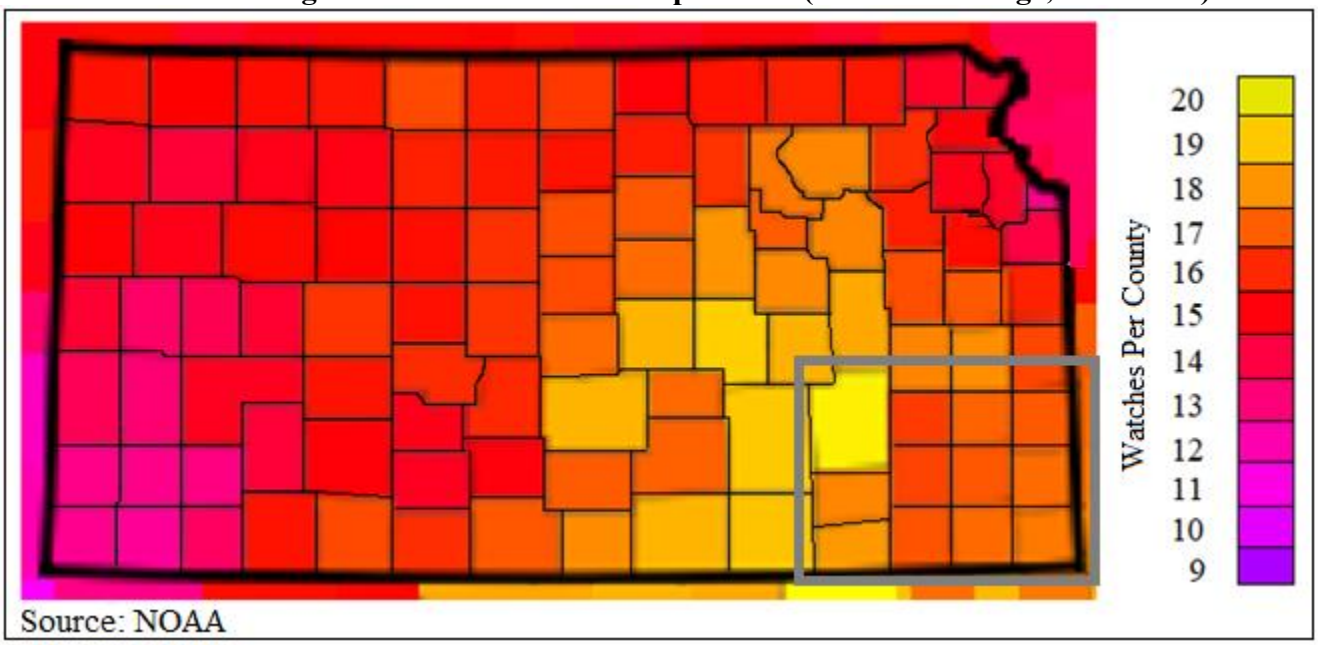
Lightning is a discharge of atmospheric electricity that is triggered by a buildup of differing charges within a cloud. According to the NWS, lightning is one of the most underrated severe weather hazards and is the second deadliest weather killer in the United States.

4.17.1 – Location and Extent

Lightning occurs over broad geographic regions. The entire Kansas Region H planning area, including all participating jurisdictions, is at risk to lightning.

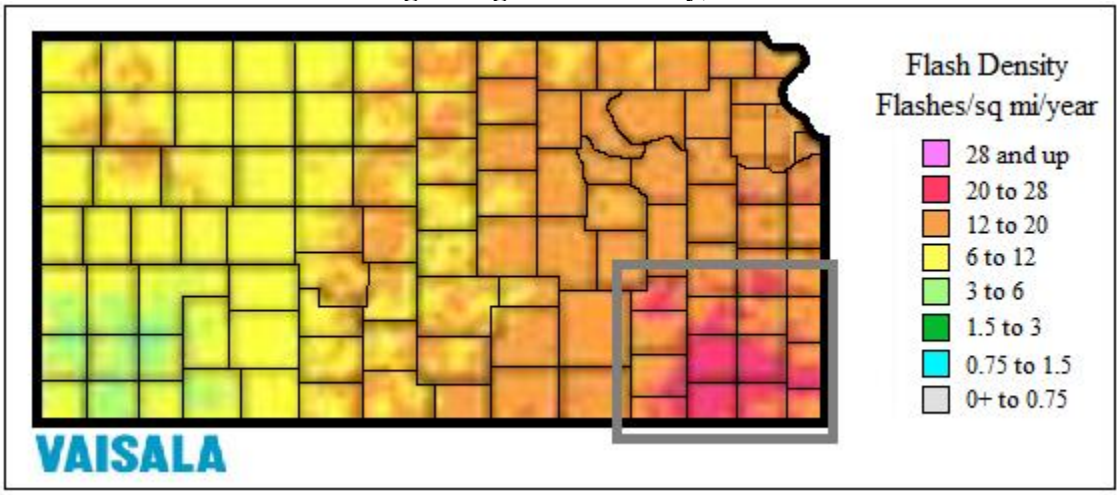
Thunderstorms are often the generator of lightning. The following map, generated by NOAA, indicates the average number severe thunderstorm watches per year for Kansas Region H.

Annual Average Thunderstorm Watches per Year (20-Year Average, 1993-2012)



The following map, generated by Vaisala, indicates the average number of lightning flashes per square mile per year for Kansas Region H. In general, the more recorded flashes the greater the potential for lightning strikes.

Vaisala Lightning Flash Density, 2008-2017



4.17.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 15 Presidential Disaster Declarations for Kansas Region H for severe storms (along with other associates hazard event), of which lightning may be a component. The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on hail events that have impacted Kansas Region H. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.146: Kansas Region H FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4287	10/20/2016 (09/02/2016 – 09/12/2016)	**Severe Storms** and Flooding	Greenwood	$6,959,536
4230	07/20/2015 (05/04/2015 – 06/21/2015)	**Severe Storms**, Tornados, Straight-Line Winds, and Flooding	Chautauqua, Cherokee, Elk, Greenwood, and Neosho	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	**Severe Storms**, Straight-line Winds, Tornados, and Flooding	Bourbon, Butler, Cherokee, Crawford, Elk, Greenwood, Montgomery, Wilson, and Woodson	$1,102,861 (Estimate)
1932	08/10/2010 (6/7-7/21/2010)	**Severe Storms**, Flooding and Tornados	Elk, Greenwood, Wilson and Woodson	$9,279,257
1860	09/30/2009 (7/8-7/14/2009)	**Severe Storms** and Flooding	Bourbon	$3,347,662
1849	06/25/2009 (4/25-5/16/2009)	**Severe Storms**, Flooding, Straight-Line Winds, and Tornados	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Greenwood, Labette, Montgomery, and Wilson	$15,013,488
1848	10/31/2008	**Severe Storms**, Flooding, and Tornados	Allen, Bourbon, Chautauqua, Cherokee, and Wilson	$4,167,044
1808	10/31/2008	**Severe Storms**, Flooding, and Tornados	Greenwood	$4,167,044

Table 4.146: Kansas Region H FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
1776	07/09/2008	**Severe Storms**, Flooding, and Tornados	Bourbon, Chautauqua, Cherokee, Crawford, Elk, Montgomery, and Wilson	$70,629,544
1711	7/2/2007 (6/26-30/2007)	**Severe Storms** and Flooding	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Elk, Greenwood, Labette, Montgomery, Neosho, Wilson, and Woodson	$40,238,600
1699	5/6/2007 (5/4/2007)	**Severe Storms**, Tornados, and Flooding	Cherokee	$117,565,269
1600	8/23/2005 (6/30-7/1/2005)	**Severe Storms** and Flooding	Cherokee, Crawford, Neosho	$4,344,569
1535	8/3/2004 (6/12-7/25/2004)	**Severe Storms**, Flooding, and Tornados	Cherokee and Woodson	$12,845,892
1462	5/6/2003 (5/4-30/2003)	**Severe Storms**, Tornados, and Flooding	Allen, Cherokee, Labette, Neosho and Woodson	$988,056
1327	5/3/2000 (4/19/2000)	**Severe Storms** and Tornados	Crawford, Labette, Neosho	$2,542,209

Source: FEMA
-: Data unavailable

The following provides details of the two Presidential Disaster Declarations for Kansas Region H since the last plan update in 2014.

Kansas – Severe Storms and Flooding
FEMA-4287-DR
Declared October 20, 2016

On October 10, 2016, Governor Sam Brownback requested a major disaster declaration due to severe storms and flooding during the period of September 2-12, 2016. The Governor requested a declaration for Public Assistance for 11 counties and Hazard Mitigation statewide. During the period of September 28 to October 7, 2016, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On October 20, 2016, President Obama declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms and flooding in Cheyenne, Bourbon, Ellis, Graham, Greenwood, Crawford, Norton, Rooks, Russell, Neosho, and Wilson Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

Kansas – Severe Storms, Tornados, Straight-Line Winds, and Flooding
FEMA-4230-DR
Declared July 20, 2015

On July 1, 2015, Governor Sam Brownback requested a major disaster declaration due to severe storms, tornados, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The Governor requested a declaration for Public Assistance, including direct federal assistance for 42 counties and Hazard Mitigation statewide. During the period of May 4 to June 27, 2015, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On July 20, 2015, President Obama declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, tornados, straight-line winds, and flooding in Atchison, Barton, Brown, Allen, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Bourbon, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Chautauqua, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Greenwood, Marshall, Elk, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Montgomery, Stevens, Wilson, Wabaunsee, and Washington Counties. Direct Federal assistance was also authorized. Finally, this declaration made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

In addition to the above reported events, the following table presents NOAA NCEI identified lightning events and the resulting damage totals in Kansas Region H for the period 2009 - 2018 (with 2009 and 2018 being full data set years).

Table 4.147: Kansas Region H NCEI Lightning Events, 2009 - 2018

County	Number of Events	Property Damage	Crop Damage	Deaths	Injuries
Allen	0	$0	$0	0	0
Bourbon	5	$27,000	$0	0	0
Chautauqua	0	$0	$0	0	0
Cherokee	0	$0	$0	0	0
Crawford	0	$0	$0	0	0
Greenwood	1	$30,000	$0	0	0
Elk	0	$0	$0	0	0
Labette	1	$7,000	$0	0	0
Montgomery	0	$0	$0	0	0
Neosho	1	$25,000	$0	0	0
Wilson	1	$2,000	$0	0	0
Woodson	0	$0	$0	0	0

Source: NOAA NCEI

The following local events were reported.

- **June 17, 2017: Greenwood County**
  Lightning struck a home and caused structural fire resulting in 30K in damages in Greenwood County.

- **July 3, 2011: Fredonia, Wilson County**
  Lightning caught a small shed on fire. The shed was a total loss. Property damages were reported at $2,000.

- **September 19, 2010: Altamont, Labette County**
  During the late evening hours on the 19th, lightning from a relatively weak area of showers and thunderstorms struck a farmstead northwest of Altamont in Labette County. Several small outbuildings were set ablaze. Property damages were reported at $7,000.

- **September 15, 2010: Fort Scott, Bourbon County**
  Lightning struck the Bourbon County Courthouse in the city of Ft. Scott which caused damage to the roof and significant damage to electronics inside the courthouse.

- **August 19, 2009: Earlton, Neosho County**
  Lightning reportedly struck a grain bin just east of Earlton. Consequently, a fire erupted, engulfing and eventually destroying the bin. Property damages were reported at $25,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of lightning on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates no related claims.

Table 4.148: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Lightning

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	0	0	$0
Bourbon	0	0	$0
Chautauqua	0	0	$0
Cherokee	0	0	$0
Crawford	0	0	$0
Elk	0	0	$0
Greenwood	0	0	$0
Labette	0	0	$0
Montgomery	0	0	$0
Neosho	0	0	$0
Wilson	0	0	$0
Woodson	0	0	$0

Source: USDA Farm Service Agency

4.17.3 – Hazard Probability Analysis

Predicting the probability of lightning occurrences is tremendously challenging due to the large number of factors involved and the random nature of strikes. Data from the NCEI indicates that Region H counties can expect on a yearly basis, relevant to lightning events:

- Two impactful events
- No deaths or injuries
- $9,100 in property damages

According to the USDA Risk Management Agency, Region H counties can expect on a yearly basis, relevant to lightning occurrences:

- No claims
- No impacted acres
- $0 in damages

In addition, Kansas Region H has had 15 Presidentially Declared Disasters relating to severe storms (of which lightning is a potential component) in the last 20 years. This represents an average of less than one declared severe storm (lightning) related disaster per year.

4.17.4 – Vulnerability Analysis

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region H county incurring damage over the period 2009 to 2018 from lightning events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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Table 4.149: Kansas Region H Structural Vulnerability Data for Lightning, 2009 -2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Allen	$1,557,716,000	$0	0.00%
Bourbon	$1,720,309,000	$27,000	0.00%
Chautauqua	$500,459,000	$0	0.00%
Cherokee	$2,163,015,000	$0	0.00%
Crawford	$4,211,278,000	$0	0.00%
Elk	$353,392,000	$30,000	0.01%
Greenwood	$834,705,000	$0	0.00%
Labette	$2,349,164,000	$7,000	0.00%
Montgomery	$4,012,672,000	$0	0.00%
Neosho	$1,782,409,000	$25,000	0.00%
Wilson	$1,128,676,000	$2,000	0.00%
Woodson	$357,734,000	$0	0.00%

Source: NCEI and HAZUS

In general counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to

lightning events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.150: Kansas Region H Population Vulnerability Data for Lightning

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

In addition, lightning may exacerbate agricultural and economic losses. The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data (2015 – 2018) allows us to quantify the monetary impact of lightning strikes on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to lightning events.

Table 4.160: Lightning Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	0	0.0%	$38,156,000	$0	0.0%
Bourbon	334,301	0	0.0%	$53,376,000	$0	0.0%
Chautauqua	310,310	0	0.0%	$35,195,000	$0	0.0%
Cherokee	308,233	0	0.0%	$86,906,000	$0	0.0%
Crawford	323,222	0	0.0%	$75,594,000	$0	0.0%
Elk	316,385	0	0.0%	$42,070,000	$0	0.0%
Greenwood	701,012	0	0.0%	$89,554,000	$0	0.0%
Labette	370,531	0	0.0%	$122,778,000	$0	0.0%
Montgomery	335,669	0	0.0%	$79,420,000	$0	0.0%
Neosho	308,150	0	0.0%	$67,958,000	$0	0.0%
Wilson	254,671	0	0.0%	$55,422,000	$0	0.0%
Woodson	294,643	0	0.0%	$54,603,000	$0	0.0%

Source: USDA

4.17.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.161: Lightning Consequence Analysis

Subject	Impacts of Lightning
Health and Safety of the Public	Severity and location dependent. Impacts on persons in the areas of lightning are expected to be severe if caught without proper shelter.
Health and Safety of Responders	Impacts will be predicated on the severity of the event. Damaged infrastructure will likely result in hazards such as downed utility lines, main breakages and debris on roadways.
Continuity of Operations	Temporary relocation may be necessary if government facilities experience damage. Services may be limited to essential tasks if utilities are impacted.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the location and structural capacity of the facility. Loss of utility infrastructure could occur. Utility lines, residential and business properties will be affected.
Environment	Impact could be severe for the immediate impacted area, depending on the size of the event. Impact will lessen as distance increases from the immediate incident area
Economic Conditions	Impacts to the economy will be dependent severity of the event and the impact on structures and infrastructure. Impacts could be severe if utilities are affected.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems in place and the timeliness of those warnings could be questioned.

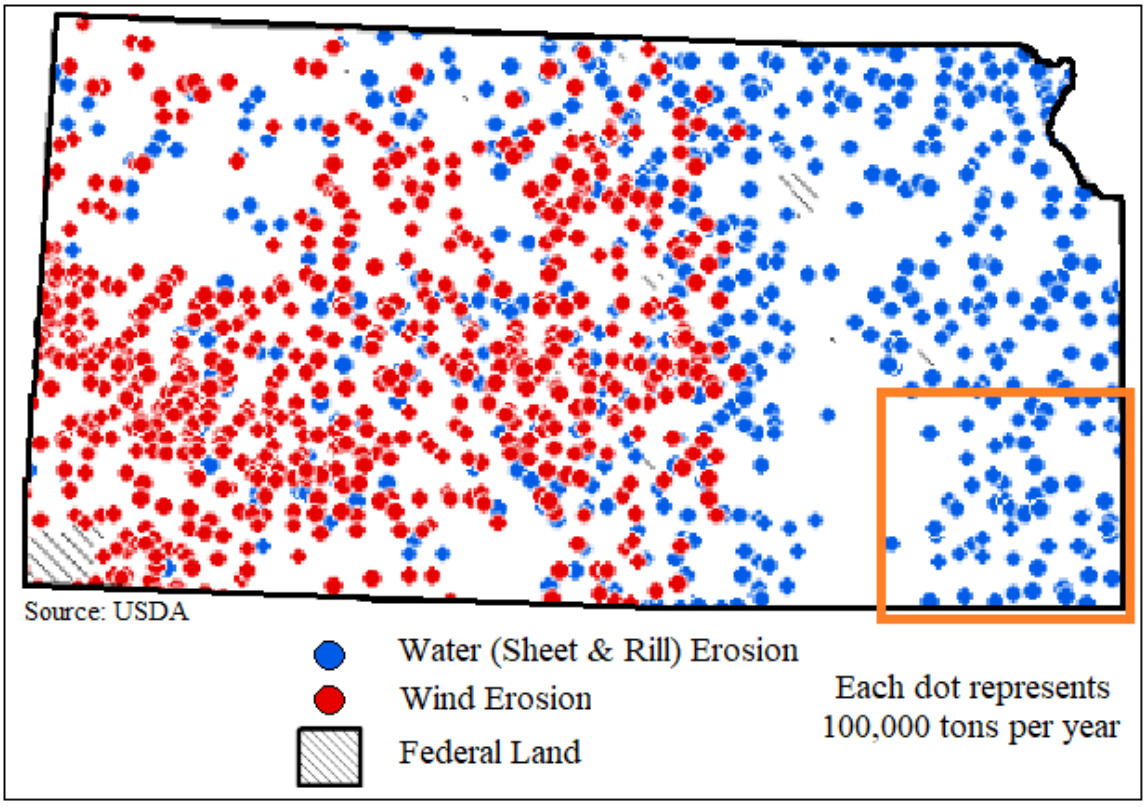
4.18 – Soil Erosion and Dust

Soil erosion, in general, is a process that removes topsoil through the application of water, wind, or farming activities. Soil erosion can be a slow, unobserved process or can happen quickly due to extreme environmental factors. The United States is losing soil 10 times faster than the natural replenishment rate, and related production losses cost the country about $44,000,000,000 each year. On average, wind erosion is responsible for about 40% of this loss and can increase markedly in drought years.

4.18.1 – Location and Extent

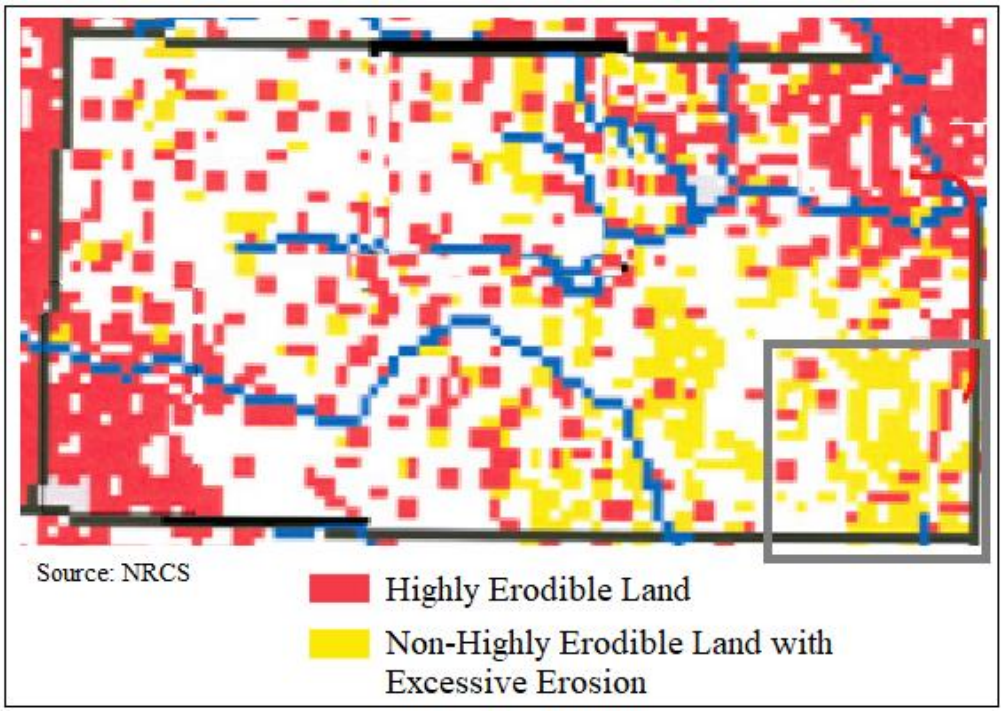
Soil erosion and dust occurs over broad geographic regions. The entire Kansas Region H planning area, including all participating jurisdictions, is at risk to soil erosion and dust.

Wind and Water Erosion on Cropland 2012



The following figure, from the Natural Resources Conservation Service (NRCS) shows areas of excessive erosion of farmland in Kansas. Each red dot represents 5,000 acres of highly erodible land, and each yellow dot represents 5,000 acres of non-highly erodible land with excessive erosion above the tolerable soil erosion rate.

NRCS Highly Erodible Land



4.18.2 – Previous Occurrences

At present there is no centralized and complete database containing historical records for soil erosion in Kansas. For Kansas Region H there have been no reported or recorded soil erosion or dust events impacting either participating jurisdictions or the region in the past 10 years.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of soil erosion and dust on the Region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates no related claims

4.18.3 – Hazard Probability Analysis

Predicting future erosion amounts is problematic as much relies on farm management practices, available moisture and crop type. Due to the on-going nature of this hazard, and the small agricultural base for the region, it is expected that future events causing minimally measurable impact to the regions crops and farmers will continue occur. Again, the rate of occurrence and potential future occurrence will be predicated on farm management practices and drought and water conditions.

4.18.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to soil erosion and dust events. Additionally, as this hazard disproportionately impacts the agricultural sector, only data on that sector was reviewed for potential vulnerability. Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of

soil erosion on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates no soil erosion related claims.

Table 4.162: Soil Erosion and Dust Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	0	0.0%	$38,156,000	$0	0.0%
Bourbon	334,301	0	0.0%	$53,376,000	$0	0.0%
Chautauqua	310,310	0	0.0%	$35,195,000	$0	0.0%
Cherokee	308,233	0	0.0%	$86,906,000	$0	0.0%
Crawford	323,222	0	0.0%	$75,594,000	$0	0.0%
Elk	316,385	0	0.0%	$42,070,000	$0	0.0%
Greenwood	701,012	0	0.0%	$89,554,000	$0	0.0%
Labette	370,531	0	0.0%	$122,778,000	$0	0.0%
Montgomery	335,669	0	0.0%	$79,420,000	$0	0.0%
Neosho	308,150	0	0.0%	$67,958,000	$0	0.0%
Wilson	254,671	0	0.0%	$55,422,000	$0	0.0%
Woodson	294,643	0	0.0%	$54,603,000	$0	0.0%

Source: USDA

4.18.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.163: Soil Erosion and Dust Consequence Analysis

Subject	Impacts of Soil Erosion and Dust
Health and Safety of the Public	Impact tends to be agricultural; however, dust can be a danger to susceptible individuals in the form of air pollutants.
Health and Safety of Responders	With proper preparedness and protection, impact to the responders is expected to be minimal.
Continuity of Operations	Minimal expectation for utilization of the COOP.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be severe, depending on the site of the soil erosion. This could adversely affect utility poles/lines, and facilities. Dust can also adversely affect machinery, air conditioners, etc.
Environment	The impact to the environment could be severe. Soil erosion and dust can severely affect farming, ranching, wildlife and plants due to production losses and habitat changes.
Economic Conditions	Impacts to the economy will be dependent on how extreme the soil erosion and dust are. Potentially it could severely affect crop yield and productivity. Seedling survival and growth is stressed by erosion and dust, as is the top soil which agriculture is dependent on.
Public Confidence in the Jurisdiction's Governance	Planning, response, and recovery may be questioned if not timely and effective.

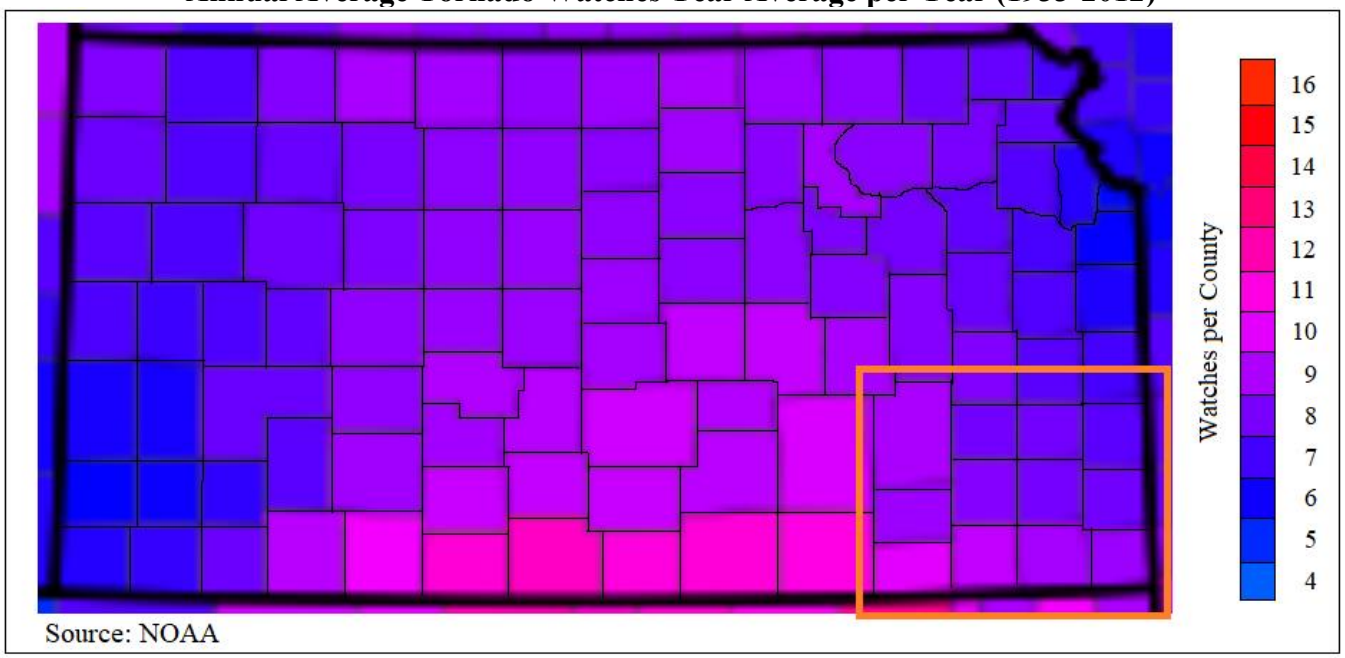
4.19 – Tornado

A tornado is a violently rotating column of air in contact with the ground. Often referred to as a twister or a cyclone, they can strike anywhere and with little warning. Tornados come in many shapes and sizes but are typically in the form of a visible condensation funnel, whose narrow end touches the earth and is often encircled by a cloud of debris and dust.

4.19.1 – Location and Extent

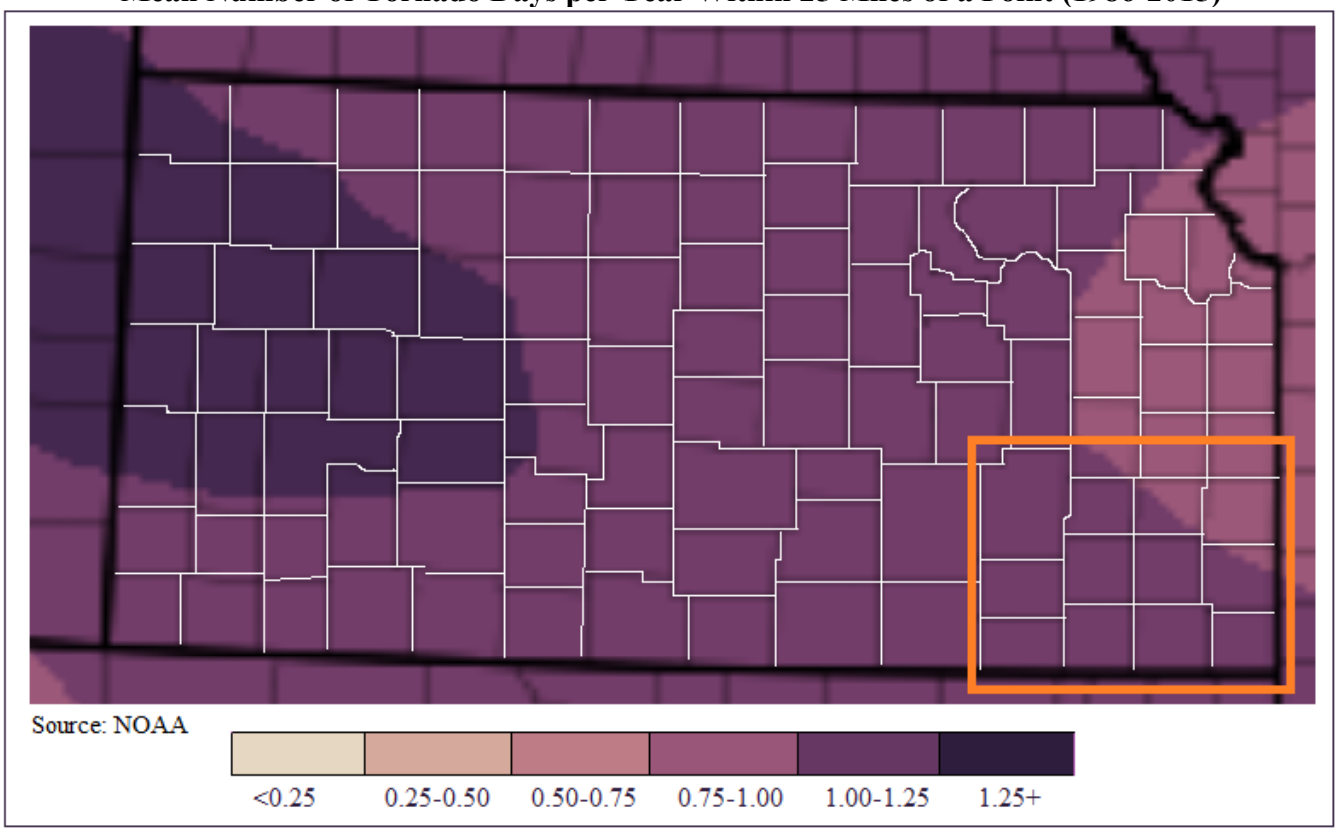
Tornados can strike anywhere in Kansas Region H, placing the entire planning area at risk. The following map, generated by NOAA, shows the average annual tornado watches per year for Kansas Region H.

Annual Average Tornado Watches Year Average per Year (1933-2012)



Additionally, NOAA generated the following map indicating the mean number of tornado days per year, using data compiled from the years 1986 to 2015.

Mean Number of Tornado Days per Year Within 25 Miles of a Point (1986-2015)



Many tornados only exist for a few seconds in the form of a touchdown. The most extreme tornados can attain wind speeds of more than 200 miles per hour, stretch more than two miles across, and travel dozens of miles.

A tornado may arrive with a squall line or cold front and touch down quickly. Smaller tornados can strike without warning. Other times tornado watches and sirens will alert communities of high potential tornado producing weather or an already formed tornado and its likely path.

Since 2007, the United States uses the Enhanced Fujita Scale to categorize tornados. The scale correlates wind speed values per F level and provides a rubric for estimating damage.

Table 4.164: Enhanced Fujita Scale

Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
EF0	65-85	53.5%	Light. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornados with no reported damage (i.e. those that remain in open fields) are always rated EF0.
EF1	86-110	31.6%	Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	10.7%	Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes complete destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	0.7%	Devastating. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	<0.1%	Explosive. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur.

Source: NOAA Storm Prediction Center

4.19.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 10 Presidential Disaster Declarations for Kansas Region H for tornados (along with other associates hazard event). The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on tornado events that have impacted Kansas Region H. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.165: Kansas Region H FEMA Tornado Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4230	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, **Tornados**, Straight-Line Winds, and Flooding	Chautauqua, Cherokee, Elk, Greenwood, and Neosho	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	Severe Storms, Straight-line Winds, **Tornados**, and Flooding	Bourbon, Butler, Cherokee, Crawford, Elk, Greenwood, Montgomery, Wilson, and Woodson	$1,102,861 (Estimate)
1932	08/10/2010 (6/7-7/21/2010)	Severe Storms, Flooding and **Tornados**	Elk, Greenwood, Wilson and Woodson	$9,279,257

Table 4.165: Kansas Region H FEMA Tornado Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
1849	06/25/2009 (4/25-5/16/2009)	Severe Storms, Flooding, Straight-Line Winds, and **Tornados**	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Greenwood, Labette, Montgomery, and Wilson	$15,013,488
1808	10/31/2008	Severe Storms, Flooding, and **Tornados**	Greenwood	$4,167,044
1776	07/09/2008	Severe Storms, Flooding, and **Tornados**	Bourbon, Chautauqua, Cherokee, Crawford, Elk, Montgomery, and Wilson	$70,629,544
1699	5/6/2007 (5/4/2007)	Severe Storms, **Tornados**, and Flooding	Cherokee	$117,565,269
1535	8/3/2004 (6/12-7/25/2004)	Severe Storms, Flooding, and **Tornados**	Cherokee and Woodson	$12,845,892
1462	5/6/2003 (5/4-30/2003)	Severe Storms, **Tornados**, and Flooding	Allen, Cherokee, Labette, Neosho and Woodson	$988,056
1327	5/3/2000 (4/19/2000)	Severe Storms and **Tornados**	Crawford, Labette, Neosho	$2,542,209

Source: FEMA
-: Data unavailable

The following provides details of the two Presidential Disaster Declarations for Kansas Region H since the last plan update in 2014.

Kansas – Severe Storms, Tornados, Straight-Line Winds, and Flooding FEMA-4230-DR
Declared July 20, 2015

On July 1, 2015, Governor Sam Brownback requested a major disaster declaration due to severe storms, tornados, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The Governor requested a declaration for Public Assistance, including direct federal assistance for 42 counties and Hazard Mitigation statewide. During the period of May 4 to June 27, 2015, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On July 20, 2015, President Obama declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, tornados, straight-line winds, and flooding in Atchison, Barton, Brown, Allen, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Bourbon, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Chautauqua, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Greenwood, Marshall, Elk, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Montgomery, Stevens, Wilson, Wabaunsee, and Washington Counties. Direct Federal

assistance was also authorized. Finally, this declaration made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

In addition to the above reported events, the following table presents NOAA NCEI identified tornado events and the resulting damage totals in Kansas Region H for the period 2009 - 2018 (with 2009 and 2018 being full data set years).

Table 4.166: Kansas Region H NCEI Tornado Events, 2009 - 2018

County	Number of Days with Event	Property Damage	Deaths	Injuries	Highest Rated Tornado
Allen	1	$0	0	0	EF0
Bourbon	3	$700,000	0	0	EF1
Chautauqua	5	$0	0	0	EF1
Cherokee	3	$10,250,000	0	0	EF2
Crawford	2	$60,000	0	0	EF0
Elk	1	$0	0	0	EF0
Greenwood	6	$17,590,000	0	8	EF3
Labette	6	$5,000	0	0	EF0
Montgomery	4	$0	0	0	EF0
Neosho	1	$0	0	0	EF0
Wilson	2	$0	0	0	EF0
Woodson	0	$0	0	0	-

Source: NOAA NCEI

The following provides both local accounts and NOAA NCEI descriptions of notable recorded events:

- **June 26, 2018: Eureka, Greenwood County**
  A large circulation around tree top level moved into the southwest side of town causing minimal damage initially to trees and one business, before descending fully to the ground, as it moved northeast across town. The tornado fully came down to the ground, on the northeast side of town, intensifying, and causing significant damage to homes and businesses. The worst damage, rated EF-3, occurred just south of the high school, with one home having only interior walls remaining standing. Eight injuries were reported due to the tornado, with three of the injuries occurring in one house. Property damage was recorded at $13,690,000.

- **February 28, 2017: Hepler, Crawford County**
  A National Weather Service storm survey revealed that an EF-1 tornado touched down approximately one mile southeast of Hepler, Kansas. The tornado destroyed one outbuilding and heavily damaging two other outbuildings. Several farm equipment items were also heavily damaged and thrown by the tornado. Estimated peak wind speed was 95 mph. Property damage was recorded at $500,000.

- **July 7, 2016: Eureka, Greenwood County**
  A tornado touched down just northwest of the Eureka Country Club and moved southeast across the town. As the tornado moved through town, it destroyed 31 homes, 23 homes had major damage, and another 32 had minor damage. A total of 152 structures were damaged in some way. The

tornado was rated an EF2, due the damage caused across town, with the hardest hit areas, just to the west of the Eureka nursing home. NO serious injuries or deaths occurred with the tornado. Eyewitness accounts suggest that residents received ample warning lead time, due to the information being received through the alert function of their mobile devices. Property damage was recorded at $3,800,000.

- **April 27, 2014: Bourbon County**
  A storm survey conducted by the NWS Office in Pleasant Hill found an EF1 tornado began at the intersection of Highway 69 and Soldier Road, near Hammond, Kansas. Minor damage was noted near Hammond, with the most significant damage consisting of toppled over grain bins and several derailed empty train cars. Through the remainder of the Bourbon County path, several destroyed outbuildings were noted as well as significant tree damage. The tornado path continued into Linn County, Kansas. Maximum winds with the tornado in Bourbon County were estimated to be between 100 and 110 mph with a maximum width of 200 yards. Property damage was recorded at $500,000.

- **April 27, 2014: Cherokee County**
  A survey team determined an EF2 tornado struck the town of Baxter Springs, Kansas. The tornado started near Quapaw, Oklahoma and crossed the state line into Kansas then moved through the town of Baxter Springs producing a 150-yard-wide swath of damage from southwest to northeast through the center of town. Emergency management reported approximately 90 homes and 11 business were destroyed and an additional seven businesses and 85 homes suffered damage. Approximately 25 injuries were reported but no fatalities. Maximum wind speeds were estimated to be between 120 and 130 mph. Property damage was recorded at $10,000,000.

Descriptions of smaller events can be found on the NOAA NCEI website:

- **www.NCEI.noaa.gov/stormevents/ftp.jsp**

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of tornados on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates no tornado related claims.

Table 4.167: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Tornados

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	0	0	$0
Bourbon	0	0	$0
Chautauqua	0	0	$0
Cherokee	0	0	$0
Crawford	0	0	$0
Elk	0	0	$0
Greenwood	0	0	$0
Labette	0	0	$0
Montgomery	0	0	$0
Neosho	0	0	$0

Table 4.167: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Tornados

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Wilson	0	0	$0
Woodson	0	0	$0

Source: USDA Farm Service Agency

4.19.3 – Hazard Probability Analysis

The following table summarizes tornado probability data for **Allen County**.

Table 4.168: Allen County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	1
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Allen County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Allen County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Bourbon County**.

Table 4.169: Bourbon County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0

Table 4.169: Bourbon County Tornado Probability Summary

Data	Recorded Impact
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$700,000
Average Property Damage per Year	$70,000
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Bourbon County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $70,000 in property damages

According to the USDA Risk Management Agency, Bourbon County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes Tornado probability data for **Chautauqua County**.

Table 4.170: Chautauqua County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	5
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Chautauqua County can expect on a yearly basis, relevant to tornado events:

- One event
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Chautauqua County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Cherokee County**.

Table 4.171: Cherokee County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$10,250,000
Average Property Damage per Year	$1,025,000
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Cherokee County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $1,025,000 in property damages

According to the USDA Risk Management Agency, Cherokee County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Crawford County**.

Table 4.172: Crawford County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	2
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$60,000
Average Property Damage per Year	$6,000
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Crawford County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $6,000 in property damages

According to the USDA Risk Management Agency, Crawford County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Elk County**.

Table 4.173: Elk County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	1
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0

Table 4.173: Elk County Tornado Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Elk County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Elk County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes Tornado probability data for **Greenwood County**.

Table 4.174: Greenwood County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	6
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	8
Average Number of Days with Event and Property Damage	1
Total Reported NCEI Property Damage (2009-2018)	$17,590,000
Average Property Damage per Year	$1,759,000
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Greenwood County can expect on a yearly basis, relevant to tornado events:

- One event
- One injury, no deaths
- $1,759,000 in property damages

According to the USDA Risk Management Agency, Greenwood County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Labette County**.

Table 4.175: Labette County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	6
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$5,000
Average Property Damage per Year	$500
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Labette County can expect on a yearly basis, relevant to tornado events:

- One event
- No deaths or injuries
- $500 in property damages

According to the USDA Risk Management Agency, Labette County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Montgomery County**.

Table 4.176: Montgomery County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	4
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0

Table 4.176: Montgomery County Tornado Probability Summary

Data	Recorded Impact
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Montgomery County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Montgomery County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Neosho County**.

Table 4.177: Neosho County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	1
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Neosho County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Neosho County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Wilson County**.

Table 4.178: Wilson County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	2
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Wilson County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes tornado probability data for **Woodson County**.

Table 4.179: Woodson County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	0
Average Events per Year	0
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Property Damage	0

Table 4.179: Woodson County Tornado Probability Summary

Data	Recorded Impact
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Woodson County can expect on a yearly basis, relevant to tornado events:

- No events
- No deaths or injuries
- $0 in property damages

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to tornado occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

Based on the number of NCEI reported events we derive the following probability for event occurrence in Kanas Region H:

- **Tornado Probability:** Approximately three events per year

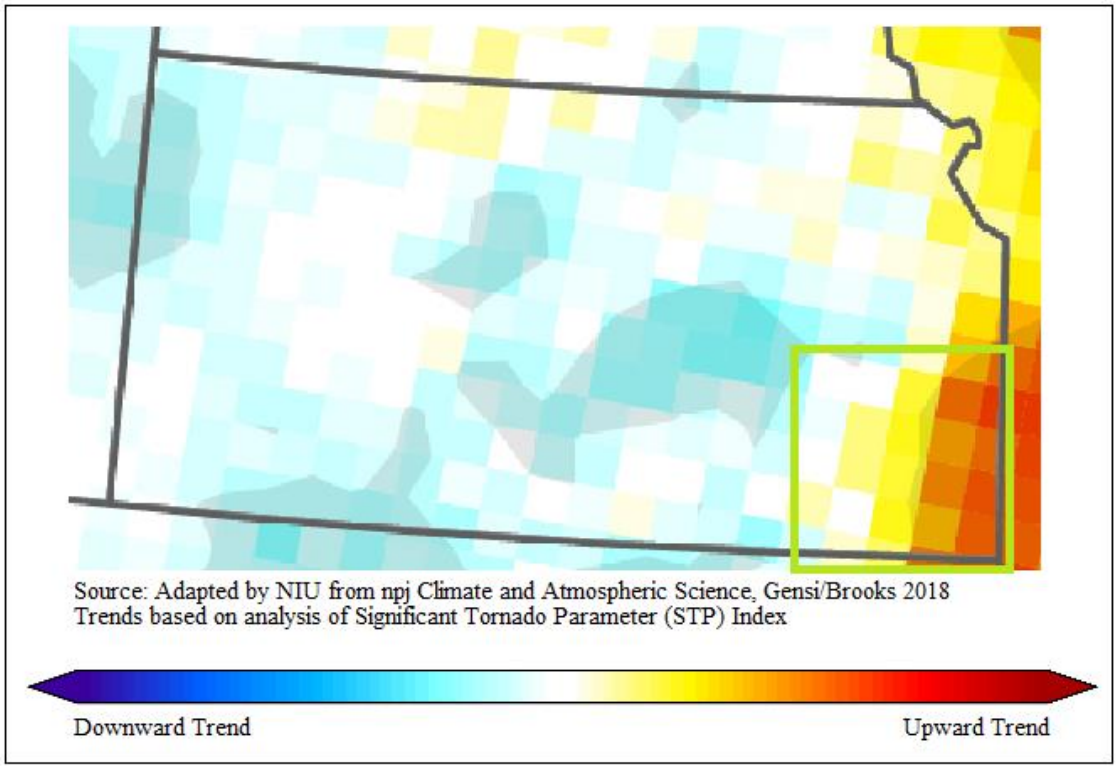
However, if events are normalized for tornados rated above an EF2, we derive the following probability for event occurrence:

- **Probability of an EF2 or greater tornado:** Less than one event per year

In addition, Kansas Region H has had 10 Presidentially Declared Disasters relating to tornados (and other concurrent events such as flooding) in the last 20 years. This represents an average one declared tornado related disaster per year.

Research conducted by the National Severe Storms Lab looked at Significant Tornado Parameter (STP) to help determine future tornado probability. STP is a measurement of the major parameters of tornado conditions, including wind speed and direction, wind at differing altitudes, unstable air patterns, and humidity. The following map, generated by Northern Illinois University and compiled from STP data, indicates that Kansas Region H may see an increasing future number of tornados, especially in the eastern half of the region.

Tornado Environmental Frequency Trends



4.19.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to tornado events. In general, counties with a higher or increasing population, high, or increasing, or having a high structural valuation are to be considered to have a potentially greater vulnerability. It is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to tornado events due to a projected decrease in the number of structures.

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region H county incurring damage over the period 2009 to 2018 from tornado events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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Table 4.180: Kansas Region H Structural Vulnerability Data for Tornados, 2009-2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Allen	$1,557,716,000	$0	0.0%
Bourbon	$1,720,309,000	$700,000	0.0%
Chautauqua	$500,459,000	$0	0.0%
Cherokee	$2,163,015,000	$10,250,000	0.5%
Crawford	$4,211,278,000	$60,000	0.0%
Elk	$353,392,000	$0	0.0%
Greenwood	$834,705,000	$17,590,000	2.1%
Labette	$2,349,164,000	$5,000	0.0%

Table 4.180: Kansas Region H Structural Vulnerability Data for Tornados, 2009-2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Montgomery	$4,012,672,000	$0	0.0%
Neosho	$1,782,409,000	$0	0.0%
Wilson	$1,128,676,000	$0	0.0%
Woodson	$357,734,000	$0	0.0%

Source: NCEI and HAZUS

In general counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to tornado events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.181: Kansas Region H Population Vulnerability Data for Tornados

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of tornados on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to tornado events.

Table 4.182: Tornado Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	0	0%	$38,156,000	$0	0%
Bourbon	334,301	0	0%	$53,376,000	$0	0%
Chautauqua	310,310	0	0%	$35,195,000	$0	0%
Cherokee	308,233	0	0%	$86,906,000	$0	0%
Crawford	323,222	0	0%	$75,594,000	$0	0%
Elk	316,385	0	0%	$42,070,000	$0	0%

Table 4.182: Tornado Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Greenwood	701,012	0	0%	$89,554,000	$0	0%
Labette	370,531	0	0%	$122,778,000	$0	0%
Montgomery	335,669	0	0%	$79,420,000	$0	0%
Neosho	308,150	0	0%	$67,958,000	$0	0%
Wilson	254,671	0	0%	$55,422,000	$0	0%
Woodson	294,643	0	0%	$54,603,000	$0	0%

Source: USDA

Between 2001 and 2010 51% of those killed by tornados were living in mobile homes, according to the NOAA. A 2012 "Kansas Severe Weather Awareness Week" report indicates that people living in mobile homes are killed by tornados at a rate 20 times higher than people living in permanent homes. Additionally, a new study from Michigan State University reported that the two biggest factors related to tornado fatalities were housing quality (measured by mobile homes as a proportion of housing units) and income level. When a tornado strikes, a county with double the number of mobile homes as a proportion of all homes will experience 62% more fatalities than a county with fewer mobile homes, according to the study data.

The following participating jurisdictions may have increased vulnerability to tornado events due to having greater than 20% of housing stock as mobile homes:

- **Gas** (Allen County)
- **LaHarpe** (Allen County)
- **Fulton (**Bourbon County)
- **Mapleton** (Bourbon County)
- **Redfield** (Bourbon County)
- **Peru** (Chautauqua County)
- **Weir** (Cherokee County)
- **West Mineral** (Cherokee County)
- **Longton** (Elk County)
- **Severy** (Greenwood County)
- **Labette City** (Labette County)
- **Dearing** (Montgomery County)
- **Elk City** (Montgomery County)
- **Havana** (Montgomery County)
- **Liberty** (Montgomery County)
- **Galesburg** (Neosho County)
- **Thayer** (Neosho County)
- **Altoona** (Wilson County)
- **New Albany** (Wilson County)
- **Neosho Falls** (Woodson County)

4.19.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.183: Tornado Consequence Analysis

Subject	Impacts of Tornado
Health and Safety of the Public	Impact of the immediate area could be severe depending on whether individuals were able to seek shelter and get out of the trajectory of the tornado. Casualties are dependent on warning systems and warning times.
Health and Safety of Responders	Impact to responders is expected to be minimal unless responders live within the affected area.
Continuity of Operations	Temporary to permanent relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the trajectory path. Roads, buildings, and communications could be adversely affected. Damage could be severe.
Environment	Impact will be severe for the immediate impacted area. Impact will lessen as distance increases from the immediate incident area.
Economic Conditions	Impacts to the economy will greatly depend on the trajectory of the tornado. If a jurisdiction takes a direct hit then the economic conditions will be severe. With an indirect hit the impact could be low to severe.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems and warning time will also be questioned.

4.20 – Wildfire

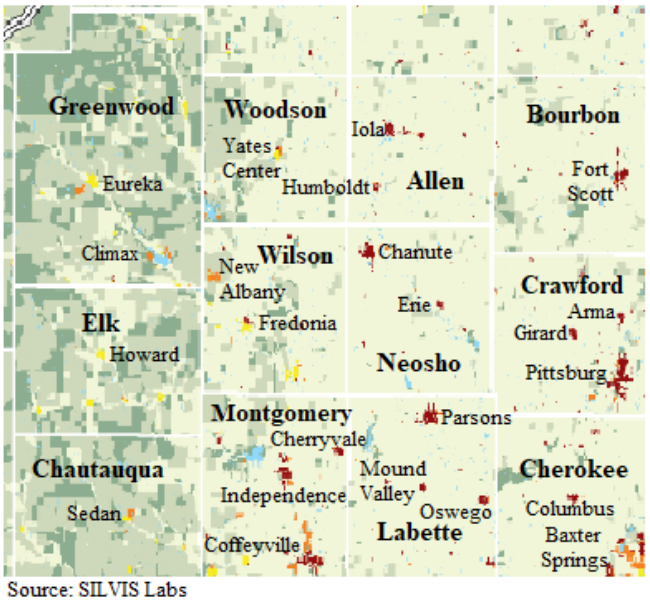
The NWS defines a wildfire as any free burning uncontainable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. They can occur naturally, by human accident, and on rare occasions by human action. Population de-concentration in the U.S. has resulted in rapid development in the outlying fringe of metropolitan areas and in rural areas with attractive recreational and aesthetic amenities, especially forests. This expansion has increased the likelihood that wildfires will threaten life and property.

4.20.1 – Location and Extent

Wildfires in Kansas Region H typically originate in pasture or prairie areas following the ignition of dry grasses (by natural or human sources). According to the 2011 Kansas Forest Action Plan, with the exception of Eastern Redcedar, most forest types in Kansas do not pose significant fire management issues. However, grasslands, which make up a majority of the open areas in Kansas Region H, do pose fire management issues due to the expansion of the Wildland Urban Interface (WUI) in recent decades.

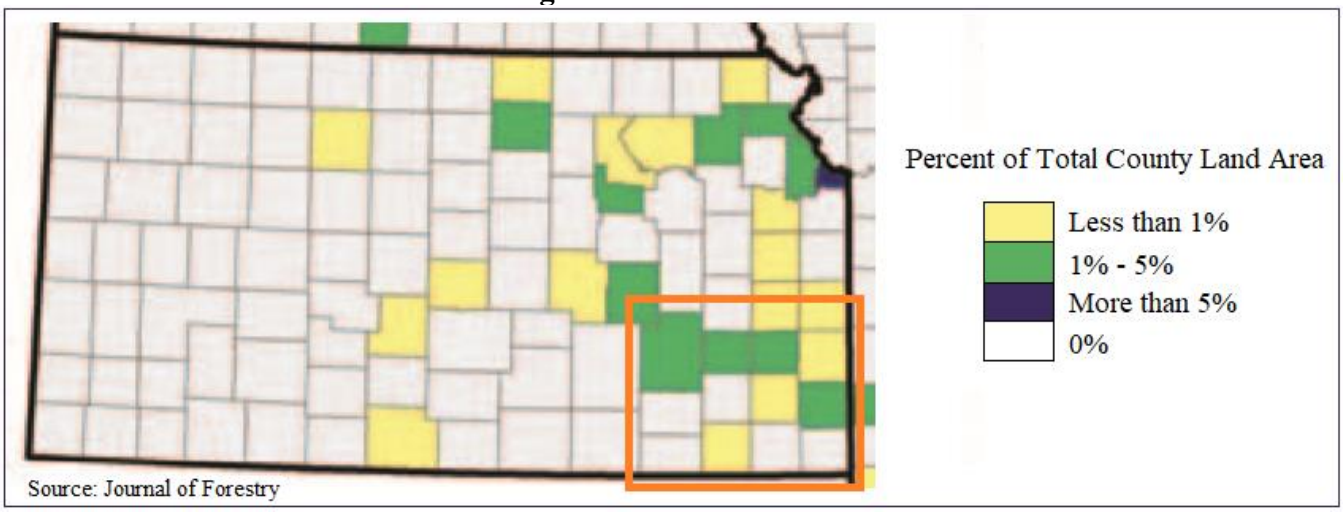
The WUI creates an environment in which fire can move readily between structural and vegetation fuels. Two types of WUI are mapped: intermixed and interface. Intermix WUI are areas where housing and vegetation intermingle; interface WUI are areas with housing in the vicinity of dense, contiguous wildland vegetation. The following maps detail WUI areas and information for Kansas Region H.

SILVIS Labs Regional WUI Map



The Eastern Redcedar is of concern to Kansas Region H. This invasive evergreen species can take over fence rows and un-planted fields, adding to wildfire fuel and risk. The following 2012 map, from the Journal of Forestry, indicates the percent of the total regional acreage impacted by Eastern Redcedar.

Percent of Total Regional Land Area of Eastern Redcedar



4.20.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been no Presidential Disaster Declarations for Kansas Region H for wildfires. In the 20-year period from 1999 to present, there have been no Fire Management Assistance Declaration for Kansas Region H for wildfires.

The Office of the State of Kansas Fire Marshall's Office (KSFM) was contacted concerning the size and origin of reported wildfires for the region. The following table lists all recorded wildfires, by county, for the six-year period 2013-2018 (currently available data).

Table 4.184: Kansas Region H State Fire Marshall Recorded Wildfire Events, 2013-2018

County	Number of Reported Fires	Deaths	Injuries	Buildings Burned	Burned Acres
Allen	83	0	0	2	3,384
Bourbon	216	0	0	2	11,878
Chautauqua	154	0	0	1	24,459
Cherokee	105	0	2	3	3,632
Crawford	124	0	2	1	4,634
Elk	219	0	0	0	63,251
Greenwood	249	0	0	1	59,056
Labette	80	0	0	4	3,501
Montgomery	251	0	2	0	17,212
Neosho	138	0	1	5	6,543
Wilson	66	0	0	0	6,724
Woodson	41	0	0	0	2,996

Source: KSFM

Additionally, a search of the NOAA NCEI database indicated no reported wildfires for the period 2009-2018.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of wildfires on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates one wildfire related claims on six acres for $169.

Table 4.185: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Wildfires

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	0	0	$0
Bourbon	0	0	$0
Chautauqua	0	0	$0
Cherokee	1	6	$169
Crawford	0	0	$0
Elk	0	0	$0
Greenwood	0	0	$0
Labette	0	0	$0
Montgomery	0	0	$0
Neosho	0	0	$0

Table 4.185: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Wildfires

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Wilson	0	0	$0
Woodson	0	0	$0

Source: USDA Farm Service Agency

4.20.3 – Hazard Probability Analysis

The following table summarizes wildfire probability data for **Allen County**.

Table 4.186: Allen County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	83
Average Events per Year	14
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	2
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	3,384
Average Burned Acres per Year	564
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Allen County can expect on a yearly basis, relevant to wildfire events:

- 14 events
- No deaths or injuries
- <1 building burned
- 564 acres burned

According to the USDA Risk Management Agency, Allen County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Bourbon County**.

Table 4.180: Bourbon County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	216
Average Events per Year	36
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	2
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	11,878
Average Burned Acres per Year	1,980
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Bourbon County can expect on a yearly basis, relevant to wildfire events:

- 36 events
- No deaths or injuries
- <1 building burned
- 1,980 acres burned

According to the USDA Risk Management Agency, Bourbon County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Chautauqua County**.

Table 4.181: Chautauqua County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	154
Average Events per Year	26
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	1
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	24,459
Average Burned Acres per Year	4,077
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0

Table 4.181: Chautauqua County Wildfire Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Chautauqua County can expect on a yearly basis, relevant to wildfire events:

- 26 events
- No deaths or injuries
- <1 building burned
- 4,077 acres burned

According to the USDA Risk Management Agency, Chautauqua County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted

$0 in insurance claims

The following table summarizes wildfire probability data for **Cherokee County**.

Table 4.182: Cherokee County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	105
Average Events per Year	18
Number Deaths or Injuries (2013-2018)	2
Average Number of Yearly Deaths and Injuries (2013-2018)	<1
Total Reported Burned Buildings (2013-2018)	3
Average Burned Buildings per Year	1
Total Reported Burned Acres (2013-2018)	3,632
Average Burned Acres per Year	605
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	69
Average Number of Acres Damaged per Year	14
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$169
Average Crop Damage per Year	$34

Source: KSFM and NOAA

Data from the KSFM indicates that Cherokee County can expect on a yearly basis, relevant to wildfire events:

- 18 events
- <1 deaths or injuries

- One building burned
- 605 acres burned

According to the USDA Risk Management Agency, Cherokee County can expect on a yearly basis, relevant to wildfire occurrences:

- <1 insurance claim
- 14 acres impacted
- $34 in insurance claims

The following table summarizes wildfire probability data for **Crawford County**.

Table 4.183: Crawford County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	124
Average Events per Year	21
Number Deaths or Injuries (2013-2018)	2
Average Number of Yearly Deaths and Injuries (2013-2018)	<1
Total Reported Burned Buildings (2013-2018)	1
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	4,634
Average Burned Acres per Year	772
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Crawford County can expect on a yearly basis, relevant to wildfire events:

- 21 events
- <1 death or injury
- <1 building burned
- 722 acres burned

According to the USDA Risk Management Agency, Crawford County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Elk County**.

Table 4.184: Elk County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	219
Average Events per Year	37
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	63,251
Average Burned Acres per Year	10,542
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Elk County can expect on a yearly basis, relevant to wildfire events:

- 37 events
- No deaths or injuries
- No buildings burned
- 10,542 acres burned

According to the USDA Risk Management Agency, Elk County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Greenwood County**.

Table 4.185: Greenwood County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	249
Average Events per Year	42
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	1
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	59,056
Average Burned Acres per Year	9,843
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0

Table 4.185: Greenwood County Wildfire Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Greenwood County can expect on a yearly basis, relevant to wildfire events:

- 42 events
- No deaths or injuries
- <1 building burned
- 9,843 acres burned

According to the USDA Risk Management Agency, Greenwood County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Labette County**.

Table 4.186: Labette County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	80
Average Events per Year	13
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	4
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	3,501
Average Burned Acres per Year	584
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Labette County can expect on a yearly basis, relevant to wildfire events:

- 13 events
- No deaths or injuries
- <1 building burned

- 584 acres burned

According to the USDA Risk Management Agency, Labette County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Montgomery County**.

Table 4.187: Montgomery County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	251
Average Events per Year	42
Number Deaths or Injuries (2013-2018)	2
Average Number of Yearly Deaths and Injuries (2013-2018)	<1
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	17,212
Average Burned Acres per Year	2,869
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Montgomery County can expect on a yearly basis, relevant to wildfire events:

- 42 events
- <1 death or injury
- No buildings burned
- 2,869 acres burned

According to the USDA Risk Management Agency, Montgomery County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Neosho County**.

Table 4.188: Neosho County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	138
Average Events per Year	23
Number Deaths or Injuries (2013-2018)	1
Average Number of Yearly Deaths and Injuries (2013-2018)	<1
Total Reported Burned Buildings (2013-2018)	5
Average Burned Buildings per Year	1
Total Reported Burned Acres (2013-2018)	6,543
Average Burned Acres per Year	1,091
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Neosho County can expect on a yearly basis, relevant to wildfire events:

- 23 events
- <1 death or injury
- One building burned
- 1,091 acres burned

According to the USDA Risk Management Agency, Neosho County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Wilson County**.

Table 4.189: Wilson County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	66
Average Events per Year	11
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	6,724
Average Burned Acres per Year	1,121
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0

Table 4.189: Wilson County Wildfire Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Wilson County can expect on a yearly basis, relevant to wildfire events:

- 11 events
- No deaths or injuries
- No buildings burned
- 1,121 acres burned

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes wildfire probability data for **Woodson County**.

Table 4.190: Woodson County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	41
Average Events per Year	7
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	2,996
Average Burned Acres per Year	499
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Woodson County can expect on a yearly basis, relevant to wildfire events:

- Seven events

- No deaths or injuries
- No buildings burned
- 499 acres burned

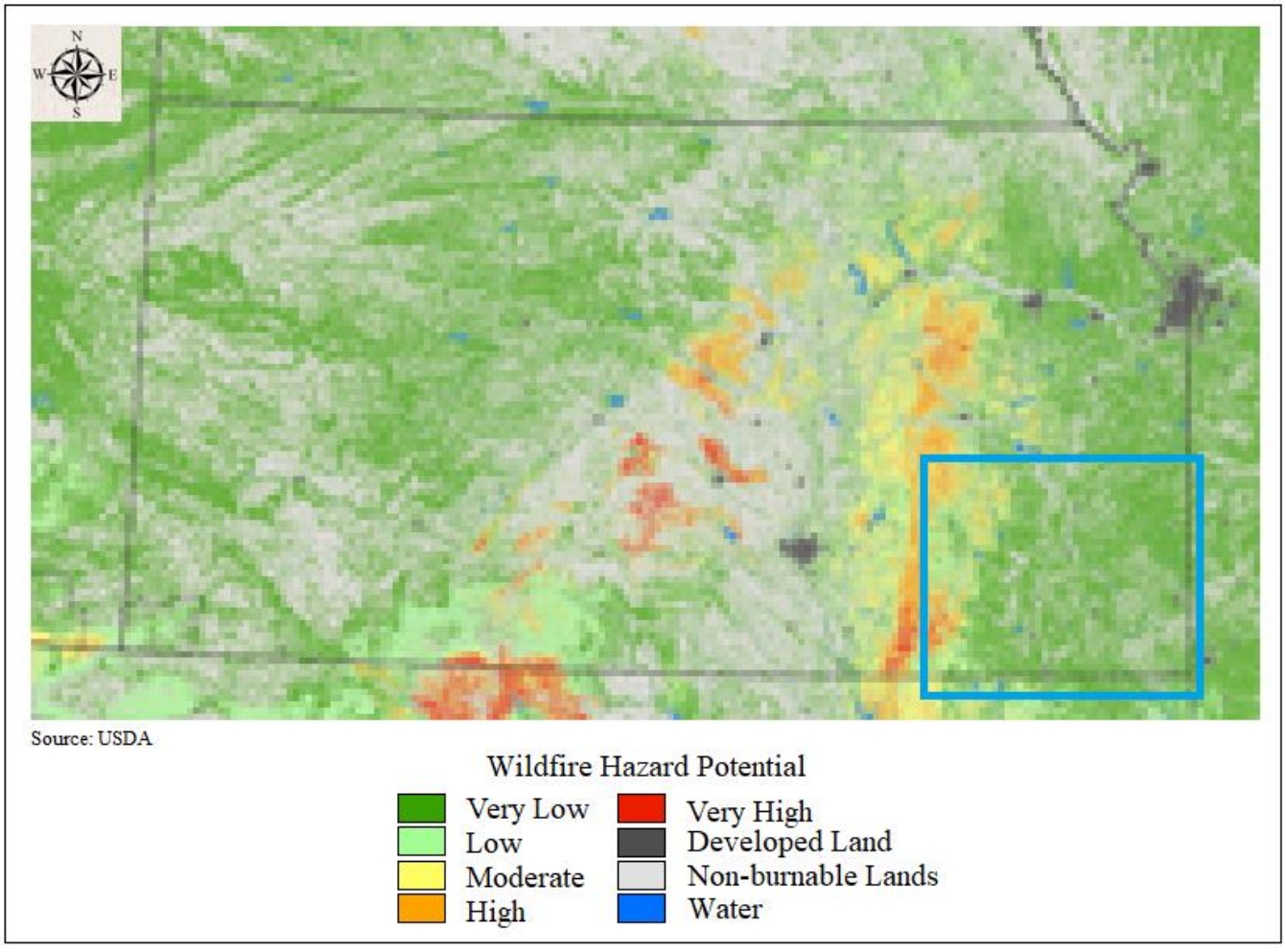
According to the USDA Risk Management Agency, Woodson County can expect on a yearly basis, relevant to wildfire occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

Mapping created by the USDA in 2018 indicates the Wildfire Hazard Potential for the United States. In general, the map indicates that Kansas Region H is the low and very low class.

Mapping created by the USDA in 2018 indicates the Wildfire Hazard Potential for the United States. In general, the map indicates that Kansas Region H is the low and moderate potential class.

USDA Wildfire Potential Map



4.20.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to wildfire events. In general, counties with a higher or increasing population, high, or increasing, or having a high structural valuation are to be considered to have a potentially greater vulnerability. It is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to wildfire events due to a projected decrease in the number of structures.

The following table presents data from HAZUS and KSFM concerning the structures and the percentage of structures for each Kansas Region H county incurring damage over the six-year period of 2013 to 2018 (current available data) from wildfire events. As KSFM did not assign a value to the structures burned, an estimate of $32,000 per structure (value determined using a commercial cost calculator for an 800 square foot general purpose barn at $40 per square foot) was used as reports indicate the majority of structures burned were farm out-buildings. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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Table 4.191: Kansas Region H Structural Vulnerability Data for Wildfires, 2009-2018

County	HAZUS Building Valuation	KSFM Structure Damage	Percentage of Building Valuation Damaged
Allen	$1,557,716,000	$64,000	0.00%
Bourbon	$1,720,309,000	$64,000	0.00%
Chautauqua	$500,459,000	$32,000	0.01%
Cherokee	$2,163,015,000	$96,000	0.00%
Crawford	$4,211,278,000	$32,000	0.00%
Elk	$353,392,000	$0	0.00%
Greenwood	$834,705,000	$32,000	0.00%
Labette	$2,349,164,000	$128,000	0.01%
Montgomery	$4,012,672,000	$0	0.00%
Neosho	$1,782,409,000	$160,000	0.01%
Wilson	$1,128,676,000	$0	0.00%
Woodson	$357,734,000	$0	0.00%

Source: NCEI and HAZUS

In general counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to wildfire events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.192: Kansas Region H Population Vulnerability Data for Wildfires

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%

Table 4.192: Kansas Region H Population Vulnerability Data for Wildfires

County	2017 Population	Percent Population Change 2000 to 2017
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of wildfires on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to wildfire events.

Table 4.193: Wildfire Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	0	0%	$38,156,000	$0	0%
Bourbon	334,301	0	0%	$53,376,000	$0	0%
Chautauqua	310,310	0	0%	$35,195,000	$0	0%
Cherokee	308,233	1	0%	$86,906,000	$34	0%
Crawford	323,222	0	0%	$75,594,000	$0	0%
Elk	316,385	0	0%	$42,070,000	$0	0%
Greenwood	701,012	0	0%	$89,554,000	$0	0%
Labette	370,531	0	0%	$122,778,000	$0	0%
Montgomery	335,669	0	0%	$79,420,000	$0	0%
Neosho	308,150	0	0%	$67,958,000	$0	0%
Wilson	254,671	0	0%	$55,422,000	$0	0%
Woodson	294,643	0	0%	$54,603,000	$0	0%

Source: USDA

Potentially lessening future vulnerability to wildfires are Community Wildfire Protection Plans (CWPPs). A CWPP is the most effective way to take advantage of various Federal programs to include the Healthy Forests Restoration Act. By having a CWPP, communities are given priority for funding of Healthy Forests Restoration Act hazardous fuels reduction projects. The three main components of a CWPP are:

- Collaboration between all affected or potentially affected jurisdictions,
- Assessment of the wildfire hazards in an area that leads to recommendation for prioritized fuel reduction, and
- A section on recommendations towards reducing structural ignitability.

Currently the following Kansas Region H counties have approved CWPPs.

- Allen County
- Chautauqua County
- Crawford County
- Elk County
- Labette County
- Montgomery County
- Neosho County
- Wilson County
- Woodson County

4.20.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.194: Wildfire Consequence Analysis

Subject	Impacts of Wildfire
Health and Safety of the Public	Impact could be severe for people living and working in the immediate area. Surrounding communities may also be impacted by evacuees.
Health and Safety of Responders	Impact to responders could be severe depending on the size and scope of the fire, especially for firefighters. Impact will be low to moderate for support responders with the main threat as smoke inhalation.
Continuity of Operations	Temporary relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Delivery of services could be affected if there is any disruption to the roads and/or utilities due to damages sustained.
Environment	Impact will be severe for the immediate area with regards to trees, bushes, animals, and crops. Impact will lessen as distance increases.
Economic Conditions	Impacts to the economy could be moderate in the immediate area.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Evacuation orders and shelter availability could be called in to question.

4.21 – Windstorm

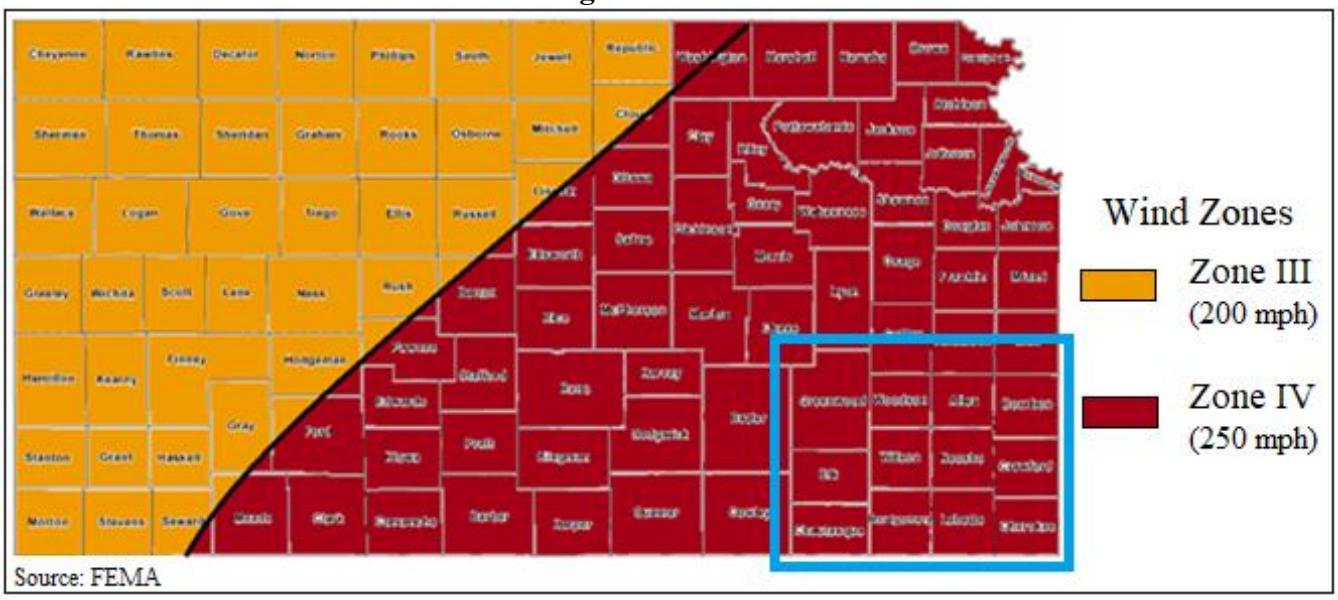
Straight-line winds are generally any thunderstorm wind that is not associated with rotation. It is these winds, which can exceed 100 mph that represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks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

4.21.1 – Location and Extent

High winds occur over broad geographic regions. The entire Kansas Region H planning area, including all participating jurisdictions, is at risk to high wind events.

The following figure shows the wind zones of the United States based on maximum wind speeds. Kansas Region H is located within wind zone IV, the highest inland category.

Region Wind Zone



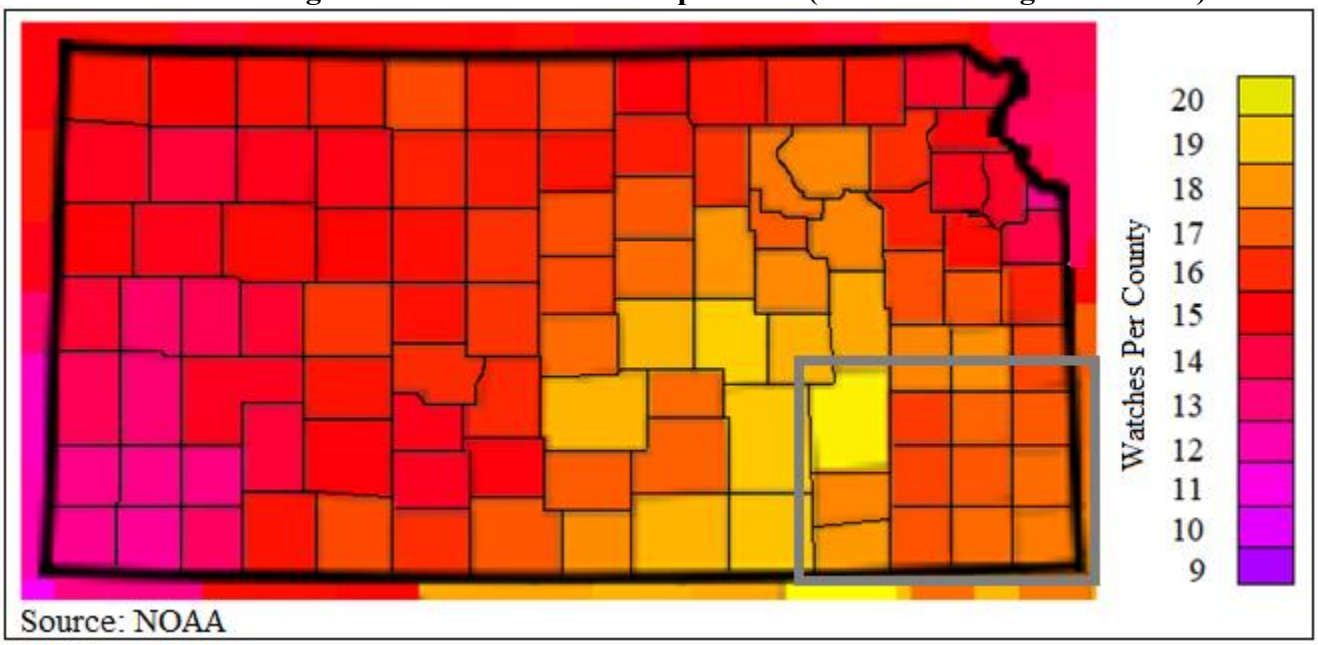
Severe thunderstorms strike Kansas Region H regularly, with accompanying high wind that can cause injury, death, and property damage. The widespread and frequent nature of thunderstorms makes high wind a relatively common occurrence. The NWS classifies thunderstorms, often the generator of high winds, using the following categories.

- **Marginal:** Isolated severe thunderstorms, limited in duration and/or coverage and/or intensity
- **Slight:** Scattered severe storms possible, Short-lived and/or not widespread, isolated intense storms possible

- **Enhanced:** Numerous severe storms possible, more persistent and/or widespread, a few intense
- **Moderate:** Widespread severe storms likely, long-lived, widespread and intense
- **High:** Widespread severe storms expected, long-lived, very widespread and particularly intense

The following map, generated by NOAA, indicates the average number severe thunderstorm watches per year for Kansas Region H.

Annual Average Thunderstorm Watches per Year (20-Year Average 1993-2012)



To measure wind speed and its correlating potential for damage, experts use the Beaufort scale as shown below.

Table 4.195: Beaufort Scale

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

4.21.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been four Presidential Disaster Declarations for Kansas Region H for Straight-Line Winds (along with other associates hazard events). The following 20-year information (with 1999 and 2018 being full data years)on past declared disasters is presented to provide a historical perspective on high wind events that have impacted Kansas Region H. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.196: Kansas Region H FEMA Straight-Line Winds Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4319	06/16/2017 (04/28/2017 – 05/03/2017)	Severe Winter Storm, Snowstorm, Straight-line Winds, Flooding	Crawford, Neosho Snow Assistance for Greeley	$53,126,486
4230	07/20/2015 (05/04/2015 – 06/21/2015)	**Severe Storms**, Tornados, Straight-Line Winds, and Flooding	Chautauqua, Cherokee, Elk, Greenwood, and Neosho	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	**Severe Storms**, Straight-line Winds, Tornados, and Flooding	Bourbon, Butler, Cherokee, Crawford, Elk, Greenwood, Montgomery, Wilson, and Woodson	$1,102,861 (Estimate)
1849	06/25/2009 (4/25-5/16/2009)	**Severe Storms**, Flooding, Straight-Line Winds, and Tornados	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Greenwood, Labette, Montgomery, and Wilson	$15,013,488

Source: FEMA
-: Data unavailable

The following provides details of the two Presidential Disaster Declaration for Kansas Region H related to severe storms (and potentially lightning) since the last plan update in 2014.

Kansas – Severe Winter Storm, Snowstorm, Straight-Line Winds, and Flooding
FEMA-4319-DR
Declared June 16, 2017

On May 31, 2017, Governor Sam Brownback requested a major disaster declaration due to a severe winter storm, snowstorm, straight-line winds, and flooding during the period of April 28 to May 3, 2017. The Governor requested a declaration for Public Assistance for 29 counties, snow assistance for 9 counties, and Hazard Mitigation statewide. During the period of May 8-21, 2017, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On June 16, 2017, President Trump declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible

local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe winter storm, snowstorm, straight-line winds, and flooding in Cherokee, Cheyenne, Crawford, Decatur, Finney, Gove, Graham, Grant, Greeley, Hamilton, Haskell, Kearny, Lane, Logan, Morton, Neosho, Norton, Rawlins, Scott, Seward, Sheridan, Sherman, Stanton, Stevens, Thomas, Wallace, and Wichita Counties. This declaration also authorized snow assistance for a period of 48 hours for Greeley, Hamilton, Lane, Logan, Morton, Scott, Thomas, and Wallace Counties. Finally, this declaration made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

Kansas – Severe Storms, Straight-line Winds, and Flooding
FEMA-4230-DR
Declared November 7, 2017

On August 31, 2017, Governor Sam Brownback requested a major disaster declaration due to severe storms, straight-line winds, and flooding during the period of July 22-27, 2017. The Governor requested a declaration for Public Assistance for two counties and Hazard Mitigation statewide. During the period of August 18-24, 2017, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On November 7, 2017, President Trump declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, straight-line winds, and flooding in Johnson and Wyandotte Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

In addition to the above reported events, the following table presents NOAA NCEI identified high wind events (High Wind and Thunderstorm Wind) and the resulting damage totals in Kansas Region H for the period 2009 - 2018 (with 2009 and 2018 being full data set years).

Table 4.197: Kansas Region H NCEI High Wind Events, 2009 - 2018

County	Number of Days with Events	Property Damage	Highest Recorded Wind Speed	Deaths	Injuries
Allen	23	$1,034,000	78 Knots	0	0
Bourbon	32	$1,052,000	78 Knots	0	0
Chautauqua	36	$223,500	78 Knots	0	0
Cherokee	59	$5,505,000	78 Knots	0	2
Crawford	37	$1,024,000	87 Knots	0	1
Elk	16	$335,450	70 Knots	0	0
Greenwood	42	$230,500	70 Knots	0	0

Table 4.197: Kansas Region H NCEI High Wind Events, 2009 - 2018

County	Number of Days with Events	Property Damage	Highest Recorded Wind Speed	Deaths	Injuries
Labette	42	$1,070,000	96 Knots	0	3
Montgomery	57	$886,200	87 Knots	0	0
Neosho	27	$612,100	70 Knots	0	0
Wilson	23	$937,500	87 Knots	1	1
Woodson	18	$47,250	70 Knots	0	0

Source: NOAA NCEI

The following provides both **local accounts** and NOAA NCEI descriptions of notable recorded events:

- **May 2, 2018: Coffeyville, Montgomery County**
  High winds caused several power lines to be blown down. Property damage was recorded at $10,000.

- **May 31, 2018: Longton, Elk County**
  Destructive winds tore off part of a roof from a home. Property damage was recorded at $8,000.

- **March 6, 2017: Weir, Cherokee County**
  Multiple power poles were snapped along the highway. Property damage was recorded at $10,000.

- **April 26, 2016: Coffeyville, Montgomery County**
  Numerous large trees were uprooted/damaged. Power lines and power poles were blown down and at the time of the report remained down. Some areas of Coffeyville were still without power. Property damage was recorded at $500,000.

- **April 26, 2016: Neodesha, Wilson County**
  A semi pulling double trailers was overturned on Highway 400 very close to the Montgomery/Wilson County line. Property damage was recorded at $75,000.

- **May 13, 2016: Greenwood County**
  High winds caused several power lines to be blown down. Property damage was recorded at $20,000.

- **July 7, 2016: Crawford County**
  A large tree was blown down into a house. One injury was reported. Property damage was recorded at $10,000.

- **October 6, 2016: Humboldt, Allen County**
  A large area of damaging downburst winds moved across the town of Humboldt. The downburst winds were produced by the rear flank downdraft from a supercell thunderstorm as it moved just to the northeast of town. Numerous large trees were blow down. Some of the trees were almost 3 to 4 feet in diameter. The northwest side of town was the hardest hit, with most of the tree damage laying over to the west and northwest. A large row of power poles was snapped on the north side

of town. Some minor superficial damage occurred to a few buildings in downtown. Property damage was recorded at $750,000.

- **July 14, 2015: Yates Center, Woodson County**
  High winds knocked trees and power lines down near Yates Center and the western portions of the county. Property damage was recorded at $10,000.

- **November 5, 2015: Girard, Crawford County**
  The microburst produced damage across the town with multiple power lines blown down and large tree branches. There was a roof at the Ace Hardware that was partially blown off. There were a couple reports of trees that had fallen on houses as well. There were no injuries reported. Property damage was recorded at $50,000.

- **July 23, 2014: Treece, Cherokee County**
  A cargo truck was blown over with one minor injury to the driver. Property damage was recorded at $1,000.

- **September 1, 2014: Parsons, Labette County**
  Several trees, limbs and power lines were knocked down from Big Hill Lake, Mound Valley and Parsons. Property damage was recorded at $120,000.

- **May 31, 2013: Sedan, Chautauqua County**
  Estimated winds up to 85 mph caused a swath of damage from Cedar Vale to 9 miles northwest of Sedan. Numerous trees, power lines, and limbs were reported down. The swath was estimated to be 2 to 3 miles wide. An estimated 9 power poles were laying across highway 99. Property damage was recorded at $100,000.

- **February 28, 2012: Altamont, Labette County**
  Winds estimated between 90 and 110 mph produced widespread damage across Labette county, including damage to sheds, mobile homes, trees and power lines. The most extensive damage occurred in a three-mile-wide swath roughly 5 to 8 miles south of Parsons, including an overturned and completely destroyed mobile home. County officials estimated that roughly 15 to 18 homes were damaged countywide. Westar reported 25 utility poles downed countywide, resulting in nearly 80 percent of the county without power. Three injuries (direct) were reported across the county, one of which was critical. Property damage was recorded at $250,000.

- **May 8, 2009: Cherokee County**
  A National Weather Service storm survey revealed that damaging winds impacted nearly all of Cherokee County. Widespread damage occurred in the form of downed power poles, uprooted trees, damaged structures, and damaged crops. More specifically, there were several structures that experienced roof damage while windows were blown out of both homes and automobiles. A 1,000-foot transmission tower was also knocked down that was built on top of the Cherokee County court house. The Columbus High School football facilities experienced significant damage. The press box was destroyed while several power poles that lit the field were snapped or blown down. One home near Crestline experienced major structural damage. This damage appeared to of occurred from a microburst that produced a concentrated area of 90 mph winds. In Weir, the rodeo grounds

and concession stand were completely destroyed, while the bath house in Scammon lost its entire roof. Several campers were also flipped over and damaged at an RV dealership in Columbus. Property damage was recorded at $5,000,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of high on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates 12 high wind related claims on 751 acres for $48,485.

Table 4.198: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, High Winds

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	1	134	$4,952
Bourbon	5	145	$6,436
Chautauqua	0	0	$0
Cherokee	1	72	$2,640
Crawford	1	20	$610
Elk	1	45	$7,189
Greenwood	0	0	$0
Labette	2	199	$21,621
Montgomery	0	0	$0
Neosho	0	0	$0
Wilson	1	136	$5,037
Woodson	0	0	$0

Source: USDA Farm Service Agency

4.21.3 – Hazard Probability Analysis

The following table summarizes high wind probability data for **Allen County**.

Table 4.199: Allen County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	23
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$1,034,000
Average Property Damage per Year	$103,400
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	134
Average Number of Acres Damaged per Year	27
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$4,952
Average Crop Damage per Year	$990

Source: NCEI and USDA

Data from the NCEI indicates that Allen County can expect on a yearly basis, relevant to high wind events:

- Two event s
- No deaths or injuries
- $103,400 in property damages

According to the USDA Risk Management Agency, Allen County can expect on a yearly basis, relevant to high wind occurrences:

- <1 insurance claim
- 27 acres impacted
- $990 in insurance claims

The following table summarizes high wind probability data for **Bourbon County**.

Table 4.200: Bourbon County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	32
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$1,052,000
Average Property Damage per Year	$105,200
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	5
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	145
Average Number of Acres Damaged per Year	29
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$6,436
Average Crop Damage per Year	$1,287

Source: NCEI and USDA

Data from the NCEI indicates that Bourbon County can expect on a yearly basis, relevant to high wind events:

- Three events
- No deaths or injuries
- $105,200 in property damages

According to the USDA Risk Management Agency, Bourbon County can expect on a yearly basis, relevant to high wind occurrences:

- One insurance claim
- 29 acres impacted
- $1,287 in insurance claims

The following table summarizes High wind probability data for **Chautauqua County**.

Table 4.201: Chautauqua County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	36
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$223,500
Average Property Damage per Year	$22,350
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Chautauqua County can expect on a yearly basis, relevant to high wind events:

- Four events
- No deaths or injuries
- $22,350 in property damages

According to the USDA Risk Management Agency, Chautauqua County can expect on a yearly basis, relevant to high wind occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes high wind probability data for **Cherokee County**.

Table 4.202: Cherokee County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	59
Average Events per Year	6
Number of Days with Event and Death or Injury (2009-2018)	2
Average Number of Days with Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$5,505,000
Average Property Damage per Year	$550,500
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	72
Average Number of Acres Damaged per Year	14
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$2,640
Average Crop Damage per Year	$528

Source: NCEI and USDA

Data from the NCEI indicates that Cherokee County can expect on a yearly basis, relevant to high wind events:

- Six events
- <1 death or injury
- $550,500 in property damages

According to the USDA Risk Management Agency, Cherokee County can expect on a yearly basis, relevant to high wind occurrences:

- <1 insurance claim
- 14 acres impacted
- $528 in insurance claims

The following table summarizes high wind probability data for **Crawford County**.

Table 4.203: Crawford County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	37
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	1
Average Number of Days with Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$1,024,000
Average Property Damage per Year	$102,400
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	20
Average Number of Acres Damaged per Year	4
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$610
Average Crop Damage per Year	$122

Source: NCEI and USDA

Data from the NCEI indicates that Crawford County can expect on a yearly basis, relevant to high wind events:

- Four events
- <1 death or injury
- $102,400 in property damages

According to the USDA Risk Management Agency, Crawford County can expect on a yearly basis, relevant to high wind occurrences:

- <1 insurance claim
- Four acres impacted
- $122 in insurance claims

The following table summarizes high wind probability data for **Elk County**.

Table 4.204: Elk County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	16
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$335,450
Average Property Damage per Year	$33,545
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	45
Average Number of Acres Damaged per Year	9
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$7,189
Average Crop Damage per Year	$1,438

Source: NCEI and USDA

Data from the NCEI indicates that Elk County can expect on a yearly basis, relevant to high wind events:

- Two events
- No deaths or injuries
- $33,545 in property damages

According to the USDA Risk Management Agency, Elk County can expect on a yearly basis, relevant to high wind occurrences:

- <1 insurance claim
- Nine acres impacted
- $1,438 in insurance claims

The following table summarizes High wind probability data for **Greenwood County**.

Table 4.205: Greenwood County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	42
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$230,500
Average Property Damage per Year	$23,050
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0

Table 4.205: Greenwood County High Wind Probability Summary

Data	Recorded Impact
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Greenwood County can expect on a yearly basis, relevant to high wind events:

- Four events
- No deaths or injuries
- $23,050 in property damages

According to the USDA Risk Management Agency, Greenwood County can expect on a yearly basis, relevant to high wind occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes high wind probability data for **Labette County**.

Table 4.206: Labette County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	42
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	3
Average Number of Days with Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$1,070,000
Average Property Damage per Year	$107,000
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	2
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	199
Average Number of Acres Damaged per Year	40
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$21,621
Average Crop Damage per Year	$4,324

Source: NCEI and USDA

Data from the NCEI indicates that Labette County can expect on a yearly basis, relevant to high wind events:

- Four events
- <1 death or injury
- $107,000 in property damages

According to the USDA Risk Management Agency, Labette County can expect on a yearly basis, relevant to high wind occurrences:

- <1 insurance claim
- 40 acres impacted
- $4,324 in insurance claims

The following table summarizes high wind probability data for **Montgomery County**.

Table 4.207: Montgomery County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	57
Average Events per Year	6
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$886,200
Average Property Damage per Year	$88,620
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Montgomery County can expect on a yearly basis, relevant to high wind events:

- Six events
- No deaths or injuries
- $88,620 in property damages

According to the USDA Risk Management Agency, Montgomery County can expect on a yearly basis, relevant to high wind occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes high wind probability data for **Neosho County**.

Table 4.208: Neosho County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	27
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$612,100
Average Property Damage per Year	$61,210

Table 4.208: Neosho County High Wind Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Neosho County can expect on a yearly basis, relevant to high wind events:

- Three events
- No deaths or injuries
- $61,210 in property damages

According to the USDA Risk Management Agency, Neosho County can expect on a yearly basis, relevant to high wind occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

The following table summarizes high wind probability data for **Wilson County**.

Table 4.209: Wilson County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	23
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	2
Average Number of Days with Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$937,500
Average Property Damage per Year	$93,750
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	136
Average Number of Acres Damaged per Year	27
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$5,037
Average Crop Damage per Year	$1,007

Source: NCEI and USDA

Data from the NCEI indicates that Wilson County can expect on a yearly basis, relevant to high wind events:

- Two events

- <1 death or injury
- $93,750 in property damages

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to high wind occurrences:

- <1 insurance claim
- 27 acres impacted
- $1,007 in insurance claims

The following table summarizes high wind probability data for **Woodson County**.

Table 4.210: Woodson County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	18
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$47,250
Average Property Damage per Year	$4,725
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$0
Average Crop Damage per Year	$0

Source: NCEI and USDA

Data from the NCEI indicates that Woodson County can expect on a yearly basis, relevant to high wind events:

- Two events
- No deaths or injuries
- $4,725 in property damages

According to the USDA Risk Management Agency, Woodson County can expect on a yearly basis, relevant to high wind occurrences:

- No insurance claims
- No acres impacted
- $0 in insurance claims

In addition, Kansas Region H has had four Presidentially Declared Disaster relating to straight-line winds (and other concurrent events) in the last 20 years. This represents an average of less than one declared straight-line wind related disaster per year.

4.21.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to high wind events. In general, counties with a higher or increasing population, and/or a high or increasing structural valuation are to be to have a potentially greater vulnerability. It is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to high wind events due to a projected decrease in the number of structures.

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region H county incurring damage over the period 2009 to 2018 from high wind events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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Table 4.211: Kansas Region H Structural Vulnerability Data for High Winds, 2009-2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Allen	$1,557,716,000	$1,034,000	0.07%
Bourbon	$1,720,309,000	$1,052,000	0.06%
Chautauqua	$500,459,000	$223,500	0.04%
Cherokee	$2,163,015,000	$5,505,000	0.25%
Crawford	$4,211,278,000	$1,024,000	0.02%
Elk	$353,392,000	$335,450	0.09%
Greenwood	$834,705,000	$230,500	0.03%
Labette	$2,349,164,000	$1,070,000	0.05%
Montgomery	$4,012,672,000	$886,200	0.02%
Neosho	$1,782,409,000	$612,100	0.03%
Wilson	$1,128,676,000	$937,500	0.08%
Woodson	$357,734,000	$47,250	0.01%

Source: NCEI and HAZUS

In general counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to high wind events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.212: Kansas Region H Population Vulnerability Data for High Winds

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%

Table 4.212: Kansas Region H Population Vulnerability Data for High Winds

County	2017 Population	Percent Population Change 2000 to 2017
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of high wind on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to high wind events.

Table 4.213: High Wind Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	27	0.01%	$38,156,000	$990	0.00%
Bourbon	334,301	29	0.01%	$53,376,000	$1,287	0.00%
Chautauqua	310,310	0	0.00%	$35,195,000	$0	0.00%
Cherokee	308,233	14	0.00%	$86,906,000	$528	0.00%
Crawford	323,222	4	0.00%	$75,594,000	$122	0.00%
Elk	316,385	9	0.00%	$42,070,000	$1,438	0.00%
Greenwood	701,012	0	0.00%	$89,554,000	$0	0.00%
Labette	370,531	40	0.01%	$122,778,000	$4,324	0.00%
Montgomery	335,669	0	0.00%	$79,420,000	$0	0.00%
Neosho	308,150	0	0.00%	$67,958,000	$0	0.00%
Wilson	254,671	27	0.01%	$55,422,000	$1,007	0.00%
Woodson	294,643	0	0.00%	$54,603,000	$0	0.00%

Source: USDA

As with tornados, the following participating jurisdictions may have increased vulnerability to windstorm events due to having greater than 20% of housing stock as mobile homes:

- **Gas** (Allen County)
- **LaHarpe** (Allen County)
- **Fulton (**Bourbon County)
- **Mapleton** (Bourbon County)
- **Redfield** (Bourbon County)
- **Peru** (Chautauqua County)
- **Weir** (Cherokee County)
- **West Mineral** (Cherokee County)
- **Longton** (Elk County)
- **Severy** (Greenwood County)
- **Labette City** (Labette County)

- **Dearing** (Montgomery County)
- **Elk City** (Montgomery County)
- **Havana** (Montgomery County)
- **Liberty** (Montgomery County)
- **Galesburg** (Neosho County)
- **Thayer** (Neosho County)
- **Altoona** (Wilson County)
- **New Albany** (Wilson County)
- **Neosho Falls** (Woodson County)

4.21.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.214: High Wind Consequence Analysis

Subject	Impacts of High Winds
Health and Safety of the Public	Impact of the immediate area could be severe depending on whether individuals were able to seek shelter. Casualties are dependent on warning systems and warning times.
Health and Safety of Responders	Impact to responders is expected to be minimal unless responders live within the affected area.
Continuity of Operations	Temporary to permanent relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the wind path. Roads, buildings, and communications could be adversely affected. Damage could be severe.
Environment	Impact will be severe for the immediate impacted area. Impact will lessen as distance increases from the immediate incident area.
Economic Conditions	Impacts to the economy will greatly depend on the wind severity. Potential economic impact conditions could be minor to severe.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems and warning time will also be questioned.

4.22 – Winter Storms

Winter weather in Kansas Region H usually come in the form of light to heavy snow or freezing rain. A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. Heavy accumulations of ice, often the result of freezing rain, can bring down trees, utility poles, and communications towers and disrupt communications and power for days.

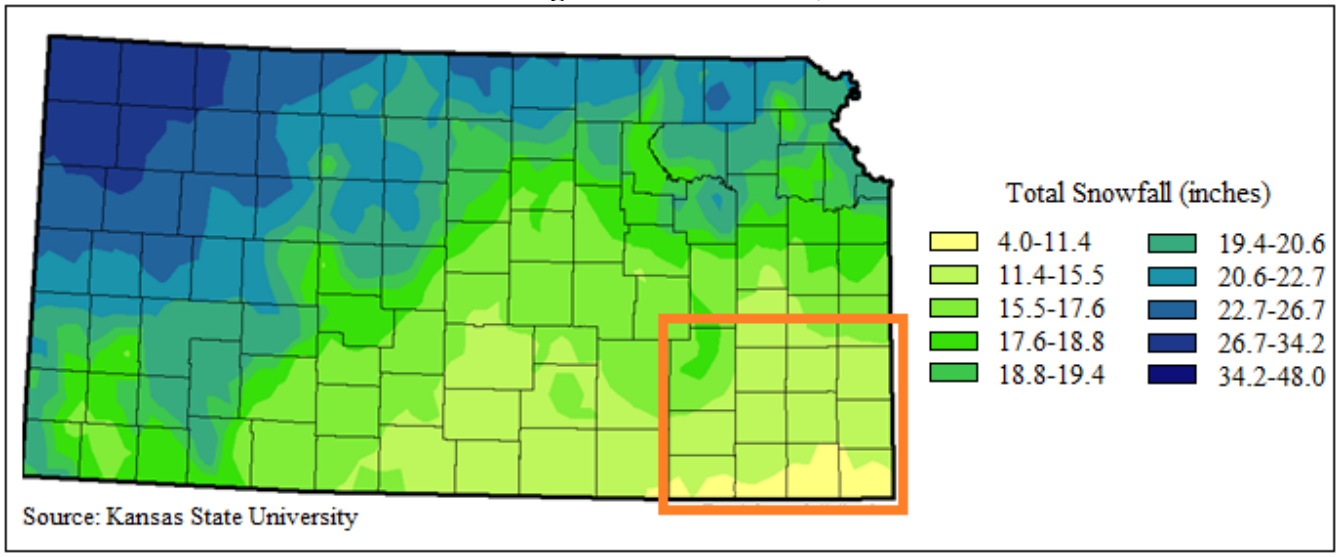
4.22.1 – Location and Extent

All of Kansas Region H is susceptible to severe winter storms. For winter weather, the NWS describes the different types of events as follows:

- **Blizzard:** Winds of 35 mph or more with snow and blowing snow reducing visibility to less than 1/4 mile for at least three hours.
- **Blowing Snow:** Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls:** Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- **Snow Showers:** Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Freezing Rain:** Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces forming a coating or glaze of ice. Most freezing-rain events are short lived and occur near sunrise between the months of December and March.
- **Sleet:** Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects.

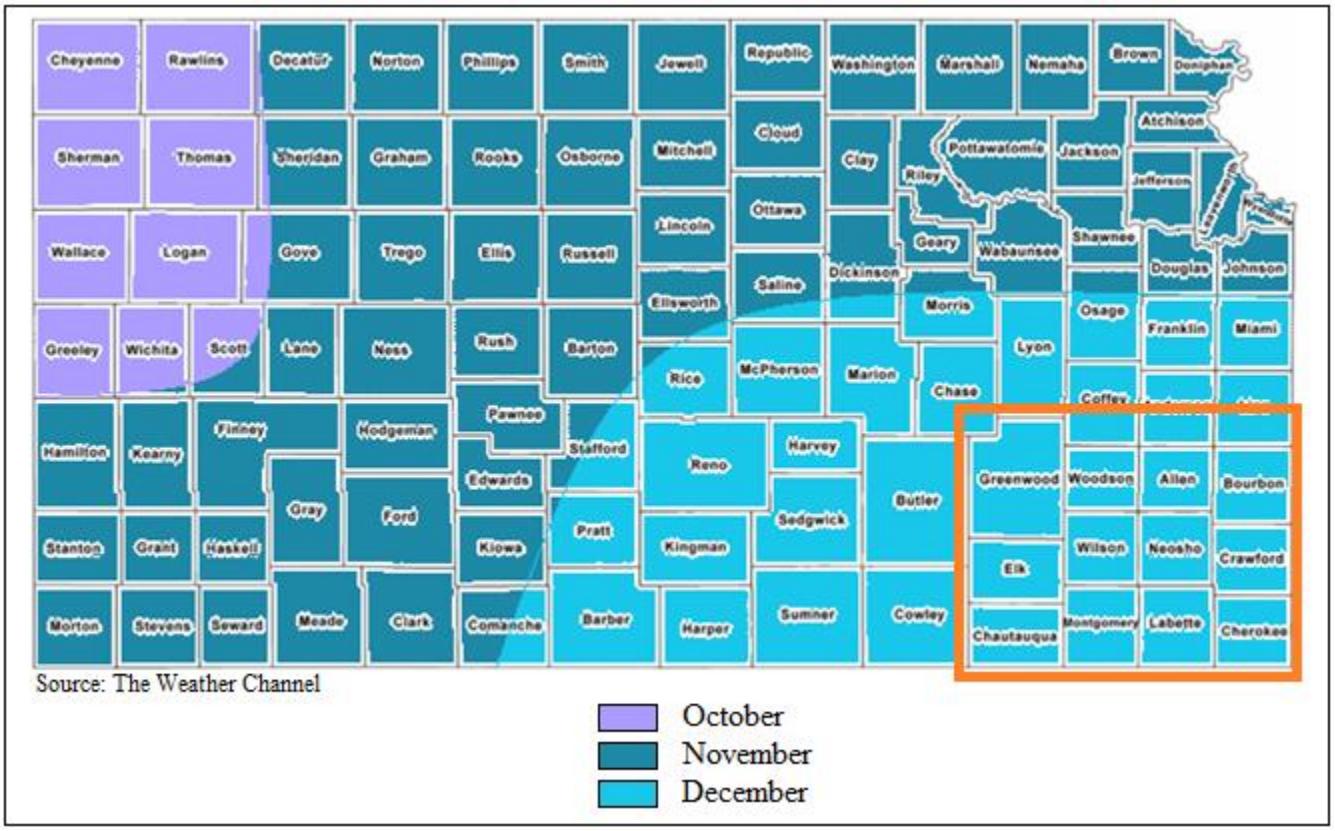
The following map, generated Kansa State University, using the latest available data, indicates the average annual snowfall for Kansas Region H for a given year.

Average Annual Snowfall, 1981-2010



Additionally, as indicated by the map below, Kansas Region H can expect to receive the first measurable snow in December of each year.

Average Date of First Measurable Snow



4.22.2 – Previous Occurrences

Since 2002, there have been six Presidential Disaster Declarations for Kansas Region H for severe winter storms. The following information is presented to provide a historical perspective on severe winter storm events that have impacted Kansas Region H. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.215: Kansas Region H FEMA Severe Winter Storms Disaster and Emergency Declarations, 2002 -2017

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4319	06/16/2017 (04/28/2017 – 05/03/2017)	**Severe Winter Storm,** Snowstorm, Straight-line Winds, Flooding	Crawford, Neosho, Snow Assistance for Greeley	$53,126,486
1885	03/09/2010 (12/9/2009-1/8/2010)	**Severe Winter Storms and Snowstorm**	Allen, Bourbon, Cherokee, Crawford, Elk, Greenwood, Labette, Neosho, Wilson, Woodson and Wyandotte	$19,100,658
1848	06/24/2009 (3/26-29/2009)	**Severe Winter Storm and Record and Near Record Snow**	Chautauqua, Elk, Greenwood, and Woodson	$20,174,657
1741	02/01/2008	**Severe Winter Storms**	Cherokee, Crawford, Labette, and Woodson	$359,557,345
1579	2/8/2005 (1/4-6/2005)	**Severe Winter Storm**, Heavy Rains, and Flooding	Chautauqua, Crawford, Elk, Greenwood, Harper, and Woodson	$106,873,672
1402	2/6/2002 (1/29-2/15/2002)	**Ice Storm**	Allen, Bourbon, Chautauqua, Cherokee, Crawford, Elk, Greenwood, Labette, Montgomery, Neosho, Wilson, and Woodson	$60,185,754

Source: FEMA

The following provides details of the one Presidential Disaster Declaration for Kansas Region H since the last plan update in 2014.

Kansas – Severe Winter Storm, Snowstorm, Straight-Line Winds, and Flooding
FEMA-4319-DR
Declared June 16, 2017

On May 31, 2017, Governor Sam Brownback requested a major disaster declaration due to a severe winter storm, snowstorm, straight-line winds, and flooding during the period of April 28 to May 3, 2017. The Governor requested a declaration for Public Assistance for 29 counties, snow assistance for 9 counties, and Hazard Mitigation statewide. During the period of May 8-21, 2017, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining

whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On June 16, 2017, President Trump declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe winter storm, snowstorm, straight-line winds, and flooding in Cherokee, Cheyenne, Crawford, Decatur, Finney, Gove, Graham, Grant, Greeley, Hamilton, Haskell, Kearny, Lane, Logan, Morton, Neosho, Norton, Rawlins, Scott, Seward, Sheridan, Sherman, Stanton, Stevens, Thomas, Wallace, and Wichita Counties. This declaration also authorized snow assistance for a period of 48 hours for Greeley, Hamilton, Lane, Logan, Morton, Scott, Thomas, and Wallace Counties. Finally, this declaration made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

The following presents NOAA NCEI data concerning winter storm events in Kansas Region H for the 10-year period of 2009 – 2018 (2009 and 2018 are full data set years). It is worth noting that the NCEI data is regional, and sometimes state wide. As such reported damage is not specific to a regional county nor to any of the participating jurisdictions.

Table 4.216: Kansas Region H NCEI Winter Storm Events, 2009 - 2018

Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Blizzards	2	$0	0	0
Ice Storm	1	$70,000	0	0
Winter Storms	17	$4,332,000	0	0

Source: NOAA NCEI

The following provides both **local accounts** and NOAA NCEI descriptions of notable recorded events:

- **March 27, 2009: Regional**
  A late season winter storm of record-breaking proportions struck central, south-central and southeast Kansas March 27-28, 2009. Heavy snow with blizzard conditions affected much of central and south-central Kansas, with accumulations exceeding 18 inches for some locations. Numerous buildings with mainly flat-topped roofs received various degrees of roof damage, some of which was rather extensive due to the weight of the heavy, wet snow. Many travelers became stranded due to the deep snow and blizzard conditions, some of which needed rescue by the National Guard. Meanwhile, sleet and freezing rain was the main culprit farther east across portions of south-central, east-central and southeast Kansas. Sleet accumulations up to 4 inches and ice accumulations up to three-quarters of an inch downed numerous trees, tree limbs, power poles and power lines, causing tens of thousands of power outages. The snow packed and icy roads aided in an uncountable number of auto accidents areawide. Property damage was recorded at $2,360,000.

- **January 1, 2013: Regional (Cherokee County)**
  Up to a half an inch of ice accumulated on elevated objects and tree limbs across the county during the ice storm. One tree fell on a house and another tree fell on to a garage. The northern portion of the county experienced a few power outages. There were a few reports of cars sliding off the road by the local sheriff office. Property damage was recorded at $50,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of winter storms on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates 94 winter storm related claims on 14,771 acres for $1,026,871.

Table 4.217: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Winter Storms

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Allen	7	578	$15,490
Bourbon	6	374	$37,717
Chautauqua	3	99	$6,777
Cherokee	14	4,884	$492,143
Crawford	8	1,006	$70,910
Elk	5	220	$26,440
Greenwood	5	181	$5,394
Labette	1	1,936	$137,141
Montgomery	12	941	$55,839
Neosho	11	2,605	$134,993
Wilson	11	1,017	$27,675
Woodson	11	930	$16,352

Source: USDA Farm Service Agency

4.22.3 – Hazard Probability Analysis

For probability purposes, each component of severe winter storms was examined and combined. The following table summarizes winter storm event data for **Kansas Region H**.

Table 4.218: Kansas Region H Winter Storm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	20
Average Event Days per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0
Total Reported NCEI Property Damage (2009-2018)	$4,402,000
Average Property Damage per Year	$440,200

Source: NCEI

Data from the NCEI indicates that Kansas Region H can expect on a yearly basis, relevant to winter storm events:

- Two events

- No deaths or injuries
- $440,200 in property damages

The following table summarizes USDA Risk Management Agency winter storm event data for **Allen County**.

Table 4.219: Allen County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	7
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	578
Average Number of Acres Damaged per Year	116
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$15,490
Average Crop Damage per Year	$3,098

Source: USDA

According to the USDA Risk Management Agency, Allen County can expect on a yearly basis, relevant to winter storm occurrences:

- Four insurance claims
- 116 acres impacted
- $3,098 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Bourbon County**.

Table 4.220: Bourbon County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	6
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	374
Average Number of Acres Damaged per Year	75
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$37,717
Average Crop Damage per Year	$7,543

Source: USDA

According to the USDA Risk Management Agency, Bourbon County can expect on a yearly basis, relevant to winter storm occurrences:

- One insurance claim
- 75 acres impacted
- $7,543 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Chautauqua County**.

Table 4.221: Chautauqua County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	3
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	99
Average Number of Acres Damaged per Year	20
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$6,777
Average Crop Damage per Year	$1,355

Source: USDA

According to the USDA Risk Management Agency, Chautauqua County can expect on a yearly basis, relevant to winter storm occurrences:

- One insurance claim
- 20 acres impacted
- $1,355 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Cherokee County**.

Table 4.222: Cherokee County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	14
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	4,884
Average Number of Acres Damaged per Year	977
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$492,143
Average Crop Damage per Year	$98,429

Source: USDA

According to the USDA Risk Management Agency, Cherokee County can expect on a yearly basis, relevant to winter storm occurrences:

- Three insurance claims
- 977 acres impacted
- $98,429 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Crawford County**.

Table 4.223: Crawford County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	8
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	1,006
Average Number of Acres Damaged per Year	201
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$70,910

Table 4.223: Crawford County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
Average Crop Damage per Year	$14,182

Source: USDA

According to the USDA Risk Management Agency, Crawford County can expect on a yearly basis, relevant to winter storm occurrences:

- Two insurance claims
- 201 acres impacted
- $14,182 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Elk County**.

Table 4.224: Elk County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	5
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	220
Average Number of Acres Damaged per Year	44
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$24,440
Average Crop Damage per Year	$5,288

Source: USDA

According to the USDA Risk Management Agency, Elk County can expect on a yearly basis, relevant to winter storm occurrences:

- One insurance claim
- 44 acres impacted
- $5,288 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Greenwood County**.

Table 4.225: Greenwood County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	5
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	181
Average Number of Acres Damaged per Year	36
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$5,394
Average Crop Damage per Year	$1,079

Source: USDA

According to the USDA Risk Management Agency, Greenwood County can expect on a yearly basis, relevant to winter storm occurrences:

- One insurance claim
- 36 acres impacted
- $1,079 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Labette County**.

Table 4.226: Labette County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	11
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	1,936
Average Number of Acres Damaged per Year	387
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$137,141
Average Crop Damage per Year	$27,428

Source: USDA

According to the USDA Risk Management Agency, Labette County can expect on a yearly basis, relevant to winter storm occurrences:

- Two insurance claims
- 387 acres impacted
- $27,428 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Montgomery County**.

Table 4.227: Montgomery County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	12
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	941
Average Number of Acres Damaged per Year	188
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$55,839
Average Crop Damage per Year	$11,168

Source: USDA

According to the USDA Risk Management Agency, Montgomery County can expect on a yearly basis, relevant to winter storm occurrences:

- Two insurance claims
- 188 acres impacted
- $11,168 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Neosho County**.

Table 4.228: Neosho County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	11
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	2,605
Average Number of Acres Damaged per Year	521
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$134,933
Average Crop Damage per Year	$26,999

Source: USDA

According to the USDA Risk Management Agency, Neosho County can expect on a yearly basis, relevant to winter storm occurrences:

- Two insurance claims
- 521 acres impacted
- $26,999 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Wilson County**.

Table 4.229: Wilson County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	11
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	1,017
Average Number of Acres Damaged per Year	203
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$27,675
Average Crop Damage per Year	$3,270

Source: USDA

According to the USDA Risk Management Agency, Wilson County can expect on a yearly basis, relevant to winter storm occurrences:

- Two insurance claims
- 203 acres impacted
- $3,270 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Woodson County**.

Table 4.230: Woodson County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	11
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	930
Average Number of Acres Damaged per Year	186
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	$16,352

Table 4.230: Woodson County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
Average Crop Damage per Year	$3,270

Source: USDA

According to the USDA Risk Management Agency, Woodson County can expect on a yearly basis, relevant to winter storm occurrences:

- Two insurance claims
- 186 acres impacted
- $3,270 in insurance claims

In addition, Kansas Region H has had six Presidentially Declared Disasters relating to winter storms (and other concurrent events) in the last 20 years. This represents an average of less than one declared winter storm related disaster per year.

4.22.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to winter storm events. In general, counties with a higher or increasing population, and/or a high or increasing structural valuation are to be considered to have a potentially greater vulnerability. It is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to winter storm events due to a projected decrease in the number of structures.

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region H county (in total, due to the regional nature of both storms and NCEI reporting) incurring damage over the period 2009 to 2018 from winter storm events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

Table 4.231: Kansas Region H Structural Vulnerability Data for Winter Storms, 2009-2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Regional Counties	$20,971,529,000	$4,402,000	0.02%

Source: NCEI and HAZUS

In general counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to winter storm events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.232: Kansas Region H Population Vulnerability Data for Winter Storms

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%

Table 4.232: Kansas Region H Population Vulnerability Data for Winter Storms

County	2017 Population	Percent Population Change 2000 to 2017
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region H County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of winter storms on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to winter storm events.

Table 4.233: Winter Storm Acres Impacted and Crop Insurance Paid per County from 2014-2018

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Allen	245,315	116	0.05%	$38,156,000	$3,098	0.01%
Bourbon	334,301	75	0.02%	$53,376,000	$7,543	0.01%
Chautauqua	310,310	20	0.01%	$35,195,000	$1,355	0.00%
Cherokee	308,233	977	0.32%	$86,906,000	$98,429	0.11%
Crawford	323,222	201	0.06%	$75,594,000	$14,182	0.02%
Elk	316,385	44	0.01%	$42,070,000	$5,288	0.01%
Greenwood	701,012	36	0.01%	$89,554,000	$1,079	0.00%
Labette	370,531	387	0.10%	$122,778,000	$27,428	0.02%
Montgomery	335,669	188	0.06%	$79,420,000	$11,168	0.01%
Neosho	308,150	521	0.17%	$67,958,000	$26,999	0.04%
Wilson	254,671	203	0.08%	$55,422,000	$5,535	0.01%
Woodson	294,643	186	0.06%	$54,603,000	$3,270	0.01%

Source: USDA

4.22.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.234: Winter Storm Consequence Analysis

Subject	Impacts of Winter Storm
Health and Safety of the Public	Severity and location dependent. Impacts on persons in the areas of snow and ice are expected to be severe if caught without proper shelter.

Table 4.234: Winter Storm Consequence Analysis

Subject	Impacts of Winter Storm
Health and Safety of Responders	Impacts will be predicated on the severity of the event. Damaged infrastructure will likely result in hazards such as downed utility lines, main breakages and debris on roadways. .
Continuity of Operations	Temporary relocation may be necessary if government facilities experience damage. Services may be limited to essential tasks if utilities are impacted.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the location and structural capacity of the facility. Loss of structural integrity of buildings and infrastructure could occur. Utility lines, roads, residential and business properties will be affected.
Environment	Impact could be severe for the immediate impacted area, depending on the size of the event. Impact will lessen as distance increases from the immediate incident area
Economic Conditions	Impacts to the economy will be dependent severity of the event and the impact on structures and infrastructure. Impacts could be severe if roads/utilities are affected.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. The timeliness warnings could be questioned.

4.23 – Civil Disorder

Civil disorder is a term that generally refers to a public disturbance by three or more people involving acts of violence that cause immediate danger, damage, or injury to others or their property. However, it is important to remember that gatherings in protest are recognized rights of any person or group, and this right is protected under the United States Constitution.

4.23.1 – Location and Extent

Historically civil disorder has been most commonly associated with urban areas and college campuses. And while the entire planning area may be affected by civil disorder, with its generally small population and low population density, the magnitude of such an event would likely be limited to the major cities within the region.

In general, civil unrest usually accompanies, or is started by, a gathering of people for an event. And while most events occur with no violence, violence can occur with little warning or cause. Unfortunately, large crowds can be subject to control by skillful troublemakers who are often able to incite behavior from members of the crowd that they usually would not consider. . In general, when a crowd begins to exhibit signs of disorder, it can be categorized in three categories:

- **Public disorder:** Public disorder is a basic breach of civic order. Individuals or small groups assembling have a tendency to disrupt the normal flow of things around them.
- **Public disturbance:** Public disturbance is designed to cause turmoil on top of the disruption. Individuals and groups assembling into a crowd begin chanting, yelling, singing, and voicing individual or collective opinions.
- **Riot:** A riot is a disturbance that turns violent. Assembled crowds become a mob that violently expresses itself by destroying property, assaulting others, and creating an extremely volatile environment.

While civil disorder is not an everyday occurrence in the planning area, when they do occur they are extremely disruptive and difficult to control. Should a civil disorder event occur in the planning area the result could be measured in loss of life, economic upheaval, and destruction of property.

4.23.2 – Previous Occurrences

There have been no documented cases of civil unrest of disorder in Kansas Region H during the past ten years.

4.23.3 – Hazard Probability Analysis

By nature, acts of civil disorder are difficult to foresee. However, the probability of a major civil disorder event in Kansas Region H is considered very low due the lack of any recent documented historical events. Again, it is worth noting that no previous occurrences in no way guarantees no future occurrences.

4.23.4 Vulnerability Analysis

Due to the unknown location and nature of civil disorder, all participating jurisdictions with Kansas Region H are vulnerable. Additionally, and again related to the capricious nature of civil disorder, all buildings and citizens are vulnerable.

Economic impacts and human injury or death are the primary concern with civil disorder. Increases in population or the hosting of major political, economic or social events could increase the likelihood and severity of a civil disturbance.

In general, it is difficult to quantify potential losses of Civil Disorder due to the many variables and human elements and lack of historical precedence. Therefore, for the purposes of this plan, a **hypothetical scenario** is included for illustrative purposes only.

> **Event:** City organizers set up a two-block long fan zone near the local community sports field for an important sporting event. The population density in the fan zone is 6,000 people, with at least five persons per 25 square feet.
>
> **Riot:** The riot began to take shape as the game came to a close, with some spectators throwing bottles and other objects. Small fires were started and soon some rioters overturned a vehicle and set it alight. Fist fights broke out and in a nearby parking lot and two police cars were also set on fire. Riot police eventually managed to disperse the rioters and all fires were extinguished.
>
> **Results:** The following table presents potential event results:

Table 4.235: Hypothetical Riot Outcomes

Category	Result
Total Traumatic Injuries	250 persons
Total Urgent Care Injuries	1,000 persons
Injuries not Requiring Hospitalization	2,500 persons
Damage to Vehicles	Glass replacement cost for approximately 200 vehicles: $ 8,000 Repair / repainting cost for approximately 200 vehicles: $800,000
Damage to Buildings	Window replacement cost for approximately 50 buildings: $80,000

Source: Kansas State Hazard Mitigation Plan

4.23.5 – Impact and Consequence Analysis

As per EMAP standards, the following table provides the consequence analysis for drought conditions.

Table 4.236: Civil Disorder Consequence Analysis

Subject	Potential Impacts
Health and Safety of the Public	Impact could be severe for persons in the incident area.
Health and Safety of Responders	Impact to responders could be severe if not trained and properly equipped. Responders that are properly trained and equipped will have a low to moderate impact.

Table 4.236: Civil Disorder Consequence Analysis

Subject	Potential Impacts
Continuity of Operations	Depending on damage to facilities/personnel in the incident area, re-location may be necessary and lines of succession execution (minimal to severe).
Property, Facilities, and Infrastructure	Impact within the incident area could be severe, depending on the extent of the event. (minimal to severe)
Environment	Localized impact within the incident area could be severe depending on the type of human caused incident.
Economic Conditions	Economic conditions could be adversely affected and dependent upon time and length of clean up and investigation (minimal to severe).
Public Confidence in the Jurisdiction's Governance	Impact will be dependent on whether or not the incident could have been avoided by government or non-government entities, clean-up and investigation times, and outcomes. (minimal to severe)

4.24 – Hazardous Materials

Hazardous materials (HazMat) are any substances that pose a risk to health, life, or property when released or improperly handled. Generally, the term refers to materials with hazardous chemical or physical properties, though sometimes biological agents can fall under this category. The basic types of hazardous materials may be categorized according to more than six different systems; but the categories of U.S. Emergency Planning and Community Right-to-Know Act (42 U.S.C. 11002) provide a general guide to hazardous materials:

- ***Extremely Hazardous Substances:*** Materials that have acutely toxic chemical or physical properties and may cause irreversible damage or death to people or harm the environment if released or used outside their intended use.
- ***Hazardous Substances:*** Materials posing a threat to human health and/or the environment, or any substance designated by the EPA to be reported if a designated quantity of the substance is spilled into waterways, aquifers, or water supplies or is otherwise released into the environment.

4.24.1 – Location and Extent

In Kansas Region H, HazMat incidents are generally classified as:

- **Fixed Facility Incidents:** Commercial Facilities and Superfund Sites
- **Transportation Incidents:** Highway, Railway, Pipeline, Air, and Water

Fixed Facilities

When facilities have hazardous materials in quantities at or above the threshold planning quantity, they must submit Tier II information to appropriate federal and state agencies to facilitate emergency planning in accordance with the Community Right to Know Act. The forms are known as Tier II reports and the facilities included are referred to as Tier II facilities. According to data provided by KDEM, there are 3,424 Tier II Facilities housing hazardous chemicals in Kansas Region H. The following table details the number of Tier II facilities by county.

Table 4.237: Kansas Region H Tier II Facilities by County

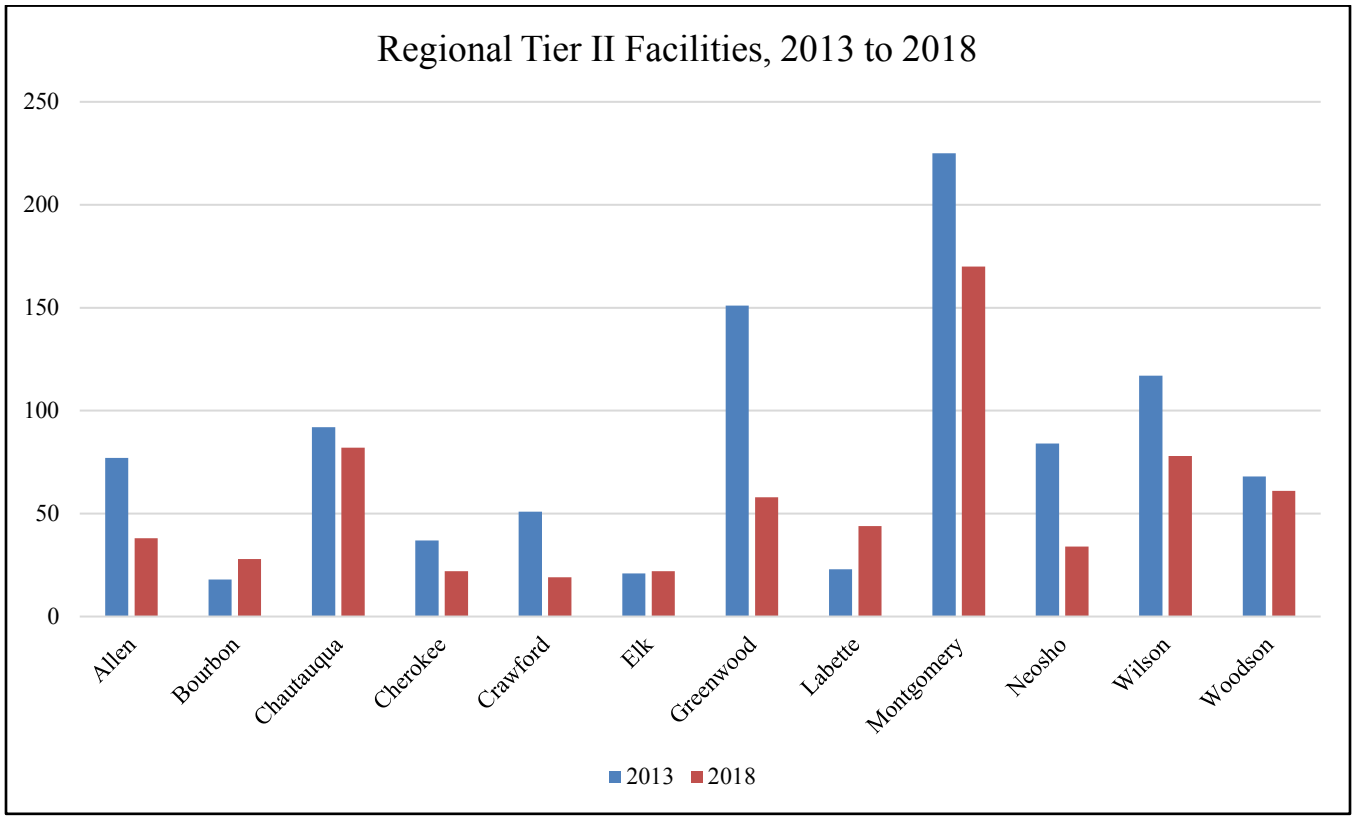
County	Tier II Facilities
Allen	77
Bourbon	18
Chautauqua	92
Cherokee	37
Crawford	51
Elk	21
Greenwood	151

Table 4.237: Kansas Region H Tier II Facilities by County

County	Tier II Facilities
Labette	23
Montgomery	225
Neosho	84
Wilson	117
Woodson	68

Source: KDEM

As illustrated in the following graph, the number of Tier II facilities has decreased for the region, primarily to due to an extensive outreach effort by KDHE to facilities that house hazardous chemicals.



The National Priorities List (NPL) is a published list of hazardous waste sites in the country that are eligible for extensive, long-term cleanup under the Superfund program. A Superfund site is an uncontrolled or abandoned location where hazardous waste is located which may affect local ecosystems and/or people. The EPA has indicated that the following Superfund sites are located with Kansas Region H.

Table 4.238: Kansas Region H NPL Facilities

Facility Name	Location	County
Cherokee County (Tri-state Mining District, Tar Creek Area)	Galena, Baxter Springs, Treece, Badger, Lawton, Waco, Crestline	Cherokee

Source: EPA

Transportation

The following table, from Kansas Department of Transportation (KDOT), presents total roadway mileage by county.

Table 4.239: Kansas Region H Total Roadway Mileage by County

County	Interstates (Miles)
Allen	1,099
Bourbon	1,249
Chautauqua	761
Cherokee	1,331
Crawford	1,433
Elk	811
Greenwood	1,529
Labette	1,392
Montgomery	1,516
Neosho	1,222
Wilson	1,102
Woodson	850

Source: KDOT

Kansas Region H is served by numerous railroad companies. Railroads are generally defined by three classes, predicated on revenue and size, with Class I (Freight) being the largest. Class I railroads are of the greatest concern due to the type of freight carried, with categories including There are three Class I railroads in Kansas Region H providing service with long-haul deliveries to national market areas and intermodal rail/truck service providers:

- Burlington Northern and Santa Fe Railway
- Kansas City Southern Railway
- Union Pacific Railroad

The following table, with information from KDOT, provides the total railroad track mileage of for each county within Kansas Region H.

Table 4.240: Kansas Region H Total Class I Railroad Mileage by County

County	Interstates (Miles)
Allen	28
Bourbon	37
Chautauqua	0
Cherokee	70
Crawford	52
Elk	35
Greenwood	0
Labette	60
Montgomery	98
Neosho	50
Wilson	55

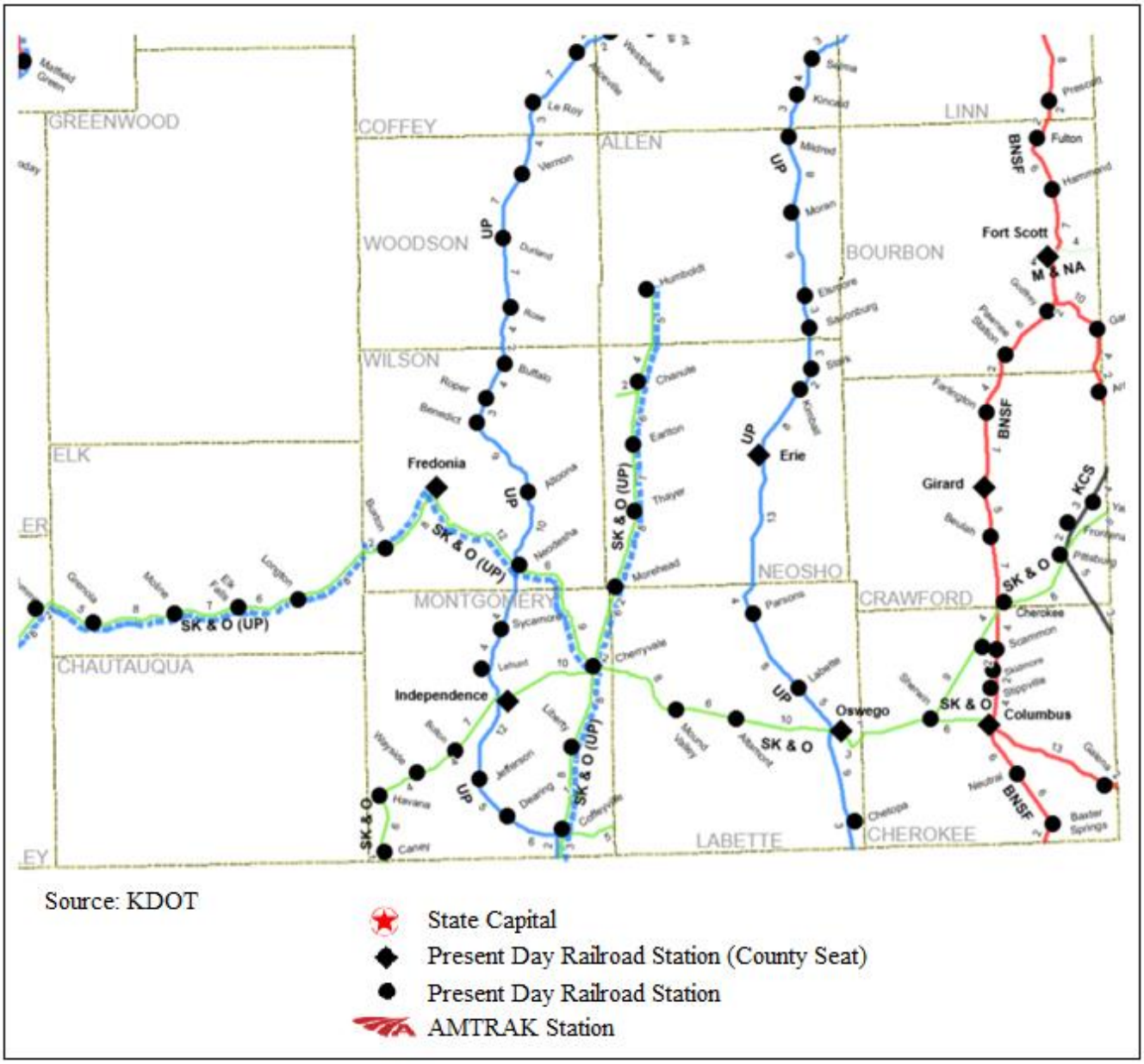
Table 4.240: Kansas Region H Total Class I Railroad Mileage by County

County	Interstates (Miles)
Woodson	22

Source: KDOT

The following map, from KDOT, shows Class I track locations in Kansas Region H.

Regional Class I Railway Lines



Pipelines

The following data, provided by KDEM and the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA), indicates the total number of gas and liquid pipeline mileage per county.

Table 4.241: PHMSA Pipeline Mileage by County

County	Gas (miles)	Liquid (miles)
Allen	81	216
Bourbon	28	5
Chautauqua	67	119
Cherokee	92	31
Crawford	22	36
Elk	64	0
Greenwood	190	106
Labette	76	2
Montgomery	127	337
Neosho	19	96
Wilson	85	110
Woodson	1	40

Source: KDEM and PHMSA

4.24.2 – Previous Occurrences

The following table, with data from KDEM, lists the number of hazardous materials incidents, injuries, fatalities and people evacuated from the public and facilities for each Kansas Region H county over the three-year period 2013-2015 (due to system changes, the most current data available).

Table 4.242: Kansas Region H HazMat KDEM Reported Incidents, 2016-2018

Jurisdiction	Fixed Facilities	Motor Carriers	Pipelines	Rail	Totals
Allen	3	2	0	0	5
Bourbon	0	1	0	0	1
Chautauqua	0	0	1	0	1
Cherokee	2	4	0	2	8
Crawford	1	3	0	0	4
Elk	0	1	1	0	2
Greenwood	1	1	1	0	3
Labette	0	3	0	2	5
Montgomery	71	6	6	3	86
Neosho	2	7	0	0	9
Wilson	2	2	0	0	4
Woodson	0	0	0	0	0

Source: KDEM

Hazardous Materials Regulations (49 CFR Parts 171-180) require certain types of HazMat incidents be reported, with data tracked by PHMSA's Office of Hazardous Materials Safety (OHMS) by transportation

category type (Air, Highway, Rail and Water). The OHMS Incident Report Database from 2010 to 2018 indicated 2,153 reported incidents within Kansas Region H for the period 2000 through 2018. The following charts detail the number of events per year per transportation category.

Table 4.243: Kansas Region H OHMS HazMat Incidents, 2000-2018

Jurisdiction	Highway	Air	Rail	Damages	Injuries	Deaths
Allen County						
Iola	1	0	0	$0	0	0
Moran	1	0	0	$210,255	0	0
Bourbon County						
Fort Scott	1	0	0	$28,580	0	0
Chautauqua County						
Sedan	1	0	0	$334,450	0	0
Cherokee County						
Baxter Springs	1	0	0	$0	0	0
Columbus	1	0	0	$40,549	0	0
Galena	1	0	0	$0	0	0
Crawford County						
Pittsburg	5	0	0	$4,000	0	0
Labette County						
Parsons	1	2	0	$0	0	0
Montgomery County						
Cherryvale	3	0	0	$0	0	0
Coffeyville	1	0	1	$1,584	0	0
Independence	6	0	0	$0	0	0
Wilson County						
Fredonia	3	0	0	$1,500	0	1

Source: PHMSA OHMS

Data from PHMSA provides significant incident reports for the pipeline systems in Kansas Region H. Data from the period 2013 to 2017 indicate that there were ten pipeline incidents that no fatalities, no injuries and $2,209,467 in damages. The following table details reported pipeline incident details for each county with a reported event.

Table 4.244: Kansas Region H PHMSA Reported Pipeline Incidents by County, 2013 to 2017

County	Number of Incidents	Fatalities	Injuries	Total Damage	Gross Barrels Spilled
Allen	2	0	0	$255,504	0
Bourbon	0	0	0	$0	-
Chautauqua	1	0	0	$86,100	8
Cherokee	0	0	0	$0	-
Crawford	0	0	0	$0	-
Elk	0	0	0	$0	-
Greenwood	1	0	0	$35,336	100
Labette	0	0	0	$0	-
Montgomery	4	0	0	$986,342	270
Neosho	0	0	0	$0	-

Table 4.244: Kansas Region H PHMSA Reported Pipeline Incidents by County, 2013 to 2017

County	Number of Incidents	Fatalities	Injuries	Total Damage	Gross Barrels Spilled
Wilson	0	0	0	$0	-
Woodson	0	0	0	$0	-

Source: PHMSA

The following are locally reported HazMat incidents.

- **August 1, 2011: Cedar Vale, Chautauqua County**

Officials noticed an unknown film layer on one of the city's sewer lagoons, accompanied by an odd odor. While trenching a sewer line to identify the problem it filled with liquid gasoline. It was determined that a leaking above ground storage tank containing gasoline caused fumes and vapors to enter the sewer system. These vapors reached explosive levels which prompted the evacuation of approximately 150 residents. One resident was hospitalized from fume exposure.

4.24.3 – Hazard Probability Analysis

HazMat incidents are not predictable. However, probabilities can be estimated using past occurrence data as a guide.

The following tables summarize occurrence data and probability for all related HazMat events for **Allen County** using data from KDEM and PHMSA.

Table 4.245: Allen County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	5
Average Events per Year	2
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Allen County can expect on a yearly basis, relevant to HazMat events:

- Two events
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Bourbon County** using data from KDEM and PHMSA.

Table 4.246: Bourbon County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	1
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Bourbon County can expect on a yearly basis, relevant to HazMat events:

- <1 event
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Chautauqua County** using data from KDEM and PHMSA.

Table 4.247: Chautauqua County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	1
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Chautauqua County can expect on a yearly basis, relevant to HazMat events:

- <1 event
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Cherokee County** using data from KDEM and PHMSA.

Table 4.248: Cherokee County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	8
Average Events per Year	3
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Cherokee County can expect on a yearly basis, relevant to HazMat events:

- Three events
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Crawford County** using data from KDEM and PHMSA.

Table 4.249: Crawford County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	4
Average Events per Year	1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Crawford County can expect on a yearly basis, relevant to HazMat events:

- One event
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Elk County** using data from KDEM and PHMSA.

Table 4.250: Elk County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	3
Average Events per Year	1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Elk County can expect on a yearly basis, relevant to HazMat events:

- One event
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Greenwood County** using data from KDEM and PHMSA.

Table 4.251: Greenwood County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	3
Average Events per Year	1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Greenwood County can expect on a yearly basis, relevant to HazMat events:

- One event
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Labette County** using data from KDEM and PHMSA.

Table 4.252: Labette County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	5
Average Events per Year	2
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Labette County can expect on a yearly basis, relevant to HazMat events:

- Two events
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Montgomery County** using data from KDEM and PHMSA.

Table 4.253: Montgomery County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	86
Average Events per Year	29
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Montgomery County can expect on a yearly basis, relevant to HazMat events:

- 29 events
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Neosho County** using data from KDEM and PHMSA.

Table 4.254: Neosho County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	9
Average Events per Year	3
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Neosho County can expect on a yearly basis, relevant to HazMat events:

- Three events
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Wilson County** using data from KDEM and PHMSA.

Table 4.255: Wilson County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	4
Average Events per Year	1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Wilson County can expect on a yearly basis, relevant to HazMat events:

- One event
- No deaths
- No injuries

The following tables summarize occurrence data and probability for all related HazMat events for **Woodson County** using data from KDEM and PHMSA.

Table 4.256: Woodson County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0

Source: KDEM and PHMSA

Data indicates that Woodson County can expect on a yearly basis, relevant to HazMat events:

- No events
- No deaths
- No injuries

While NPL (Superfund) sites have been identified by the EPA as requiring cleanup, in general, the probability of an incident endangering the public from these sites is low due to active identification and remediation measures.

4.24.4 – Vulnerability Analysis

Special populations are particularly vulnerable to the impacts of a hazardous materials incident because of the potential difficulties involved in the evacuation. The following table details the number of special population facilities in each Kansas Region H county located within ½ mile of a chemical facility. The locations of colleges, educational and correctional institution facilities is from the Kansas Data Access & Support Center, health facilities data is from HAZUS, aging facilities is from KDEM and child care facilities is from KDHE.

Table 4.257: Kansas Region H Special Population Facilities Within 0.5 Miles of a Chemical Facility

County	Health Facilities	Colleges	Educational Facilities	Aging Facilities	Child Care	Correctional Institutions
Allen		0	11	2	48	1
Bourbon	0	1	4	3	27	1
Chautauqua	1	0	4	2	4	1
Cherokee	1	0	7	3	33	2
Crawford	1	0	14	5	35	1
Elk	0	0	1	2	2	1
Greenwood	1	0	5	3	14	1
Labette	2	1	10	4	53	3
Montgomery	0	2	15	7	71	3
Neosho	0	1	10	3	66	1
Wilson	0	0	5	2	14	0
Woodson	0	0	2	1	3	1

Source: KDEM

In general counties with a high population and/or a growing population are at increased risk. As such, it is worth highlighting the majority of Kansas Region H counties may have decreased vulnerability to HazMat events due to decreasing populations. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.258: Kansas Region H Population Vulnerability Data for HazMat

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

4.24.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.259: HazMat Incident Consequence Analysis

Subject	Impacts of Hazardous Materials Incident
Health and Safety of Persons in the Area of the Incident	Impact in the immediate area could be severe and long lasting.
Responders	Impact to responders is expected to be moderate to severe, potentially even with required safety equipment.
Continuity of Operations	Long term relocation may be necessary if government facilities experience contamination or damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the incident area. Facilities may need to be abandoned and razed. Large areas may become inaccessible.
Environment	Impact could be severe for the immediate area. Impact will lessen with distance. The proximity of open bodies of water could compound the impact.
Economic Conditions	Local economy and finances may be adversely affected, depending on the nature, extent and duration of the event.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Warning systems and the timeliness of those warnings could be questioned.

4.25 – Major Disease

For this plan, major disease is classified as infectious diseases caused by microscopic agents, including viruses, bacteria, parasites, and fungi or by their toxins, that may impact humans. They may be spread by direct contact with an infected person or animal, ingesting contaminated food or water, vectors such as mosquitoes or ticks, contact with contaminated surroundings such as animal droppings, infected droplets, or by aerosolization.

4.25.1 – Location and Extent

Human transmissible disease and infectious diseases are illnesses caused by microscopic agents, including viruses, bacteria, parasites, and fungi or by their toxins. They may be spread by direct contact with an infected person or animal, ingesting contaminated food or water, vectors such as mosquitoes or ticks, contact with contaminated surroundings such as animal droppings, infected droplets, or by aerosolization.

The entire planning area is susceptible to a transmissible disease outbreak. However, more densely populated areas may be more susceptible.

4.25.2 – Previous Occurrences

The KDHE was contacted concerning the epidemiological tracking of contagious and/or human transmissible diseases. Data was solicited concerning the following diseases of concern:

- Haemophilus Influenzae Invasive Disease
- Measles (Rubeola)
- Meningococcal Infections
- Mumps
- Pertussis
- Streptococcus pneumoniae, Invasive
- West Nile Virus
- Zika Virus

A review of available data indicates there have been no unusual or concerning spikes in these diseases for the region. However, data indicates that Miami and Linn Counties to the north saw a small spike in Measles cases in 2018.

According to the CDC, the 2017-2018 influenza outbreak was notably impactful. In Kansas, approximately 68 people died as a direct cause of the flu and 32 people died with the flu as a contributing cause.

Finally, no new novel pathogens of concern have been tracked or reported.

4.25.3 – Hazard Probability Analysis

Each year the Centers for Disease Control (CDC) produces a report detailing the legally reportable diseases in the United States. While over time this report can serve as a predictor of the likelihood of

future disease, it is impossible to predict outbreaks. Data from the CDC report does not indicate any areas of concern for Kansas Region H. Based on the relatively limited/controlled outbreak history in Kansas Region H and the relatively low population density the possibility of a large-scale major disease outbreak is considered to be limited.

4.25.4 – Vulnerability Analysis

For purposes of this assessment, no facilities or agricultural commodities are considered vulnerable to the major disease hazard.

Due to the person to person transmission of many diseases of concern counties with a higher identified population are to be considered to have a potentially greater vulnerability. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.260: Kansas Region H Population Vulnerability Data for Major Disease

County	2017 Population	Percent Population Change 2000 to 2017
Allen	12,752	-11.4%
Bourbon	14,757	-4.0%
Chautauqua	3,425	-21.4%
Cherokee	20,501	-9.3%
Crawford	39,099	2.2%
Elk	2,581	-20.9%
Greenwood	6,227	-18.8%
Labette	20,553	-10.0%
Montgomery	33,464	-7.7%
Neosho	16,209	-4.6%
Wilson	8,858	-14.2%
Woodson	3,178	-16.1%

Source: US Census Bureau

Additionally, there is an increased likelihood of mortality for very young and very old populations due to transmissible disease. The following table indicates the percentage of the total county population that may be considered especially vulnerable to a major disease.

Table 4.261: Kansas Region H Vulnerable Population Vulnerability Data for Major Disease

County	Percentage of Population 5 and Under (2017)	Percentage of Population 65+ (2017)
Allen	5.7%	22.8%
Bourbon	5.6%	18.8%
Chautauqua	5.6%	26.0%
Cherokee	5.6%	18.8%
Crawford	6.2%	15.4%
Elk	4.8%	28.7%
Greenwood	5.1%	24.6%
Labette	6.5%	19.0%
Montgomery	6.5%	29.7%

Table 4.261: Kansas Region H Vulnerable Population Vulnerability Data for Major Disease

County	Percentage of Population 5 and Under (2017)	Percentage of Population 65+ (2017)
Neosho	6.5%	19.4%
Wilson	6.0%	21.1%
Woodson	4.8%	24.1%

Source: US Census Bureau

Of note for Kanas Region H and its participating jurisdictions concerning a major disease outbreak:

- Regionally, 5.2% of the total population is under the age of 5
- There is a high percentage of adults over the age of 65 in all participating counties, approximately 20.6% of the total population
- Regionally, 13.4% of persons under the age of 65 have an identified disability

4.25.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.262: Major Disease Consequence Analysis

Subject	Impacts of Major Disease Outbreak
Health and Safety of Persons in the Area of the Incident	Impact over a widespread area could be severe depending on type of outbreak and whether it is a communicable disease. Casualties are dependent on warning systems, warning times and the availability of vaccines, antidotes, and medical svc.
Responders	Impact to responders could be severe, especially if they reside in the area and or their type of exposure during response. With proper precautions and safety nets in place the impact is lessened.
Continuity of Operations	Continuity of Operations will be greatly dependent on availability of healthy individuals. COOP is not expected to be exercised.
Property, Facilities, and Infrastructure	Access to facilities and infrastructure could be affected until decontamination is completed
Environment	Impact could be severe for the immediate impacted area depending on the source of the outbreak. Impact could have far-reaching implications if disease is transferable between humans and animals or to wildlife.
Economic Conditions	Impacts to the economy could be severe if the disease is communicable. Loss of tourism, revenue, and business as usual will greatly affect the local economy and the state as a whole.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Availability of medical supplies, vaccines, and treatments will come into question.

4.26 – Radiological Incident

For purposes of this plan, a radiological incident is considered an accident involving a release of radioactive materials from a nuclear reactor. Radiological accidents could cause injury or death, contaminate property and valuable environmental resources, as well as disrupt the functioning of communities and their economies. Since 1980, each utility that owns a commercial nuclear power plant in the United States has been required to have both an onsite and offsite emergency response plan as a condition of obtaining and maintaining a license to operate that plant. Onsite emergency response plans are approved by the U.S. Nuclear Regulatory Commission (NRC).

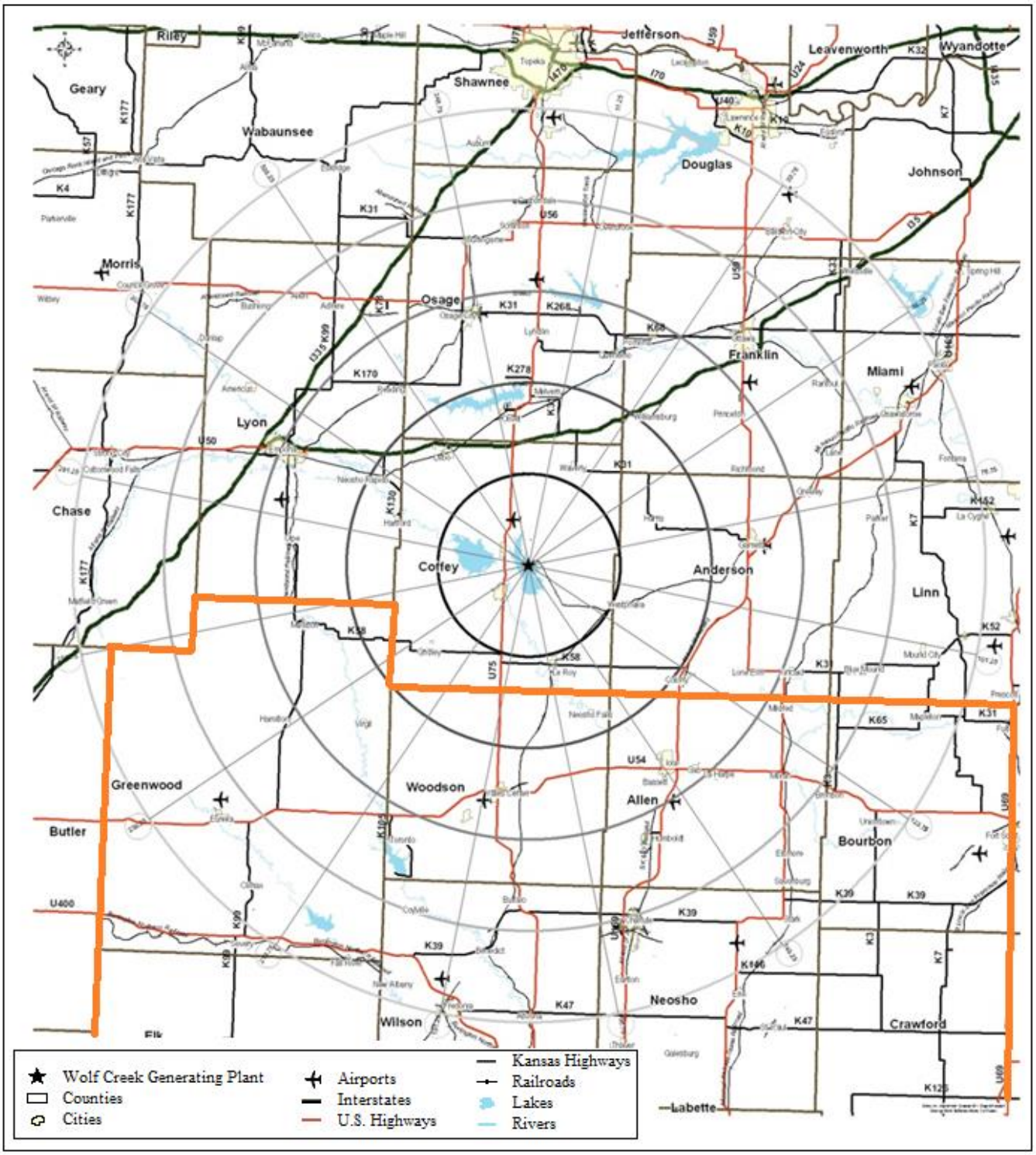
4.26.1 – Location and Extent

The only active commercial nuclear reactor within the State of Kansas is the Wolf Creek Nuclear Power Plant (Wolf Creek) in Coffey County. The following information, from the NRC, pertains to Wolf Creek:

- **Location:** Burlington, KS (3.5 miles NE of Burlington, KS)
- **Operator:** Wolf Creek Nuclear Operating Corp.
- **Operating License:** Issued - 06/04/1985
- **Renewed License:** Issued - 11/20/2008
- **License Expires -** 03/11/2045
- **Reactor Type:** Pressurized Water Reactor
- **Licensed MWt:** 3,565
- **Reactor Vendor/Type:** Westinghouse Four-Loop
- **Containment Type:** Dry, Ambient Pressure

The following map, from KDEM, illustrates both the 10-mile 50-mile emergency planning zones (EPZs) for Wolf Creek.

Wolf Creek Generating Plant Exclusion Zones



Because Region H is not located in the 10-mile EPZ, a nuclear incident from Wolf Creek is not considered a significant hazard.

4.26.2 – Previous Occurrences

There have been no previous major radiological events recorded in Kansas Region H.

4.26.3 – Hazard Probability Analysis

Counties within the 50-mile Emergency Planning Zone for commercial nuclear power plants (Allen, Bourbon, Elk, Greenwood, Neosho, Wilson and Woodson) have a slightly higher radiological risk than other counties within the region, but the potential for an incident is extremely low. Historically there have been no nuclear failure and/or release events in Kansas Region H, or at Wolf Creek. The firm regulations imposed by the NRC on Wolf Creek work to ensure its safe operation. The amount of radioactivity released by a nuclear power plant is monitored continuously to be sure it does not go above allowed levels. The same sophisticated monitoring equipment provides exact information about any accidental release. The risk to the public from radioactivity released from nuclear power plants is smaller than the amount, and associated risk, we receive naturally on a daily basis.

There are over 300 licensees of various sizes for radioactive material within the State of Kansas. In general, the major usage of radioactive materials in southeast Kansas are for medical diagnostics and therapy, soil density testing in the construction industry, and in radiography cameras in pipeline construction and repair. However, strict licensing requirements and the generally low amounts of radioactive materials used considerably lower the probability of an impactful event.

4.26.4 – Vulnerability Assessment

During all lawful operations of radioactive materials, the licensee is responsible for ensuring that the area around the source material is cordoned off or shielding is used to prevent unnecessary exposures. Inspections of practices and security measures are regularly conducted to ensure compliance and conformity to regulations in order to protect the public. The frequency of inspections can be adjusted in response to perceived risk. Public risk can be reduced by minimizing the duration of exposure, shielding the source material and maximizing the distance from the source.

It is common for materials, including pharmaceuticals, industrial sources and nuclear fuel rods destined to nuclear reactors, to be transported across southeastern Kansas highways and railroads. Areas near interstates and major highways have an increased risk of transportation accidents. Remote areas also have to account for long response times from hazardous materials and health physics personnel.

The potential danger from an accident involving radioactive material is exposure to radiation. This exposure could come from the release of radioactive material into the environment, usually characterized by radioactive gases and particles. The major hazards to people in the vicinity of the release are radiation exposure to the body.

Assuming the vulnerability to both structures and populations is not possible due to the tremendous number of variables involved in a potential nuclear release event. However, due to the relative distance of Kansas Region H from Wolf Creek, and the strict oversight provided by the NRC, the potential vulnerability to Kansas Region H is considered to be very low.

4.26.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.263: Radiological Incident Consequence Analysis

Subject	Impacts of Nuclear Incident
Health and Safety of Persons in the Area of the Incident	Impact in the immediate area could be severe and long lasting.
Responders	Impact to responders is expected to be severe, potentially even with required safety equipment.
Continuity of Operations	Long term relocation may be necessary if government facilities experience contamination.
Property, Facilities, and Infrastructure	Localized impact could be severe in the incident area. Facilities may need to be abandoned and razed. Large areas may become inaccessible.
Environment	Impact could be severe for the immediate area. Impact will lessen with distance.
Economic Conditions	Local economy and finances may be adversely affected, depending on the nature, extent and duration of the event.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Warning systems and the timeliness of those warnings could be questioned.

4.27 – Terrorism

The United States does not have a standardized definition of terrorism that is agreed upon by all agencies. The Federal Bureau of Investigation generally defines terrorism as:

> "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."

4.27.1 – Location and Extent

Kansas is home to a wide variety of criminal extremist groups. The Southern Poverty Law Center reported that in 2018 there were three active hate groups in Kansas: one neo-Nazi group, the National Socialist Movement in Lansing, one racist skinhead group, the Midland Hammerskins in Wichita, and one anti-homosexual group, the Westboro Baptist Church in Topeka. Other groups, such as the Animal Liberation Front, Earth Liberation Front, and People for the Ethical Treatment of Animals may have sympathizers in the region. Although no major terrorist acts have been attributed to any of these latter groups, their involvement in violent acts is meant to disrupt governmental functions and cannot be discounted.

4.27.2 – Previous Occurrences

Kansas Region H has been fortunate to escape a major terrorist incident.

4.27.3 – Hazard Probability Analysis

By nature, acts of terrorism are difficult to foresee. However, the probability of a major terrorist event in Kansas Region H is considered very low due the lack of any documented historical events. Again, it is worth noting that no previous occurrences in no way guarantees no future occurrences.

4.27.4 – Vulnerability Analysis

For purposes of this assessment, data is not available to quantify vulnerability or estimated losses as a result of terrorism incidents that might impact state-owned facilities.

For this assessment, it is not possible to calculate a specific vulnerability for each county or participating jurisdiction. However, because of the desire for publicity following attacks, it is more likely that counties and jurisdictions with greater population densities and /or larger evet venues have a greater risk.

In general, it is difficult to quantify potential losses of terrorism due to the many variables and human elements and lack of historical precedence. Therefore, for the purposes of this plan, the loss estimates will take into account three hypothetical scenarios. The estimated impact of each event was calculated using the Electronic Mass Casualty Assessment and Planning Scenarios developed by Johns Hopkins University.

Please note that the hypothetical scenarios are included for illustrative purposes only.

Scenario #1: Mustard Gas Release

Event: Mustard gas is released from a light aircraft onto the stadium during a home football game. The agent directly contaminates the stadium and the immediate surrounding area. This attack would cause harm to humans and could render portions of the stadium unusable for a short time period in order to allow for a costly clean-up. There might also be a fear by the public of long-term contamination of the stadium and subsequent boycott of games resulting in a loss of revenue and tourism dollars.

Event Assumptions: For this scenario the number of people in the stadium is 50,000 with an additional 5,000 persons remain outside the stadium in the adjacent parking areas. The agent used, mustard gas, is extremely toxic and may damage eyes, skin and respiratory tract with death sometimes resulting from secondary respiratory infections. Death rate from exposure estimated to be 3%. The estimated decontamination cost is $12 person. For this scenario it is assumed that all persons with skin injuries will require decontamination.

Results: The following table presents the estimated human and economic impacts of the scenario.

Table 4.264: Estimated Impact of Scenario #1, Mustard Gas Release

Impact	Post Exposure Onset Time	Effect
Severe Eye Injuries (1-2 hours)	1 -2 Hours	41,250 persons
Severe Airway Injuries (1-2 hours)	1 - 2 Hours	41,250 persons
Severe Skin Injuries (2 hours to days)	2 Hours to Days	49,500 persons
Deaths	Immediate to Days	1,100 persons
Cost of Decontamination	N/A	$594,000

Source: Electronic Mass Casualty Assessment and Planning Scenarios by Johns Hopkins University

Scenario #2: Pneumonic Plague

Event: Four Canisters containing aerosolized pneumonic plague bacteria are opened in public bathrooms of heavily populated buildings (airports, stadiums, etc.). Each release location will directly infect 110 people; hence, the number of release locations dictates the initial infected population. The secondary infection rate is used to calculate the total infected population. This attack method would not cause damages to buildings or other infrastructure, only to human populations.

Event Assumptions: Each canister contains 650 milliliters of pneumonic plague bacteria. The type of infectious agent used is identified on Day 4. After identification, the fatality rate is 10% for new cases. Pneumonic plague has a 1-15 percent mortality rate in treated cases and a 40-60 percent mortality rate in untreated cases.

Results: The following table presents the estimated human impacts of the scenario.

Table 4.265: Estimated Impact of Scenario #2, Pneumonic Plague Release

Impact	Effect
Initial Infected Population	440 persons
Secondary Infected Population	883 persons
Deaths (7% of Infected)	62

Source: Electronic Mass Casualty Assessment and Planning Scenarios by Johns Hopkins University

Scenario #3: Improvised Explosive Device

Event: An improvised explosive device utilizing an ammonium nitrate/fuel oil mixture is carried in a panel van to a parking area during a time when stadium patrons are leaving their cars and entering the stadium and detonated. Potential losses with this type of scenario include both human and structural assets.

Event Assumptions: The quantity of ammonium nitrate/fuel oil mixture used is 4,000 pounds. The population density of the lot is assumed to be 1 person per every 25 square feet for a pre-game crowd. The Lethal Air Blast Range for such a vehicle is estimated to be 50 feet according to the Bureau of Alcohol, Tobacco, Firearms and Explosives Standards. The Falling Glass Hazard distance is estimated at 600 feet according to Bureau of Alcohol, Tobacco, Firearms and Explosives Explosive Standards. In this event, damage would occur to vehicles, and depending on the proximity of other structures, damages would occur to the stadium complex itself. The exact amount of these damages is difficult to predict because of the large numbers of factors, including the type of structures nearby and the amount of insurance held by vehicle owners. It is estimated that the average replacement cost for a vehicle is $20,000 and the average repair cost for damaged vehicles would be $4,000.

Results: The following table presents the estimated human impacts of the scenario.

Table 4.266: Estimated Impact of Scenario #3, Improvised Explosive Device

Impact	Effect
Deaths	1,391 persons
Trauma Injuries	2,438 persons
Urgent Care Injuries	11,935
Injuries not Requiring Hospitalization	4,467
Repair Costs for 100 Vehicles	$400,000
Replacement Costs for 50 Vehicles	$1,000,000

Source: Electronic Mass Casualty Assessment and Planning Scenarios by Johns Hopkins University

4.27.5 – Impact and Consequence Analysis

There is no consensus on estimates of potential fatalities and injuries for terrorism events. Injury and death tolls would be dependent on the type, size and weapon used. Areas with higher population densities would likely result in a greater number of casualties.

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.267: Terrorism Consequence Analysis

Subject	Impacts of Terrorism
Health and Safety of Persons in the Area of the Incident	Impact could be severe for persons in the incident area.
Responders	Impact to responders could be severe if not trained and properly equipped. Responders that are properly trained and equipped will have a low to moderate impact.
Continuity of Operations	Depending on damage to facilities/personnel in the incident area, relocation may be necessary and lines of succession execution.
Property, Facilities, and Infrastructure	Impact within the incident area could be severe for explosion, moderate to low for Hazmat.
Environment	Localized impact within the incident area could be severe depending on the type of incident.
Economic Conditions	Economic conditions could be adversely affected and dependent upon time and length of clean up and investigation.
Public Confidence in Governance	Impact dependent on if the incident could have been avoided by government entities, clean-up, investigation times and outcomes.

4.28 – Utility/Infrastructure Failure

Critical infrastructure involves several different types of facilities and systems including:

- Electric power
- Transportation routes
- Natural gas and oil pipelines
- Water and sewer systems, storage networks
- Internet/telecommunications systems

Failure of utilities or infrastructure components in south-southwest Kansas can seriously impact public health, functioning of communities and the region's economy. Disruptions to utilities can occur from many of the hazards detailed in this plan, but the most likely causes include:

- Floods
- Lightning
- Tornados and Windstorms
- Winter Storms

In addition to being impacted by another listed hazard, utilities and infrastructure can fail as a result of faulty equipment, lack of maintenance, degradation over time, or accidental damage.

4.28.1 – Location and Extent

All of Kansas Region H is at risk for utility and/or infrastructure failure. The following sections discuss the major utilities in further detail.

Electric Power

The most common hazards analyzed in this plan that may disrupt the power supply are flood, lightning, tornado, windstorm, and winter weather. In addition, extreme heat can disrupt power supply when air conditioning use spikes during heat waves resulting in brownouts or rolling blackouts.

In general, electricity in Kansas Region H is provided by either investor-owned utilities or rural electric cooperatives (RECs). RECs are not-for-profit, member-owned electric utilities. Kansas RECs are governed by a board of trustees elected from the membership. Most Kansas RECs were set up under the Kansas Electric Cooperative Act, which, together with the federal Rural Electrification Act of 1934, made electric power available to rural customers. Information on regional electrical suppliers may be found at www.kec.org/servicearea_map.html. Additionally, locations of electric certified areas and transmission lines may be found at www.kcc.state.ks.us/maps/ks_electric_certified_areas.pdf.

Transportation Routes

Transportation routes can also be impacted by many of the hazards discussed in this plan. The primary hazards that impact transportation are flood, hazardous materials, and winter weather. Flood events can make roads and bridges impassible due to high water. Flood waters can also erode or scour road beds and bridge abutments. Highway and railroad accidents that involve hazardous materials can impact transportation routes through closures and/or evacuations. Winter weather frequently impacts transportation as roads become treacherous or impassible due to ice and snow. Other hazards that impact transportation routes include dam and levee failures if routes are in inundation areas, extreme temperatures that can cause damage to pavement, land subsidence that can damage roads/railroads, landslides that can cause debris and rock falls onto roadways, terrorism that can target routes, tornados that can directly damage infrastructure or deposit debris in routes, wildfires that can cause decreased visibility on transportation routes due to smoke, and windstorms that can cause vehicle accidents or overturning.

Pipelines Systems

Hazards that can impact natural gas and oil pipelines include earthquakes, expansive soils, land subsidence, landslide, and terrorism

Water and Sewer Systems

The primary hazards that can impact water supply systems include drought, floods, hazardous materials, and terrorism. Water district boundary maps are available for review at https://krwa.net/ONLINE-RESOURCES/RWD-Maps.

Internet and Telecommunications

Internet and telecommunications infrastructure can be impacted by floods, lightning, tornados, windstorms, and winter weather. Land line phone lines often utilize the same poles as electric lines, so when weather events such as windstorm or winter weather cause lines to break both electricity and telephone services may experience outages. With the increasing utilization of cellular phones, hazard events such as tornado that can damage cellular repeaters can cause outages. In addition, during any hazard event, internet and telecommunications systems can become overwhelmed due to the surge in call and usage volume. A map indicating telephone service providers in Kansas Region H is available at www.kcc.state.ks.us/maps /ks_telephone_certified_areas.pdf.

4.28.2 – Previous Occurrences

Each year disruptions to utility services ranging from minor to serious are a secondary result of other hazard events including drought, flood, tornado, windstorm, winter storm, lightning, and extreme heat.

4.28.3 – Hazard Probability Analysis

Minor utility failures occur annually across the region, with larger failures usually tied to other disaster events such as tornados, winter storms and windstorms. As discussed throughout this plan, these concurrent events occur regularly. As such, it is expected that occasional, and largely concurrent utility failure events will occur.

4.28.4 – Vulnerability Assessment

Regionally, smaller utility suppliers generally have limited resources for mitigation. Thus, the large number of small utility service providers could mean greater vulnerability in the event of a major, widespread disaster, such as a major flood, severe winter storm or ice storm.

In recent years, regional electric power grid system failures in the western and east-central United States have demonstrated that similar failures could happen in Kansas Region H. This vulnerability is most appropriately addressed on a multi-state regional or national basis.

Since utility/infrastructure failure is generally a secondary or cascading impact of other hazards, it is not possible to quantify estimated potential losses specific to this hazard due to the variables associated with affected population, duration of outages, etc.

Although the limitless variables make it difficult to estimate future losses on a statewide basis, FEMA has developed standard loss of use estimates in conjunction with their Benefit-Cost Analysis methodologies to estimate the cost of lost utilities on a per-person, per-use basis.

Table 4.268: FEMA Benefit-Cost Analysis

Loss of Electric Power	Cost of Complete Loss of Service
Total Economic Impact	$131 per person per day
Loss of Potable Water Service	Cost of Complete Loss of Service
Total Economic Impact	$103 per person per day
Loss of Wastewater Service	Cost of Complete Loss of Service
Total Economic Impact	$45 per person per day
Loss of Road/Bridge Service	Cost of Complete Loss of Service
Vehicle Delay Detour Time	$29.63 per vehicle per hour (one-way trips)
Vehicle Delay Mileage	$0.54 per mile (or current federal mileage rate)

Source: FEMA BCA Reference Guide, June 2009, Appendix C

4.28.5 – Impact and Consequence Analysis

As per EMAP requirements, the following table provides the Consequence Analysis.

Table 4.269: Utility/Infrastructure Failure Consequence Analysis

Subject	Impacts of Nuclear Incident
Health and Safety of Persons in the Area of the Incident	Localized impact will be moderate to severe for persons with functional and access needs, and the elderly, depending on length of failure and time of year.
Responders	Impact to responders will be minimal if properly trained and equipped.
Continuity of Operations	Due to the nature of the hazard, the COOP plan is not expected to be activated, however, if the recovery time is excessive than temporary relocation may become necessary (minimal).
Property, Facilities, and Infrastructure	Impact is dependent on the nature of the incident, e.g., electric, water, sewage, gas, communication disruptions). (Minimal)
Environment	Impact, depending on the nature of the incident, should be minimal.
Economic Conditions	Economic conditions could be adversely affected depending on damages suffered, extent of damages, etc. (minimal)
Public Confidence in Governance	Impact will be dependent on whether or not the government or non-government entities response, recovery, and planning were not timely and effective (minimal).

4.29 – Future Development

Future development speaks to the potential impacts of land use and demographic changes in hazard prone areas. Future development data is speculative as future conditions are subject to numerous unpredictable factors. While past trends are used to inform the discussion, these historical trends are no guarantee of future conditions.

For hazards that affect the entire planning area, the predicted decrease in both population and housing will tend to decrease potential vulnerability. It is difficult to quantify the exact change in vulnerability, but it can be depicted as generally directly proportional to the population and housing change itself.

As indicated in the data above, the majority of Kansas Region H participating jurisdiction have seen a slight increase or steady hold in farm acreage and an increase in the market value of produced agricultural goods. These continuing agricultural gains could result in increased exposure to both natural and man-made hazards.

5.0 Capability Assessment

5.1 – Introduction

44 CFR 201.6 does not require a capability assessment to be completed for local hazard mitigation plans. However, 201.6(c)(3) states "A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools."

This section of the plan discusses the current capacity of regional communities to mitigate the effects of identified hazards. A capability assessment is conducted to determine the ability of a jurisdiction to execute a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs or projects.

A capability assessment helps to determine which mitigation actions are practical based on a jurisdiction's fiscal, staffing and political resources. A capability assessment consists of:

- An inventory of relevant plans, ordinances, or programs already in place
- An analysis capacity to carry them out.

A thoughtful review of jurisdictional capabilities will assist in determining gaps that could limit current or proposed mitigation activities, or potentially aggravate a jurisdictions vulnerability to an identified hazard. Additionally, a capability assessment can detail current successful mitigation actions that should continue to receive support.

For this plan each participating jurisdiction was given an opportunity to present their capability assessment information.

5.2 – Granted Authority

In implementing a mitigation plan or specific action, a local jurisdiction may utilize any or all of the four broad types of government authority granted by the State of Kansas. The four types of authority are defined as:

- Regulation
- Acquisition
- Taxation
- Spending

Regulation

The scope of this local authority is subject to constraints, however, as all of Kansas' political subdivisions must not act without proper delegation from the State. Under a principle known as "Dillon's Rule," all power is vested in the State and can only be exercised by local governments to the extent it is delegated.

Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely "hazard-proofing" a particular piece of property or area is to acquire the property, thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Kansas legislation empowers cities, towns, counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain (County Home Rule Powers, K.S.A. 19-101, 19-101a, 19-212).

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by Kansas law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the community. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood control within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development. Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.

Spending

The Kansas General Assembly allocated the ability to local governments to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption of annual budgets and a Capital Improvement Plan. A Capital Improvement Plan is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a community can control growth to some extent. In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to services. A Capital Improvement Plan that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the Capital Improvement Plan is effective in directing growth away from environmentally sensitive or high hazard areas.

5.3 – Governance

All counties within Kansas Region H operate under a county commissioner form of governance, with the elected board of commissioners overseeing county operations.

Table 5.1: County Governance

Jurisdiction	Government Structure	Number of Commissioners
Allen County	Commission	3
Bourbon County	Commission	3
Chautauqua County	Commission	3
Cherokee County	Commission	3
Crawford County	Commission	3
Elk County	Commission	3
Greenwood County	Commission	3
Labette County	Commission	3
Montgomery County	Commission	3
Neosho County	Commission	3
Wilson County	Commission	3
Woodson County	Commission	3

In general, the participating towns and cities in Kansas Region H operate either under a Mayoral form of governance or an elected city council form of governance.

5.4 – Jurisdictional Capabilities

Information as to the current capacity of participating jurisdictions is summarized in the following sections and tables. All capability information was provided by jurisdictional officials through the above referenced questions and through outreach from the MPC.

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Many smaller jurisdictions have very limited to no planning, management, response or mitigation capabilities. Often these jurisdictions rely on the county or nearby larger municipalities for assistance. This lack of capabilities is reflected in the following tables. Additionally, many very small or extremely limited participating small jurisdictions, largely townships, are not listed on the capability list. This in no way diminishes the participation in the process of these jurisdictions. Finally, special district capabilities are included in their overarching jurisdiction.

5.4.1 – Planning Capabilities

The planning capability assessment is designed to provide a general overview of the key planning and regulatory tools or programs in place or under development. This information helps identify opportunities to address existing planning gaps and provides an opportunity to review areas that mitigation planning actions can be utilized with existing plans. Jurisdictions were asked if they had completed the following:

Comprehensive Plan: A comprehensive plan establishes the overall vision for a jurisdiction and serves as a guide to decision making, and generally contains information on demographics, land use, transportation, and facilities. As a comprehensive plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.

Critical Facilities Plan: A critical facilities plan is used to identify a jurisdiction's critical facilities, including fire stations, police stations, hospitals, schools, day care centers, senior care facilities, major roads and bridges, critical utility sites, and hazardous material storage areas. Additionally, this plan may be used to determine methods to mitigate damage to these facilities.

Debris Management Plan: A debris management plan covers the response and recovery from debris-causing incidents such as tornados or floods. Planning considerations include debris removal and disposal, disposal locations, equipment availability, and personnel training.

Emergency Operations Plan: An emergency operations plan outlines responsibility, means and methods by which resources are deployed during and following an emergency or disaster.

Evacuation Plan: A plan that outlines routes and methods by which populations are evacuated during and following an emergency or disaster.

Fire Mitigation Plan: A fire mitigation plan is used to mitigate a jurisdictions wildfire risk and vulnerability. The plan documents areas with an elevated risk of wildfires, and identifies the actions taken to decrease the risk. A fire mitigaion plan can influence and prioritize future funding for hazardous fuel reduction projects, including where and how federal agencies implement fuel reduction projects on federal lands.

Flood Mitigation Assistance Plan: The purpose of the flood mitigation assistance plan is to reduce or eliminate the long-term risk of flood damage to buildings and other structures insured under the NFIP.

Recovery Plan: A disaster recovery plan guides the recovery and reconstruction process following a disaster. Hazard mitigation principles should be incorporated into disaster recovery plans to assist in breaking the cycle of disaster loss.

Vulnerable Population Plan and/or Inventory: A vulnerable populations plan is used to develop a strategic approach for support to persons with functional or special needs before, during and following a disaster.

The table below summarizes relevant jurisdictional planning capabilities.

Table 5.2: Jurisdictional Planning Capabilities

Jurisdiction	Comprehensive Plan	Critical Facilities Plan	Debris Management Plan	Emergency Operations Plan	Evacuation Plan	Firewise or other Fire Mitigation Plan	Flood Mitigation Assistance Plan	Recovery Plan	Vulnerable Population Plan and/or Inventory
Allen County	x	x	x	x	x	x	x	x	x
Elsmore									
Gas	x		x	x	x		x		
Humboldt	x	x	x	x	x	x	x	x	
Iola	x		x	x		x	x		
LaHarpe				x					
Moran	x	x							
Savonburg									
Bourbon County		x		x	x			x	x
Bronson			x	x			x		
Fort Scott	x	x		x	x		x		
Fulton									
Mapleton									
Redfield				x					
Uniontown				x			x		
Chautauqua County		x		x				x	
Cedar Vale				x					
Chautauqua (city)									
Elgin				x					
Peru									
Sedan				x					
Cherokee County		x	x	x			x	x	x
Baxter Springs									
Columbus									
Galena									
Roseland									
Scammon									
Weir									
West Mineral									
Crawford County			x	x	x		x	x	x
Arcadia		x		x			x		
Arma									
Cherokee									
Franklin									

Table 5.2: Jurisdictional Planning Capabilities

Jurisdiction	Comprehensive Plan	Critical Facilities Plan	Debris Management Plan	Emergency Operations Plan	Evacuation Plan	Firewise or other Fire Mitigation Plan	Flood Mitigation Assistance Plan	Recovery Plan	Vulnerable Population Plan and/or Inventory
Frontenac									x
Girard									
Hepler				x					
McCune									
Mulberry			x	x	x				
Pittsburg									
Walnut									
Elk County			x	x					
Elk Falls									
Grenola									
Howard									
Longton				x					
Moline				x			x		
Greenwood County				x	x			x	
Climax									
Eureka									
Fall River									
Hamilton				x					
Madison									
Severy				x					
Labette County				x					x
Altamont									
Chetopa									
Edna									
Labette									
Mound Valley	x	x		x	x				
Oswego	x								
Parsons	x			x					
Montgomery County									
Caney	x		x						
Cherryvale									
Coffeyville									
Dearing									
Elk City									
Havana									

Table 5.2: Jurisdictional Planning Capabilities

Jurisdiction	Comprehensive Plan	Critical Facilities Plan	Debris Management Plan	Emergency Operations Plan	Evacuation Plan	Firewise or other Fire Mitigation Plan	Flood Mitigation Assistance Plan	Recovery Plan	Vulnerable Population Plan and/or Inventory
Independence	x	x	x	x	x	x	x	x	
Liberty									
Neosho County		x	x	x	x				
Chanute	x	x	x	x	x	x	x	x	x
Erie	x			x			x		
Galesburg									
St. Paul		x		x		x	x		
Stark				x					
Thayer				x					
Wilson County	x	x	x	x	x		x	x	x
Altoona									
Benedict									
Buffalo	x	x	x						
Fredonia			x		x	x	x	x	x
Neodesha									
New Albany									
Woodson County	x	x	x	x		x	x	x	
Neosho Falls				x					
Toronto	x			x					
Yates Center	x			x	x				

5.4.2 – Policies and Ordinances

Participating jurisdictions were asked if the following policies and ordinances and plans were established and enforced:

Building Code: Many structural mitigation measures involve constructing and retrofitting homes, businesses and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through the building code.

Floodplain Ordinance: In general, floodplain ordinances are used to:

- Minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage.
- Prevent and minimize loss of life, injuries, and property damage in flood hazard areas.
- Promote the public health, safety and welfare of citizens in flood hazard areas.

Floodplain ordinances may allow jurisdictions to:

- Manage planned growth
- Adopt local ordinances to regulate uses in flood hazard areas
- Enforce those ordinances
- Grant permits for use in flood hazard areas that are consistent with the ordinance

These ordinances can also help ensure meeting the minimum requirements of participation in the NFIP. The incentive for local governments adopting such ordinances is that they will afford their residents the ability to purchase flood insurance through the NFIP.

Stormwater Ordinance: The purpose of a stormwater ordinance is to protect the quality and quantity of local, regional and state waters from the potential harm of unmanaged stormwater. Stormwater ordinances include protection from activities that result in the degradation of properties, water quality, stream channels, and other natural resources.

Nuisance Ordinance: Local governments may use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

Zoning: Zoning is the traditional and most common tool available to local jurisdictions to control the use of land. Zoning is used to promote health, safety, and the general welfare of the community. Zoning is used to dictate the type of land use and to set minimum specifications for use such as lot size, building height and setbacks, and density of population. Local governments are authorized to divide their jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, special use districts or conditional use districts. Zoning ordinances consist of maps and written text.

The table below summarizes relevant jurisdictional policies and ordinances.

Table 5.3: Jurisdictional Policies and Ordinances

Jurisdiction	Building Code	Floodplain Ordinance	Nuisance Ordinance	Storm Water Ordinance	Zoning Ordinance
Allen County	x	x		x	x
Elsmore					
Gas	x	x	x		x
Humboldt	x	x	x		x
Iola	x	x	x	x	x
LaHarpe	x	x	x	x	x
Moran	x	x	x	x	
Savonburg					
Bourbon County		x			
Bronson		x	x	x	
Fort Scott	x	x			
Fulton		x			
Mapleton					
Redfield		x	x		
Uniontown	x	x	x		
Chautauqua County					
Cedar Vale					
Chautauqua (city)					
Elgin					
Peru					
Sedan		x			
Cherokee County		x			
Baxter Springs		x			
Columbus		x			
Galena		x			
Roseland					
Scammon		x	x		
Weir		x			
West Mineral		x			
Crawford County		x	x		x
Arcadia		x	x		
Arma		x			
Cherokee		x			
Franklin					
Frontenac	x	x	x	x	x
Girard		x			
Hepler		x			
McCune		x			

Table 5.3: Jurisdictional Policies and Ordinances

Jurisdiction	Building Code	Floodplain Ordinance	Nuisance Ordinance	Storm Water Ordinance	Zoning Ordinance
Mulberry			x		
Pittsburg		x			
Walnut					
Elk County		x			
Elk Falls					
Grenola					
Howard		x	x		
Longton		x	x		
Moline		x	x		
Greenwood County	x	x			x
Climax			x		
Eureka		x			
Fall River					
Hamilton		x			
Madison	x	x	x		
Severy					
Labette County		x			
Altamont		x			
Chetopa		x			
Edna		x			
Labette	x	x	x		
Mound Valley		x			
Oswego	x	x	x		x
Parsons	x	x	x		
Montgomery County		x			
Caney	x	x	x		x
Cherryvale		X			
Coffeyville		X			
Dearing		X			
Elk City		X			
Havana					
Independence	x	x	x	x	x
Liberty					
Neosho County		x			
Chanute	x	x	x	x	x
Erie	x	x	x		x
Galesburg		x			
St. Paul		x	x		x
Stark					

Table 5.3: Jurisdictional Policies and Ordinances

Jurisdiction	Building Code	Floodplain Ordinance	Nuisance Ordinance	Storm Water Ordinance	Zoning Ordinance
Thayer					
Wilson County		x			x
Altoona		x			
Benedict			x		
Buffalo	x	x	x	x	
Fredonia		x	x	x	x
Neodesha	x	x	x	x	x
New Albany					
Woodson County		x			x
Neosho Falls		x			
Toronto		x			
Yates Center		x			x

5.4.3 – Programs

This part of the capability's assessment includes the identification and evaluation of existing programs for each participating jurisdiction:

Community Rating System program under the National Flood Insurance Program: The NFIP's Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Participants are offered flood insurance premium rates at a discount to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS. These goals are the reduction of flood damage to insurable property, the strengthening and support of insurance aspects of the NFIP, and the encouragement of a comprehensive approach to floodplain management.

Firewise Community Certification: The Firewise Communities Program encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes from the risk of wildfire. Firewise is a key component of Fire Adapted Communities, a collaborative approach that connects all those who play a role in wildfire education, planning and action with comprehensive resources to help reduce risk. The program is co-sponsored by the USDA Forest Service, the US Department of the Interior, and the National Association of State Foresters.

ISO Fire Rating: This assessment also includes the identification and evaluation of existing ISO fire ratings. The Fire Suppression Rating Schedule is a manual containing the criteria ISO uses in reviewing the fire prevention and fire suppression capabilities of individual communities or fire

protection areas. The schedule measures the major elements of a community's fire protection system and develops a numerical grading called a Public Protection Classification.

National Flood Insurance Program: In 1968, Congress created the NFIP to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding.

***National Weather Service StormReady Program*:** StormReady uses a grassroots approach to help communities develop plans to handle all types of severe weather. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations

The table below summarizes relevant local programs.

Table 5.4: Jurisdictional Programs

Jurisdiction	Community Rating System program	Firewise Community Certification	ISO Fire Rating	National Flood Insurance Program	National Weather Service Storm Ready Certification
Allen County			x	x	
Elsmore					
Gas			4	x	
Humboldt	x		6	x	
Iola			x	x	
LaHarpe				x	x
Moran	x		x	x	
Savonburg					
Bourbon County			x	x	
Bronson			5	x	
Fort Scott			4	x	
Fulton				x	
Mapleton					
Redfield				x	
Uniontown			05/05X	x	
Chautauqua County					
Cedar Vale					
Chautauqua (city)					
Elgin					

Table 5.4: Jurisdictional Programs

Jurisdiction	Community Rating System program	Firewise Community Certification	ISO Fire Rating	National Flood Insurance Program	National Weather Service Storm Ready Certification
Peru			3		
Sedan			7	x	
Cherokee County			9	x	
Baxter Springs			6	x	
Columbus			4	x	
Galena			4	x	
Roseland					
Scammon			7	x	
Weir			7	x	
West Mineral			7	x	
Crawford County			x	x	
Arcadia			7	x	
Arma			5	x	
Cherokee				x	
Franklin					
Frontenac	x		5	x	
Girard			6	x	
Hepler			9	x	
McCune			10	x	
Mulberry			7		
Pittsburg			3	x	
Walnut					
Elk County			10	x	
Elk Falls			10		
Grenola			7	x	
Howard			6	x	
Longton			7	x	
Moline			9	x	
Greenwood County			x	x	
Climax					
Eureka			3	x	
Fall River			7		
Hamilton			7	x	
Madison				x	
Severy			x		
Labette County			x	x	x

Table 5.4: Jurisdictional Programs

Jurisdiction	Community Rating System program	Firewise Community Certification	ISO Fire Rating	National Flood Insurance Program	National Weather Service Storm Ready Certification
Altamont			6	x	
Chetopa			7	x	
Edna			6	x	
Labette			10	x	
Mound Valley			6	x	
Oswego			x	x	
Parsons			4	x	
Montgomery County				x	
Caney			5	x	
Cherryvale			5	x	
Coffeyville				x	
Dearing			6	x	
Elk City				x	
Havana					
Independence	x	x	6	x	
Liberty					
Neosho County				x	
Chanute	x		4	x	
Erie			5	x	
Galesburg			x	x	
St. Paul	x	x	8	x	x
Stark			9		
Thayer					
Wilson County			10	x	
Altoona				x	
Benedict					
Buffalo			7	x	
Fredonia	**x**	**x**	6	x	
Neodesha			6	x	
New Albany					
Woodson County			8	x	
Neosho Falls			x	x	
Toronto			8	x	
Yates Center		x	5	x	x

In addition, participating jurisdictions operate with mutual aid agreements. These are understandings among localities to lend assistance across jurisdictional boundaries. Mutual aid may be requested only when an emergency occurs that exceeds local resources.

5.4.4 – Staffing and Departmental Capabilities

A comprehensive mitigation program relies on many skilled professionals. These professionals include:

- Planners
- Emergency managers
- Floodplain managers
- GIS personnel

While exact responsibilities differ from jurisdiction to jurisdiction, the general duties of applicable departments are described below:

Building Official: Building officials are generally the jurisdictional administrator of building and construction codes, engineering calculation supervision, permits, facilities management, and accepted construction procedures. They may also inspect structures to ensure compliance with the plans and to check workmanship as well as code compliance.

Emergency Management Coordinator: The Emergency Management office is responsible for the mitigation, preparedness, response and recovery operations that deal with both natural and man-made disaster events. The formation of an emergency management department in each county is mandated under Kansas General Statutes.

Local Emergency Planning Committee: Local Emergency Planning Committees are generally housed at the county or municipal level. They do not function in actual emergency situations, but attempt to identify and catalogue potential hazards, identify available resources, mitigate hazards when feasible, and write emergency plans. The role of the LEPC is to anticipate and plan the initial response for foreseeable disasters in their jurisdiction.

Mapping Specialist: A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. A GIS mapping specialist uses this data to create county maps, including flood plain, fire hazard, drought and other mitigation maps.

NFIP Floodplain Administrator: The NFIP floodplain administrator ensures a jurisdiction is meeting the minimum requirements of participation in the NFIP, and often is tasked with applying for funding or grants.

Planning Department: A planning department usually provides management and oversight of development through the application of codes, ordinances, building regulations and public input.

Public Works Official: Public works officials usually provide management and oversight of infrastructure projects such as public buildings (municipal buildings, schools, hospitals), transport infrastructure (roads, railroads, bridges, pipelines, airports), public spaces (public squares, parks), public services (water supply, sewage, electrical grid, dams), and other physical assets and facilities.

The table below summarizes relevant local staffing and departmental capabilities.

Table 5.5: Staffing and Departmental Capabilities

Jurisdiction	Building Code Official or Inspector	Emergency Management Coordinator	Local Emergency Planning Committee	Mapping Specialist	NFIP Floodplain Administrator	Planning Department	Public Works Official
Allen County	x	x	x	x	x	x	x
Elsmore					x		
Gas	x	x			x		x
Humboldt	x		x		x	x	x
Iola	x	x	x	x	x	x	x
LaHarpe	x	x	x		x		x
Moran	x				x	x	x
Savonburg					x		
Bourbon County		x	x	x	x		x
Bronson					x		x
Fort Scott		x	x		x	x	
Fulton					x		
Mapleton							
Redfield					x		x
Uniontown	x				x	x	x
Chautauqua County		x	x	x			x
Cedar Vale							
Chautauqua (city)							
Elgin		x					x
Peru							
Sedan					x		x
Cherokee County		x	x	x	x		x
Baxter Springs					x		
Columbus					x		
Galena					x		
Roseland					x		
Scammon					x		x
Weir					x		
West Mineral					x		

Table 5.5: Staffing and Departmental Capabilities

Jurisdiction	Building Code Official or Inspector	Emergency Management Coordinator	Local Emergency Planning Committee	Mapping Specialist	NFIP Floodplain Administrator	Planning Department	Public Works Official
Crawford County		x	x	x	x	x	x
Arcadia					x		x
Arma					x		
Cherokee					x		
Franklin					x		
Frontenac	x				x	x	x
Girard					x		
Hepler					x		
McCune					x		x
Mulberry							x
Pittsburg					x		
Walnut							
Elk County		x	x	x	x		x
Elk Falls					x		
Grenola					x		x
Howard			x		x		x
Longton	x				x		x
Moline	x	x			x		x
Greenwood County		x	x	x	x	x	x
Climax							
Eureka					x		
Fall River							
Hamilton					x		
Madison		x			x		x
Severy							
Labette County	x	x	x	x	x	x	x
Altamont					x		
Chetopa					x		
Edna					x		
Labette					x		
Mound Valley		x			x	x	x
Oswego	x				x		x
Parsons	x	x	x		x		x
Montgomery County					x		
Caney	x	x			x	x	x
Cherryvale					x		
Coffeyville					x		
Dearing					x		

Table 5.5: Staffing and Departmental Capabilities

Jurisdiction	Building Code Official or Inspector	Emergency Management Coordinator	Local Emergency Planning Committee	Mapping Specialist	NFIP Floodplain Administrator	Planning Department	Public Works Official
Elk City					x		
Havana					x		
Independence	x	x	x	x	x	x	x
Liberty							
Neosho County		x	x	x	x		x
Chanute	x	x	x		x	x	x
Erie	x				x		x
Galesburg					x		
St. Paul		x	x		x	x	x
Stark							
Thayer							
Wilson County		x	x	x	x	x	x
Altoona					x		
Benedict							
Buffalo	x						
Fredonia	x	x	x		x	x	x
Neodesha					x		
New Albany							
Woodson County		x	x	x	x	x	x
Neosho Falls	x				x	x	x
Toronto					x		
Yates Center					x		

5.4.5 – Non-Governmental Organizations Capabilities

Non-Governmental Organizations (NGOs) are legally constituted corporations that operate independently from any form of government and are not conventional for-profit businesses. In the cases in which NGOs are funded totally or partially by a government agency, the NGO maintains its non-governmental status by excluding government representatives from membership in the organization. The following is a brief discussion of both the American Red Cross and the Salvation Army, both of which provide regional operations and coverage.

> ***American Red Cross:*** The American Red Cross is a humanitarian organization that provides emergency assistance, disaster relief and education. In addition, they offers services in five other areas: community services that help the needy; communications services and comfort for military members and their family members; the collection, processing and distribution of blood and blood products; educational programs on preparedness, health, and safety; and international relief and development programs.

Salvation Army: The Salvation Army is a Christian denomination and international charitable organization. In addition to being among the first to arrive with help after natural or man-made disasters, the Salvation Army runs charity shops and operates shelters for the homeless.

5.4.6 – Fiscal Capabilities

In general, the jurisdictions of the Kansas Region H receive the majority of their revenue through state and local sales tax and federal and state pass through dollars. Based on available revenue information, and given that both the state and counties are experiencing budget deficits, funding for mitigation programs and disaster response is at a premium. Adding to the budget crunch is the increased reliance on local accountability by the federal government.

The following provide brief definitions of applicable fiscal programs:

Application and Management of Grant Funding: The jurisdiction has the staffing and capabilities to apply for grant funding and oversee all necessary provisions of the funding.

Authority to Levy Taxes: The authority to levy taxes would allow the jurisdiction to tax its population base.

Authority to Withhold Spending in Hazard Prone Areas: The ability of a jurisdiction to not provide funding for activities or actions in an area that is known to be prone to specific hazards.

Incur Debt through General Obligation Bonds: General obligation bonds are issued with the belief that a municipality will be able to repay its debt obligation through taxation or revenue from projects. General obligation bonds can be used to generate funds for mitigation projects.

Usage of Capital Improvement Funding for Mitigation Projects: Capital improvement allows for spending on identified capital projects and for equipment purchases, in this context related to mitigation projects.

The following table highlights each jurisdiction's fiscal capabilities.

Table 5.6: Jurisdictional Financial Capabilities

Jurisdiction	Apply for and Manage Grant Funding	Authority to levy taxes for specific purposes	Authority to Withhold spending in hazard prone areas	Incur Debt through General Obligation Bonds	Usage of Capital Improvement Funding for Mitigation Projects
Allen County	x	x	x	x	x
Elsmore	x	x			
Gas	x	x	x	x	x
Humboldt	x	x	x	x	x
Iola	x	x	x	x	x
LaHarpe	x	x			x
Moran	x	x	x	x	x
Savonburg		x			
Bourbon County	x	x			
Bronson	x	x		x	x
Fort Scott	x	x		x	x
Fulton	x	x			
Mapleton	x	x			
Redfield	x	x			x
Uniontown	x	x		x	x
Chautauqua County	x	x	x	x	x
Cedar Vale	x	x			x
Chautauqua (city)	x	x			
Elgin	x	x			
Peru	x	x			
Sedan	x	x			
Cherokee County	x	x		x	x
Baxter Springs	x	x			
Columbus	x	x			
Galena	x	x			
Roseland	x	x			
Scammon	x	x			
Weir	x	x			
West Mineral	x	x			
Crawford County	x	x		x	
Arcadia	x	x			
Arma	x	x			
Cherokee	x	x			
Franklin	x	x			
Frontenac	x	x		x	x

Table 5.6: Jurisdictional Financial Capabilities

Jurisdiction	Apply for and Manage Grant Funding	Authority to levy taxes for specific purposes	Authority to Withhold spending in hazard prone areas	Incur Debt through General Obligation Bonds	Usage of Capital Improvement Funding for Mitigation Projects
Girard	x	x			x
Hepler	x	x			x
McCune	x	x			x
Mulberry	x	x		x	x
Pittsburg	x	x			x
Walnut	x	x	x	x	x
Elk County	x	x		x	x
Elk Falls	x	x			x
Grenola	x	x			x
Howard	x	x		x	x
Longton	x	x	x	x	x
Moline	x	x	x	x	x
Greenwood County	x	x	x	x	x
Climax	x	x		x	x
Eureka	x	x		x	x
Fall River	x	x		x	x
Hamilton	x	x		x	x
Madison	x	x		x	x
Severy	x	x		x	x
Labette County	x	x	x	x	x
Altamont	x	x			x
Chetopa	x	x			x
Edna	x	x			x
Labette	x	x			x
Mound Valley	x	x	x	x	x
Oswego	x	x		x	x
Parsons	x	x			x
Montgomery County	x	x			x
Caney	x	x	x	x	x
Cherryvale	x	x			x
Coffeyville	x	x			x
Dearing	x	x			x
Elk City	x	x			x
Havana	x	x			x
Independence	x	x	x	x	x
Liberty	x	x			x

Table 5.6: Jurisdictional Financial Capabilities

Jurisdiction	Apply for and Manage Grant Funding	Authority to levy taxes for specific purposes	Authority to Withhold spending in hazard prone areas	Incur Debt through General Obligation Bonds	Usage of Capital Improvement Funding for Mitigation Projects
Neosho County	x	x			x
Chanute	x	x	x	x	x
Erie	x	x		x	x
Galesburg	x	x	x	x	x
St. Paul	x	x			x
Stark	x				x
Thayer	x	x			x
Wilson County	x	x	x	x	x
Altoona	x	x			x
Benedict	x	x			x
Buffalo	x	x	x	x	x
Fredonia	x	x	x	x	x
Neodesha	x	x			x
New Albany	x	x			x
Woodson County	x	x		x	x
Neosho Falls	x	x		x	x
Toronto	x	x			x
Yates Center	x	x		x	x

5.4.7 – School Capability Assessment

Participating school districts were provided with a different set of questions that participating governmental jurisdictions. These questions were asked to ascertain the level of preparedness of the institution.

The following provides brief definitions of terms used in the capability assessment of schools. Please note that some definitions have been provided in previous sections.

Access to Local, Regional and State Funds: The ability to use local, regional and state funding on school activities and improvements.

Active Shooter Plan: An active shooter plan outlines responsibility, means and methods by which resources are deployed during an active shooter scenario.

Capital Improvement Plan: A capital improvement plan guides scheduling of, and spending on, school improvements. A capital improvement plan can guide future development away from identified hazard areas, an incorporate identified mitigation strategies.

District Master Plan: A master plan establishes the overall vision and serves as a guide to decision making. A master plan generally contains information on demographics, land use, transportation, and facilities. As a master plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.

Emergency Operations Plan/Evacuation Plan: An emergency operations plan outlines responsibility, means and methods by which resources are deployed during and following an emergency or disaster. Often included in these plans are detailed evacuation procedures and policies.

Incur Debt through General Obligation Bonds: General obligation bonds are issued with the belief that an entity will be able to repay its debt obligation through taxation or revenue from projects. General obligation bonds can be used to generate funds for mitigation projects.

School Safety or Resource Officer: A person with overall responsibility for safety of the school, students and staff.

Information as to the current capacity of participating schools, colleges and universities is summarized in the following table.

Table 5.7: College, Unified School District or University Capabilities

Jurisdiction	Access to Local, Regional and State funds	Active Shooter Plan or Policy	Capital Improvement Plan	District Master Plan	School Emergency and Evacuation Plans	School Safety or Resource Officers or Dedicated Law Enforcement
Allen County						
Allen County Community College	x	x	x	x	x	
USD 256 - Marmaton Valley	x	x	x	x	x	
USD 257 - Iola Public Schools	x	x	x	x	x	
USD 258 - Humboldt	x	x	x	x	x	
Bourbon County						
Fort Scott Community College	x	x	x		x	x
USD 234 - Fort Scott	x	x	x		x	x
USD 235 - Uniontown	x	x		x	x	
Chautauqua County						
USD 285 – Cedar Vale						

Table 5.7: College, Unified School District or University Capabilities

Jurisdiction	Access to Local, Regional and State funds	Active Shooter Plan or Policy	Capital Improvement Plan	District Master Plan	School Emergency and Evacuation Plans	School Safety or Resource Officers or Dedicated Law Enforcement
USD 286 – Chautauqua County						
Cherokee County						
USD 404 - Riverton	x	x	x		x	
USD 493 - Columbus	x	x	x	x	x	x
USD 499 - Galena	x	x	x	x	x	x
USD 508 - Baxter Springs	x	x	x	x	x	x
Crawford County						
Fort Scott Community College						
Pittsburg State University	x	x			x	x
USD 246 - Arma						
USD 247 - Cherokee	x	x	x	x	x	x
USD 248 - Girard	x	x	x	x	x	x
USD 249 - Frontenac	x	x	x	x	x	
USD 250 Pittsburg	x	x	x	x	x	x
USD 609 - SE Kansas Education Services Center	x	x	x	x	x	x
Elk County						
USD 282 - West Elk	x	x	x		x	x
USD 283 - Elk Valley	x	x	x		x	x
Greenwood County						
USD 386 – Madison-Virgil	x	x			x	
USD 389 - Eureka	x	x	x	x	x	x
USD 390 - Hamilton	x	x			x	
Labette County						
Labette County Community College	x	x			x	
USD 503 - Parsons	x	x			x	
USD 504 - Oswego	x	x			x	
USD 505 - Chetopa-St. Paul	x	x			x	
USD 506 - Labette County	x	x			x	
Montgomery County						
Coffeyville Community College	x	x	x	x	x	x
Independence Bible School	x	x			x	
Independence Community College	x	x			x	
USD 436 - Caney	x	x			x	
USD 445 - Coffeyville	x	x			x	
USD 446 - Independence	x	x			x	

Table 5.7: College, Unified School District or University Capabilities

Jurisdiction	Access to Local, Regional and State funds	Active Shooter Plan or Policy	Capital Improvement Plan	District Master Plan	School Emergency and Evacuation Plans	School Safety or Resource Officers or Dedicated Law Enforcement
USD 447 - Cherryvale	x	x	x	x	x	
Neosho County						
Neosho County Community College	x	x	x	x	x	x
USD 101 - Erie	x	x			x	
USD 413 - Chanute	x	x			x	
USD 447 - Cherryvale	x	x			x	
USD 505 - Chetopa-St. Paul	x	x	x	x	x	x
Wilson County						
USD 387 - Altoona-Midway	x	x			x	
USD 461 - Neodesha	x	x	x	x	x	
USD 484 - Fredonia	x	x			x	
Woodson County						
USD 366 - Woodson County	x	x			x	

Additionally, under K.S.A. 72-5457 (General Provisions for the Issuance of Bonds), all Kansas USDs may issue general obligation bonds to:

- Purchase or improve any site or sites necessary for school district purposes including housing and boarding pupils enrolled in an area vocational school
- Acquire, construct, equip, furnish, repair, remodel or make additions to buildings including housing and boarding pupils enrolled in an area vocational school operated under the board of education of a school district

6.0 Mitigation Strategy

6.1 – Introduction

As part of this planning effort, Kansas Region H and its participating jurisdictions worked to minimize the risk of future impacts from identified hazards to all citizens. In an attempt to shape future regulations, ordinances and policy decisions, the MPC reviewed and developed a hazard mitigation strategy. This comprehensive strategy includes:

- The consistent review and revision, as necessary, of obtainable goals and objectives
- The consistent review, revision and development of a comprehensive list of potential hazard mitigation actions

The development of a robust mitigation strategy allows for:

- The ability to effectively direct limited resources for maximum benefit
- The ability to prioritize identified hazard mitigation projects to maximize positive outcomes
- The increase in public and private level participation in hazard mitigation through transparency and awareness
- The potential direction of future policy decisions through awareness and education
- The achievement of the ultimate goal of a safer region for all our citizens

Considering the factors listed above, the MPC continues to implement the following mitigation strategy:

- **Implement** the recommendations of this plan.
- **Utilize** existing regulations, policies, programs, procedures, and plans already in place.
- **Share** information on Funding opportunities.
- **Communicate** the information contained in this plan so all jurisdictions and citizens have a clearer understanding of the hazards facing the region and what can be done to mitigate their impacts.
- **Publicize** the success stories that have been achieved through the region's ongoing mitigation efforts.

6.2 – Emergency Management Accreditation Program Integration

As per requirements, in identifying and reviewing mitigation actions the following activities recommended by the EMAP were considered:

- The use of applicable building construction standards
- Hazard avoidance through appropriate land-use practices
- Relocation, retrofitting, or removal of structures at risk
- Removal or elimination of the hazard
- Reduction or limitation of the amount or size of the hazard
- Segregation of the hazard from that which is to be protected
- Modification of the basic characteristics of the hazard
- Control of the rate of release of the hazard
- Provision of protective systems or equipment for both cyber or physical risks

- Establishment of hazard warning and communication procedures
- Redundancy or duplication of essential personnel, critical systems, equipment, and information materials.

6.3 – Problem Statements

Based on the regionally identified hazards, county specific problem statements have been developed to detail identified major concerns that can potentially be addressed through proposed mitigation actions. Problems statements were developed using the following inputs:

- Identify a key point of concern
- Is the problem getting worse, better, or staying the same?
- What are the identified or potential impacts?

The following table present regional problem statements to be utilized in informing the review, modification and development of hazard mitigation actions.

Table 6.1: Kansas Region H Problem Statements

Identified Hazard	Problem Statement	Current Condition (Same, Improving, Worsening)	Potential Impact(s)
Flood	Numerous low-water crossing throughout the region repeatedly flood	Same	Road damage, potential loss of life, cutoff of emergency services
Flood	The number of flood insurance policies have decreased from 2012 to 2018	Worsening	Loss of coverage for flood prone properties.
Tornado	Predictions indicate a potential increase in the number of tornados per year	Worsening	Increased injuries, deaths and property damage
Tornado	Current saferooms may not provide enough space to shelter all of those in need.	Same	Injuries and/or loss of life
Windstorm	Allen County is located in Wind Region IV, the highest classification for inland winds.	Same	High potential for property damages, injuries and/or deaths
Windstorm	Current saferooms may not provide enough space to shelter all of those in need.	Same	Injuries and/or loss of life
Winter Storm	Ice storms may damage utilities	Same	Lack of service to citizens, potential adverse impacts due to loss of heat or power
Utility Failure	Power infrastructure is above ground and susceptible to a range of hazards	Worsening with age of infrastructure	Lack of service to citizens, potential adverse impacts due to loss of heat or power

Additionally, problem statements from the public survey are incorporated to provide a community wide view. Problems statements were developed using the following inputs:

- Location
- Identified hazard
- Key point of concern

The following table present community problem statements to be utilized in informing the review, modification and development of hazard mitigation actions.

Table 6.2: Kansas Region H Community Problem Statements

Jurisdiction	Identified Hazard	Problem Statement
Allen County	Flood	Allow properties in flood zones to have outdoor, above/below ground storm shelters.
Allen County	Flood	Better protect the south side of town from flooding.
Allen County	Flood	The lack of maintenance and upkeep of drainage, runoff, curbing and ditches have seriously eroded and undermined the integrity of the streets of Humboldt
Allen County	All Hazards	In the rural areas outside of town tornados or any emergency with less than 1-3 hours of warning could be much more catastrophic. With shelters up to 15 minutes away and little notice it becomes dangerous quick.
Allen County, Humboldt	All Hazards	Training first responders. There has been limited training
Allen, Iola	Tornado, Windstorm	We need more storm shelters.
Allen County, Iola	Flood	Water infrastructure, mold issues
Allen County, Iola	Major Disease	I am not convinced that a significant outbreak of a disease could be handled with two hospitals shutting down.
Allen County, Iola	Tornado, Windstorm	A public shelter in my area is desperately needed. We have over 50 homes in our area, most of which are on concrete slabs and have no tornado protection.
Bourbon County	Flood	The ditches need to be cleaned for better water flow from the down pours. Check them out, Tall weeds brush, trash, etc.
Bourbon County	Utility/ Infrastructure Failure	Failure of aging infrastructure (water, sanitary sewer, storm sewer, electric, bridges, roads) is the greatest concern and most likely to cause hazards and the most deserving of funds to help renew.
Bourbon County, Fort Scott	All Hazards	Being able to communicate as effectively as possible in the event of a hazard.
Crawford County	Tornado, Windstorm	In my area it would be to fund a storm shelters for citizens and businesses.
Crawford County	All Hazards	Yearly meetings to update/review the mitigation plan that is in place and understand its content.
Elk County	All Hazards	Develop a coordinated set of activities that provide support for all county agencies to collaborate in the event of a pending event.

6.4 – Identification of Goals

44 CFR 201.6 (c)(3)(i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Through thorough discussions at stakeholder meetings, the MPC determined that the four previously identified primary hazard mitigation goals remained relevant and applicable. This was because the priorities of Kansas Region H in relation to hazard mitigation planning have not changed during the five-year planning cycle. These goals were reviewed through a well-established consideration process, instituted by the MPC during previous plan updates, which consisted of:

- A review of previously identified hazard mitigation goals
- A review of demographic and built environment data
- A review of identified hazards, hazard events, and vulnerabilities
- A review all identified hazard mitigation actions

The following goals represent the Kansas Region H vision for hazard mitigation and disaster resilience.

- **Goal 1:** Reduce or eliminate risk to the people and property of Kansas Region H from the impacts of the identified hazards in this plan.
- **Goal 2:** Strive to protect all vulnerable populations, structures, and critical facilities in Kansas Region H from the impacts of the identified hazards.
- **Goal 3:** Improve public outreach initiatives to include education, awareness and partnerships with all entities in order to enhance understanding of the risk Kansas Region H faces due to the impacts of the identified hazards.
- **Goal 4:** Enhance communication and coordination among all agencies and between agencies and the public.

6.5 – Completed Mitigation Actions

Sine the completion of the previous HMP, each jurisdiction has been tracking the completion status of all identified hazard mitigation actions. Each of the following completed actions should be viewed as a testament to the effectiveness of the HMP and a positive step in creating safer and more resilient communities.

Table 6.3: Region H Participating Jurisdictions Completed Hazard Mitigation Actions

Jurisdiction	Action Description
Caney Valley	Upgrade power lines to withstand ice accumulation and windstorms
Caney Valley REC	Tree and brush removal near power lines
Elk County	Implement reverse 911 warning system
Neosho County Community College	Institute emergency notification system

While the Kansas Region H hazard mitigation program has matured over the years, an unfortunate lack of funding and grant opportunities has prevented the completion of any major hazard mitigation projects. Kansas Region H remains committed to pursuing funding to complete all major hazard mitigation projects.

6.6 – Review and Addition of Mitigation Actions

For this plan update, members of the MPC and participating jurisdictions were asked to complete a thorough review of all not completed mitigation actions. Additionally, MPC members and participating jurisdictions were provided with the opportunity to identify and incorporate newly identified actions based on:

- Hazard events that have occurred since the last plan revision
- Updated risk assessments
- Identified goals and objectives
- Changing local capabilities
- New vulnerabilities.

In identifying new, or reviewing existing mitigation actions, the following general categories were considered:

Local Plans and Regulations: Actions that influence the way land and buildings are developed or constructed. Actions may include:

- Revision or institution planning and zoning ordinances
- Revision or institution of building codes
- Open space preservation
- Revision or institution floodplain regulations
- Revision or institution stormwater management regulations
- Drainage system maintenance
- Requirements for riverine setbacks

Structure and Infrastructure Projects: Actions that involve the modification of existing structures to protect, or remove from, a hazard or hazard area., such as:

- Acquisition of hazard prone properties
- Relocation of hazard prone properties
- Revision or institution of building elevation requirements
- Critical facilities protection
- Installation or retrofitting of community safe rooms
- Requiring insurance
- Installation or update of warning systems

Natural Systems Protection: Actions that minimize hazard losses to natural systems, such as:. Actions may include:

- Mandatory floodplain area protection
- Revision or institution of comprehensive watershed management programs
- Requirements for riparian buffers
- Requirements for forest and shrub management
- Revision or institution of erosion and sediment control
- Wetland preservation and restoration
- Slope stabilization programs

Education and Awareness Programs: Actions to inform and educate about potential hazards and actions to mitigate against them. Actions may include:

- Educational outreach programs
- Speaker and/ or demonstration events
- Notifying citizens on where to get information
- School educational and event programs

Each action was reviewed using the following metrics, asking if it was:

- **Specific** – The action addresses a hazard or need
- **Measurable** – Achievement or progress can be measured
- **Attainable** – Accepted by those responsible for achieving it
- **Relevant –** Substantively addresses the problem
- **Time-bound** – Time period for achievement is clearly stated

Additionally, the MPC and each jurisdiction was instructed to provide a brief summary regarding the status of each of these actions using the following:

- **Not Started:** Action will provide reason(s) for lack of progress, which may include lack of Funding, differing priorities, changes in political climate, lack of technical skills, etc.
- **In progress:** Action will provide a summary, and if applicable, a of percentage work completed to date.
- **Deleted:** Actions deemed no longer viable were marked for deletion from the plan. These actions are detailed in the next section.

6.7 – Prioritization of Mitigation Actions

44 CFR 201.6 (c)(3)(iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

All participating jurisdictions worked together to review and prioritize both previously identified and newly created hazard mitigation actions, with a self-analysis method used for prioritization. This methodology takes all considerations into account to ensure that, based on capabilities, funding, public wishes, political climate, and legal framework and context, reasonable actions are determined. Major determining factors included the potential effects on the overall risk to life and property, ease of implementation, community and agency support, consistency with mitigation goals, and the availability of Funding.

Of major concern was the potential cost of each action. In general, identified actions were proposed to reduce future damages. As such, it is critical that selected and implemented actions provide a greater saving over the life of the action than the initial cost. For structural and property protection actions cost effectiveness is primarily assessed on:

- Likelihood of damages occurring
- Severity of the damages
- Potential effectiveness

For all other type of actions, including legislative actions, codes and ordinances, maintenance and education, cost effectiveness is primarily assessed on likely future benefits as these actions may not easily result in a quantifiable reduction in damage.

Based on this review, both previously identified and new action items were prioritized as per the following:

High priority:
- Actions that should be implemented as soon as possible
- Actions deemed most critical to achieve the identified mitigation goals

Medium priority:
- Actions that should be implemented in the long-term
- Actions deemed important to meet identified mitigation goals

Low priority
- Actions that should be implemented if Funding becomes available
- Actions that have lowest impact toward achieving mitigation goals

6.8 – Jurisdictional Mitigation Actions

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

44 CFR 201.6 (c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

The following tables identify mitigation action items for each participating jurisdiction, along with the following information:

- Hazard addressed
- Responsible party
- Overall priority
- Goal(s) addressed
- Estimated cost
- Potential Funding source
- Proposed completion timeframe
- Current status
- New actions that have been added to this plan update are identified as such.
- Actions that are in support of NFIP compliance are identified with a bold type **NFIP**

6.8.1 – Allen County Mitigation Actions

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Allen County-1	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	Emergency Management Coordinator	High	1, 4	Staff Time	None Identified	Annually	Not started, lack of staff
Allen County-2	Promote National Flood Insurance Program **(NFIP)**	Flood	Allen County Flood Plain Director	Medium	3	$1,000	Local funding and staff time	Repeating	In progress
Allen County-3	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	Repeating	In progress
Allen County-4	Identify staff training and exercise needs	Multi-Hazard	Emergency Management Coordinator	Medium	3	$15,000	FEMA grants, local funds	Two years	Not started, lack of funding
Allen County-5	Increase public and fire department training on wildland-urban interface fires	Wildfire	Emergency Management Coordinator	Low	3	$30 per student per training session	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Allen County-6	Provide homeowner education on wildfire mitigation measures in the wildland-urban interface.	Wildfire	Emergency Management Coordinator	Low	1, 3	$500	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Allen County-7	Acquire and demolish properties in identified flood zones **(NFIP)**	Flood	Allen County Flood Plain Director	Medium	3	$500,000 (per project based)	Local, HMGP, PDM, FMA	Repeating	Not started, lack of funding
Allen County-8	Construct community storm shelter to serve the unincorporated community of Mildred	Tornado, Windstorm	Emergency Management Coordinator	High	1, 2	$50,000	HMGP, PDM	Two years	New
Elsmore-1	Replace storm siren throughout city	Tornado	City of Elsmore Council	Medium	1, 2	$30,000	HMGP, PDM	Five years	Not started, lack of funding

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Elsmore-2	Replace electric poles throughout city	Multi-Hazard	City of Elsmore Council	Medium	1, 2	$200,000	HMGP, PDM	Five years	Not started, lack of funding
Elsmore-3	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	City of Elsmore Council	High	1, 4	Staff Time	Local	Repeating	In progress
Elsmore-4	Join the **NFIP**.	Flood	City of Elsmore Council	Medium	3	Staff Time	Local funding and staff time	2 years	Not started, lack of staff
Elsmore-5	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	City of Elsmore Council	Medium	3	$5,000	Local funding and staff time	One year and ongoing	Not started, lack of funding
Elsmore-6	Identify staff training and exercise needs	Multi-Hazard	City of Elsmore Council	Medium	3	$15,000	FEMA grants, local funds	Two years	Not started, lack of funding
Elsmore-7	Increase public and fire department training on wildland-urban interface fires	Wildfire	City of Elsmore Council	Low	3	$30 per student per training session	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Elsmore-8	Provide homeowner education on wildfire mitigation measures in the wildland-urban interface.	Wildfire	City of Elsmore Council	Low	1, 3	$500	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Gas-1	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	City of Gas Council	High	1, 4	Staff Time	None Identified	Repeating	In progress
Gas-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress
Gas-3	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	One year and ongoing	Not started, lack of funding

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Gas-4	Identify staff training and exercise needs	Multi-Hazard	City of Gas Council	Medium	3	$15,000	FEMA grants, local funds	Two years	Not started, lack of funding
Gas-5	Increase public and fire department training on wildland-urban interface fires	Wildfire	City of Gas Council	Low	3	$30 per student per training session	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Gas-6	Provide homeowner education on wildfire mitigation measures in the wildland-urban interface.	Wildfire	City of Gas Council	Low	1, 3	$500	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Gas-7	Acquire and demolish properties in identified flood zones **(NFIP)**	Flood	NFIP Director	Medium	3	$500,000 (per project based)	Local, HMGP, PDM, FMA	Repeating	Not started, lack of funding
Humboldt-1	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	City of Humboldt Council	High	1, 4	Staff Time	None Identified	Repeating	In progress
Humboldt-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress
Humboldt-3	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	City of Humboldt Council	Medium	3	$5,000	Local funding and staff time	One year and ongoing	Not started, lack of funding
Humboldt-4	Identify staff training and exercise needs	Multi-Hazard	City of Humboldt Council	Medium	3	$15,000	FEMA grants	Two years	Not started, lack of funding
Humboldt-5	Increase public and fire department training on wildland-urban interface fires	Wildfire	City of Humboldt Council	Low	3	$30 per student per training session	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Humboldt-6	Provide homeowner education on wildfire mitigation measures in the wildland-urban interface.	Wildfire	City of Humboldt Council	Low	1, 3	$500	Kansas Forest Service and	Three to five years	Not started, lack of funding

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
							federal grants		
Humboldt-7	Acquire and demolish properties in identified flood zones **(NFIP)**	Flood	NFIP Director	Medium	3	$500,000 (per project based)	Local, HMGP, PDM, FMA	Repeating	Not started, lack of funding
Iola-1	Implement buyout program for flood damaged properties **(NFIP)**	Flood	NFIP Director	High	1	$4,000,000	FEMA HMGP, CDBG, State funding, City funds	One year	Not started, lack of funding
Iola-2	Construct flood wall to protect municipal power and water treatment utilities complex **(NFIP)**	Flood	City of Iola Codes Services Department Supervisor	High	2	$3,000,000	HMGP, PDM, CDBG, revenue from rates and utility reserves	Two years	Not started, lack of funding
Iola-3	Reconstruct Coon Creek channel throughout the City to prevent future flooding **(NFIP)**	Flood	City of Iola Codes Services Department Supervisor	Medium	1	$10,000,000	HMGP, PDM, State, City funds	Five years	Not started, lack of funding
Iola-4	Construct a water detention structure at the headwaters of Coon Creek **(NFIP)**	Flood	City of Iola Code Services Department Supervisor	Medium	1	$2,500,000	USACE, HMGP, PDM, State, Local	Three years	Not started, lack of funding
Iola-5	Develop underground electric distribution	Multi-Hazard	City of Iola Electric Department Director and City Administrator Office	Low	1, 2	$60,000,000	HMGP, PDM, CDBG, revenue from rates and utility reserves	10 years	Not started, lack of funding
Iola-6	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	City of Iola Council	High	1, 4	Staff Time	Local	Repeating	In Progress

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Iola-7	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In Progress
Iola-8	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	One year and ongoing	
Iola-9	Identify staff training and exercise needs	Multi-Hazard	City of Iola Council	Medium	3	$15,000	FEMA grants, local funds	Two years	Not started, lack of funding
LaHarpe-1	Install backup generator at emergency shelter	All Hazards	Electrical Department Director	High	1	$4,000	FEMA grants, local funds	12 months	Not started, lack of funding
LaHarpe-2	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	City of LaHarpe Council	High	1, 4	Staff Time	Local	Repeating	In progress
LaHarpe-3	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress
LaHarpe-4	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	City of LaHarpe Council	Medium	3	$5,000	Local funding and staff time	One year and ongoing	Not started, lack of funding
LaHarpe-5	Identify staff training and exercise needs	Multi-Hazard	City of LaHarpe Council	Medium	3	$15,000	U.S. Department of Homeland Security grants, local funds	Two years	Not started, lack of funding
LaHarpe-6	Increase public and fire department training on wildland-urban interface fires	Wildfire	City of LaHarpe Council	Low	3	$30 per student per training session	The Kansas Forest Service, along with its state and federal partners	Three to five years	Not started, lack of funding

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
LaHarpe-7	Provide homeowner education on wildfire mitigation measures in the wildland-urban interface.	Wildfire	City of LaHarpe Council	Low	1, 3	$500	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
LaHarpe-8	Install backup generator at emergency shelter	All Hazards	Electrical Department Director	High	1	$4,000	Local, HMGP, PDM	12 months	Not started, lack of funding
LaHarpe-9	Acquire and demolish properties in identified flood zones **(NFIP)**	Flood	NFIP Director	Medium	3	$500,000 (per project based)	Local, HMGP, PDM, FMA	Repeating	Not started, lack of funding
Moran-1	Increase water storage capacity in Moran	Multi-Hazard	City of Moran City Council	Medium	1, 2	$675,000	Loan, grants, and City funds	One year	
Moran-2	Prevent damage to power lines through upgrades, burying, etc.	Multi-Hazard	City of Moran City Council	Medium	1, 2	$71,340	FEMA HMGP and PDM, CDBG Program, revenue from rates and other City funds	Three years	Not started, lack of funding
Moran-3	Construct community storm shelter	Multi-Hazard	City of Moran City Clerk and City Council	High	2	$35,000 - $150,000	HMGP, PDM	6-18 months	Not started, lack of funding
Moran-4	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	City of Moran Council	High	1, 4	Staff Time	None Identified	Repeating	In progress
Moran-5	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In progress
Moran-6	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	City of Moran City Clerk and City Council	Medium	3	$5,000	Local funding and staff time	One year and ongoing	Not started, lack of funding

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Moran-7	Identify staff training and exercise needs	Multi-Hazard	City of Moran City Clerk and City Council	Medium	3	$15,000	FEMA grants, local funds	Two years	Not started, lack of funding
Moran-8	Increase public and fire department training on wildland-urban interface fires	Wildfire	City of Moran City Clerk and City Council	Low	3	$30 per student per training session	The Kansas Forest Service, along with its state and federal partners	Three to five years	Not started, lack of funding
Moran-9	Provide homeowner education on wildfire mitigation measures in the wildland-urban interface.	Wildfire	City of Moran City Clerk and City Council	Low	1, 3	$500	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Moran-10	Acquire and demolish properties in identified flood zones **(NFIP)**	Flood	NFIP Director	Medium	3	$500,000 (per project based)	Local, HMGP, PDM, FMA	Repeating	Not started, lack of funding
Savonburg-1	Upgrade and enhance power lines to endure ice and wind conditions and provide back-up power and pole replacement	Winter storm, Windstorm	City of Savonburg Electric Department, Director	High	1	$20,000	Local, HMGP, PDM	Five years	Not started, lack of funding
Savonburg-2	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	City of Savonburg Council	High	1, 4	Staff Time	None Identified	Repeating	In progress
Savonburg-3	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In progress
Savonburg-4	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	City of Savonburg Council	Medium	3	$5,000	Local funding and staff time	One year and repeating	Not started, lack of funding
Savonburg-5	Identify staff training and exercise needs	Multi-Hazard	City of Savonburg Council	Medium	3	$15,000	U.S. Department of Homeland Security	Two years	Not started, lack of funding

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
							grants, local funds		
Savonburg-6	Increase public and fire department training on wildland-urban interface fires	Wildfire	City of Savonburg Council	Low	3	$30 per student per training session	The Kansas Forest Service, along with its state and federal partners	Three to five years	Not started, lack of funding
Savonburg-7	Provide homeowner education on wildfire mitigation measures in the wildland-urban interface.	Wildfire	City of Savonburg Council	Low	1, 3	$500	Kansas Forest Service and federal grants	Three to five years	Not started, lack of funding
Savonburg-8	Upgrade and enhance power lines to endure ice and wind conditions and provide back-up power and pole replacement	Winter storm, Windstorm	City of Savonburg Electric Department, Director	High	1	$20,000	HMGP, PDM	Five years	Not started, lack of funding
Savonburg-9	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	City of Savonburg Council	High	1, 4	Staff Time	Local	Repeating	In progress
Allen County CC-1	Implement emergency notification system	Multi-Hazard	Allen County Community College, Student Affairs Director	Medium	4	$6,800	Allen County Community College general funds	Three years	Not started, lack of funding
Allen County CC-2	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	Emergency Management Coordinator	High	1, 4	Staff Time	Local	Repeating	In progress
Allen County CC-3	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	Repeating	Not started, lack of funding
Allen County CC-4	Identify staff training and exercise needs	Multi-Hazard	Emergency Management Coordinator	Medium	3	$15,000	FEMA grants, local funds	Two years	Not started, lack of funding

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD 256-1	Identify, prioritize, and seek funding to address tornado shelter needs in existing school buildings	Tornado	Marmaton Valley Schools USD 256 Superintendent	High	1, 2	$500,000	Local, HMGP, PDM, State	Three to five years	Not started, lack of funding
USD 256-2	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	Emergency Management Coordinator	High	1, 4	Staff Time	Local	Repeating	In progress
USD 256-3	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	One year and ongoing	
USD 256-4	Identify staff training and exercise needs	Multi-Hazard	Emergency Management Coordinator	Medium	3	$15,000	Local, HMGP, PDM, State	Two years	Not started, lack of funding
USD 257-1	Construct safe rooms in existing school buildings and in new schools currently being planned	Tornado	Iola Public Schools USD 257 Superintendent	High	1, 2	Elementary School $900,850, Middle School $504,175, and High School $614,900	Local, HMGP, PDM, State	Three years.	Not started, lack of funding
USD 257-2	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	Emergency Management Coordinator	High	1, 4	Staff Time	Local	Repeating	In progress
USD 257-3	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	One year and ongoing	Not started, lack of funding
USD 257-4	Identify staff training and exercise needs	Multi-Hazard	Emergency Management Coordinator	Medium	3	$15,000	Local, HMGP, PDM, State	Two years	Not started, lack of funding
USD 258-1	Construct safe rooms in each school building.	Tornado	Humboldt School USD 258, Superintendent	High	1, 2	$500,000 each	Local, HMGP, PDM, State	Three to five years	Not started, lack of funding
USD 258-2	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	Emergency Management Coordinator	High	1, 4	Staff Time	Local	Annually	In progress

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD 258-3	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	One year and ongoing	Not started, lack of funding
USD 258-4	Identify staff training and exercise needs	Multi-Hazard	Emergency Management Coordinator	Medium	3	$15,000	Local, HMGP, PDM, State	Two years	Not started, lack of funding
Allen County Rural Water Districts (all Districts)-1	Acquire and install emergency generators for priority use structures.	Utility Failure	RWD Director	High	1,2	$50,000	HMGP	Four years	New
Allen County Rural Water Districts (all Districts)-2	Replace water line due to expansive soil. Shifting stream banks caused by floods. Extend current line encasement	Expansive soil	RWD Director	Medium	1,2,3	$100,000	HMGP	Six years	New
Allen County Rural Water Districts (all Districts)-3	Replace water lines that are deteriorating or too small	Utility Failure	RWD Director	High	1	$100,000	HMGP	Four years	New
American Red Cross-1	Train volunteers in disaster response	Multi-Hazard	American Red Cross, Director	Medium	3	Staff Time	American Red Cross	Repeating	In progress
American Red Cross-2	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	Emergency Management Coordinator	High	1, 4	Staff Time	Local	Annually	In progress
American Red Cross-3	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	One year and ongoing	Not started, lack of funding
American Red Cross-4	Identify staff training and exercise needs	Multi-Hazard	Emergency Management Coordinator	Medium	3	$15,000	Local, HMGP, PDM, State	Two years	Not started, lack of funding
Southeast Kansas Community Health Center-1	Construct safe room for patient and staff in all Community Health Center buildings	Tornado	Director	High	1, 2	$1,000,000 each	HMGP, PDM, Local, State	Five years	New

Table 6.4: Allen County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Southeast Kansas Community Health Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New
Southern Star-1	Evaluate and update mitigation plan during each annual review of the Allen County Basic Operations Plan.	Multi-Hazard	Emergency Management Coordinator	High	1, 4	Staff Time	Local	Annually	In progress
Southern Star-2	Develop public education program on hazards and risk in Allen County and preparedness and mitigation activities	Multi-Hazard	Emergency Management Coordinator	Medium	3	$5,000	Local funding and staff time	Repeating	Not started, lack of funding
Southern Star-3	Identify staff training and exercise needs	Multi-Hazard	Emergency Management Coordinator	Medium	3	$15,000	Local, HMGP, PDM, State	Two years	Not started, lack of funding

6.8.2 – Bourbon County Mitigation Actions

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Bourbon County-1	Appoint a planning committee to research and recommend development of a Comprehensive Land Use Plan for Bourbon County. **(NFIP)**	Flood	County Officials	Medium	1, 2	Staff Time	Local	Six years	Not started, lack of staff time
Bourbon County-2	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. **(NFIP)**	Flood	County Officials	Low	1, 2, 3	Staff Time	FEMA, KDEM, Local	Five years	Not started, lack of staff time
Bourbon County-3	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance program, in addition to other flood protection measures. **(NFIP)**	Flood	City-County Officials	High	3, 4	No Cost / Low Cost	Local	Repeating	Not started, lack of staff time
Bourbon County-4	Identify flood prone areas and recommend flood reduction measures to county planners. **(NFIP)**	Flood	County Officials	High	1, 2	No Cost / Low Cost	Local	Five years	Not started, lack of staff time
Bourbon County-5	Research and design an appropriate stream buffer ordinance to further protect the jurisdiction's water resources and to limit future flood damages adjacent to major waterways.	Multi-hazard	County Officials	Medium	1, 2	No Cost / Low Cost	FEMA, State, Local	Five years	Not started, lack of staff time
Bourbon County-6	Identify the County's most at-risk critical facilities and evaluate potential mitigation techniques for protecting each facility to the maximum extent possible.	Multi-hazard	Emergency Manager	Low	1, 3	Staff Time	Local	Five years	Not started, lack of staff time
Bourbon County-7	Conduct an inventory/survey for the emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	Multi-hazard	Emergency Manager / City Emergency Services Officials	High	1	$208,000	Local / State	Five years	Not started, lack of funding

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Bourbon County-8	Develop and implement a wildfire prevention/education program. In addition to providing education to the general public, the program should also target children, fire and equipment users, builders and developers, and homeowners.	Wildfire	Fire Officials/ Emergency Manager	Medium	3	Staff Time	Local	Repeating	Not started, lack of staff time
Bourbon County-9	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources. Include agreements with local, state and federal agencies.	Wildfire	Fire Officials/ Emergency Manager	Medium	1, 3	No Cost / Low Cost	Local	Repeating	In progress
Bourbon County-10	Create a working group to evaluate the firefighting water supply resources within the County. This should include both fixed and mobile supply issues.	Wildfire	Fire Officials/ Emergency Manager	High	1, 3, 4	No Cost / Low Cost	Local	Five years	Not started, lack of staff time
Bourbon County-11	Contact all owners of high hazard dams in Bourbon County and inform them of their responsibility to complete and provide Emergency Action Plans (EAPs) to the Bourbon County Emergency Management Department as prescribed by the Kansas Department of Agriculture – Water Resources Division, Chief Engineer.	Dam/Levee Failure	Bourbon County Emergency Manager / Mill Creek WD No.98 Officials/ Marmaton WJD No. 102 Officials	Medium	1, 3	Staff Time	Local	Six years	Not started, lack of staff time
Bourbon County-12	Plan and fund animal sheltering facilities adjacent to existing storm shelters.	Multi-hazard	Emergency Manager	Medium	2	Staff Time	Local / State / Federal	Six years	Not started, lack of staff time
Bourbon County-13	Develop a County Animal Rescue Team.	Multi-hazard	Emergency Manager	Medium	2	Staff Time	Local / State / Federal	Five years	Not started, lack of staff time
Bourbon County-14	Seek funding for emergency generators for county sanitation systems.	Multi-hazard	Emergency Manager	Medium	1, 3	Staff Time	Local / State / Federal	Five years	Not started, lack of staff time

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Bourbon County-15	Seek funding for the purchase and installation of fire danger signs.	Wildfire	Emergency Manager / Public Works Officials	Medium	1, 3	Staff Time	Local / State / Federal	Five years	Not started, lack of staff time
Bourbon County-16	Seek funding for training of the Bourbon County Search and Rescue Team to include water rescue.	Multi-hazard	Emergency Manager	High	1, 3	No Cost / Low Cost	Local / State / Federal	Five years	Not started, lack of staff time
Bourbon County-17	The County and local governments will work with the Kansas Department of Agriculture - Division of Water Resources to educate and promote local jurisdictional participation in the National Flood Insurance Program **(NFIP)**	Flood	Emergency Manager / Local Officials	Medium	1, 3	No Cost / Low Cost	Local / State	Repeating	In progress
Bourbon County-18	Continued operation and management of jurisdictional **NFIP** activities.	Flood	City / County Officials	High	1	No Cost / Low Cost	State, FEMA, Programs Grants	Repeating	In progress
Bourbon County-19	Advertise and promote the availability of flood insurance to property owners by direct mail once a year. **(NFIP)**	Flood	City / County Officials	High	3	No Cost / Low Cost	Local	Repeating	Not started, lack of staff time
Bourbon County-20	Collect educational materials on individual and family preparedness / mitigation measures for property owners and display at both the library and routinely visited government offices. **(NFIP)**	Flood	Emergency Manager / City Emergency Services Officials	High	3	No Cost / Low Cost	Local	Repeating	Not started, lack of staff time
Bourbon County-21	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other appropriate events.	Multi-hazard	Emergency Manager / City Officials	Medium	3	No Cost / Low Cost	Local	Repeating	Not started, lack of staff time
Bourbon County-22	Encourage the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Multi-hazard	School District Superintendents/ State of Kansas/FEMA	High	2	No Cost / Low Cost	FEMA/State /Local	Repeating	Not started, lack of staff time

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Bourbon County-23	Educate residents about driving in winter storms and handling winter-related health effects.	Multi-hazard	Emergency Manager / City Emergency Services	High	3	No Cost / Low Cost	Local	Repeating	Not started, lack of staff time
Bourbon County-24	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues that can severely impact the county and regional economies, and develop and implement plans to address these issues.	Terrorism and Civil Disorder	County Emergency Manager/ Local Producers	Medium	1, 3		Local / State / Federal	Six Years	Not started, lack of staff time
Bourbon County-25	Develop an annex to the Local Emergency Operations Plan (LEOP) for dam failure response and evacuation plans for high hazard dams in Bourbon County.	Dam/Levee Failure	Emergency Manager	High	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Bourbon County-26	Coordinate county and local government mitigation efforts with Rural Electric Cooperatives, encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies.	Utility/ Infrastructure Failure	Public Works Director	High	3, 4	No Cost / Low Cost	Local	Six Years	In progress
Bourbon County-27	Prepare and adopt an Outdoor Warning Sirens Plan for the county, including consideration of the unique geographical locations, technical requirements, system types and operational procedures of each local jurisdiction.	Tornado	Emergency Manager / City Officials / County Emergency Services Officials	High	1, 2	Staff Time	Local / State / Federal	Three Years	Not started, lack of staff time
Bronson-1	Identify flash-flood prone areas to consider flood reduction measures to the city's floodplain manager/ planning officer. **(NFIP)**	Flood	City Officials	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Bronson-2	Incorporate the inspection and management of trees that may pose a threat to the county's routine maintenance system process.	Multi-Hazard	City of Bronson Public Works	Medium	1	Staff Time	Local	Three Years	Not started, lack of staff time
Bronson-3	Conduct a study of the existing storm warning system and seek funding to upgrade or replace the warning sirens for the City of Bronson. The study should include a 'warning system policy' that includes the dissemination of information about the 'warning siren policy' to the community.	Tornado	City of Bronson Officials	Medium	1, 3	$50,000	Local / State / Federal	Three Years	Not started, lack of funding
Bronson-4	Seek funding for the purchase and installation of a backup power to the Bronson Community Center.	Multi-hazard	City of Bronson	Low	1	$50,000	Local / State / Federal	Three Years	Not started, lack of funding
Bronson-5	Seek funding to conduct a study for the location, design, and construction of community tornado shelters for Bronson citizens.	Tornado	City of Bronson Officials	Low	2	$500,000	Local / State / Federal	Three Years	Not started, lack of funding
Bronson-6	Seek funding to complete a stormwater drainage study/plan for the City of Bronson that will lead to a stormwater management ordinance. **(NFIP)**	Flood	City Officials	Medium	2	$30,000	Local / State / Federal	Three Years	Not started, lack of funding
Bronson-7	Seek funding to perform improvements to minimize flood damage to existing development by maximizing the effectiveness of the storm sewer infrastructure. **(NFIP)**	Flood	City of Bronson Officials	Low	1	$50,000	Local / State / Federal	Three Years	Not started, lack of funding
Bronson-8	The City of Bronson, Bourbon County, and Allen County will work in coordination with private property owners to conduct maintenance procedures to the wastewater lagoon system and adjacent drainage ditch. **(NFIP)**	Flood	City of Bronson Officials / Bourbon County / County / Private Property Owners	Medium	1, 2	$100,000	Local / State / Federal	Three Years	Not started, lack of funding

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Bronson-9	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In progress
Fort Scott-1	Identify flood prone areas to consider future flood reduction measures within the City of Fort Scott. **(NFIP)**	Flood	City Officials	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Fort Scott-2	Develop and submit an Emergency Action Plan (EAP) for the High Hazard Dam owned by the City of Fort Scott.	Dam/Levee Failure	City of Fort Scott Officials / Emergency Management Director	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Fort Scott-3	Seek funding to complete a stormwater drainage study/plan for the City of Fort Scott that will lead to a stormwater management ordinance. **(NFIP)**	Flood	City Officials	Medium	1, 3	$50,000	Local / State / Federal	Three Years	Not started, lack of funding
Fort Scott-4	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. **(NFIP)**	Flood	City Officials	High	1, 2, 3	$500,000 (per project)	Local / State / Federal	Three Years	Not started, lack of funding
Fort Scott-5	Seek funding for the purchase and installation of a backup power generators for Fort Scott critical facilities.	Multi-Hazard	City Officials	Medium	1, 2	$50,000	Local / State / Federal	Three Years	Not started, lack of funding
Fort Scott-6	Build two community safe rooms adjacent to 2 fire station buildings	Tornado	City of Fort Scott Officials	Medium	2	$800,000	Local / State / Federal	Three Years	Not started, lack of funding
Fort Scott-7	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In progress
Fulton-1	Identify flood prone areas to consider future flood reduction measures within the City of Fulton. **(NFIP)**	Flood	City Officials	Medium	1, 2	Staff Time	Local	Four Years	Not started, lack of staff time
Fulton-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In progress
Mapleton-1	Promote the use of NOAA All Hazards Weather Radios for the entire community of Mapleton. Seek funding	Multi-hazard	City of Mapleton Officials	Medium	1, 3, 4	$40 per radio	Local / State / Federal	Four Years	Not started, lack of staff time

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	to subsidize purchase and distribution of weather radios.								
Redfield- 1	Identify flood prone areas to consider future flood reduction measures within the City of Redfield. **(NFIP)**	Flood	City Planners	High	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Redfield- 2	Seek funding to design and build a Safe Room(s) for the community of Redfield.	Tornado	City of Redfield Officials	Low	2	$800,000	Local	Three Years	Not started, lack of funding
Redfield- 3	Conduct a study to determine the efficacy of the existing warning siren system within the Jurisdiction, and repair and install new sirens as needed to ensure area coverage.	Tornado	Local Officials	Medium	1	$10,000	Local / State / Federal	Three Years	Not started, lack of funding
Redfield- 4	Seek funding to design and construct an addition to the fire station to accommodate two new apparatus.	Multi-Hazard	City of Redfield Officials	Low	1	$500,000	Local / State / Federal	Three Years	Not started, lack of funding
Redfield- 5	Seek funding for the purchase and installation of a backup power for critical facilities in Redfield.	Multi-hazard	City of Redfield Officials	Low	1	$50,000	Local / State / Federal	Three Years	Not started, lack of funding
Redfield-6	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In progress
Uniontown-1	Identify flood prone areas to consider future flood reduction measures within the City of Uniontown. **(NFIP)**	Flood	City Officials	High	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Uniontown-2	Seek funding to complete a stormwater drainage study/plan for the City of Uniontown that will lead to a stormwater management ordinance. **(NFIP)**	Flood	City Officials / Professional Engineers	High	1	$20,000	Local / State / Federal	Three Years	Not started, lack of staff time
Uniontown-3	Seek funding to perform improvements to minimize flood damage to existing development by maximizing the effectiveness of the storm sewer infrastructure. **(NFIP)**	Flood	City of Uniontown Officials / Professional Engineer	High	1	$50,000	Local / State / Federal	Three Years	Not started, lack of funding
Uniontown-4	Conduct a study to determine the efficacy of the existing warning siren system within the Jurisdiction, and	Tornado	Local Officials	Medium	1, 2	$10,000	Local / State / Federal	Three Years	Not started, lack of funding

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	repair and install new sirens as needed to ensure area coverage.								
Uniontown-5	Incorporate the inspection and management of trees into the city's routine maintenance process to remove trees that may pose a threat to people and the infrastructure.	Multi-Hazard	City of Uniontown Officials	Medium	1	$10,000	Local / State / Federal	Three Years	Not started, lack of funding
Uniontown-6	Seek funding to retain an engineer to design and construct a community tornado shelter.	Tornado	City of Uniontown Officials	Medium	2	$600,000	Local / State / Federal	Three Years	Not started, lack of funding
Uniontown-7	Complete recommended repairs to the main drainage channel that runs through the middle of Uniontown as recommended by Agricultural Engineering Associates. **(NFIP)**	Flood	City of Uniontown Officials	High	1, 2	$50,000	Local / State / Federal	Three Years	Not started, lack of funding
Uniontown-8	Complete upgrades for the Uniontown wastewater lagoon facility as recommended by Agricultural Engineering Associates.	Flood	City of Uniontown Officials	High	1, 2	$100,000	Local / State / Federal	Three Years	Not started, lack of funding
Uniontown-9	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In progress
Fort Scott Community College-1	Research and pursue funding for the installation of alternative forms of public warning and mass notification systems during inclement weather.	Multi-hazard	Fort Scott Community College Official	Medium	4	$50,000	Local / State / Federal	Four Years	Not started, lack of funding
Fort Scott Community College-2	Develop and fund mitigation projects for the construction of tornado safe rooms on the campus.	Tornado	Fort Scott Community College Official/ FEMA	Low	2	$500,000 (per facility)	Local / State / Federal	Five Years	Not started, lack of funding
Fort Scott Community College-3	Seek funding for the purchase and installation of backup power sources for Fort Scott Community College facilities.	Multi-hazard	Fort Scott Community College Official	Low	1, 2	$500,000 (per facility)	Local / State / Federal	Five Years	Not started, lack of funding
USD 234-1	Develop and fund mitigation projects for the construction of tornado safe rooms in USD 234 schools.	Tornado	School District Superintendent / State	Low	2	$500,000 (per facility)	Local / State / Federal	Five Years	Not started, lack of funding

Table 6.5: Bourbon County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD 235-1	Develop and fund mitigation projects for the construction of tornado safe rooms in USD 235 schools.	Tornado	School District Superintendent / State	Low	2	$500,000 (per facility)	Local / State / Federal	Five Years	Not started, lack of funding
USD 235-2	Seek funding for the purchase and installation of backup power sources in USD 235 facilities.	Multi-hazard	School District Superintendent / FEMA	Low	2	$500,000 (per facility)	Local / State / Federal	Five Years	Not started, lack of funding
Bourbon County Rural Fire District (RFS)#1-1	Reduce hazardous fuel loads in prioritized wildfire risk areas.	Wildfire	Fire District Chief	Medium	1	$85 per acre	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Bourbon County RFD#1-2	Purchase back-up generators for all stations.	Tornado, Winter Storm	Fire District Chief	Medium	2	$800,000	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Southeast Kansas Community Health Center-1	Construct safe room for patient and staff in all Community Health Center buildings	Tornado	Director	High	1, 2	$1,000,000 each	HMGP, PDM, Local, State	Five years	New
Southeast Kansas Community Health Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New

6.8.3 – Chautauqua County Mitigation Actions

Table 6.6: Chautauqua County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Chautauqua County-1	Expand/Improve outdoor warning sirens	Tornado, Windstorm	Chautauqua County Emergency Manager	High	2	$50,000	State of Kansas Grants	Repeating	Not started, lack of funding
Chautauqua County-2	Public Education: Promote NOAA "All-Hazards" Weather Radios in homes & businesses	All Hazards	Chautauqua County Emergency Manager	High	3, 4	Staff Time	Local Funding	Repeating	Not started, lack of staff time
Chautauqua County-3	Enhance GIS Capabilities	All Hazards	Chautauqua County Appraiser Office and Emergency Manager	High	1	$25,000	Emergency Management Performance Grant	6-24 months	Not started, lack of funding
Chautauqua County-4	Maintain and expand Reverse 911 system	All Hazards	Chautauqua County Emergency Manager	High	4	$20,000	Grants, Local funds	Repeating	Not started, lack of funding
Chautauqua County-5	Build safe rooms for Quivira Boy Scout N Ranch	Tornado, Windstorm	Chautauqua County Emergency Manager	High	2	$600,000	PDM, HMGP, Local	5 years	Not started, lack of funding
Chautauqua County-6	Conduct homeowner education on Wildland Urban Interface (WUI)	Wildfire	Kansas Forest Service Officials and local Fire Department Managers	High	3	$500	KFS and federal grants	Repeating	Not started, lack of funding
Chautauqua County-7	Increase public and fire department training on wildland urban interface fires	Wildfire	Kansas Forest Service Officials	Low	3	$30 per student per training session	KFS, along state and federal partners	Repeating	Not started, lack of staff time
Chautauqua County-8	Reduce hazardous fuels in prioritized wildfire risk areas	Wildfire	Kansas Forest Service Officials and the local Fire	Low	1	Approximately $85/acre	KFS, federal WUI grant dollars	Repeating	Not started, lack of funding

Table 6.6: Chautauqua County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
			Department Managers						
Cedar Vale-1	Construct community storm shelter (saferoom) in accordance with FEMA design standards 361. This would be free-standing shelter for approximately 200 residents during inclement weather.	Windstorms, Tornados	City Council	Medium	2	$150,000	HMGP, PDM, Local, State	Three years	Not started, lack of funding
Cedar Vale-2	Purchase and install two storm sirens	Tornado	City Maintenance Director	High	2	$15,000	FEMA grant funding	Five years	Not started, lack of funding
City of Chautauqua-1	Construct community storm shelter (saferoom) in accordance with FEMA design standards.	Windstorms, Tornados	City Council	Medium	2	$150,000	HMGP, PDM, Local, State	Three years	Not started, lack of funding
Elgin-1	Construct community storm shelter (saferoom) in accordance with FEMA design standards.	Windstorms, Tornados	City Council	Medium	2	$150,000	HMGP, PDM, Local, State	Three years	Not started, lack of funding
Elgin-2	Purchase backup generators for all critical facilities.	Utility Failure	City Council	High	1, 2	$25,000	HMGP, PDM, Local, State	Four years	Not started, lack of funding
Niotaze-1	Construct community storm shelter (saferoom) in accordance with FEMA design standards.	Windstorms, Tornados	City Council	Medium	2	$150,000	HMGP, PDM, Local, State	Three years	Not started, lack of funding
Peru-1	Purchase backup generators for all critical facilities.	Utility Failure	City Employee	High	1, 2	$25,000	HMGP, PDM, Local, State	Four years	Not started, lack of funding
Peru-2	Install a storm siren on the south side of town	Tornado	City of Peru and Fire Department Managers	High	2	$100,000	Grant funding	Five years	Not started, lack of funding
Peru-3	Construct a community storm shelter	Tornado	City of Peru and Fire Department Managers	High	2	$3,000,000	Grant funding	Five years	Not started, lack of funding
Sedan-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local	Repeating	In progress
Sedan-2	Purchase portable generator, train employees how to use & hook-up	Utility Failure	City of Sedan Officials	High	1, 2	$50,000	City funds, HMGP, CDBG	6 months	Not started, lack of funding

Table 6.6: Chautauqua County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Sedan-3	Construct new or retrofit saferoom (storm shelter) in accordance with FEMA design standards 361. These would be shelter for residences and employees during inclement weather.	Tornado, Windstorm	City Officials	Medium	2	$700,000	HMGP. PDM, CDBG. Local, State	One year	Not started, lack of funding
Sedan-4	Identify flash-flood prone areas to consider flood reduction measures to the city's floodplain manager/ planning officer. (NFIP)	Flood	City Officials	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
USD 285-1	Create a community storm shelter within the elementary and/or high school that would be adequate to house all children and faculty at the school.	Tornado, Windstorm	USD 285 Office of Superintendent	Medium	1, 2	$800,000	HMGP. PDM, CDBG. Local, State	Five years	Not started, lack of funding
USD 286-1	Create a community storm shelter within the elementary and/or high school that would be adequate to house all children and faculty at the school in addition to providing additional sheltering space for the public, especially during sporting events.	Tornado, Windstorm	USD 286 Office of Superintendent	Medium	1, 2	$800,000	HMGP. PDM, CDBG. Local, State	Five years	Not started, lack of funding
Caney Valley-1	Construct tie lines to enable redundant electric service	Utility Infrastructure Failure, Concurrent Hazards	Caney Valley Electric Cooperative Director	Medium	2	Single-phase - $30,000 per mile Three-phase - $50,000 per mile	RUS Loan Funds, Gen. Budget Funds	Five years	Not started, lack of funding
Caney Valley-2	Support a program to replace overhead primary electric lines to underground	Winter storm, tornado, utility/infrastructure failure, windstorm	Caney Valley Electric Cooperative Director	Low	2	$75,000 to $100,000 per mile	FEMA, RUS loan funds, General budget funds	Five years	Not started, lack of funding
Caney Valley-3	Provide electrical safety training for emergency personnel (fire fighters, EMTs and county personnel) at no cost, with a high-voltage safety trailer that Caney Valley Electric jointly owns.	Education	Caney Valley Electric Cooperative Director	Low	3	$500.00 per visit setup / Free to county	General Funds	Three years	In progress

Table 6.6: Chautauqua County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Caney Valley-4	Support continual efforts in the county with right-of-way clearing of brush and pole & conductor replacement.	Storms, Lightning, Tornado	Caney Valley Electric Cooperative Director	Medium	1	Average $20,000 per year over 4 years	RUS loan funds, General funds	Three years	In progress
Caney Valley-5	Evaluate cost and effective solutions for lighting protection of critical rural facilities	Lightning, Utility/ Infrastructure Failure	Caney Valley Electric Cooperative Director	Low	4	$75.00 per hour / Free to county	General Funds	Three years	In progress
Caney Valley-6	Enhance existing G.I.S. system to improve mitigation efforts and response time during emergency events.	Utility/ Infrastructure Failure	Caney Valley Electric Cooperative Director	High	4	$200,000	RUS loan funds General budget funds	Five years	In progress
Caney Valley-7	Continue educational efforts through bill inserts and the web site on how to manage members' usage and offer safety advice during natural hazard events, outages and storms.	Utility/ Infrastructure Failure	Caney Valley Electric Cooperative Director	Low	4	Free to members and Public	General Funds	Two years	In progress
Chautauqua County Rural Fire Districts (all Districts)-1	Reduce hazardous fuel loads in prioritized wildfire risk areas.	Wildfire	Fire District Chiefs	Medium	1	$85 per acre	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Chautauqua County Rural Fire Districts (all Districts)-2	Purchase back-up generators for all stations.	Tornado, Winter Storm	Fire District Chiefs	Medium	2	$100,000	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Chautauqua County Rural Water Districts (all Districts)-1	Acquire and install emergency generators for priority use structures.	Utility Failure	RWD Director	High	1,2	$30,000 per facility	HMGP, PDM, Local	Five years	New
Chautauqua County Rural Water Districts (all Districts)-2	Replace water lines due to expansive soil.	Expansive soil	RWD Director	High	1,2	$1,000,000	HMGP, PDM, Local	Five years	New
Chautauqua County Rural	Replace water lines that are deteriorating or too small	Utility Failure	RWD Director	High	1	$1,000,000	HMGP, PDM, Local	Five years	New

Table 6.6: Chautauqua County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Water Districts (all Districts)-3									

6.8.4 – Cherokee County Mitigation Actions

Table 6.7: Cherokee County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Cherokee County-1	Construct additional acceptable community storm shelters	Tornado and Windstorm	Emergency Manager	High	1, 2	$800,000	Local, State, HMGP, PDM	Two years	Not started, lack of funding
Cherokee County-2	Acquire outdoor tornado warning for county	Tornado	Emergency Manager	High	2	$250,000	Local, State, HMGP, PDM	One year	Not started, lack of funding
Cherokee County-3	Acquire audio/visual emergency communications notification systems for interior and exterior of school grounds	All Hazards	School District Administrators	Medium	1, 4	$300,000	Local, State, HMGP, PDM	Two years	Not started, lack of funding
Cherokee County-4	Implement program for promoting the purchase of NOAA weather radios	All Hazards	Emergency Manager	Medium	3, 4	$250,000	Local, State, HMGP, PDM	One year	Not started, lack of funding
Cherokee County-5	Acquire and conduct structural remediation of flood prone properties **(NFIP)**	Flood	Flood Plain Administrator	Medium	1, 2	$750,000	Local, State, HMGP, PDM, FMA	Five years	Not started, lack of funding
Cherokee County-6	Community Storm Shelters and Hazard Supply Staging Areas	Multi-Hazard	Hazard Mitigation Committee, Emergency Managers	Medium	2, 3	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	Three years	Not started, lack of funding
Cherokee County-7	Institute a NOAA Weather Radio Program	Multi-Hazard	Hazard Mitigation Committee, Emergency Managers and School Administrators	Medium	3, 4	No cost to county, cities, or schools. Residents will cover the 25% match.	Local, State, HMGP, PDM	Three years	Not started, lack of staff time
Cherokee County-8	Emergency Operations Center/911 Call Center/Community Shelter	Multi-Hazard	Hazard Mitigation Committee, Emergency Managers	Medium	2, 3, 4	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	Five years	Not started, lack of funding
Cherokee County-9	Drainage and Storm Water Management Program	Multi-Hazard	Hazard Mitigation Committee,	Medium	1	$3,000,000	Local, State, HMGP, PDM	Five years	Not started, lack of funding

Table 6.7: Cherokee County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
			Emergency Managers						
Cherokee County-10	Continued operation and management of jurisdictional **NFIP** activities.	Flood	Hazard Mitigation Committee, Emergency Managers	Medium	1	Staff Time	City and County Budget	Repeating	In progress
Cherokee County-11	Institute a debris removal program	Multi-Hazard	Hazard Mitigation Committee, Emergency Managers	Medium	1, 2	Staff Time and Equipment Usage	Local, State, HMGP, PDM	Three years	
Cherokee County-12	Conduct a floodplain property acquisition program **(NFIP)**	Flood	Hazard Mitigation Committee, Emergency Managers	Medium	1	$60,000 per property	Local, State, HMGP, PDM	Three years	Not started, lack of funding
Cherokee County-13	Purchase an EM Mobile Unit to serve as a command post during a hazard event.	Multi-Hazard	Hazard Mitigation Committee, Emergency Managers	Medium	1, 2	$50,000	Local, State, HMGP, PDM	Five years	Not started, lack of funding
Cherokee County-14	Have a hazardous material removal day for the public which will allow them to bring all their hazardous household waste to one location in the communities to dispose of the hazardous materials properly.	Hazardous Materials	Hazard Mitigation Committee, Emergency Managers	Medium	1	$20,000	Local, State, HMGP, PDM	Five years	Not started, lack of funding
Cherokee County-15	Advise residents on Individual Safe Room Program	Tornado and Windstorm	Hazard Mitigation Committee, Emergency Managers	Medium	2	Staff Time	HMGP Grant, Local, State, HMGP, PDM	Five years	
Cherokee County-16	Acquire audio and visual emergency communication and notification systems for interior and exterior of school grounds	Multi-Hazard	Emergency Manager	High	1, 4	$30,000	HMGP	Three years	New
Cherokee County-17	acquire outdoor warning and NOAA weather alert program for the county	Multi-Hazard	Emergency Manager	High	1,2,3	$20,000	HMGP	Three years	New
Cherokee County-18	Develop drainage and storm water management program	Flood	Emergency Manager	High	1,2	$20,000	HMGP	Two years	New

Table 6.7: Cherokee County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Baxter Springs-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress
Baxter Springs-2	Identify flash-flood prone areas to consider flood reduction measures to the city's floodplain manager/ planning officer. **(NFIP)**	Flood	NFIP Director	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Columbus-1	Construct community storm shelters and secure hazard supply staging areas	Multi-Hazard	City Clerk, Mayor	Medium	1, 2	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	Three years	Not started, lack of funding
Columbus-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress
Columbus-3	Identify flash-flood prone areas to consider flood reduction measures to the city's floodplain manager/ planning officer. **(NFIP)**	Flood	NFIP Director	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Galena-1	Construct a Community Storm Shelter	Tornado	City Clerk, Mayor	Medium	2	$300,000	Local, State, HMGP, PDM	Five years	Not started, lack of funding
Galena-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress
Galena-3	Identify flash-flood prone areas to consider flood reduction measures to the city's floodplain manager/ planning officer. **(NFIP)**	Flood	NFIP Director	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Roseland-1	Construct community storm shelters and secure hazard supply staging areas	Multi-Hazard	City Clerk, Mayor	Medium	1, 2	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	Three years	Not started, lack of funding
Roseland-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress
Roseland-3	Identify flash-flood prone areas to consider flood reduction measures to the city's floodplain manager/ planning officer. **(NFIP)**	Flood	NFIP Director	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Scammon-1	Construct community storm shelters	Multi-Hazard	City Clerk, Mayor	Medium	1, 2	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	One to three years	Not started, lack of funding

Table 6.7: Cherokee County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Scammon-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	1,2,3	Staff Time	Local funding HMGP	Repeating	In progress
Scammon-3	Acquire and conduct structural remediation of flood prone properties. **(NFIP)**	Flood	NFIP Director	Medium	1, 2	$1,000,000	HMGP, Local	Three years	Not started, lack of funding
Scammon-4	Re-fabrication of manholes to prevent flood waters from entering sewer system	Flood	NFIP Director	High	1, 2	$300,000	Local, HMGP	One to four years	New
Scammon-5	Acquire a warning siren for the city.	All Hazards	City Council	High	1, 2	$150,000	HMGP, PDM, State, Local	Three years	New
Scammon-6	Develop Hazardous materials removal program for the public to allow them to dispose of hazardous waste	HazMat	City Council	Medium	1,3	$50,000	HMGP, Local	One to two years	New
Scammon-7	Deployment of a of drainage and stormwater management program.	Flood	NFIP Director	High	1,2,3	$2,500,000	Local funding HMGP	Repeating	In progress
Wei2-1	Construct community storm shelters and secure hazard supply staging areas	Multi-Hazard	City Clerk, Mayor	Medium	1, 2	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	Three years	Not started, lack of funding
Weir-3	Upgrade and improve stormwater management system on Main Street **(NFIP)**	Flood	City Clerk, Mayor, Council	High	1, 2	$500,000 to $700,000	Local, State, HMGP, PDM, FMA	6 months	Not started, lack of funding
Weir-4	Create a saferoom or shelter at a school or public building	Tornado	City Clerk, Mayor	High	2	$300,000 to $400,000	Grant funding and in-kind donations	Two years	Not started, lack of funding
Weir-5	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress
Weir-6	Identify flash-flood prone areas to consider flood reduction measures to the city's floodplain manager/ planning officer. **(NFIP)**	Flood	NFIP Director	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
West Mineral-1	Construct community storm shelters and secure hazard supply staging areas	Multi-Hazard	City Clerk, Mayor	Medium	1, 2	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	Three years	Not started, lack of funding
West Mineral-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Medium	3	Staff Time	Local funding and staff time	Repeating	In progress

Table 6.7: Cherokee County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
West Mineral-3	Identify flash-flood prone areas to consider flood reduction measures to the city's floodplain manager/ planning officer. **(NFIP)**	Flood	NFIP Director	Medium	1, 2	Staff Time	Local	Three Years	Not started, lack of staff time
Coffeyville Community College -1	Evaluate existing buildings for the construction safe areas from severe weather and fund the construction of safe areas.	Tornado	VP for Operations & Finance	High	1, 2	$800,000	Grant funding, private donations, HMGP	Five years	New
Coffeyville Community College - 2	Acquire audio and visual emergency communication and notification systems for interior and exterior of College facilities.	Multi-Hazard	VP for Operations & Finance	High	1, 4	$60,000	HMGP	Five years	New
USD 247-1	Identify and clearly mark evacuation routes	Dam and Levee Failure, Flood and Winter Storm	USD 247 Superintendent	Medium	2	Staff Time	Local	Repeating	Not started, lack of staff
USD 247-2	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	USD 247 Superintendent	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
USD 404-1	Construct community Storm Shelters and Hazard Supply Staging Areas in all USD 404 buildings	Multi-Hazard	Superintendent	Medium	2	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	Three years	Not started, lack of funding
USD 493-1	Evaluate existing buildings for the construction safe areas from severe weather and fund the construction of safe areas.	Tornado	Superintendent	High	1, 2	$1,000,000	Grant funding, private donations, HMGP	Three years	New/On-going
USD 493 -2	Acquire and install emergency generators for priority use structures.	Multi-Hazard	Superintendent	Medium	1, 2	$40,000	HMGP	Three years	New
USD 493 -3	Acquire audio and visual emergency communication and notification systems for interior and exterior of facilities.	Multi-Hazard	Superintendent	High	1, 4	$30,000	HMGP	Three years	New

Table 6.7: Cherokee County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD 499-1	Construct community storm shelters at all USD 499 facilities	Multi-Hazard	Superintendent	Medium	1,2	$200,000 to $500,000 per shelter	Local, State, HMGP, PDM	Three years	Not started, lack of funding
USD 499-2	Construct secure hazard supply staging areas at all USD 499 facilities	Multi-Hazard	Superintendent	Medium	1,2	$50,000 per area	Local, State, HMGP, PDM	Three years	Not started, lack of funding
USD 508-1	Construct secure safe rooms at all USD 508 facilities	Multi-Hazard	Superintendent	Medium	1,2	$50,000 per area	Local, State, HMGP, PDM	Three years	Not started, lack of funding
USD 508-2	Acquire push notification software such as Building Safe, Lockdown, Crisis Go, or similar application to improve communication and response effectiveness in the event of crisis	Multi-Hazard	Supt/BOE	High	1,2,3,4	$500-$3500 Annual	HMGP or other state funding	One year	New
USD 508-3	Relocate main offices at High School campus to the front doors of the main entrance.	Multi-Hazard	Supt/BOE	High	1,2	Est. $150,000 plus	HMGP or other state funding	Two years	New
USD 508-4	Continue to upgrade exterior doors	Multi-Hazard	Supt/BOE	Med	1,2	Est. $50,000	Capital Outlay	Three years	New
Heartland-1	Upgrade and Enhanced Power lines	Multi-Hazard	Heartland REC Director	Medium	1	$1,160,000	Local, State, HMGP, PDM	Four years	Not started, lack of funding
Cherokee County RWDs (all Districts)-1	Acquire and install emergency generators for priority use structures.	Utility Failure	RWD Executive	High	1,2	$50,000	HMGP	Four years	New
Cherokee County RWDs (all Districts)-2	Replace water line due to expansive soil. Shifting stream banks caused by floods. Extend current line encasement	Expansive soil	RWD Executive	Medium	1,2,3	$100,000	HMGP	Six years	New
Cherokee County RWDs (all Districts)-3	Replace water lines that are deteriorating or too small	Utility Failure	RWD Executive	High	1	$100,000	HMGP	Four years	New

Table 6.7: Cherokee County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
SE Kansas Community Health Center-1	Construct safe room for patient and staff in all Community Health Center buildings	Tornado	Director	High	1, 2	$1,000,000 each	HMGP, PDM, Local, State	Five years	New
SE Kansas Community Health Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New

6.8.5 – Crawford County Mitigation Actions

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Crawford County-1	Identify and clearly mark evacuation routes	Dam and Levee Failure, Flood and Winter Storm	Crawford County Council	High	2	Staff Time	Local	Three years	Not started. lack of staff time
Crawford County-2	Construct communication "huts" at three strategically placed locations throughout Crawford County.	Multi-Hazard	Crawford County Council	High	3	$280,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-3	Develop and implement a local hazard training plan.	Multi-Hazard	Crawford County Council	High	3	Staff Time	Local	Repeating	Not started, lack of staff
Crawford County-4	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	Crawford County Council	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
Crawford County-5	Acquire or conduct structural remediation of flood-prone properties in the Kirkwood area. **(NFIP)**	Flood	Crawford County Council	High	1	$208,000	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
Crawford County-6	Study and implement drainage issued throughout the county in flood prone areas, and make recommendations for flood control measures, flood management procedures, and low-water crossing improvements. **(NFIP)**	Flood	Crawford County Council	High	1	$210,000	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
Crawford County-7	Support a program to replace existing overhead primary electric lines to underground	Tornado, Wind Storm, Winter Storm, Utility Failure	Crawford County Council	Medium	1	$175,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-8	Identify and seek additional methods of financial and technical assistance for hazard mitigation projects.	Multi-Hazard	Crawford County Council	Medium	1, 2, 3, 4	Staff Time	Local	Repeating	Not started, lack of staff
Crawford County-9	Create a storm shelter / saferoom at the Crawford County Ambulance buildings in Girard and Pittsburg.	Multi-Hazard	Crawford County Council	Medium	2	$5,000 per facility	HMGP, PDM, Local, State	Five years	Not started, lack of funding

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Crawford County-10	Create a storm shelter / saferoom at the Crawford County Mental Health Main Campus at 30th and Michigan.	Multi-Hazard	Crawford County Council	Low	2	$100,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-11	Create a storm shelter / saferoom at the Crawford County Mental Health Discovery Center at 5th and Elm.	Multi-Hazard	Crawford County Council	Low	2	$100,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-12	Acquire outdoor warning systems and other early warning devices for unincorporated areas such as Farlington, Farlington Lake, Croweburg, Ringo, Opolis, West 4th street mobile home park, and Langdon Lane rural areas.	Tornado	Emergency Manager	Low	2	$35,000 per Siren	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-13	Reverse 911 System	Multi-Hazard	Crawford County 911 Director	Medium	4	$40,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-14	Vulnerable population support	Multi-Hazard	Crawford County Emergency Management	Medium	3	$5,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-15	Purchasing salt and materials to prepare for winter storm	Winter Storm	Crawford County Road and Bridge Director	Medium	1	$15,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-16	Installing a generator and transfer switch at the court house	Multi-Hazard	Crawford County Council	Medium	1	$100,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County-17	Identify critical facilities that are vulnerable to natural and man-made hazards.	Multi-Hazard	Crawford County Council	High	1	Staff Time	Local	Repeating	Not started, lack of staff
Crawford County-18	Develop an awareness plan to educate people about the dangers of naturally-occurring diseases, such as influenza and vaccine-preventable diseases.	Major Disease	Crawford County Public Health Director	High	3	Staff Time	Local	Repeating	Not started, lack of staff
Crawford-19	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	High	1	Staff Time	Local	Repeating	In progress
Arcadia-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	High	1	Staff Time	Local	Repeating	In progress

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Arcadia-2	Support an electric power upgrade program designed to protect lines including tree trimming and pole replacement.	Tornado, Wind Storm, Winter Storm, Utility Failure	Arcadia Council	High	1	Staff Time	Local	Repeating	Not started, lack of staff
Arcadia-3	Update flood damage prevention ordinance to include new FEMA digital flood insurance rate maps. **(NFIP)**	Flood	Arcadia Council	High	1	Staff Time	Local	Repeating	Not started, lack of staff
Arcadia-4	Provide additional support to the Community Rating System to raise the rating to the next level. **(NFIP)**	Flood	Arcadia Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Arma-1	Identify and clearly mark evacuation routes	Dam and Levee Failure, Flood and Winter Storm	Arma Council	High	2	Staff Time	Local	Repeating	Not started, lack of staff
Arma-2	Develop and implement a local hazard training plan.	Multi-Hazard	Arma Council	High	3	Staff Time	Local	Repeating	Not started, lack of staff
Arma-3	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	Arma Council	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
Arma-4	Support a program to replace existing overhead primary electric lines to underground	Tornado, Wind Storm, Winter Storm, Utility Failure	Arma Council	Medium	1	$175,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Arma-5	Identify and seek additional methods of financial and technical assistance for hazard mitigation projects.	Multi-Hazard	Arma Council	Medium	1, 2, 3, 4	Staff Time	Local	Repeating	Not started, lack of staff
Arma-6	Update flood damage prevention ordinance to include new FEMA digital flood insurance rate maps. **(NFIP)**	Flood	Arma Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Arma-7	Provide additional support to the Community Rating System to raise the rating. **(NFIP)**	Flood	Arma Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Arma-8	Identify critical facilities that are vulnerable to natural and man-made hazards.	Multi-Hazard	Arma Council	High	1	Staff Time	Local	Repeating	Not started, lack of staff

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Arma-9	Install two additional tornado sires in southern part of city	Tornado	Arma City Council and Mayor	High	2	$80,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Arma-10	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	High	1	Staff Time	Local	Repeating	In progress
Cherokee-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	High	1	Staff Time	Local	Repeating	In progress
Cherokee-2	Update flood damage prevention ordinance to include new FEMA digital flood insurance rate maps. **(NFIP)**	Flood	Cherokee Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Frontenac-1	Update flood damage prevention ordinance to include new FEMA digital flood insurance rate maps. **(NFIP)**	Flood	Frontenac Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Frontenac-2	Provide additional support to the Community Rating System to raise the rating to the next level. **(NFIP)**	Flood	Frontenac Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Frontenac-3	Improve channel flow characteristics and eliminate obstructions to identified areas on Cow Creek. **(NFIP)**	Flood	Frontenac Council	High	1	$12,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Frontenac-4	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	High	1	Staff Time	Local	Repeating	In progress
Girard-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	High	1	Staff Time	Local	Repeating	In progress
Girard-2	Acquire and install a permanently mounted emergency generator for the city critical facilities.	Utility Failure	Girard Council	High	1, 2	$90,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Girard-3	Update flood damage prevention ordinance to include new FEMA digital flood insurance rate maps. **(NFIP)**	Flood	Girard Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Girard-4	Provide additional support to the Community Rating System to raise the rating to the next level. **(NFIP)**	Flood	Girard Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Grant Township-1	Support a program to replace existing overhead primary electric lines to underground	Tornado, Wind Storm, Winter Storm, Utility Failure	Grant Township Personnel	Medium	1	$175,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Hepler-1	Acquire and install a permanently mounted emergency generator for the city critical facilities.	Utility Failure	Town Council	High	1, 2	$90,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Hepler-2	Create additional acceptable community storm shelters for residents	Tornado, Windstorm	Town Council	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
McCune-1	Acquire outdoor tornado warning sirens for the Croweburg area.	Tornado	McCune Council	High	2	$40,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Mcune-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	High	1	Staff Time	Local	Repeating	In progress
McCune-3	Update flood damage prevention ordinance to include new FEMA digital flood insurance rate maps. **(NFIP)**	Flood	McCune Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Mulberry-1	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	Mulberry Council	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
Osage Township-1	Acquire outdoor tornado warning sirens for the Croweburg area.	Tornado	Osage Township Director	High	2	$40,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Pittsburg-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	High	1	Staff Time	Local	Repeating	In progress
Pittsburg-2	Update flood damage prevention ordinance to include new FEMA digital flood insurance rate maps. **(NFIP)**	Flood	Pittsburg Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Pittsburg-3	Provide additional support to the Community Rating System to raise the rating to the next level.	Flood	Pittsburg Council	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff
Pittsburg-4	Create additional acceptable community storm shelters for residents	Tornado	City of Pittsburg Council	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Sheridan Township-1	Construction of storm shelter with a back-up generator for residents of Sheridan township.	Tornado, Winter Storm	Sheridan Township Personnel	Medium	1, 2	$250,000 per shelter	HMGP, PDM, Local, State	Five years	Not started, lack of funding

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Sherman Township-1	Enhance a planned structure in Sherman Township with an upgrade to a basement that could be used as a FEMA storm shelter	Tornado	Sherman Township Personnel	Medium	2	$150,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Walnut-1	Acquire and install a permanently mounted emergency generator for the city critical facilities.	Utility Failure	Town Council	High	1, 2	$90,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Walnut-2	Create additional acceptable community storm shelters for residents	Tornado, Windstorm	Town Council	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
Fort Scott Community College-1	Develop and fund mitigation projects for the construction of tornado safe rooms on the campus.	Tornado	Fort Scott Community College Official	Low	2	$500,000 (per facility)	Local / State / Federal	Five Years	Not started, lack of funding
Fort Scott Community College-2	Seek funding for the purchase and installation of backup power sources for Fort Scott Community College facilities.	Multi-hazard	Fort Scott Community College Official	Low	1, 2	$500,000 (per facility)	Local / State / Federal	Five Years	Not started, lack of funding
PSU-1	Reduce the damage from flooding in University buildings by evaluating storm and sanitary sewers and prioritizing repairs on University grounds. **(NFIP)**	Flood	Pittsburg State University Chancellor	High	1	$2,000,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
PSU-2	Acquire and install emergency generators for buildings prioritized on building usage for University grounds.	Utility Failure	Pittsburg State University Chancellor	High	1, 2	$500,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
PSU-3	Evaluate cost effective solutions to assure protection of electrical and building systems during lightning storms.	Utility Failure, Lightning	Pittsburg State University Chancellor	High	1	$200,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
USD 246-1	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	USD 246 Superintendent	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
USD 246-2	Evaluate existing buildings for safe areas from severe weather and prioritize replacements and upgrades to existing facilities.	Tornado, Winter Storm, Flood, Extreme Temperature	USD 246 Superintendent	High	1,2	$500,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD 247-1	Identify and clearly mark evacuation routes	Dam and Levee Failure, Flood and Winter Storm	USD 247 Superintendent	Medium	2	Staff Time	Local	Repeating	Not started, lack of staff
USD 247-2	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	USD 247 Superintendent	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
USD 248-1	Conduct regular emergency preparedness drills for school children at all levels, including tornado drills, and fire evacuation drills.	Tornado, Wildfire,	USD 248 Superintendent	High	3	Staff Time	Local	Repeating	Not started, lack of staff
USD 248-2	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	USD 248 Superintendent	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
USD 249-1	Conduct regular emergency preparedness drills for school children at all levels, including tornado drills, and fire evacuation drills.	Multi-Hazard	USD 249 Superintendent	High	3	Staff Time	Local	Repeating	Not started, lack of staff
USD 249-2	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	USD 249 Superintendent	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
USD 250-1	Acquire audio and visual emergency communication and notification systems.	Multi-Hazard	USD 250 Superintendent	High	4	$250,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
USD 250-2	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	USD 250 Superintendent	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding
USD 609-1	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	USD 609 Superintendent	High	2	$250,000 per shelter	HMGP, PDM, Local, State	Repeating	Not started, lack of funding

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Crawford County Fire District #1-1	Acquire permanent emergency generator power for local fire stations.	Tornado, Winter Storm, Flood, Utility Failure, Extreme Temperature	Fire District #1 Chief	High	1, 2	$55,000	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #1-2	Provide homeowner education on wildfire mitigation in wildland-urban interface	Wildfire	Fire District #1 Chief	Medium	3	$500 per session	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #1-3	Increase public and fire department training on wildland-urban interface fires.	Wildfire	Fire District #1 Chief	Medium	3	$30 per student	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #1-4	Reduce hazardous fuel loads in prioritized wildfire risk areas.	Wildfire	Fire District #1 Chief	Medium	1	$85 per acre	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #2-1	Create additional acceptable community storm shelters for residents	Extreme Temperature, Flood, Tornado	Fire District #2 Chief	High	2	$250,000 per shelter	HMGP, PDM, KFS, Local, State	Repeating	Not started, lack of funding
Crawford County Fire District #2-2	Provide homeowner education on wildfire mitigation in wildland-urban interface	Wildfire	Fire District #2 Chief	Medium	3	$500 per session	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #2-3	Increase public and fire department training on wildland-urban interface fires.	Wildfire	Fire District #2 Chief	Medium	3	$30 per student	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #2-4	Reduce hazardous fuel loads in prioritized wildfire risk areas.	Wildfire	Fire District #2 Chief	Medium	1	$85 per acre	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #3-1	Construction of storm shelter with a back-up generator for residents of Sheridan township.	Tornado, Winter Storm	Fire District #3 Chief	Medium	2	$800,000	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #3-2	Provide homeowner education on wildfire mitigation in wildland-urban interface	Wildfire	Fire District #4 Chief	Medium	3	$500 per session	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Crawford County Fire District #3-3	Increase public and fire department training on wildland-urban interface fires.	Wildfire	Fire District #3 Chief	Medium	3	$30 per student	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #3-4	Reduce hazardous fuel loads in prioritized wildfire risk areas.	Wildfire	Fire District #3 Chief	Medium	1	$85 per acre	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #4-1	Acquire and install a permanently mounted emergency generator for the Crawford County courthouse.	Utility Failure	Fire District #4 Chief	High	2	$90,000	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #4-2	Develop a program or system for supporting vulnerable populations during emergency events.	Multi-Hazard	Fire District #4 Chief	High	3	Staff Time	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of staff
Crawford County Fire District #4-3	Provide homeowner education on wildfire mitigation in wildland-urban interface	Wildfire	Fire District #4 Chief	Medium	3	$500 per session	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #4-4	Increase public and fire department training on wildland-urban interface fires.	Wildfire	Fire District #4 Chief	Medium	3	$30 per student	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County Fire District #4-5	Reduce hazardous fuel loads in prioritized wildfire risk areas.	Wildfire	Fire District #4 Chief	Medium	1	$85 per acre	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Crawford County RWD #2-1	Improve coordination, planning, and investment in long-term water supplies to meet demands of ongoing growth and development.	Flood and Drought	RWD #2 Director	Low	1, 3	Staff Time	Local	Repeating	Not started, lack of staff
Crawford County RWD #3-1	Replace water lines in jeopardy of being damaged due to expansive soils.	Expansive Soil	RWD #3 Director	Low	1	$10,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County RWD#5-1	Acquire a series of variable speed pumps to assure the ability to supply water during natural and man-made disasters.	Flood, Winter Storm, Tornado, Lightning	RWD #5 Director	High	1, 2	$120,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Crawford County RWD#7-1	Increase size of water lines from 3" to 6" for fire department	Wildfire	RWD #7 Director	Medium	1, 2	$100,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Girard Medical Center-1	Install a safe room	Tornado	Engineering Supervisor	High	1, 2	$900,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Heartland-1	Upgrade and Enhanced Power lines	Multi-Hazard	Heartland REC Director	Medium	1	$1,160,000	Local, State, HMGP, PDM	Four years	Not started, lack of funding
Hepler Rural Fire District-1	Develop a program or system for supporting vulnerable populations during emergency events.	Multi-Hazard	Fire Chief	High	3	Staff Time	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Hepler Rural Fire District-2	Provide homeowner education on wildfire mitigation in wildland-urban interface	Wildfire	Fire Chief	Medium	3	$500 per session	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Hepler Rural Fire District-3	Increase public and fire department training on wildland-urban interface fires.	Wildfire	Fire Chief	Medium	3	$30 per student	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Salvation Army-1	Purchase storage facility disaster vehicles	All Hazards	Captain	High	1, 2	$50,000	FEMA grants	Five years	Not started, lack of funding
Salvation Army-2	Purchase generators for facilities	All Hazards	Captain	High	1, 2	$35,000	FEMA grants	Five years	Not started, lack of funding
Southeast Kansas Community Health Center-1	Construct safe room for patient and staff in all Community Health Center buildings	Tornado	Director	High	1, 2	$1,000,000 each	HMGP, PDM, Local, State	Five years	New
Southeast Kansas Community Health Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New
Via Christi Hospital-1	Construct safe room for patient and staff in all facility buildings	Tornado	Director	High	1, 2	$4,000,000	HMGP, PDM, Local, State	18 months	Not started, lack of funding

Table 6.8: Crawford County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Via Christi Hospital-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New

6.8.6 – Elk County and Participating Jurisdiction Mitigation Actions

Table 6.9: Elk County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Elk County-1	Update culverts and bridges to address flooding issues within Elk County. **(NFIP)**	Flood	Elk County Road and Bridge Director	High	1	$200,000	HMGP, County funds	1-5 years	In-Progress, 232 completed since 4/1/17.
Elk County-2	Install a generator for County courthouse	Winter Storm, Tornado, Utility/ Infrastructure Failure, Windstorm, Flood, Lightning	Elk County Maintenance Director	High	1,2	$50,000	County budget	2019	Not Started – Differing Priorities
Elk County-3	Test weather alert systems and provide public education	All Hazards	Elk County Sheriff	Medium	1,3,4	$150	City and county budgets	2019 – 2024. At city identified times and annually.	In progress - Complete for prior years, not started for future years
Elk County-4	Continued operation and management of jurisdictional **NFIP** activities.	Flood	Elk County Emergency Manager, Floodplain Administrator	Low	1,2,3,4	$500	Local	Five years	In progress, awaiting FEMA floodplain mapping for the county
Elk County-5	Promote Crop Insurance and Private Hazard Insurance via newsletter articles, news releases, electronic communications and community events.	All Hazards	Elk County Emergency Manager and Rolling Prairie Extension Director	Low	3	$500	County budget for staff time	2019 - 2024	In progress
Elk County-6	Obtain inundation maps and emergency action plans for all high and significant hazard dams in the county	Dam and Levee Failure	Elk County Emergency Manager and Board Members	Low	1, 2, 3,4	$23,500 - $50,000	County Budget for staff time, State Conservation	2022	In progress 10% complete. EAP

Table 6.9: Elk County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
			for Dam Management				District, HMGP		complete for one out of ten dams.
Elk County-7	Identify and Reduce hazardous fuels in prioritized wildfire risk areas	Wildfire	Kansas Forest Service Personnel and the Local Fire Department Managers	Low	1	$85 per acre	The Kansas Forest will assist qualifying communities with pursuing federal WUI grant dollars for hazardous fuel reduction	2021	Not Started – Differing Priorities
Elk County-8	Update or replace water and sewer infrastructure throughout county	Utility/ Infrastructure Failure	Emergency Manager and Public Works Departments as applicable	High	1, 2	$10.5M - $25M	CDBG, local funding	2020	In progress
Elk County-9	Increase participation by 10% annually in reverse 911 warning system	All Hazards	Elk County Sheriff and Emergency Manager	Medium	1,3,4	$500	County Budget	2019 - 2024	In Progress - Updated action from implementing system to increase participation. Implementing is complete.
Elk County-10	Improve flooding conditions on Pioneer approximately 1.5 miles east of Butler / Elk County line **NFIP**.	Flood	Elk County Road and Bridge Director	High	1	$80,000	HMGP, County Funds	2019	New
Elk County-11	Partner with entities providing free smoke alarms for residences that do not have them and Fire Departments for installation	Fire	Emergency Management and Rural / Local Fire Departments	High	1,3,4	$100	Red Cross / State Fire Marshal (smoke alarms)	2019 - 2020	New
Elk County-12	Identify water sources for aerial fire suppression	Wildfire	Emergency Management,	High	1	$50	County Budget	2019	New

Table 6.9: Elk County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
			Watershed Districts						
Elk County-13	Increase public awareness and CPR certifications within Elk County	All Hazards	EMS	Medium	3,4	$1,000	County Budget	2019 and on	New
Elk County-14	Construct saferoom as part of new EMS facility	Tornado Wind storm	EMS	Medium	1,2	$40,000 - $100,000	HMGP, FEMA Grants, County Budget	2020	New
Elk Falls-1	Construct tornado safe rooms in Elk Falls.	Tornado, Windstorm	City Council	High	1, 2	$100,000	HMGP, Grants, Donations	Five years	New
Elk Falls-2	Purchase a generator for Elk Falls Senior Center.	Utility Failure	City Council	High	1, 2	$20,000	HMGP, Grants, Donations	Five years	New
Grenola-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Low	1	Staff Time	Local	Repeating	In progress
Grenola-2	Continue to test weather alert sirens	All Hazards	Grenola City Council, Fire Department Personnel	Medium	1, 3, 4	None	None	Annually and upon request	In progress
Grenola-3	Provide NOAA Weather Radios to citizens	All Hazards	City of Grenola Personnel, County Emergency Manager	Medium	1, 3, 4	$45 for each weather radio @200 hours	HMGP, fund raiser	2022	Not started due to lack of funding
Grenola-4	Construct Saferooms/public shelters in Grenola	Winter Storm, Tornado, Utility/ Infrastructure Failure, Windstorm, Flood, Extreme Temperature	City of Grenola	High	2	$150,000	HMGP, other grants, private donations	2023	Not started due to lack of funding
Grenola-5	Obtain facilities, equipment, and training for disaster response	All Hazards	Grenola Fire Department Personnel	Medium	1, 2, 3	TBD	FEMA HMGP, PFHMGP,	2019 - 2024	Not Started

Table 6.9: Elk County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
							forestry grants, private donations		
Grenola-6	Replace culverts throughout city **(NFIP)**	Flood	Grenola Public Works Director	Medium	1, 2	$125,000	HMGP, PDM,FMA, Local, State,	Five years	In progress, four completed
Howard-1	Construct above ground saferooms in Howard	Tornado, Windstorm	City of Howard Council	High	2	$195,000	HMGP	Three years	Not started, lack of funding
Howard-2	Install generator at Cox Building	Multi-Hazard	City of Howard Council	High	1,2	$208,000	HMGP, fund raisers, donations	Four years	Not started, lack of funding
Howard-3	Upgrade and/or replace culverts within city limit **(NFIP)**	Flood	City of Howard Council	High	1,2	$20,000	State of Kansas Special Highway Tax Distribution	Five years	Not Started - Differing Priorities
Howard-4	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Low	1	Staff Time	Local	Repeating	In progress
Longton-1	Upgrade and/or replace culverts within Longton city limit **(NFIP)**	Flood	Longton Governing Body	High	1,2	$20,000	State of Kansas Special Highway Tax Distribution	Five years	Not Started - Differing Priorities
Longton-2	Upgrade the existing outdoor warning siren and/or install an additional siren	Tornado Windstorm	Longton Governing Body	Medium	2	$10,000-$20,000	FEMA HMGP, Elk County General Fund, City of Longton	Two years	Not Started - Lack of Funding
Longton-3	Construct a community storm shelter / saferoom	Tornado Windstorm	Longton Governing Body	High	2	$30,000-$40,000	Donations from citizens and nonprofit organizations, FEMA HMGP	Five years	Not Started - Lack of Funding
Longton-4	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Director	Low	1	Staff Time	Local	Repeating	In progress

Table 6.9: Elk County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Longton-5	Identify and seek additional methods of financial and technical assistance for hazard mitigation projects	All Hazards	Longton Governing Body	Low		Staff Time	Local,	Five years	New
Longton-6	Assess vulnerability of critical infrastructure, including sewer system, to identify and prioritize projects for risk reduction.	Utility/ Infrastructure Failure	Longton Governing Body	Low		Staff Time	Local FEMA	Five years	New
Moline-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	Local	Repeating	In progress
Moline-2	Upgrade and/or replace culverts within Moline city limits. **(NFIP)**	Flood	NFIP Administrator	Low	1, 2	$250,000	FMA grants	Five years	Not started, lack of funding
Moline-3	Construct tornado saferooms	Tornado, Windstorm	City of Moline Council	High	2	$195,000	FEMA HMGP, private donations	Three years	Not started, lack of funding
USD-282-1	Construct safe rooms at USD 282	Tornado, windstorm	West Elk Board of Education Superintendent	High	2	$300,000 to $500,000 per location	FEMA KDEM, HMGP, Local	Two years	Not started, lack of funding
USD-282-2	Secure and update outdoor access for controlled entry and for public hazard shelter	Civil Unrest, Terrorism	West Elk Board of Education Superintendent	High	2	$55,000	FEMA KDEM, HMGP, Local	One Year	Not started, lack of funding
USD 283-1	Construct safe rooms at USD 283	Tornado, windstorm	Elk Valley USD 283 District Officer	High	2	$350,000	FEMA KDEM, HMGP, Local	One year	Not started, lack of funding
Caney Valley-1	Construct tie lines to enable redundant electric service	Winter storm, tornado, utility failure, windstorm, flood, hailstorm, lightning, extreme temperatures	Caney Valley Electric Cooperative Director	Medium	2	Single-phase - $30,000 per mile Three-phase - $50,000 per mile	RUS Loan Funds, Gen. Budget Funds	Five years	Not started, lack of funding

Table 6.9: Elk County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Caney Valley-2	Support a program to replace overhead primary electric lines to underground	Winter storm, tornado, utility/ failure, windstorm, lightning	Caney Valley Electric Cooperative Director	Low	2	$75,000 to $100,000 per mile	FEMA, RUS loan funds, General budget funds	Five years	Not started, lack of funding
Caney Valley-3	Provide electrical safety training for emergency personnel (fire fighters, EMTs and county personnel) at no cost, with a high-voltage safety trailer that Caney Valley Electric jointly owns.	Education	Caney Valley Electric Cooperative Director	Low	3	$500.00 per visit setup / Free to county	General Funds	Three years	In progress
Caney Valley-4	Support continual efforts in the county with right-of-way clearing of brush and pole & conductor replacement as needed.	Storms, Lightning, Tornado	Caney Valley Electric Cooperative Director	Medium	1	Average $20,000 per year over 4 years	RUS loan funds, General funds	Three years	In progress
Caney Valley-5	Evaluate cost and effective solutions for lighting protection of critical rural facilities	Lightning, Utility/ Infrastructure Failure	Caney Valley Electric Cooperative Director	Low	4	$75.00 per hour / Free to county	General Funds	Three years	In progress
Caney Valley-6	Enhance existing G.I.S. system to improve mitigation efforts and response time during emergency events.	Utility/ Infrastructure Failure	Caney Valley Electric Cooperative Director	High	4	$200,000	RUS loan funds General budget funds	Five years	In progress
Caney Valley-7	Continue educational efforts through bill inserts and the web site on how to manage members' usage and offer safety advice during natural hazard events, outages and storms.	Utility/ Infrastructure Failure	Caney Valley Electric Cooperative Director	Low	4	Free to members and Public	General Funds	Two years	In progress
Elk County Rural Fire-1	Provide Wildfire public education at community events throughout Elk County	Wildfire	Kansas Forest Service, Elk County Rural Fire and Local Fire Departments Managers	Medium	3	Materials and presenter time per workshop are estimated to be	Kansas Forest Service and federal grants	2019 and on	In progress, annual session conducted at schools with local fire departments and at

Table 6.9: Elk County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
						approximately $500			county events
Elk County Rural Fire-2	Increase public and fire department training on wildland urban interface fires	Wildfire	Elk County Rural Fire Chief	Medium	3, 4	$30 per student per training session	KFS, state and federal partners	Three years	Not started due to differing priorities
Elk County Rural Water Districts (all Districts)-1	Replace water lines in jeopardy of being damaged due to expansive soils.	Expansive Soil	RWD Director	Low	1	$10,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Elk County Rural Water Districts (all Districts)-2	Acquire a series of variable speed pumps to assure the ability to supply water during natural and man-made disasters.	Flood, Winter Storm, Tornado, Lightning	RWD Director	High	1, 2	$120,000	HMGP, PDM, Local, State	Five years	Not started, lack of funding
Radiant Electric-1	Installation of lightning arrestors on distribution power line structures :of remaining 20 mile of single phase and 20 mile of multiple phase we have completed 30%: remaining work, 14 miles of single phase @ 4 arrestors per mile @ $275 per arrestor =$15,400 and 14 miles of multiple phase @ 12 arrestors per mile @ $275 per arrestors =$46,200.	Lightning	Radiant Electric Cooperative	Medium	1	$60,000	Rural Utilities Service, USDA; General Funds for maintenance, FEMA/KDEM Mitigation (HMGP)	Two years	In progress; 30% completed (2018)
Radiant Electric-2	Replace copper weld wire and pole line spans to current codes and standards	Winter storm, tornado, utility/ infrastructure failure, windstorm, hailstorm, lightning, extreme temperatures	Radiant Electric Cooperative Director	Medium	1	$1,000,000	Rural Utilities Service, USSDA; FEMA/KDEM Mitigation (HMGP)	Two months	Not started, lack of funding

Table 6.9: Elk County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Water District #24-1	Increase pumping capacity to ensure adequate flow velocities.	Wildfire, Utility Failure	Director	Medium	1, 2	$2,000,000	HMGP, PDM	Five years	Not started, lack of funding

6.8.7 – Greenwood County and Participating Jurisdictions Mitigation Actions

Table 6.10: Greenwood County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Greenwood County-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1,2,3,4	$500	Local	Repeating	New
Greenwood County-2	Purchase 2 Portable Generators for shelters and reception centers	Tornado, Windstorm, Winter Storm, Lightning, Utility/Infrastructure Failure	Greenwood County Emergency Management	High	1,2	150,000	HMPG, County Budget	One year	New
Greenwood County-3	Update culverts to address recurrent flooding issues on county road network (NFIP)	Flood	Greenwood County Road and Bridge	High	1	$100,000	HMPG, County Budget	Two years	New
Greenwood County-4	Purchase generator for EMS/Fire North Communications Tower	Tornado, Windstorm, Winter Storm, Lightning, Utility/Infrastructure Failure	Greenwood County Emergency Management	High	2,4	$15,000	HMPG, County Budget	One year	New
Greenwood County-5	Purchase 2 Portable Electronic Billboard Signs for public warning and information	Tornado, Windstorm, Winter Storm, Lightning, Utility/Infrastructure Failure	Greenwood County Emergency Management	Medium	3,4	$36,000	HMPG, County Budget	Two years	New
Greenwood County-6	Purchase existing facility to retrofit and outfit an Emergency Opertions Center	Tornado, Windstorm, Winter Storm, Lightning, Utility/Infrastructure Failure	Greenwood County Emergency Management	High	2,3,4	$180,000	HMPG, County Budget	Two years	New
Greenwood County-7	Aquire outdoor warning sirens for unincorporated communities of Piedmont, Neal, Virgil, and Lamont	Tornado	Greenwood County Emergency Management	High	2	$25,000 per siren	HMPG, County Budget	Three years	New

Table 6.10: Greenwood County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Greenwood County-8	Upgrade Sheriff's Office emergency communication tower at dispatch center	Tornado, Windstorm, Winter Storm, Lightning, Utility/Infrastructure Failure	Greenwood County Sheriff's Office	High	2,4	$40,000	HMPG, County Budget	Two years	New
Greenwood County-9	Address scour on county bridges by concreting approaches	Flood	Greenwood County Road and Bridge	High	1	$8,000 per approach	HMPG, County Budget	Three years	New
Greenwood County-10	Upgrade and repair GWFD North and EMS communication tower at Madison	Tornado, Windstorm, Winter Storm, Lightning, Utility/Infrastructure Failure	Greenwood County EMS	High	2,4	75,000	HMPG, County Budget	Two years	New
Greenwood County-11	Reinforce bridge footings for scour on critical bridges (NFIP)	Flood	Greenwood County Road and Bridge	High	1,2	$1,000,000	HMPG, County Budget	Three years	New
Greenwood County-12	Install riprap along channel banks that border roadways to reduce erosion and damages that occur during flooding events	Flood	Greenwood County Road and Bridge	Medium	1,2	$300,000	HMPG, County Budget	Three years	New
Climax-1	Construct community tornado safe rooms.	Tornado, Windstorm	City Council	High	1, 2	$300,000	HMGP, PDM, Local	Five years	New
Climax-2	Purchase a generator for identified critical facilities.	Utility Failure	City Council	High	1, 2	$20,000	HMGP, PMD, Local	Five years	New
Eureka-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	Local	Repeating	New
Eureka-2	Development of Base Flood Elevation (BFE) mapping in Eureka	Flood	City of Eureka	High	1,2	150,000	HMPG, City Budget	1 year	New
Eureka-3	Perform a Flood Insurance (FIS) Study	Flood	City of Eureka	High	1,2		HMPG, City Budget	1 year	New
Eureka-4	Implement buyout program for flood prone properties (NFIP)	Flood	City of Eureka	High	1	$500,000	HMPG, City Budget	1 year	New

Table 6.10: Greenwood County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Eureka-5	Replace obsolete/failing 4 outdoor warning sirens	Tornado	City of Eureka	High	2	$100,000	HMPG, City Budget	2 years	New
Eureka-6	Replace waterline from W-7 reservoir to Eureka Water Plant	Utility failure	City of Eureka	High	1	$20,000,000	HMPG, City Budget	1 year	New
Eureka-7	Removal of brush & debris restricting flow in streams through Eureka	Flood	City of Eureka	Medium	1	$50,000	HMPG, City Budget	3 year	New
Eureka-8	Stream bank stabilization on streams through Eureka	Flood	City of Eureka	High	1	$50,000	HMPG, City Budget	3 year	New
Eureka-9	Expansion of fire station to add one bay to accommodate newly purchased fire truck and rescue boat along with technical rescue resources.	All Hazards	City of Eureka	High	1,2	$350,000	HMPG, City Budget	2 year	New
Fall River-1	Construct community tornado safe rooms.	Tornado, Windstorm	City Council	High	1, 2	$300,000	HMGP, PDM, Local	Five years	New
Fall River-2	Purchase a generator for identified critical facilities.	Utility Failure	City Council	High	1, 2	$20,000	HMGP, PMD, Local	Five years	New
Hamilton-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	Local	Repeating	New
Hamilton-2	Replace culverts throughout city **(NFIP)**	Flood	City Council	Medium	1, 2	$125,000	HMGP, PDM, FMA, Local, State,	Five years	New
Hamilton-3	Replace Storm Siren	Tornado	Superintendent, Mayor	High	1,2	$15,000	FEMA grant funding	Five years	New
Hamilton-4	Install back-up generator at City Hall and fire department	All Hazards	City of Hamilton Officials	Medium	1,2,4	$40,000	Grant funding/local/state/federal	Five years	New
Hamilton-5	replace culverts to facilitate better storm water drainage	flood	City of Hamilton Officials	Medium	1,2	$20,000	local/state	Five years	New
Hamilton-6	Investigate source for secondary water supply	Multi-Hazard	Superintendent, Mayor	Medium	1,2,4	Staff time	local/state federal	Five years	New
Hamilton-7	Install generator on water pump to city located in Madison	Multi-Hazard	Superintendent, Mayor	Medium	1,2,4	$20,000	Grant funding/local/state/federal	Five years	New
Hamilton-8	Replace electric Poles that supply city buildings	Multi-Hazard	City of Hamilton Officials	Low	1,4	$20,000	local/state	Five years	New

Table 6.10: Greenwood County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Madison-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	Local	Repeating	New
Madison-2	Replace culverts throughout city **(NFIP)**	Flood	City Council	Medium	1, 2	$125,000	HMGP, PDM, FMA, Local, State,	Five years	New
Madison-3	Purchase a generator for identified critical facilities.	Utility Failure	City Council	High	1, 2	$20,000	HMGP, PMD, Local	Five years	New
Madison-4	Construct community tornado safe rooms.	Tornado, Windstorm	City Council	High	1, 2	$300,000	HMGP, PDM, Local	Five years	New
Madison-5	Purchase and install generator for water plant	Utility Failure	City Council	High	1, 2	$150,000	HMGP, PDM, Local	One years	New
Severy-1	Purchase and install backup generator for water plant	All Hazards	City of Severy	High	1,2	$150,000	HMPG, City Budget	One year	New
Severy-2	Update culverts to address recurrent flooding issues on city road network (NFIP)	Flood	City of Severy	High	1	$100,000	HMPG, City Budget	Two years	New
Severy-3	Acquire and install new outdoor warning siren	Tornado	City of Severy	High	2	$25,000	HMPG, City Budget	One year	New
USD-386-1	Construct safe rooms at USD 386	Tornado, windstorm	Superintendent	High	2	$500,000 per location	HMGP, PDM, Local	Five years	New
USD-386-2	Secure and update outdoor access for controlled entry and for public hazard shelter	Civil Unrest, Terrorism	Superintendent	High	2	$55,000	HMGP, PDM, Local	Five years	New
USD 389-1	Construct safe rooms at USD 389	Tornado, windstorm	Superintendent	High	2	$500,000 per location	HMGP, PDM, Local	Five years	New
USD 389-2	Secure and update outdoor access for controlled entry and for public hazard shelter	Civil Unrest, Terrorism	Superintendent	High	2	$55,000	HMGP, PDM, Local	Five years	New
USD 390-1	Construct safe rooms at USD 390	Tornado, windstorm	Superintendent	High	2	$500,000 per location	HMGP, PDM, Local	Five years	New
USD 390-2	Secure and update outdoor access for controlled entry and for public hazard shelter	Civil Unrest, Terrorism	Superintendent	High	2	$55,000	HMGP, PDM, Local	Five years	New

Table 6.10: Greenwood County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Butler REC-1	Replace copper weld wire spans and poles with poles to current standards	Tornado, Windstorm, Winter Storm	Electric Cooperative Director	Medium	1	$5,000,000	Rural Utilities Service, FEMA Hazard Mitigation Grant Program, KDEM	Two years	Not started, lack of funding
Lyon-Coffey REC-1	Replace copper weld wire spans and poles with poles to current standards	Tornado, Windstorm, Winter Storm	Lyon-Coffey Electric Cooperative, Inc Director	Medium	1	$11,000,000	Rural Utilities Service, FEMA HMGP, KDEM	Two years	Not started, lack of funding
Greenwood County RFD #1- 1	Increase public and fire department training on wildland urban interface fires	Wildfire	Greenwood County Fire District #1 Chief	Low	3	$40 per student per training session	Kansas Forest Service along with its state and federal partners	Two Years	New
Greenwood County RFD #1- 2	Reduce hazardous fuel loads in prioritized wildfire risk areas.	Wildfire	Greenwood County Fire District #1 Chief	Medium	1	$85 per acre	HMGP, PDM, KFS, Local, State	Five years	Not started, lack of funding
Radiant Electric-1	Installation of lightning arrestors on distribution power line structures of remaining one mile of multiple phase	Lightning	Radiant Electric Cooperative	Medium	1	$3,000	Rural Utilities Service, U.S. Department of Agriculture; General Funds for maintenance, FEMA/KDEM Mitigation (HMGP)	1-2 years	In progress; 30% completed (2018)
Radiant Electric-2	Replace copper weld wire and pole line spans to current codes and standards	Utility/ Infrastructure Failure, Concurrent Hazard	Radiant Electric Cooperative Director	Medium	1	$100,000	Rural Utilities Service, U.S. Department of Agriculture; FEMA/KDEM	2 months	Not started, lack of funding

Table 6.10: Greenwood County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
							Mitigation (HMGP)		

6.8.8 – Labette County and Participating Jurisdictions Mitigation Actions

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Labette County-1	Address scour on County bridges **(NFIP)**	Flood	Labette County Road and Bridge Department Director	Low	1, 2	$1,600 per bridge for rip rap	County budget, FEMA HMGP	Repeating	Not started, lack of funding
Labette County-3	Evaluate vault located at 901 S. Huston evaluated as a potential tornado shelter	Tornado, Windstorm	Labette County Road and Bridge Department Director	High	1, 2	$500	HMGP, PDM, Local	One year	Not started, lack of funding
Labette County-4	Evaluate County Courthouse for use as a tornado shelter	Tornado, Windstorm	Labette County Emergency Manager	High	1, 2	$500	FEMA HMGP, LEPC funds	6 months	Not started, lack of funding
Labette County-5	Trim or remove tree and brush from County Right of Way	Dam Failure, Flood, Lightning, Tornado, Wildfire, Windstorm, Winter Storm	Labette County Road and Bridge Department Director	Medium	1	$100,000	HMGP, PDM, Local	One year and Repeating	Not started, lack of funding
Labette County-6	Continued operation and management of jurisdictional **NFIP** activities.	Flood	Labette County Commission Chairman	Low	1	Staff Time	Local	Repeating	In progress
Labette County-7	Build certified safe room for community	Tornado, Windstorm	Health Department Director	High	1, 2	$500,000	HMGP, PDM, Local	18 Months	Not started, lack of funding
Labette County-8	Educate operators, owners and citizens on the signs of agri-terrorism, proper disposal of infected animals, and proper security procedures	Agri-Terrorism	Health Department Director	High	3	$100,000	HMGP, PDM, Local	2-Three years	Not started, lack of funding
Labette County-9	Long term monitoring of citizens and animals for negative effects from a radiological event	Radiological	Health Department Sanitarian	Medium	1, 2	$100,000	HMGP, PDM, Local	2-Three years	Not started, lack of funding
Labette County-10	Create stockpile of supplies to treat identified responders and family	Major Disease Outbreak	Health Department Director	Medium	1, 2	$300,000	SNS Stockpile from federal government,	2-Three years	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	member in the event of a disease outbreak						Local resources		
Labette County-11	Install riprap on channel banks above dams to control erosion	Dam/Levee Failure, Infrastructure Failure, Soil Erosion	Labette County Public Works	High	1, 2	$3,000,000 to $5,000,000	HMGP, PDM, Local	1-Five years	Not started, lack of funding
Labette County-12	Install generator at county courthouse	Utility/ Infrastructure Failure, Windstorm, Winter Storm	Labette County Courthouse maintenance supervisor	Medium	1, 2	$50,000	HMGP, PDM, Local	6 months - Three years	Not started, lack of funding
Labette County-13	Update public warning systems	All Hazards	Labette County Emergency Communications Director	Medium	1, 2	$50,000	HMGP, PDM, Local	One year	Not started, lack of funding
Labette County-14	Update, replace and add warning sirens	Tornado	Labette County Emergency Manager	High	1, 2	$450,000	HMGP, PDM, Local	1- Two years	Not started, lack of funding
Labette County-14	Wildfire public education	Wildfire	Labette County Emergency Manager	Low	3, 4	$500	Kansas Forest Service and federal grants	Repeating	Not started, lack of funding
Labette County-16	Increase public and fire department training on wildland urban interface fires	Wildfire	Labette County Emergency Manager	Low	3, 4	$30 per student per training session	KFS, WUI gran.	Repeating	Not started, lack of funding
Labette County-15	Reduce hazardous fuels in prioritized wildfire risk areas	Wildfire	Labette County Emergency Manager	Low	1	Approximately $85/acre for hazardous fuel reduction projects	KFS, WUI grant	Repeating	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Labette County-16	Begin a hazard mitigation public information campaign	All Hazards	Labette Health Emergency Preparedness Director	High	3	$5,000 to $15,000	HMGP, PDM, Local	Two years	Not started, lack of funding
Labette County-17	Construct a safe room/CORE building	Tornado, Windstorm	Labette Health Emergency Preparedness Director	High	1, 2	$40,000	HMGP, PDM, Local	6 months	Not started, lack of funding
Labette County-18	Educate and prepare vulnerable populations for disasters	High	Director, Labette County Mental Health	High	1, 3		SRS, Federal and State Grants	Repeating	Not started, lack of funding
Altamont-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	Local	Repeating	In progress
Altamont-2	Construct a community tornado shelter with generator	Tornado, Utility/ Infrastructure Failure, Windstorm, Extreme Heat, Winter Storm	City Mayor	High	1, 2	$1,500,000	HMGP, PDM, Local	Five years	Not started, lack of funding
Altamont-3	Public Information Campaign on Preparedness	All Hazards	City Clerk	High	1, 3	$208,000	HMGP, PDM, Local	4 years	Not started, lack of funding
Altamont-4	Power line clearance	Utility/ Infrastructure Failure, Windstorm, Winter Storm	City Utility Director	Medium	1	$40,000 every five years	HMGP, PDM, Local	6 months to One year	Not started, lack of funding
Altamont-5	Purchase and install storm sirens	Tornado	City Mayor	High	1, 2, 4	$95,000	HMGP, PDM, Local	3-4 years	Not started, lack of funding
Altamont-6	Replace culverts throughout city **(NFIP)**	Flood	City Mayor	Medium	1, 2	$125,000	HMGP, PDM, FMA, Local, State,	Five years	New

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Chetopa-1	Permanent flood-proofing of the well house	Flood, Dam Failure	City Mayor	High	1, 2	$230,000	HMGP	3-Five years	Not started, lack of funding
Chetopa-2	Generator installation for critical facilities and functions	Dam Failure, Extreme Heat, Flood, Lightning, Tornado, Utility /Infrastructure Failure, Windstorm, Winter Storm	City Mayor	High	1, 2	$5,000	FEMA HMGP, City budget	TBD	Not started, lack of funding
Chetopa-3	Warning Siren Upgrades/ Public Information for camping parks	Tornado, Windstorm	City Mayor/Clerk	High	1, 2, 3, 4	$200,000	City budget, state surplus, FEMA mitigation grants, other grants to be identified	Five years	Not started, lack of funding
Chetopa-4	Upgrade electrical distribution system for windstorm and winter storm mitigation	Utility/ Infrastructure Failure Wind Storm, Winter Storm	City Mayor	Medium	1	$100,000	City budget, FEMA HMGP	One year	Not started, lack of funding
Chetopa-5	Construct or modify existing community shelter	Tornado, Windstorm	City Mayor	High	1, 2	$250,000	City budget, FEMA HMGP, state surplus, other grants as identified	Five years	Not started, lack of funding
Chetopa-6	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	City budget	Repeating	In progress
Chetopa-7	Increase river water storage capacity and water intake	Extreme Temperatures Drought,	City Mayor	High	1, 2	$500,000	HMGP, PDM, City funds	Five years	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
		Utility/ Infrastructure Failure							
Chetopa-8	Replace culverts throughout city **(NFIP)**	Flood	City Mayor	Medium	1, 2	$125,000	HMGP, PDM, FMA, Local, State,	Five years	New
Edna-1	Purchase back-up power system	Utility/ Infrastructure Failure	City Mayor	High	1, 2	$20,000	HMGP, PDM, City funds	Five years	Not started, lack of funding
Edna-2	Construct storm shelter	Tornado	City Mayor	High	1, 2	$800,000	HMGP, PDM, City funds	Five years	Not started, lack of funding
Edna-3	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	City budget	Repeating	In progress
Edna-4	Replace culverts throughout city **(NFIP)**	Flood	City Mayor	Medium	1, 2	$125,000	HMGP, PDM, FMA, Local, State,	Five years	New
Labette City-1	Construct storm shelter	Tornado	City Mayor	High	1, 2	$800,000	HMGP, PDM, City funds	Five years	Not started, lack of funding
Labette City-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	City budget	Repeating	In progress
Labette City-3	Replace culverts throughout city **(NFIP)**	Flood	City Mayor	Medium	1, 2	$125,000	HMGP, PDM, FMA, Local, State,	Five years	New
Mound Valley-1	Construct a Community Safe Room	Tornado, Wind Storm	City Mayor	High	1, 2	$800,000	HMGP, PDM, City funds	Five years	Not started, lack of funding
Mound Valley-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	City budget	Repeating	In progress
Mound Valley-3	Replace culverts throughout city **(NFIP)**	Flood	City Mayor	Medium	1, 2	$125,000	HMGP, PDM, FMA, Local, State,	Five years	New
Oswego-1	Flood proof Oswego Water Treatment Facility Intake **(NFIP)**	Dam Failure, Flood	City Mayor	High	1, 2	$80,000	HMGP, KDC, Watershed Restoration	Five years	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
							and Protection Strategy, KDHE, Rural Development		
Oswego-2	Protect Oswego water supply through various methods.	Drought, Dam Failure, Flood, Utility/ Infrastructure Failure	City Mayor	High	1, 2	$500,000	FEMA, KDHE, USACE, WRAPS, Rural Development, KDC	Five years	Not started, lack of funding
Oswego-3	Construct a secondary water supply line for Oswego	Drought, Wildfire	City Mayor	High	1, 2	$800,000	KDHE, Rural Development, KDC	Five years	Not started, lack of funding
Oswego-4	Install generators in critical/special needs facilities	Multi-Hazard	City Public Works Director	High	1, 2	$10,000	HMGP, KDC, Rural Development	Five years	Not started, lack of funding
Oswego-5	Provide hazard information to the public	All Hazards	City Clerk	High	1, 2, 3, 4	$3,000	City budget	One year	Not started, lack of funding
Oswego-6	Conduct a utility line clearance program	Utility /Infrastructure Failure, Windstorm, Winter Storm	City Public Works Director	Medium	1	$40,000	Private energy providers	One year	Not started, lack of funding
Oswego-7	Evaluate existing shelter locations in schools and public buildings and complete construction at each identified facility.	Tornado, Windstorm	City Clerk	High	1, 2	$800,000	HMGP, PDM, City funds	Five years	Not started, lack of funding
Oswego-8	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	City budget	Repeating	In progress
Oswego-9	Construct emergency shelters within the community	Tornado, Windstorm	City Mayor	High	1, 2	$800,000	HMGP, PDM, City funds	Five years	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Parsons-1	Floodproof Parsons wastewater treatment facility **(NFIP)**	Flood	Parsons City Manager	High	1, 2	$3,000,000	FEMA HMGP	5-10 years	Not started, lack of funding
Parsons-2	Floodproof Parsons water treatment facility **(NFIP)**	Flood	Parsons City Manager	High	1, 2	$3,000,000	FEMA HMGP	5-10 years	Not started, lack of funding
Parsons-3	Construct community tornado shelters	Tornado, Windstorm	Parsons City Manager	High	1, 2	$750,000	FEMA HMGP	2-8 years	Not started, lack of funding
Parsons-4	Install/expand/upgrade outdoor warning sirens in Parsons	Tornado, Windstorm	Parsons City Manager	High	1, 2, 4	$128,000	FEMA HMGP	2-6 years	Not started, lack of funding
Parsons-5	Upgrade levee system on Labette Creek	Dam/Levee Failure, Flood	Parsons City Manager	Low	1, 2	$2,000,000	FEMA	2-4 years	Not started, lack of funding
Parsons-6	Buyout flood prone properties to include repetitive loss properties **(NFIP)**	Flood	Parsons City Manager	Low	1	$2,000,000	FEMA HMGP	1-Three years	Not started, lack of funding
Parsons-7	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	Staff Time	City budget	Repeating	In progress
Parsons-8	Review all proposed project alternatives included in the 2000 Flood Mitigation Plan to determine if they are still viable, follow up, as appropriate. **(NFIP)**	Flood	Parsons City Manager	Low	1, 2	$3,796,000	FEMA FMA or HMGP	10 years	Not started, lack of funding
Parsons-11	Install and upgrade flood pumps **(NFIP)**	Flood	Utilities Director	High	1, 2	$3,000,000	FEMA FMA or HMGP	One year	Not started, lack of funding
Parsons-12	Purchase of back-up generator for critical city facilities	Multi-Hazard	Parsons City Manager	High	1, 2	$50,000 per location	FEMA FMA or HMGP	One year	Not started, lack of funding
Parsons-13	Educate citizens on critical infrastructure	Multi-Hazard	City PIO	Medium	3	<$100	Local	One year	Not started, lack of funding
Parsons-14	Create buffer zones around waterways to prevent chemical migration	Multi-Hazard	Utilities Director	High	1, 2	$2,000,000	NRCS and USDA	Several years	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Labette County Community College-1	Put FEMA approved shelters in place in different areas throughout campus.	Tornado	LCC's Facilities Director	High	1, 2	$800,000	HMGP, PDM, City funds	Five years	Not started, lack of funding
USD 493 -1	Construct safe rooms in new and existing buildings in USD 493	Tornado	USD 493 Superintendent	High	1, 2	$800,000	HMGP, PDM, Local	Five years	Not started, lack of funding
USD 493 -2	Purchase of back-up generator for school facilities	Utility Failure	USD 493 Superintendent	High	1, 2	$10,000 each	HMGP, PDM, Locals	Five years	Not started, lack of funding
USD503-1	Construct saferoom at Parsons Middle School	Tornado, Windstorm	USD 503 Superintendent	High	1, 2	$216,000	FEMA HMGP	Five years	Not started, lack of funding
USD503-2	Install generators at High School and Middle School	Dam Failure, Extreme Heat, Flood, Lightning, Tornado, Utility/ Infrastructure Failure, Windstorm, Winter Storm	USD 503 Superintendent	High	1, 2	$60,000	FEMA HMGP	Five years	Not started, lack of funding
USD504-1	Construct saferoom at Oswego High School	Tornado, Windstorm	USD 504 Superintendent	High (20)	1, 2	$650,000	Capital Outlay Fund, Qualified Zone Academy Bonds, FEMA HMGP	Two years	Not started, lack of funding
USD504-2	Construct saferoom at Neosho Heights, Oswego High and Service Valley Charter Academy	Tornado, Windstorm	USD 504 Superintendent	High	1, 2	$800,000	FEMA HMGP	Five years	Not started, lack of funding
USD505-3	New antenna for weather signal for Chetopa School	All Hazards	USD 505 Maintenance Supervisor	High	1, 4	$800-$2,500	School District, FEMA HMGP,	Five years	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
							National Weather Service, other grants		
USD505-4	Conduct hazard mitigation public information campaign	All Hazards	USD 505 Superintendent	High	3	$500	School District / Chetopa City	6 months	Not started, lack of funding
USD505-5	Install generators at USD 505 facilities	Multi-Hazard	USD 505 Superintendent	High	1, 2	Used: $27,000 to $45,000	School District, FEMA HMGP	Five years	Not started, lack of funding
USD505-4	Construct saferooms in new and existing buildings in USD 505	Tornado, Windstorm	USD 505 Superintendent	High	1, 2	$700,000	FEMA HMGP	Five years	Not started, lack of funding
USD505-5	Lock and ventilate server rooms and install smoke and flood detectors	Utility/ Infrastructure Failure	USD 505 Technology Department Supervisor	High	1, 2	$5,000	District funds	6 months - One year	Not started, lack of funding
USD506-1	Construct saferooms in new and existing buildings in USD 506	Tornado, Windstorm	USD 506 Superintendent	High	12	$1,250,000 each	FEMA HMGP	Five years	Not started, lack of funding
USD506-2	Install generators in school buildings	Dam Failure, Extreme Heat, Flood, Lightning, Tornado, Utility/ Infrastructure Failure, Windstorm, Winter Storm	USD 506 Superintendent	High	12	$150,000	FEMA HMGP	Two years	Not started, lack of funding
USD506-3	Install storm siren for elementary school	Tornado, Windstorm	USD 506 Maintenance Supervisor	High	1, 2, 4	$25,000	FEMA HMGP	6 months - One year	Not started, lack of funding
Great Plains Industrial Park-1	Conduct wildfire training	Wildfire	Redevelopment Authority Grounds Manager	Low	1, 3	$150,000	Fire Departments, KSAAP-LRA,	18 months	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
							KS Forest Service, other state agencies, FEMA		
Great Plains Industrial Park-2	Reduce hazardous fuels and explosives in prioritized wildfire risk areas	Wildfire	Redevelopment Authority Grounds Manager	Low	1	$50,000	Various partners, Kansas Forest Service, FEMA	Two years	Not started, lack of funding
Great Plains Industrial Park-3	Saferoom Construction on-site	Tornado, Windstorm	Redevelopment Authority Executive Director	High	1, 2	$175,000	Contributions from tenants, FEMA HMGP	Five years	Not started, lack of funding
Labette County Medical Center-1	Construct safe room for patient and staff in all facility buildings	Tornado	Director	High	1, 2	$4,000,000	HMGP, PDM, Local, State	18 months	Not started, lack of funding
Labette County Medical Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New
Labette County RWD #7 -1	Public Education on Water Plan	Drought	RWD#7	High	3	Staff Time	Local	One year	Not started, lack of staff
PWWSD#4-1	Install generators at north and south pump station	Dam Failure, Extreme Heat, Flood, Lightning, Tornado, Utility/ Infrastructure Failure, Windstorm, Winter Storm	Board Chairperson	High	1, 2	$40,000 each	FEMA, HMGP, district reserves	Five years	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
PWWSD#4-2	Relocate Raw Water Pump House	Dam Failure, Flood	Board Chairperson	High	1, 2	$200,000	FEMA, HMGP, district reserves	Five years	Not started, lack of funding
Radiant Electric-1	Installation of lightning arrestors on distribution power line structures of remaining one mile of multiple phase	Lightning	Radiant Electric Cooperative	Medium	1	$3,000	Rural Utilities Service, U.S. Department of Agriculture; General Funds for maintenance, FEMA/KDEM Mitigation (HMGP)	Two years	In progress; 30% completed (2018)
Radiant Electric-2	Replace copper weld wire and pole line spans to current codes and standards	Utility/ Infrastructure Failure, Concurrent Hazard	Radiant Electric Cooperative Director	Medium	1	$100,000	Rural Utilities Service, U.S. Department of Agriculture; FEMA/KDEM Mitigation (HMGP)	Two months	Not started, lack of funding
Southeast Kansas Community Health Center-1	Construct safe room for patient and staff in all Community Health Center buildings	Tornado	Director	High	1, 2	$1,000,000 each	HMGP, PDM, Local, State	Five years	New
Southeast Kansas Community Health Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New
Twin Valley-1	Replace copper weld wire and pole line spans to current codes and standards	Utility/ Infrastructure Failure, Concurrent Hazard	Twin Valley Electric Cooperative, Inc.	Medium	1	$17,500,000	Rural Utilities Service, FEMA HMGP	Three years	Not started, lack of funding

Table 6.11: Labette County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Twin Valley-2	Installation of a Tie-Line to connect two metering points together for back feeding to correct major outages	Utility/ Infrastructure Failure, Concurrent Hazard	Twin Valley Electric Cooperative Manager	Medium	1, 2	$60,000.00 per mile	Rural Utilities Service, FEMA/ SEMA Mitigation	6 months	Not started, lack of funding
Twin Valley-3	Installation of lightning arrestors on distribution power line structures	Utility/ Infrastructure Failure, Concurrent Hazard	Twin Valley Electric Cooperative Manager	Medium	1, 2	$24,000	Rural Utilities Service, FEMA HMGP	One year or more	Not started, lack of funding
Twin Valley-4	Repair and rebuild of electric utility infrastructure to maintain reliable electric service for Twin Valley membership	Utility/ Infrastructure Failure, Concurrent Hazard	C.O.O	High	1, 2	$1,000,000	Rural Utilities Service, FEMA HMGP	Repeating	Not started, lack of funding

6.8.9 – Montgomery County and Participating Jurisdictions Mitigation Actions

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Montgomery County-1	Add telemetry to the existing NOAA Verdigris River Station at Coffeyville and Independence **(NFIP)**	Flood	Montgomery County Emergency Manager, Independence, and Coffeyville Floodplain Management Department Directors	High	4	$40,000	HMGP	18 months	Not started, lack of funding
Montgomery County-2	Promote NOAA All Hazard Radios	All Hazards	Montgomery County Emergency Manager	Medium	3	Staff Time	Local	Repeating	Not started, lack of staff time
Montgomery County-3	Promote Flood Insurance (NFIP)	Flood	Montgomery County Emergency Manager	Medium	1	Staff Time	Local	Repeating	Not started, lack of staff time
Montgomery County-4	Improve Fragmented Communications System in County	All Hazards	Montgomery County Emergency Manager	High	3, 4	$1,000,000	HMGP	18 months	Not started, lack of funding
Montgomery County-5	Implement reverse call back system for severe weather warnings	All Hazards	Montgomery County Emergency Manager	High	3, 4	$30,000 per year	NOAA, local budget	18 months	Not started, lack of funding
Montgomery County-6	Distribute "Family Guide for Emergency Prepared Neighborhoods"	All Hazards	Montgomery County Emergency Manager	Medium	3	Staff Time	Local	Three months	Not started, lack of staff time
Montgomery County-8	Install back-up generators in critical/special needs facilities	Flood, Tornado, Winter Storm, Windstorm,	Montgomery County Emergency Manager	High	1, 2	$10,000 each	HMGP	18 months	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
		Utility/ Infrastructure Failure, Extreme Heat							
Montgomery County-9	Prepare Debris Removal Plan for FEMA Approval	Winter Storm, Windstorm	Montgomery County Emergency Management	Medium	1, 2	Staff Time	Staff Time and Resources	18 months	Not started, lack of staff time
Montgomery County-10	Work with park owners to develop emergency procedures for mobile home tenants	All Hazards	Montgomery County Emergency Manager	Medium	3	Staff Time	Staff Time and Resources	Repeating	Not started, lack of staff time
Montgomery County-11	Identify and publish locations of existing shelter locations	Tornado, Flood, Extreme Heat	Montgomery County Emergency Manager	Medium	3, 4	Staff Time	Staff Time and Resources	Repeating	Not started, lack of staff time
Montgomery County-12	Continued operation and management of jurisdictional **NFIP** activities.	Flood	Montgomery County Emergency Manager	Low	1	Staff Time	Staff Time and Resources	Repeating	In progress
Montgomery County-13	Mitigate landslide hazard on Table Mound Road	Landslide	Montgomery County Public Works Department Director	Medium	1, 2	$1,000,000	HMGP	Two years	Not started, lack of funding
Montgomery County-14	Reinforce bridge footings for scour critical bridges **(NFIP)**	Flood	Montgomery County Public Works Department Director	Medium	1, 2	$2,000,000	HMGP/Local Funding	Two years	Not started, lack of funding
Montgomery County-15	Work with K-State Research and Extension to monitor crop disease and continue research for damage prevention	Agricultural Infestation	K-State Research and Extension – Montgomery County and Montgomery County	Medium	1	Staff Time	Staff Time and Resources	Repeating	Not started, lack of staff time

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
			Emergency Manager						
Montgomery County-16	Promote Availability of Crop Insurance	Agricultural Infestation, Drought, flood, Hail	K-State Research and Extension – Montgomery County and Montgomery County Emergency Manager	Medium	1, 3	Staff Time	Staff Time and Resources	Staff Time	In progress
Montgomery County-17	Inform public through current and new technology over all media outlets	All Hazards	Montgomery County GIS Department Director	Medium	3	Staff Time	Staff Time and Resources	Staff Time	In progress
Montgomery County-19	Develop GIS layers of pipeline locations	Utility/ Infrastructure Failure, Expansive Soils	Montgomery County GIS Department Director	Medium	1, 3	$208,000	Local funding	4 years	Not started, lack of funding
Caney-1	Identify and publish location of existing shelter locations	Tornado, Flood, Extreme Heat	City of Caney, City Administrator	Medium	1, 3	$5,000	HMGP	6 months	Not started, lack of funding
Caney-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	City of Caney, City Administrator	Low	1	Staff Time	Staff Time and Resources	Staff Time	In progress
Caney-3	Upgrade Outdoor Warning Sirens	Tornado	City of Caney, City Administrator	High	1, 2	$200,000	HMGP	6 months	Not started, lack of funding
Caney-4	Purchase and demolish flood prone properties in flood zones **(NFIP)**	Flood	NFIP Administrator	Low	1	$500,000	FEMA-HMGP, HMA, KDEM, KDOC, City	5 years	Not started, lack of funding
Cherryvale-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	City of Cherryvale, City Administrator	Low	1	Staff Time	Staff Time and Resources	Staff Time	In progress

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Cherryvale-2	Enhance Stormwater Drainage System	Flood	City of Cherryvale, City Administrator	Medium	1, 2	$175,000-$250,000	City of Cherryvale Capital Improvement Fund, HMGP	6 months	Not started, lack of funding
Cheryvale-3	Purchase and demolish flood prone properties **(NFIP)**	Flood	NFIP Administrator	Low	1	$500,000	FEMA-HMGP, HMA, KDEM, KDOC, City	5 years	Not started, lack of funding
Coffeyville-1	Implement physical and electronic perimeter monitoring of critical facilities and utilities	Utility/ Infrastructure Failure	City of Coffeyville Utility Department Director, other entities	Medium	2	$750,000	HMGP	18 months	Not started, lack of funding
Coffeyville-2	Expand/Improve Emergency Communications	All Hazards	Coffeyville Police Department Chief	High	3	$175,000	HMGP and other Grants, 911 monies	1-Two years	Not started, lack of funding
Coffeyville-3	Implement reverse call back system for severe weather warnings	All Hazards	Montgomery County Emergency Manager	High	3	$60,000 to implement and $5,000 to $10,000 a year to maintain	Grants, Private Sectors Companies that might benefit from the system	1-Three years	Not started, lack of funding
Coffeyville-4	Elevate or flood proof wastewater lift stations in Coffeyville **(NFIP)**	Flood	City of Coffeyville Wastewater Utility Director	High	1, 2	$400,000	HMGP	24 months	Not started, lack of funding
Coffeyville-5	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	$10,000 per year	City of Coffeyville	Repeating	In progress
Coffeyville-6	Implement flood proofing measures such as elevation of electrical components at the Coffeyville Water Treatment Plant Intake Structure **(NFIP)**	Flood	City of Coffeyville Water Utility	High	1, 2	$100,000	HMGP	18 months	Not started, lack of funding
Coffeyville-7	Install back-up pumps and mobile piping system at the Coffeyville Water Treatment Plant **(NFIP)**	Flood	City of Coffeyville Water Utility Director	High	1, 2	$125,000	HMGP	18 months	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Coffeyville-8	Increase the height of the Coffeyville levee	Dam/Levee Failure, Flood	City of Coffeyville Engineering Department Director	Medium	1, 2	$5,000,000	Hazard Mitigation Grant Program, US Army Corps of Engineers	24 months	Not started, lack of funding
Coffeyville-9	Flood prone property buyout in Coffeyville **(NFIP)**	Flood	City of Coffeyville Engineering Department Director	Low	1	$4,000,000	FEMA-HMGP, HMA, KDEM, KDOC, City	18 months	Not started, lack of funding
Coffeyville-10	Upgrade Outdoor Warning Sirens	Tornado	Coffeyville Fire Department Chief	High	2, 3	$175,000	HMGP and other Grants, Private Donations, 911 money, Chemical Companies, Railroad and other companies with vested interest in public warning system	One year	Not started, lack of funding
Coffeyville-11	Relocate electric transmission and distribution lines out of the floodplain **(NFIP)**	Flood	Electric Department Director	Medium	1	$500,000	HMGP	Two years	Not started, lack of funding
Coffeyville-12	Purchase/Install SCADA software to help reduce peak demand outages	Extreme Heat Utility/ Infrastructure Failure	Electric Department Director	Low	1	$60,000	HMGP	One year	Not started, lack of funding
Coffeyville-13	Add electric substation transformer switching devices for flexibility in controlling peak load and extreme heat outages	Extreme Heat Utility/ Infrastructure Failure	Electric Department Director	Low	1, 2	$350,000	HMGP	1-Two years	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Coffeyville-14	Bury utility, phone, cable wires for new construction	Winter Storm, Windstorm Utility/ Infrastructure Failure	Electric Department Director	Low	1	$200,000	HMGP	One year	Not started, lack of funding
Coffeyville-15	Geographically separate electric supply lines and substations	All Hazards	Electric Department Director	Low	1	$1,000,000	HMGP	Two years	Not started, lack of funding
Coffeyville-16	Elevate electric transformers above the flood elevation	Flood Utility/ Infrastructure Failure	Electric Department Director	Medium	1, 2	$250,000	HMGP	Two years	Not started, lack of funding
Coffeyville-17	Install self-supporting concrete electric poles	Winter Storm, Windstorm Utility/ Infrastructure Failure	Electric Department Director	Low	1, 2	$300,000	HMGP	Two years	Not started, lack of funding
Coffeyville-18	Add disconnect switches on primary lines to allow for isolation areas	All Hazards Utility/ Infrastructure Failure	Electric Department Director	Medium	1	$450,000	HMGP	Two years	Not started, lack of funding
Dearing-1	Implement physical and electronic perimeter monitoring of critical facilities and utilities-water pumping station, wastewater lift station, and city lagoons	Utility/ Infrastructure Failure	City of Dearing Council	Medium	2	$200,000	HMGP	Two years	Not started, lack of funding
Dearing-2	Install back-up generator for city hall	Winter Storm, Windstorm, Flood, Lightning, Utility/ Infrastructure Failure	City of Dearing Council	High	1, 2	$30,000	HMGP	Two years	Not started, lack of funding
Dearing-3	Install back-up generator for waste water lift station	Multi-Hazard	City of Dearing Council	High	1, 2	$50,000	HMGP	One year	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Dearing-4	Install back-up generator for water system pumping station	Multi-Hazard	City of Dearing Council	High	1, 2	$50,000	HMGP	One year	Not started, lack of funding
Dearing-5	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1	$10,000 per year	City of Coffeyville	Repeating	In progress
Dearing-6	Culvert Enlargement for Storm Drainage **(NFIP)**	Flood	City of Dearing Council	Medium	1		HMGP ; potential soft match from Engineer	Three years	Not started, lack of funding
Dearing-7	Stream Erosion and Sediment Control Project **(NFIP)**	Flood	City of Dearing Council	Medium	1	$300,000	HMGP ; potential soft match from Engineer	Two years	Not started, lack of funding
Dearing-8	Construct a tornado shelter, cooling center, city hall	Tornado, Extreme Heat	City of Dearing Council	High	1, 2	$200,000	HMGP potential soft match from Architect	Four years	Not started, lack of funding
Elk City-1	Improve dike protecting Elk City Water Plant **(NFIP)**	Flood	Elk City Council, Corps of Engineers	High	1, 2	TBD	HMGP, HMA	Three years	Not started, lack of funding
Elk City-2	Mitigate Elk City water pumps against flood damage **(NFIP)**	Flood	Elk City Council	High	1, 2	$9,000	HMGP	One year	Not started, lack of funding
Elk City-3	Construct community tornado shelter	Tornado	Elk City Council	High	1,2,3,4	$200,000 - $300,000	HMGP, HMA	Three years	Not started, lack of funding
Elk City-4	Install Tornado Sirens	Tornado	Elk City Council	High	1,2,3,4	Minimal	None	Four months	Not started, lack of funding
Elk City-5	Purchase automatic pump and generator for water plant **(NFIP)**	Flood	Elk City Council	High	1, 2	$20,000	HMGP	One year	Not started, lack of funding
Elk City-6	Elk City Dike drainage improvement and maintenance **(NFIP)**	Flood	Elk City Council	Medium	1, 2	$200,000 - $300,000	HMGP, HMA	One year	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Elk City-7	Continued operation and management of jurisdictional **NFIP** activities.	Flood	Elk City Council	Low	1	Staff Time	Staff Time	Repeating	In progress
Havana-1	Purchase and install outdoor warning sirens	Tornado	City of Havana Council	High	1, 2	$40,000	HMGP	Two years	Not started, lack of funding
Havana-2	Install back-up generator for shelter	Winter Storm, Windstorm, Flood, Lightning, Utility/ Infrastructure Failure	City of Havana Council	High	1, 2	$5,000	HMGP	Following shelter construction	Not started, lack of funding
Havana-3	Construct storm shelter	Tornado	City of Havana Council	High	1, 2	TBD	HMGP	Two years	Not started, lack of funding
Independence-1	Replace and increase storm warning public address system	Tornado	Independence Police Department Chief	High	1, 2,4	$150,000	Grants or capital out levy	Five years	Not started, lack of funding
Independence-2	Construct flood gate and pumps at the end of the levee adjoining pine street	Dam/Levee Failure, Flood	City of Independence – Street Department Director	Medium	1, 2		HMGP, PDM, FMA	Five years	Not started, lack of funding
Independence-3	Install emergency generator at Water Treatment Plant **(NFIP)**	Flood	City of Independence – Water and Sewer Department Director	High	1, 2	$750,000	HMGP, FMA	Five years	Not started, lack of funding
Independence-4	Develop project to mitigate flood damage of Independence high service pump station at the Water Treatment Plant--elevate high service pump building and clear wells **(NFIP)**	Flood	City of Independence – Water and Sewer Department Director	High	1, 2	$5,000,000	HMGP, HMA	Three years	Not started, lack of funding
Independence-5	Relocate the main electrical panel at Water Treatment Plant outside the floodplain **(NFIP)**	Flood	City of Independence – Director of Utilities	High	1, 2	$500,000	HMGP	Three years	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Independence-6	Purchase and install standby pumps at lift stations for discharge of wastewater in the event lift stations are inoperable **(NFIP)**	Flood	City of Independence – Water and Sewer Department Director	High	1, 2	$250,000	HMGP	Three years	Not started, lack of funding
Independence-7	Replace pumps with submersible pumps, elevate electrical control panels and elevate emergency generators at Wald Ave. and Southwest Pump Stations (sanitary sewer) **(NFIP)**	Flood	City of Independence – Water and Sewer Department Director	High	1, 2	$10,000,000	HMGP	Four years	Not started, lack of funding
Independence-8	Construct flood levee to protect buildings, equipment and treatment facilities at the wastewater treatment plant **(NFIP)**	Flood	City of Independence – Water and Sewer Department Director	High	1, 2	$2,000,000	HMGP, Army Corp of Engineers	Five years	Not started, lack of funding
Independence-9	Continued operation and management of jurisdictional **NFIP** activities.	Flood	City of Independence Council	Low	1	Staff Time	Local	Repeating	In progress
Independence-10	Purchase flood prone property in the 100-year floodplain **(NFIP)**	Flood	City of Independence Council	Medium	1	$3,292,020	FEMA-HMGP	Repeating	Not started, lack of funding
Liberty-1	Provide flood protection to Liberty Wastewater Treatment Plant **(NFIP)**	Flood	City of Liberty Council	High	1	$320,000	HMGP	Two years	Not started, lack of funding
Coffeyville Community College-1	Construct saferoom on college campus	Tornado	Planning and Operations Manager	High	1, 2	$450,000	Grant funding and private donations, HMGP, HMA	Five years	Not started, lack of funding
Coffeyville Community College - 2	Acquire and install emergency generators for priority use structures.	Multi-Hazard	VP for Operations & Finance	Medium	1, 2	$50,000	HMGP	Five years	New
Coffeyville Community College - 3	Acquire audio and visual emergency communication and notification systems for interior and exterior of College facilities.	Multi-Hazard	VP for Operations & Finance	High	1, 4	$60,000	HMGP	Five years	New

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Coffeyville Community College - 4	Develop continuity of service plan	Multi-Hazard	VP for Operations & Finance	High	2, 3, 4	$20,000	HMGP	Five years	New
Independence Community College-1	Provide training services and resource materials for train-the-trainer training sessions to assist with implementation of area mitigation action projects	All Hazards	Office of Instruction Manager, Independence Community College	Medium	3	$30 to $65 dollars per hour for development and $25 to $70 dollars per hour for instruction.	FEMA	Repeating	Not started, lack of funding
Montgomery County Private Non-profit Schools-1	Construct safe rooms in private schools	Tornado	Individual private school councils or boards	High	1, 2	Varies based on project location	HMGP	5 years	Not started, lack of funding
Montgomery County Private Non-profit Schools-2	Evaluate safe rooms in private schools	Tornado	Individual private school councils or boards	High	1, 2	Varies based on project location	HMGP	5 years	Not started, lack of funding
USD 436-1	Evaluate existing tornado shelter locations in all USD 436 schools	Tornado	USD 436 Superintendent	High	1, 2	$6,000	USD 436 – Contingency Reserve Fund; USD 436 – Supplemental General Fund	6 months	Not started, lack of funding
USD 436-2	Construct safe rooms in new and existing schools in USD 436	Tornado	USD 436 Superintendent	High	1, 2	$2,000,000 to $5,000,000	Contingency Reserve Fund, Supplemental General Fund, Capital Outlay Fund, Federal Grants, State Grants	6 years	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD 445-1	Evaluate existing school shelter locations in all schools in USD 445	Tornado	USD 445 Superintendent	High	1, 2		HMGP	Three years	Not started, lack of funding
USD 445-2	Construct safe rooms in new and existing schools in USD 455	Tornado	USD 445 Superintendent	High	1, 2		HMGP	Three years	Not started, lack of funding
USD 446-1	Evaluate existing tornado shelter locations in all USD 446 schools	Tornado	USD 446 Superintendent	High	1, 2	$10,000 to $20,000	HMGP	One year	Not started, lack of funding
USD 446-2	Construct safe rooms in new and existing schools in USD 446	Tornado	USD 446 Superintendent	High	1, 2	$400,000	HMGP	Three years	Not started, lack of funding
USD 447-1	Evaluate existing tornado shelter locations in all USD 447 schools	Tornado	USD 447 Superintendent	High	1, 2	$2,500 to $7,500 per facility	Local district funds, private donations, state/federal dollars	18 months	Not started, lack of funding
USD 447-2	Construct safe rooms in new and existing schools in USD 447	Tornado	USD 447 Superintendent	High	1, 2	$55,000 - $75,000 per facility	Local district funds, private donations, state/federal dollars	Five years	Not started, lack of funding
American Red Cross-1	Promote private insurance	All Hazards	American Red Cross Disaster Services Director	Medium	3	None	None	One year	Not started, lack of funding
Coffeyville Regional Medical Center-1	Construct Safe room at Coffeyville Regional Medical Center	Tornado	Coffeyville Regional Medical Administration Director	High	1, 2	$1,600,000	HMGP, Coffeyville Regional Medical Center	Two years	Not started, lack of funding
Labette County Medical Center-1	Construct safe room for patient and staff in all facility buildings	Tornado	Director	High	1, 2	$4,000,000	HMGP, PDM, Local, State	18 months	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Labette County Medical Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New
Montgomery County RFD #1-1	Reduce hazardous fuels in prioritized wildfire risk areas	Wildfire	Kansas Forest Service, Local Fire Department Chiefs and Rural Fire District Chiefs	Low	1	$85/ac	KFS, WUI grant funds	Repeating	Not started, lack of funding
Montgomery County RFD #1-2	Increase public and fire department training on wildland urban interface fires	Wildfire	Kansas Forest Service	Low	3	$30 per student per training session	KFS, state and federal partners	Repeating	Not started, lack of funding
Montgomery County RFD #1-3	Provide homeowner education on wildfire mitigation in wildland-urban interface	Wildfire	Kansas Forest Service and local Fire Department Chiefs	Low	3	$500	Kansas Forest Service and federal grants	Repeating	Not started, lack of funding
Montgomery County RFD #1-4	Reduce hazardous fuels in prioritized wildfire risk areas	Wildfire	Kansas Forest Service, Local Fire Department Chiefs and Rural Fire District Chiefs	Low	1	$85/ac	The Kansas Forest Service, WUI grant funds	Repeating	Not started, lack of funding
Montgomery County RWDs (all Districts)-1	Install back-up generators for pumps	Utility/ Infrastructure Failure	Rural Water District Director	High	1, 2	$25,000 for each pump	RUS, HMGP, PDM, Local	Nine months	Not started, lack of funding
Montgomery County RWDs (all Districts)-2	Map Pipelines	Utility/ Infrastructure Failure	Rural Water District Director	Medium	1, 2, 3	$10,000	RUS, HMGP, PDM, Local	Repeating	Not started, lack of funding
Montgomery County RWDs (all Districts)-3	Perimeter monitoring	Utility/ Infrastructure Failure	Rural Water District Director	Medium	1, 2	$10,000 to $25,000 per site	RUS, HMGP, PDM, Local	Repeating	Not started, lack of funding

Table 6.12: Montgomery County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Montgomery County RWD #8 and #13-1	Connect water supply systems of RWD #8 and RWD #13 **(NFIP)**	Flood	Rural Water District Director	High	1	$50,000	FEMA and Kansas Rural Water Association.	Three years	Not started, lack of funding
PWWSD #4-1	Install back-up generator at pump house	Utility/ Infrastructure Failure	Public Wholesale Water Supply District #4 Director	High	1, 2	$25,000	Reserves or HMGP	Five years	Not started, lack of funding
Radiant Electric Cooperative-1	Installation of lightning arrestors on distribution power line structures of remaining 10 mile of single phase and 25 mile of multiple phase	Lightning	Radiant Electric Cooperative	Medium	1	$170,000	RUS, USDA; FEMA, KDEM, HMGP	Two years	In progress; 30% completed (2018)
Radiant Electric Cooperative-2	Replace copper weld wire and pole line spans to current codes and standards	Utility Failure, Lightning	Radiant Electric Cooperative Director	Medium	1	$2,500,000	RUS, USDA; FEMA, KDEM Mitigation	Two months	Not started, lack of funding
Radiant Electric Cooperative-3	Relocation/elevation of power line and related infrastructure facilities out of floodplain **(NFIP)**	Flood	Radiant Electric Cooperative Director	Medium	1, 2	$500,000	RUS, USDA; FEMA	Two years	Not started, lack of funding
Southeast Kansas Community Health Center-1	Construct safe room for patient and staff in all Community Health Center buildings	Tornado	Director	High	1, 2	$1,000,000 each	HMGP, PDM, Local, State	Five years	New
Southeast Kansas Community Health Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New

6.8.10 – Neosho County and Participating Jurisdictions Mitigation Actions

Table 6.13: Neosho County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Neosho County-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	Neosho County Emergency Manager	Low	1, 2	Staff Time	Neosho County General Revenue	Repeating	In progress
Neosho County-2	Promote Neosho County Hazard Mitigation Plan to the public	All Hazards	Neosho County Emergency Manager	High	3	Staff Time	None	Repeating	In progress
Neosho County-3	Ensure the Neosho County Hazard Mitigation Plan is reviewed and kept current	All Hazards	Neosho County Emergency Manager	Low	1, 4	Staff Time	None	Repeating	In progress
Neosho County-4	Obtain Dam Inundation Maps and Emergency Action Plans for the high and significant hazard dams in the County	Dam/Levee Failure	Neosho County Emergency Manager	Low	1, 3	Staff Time	County budget for staff time	One year	Not started, lack of staff time
Neosho County-5	Update critical infrastructure	Multi-Hazard	Rural Water District Directors	Medium	1, 2	$5,000,000	HMGP, PDM, Local, State	Four years	Not started, lack of funding
Neosho County-6	Promote Crop Insurance and Private Hazard Insurance	All Hazards	Neosho County Emergency Manager	High	3, 4	Staff Time	County budget for staff time	One year	Not started, lack of staff time
Neosho County-7	Conduct wildfire public education	Wildfire	Kansas Forest Service and local Fire Department Chiefs	Low	3, 4	$500	Kansas Forest Service and federal grants	Repeating	Not started, lack of staff time
Neosho County-8	Increase public and fire department training on wildland urban interface fires	Wildfire	Kansas Forest Service Personnel	Low	3, 4	$30 per student	KFS, state and federal partners	Repeating	Not started, lack of funding
Neosho County-9	Reduce hazardous fuels in prioritized wildfire risk areas	Wildfire	Kansas Forest Service and the local Fire Department Chiefs	Low	1	$85 per acre	The Kansas Forest Service, WUI grant dollars	Repeating	Not started, lack of funding
Chanute-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In progress

Table 6.13: Neosho County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Chanute-2	Purchase and demolish flood prone properties in flood zones **(NFIP)**	Flood	NFIP Administrator	Low	1	$500,000	PDM, HMGP, FMA	Five years	Not started, lack of funding
Erie-1	Purchase and demolish flood prone properties in flood zones **(NFIP)**	Flood	NFIP Administrator	Low	1	$667,772	PDM, HMGP, FMA, CDBG Urgent Need Program	Five years	Not started, lack of funding
Erie-2	Public Information on location of tornado shelters and cooling centers	Tornado, Extreme Heat	City of Erie, City Clerk	High	1, 4	Staff Time	Local	Repeating	Not started, lack of staff time
Erie-3	Install Additional Severe Weather Warning Sirens	Tornado, Wind Storm	Erie Police Department Chief	Medium	1, 2, 4	$25,000	Homeland Security Rural Development Grant	Four years	Not started, lack of funding
Erie-4	Bury secondary power lines in new development	Tornado, Windstorm, Utility/ Infrastructure Failure, Winter Storm, Lightning	City Superintendent	Medium	1	$800,000	PDM, HMGP, Local, State	Repeating	Not started, lack of funding
Erie-5	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In progress
Galesburg-1	Install one centrally located tornado siren in town	Tornado	Galesburg City Council	Medium	1, 2	$25,000 to $50,000		1-Three years	Not started, lack of funding
Galesburg-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In progress
Galesburg-3	Purchase and demolish flood prone properties in flood zones **(NFIP)**	Flood	NFIP Administrator	Low	1	$500,000	PDM, HMGP, FMA	5 years	Not started, lack of funding
St. Paul-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In process
St. Paul-2	Purchase and demolish flood prone properties in flood zones **(NFIP)**	Flood	NFIP Administrator	Low	1	$500,000	PDM, HMGP, FMA	Five years	Not started, lack of funding

Table 6.13: Neosho County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
St. Paul-3	Notify residents of locations of city tornado shelters and cooling centers	Tornado, Extreme Heat	City of St. Paul City Council	High	3, 4	Staff Time	Local	Repeating	Not started, lack of staff
Stark-1	Construct storm shelters and safe rooms	Tornados and Windstorms	Mayor	High	1, 2	$600,000	Federal grants	Four years	Not started, lack of funding
Thayer-1	Provide public Information on location of tornado shelters and cooling center	Tornado, Windstorm	City of Thayer Council	High	1, 3	$3,000	Local, State, Grant	One year	Not started, lack of funding
Thayer-2	Promote NOAA Weather Radios	All Hazards	City of Thayer Council	Medium	1, 3, 4	$3,500	HMGP	One year	Not started, lack of funding
Thayer-5	Conduct a utility line clearance program	Tornado, Windstorm, Winter Storm, Utility/ Infrastructure Failure	City of Thayer Council	Medium	1, 2	$100,000	PDM, HMGP, Local	Repeating	Not started, lack of funding
Thayer-6	Install generator at the Thayer Community Building	Tornado, Windstorm, Winter Storm, Utility/ Infrastructure Failure, Lightning	City of Thayer Council	Medium	1, 2	$20,000	HMGP	One year	Not started, lack of funding
Thayer-7	Install Generators at Thayer lift station and water treatment plant	Tornado, Windstorm, Winter Storm, Utility/ Infrastructure Failure, Lightning	City of Thayer Council	Medium	1, 2	$18,200	HMGP	One year	Not started, lack of funding
Thayer-8	Wildfire fuel reduction around the Rail Road right of way leading into and through Thayer, KS	Wildfire	City of Thayer Council	Low	1, 2	$100,000	KFS, WUI grant dollars for hazardous fuel reduction projects	One year	Not started, lack of funding

Table 6.13: Neosho County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Thayer-9	Conduct local road flood prevention **(NFIP)**	Flood	City of Thayer Council	Low	1, 2	$50,000	HMGP	One year	Not started, lack of funding
Thayer-10	Continue the process to join the **NFIP**	Flood	City of Thayer Council	Low	1, 2	Staff Time	Local	One year	In process
Neosho County Community College-1	Install generators at Neosho County Community College	Multi-Hazard	Neosho County Community College, VP of Planning & Operations	Medium	1, 4	$30,000-$40,000	HMGP	Two years	Not started, lack of funding
Neosho County Community College-3	Seek funding and construct a storm shelter for all college buildings.	Tornado, Windstorm	Neosho County Community College, VP of Planning & Operations	High	1, 2	$1,000,000 per facility	HMGP, PDM, Local ,State	Five years	New
USD 101-1	Evaluate existing school tornado shelter locations	Tornado	USD 101 Superintendent	High	1, 2	$2,500 to $7,500 per facility identified	Local district funds, private donations, state/federal grants	18 months and Repeating	Not started, lack of funding
USD 101-2	Construct saferooms in all USD 101 schools	Tornado	USD 101 Superintendent	High	1, 2	$750,000	Bond funds and HMGP grant	Three years	Not started, lack of funding
USD 413-1	Construct a storm shelter in all USD 413 buildings	Tornado	District Office Manager	High	1, 2	$300,000	Bond funds and HMGP grant	Three years	Not started, lack of funding
USD 447-1	Evaluate existing school tornado shelter locations	Tornado	USD 447 Board of Education and Superintendent of Schools	High	1, 2	$2,500 to $7,500 per facility identified	Local district funds, private donations, state/federal grants	18 months and Repeating	Not started, lack of funding
USD 447-2	Construct saferooms in all 447 buildings	Tornado	USD 447 Board of Education and Superintendent of Schools	High	1, 2	$500,000 each	Local district funds, private donations, HMGP	Five years	Not started, lack of funding

Table 6.13: Neosho County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD 505-1	Evaluate existing school tornado shelter locations	Tornado	USD 505 Superintendent	High	1, 2	Staff Time	USD 505	Two years	Not started, lack of staff
USD 505-2	Construct saferooms in all USD 505 buildings	Tornado	USD 505 Superintendent	High	1, 2	$190,553	HMGP	Three years	Not started, lack of funding
USD 505-3	Install Generators at USD 505 facilities	Lightning, Tornado, Utility/ Infrastructure Failure, Windstorm, Winter Storm	USD 505 Superintendent	Medium	1, 2	Used: $27,000 to $45,000 each New: $52,000 to $88,000 each	USD 505	Five years	Not started, lack of funding
Caney Valley Electric-1	Installation of Lightning Arrestors on distribution power line structures	Lightning, Utility/ Infrastructure Failure	Electric Cooperative Director	Medium	1, 2	$62,000	RUS, USDA; General Funds for maintenance, HMGP	Two years	New
Caney Valley Electric-2	Replace copper weld wire and pole line spans to current codes and standards	Tornado, Utility/ Infrastructure Failure, Wind Storm, Winter Storm	Electric Cooperative Director	Medium	1, 2	$3,000,000	RUS, USDA; General Funds; FEMA/KDEM Mitigation (HMGP)	One year	New
Heartland Rural Electric Cooperative-1	Upgrade power lines utilizing twisted pair conductors	Tornado, Utility/ Infrastructure Failure, Wind Storm, Winter Storm	Heartland REC Director	Medium	1, 2	$2,598,000	HMGP	Four years	Not started, lack of funding
Labette County Medical Center-1	Construct safe room for patient and staff in all facility buildings	Tornado	Director	High	1, 2	$4,000,000	HMGP, PDM, Local, State	18 months	Not started, lack of funding

Table 6.13: Neosho County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Labette County Medical Center-2	Purchase backup generators for all Health Center buildings	Utility Failure	Director	High	1, 2	$30,000 per generator	HMGP, PDM, Local, State	Five years	New
Neosho County PWWSD #23-1	Move plant out of floodplain	Flood	Plant Manager	High	1, 2	$20,000,000	RWA, USDA, PDM	Six years	Not started, lack of funding
Neosho County RWDs (all Districts)-1	Install back-up generators for pumps	Utility/ Infrastructure Failure	Rural Water District Director	High	1, 2	$25,000 for each pump	RUS, HMGP, PDM, Local	9 months	Not started, lack of funding
Neosho County RWDs (all Districts)-2	Map all pipelines within jurisdiction	Utility/ Infrastructure Failure	Rural Water District Director	Medium	1, 2, 3	$10,000	RUS, HMGP, PDM, Local	Repeating	Not started, lack of funding
Neosho County RWDs (all Districts)-3	Conduct perimeter monitoring	Utility/ Infrastructure Failure	Rural Water District Director	Medium	1, 2	$10,000 to $25,000 per site	RUS, HMGP, PDM, Local	Repeating	Not started, lack of funding
Radiant Electric-1	Installation of lightning arrestors on distribution power line structures of remaining 20 mile of single phase and 20 mile of multiple phase we have completed 30%: remaining work, 14 miles of single phase @ 4 arrestors per mile @ $275 per arrestor =$15,400 and 14 miles of multiple phase @ 12 arrestors per mile @ $275 per arrestors =$46,200.	Utility/ Infrastructure Failure, Lightning	Radiant Electric Cooperative	Medium	1	$60,000	Rural Utilities Service, U.S. Department of Agriculture; General Funds for maintenance, FEMA/KDEM Mitigation (HMGP)	Two years	In progress; 30% completed (2018)
Radiant Electric-2	Replace copper weld wire and pole line spans to current codes and standards	Utility/ Infrastructure Failure, Lightning	Radiant Electric Cooperative Director	Medium	1	$1,000,000	RUS, UUSDA; FEMA/KDEM Mitigation (HMGP)	Two months	Not started, lack of funding

Table 6.13: Neosho County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Twin Valley Electric Cooperative-1	Installation of Lightning Arrestors on distribution power line structures	Lightning, Utility/ Infrastructure Failure	Twin Valley Electric Cooperative Director	Medium	1, 2	$62,000	RUS, USDA; General Funds for maintenance, HMGP	Two years	Not started, lack of funding
Twin Valley Electric Cooperative-2	Replace copper weld wire and pole line spans to current codes and standards	Tornado, Utility/ Infrastructure Failure, Wind Storm, Winter Storm	Twin Valley Electric Cooperative Director	Medium	1, 2	$3,000,000	RUS, USDA; General Funds; FEMA/KDEM Mitigation (HMGP)	One year	Not started, lack of funding
Twin Valley Electric Cooperative-3	Installation of a Tie-Line to connect two meeting points together for back-feeding to correct major outages	Tornado, Utility Infrastructure Failure, Wind Storm, Winter Storm	Twin Valley Electric Cooperative Director	Medium	1, 2	$540,000	RUS, USDA; General Funds; HMGP	Six months	Not started, lack of funding

6.8.11 – Wilson County and Participating Jurisdictions Mitigation Actions

Table 6.14: Wilson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Wilson County-1	Obtain backup power generator for Wilson County Courthouse	Multi-Hazard	Wilson County Coordinator	Medium	2	$150,000-$175,000	FEMA Hazard Mitigation Grant Program, Judicial Capital Outlay	Three years	Not started, lack of funding
Wilson County-2	Review and enforce the County's floodplain ordinance **(NFIP)**	Flood	Wilson County Floodplain Manager	Medium	1	$3,000	Local taxes and fees	Repeating	In progress
Wilson County-3	Coordinate annual reviews of the Wilson County Multi-Hazard Mitigation Plan to monitor, evaluate, and update the plan	Multi-Hazard	Wilson County Emergency Management - Emergency Manager	High	1, 4	Staff Time	None	Repeating	In progress
Wilson County-4	Increase outreach on National Flood Insurance Program **(NFIP)**	Flood	Wilson County Floodplain Manager	High	3	$500	Local	Three years	Not started, lack of funding and staff
Wilson County-5	Improve public outreach activities related to risk, preparedness, and mitigation	Multi-Hazard	Wilson County Emergency Management - Emergency Manager	High	3	$500	Local	Repeating	In progress
Wilson County-6	Coordinate with FEMA in completing and adopting new flood maps **(NFIP)**	Flood	Wilson County Floodplain Manager	Low	1, 3	$5,000	Wilson County	Two years	Not started, lack of funding
Wilson County-7	Improve GIS mapping and information available on the Internet	Multi-Hazard	Wilson County GIS/ Data Processing Department - Specialist	Low	3	$5,000 for initial set up of Interne, $60,000 for new aerial photography	Local funds, Wireless 911 Grant Program	Funding dependent	Not started, lack of funding

Table 6.14: Wilson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Wilson County-8	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In process
Altoona-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In process
Altoona-2	Purchase and demolish flood prone properties in flood zones **(NFIP)**	Flood	NFIP Administrator	Low	1	$500,000	PDM, HMGP, FMA	Five years	Not started, lack of funding
Benedict-1	Upgrade warning siren for entire town	Multi-Hazard	City of Benedict Mayor	Medium	1	$20,000	FEMA	Three years	Not started, lack of funding
Buffalo-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In process
Buffalo-2	Construct community shelter meeting safe room standards	Multi-Hazard	City of Buffalo Mayor	Low	1, 2	$1,000,000	FEMA Hazard Mitigation Grant Program or Pre-Disaster Mitigation Grant Program	Five years	Not started, lack of funding
Buffalo-3	Enhance and continue housing rehabilitation program	Multi-Hazard	City of Buffalo Mayor	High	1, 2	$220,000	HMGP, PDM, Local	Two years	Not started, lack of funding
Buffalo-4	Evaluate and conduct culvert cleanouts **(NFIP)**	Flood	City of Buffalo Mayor	High	1	$250,000	HMGP, FMA, PDM	Two years	Not started, lack of funding
Fredonia-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In process
Fredonia-2	Mitigate potential flood damage to Fredonia wastewater treatment plant by constructing levee or dike. **(NFIP)**	Flood	Fredonia - Utilities Director	Medium	1, 2	$500,000	State revolving fund grants and/or loans, County revenues from countywide sales tax, HMGP	One year	Not started, lack of funding

Table 6.14: Wilson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Fredonia-3	Determine backup facilities for City Hall, Police Station, Fire Department, and City Shop	Tornado	Fredonia City Administrator	High	1, 2	Staff Time	Local	Five years	Not started, lack of staff
Fredonia-4	Construction of levee/dike around sewer plant **(NFIP)**	Flood	Fredonia Utilities Director	Medium	1, 2	$500,000	HMGP, FMA, PDM	One year	Not started, lack of funding
Fredonia-5	Install electric lines underground and replace pole-mounted transformers with ground transformers	Windstorm and Winter Storm	Fredonia Utilities Director	High	1	$4,000,000	HMGP, PDM, Local	Multiple years	Not started, lack of funding
Neodesha-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In process
Neodesha-2	Relocate raw water intake for City of Neodesha to prevent further damage due to flooding and erosion	Flood	Neodesha Utilities Director	High	1, 2	$2,050,000	City revenue bonds	One year	Not started, lack of funding
Neodesha-3	Develop new water storage for Neodesha	Multi-Hazard	Neodesha City Administrator	Medium	1, 2	$3,000,000	FEMA HMGP and PDM Program, Community Development Block Grants, and City revenue bonds	Two years	Not started, lack of funding
New Albany-1	Install an outdoor warning siren	Tornado	City of New Albany Council	High	1, 2	$4,500	City funds or available grant funding	Five years	Not started, lack of funding
New Albany-2	Construct a community shelter for 50 residents	Tornado	City of New Albany Council	Medium	1, 2	$25,000	Grant funding	Five years	Not started, lack of funding
USD 387-1	Retrofit existing best available area for tornado refuge to meet FEMA tornado safe room standards (all buildings)	Tornado	Altoona-Midway USD 387 Superintendent	High	1	$600,000	FEMA HMGP	Three years	Not started, lack of funding
USD 461-1	Complete tornado refuge site assessment and prioritize and implement safe room projects, to include construction of safe rooms for all school buildings	Tornado	USD 461 Neodesha Superintendent	High	1	$500,000	District funding, FEMA HMGP, bond issues	Three years	Not started, lack of funding

Table 6.14: Wilson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD 484-1	Complete tornado refuge site assessment and prioritize and implement safe room projects, to include construction of safe rooms for all school buildings	Tornado	Fredonia USD 484 Superintendent	High	1	$500,000	District funding, FEMA HMGP, bond issues	Three years	Not started, lack of funding
PWWSD #23-1	Relocate Fredonia water treatment plant out of the floodplain (NFIP)	Flood	City of Fredonia Utility Department	Medium	1, 2	$50,000,000	HMGP, FMA, PDM	Two years	In progress, 25% complete
Radiant Electric-1	Installation of lightning arrestors on distribution power line structures of remaining 200 mile of single phase and 70 miles of multiple phase	Lightning	Radiant Electric Cooperative	Medium	1	$320,000	Rural Utilities Service, USDA; General Funds for maintenance, FEMA/KDEM Mitigation (HMGP)	Two years	In progress; 30% completed (2018)
Radiant Electric-2	Replace copper weld wire and pole line spans to current codes and standards	Winter storm, tornado, utility failure, windstorm, flood, hailstorm, lightning, extreme temperatures	Radiant Electric Cooperative Director	Medium	1	$2,500,000	Rural Utilities Service, U.S. Department of Agriculture; FEMA/KDEM Mitigation (HMGP)	Two years	Not started, lack of funding
Wilson County RFD-1	Reduce hazardous fuels in prioritized wildfire risk areas	Wildfire	Fire Department Chief and Emergency Manager	Low	1	$85/acre	State of Kansas, WUI grants	Repeating	Not started, lack of funding
Wilson County RWDs (all Districts)-1	Purchase and install generators at critical facilities	Utility Failure	Director	Medium	1, 2	$30,000	Water district general funds	Three years	Not started, lack of funding
Wilson County RWDs (all Districts)-1	Upgrade and/or replace infrastructure	Utility Failure	Director	Medium	1, 2	$30,000	Water district general funds	Three years	Not started, lack of funding

Table 6.14: Wilson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Wilson RWD #11-1	Bore out waterline under pond spillway	Flood	Wilson RWD #11- Operator	Low	1	$20,000		Three years	Not started, lack of funding

6.8.12 – Woodson County and Participating Jurisdictions Mitigation Actions

Table 6.15: Woodson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Woodson County-1	Conduct drainage improvement study **(NFIP)**	Flood	Woodson County Public Works Department Director	High	1	$125,000	FEMA-Hazard Mitigation Grant Program; County funds	Three years	Not started, lack of funding
Woodson County-2	Construct community storm shelters in underserved communities and meeting places.	Tornado, Windstorm	Woodson County Emergency Manager	High	1, 2	$800,000	FEMA Hazard Mitigation Grant Program / local funds or in-kind match	Five years	Not started, lack of funding
Woodson County-3	Purchase and install generator for 4-H and Community Building	Lightning, Tornado, Windstorm, Winter Storm, Utility/ Infrastructure Failure	Woodson County Public Works Department Director	High	1, 2	$30,000	FEMA Hazard Mitigation Grant Program	Two years	Not started, lack of funding
Woodson County-4	Mark evacuation routes throughout county	Flooding, Winter Storms	Woodson County Emergency Manager	Medium	1, 2, 3, 4	$60,000 plus staff time	FEMA Hazard Mitigation Grant Program/ County staff time	Four years	Not started, lack of funding
Woodson County-5	Enhance GIS capabilities of county	All Hazards	Woodson County Appraiser and Emergency Manager	Medium	1	$25,000	Emergency Management Performance Grant	Two years	Not started, lack of funding
Woodson County-6	Continued operation and management of jurisdictional **NFIP** activities.	Flood	Woodson County Emergency Manager	High	1	Staff Time	Local	Repeating	In process
Neosho Falls-1	Continued operation and management of jurisdictional **NFIP** activities.	Flood	NFIP Administrator	Low	1, 2	Staff Time	Local	Repeating	In process
Neosho Falls-2	Purchase and demolish flood prone properties in flood zones **(NFIP)**	Flood	NFIP Administrator	Low	1	$500,000	PDM, HMGP, FMA	Five years	Not started, lack of funding

Table 6.15: Woodson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Toronto-1	Construct a community Storm Shelter	Tornado, Windstorm	City of Toronto Council	High	1, 2	$600,000	Hazard Mitigation Grant Program	1-4 years	Not started, lack of funding
Toronto-2	Continued operation and management of jurisdictional **NFIP** activities.	Flood	City of Toronto Council	High	1	Staff Time	Local	Repeating	In process
Toronto-3	Purchase and demolish flood prone properties in flood zones **(NFIP)**	Flood	NFIP Administrator	Low	1	$500,000	PDM, HMGP, FMA	Five years	Not started, lack of funding
Yates Center-1	Purchase a back-up generator for shop	Lightning, Tornado, Windstorm, Winter Storm, Utility/ Infrastructure Failure	Yates Center Road and Bridge Department Director	High	1, 2	$25,000	Hazard Mitigation Grant Program	Three years	Not started, lack of funding
Yates Center-2	Prevent flooding to low water bridge **(NFIP)**	Flood	Yates Center Road and Bridge Department Director	High	1, 2	$50,000 - $60,000	Hazard Mitigation Grant Program	Three years	Not started, lack of funding
Yates Center-3	Conduct stream corridor restoration project **(NFIP)**	Flood	Yates Center Street Department Director	High	1, 2	$100,000	Hazard Mitigation Grant Program or other grants and local funding	Two years	Not started, lack of funding
Yates Center-4	Adopt building code	All Hazards	Yates Center Code Enforcement Officer	Medium	1	$40,000 per year for an inspector and the cost of adopting a building code	Each city would contribute a portion of the salary for a building inspector	One year	Not started, lack of funding
Yates Center-5	Continued operation and management of jurisdictional **NFIP** activities.	Flood	City of Yates Center Council	High	1	Staff Time	Local	Repeating	In process

Table 6.15: Woodson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD-366-1	Construct school/community saferoom in all USD 366 buildings	Tornado, Windstorm	City of Yates Center Council	High	1, 2	$1,200,000	Hazard Mitigation Grant Program	Five years	Not started, lack of funding
Heartland Electric-1	Upgrade and enhance power lines	Tornado, Windstorm, Winter Storm	Heartland Rural Electric Cooperative Director	Medium	1	$208,000	FEMA Hazard Mitigation Grant Program	Four years	Not started, lack of funding
Lyon-Coffey REC-1	Replace copper weld wire spans and poles with poles to current standards	Tornado, Windstorm, Winter Storm	Lyon-Coffey Electric Cooperative, Inc Director	Medium	1	$11,000,000	Rural Utilities Service, FEMA Hazard Mitigation Grant Program, KDEM	Two years	Not started, lack of funding
Radiant Electric-1	Installation of lightning arrestors on distribution power line structures of remaining 10 mile of single phase and one mile of multiple phase	Lightning	Radiant Electric Cooperative	Medium	1	$10,000	RUS, USDA; General Funds for maintenance, HMGP	Two years	In progress; 30% completed (2018)
Radiant Electric-2	Replace copper weld wire and pole line spans to current codes and standards	Utility/ Infrastructure Failure, Lightning,	Radiant Electric Cooperative Director	Medium	1	$500,000	RUS, HMGP, HMGP	2 months	Not started, lack of funding
SEK Health-1	Provide public information on all hazards, particularly transmissible major disease	All Hazards	SEK Health Director	High	3	$10,000	FEMA HMGP	Two years	Not started, lack of funding
Woodson County RFD-1	Homeowner Education on Wildland Urban Interface	Wildfire	Woodson County Rural Fire Department Chief and Emergency Manager	High	3	$500 per workshop	HMGP, KFS Community Wildfire Protection Program grants, Emergency Management Performance Grants	Three years	Not started, lack of funding

Table 6.15: Woodson County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Woodson County RFD - 2	Increase public and fire department training on wildland urban interface fires	Wildfire	Woodson County Rural Fire Department Chief and Emergency Manager	Low	3	$30 per student per training session	KFS, state and federal partners	Repeating	Not started, lack of funding
Woodson County RFD - 3	Reduce hazardous fuels in prioritized wildfire risk areas	Wildfire	Woodson County Rural Fire Department Chief and Emergency Manager	Low	1	$85/acre	KFS, WUI grant dollars for hazardous fuel reduction projects	Repeating	Not started, lack of funding
Woodson County RWD #1-1	Install back-up generators for pumps	Utility/ Infrastructure Failure	Rural Water District Director	High	1, 2	$25,000 for each pump	HMGP, PDM, Local	One year	Not started, lack of funding

6.9 –Mitigation Actions No Longer Under Consideration

For this plan update, members of the MPC and participating jurisdictions were asked to consider if all previous mitigation actions were still viable. Due to the thorough nature of the review, and the comprehensive updating of mitigation actions to meet both the needs of the participating jurisdictions and FEMA planning requirements, many actions were either modified or removed from consideration. A full comparison of jurisdictional actions may be completed by comparing the actions detailed in this plan against the actions from the 2014 regional hazard mitigation plan.

6.10 – Action Implementation and Monitoring

44 CFR 201.6 (c)(3)(iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Kansas Region H and relevant participating jurisdictions are responsible for implementing their identified mitigation action(s). To foster accountability and increase the likelihood that actions will be implemented, every proposed action is assigned to an action champion. In general:

- The identified champion will be responsible for tracking and reporting on action status.
- The identified champion will provide input on whether the action as implemented is successful in reducing vulnerability.
- If the action is unsuccessful in reducing vulnerability, the identified champion will be tasked with identifying deficiencies and additional required actions.

Additionally, each action has been assigned a proposed completion timeframe to assist in tracking the continued viability of the action if not completed, and to assist participating jurisdictions in potentially programming Funding to complete the actions.

In general, each participating jurisdiction, along with the MPC, is responsible for monitoring the progress of mitigation activities and projects. To facilitate the tracking of mitigation actions the Kansas Region H MPC and KDEM, in conjunction with participating jurisdictions, will compile a list of projects funded and completed. Additionally, the MPC and participating jurisdictions will be solicited annually to provide information on any other mitigation projects that were not funded through hazard mitigation grants for tracking and update purposes.

To track mitigation projects from initiation to closeout, participating jurisdictions will use a project tracking methodology that includes, at a minimum, the following information:

- Applicant data
- Grant identifier
- Award date

- Awarded contractor
- Period of Performance
- Total project cost, including local share of project
- Quarterly Reports

Upon completion of a project the awarded participating jurisdiction will conduct a closeout site visit to:

- Review all project documents
- Review all procurement documents and contracts
- Photograph completed project

Project closeout packages will generally be submitted no more than 90 days after a project has been completed, and should include the following:

- All available documentation
- Photographs of completed project
- Materials, labor and equipment documentation
- Close-out certification

6.11 – Jurisdictional Compliance with NFIP

44 CFR 201.6 (c)(3)(ii) All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Participating jurisdictions are committed to continued involvement and compliance with the NFIP. To help facilitate compliance, each participating jurisdiction:

- Adopts floodplain regulations through local ordinance
- Enforces floodplain ordinances through building restrictions as detailed in relevant ordinance
- Regulates new construction in Special Flood Hazard Areas as outlined in their floodplain ordinance
- Utilizes FEMA FIRMs
- Monitors floodplain activities

Currently, no participating jurisdiction has available funding to complete local requests for floodplain map updates. Additionally, as of this plan, there are no active community assistance or monitoring activities occurring in any participating jurisdiction. Key to achieving across the board reduction in flood damages is a robust community assistance, education and awareness program. As such, Kansas Region H and its participating jurisdictions will continue to develop both electronic (including social media) and in person outreach activities.

Specific mitigation actions supporting regional commitment to both the NFIP and potential CRS application and compliance were identified above with a bold type **NFIP** in the subsequent mitigation action sections.

6.12 –Primary Mitigation Action Funding Sources

It is generally recognized that mitigation actions help communities realize long term savings by preventing future losses due to hazard events. However, many mitigation actions are beyond the budgetary capabilities a jurisdiction and Funding assistance, often in the form of grants, may be required. This following table provides a general description of some of the primary avenues available to jurisdictions to defray the cost of implementing mitigation actions.

Table 6.16: Primary Hazard Mitigation Funding Mechanisms

Program	Funding Agency	Funding Match Requirement	Program Description
Community Development Block Grant Program	Department of Housing and Urban Development	N/A	Program is a competitive grant process through which about half of the Funding goes to support the development of community facilities and water and sewer projects. grants in four categories, community improvement, urgent need, Kansas Small Towns Environment Program and economic development.
Federal Public Assistance	FEMA	Varied	Provides Funding used to restore the parts of a structure that was damaged during a disaster. The restoration must provide protection from subsequent events.
Federal Individual Assistance	FEMA	Varied	Provides assistance for qualified homeowners/renters whose primary residence was damaged or destroyed in a declared designated area.
Flood Mitigation Assistance	FEMA	Varied	Program provides Funding to States, Territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. Funding is also available for management costs.
Hazard Mitigation Grant Program	FEMA	25%	Program is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. Funding is available, when authorized under the Presidential Major Disaster Declaration, in the areas of the state requested by the governor. The amount of Funding available to the applicant is based upon the total federal assistance provided by FEMA for disaster recovery under the major disaster declaration.
Pre-Disaster Mitigation Program	FEMA	25%	Program is designed to assist states, territories, Indian tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on federal Funding from future major disaster declarations.

6.13 – Additional Hazard Mitigation Funding Mechanisms

A wide variety of federal and state agencies offer mechanisms for funding mitigation projects. A thorough, but by no means complete, list of potential mitigaion funding sources are detailed in the following table along with a brief program description.

Table 6.17: Additional Potential Hazard Mitigation Funding Mechanisms

Department	Program	Program Description
FEMA	Fire Management Assistance Grant Program	Provides for the mitigation, management, and control of fires on publicly or privately-owned forests or grasslands. The process is initiated when the state requests federal assistance for an event where the threat of major disaster exists for either single fires or numerous small fires.
FEMA	Risk Mapping, Assessment, and Planning (Risk Map)	The Risk MAP strategy incorporates floodplain management with hazard mitigation by using tools such as DFIRMs, HAZUS reports, and risk assessment data to deliver quality data that increases public awareness and leads to action to reduce risk to life and property.
National Oceanic and Atmospheric Administration National Weather Service (NOAA NWS)	StormReady Program	StormReady is a voluntary program that was developed by NOAA NWS to help communities better prepare for and mitigate effects of all types of severe weather from tornadoes to flooding. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations.
Mutual Aid	Kansas Water, Wastewater, Gas and Electric Utility Mutual Aid Program (KSMAP)	KSMAP has been developed to serve as the mutual aid program for Kansas utilities to help with provision of equipment, materials and personnel to assist in the restoration and continuation of utility service for those utilities needing assistance. The project is a joint effort of Kansas Municipal Utilities, Kansas Rural Water Association, the Kansas Section – American Water Works Association, the Kansas Water Environment Association, Kansas Corporation Commission, Kansas Department of Health & Environment and the Kansas Division of Emergency Management.
FEMA	Individual & Households, Other Needs Assistance (ONA) Program	The ONA program provides financial assistance to individuals or households who sustain damage or develop serious needs because of a natural or man-made disaster. The Funding share is 75% federal funds and 25% state funds. The program gives funds for disaster-related necessary expenses and serious needs, including personal property, transportation, medical and dental, funeral, essential tools, flood insurance, and moving and storage. The current maximum allowable amount for any one disaster to individuals or families is $25,000.
Council of Western State Foresters	Wildland Urban Interface (WUI) Grants	The WUI Grant may be used to apply for financial assistance towards hazardous fuels and educational projects within the four goals of: improved prevention, reduction of hazardous fuels, restoration of fire-adapted ecosystems and promotion of community assistance.

Table 6.17: Additional Potential Hazard Mitigation Funding Mechanisms

Department	Program	Program Description
Small Business Administration	Disaster Loans	SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.
Kansas Department of Agriculture – Division of Conservation (KDA-DoC)	Multipurpose Small Lakes Program	Provides state cost-share assistance to a government entity for the construction or renovation of a dam for flood control and water supply and/or recreational purposes. It requires a general plan of works and a local nonpoint source pollution control plan.
(KDA-DoC)	State Assistance to Watershed Dam Construction	Provides state cost-share assistance to a government entity for the construction or renovation of a dam for flood control and water supply and/or recreational purposes. It requires a general plan of works and a local nonpoint source pollution control plan.
(KDA-DoC)	State Assistance to Watershed Dam Construction	Provides cost-share assistance to organized watershed districts and other special purpose districts for the implementation of structural and nonstructural practices that reduce flood damage. Structural practices must be approved by the chief engineer of the Division of Water Resources.
(KDA-DoC)	Water Resources Cost Share Program	Provides state cost-share assistance to landowners for the establishment of enduring water conservation practices to protect and improve the quality and quantity of Kansas water resources.
(KDA-DoC)	Water Conservation Program	Provides financial incentives for voluntary retirements of private water rights in high priority areas.
(KDA-DoC)	Water Conservation Program	Provides financial incentives for voluntary retirements of private water rights in high priority areas.
Kansas Department of Agriculture – Division of Water Resources (KDA-DWR)	Community Assistance Program	This program enhances the State's capability to provide floodplain management information and technical assistance to help local officials in NFIP and CRS participating communities. It also encourages nonparticipating communities to join the NFIP and CRS.
KDA-DWR	Floodplain Management Program	Program provides technical assistance for local, state and federal floodplain management, including managing the NFIP and floodplain ordinances and regulations adopted by city and county governments.
Kansas Department of Commerce (KDC)	Community Service Tax Credit	Program offers Kansas tax credits to for nonprofit organizations for contributions to approved projects. Projects eligible for tax credit awards include community service, crime prevention and health care
KDC	Kansas Partnership Fund	This fund provides low-interest state loans to cities and counties for infrastructure improvements that support Kansas basic enterprises.
Kansas Department of Health and Environment—Bureau of Environmental Remediation (KDHE-BER)	Abandoned Mine Land Program	Program provides for the remediation of sites that are an immediate threat to the health and safety of the public.
KDHE-BER	Kansas Brownfields Program	Programs to assist communities with the redevelopment of brownfields properties
KDHE-BER	State Water Plan Contamination Remediation Program	Program provides Funding for the evaluation, monitoring, and remediation of contaminated groundwater or surface water sites and provides Funding to supply alternate water sources as an emergency

Table 6.17: Additional Potential Hazard Mitigation Funding Mechanisms

Department	Program	Program Description
		response action to residences with contaminated drinking water sources.
Kansas Department of Transportation	Transportation Enhancement Program	This is an annual competitive Federal Transportation Enhancement funded program that can be used for transportation enhancement activities that include environmental mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality while maintaining habitat connectivity.
Kansas Forest Service (KFS)	Community Forestry Program	Program provides assistance, education, and support to communities and municipalities in organizing urban and community forestry programs, identifying resource needs, setting priorities of work, and training city employees.
KFS	Rural Forestry Program	Professional foresters provide on-site forest management and agro-forestry analysis and recommendations through inventory of forests, woodlands and windbreaks.
KFS	Firewise Program	The Kansas Firewise program offers prevention materials for homeowners to reduce the threat of wildland fire in rural and high-risk areas.
KFS	Forest Health Program	Program monitors the impacts of insects, diseases, drought, flooding and other health issues in forests, woodlands, windbreaks and conservation tree plantings by providing diagnosis and control recommendations and mitigation and planning for Emerald Ash Borer, Asian Bush Honeysuckles and other invasive species.
KFS	Landowner Education	Provides information and education to farmers regarding the benefits of good forest management. This includes information about federal cost share practices including the Environmental Quality Incentives Program, Conservation Reserve Program, and the Riparian and Wetland Protection Program.
KFS	Rural Fire Protection	Program provides fire support services to rural fire departments, including wildfire training, Smokey Bear fire prevention materials, and the acquisition and distribution of excess military vehicles for conversion to firefighting units.
Kansas Highway Patrol	Federal Preparedness Grant Program	Through this program, the Department of Homeland Security/FEMA provides Funding to states to prevent, respond to, and recover from acts of terrorism by enhancing and sustaining capabilities.
Kansas State Fire Marshal's Office	Fire Prevention Program	Program focuses on structural inspection to ensure compliance with the Kansas Fire Prevention Code.
Kansas State Fire Marshal's Office	Hazardous Materials Program	Program provides training, planning, and analysis related to hazardous materials accidents/incidents and WMD events to help local facilities and local, state, and federal agencies before an event occurs.
Kansas Water Office (KWO)	Public Information and Education	This public education program provides information on water resource issues to the general public through publication of articles, pamphlets, news reports, etc. It also provides support for environmental education and local leadership development programs.
KWO	Stream Gauging Program	State financial assistance is provided for the operation of selected gauging stations operated by the U.S. Geological Survey.

Table 6.17: Additional Potential Hazard Mitigation Funding Mechanisms

Department	Program	Program Description
KWO	Technical Assistance to Water Users	Program provides technical assistance to municipalities, irrigators, and other groups to assist in the reduction of water use and improve water use efficiency.
KWO	Public Information and Education	Eligible jurisdiction can use loans for construction, replacement, acquisition and ownership of facilities, land and easement procurement, improvements for developing and utilization of water resources, projects to supply quality water to residents, provide water for navigation, provide recreational access to lakes and streams, reclaim, preserve and protect the state's land resources, and protect the wealth of the state from disastrous floods.

7.0 Plan Maintenance

7.1 – Hazard Mitigation Plan Monitoring and Evaluation

44 CFR 201.6 (c)(4) A plan maintenance process that includes: (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

The Kansas Region H Hazard Mitigation Plan will be updated then approved by FEMA every five years. During the five-year cycle, the plan will undergo continuous monitoring and evaluation to ensure that the policies, procedures, priorities, and state environment established in the plan reflect current conditions.

To achieve this, the MPC will meet annually after plan approval. If needed, additional meetings will take place during this timeframe. The State of Kansas State Hazard Mitigation Officer will determine the meeting dates and location and is responsible for sending invitations.

During the five-year evaluation phase, the MPC is responsible for assessing the effectiveness of the plan by:

- Reviewing the hazards and determining if any of them have changed
- Determining if there are new hazards that pose a risk to the state
- Ensuring goals and objectives are still relevant
- Determining if any actions have been completed or are deemed irrelevant
- Determining if new actions should be added
- Determining if capabilities have changed

In addition to these meetings, the MPC will monitor and evaluate the progress of mitigation projects via regular reports, site visits, and correspondence. Progress and viability of identified mitigation actions will be measured based on the following variables:

- The number of projects successfully implemented
- The breadth of disbursement of mitigation grant funds
- The disaster losses avoided over time
- Public awareness
- Success of completed mitigation projects in helping address and achieve identified goals and objectives
- Have the completed mitigation actions resulted in a safer Kansas Region H

In order to monitor the implementation of plan actions and the overall progress of plan goals, MPC members will report on the following information:

- How the actions from the mitigation strategy are being pursued and completed
- Are actions being prioritized
- How the plan goals and objectives are being carried out
- How mitigation funding mechanisms are being utilized
- How participating jurisdictions are receiving technical assistance

7.2 – Jurisdictional Maintenance Requirements

Kansas Region H and all participating jurisdictions will be tasked with plan monitoring, evaluation, and maintenance. All participating jurisdictions, led by MPC, will:

- Regularly monitor and evaluate the implementation of the plan
- When applicable, after a disaster event, evaluate the effectiveness of the plan
- Act as a think tank for all issues related to hazard mitigation planning
- Act as a clearinghouse for hazard mitigation ideas and activities
- Assist with the implementation of all identified actions with available resources
- Monitor all available funding opportunities for mitigation actions
- Coordinate the cycle for the revision and update of the mitigation plan
- Report on plan progress and recommended changes to the relevant governing bodies
- Inform and solicit input from the public

Each participating jurisdiction will also be responsible for promoting the integration of the hazard mitigation plan into all relevant plans, policies, procedures and ordinances.

7.3 – Plan Maintenance and Update Process

44 CFR 201.6 (c)(4) A plan maintenance process that includes: (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle."

Kansas Region H, the State of Kansas, and the MPC will facilitate a yearly plan review and the subsequent hazard mitigation plan revision and re-adoption process within the required five-year period.

Information from the annual meetings will be incorporated in to the plan update. Starting in calendar year 2022, the formal update process will begin. A thorough review and revision of the plan will take place, following all requirements detailed in 44 CFR 201.4, FEMA guidance documents, and DMA 2000. The following represents a general timeline for the next required plan revision.

- **2021 Spring Meeting:** The MPC will begin updating the plan risk assessment. Hazards will be analyzed for continued relevancy and a review will be conducted to determine and new potential hazards.
- **2021 Fall Meeting:** The MPC will begin updating the vulnerability assessment. Data will be gathered on jurisdictional assets, critical facilities, building stock values, crop losses, jurisdictional damages, etc.
- **2022 Spring Meeting:** The MPC will review all information from previous meetings and determine if hazard mitigation goals and objectives are still relevant. Actions will be reviewed for currency and applicability.
- **2022 Fall Meeting:** The MPC will evaluate the policies, programs, capabilities, and funding sources from the previous plan to determine if they are still accurate and determine if additions are required.

- **2023 Spring Meeting:** The MPC will being the process of the formal five year plan update.
- **2023 Fall Meeting:** The MPC will review the draft copy of the mitigation plan and make comments and updates if necessary. Formal submittal to FEMA for re-approval will follow.

As part of the plan maintenance process, and consistently during the five-year HMP approval period, the MPC will continually monitor all elements of the plan, including:

- The incorporation of the HMP into other planning mechanisms
- All revisions and updates to the HMP
- Continued public participation

This monitoring will be done through outreach efforts to include:

- Email communication
- Phone communication
- In person communication at meetings, relevant conferences, and local planning events

Through consistent monitoring the MPC will then be able to efficiently incorporate these elements into the next plan revision.

Upon each successive revision, the plan will need to be re-adopted by all participating jurisdictions. Circumstances, including a major disaster or a change in regulations or laws, may modify the required five-year planning cycle.

7.4 – Post-Disaster Declaration Procedures

Following a disaster, each participating jurisdiction and the MPC may review the plan to determine if any additional actions need to be identified, additional funding has become available, or any identified actions need to be re-prioritized.

7.5 – Incorporation of HMP into Other Planning Mechanisms

44 CFR 201.6 (c)(4)(ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

The hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various county and local plans. Under the leadership of the MPC, it is hoped that when each of these other plans is updated, they will be measured against the contents of this Hazard Mitigation Plan.

Below is a list of the various jurisdictional planning efforts, either solely or jointly administered, and relevant planning documents. While each plan can stand alone, each participating jurisdiction, under the leadership of their MPC member, will actively work to incorporate relevant parts of this hazard mitigation plan into the following:

- All participating jurisdictions Codes and Ordinances
- All participating jurisdictions Comprehensive Plans
- All participating jurisdictions Critical Facilities Plans
- All participating jurisdictions Economic Development Strategic Plans
- All participating jurisdictions Emergency Operations Plans
- All participating jurisdictions Flood Mitigation Assistance Plan
- All participating jurisdiction Land-Use Plans
- Community Wildfire Protection Plans

Additionally, in cooperation with the MPC, each participating jurisdiction will be actively courted on incorporating elements of this hazard mitigation plan for any relevant plan, code or ordinance revision or creation.

Finally, each participating jurisdiction has committed to actively encourage all departments to implement actions that minimize loss of life and property damage from hazards. Whenever possible, each participating jurisdiction will use existing plans, policies, procedures and programs to aid in the implementation of identified hazard mitigation actions. Potential avenues for implementation may include:

- Operation plans
- General or master plans
- Ordinances
- Capital improvement plans
- Budget revisions or adoptions
- Hiring of staff
- Stormwater planning
- Land use planning

Additionally, participating jurisdictions are encouraged to utilize all available budget avenues for the completion of hazard mitigation items. Budgetary options may include:

- Annual budgets
- Departmental budgets
- Application for grant funding
- In-kind donations

Where appropriate, the MPC will take the lead in integrating this HMP into overarching, countywide plans, code, ordinances and any other relevant documents, policies or procedures.

7.6 – Continued Public Involvement

44 CFR 201.6 (c)(4)(iii) Discussion on how the community will continue public participation in the plan maintenance process.

Public participation is an important part of the continued mitigation planning process. Every effort will be made to keep the public informed on both relevant mitigation issues and the five-year plan revision cycle. Strategies for continued public involvement may include:

- Postings on electronic media, to include websites
- Notifications, when possible, in local media
- Making plans available for review in public locations
- A review of local mitigation strategies and goals
- A review completed and remaining hazard mitigation actions