

# Kansas Homeland Security Region A Hazard Mitigation Plan

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

Cheyenne County, Decatur County, Gove  
County, Logan County, Rawlins County,  
Sheridan County, Sherman County, Thomas  
County, and Wallace County

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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
CRS	Community Rating System
CWPP	Community Wildfire Protection Plans
EAB	Emerald Ash Borer
EAP	Emergency Action Plan
EMAP	Emergency Management Accreditation Program
EF	Enhanced Fujita
EPA	Environmental Protection Agency
°F	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 Planning
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
NSFHA	No Special Flood Hazard Area
NGO	Non-Governmental Organization





Acronym	Meaning
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
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 A (hereafter referred to as Kansas Region A) 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 A 2015 Hazard Mitigation Plan
- Build for a safer future for all citizens
- Foster cooperation for planning and resiliency
- Identify, prioritize and mitigate against hazards
- Assist 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 A.

## 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: Cheyenne County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Cheyenne County</b>	x	x
City of Bird City	x	x
City of St. Francis	x	x
USD #103 - Cheylin	x	x
USD #297 – St. Francis Community Schools	x	x
Cheyenne County Hospital	x	x
Midwest Energy	x	x

**Table 1.2: Decatur County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Decatur County</b>	x	x
City of Dresden	x	x
City of Jennings	x	x
City of Norcatur	x	x
City of Oberlin	x	x
USD #294 – Oberlin	x	x
Midwest Energy	x	x
Prairie Land Electric COOP	x	x

**Table 1.3: Gove County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Gove County</b>	x	x
City of Gove	x	x
City of Grainfield	x	x
City of Grinnell	x	x
City of Park	x	x



**Table 1.3: Gove County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
City of Quinter	X	X
USD #291 – Grinnell Public Schools	X	X
USD #292 – Wheatland	X	X
USD #293 – Quinter Public Schools	X	X
Lane-Scott Electric COOP	X	X
Midwest Energy	X	X
Western Cooperative Electrical	X	X
Westplains Energy	X	X

**Table 1.4: Logan County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Logan County</b>	X	X
City of Oakley	X	X
City of Winona	X	X
USD #274 - Oakley	X	X
USD #275 - Triplains	X	X
Midwest Energy	X	X

**Table 1.5: Rawlins County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Rawlins County</b>	X	X
City of Atwood	X	X
City of Herndon	X	X
City of McDonald	X	X
USD #105 – Rawlins County	X	X
Midwest Energy	X	X
Prairie Land Electric COOP	X	X

**Table 1.6: Sheridan County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Sheridan County</b>	X	X
City of Hoxie	X	X
City of Selden	X	X
USD #316-Golden Plains	X	X
Midwest Energy	X	X
Prairie Land Electric COOP	X	X
Western Cooperative Electric	X	X

**Table 1.7: Sherman County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Sherman County</b>	X	X
City of Goodland	X	X
City of Kanorado	X	X
Northwest Kansas Technical College	X	X



**Table 1.7: Sherman County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
USD #352 – Goodland	x	x
Midwest Energy	x	x
Prairie Land Electric COOP	x	x
Sunflower Electric	x	x

**Table 1.8: Thomas County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Thomas County</b>	x	x
City of Brewster	x	x
City of Colby	x	x
City of Gem	x	x
City of Menlo	x	x
City of Rexford	x	x
Colby Community College		x
Heartland Christian School		x
Sacred Heart Catholic School		x
USD #314 - Brewster	x	x
USD #315 – Colby Public Schools	x	x
USD #316 – Golden Plains	x	x
Citizen Medical Center	x	x
Colby Health and Rehab		x
Fairview Estates Assisted Living		x
Family Center for Healthcare		x
Prairie Senior Living Center		x
Midwest Energy	x	x

**Table 1.9: Wallace County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2015 HMP Participant</b>	<b>2020 HMP Participant</b>
<b>Wallace County</b>	x	x
City of Sharon Springs	x	x
City of Wallace	x	x
USD # 241 – Wallace County Schools	x	x
USD # 242 - Weskan	x	x
Midwest Energy	x	x

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

### 1.3 – Assurances

Kansas Region A 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 A 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 A 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 June 2019, Kansas Region A and its participating jurisdictions began the process to update the Kansas Region A 2015 HMP. It was determined that Jeanne Bunting, the Kansas State Hazard Mitigation Officer 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 2015 Kansas Region A 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 A and its participating jurisdiction undertook the following steps to update and create a robust HMP:

- Review of the 2015 Kansas Region A 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 – 2020 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 A 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 A Mitigation Planning Committee**

<b>Participant</b>	<b>Title</b>	<b>Organization</b>
Ryan Murray	Emergency Manager	Cheyenne County
Jenni Cravens	Assistant Director	Cheyenne County
Jacque Boultinghouse	Emergency Manager	Decatur County
Mike Haase	Emergency Manager	Gove County
George Pappy Lies	Emergency Manager	Logan County
Ryan Murray	Emergency Manager	Rawlins County
Jenni Cravens	Assistant Director	Rawlins County
Don Koerperich	Emergency Manager	Sheridan County
Ryan Murray	Emergency Manager	Sherman County
Jenni Cravens	Assistant Director	Sherman County
David Becker	Emergency Manager	Thomas County
Larry Townsend	Emergency Manager	Wallace County
Jennifer Ellerman	Mitigation Planner	State of Kansas
Jeanne Bunting	State Hazard Mitigation Officer	State of Kansas
Matt Eyer	Plan Author	Blue Umbrella Solutions

## 2.4 – Jurisdictional Representation

Each participating jurisdiction delegated a point of contact to represent that jurisdiction during the planning process. From project inception to completion these representatives were kept fully informed concerning the planning process, milestones, and participation requirements. In general, jurisdictional representatives were asked to participate in the following ways:

- If possible, attend and participate in meetings
- Provide jurisdiction specific data and information
- Review planning elements and drafts
- Integrate hazard mitigation planning elements with jurisdictional planning mechanisms
- Assist with the revision and development of mitigation actions

The following details jurisdictional representation.

**Table 2.2: Cheyenne County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Cheyenne County</b>	Emergency Manager
City of Bird City	City Manager
City of St. Francis	City Manager
USD #103 - Cheylin	Superintendent
USD #297 – St. Francis Community Schools	Superintendent
Cheyenne County Hospital	Safety Manager
Midwest Energy	Director



**Table 2.3: Decatur County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Decatur County</b>	Emergency Manager
City of Dresden	City Clerk
City of Jennings	City Clerk
City of Norcatour	City Clerk
City of Oberlin	City Clerk
USD #294 – Oberlin	Superintendent
Midwest Energy	Director
Prairie Land Electric COOP	Director

**Table 2.4: Gove County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Gove County</b>	Emergency Manager
City of Gove	City Manager
City of Grainfield	City Manager
City of Grinnell	City Manager
City of Park	City Manager
City of Quinter	City Manager
USD #291 – Grinnell Public Schools	Superintendent
USD #292 – Wheatland	Superintendent
USD #293 – Quinter Public Schools	Superintendent
Lane-Scott Electric COOP	Director
Midwest Energy	Director
Western Cooperative Electrical	Director
Westplains Energy	Director

**Table 2.5: Logan County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Logan County</b>	City Clerk
City of Oakley	City Clerk
City of Winona	Superintendent
USD #274 - Oakley	Superintendent
USD #275 - Triplains	Director
Midwest Energy	Director

**Table 2.6: Rawlins County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Rawlins County</b>	Emergency Manager
City of Atwood	City Manager
City of Herndon	City Manager
City of McDonald	City Manager
USD #105 – Rawlins County	Superintendent
Midwest Energy	Director
Prairie Land Electric COOP	Director



**Table 2.7: Sheridan County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Sheridan County</b>	Emergency Manager
City of Hoxie	City Clerk
City of Selden	City Clerk
USD #316-Golden Plains	Superintendent
Midwest Energy	Director
Prairie Land Electric COOP	Director
Western Cooperative Electric	Director

**Table 2.8: Sherman County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Sherman County</b>	Emergency Manager
City of Goodland	City Manager
City of Kanorado	City Manager
Northwest Kansas Technical College	Director of Safety
USD #352 – Goodland	Superintendent
Midwest Energy	Director
Prairie Land Electric COOP	Director
Sunflower Electric	Director

**Table 2.9: Thomas County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Thomas County</b>	Emergency Manager
City of Brewster	City Clerk
City of Colby	City Clerk
City of Gem	City Clerk
City of Menlo	City Clerk
City of Rexford	City Clerk
Colby Community College	Administrator
Heartland Christian School	Superintendent
Sacred Heart Catholic School	Administrator
USD #314 - Brewster	City Clerk
USD #315 – Colby Public Schools	Superintendent
USD #316 – Golden Plains	Superintendent
Citizen Medical Center	Operations Manager
Colby Health and Rehab	Director
Fairview Estates Assisted Living	Director
Family Center for Healthcare	Director
Prairie Senior Living Center	Director
Midwest Energy	Director

**Table 2.10: Wallace County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
<b>Wallace County</b>	Emergency Manager
City of Sharon Springs	City Clerk





**Table 2.10: Wallace County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Title</b>
City of Wallace	City Clerk
USD # 241 – Wallace County Schools	Superintendent
USD # 242 - Weskan	Superintendent
Midwest Energy	Director

## 2.5 – 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*

Within Kansas Region A 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 these entities. The Kansas Region A 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.

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.

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, including, but not limited to:

- American Red Cross
- Center for Disease Control
- FEMA
- Kansas Adjutant General's Office
- Kansas Department of Agriculture, the Kansas Department of Health and Environment
- Kansas Department of Transportation
- Kansas Fire Service, Kansas Water Office
- Kansas Geological Survey
- Kansas State Fire Marshall
- Local and county planning and zoning offices (where available).
- Local business and non-profit entities





- National Oceanic and Atmospheric Administration
- National Weather Service
- Nuclear Regulatory Commission
- Pipeline and Hazardous Materials Safety Administration
- Salvation Army
- United States Army Corp of Engineers, National Resource Conservation Service
- United States Department of Agriculture
- United States Geological Survey

## 2.6 – 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 A 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.

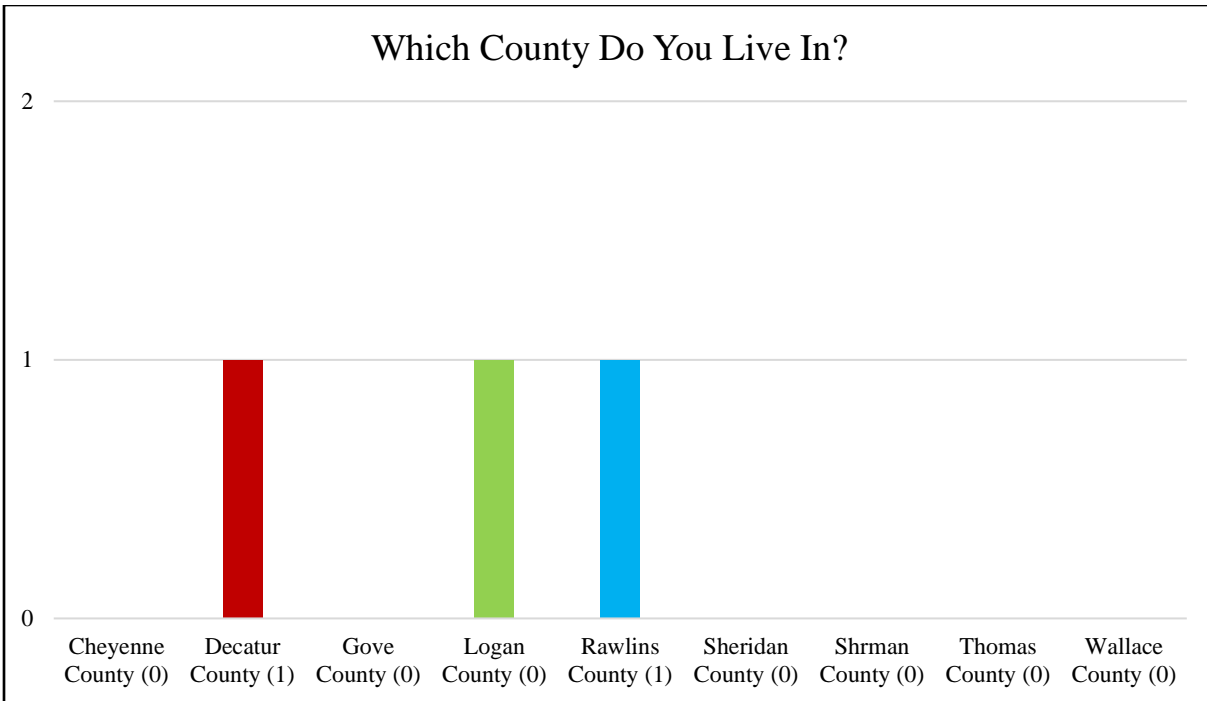
Additionally, as citizens were made more aware of potential hazards and the local process to mitigation against their impacts, it was believed that they would take a stronger role in making their homes, neighborhoods, schools, and businesses safer from the potential effects of natural hazards.

The following graphics represents the feedback received from the public from the online survey document (three participants).

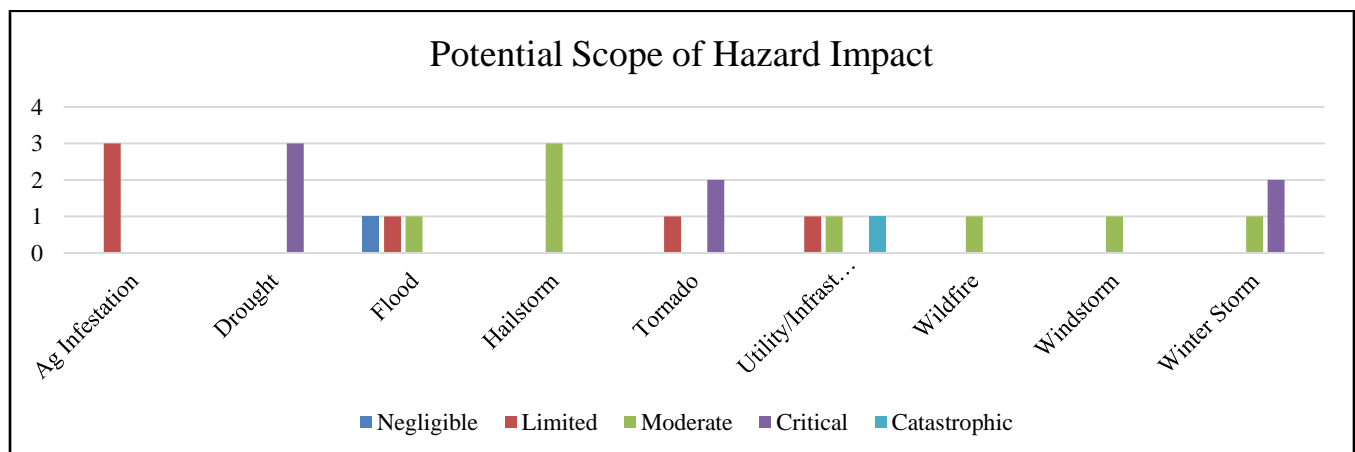
**Question 1:** In which county or jurisdiction do you live?





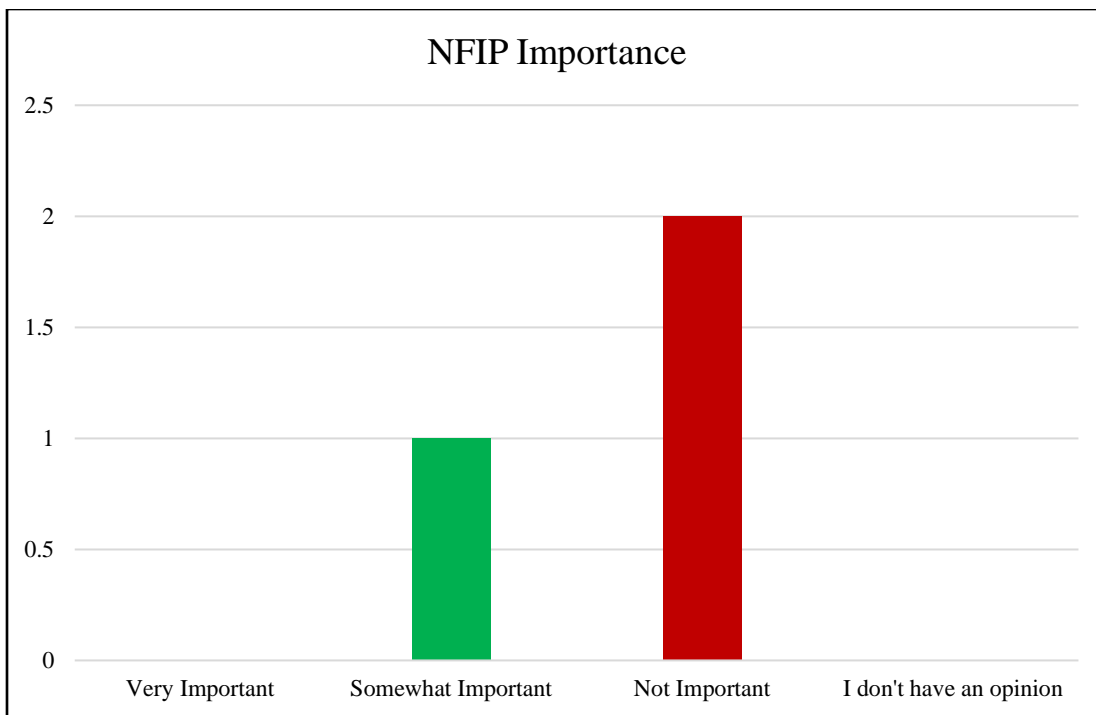


**Question 2:** In 2020, the Region A consisting of Cheyenne, Decatur, Gove, Logan, Rawlins, Sheridan, Sherman, Thomas and Wallace Counties, the planning committee determined that the hazards listed below are important to the area. Indicate the level of risk, or the scope of potential impacts, in the Region, that you perceive for each hazard:

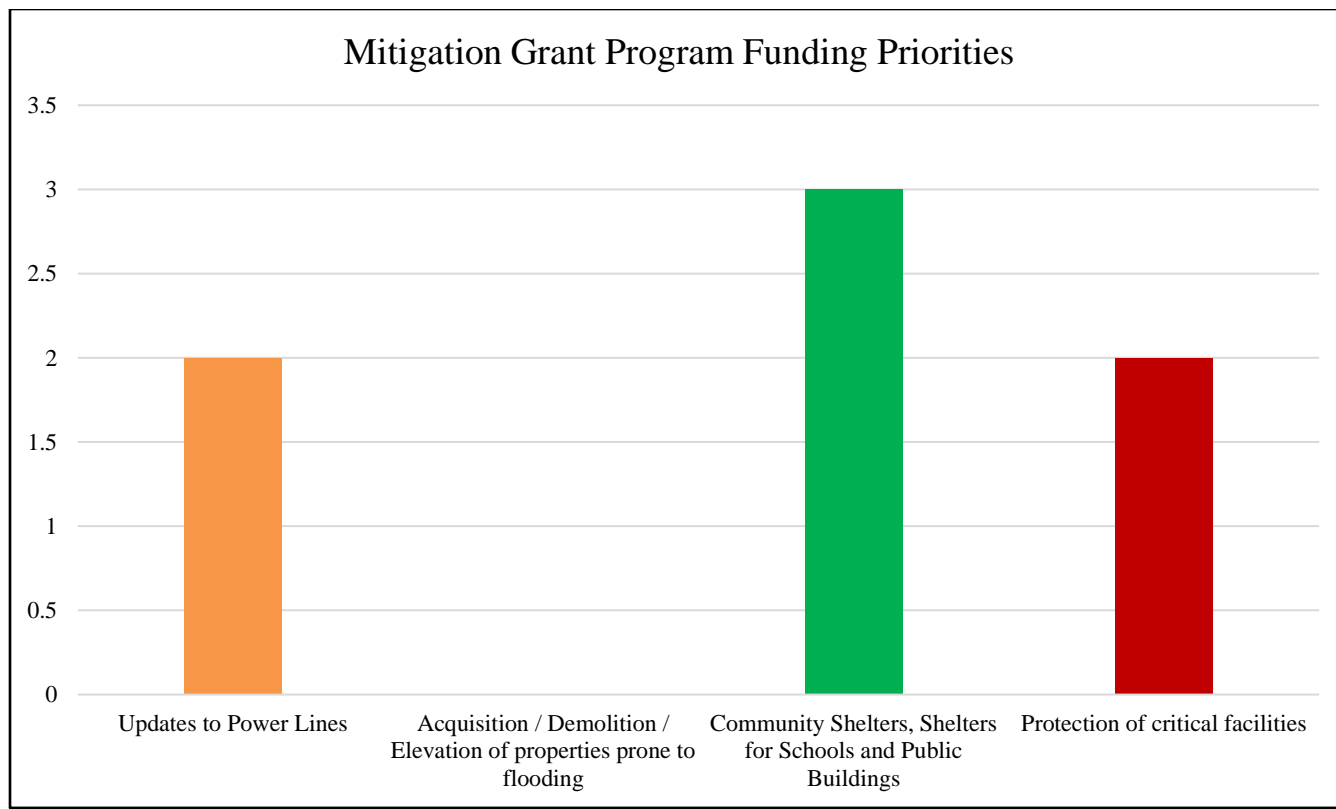


**Question 3:** In the Region, the planning committee has determined that a flood event is a critical hazard. How important is it for you to have your community participate in or continue to participate in the National Flood Insurance Program?



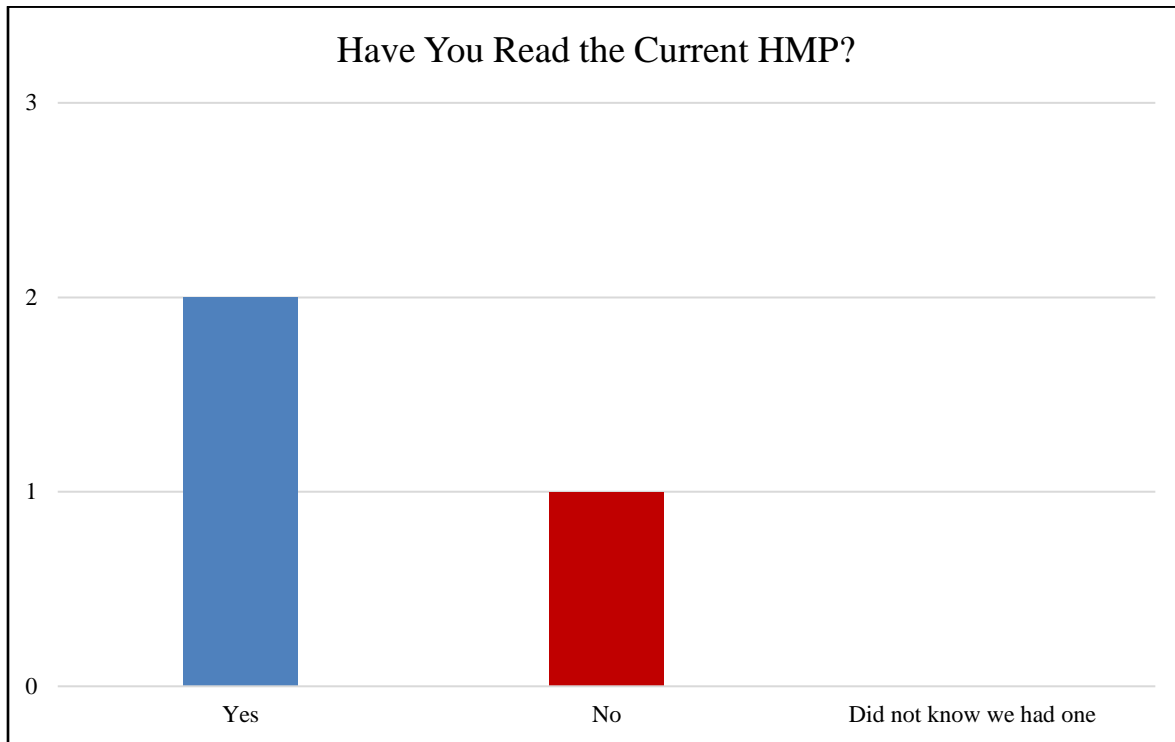


**Question 4:** The Kansas Division of Emergency Management currently reviews the application for funds for the FEMA Risk Mitigation Grant Program. Your current funding priorities are listed below. Please check those that could benefit your community.

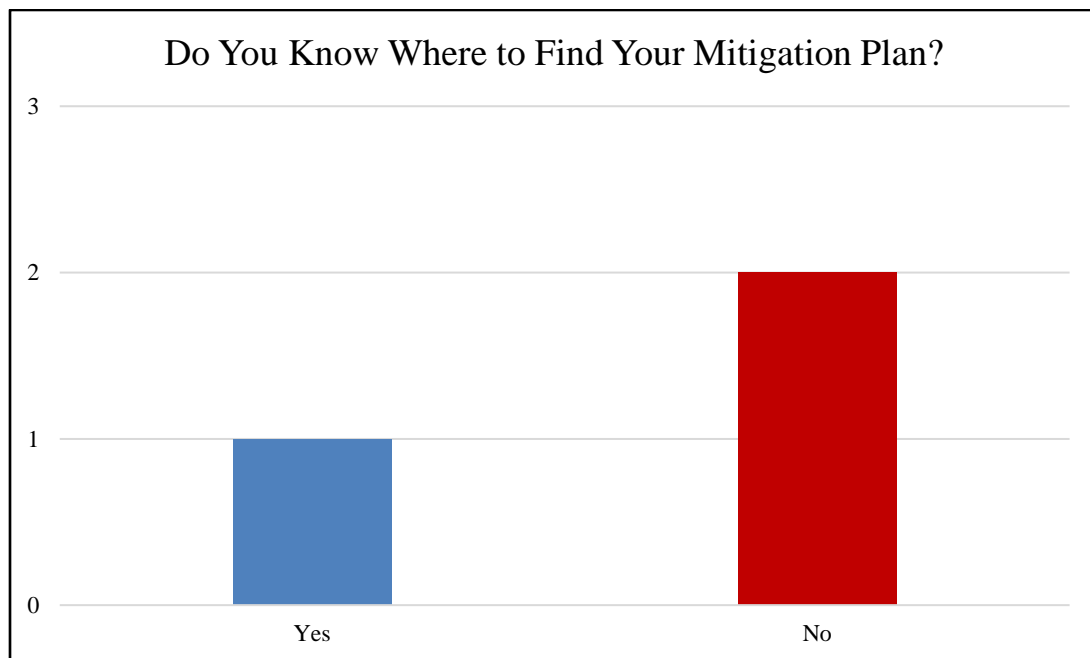




**Question 5:** Have you had the opportunity to read your current Risk Mitigation Plan?



**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.





**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 2.11: Kansas Region A Survey Comments, Areas of Concern**

Jurisdiction	Comments
None	None

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

**Table 2.12: Kansas Region A Survey Comments, Requested Projects**

Jurisdiction	Comments
Logan County	I would like to see a number of stand by generators capable of running water wells, shelters and critical infrastructure in the event of a wide spread power grid failure available throughout the region.

## 2.7 – Planning Meetings

Within Kansas Region A 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.

Due to the current COVID-19 pandemic and considering many factors impacting the current planning environment including increased workload, non-standard work hours, staff reductions, and social distancing measures, kickoff meetings were conducted online. Meetings were held with MPC members, available representatives from jurisdictions within the planning region, local and regional stakeholders, and the public. During the kickoff meetings 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 forms 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.

Due to the current COVID-19 pandemic and considering many factors impacting the current planning environment including increased workload, non-standard work hours, staff reductions, and social distancing measures, the mid-term planning meeting was conducted 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.

Due to the current COVID-19 pandemic and considering many factors impacting the current planning environment including increased workload, non-standard work hours, staff reductions, and social distancing measures, the final meeting was conducted online. To ensure wide circulation and participation, the Hazard Mitigation Committee members were tasked with conducting outreach to participating jurisdictions within their county. All participants were invited to submit any questions, plan additions, or plan modifications either via email or phone. Revision from this process included modifications to mitigation action items and modifications to capability assessments. The completed draft HMP was then made available for review and comment.

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

**Table 2.13: Kansas Region A Planning Meetings**

Meeting Number	Date	Location
1 (Kickoff)	06/09/2020	Morning Online
2 (Mid-Term)	10/14/2020	Online
3 (Final)		Online

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

## 2.8 – 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 A'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 A'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 2015 plan update successfully integrated approved Kansas Region A local hazard mitigation plans into one regional 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 of 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.



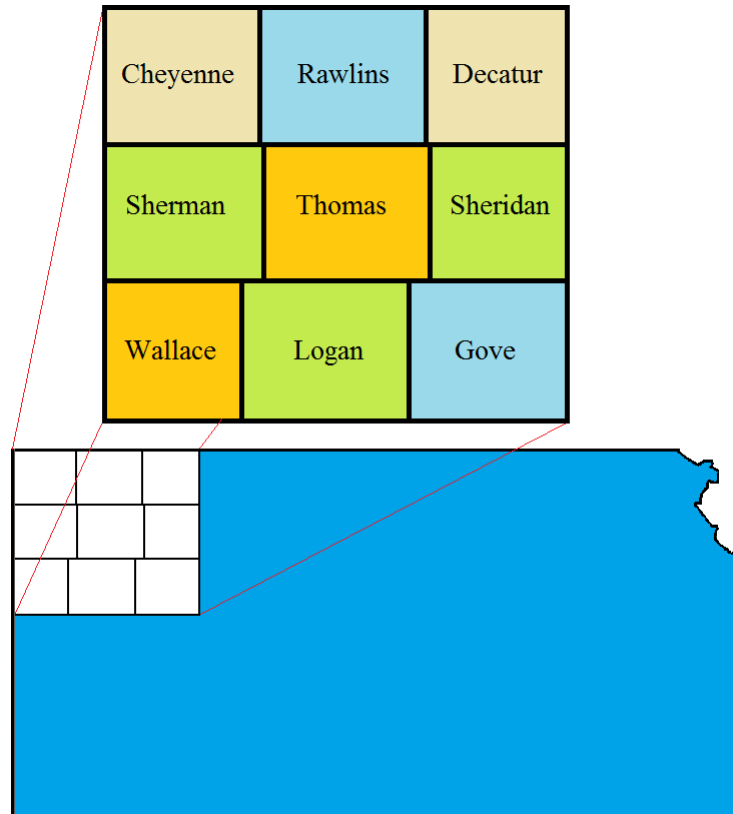
## 3.0 Planning Area

### 3.1 – Introduction

Kansas Region A consists of the following nine participating counties and their participating jurisdictions:

- Cheyenne County
- Decatur County
- Gove County
- Logan County
- Rawlins County
- Sheridan County
- Sherman County
- Thomas County
- Wallace County

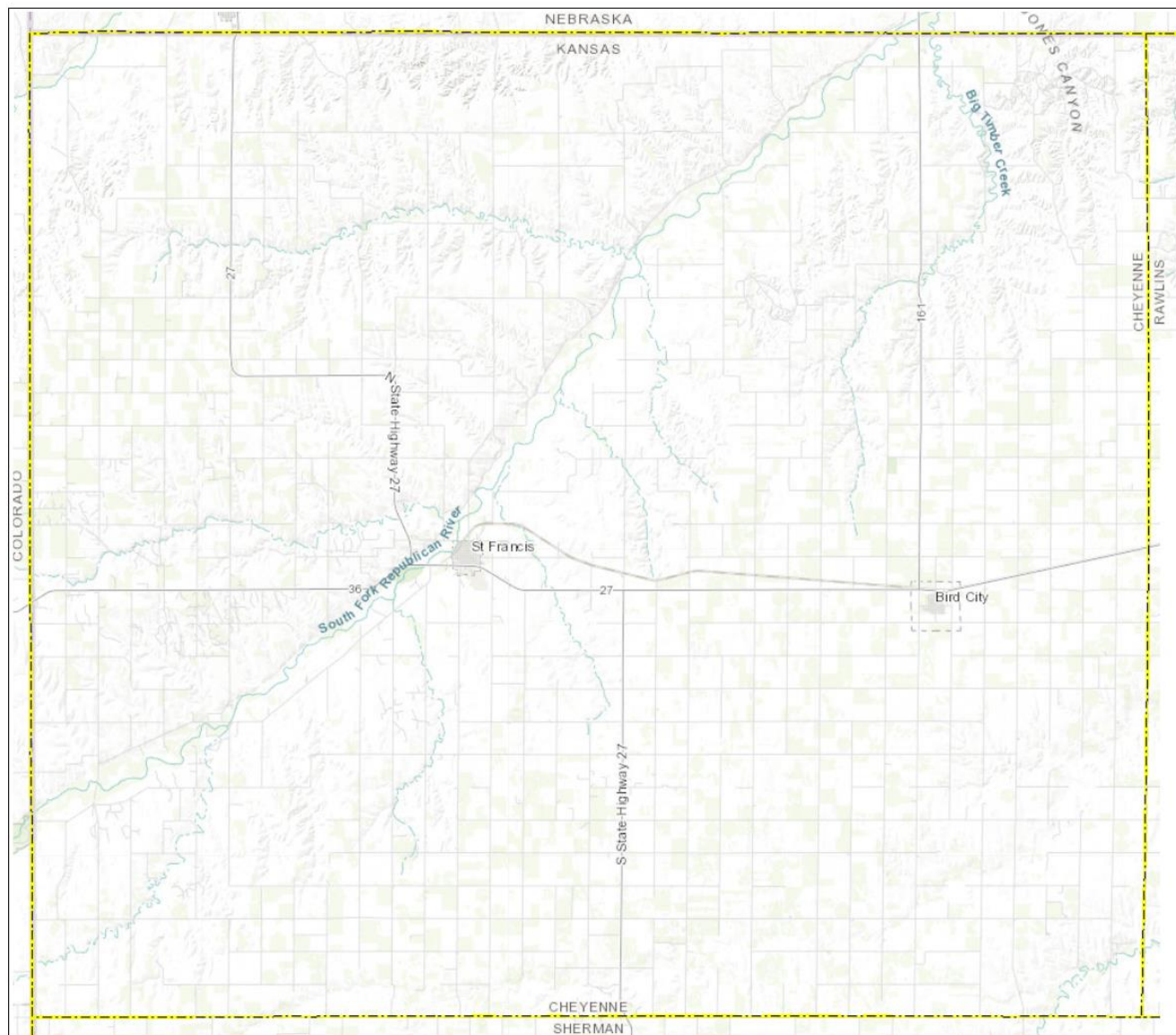
The following map details the locations of these counties.





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

### Map of Cheyenne County

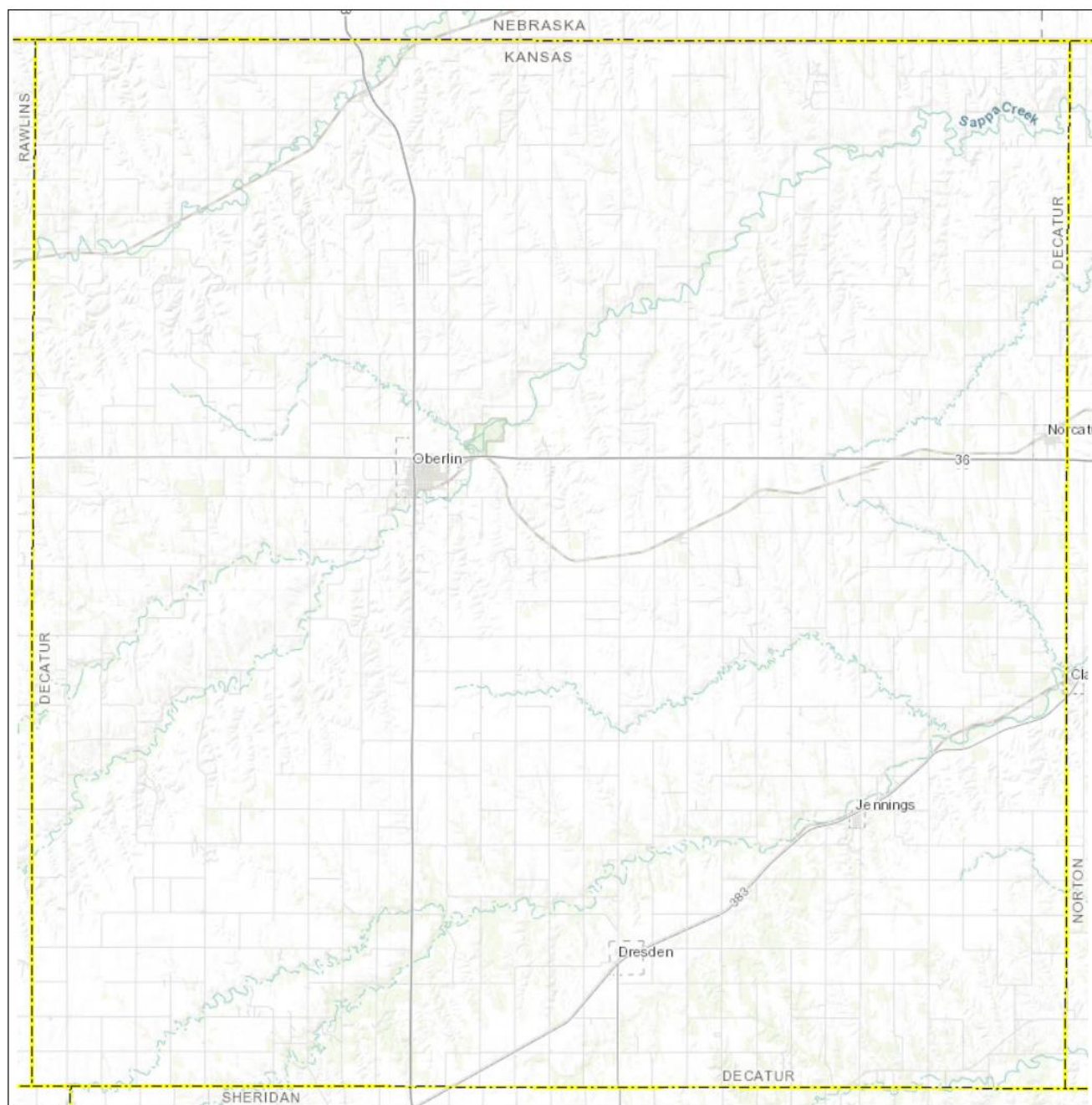






The following is a map of **Decatur County**, provided by KDOT.

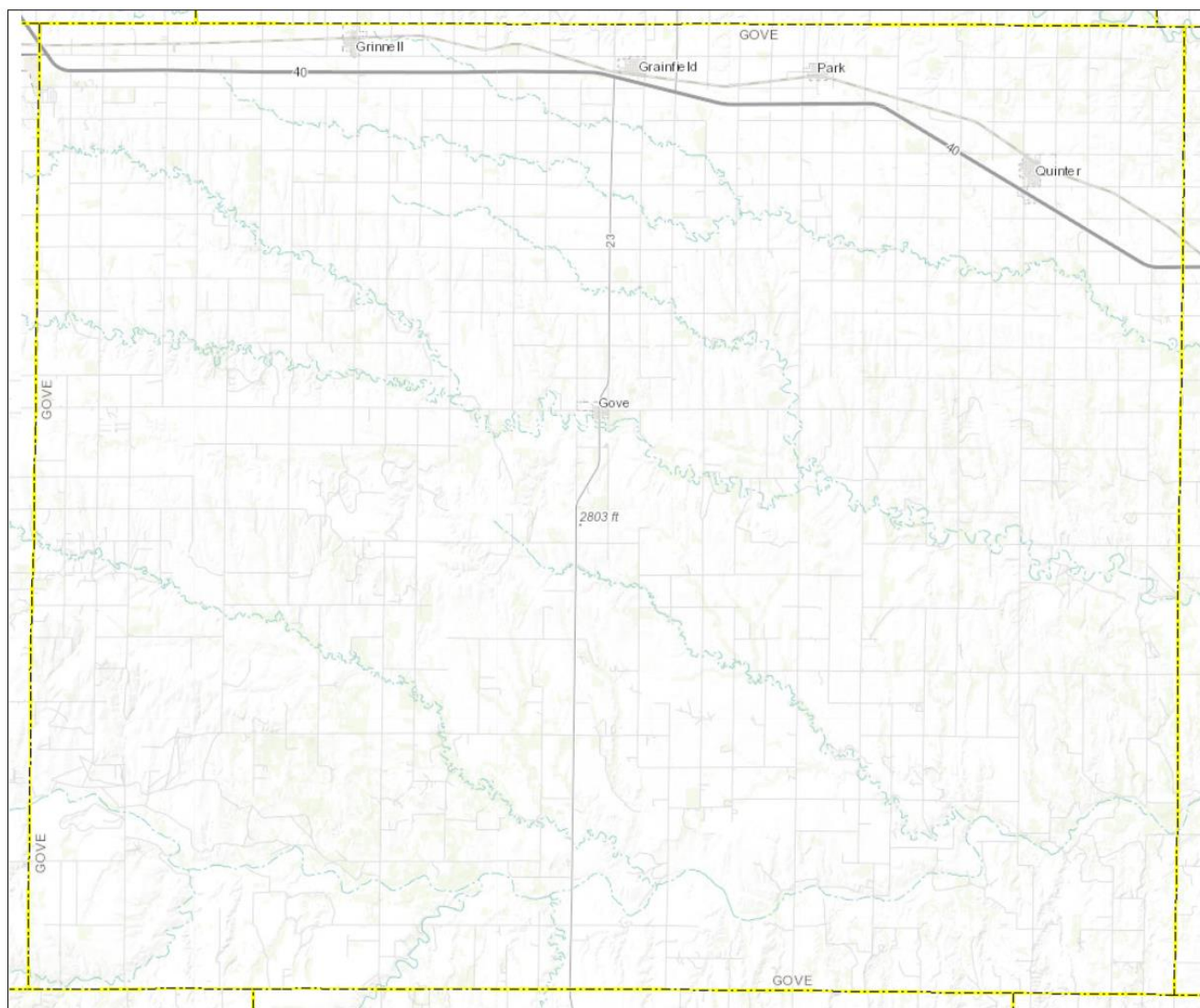
**Map of Decatur County**





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

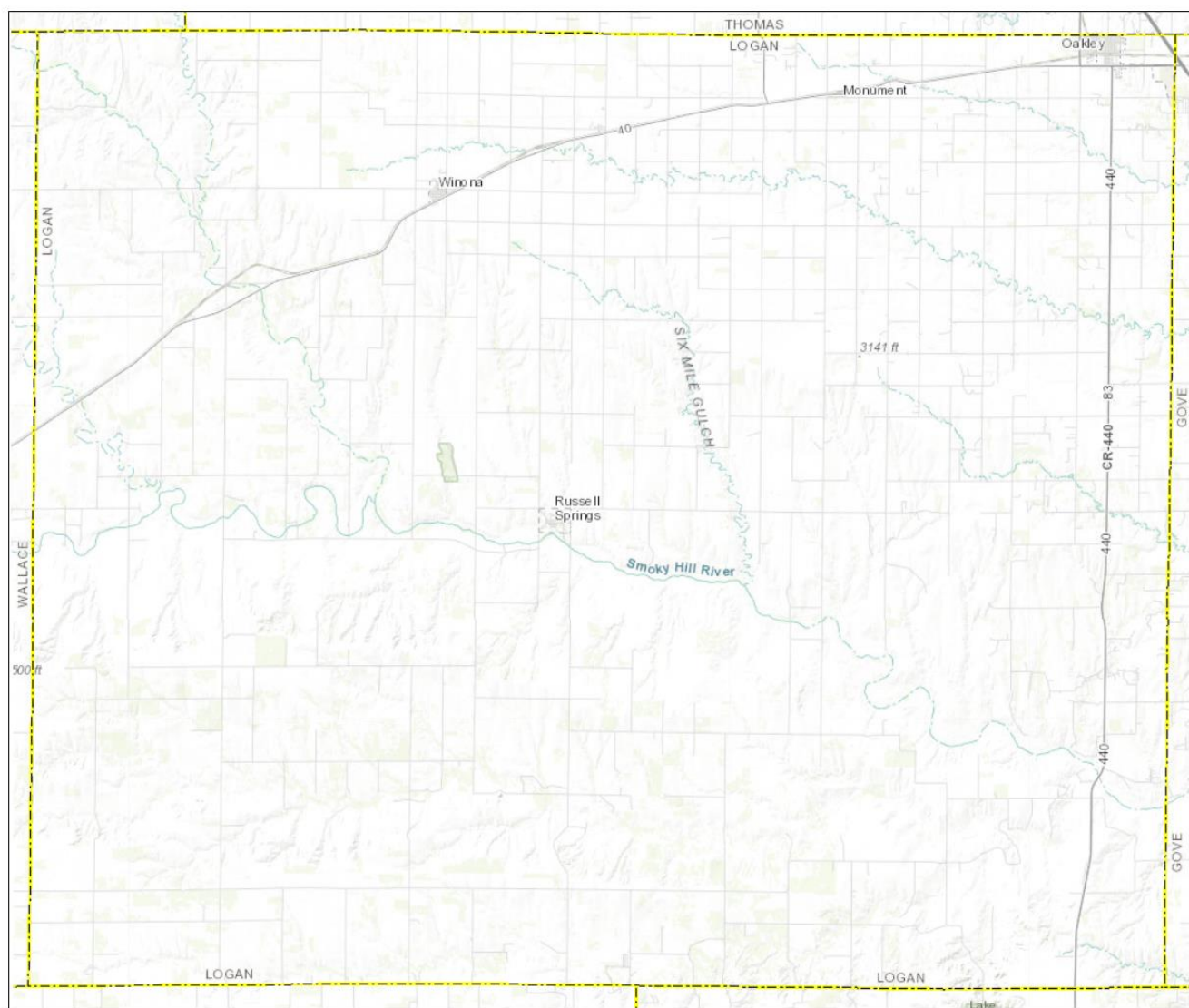
### Map of Gove County





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

### Map of Logan County

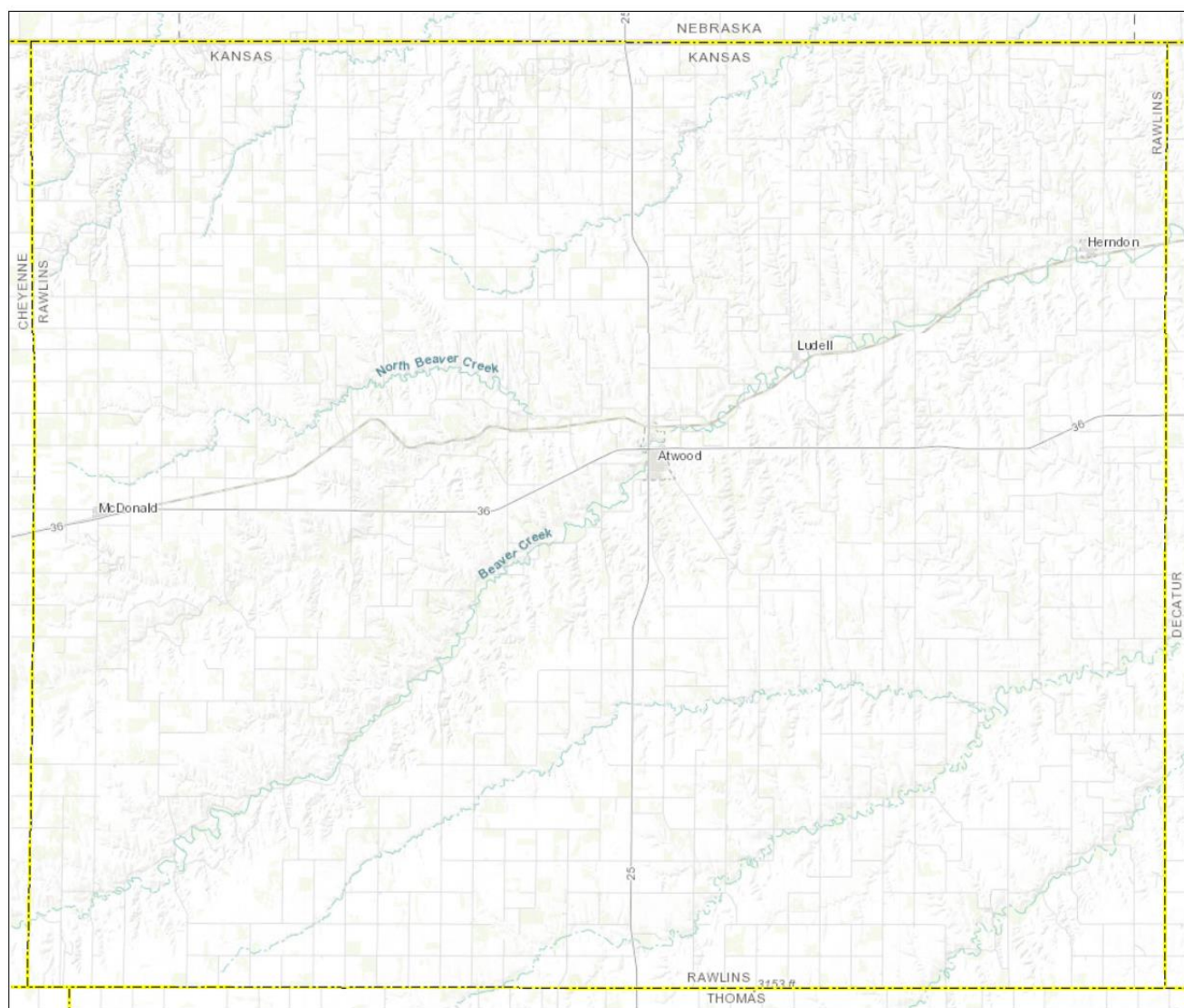






The following is a map of **Rawlins County**, provided by KDOT.

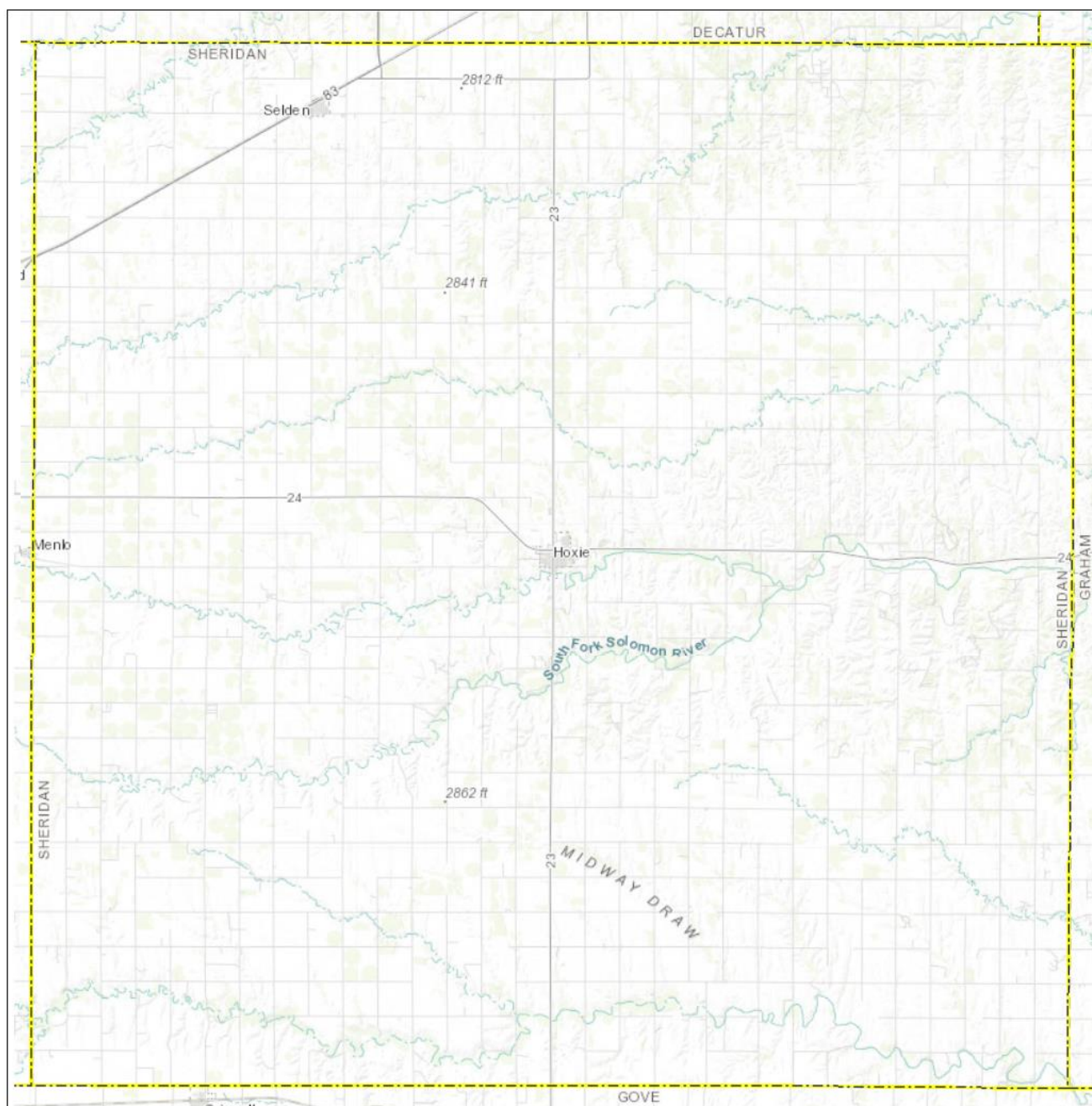
### Map of Rawlins County





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

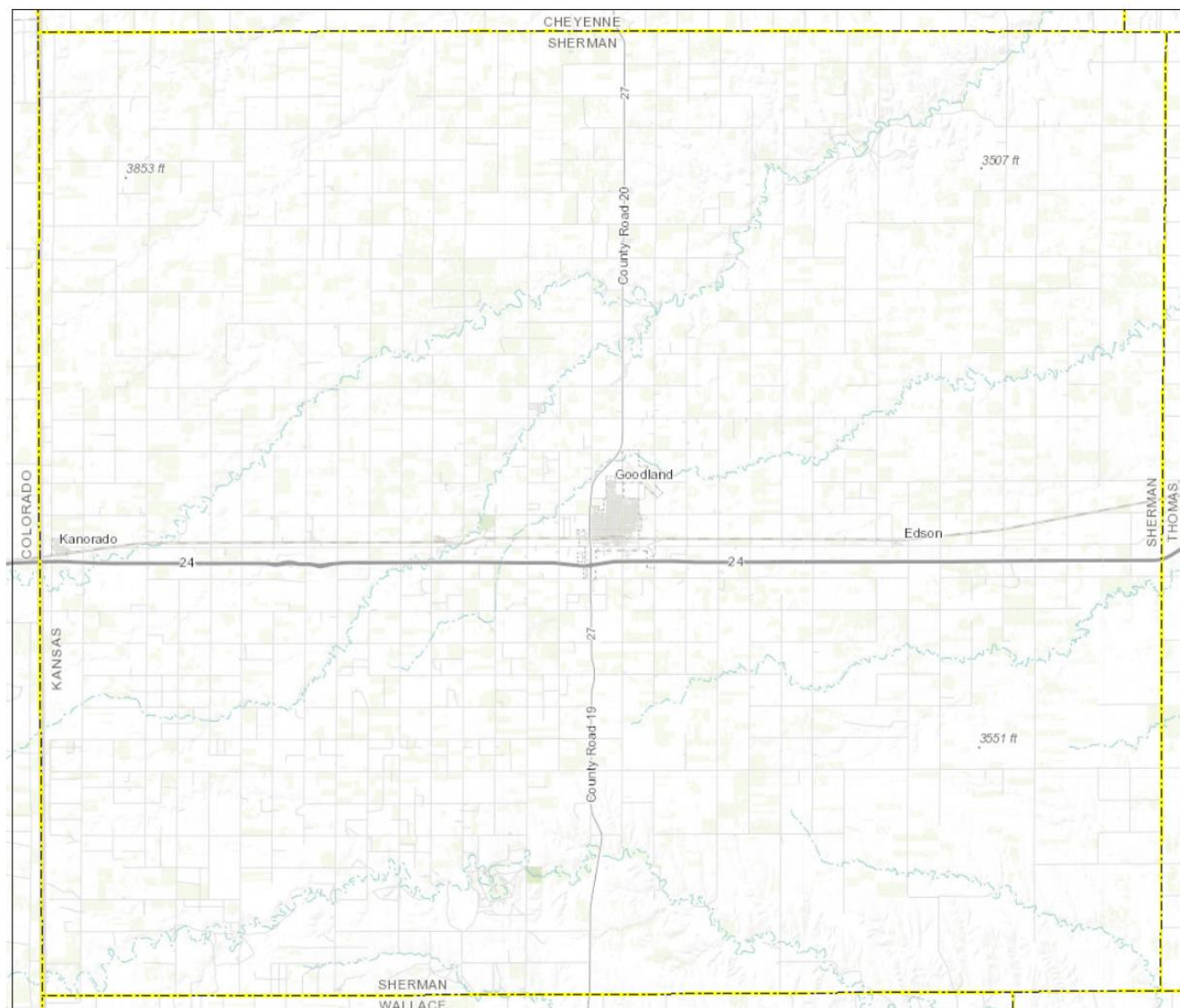
### Map of Sheridan County





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

### Map of Sherman County

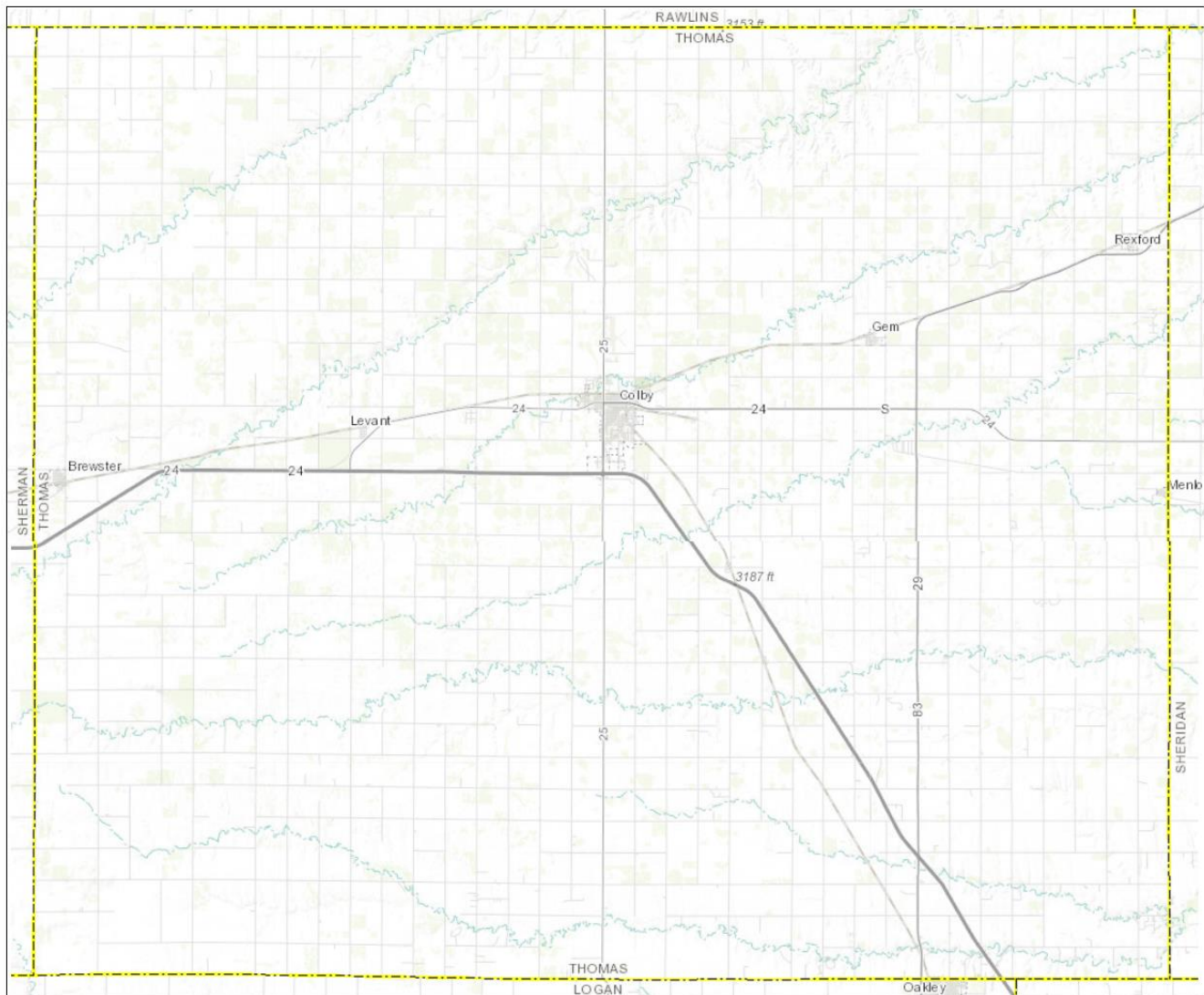






The following is a map of **Thomas County**, provided by KDOT.

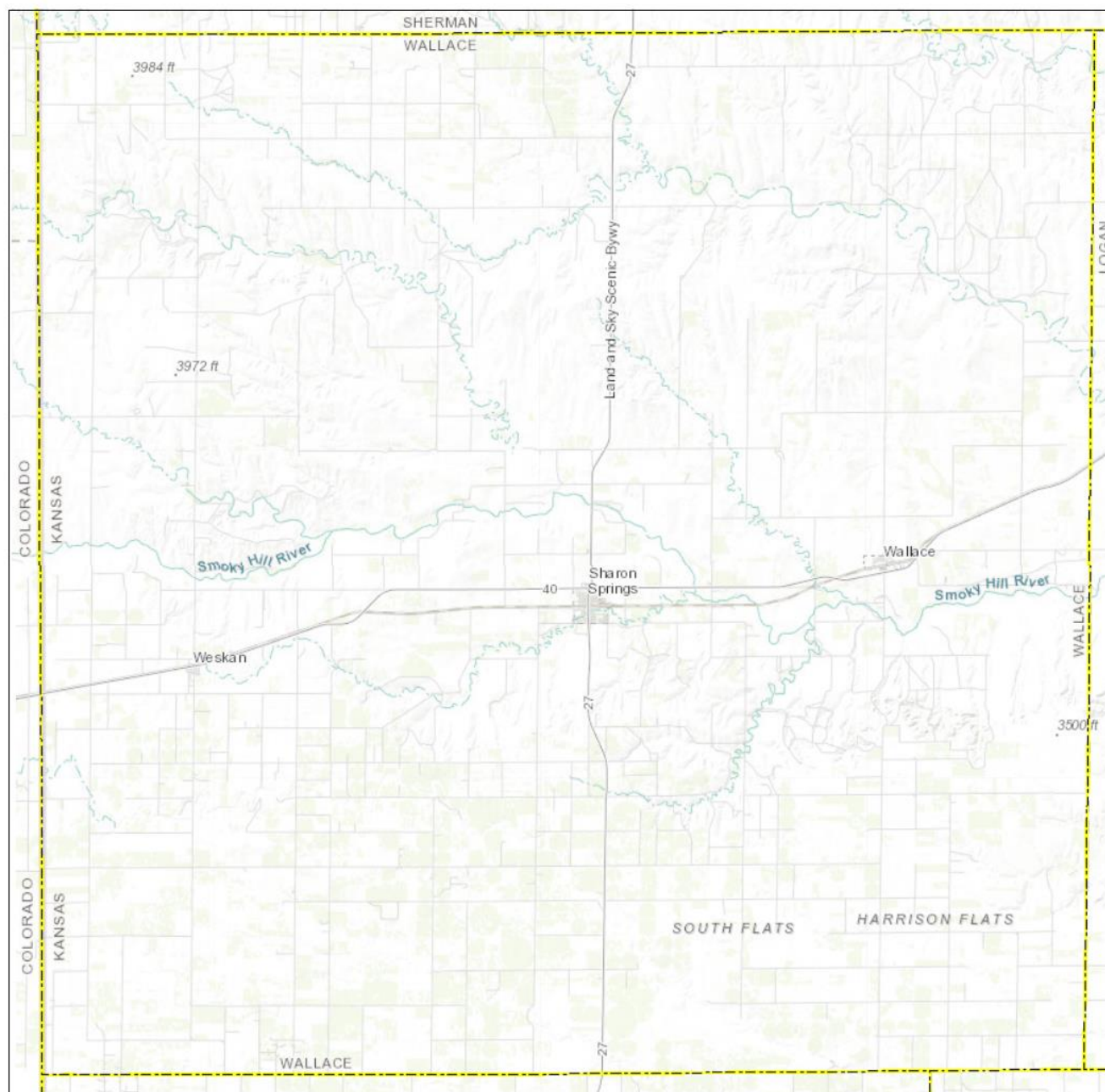
### Map of Thomas County





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

### Map of Wallace County



## 3.2 – Regional Population Data

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





**Table 3.1: Cheyenne County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Cheyenne County</b>	3,165	2,714	2,660	-505	-16.0%	3
City of Bird City	480	447	434	-46	-9.6%	195
City of St. Francis	1,495	1,329	1,294	-201	-13.4%	1,487

Source: US Census Bureau

Of note for Cheyenne County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Cheyenne County, -16.0% as a whole
- Population losses were noted in all participating cities

**Table 3.2: Decatur County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Decatur County</b>	3,446	2,957	2,817	-629	-18.3%	3
City of Dresden	51	41	40	-11	-21.6%	43
City of Jennings	145	96	92	-53	-36.6%	341
City of Norcatur	168	151	146	-22	-13.1%	147
City of Oberlin	1,985	1,788	1,725	-260	-13.1%	903

Source: US Census Bureau

Of note for Decatur County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Decatur County, -18.3% as a whole
- Population losses were noted in all participating cities

**Table 3.3: Gove County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Gove County</b>	3,079	2,692	2,612	-467	-15.2%	2
City of Gove	105	80	70	-35	-33.3%	280
City of Grainfield	327	273	245	-82	-25.1%	510
City of Grinnell	329	258	231	-98	-29.8%	453
City of Park	151	126	113	-38	-25.2%	353
City of Quinter	956	919	1021	65	6.8%	1,031

Source: US Census Bureau

Of note for Gove County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Gove County, -15.2% as a whole





- Population losses were noted in four out of five participating cities

**Table 3.4: Logan County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Logan County</b>	3,053	2,774	2,844	-209	-6.8%	3
City of Oakley	2,192	2,054	2,108	-84	-3.8%	1,087
City of Winona	228	162	161	-67	-29.4%	619

Source: US Census Bureau

Of note for Logan County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Logan County, -6.8% as a whole
- Population losses were noted in all participating cities

**Table 3.5: Rawlins County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Rawlins County</b>	2,979	2,496	2,508	-471	-15.8%	2
City of Atwood	1,279	1,194	1,192	-87	-6.8%	1,084
City of Herndon	148	128	127	-21	-14.2%	488
City of McDonald	159	158	156	-3	-1.9%	709

Source: US Census Bureau

Of note for Rawlins County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Rawlins County, -15.8% as a whole
- Population losses were noted in all participating cities

**Table 3.6: Sheridan County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Sheridan County</b>	2,791	2,530	2,533	-258	-9.2%	3
City of Hoxie	1,250	1,196	1,198	-52	-4.2%	1,426
City of Selden	201	214	213	12	6.0%	710

Source: US Census Bureau

Of note for Sheridan County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Sheridan County, -9.2% as a whole
- Population losses were noted in one out of two participating cities



**Table 3.7: Sherman County Population Data**

<b>Jurisdiction</b>	<b>Population 2000</b>	<b>Population 2010</b>	<b>Population 2018</b>	<b>Numeric Population Change 2000 - 2018</b>	<b>Percent Population Change 2000 to 2018</b>	<b>Population Density, per Square Mile 2018</b>
<b>Sherman County</b>	6,729	6,018	5,899	-830	-12.3%	6
City of Goodland	4,917	4,487	4,386	-531	-10.8%	1,004
City of Kanorado	246	153	150	-96	-39.0%	577

Source: US Census Bureau

Of note for Sherman County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Sherman County, -12.3% as a whole
- Population losses were noted in all participating cities

**Table 3.8: Thomas County Population Data**

<b>Jurisdiction</b>	<b>Population 2000</b>	<b>Population 2010</b>	<b>Population 2018</b>	<b>Numeric Population Change 2000 - 2018</b>	<b>Percent Population Change 2000 to 2018</b>	<b>Population Density, per Square Mile 2018</b>
<b>Thomas County</b>	8,159	7,930	7,711	-448	-5.5%	7
City of Brewster	286	306	288	2	0.7%	1,108
City of Colby	5,428	5,416	5,317	-111	-2.0%	1,573
City of Gem	96	88	84	-12	-12.5%	255
City of Menlo	57	61	58	1	1.8%	483
City of Rexford	155	235	244	89	57.4%	938

Source: US Census Bureau

Of note for Thomas County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Thomas County, -5.5% as a whole
- Population losses were noted in two out of five participating cities

**Table 3.9: Wallace County Population Data**

<b>Jurisdiction</b>	<b>Population 2000</b>	<b>Population 2010</b>	<b>Population 2018</b>	<b>Numeric Population Change 2000 - 2018</b>	<b>Percent Population Change 2000 to 2018</b>	<b>Population Density, per Square Mile 2018</b>
<b>Wallace County</b>	1,732	1,480	1,503	-229	-13.2%	2
City of Sharon Springs	835	748	752	-83	-9.9%	826
City of Wallace	64	58	59	-5	-7.8%	148

Source: US Census Bureau

Of note for Wallace County and its participating jurisdictions for the period 2000 to 2018:

- A population loss was noted in Wallace County, -13.2% 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 A jurisdiction, by county. The higher a jurisdiction's at-risk population the greater the potential vulnerability to identified hazards.

**Table 3.10: Kansas Region A Potentially Vulnerable Population Data, Jurisdictions Over 5,000 Persons**

Jurisdiction	Percentage of Population 5 and Under (2018)	Percentage of Population 65+ (2018)	Percentage of Population Speaking Language Other Than English (2018)	Percentage of Population Living Below Poverty Level (2018)	Persons with a Disability, Under the Age of 65 (2018)
Cheyenne County	7.0%	27.3%	7.4%	12.4%	10.8%
Decatur County	5.8%	28.4%	4.1%	13.6%	7.5%
Gove County	5.8%	24.2%	3.2%	11.4%	8.4%
Logan County	7.5%	21.2%	3.9%	9.1%	6.3%
Rawlins County	6.7%	27.9%	7.4%	12.9%	11.5%
Sheridan County	6.0%	23.7%	6.3%	11.9%	10.3%
Sherman County	6.8%	19.5%	10.1%	13.7%	12.9%
Thomas County	7.4%	18.1%	3.9%	9.9%	10.4%
Wallace County	6.9%	24.2%	4.3%	13.1%	8.9%

Source: US Census Bureau

Of note for Kanas Region A and its participating jurisdictions:

- Regionally, 6.7% of the total population is under the age of 5
- Regionally, 23.8% of the total population is above the age of 65
- Regionally, 5.6% of the total population speak a language other than English at home
- Regionally, 12.0% of the total population is living below the poverty line
- Regionally, 9.7% 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. In general, the lower a jurisdiction's housing stock, the lower the hazard vulnerability.

**Table 3.11: Cheyenne County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
<b>Cheyenne County</b>	1,636	1,504	-132	-8.1%	4.7%	1
City of Bird City	285	312	27	9.5%	2.9%	140
City of St. Francis	766	788	22	2.9%	2.2%	906

Source: US Census Bureau

Of note for Cheyenne County and its participating jurisdictions for the period 2000 to 2018:

- A housing loss was noted in Cheyenne County, -8.1% as a whole
- Housing gains were noted in all participating cities

**Table 3.12: Decatur County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
<b>Decatur County</b>	1,821	1,801	-20	-1.1%	4.1%	2
City of Dresden	28	41	13	46.4%	0.0%	44
City of Jennings	99	111	12	12.1%	9.9%	411
City of Norcatur	104	174	70	67.3%	6.9%	176
City of Oberlin	1,048	1,032	-16	-1.5%	2.8%	540

Source: US Census Bureau

Of note for Decatur County and its participating jurisdictions for the period 2000 to 2018:

- Housing levels remained static in Decatur County, with a small -1.1% decline
- Housing losses were noted in three out of four participating cities

**Table 3.13: Gove County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
<b>Gove County</b>	1,413	1,413	0	0.0%	6.5%	1
City of Gove	55	53	-2	-3.6%	11.3%	212



**Table 3.13: Gove County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
City of Grainfield	159	169	10	6.3%	6.5%	352
City of Grinnell	158	191	33	20.9%	7.3%	375
City of Park	89	101	12	13.5%	5.9%	316
City of Quinter	463	437	-26	-5.6%	4.6%	441

Source: US Census Bureau

Of note for Gove County and its participating jurisdictions for the period 2000 to 2018:

- Housing levels remained static in Gove County
- Housing gains were noted in three out of five participating cities

**Table 3.14: Logan County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
<b>Logan County</b>	1,423	1,448	25	1.8%	5.5%	1
City of Oakley	1,009	1,075	66	6.5%	7.3%	554
City of Winona	103	114	11	10.7%	2.6%	438

Source: US Census Bureau

Of note for Logan County and its participating jurisdictions for the period 2000 to 2018:

- Housing levels remained static in Logan County, with a small 1.8% gain
- Housing gains were noted in all participating cities

**Table 3.15: Rawlins County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
<b>Rawlins County</b>	1,565	1,453	-112	-7.2%	4.1%	1
City of Atwood	708	635	-73	-10.3%	4.1%	577
City of Herndon	107	109	2	1.9%	6.4%	419
City of McDonald	109	102	-7	-6.4%	3.9%	464

Source: US Census Bureau

Of note for Rawlins County and its participating jurisdictions for the period 2000 to 2018:





- A housing loss was noted in Rawlins County, -7.2% as a whole
- Housing gains were noted in two out of three participating cities

**Table 3.16: Sheridan County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
<b>Sheridan County</b>	1,263	1,257	-6	-0.5%	3.1%	1
City of Hoxie	601	636	35	5.8%	2.2%	757
City of Selden	118	181	63	53.4%	0.0%	603

Source: US Census Bureau

Of note for Sheridan County and its participating jurisdictions for the period 2000 to 2018:

- Housing levels remained static in Sheridan County, with a small -0.5% decline
- Housing gains were noted in all participating cities

**Table 3.17: Sherman County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
<b>Sherman County</b>	3,184	3,125	-59	-1.9%	8.7%	3
City of Goodland	2,410	2,360	-50	-2.1%	8.3%	540
City of Kanorado	101	109	8	7.9%	34.9%	419

Source: US Census Bureau

Of note for Sherman County and its participating jurisdictions for the period 2000 to 2018:

- Housing levels remained static in Sherman County, with a small -1.9% decline
- Housing gains were noted in one out of two participating cities

**Table 3.18: Thomas County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
<b>Thomas County</b>	3,562	3,574	12	0.3%	10.9%	3
City of Brewster	136	149	13	9.6%	16.1%	573
City of Colby	2,405	2,508	103	4.3%	10.2%	742
City of Gem	47	49	2	4.3%	30.6%	148
City of Menlo	23	16	-7	-30.4%	12.5%	133
City of Rexford	105	85	-20	-19.0%	12.9%	327

Source: US Census Bureau





Of note for Thomas County and its participating jurisdictions for the period 2000 to 2018:

- Housing levels remained static in Thomas County, with a small 0.3% gain
- Housing losses were noted in three out of five participating cities

**Table 3.19: Wallace County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2018	Numeric Housing Change 2000 - 2018	Percentage Housing Change 2000 - 2018	Percentage Mobile Homes 2018	Housing Density, per Square Mile 2018
Wallace County	791	806	15	1.9%	6.8%	1
City of Sharon Springs	408	441	33	8.1%	5.4%	485
City of Wallace	35	41	6	17.1%	24.4%	103

Source: US Census Bureau

Of note for Wallace County and its participating jurisdictions for the period 2000 to 2018:

- Housing levels remained static in Wallace County, with a small 1.9% increase
- Housing gains were noted in all participating cities

### 3.5 – Regional Property Valuations

This section quantifies the built environment exposed to potential hazards in Kansas Region A. The following tables provide monetary value of structures, by category and where available, for each county in Kansas Region A. 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 3.20: Kansas Region A Property Valuations, Residential, Commercial and Industrial**

County	Residential	Commercial	Industrial
Cheyenne	\$361,260,000	\$100,943,000	\$27,401,000
Decatur	\$430,950,000	\$97,757,000	\$15,738,000
Gove	\$360,152,000	\$105,313,000	\$37,383,000
Logan	\$367,161,000	\$136,218,000	\$12,235,000
Rawlins	\$409,870,000	\$124,882,000	\$19,182,000
Sheridan	\$397,734,000	\$107,558,000	\$11,328,000
Sherman	\$877,820,000	\$278,870,000	\$37,625,000
Thomas	\$1,047,601,000	\$351,383,000	\$49,674,000
Wallace	\$263,429,000	\$48,866,000	\$4,470,000

Source: HAZUS

**Table 3.21: Kansas Region A Property Valuations, Agriculture, Government and Education**

County	Agriculture	Government	Education
Cheyenne	\$30,840,000	\$2,538,000	\$16,034,000
Decatur	\$29,540,000	\$6,864,000	\$11,546,000
Gove	\$46,244,000	\$6,599,000	\$34,794,000





**Table 3.21: Kansas Region A Property Valuations, Agriculture, Government and Education**

County	Agriculture	Government	Education
Logan	\$32,664,000	\$6,474,000	\$18,714,000
Rawlins	\$35,326,000	\$11,804,000	\$14,644,000
Sheridan	\$29,514,000	\$4,674,000	\$16,216,000
Sherman	\$41,680,000	\$10,118,000	\$42,634,000
Thomas	\$59,924,000	\$13,738,000	\$117,148,000
Wallace	\$18,412,000	\$7,819,000	\$10,824,000

Source: HAZUS

**Table 3.22: Kansas Region A Property Total Valuations**

County	Total
Cheyenne	\$554,880,000
Decatur	\$616,613,000
Gove	\$606,667,000
Logan	\$590,580,000
Rawlins	\$631,196,000
Sheridan	\$580,596,000
Sherman	\$1,329,873,000
Thomas	\$1,689,350,000
Wallace	\$365,668,000

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 3.23: Participating USD Information**

School District	Enrollment (2013)	Enrollment (2018)	Enrollment Change (2013-2018)	School Buildings (2018)	Total Insured Valuation of Structures (2018)
<b>Cheyenne County</b>					
USD #103 - Cheylin	129	127	-2	7	-
USD #297 – St. Francis Community Schools	298	270	-28	2	\$25,210,311
<b>Decatur County</b>					
USD #294 – Oberlin	360	350	-10	5	-
<b>Gove County</b>					
USD #291 – Grinnell Public Schools	99	77	-22	7	-
USD #292 – Wheatland	104	101	-3	7	-
USD #293 – Quinter Public Schools	304	315	11	7	-
<b>Logan County</b>					
USD #274 - Oakley	428	450	22	8	-
USD #275 - Triplains	81	71	-10	7	-
<b>Rawlins County</b>					
USD #105 – Rawlins County	325	356	31	8	-
<b>Sheridan County</b>					
USD #316-Golden Plains	199	100	-99	3	\$1,500,000
USD #412 – Hoxie Community Schools	350	470	120	2	\$2,500,000
<b>Sherman County</b>					
USD #352 – Goodland	1,076	971	-105	9	-
<b>Thomas County</b>					
USD #314 - Brewster	102	127	25	4	\$1,494,918
USD #315 – Colby Public Schools	960	952	-8	6	\$53,000,000
USD #316 – Golden Plains	199	100	-99	3	\$1,500,000
<b>Wallace County</b>					
USD # 241 – Wallace County Schools	196	200	4	7	-
USD # 242 - Weskan	96	100	4	7	-

Source: Kansas State Department of Education and participating USDs

:- Information unavailable

The following table presents participating private school, 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 3.24: Participating Private School, College and University Information**

School District	Estimated Enrollment (2019)	Number of Buildings (2019)	Total Insured Valuation of Structures (2019)
<b>Sherman County</b>			
Northwest Kansas Technical College	820	21	-
<b>Thomas County</b>			
Colby Community College	2,459	29	\$148,708,855
Heartland Christian School	52	1	-
Sacred Heart Catholic School	120	2	-

Source: Participating private school, college, or university

-: 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.

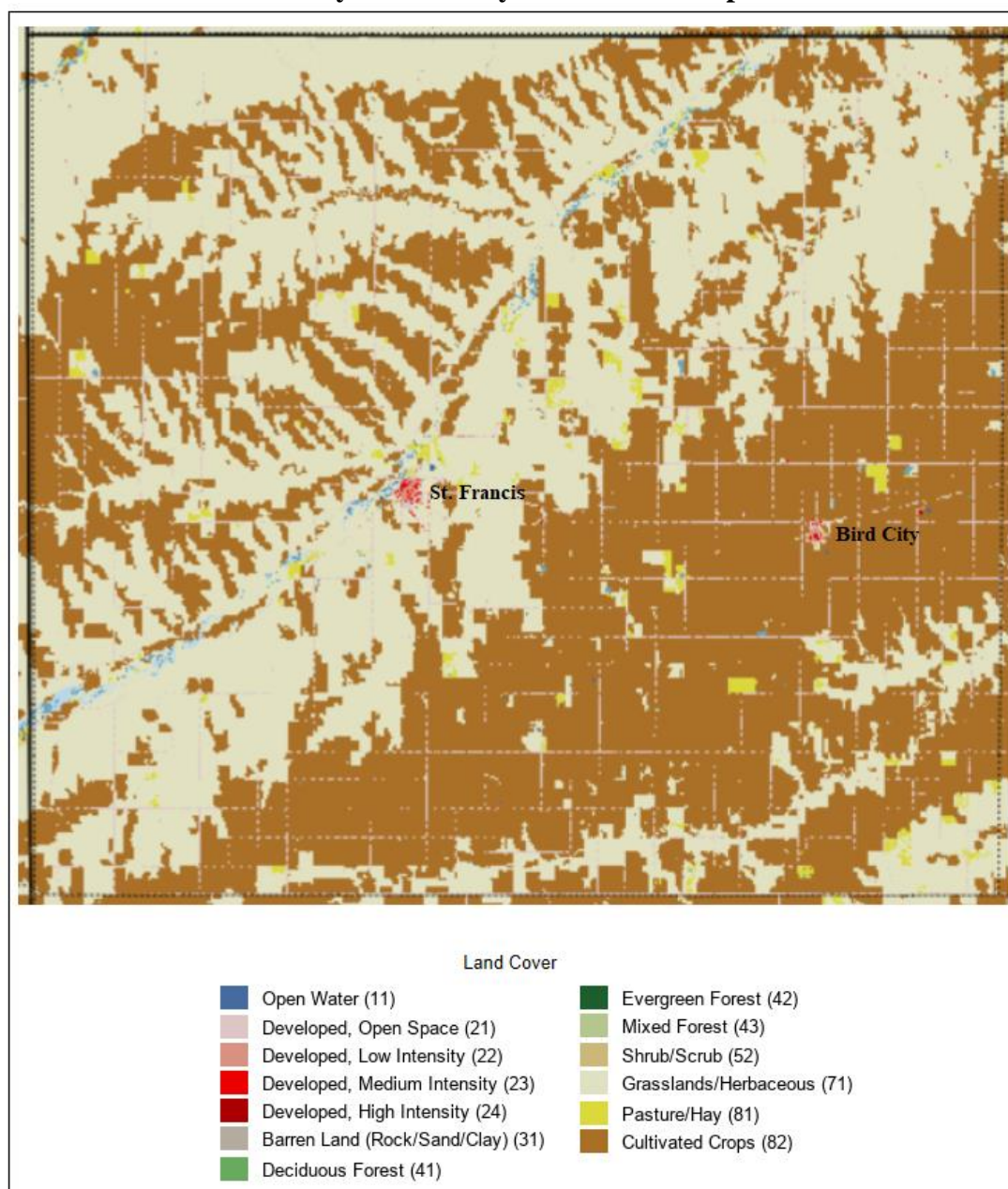




### 3.9 – Regional Land Cover

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.

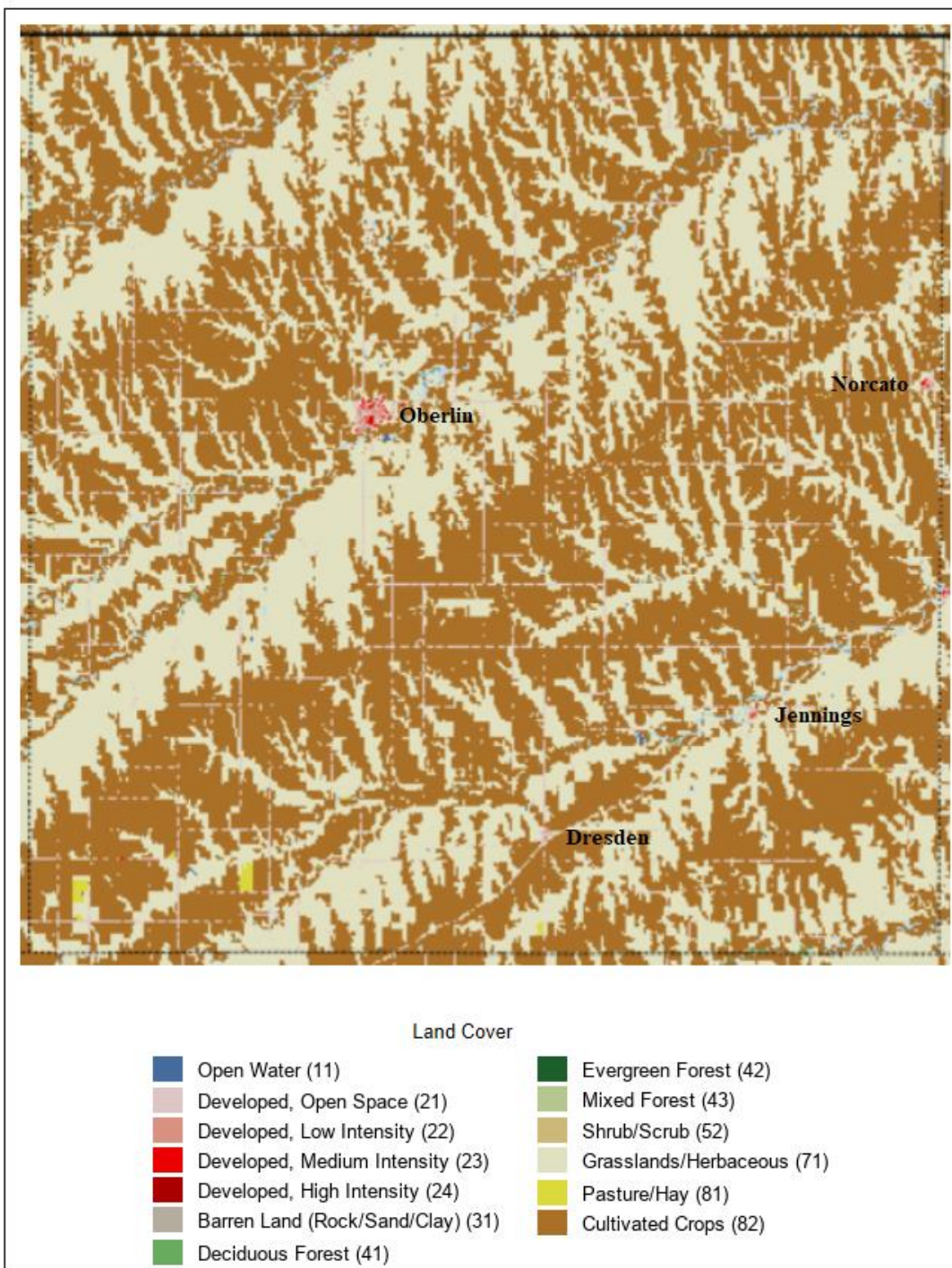
**Cheyenne County Land Cover Map**





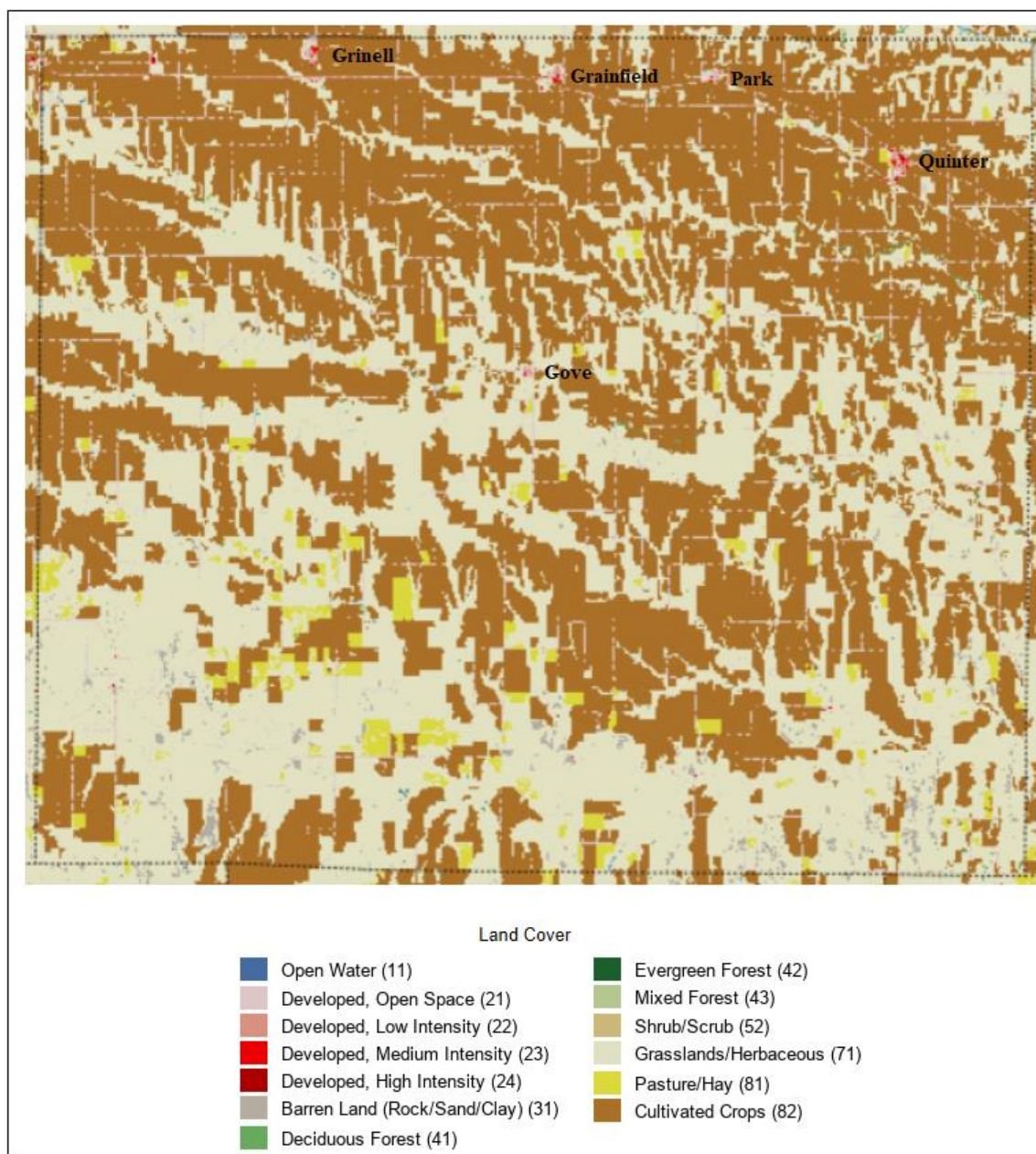


## Decatur County Land Cover Map





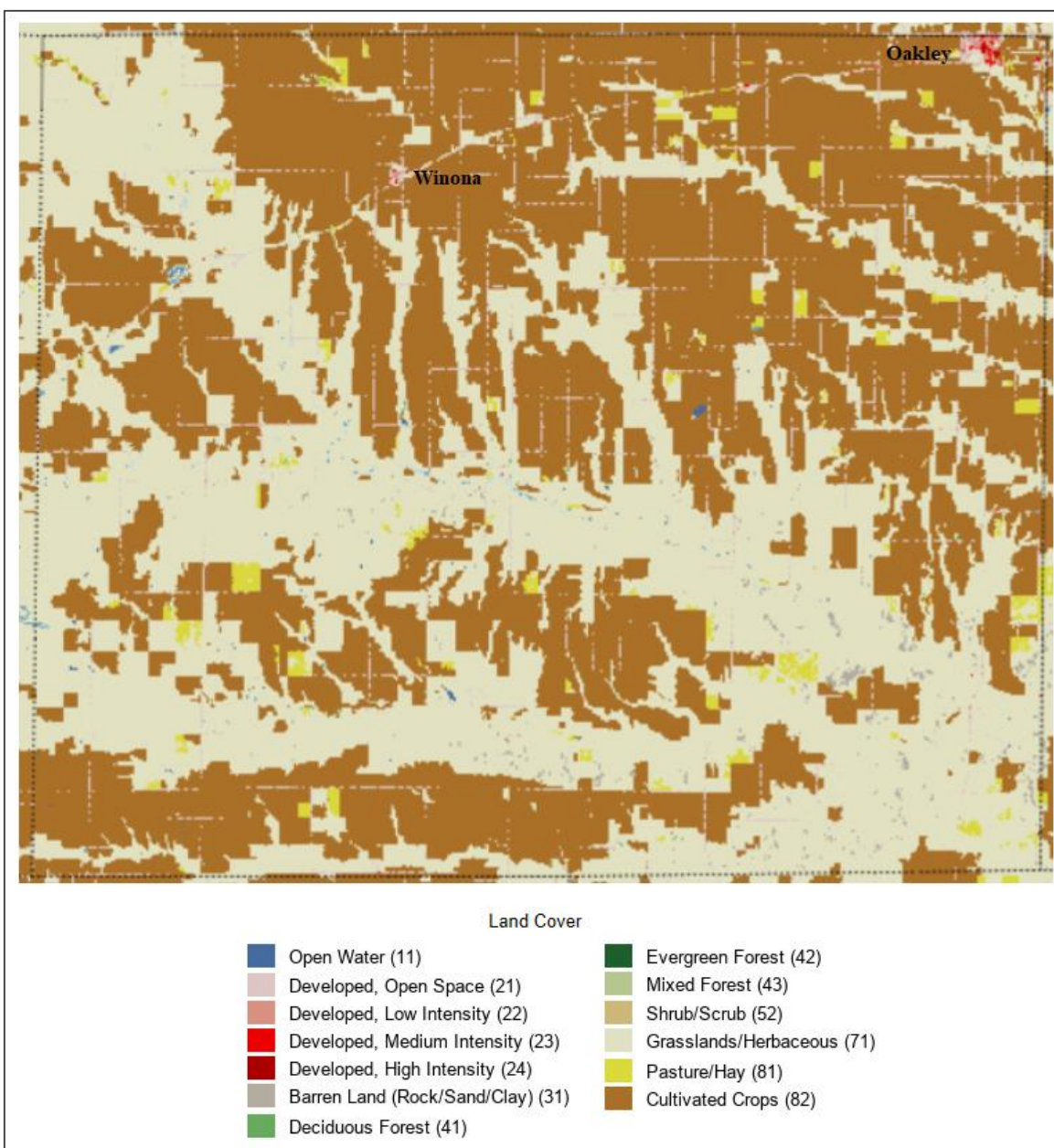
## Gove County Land Cover Map





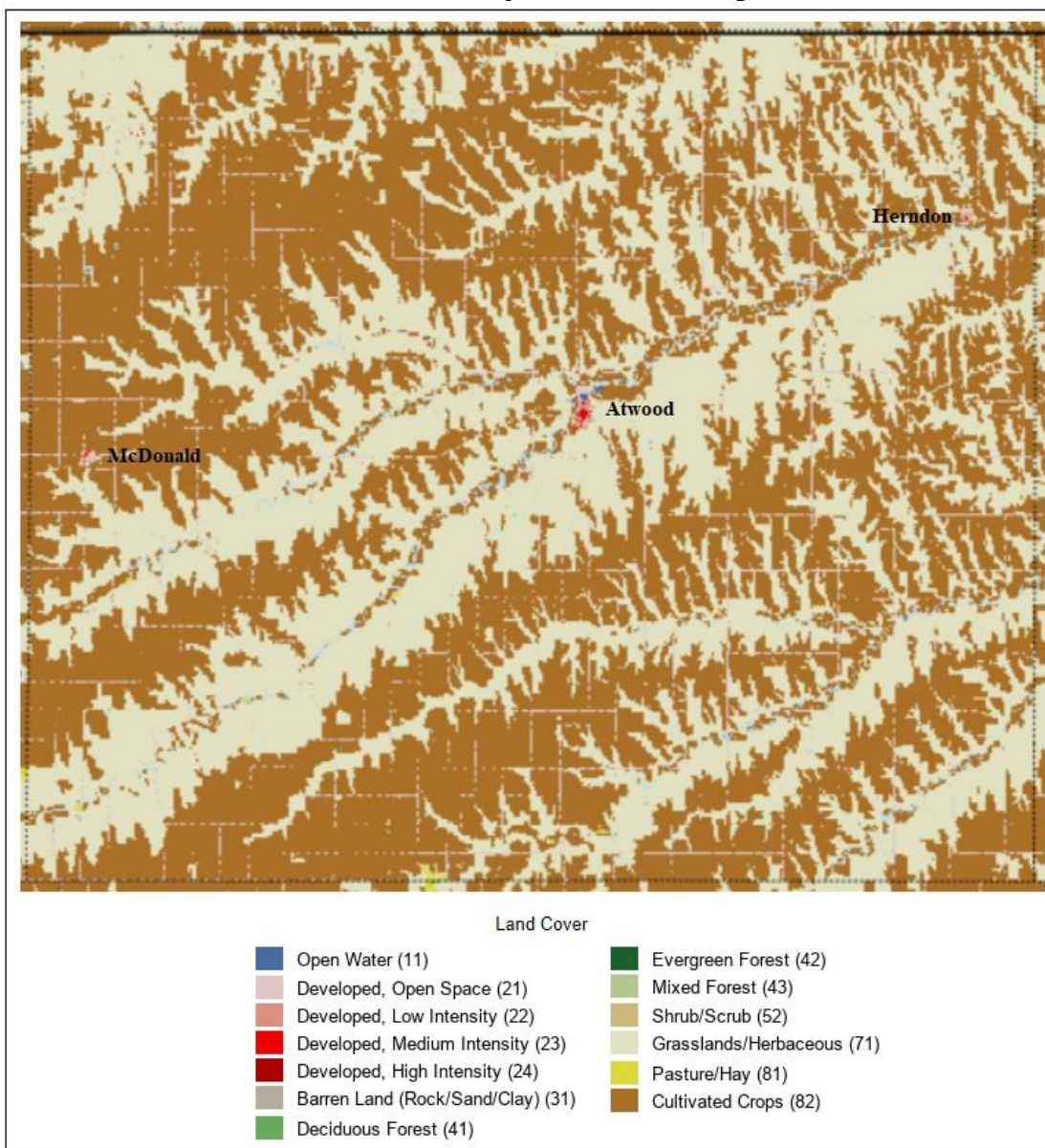


## Logan County Land Cover Map





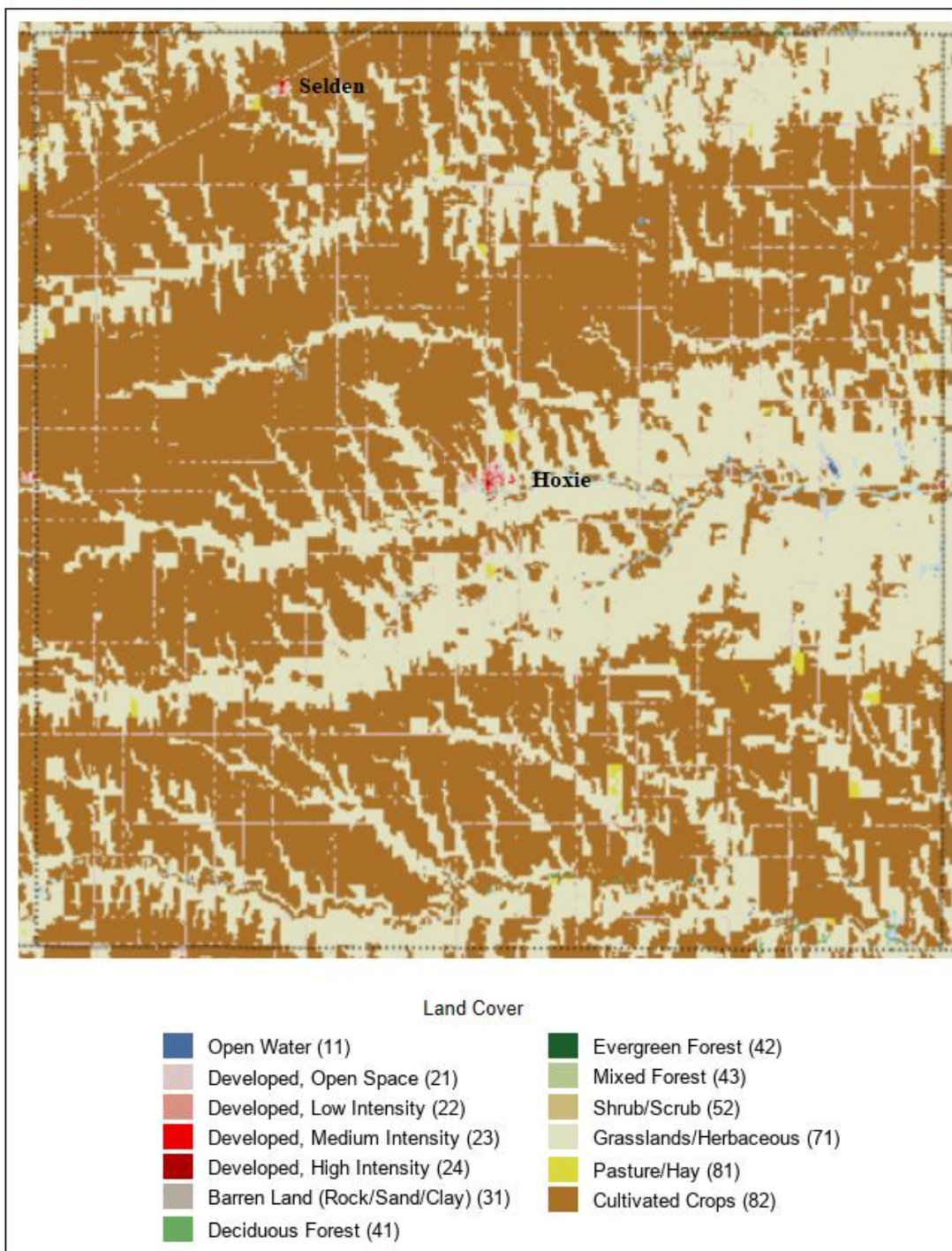
## Rawlins County Land Cover Map





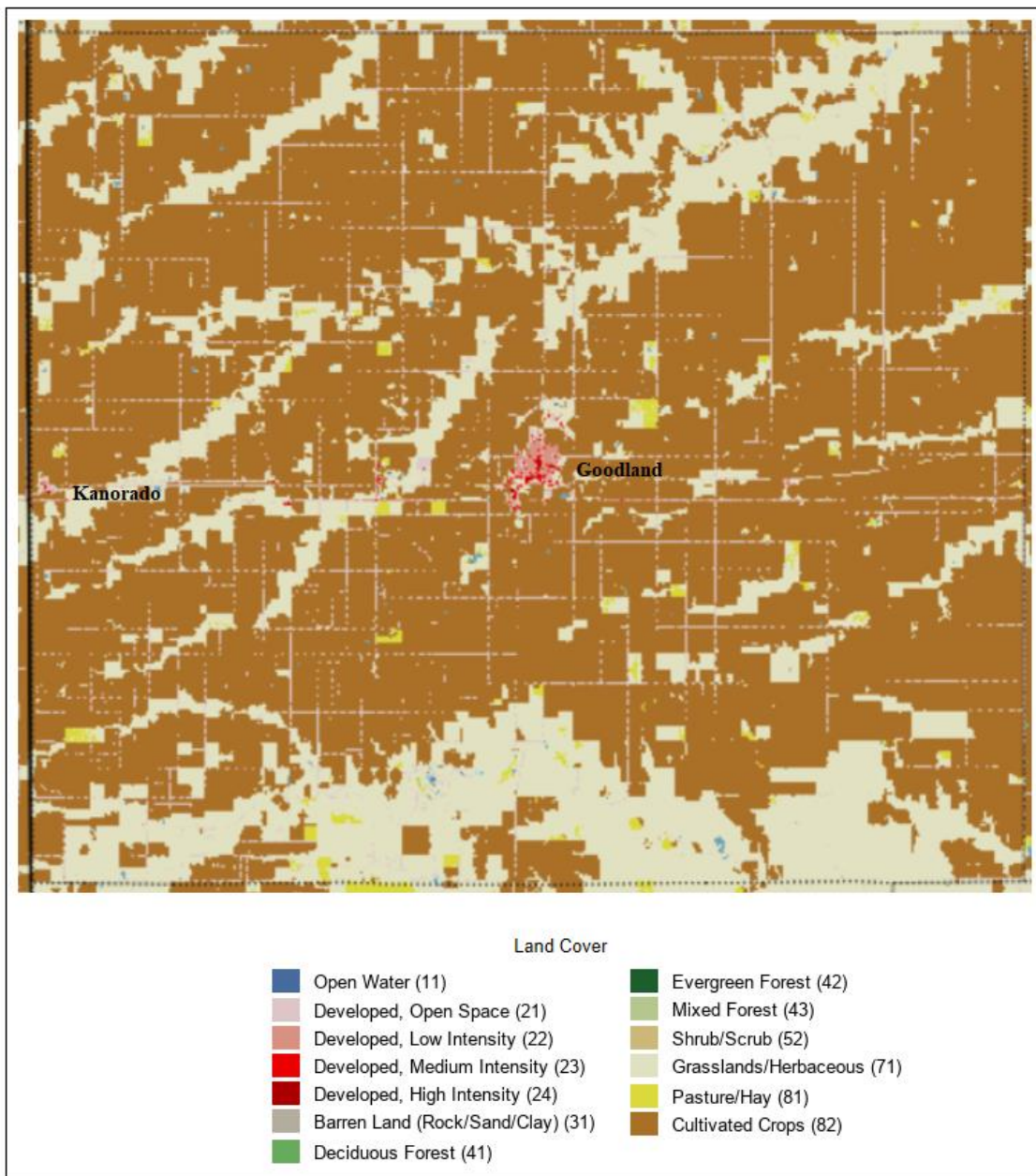


## Sheridan County Land Cover Map





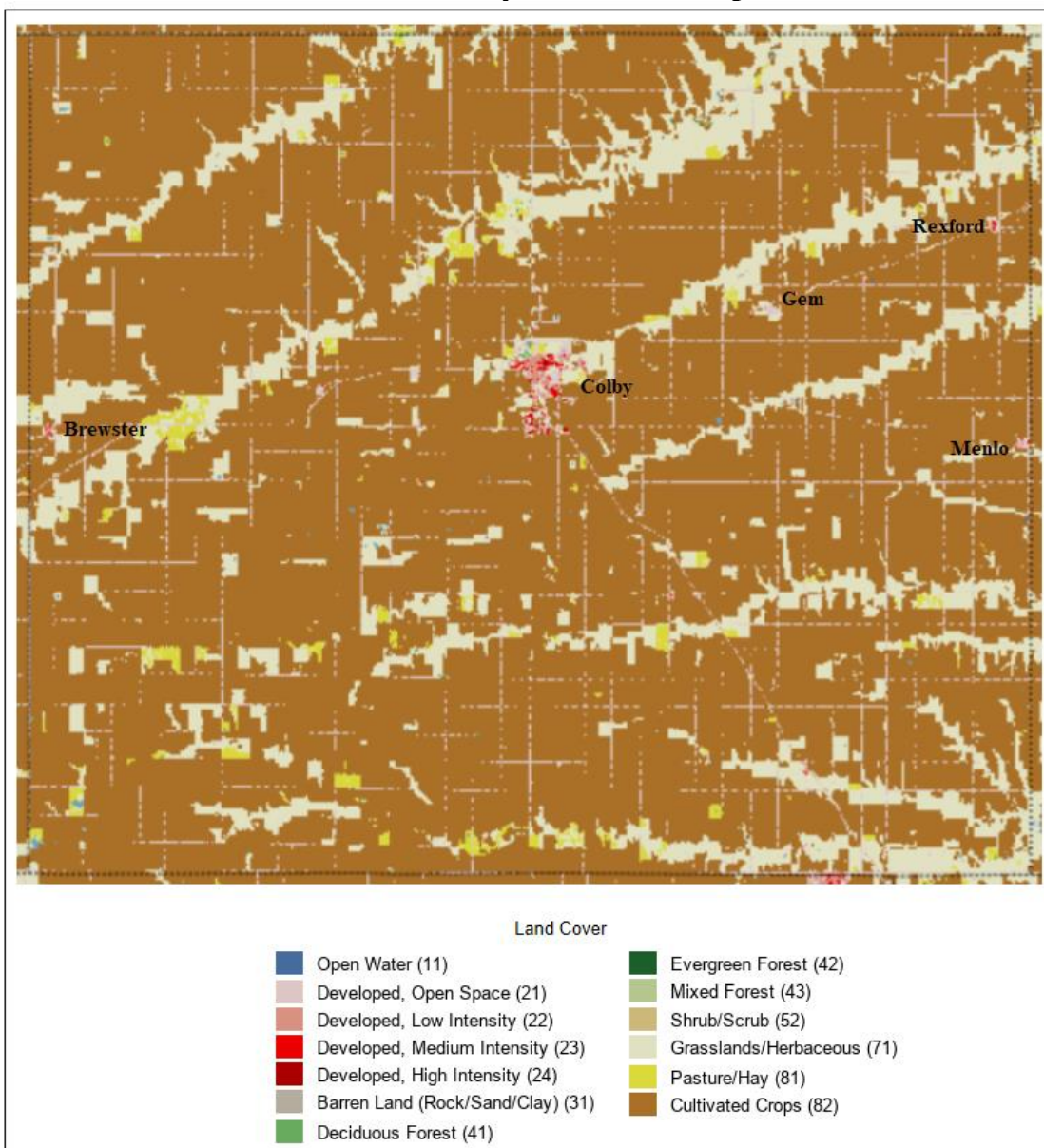
## Sherman County Land Cover Map





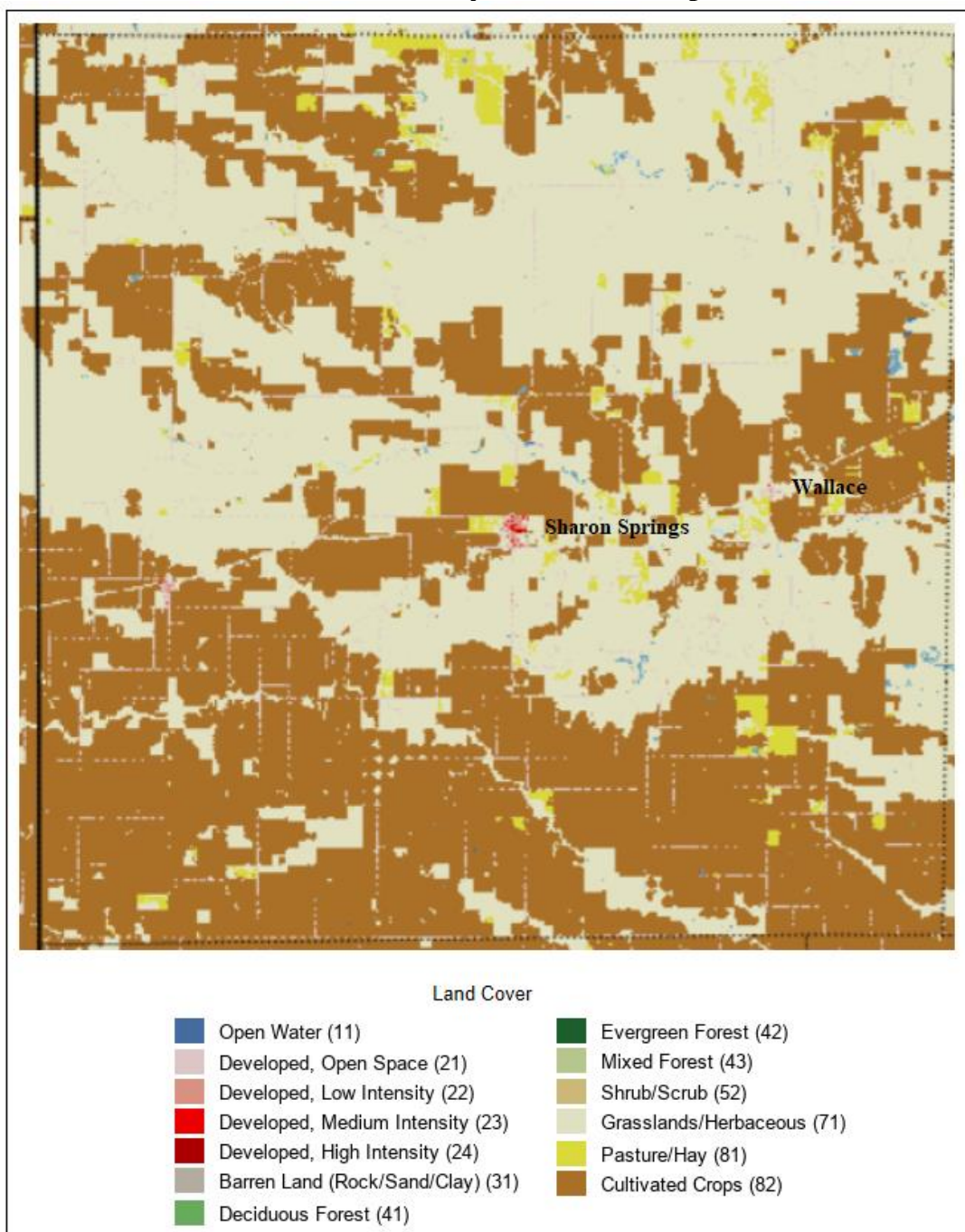


## Thomas County Land Cover Map





## Wallace 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 approximately 46,000,000 acres of farmland, which accounts for 88% of all Kansas land.

The following tables present information from the USDA National Agricultural Statistics Service 2017 Census of Agriculture (the latest available data) relating to farm totals, agricultural acreage and livestock (cattle, hogs and pigs) for Kansas Region A.

**Table 3.25: Kansas Region A Farm Data, 2017 Census of Agriculture**

County	Number of Farms	Farm Acreage	Percent of Acreage as Cropland	Percent of Acreage as Pastureland	Market Value of Products Sold (Yearly)	Percentage of State Agriculture Sales
Cheyenne	384	529,326	64%	34%	\$132,754,000	1%
Decatur	270	420,032	61%	37%	\$233,431,000	1%
Gove	350	567,444	64%	34%	\$201,514,000	1%
Logan	270	604,595	56%	41%	\$70,870,000	0.5%
Rawlins	298	603,529	59%	39%	\$100,351,000	1%
Sheridan	318	512,108	70%	28%	\$348,852,000	2%
Sherman	386	618,428	79%	20%	\$139,179,000	1%
Thomas	402	669,940	85%	14%	\$251,056,000	1%
Wallace	281	445,809	68%	31%	\$81,786,000	0.5%

Source: United States Department of Agriculture National Agricultural Statistics Service

**Table 3.26: Kansas Region A Livestock Data, 2017 Census of Agriculture**

County	Cattle	Hogs and Pigs
Cheyenne	-	-
Decatur	185,155	-
Gove	136,071	-
Logan	22,551	-
Rawlins	33,449	-
Sheridan	259,158	-
Sherman	37,316	13
Thomas	-	16
Wallace	-	-

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*





Future development speaks to the potential impacts of land use and demographic changes in hazard prone areas. Data in this section is based on the best available data but is speculative as future conditions are subject to numerous unpredictable factors. While past trends are used to inform the discussion, previous historical trends are no guarantee of future conditions.

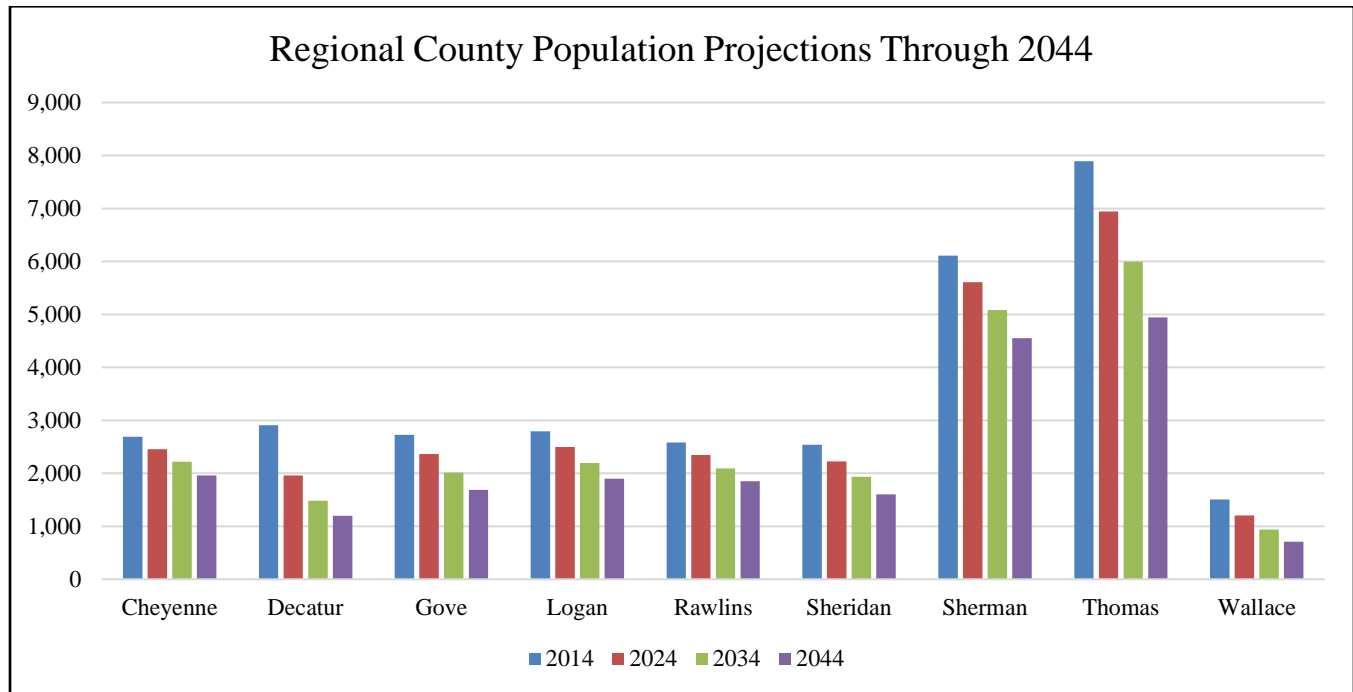
The University of Kansas Institute for Policy and Social Research developed population projections for the region using historical and trend data. Indications are the region will experience a decline in population through the year 2044.

**Table 3.27: Kansas Region A Population Projections Through 2044**

County	2014	2024	2034	2044	Projected Growth Percentage Through 2044
Cheyenne	2,693	2,454	2,216	1,962	-27.1%
Decatur	2,908	1,961	1,480	1,198	-58.1%
Gove	2,727	2,363	2,016	1,687	-38.1%
Logan	2,794	2,497	2,193	1,897	-32.1%
Rawlins	2,584	2,344	2,094	1,853	-28.3%
Sheridan	2,539	2,226	1,934	1,600	-37.0%
Sherman	6,110	5,610	5,082	4,551	25.5%
Thomas	7,891	6,942	5,992	4,941	-37.4%
Wallace	1,506	1,204	939	708	-53.0%

Source: University of Kansas Institute for Policy and Social Research

The following chart illustrates the above data.



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 growth in housing through the year 2054.



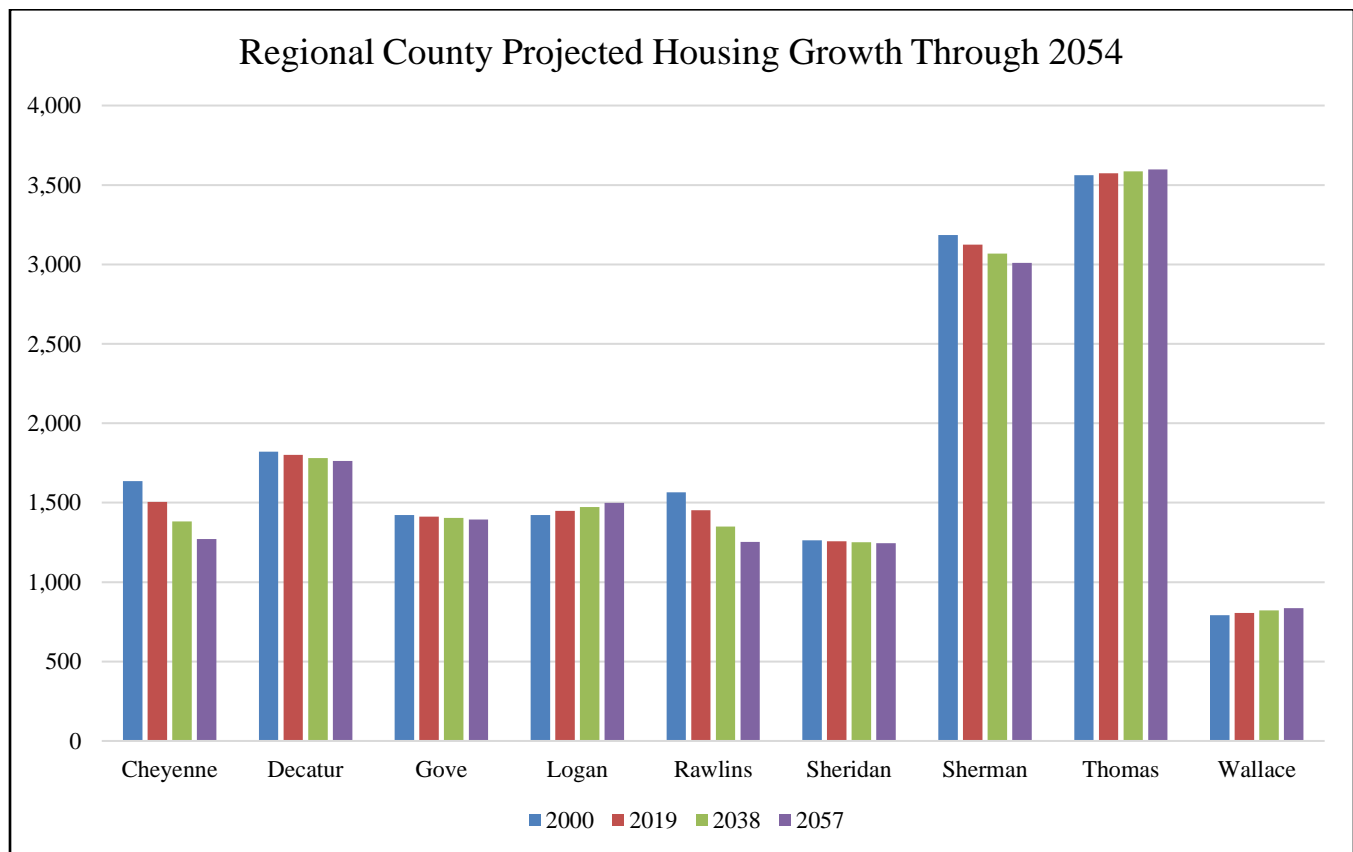


**Table 3.28: Kansas Region A Housing Projections Through 2054**

County	2000	2018	2036	2054	Projected Growth Percentage Through 2054
Cheyenne	1,636	1,504	1,383	1,271	-8.1%
Decatur	1,821	1,801	1,781	1,762	-1.1%
Gove	1,423	1,413	1,403	1,393	-0.7%
Logan	1,423	1,448	1,473	1,499	1.8%
Rawlins	1,565	1,453	1,349	1,252	-7.2%
Sheridan	1,263	1,257	1,251	1,245	-0.5%
Sherman	3,184	3,125	3,067	3,010	-1.9%
Thomas	3,562	3,574	3,586	3,598	0.3%
Wallace	791	806	821	837	1.9%

Source: US Census Bureau

The following chart illustrates the above data.



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 2030.



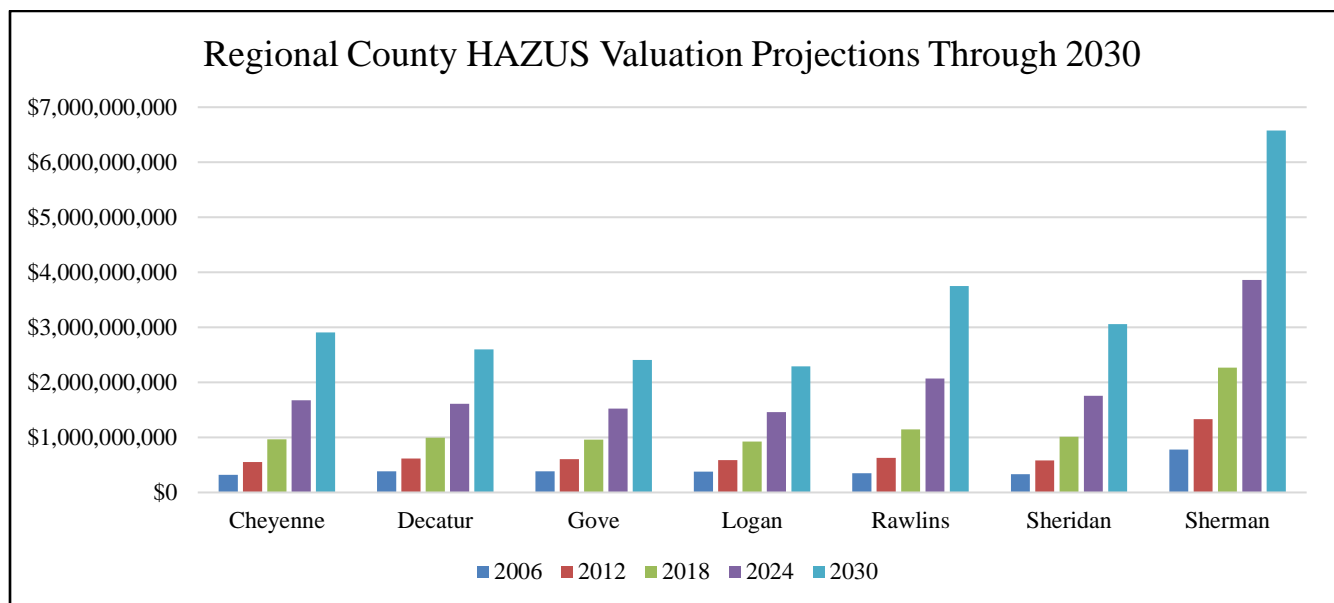


**Table 3.29: Kansas Region A Property Valuation Projections Through 2030**

County	2006	2012	2018	2024	2030	Projected Growth Percentage Through 2030
Cheyenne	\$319,487,000	\$554,880,000	\$963,706,863	\$1,673,750,932	\$2,906,944,311	73.7%
Decatur	\$381,661,000	\$616,613,000	\$996,202,367	\$1,609,468,430	\$2,600,263,472	61.6%
Gove	\$383,075,000	\$606,667,000	\$960,764,469	\$1,521,540,424	\$2,409,628,309	58.4%
Logan	\$375,840,000	\$590,580,000	\$928,013,879	\$1,458,244,032	\$2,291,426,565	57.1%
Rawlins	\$348,443,000	\$631,196,000	\$1,143,396,166	\$2,071,234,281	\$3,751,990,407	81.1%
Sheridan	\$333,747,000	\$580,596,000	\$1,010,021,709	\$1,757,063,177	\$3,056,638,268	74.0%
Sherman	\$780,637,000	\$1,329,873,000	\$2,265,537,242	\$3,859,510,642	\$6,574,962,493	70.4%
Thomas	\$1,013,339,000	\$1,689,350,000	\$2,816,336,312	\$4,695,149,155	\$7,827,341,319	66.7%
Wallace	\$195,594,000	\$365,668,000	\$683,625,705	\$1,278,055,791	\$2,389,358,084	87.0%

Source: HAZUS

The following chart illustrates the above data.



The United States Department of Agriculture (USDA) 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 a steady decrease in the number of farms through the year 2037.

**Table 3.30: Kansas Region A Number of Farms Data Projections Through 2037**

County	Number of Farms, 2007	Number of Farms, 2017	Number of Farms, 2027	Number of Farms, 2037	Projected Growth Percentage Through 2037
Cheyenne	422	384	349	318	-9.0%
Decatur	303	270	241	214	-10.9%
Gove	413	350	297	251	-15.3%





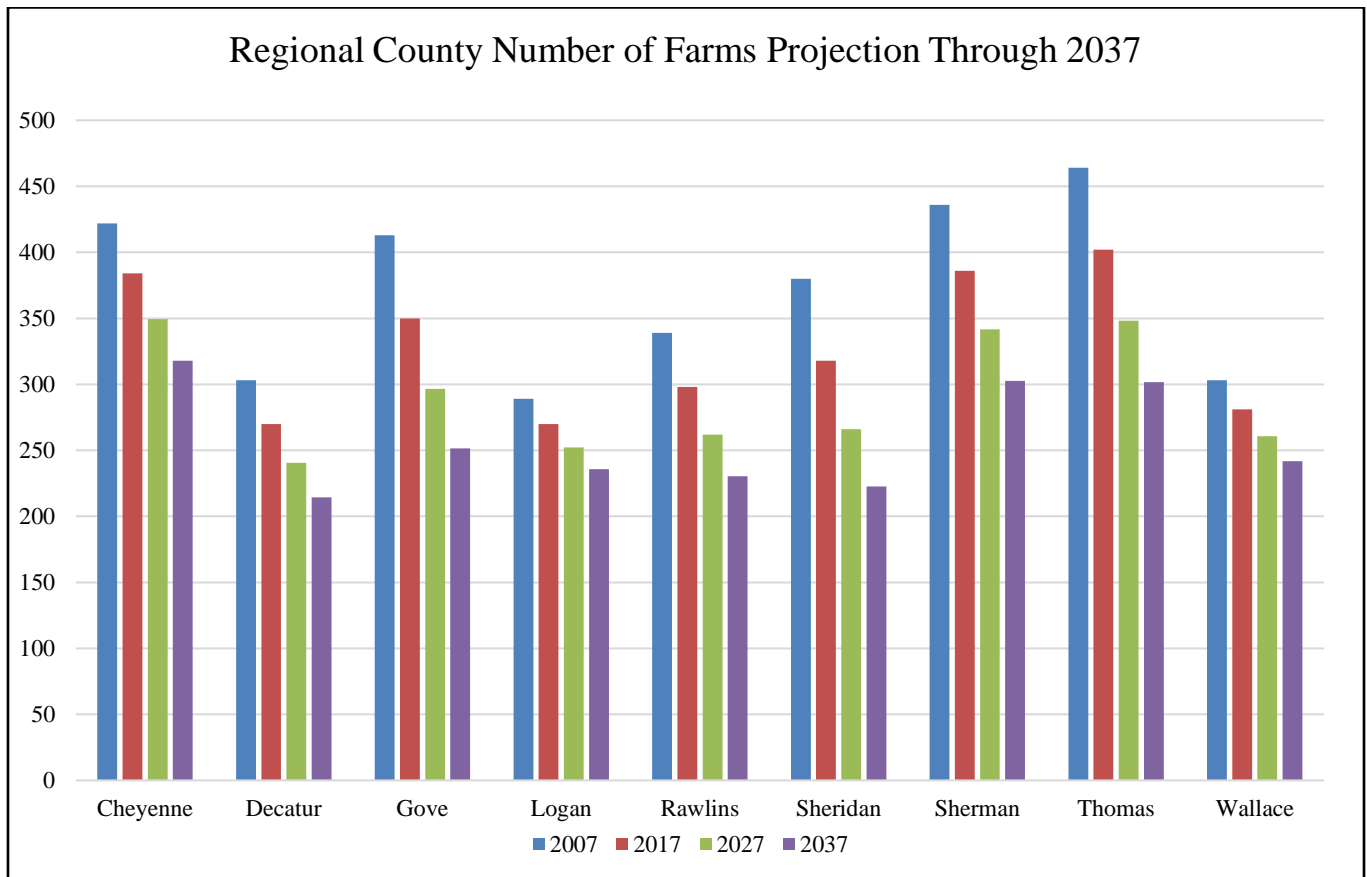


**Table 3.30: Kansas Region A Number of Farms Data Projections Through 2037**

County	Number of Farms, 2007	Number of Farms, 2017	Number of Farms, 2027	Number of Farms, 2037	Projected Growth Percentage Through 2037
Logan	289	270	252	236	-6.6%
Rawlins	339	298	262	230	-12.1%
Sheridan	380	318	266	223	-16.3%
Sherman	436	386	342	303	-11.5%
Thomas	464	402	348	302	-13.4%
Wallace	303	281	261	242	-7.3%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.



USDA National Agricultural Statistics Service data indicates the region will experience no major change in farm acreage through the year 2037.



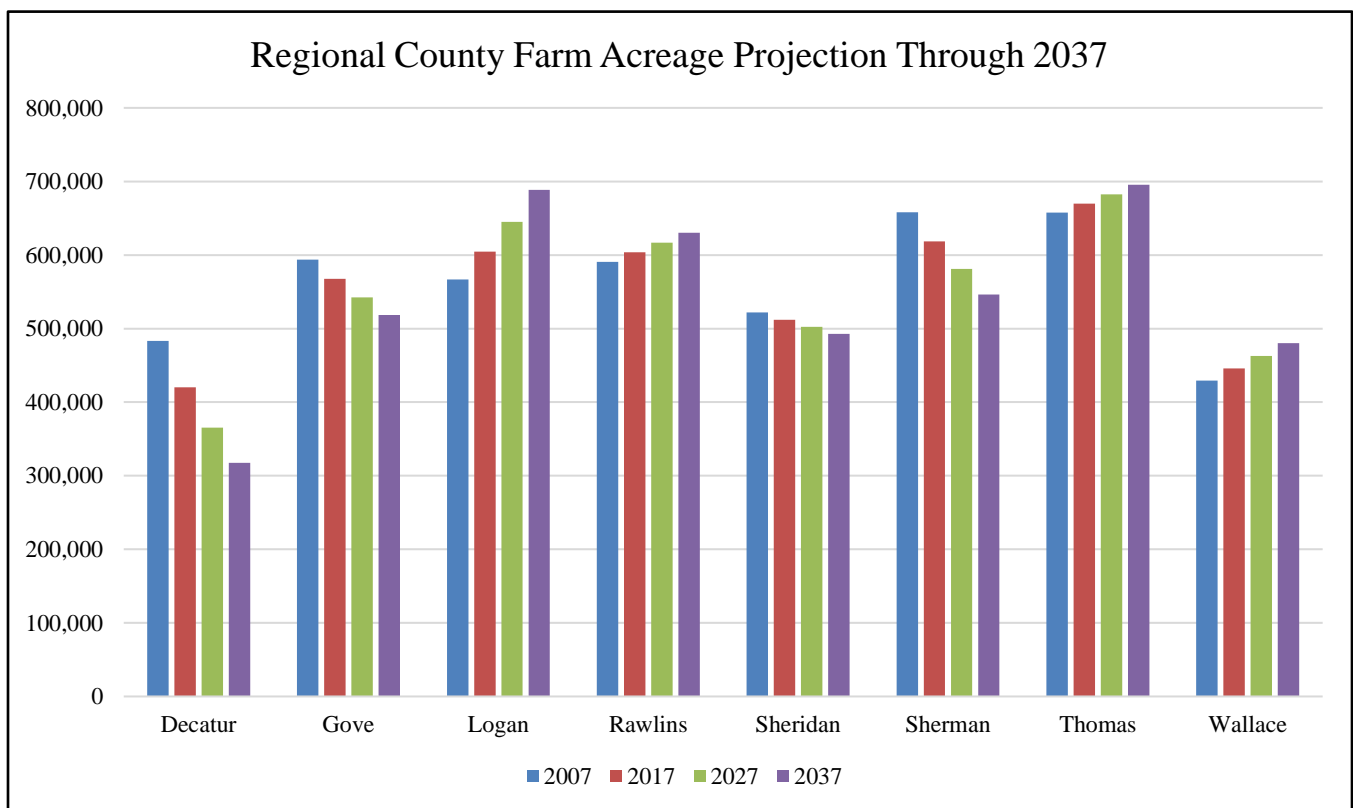


**Table 3.31: Kansas Region A Farm Acreage Data Projections, Through 2037**

County	Farm Acreage, 2007	Farm Acreage, 2017	Farm Acreage, 2027	Farm Acreage, 2037	Projected Growth Percentage Through 2037
Cheyenne	576,831	529,326	485,733	445,731	-8.2%
Decatur	483,134	420,032	365,172	317,477	-13.1%
Gove	593,622	567,444	542,420	518,500	-4.4%
Logan	566,569	604,595	645,173	688,475	6.7%
Rawlins	590,628	603,529	616,712	630,183	2.2%
Sheridan	522,052	512,108	502,353	492,785	-1.9%
Sherman	657,942	618,428	581,287	546,377	-6.0%
Thomas	657,471	669,940	682,645	695,592	1.9%
Wallace	429,533	445,809	462,702	480,235	3.8%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.



USDA National Agricultural Statistics Service data indicates the region will experience steady increase in the number of cattle through the year 2037.



**Table 3.32: Kansas Region A Total Cattle Data Projections Through 2037**

County	Cattle, 2012	Cattle, 2017	Cattle, 2027	Cattle, 2037	Projected Growth Percentage Through 2037
Cheyenne	50,788	-	-	-	-
Decatur	48,347	185,155	709,090	2,715,609	283.0%
Gove	71,266	136,071	259,806	496,057	90.9%
Logan	24,412	22,551	20,832	19,244	-7.6%
Rawlins	30,406	33,449	36,797	40,479	10.0%
Sheridan	117,073	259,158	573,684	1,269,932	121.4%
Sherman	28,316	37,316	49,177	64,807	31.8%
Thomas	51,233	-	-	-	-
Wallace	16,427	-	-	-	-

Source: United States Department of Agriculture National Agricultural Statistics Service

-: Data not reported (no projection possible)

USDA National Agricultural Statistics Service data indicates the region will experience a continued increase in the market value of agricultural products through the year 2037.

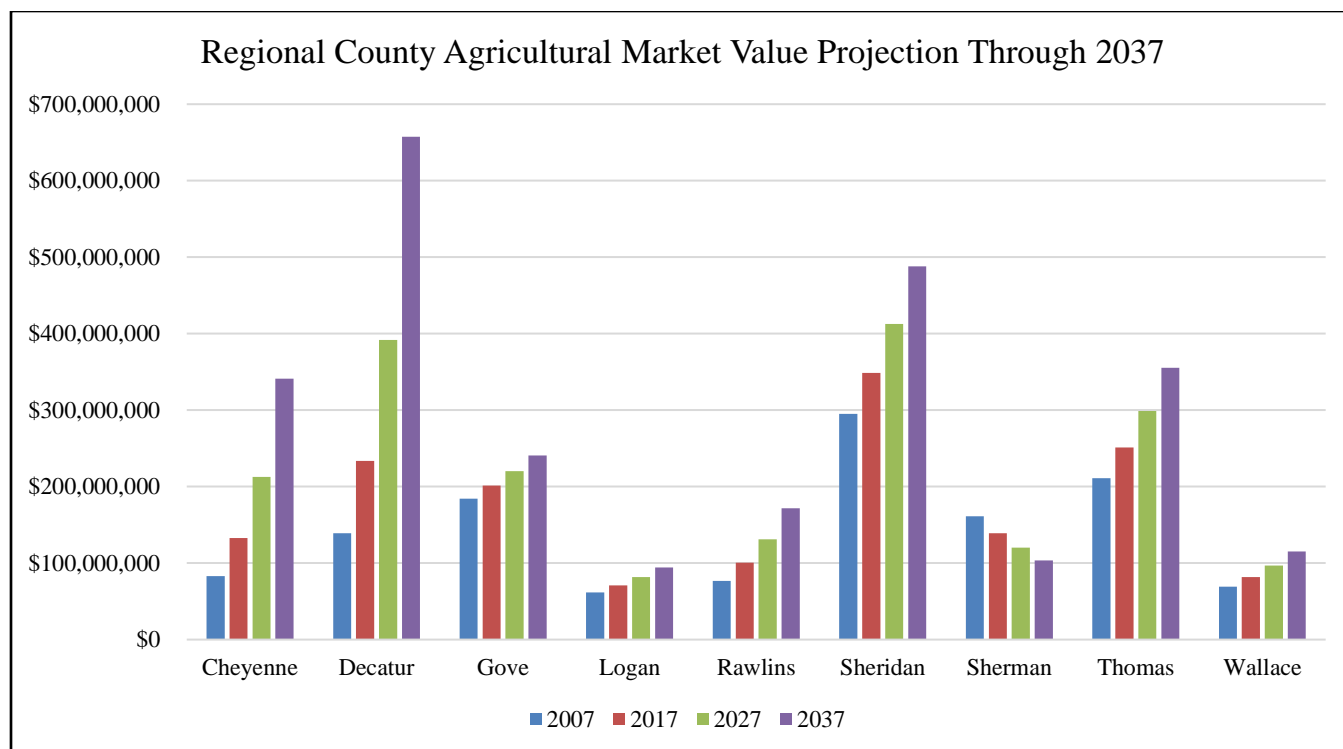
**Table 3.33: Kansas Region A Agricultural Market Value Data Projections, Through 2037**

County	Market Value, 2007	Market Value, 2012	Market Value, 2017	Market Value, 2022	Projected Growth Percentage Through 2037
Cheyenne	\$82,813,000	\$132,754,000	\$212,812,294	\$341,150,342	60.3%
Decatur	\$139,106,000	\$233,431,000	\$391,715,898	\$657,330,625	67.8%
Gove	\$184,405,000	\$201,514,000	\$220,210,364	\$240,641,367	9.3%
Logan	\$61,491,000	\$70,870,000	\$81,679,545	\$94,137,831	15.3%
Rawlins	\$76,760,000	\$100,351,000	\$131,192,329	\$171,512,265	30.7%
Sheridan	\$294,926,000	\$348,852,000	\$412,638,146	\$488,087,326	18.3%
Sherman	\$161,330,000	\$139,179,000	\$120,069,386	\$103,583,568	-13.7%
Thomas	\$211,027,000	\$251,056,000	\$298,677,966	\$355,333,182	19.0%
Wallace	\$68,973,000	\$81,786,000	\$96,979,250	\$114,994,924	18.6%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.





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 regional decrease in population 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 change itself.

For hazards that affect the entire planning area, the predicted static number of structures will tend to keep the potential vulnerability unchanged. It is difficult to quantify the exact change in vulnerability, but it can be depicted as generally directly proportional to the change in the number of structures.

As indicated in the data above, the predicted static growth of regional farm acreage, and the market value increase of regional agricultural goods could result in increased exposure to both natural and man-made hazards.

### 3.12 – Regional Economic Activity Patterns

Kansas Region A’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 A counties for the period 2015 to 2018 (the latest available data).

**Table 3.34: Kansas Region A Gross Domestic Product, 2015 to 2018**

County	2015	2016	2017	2018	State Rank in 2018 (out of 105)
Cheyenne	\$124,325	\$120,229	\$113,108	\$138,297	91
Decatur	\$173,631	\$177,876	\$150,564	\$158,897	84
Gove	\$199,354	\$189,084	\$178,678	\$178,222	79
Logan	\$137,353	\$133,641	\$131,518	\$143,712	87
Rawlins	\$133,297	\$125,294	\$128,673	\$142,052	89
Sheridan	\$130,929	\$137,685	\$126,621	\$131,903	93
Sherman	\$227,698	\$222,832	\$226,687	\$273,047	61
Thomas	\$395,459	\$389,736	\$414,243	\$413,995	44
Wallace	\$91,717	\$104,461	\$118,874	\$136,715	92

Source: Bureau of Economic Analysis

The following table, using data from the Bureau of Economic Analysis, details the percentage GDP change from the preceding period for 2016 to 2018 (the latest available data).

**Table 3.35: Kansas Region A GDP Percentage Change from Preceding Period, 2016 to 2018**

County	2016	2017	2018	State Rank in 2018 (out of 105)
Cheyenne	-3.3%	-5.9%	22.3%	4
Decatur	2.4%	-15.4%	5.5%	28
Gove	-5.2%	-5.5%	-0.3%	80
Logan	-2.7%	-1.6%	9.3%	18
Rawlins	-6.0%	2.7%	10.4%	16
Sheridan	5.2%	-8.0%	4.2%	34
Sherman	-2.1%	1.7%	20.5%	5
Thomas	-1.4%	6.3%	-0.1%	78
Wallace	13.9%	13.8%	15.0%	9

Source: Bureau of Economic Analysis

The average Kansas Region A unemployment rate for July 2020 of 3.5% is lower than the average State of Kansas unemployment rate of 7.2%. The following table details the regional unemployment rates, using data from the Kansas Department of Labor, for the months of July 2019 and July 2020.

**Table 3.36: Kansas Region A Unemployment Rate, July 2019 to July 2020**

County	July 2019	July 2020
Cheyenne	3.3%	2.7%
Decatur	3.4%	4.7%
Gove	2.5%	3.6%
Logan	2.7%	3.0%
Rawlins	2.9%	3.4%





**Table 3.36: Kansas Region A Unemployment Rate, July 2019 to July 2020**

County	July 2019	July 2020
Sheridan	2.5%	3.4%
Sherman	3.4%	4.2%
Thomas	2.8%	3.7%
Wallace	3.7%	2.5%

Source: Kansas Department of Labor

### 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 A 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.”

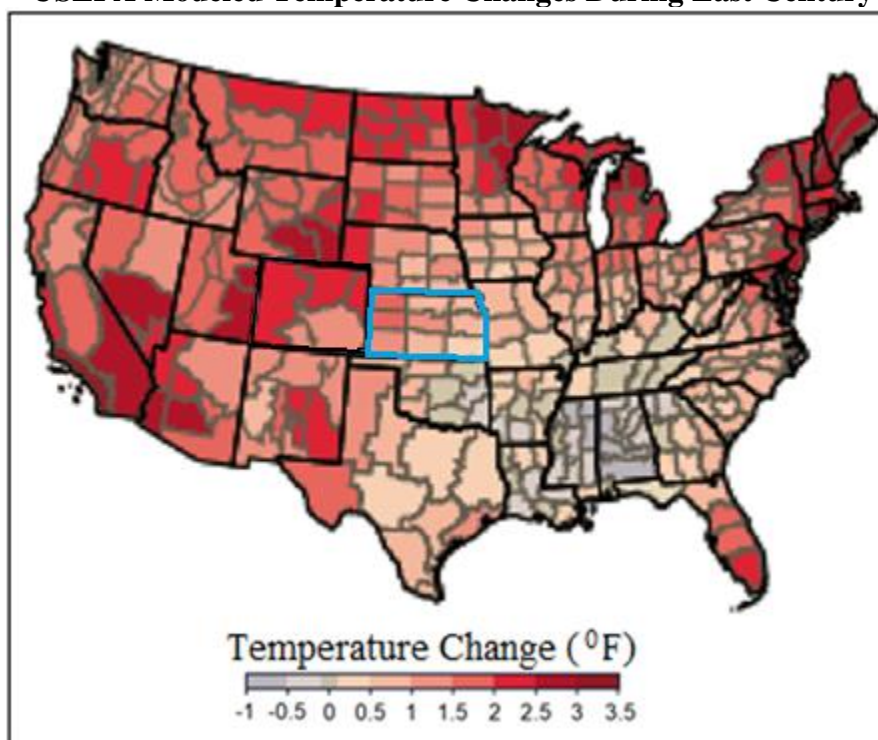
The following map, from the USEPA Climate Change Indicators in the United States, illustrates modeled temperature changes during the last century.







### 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 A 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 A 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 2018 State of Kansas Hazard Mitigation Plan. Ten-year data sets from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) (2010 to 2019, with 2010 and 2019 being full data set years) were used, where applicable, for hazard occurrence and impact data. Ten-year data sets from the United States Department of Agriculture (USDA) Risk Management Agency (2010 to 2018, with 2013 and 2018 being full data set years) were used to determine agricultural losses. The ten-year data set was used to reflect the change in the climate and more accurately depict changes in the region. 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 A hazard mitigation plan in 2015, there have been five federal disaster declarations for the region, as follows:

- DR 4504: Declared on March 29, 2020 – COVID-19 Pandemic





- DR 4449: Declared on June 20, 2019 – Severe Storms, Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides
- DR 4319: Declared on June 16, 2017 – Severe Winter Storm, Snowstorm, Straight-Line Winds, and Flooding
- DR 4304: Declared on February 24, 2017 – Severe Winter Storm
- DR 4287: Declared on October 20, 2016 – Severe Storms and Flooding
- 

For the 20-year period from 2000 to 2020 (data set includes full years for 2000 and 2019), Kansas Region A has had 13 federal disaster declarations. These declarations included the following identified hazards:

- Flooding
- Landslides
- Major Disease
- Severe Storms
- Straight-Line Winds
- Severe Winter Storms
- Tornadoes

Additionally, since the 2015 plan, there has been one Emergency Declaration for the region, as follows:

- EM3481: Declared on March 12, 2020 – COVID-19

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 A’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 A, 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
- Windstorm
- Winter Storm

Additionally, the MPC confirmed six man-made hazards that may impact Kansas Region A, 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
<b>Probability</b>	Unlikely (10% chance of occurrence)	Occasional (20% chance of occurrence)	Likely (33% chance of occurrence)	Highly Likely (100% chance of occurrence)
<b>Magnitude</b>	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)
<b>Warning Time</b>	24+ hours	12-24 hours	6-12 hours	<6 hours
<b>Duration</b>	< 6 hours	< 1 day	< 1 week	1 week +







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

$$(\text{Probability} \times 0.45) + (\text{Magnitude/Severity} \times 0.30) + (\text{Warning Time} \times 0.15) + (\text{Duration} \times 0.10)$$

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**

Planning Significance	CPRI Range	
	Low CPRI	High CPRI
<b>High</b>	3.0	4.0
<b>Moderate</b>	2.0	2.9
<b>Low</b>	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 A.

**Table 4.3: Kansas Region A Natural Hazard CPRI Planning Significance**

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Agricultural Infestation	1.0	2.0	1.0	4.0	1.6
Dam and Levee Failure	1.0	2.5	2.0	3.0	1.8
Drought	3.0	3.0	1.0	4.0	2.8
Earthquake	1.0	1.5	4.0	1.0	1.6
Expansive Soils	1.0	1.0	1.0	4.0	1.3
Extreme Temperature	2.0	1.5	1.5	3.0	1.9
Flood	3.5	3.0	2.0	3.0	3.1
Hailstorm	4.0	3.0	3.0	1.0	3.3
Land Subsidence	1.0	1.0	2.0	4.0	1.5
Landslide	1.0	1.0	4.0	1.0	1.5
Lightning	1.0	1.0	4.0	1.0	1.5
Soil Erosion & Dust	2.0	1.0	1.0	4.0	1.8
Tornado	3.0	3.0	4.0	1.0	3.0
Wildfire	3.0	2.0	4.0	2.0	2.8
Windstorm	4.0	3.0	2.0	2.0	3.2
Winter Storm	4.0	3.0	2.0	3.0	3.3





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

<b>Hazard</b>	<b>Probability</b>	<b>Magnitude/Severity</b>	<b>Warning Time</b>	<b>Duration</b>	<b>CPRI</b>
Civil Disorder	2.0	1.0	4.0	1.0	1.9
Hazardous Materials Event	1.0	2.0	4.0	1.5	1.8
Major Disease Outbreak	4.0	2.5	1.0	4.0	3.1
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	2.0	2.0	4.0	2.0	2.3

The average CPRI for each identified hazard remained the same as the calculated CPRI for the 2015 planning effort, where individual county rankings were combined into a regional ranking, with the exception of Major Disease Outbreak. As of this plan a worldwide pandemic is taking place from the SARS COV-2 virus. The revised ranking reflects this on-going event, with a complete description provided in the Major Disease Outbreak section.

## 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 (KDHE), 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, using the latest available data, in Kansas Region A:





- Cheyenne County: 10
- Decatur County: 14
- Gove County: 22
- Logan County: 5
- Rawlins County: 7
- Sheridan County: 29
- Sherman County: 10
- Thomas County: 15
- Wallace County: 9

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, rice 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 A:

- 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 east of Kansas Region A. However, no instances of EAB have been detected in Kanas Region A or in any adjacent counties.

## 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

In a continuing effort to monitor the prevalence and spread of CWD in Kansas deer, the Kansas Department of Wildlife, Parks and Tourism (KDWP) has collected and tested samples from 360 deer in 2018 and 2019. Thirty-seven of those samples were confirmed positive. The 37 confirmed positives came from deer taken in Cheyenne, Rawlins, Decatur, Norton, Phillips, Smith, Thomas, Sheridan, Gove, Rooks, Osborne, Scott, Lane, Hamilton, Haskell, Hodgeman, Ford, Edwards, Stafford, Reno, and Pratt counties. While most positives are still coming from northwest Kansas, new counties were added to the list this year, including several that show the disease's spread to the south and east.

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 A.

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 ten-year period of 2009- 2018 (with 2009 and 2018 being full data years) for the region indicates 168 claims on 26,347 acres for \$50,187,626.

**Table 4.5: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Agricultural Infestation**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	25	3,577	\$268,193
Decatur	19	1,526	\$116,164
Gove	23	3,594	\$48,421,537
Logan	19	3,205	\$201,743
Rawlins	11	4,880	\$343,697
Sheridan	21	2,197	\$224,806
Sherman	19	2,491	\$206,676
Thomas	15	1,155	\$111,579
Wallace	16	3,722	\$293,232

Source: USDA Farm Service Agency







### 4.7.3 – Hazard Probability Analysis

Kansas Region A experiences agricultural losses every year because of insects, vermin or diseases that impact plants and livestock. Data from the USDA Risk Management Agency indicates that there has been at least one claimed incident of agricultural infestation for Kansas Region A for the period 2009 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 2017 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 A County. The USDA Risk Management Agency provides information on insured crop losses related to identified hazards, with data from the ten-year period of 2009 to 2018 (with 2009 and 2018 being full data set years) used for analysis. The higher the percentage loss, the higher the potential vulnerability the county has to agricultural infestation events.

**Table 4.6: Agricultural Infestation Acres Impacted and Crop Insurance  
Paid per County from 2009-2018**

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
Cheyenne	529,326	358	0.07%	\$132,754,000	\$26,819	0.02%
Decatur	420,032	153	0.04%	\$233,431,000	\$11,616	0.00%
Gove	567,444	359	0.06%	\$201,514,000	\$4,842,154	2.40%
Logan	604,595	321	0.05%	\$70,870,000	\$20,174	0.03%
Rawlins	603,529	488	0.08%	\$100,351,000	\$34,370	0.03%
Sheridan	512,108	220	0.04%	\$348,852,000	\$22,481	0.01%
Sherman	618,428	249	0.04%	\$139,179,000	\$20,668	0.01%
Thomas	669,940	116	0.02%	\$251,056,000	\$11,158	0.00%
Wallace	445,809	372	0.08%	\$81,786,000	\$29,323	0.04%

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**

<b>Pest (Disease Insect, or weed)</b>	<b>Crop or Host Plant</b>	<b>Current Distribution</b>	<b>Type of Loss</b>
Rust, Austro-Asian	Soybean	Australia, Japan, 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
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**

<b>Subject</b>	<b>Impacts of Agricultural Infestation</b>
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 134 jurisdictional dams in Kansas Region A. These dams are classified as follows.

**Table 4.9: Kansas Region A KDA-DWR Jurisdictional Dams**

County	Low	Significant	High	High Hazard Without EAP
Cheyenne	20	0	0	0
Decatur	25	0	0	0
Gove	21	0	0	0
Logan	13	0	0	0
Rawlins	18	1	2	0
Sheridan	8	0	1	0
Sherman	8	0	0	0
Thomas	8	0	0	0
Wallace	9	0	0	0

Source: KDA-DWR

The following maps show all identified dams within Kansas Region A with a Significant or High classification, and available inundation and location mapping. Please note that information related to dams may have been classified and unable for review.





# Significant & High Hazard Dams in Kansas

Region: A



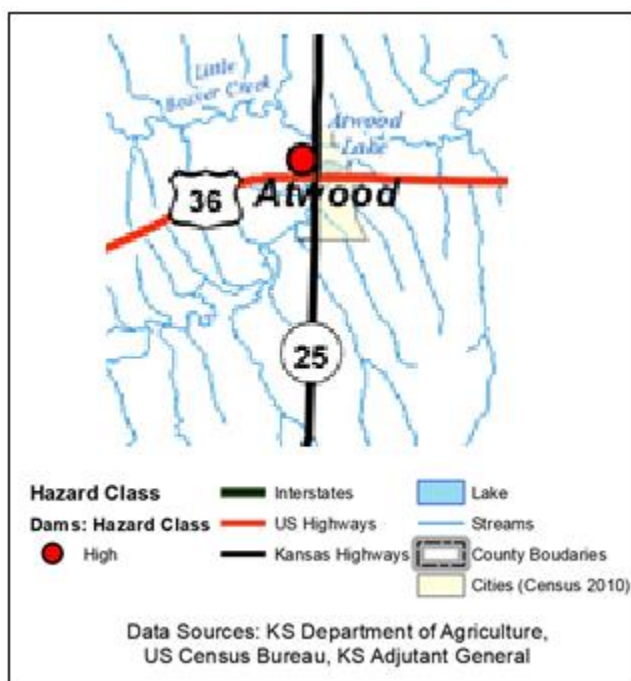
- High Hazard
- Significant Hazard
- Mitigation Regions
- Places
- Counties

0 5 10 20 30 Miles

Provided By: Kansas Division of Emergency Management - GIS (2019)

Data Source: KDEM, Census, ESRI





In addition, the KDA-DWR indicates that there are no dams within Kansas Region A that are operated by Federal Government agencies.

**Table 4.10: Kansas Region A Federally Operated Dams**

Reservoir	County	Year Storage Began	Operating Agency	River Basin	Contributing Drainage Area (Square Miles)	Surface Area (Acres)	Estimated Storage Capacity (Acre Feet)
None							

Source: Kansas Water Office and Kansas Department of Agriculture, Division of Water Resources

Of additional potential concern are high hazard dams in neighboring regions. No dams in adjacent regions were identified that would cause major impacts to the planning region in the event of a catastrophic failure. Bonny Dam, near Hale, Colorado was mentioned in the public comments. This dam poses no threat to the region due to the relative distance and lack of infrastructure and development in the region that could be impacted by a dam failure.

#### 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 to the USACE Integrated NLD, there is one levee in the NLSP in Kansas Region A. The following table provides available information on the one identified levee that provide protection to people and/or structures.

**Table 4.11: Kansas Region A USACE NLD Levees**

County(ies)	Jurisdiction(s)	Name	Waterway	Total Length	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Wallace	Wallace County	LWA-0001	-	0.18	0.018	-	-

Source: USACE

-: Data not available

### Local Concerns

No specific local concerns as related to dam and levee failure were identified.

### 4.8.3 – Previous Occurrences

Kansas Region A has had no reported dam or levee failure incidents

### 4.8.4 – Hazard Probability Analysis

Due to the variability of the size and construction of the dams in Region A, 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 A 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 0% probability of a dam failure in a given year. However, because past non-occurrence does not guarantee future non-occurrence, both federal and nonfederal dams may be damaged in future catastrophic regional flood events or due to the impacts of age.

Historically, the limited available data indicates there has been no reported levee failure events in Kansas Region A 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 4.12: 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 A participating county.

**Table 4.13: Kansas Region A 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
Cheyenne	20	0	0	0	0	20	Low
Decatur	25	0	0	0	0	25	Low
Gove	21	0	0	0	0	21	Low
Logan	13	0	0	0	0	13	Low
Rawlins	18	1	2	0	0	26	Low
Sheridan	8	0	1	0	0	11	Low
Sherman	8	0	0	0	0	8	Low
Thomas	8	0	0	0	0	8	Low
Wallace	9	0	0	0	0	9	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.

Counties with a higher identified population are to be considered to have a potentially greater vulnerability to potential dam failure events. The following table indicates the total county population and registered growth over the period 2000 to 2018.

**Table 4.14: Kansas Region A Population Vulnerability Data for Dam Failure**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%





**Table 4.14: Kansas Region A Population Vulnerability Data for Dam Failure**

County	2018 Population	Percent Population Change 2000 to 2018
Wallace	1,503	-13.2%

Source: US Census Bureau

Data concerning potential vulnerabilities for specific jurisdictions relating to population, including growth or decline, may be found in Section 3.2, Regional Population Data.

#### 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 4.15: Kansas Region A 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
Wallace	Wallace County	LWA-0001	0	0	\$0	Not Screened	No regulatory

Source: USACE NLD

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 4.16: Kansas Region A 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
Cheyenne	0	0.0%	0	0.0%
Decatur	0	0.0%	0	0.0%
Gove	0	0.0%	0	0.0%
Logan	0	0.0%	0	0.0%
Rawlins	0	0.0%	0	0.0%
Sheridan	0	0.0%	0	0.0%
Sherman	0	0.0%	0	0.0%
Thomas	0	0.0%	0	0.0%
Wallace	0	0.0%	0	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 4.17: 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

All of Kansas Region A is vulnerable to drought, and it is most disastrous in the rural areas where the majority of agricultural businesses are located.

### 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 4.18: 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

According to the September 10, 2020 map, the region is rated as D2 or below. Current drought maps for the region may be found at:

- <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?KS>

Historical data was gathered from the U.S. Drought Monitor weekly reports from the 10-year period 2010 through 2019 (data set includes full years for 2010 and 2019). This data was compiled and aggregated to provide a yearly estimate of the percentage of the year Kansas Region A was in each Drought Monitor category. This data was compiled and aggregated to provide a yearly estimate of the percentage of the year Kansas Region A was in each Drought Monitor category, with category data overlapping.





**Table 4.19: Percentage of Kansas Region A in U.S. Drought Monitor Category, 2010-2019**

Year	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2020 YTD	18.5%	81.5%	25.2%	0.0%	0.0%	0.0%
2019	76.9%	23.1%	0.0%	0.0%	0.0%	0.0%
2018	60.0%	40.0%	5.0%	0.0%	0.0%	0.0%
2017	59.3%	40.7%	21.0%	0.0%	0.0%	0.0%
2016	67.2%	32.8%	11.3%	0.0%	0.0%	0.0%
2015	19.2%	80.8%	42.1%	15.9%	0.0%	0.0%
2014	0.0%	100.0%	96.0%	74.5%	32.0%	0.0%
2013	0.0%	98.1%	98.1%	97.7%	73.2%	57.1%
2012	32.0%	68.0%	57.7%	51.9%	50.0%	42.3%
2011	38.8%	61.2%	44.4%	0.0%	0.0%	0.0%
2010	79.9%	20.1%	11.8%	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 2015 through 2019 (with 2015 and 2019 being full data set years) for Kansas Region A.

**Table 4.20: Kansas Region A Secretarial Drought Declarations, 2015 - 2019**

Year	Number of Secretarial Drought Disaster Declarations
2019	0
2018	3
2017	1
2016	0
2015	2

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 ten-year period of 2009 - 2018, for the region, indicates 1,352 drought related claims on 3,334,265 acres for \$501,621,881.

**Table 4.20: Kansas Region A USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Drought**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	116	180,055	\$23,020,396
Decatur	136	394,536	\$61,522,551
Gove	184	371,158	\$48,421,537
Logan	164	419,632	\$53,342,291
Rawlins	157	454,018	\$75,108,332
Sheridan	137	319,531	\$46,008,149
Sherman	132	338,941	\$59,750,623
Thomas	174	595,874	\$99,424,335
Wallace	152	260,520	\$35,023,668

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 A Estimated Probability of Being in U.S. Drought Monitor Category**

None	D0-D4	D1-D4	D2-D4	D3-D4	D4
43.3%	56.5%	38.7%	24.0%	15.5%	9.9%

Source: U.S. Drought Monitor

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

**Table 4.22: Cheyenne County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	116
Average Number of Claims per Year	12
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	180,055
Average Number of Acres Damaged per Year	18,006
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$23,020,396
Average Crop Damage per Year	\$2,302,040

Source: USDA

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

- 12 insurance claims
- 18,006 acres impacted
- \$2,302,040 in insurance claims

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

**Table 4.23: Decatur County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	136
Average Number of Claims per Year	14
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	394,536
Average Number of Acres Damaged per Year	39,454
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$61,522,551
Average Crop Damage per Year	\$6,152,255

Source: USDA

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

- 14 insurance claims





- 39,454 acres impacted
- \$6,152,255 in insurance claims

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

**Table 4.24: Gove County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	184
Average Number of Claims per Year	18
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	371,158
Average Number of Acres Damaged per Year	37,116
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$48,421,537
Average Crop Damage per Year	\$4,842,154

Source: USDA

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

- 18 insurance claims
- 37,116 acres impacted
- \$4,842,154 insurance claims

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

**Table 4.25: Logan County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	164
Average Number of Claims per Year	16
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	419,632
Average Number of Acres Damaged per Year	41,963
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$53,342,291
Average Crop Damage per Year	\$5,334,229

Source: USDA

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

- 16 insurance claims
- 41,963 acres impacted
- \$5,334,229 in insurance claims

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

**Table 4.26: Rawlins County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	157
Average Number of Claims per Year	16



**Table 4.26: Rawlins County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	454,018
Average Number of Acres Damaged per Year	45,402
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$75,108,332
Average Crop Damage per Year	\$7,510,833

Source: USDA

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

- 16 insurance claims
- 45,402 acres impacted
- \$7,510,833 in insurance claims

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

**Table 4.27: Sheridan County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	137
Average Number of Claims per Year	14
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	319,531
Average Number of Acres Damaged per Year	31,953
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$46,008,149
Average Crop Damage per Year	\$4,600,815

Source: USDA

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

- 14 insurance claims
- 31,953 acres impacted
- \$4,600,815 in insurance claims

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

**Table 4.28: Sherman County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	132
Average Number of Claims per Year	13
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	338,941
Average Number of Acres Damaged per Year	33,894
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$59,750,623
Average Crop Damage per Year	\$5,975,062

Source: USDA





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

- 13 insurance claims
- 33,894 acres impacted
- \$5,975,062 in insurance claims

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

**Table 4.29: Thomas County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	174
Average Number of Claims per Year	17
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	595,874
Average Number of Acres Damaged per Year	59,587
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$99,424,335
Average Crop Damage per Year	\$9,942,433

Source: USDA

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

- 17 insurance claims
- 59,587 acres impacted
- \$9,942,433 in insurance claims

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

**Table 4.30: Wallace County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	152
Average Number of Claims per Year	15
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	260,520
Average Number of Acres Damaged per Year	26,052
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$35,023,668
Average Crop Damage per Year	\$3,502,367

Source: USDA

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

- 15 insurance claims
- 26,052 acres impacted
- \$3,502,367 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 2017 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 A County. USDA Risk Management Agency crop loss data (for the ten-year period from 2009 – 2018) allows us to quantify the monetary impact of drought conditions on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to drought events.

**Table 4.31: Drought Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	18,006	3.40%	\$132,754,000	\$2,302,040	1.73%
Decatur	420,032	39,454	9.39%	\$233,431,000	\$6,152,255	2.64%
Gove	567,444	37,116	6.54%	\$201,514,000	\$4,842,154	2.40%
Logan	604,595	41,963	6.94%	\$70,870,000	\$5,334,229	7.53%
Rawlins	603,529	45,402	7.52%	\$100,351,000	\$7,510,833	7.48%
Sheridan	512,108	31,953	6.24%	\$348,852,000	\$4,600,815	1.32%
Sherman	618,428	33,894	5.48%	\$139,179,000	\$5,975,062	4.29%
Thomas	669,940	59,587	8.89%	\$251,056,000	\$9,942,433	3.96%
Wallace	445,809	26,052	5.84%	\$81,786,000	\$3,502,367	4.28%

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](http://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 4.32: 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 A is in an area of low potential seismic activity, with the Humboldt Fault (also known as the Nemaha Uplift) passing to the east of the region. Most earthquakes in the Humboldt Fault Zone are small and are detected only with instruments.



**Humboldt Fault Zone**



Source: Kansas Geological Survey

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 4.33: 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



**Table 4.33: Earthquake Magnitude Scale Comparison**

<b>Mercalli Scale Intensity</b>	<b>Verbal Description</b>	<b>Richter Scale Magnitude</b>	<b>Acceleration (%g)</b>	<b>Velocity (cm/s)</b>	<b>Witness Observations</b>
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

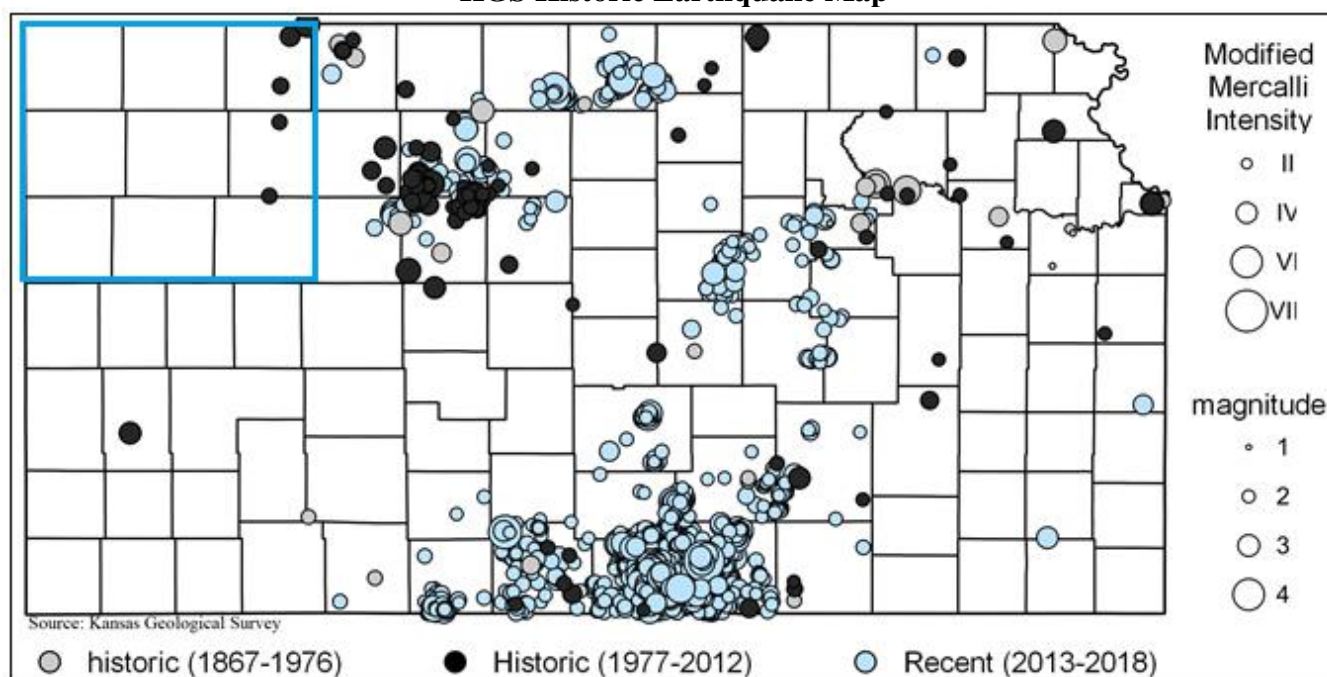
#### 4.10.2 – Previous Occurrences

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

**Table 4.34: Region A 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
Cheyenne	0	0	0	0	0	0	-
Decatur	2	0	0	0	0	0	3.3
Gove	0	0	0	0	0	0	-
Logan	0	0	0	0	0	0	-0
Rawlins	0	0	0	0	0	0	-
Sheridan	2	0	0	0	0	0	2.3
Sherman	0	0	0	0	0	0	-
Thomas	0	0	0	0	0	0	-
Wallace	0	0	0	0	0	0	-

Source: KGS

According to this archive, Kansas Region A has had no earthquakes over magnitude 4.0 earthquake since 1979.

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



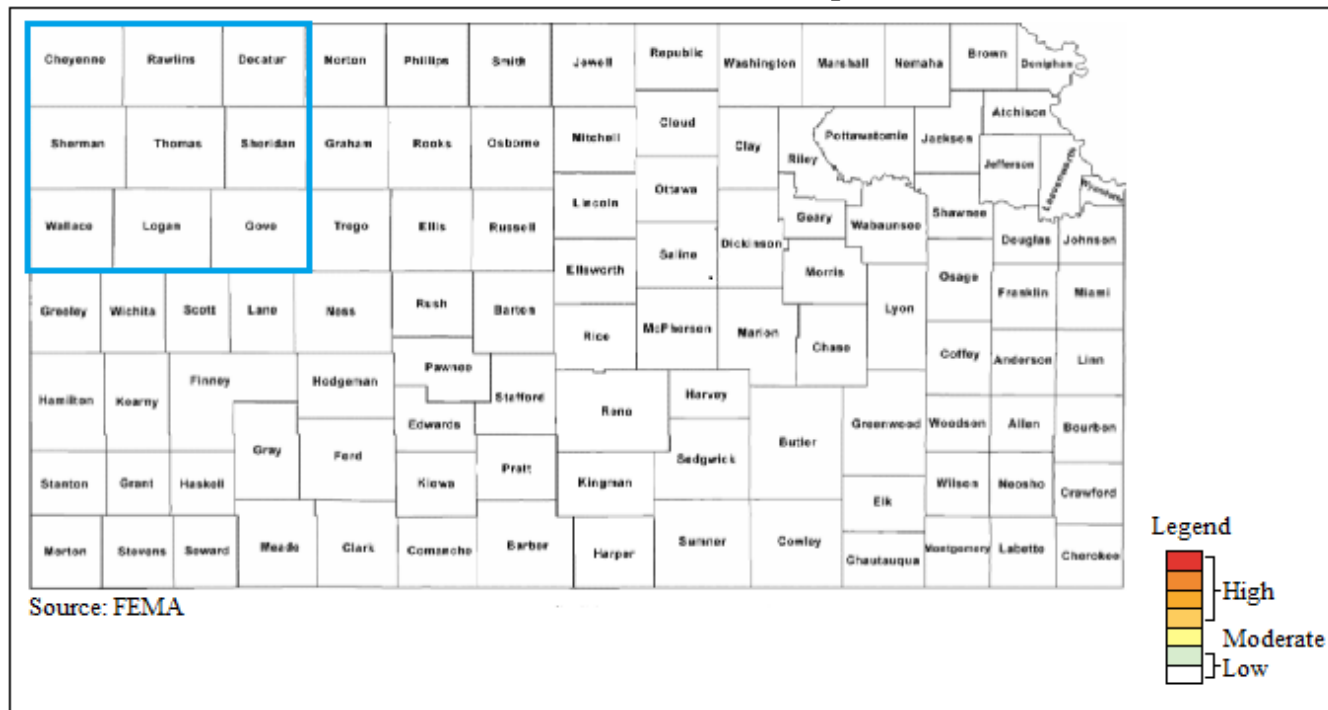


pattern of increased earthquake activity in an area over time may indicate a correlation between injection and seismic events.

### 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 A, falls into the low hazard rankings.

**FEMA Seismic Risk Map**

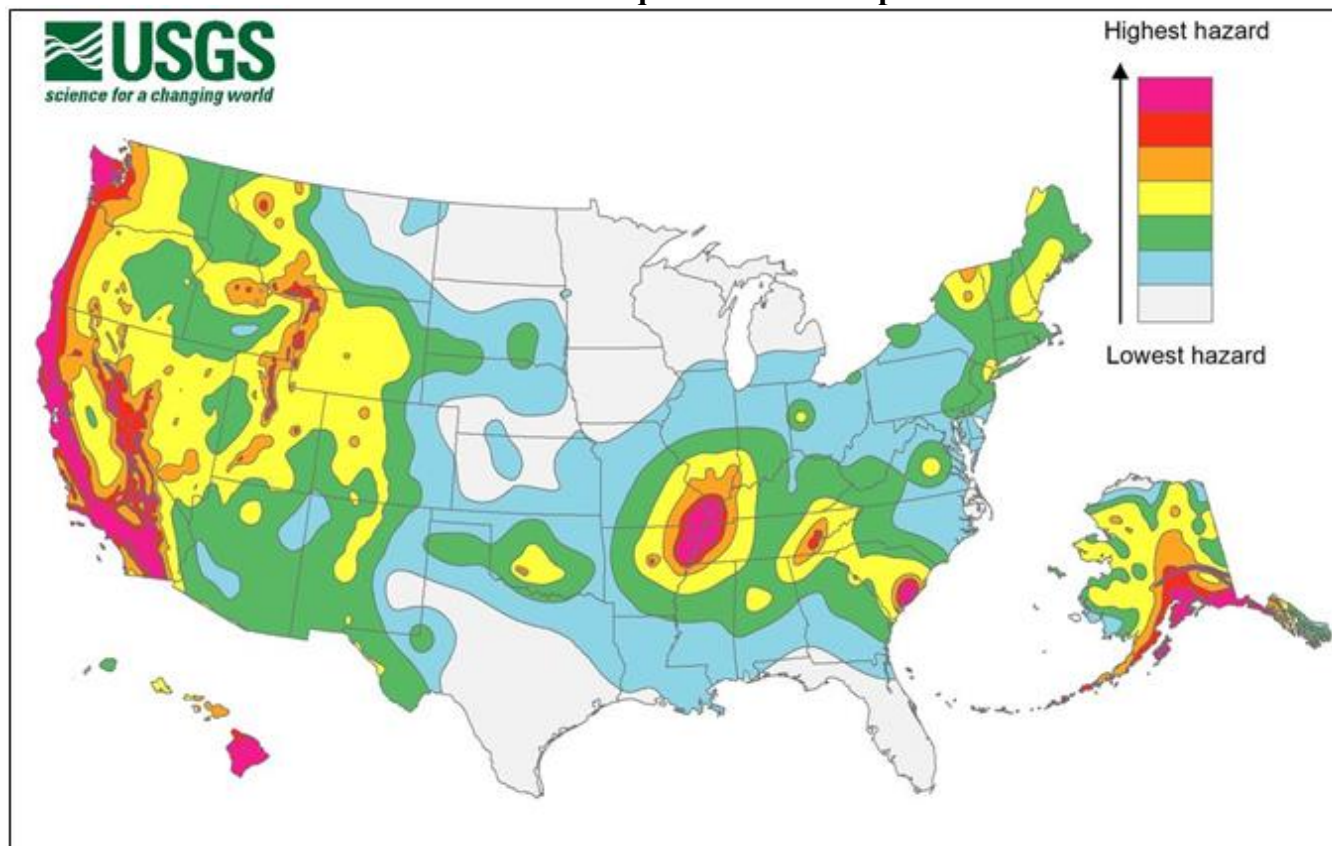


The USGS also published a map that indicates hazard rankings based on acceleration (%g) for the United States, with the data correlating with the indicated FEMA risk. This map indicates the probability that ground shaking will exceed a certain level over a 50-year period. The low-hazard areas have a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

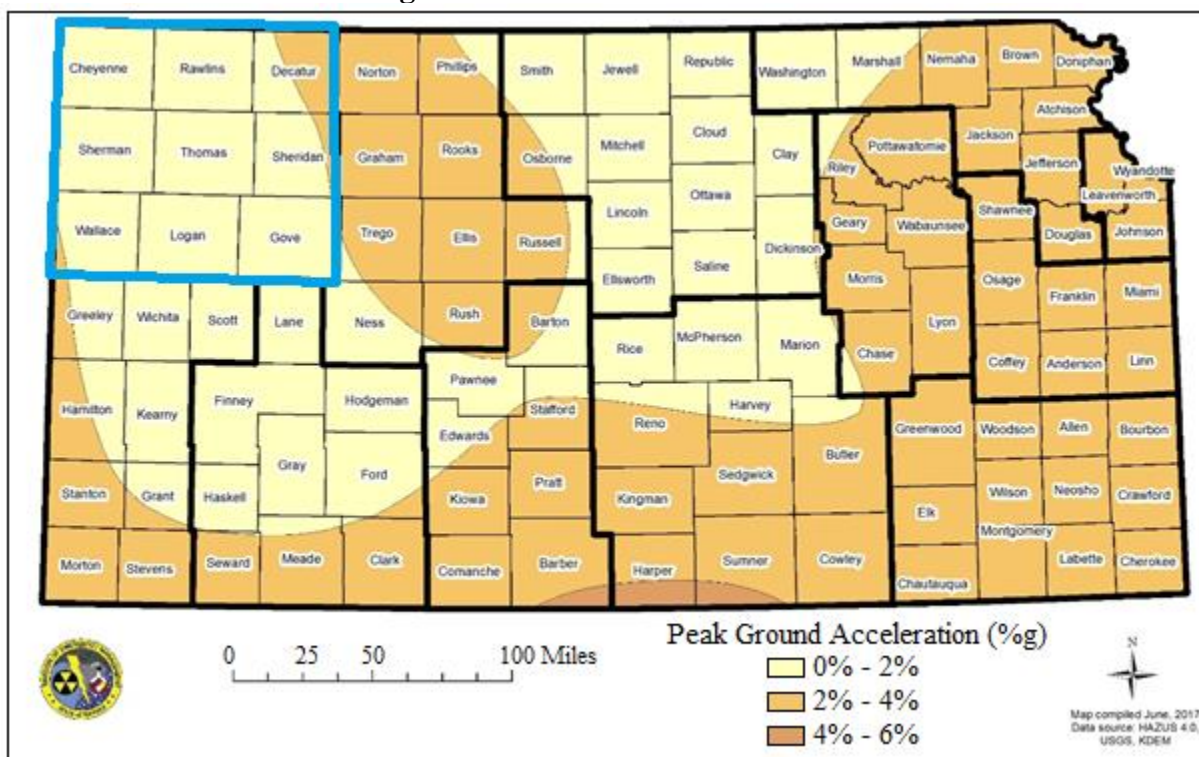
The following map, created using available HAZUS data, shows the ground shaking potential of a worst-case scenario 2,500-year 6.7 magnitude earthquake.







## 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 4.35: Kansas Region A Probabilistic 6.7 Magnitude Earthquake Damages**

County	Total Earthquake Losses	Displaced Households
Cheyenne	\$878,000	<1
Decatur	\$1,117,000	<1
Gove	\$1,083,000	<1
Logan	\$1,058,000	<1
Rawlins	\$1,000,000	<1
Sherman	\$1,000,000	<1
Sheridan	\$2,305,000	1
Thomas	\$2,844,000	1
Wallace	\$645,000	<1

Source: KDEM and HAZUS

Counties with a higher identified population are to be considered to have a potentially greater vulnerability to earthquake events. The following table indicates the total county population and the percentage change over the period 2000 to 2018.



**Table 4.36: Kansas Region A Population Vulnerability Data for Earthquakes**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

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 2018.

**Table 4.37: Kansas Region A Structure Vulnerability Data for Earthquakes**

County	2018 Housing Units	Percent Change 2000 to 2018
Cheyenne	1,504	-8.1%
Decatur	1,801	-1.1%
Gove	1,413	0.0%
Logan	1,448	1.8%
Rawlins	1,453	-7.2%
Sheridan	1,257	-0.5%
Sherman	3,125	-1.9%
Thomas	3,574	0.3%
Wallace	806	1.9%

Source: US Census Bureau

Data concerning potential vulnerabilities for specific jurisdictions relating to population and housing, including growth or decline, may be found in Section 3.2, Regional Population Data and Section 3.4, Regional Housing Data.

#### 4.10.5 – Consequence Analysis

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

**Table 4.38: 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.





**Table 4.38: Earthquake Consequence Analysis**

<b>Subject</b>	<b>Impacts of Earthquake</b>
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 soil places pressure on structural foundations and subsurface dwellings. This pressure can become so great it damages foundations, cracks walls, and deforms structures.

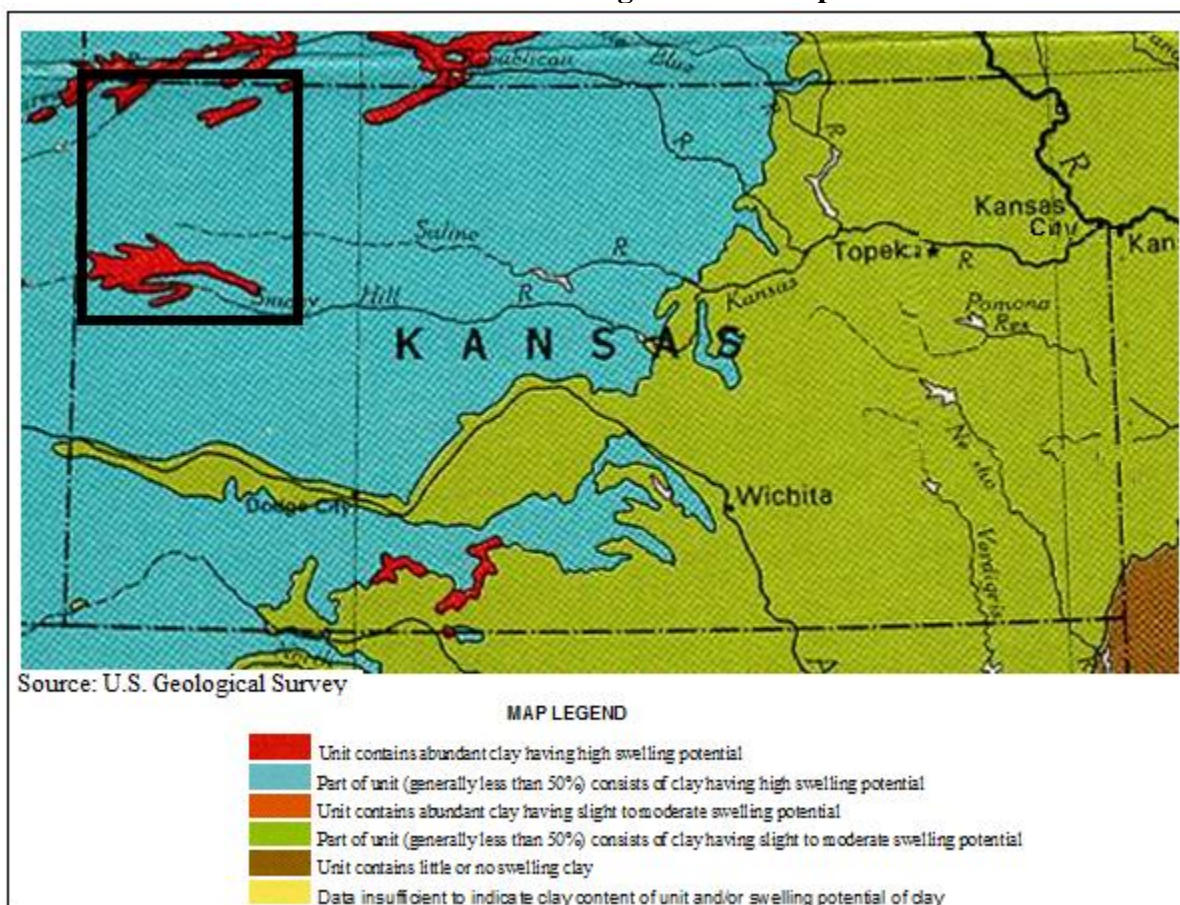
### 4.11.1 – Location and Extent

Kansas Region A 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 A, indicating it is located in an area where generally less than 50% of the soil unit consists of clay having high swelling potential.

**USGS Soil Swelling Potential Map**







#### 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 4.39: Kansas Region A Estimated Potential Structural Damages, Expansive Soil**

County	HAZUS Property Valuation	Property Valuation for 10% of Building Stock	Estimated 50% Damage
Cheyenne	\$554,880,000	\$55,488,000	\$27,744,000
Decatur	\$616,613,000	\$61,661,300	\$30,830,650
Gove	\$606,667,000	\$60,666,700	\$30,333,350
Logan	\$590,580,000	\$59,058,000	\$29,529,000
Rawlins	\$631,196,000	\$63,119,600	\$31,559,800
Sheridan	\$580,596,000	\$58,059,600	\$29,029,800
Sherman	\$1,329,873,000	\$132,987,300	\$66,493,650
Thomas	\$1,689,350,000	\$168,935,000	\$84,467,500
Wallace	\$365,668,000	\$36,566,800	\$18,283,400

Source: US Census Bureau and HAZUS

Data concerning potential vulnerabilities for specific jurisdictions relating to housing, including growth or decline, may be found in Section 3.4, Regional Housing Data.

#### 4.11.5 – Consequence Analysis

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





**Table 4.40: Expansive Soils Consequence Analysis**

<b>Subject</b>	<b>Impacts of Expansive Soils</b>
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 dry.

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

**Table 4.41: Extreme Temperature Definitions**

Term	Definition
<b>Extreme Heat</b>	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.
<b>Extreme Cold</b>	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.

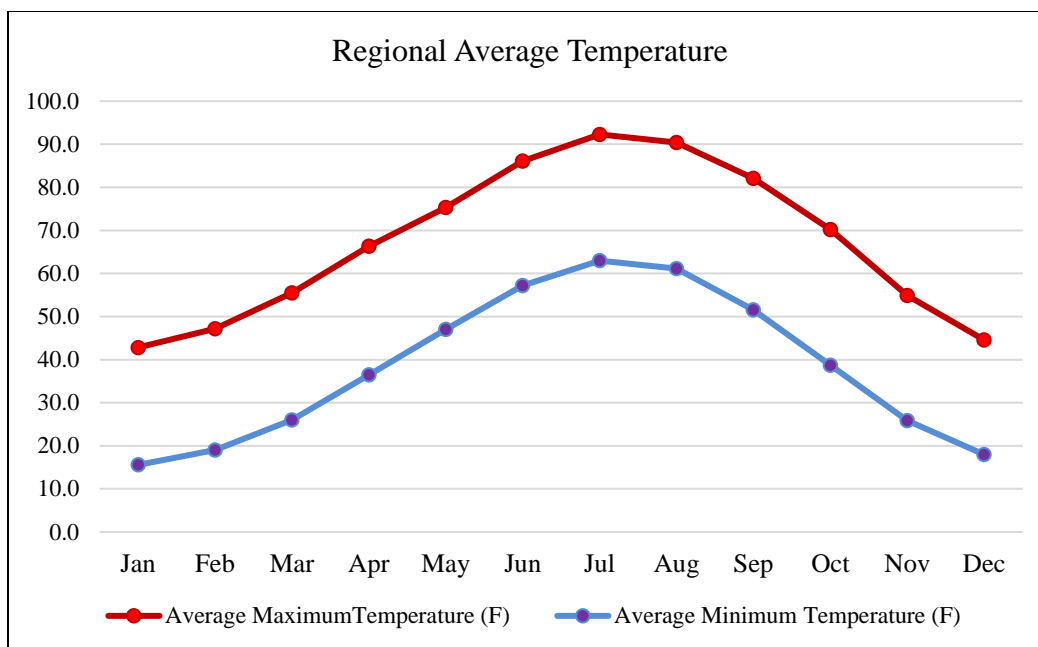
The following tables and charts present average climate data the region.

**Table 4.41: Regional Average Temperatures**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Minimum Temperature (F)	15.6	19.1	26.0	36.5	47.0	57.2	63.0	61.2	51.5	38.7	25.9	18.0	38.3
Average Maximum Temperature (F)	42.8	47.2	55.5	66.3	75.3	86.1	92.3	90.4	82.1	70.2	54.9	44.6	67.3

Source: High Plains Regional Climate Center





Source: High Plains Regional Climate Center

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.

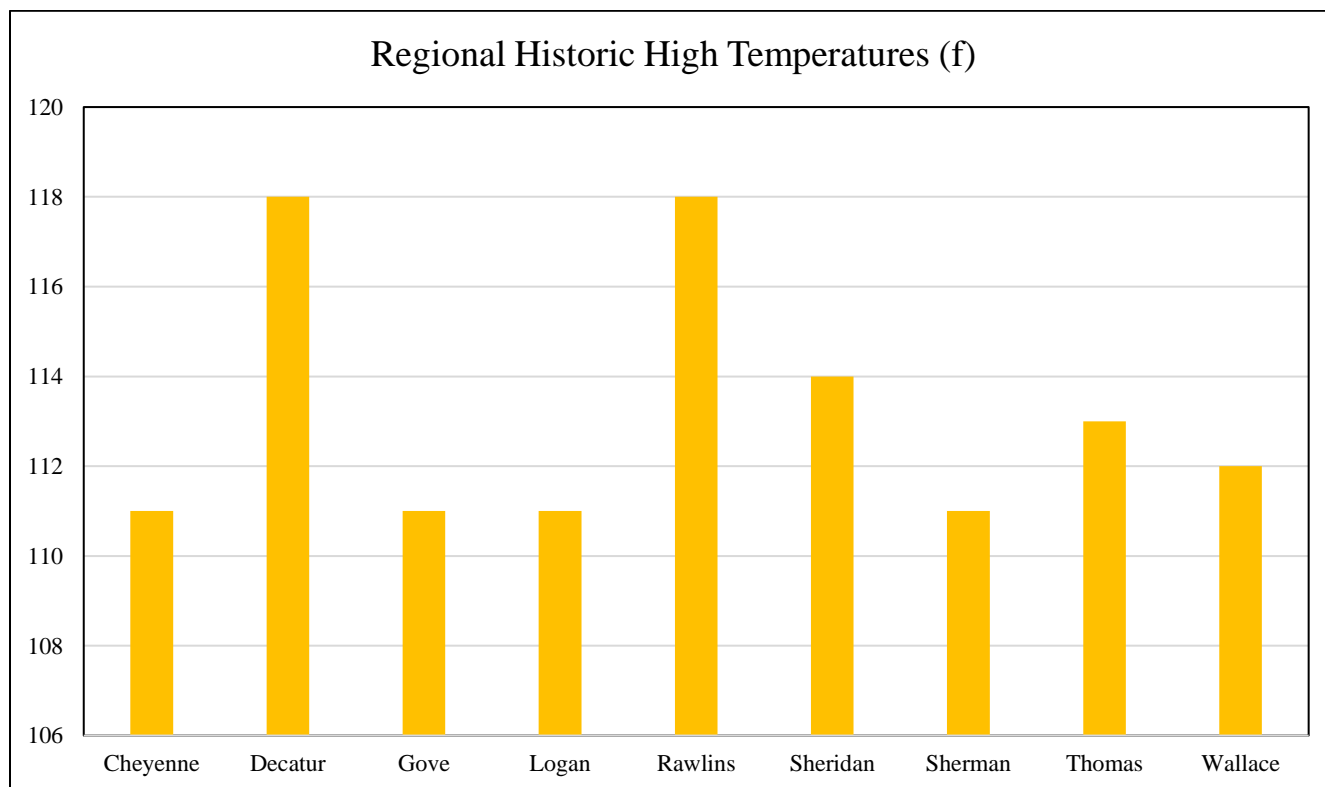
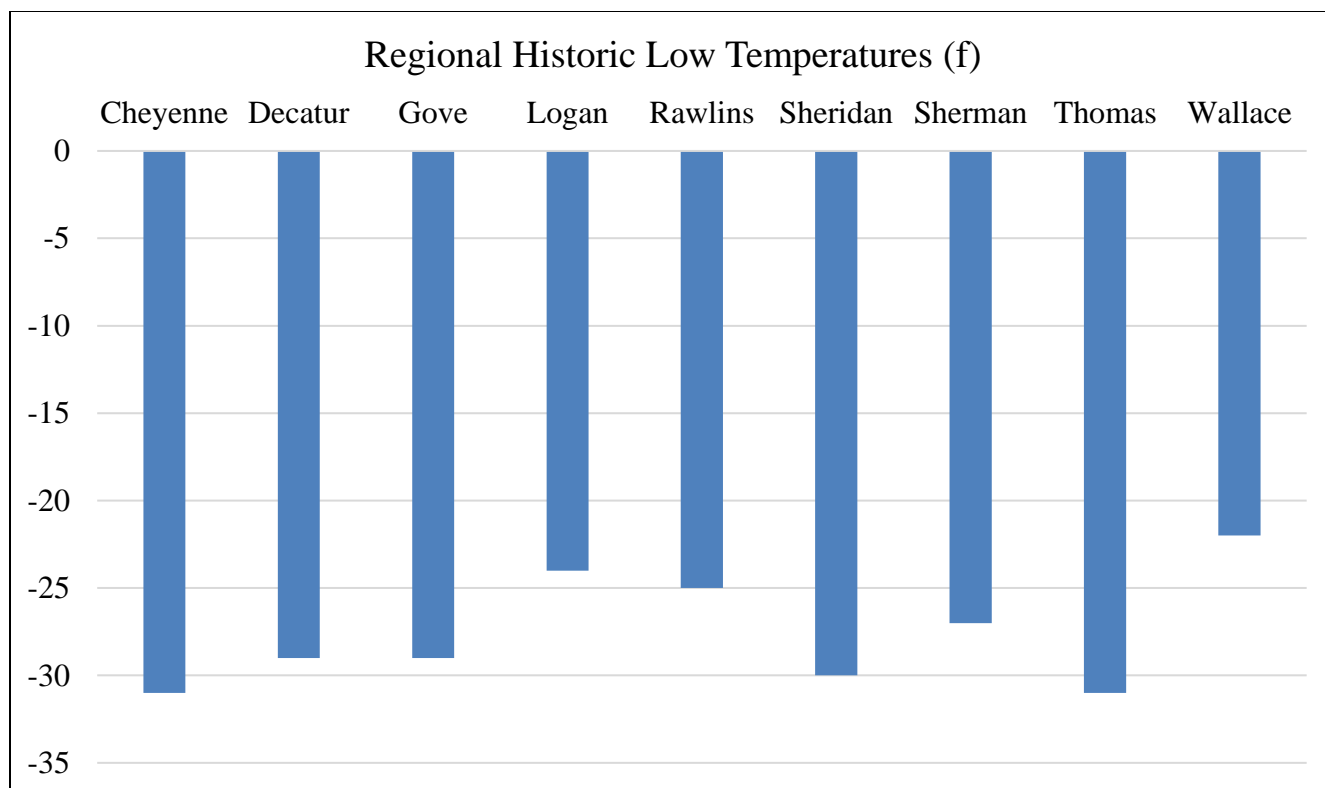
**Table 4.43: Kansas Region A Historic Temperatures**

County	Historic Low Temperature (F)	Historic High Temperature (F)
Cheyenne	-31 (1989)	111 (1940)
Decatur	-29 (1912)	118 (1936)
Gove	-29 (1918)	111 (1911)
Logan	-24 (1933)	111 (2012)
Rawlins	-25 (1959)	118 (1936)
Sheridan	-30 (1899)	114 (1940)
Sherman	-27 (1989)	111 (1940)
Thomas	-31 (1899)	113 (1940)
Wallace	-22 (1989)	112 (1971)

Source: High Plains Regional Climate Center

The following graphs represent the above historic temperature data.





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 A from the ten-year period 2010 - 2019 (data set includes full years for 2010 and 2019) for the region. Data was reviewed regionally as the extreme temperature events covered large areas.

**Table 4.44: Kansas Region A NCEI Extreme Temperature Events, 2010 - 2019**

County	Event Type	Number of Events	Property Damage	Deaths	Injuries
Kansas Region A	Cold	7	\$0	0	0
	Heat	1	\$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 ten-year period 2009 - 2018 (data set includes full years for 2009 and 2018), for the region, indicates 693 extreme temperature related claims on 938,230 acres for \$93,855,536.

**Table 4.45: USDA Risk Management Agency Cause of Loss Indemnities  
2009-2018, Extreme Temperatures**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	55	32,144	\$6,097,148
Decatur	66	47,224	\$8,673,977
Gove	107	487,772	\$9,012,177
Logan	51	13,909	\$2,209,000
Rawlins	62	36,335	\$8,125,498
Sheridan	118	149,490	\$24,638,635
Sherman	73	60,625	\$14,124,276
Thomas	97	81,493	\$15,863,161
Wallace	64	29,239	\$5,111,664

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 A communities.

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

**Table 4.46: Kansas Region A Extreme Temperature Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	8
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0



**Table 4.46: Kansas Region A Extreme Temperature Probability Summary**

Data	Recorded Impact
Average Property Damage per Year	\$0

Source: NCEI

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

- One 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 **Cheyenne County**

**Table 4.47: Cheyenne County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	55
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	32,144
Average Number of Acres Damaged per Year	3,214
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$6,097,148
Average Crop Damage per Year	\$609,715

Source: USDA

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

- Six insurance claims
- 3,214 acres impacted
- \$609,715 in insurance claims

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

**Table 4.48: Decatur County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	66
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	47,224
Average Number of Acres Damaged per Year	4,722
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$8,673,977
Average Crop Damage per Year	\$867,398

Source: USDA

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





- Seven insurance claims
- 4,722 acres impacted
- \$876,398 in insurance claims

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

**Table 4.49: Gove County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	107
Average Number of Claims per Year	11
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	487,772
Average Number of Acres Damaged per Year	48,777
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$9,012,177
Average Crop Damage per Year	\$901,218

Source: USDA

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

- 11 insurance claims
- 48,777 acres impacted
- \$901,218 in insurance claims

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

**Table 4.50: Logan County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	51
Average Number of Claims per Year	5
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	13,909
Average Number of Acres Damaged per Year	1,391
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,209,000
Average Crop Damage per Year	\$220,900

Source: USDA

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

- Five insurance claims
- 1,391 acres impacted
- \$220,900 in insurance claims

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





**Table 4.51: Rawlins County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	62
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	36,335
Average Number of Acres Damaged per Year	3,634
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$8,125,498
Average Crop Damage per Year	\$812,550

Source: USDA

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

- Six insurance claims
- 3,634 acres impacted
- \$812,550 in insurance claims

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

**Table 4.52: Sheridan County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	118
Average Number of Claims per Year	12
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	149,490
Average Number of Acres Damaged per Year	14,949
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$24,638,635
Average Crop Damage per Year	\$2,463,864

Source: USDA

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

- 12 insurance claims
- 14,949 acres impacted
- \$2,463,864 in insurance claims

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

**Table 4.53: Sherman County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	73
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	60,625
Average Number of Acres Damaged per Year	6,062
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$14,124,276
Average Crop Damage per Year	\$1,412,428

Source: USDA





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

- Seven insurance claims
- 6,062 acres impacted
- \$1,412,428 in insurance claims

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

**Table 4.54: Thomas County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	97
Average Number of Claims per Year	10
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	81,493
Average Number of Acres Damaged per Year	8,149
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$15,863,161
Average Crop Damage per Year	\$1,586,316

Source: USDA

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

- 10 insurance claims
- 8,149 acres impacted
- \$1,586,316 in insurance claims

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

**Table 4.55: Wallace County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	64
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	29,239
Average Number of Acres Damaged per Year	2,924
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$5,111,664
Average Crop Damage per Year	\$511,166

Source: USDA

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

- Six insurance claims
- 2,924 acres impacted
- \$511,166 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.

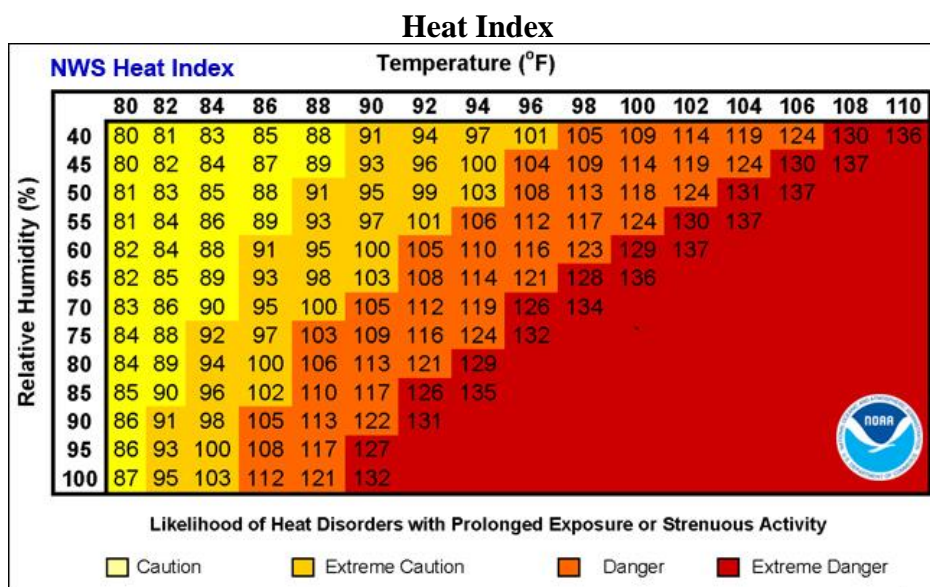
Exposure to direct sun can increase Heat Index values by as much as 15°F. The zone above 105°F corresponds to a Heat Index that may cause increasingly severe heat disorders with continued exposure and/or physical activity. The following table discusses potential impacts on human health related to excessive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

**Table 4.56: 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.



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

		Temperature (°F)																		
		Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63	
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72	
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77	
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81	
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84	
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87	
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89	
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91	
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93	
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Times

30 minutes

10 minutes

5 minutes

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V<sup>0.16</sup>) + 0.4275T(V<sup>0.16</sup>)

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Counties with a high population and/or a growing population are at increased risk. The following table indicates the total county population and registered growth over the period 2000 to 2018.

**Table 4.57: Kansas Region A Population Vulnerability Data for Extreme Temperatures**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

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 4.58: Kansas Region A Vulnerable Population Vulnerability Data for Extreme Temperatures**

County	Percentage of Population 5 and Under (2018)	Percentage of Population 65+ (2018)
Cheyenne	7.0%	27.3%
Decatur	5.8%	28.4%
Gove	5.8%	24.2%
Logan	7.5%	21.2%





**Table 4.58: Kansas Region A Vulnerable Population Vulnerability  
Data for Extreme Temperatures**

County	Percentage of Population 5 and Under (2018)	Percentage of Population 65+ (2018)
Rawlins	6.7%	27.9%
Sheridan	6.0%	23.7%
Sherman	6.8%	19.5%
Thomas	7.4%	18.1%
Wallace	6.9%	24.2%

Source: US Census Bureau

Data concerning potential vulnerabilities for specific jurisdictions relating to population, including growth or decline, may be found in Section 3.2, Regional Population Data.

In addition, extreme temperatures may exacerbate agricultural and economic losses. The USDA 2017 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 A County. USDA Risk Management Agency crop loss data for the ten-year period 2009 - 2018 (data set includes full years for 2009 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 potential vulnerability the county has to extreme temperature events.

**Table 4.59: Extreme Temperature Acres Impacted and Crop Insurance  
Paid per County from 2009-2018**

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
Cheyenne	529,326	3,214	0.61%	\$132,754,000	\$609,715	0.46%
Decatur	420,032	4,722	1.12%	\$233,431,000	\$867,398	0.37%
Gove	567,444	48,777	8.60%	\$201,514,000	\$901,218	0.45%
Logan	604,595	1,391	0.23%	\$70,870,000	\$220,900	0.31%
Rawlins	603,529	3,634	0.60%	\$100,351,000	\$812,550	0.81%
Sheridan	512,108	14,949	2.92%	\$348,852,000	\$2,463,864	0.71%
Sherman	618,428	6,062	0.98%	\$139,179,000	\$1,412,428	1.01%
Thomas	669,940	8,149	1.22%	\$251,056,000	\$1,586,316	0.63%
Wallace	445,809	2,924	0.66%	\$81,786,000	\$511,166	0.63%

Source: USDA

## 4.12.5 – Consequence Analysis

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

**Table 4.60: 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.





**Table 4.60: Extreme Temperature Consequence Analysis**

<b>Subject</b>	<b>Impacts of Extreme Temperatures</b>
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 A 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 Kansas indicates that the average annual precipitation for Kansas Region A counties for 2013 - 2018 (the latest available data):

- Cheyenne County: 26.7 inches
- Decatur County: 22.3 inches
- Gove County: 22.7 inches
- Logan County: 21.6 inches
- Rawlins County: 23.3 inches
- Sheridan County: 22.9 inches
- Sherman County: 22.5 inches
- Thomas County: 26.9 inches
- Wallace County: 20.7 inches

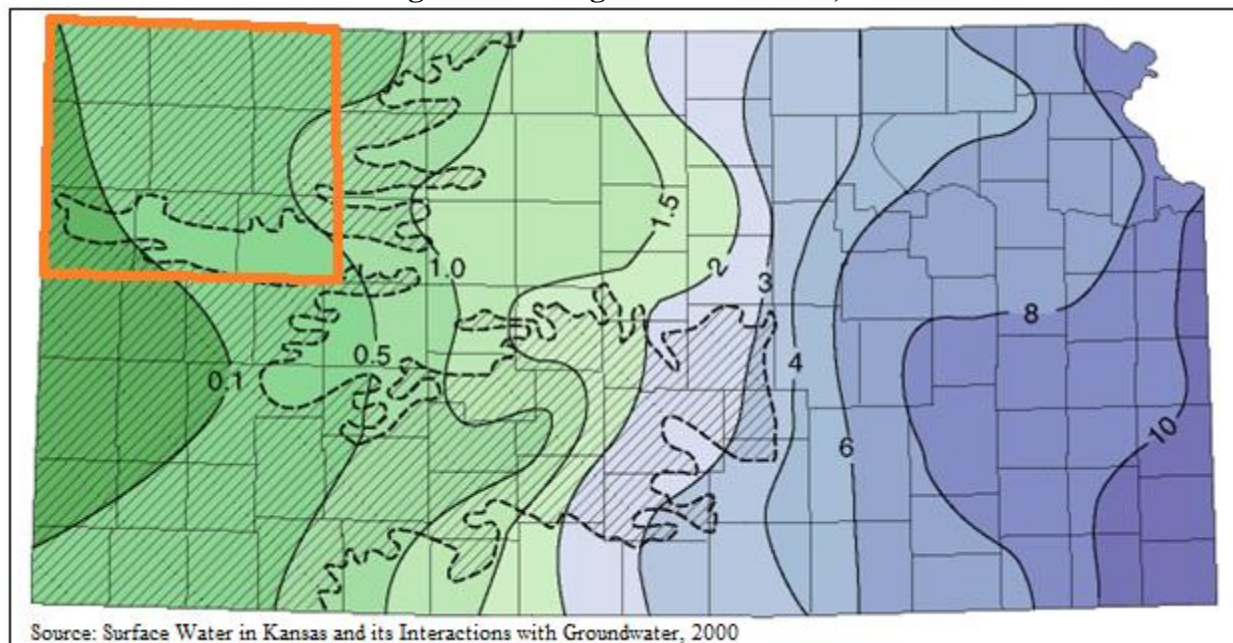
This equates to a regional average of 23.3 inches of precipitation for the six-year period 2013 - 2018.





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 A 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 A 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.





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.

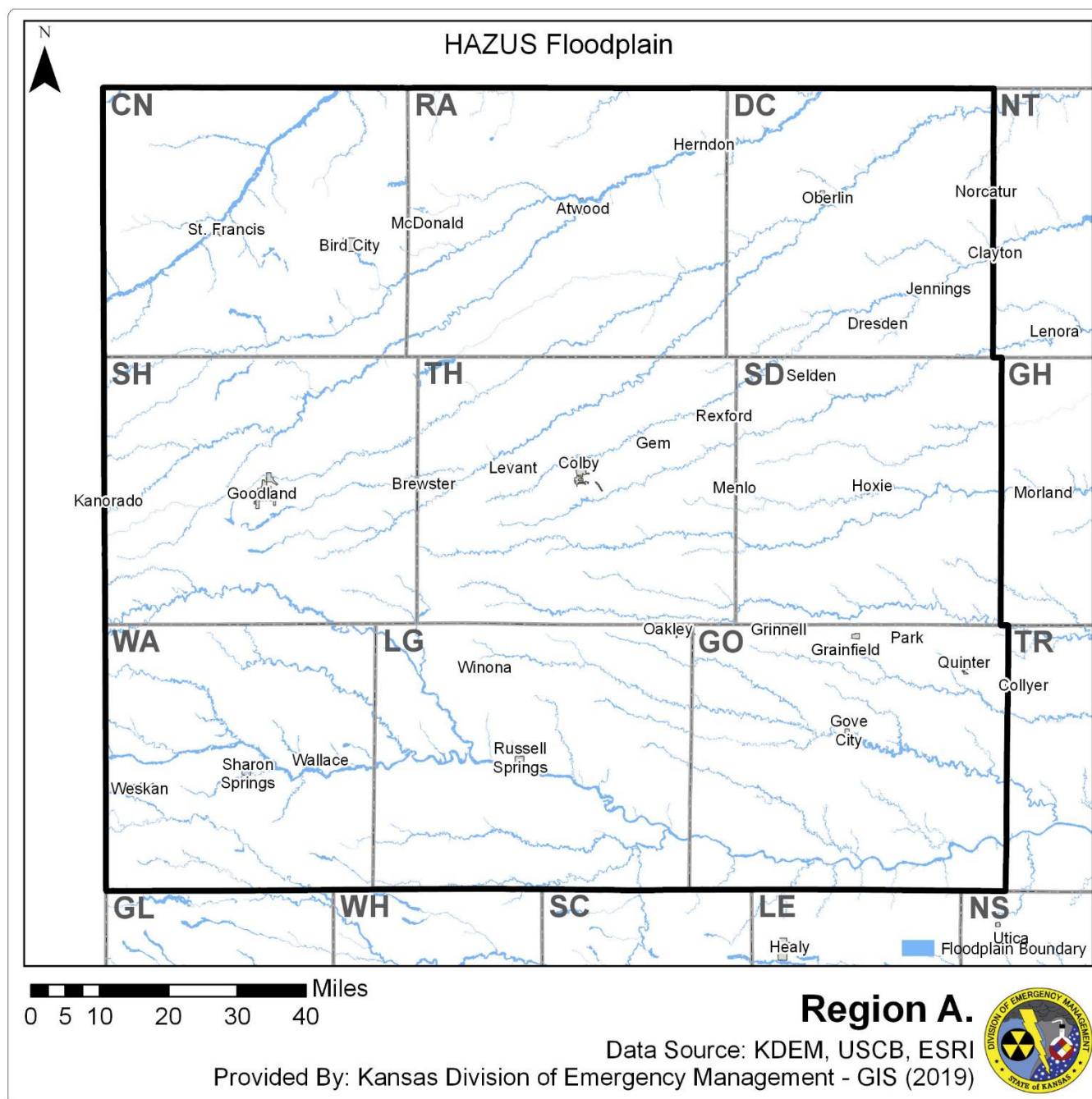
**Table 4.61: Flood Recurrence Interval Probability**

<b>Recurrence Interval, in Years</b>	<b>Probability of Occurrence in Any Given Year</b>	<b>Percent Chance of Occurrence in Any Given Year</b>
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.





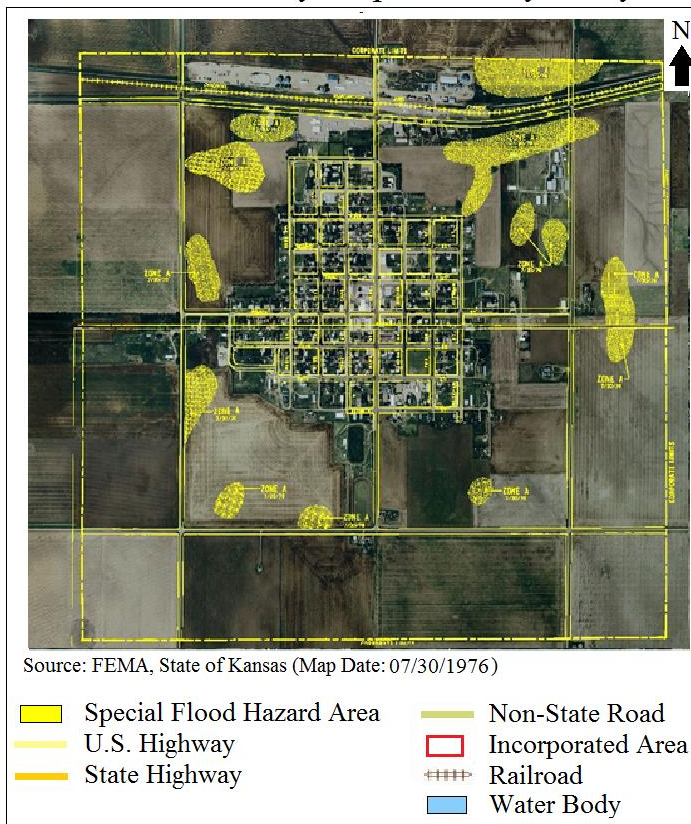
Please note that at the time of this plan not all counties were fully mapped. If available, other relevant maps indicating potential flooding zones have been included.





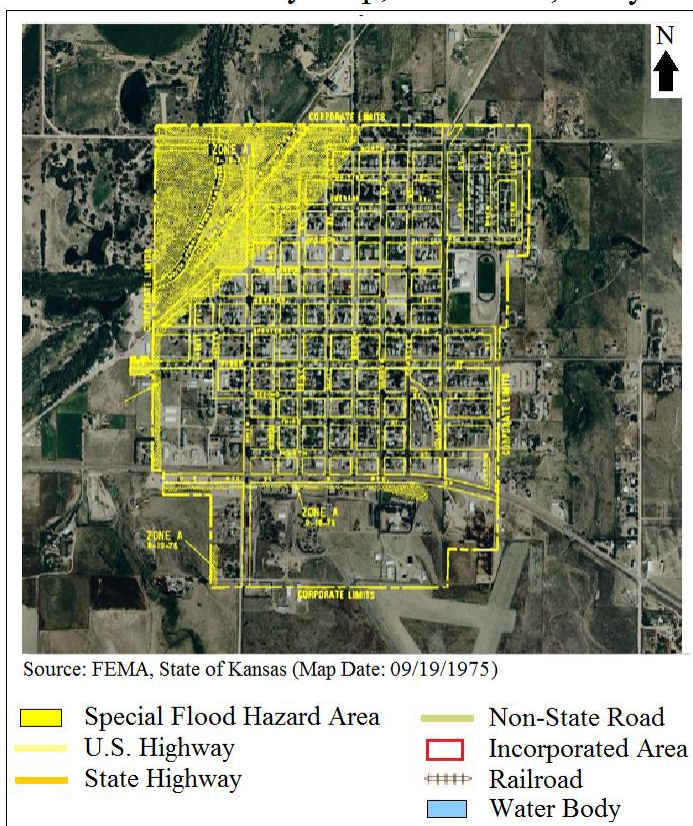


## FEMA Flood Hazard Boundary Map, Bird City, Cheyenne County





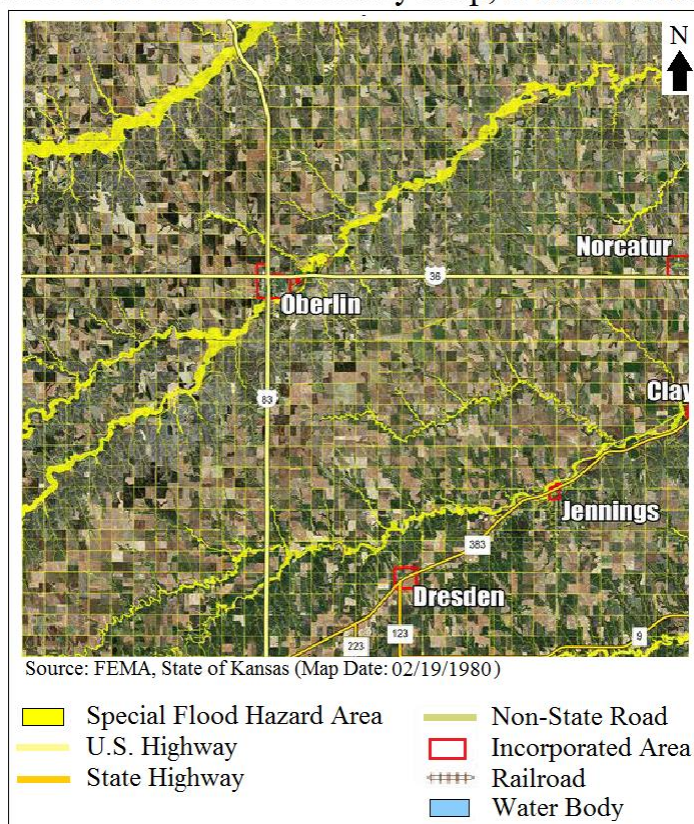
## FEMA Flood Hazard Boundary Map, St. Francis, Cheyenne County





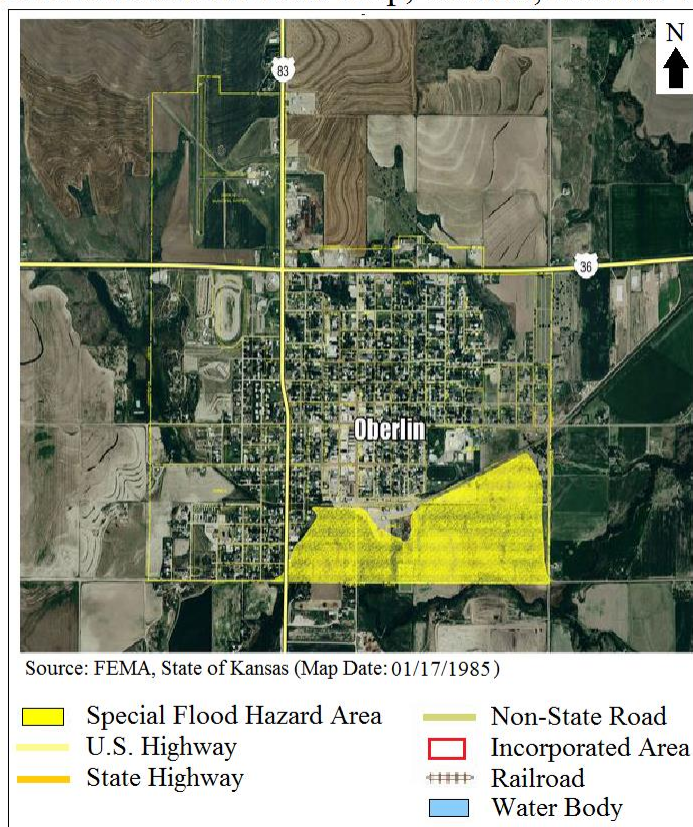


## FEMA Flood Hazard Boundary Map, Decatur County



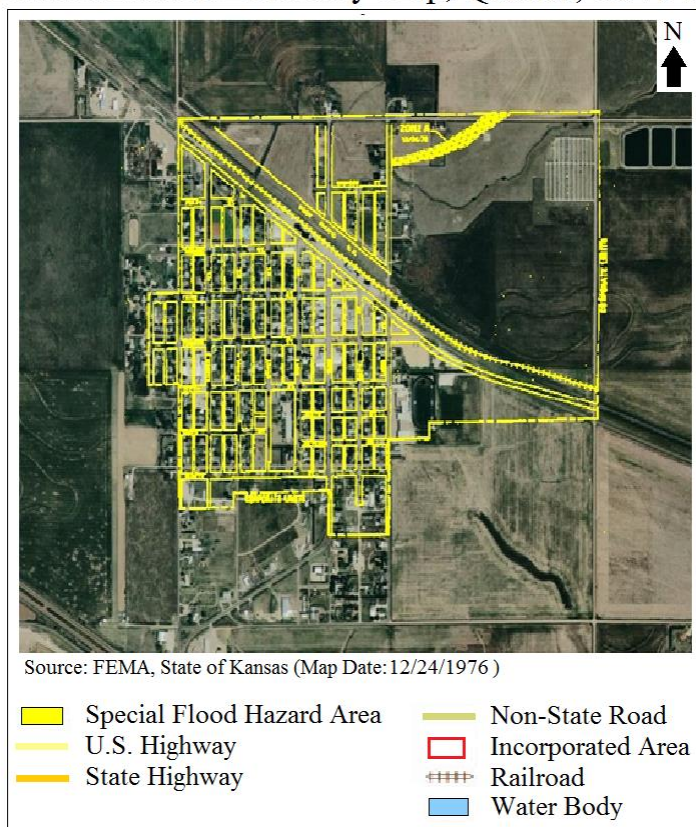


## FEMA Flood Insurance Rate Map, Oberlin, Decatur County





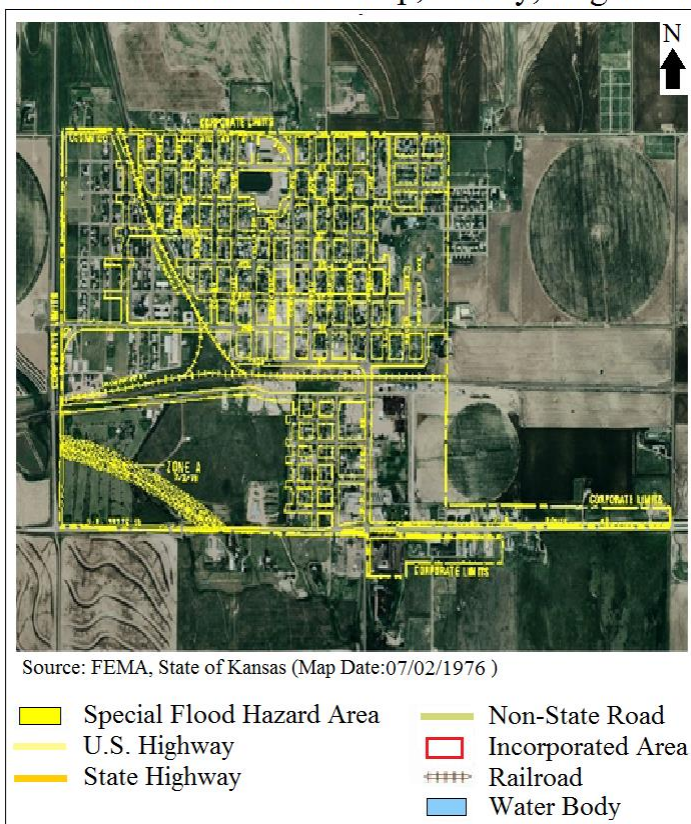
## FEMA Flood Hazard Boundary Map, Quinter, Gove County





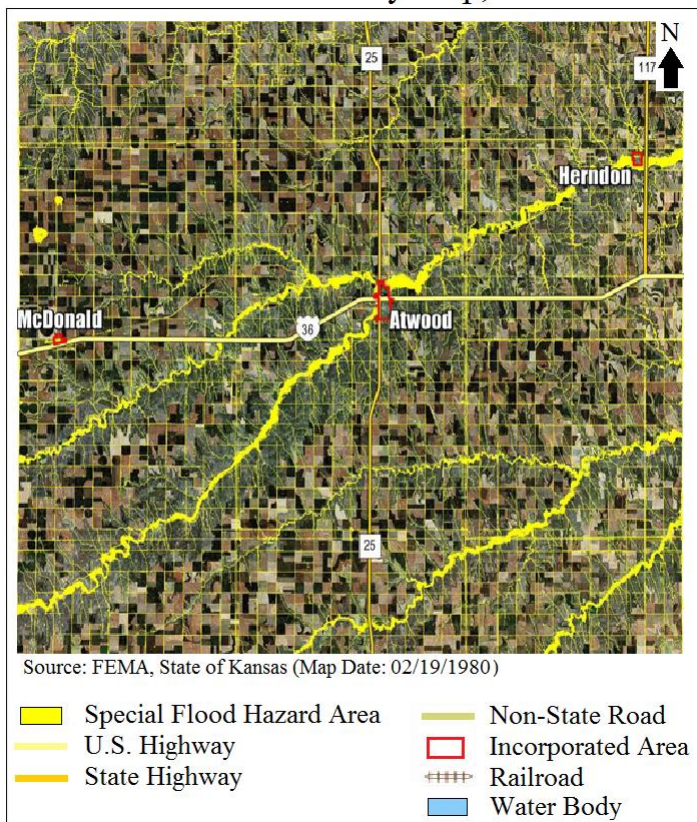


## FEMA Flood Insurance Rate Map, Oakley, Logan County



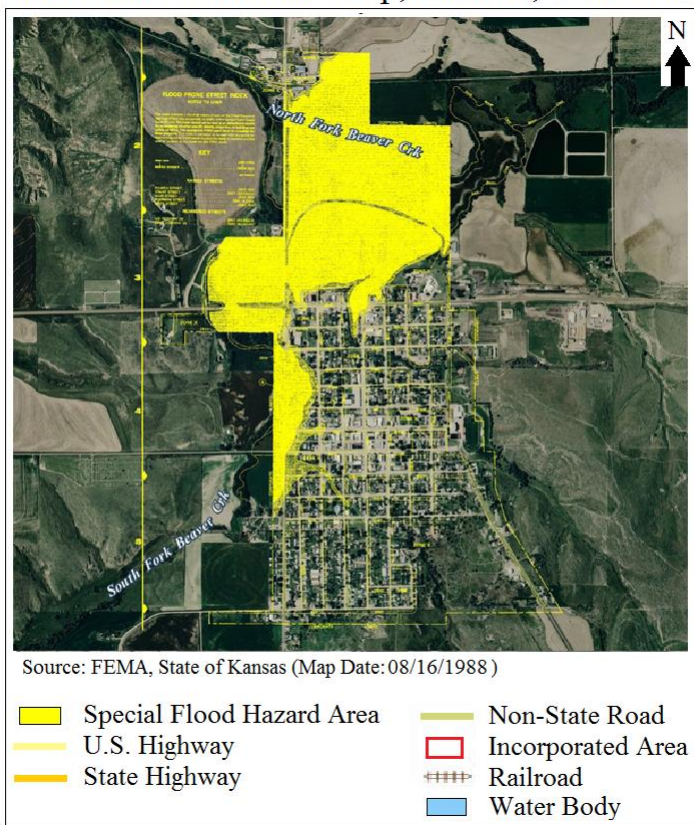


## FEMA Flood Hazard Boundary Map, Rawlins County





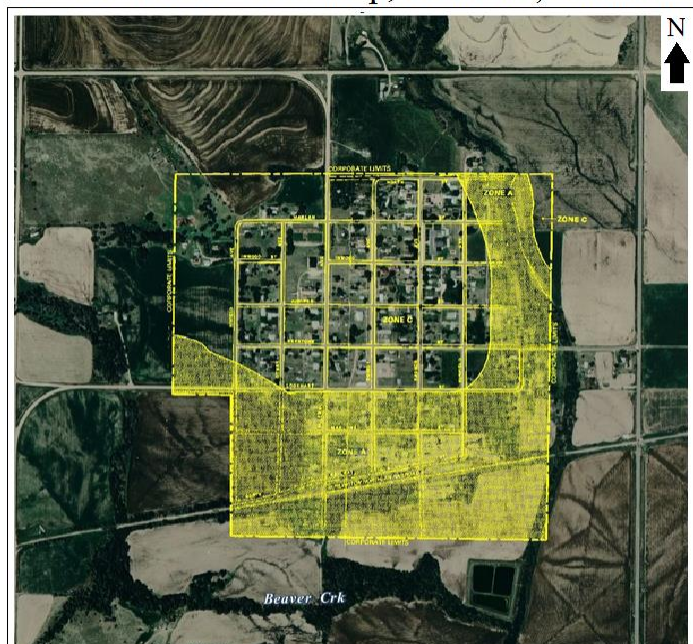
## FEMA Flood Insurance Rate Map, Atwood, Rawlins County







## FEMA Flood Insurance Rate Map, Herndon, Rawlins County



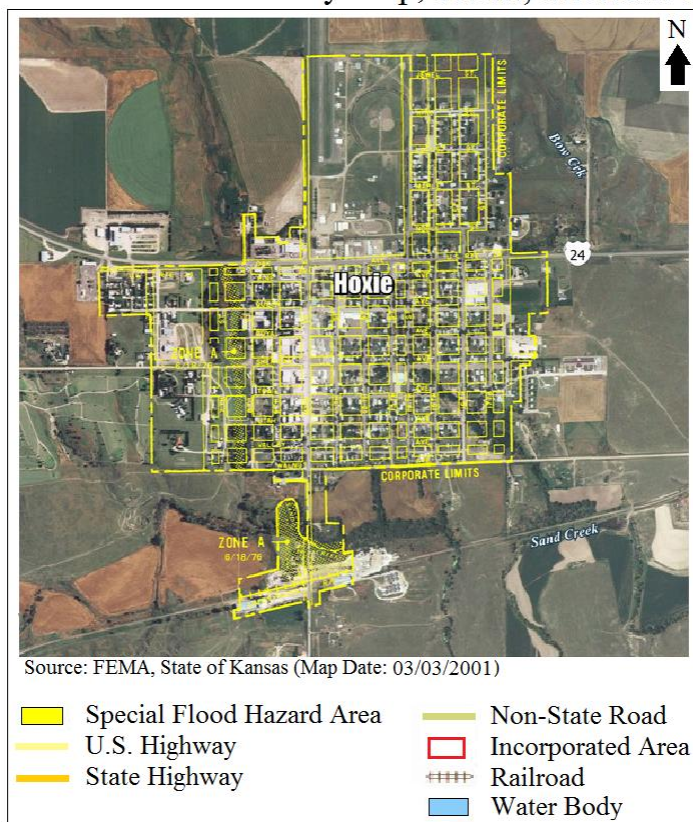
Source: FEMA, State of Kansas (Map Date:10/30/1979 )

- |                           |                   |
|---------------------------|-------------------|
| Special Flood Hazard Area | Non-State Road    |
| U.S. Highway              | Incorporated Area |
| State Highway             | Railroad          |
|                           | Water Body        |



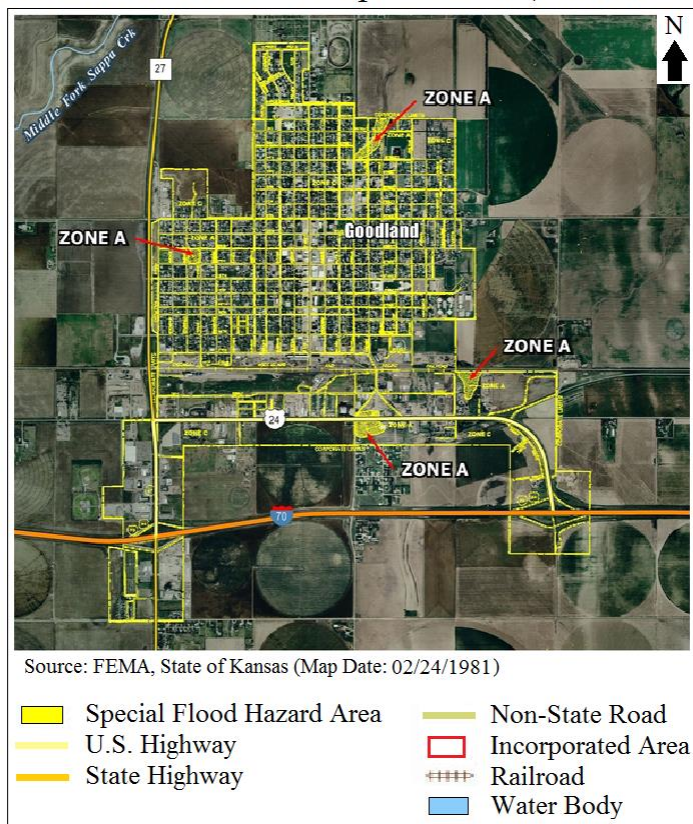


## FEMA Flood Hazard Boundary Map, Hoxie, Sheridan County





## FEMA Flood Insurance Rate Map, Goodland, Sherman County





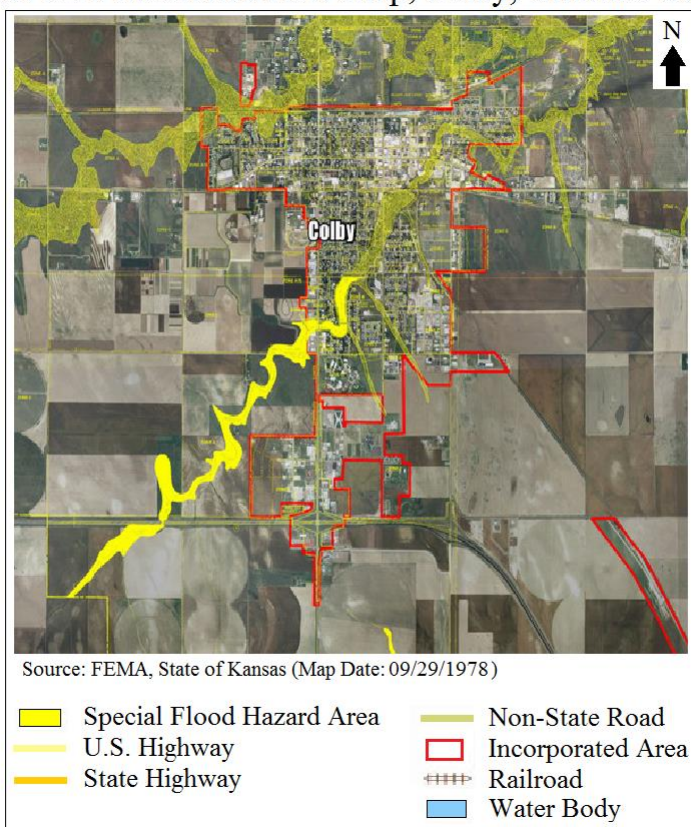
## FEMA Flood Hazard Boundary Map, Brewster, Thomas County





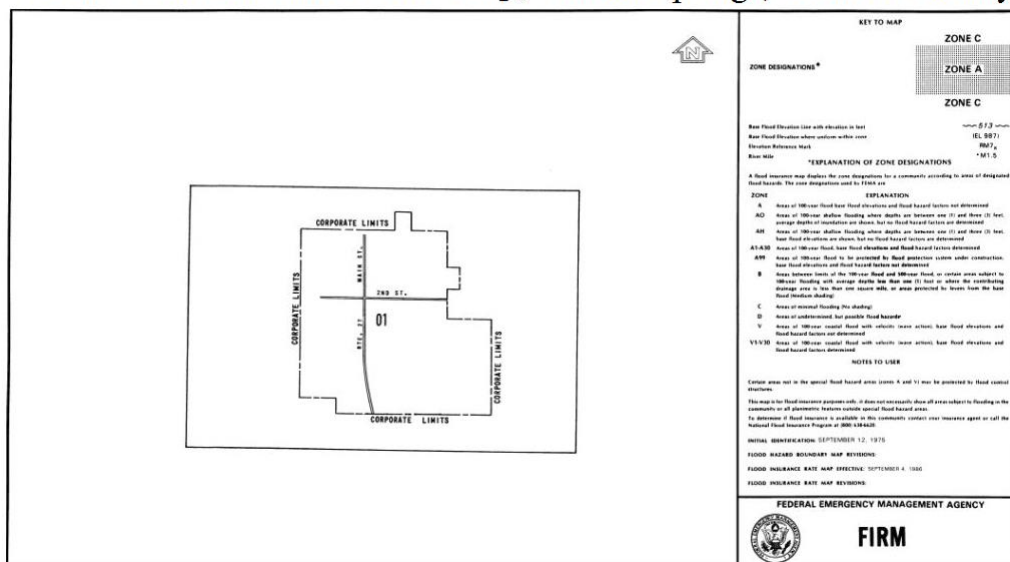


## FEMA Flood Insurance Rate Map, Colby, Thomas County





## FEMA Flood Insurance Rate Map, Sharon Springs, Wallace County



### Local Concerns

The following detail specific local concerns as related to flooding:

- In **Cheyenne County**, the city of **St. Francis** has two Zone A flood areas in the corporate limits of the town, one encompassing the northwest corner of town and one at the extreme southwest corner of the corporate limits. **Bird City** has twelve small Zone A areas throughout the corporate limits. The majority of the flood zones are unimproved. There are no apparent streams or creeks near the town, so the flood zones appear to be due to topography in the town.
- In **Decatur County**, the city of **Oberlin** has potential flooding areas along Sappa Creek. It appears the only development within this area is the sewage treatment lagoon.
- In **Gove County**, the city of **Quinter** has a SFHA trending east-west that does not appear to include improvements.
- In **Logan County**, the city of **Oakley** has one SFHA located along a creek in the southwest corner of the city. It appears that this area is primarily agricultural with limited development.
- In **Rawlins County**, the city of **Atwood** has one Zone AE and two small Zone X areas in the extreme northwest corner of the city limits. These areas appear to be agricultural and largely undeveloped. The city of **Herndon** has one Zone A in the corporate city limits from Lockhart Street south, and Sunfield Avenue east from the north to south limits. It appears that there are improved areas located within the Zone A in the south and east parts of the city limits.
- In **Sheridan County**, the city of **Hoxie** has one Zone A located along the western edge of the city and a small Zone A area to the south that lies along the abandoned railroad tracks.
- In **Sherman County**, the city of **Goodland** has four small Zone A flood areas with limited improvement.
- In **Thomas County**, the city of **Colby** has two primary flood zones. **Prairie Dog Creek** flows to the north of the city and includes some developed areas. There is also an unnamed tributary of **Prairie Dog Creek** that flows southwest to northeast through the city, also including some developed areas. The city of **Brewster** has one Zone A in a small, undeveloped area of the city.







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. A review of the mapping system indicates no recorded repeat flood areas within the region.

#### 4.13.2 – Previous Occurrences

In the 20-year period from 2000 to present, there have been eight Presidential Disaster Declarations for Kansas Region A for floods (along with other associates hazard events such as tornados or severe storms). The following 20-year information (with 2000 and 2019 being full data years) on past declared disasters is presented to provide a historical perspective on flood events that have impacted Kansas Region A. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2015.

**Table 4.62: Kansas Region A FEMA Flood Disaster and Emergency Declarations, 2000 - 2019**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28-07/12/2019)	Severe Storms, Straight-line Winds, Tornados, <b>Flooding</b> , Landslides, and Mudslides	Wallace	\$1,887,116
<b>4319</b>	06/16/2017 (04/28/2017 – 05/03/2017)	Severe Winter Storm, Snowstorm, Straight-Line Winds, <b>Flooding</b>	Cheyenne, Decatur, Gove, Logan, Rawlins, Sheridan, Sherman, Thomas, and Wallace	\$53,126,486
<b>4287</b>	10/20/2016 (09/02/2016 – 09/12/2016)	Severe Storms and <b>Flooding</b>	Cheyenne	\$6,959,536
4230	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, Tornados, Straight-Line Winds, and <b>Flooding</b>	Cheyenne	\$13,848,325
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, Straight-Line Winds, Tornados and <b>Flooding</b>	Logan, Sherman	\$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	Severe Storms, <b>Flooding</b> and Tornados	Cheyenne, Decatur, and Sheridan	\$9,279,257
1776	07/09/2008	Severe Storms, <b>Flooding</b> , and Tornados	Decatur, Gove, Logan, Sheridan, Thomas, and Wallace	\$70,629,544
1535	8/3/2004 (6/12-7/25/2004)	Severe Storms, <b>Flooding</b> , and Tornados	Decatur, Sheridan, Thomas, and Wallace	\$12,845,892

Source: FEMA

The following provides details concerning Presidential Disaster Declarations DR 4449, DR 4319, and DR 4287 for Kansas Region A.





## **Kansas –Severe Storms, Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides**

### **FEMA-4449-DR**

Declared June 20, 2019 On June 7, 2019

Governor Laura Kelly requested a major disaster declaration due to severe storms, straight-line winds, tornadoes, flooding, landslides, and mudslides beginning on April 28, 2019, and continuing. The Governor requested a declaration for Public Assistance for 63 counties and Hazard Mitigation statewide. Beginning on May 20, 2019, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested areas 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 20, 2019, 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, tornadoes, flooding, landslides, and mudslides in Allen, Anderson, Atchison, Barber, Barton, Butler, Chase, Chautauqua, Cherokee, Clark, Clay, Cloud, Coffey, Cowley, Doniphan, Elk, Ellsworth, Franklin, Geary, Greenwood, Harper, Harvey, Hodgeman, Jefferson, Kingman, Leavenworth, Lincoln, Linn, Lyon, Marion, Marshall, McPherson, Meade, Montgomery, Morris, Nemaha, Neosho, Osage, Ottawa, Pawnee, Phillips, Pottawatomie, Pratt, Reno, Rice, Rush, Russell, Saline, Sumner, Wabaunsee, Washington, Wilson, and Woodson Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide

## **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, Cheyenne, Decatur, Gove, Haskell, Logan, Lane, Logan, Rawlins, Neosho, Norton, Rawlins, Sheridan, Seward, Sheridan, Sherman, Sherman, Thomas, Thomas, Wallace, and Wallace Counties. This declaration also authorized snow assistance for a period of 48 hours for Decatur, Gove, Lane, Logan, Rawlins, Sheridan, Thomas, and Wallace Counties. Finally, this declaration made Hazard Mitigation Cheyenne Program assistance requested by the Governor available for hazard mitigation measures statewide.

## **Kansas – Severe Storms and Flooding**

### **FEMA-4287-DR**

Declared October 20, 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, Cowley, Ellis, Graham, Greenwood, Kingman, Norton, Rooks, Russell, Sedgwick, and Sumner 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 flood events and the resulting damage totals in Kansas Region A for the period 2010 - 2019 (with 2010 and 2019 being full data set years).

**Table 4.63: Kansas Region A NCEI Flood and Flash Flood Events, 2010 - 2019**

<b>County</b>	<b>Event Type</b>	<b>Number of Days with Events</b>	<b>Property Damage</b>	<b>Deaths</b>	<b>Injuries</b>
Cheyenne	Flood	0	\$0	0	0
	Flash Flood	8	\$0	0	0
Decatur	Flood	2	\$0	0	0
	Flash Flood	6	\$0	0	0
Gove	Flood	6	\$10,000	0	0
	Flash Flood	11	\$0	0	0
Logan	Flood	11	\$0	0	0
	Flash Flood	19	\$220,000	0	0



**Table 4.63: Kansas Region A NCEI Flood and Flash Flood Events, 2010 - 2019**

County	Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Rawlins	Flood	2	\$0	0	0
	Flash Flood	12	\$0	0	0
Sheridan	Flood	1	\$0	0	0
	Flash Flood	6	\$0	0	0
Sherman	Flood	3	\$0	0	0
	Flash Flood	15	\$1,000	0	0
Thomas	Flood	3	\$7,000	0	0
	Flash Flood	8	\$21,000	0	0
Wallace	Flood	1	\$0	0	0
	Flash Flood	6	\$0	0	0

Source: FEMA

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

- August 10, 2017: Rexford, Thomas County**  
 A semi tipped over on Highway 83, possibly due to hydroplaning from the heavy rainfall. Property damage was recorded at \$7,000.
- June 20, 2017: Grainfield, Gove County**  
 Intense, heavy rainfall caused many drivers to hydroplane and a semi with trailer to rollover at mile marker 91 on I-70, two miles west of Grainfield. Property damage was recorded at \$10,000.
- September 3, 2016: Wheeler, Cheyenne County**  
 Eight feet of road was washed out around a culvert on CR 19 between CR BB and CR AA. The washout also exposed a phone line running under the road. The culvert had to be replaced. Property damage was recorded at \$40,000.
- June 29, 2014: Winona, Logan County**  
 Flooding occurring on many roads just north of Winona. Doppler radar estimated 5 to 7 inches of rain had fallen within 1-2 hours. County officials are in the process of closing some county roads. The Union Pacific Railroad tracks between Winona and Page City were washed out as a result of the torrential rainfall. Property damage was recorded at \$200,000.
- August 5, 2011: Colby, Thomas County**  
 Police car had to be abandoned after 2.10 inches of rain fell in 45 minutes causing the engine to become flooded. Property damage was recorded at \$20,000.

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 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 11 flooding related claims on 665 acres for \$86,392.



**Table 4.64: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Flooding**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	0	0	0
Decatur	0	0	\$0
Gove	0	0	0
Logan	3	248	\$42,837
Rawlins	3	40	4,816
Sheridan	1	65	\$2,060
Sherman	3	113	\$13,958
Thomas	1	198	22,721
Wallace	0	0	0

Source: USDA Farm Service Agency

### 4.13.3 – Hazard Probability Analysis

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

**Table 4.65: Cheyenne County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	0
Average Events per Year	0
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

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

- No events
- No deaths or injuries
- \$0 in property damages

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

**Table 4.66: Cheyenne County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	8
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI







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

- One event
- No deaths or injuries
- \$0 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 **Cheyenne County**

**Table 4.67: Cheyenne County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: USDA

According to the USDA Risk Management Agency, Cheyenne 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 **Decatur County**.

**Table 4.68: Decatur County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	2
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

Data from the NCEI indicates that Decatur 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 **Decatur County**.

**Table 4.69: Decatur County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	6
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

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

- One event
- No deaths or injuries
- \$0 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 **Decatur County**

**Table 4.70: Decatur County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: USDA

According to the USDA Risk Management Agency, Decatur 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 **Gove County**.

**Table 4.71: Gove County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	6
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0



**Table 4.71: Gove County Riverine Flood Probability Summary**

Data	Recorded Impact
Total Reported NCEI Property Damage (2010-2019)	\$10,000
Average Property Damage per Year	\$1,000

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
- \$1,000 in property damages

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

**Table 4.72: Gove County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	11
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

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

- One event
- No deaths or injuries
- \$0 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 **Gove County**

**Table 4.73: Gove County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: USDA

According to the USDA Risk Management Agency, Gove 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 **Logan County**.

**Table 4.74: Logan County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	11
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

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
- \$0 in property damages

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

**Table 4.75: Logan County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	19
Average Events per Year	2
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$220,000
Average Property Damage per Year	\$22,000

Source: NCEI

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

- Two events
- No deaths or injuries
- \$22,000 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 **Logan County**



**Table 4.76: Logan County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	3
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	248
Average Number of Acres Damaged per Year	25
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$42,837
Average Crop Damage per Year	\$4,284

Source: USDA

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

- <1 insurance claim
- 25 acres impacted
- \$4,284 in insurance claims

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

**Table 4.77: Rawlins County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	2
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

Data from the NCEI indicates that Rawlins 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 **Rawlins County**.

**Table 4.78: Rawlins County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	12
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI





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

- One event
- No deaths or injuries
- \$0 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 **Rawlins County**

**Table 4.79: Rawlins County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	3
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	40
Average Number of Acres Damaged per Year	4
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$4,816
Average Crop Damage per Year	\$482

Source: USDA

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

- <1 insurance claim
- Four acres impacted
- \$482 in insurance claims

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

**Table 4.80: Sheridan County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	1
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

Data from the NCEI indicates that Sheridan 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 **Sheridan County**.





**Table 4.81: Sheridan County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	6
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$0 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 **Sheridan County**

**Table 4.82: Sheridan County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	65
Average Number of Acres Damaged per Year	7
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,060
Average Crop Damage per Year	\$206

Source: USDA

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

- <1 insurance claims
- Seven acres impacted
- \$206 in insurance claims

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

**Table 4.83: Sherman County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	3
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI





Data from the NCEI indicates that Sherman 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 **Sherman County**.

**Table 4.84: Sherman County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	15
Average Events per Year	2
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$1,000
Average Property Damage per Year	\$100

Source: NCEI

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

- Two events
- No deaths or injuries
- \$100 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 **Sherman County**

**Table 4.85: Sherman County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	3
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	113
Average Number of Acres Damaged per Year	11
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$13,958
Average Crop Damage per Year	\$1,396

Source: USDA

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

- <1 insurance claim
- 11 acres impacted
- \$1,396 in insurance claims





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

**Table 4.86: Thomas County Riverine Flood Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	3
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$7,000
Average Property Damage per Year	\$700

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$700 in property damages

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

**Table 4.87: Thomas County Flash Flood Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	8
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$21,000
Average Property Damage per Year	\$2,100

Source: NCEI

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

- One event
- No deaths or injuries
- \$2,100 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 **Thomas County**

**Table 4.88: Thomas County Flooding Agricultural Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	198
Average Number of Acres Damaged per Year	20



**Table 4.88: Thomas County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$22,721
Average Crop Damage per Year	\$2,272

Source: USDA

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

- <1 insurance claim
- 20 acres impacted
- \$2,272 in insurance claims

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

**Table 4.89: Wallace County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	1
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

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

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

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

**Table 4.90: Wallace County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	6
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0

Source: NCEI

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





- One event
- No deaths or injuries
- \$0 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 **Wallace County**

**Table 4.91: Wallace County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: USDA

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

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

In addition, Kansas Region A has had eight Presidentially Declared Disasters relating to flooding (and other causes) in the last 20 years. This represents an average of one 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 A 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 A county.

**Table 4.92: Kansas Region A 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
Cheyenne	20	0	20	0	0
Decatur	49	0	44	0	0
Gove	23	0	13	0	0
Logan	25	0	20	0	0
Rawlins	81	5	85	10	0
Sheridan	26	0	17	0	0
Sherman	30	1	18	0	0
Thomas	79	4	57	3	0
Wallace	17	0	18	0	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 4.93: Kansas Region A 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
Cheyenne	\$347,000	\$249,000	\$1,000	\$597,000	\$0	\$597,000
Decatur	\$914,000	\$734,000	\$11,000	\$1,659,000	\$1,000	\$1,660,000
Gove	\$485,000	\$312,000	\$14,000	\$811,000	\$0	\$811,000
Logan	\$396,000	\$322,000	\$1,000	\$719,000	\$4,000	\$723,000
Rawlins	\$2,610,000	\$4,420,000	\$278,000	\$7,308,000	\$63,000	\$7,371,000
Sheridan	\$630,000	\$569,000	\$33,000	\$1,232,000	\$0	\$1,232,000
Sherman	\$890,000	\$1,277,000	\$46,000	\$2,213,000	\$10,000	\$2,223,000
Thomas	\$1,359,000	\$1,065,000	\$50,000	\$2,474,000	\$3,000	\$2,477,000
Wallace	\$408,000	\$217,000	\$4,000	\$629,000	\$0	\$629,000

Source: FEMA and HAZUS

The USDA 2017 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 A County. USDA Risk Management Agency crop loss data for the years 2009 - 2018 (with 2009 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 potential vulnerability the county has to flood events.

**Table 4.94: Flood Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	0	0.00%	\$132,754,000	\$0	0.00%
Decatur	420,032	0	0.00%	\$233,431,000	\$0	0.00%
Gove	567,444	0	0.00%	\$201,514,000	\$0	0.00%
Logan	604,595	25	0.00%	\$70,870,000	\$4,284	0.01%
Rawlins	603,529	4	0.00%	\$100,351,000	\$482	0.00%
Sheridan	512,108	7	0.00%	\$348,852,000	\$206	0.00%
Sherman	618,428	11	0.00%	\$139,179,000	\$1,396	0.00%
Thomas	669,940	0	0.00%	\$251,056,000	\$2,272	0.00%
Wallace	445,809	0	0.00%	\$81,786,000	\$0	0.00%

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.

### ***Mold***

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 4.95: Kansas Region A NFIP Communities**

<b>Community</b>	<b>Initial Flood Hazard Boundary Map Identified</b>	<b>Initial Flood Insurance Rate Map Identified</b>	<b>Current Effective Map Date</b>
<b>Cheyenne County</b>			
Bird City	07/30/76	-	07/30/76
St. Francis	09/19/75	-	09/19/75
<b>Decatur County</b>			
Decatur County	02/12/80	-	02/12/80
Oberlin	12/28/1973	01/17/85	01/17/85
<b>Gove County</b>			
Quinter	12/24/1976	-	12/24/1976



**Table 4.95: Kansas Region A NFIP Communities**

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
<b>Logan County</b>			
Oakley	07/02/76	-	07/02/76
<b>Rawlins County</b>			
Rawlins County	02/19/80	-	02/19/80
Atwood	02/15/74	08/16/88	08/16/88
Herndon	11/22/1974	10/30/1979	10/30/79(M)
<b>Sheridan County</b>			
Hoxie	06/18/76	03/01/01	03/01/01(L)
<b>Sherman County</b>			
Goodland	02/15/74	02/24/81	02/24/81(M)
<b>Thomas County</b>			
Brewster	07/16/76	-	12/24/1976
Colby	02/15/74	09/29/78	09/29/78
<b>Sheridan County</b>			
Sharon Springs	09/12/75	09/04/86	09/04/86(M)

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. No Region A communities are currently CRS participants:

**Table 4-96: Kansas Region A CRS Participating Jurisdictions**

Jurisdiction	County	CRS Entry Date	CRS Class	% Discount for SFHA	% Discount for Non-SFHA	Status
No current participating jurisdictions						

#### 4.13.6 – FEMA Flood Policy and Loss Data

Kansas Region A 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 A. Loss statistics include losses through June, 2020.

**Table 4.97: Kansas Region A NFIP Policy and Loss Statistics**

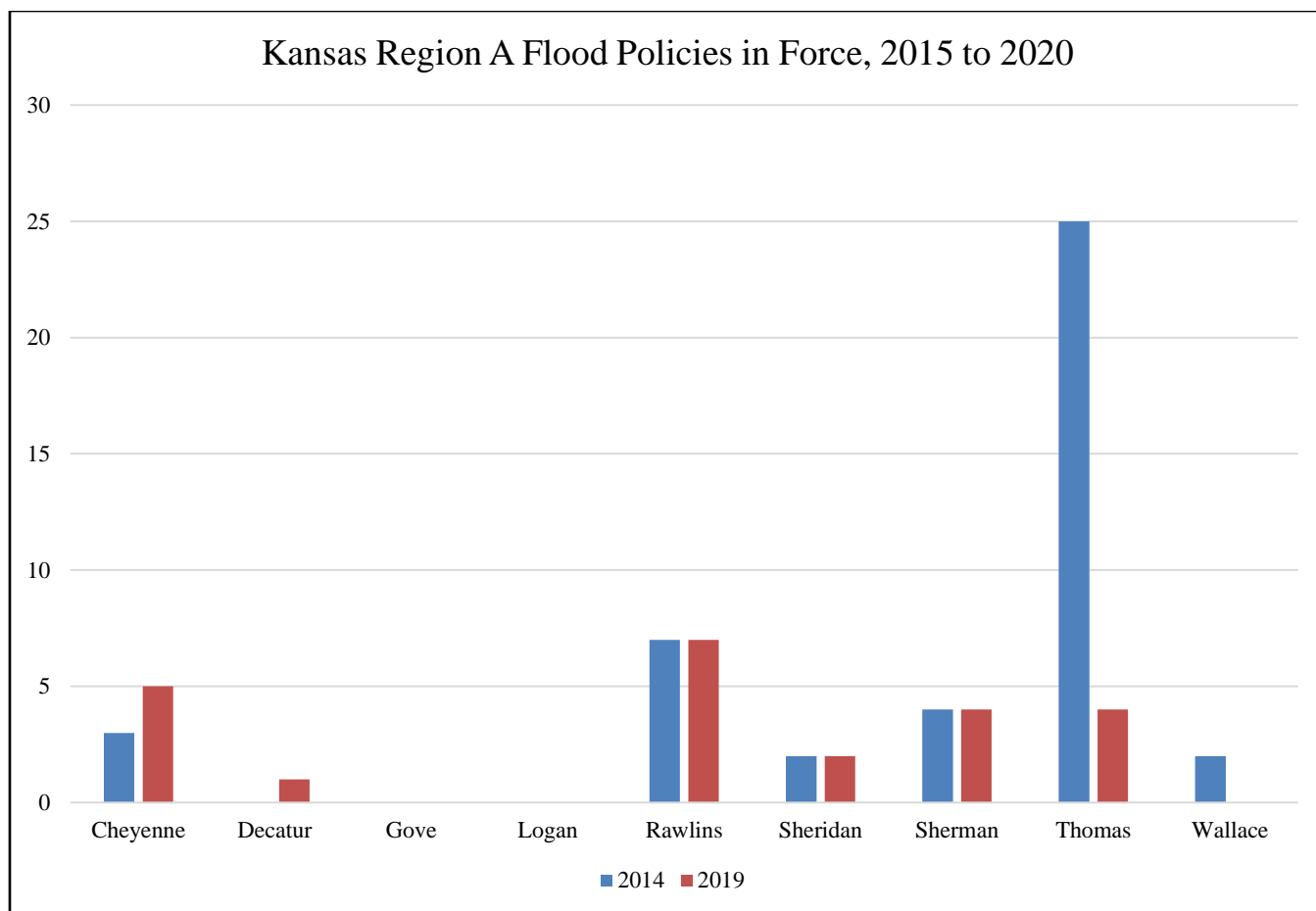
<b>Jurisdiction</b>	<b>Number of Policies in Force</b>	<b>Insurance in Force</b>	<b>Number of Closed Losses</b>	<b>Total Payments</b>
<b>Cheyenne County</b>				
St. Francis	5	\$173,300	0	\$0
<b>Decatur County</b>				
Decatur County	1	\$28,000	0	\$0
<b>Rawlins County</b>				
Atwood	7	\$1,353,000	1	\$31,887
<b>Sheridan County</b>				
Hoxie	2	\$500,000	0	\$0
<b>Sherman County</b>				
Goodland	4	\$450,500	0	\$0
<b>Thomas County</b>				
Colby	4	\$880,000	0	\$0

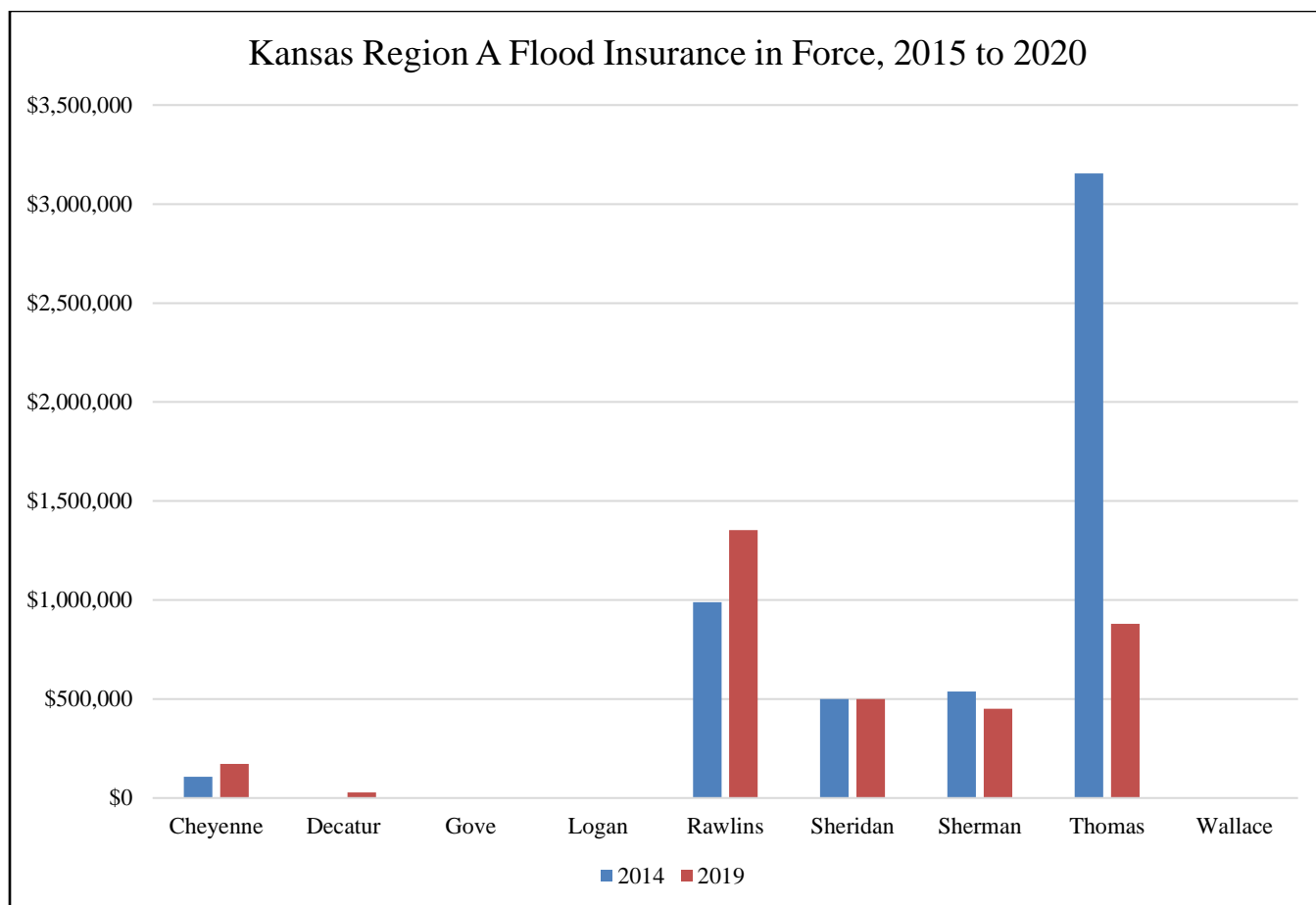
Source: FEMA, "Policy and Loss Data by Community with County and State Data"

The following graphs summarize data from the above table for Kansas Region A in comparison to 2015 data. Of note:

- Regionally the number of flood policies has decreased from 2015 to 2020, from 43 to 23
- Regionally the amount of flood insurance in-force has decreased from 2015 to 2020, from \$5,288,400 to \$3,384,500.







#### 4.13.7 – Repetitive Loss Properties

A high priority to Kansas Region A 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.

No RL or SRL properties were reported in Kansas Region A.

**Table 4.98: Kansas Region A Repetitive Loss Properties, As of December 2018**

County Name	Community Name	Mitigated	Insured	Occupancy	Total Building Payment	Total Contents Payment	Losses	Total Paid
None								

#### 4.13.8 – Consequence Analysis

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

**Table 4.99: 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.
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.



### 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 4.99: Hailstorm Intensity Scale**

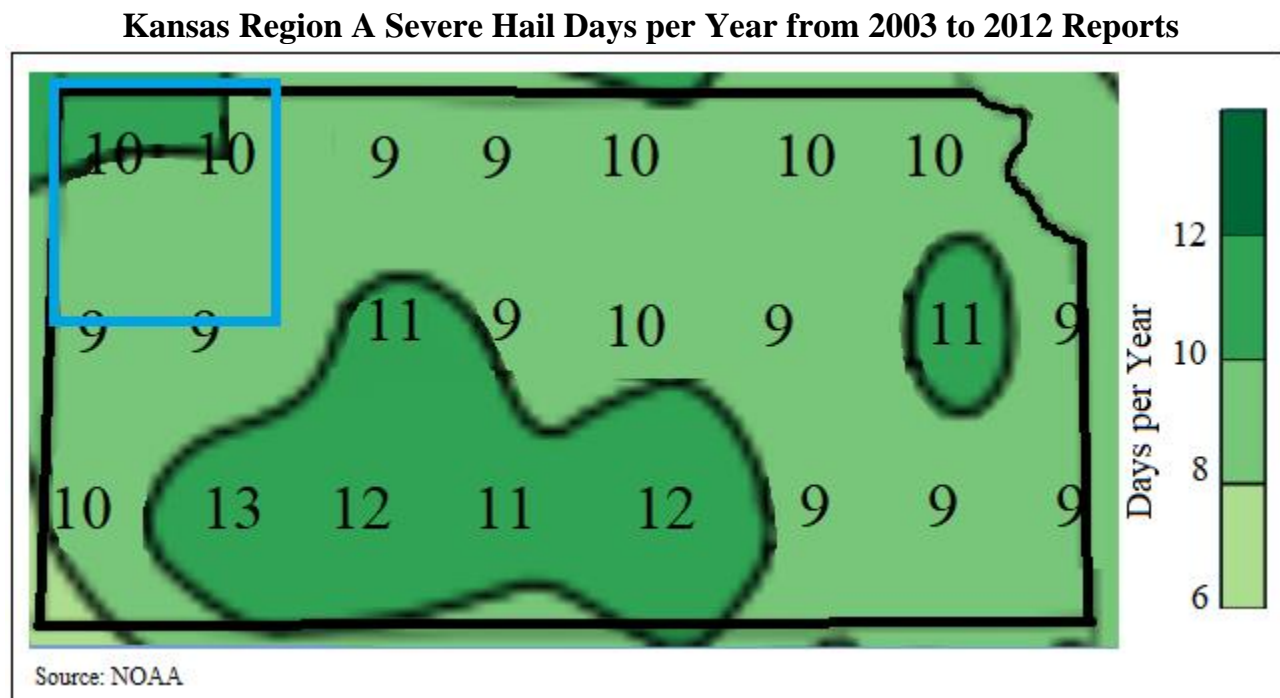
Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	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 A.



#### 4.14.2 – Previous Occurrences

In the 20-year period from 2000 to present, there have been seven Presidential Disaster Declarations for Kansas Region A for severe storms (along with other associated hazards), of which hail may be a component. The following 20-year information (with 2000 and 2019 being full data years) on past declared disasters is presented to provide a historical perspective on hail events that have impacted Kansas Region A. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2015.

**Table 4.100: Kansas Region A FEMA Severe Storm Disaster and Emergency Declarations, 2000 - 2019**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28-07/12/2019)	<b>Severe Storms</b> , Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides	Wallace	\$1,887,116
<b>4287</b>	10/20/2016 (09/02/2016 – 09/12/2016)	<b>Severe Storms</b> and Flooding	Cheyenne	\$6,959,536
4230	07/20/2015 (05/04/2015 – 06/21/2015)	<b>Severe Storms</b> , Tornadoes, Straight-Line Winds, and Flooding	Cheyenne	\$13,848,325
4010	07/29/2011 (5/19-6/4/2011)	<b>Severe Storms</b> , Straight-Line Winds, Tornadoes and Flooding	Logan, Sherman	\$8,259,620



**Table 4.100: Kansas Region A FEMA Severe Storm Disaster and Emergency Declarations, 2000 - 2019**

<b>Declaration Number</b>	<b>Incident Period</b>	<b>Disaster Description</b>	<b>Regional Counties Involved</b>	<b>Dollars Obligated</b>
1932	08/10/2010 (6/7-7/21/2010)	<b>Severe Storms</b> , Flooding and TORNADOS	Cheyenne, Decatur, and Sheridan	\$9,279,257
1776	07/09/2008	<b>Severe Storms</b> , Flooding, and TORNADOS	Decatur, Gove, Logan, Sheridan, Thomas, and Wallace	\$70,629,544
1535	8/3/2004 (6/12-7/25/2004)	<b>Severe Storms</b> , Flooding, and TORNADOS	Decatur, Sheridan, Thomas, and Wallace	\$12,845,892

Source: FEMA

The following provides details concerning Presidential Disaster Declarations DR 4449 and DR 4287 for Kansas Region A.

### **Kansas –Severe Storms, Straight-line Winds, TORNADOS, Flooding, Landslides, and Mudslides FEMA-4449-DR**

Declared June 20, 2019 On June 7, 2019

Governor Laura Kelly requested a major disaster declaration due to severe storms, straight-line winds, tornados, flooding, landslides, and mudslides beginning on April 28, 2019, and continuing. The Governor requested a declaration for Public Assistance for 63 counties and Hazard Mitigation statewide. Beginning on May 20, 2019, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested areas 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 20, 2019, 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, tornados, flooding, landslides, and mudslides in Allen, Anderson, Atchison, Barber, Barton, Butler, Chase, Chautauqua, Cherokee, Clark, Clay, Cloud, Coffey, Cowley, Doniphan, Elk, Ellsworth, Franklin, Geary, Greenwood, Harper, Harvey, Hodgeman, Jefferson, Kingman, Leavenworth, Lincoln, Linn, Lyon, Marion, Marshall, McPherson, Meade, Montgomery, Morris, Nemaha, Neosho, Osage, Ottawa, Pawnee, Phillips, Pottawatomie, Pratt, Reno, Rice, Rush, Russell, Saline, Sumner, Wabaunsee, Washington, Wilson, and Woodson Counties. This declaration also 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

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, Cowley, Ellis, Graham, Greenwood, Kingman, Norton, Rooks, Russell, Sedgwick, and Sumner 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 hailstorm events and the resulting damage totals in Kansas Region A for the period 2010 - 2019 (with 2010 and 2019 being full data set years).

**Table 4.101: Kansas Region A NCEI Hailstorm Events, 2010 - 2019**

County	Number of Days with Events	Property Damage	Deaths	Injuries
Cheyenne	53	\$80,750	0	0
Decatur	32	\$83,000	0	0
Gove	49	\$34,000	0	0
Logan	69	\$211,300	0	0
Rawlins	69	\$0	0	0
Sheridan	46	\$0	0	0
Sherman	91	\$3,250	0	0
Thomas	57	\$1,005,000	0	0
Wallace	45	\$3,750	0	0

Source: NOAA NCEI

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

- **July 31, 2013: Oakley, Logan County**

Numerous reports from emergency manager (EM), trained spotters and the public were received in a short period of time with hail sizes ranging from 1.25 up to 2.50 in diameter. The EM estimated at least 100 vehicles in town suffered some type of hail damage, with some having windshields or other glass broken. Two med-flight aircraft also had damage. Property damage was recorded at \$200,000.

- **August 9, 2011: Norcatur, Decatur County**

Trained spotters and Law Enforcement reported hail up to 1.75 inches in diameter. Law Enforcement also reported damage to two of their vehicles, with damages totaling almost \$20,000. Many other reports of damage to vehicles, windows of houses and businesses, and crops. Property damage was recorded at \$75,000.





- **July 12, 2010: Colby, Thomas County**

A long-track supercell produced 25 known reports of large hail over a 30-mile path from Colby to near Oakley over a period of about 90 minutes. Hail sizes ranged from golf ball to grapefruit size. Windows were broken, roofs heavily damaged, skylights broken, and equipment destroyed. Approximately 35,000 acres of cropland were affected by the storm. Property damage was recorded at \$1,000,000.

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 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 1,125 hail related claims on 1,323,456 acres for \$163,501,822.

**Table 4.102: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Hail**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	136	137,283	\$19,515,717
Decatur	73	51,445	\$4,533,670
Gove	113	73,404	\$6,425,764
Logan	109	107,997	\$11,838,706
Rawlins	111	63,319	\$5,958,795
Sheridan	144	111,221	\$13,080,899
Sherman	219	362,406	\$50,578,989
Thomas	195	317,158	\$41,056,946
Wallace	125	99,223	\$10,512,336

Source: USDA Farm Service Agency

### 4.12.3 – Hazard Probability Analysis

The following table summarizes hailstorm probability data for **Cheyenne County**.

**Table 4.103: Cheyenne County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	53
Average Events per Year	5
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$80,750
Average Property Damage per Year	\$8,075
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	136
Average Number of Claims per Year	14
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	137,283
Average Number of Acres Damaged per Year	13,728
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$19,515,717
Average Crop Damage per Year	\$1,951,572

Source: NCEI and USDA

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







- Five events
- No deaths or injuries
- \$8,075 in property damages

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

- 14 insurance claims
- 13,728 acres impacted
- \$1,951,572 in insurance claims

The following table summarizes hailstorm probability data for **Decatur County**.

**Table 4.104: Decatur County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	33
Average Events per Year	3
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$83,000
Average Property Damage per Year	\$8,300
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	73
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	51,445
Average Number of Acres Damaged per Year	5,145
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$4,533,670
Average Crop Damage per Year	\$453,367

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- \$8,300 in property damages

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

- Seven insurance claims
- 5,145 acres impacted
- \$453,367 in insurance claims

The following table summarizes hailstorm probability data for **Gove County**.



**Table 4.105: Gove County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	49
Average Events per Year	5
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$34,000
Average Property Damage per Year	\$3,400
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	113
Average Number of Claims per Year	11
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	73,404
Average Number of Acres Damaged per Year	7,340
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$6,425,764
Average Crop Damage per Year	\$642,576

Source: NCEI and USDA

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

- Five events
- No deaths or injuries
- \$3,400 in property damages

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

- 11 insurance claims
- 7,340 acres impacted
- \$642,576 in insurance claims

The following table summarizes hailstorm probability data for **Logan County**.

**Table 4.106: Logan County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	69
Average Events per Year	7
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$211,300
Average Property Damage per Year	\$21,130
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	109
Average Number of Claims per Year	11
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	107,997
Average Number of Acres Damaged per Year	10,800
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$11,838,706
Average Crop Damage per Year	\$1,183,871

Source: NCEI and USDA





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

- Seven events
- No deaths or injuries
- \$21,130 in property damages

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

- 11 insurance claim
- 10,800 acres impacted
- \$1,183,871 in insurance claims

The following table summarizes hailstorm probability data for **Rawlins County**.

**Table 4.107: Rawlins County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	69
Average Events per Year	7
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	111
Average Number of Claims per Year	11
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	63,319
Average Number of Acres Damaged per Year	6,332
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$5,958,795
Average Crop Damage per Year	\$595,879

Source: NCEI and USDA

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

- Seven events
- No deaths or injuries
- \$0 in property damages

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

- 11 insurance claims
- 6,332 acres impacted
- \$595,879 in insurance claims

The following table summarizes hailstorm probability data for **Sheridan County**.



**Table 4.108: Sheridan County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	46
Average Events per Year	5
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	144
Average Number of Claims per Year	14
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	111,221
Average Number of Acres Damaged per Year	11,122
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$13,080,899
Average Crop Damage per Year	\$1,308,090

Source: NCEI and USDA

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

- Five events
- No deaths or injuries
- \$0 in property damages

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

- 14 insurance claims
- 11,122 acres impacted
- \$1,308,090 in insurance claims

The following table summarizes hailstorm probability data for **Sherman County**.

**Table 4.109: Sherman County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	91
Average Events per Year	9
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$3,250
Average Property Damage per Year	\$325
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	219
Average Number of Claims per Year	22
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	362,406
Average Number of Acres Damaged per Year	36,241
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$50,578,989
Average Crop Damage per Year	\$5,057,899

Source: NCEI and USDA





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

- Nine events
- No deaths or injuries
- \$325 in property damages

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

- 22 insurance claims
- 36,241 acres impacted
- \$5,057,899 in insurance claims

The following table summarizes hailstorm probability data for **Thomas County**.

**Table 4.110: Thomas County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	57
Average Events per Year	6
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$1,005,000
Average Property Damage per Year	\$100,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	195
Average Number of Claims per Year	20
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	317,158
Average Number of Acres Damaged per Year	31,716
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$41,056,946
Average Crop Damage per Year	\$4,105,695

Source: NCEI and USDA

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

- Six events
- No deaths or injuries
- \$100,500 in property damages

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

- 20 insurance claims
- 31,716 acres impacted
- \$4,105,695 in insurance claims

The following table summarizes hailstorm probability data for **Wallace County**.





**Table 4.111: Wallace County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	45
Average Events per Year	5
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$3,750
Average Property Damage per Year	\$375
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	125
Average Number of Claims per Year	13
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	99,223
Average Number of Acres Damaged per Year	9,922
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$10,512,336
Average Crop Damage per Year	\$1,051,234

Source: NCEI and USDA

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

- Five events
- No deaths or injuries
- \$375 in property damages

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

- 13 insurance claims
- 9,922 acres impacted
- \$1,051,234 in insurance claims

In addition, Kansas Region A has had seven Presidentially Declared Disasters relating to severe storms (of which hail is a potential component) in the last 20 years. This represents an average of less than one 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. 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.

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 A county incurring damage over the period 2010 to 2019 from hailstorm events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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**Table 4.112: Kansas Region A Structural Vulnerability Data for Hailstorms, 2010-2019**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Cheyenne	\$554,880,000	\$80,750	0.01%
Decatur	\$616,613,000	\$83,000	0.01%
Gove	\$606,667,000	\$34,000	0.01%
Logan	\$590,580,000	\$211,300	0.04%
Rawlins	\$631,196,000	\$0	0.00%
Sheridan	\$580,596,000	\$0	0.00%
Sherman	\$1,329,873,000	\$3,250	0.00%
Thomas	\$1,689,350,000	\$1,005,000	0.06%
Wallace	\$365,668,000	\$3,750	0.00%

Source: NCEI and HAZUS

Data concerning potential vulnerabilities for specific jurisdictions relating to housing, including growth or decline, may be found in Section 3.4, Regional Housing Data.

The USDA 2017 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 A County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of hailstorm conditions on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to hailstorm events.

**Table 4.113: Hailstorm Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	13,728	2.59%	\$132,754,000	\$1,951,572	1.47%
Decatur	420,032	5,145	1.22%	\$233,431,000	\$453,367	0.19%
Gove	567,444	7,340	1.29%	\$201,514,000	\$642,576	0.32%
Logan	604,595	10,800	1.79%	\$70,870,000	\$1,183,871	1.67%
Rawlins	603,529	6,332	1.05%	\$100,351,000	\$595,879	0.59%
Sheridan	512,108	11,122	2.17%	\$348,852,000	\$1,308,090	0.37%
Sherman	618,428	36,241	5.86%	\$139,179,000	\$5,057,899	3.63%
Thomas	669,940	31,716	4.73%	\$251,056,000	\$4,105,695	1.64%
Wallace	445,809	9,922	2.23%	\$81,786,000	\$1,051,234	1.29%

Source: USDA

#### 4.14.5 – Impact and Consequence Analysis

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

**Table 4.114: 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.





**Table 4.114: Hailstorm Consequence Analysis**

<b>Subject</b>	<b>Impacts of Hailstorm</b>
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

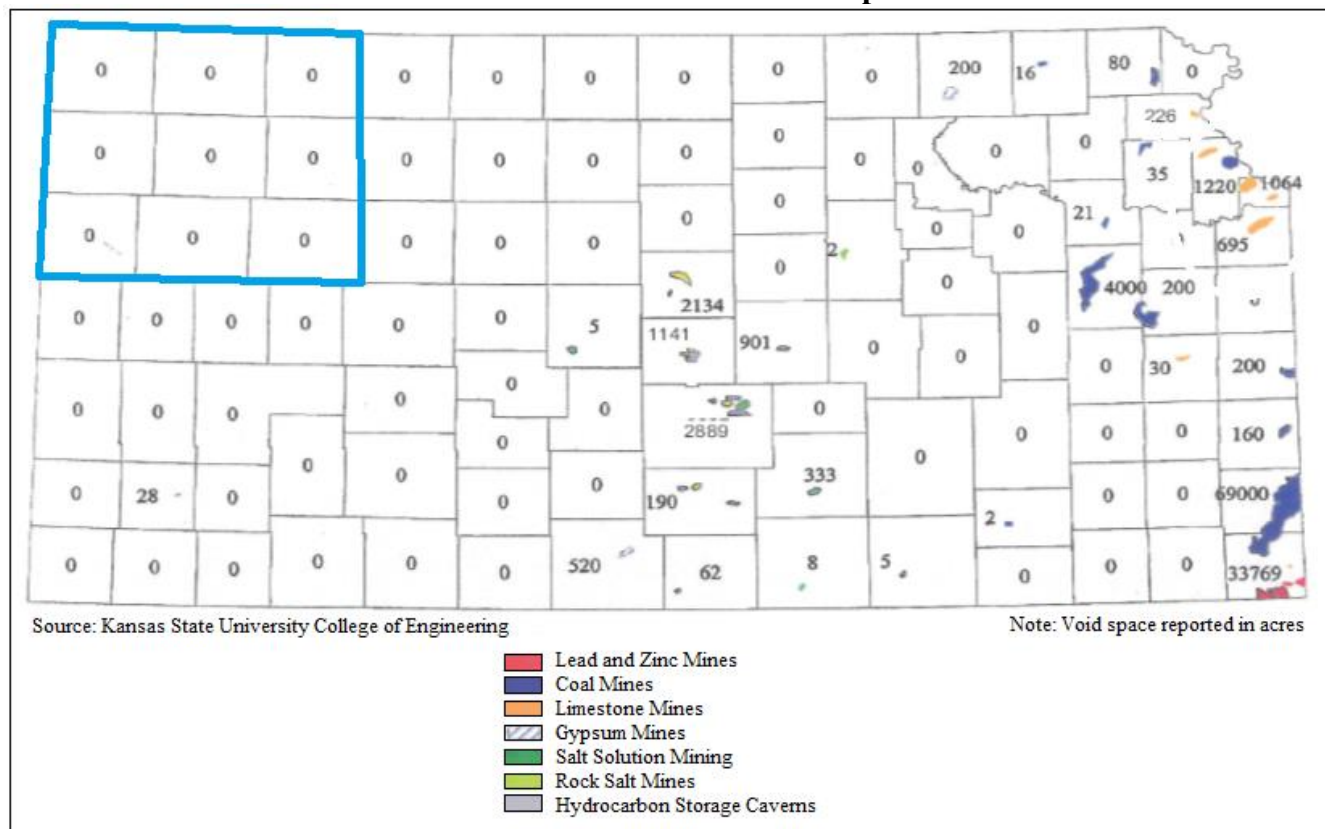
Land subsidence is caused when the ground above manmade or natural voids collapses. Subsidence can be related to mine collapse, water and oil withdrawal, or natural causes such as shrinking of expansive soils, salt dissolution (which may also be related to mining activities), and cave collapses. The 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 A 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.

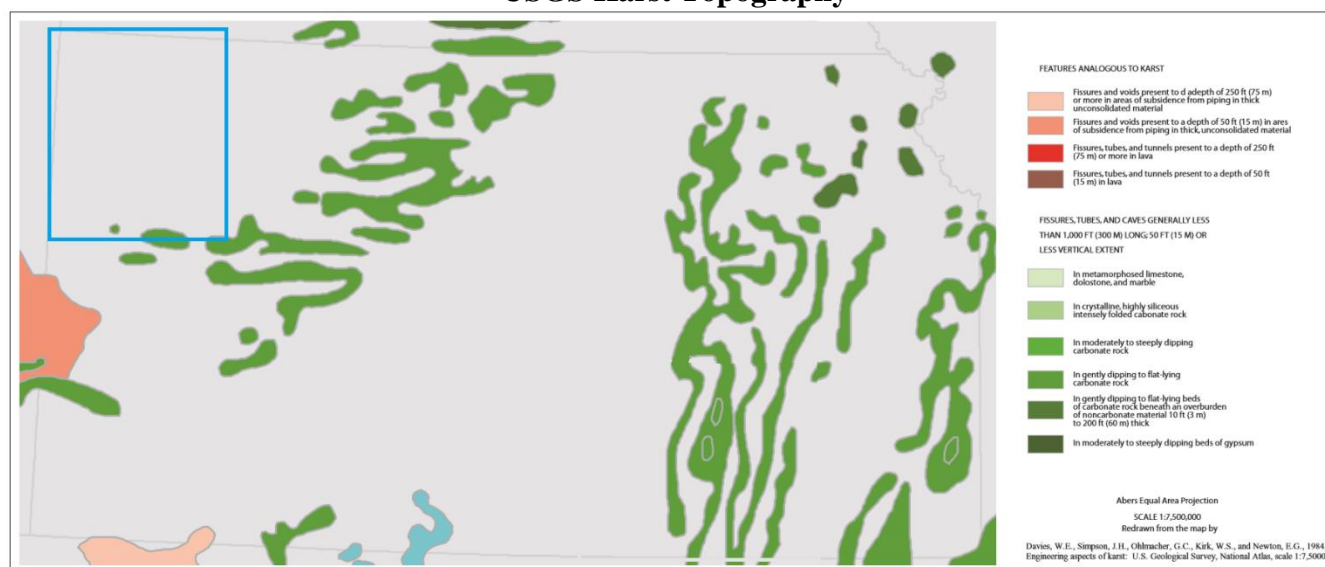
**Table 4.115: Kansas Region A Sub-Surface Void Space**

County	Total Sub-Surface Void Space
Cheyenne	0
Decatur	0
Gove	0
Logan	0
Rawlins	0
Sheridan	0
Sherman	0
Thomas	0
Wallace	0

Source: KDHE

Of additional concern to Kansas Region A 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 A.

**USGS Karst Topography**



#### 4.15.2 – Previous Occurrences

There have been no reported land subsidence events in Kansas Region A during the period from 2010 to 2020.





### 4.15.3 – Hazard Probability Analysis

Land subsidence events with the potential to affect Kansas Region A 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

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 A 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 A counties. Please note that not all classifications with identified acreage are shown.

**Table 4.116: Kansas Region A Sub-Surface Void Space Acreage**

County	All Void Space Categories
Cheyenne	0
Decatur	0
Gove	0
Logan	0



**Table 4.116: Kansas Region A Sub-Surface Void Space Acreage**

County	All Void Space Categories
Rawlins	0
Sherman	0
Sheridan	0
Thomas	0
Wallace	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 4.117: Kansas Region A 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
Cheyenne	652,800	0	0.0%
Decatur	572,160	0	0.0%
Gove	686,080	0	0.0%
Logan	686,720	0	0.0%
Rawlins	684,800	0	0.0%
Sherman	573,440	0	0.0%
Sheridan	675,840	0	0.0%
Thomas	688,000	0	0.0%
Wallace	584,960	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 A county incurring damage over the period 2010 to 2019 from land subsidence events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.118: Kansas Region A Structural Vulnerability Data for Land Subsidence, 2010-2019**

County	HAZUS Building Valuation	Reported Structure Damage	Percentage of Building Valuation Damaged
Cheyenne	\$554,880,000	\$0	0.0%
Decatur	\$616,613,000	\$0	0.0%
Gove	\$606,667,000	\$0	0.0%
Logan	\$590,580,000	\$0	0.0%
Rawlins	\$631,196,000	\$0	0.0%
Sheridan	\$580,596,000	\$0	0.0%
Sherman	\$1,329,873,000	\$0	0.0%
Thomas	\$1,689,350,000	\$0	0.0%
Wallace	\$365,668,000	\$0	0.0%

Source: HAZUS

Data concerning potential vulnerabilities for specific jurisdictions relating to housing, including growth or decline, may be found in Section 3.4, Regional Housing Data.







#### 4.15.5 – Impact and Consequence Analysis

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

**Table 4.119: Land Subsidence Consequence Analysis**

<b>Subject</b>	<b>Impacts of Land Subsidence</b>
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

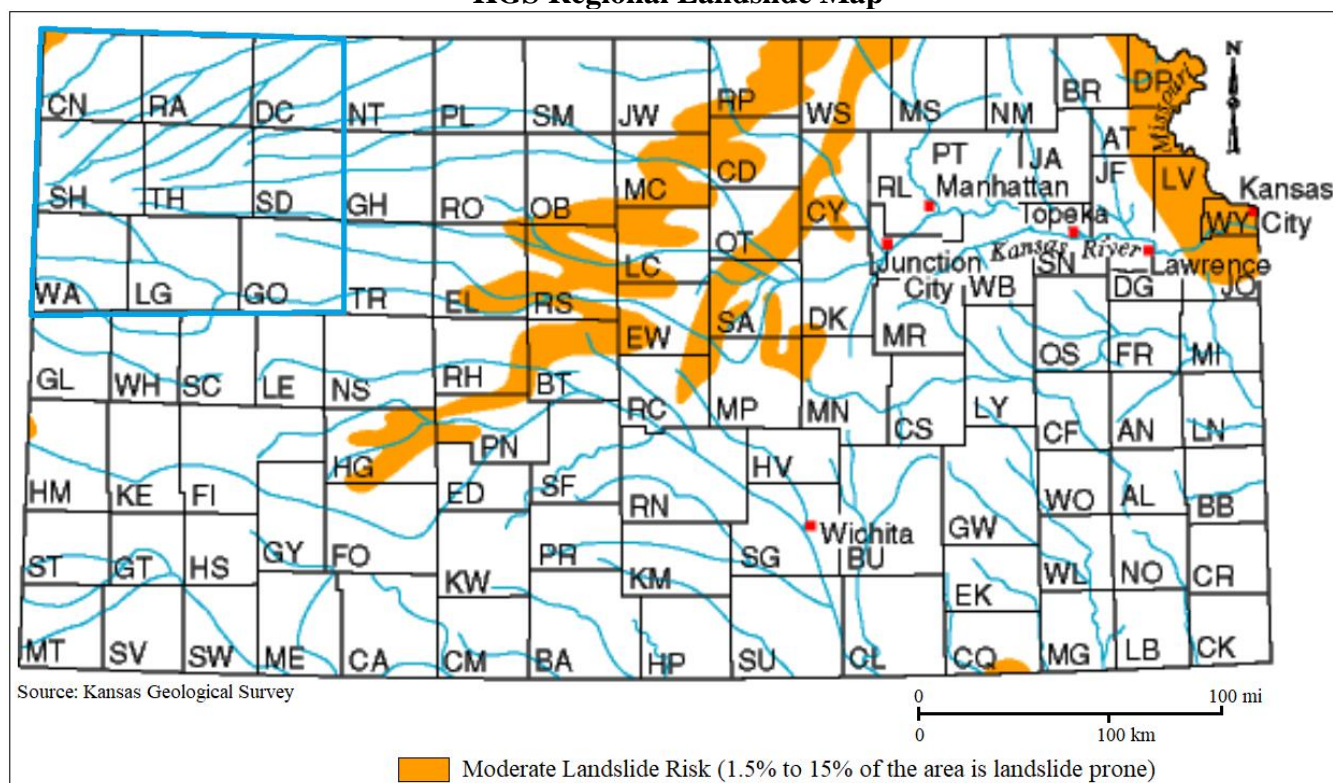
Landslides are the downward and outward movement of slopes. Landslides include a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on and over steepened slopes is the primary reason for a landslide, landslides are often prompted 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 A there have been no reported or recorded landslides impacting either participating jurisdictions or the region in the past 10 years.

There was one Presidential Disaster declared for the region concerning landslides. However, no impacts from the disaster concerning landslides were reported for the region. The following provides details concerning Presidential Disaster Declaration DR 4449 for Kansas Region A.

##### **Kansas –Severe Storms, Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides**

##### **FEMA-4449-DR**

Declared June 20, 2019 On June 7, 2019

Governor Laura Kelly requested a major disaster declaration due to severe storms, straight-line winds, tornadoes, flooding, landslides, and mudslides beginning on April 28, 2019, and continuing. The Governor requested a declaration for Public Assistance for 63 counties and Hazard Mitigation statewide. Beginning on May 20, 2019, joint federal, state, and local Government Preliminary Damage Assessments (PDAs) were conducted in the requested areas 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 20, 2019, 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, tornadoes, flooding, landslides, and mudslides in Allen, Anderson, Atchison, Barber, Barton, Butler, Chase, Chautauqua, Cherokee, Clark, Clay, Cloud, Coffey, Cowley, Doniphan, Elk, Ellsworth, Franklin, Geary, Greenwood, Harper, Harvey, Hodgeman, Jefferson, Kingman, Leavenworth, Lincoln, Linn, Lyon, Marion, Marshall, McPherson, Meade, Montgomery, Morris, Nemaha, Neosho, Osage, Ottawa, Pawnee, Phillips, Pottawatomie, Pratt, Reno, Rice, Rush, Russell, Saline, Sumner, Wabaunsee, Washington, Wilson, and Woodson Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide

#### 4.16.3 – Hazard Probability Analysis

Landslides with the potential to affect Kansas Region A 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 A (in Cheyenne 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 4.120: Kansas Region A 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
Cheyenne	652,800	65,280	10.0%
Decatur	572,160	0	0.0%
Gove	686,080	0	0.0%
Logan	686,720	0	0.0%
Rawlins	684,800	0	0.0%
Sherman	573,440	0	0.0%
Sheridan	675,840	0	0.0%
Thomas	688,000	0	0.0%
Wallace	584,960	0	0.0%

Source: KDEM 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 A county incurring damage over the period 2010 to 2019 from landslide events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.121: Kansas Region A Structural Vulnerability Data for Landslides, 2010-2019**

County	HAZUS Building Valuation	Reported Structure Damage	Percentage of Building Valuation Damaged
Cheyenne	\$554,880,000	\$0	0.0%
Decatur	\$616,613,000	\$0	0.0%
Gove	\$606,667,000	\$0	0.0%
Logan	\$590,580,000	\$0	0.0%
Rawlins	\$631,196,000	\$0	0.0%
Sheridan	\$580,596,000	\$0	0.0%
Sherman	\$1,329,873,000	\$0	0.0%
Thomas	\$1,689,350,000	\$0	0.0%
Wallace	\$365,668,000	\$0	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 4.122: 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 Decatur. 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.

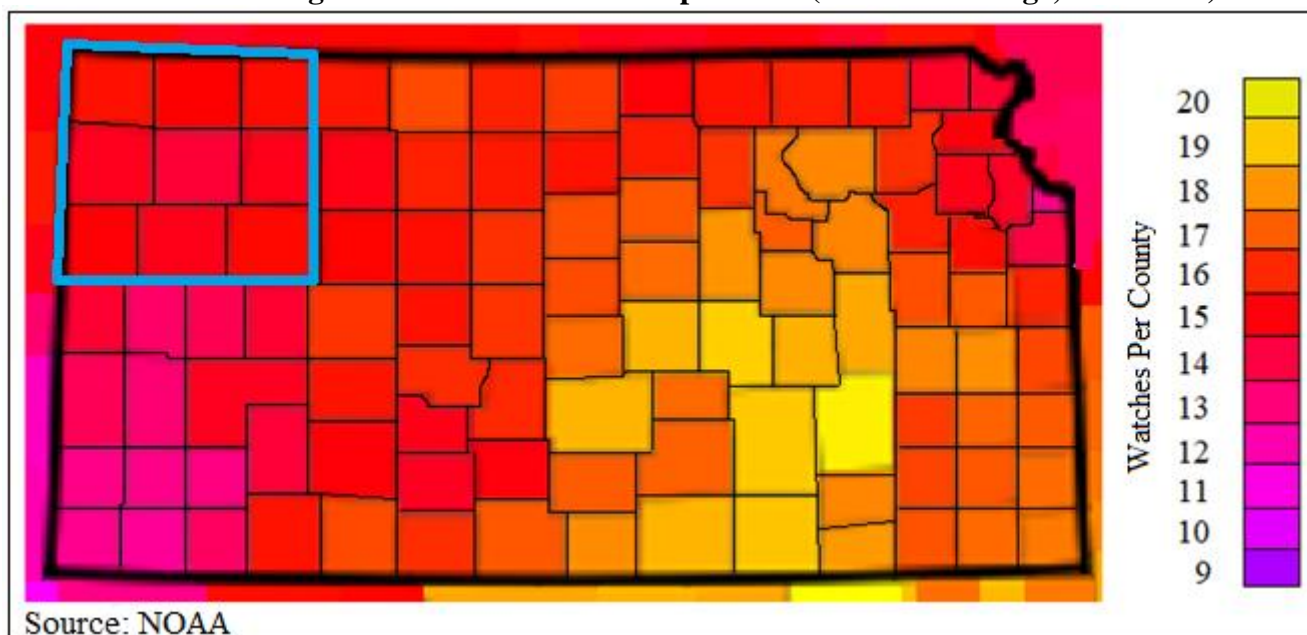


### 4.17.1 – Location and Extent

Lightning occurs over broad geographic regions. The entire Kansas Region A 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 A.

**Annual Average Thunderstorm Watches per Year (20-Year Average, 1993-2012)**



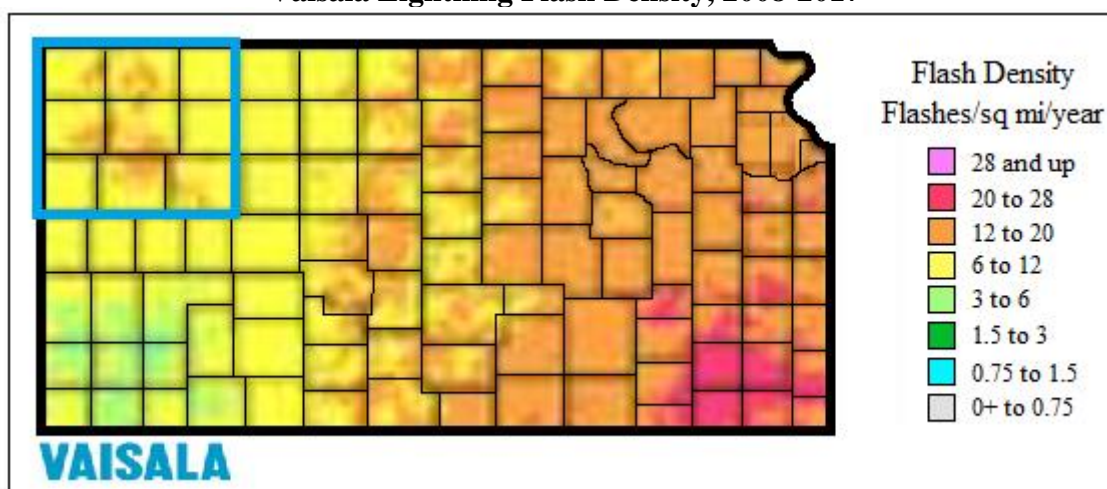
The following map, generated by Vaisala, indicates the average number of lightning flashes per square mile per year for Kansas Region A. In general, the more recorded flashes the greater the potential for lightning strikes.







### Vaisala Lightning Flash Density, 2008-2017



#### 4.17.2 – Previous Occurrences

In the 20-year period from 2000 to present, there have been seven Presidential Disaster Declarations for Kansas Region A for severe storms (along with other associated hazard event), of which lightning may be a component. The following 20-year information (with 2000 and 2019 being full data years) on past declared disasters is presented to provide a historical perspective on hail events that have impacted Kansas Region A. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2015.

**Table 4.123: Kansas Region A FEMA Severe Storm Disaster and Emergency Declarations, 2000 - 2019**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28-07/12/2019)	<b>Severe Storms</b> , Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides	Wallace	\$1,887,116
<b>4287</b>	10/20/2016 (09/02/2016 – 09/12/2016)	<b>Severe Storms</b> and Flooding	Cheyenne	\$6,959,536
4230	07/20/2015 (05/04/2015 – 06/21/2015)	<b>Severe Storms</b> , Tornadoes, Straight-Line Winds, and Flooding	Cheyenne	\$13,848,325
4010	07/29/2011 (5/19-6/4/2011)	<b>Severe Storms</b> , Straight-Line Winds, Tornadoes and Flooding	Logan, Sherman	\$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	<b>Severe Storms</b> , Flooding and Tornadoes	Cheyenne, Decatur, and Sheridan	\$9,279,257
1776	07/09/2008	<b>Severe Storms</b> , Flooding, and Tornadoes	Decatur, Gove, Logan, Sheridan, Thomas, and Wallace	\$70,629,544
1535	8/3/2004 (6/12-7/25/2004)	<b>Severe Storms</b> , Flooding, and Tornadoes	Decatur, Sheridan, Thomas, and Wallace	\$12,845,892

Source: FEMA





The following provides details concerning Presidential Disaster Declarations DR 4449 and DR 4287 for Kansas Region A.

### **Kansas –Severe Storms, Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides FEMA-4449-DR**

Declared June 20, 2019 On June 7, 2019

Governor Laura Kelly requested a major disaster declaration due to severe storms, straight-line winds, tornadoes, flooding, landslides, and mudslides beginning on April 28, 2019, and continuing. The Governor requested a declaration for Public Assistance for 63 counties and Hazard Mitigation statewide. Beginning on May 20, 2019, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested areas 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 20, 2019, 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, tornadoes, flooding, landslides, and mudslides in Allen, Anderson, Atchison, Barber, Barton, Butler, Chase, Chautauqua, Cherokee, Clark, Clay, Cloud, Coffey, Cowley, Doniphan, Elk, Ellsworth, Franklin, Geary, Greenwood, Harper, Harvey, Hodgeman, Jefferson, Kingman, Leavenworth, Lincoln, Linn, Lyon, Marion, Marshall, McPherson, Meade, Montgomery, Morris, Nemaha, Neosho, Osage, Ottawa, Pawnee, Phillips, Pottawatomie, Pratt, Reno, Rice, Rush, Russell, Saline, Sumner, Wabaunsee, Washington, Wilson, and Woodson Counties. This declaration also 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

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, Cowley, Ellis, Graham, Greenwood, Kingman, Norton, Rooks, Russell, Sedgwick, and Sumner 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 lightning events and the resulting damage totals in Kansas Region A for the period 2010 - 2019 (with 2010 and 2019 being full data set years).

**Table 4.124: Kansas Region A NCEI Lightning Events, 2010 - 2019**

County	Number of Events	Property Damage	Crop Damage	Deaths	Injuries
Cheyenne	0	\$0	\$0	0	0
Decatur	0	\$0	\$0	0	0
Gove	0	\$0	\$0	0	0
Logan	0	\$0	\$0	0	0
Rawlins	5	\$104,000	\$0	0	0
Sheridan	0	\$0	\$0	0	0
Sherman	0	\$0	\$0	0	0
Thomas	0	\$0	\$0	0	0
Wallace	0	\$0	\$0	0	0

Source: NOAA NCEI

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

- **April 14, 2011: Ludell, Rawlins County**

At 1330 CDT, lightning struck an oil tank battery on a farm northeast of Ludell, causing an explosion that blew the lid off the crude oil storage tank and damaged a second tank. Firefighters were able to control the fire in about an hour. Property damage was recorded at \$100,000.

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 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates no related claims.

**Table 4.125: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Lightning**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	0	0	\$0
Decatur	0	0	\$0
Gove	0	0	\$0
Logan	0	0	\$0
Rawlins	0	0	\$0
Sheridan	0	0	\$0
Sherman	0	0	\$0
Thomas	0	0	\$0
Wallace	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 A counties can expect on a yearly basis, relevant to lightning events:

- <1 impactful event
- No deaths or injuries
- \$10,400 in property damages

According to the USDA Risk Management Agency, Region A counties can expect on a yearly basis, relevant to lightning occurrences:

- No claims
- No impacted acres
- \$0 in damages

In addition, Kansas Region A has had seven 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 A county incurring damage over the period 2010 to 2019 from lightning events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.126: Kansas Region A Structural Vulnerability Data for Lightning, 2010 - 2019**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Cheyenne	\$554,880,000	\$0	0.0%
Decatur	\$616,613,000	\$0	0.0%
Gove	\$606,667,000	\$0	0.0%
Logan	\$590,580,000	\$0	0.0%
Rawlins	\$631,196,000	\$104,000	0.02%
Sheridan	\$580,596,000	\$0	0.0%
Sherman	\$1,329,873,000	\$0	0.0%
Thomas	\$1,689,350,000	\$0	0.0%
Wallace	\$365,668,000	\$0	0.0%

Source: NCEI and HAZUS

Counties with a higher identified population are to be considered to have a potentially greater vulnerability to potential lightning events. The following table indicates the total county population and registered growth over the period 2000 to 2018.



**Table 4.127: Kansas Region A Population Vulnerability Data for Lightning**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

Source: US Census Bureau

Data concerning potential vulnerabilities for specific jurisdictions relating to population and housing, including growth or decline, may be found in Section 3.2, Regional Population Data and Section 3.4, Regional Housing Data.

In addition, lightning may exacerbate agricultural and economic losses. The USDA 2017 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 A County. USDA Risk Management Agency crop loss data (2009 – 2018) allows us to quantify the monetary impact of lightning strikes on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to lightning events.

**Table 4.128: Lightning Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	0	0.0%	\$132,754,000	\$0	0.0%
Decatur	420,032	0	0.0%	\$233,431,000	\$0	0.0%
Gove	567,444	0	0.0%	\$201,514,000	\$0	0.0%
Logan	604,595	0	0.0%	\$70,870,000	\$0	0.0%
Rawlins	603,529	0	0.0%	\$100,351,000	\$0	0.0%
Sheridan	512,108	0	0.0%	\$348,852,000	\$0	0.0%
Sherman	618,428	0	0.0%	\$139,179,000	\$0	0.0%
Thomas	669,940	0	0.0%	\$251,056,000	\$0	0.0%
Wallace	445,809	0	0.0%	\$81,786,000	\$0	0.0%

Source: USDA

#### 4.17.5 – Impact and Consequence Analysis

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





**Table 4.129: Lightning Consequence Analysis**

<b>Subject</b>	<b>Impacts of Lightning</b>
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

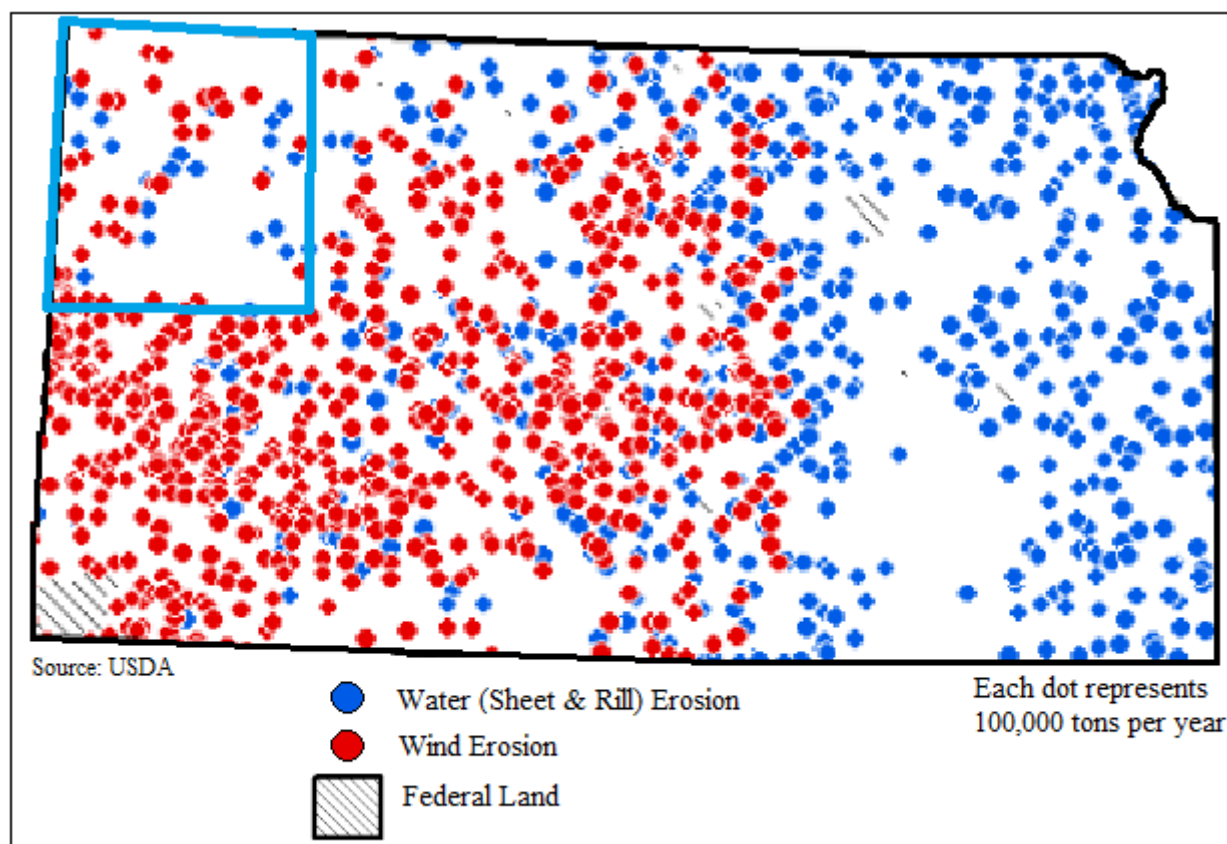
Soil erosion, in general, is a process that removes topsoil through the application of water, wind, or farming activities. Soil erosion can be a slow, unobserved process or can happen quickly due to extreme environmental factors. The United States is losing soil 10 times faster than the natural replenishment 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 A planning area, including all participating jurisdictions, is at risk to soil erosion and dust.

**Wind and Water Erosion on Cropland 2012**

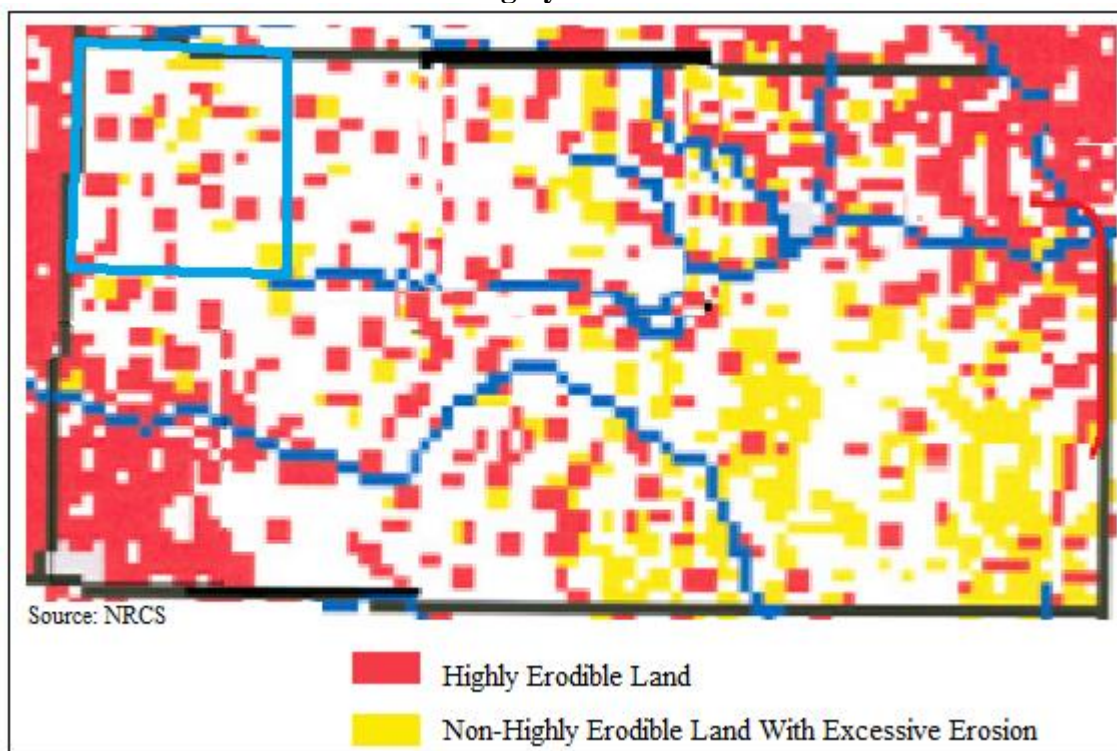


The following figure, from the Natural Resources Conservation Service (NRCS) shows areas of excessive erosion of farmland in Kansas. Each red dot represents 5,000 acres of highly erodible land, and each yellow dot represents 5,000 acres of non-highly erodible land with excessive erosion above the tolerable 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 A there have been no reported or recorded soil erosion or dust events impacting either participating jurisdictions or the region in the past 10 years.

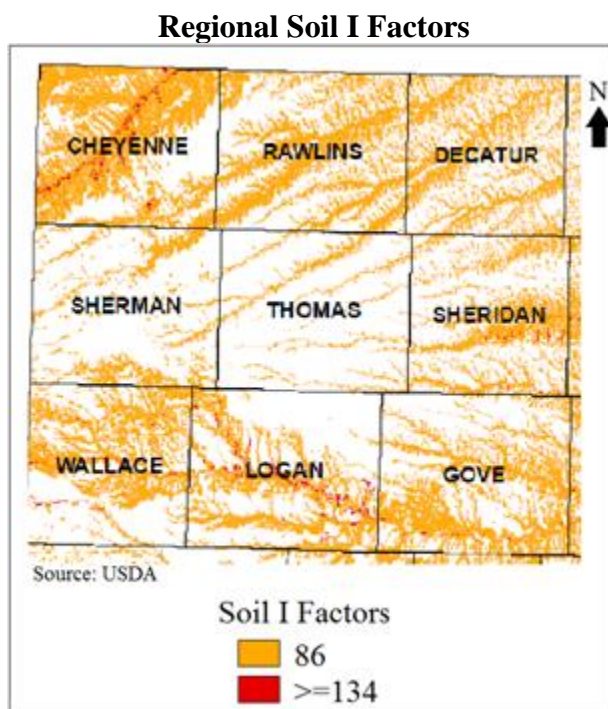
Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of soil erosion and dust on the Region's agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 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.

The map below indicates all Kansas Region A soils that have an "I" value, or wind erodibility index, of 86 or greater. The higher the I value, the more susceptible it is to wind erosion.





#### 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 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates no soil erosion related claims.

**Table 4.130: Soil Erosion and Dust Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	0	0.0%	\$132,754,000	\$0	0.0%
Decatur	420,032	0	0.0%	\$233,431,000	\$0	0.0%
Gove	567,444	0	0.0%	\$201,514,000	\$0	0.0%
Logan	604,595	0	0.0%	\$70,870,000	\$0	0.0%
Rawlins	603,529	0	0.0%	\$100,351,000	\$0	0.0%
Sheridan	512,108	0	0.0%	\$348,852,000	\$0	0.0%
Sherman	618,428	0	0.0%	\$139,179,000	\$0	0.0%
Thomas	669,940	0	0.0%	\$251,056,000	\$0	0.0%
Wallace	445,809	0	0.0%	\$81,786,000	\$0	0.0%

Source: USDA





#### 4.18.5 – Impact and Consequence Analysis

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

**Table 4.131: 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

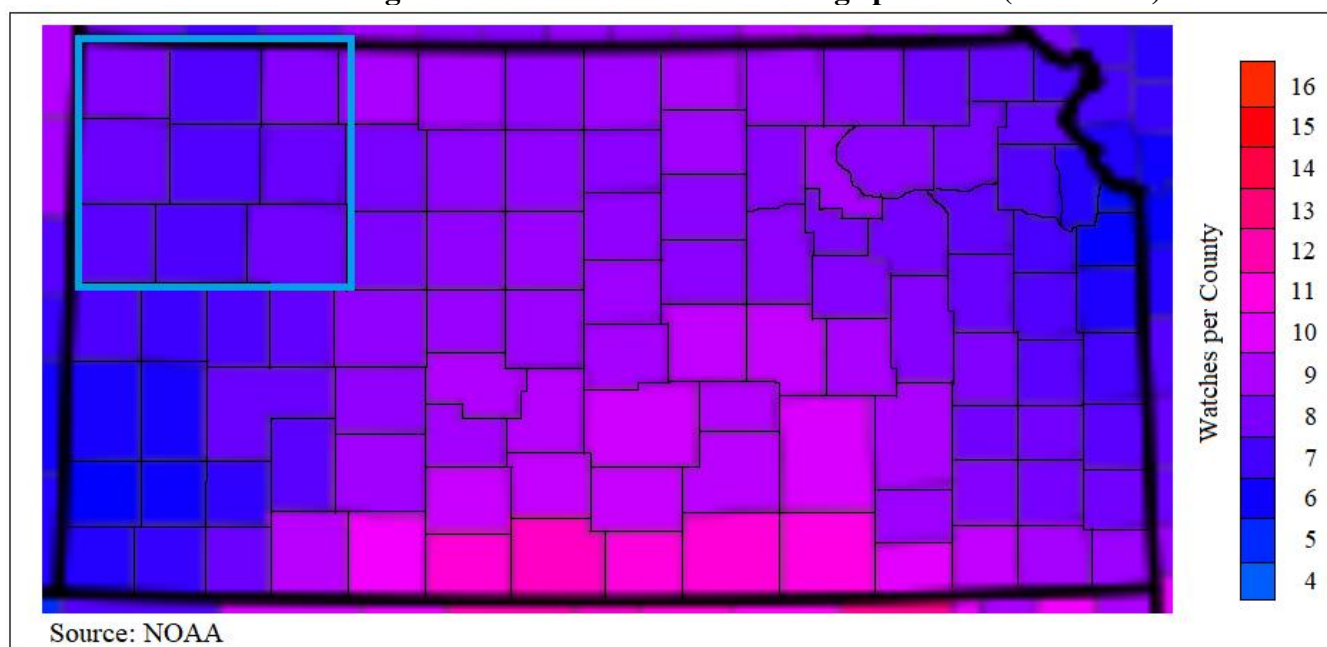
A tornado is a violently rotating column of air in contact with the ground. Often referred to as a twister or a cyclone, they can strike anywhere and with little warning. Tornadoes come in many shapes and sizes but are typically in the form of a visible condensation funnel, whose narrow end touches the earth and is often encircled by a Decatur of debris and dust.

### 4.19.1 – Location and Extent

Tornadoes can strike anywhere in Kansas Region A, placing the entire planning area at risk. The following map, generated by NOAA, shows the average annual tornado watches per year for Kansas Region A.



**Annual Average Tornado Watches Year Average per Year (1933-2012)**

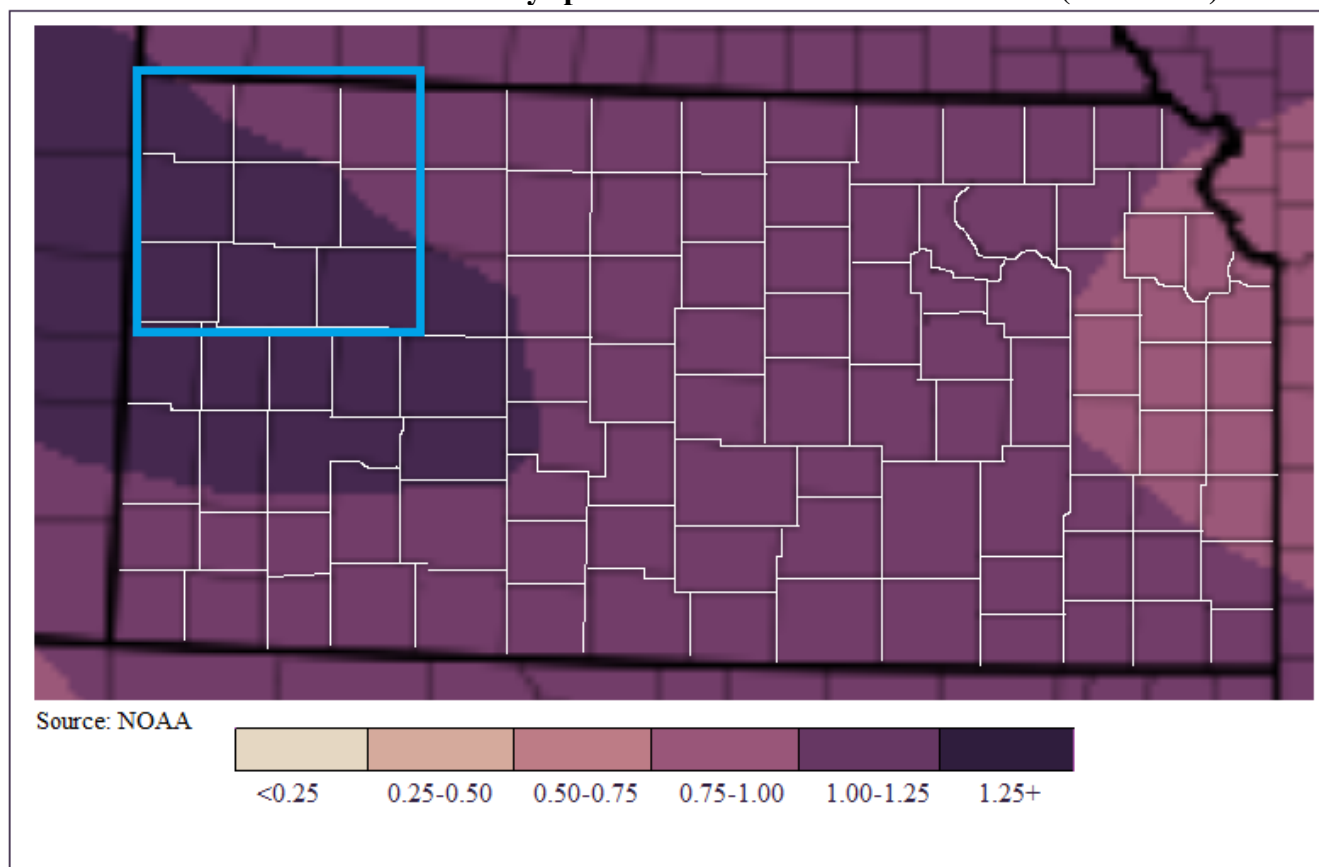


Additionally, NOAA generated the following map indicating the mean number of tornado days per year, using data compiled from the years 1986 to 2015.





### 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 4.132: 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.







**Table 4.132: Enhanced Fujita Scale**

Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
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 2000 to present, there have been six Presidential Disaster Declarations for Kansas Region A for tornados (along with other associates hazard events). The following 20-year information (with 2000 and 2019 being full data years) on past declared disasters is presented to provide a historical perspective on tornado events that have impacted Kansas Region A. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2015.

**Table 4.133: Kansas Region A FEMA Tornado Disaster and Emergency Declarations, 2000 - 2019**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28-07/12/2019)	Severe Storms, Straight-line Winds, <b>Tornados</b> , Flooding, Landslides, and Mudslides	Wallace	\$1,887,116
4230	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, <b>Tornados</b> , Straight-Line Winds, and Flooding	Cheyenne	\$13,848,325
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, Straight-Line Winds, <b>Tornados</b> and Flooding	Logan, Sherman	\$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	Severe Storms, Flooding and <b>Tornados</b>	Cheyenne, Decatur, and Sheridan	\$9,279,257
1776	07/09/2008	Severe Storms, Flooding, and <b>Tornados</b>	Decatur, Gove, Logan, Sheridan, Thomas, and Wallace	\$70,629,544
1535	8/3/2004 (6/12-7/25/2004)	Severe Storms, Flooding, and <b>Tornados</b>	Decatur, Sheridan, Thomas, and Wallace	\$12,845,892

Source: FEMA

–: Data unavailable





The following provides details concerning Presidential Disaster Declaration DR 4449 for Kansas Region A.

# **Kansas –Severe Storms, Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides**

## **FEMA-4449-DR**

Declared June 20, 2019 On June 7, 2019

Governor Laura Kelly requested a major disaster declaration due to severe storms, straight-line winds, tornadoes, flooding, landslides, and mudslides beginning on April 28, 2019, and continuing. The Governor requested a declaration for Public Assistance for 63 counties and Hazard Mitigation statewide. Beginning on May 20, 2019, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested areas 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 20, 2019, 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, tornadoes, flooding, landslides, and mudslides in Allen, Anderson, Atchison, Barber, Barton, Butler, Chase, Chautauqua, Cherokee, Clark, Clay, Cloud, Coffey, Cowley, Doniphan, Elk, Ellsworth, Franklin, Geary, Greenwood, Harper, Harvey, Hodgeman, Jefferson, Kingman, Leavenworth, Lincoln, Linn, Lyon, Marion, Marshall, McPherson, Meade, Montgomery, Morris, Nemaha, Neosho, Osage, Ottawa, Pawnee, Phillips, Pottawatomie, Pratt, Reno, Rice, Rush, Russell, Saline, Sumner, Wabaunsee, Washington, Wilson, and Woodson 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 tornado events and the resulting damage totals in Kansas Region A for the period 2010 - 2019 (with 2010 and 2019 being full data set years).

**Table 4.134: Kansas Region A NCEI Tornado Events, 2010 - 2019**

<b>County</b>	<b>Number of Days with Event</b>	<b>Property Damage</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Highest Rated Tornado</b>
Cheyenne	4	\$50,000	0	0	EF1
Decatur	2	\$6,000	0	0	EF0
Gove	10	\$266,500	0	0	EF1
Logan	6	\$50,000	0	0	EF1
Rawlins	2	\$0	0	0	EF0
Sheridan	8	\$175,000	0	0	EF2
Sherman	10	\$25,000	0	0	EF1
Thomas	6	\$242,000	0	0	EF1





**Table 4.134: Kansas Region A NCEI Tornado Events, 2010 - 2019**

County	Number of Days with Event	Property Damage	Deaths	Injuries	Highest Rated Tornado
Wallace	1	\$0	0	0	EF0

Source: NOAA NCEI

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

- August 11, 2019: Wheeler, Cheyenne County**  
 Spotter reported a rain wrapped tornado. Damage survey revealed lots of minor damage, including damaged roofs, a destroyed center irrigation pivot, numerous trees downed, siding on houses damaged, and a small shed destroyed, among other minor damage. Property damage was recorded at \$50,000.
- May 6, 2019: Mingo, Thomas County**  
 Spotter reported a rain wrapped tornado. Damage survey revealed lots of minor damage, including damaged roofs, a destroyed center irrigation pivot, numerous trees downed, siding on houses damaged, and a small shed destroyed, among other minor damage. Property damage was recorded at \$42,000.
- October 2, 2017: Quinter, Gove County**  
 Many structures were damaged in Quinter. The tornado began near the elementary school, causing damage to playground equipment and blew a fence down. The tornado then caused damage to the city building to the northeast of the school, and damaged a few businesses, a few single-wide mobile homes, and a few homes. Damage to the buildings ranged from losing shingles to porches being blown over, blowing in a set of doors to a hardware store, and blowing a mobile home off its foundation. Many windows were also broken out of the buildings and a few vehicles. Some of the buildings with metal roofing lost some paneling. Numerous trees had significant damage, with some tree trunks having been snapped. A windbreak on the edge of town was damaged in the middle but not on either end. Property damage was recorded at \$119,000.
- May 9, 2015: Grinnell, Gove County**  
 Spotters reported a tornado moving from south of Grinnell to just northwest of Grinnell. Minor roof damage was reported, and irrigation pivot sections were overturned. Property damage was recorded at \$50,000.
- May 9, 2015: Selden, Sheridan County**  
 Chaser reported a large tornado on the ground moving north from Sheridan into Decatur county. Damage occurred at a farmstead with a large tree damaged, minor roof damage and an antenna blown over near Selden. Another resident reported a barn was destroyed. Property damage was recorded at \$75,000.
- June 29, 2014: Gove County**  
 Two outbuildings heavily damaged and one nearly destroyed. Three hail bales moved. Residence itself sustained minor to no damage. Property damage was recorded at \$50,000.





- **June 1, 2014: Elkader, Logan County**

Garage and barn destroyed near Rd 310 and Rd Bison. Roof of residence damaged by numerous 2x4s which penetrated roof and ceiling. No injuries reported. Property damage was recorded at \$50,000.

- **October 6, 2011: Brewster, Thomas County**

The tornado developed about 4 miles SSE of Brewster near Roads 3 and M. The tornado traveled north-northeast at speeds of 50 mph, passing east of Brewster and dissipating about 4 miles northeast of Brewster near roads 4 and T. One farmstead south of Interstate 70 received damage to outbuildings, trees, a large grain bin and utility poles on the property. Fortunately only minor roof damage occurred as the large tree branches fell on the house. Further northeast several utility poles were snapped and at least one irrigation pivot was overturned. Numerous outbuildings were also damaged at a farm near Roads 4 and R as the tornado moved northeast. Property damage was recorded at \$200,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of tornadoes on the region's agricultural base. Crop loss data for the years 2010 - 2019 (with 2010 and 2019 being full data years), for the region, indicates three tornado related claims on 748 acres for \$88,470.

**Table 4.135: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Tornadoes**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	0	0	\$0
Decatur	0	0	\$0
Gove	0	0	\$0
Logan	0	0	\$0
Rawlins	0	0	\$0
Sheridan	2	101	\$1,531
Sherman	0	0	\$0
Thomas	0	0	\$0
Wallace	1	647	\$86,939

Source: USDA Farm Service Agency

### 4.19.3 – Hazard Probability Analysis

The following table summarizes tornado probability data for **Cheyenne County**.

**Table 4.136: Cheyenne County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	4
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$50,000
Average Property Damage per Year	\$5,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0



**Table 4.136: Cheyenne County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

Data from the NCEI indicates that Cheyenne 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, Cheyenne 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 **Decatur County**.

**Table 4.137: Decatur County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	2
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$6,000
Average Property Damage per Year	\$600
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

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

- <1 event
- No deaths or injuries
- \$600 in property damages





According to the USDA Risk Management Agency, Decatur 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 **Gove County**.

**Table 4.138: Gove County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	10
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$266,500
Average Property Damage per Year	\$26,650
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

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

- One event
- No deaths or injuries
- \$26,650 in property damages

According to the USDA Risk Management Agency, Gove 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 **Logan County**.

**Table 4.139: Logan County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	6
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0





**Table 4.139: Logan County Tornado Probability Summary**

Data	Recorded Impact
Total Reported NCEI Property Damage (2010-2019)	\$50,000
Average Property Damage per Year	\$5,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

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

- One event
- No deaths or injuries
- \$5,000 in property damages

According to the USDA Risk Management Agency, Logan 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 **Rawlins County**.

**Table 4.140: Rawlins County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	2
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

Data from the NCEI indicates that Rawlins 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, Rawlins 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 **Sheridan County**.

**Table 4.141: Sheridan County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	8
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$175,000
Average Property Damage per Year	\$17,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	2
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	101
Average Number of Acres Damaged per Year	10
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,531
Average Crop Damage per Year	\$153

Source: NCEI and USDA

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

- One event
- No deaths or injuries
- \$17,500 in property damages

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

- <1 insurance claim
- 10 acres impacted
- \$153 in insurance claims

The following table summarizes Tornado probability data for **Sherman County**.



**Table 4.142: Sherman County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	10
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$25,000
Average Property Damage per Year	\$2,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

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

- One event
- No deaths or injuries
- \$2,500 in property damages

According to the USDA Risk Management Agency, Sherman 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 **Thomas County**.

**Table 4.143: Thomas County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	6
Average Events per Year	1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$242,000
Average Property Damage per Year	\$24,200
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA





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

- One event
- No deaths or injuries
- \$24,200 in property damages

According to the USDA Risk Management Agency, Thomas 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 **Wallace County**.

**Table 4.144: Wallace County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	1
Average Events per Year	<1
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	647
Average Number of Acres Damaged per Year	65
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$86,939
Average Crop Damage per Year	\$8,694

Source: NCEI and USDA

Data from the NCEI indicates that Wallace 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, Wallace County can expect on a yearly basis, relevant to tornado occurrences:

- <1 insurance claim
- 65 acres impacted
- \$8,694 in insurance claims

Based on the number of NCEI reported events we derive the following probability for event occurrence in Kanas Region A:





- **Tornado Probability:** Approximately five events per year

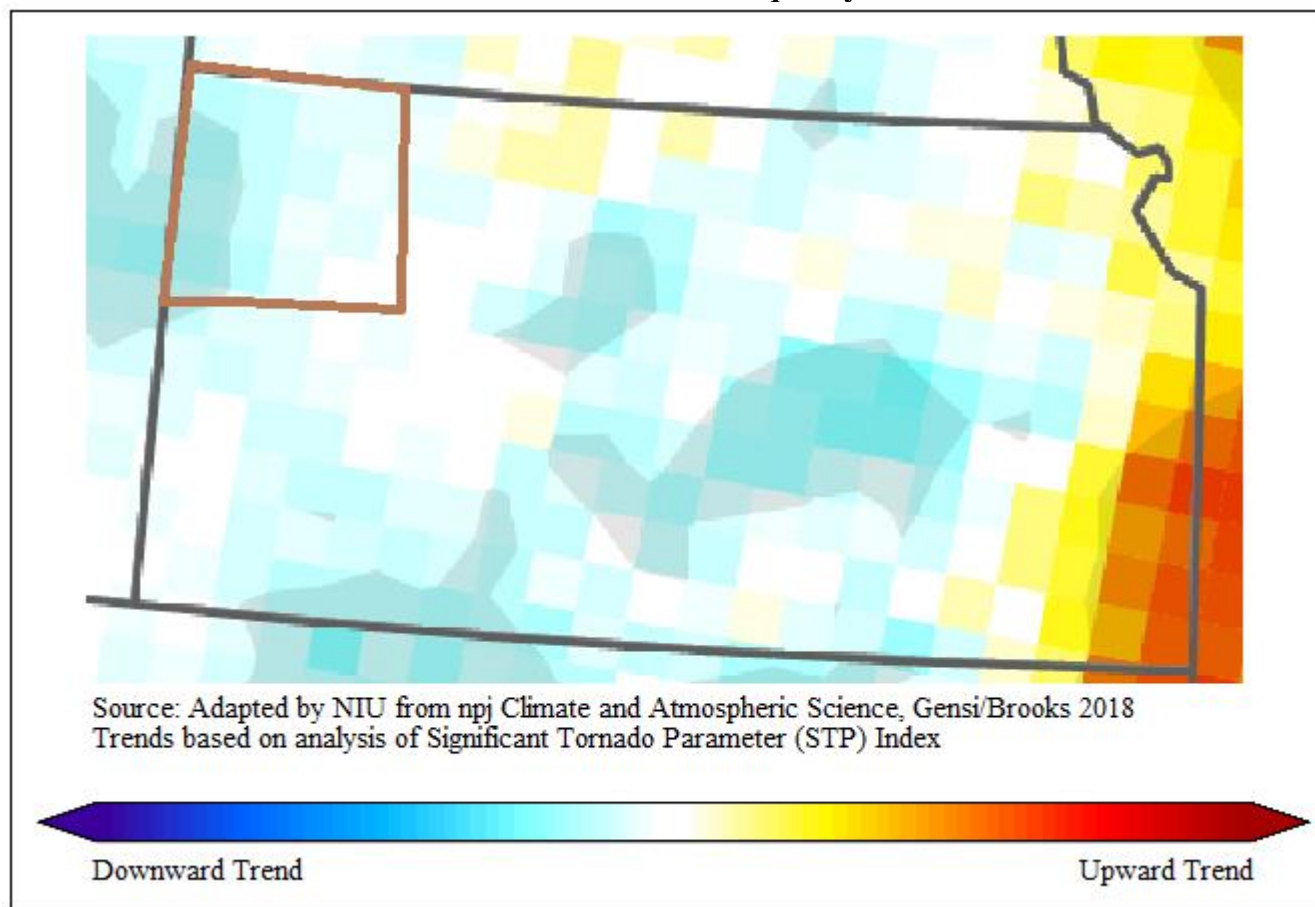
However, if events are normalized for tornados rated above an EF2, we derive the following probability for event occurrence:

- **Probability of an EF2 or greater tornado:** <1 event per year

In addition, Kansas Region A has had six Presidentially Declared Disasters relating to tornados (and other concurrent events such as flooding) in the last 20 years. This represents an average less than 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 A may see a decreasing future number of tornados.

### 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. 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.

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 A county incurring damage over the period 2010 to 2019 from tornado events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.145: Kansas Region A Structural Vulnerability Data for Tornadoes, 2010-2019**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Cheyenne	\$554,880,000	\$50,000	0.01%
Decatur	\$616,613,000	\$6,000	0.00%
Gove	\$606,667,000	\$266,500	0.04%
Logan	\$590,580,000	\$50,000	0.01%
Rawlins	\$631,196,000	\$0	0.00%
Sheridan	\$580,596,000	\$175,000	0.03%
Sherman	\$1,329,873,000	\$25,000	0.00%
Thomas	\$1,689,350,000	\$242,000	0.01%
Wallace	\$365,668,000	\$0	0.00%

Source: NCEI and HAZUS

Counties with a higher identified population are to be considered to have a potentially greater vulnerability to potential tornado failure events. The following table indicates the total county population and registered growth over the period 2000 to 2018.

**Table 4.146: Kansas Region A Population Vulnerability Data for Tornadoes**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

Source: US Census Bureau

Data concerning potential vulnerabilities for specific jurisdictions relating to population and housing, including growth or decline, may be found in Section 3.2, Regional Population Data and Section 3.4, Regional Housing Data.







The USDA 2017 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 A County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of tornadoes on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to tornado events.

**Table 4.147: Tornado Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	0	0.00%	\$132,754,000	\$0	0.00%
Decatur	420,032	0	0.00%	\$233,431,000	\$0	0.00%
Gove	567,444	0	0.00%	\$201,514,000	\$0	0.00%
Logan	604,595	0	0.00%	\$70,870,000	\$0	0.00%
Rawlins	603,529	0	0.00%	\$100,351,000	\$0	0.00%
Sheridan	512,108	10	0.00%	\$348,852,000	\$153	0.00%
Sherman	618,428	0	0.00%	\$139,179,000	\$0	0.00%
Thomas	669,940	0	0.00%	\$251,056,000	\$0	0.00%
Wallace	445,809	65	0.01%	\$81,786,000	\$8,694	0.01%

Source: USDA

Between 2001 and 2010 51% of those killed by tornadoes 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 tornadoes 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:

- **Kanorado** (Sherman County)
- **Gem** (Thomas County)
- **City of Wallace** (Wallace County)

#### 4.19.5 – Impact and Consequence Analysis

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





**Table 4.148: Tornado Consequence Analysis**

<b>Subject</b>	<b>Impacts of Tornado</b>
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 uncontrollable 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

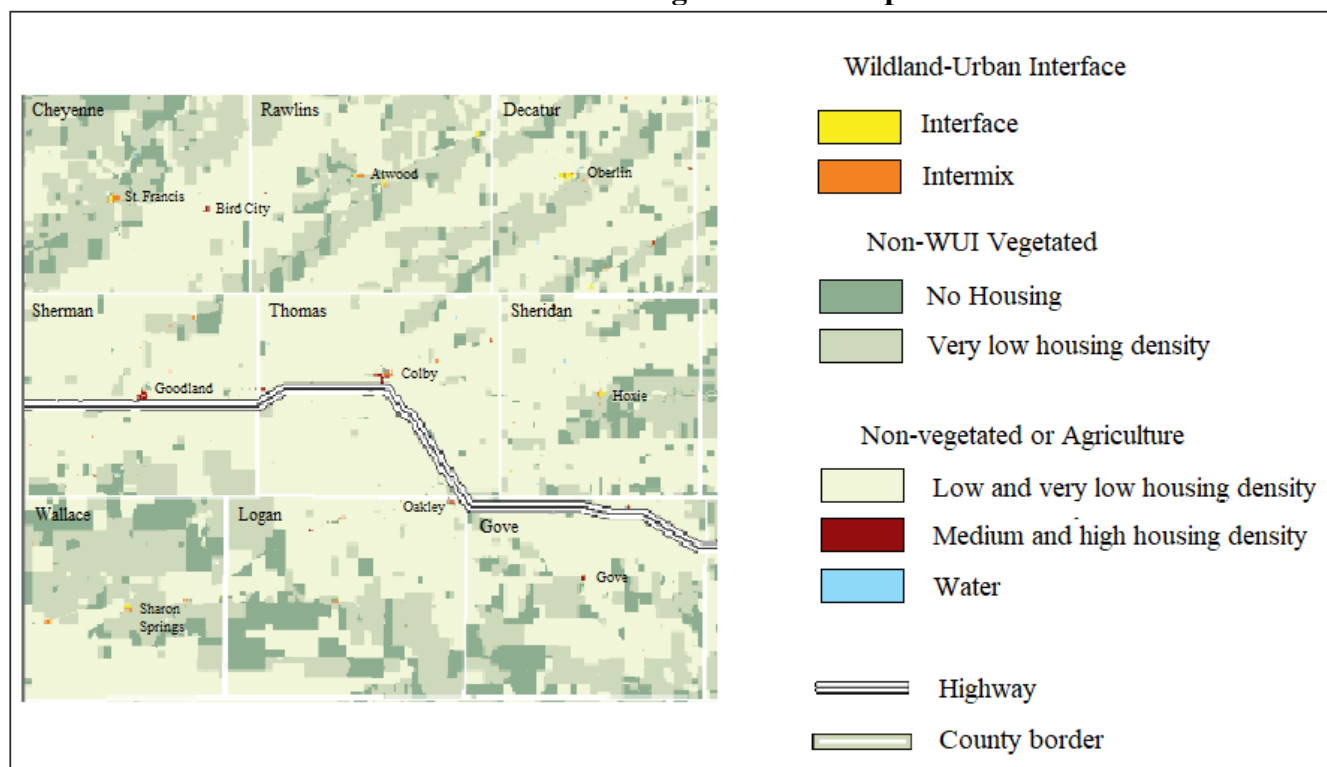
Wildfires in Kansas Region A typically originate in pasture or prairie areas following the ignition of dry grasses (by natural or human sources). According to the 2011 Kansas Forest Action Plan, with the exception of Eastern Redcedar, most forest types in Kansas do not pose significant fire management issues. However, grasslands, which make up a majority of the open areas in Kansas Region A, 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 A.





## SILVIS Labs Regional WUI Map



The Eastern Redcedar is an invasive evergreen species can take over fence rows and un-planted fields adding to wildfire fuel and risk. Research conducted through the Journal of Forestry indicates that the percent of the total regional acreage impacted by Eastern Redcedar in Region A is 0%.

### 4.20.2 – Previous Occurrences

In the 20-year period from 2000 to present, there have been no Fire Management Assistance Declarations for Region A.

In the 20-year period from 2000 to present, there have been no Presidential Disaster Declarations for Kansas Region A 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 4.149: Kansas Region A State Fire Marshall Recorded Wildfire Events, 2013-2018**

County	Number of Reported Fires	Deaths	Injuries	Buildings Burned	Burned Acres
Cheyenne	18	0	0	0	2,725
Decatur	0	0	0	0	0
Gove	5	0	0	0	165
Logan	11	0	0	0	1,750
Rawlins	6	0	0	0	432





County	Number of Reported Fires	Deaths	Injuries	Buildings Burned	Burned Acres
Sheridan	7	0	0	0	105
Sherman	18	0	0	0	6,613
Thomas	7	0	0	0	305
Wallace	3	0	0	0	60

Source: KSFM

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 2010 - 2019 (with 2010 and 2019 being full data years), for the region, indicates six wildfire related claims on 623 acres for \$232,659.

**Table 4.150: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Wildfires**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	0	0	\$0
Decatur	2	141	\$62,665
Gove	0	0	\$0
Logan	2	162	\$24,245
Rawlins	0	0	\$0
Sheridan	0	0	\$0
Sherman	1	66	\$9,775
Thomas	1	254	\$135,974
Wallace	0	0	\$0

Source: USDA Farm Service Agency

### 4.20.3 – Hazard Probability Analysis

The following table summarizes wildfire probability data for **Cheyenne County**.

**Table 4.151: Cheyenne County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	18
Average Events per Year	3
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)	2,725
Average Burned Acres per Year	454
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and USDA





Data from the KSFM indicates that Cheyenne County can expect on a yearly basis, relevant to wildfire events:

- Three events
- No deaths or injuries
- No buildings burned
- 454 acres burned

According to the USDA Risk Management Agency, Cheyenne 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 **Decatur County**.

**Table 4.152: Decatur County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	0
Average Events per Year	0
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)	0
Average Burned Acres per Year	0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	2
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	141
Average Number of Acres Damaged per Year	14
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$62,665
Average Crop Damage per Year	\$6,267

Source: KSFM and USDA

Data from the KSFM indicates that Decatur County can expect on a yearly basis, relevant to wildfire events:

- No events
- No deaths or injuries
- No buildings burned
- No acres burned

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

- <1 insurance claims







- 14 acres impacted
- \$6,267 in insurance claims

The following table summarizes wildfire probability data for **Gove County**.

**Table 4.153: Gove County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	5
Average Events per Year	1
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)	165
Average Burned Acres per Year	28
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and USDA

Data from the KSFM indicates that Gove County can expect on a yearly basis, relevant to wildfire events:

- One event
- No deaths or injuries
- No buildings burned
- 28 acres burned

According to the USDA Risk Management Agency, Gove 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 **Logan County**.

**Table 4.154: Logan County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	11
Average Events per Year	2
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



**Table 4.154: Logan County Wildfire Probability Summary**

Data	Recorded Impact
Total Reported Burned Acres (2013-2018)	1,750
Average Burned Acres per Year	292
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	2
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	162
Average Number of Acres Damaged per Year	16
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$24,245
Average Crop Damage per Year	\$2,425

Source: KSFM and USDA

Data from the KSFM indicates that Logan County can expect on a yearly basis, relevant to wildfire events:

- Two events
- No deaths or injuries
- No buildings burned
- 292 acres burned

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

- <1 insurance claims
- 16 acres impacted
- \$2,425 in insurance claims

The following table summarizes wildfire probability data for **Rawlins County**.

**Table 4.155: Rawlins County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	6
Average Events per Year	1
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)	432
Average Burned Acres per Year	72
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and USDA





Data from the KSFM indicates that Rawlins County can expect on a yearly basis, relevant to wildfire events:

- One event
- No deaths or injuries
- No buildings burned
- 72 acres burned

According to the USDA Risk Management Agency, Rawlins 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 **Sheridan County**.

**Table 4.156: Sheridan County Wildfire Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of KSFM Reported Events (2013-2018)	7
Average Events per Year	1
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)	105
Average Burned Acres per Year	18
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and USDA

Data from the KSFM indicates that Sheridan County can expect on a yearly basis, relevant to wildfire events:

- One event
- No deaths or injuries
- No buildings burned
- 18 acres burned

According to the USDA Risk Management Agency, Sheridan 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 **Sherman County**.

**Table 4.157: Sherman County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	18
Average Events per Year	3
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)	6,613
Average Burned Acres per Year	1,102
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	66
Average Number of Acres Damaged per Year	7
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$9,775
Average Crop Damage per Year	\$978

Source: KSFM and USDA

Data from the KSFM indicates that Sherman County can expect on a yearly basis, relevant to wildfire events:

- Three events
- No deaths or injuries
- No buildings burned
- 1,102 acres burned

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

- <1 insurance claim
- Seven acres impacted
- \$978 in insurance claims

The following table summarizes wildfire probability data for **Thomas County**.

**Table 4.158: Thomas County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	7
Average Events per Year	1
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0



**Table 4.158: Thomas County Wildfire Probability Summary**

Data	Recorded Impact
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	305
Average Burned Acres per Year	51
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	254
Average Number of Acres Damaged per Year	25
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$135,974
Average Crop Damage per Year	\$13,597

Source: KSFM and USDA

Data from the KSFM indicates that Thomas County can expect on a yearly basis, relevant to wildfire events:

- One event
- No deaths or injuries
- No buildings burned
- 51 acres burned

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

- <1 insurance claim
- 25 acres impacted
- \$13,597 in insurance claims

The following table summarizes wildfire probability data for **Wallace County**.

**Table 4.159: Wallace County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	3
Average Events per Year	1
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)	60
Average Burned Acres per Year	10
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and USDA





Data from the KSFM indicates that Wallace County can expect on a yearly basis, relevant to wildfire events:

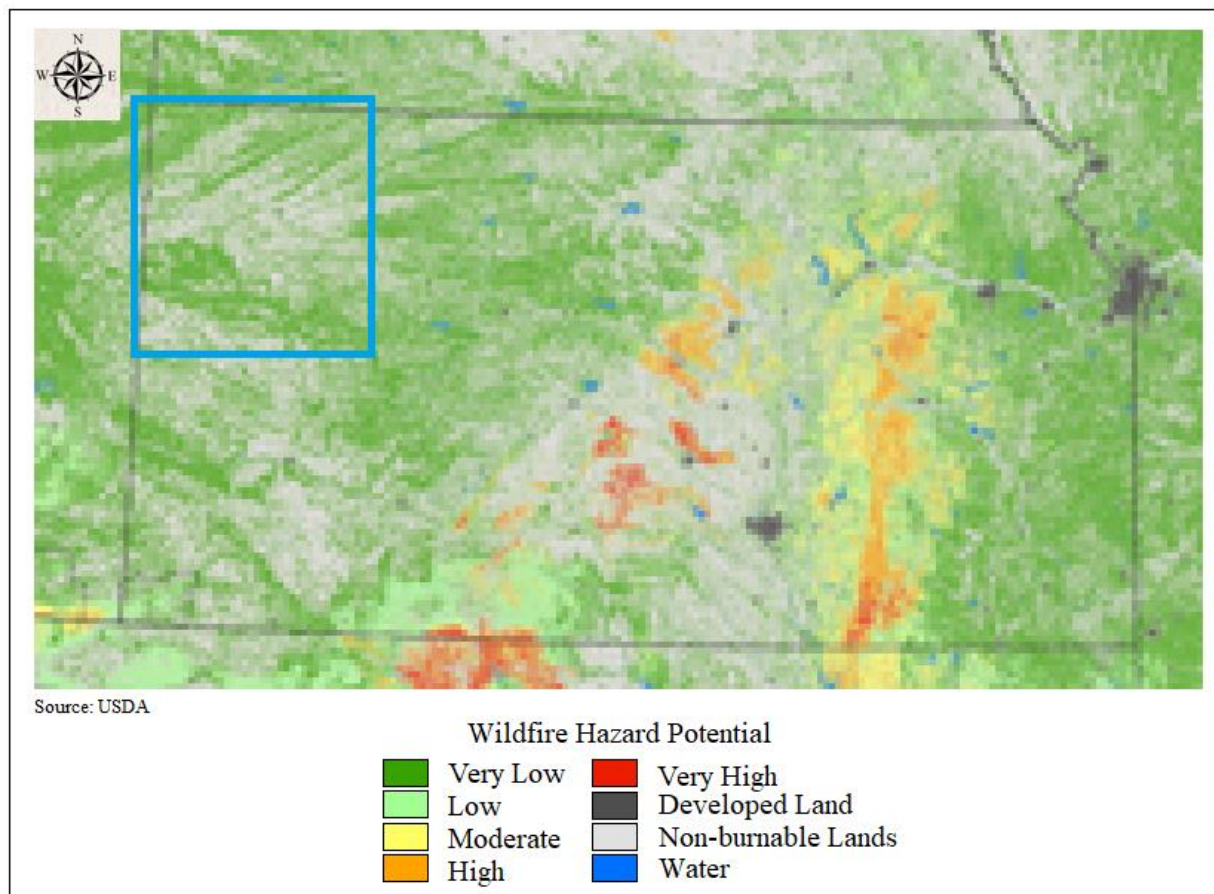
- One event
- No deaths or injuries
- No buildings burned
- Ten acres burned

According to the USDA Risk Management Agency, Wallace 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 A is the low and very low 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. 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.

The following table presents data from HAZUS and KSFM concerning the structures and the percentage of structures for each Kansas Region A 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. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.160: Kansas Region A Structural Vulnerability Data for Wildfires, 2010-2019**

County	HAZUS Building Valuation	KSFM Structure Damage	Percentage of Building Valuation Damaged
Cheyenne	\$554,880,000	\$0	0.0%
Decatur	\$616,613,000	\$0	0.0%
Gove	\$606,667,000	\$0	0.0%
Logan	\$590,580,000	\$0	0.0%
Rawlins	\$631,196,000	\$0	0.0%
Sheridan	\$580,596,000	\$0	0.0%
Sherman	\$1,329,873,000	\$0	0.0%
Thomas	\$1,689,350,000	\$0	0.0%
Wallace	\$365,668,000	\$0	0.0%

Source: NCEI and HAZUS

Counties with a higher identified population are to be considered to have a potentially greater vulnerability to potential wildfire events. The following table indicates the total county population and registered growth over the period 2000 to 2018.

**Table 4.161: Kansas Region A Population Vulnerability Data for Wildfires**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

Source: US Census Bureau





Data concerning potential vulnerabilities for specific jurisdictions relating to population and housing, including growth or decline, may be found in Section 3.2, Regional Population Data and Section 3.4, Regional Housing Data.

The USDA 2017 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 A 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 potential vulnerability the county has to wildfire events.

**Table 4.162: Wildfire Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	0	0.00%	\$132,754,000	\$0	0.00%
Decatur	420,032	14	0.00%	\$233,431,000	\$6,267	0.00%
Gove	567,444	0	0.00%	\$201,514,000	\$0	0.00%
Logan	604,595	16	0.00%	\$70,870,000	\$2,425	0.00%
Rawlins	603,529	0	0.00%	\$100,351,000	\$0	0.00%
Sheridan	512,108	0	0.00%	\$348,852,000	\$0	0.00%
Sherman	618,428	7	0.00%	\$139,179,000	\$978	0.00%
Thomas	669,940	25	0.00%	\$251,056,000	\$13,597	0.01%
Wallace	445,809	0	0.00%	\$81,786,000	\$0	0.00%

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, no Kansas Region A county has a CWPP.

#### 4.20.5 – Impact and Consequence Analysis

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

**Table 4.163: 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.





**Table 4.163: Wildfire Consequence Analysis**

<b>Subject</b>	<b>Impacts of Wildfire</b>
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

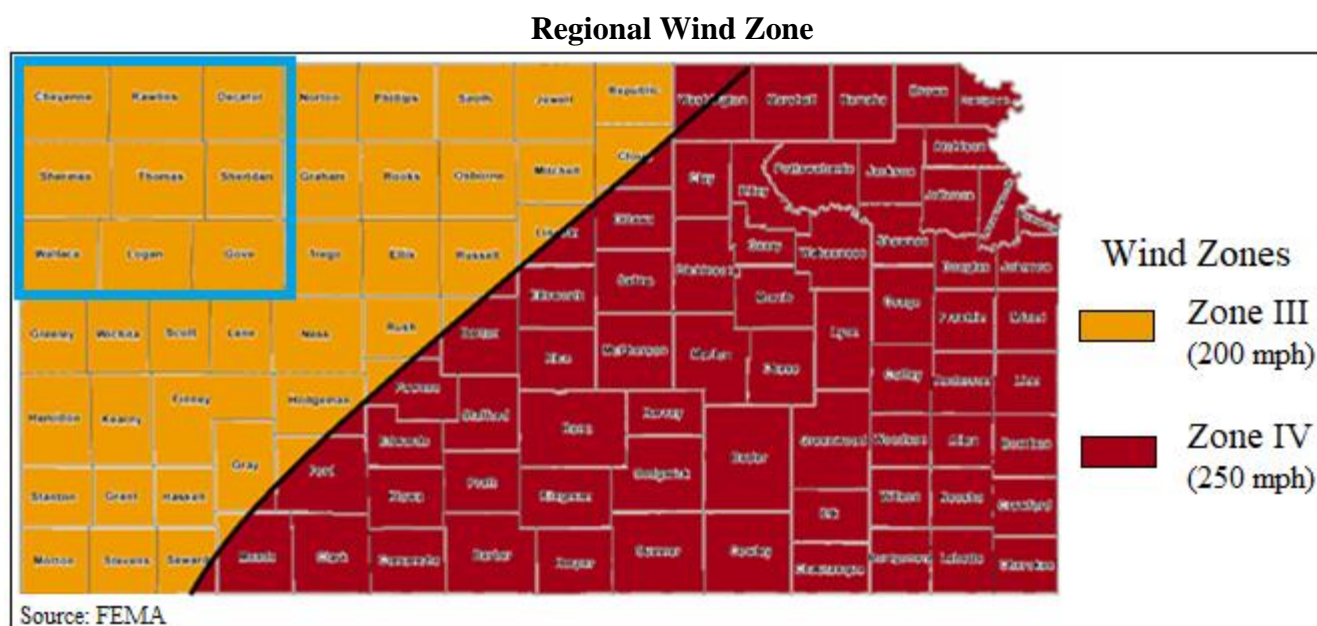
Straight-line winds are generally any thunderstorm wind that is not associated with rotation. It is these winds, which can exceed 100 mph that represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks 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 A 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 A is located within wind zone III, the second highest inland category.



Severe thunderstorms strike Kansas Region A 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.

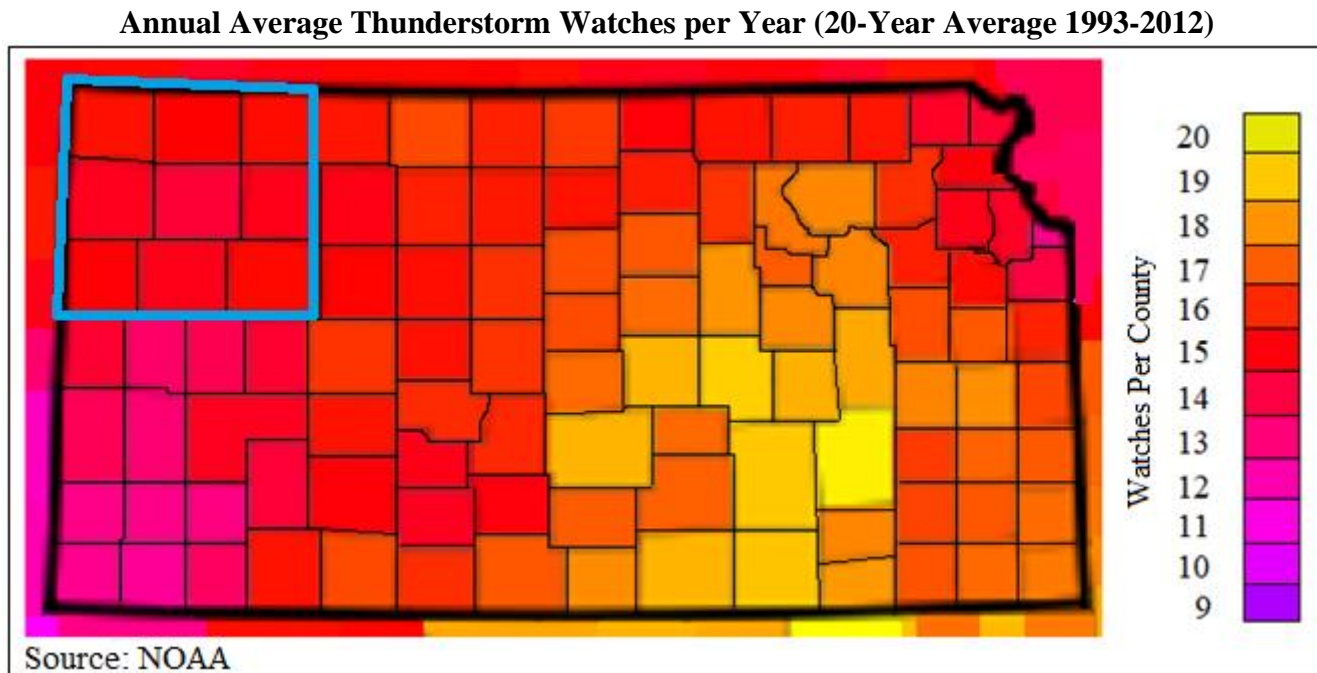
- **Marginal:** Isolated severe thunderstorms, limited in duration and/or coverage and/or intensity
- **Slight:** Scattered severe storms possible, Short-lived and/or not widespread, isolated intense storms possible





- **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 A.



To measure wind speed and its correlating potential for damage, experts use the Beaufort scale as shown below.

**Table 4.164: 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 2000 to present, there have been four Presidential Disaster Declarations for Kansas Region A for Straight-Line Winds (along with other associated hazard events). The following 20-year information (with 2000 and 2019 being full data years) on past declared disasters is presented to provide a historical perspective on high wind events that have impacted Kansas Region A. Declaration numbers in bold indicate declared disaster that have occurred since the previous mitigation plan update in 2015.

**Table 4.165: Kansas Region A FEMA Straight-Line Winds Disaster and Emergency Declarations, 2000 - 2019**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28-07/12/2019)	Severe Storms, <b>Straight-Line Winds</b> , Tornadoes, Flooding, Landslides, and Mudslides	Wallace	\$1,887,116
<b>4319</b>	06/16/2017 (04/28/2017 – 05/03/2017)	Severe Winter Storm, Snowstorm, <b>Straight-Line Winds</b> , Flooding	Cheyenne, Decatur, Gove, Logan, Rawlins, Sheridan, Sherman, Thomas, and Wallace	\$53,126,486
4230	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, Tornadoes, <b>Straight-Line Winds</b> , and Flooding	Cheyenne	\$13,848,325
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, <b>Straight-Line Winds</b> , Tornadoes and Flooding	Logan, Sherman	\$8,259,620

Source: FEMA

–: Data unavailable

The following provides details concerning Presidential Disaster Declarations DR 4449 and DR 4319 for Kansas Region A.

### **Kansas –Severe Storms, Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides**

#### **FEMA-4449-DR**

Declared June 20, 2019 On June 7, 2019

Governor Laura Kelly requested a major disaster declaration due to severe storms, straight-line winds, tornadoes, flooding, landslides, and mudslides beginning on April 28, 2019, and continuing. The Governor requested a declaration for Public Assistance for 63 counties and Hazard Mitigation statewide. Beginning on May 20, 2019, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested areas 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 20, 2019, 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, tornados, flooding, landslides, and mudslides in Allen, Anderson, Atchison, Barber, Barton, Butler, Chase, Chautauqua, Cherokee, Clark, Clay, Cloud, Coffey, Cowley, Doniphan, Elk, Ellsworth, Franklin, Geary, Greenwood, Harper, Harvey, Hodgeman, Jefferson, Kingman, Leavenworth, Lincoln, Linn, Lyon, Marion, Marshall, McPherson, Meade, Montgomery, Morris, Nemaha, Neosho, Osage, Ottawa, Pawnee, Phillips, Pottawatomie, Pratt, Reno, Rice, Rush, Russell, Saline, Sumner, Wabaunsee, Washington, Wilson, and Woodson Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

### **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, Cheyenne, Decatur, Gove, Haskell, Logan, Lane, Logan, Rawlins, Neosho, Norton, Rawlins, Sheridan, Seward, Sheridan, Sherman, Sherman, Thomas, Thomas, Wallace, and Wallace Counties. This declaration also authorized snow assistance for a period of 48 hours for Decatur, Gove, Lane, Logan, Rawlins, Sheridan, Thomas, and Wallace Counties. Finally, this declaration made Hazard Mitigation Cheyenne 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 A for the period 2010 - 2019 (with 2010 and 2019 being full data set years).

**Table 4.166: Kansas Region A NCEI High Wind Events, 2010 - 2019**

<b>County</b>	<b>Number of Days with Events</b>	<b>Property Damage</b>	<b>Highest Recorded Wind Speed</b>	<b>Deaths</b>	<b>Injuries</b>
Cheyenne	68	\$318,500	85 Knots	0	0





**Table 4.166: Kansas Region A NCEI High Wind Events, 2010 - 2019**

County	Number of Days with Events	Property Damage	Highest Recorded Wind Speed	Deaths	Injuries
Decatur	33	\$113,900	80 Knots	0	0
Gove	68	\$290,050	87 Knots	0	0
Logan	69	\$621,000	87 Knots	0	0
Rawlins	67	\$431,400	87 Knots	0	0
Sheridan	43	\$85,100	87 Knots	0	0
Sherman	117	\$1,048,000	96 Knots	0	0
Thomas	74	\$540,000	87 Knots	0	0
Wallace	57	\$733,450	87 Knots	0	0

Source: NOAA NCEI

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

- July 26, 2018: Lyle, Decatur County**  
 High winds caused Major roof damage to machine shed, including part of the roof removed. Pea size hail also occurred with the wind. Property damage was recorded at \$30,000.
- July 26, 2018: Kanorado, Sherman County**  
 Two irrigation pivots were flipped on their side on the south side of I-70 near mile marker 5. Property damage was recorded at \$130,000.
- June 30, 2018: St. Francis, Cheyenne County**  
 High winds damaged an irrigation pivot. Property damage was recorded at \$30,000.
- May 28, 2018: Brewster, Thomas County**  
 Straight-line winds destroyed an empty grain bin, tore some roof off of a barn and collapsed a second barn. Structural integrity of the collapsed barn prior to the damaging winds is unknown. Property damage was recorded at \$78,000.
- August 10, 2017: Atwood, Rawlins County**  
 Fourteen power lines were broken off along CR 23 southeast of Atwood. Property damage was recorded at \$145,000.
- May 25, 2017: Gove County**  
 A metal shed was blown down along with a power pole. A number of trees were also blown down, including one that was 30 ft. tall halfway between CR Cedar Crest and CR Apache Acre on Highway 83. Property damage was recorded at \$279,000.
- June 10, 2015: Park, Gove County**  
 A semi pulling a loaded trailer and a truck pulling a camper were blown over at mile marker 99 near the Park exit. Property damage was recorded at \$59,000.





- **June 14, 2014: Bird City, Cheyenne County**  
High winds overturned pivot and multiple power poles snapped near Road D and Road 27. Property damage was recorded at \$40,000.
- **June 20, 2011: Sharon Springs, Wallace County**  
A small thunderstorm complex produced a long swath of significant wind and hail damage across south-central into central Wallace county. The damage began near the Wallace-Greeley county border about 13 miles SSW of Sharon Springs and continued to about 8 miles SSE of Wallace. Approximately 25 irrigation pivots were blown over, numerous grain bins were either damaged or destroyed, utility poles were broken, some outbuildings damaged, and one semi-truck blown over. Some residences reported shingle damage and broken winds due to a combination of wind and hail. Property damage was recorded at \$488,000.

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 2010 - 2019 (with 2010 and 2019 being full data years), for the region, indicates 235 high wind related claims on 46,905 acres for \$8,145,720.

**Table 4.167: USDA Risk Management Agency Cause of Loss Indemnities  
2009-2018, High Winds**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	18	1,806	\$175,162
Decatur	14	3,127	\$473,514
Gove	17	2,398	\$2,273,718
Logan	25	3,671	\$487,564
Rawlins	24	4,740	\$531,916
Sheridan	28	3,639	\$514,004
Sherman	33	10,215	\$1,667,710
Thomas	30	8,428	\$946,097
Wallace	46	8,881	\$1,076,035

Source: USDA Farm Service Agency

### 4.21.3 – Hazard Probability Analysis

The following table summarizes high wind probability data for **Cheyenne County**.

**Table 4.168: Cheyenne County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	68
Average Events per Year	7
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$318,500
Average Property Damage per Year	\$31,850
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	18
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,806



**Table 4.168: Cheyenne County High Wind Probability Summary**

Data	Recorded Impact
Average Number of Acres Damaged per Year	181
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$175,162
Average Crop Damage per Year	\$17,516

Source: NCEI and USDA

Data from the NCEI indicates that Cheyenne County can expect on a yearly basis, relevant to high wind events:

- Seven events
- No deaths or injuries
- \$31,850 in property damages

According to the USDA Risk Management Agency, Cheyenne County can expect on a yearly basis, relevant to high wind occurrences:

- Two insurance claims
- 181 acres impacted
- \$17,516 in insurance claims

The following table summarizes high wind probability data for **Decatur County**.

**Table 4.169: Decatur County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	33
Average Events per Year	3
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$113,900
Average Property Damage per Year	\$11,390
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	14
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,127
Average Number of Acres Damaged per Year	313
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$473,514
Average Crop Damage per Year	\$47,351

Source: NCEI and USDA

Data from the NCEI indicates that Decatur County can expect on a yearly basis, relevant to high wind events:

- Three events
- No deaths or injuries
- \$11,390 in property damages





According to the USDA Risk Management Agency, Decatur County can expect on a yearly basis, relevant to high wind occurrences:

- One insurance claim
- 313 acres impacted
- \$47,351 in insurance claims

The following table summarizes High wind probability data for **Gove County**.

**Table 4.170: Gove County High Wind Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	68
Average Events per Year	7
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$290,050
Average Property Damage per Year	\$29,005
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	17
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	2,398
Average Number of Acres Damaged per Year	240
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,273,718
Average Crop Damage per Year	\$227,372

Source: NCEI and USDA

Data from the NCEI indicates that Gove County can expect on a yearly basis, relevant to high wind events:

- Seven events
- No deaths or injuries
- \$29,005 in property damages

According to the USDA Risk Management Agency, Gove County can expect on a yearly basis, relevant to high wind occurrences:

- Two insurance claims
- 240 acres impacted
- \$227,372 in insurance claims

The following table summarizes high wind probability data for **Logan County**.

**Table 4.171: Logan County High Wind Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	69
Average Events per Year	7
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$621,000



**Table 4.171: Logan County High Wind Probability Summary**

Data	Recorded Impact
Average Property Damage per Year	\$62,100
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	25
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,671
Average Number of Acres Damaged per Year	367
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$487,564
Average Crop Damage per Year	\$48,756

Source: NCEI and USDA

Data from the NCEI indicates that Logan County can expect on a yearly basis, relevant to high wind events:

- Seven events
- No deaths or injuries
- \$62,100 in property damages

According to the USDA Risk Management Agency, Logan County can expect on a yearly basis, relevant to high wind occurrences:

- Three insurance claims
- 367 acres impacted
- \$48,756 in insurance claims

The following table summarizes high wind probability data for **Rawlins County**.

**Table 4.172: Rawlins County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	67
Average Events per Year	7
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$431,400
Average Property Damage per Year	\$43,140
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	24
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	4,740
Average Number of Acres Damaged per Year	474
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$531,916
Average Crop Damage per Year	\$53,192

Source: NCEI and USDA

Data from the NCEI indicates that Rawlins County can expect on a yearly basis, relevant to high wind events:

- Seven events







- No deaths or injuries
- \$43,140 in property damages

According to the USDA Risk Management Agency, Rawlins County can expect on a yearly basis, relevant to high wind occurrences:

- Two insurance claims
- 474 acres impacted
- \$53,192 in insurance claims

The following table summarizes high wind probability data for **Sheridan County**.

**Table 4.173: Sheridan County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	43
Average Events per Year	4
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$85,100
Average Property Damage per Year	\$8,510
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	28
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,639
Average Number of Acres Damaged per Year	364
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$514,004
Average Crop Damage per Year	\$51,400

Source: NCEI and USDA

Data from the NCEI indicates that Sheridan County can expect on a yearly basis, relevant to high wind events:

- Four events
- No deaths or injuries
- \$8,510 in property damages

According to the USDA Risk Management Agency, Sheridan County can expect on a yearly basis, relevant to high wind occurrences:

- Three insurance claim
- 364 acres impacted
- \$51,400 in insurance claims

The following table summarizes High wind probability data for **Sherman County**.



**Table 4.174: Sherman County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	117
Average Events per Year	12
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$1,048,000
Average Property Damage per Year	\$104,800
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	33
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	10,215
Average Number of Acres Damaged per Year	1,022
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,667,710
Average Crop Damage per Year	\$166,771

Source: NCEI and USDA

Data from the NCEI indicates that Sherman County can expect on a yearly basis, relevant to high wind events:

- 12 events
- No deaths or injuries
- \$104,800 in property damages

According to the USDA Risk Management Agency, Sherman County can expect on a yearly basis, relevant to high wind occurrences:

- Three insurance claim
- 1,022 acres impacted
- \$166,771 in insurance claims

The following table summarizes high wind probability data for **Thomas County**.

**Table 4.175: Thomas County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	74
Average Events per Year	7
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$540,000
Average Property Damage per Year	\$54,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	30
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	8,428
Average Number of Acres Damaged per Year	843
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$946,097
Average Crop Damage per Year	\$94,610

Source: NCEI and USDA





Data from the NCEI indicates that Thomas County can expect on a yearly basis, relevant to high wind events:

- Seven events
- No deaths or injuries
- \$54,000 in property damages

According to the USDA Risk Management Agency, Thomas County can expect on a yearly basis, relevant to high wind occurrences:

- Three insurance claims
- 843 acres impacted
- \$94,610 in insurance claims

The following table summarizes high wind probability data for **Wallace County**.

**Table 4.176: Wallace County High Wind Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2010-2019)	57
Average Events per Year	6
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$733,450
Average Property Damage per Year	\$73,345
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	46
Average Number of Claims per Year	5
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	8,881
Average Number of Acres Damaged per Year	888
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,076,035
Average Crop Damage per Year	\$107,604

Source: NCEI and USDA

Data from the NCEI indicates that Wallace County can expect on a yearly basis, relevant to high wind events:

- Six events
- No deaths or injuries
- \$73,345 in property damages

According to the USDA Risk Management Agency, Wallace County can expect on a yearly basis, relevant to high wind occurrences:

- Five insurance claims
- 888 acres impacted
- \$107,604 in insurance claims





In addition, Kansas Region A 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. Counties with a higher or increasing population, and/or a high or increasing structural valuation are considered to have a potentially greater vulnerability.

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 A county incurring damage over the period 2010 to 2019 from high wind events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.177: Kansas Region A Structural Vulnerability Data for High Winds, 2010-2019**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Cheyenne	\$554,880,000	\$318,500	0.06%
Decatur	\$616,613,000	\$113,900	0.02%
Gove	\$606,667,000	\$290,050	0.05%
Logan	\$590,580,000	\$621,000	0.11%
Rawlins	\$631,196,000	\$431,400	0.07%
Sheridan	\$580,596,000	\$85,100	0.01%
Sherman	\$1,329,873,000	\$1,048,000	0.08%
Thomas	\$1,689,350,000	\$540,000	0.03%
Wallace	\$365,668,000	\$733,450	0.20%

Source: NCEI and HAZUS

Counties with a higher identified population are to be considered to have a potentially greater vulnerability to potential high wind events. The following table indicates the total county population and registered growth over the period 2000 to 2018.

**Table 4.178: Kansas Region A Population Vulnerability Data for High Winds**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

Source: US Census Bureau





Data concerning potential vulnerabilities for specific jurisdictions relating to population and housing, including growth or decline, may be found in Section 3.2, Regional Population Data and Section 3.4, Regional Housing Data.

The USDA 2017 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 A 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 potential vulnerability the county has to high wind events.

**Table 4.179: High Wind Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	181	0.03%	\$132,754,000	\$17,516	0.01%
Decatur	420,032	313	0.07%	\$233,431,000	\$47,351	0.02%
Gove	567,444	240	0.04%	\$201,514,000	\$227,372	0.11%
Logan	604,595	367	0.06%	\$70,870,000	\$48,756	0.07%
Rawlins	603,529	474	0.08%	\$100,351,000	\$53,192	0.05%
Sheridan	512,108	364	0.07%	\$348,852,000	\$51,400	0.01%
Sherman	618,428	1,022	0.17%	\$139,179,000	\$166,771	0.12%
Thomas	669,940	843	0.13%	\$251,056,000	\$94,610	0.04%
Wallace	445,809	888	0.20%	\$81,786,000	\$107,604	0.13%

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:

- **Kanorado** (Sherman County)
- **Gem** (Thomas County)
- **City of Wallace** (Wallace County)

#### 4.21.5 – Impact and Consequence Analysis

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

**Table 4.180: 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.





**Table 4.180: High Wind Consequence Analysis**

<b>Subject</b>	<b>Impacts of High Winds</b>
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 A 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 A is susceptible to severe winter storms. For winter weather, the NWS describes the different types of events as follows:

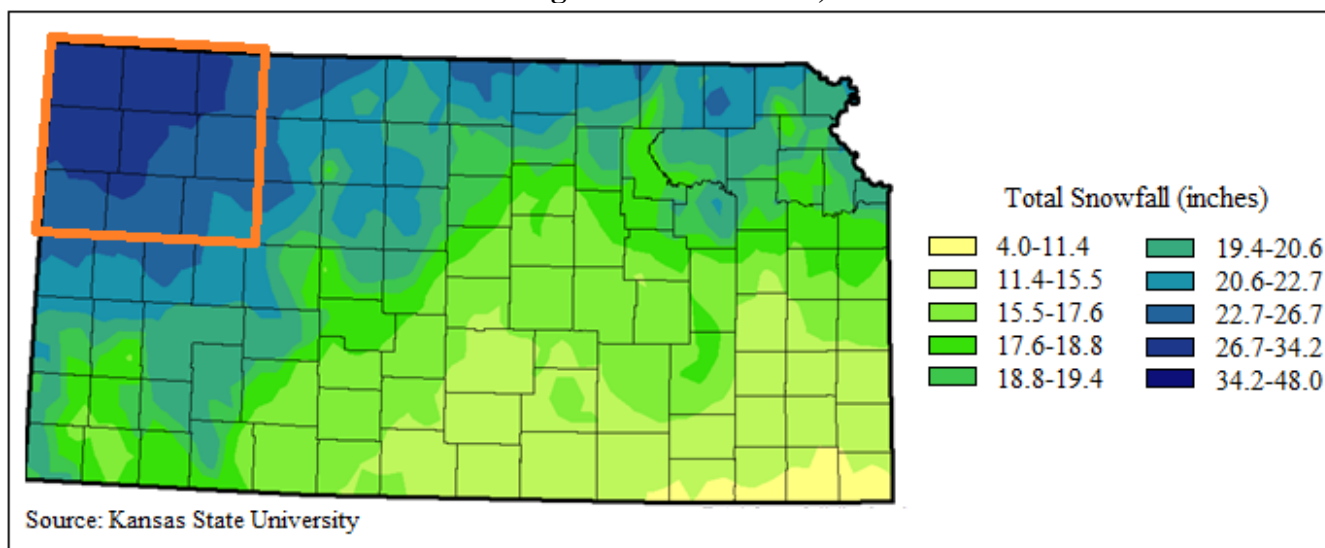
- **Blizzard:** Winds of 35 mph or more with snow and blowing snow reducing visibility to less than 1/4 mile for at least three hours.
- **Blowing Snow:** Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls:** Brief, 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 Kansas State University, using the latest available data, indicates the average annual snowfall for Kansas Region A for a given year.



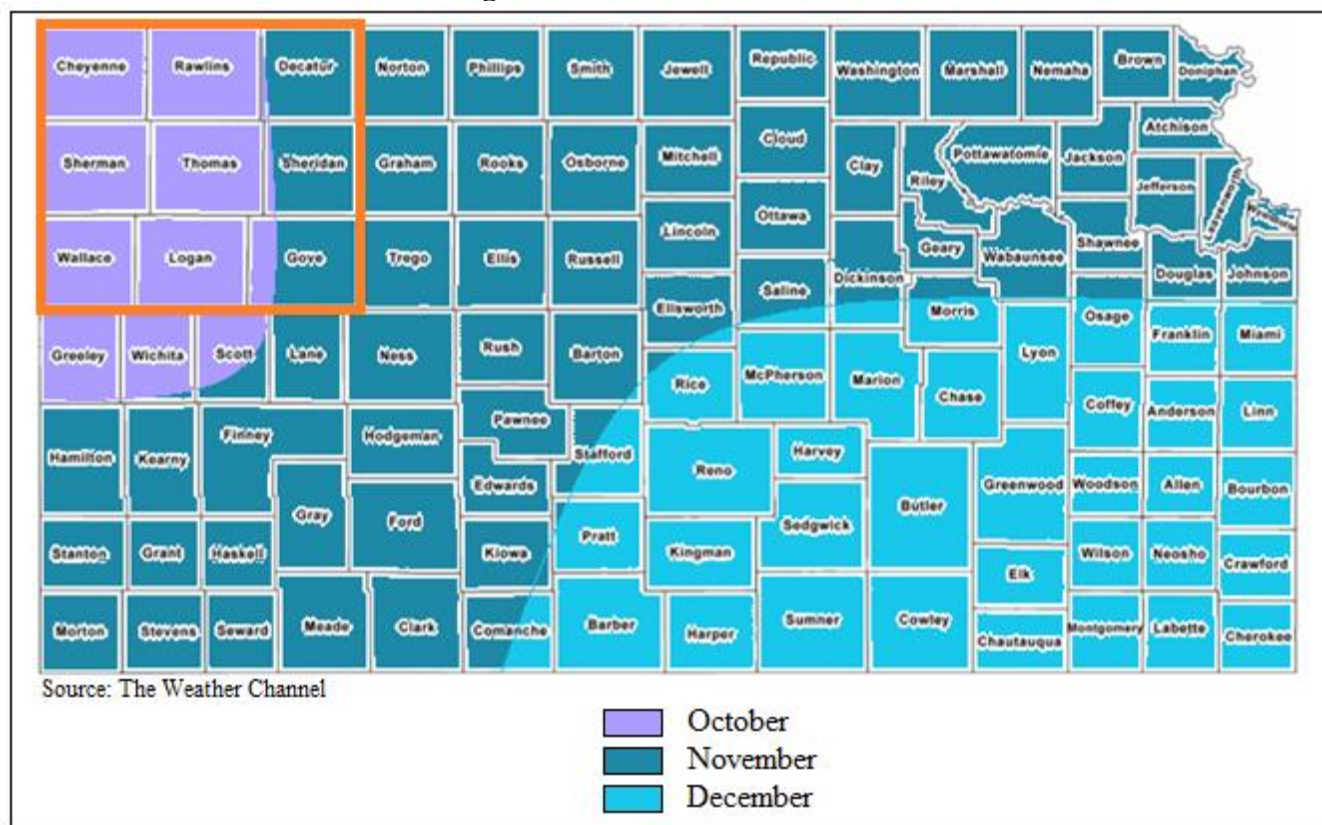


### Average Annual Snowfall, 1981-2010



Additionally, as indicated by the map below, Kansas Region A can expect to receive the first measurable snow in October to November of each year.

### Average Date of First Measurable Snow





#### 4.22.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been six Presidential Disaster Declarations for Kansas Region A for severe winter storms. The following information is presented to provide a historical perspective on severe winter storm events that have impacted Kansas Region A. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2015.

**Table 4.181: Kansas Region A FEMA Severe Winter Storms Disaster and Emergency Declarations, 1999 - 2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4319</b>	06/16/2017 (04/28/2017 – 05/03/2017)	<b>Severe Winter Storm</b> , Snowstorm, Straight-Line Winds, Flooding	Cheyenne, Decatur, Gove, Logan, Rawlins, Sheridan, Sherman, Thomas, and Wallace	\$53,126,486
<b>4304</b>	02/24/2017 (01/13/2017 – 01/16/2017)	<b>Severe Winter Storm</b>	Sheridan	\$8,027,446
1885	03/09/2010 (12/9/2009-1/8/2010)	<b>Severe Winter Storms and Snowstorm</b>	Cheyenne, Decatur, Gove, Logan, Rawlins, Sheridan, and Wallace	\$19,100,658
1741	02/01/2008	<b>Severe Winter Storms</b>	Gove, Logan, Sheridan, Thomas and, Wallace	\$359,557,345
1675	1/7/2007 (12/28-30/2006)	<b>Severe Winter Storm</b>	Cheyenne, Decatur, Gove, Logan, Rawlins, Sheridan, Sherman, Thomas, and Wallace	\$315,201,639
1626	1/26/2006 (11/27-28/2005)	<b>Severe Winter Storm</b>	Cheyenne, Decatur, Gove, Rawlins, Sheridan, Sherman, and Thomas	\$50,281,517

Source: FEMA

The following provides details concerning Presidential Disaster Declarations DR 4319 and DR 4304 for Kansas Region A.

#### **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, Cheyenne, Decatur, Gove, Haskell, Logan, Lane, Logan, Rawlins, Neosho, Norton, Rawlins, Sheridan, Seward, Sheridan, Sherman, Sherman, Thomas, Thomas, Wallace, and Wallace Counties. This declaration also authorized snow assistance for a period of 48 hours for Decatur, Gove, Lane, Logan, Rawlins, Sheridan, Thomas, and Wallace Counties. Finally, this declaration made Hazard Mitigation Cheyenne Program assistance requested by the Governor available for hazard mitigation measures statewide.

### **Kansas – Severe Winter Storm**

#### **FEMA-4304-DR**

Declared February 24, 2017

On February 13, 2017, Governor Sam Brownback requested a major disaster declaration due to a severe winter storm during the period of January 13-16, 2017. The Governor requested a declaration for Public Assistance for 23 counties and Hazard Mitigation statewide. During the period of January 25 to February 7, 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 February 24, 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 in Barton, Clark, Comanche, Edwards, Ellsworth, Ford, Hodgeman, Jewell, Kiowa, Meade, Ness, Pawnee, Pratt, Rush, Seward, Sheridan, Stafford, and Trego Counties. This declaration also 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 A for the 10-year period of 2010 – 2019 (2010 and 2019 are full data set years). It is worth noting that the NCEI data is regional, and sometimes statewide. As such reported damage is not specific to a regional county nor to any of the participating jurisdictions.

**Table 4.182: Kansas Region A NCEI Winter Storm Events, 2010 - 2019**

<b>Event Type</b>	<b>Number of Days with an Event</b>	<b>Property Damage</b>	<b>Deaths</b>	<b>Injuries</b>
Blizzards	17	\$457,000	0	0
Ice Storm	3	\$0	0	0
Winter Storms	6	\$22,000	0	0

Source: NOAA NCEI





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

- **April 14, 2011: Regional**

Six inches of snow fell with winds of 40 to 50 mph, reducing visibility below one quarter mile. According to newspaper reports, 50 power poles were downed in Cheyenne county as a result of the wet snow and strong wind. Property damage was recorded at \$437,000.

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 2010 - 2019 (with 2010 and 2019 being full data years), for the region, indicates 670 winter storm related claims on 516,270 acres for \$47,961,795.

**Table 4.183: USDA Risk Management Agency Cause of Loss Indemnities  
2009-2018, Winter Storms**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Cheyenne	51	53,924	\$4,725,278
Decatur	63	36,518	\$3,318,607
Gove	77	56,471	\$4,497,001
Logan	61	44,807	\$3,694,573
Rawlins	90	78,800	\$6,881,837
Sheridan	76	61,578	\$5,464,825
Sherman	69	75,998	\$9,152,284
Thomas	93	61,873	\$5,522,968
Wallace	90	46,301	\$4,704,422

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 A**.

**Table 4.184: Kansas Region A Winter Storm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2010-2019)	26
Average Events per Year	3
Deaths or Injuries (2010-2019)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2010-2019)	\$479,000
Average Property Damage per Year	\$47,900

Source: NCEI

Data from the NCEI indicates that Kansas Region A can expect on a yearly basis, relevant to winter storm events:

- Three events
- No deaths or injuries
- \$47,900 in property damages







The following table summarizes USDA Risk Management Agency winter storm event data for **Cheyenne County**.

**Table 4.185: Cheyenne County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	51
Average Number of Claims per Year	5
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	53,924
Average Number of Acres Damaged per Year	5,392
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$4,725,278
Average Crop Damage per Year	\$472,528

Source: USDA

According to the USDA Risk Management Agency, Cheyenne County can expect on a yearly basis, relevant to winter storm occurrences:

- Five insurance claims
- 5,392 acres impacted
- \$472,528 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Decatur County**.

**Table 4.186: Decatur County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	63
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	36,518
Average Number of Acres Damaged per Year	3,652
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,318,607
Average Crop Damage per Year	\$331,861

Source: USDA

According to the USDA Risk Management Agency, Decatur County can expect on a yearly basis, relevant to winter storm occurrences:

- Six insurance claims
- 3,652 acres impacted
- \$331,861 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Gove County**.





**Table 4.187: Gove County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	77
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	56,471
Average Number of Acres Damaged per Year	5,647
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$4,497,001
Average Crop Damage per Year	\$449,700

Source: USDA

According to the USDA Risk Management Agency, Gove County can expect on a yearly basis, relevant to winter storm occurrences:

- Eight insurance claims
- 5,647 acres impacted
- \$449,700 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Logan County**.

**Table 4.188: Logan County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	61
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	44,807
Average Number of Acres Damaged per Year	4,481
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,694,573
Average Crop Damage per Year	\$369,457

Source: USDA

According to the USDA Risk Management Agency, Logan County can expect on a yearly basis, relevant to winter storm occurrences:

- Six insurance claims
- 4,481 acres impacted
- \$369,457 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Rawlins County**.

**Table 4.189: Rawlins County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	90
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	78,800
Average Number of Acres Damaged per Year	7,880
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$6,881,837



**Table 4.189: Rawlins County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
Average Crop Damage per Year	\$688,184

Source: USDA

According to the USDA Risk Management Agency, Rawlins County can expect on a yearly basis, relevant to winter storm occurrences:

- Nine insurance claims
- 7,880 acres impacted
- \$688,184 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Sheridan County**.

**Table 4.190: Sheridan County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	76
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	61,578
Average Number of Acres Damaged per Year	6,158
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$5,464,825
Average Crop Damage per Year	\$546,482

Source: USDA

According to the USDA Risk Management Agency, Sheridan County can expect on a yearly basis, relevant to winter storm occurrences:

- Eight insurance claims
- 6,158 acres impacted
- \$546,482 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Sherman County**.

**Table 4.191: Sherman County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	63
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	36,518
Average Number of Acres Damaged per Year	3,652
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,318,607
Average Crop Damage per Year	\$331,861

Source: USDA

According to the USDA Risk Management Agency, Sherman County can expect on a yearly basis, relevant to winter storm occurrences:





- Six insurance claim
- 3,652 acres impacted
- \$331,861 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Thomas County**.

**Table 4.192: Thomas County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	93
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	61,873
Average Number of Acres Damaged per Year	6,187
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$5,522,968
Average Crop Damage per Year	\$552,297

Source: USDA

According to the USDA Risk Management Agency, Thomas County can expect on a yearly basis, relevant to winter storm occurrences:

- Nine insurance claims
- 6,187 acres impacted
- \$552,297 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Wallace County**.

**Table 4.193: Wallace County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	90
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	46,301
Average Number of Acres Damaged per Year	4,630
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$4,704,422
Average Crop Damage per Year	\$470,442

Source: USDA

According to the USDA Risk Management Agency, Wallace County can expect on a yearly basis, relevant to winter storm occurrences:

- Nine insurance claims
- 4,630 acres impacted
- \$470,442 in insurance claims





In addition, Kansas Region A 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. 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.

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 A county (in total, due to the regional nature of both storms and NCEI reporting) incurring damage over the period 2010 to 2019 from winter storm events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.194: Kansas Region A Structural Vulnerability Data for Winter Storms, 2010-2019**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Regional Counties	\$6,965,423,000	\$479,000	0.01%

Source: NCEI and HAZUS

Counties with a higher identified population are to be considered to have a potentially greater vulnerability to potential winter storm events. The following table indicates the total county population and registered growth over the period 2000 to 2018.

**Table 4.195: Kansas Region A Population Vulnerability Data for Winter Storms**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

Source: US Census Bureau

Data concerning potential vulnerabilities for specific jurisdictions relating to population and housing, including growth or decline, may be found in Section 3.2, Regional Population Data and Section 3.4, Regional Housing Data.

The USDA 2017 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 A 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 potential vulnerability the county has to winter storm events.

**Table 4.196: Winter Storm Acres Impacted and Crop Insurance Paid per County from 2009-2018**

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
Cheyenne	529,326	5,392	1.02%	\$132,754,000	\$472,528	0.36%
Decatur	420,032	3,652	0.87%	\$233,431,000	\$331,861	0.14%
Gove	567,444	5,647	1.00%	\$201,514,000	\$449,700	0.22%
Logan	604,595	4,481	0.74%	\$70,870,000	\$369,457	0.52%
Rawlins	603,529	7,880	1.31%	\$100,351,000	\$688,184	0.69%
Sheridan	512,108	6,158	1.20%	\$348,852,000	\$546,482	0.16%
Sherman	618,428	3,652	0.59%	\$139,179,000	\$331,861	0.24%
Thomas	669,940	6,187	0.92%	\$251,056,000	\$552,297	0.22%
Wallace	445,809	4,630	1.04%	\$81,786,000	\$470,442	0.58%

Source: USDA

#### 4.22.5 – Impact and Consequence Analysis

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

**Table 4.197: 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.
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. 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 or disorder in Kansas Region A during the past ten years. The following reported events are reported under this section but represent civic action rather than civil disorder.

- **March and June 2020: Regional**  
Numerous peaceful protests occurred throughout the region to protest the death of George Floyd.







### 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 A 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 A 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.

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 4.198: 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 4.199: Civil Disorder Consequence Analysis**

<b>Subject</b>	<b>Potential Impacts</b>
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.
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 A, 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 776 Tier II Facilities housing hazardous chemicals in Kansas Region A. The following table details the number of Tier II facilities by county.

**Table 4.200: Kansas Region A Tier II Facilities by County**

County	Tier II Facilities
Cheyenne	77
Decatur	105
Gove	28
Logan	184
Rawlins	115
Sheridan	84
Sherman	20



**Table 4.200: Kansas Region A Tier II Facilities by County**

County	Tier II Facilities
Thomas	127
Wallace	36

Source: KDEM

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 was one Superfund site in northwest Kansas in Colby, Thomas County. A Superfund site is an uncontrolled or abandoned location where hazardous waste is located which may affect local ecosystems and/or people. This site has undergone comprehensive remediation, with both removal activities and a placement of a geo-membrane cap on the site.

### ***Transportation***

The following table, from Kansas Department of Transportation (KDOT), presents total roadway mileage by county.

**Table 4.201: Kansas Region A Total Roadway Mileage by County**

County	Roadways (Miles)
Cheyenne	1,264
Decatur	1,307
Gove	1,233
Logan	985
Rawlins	1,303
Sheridan	1,358
Sherman	1,332
Thomas	1,677
Wallace	703

Source: KDOT

Kansas Region A 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 A providing service with long-haul deliveries to national market areas and intermodal rail/truck service providers:

- Burlington Northern and Santa Fe Railway
- Cimarron Valley Railway
- Kansas & Oklahoma Railroad

The following table, with information from KDOT, provides the total railroad track mileage of for each county within Kansas Region A.





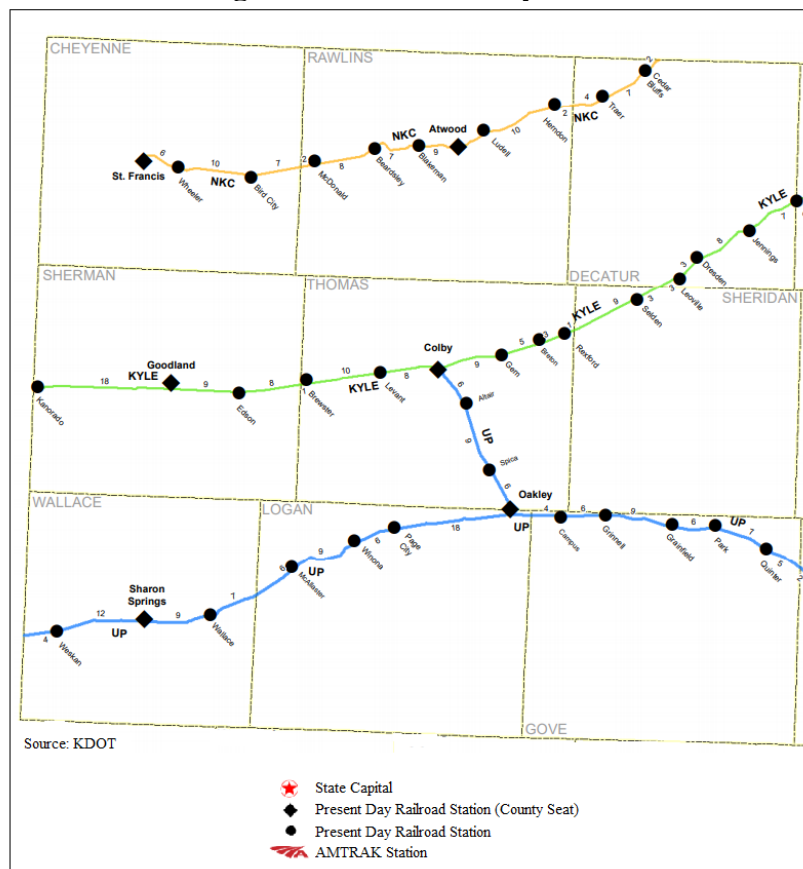
**Table 4.202: Kansas Region A Total Class I Railroad Mileage by County**

County	Rail Lines (Miles)
Cheyenne	22
Decatur	58
Gove	37
Logan	40
Rawlins	40
Sheridan	10
Sherman	35
Thomas	60
Wallace	32

Source: KDOT

The following map, from KDOT, shows Class I track locations in Kansas Region A.

### 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 4.203: PHMSA Pipeline Mileage by County**

County	Gas (miles)	Liquid (miles)
Cheyenne	130	37
Decatur	27	33
Gove	88	36
Logan	77	110
Rawlins	97	39
Sheridan	59	34
Sherman	59	46
Thomas	106	34
Wallace	34	91

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 A county over the ten-year period 2016-2018 (the latest available data).

**Table 4.204: Kansas Region A HazMat KDEM Reported Incidents, 2016-2018**

Jurisdiction	Incidents	Injuries	Fatalities	People Evacuated
Cheyenne	3	2	0	0
Decatur	0	0	0	0
Gove	0	0	0	0
Logan	1	0	0	0
Rawlins	0	0	0	0
Sheridan	0	0	0	0
Sherman	2	2	0	0
Thomas	3	0	0	0
Wallace	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 10 reported incidents within Kansas Region A for the period 2000 through 2018. The following charts detail the number of events per year per transportation category.

**Table 4.205: Kansas Region A OHMS HazMat Incidents, 2000-2018**

Jurisdiction	Highway	Air	Rail	Damages	Injuries	Deaths
<b>Decatur County</b>						
Jennings	1	0	0	\$0	0	0
<b>Gove County</b>						
Gove	2	0	0	\$25,000	0	0
<b>Logan County</b>						
Oakley	1	0	0	\$4,000	0	0





**Table 4.205: Kansas Region A OHMS HazMat Incidents, 2000-2018**

Jurisdiction	Highway	Air	Rail	Damages	Injuries	Deaths
<b>Sherman County</b>						
Goodland	5	0	0	\$5,400	0	0
<b>Thomas County</b>						
Hugoton	1	0	0	\$2,000	0	0

Source: PHMSA OHMS

-: No reported events

Data from PHMSA provides significant incident reports for the pipeline systems in Kansas Region A. Data from the period 2013 to 2017 indicate that there were four pipeline incidents with no fatalities, no injuries and \$2,842,628 in damages. The following table details reported pipeline incident details for each county with a reported event.

**Table 4.206: Kansas Region A PHMSA Reported Pipeline Incidents by County, 2013 to 2017**

County	Number of Incidents	Fatalities	Injuries	Total Damage	Gross Barrels Spilled
Cheyenne	0	0	0	\$0	0
Decatur	0	0	0	\$0	0
Gove	0	0	0	\$0	0
Logan	0	0	0	\$0	0
Rawlins	1	0	0	\$3,888	2
Sheridan	0	0	0	\$0	0
Sherman	0	0	0	\$0	0
Thomas	0	0	0	\$0	0
Wallace	3	0	0	\$2,838,740	1,722

Source: PHMSA

#### 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 **Cheyenne County** using data from KDEM.

**Table 4.207: Cheyenne County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	3
Average Events per Year	1
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM





Data indicates that Cheyenne County can expect on a yearly basis, relevant to HazMat events:

- One event
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Decatur County** using data from KDEM.

**Table 4.208: Decatur County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM

Data indicates that Decatur County can expect on a yearly basis, relevant to HazMat events:

- No events
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Gove County** using data from KDEM.

**Table 4.209: Gove County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM

Data indicates that Gove County can expect on a yearly basis, relevant to HazMat events:

- No events





- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Logan County** using data from KDEM.

**Table 4.210: Logan County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	1
Average Events per Year	<1
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM

Data indicates that Logan County can expect on a yearly basis, relevant to HazMat events:

- <1 event
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Rawlins County** using data from KDEM.

**Table 4.211: Rawlins County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM

Data indicates that Rawlins County can expect on a yearly basis, relevant to HazMat events:

- No events
- No deaths
- No injuries





- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Sheridan County** using data from KDEM.

**Table 4.212: Sheridan County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM

Data indicates that Sheridan County can expect on a yearly basis, relevant to HazMat events:

- No events
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Sherman County** using data from KDEM.

**Table 4.213: Sherman County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	2
Average Events per Year	1
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	2
Average Injuries per Year	1
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM

Data indicates that Sherman County can expect on a yearly basis, relevant to HazMat events:

- One event
- No deaths
- One injury
- No evacuations





The following tables summarize occurrence data and probability for all related HazMat events for **Thomas County** using data from KDEM.

**Table 4.214: Thomas County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	3
Average Events per Year	1
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM

Data indicates that Thomas County can expect on a yearly basis, relevant to HazMat events:

- One event
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Wallace County** using data from KDEM.

**Table 4.215: Wallace County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2016-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2016-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2016-2018)	0
Average Evacuations per Year	0

Source: KDEM

Data indicates that Wallace County can expect on a yearly basis, relevant to HazMat events:

- No events
- No deaths
- No injuries
- No evacuations





#### 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 A 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 childcare facilities is from KDHE.

**Table 4.216: Kansas Region A Special Population Facilities Within 0.5 Miles of a Chemical Facility**

County	Health Facilities	Colleges	Educational Facilities	Aging Facilities	Child Care	Correctional Institutions
Cheyenne	0	0	4	1	6	1
Decatur	1	0	2	2	11	1
Gove	0	0	6	1	9	0
Logan	0	0	5	0	8	0
Rawlins	1	0	2	1	7	1
Sheridan	1	0	2	1	7	1
Sherman	0	0	4	0	10	1
Thomas	2	0	5	2	28	1
Wallace	0	0	4	0	3	1

Source: KDEM

Counties with a higher identified population are to be considered to have a potentially greater vulnerability to potential HazMat events. The following table indicates the total county population and registered growth over the period 2000 to 2018.

**Table 4.217: Kansas Region A Population Vulnerability Data for HazMat**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

Source: US Census Bureau

#### 4.24.5 – Impact and Consequence Analysis

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







**Table 4.218: HazMat Incident Consequence Analysis**

<b>Subject</b>	<b>Impacts of Hazardous Materials Incident</b>
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

In the 20-year period from 2000 to present, there has been one Presidential Disaster Declaration and one State of Kansas Emergency Declaration for Kansas Region A for a major disease outbreak. The following information is presented to provide a historical perspective on major disease events that have impacted Kansas Region A.

**Table 4.219: Kansas Region A FEMA Major Disease Disaster Declarations, 2000 - 2020**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4504	03/29/2020 (On-Going)	COVID-19 Pandemic	Chase, Geary, Lyon, Morris, Pottawatomie, Riley and Wabaunsee	-

Source: FEMA

-: Data unavailable

**Table 4.220: Kansas Region A Emergency Major Disease Disaster Declarations, 2000 - 2020**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
3481	03/12/2020 (On-Going)	COVID-19	Chase, Geary, Lyon, Morris, Pottawatomie, Riley and Wabaunsee	-

Source: State of Kansas

-: Data unavailable

- **Coronavirus Disease 2019**

As of this plan, the World Health Organization, the Center for Disease Control (CDC) and KDHE is responding to a pandemic outbreak of respiratory illness caused by a novel coronavirus, SARS COV-2, which causes the respiratory illness Coronavirus Disease 2019 (COVID-19). The outbreak first started in Wuhan, China, but cases have been identified in a growing number national





and international locations, including Kansas. COVID-19 is currently spreading rapidly and is thought to spread mainly between people who are in close contact with one another (within about 6 feet) through respiratory droplets produced when an infected person coughs or sneezes. It also may be possible that transmission is occurring through touching a surface or object that has the virus on it and then touching your mouth, nose, or possibly their eyes

Risk of infection is higher for people who are close contacts of someone known to have COVID-19, for example healthcare workers, or household members. Other people at higher risk for infection are those who live in or have recently been in an area with ongoing spread of COVID-19.

Patients with COVID-19 have had mild to severe respiratory illness with symptoms of fever, cough and shortness of breath. Some patients have pneumonia in both lungs, multi-organ failure and in some cases death.

There is currently no vaccine to protect against COVID-19. The best way to prevent infection is to take everyday preventive actions, like avoiding close contact with people who are sick and washing your hands often. There is no specific antiviral treatment for COVID-19. People with COVID-19 can seek medical care to help relieve symptoms.

The economic impact of the pandemic is being felt by the region through job loss and business closures.

This is a rapidly evolving situation, and any further data considered for inclusion in this plan would likely be out of date. Up to date information may be found at the following CDC website:

- <https://www.cdc.gov/coronavirus/2019-ncov/index.html>

In addition, 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.

#### **4.25.3 – Hazard Probability Analysis**

Data from the CDC indicates that COVID-19 is a concern for the state of Kansas and Kansas Region A. Based on this emerging threat, Kansas Region A is currently at risk to a large-scale major disease outbreak.





#### 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 2018.

**Table 4.221: Kansas Region A Population Vulnerability Data for Major Disease**

County	2018 Population	Percent Population Change 2000 to 2018
Cheyenne	2,660	-16.0%
Decatur	2,817	-18.3%
Gove	2,612	-15.2%
Logan	2,884	-6.8%
Rawlins	2,508	-15.8%
Sheridan	2,553	-9.2%
Sherman	5,899	-12.3%
Thomas	7,711	-5.5%
Wallace	1,503	-13.2%

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 4.222: Kansas Region A Vulnerable Population Vulnerability Data for Major Disease**

County	Percentage of Population 5 and Under (2018)	Percentage of Population 65+ (2018)
Cheyenne	7.0%	27.3%
Decatur	5.8%	28.4%
Gove	5.8%	24.2%
Logan	7.5%	21.2%
Rawlins	6.7%	27.9%
Sheridan	6.0%	23.7%
Sherman	6.8%	19.5%
Thomas	7.4%	18.1%
Wallace	6.9%	24.2%

Source: US Census Bureau

#### 4.25.5 – Impact and Consequence Analysis

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





**Table 4.223: Major Disease Consequence Analysis**

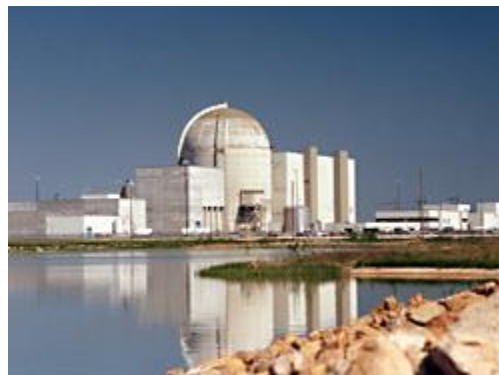
<b>Subject</b>	<b>Impacts of Major Disease Outbreak</b>
Health and Safety of Persons in the Area of the Incident	Impact over a widespread area could be severe depending on type of outbreak and whether it is a communicable disease. Casualties are dependent on warning systems, warning times and the availability 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. Kansas Region A is well outside of both the 10-mile 50-mile emergency planning zones for Wolf Creek. The entire planning region is at risk from a radiological event due to transportation accidents.

### 4.26.2 – Previous Occurrences

There have been no reported major radiological events recorded in Kansas Region A

### 4.26.3 – Hazard Probability Analysis

There have been no reported nuclear failure and/or release events in Kansas Region A.

### 4.26.4 – Vulnerability Assessment

The major usage of radioactive materials in the region are for medical diagnostics and therapy, soil density testing in the construction industry, and in radiography cameras in pipeline construction and repair. 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 via 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.







#### 4.26.5 – Impact and Consequence Analysis

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

**Table 4.224: Radiological Incident Consequence Analysis**

<b>Subject</b>	<b>Impacts of Nuclear Incident</b>
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

The Southern Poverty Law Center reported that in 2019 there were three active hate groups in Kansas: one neo-Nazi group, the Feuerkrieg Division, one black separatist group, Israel United in Christ, and one anti-LGBTQ group, the Westboro Baptist Church. 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 A 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 A 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 event venues have a greater risk.

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 4.225: 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 4.226: 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 4.227: 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 4.228: Terrorism Consequence Analysis**

<b>Subject</b>	<b>Impacts of Terrorism</b>
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
- Tornadoes 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 A 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 A 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](http://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](http://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 roadbeds 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 A is available at [www.kcc.state.ks.us/maps/ks\\_telephone\\_certified\\_areas.pdf](http://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 A. 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 4.229: FEMA Benefit-Cost Analysis**

<b>Loss of Electric Power</b>	<b>Cost of Complete Loss of Service</b>
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, Appendix C

#### 4.28.5 – Impact and Consequence Analysis

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

**Table 4.230: Utility/Infrastructure Failure Consequence Analysis**

<b>Subject</b>	<b>Impacts of Utility/Infrastructure Incident</b>
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.





**Table 4.230: Utility/Infrastructure Failure Consequence Analysis**

<b>Subject</b>	<b>Impacts of Utility/Infrastructure Incident</b>
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).



# 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 jurisdiction's 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 A operate under a county commissioner form of governance, with the elected board of commissioners overseeing county operations.

**Table 5.1: County Governance**

<b>Jurisdiction</b>	<b>Government Structure</b>	<b>Number of Commissioners</b>
Cheyenne County	Commission	3
Decatur County	Commission	3
Gove County	Commission	3
Logan County	Commission	3
Rawlins County	Commission	3
Sheridan County	Commission	3
Sherman County	Commission	3
Thomas County	Commission	3
Wallace County	Commission	3

In general, the participating towns and cities in Kansas Region A 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**

<b>Jurisdiction</b>	<b>Comprehensive Plan</b>	<b>Critical Facilities Plan</b>	<b>Debris Management Plan</b>	<b>Emergency Operations Plan</b>	<b>Evacuation Plan</b>	<b>Firewise or other Fire Mitigation Plan</b>	<b>Flood Mitigation Assistance Plan</b>	<b>Recovery Plan</b>	<b>Vulnerable Population Plan and/or Inventory</b>
<b>Cheyenne County</b>		x		x					
City of Bird City				x					
City of St. Francis				x					
<b>Decatur County</b>				x					
City of Dresden				x					
City of Jennings				x					
City of Norcatur				x					
City of Oberlin				x			x		
<b>Gove County</b>				x					
City of Gove				x					
City of Grainfield				x					
City of Grinnell				x					
City of Park				x					
City of Quinter				x					
<b>Logan County</b>	x		x	x					
City of Oakley				x					
City of Winona				x					
<b>Rawlins County</b>		x		x				x	
City of Atwood				x					
City of Herndon				x					
City of McDonald				x					
<b>Sheridan County</b>			x	x	x				x
City of Hoxie			x	x			x		
City of Selden									
<b>Sherman County</b>		x		x					
City of Goodland		x		x	x	x	x		
City of Kanorado				x					
<b>Thomas County</b>		x	x	x	x			x	x
City of Brewster	x		x	x					
City of Colby			x	x					
City of Gem			x	x	x				





**Table 5.2: Jurisdictional Planning Capabilities**

<b>Jurisdiction</b>	<b>Comprehensive Plan</b>	<b>Critical Facilities Plan</b>	<b>Debris Management Plan</b>	<b>Emergency Operations Plan</b>	<b>Evacuation Plan</b>	<b>Firewise or other Fire Mitigation Plan</b>	<b>Flood Mitigation Assistance Plan</b>	<b>Recovery Plan</b>	<b>Vulnerable Population Plan and/or Inventory</b>
City of Menlo			X	X	X				
City of Rexford				X					
<b>Wallace County</b>				X				X	
City of Sharon Springs				X					
City of Wallace									





## 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**

<b>Jurisdiction</b>	<b>Building Code</b>	<b>Floodplain Ordinance</b>	<b>Nuisance Ordinance</b>	<b>Storm Water Ordinance</b>	<b>Zoning Ordinance</b>
<b>Cheyenne County</b>					
City of Bird City	x	x	x		x
City of St. Francis	x	x	x	x	x
<b>Decatur County</b>		x			
City of Dresden			x		
City of Jennings			x		
City of Norcatur			x		
City of Oberlin	x	x	x	x	x
<b>Gove County</b>			x		x
City of Gove			x		
City of Grainfield			x		
City of Grinnell			x		
City of Park			x		
City of Quinter		x	x		x
<b>Logan County</b>					
City of Oakley	x	x	x		x
City of Winona			x		x
<b>Rawlins County</b>		x	x		
City of Atwood	x	x	x		x
City of Herndon		x	x		
City of McDonald	x		x		x
<b>Sheridan County</b>					
City of Hoxie		x	x		x
City of Selden			x		
<b>Sherman County</b>					
City of Goodland	x	x	x		x
City of Kanorado					
<b>Thomas County</b>					
City of Brewster	x	x	x		
City of Colby	x	x	x	x	x
City of Gem			x		
City of Menlo					
City of Rexford			x		
<b>Wallace County</b>					





**Table 5.3: Jurisdictional Policies and Ordinances**

<b>Jurisdiction</b>	<b>Building Code</b>	<b>Floodplain Ordinance</b>	<b>Nuisance Ordinance</b>	<b>Storm Water Ordinance</b>	<b>Zoning Ordinance</b>
City of Sharon Springs		X	X		
City of Wallace			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**

<b>Jurisdiction</b>	<b>Community Rating System program</b>	<b>Firewise Community Certification</b>	<b>ISO Fire Rating</b>	<b>National Flood Insurance Program</b>	<b>National Weather Service Storm Ready Certification</b>
<b>Cheyenne County</b>					X
City of Bird City			6	X	X
City of St. Francis			5	X	X
<b>Decatur County</b>			9	X	
City of Dresden					
City of Jennings			9		
City of Norcatur			9		
City of Oberlin			8	X	
<b>Gove County</b>			X		
City of Gove			X		
City of Grainfield			X		
City of Grinnell			X		
City of Park			X		
City of Quinter			X	X	
<b>Logan County</b>			10		
City of Oakley			7	X	
City of Winona			8		
<b>Rawlins County</b>				X	
City of Atwood				X	
City of Herndon			8	X	
City of McDonald			X		
<b>Sheridan County</b>					
City of Hoxie				X	
City of Selden					X
<b>Sherman County</b>			4		X
City of Goodland			4	X	X
City of Kanorado			6		





**Table 5.4: Jurisdictional Programs**

<b>Jurisdiction</b>	<b>Community Rating System program</b>	<b>Firewise Community Certification</b>	<b>ISO Fire Rating</b>	<b>National Flood Insurance Program</b>	<b>National Weather Service Storm Ready Certification</b>
<b>Thomas County</b>			x		x
City of Brewster			x	7	
City of Colby			x	4	
City of Gem			x		
City of Menlo			5x		
City of Rexford			x		
<b>Wallace County</b>			x		
City of Sharon Springs			x	x	
City of Wallace			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 on 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
<b>Cheyenne County</b>		x	x	x			x
City of Bird City	x				x		x
City of St. Francis	x			x	x	x	x
<b>Decatur County</b>		x	x		x		x
City of Dresden							x
City of Jennings							x
City of Norcatur	x						x
City of Oberlin					x		x
<b>Gove County</b>		x	x				x
City of Gove							x
City of Grainfield							x
City of Grinell							x





**Table 5.5: Staffing and Departmental Capabilities**

<b>Jurisdiction</b>	<b>Building Code Official or Inspector</b>	<b>Emergency Management Coordinator</b>	<b>Local Emergency Planning Committee</b>	<b>Mapping Specialist</b>	<b>NFIP Floodplain Administrator</b>	<b>Planning Department</b>	<b>Public Works Official</b>
City of Park							X
City of Quinter					X		X
<b>Logan County</b>		X	X	X			X
City of Oakley	X				X		X
City of Winona							X
<b>Rawlins County</b>		X		X	X		X
City of Atwood	X				X		X
City of Herndon					X		X
City of McDonald						X	X
<b>Sheridan County</b>		X	X	X			X
City of Hoxie					X		X
City of Selden						X	X
<b>Sherman County</b>		X	X	X			X
City of Goodland	X				X	X	X
City of Kanorado						X	X
<b>Thomas County</b>		X	X				X
City of Brewster	X					X	X
City of Colby	X				X	X	X
City of Gem							
City of Menlo							
City of Rexford							X
<b>Wallace County</b>		X	X	X		X	X
City of Sharon Springs						X	X
City of Wallace							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 A 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**

<b>Jurisdiction</b>	<b>Apply for and Manage Grant Funding</b>	<b>Authority to levy taxes for specific purposes</b>	<b>Authority to Withhold spending in hazard prone areas</b>	<b>Incur Debt through General Obligation Bonds</b>	<b>Usage of Capital Improvement Funding for Mitigation Projects</b>
<b>Cheyenne County</b>	x	x		x	x
City of Bird City	x	x	x	x	x
City of St. Francis	x	x	x	x	x
<b>Decatur County</b>	x	x		x	x
City of Dresden	x	x		x	x
City of Jennings	x	x		x	x
City of Norcatat					
City of Oberlin					
<b>Gove County</b>	x	x		x	x
City of Gove	x	x		x	x
City of Grainfield	x	x		x	x
City of Grinnell	x	x		x	x
City of Park	x	x		x	x
City of Quinter	x	x		x	x
<b>Logan County</b>	x	x		x	x
City of Oakley	x	x		x	x
City of Winona	x	x		x	x
<b>Rawlins County</b>	x	x		x	x
City of Atwood	x	x	x	x	x
City of Herndon	x	x		x	x
City of McDonald	x	x		x	x
<b>Sheridan County</b>	x	x		x	x
City of Hoxie	x	x		x	x
City of Selden	x	x		x	x
<b>Sherman County</b>	x	x		x	x
City of Goodland	x	x	x	x	x
City of Kanorado	x	x		x	x
<b>Thomas County</b>	x	x		x	x
City of Brewster	x	x		x	x
City of Colby	x	x		x	x
City of Gem	x	x		x	x







**Table 5.6: Jurisdictional Financial Capabilities**

<b>Jurisdiction</b>	<b>Apply for and Manage Grant Funding</b>	<b>Authority to levy taxes for specific purposes</b>	<b>Authority to Withhold spending in hazard prone areas</b>	<b>Incur Debt through General Obligation Bonds</b>	<b>Usage of Capital Improvement Funding for Mitigation Projects</b>
City of Menlo	x	x		x	x
City of Rexford	x	x		x	x
<b>Wallace County</b>	x	x		x	x
City of Sharon Springs	x	x		x	x
City of Wallace	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**

<b>Jurisdiction</b>	<b>Access to Local, Regional and State funds</b>	<b>Active Shooter Plan or Policy</b>	<b>Capital Improvement Plan</b>	<b>District Master Plan</b>	<b>School Emergency and Evacuation Plans</b>	<b>School Safety or Resource Officers or Dedicated Law Enforcement</b>
<b>Cheyenne County</b>						
USD #103 - Cheylin	x	x	x		x	
USD #297 – St. Francis Community Schools	x				x	
<b>Decatur County</b>						
USD #294 – Oberlin	x	x	x		x	
<b>Gove County</b>						
USD #291 – Grinnell Public Schools	x	x	x		x	
USD #292 – Wheatland	x	x	x		x	
USD #293 – Quinter Public Schools	x	x	x		x	
<b>Logan County</b>						
USD #274 - Oakley	x	x	x		x	
USD #275 - Triplains	x	x	x		x	
<b>Rawlins County</b>						
USD #105 – Rawlins County	x	x	x		x	
<b>Sheridan County</b>						
USD #316-Golden Plains	x	x		x	x	
USD #412 – Hoxie Community Schools	x	x	x	x	x	x
<b>Sherman County</b>						
Northwest Kansas Technical College	x	x	x		x	
USD #352 – Goodland	x	x	x		x	
<b>Thomas County</b>						
Colby Community College	x	x	x	x	x	x
Heartland Christian School		x	x	x	x	x
Sacred Heart Catholic School		x	x	x	x	





**Table 5.7: College, Unified School District or University Capabilities**

<b>Jurisdiction</b>	<b>Access to Local, Regional and State funds</b>	<b>Active Shooter Plan or Policy</b>	<b>Capital Improvement Plan</b>	<b>District Master Plan</b>	<b>School Emergency and Evacuation Plans</b>	<b>School Safety or Resource Officers or Dedicated Law Enforcement</b>
USD #314 - Brewster	x	x	x		x	
USD #315 – Colby Public Schools	x	x	x	x	x	
USD #316 – Golden Plains	x	x		x	x	
<b>Wallace County</b>						
USD # 241 – Wallace County Schools	x	x	x		x	
USD # 242 - Weskan						

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

## 5.5 – Opportunities for Capability Improvement

As part of this plan update, the MPC identified the following opportunities for improvement across the Region A concerning current capabilities:

- **Local Funding**
  - Integration of mitigation plans with other local plans and programs, such as capital improvement plans
  - Adoption of cost-effective mitigation measures when developing capital improvement projects
- **Public Education and Outreach**
  - Regular deployment of hazard awareness campaigns to enhance public awareness
- **Land Use Planning and Regulations**
  - Continued encouragement of using land use planning to identify areas at risk to natural hazards
  - Stormwater retention/detention projects to reduce flooding





- Locally funded buyouts of hazard prone properties
- **Floodplain Management**
  - Encourage and support new participation in the NFIP and in the CRS
  - Continue the promotion and enforcement of NFIP and CRS floodplain management programs



# 6.0 Mitigation Strategy

## 6.1 – Introduction

As part of this planning effort, Kansas Region A 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 A 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 and 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, 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 A Problem Statements**

Identified Hazard	Problem Statement
Tornado/Windstorm	The number of community shelters is inadequate to protect all populations, especially in smaller communities

County specific problem statements were generated through discussions with participating jurisdictions within that county, to be utilized in informing the review, modification and development of hazard mitigation actions. 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 problem statements for each county

**Table 6.2: Kansas Region A Community Problem Statements**

Jurisdiction	Identified Hazard	Problem Statement
Cheyenne County	Utility Failure	Tree damage and downed limbs may cause loss of utilities.
Cheyenne County	Utility Failure	County does not have an adequate number of generators for critical facilities.
Decatur County	Tornado	Public outreach initiatives need to be expanded concerning hazard mitigation.
Decatur County	Wildfire	Equipment shortfalls may hamper fire response efforts.
Gove County	Flood	Repeat flood areas are of concern to the county.
Gove County	Wildfire	Mapping of wildfire areas in the county needs to be expanded.







**Table 6.2: Kansas Region A Community Problem Statements**

<b>Jurisdiction</b>	<b>Identified Hazard</b>	<b>Problem Statement</b>
Logan County	Utility Failure	Power infrastructure is above ground and subject to a range of hazards.
Rawlins County	Utility Failure	Tree damage and downed limbs may cause loss of utilities.
Rawlins County	Utility Failure	County does not have an adequate number of generators for critical facilities.
Sheridan County	Wildfire	Potential wildfires are a concern to county communities.
Sherman County	Utility Failure	County does not have an adequate number of generators for critical facilities.
Sherman County	Wildfire	Public outreach and education efforts on wildfires need to be increased.
Thomas County	Tornado	County does not have an adequate number of generators for critical facilities.
Wallace County	Tornado	County does not have an adequate number of safe rooms in hospital.

## 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 A 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 A vision for hazard mitigation and disaster resilience.

- **Goal 1:** Reduce or eliminate risk to the people and property of Kansas Region A 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 A 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 A 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 A Participating Jurisdictions Completed Hazard Mitigation Actions**

Jurisdiction	Action Description
St. Francis, Cheyenne County	Constructed a community safe room / tornado shelter

Kansas Region A remains committed to investigating and obtaining all available grant funding for the completion of 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. 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 – Cheyenne County Mitigation Actions

**Table 6.4: Cheyenne 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
Cheyenne County-1	Construct a building structure capable of protecting heavy machinery from the elements and provide adequate workspace for maintenance crews to work.	All Hazards	Emergency Manager	High	1,2	\$300,000	Local, State, Federal	Five years	New
Cheyenne County-2	Redesign and construct improved low water crossings in these areas through building up roads, installing bridges, and/or adding culverts.	Flood	Road and Bridge Manager	High	1,2	Project dependent	Local, State, Federal	Five years	New
Cheyenne County-3	Update and replace sirens throughout county.	All Hazards	Emergency Manager	High	1,2	\$500,000	Local, State, Federal	Five years	New
Cheyenne County-4	Construct safe rooms and storm shelters in rural and underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$1,000,000 per shelter	Local, State, Federal	Five years	Not started, lack of funding
Cheyenne County-5	Make available educational materials on individual and family preparedness / mitigation measures.	All Hazards	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	In progress
Cheyenne County-6	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	Not started, lack of staff
Cheyenne County-7	Research and recommend completion of an application packet for admittance to the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of staff
Cheyenne County-8	Conduct an inventory/survey for the emergency response services to identify any existing needs or shortfalls. Fund identified shortfalls.	All Hazards	Emergency Manager	High	1,2,4	Staff Time	Local, State	Continuous	Not started, lack of staff
Cheyenne County-9	Purchase and install back-up generators for critical facilities.	Utility/ Infrastructure Failure	Fire Chief, Emergency Manager	High	1,2	\$500,000	Local, state, federal	Four years	Not started, lack of funding
Cheyenne County-10	Create a working group to evaluate the firefighting water supply resources within the County.	Wildfire	Fire Chief, Emergency Manager	High	1,2,4	Staff Time	Local	Five years	Not started, lack of staff







**Table 6.4: Cheyenne 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
Cheyenne County-11	Annually host a public hazards workshop at public county event.	All Hazards	Emergency Manager	High	3	\$500	Local	Continuous	In progress
Cheyenne County-12	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	New
Cheyenne County-13	Update county GIS capabilities, including purchasing new mapping software, computers and large printers.	All Hazards	County Appraiser, Director GIS	Medium	4	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
Cheyenne County-14	Identify the county's most at-risk critical facilities and evaluate potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Emergency Manager	Medium	1,2	Staff Time	Local	Five years	Not started, lack of staff
Cheyenne County-15	Promote and educate the public and private sectors on potential agricultural issues that can severely impact the county and regional economies and develop and implement plans to address these issues.	Agricultural Infestation, Terrorism	Extension Agent, Emergency Manager	Medium	3	Staff Time	Local, State	Four years	Not started, lack of staff time
Cheyenne County-16	Research and recommend appropriate building codes for the county that includes wind-resistant design techniques for new construction.	Tornado, Windstorm	Emergency Manager	Medium	1,2	Staff Time	Local	Five years	Not started, lack of staff
Cheyenne County-17	Develop and implement a wildfire prevention/education program to educate the general public.	Wildfire	Fire Chief, Emergency Manager	Medium	3	\$500 per workshop	Local, State, Federal	Five years	Not started, lack of funding
Cheyenne County-18	Research and develop a Land Use Plan for Cheyenne County.	All Hazards	Emergency Manager	Low	1,2	\$10,000	Local, State, Federal	Five years	Not started, lack of funding
Bird City-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Bird City-2	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. ( <b>NFIP</b> )	Flood	NFIP Administrator, County Planners	High	1,2	Staff time, acquisition cost property dependent	Local, State, Federal, Grants	Four years	Not started, lack of funding





**Table 6.4: Cheyenne 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
Bird City-3	Purchase and Install backup power for critical facilities in Bird City.	Utility/ Infrastructure Failure	City Manager	Low	1,2	\$40,000	Local, State, Federal	Five years	Not started, lack of funding
Bird City-4	Construct community safe rooms throughout city.	Tornado, Windstorm	City Manager	High	1,2	\$100,000 per room	Local, State, Federal	Five years	Not started, lack of funding
Bird City-5	Upgrade existing siren / notification system.	All Hazards	City Manager	High	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Bird City-6	Hire outside consultants to conduct a study of existing drainage and sewer system. Prioritize risks based on the assessment conducted. Review and address city ordinances related to drainage and sewer system. Identify resources for correcting issues identified, and correct risks identified including update the sewer and waste systems.	Flood	City Manager	Medium	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Bird City-7	Hire outside consultants to conduct a study of Infrastructure Integrity and Protection, prioritize risks based on the assessment and update city ordinances related to infrastructure protection. Identify resources for correcting issues identified, and correct risks identified.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Bird City-8	Perform pressure tests, upgrade fire protection supply hydrants, and upgrade supply lines.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$3,000,000	Local, State, Federal	Five years	Not started, lack of funding
Bird City-9	Replace old materials with fire resistant landscape and building materials that surround community building and infrastructure to protect property, infrastructure, and lives.	Multi-Hazard	City Manager	Medium	1,2	\$20,000	Local, State, Federal	Five years	Not started, lack of funding
Bird City-10	Purchase 800MHz portable radio base station to be installed at clinic	All Hazards	City Manager	High	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding





**Table 6.4: Cheyenne 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
Bird City-9	Purchase MaxAir helmet for hazmat response	Hazardous Materials	City Manager	High	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
St Francis-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
St Francis-2	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. ( <b>NFIP</b> )	Flood	NFIP Administrator, County Planners	High	1,2	Staff time, acquisition cost property dependent	Local, State, Federal, Grants	Four years	Not started, lack of funding
St Francis-3	Update electrical infrastructure.	Utility/ Infrastructure Failure	City Superintendent	High	1,2	\$1,500,000	Local, State, Federal	Continuous	Not started, lack of funding
St Francis-4	Construct a FEMA standard safe room / storm shelter that is accessible to people with disabilities and that is available 24x7	Tornado, Windstorm	City Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
St Francis-5	Purchase and install an auto start backup generator for the health department and rural health clinic	All Hazards	Health Department Director	High	1,2	\$13,000	Local, State, Federal	Five years	Not started, lack of funding
St Francis-6	Purchase additional two-way radios for staff / offices.	All Hazards	City Superintendent	High	1,2	\$20,000	Local, State, Federal	Five years	Not started, lack of funding
St Francis-7	Purchase and install four overhead speakers for Clinic, one speaker in Hospital Ambulance Bay and larger amps in order to install additional speakers.	All Hazards	City Superintendent	High	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
USD#103-1	Construct tornado safe rooms in all USD# 103 schools.	Tornado, Windstorm	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#297-1	Construct tornado safe rooms in all USD# 297 schools.	Tornado, Windstorm	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding



**Table 6.4: Cheyenne 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
Cheyenne County Hospital -1	Construct safe rooms for all hospital facilities.	Tornado, Windstorm	Director	Low	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-1	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	500,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	2,900,000	Local, State, Federal	Five years	Not started, lack of funding
Prairie Land Electric-1	Tree trimming and branch removal project to reduce the risk of downed power lines.	Utility/ Infrastructure Failure	REC Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of funding
Prairie Land Electric-2	Bury Electrical Lines to the extent possible. Encourage the burying of lines in new construction.	Utility/ Infrastructure Failure	REC Manager	Medium	1,2	Mileage dependent	Local, State, Federal	12/31/2030	Not started, lack of funding
Prairie Land Electric-3	Enhance and upgrade all power lines within the County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$1,000,000 for each distribution pole and \$2,500 per transmission pole	Local, State, Federal	Five years	Not started, lack of funding





## 6.8.2 – Decatur County Mitigation Actions

**Table 6.5: Decatur 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
Decatur County-1	Collect educational materials on individual and family preparedness /mitigation measures for property owners, and display at both the library and routinely visited government offices.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Decatur County-2	Construct safe rooms and storm shelters in rural and underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$1,000,000 each	Local, State, Federal	Five years	Not started, lack of funding
Decatur County-3	Purchase and install outdoor weather warning sirens in underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$200,000	Local, State, Federal	Five years	Not started, lack of funding
Decatur County-4	Conduct an inventory/survey for emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources. Purchase equipment to address shortfalls	All Hazards	Emergency Manager	High	1,2	Staff Time and equipment dependent	Local	Five years	Not started, lack of funding
Decatur County-5	Complete a Community Wildfire Protection Plan.	Wildfire	Fire Chief, Emergency Manager	High	3,4	Staff Time	Local, State, Federal	Two years	Not started, lack of staff
Decatur County-6	Map suspected hazardous wildfire areas in the county.	Wildfire	Fire Chief, Emergency Manager	High	4	Staff Time	Local, State, Federal	Annually	Not started, lack of staff
Decatur County-7	Continued participation and compliance with the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff Time	Local	Continuous	In progress
Decatur County-8	Educate and promote local jurisdictional participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2,3,4	Staff Time	Local	Continuous	In progress
Decatur County-9	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. ( <b>NFIP</b> )	Flood	NFIP Administrator, County Planners	High	1,2	Staff time, acquisition cost property dependent	Local, State, Federal, Grants	Four years	Not started, lack of funding



**Table 6.5: Decatur 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
Decatur County-10	Encourage the repositioning of as many utility lines as possible underground. Consider local regulations to require the placement of all new utility lines underground.	Utility/ Infrastructure Failure	Director Roads and Bridges, Director Planning & Zoning, Director RECs	High	1,2	Staff Time	Local	Five years	Not started, lack of staff
Decatur County-11	Research and recommend appropriate building codes for the Jurisdiction that includes wind-resistant design techniques for new construction.	Tornado, Windstorm	Emergency Manager	High	1,2	Staff Time	Local	Continuous	Not started, lack of staff
Decatur County-12	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	New
Decatur County-13	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	Medium	1,2,3	Staff Time	Local	Continuous	Not started, lack of staff
Decatur County-14	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/ Agri-Terrorism	Director County Health Department, Emergency Manager, Director County Extension Office, Local Producers	Medium	3	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Decatur County-15	Identify the most at-risk critical facilities and evaluate potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Emergency Manager	Medium	2	\$15,000	Local	Five years	Not started, lack of funding
Decatur County-16	Research and adopt an ordinance requiring installation of onsite tornado shelters for any new Manufactured Housing and Travel Trailer Parks with more than 10 mobile home spaces.	Tornado, Windstorm	County Planner	Medium	1,2,4	Staff Time	Local	Five years	Not started, lack of staff
Decatur County-17	Update county GIS capabilities, including purchasing new mapping software, computers and large printers.	All Hazards	County Appraiser	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding







Table 6.5: Decatur 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
Decatur County-18	Develop and implement a wildfire prevention/education program.	Wildfire	Fire Chief, Emergency Manager	Medium	3	\$10,000	Local	Five years	Not started, lack of funding
Decatur County-19	Create a working group to evaluate the firefighting water supply resources within the County.	Wildfire	Fire Chief, Emergency Manager	Medium	4	\$10,000	Local	Five years	Not started, lack of funding
Dresden-1	Purchase and distribute NOAA All Hazards Weather Radios for the entire community.	All Hazards	City Manager	Medium	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Dresden-2	Construct a community safe room.	Tornado, Windstorm	City Manager	Low	1,2	\$350,000	Local, State, Federal	Five years	Not started, lack of funding
Jennings-1	Purchase and distribute NOAA All Hazards Weather Radios for the entire community.	All Hazards	City Manager	High	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Jennings-2	Construct a community safe room.	Tornado, Windstorm	City Manager	High	1,2	\$350,000	Local, State, Federal	Five years	Not started, lack of funding
Jennings-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners and display them at the library and the Jennings Clinic / EMS building.	All Hazards	City Manager	Medium	3	\$1,000	Local, State, Federal	Five years	Not started, lack of funding
Norcat-1	Purchase and distribute NOAA All Hazards Weather Radios for the entire community.	All Hazards	City Manager	Medium	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Norcat-2	Construct a community safe room.	Tornado, Windstorm	City Manager	Low	1,2	\$350,000	Local, State, Federal	Five years	Not started, lack of funding
Oberlin-1	The City of Oberlin is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Oberlin-2	Assess flood prone areas and recommend flood reduction measures to city planners. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$10,000	Local	Continuous	Not started, lack of funding



**Table 6.5: Decatur 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
Oberlin-3	Purchase and distribute NOAA All Hazards Weather Radios for the entire community.	All Hazards	City Manager	High	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Oberlin-4	Construct a community safe room.	Tornado, Windstorm	City Manager	High	1,2	\$350,000	Local, State, Federal	Five years	Not started, lack of funding
USD#294-1	Construct tornado safe rooms in all USD# 294 schools.	Tornado, Windstorm	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$3,000,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Prairie Land Electric-1	Tree trimming and branch removal project to reduce the risk of downed power lines.	Utility/ Infrastructure Failure	REC Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of funding
Prairie Land Electric-2	Bury Electrical Lines to the extent possible. Encourage the burying of lines in new construction.	Utility/ Infrastructure Failure	REC Manager	Medium	1,2	Mileage dependent	Local, State, Federal	Ten years	Not started, lack of funding
Prairie Land Electric-3	Enhance and upgrade all power lines to withstand all hazard events.	All Hazards	REC Manager	High	1,2	\$1,000,000 for each distribution pole and \$2,500 per transmission pole	Local, State, Federal	Five years	Not started, lack of funding





### 6.8.3 – Gove County Mitigation Actions

**Table 6.6: Gove 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
Gove County-1	The County and local governments will work with the KDA-DWR Resources to educate and promote local jurisdictional participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	In progress
Gove County-2	Collect educational materials on individual and family preparedness /mitigation measures and display at public locations.	All Hazards	Emergency Manager	High	3	Staff Time	Local, State, Federal	Continuous	In progress
Gove County-3	Construct safe rooms in underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$750,000 per safe room	Local, State, Federal	Five years	Not started, lack of funding
Gove County-4	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storms	Emergency Manager	High	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Gove County-5	Increase public awareness and procedures to follow if a hazardous material spill event occurs by publishing articles in the local newspaper, holding town hall meetings, radio announcements and providing bulletins to local churches and schools.	Hazardous Material	Emergency Manager	High	3	Staff Time	Local, State	Continuous	Not started, lack of staff
Gove County-6	Educate the public about pipelines safety risks and what to do in case of a pipeline accident.	Utility/ Infrastructure Failure	Emergency Manager	High	3	Staff Time	Local, State	Five years	Not started, lack of staff
Gove County-7	Provide risk information on the location of pipelines to builders, excavators, the banking and real estate industry, and current and potential property owners.	Utility/ Infrastructure Failure	Emergency Manager	High	3,4	Staff Time	Local, State	Five years	Not started, lack of staff
Gove County-8	Develop traffic control policies to route hazardous materials to designated routes to protect citizens of Gove County.	Hazardous Material	Emergency Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of staff
Gove County-9	Conduct an inventory/survey for the county's emergency response services to identify any existing needs or shortfalls	All Hazards	Emergency Manager	High	1,2	Staff Time, per equipment	Local, State	Five years	Not started, lack of funding



**Table 6.6: Gove 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
	in terms of personnel, equipment or required resources. Purchase equipment or fill positions to address identified shortfalls.					or position cost			
Gove County-10	Expand and update cooperative agreements for firefighting resources. Include agreements with local, state, and federal agencies.	Wildfire	Fire Chiefs, Emergency Manager	High	4	Staff Time	Local	Five years	Not started, lack of staff
Gove County-11	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	New
Gove County-12	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/ Agri-Terrorism	Directors of County Health and Extension, Emergency Manager, Local Producers	Medium	3	\$2,000	Local, State, Federal	Five years	Not started, lack of funding
Gove County-13	Establish the capability for a single, interagency mobile Incident Command Post and Mobile Communications Center.	All Hazards	Emergency Manager	Low	4	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Gove County-14	Facilitate training in hazardous material response policies and procedures, including annual exercises within the county, and research funding options to provide training for emergency responders in the county.	Hazardous Material	Emergency Manager	Medium	1,2,4	\$20,000	Local, State, Federal	Five years	Not started, lack of funding
Gove County-15	Enhance community volunteer response capabilities by creation of Citizen Emergency Response Teams.	All Hazards	Emergency Manager	Medium	1,2,4	Staff Time	Local, State	Five years	Not started, lack of staff
Gove County-16	Promote increased security around fixed hazardous materials sites.	Hazardous Material	Emergency Manager	Medium	1,2	\$40,000	Local, State, Federal	Five years	Not started, lack of funding



**Table 6.6: Gove 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
Gove County-17	Develop and implement a wildfire prevention/education program for the public, children, fire and equipment users, builders and developers, and homeowners.	Wildfire	Fire Chief, Emergency Manager	Medium	1,2	\$8,000	Local	Five years	Not started, lack of funding
Gove County-18	Purchase and install warning sirens in underserved areas of the county.	Tornado, Windstorm	Emergency Manager	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Gove County-19	Rural Telephone / Nex-Tech will seek funding sources for possible capital improvement projects including updating headends and wireless equipment, cellular solutions, and fiber capabilities in Gove County, among other possible projects.	Utility/ Infrastructure Failure	Manager Rural Telephone Co., Emergency Manager	Medium	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
City of Gove-1	Purchase and install emergency generators and/or transfer switches to provide backup power for Critical Facilities.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
City of Gove-2	Purchase, install and upgrade warning sirens.	Tornado, Windstorm	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
City of Gove-3	Incorporate the inspection and management of trees that may pose a threat to the city's routine maintenance system process.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
City of Gove-4	Purchase NOAA Weather Radio for the entire City of Gove.	All Hazards	City Manager	Medium	1,2	\$10,000	Local, State, Federal	Five years	Not started, lack of funding
Grainfield-1	Purchase and install emergency generators and/or transfer switches to provide backup power for Critical Facilities.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Grainfield-2	Purchase, install, and upgrade warning sirens.	Tornado, Windstorm	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding



**Table 6.6: Gove 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
Grainfield-3	Purchase NOAA Weather Radio for the entire City of Gove.	All Hazards	City Manager	Medium	1,2	\$10,000	Local, State, Federal	Five years	Not started, lack of funding
Grinnell-1	Purchase and install emergency generators and/or transfer switches to provide backup power for Critical Facilities.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Grinnell-2	Purchase, install, and upgrade warning sirens.	Tornado, Windstorm	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
Grinnell-3	Seek funds to design and construct a community safe room.	Tornado, Windstorm	City Manager	Low	1,2	\$300,000	Local, State, Federal	Five years	Not started, lack of funding
Park-1	Purchase and install emergency generators and/or transfer switches to provide backup power for Critical Facilities.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Park-2	Purchase, install, and upgrade warning sirens.	Tornado, Windstorm	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
Park-3	Incorporate the inspection and management of trees that may pose a threat to the city's routine maintenance system process.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
Park-4	Seek funds to design and construct a community safe room.	Tornado, Windstorm	City Manager	Low	1,2	\$300,000	Local, State, Federal	Five years	Not started, lack of funding
Park-5	Purchase equipment to assist in the removal of snow and ice from streets after major winter storm or ice events.	Winter Storms	City Manager	Low	1,2	\$200,000	Local, State, Federal	Five years	Not started, lack of funding
Park-6	Form a City of Park Fire Department, including equipment, personnel, resources, and training.	All Hazards	City Manager	Low	1,2	\$1,500,000	Local, State, Federal	Five years	Not started, lack of funding
Park-7	Construct a community safe room.	Tornado, Windstorm	City Manager	Low	1,2	\$300,000	Local, State, Federal	Five years	Not started, lack of funding







**Table 6.6: Gove 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
Quinter-1	Continued participation and compliance with the NFIP.	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Quinter-2	Assess flood prone areas and recommend flood reduction measures to city planners. <b>(NFIP)</b>	Flood	NFIP Administrator	High	1,2	\$10,000	Local	Continuous	Not started, lack of funding
Quinter-3	Incorporate the inspection and management of trees that may pose a threat to the city's routine maintenance system process.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
Quinter-4	Purchase and install emergency generators and/or transfer switches to provide backup power for Critical Facilities.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Quinter-5	Purchase, install, and upgrade warning sirens.	Tornado, Windstorm	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
USD#291-1	Design and construct tornado safe rooms for all USD# 291 schools.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#291-2	Purchase and implement enhancements to the District's early warning system for students and staff for weather alerts and campus emergencies.	All Hazards	Superintendent	Medium	1,2	\$50,000	Local, State, Federal	Five years	Not started, lack of funding
USD#292-1	Design and construct tornado safe rooms for all USD# 292 schools.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#292-2	Purchase and implement enhancements to the District's early warning system for students and staff for weather alerts and campus emergencies.	All Hazards	Superintendent	Medium	1,2	\$50,000	Local, State, Federal	Five years	Not started, lack of funding
USD#293-1	Design and construct tornado safe rooms for all USD# 293 schools.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#293-2	Retain a professional school safety and security firm to review and update the school's Security Plan.	All Hazards	Superintendent	Medium	1,2	\$50,000	Local, State, Federal	Five years	Not started, lack of funding



**Table 6.6: Gove 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#293-3	Purchase and implement enhancements to the District's early warning system for students and staff for weather alerts and campus emergencies.	All Hazards	Superintendent	Medium	1,2	\$50,000	Local, State, Federal	Five years	Not started, lack of funding
Lane-Scott Electric-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$2,900,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$2,900,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Western Cooperative Electrical-1	Enhance and upgrade electric transmission and distribution lines.	Utility/ Infrastructure Failure	REC Manager	High	1,2	\$2,000,000	Local, State, Federal	Five years	Not started, lack of funding
Western Cooperative Electrical-2	Bury electrical lines to the extent possible. Encourage the burying of lines in new construction.	Utility/ Infrastructure Failure	REC Manager	Medium	1,2	Mileage dependent	Local, State, Federal	Ten years	Not started, lack of funding
WestPlains Energy-1	Enhance and upgrade all power lines to withstand all hazard events.	All Hazards	Director	High	1,2	\$3,000,000	Local, State, Federal	Five years	Not started, lack of funding





## 6.8.4 – Logan County Mitigation Actions

**Table 6.7: Logan 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
Logan County-1	Educated and promote local jurisdictional participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff time	Local	Continuous	In progress
Logan County-2	Collect educational materials on individual and family preparedness/mitigation measures and display at public locations.	All Hazards	Emergency Manager	High	3	Staff time	Local, State, Federal	Continuous	Not started, lack of staff
Logan County-3	Construct safe rooms and storm shelters in rural and underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$700,000 per safe room	Local, State, Federal	Five years	Not started, lack of funding
Logan County-4	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	1,2,3	Staff time	Local, State, Federal	Continuous	Not started, lack of staff
Logan County-5	Increase public awareness and procedures to follow if a hazardous material spill event occurs by publishing articles in various mediums.	Hazardous Material	Emergency Manager	High	1,2	Staff time	Local, State	Continuous	Not started, lack of staff
Logan County-6	Educate the public about pipelines safety risks and what to do in case of a pipeline accident.	Utility/ Infrastructure Failure, Hazardous Material	Emergency Manager	High	3	Staff time	Local, State	Five years	Not started, lack of staff
Logan County-7	Provide risk information on the location of pipelines to builders, excavators, the banking and real estate industry, and current and potential property owners.	Utility/ Infrastructure Failure, Hazardous Material	Emergency Manager, Directors of Utilities, Industries.	High	4	Staff time	Local, State	Five years	Not started, lack of staff
Logan County-8	Create plans and procedures and purchase equipment to enhance capabilities to respond quickly and effectively to a pipeline accident.	Utility/ Infrastructure Failure, Hazardous Material	Emergency Manager	High	1,2	Staff time, per equipment cost	Local	Five years	Not started, lack of funding
Logan County-9	Expand and update cooperative agreements for firefighting resources.	Wildfire	Fire Chiefs, Emergency Manager	High	4	Staff Time	Local	Five years	Not started, lack of staff





**Table 6.7: Logan 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
	Include agreements with local, state, and federal agencies.								
Logan County-10	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	New
Logan County-11	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/ Agri-Terrorism	Directors of County Health Department, Extension Office, Local Producers and Emergency Manager	Medium	3	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Logan County-12	Develop a plan to mitigate potential risks identified in the Logan County Hazard Analysis including stored chemicals, chemical transport, pipeline incidents, and crop-dusting incidents.	Hazardous Material	Emergency Manager	Medium	1,2	\$10,000	Local, State, Federal	Five years	Not started, lack of funding
Logan County-13	Establish the capability for an Interagency Mobile Incident Command Post and Mobile Communications Center.	All Hazards	Emergency Manager	Medium	4	\$150,000	Local, State, Federal	Five years	Not started, lack of funding
Logan County-14	Facilitate training in hazardous material response policies and procedures, including annual exercises within the county, and research funding options to provide training for emergency responders in the county.	Hazardous Material	Emergency Manager	Medium	1,2	\$40,000	Local, State, Federal	Five years	Not started, lack of funding
Logan County-15	Enhance community volunteer response capabilities by creation of Citizen Emergency Response Teams.	All Hazards	Emergency Manager	Medium	1,2,4	\$15,000	Local, State	Five years	Not started, lack of funding
Logan County-16	Institute increased security around fixed hazardous materials sites.	Hazardous Material	Emergency Manager	Medium	1,2	\$60,000	Local, State, Federal	Five years	Not started, lack of funding
Logan County-17	Develop an Emergency Response Plan Annex for Logan County for aerial spraying accident response and recovery.	Hazardous Material	Emergency Manager	Medium	1,2	\$20,000	Local, State, Federal	Five years	Not started, lack of funding



**Table 6.7: Logan 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
Logan County-18	Develop an Emergency Response Plan Annex for Logan County for rail transportation accident response and recovery.	Hazardous Material	Emergency Manager	Medium	1,2	\$20,000	Local, State, Federal	Five years	Not started, lack of funding
Logan County-19	Develop traffic control policies to route hazardous materials to designated routes to protect citizens of Logan County.	Hazardous Material	Emergency Manager	High	1,2	Staff time	Local	Five years	Not started, lack of staff
Logan County-20	Conduct an inventory/survey for the county's emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources. Purchase equipment or fund positions to address identified shortfalls.	All Hazards	Emergency Manager	High	1,2	Staff time, per equipment of position cost	Local, State	Five years	Not started, lack of funding
Logan County-21	Identify the jurisdiction's most at-risk critical facilities and evaluate potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Emergency Manager	Medium	1,2	\$20,000	Local	Five years	Not started, lack of funding
Logan County-22	Develop and implement a wildfire prevention/education program.	Wildfire	Fire Chief, Emergency Manager	Medium	3	\$3,000 per event	Local	Five years	Not started, lack of funding
Logan County-23	Evaluate the firefighting water supply resources within the jurisdiction. This should include both fixed and mobile supply issues.	Wildfire	Fire Chief, Emergency Manager	Medium	1,2	\$10,000	Local	Five years	Not started, lack of funding
Logan County-24	Purchase, install, and upgrade new and existing warning sirens.	Tornado, Windstorm	Emergency Manager	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Logan County-25	Purchase and install emergency generator and/or transfer switches at the Long-Term Care Facility. In addition, procure funding to maintain existing generators at the hospital.	Utility/ Infrastructure Failure	Director County Hospital, Emergency Manager	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Logan County-26	S&T Telephone will seek funding sources for possible capital improvement projects including updating headends	Utility/ Infrastructure Failure	Director S&T Telephone,	Medium	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding





Table 6.7: Logan 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 wireless equipment, cellular solutions, and fiber capabilities in Logan County, among other possible projects.		Emergency Manager						
Oakley-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff time	Local	Continuous	In progress
Oakley-2	Assess flood prone areas and recommend flood reduction measures to city planners. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$10,000	Local	Continuous	Not started, lack of funding
Oakley-3	Purchase and install emergency generators and/or transfer switches to provide backup power for the City Hall Complex.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$40,000	Local, State, Federal	Five years	Not started, lack of funding
Oakley-4	The City of Oakley will work with Logan County to research funding options to construct a garage berth for indoor storage of the Logan County Fire Department water tanker.	Wildfire	City Manager, County Emergency Manager	Low	1,2	\$50,000	Local, State, Federal	Five years	Not started, lack of funding
Oakley-5	Seek funding to evaluate and update the existing City of Oakley evacuation plans.	All Hazards	City Manager	Medium	1,2	\$25,000	Local, State, Federal	Five years	Not started, lack of funding
Oakley-6	Rewire the City of Oakley potable water wells and sewage lift stations to allow the hookup of backup generators, and purchase/install portable emergency generators for the water wells and lift stations.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$75,000	Local, State, Federal	Five years	Not started, lack of funding
Winona-1	Purchase and install emergency generators and/or transfer switches to provide backup power for Critical Facilities.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$40,000	Local, State, Federal	Five years	Not started, lack of funding
Winona-2	Incorporate the inspection and management of trees that may pose a threat to the city's routine maintenance system process.	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$3,000 annually	Local, State	Five years	Not started, lack of funding







**Table 6.7: Logan County Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Hazard Addressed</b>	<b>Responsible Party</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Estimated Cost</b>	<b>Potential Funding Source</b>	<b>Proposed Completion Timeframe</b>	<b>Current Status</b>
USD#274-1	Fund, design and construct safe rooms for all USD#274 facilities.	Tornado, Windstorm	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#274-2	Retain a professional school safety and security firm to review and update the school's Security Plan.	Terrorism/ Agri-Terrorism, Civil Disorder	Superintendent	Medium	1,2	\$50,000	Local, State, Federal	Five years	Not started, lack of funding
USD#275-1	Fund, design and construct safe rooms for all USD#275 facilities.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$2,900,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding





## 6.8.5 – Rawlins County Mitigation Actions

**Table 6.8: Rawlins 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
Rawlins County-1	The County and local governments will work with the KDA-DWR to educate and promote local jurisdictional participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2,3	Staff Time	Local	Five years	On-going
Rawlins County-2	Continued participation and compliance with the NFIP.	Flood	Emergency Manager	High	1,2	Staff Time	Local	Continuous	On-going, continuous
Rawlins County-3	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. ( <b>NFIP</b> )	Flood	NFIP Administrator, County Planners	High	1,2	Staff time, acquisition cost property dependent	Local, State, Federal, Grants	Four years	Not started, lack of funding
Rawlins County-4	Collect educational materials on individual and family preparedness / mitigation measures and display at public locations.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Five years	Not started, lack of staff
Rawlins County-5	Design and construct safe rooms in underserved areas of the county.	Tornados, Windstorm	Emergency Manager	High	1,2	\$350,000 per safe room	Local, State, Federal	Five years	Not started, lack of funding
Rawlins County-6	Coordinate county and local government mitigation efforts with RECs, 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	Director Road and Bridge, REC Managers	High	4	Staff Time	Local, State, Federal	Continuous	In progress
Rawlins County-7	Research and recommend appropriate building codes for the County that include wind-resistant design techniques for new construction.	All Hazards	Emergency Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of staff
Rawlins County-8	Conduct an inventory/survey for the emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources. Fund identified shortfalls,	All Hazards	Emergency Manager	High	1,2	Staff Time, per equipment or position cost	Local, State	Five years	Not started, lack of funding



**Table 6.8: Rawlins 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
Rawlins County-9	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 Chief, Emergency Manager	High	4	Staff Time	Local	Five years	Not started, lack of staff
Rawlins County-10	Construct a building structure capable of protecting heavy machinery from the elements and provide adequate workspace for maintenance crews to work.	All Hazards	Public Works Manager	High	1,2	\$300,000	Local, State, Federal	Continuous	Not started, lack of funding
Rawlins County-11	Construct a safe room(s) accessible for all patients and staff of Rawlins County Health Center.	All Hazards	Director	High	1,2	\$1,000,000 per room	Local, State, Federal	Five years	Not started, lack of funding
Rawlins County-12	Purchase and install generators for all critical facilities in county.	All Hazards	Emergency Manager	High	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Rawlins County-13	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	New
Rawlins County-14	Regularly host a public hazards workshop in combination with local festivals, fairs, or other appropriate events.	All Hazards	Emergency Manager	Medium	3	\$1,000 per event	Local	Continuous	In progress
Rawlins County-15	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/ Agri-Terrorism	Directors County Health Department, Extension Office, Local Producers, Emergency Manager	Medium	3	\$2,000 per annum	Local, State, Federal	Continuous	Not started, lack of staff.
Rawlins County-16	Update county GIS capabilities, including purchasing new mapping software, computers and large printers	All Hazards	County Appraiser, GIS Manager	Medium	4	\$35,000	Local, State, Federal	Continuous	Not started, lack of funding
Rawlins County-17	Develop and implement a wildfire prevention/education program.	Wildfire	Fire Chief, Emergency Manager	Medium	3	\$2,000 per event	Local	Five years	Not started, lack of funding





Table 6.8: Rawlins 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
Rawlins County-18	Research and develop a Comprehensive Land Use Plan for Rawlins County.	Flood	Appraiser	Low	1,2	\$50,000	Local	Five years	Not started, lack of funding
Atwood-1	The city of Atwood is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Atwood-2	Promote and educate the residents of the importance of the <b>NFIP</b> program and continue to identify flood prone properties.	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	In progress
Herndon-1	The City of Herndon is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Herndon-2	Promote and educate the residents of the importance of the <b>NFIP</b> program and continue to identify flood prone properties.	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	In progress
Herndon-3	Seek funding for the purchase and installation of a backup power to the Herndon Senior Center.	All Hazards	City Manager	High	1,2	\$40,000	Local, State, Federal	Five years	Not started, lack of funding
Herndon-4	Purchase new sirens to upgrade City coverage.	All Hazards	City Manager	High	1,2	\$200,000	Local	Five years	Not started, lack of funding
Herndon-5	Purchase backup power supplies, to include generators, for all critical infrastructure.	All Hazards	City Manager	Medium	1,2	\$500,000	Local, State	Five years	Not started, lack of funding
McDonald-1	Purchase and install warning sirens.	Tornados, Windstorm	City Manager	Medium	1,2	\$45,000	Local, State, Federal	Five years	Not started, lack of funding
McDonald-2	Seek funding to design and construct safe rooms in public and private facilities.	Tornados, Windstorm	City Manager	Low	1,2	\$300,000 per safe room	Local, State, Federal	Five years	Not started, lack of funding
McDonald-4	Purchase backup power supplies, to include generators, for all critical infrastructure	Utility/ Infrastructure Failure	City Manager	Low	1,2	\$500,000	Local, State	Five years	Not started, lack of funding



**Table 6.8: Rawlins 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#105-1	Construct tornado safe rooms for all USD# 105 schools.	Tornados, Windstorm	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$2,900,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Prairie Land Electric-1	Tree trimming and branch removal project to reduce the risk of downed power lines.	Multi-Hazard	REC Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of funding
Prairie Land Electric-2	Bury new lines in new construction.	Utility/ Infrastructure Failure	REC Manager	Medium	1,2	Mileage dependent	Local, State, Federal	Ten years	Not started, lack of funding
Prairie Land Electric-3	Enhance and upgrade all power lines to withstand all hazard events.	All Hazards	Director	High	1,2	\$5,000,000	Local, State, Federal	Five years	Not started, lack of funding





## 6.8.6 – Sheridan County and Participating Jurisdiction Mitigation Actions

**Table 6.9: Sheridan 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
Sheridan County-1	Collect educational materials on individual and family preparedness and/or mitigation measures for property owners, and display at both the library and routinely visited jurisdiction offices.	All Hazards	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	In progress
Sheridan County-2	Design and construct safe rooms in underserved areas of the county.	Tornados, Windstorms	Emergency Manager	High	1,2	\$700,000 per safe room	Local, State, Federal	Five years	Not started, lack of funding
Sheridan County-3	Coordinate county and local government mitigation efforts with RECs, encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to these hazards.	All Hazards	Road and Bridge Supervisor, Directors of RECs	High	1,2,4	Staff Time	Local	Five years	Not started, lack of staff
Sheridan County-4	Educate and promote participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Sheridan County-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Sheridan County-6	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	New
Sheridan County-7	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 Chief, Emergency Manager	High	4	Staff Time	Local	Five years	Not started, lack of staff
Sheridan County-8	Encourage the repositioning of as many utility lines as possible underground. Consider local regulations to require the placement of all new utility lines underground.	Utility/ Infrastructure Failure	Roads and Bridge Supervisor, Directors of RECs	High	1,2	Staff Time	Local, State, Federal	Five years	Not started, lack of staff







**Table 6.9: Sheridan 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
Sheridan County-9	Research and consider appropriate building codes for the county that includes wind-resistant design techniques for new construction.	Tornados, Windstorms	Emergency Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of staff
Sheridan County-10	Identify the county's most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility.	All Hazards	Emergency Manager	Medium	1,2	\$15,000	Local	Five years	Not started, lack of funding
Sheridan County-11	Coordinate county and local government mitigation efforts with RECs, encourage identification of hazards potentially affecting their infra- structure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies	All Hazards	Emergency Manager	Medium	1,2	Staff Time	Local, State	Five years	Not started, lack of staff
Sheridan County-12	Annually host a public hazards workshop for residents in combination with local festivals, fairs, or other appropriate events.	All Hazards	Emergency Manager	Medium	1,2,3	\$1,000 per event	Local, State	Continuous	In progress
Sheridan County-13	Promote and educate the jurisdiction's public and private sectors on potential agricultural issues that can severely impact the county and regional economies and develop and implement plans to address these issues.	Terrorism/ Agri-Terrorism	Directors of the County Health and Extension Office, Local Producers, County Planners, and Emergency Manager	Medium	3	\$1,000 per event	Local, State, Federal	Five years	Not started, lack of funding
Sheridan County-14	Purchase and install warning sirens for underserved areas of the county.	Tornados, Windstorms	Emergency Manager	Medium	1,2	\$20,000 per siren	Local	Five years	Not started, lack of funding
Sheridan County-15	Update county GIS capabilities, including purchasing new mapping software, computers and large printers.	All Hazards	County Appraiser, Emergency Manager	Medium	4	Staff Time	Local	Five years	Not started, lack of funding
Sheridan County-16	Develop and implement a wildfire prevention/education program.	Wildfire	Fire Chief, Emergency Manager	Medium	3	\$1,000 per event	Local	Five years	Not started, lack of funding



**Table 6.9: Sheridan 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
Sheridan County-17	Create a working group to evaluate the firefighting water supply resources within the County, including both fixed and mobile supply issues.	Wildfire	Fire Chief, Emergency Manager	Medium	4	Staff Time	Local	Five years	Not started, lack of staff
Sheridan County-18	Research and consider an ordinance/resolution to require installation of tornado shelter for major new manufactured and/or mobile home parks with more than 10 mobile home spaces.	Tornados, Windstorms	Emergency Manager	Medium	1,2	Staff Time	Local	Five years	Not started, lack of staff
Hoxie-1	The City of Hoxie is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Hoxie-2	Identify flood prone areas to consider flood reduction measures to city officials. ( <b>NFIP</b> )	Flood	City Manager	High	1,2	\$10,000	Local	Continuous	In progress
Hoxie-3	Design and construct a community safe room.	Tornados, Windstorms	City Manager	High	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Selden-1	Design and construct a community safe room for the Selden public library.	Tornados, Windstorms	City Manager	Low	1,2	\$300,000	Local, State, Federal	Five years	Not started, lack of funding
Selden-2	Construct curbs and gutters to aid in directional flow of runoff into drainage system.	Flood	City Manager	Medium	1,2	\$50,000	Local, State, Federal	Five years	Not started, lack of funding
Selden-3	Purchase and install warning sirens.	Tornados, Windstorms	City Manager	Medium	1,2	\$45,000	Local, State, Federal	Five years	Not started, lack of funding
USD#316-1	Construct tornado safe rooms for all USD# 316 schools.	Tornados, Windstorms	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#412-1	Construct tornado safe rooms for all USD# 412 schools.	Tornados, Windstorms	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding





**Table 6.9: Sheridan County Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Hazard Addressed</b>	<b>Responsible Party</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Estimated Cost</b>	<b>Potential Funding Source</b>	<b>Proposed Completion Timeframe</b>	<b>Current Status</b>
Midwest Energy-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$3,000,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Prairie Land Electric-1	Enhance and upgrade all power lines to withstand all hazard events.	All Hazards	Director	High	1,2	\$3,000,000	Local, State, Federal	Five years	Not started, lack of funding
Western Cooperative Electrical-1	Enhance and upgrade electric transmission and distribution lines.	Utility/ Infrastructure Failure	REC Manager	High	1,2	\$2,000,000	Local, State, Federal	Five years	Not started, lack of funding
Western Cooperative Electrical-2	Bury electrical lines to the extent possible.	Utility/ Infrastructure Failure	REC Manager	Medium	1,2	Mileage dependent	Local, State, Federal	Ten years	Not started, lack of funding





## 6.8.7 – Sherman County and Participating Jurisdictions Mitigation Actions

**Table 6.10: Sherman 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 County-1	Collect educational materials on individual and family preparedness / mitigation measures and display at public locations.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Sherman County-2	Construct safe rooms in underserved areas of the county.	Tornados, Windstorms	Emergency Manager	High	1,2	\$700,000 per safe room	Local, State, Federal	Five years	Not started, lack of funding
Sherman County-3	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Sherman County-4	Coordinate county and local government mitigation efforts with RECs, 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	Director Public Works, REC Managers	High	4	Staff Time	Local, State, Federal	Five years	Not started, lack of staff
Sherman County-5	Research and recommend appropriate building codes for the county that include wind-resistant design techniques for new construction.	All Hazards	Emergency Manager	High	1,2	Staff Time	Local, State	Five years	Not started, lack of staff
Sherman County-6	Conduct an inventory/survey for the emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources. Fund identified shortfalls.	All Hazards	Emergency Manager	High	1,2	Staff time, per project or position cost	Local, State	Five years	Not started, lack of funding
Sherman County-7	Research and recommend an ordinance/resolution to require tornado shelters for new major manufactured and/or mobile home parks with more than 10 mobile home spaces.	Tornados, Windstorms	Emergency Manager	High	1,2	Staff Time	Local, State	Five years	Not started, lack of staff
Sherman County-8	Examine the current agreements within the county and assess the need to expand	Wildfire	Fire Chief, Emergency Manager	High	4	Staff Time	Local	Five years	Not started, lack of staff





Table 6.10: Sherman 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
	or update cooperative agreements for firefighting resources.								
Sherman County-9	Create a working group to evaluate the firefighting water supply resources within the County, including both fixed and mobile supply issues.	Wildfire	Fire Chief, Emergency Manager	High	4	Staff Time	Local	Five years	Not started, lack of staff
Sherman County-10	Research and recommend an application package for participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of staff
Sherman County-11	Construct a FEMA safe structure to house central dispatch and allow space for emergency operations center and first responder teams including fire and EMS.	All Hazards	Emergency Manager	High	1,2	\$600,000	Local, State, Federal	Five years	Not started, lack of funding
Sherman County-12	Construct a safe room(s) accessible for all patients and staff of Goodland Regional Medical Center.	All Hazards	Director	High	1,2	\$1,000,000 per room	Local, State, Federal	Five years	Not started, lack of funding
Sherman County-13	Purchase and install generators for all critical county facilities.	All Hazards	Director	High	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Sherman County-14	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	Not started, lack of funding
Sherman County-15	Educate and promote participation in the <b>NFIP</b> .	Flood	Emergency Manager	Medium	1,2,3	Staff Time	Local	Five years	In progress
Sherman County-16	Coordinate county and local government mitigation efforts with RECs, encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies	All Hazards	Emergency Manager	Medium	1,2	\$10,000	Local	Five years	Not started, lack of funding
Sherman County-17	Annually host a public hazards workshop in combination with local festivals, fairs, or other appropriate events.	All Hazards	Emergency Manager	Medium	1,2,3	\$1,000 per annum	Local	Continuous	In progress





**Table 6.10: Sherman 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 County-18	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/ Agri-Terrorism	Directors of County Health and Extension Offices, Local Producers, Emergency Manager	Medium	3	\$1,000 per event	Local, State, Federal	Continuous	Not started, lack of funding
Sherman County-19	Update county GIS capabilities, including purchasing new mapping software, computers and large printers	All Hazards	County Appraiser, GIS Manager	Medium	4	\$20,000	Local, State, Federal	Continuous	Not started, lack of funding
Sherman County-20	Research and develop a Comprehensive Land Use Plan for Sherman County.	Flood	Emergency Manager	Medium	1,2	\$20,000	Local	Five years	Not started, lack of funding
Sherman County-21	Develop and implement a wildfire prevention/education program	Wildfire	Fire Chief, Emergency Manager	Medium	3	\$1,000 per event	Local	Continuous	Not started, lack of funding
Goodland-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Goodland-2	Identify flood prone properties. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	In progress
Goodland-3	Construct three community tornado shelters.	Tornado	City Manager	High	1,2,3	\$1,000,000 each	Local, State, Federal	Five years	Not started, lack of funding
Goodland-4	Install multiple water wells and associated infrastructure.	All Hazards	City Manager	High	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Goodland-5	Purchase and install a new high capacity generator.	Utility/ Infrastructure Failure	City Manager	High	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
Kanorado-1	Design and construct three community tornado shelters.	Tornados, Windstorms	City Manager	Low	1,2	\$300,000	Local, State, Federal	Five years	Not started, lack of funding
Northwest Kansas Technical College-1	Design and construct a tornado shelter.	Tornados, Windstorms	Dean	Low	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding





**Table 6.10: Sherman 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
Northwest Kansas Technical College-2	Purchase and install backup power sources for all facilities.	Utility/ Infrastructure Failure	Dean	Low	1,2	\$100,000	Local, State, Federal	Five years	Not started, lack of funding
USD#352-1	Construction tornado safe rooms in all USD#352 schools.	Tornados, Windstorms	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-1	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$3,00,000	Local, State, Federal	Five years	Not started, lack of funding
Prairie Land Electric-1	Tree trimming and branch removal project to reduce the risk of downed power lines.	Utility/ Infrastructure Failure	REC Manager	High	1,2	Staff Time	Local	Five years	In progress
Prairie Land Electric-2	Bury electrical lines to the extent possible.	Utility/ Infrastructure Failure	REC Manager	Medium	1,2	Mileage dependent	Local, State, Federal	Ten years	Not started, lack of funding
Prairie Land Electric-3	Enhance and upgrade all power lines to withstand all hazard events.	All Hazards	Director	High	1,2	\$4,000,000	Local, State, Federal	Five years	Not started, lack of funding
Sunflower Electric-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	Director	Medium	1,2	\$2,000,000	Local, State, Federal	Five years	Not started, lack of funding





## 6.8.8 – Thomas County and Participating Jurisdictions Mitigation Actions

**Table 6.11: Thomas 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
Thomas County-1	Collect educational materials on individual and family preparedness mitigation and display at public locations.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Thomas County-2	Coordinate county and local government mitigation efforts with RECs, 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, REC Managers	High	4	Staff Time	Local	Five years	Not started, lack of staff
Thomas County-3	Design and construct of safe rooms in underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$700,000 per safe room	Local, State, Federal	Five years	Not started, lack of funding
Thomas County-4	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Thomas County-5	Research and consider appropriate building codes for the county that includes wind-resistant design techniques for new construction.	Tornado, Windstorm	Emergency Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of staff
Thomas County-6	Conduct an inventory/survey for the county's emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources. Fund identified shortfalls.	All Hazards	Emergency Manager	High	1,2	Staff time, project or position dependent	Local, State	Five years	Not started, lack of funding
Thomas County-7	Research and consider an ordinance/resolution to require installation of tornado shelters for new major manufactured and/or mobile home parks with more than 10 mobile home spaces.	Tornado, Windstorm	County Planner	High	1,2	Staff Time	Local	Five years	Not started, lack of staff



**Table 6.11: Thomas 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
Thomas County-8	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 Chief, Emergency Manager	High	4	Staff Time	Local	Five years	Not started, lack of staff
Thomas County-9	Complete process for participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff Time	Local	Five years	Not started, lack of staff
Thomas County-10	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Continuous	New
Thomas County-11	Coordinate county and local government mitigation efforts with RECs, encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities to these hazards, and identification of mitigation strategies	All Hazards	Emergency Manager	Medium	3	\$1,000 per event	Local	Continuous	Not started, lack of funding
Thomas County-12	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/ Agri-terrorism	Directors of County Health and Extension Office, Local Producers, Emergency Manager	Medium	3	\$1,500 per event	Local, State, Federal	Five years	Not started, lack of funding
Thomas County-13	Identify the county's most at-risk critical facilities and implement mitigation techniques to protect each facility to the maximum extent possible.	All Hazards	Emergency Manager	Medium	1,2	\$400,000	Local	Five years	Not started, lack of funding
Thomas County-14	Update county GIS capabilities, including purchasing new mapping software, computers and large printers	All Hazards	County Appraiser, GIS Manager	Medium	4	\$25,000	Local, State, Federal	Five years	Not started, lack of funding
Thomas County-15	Develop and implement a wildfire prevention/education program for the general public.	Wildfire	Fire Chief, Emergency Manager	Medium	3	\$1,500 per event	Local	Five years	Not started, lack of funding





**Table 6.11: Thomas 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
Thomas County-16	Create a working group to evaluate the firefighting water supply resources within the County.	Wildfire	Fire Chief, Emergency Manager	Medium	1,2	\$10,000	Local	Five years	Not started, lack of funding
Thomas County-17	Purchase back-up batteries/generators for warning sirens.	Utility/ Infrastructure Failure	Emergency Manager	Medium	1,2	\$110,000	Local, State, Federal	Five years	Not started, lack of funding
Thomas County-18	Research and consider development of a Comprehensive Land Use Plan for Thomas County.	All Hazards	County Planner	Low	1,2	\$50,000	Local	Five years	Not started, lack of funding
Brewster-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	3	Staff Time	Local, State	Continuous	In progress
Brewster-2	Identify flood prone properties. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	In progress
Brewster-3	Design and construct community safe rooms in critical facilities and designated areas for residents.	Tornado, Windstorm	City Manager	High	1,2	\$500,000 per shelter	Local, State, Federal	Five years	Not started, lack of funding
Brewster-4	Subsidize purchase and distribution of weather radios.	All Hazards	City Manager	Medium	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Brewster-5	Advertise and promote safety advice from hazards to property owners by a direct mail newsletter once a year.	All Hazards	City Manager	Medium	1,2,3	\$500.00 per annum	Local, State, Federal	Five years	Not started, lack of funding
Brewster-6	Purchase and install warning sirens.	All Hazards	City Manager	Medium	1,2	\$20,000	Local, State, Federal	Five years	Not started, lack of funding
Brewster-7	Purchase and install backup generators at critical facilities.	Utility/ Infrastructure Failure	City Manager	Low	1,2	\$40,000	Local, State, Federal	Five years	Not started, lack of funding
Colby-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Colby-2	Assess flood prone areas and recommend flood reduction measures to city planners. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	In progress
Gem-1	Purchase and install alternative forms of public warning and mass notification systems for severe weather.	Tornado, Windstorm	City Manager	Medium	1,2	\$45,000	Local, State, Federal	Five years	Not started, lack of funding





**Table 6.11: Thomas 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
Menlo-1	Purchase and install alternative forms of public warning and mass notification systems for severe weather.	Tornado, Windstorm	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Five years	Not started, lack of funding
Menlo-2	Design and construct a community safe room.	Tornado, Windstorm	City Manager	High	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Rexford-1	Design and construct a community safe room.	Tornado, Windstorm	City Manager	High	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Colby Community College-1	Design and construct safe rooms for all college facilities.	Tornado, Windstorm	Director	Medium	1,2	\$500,000	Local, State, Federal	Five years	New
Colby Community College-2	Purchase and install backup generators.	All Hazards	Director	Medium	1,2	\$20,000	Local, State, Federal	Five years	New
Heartland Christian School-1	Design and construct a school safe room.	Tornado, Windstorm	Director	Medium	1,2	\$500,000	Local, State, Federal	Five years	New
Sacred Heart Catholic School-1	Design and construct a school safe room.	Tornado, Windstorm	Director	Medium	1,2	\$500,000	Local, State, Federal	Five years	New
USD#314-1	Design and construct safe rooms for all USD #314 facilities.	Tornado, Windstorm	Superintendent	High	1,2	\$2,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#315-1	Design and construct safe rooms for all USD #315 facilities.	Tornado, Windstorm	Superintendent	High	1,2	\$2,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#316-1	Design and construct safe rooms for all USD #316 facilities.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Citizen Medical-1	Design and construct safe rooms in all facilities.	Tornado, Windstorm	Director	Medium	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Colby Health and Rehab-1	Design and construct a facility safe room.	Tornado, Windstorm	Director	Medium	1,2	\$500,000	Local, State, Federal	Five years	New





**Table 6.11: Thomas 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
Fairview Estates Assisted Living-1	Design and construct a facility safe room.	Tornado, Windstorm	Director	Medium	1,2	\$500,000	Local, State, Federal	Five years	New
Family Center for Healthcare-1	Design and construct a facility safe room.	Tornado, Windstorm	Director	Medium	1,2	\$500,000	Local, State, Federal	Five years	New
Prairie Senior Living Center-1	Design and construct a facility safe room.	Tornado, Windstorm	Director	Medium	1,2	\$500,000	Local, State, Federal	Five years	New
Midwest Energy-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$3,000,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding







## 6.8.9 – Wallace County and Participating Jurisdictions Mitigation Actions

**Table 6.12: Wallace 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
Wallace County-1	Collect educational materials on individual and family preparedness mitigation and display at public locations.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Wallace County-2	Purchase and distribute NOAA Weather Radio's for residents.	All Hazards	Emergency Manager	High	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-3	Design and construct of safe rooms in underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$700,000 per safe room	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-4	See funding for the design and construction of an Emergency Operations/911 call center that would also serve as a community shelter.	All Hazards	Emergency Manager	High	1,2	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-5	Purchase E-911 Radios.	All Hazards	Emergency Manager	High	1,2,4	\$40,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-6	Initiate a program to reduce or eliminate flash flooding by incorporating a Storm Water Management Program.	Flood	Emergency Manager	High	1,2	\$3,000,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-7	Encourage and promote participation in the NFIP.	Flood	Floodplain Manager, Emergency Manager	High	1,2	Staff Time	Local	Five years	In progress
Wallace County-8	Participate in the State of Kansas residential safe room reimbursement program	High Winds, Tornado	Emergency Manager	High	1,2,3	Staff Time	Local	Five years	New
Wallace County-9	Dredge creek beds to increase water flow and reduce flooding.	Flood	Emergency Manager	Medium	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-10	Update EOC work consoles to provide enhanced response environment.	All Hazards	Emergency Manager	Medium	1,2,4	\$105,000	Local, State, Federal	Five years	Not started, lack of funding



**Table 6.12: Wallace 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
Wallace County-11	Have a communitywide tree-trimming program to cut down branches and trees away from power lines and drainage areas.	Utility/ Infrastructure Failure	Emergency Manager	Medium	1,2	Staff Time	Local, State, Federal	Five years	Not started, lack of staff
Wallace County-12	Purchase backup generators for critical facilities	Utility/ Infrastructure Failure	Emergency Manager	Medium	1,2	\$20,000 per generator	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-13	Purchase an emergency management mobile unit	All Hazards	Emergency Manager	Medium	1,2,4	\$50,000 per unit	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-14	Conduct controlled burns consisting of rural and local fire department, State Forestry Service and area farmer to reduce the threat of wildfire.	Wildfire	Fire Chief, Emergency Manager	Medium	1,2	\$20,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-15	Upgrade Fire Department radio system to become Project 25 compliant.	All Hazards	Emergency Manager	Medium	1,2,4	\$500,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-16	Purchase a computer backup system to ensure data viability.	Utility/ Infrastructure Failure	Emergency Manager	Low	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-17	Construct animal keep zones for displaced animals after a disaster.	All Hazards	Emergency Manager	Low	1,2	\$50,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-18	Run a water line to a secondary water source for each of the water.	All Hazards	Emergency Manager	Low	1,2	\$500,000 per line	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-19	Purchase and install an above ground gas pumps with backup generator for official vehicles.	Utility/ Infrastructure Failure	Emergency Manager	Low	1,2	\$15,000 per set up	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-20	Purchase protective window film for all county facilities to reduce risk of airborne debris.	All Hazards	Emergency Manager	Low	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-21	Purchase lightning detection systems to provide warnings to citizens for lightning up to 10 miles away.	Lightning	Emergency Manager	Low	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding





**Table 6.12: Wallace 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
Wallace County-22	Purchase new pumper trucks and fire equipment for each fire station.	Wildfire	Fire Chief, Emergency Manager	Low	1,2	\$40,000 per unit	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-23	Purchase hand sanitizer equipment and place in various locations.	Major Disease Outbreak	Emergency Manager	Low	1,2	\$50 per dispenser	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-24	Develop a storm shelter and safe room database with latitude and longitude.	All Hazards	Emergency Manager	Low	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-25	Become a Firewise community by meeting the criteria.	Wildfire	Fire Chief, Emergency Manager	Low	1,2	\$10,000 plus	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-26	Construct snow fences to reduce the risk of blowing snow build up on roads.	Winter Storm	Emergency Manager	Low	1,2	\$500,000 countywide	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-27	Purchase a reverse 911 system for the community.	All Hazards	Emergency Manager	Low	1,2	\$50,000 per system	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-28	Purchase Federal Commander Digital System. Siren control units and antennas for each siren, FSK encoder, software and training.	All Hazards	Emergency Manager	Low	1,2	\$85,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-29	Purchase a tub-grinder for the Solid Waste Division to expedite disposal of debris generated by disasters.	Utility/ Infrastructure Failure	Emergency Manager	Low	1,2	\$300,000	Local, State, Federal	Five years	Not started, lack of funding
Wallace County-30	Purchase an Outage Reporting System that will combine the electric SCADA with GIS data to reduce response time.	All Hazards	Emergency Manager	Low	1,2,4	\$150,000	Local, State, Federal	Five years	Not started, lack of funding
Sharon Springs-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Sharon Springs-2	Initiate a program to reduce or eliminate flash flooding by incorporating a Storm Water Management Program. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$3,000,000	Local, State, Federal	Five years	Not started, lack of funding
Sharon Springs-3	Purchase NOAA weather radios for residents.	All Hazards	City Manager	High	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding



**Table 6.12: Wallace 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
Sharon Springs-4	Design and construct community safe rooms.	Tornado, Windstorm	City Manager	High	1,2	\$300,000 per site.	Local, State, Federal	Five years	Not started, lack of funding
Sharon Springs-5	Purchase backup generators for critical facilities	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$20,000 per generator	Local, State, Federal	Five years	Not started, lack of funding
City of Wallace-1	Purchase NOAA weather radios for residents.	All Hazards	City Manager	High	1,2	\$5,000	Local, State, Federal	Five years	Not started, lack of funding
City of Wallace-2	Design and construct community safe rooms.	Tornado, Windstorm	City Manager	High	1,2	\$300,000 per site.	Local, State, Federal	Five years	Not started, lack of funding
City of Wallace-3	Purchase backup generators for critical facilities	Utility/ Infrastructure Failure	City Manager	Medium	1,2	\$20,000 per generator	Local, State, Federal	Five years	Not started, lack of funding
USD#241-1	Seek funding for the design and construction of safe rooms in USD#241 facilities.	Tornado, Windstorm	Superintendent	Medium	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#241-2	Seek funding for the purchase and installation of backup generators for USD#241 facilities.	Utility/ Infrastructure Failure	Superintendent	Medium	1,2	\$80,000	Local, State, Federal	Five years	Not started, lack of funding
USD#242-1	Design and construct safe rooms in USD#242 facilities.	Tornado, Windstorm	Superintendent	Medium	1,2	\$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD#242-2	Seek funding for the purchase and installation of backup generators for USD# 242 facilities.	Utility/ Infrastructure Failure	Superintendent	Medium	1,2	\$80,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-1	Enhance and upgrade electric transmission and distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$2,900,000	Local, State, Federal	Five years	Not started, lack of funding
Midwest Energy-2	Enhance and upgrade gas distribution lines.	All Hazards	VP, Operations	Medium	1,2	\$500,000	Local, State, Federal	Five years	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 2015 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 A 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 A 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

Key to achieving across the board reduction in flood damages is a robust community assistance, education and awareness program. As such, Kansas Region A 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 6.13: 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 6.13: 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.
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. <a href="https://agriculture.ks.gov/divisions-programs/division-of-conservation/flood-control-and-lakes-programs">https://agriculture.ks.gov/divisions-programs/division-of-conservation/flood-control-and-lakes-programs</a>
(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





**Table 6.13: Additional Potential Hazard Mitigation Funding Mechanisms**

Department	Program	Program Description
		practices must be approved by the chief engineer of the Division of Water Resources. <a href="https://agriculture.ks.gov/divisions-programs/division-of-conservation/flood-control-and-lakes-programs">https://agriculture.ks.gov/divisions-programs/division-of-conservation/flood-control-and-lakes-programs</a>
(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. <a href="https://agriculture.ks.gov/divisions-programs/division-of-conservation/financial-assistance">https://agriculture.ks.gov/divisions-programs/division-of-conservation/financial-assistance</a>
(KDA-DoC)	Water Conservation Program	Provides financial incentives for voluntary retirements of private water rights in high priority areas. For more information about WRAP enrollment opportunities, please contact
Kansas Department of Agriculture – Division of Water Resources (KDA-DWR)	Community Assistance Program State Support Services Element	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. <a href="https://agriculture.ks.gov/divisions-programs/dwr/floodplain/flood-safety-2">https://agriculture.ks.gov/divisions-programs/dwr/floodplain/flood-safety-2</a>
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 <a href="https://www.kansascommerce.gov/programs-services/community-development-assistance/community-service-tax-credit-program/">https://www.kansascommerce.gov/programs-services/community-development-assistance/community-service-tax-credit-program/</a>
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. <a href="http://www.kdheks.gov/mining/abandoned_mineland.htm">http://www.kdheks.gov/mining/abandoned_mineland.htm</a>
Kansas Department of Commerce (KDC)	CDBG Urgent Need Grant Abandoned Mine Land Program	This funding is intended to resolve emergency issues created by a severe disaster that pose a threat to the health and safety of citizens. <a href="https://www.kansascommerce.gov/programs-services/community-development-assistance/community-development-block-grant-program/urgent-need/">https://www.kansascommerce.gov/programs-services/community-development-assistance/community-development-block-grant-program/urgent-need/</a>
KDHE-BER	Kansas Brownfields Program	Programs to assist communities with the redevelopment of brownfields properties <a href="http://www.kdheks.gov/brownfields/index.html">http://www.kdheks.gov/brownfields/index.html</a>
KDHE-BER	State Water Plan Contamination Remediation Orphan Sites 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 <a href="http://www.kdheks.gov/ars/swp/index.html">http://www.kdheks.gov/ars/swp/index.html</a>
Kansas Department of Transportation	Transportation Alternative Program	This is an annual competitive Federal Transportation Alternatives program that can be used for transportation enhancement activities that include: Vegetation Management - improvement of roadway safety; prevention of invasive species; providing erosion control.



**Table 6.13: Additional Potential Hazard Mitigation Funding Mechanisms**

Department	Program	Program Description
		Stormwater Mitigation - pollution prevention and abatement activities to address stormwater management; water pollution prevention related to highway construction or due to highway runoff. Wildlife Management - reduction of vehicle-caused wildlife mortality; restoration and maintenance of connectivity among terrestrial or aquatic habitats. <a href="http://www.ksdot.org/bureaus/burtransplan/TransAlt.asp">http://www.ksdot.org/bureaus/burtransplan/TransAlt.asp</a>
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. <a href="https://www.kansasforests.org/community_forestry/">https://www.kansasforests.org/community_forestry/</a>
KFS	Rural Forestry Program	Professional foresters provide on-site forest management and agro-forestry analysis and recommendations through inventory of forests, woodlands and windbreaks. <a href="https://www.kansasforests.org/rural_forestry/">https://www.kansasforests.org/rural_forestry/</a>
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. <a href="https://www.kansasforests.org/fire_management/fireprevention.html">https://www.kansasforests.org/fire_management/fireprevention.html</a>
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. <a href="https://www.kansasforests.org/forest_health/">https://www.kansasforests.org/forest_health/</a>
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. <a href="https://www.kansasforests.org/forest_health/">https://www.kansasforests.org/forest_health/</a>
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. <a href="https://www.kansashighwaypatrol.org/">https://www.kansashighwaypatrol.org/</a>
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.





**Table 6.13: Additional Potential Hazard Mitigation Funding Mechanisms**

Department	Program	Program Description
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. <a href="https://www.kwo.ks.gov/">https://www.kwo.ks.gov/</a>
KWO	Stream Gauging Program	State financial assistance is provided for the operation of selected gauging stations operated by the U.S. Geological Survey. <a href="https://www.kwo.ks.gov/projects/stream-gaging-network">https://www.kwo.ks.gov/projects/stream-gaging-network</a>
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. (For assistance contact KWO at 785-296-3185.
KWO	Water Resource Planning	As the water planning, policy, coordination and marketing agency for the state the Kansas Water Office works to maintain a comprehensive State Water Plan for the management, conservation and development of the water resources of the state. This includes the collection and compilation of information pertaining to climate, water and soil as related to the usage of water for agricultural, industrial and municipal purposes and the availability of water supplies in the several watersheds of the state; development of a state plan of water resources management, conservation and development for water planning areas; the development and maintenance of guidelines for water conservation plans and practices; and The establishment of guidelines as to when conditions indicative of drought exist. <a href="https://www.kwo.ks.gov/about-the-kwo/kwo">https://www.kwo.ks.gov/about-the-kwo/kwo</a>



# 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 A 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 A

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 A 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 A, 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 into 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.

- **Three years before plan expiration, Spring:** 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.
- **Three years before plan expiration, Fall:** 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.
- **Two years before plan expiration, Spring:** 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. Work will begin on HMP revision.
- **Two years before plan expiration, Fall:** The MPC will evaluate the policies, programs, capabilities, and funding sources from the previous plan and plan revision to determine if they are still accurate and determine if additions are required.





- **One year before plan expiration:** Work will begin on the revision of the 2019 HMP.
- **Six months before plan expiration:** The MPC will review the final draft copy of the mitigation plan and make comments and updates if necessary. All participating jurisdictions and the public will be given an opportunity to review and comment on draft HMP.
- **Two months before plan expiration:** Formal submittal to FEMA for re-approval.

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 HMP.

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. 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:

- Budget revisions or adoptions
- Capital improvement plans
- General or master plans
- Hiring of staff
- Land use planning
- Operation plans
- Ordinances
- Stormwater planning

Participating jurisdictions are encouraged to utilize all available budget avenues for the completion of hazard mitigation items. Budgetary options may include:

- Annual budgets
- Application for grant funding
- Departmental budgets
- 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



# **Appendix A**

## **Adoption Resolutions**





### Model Resolution

Resolution # \_\_\_\_\_: **Adopting the Kansas Homeland Security Region A Hazard Mitigation Plan**

**Whereas**, the (Name of Government/District/Organization) recognizes the threat that natural hazards pose to people and property within our community; and

**Whereas**, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

**Whereas**, the U.S. Congress passed the Disaster Mitigation Act of 2000 (“Disaster Mitigation Act”) emphasizing the need for pre-disaster mitigation of potential hazards;

**Whereas**, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

**Whereas**, an adopted Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

**Whereas**, the (Name of Government/District/Organization) fully participated in the FEMA prescribed mitigation planning process to prepare this Multi-Hazard Mitigation Plan; and

**Whereas**, the Kansas Division of Emergency Management and FEMA Region VII officials have reviewed the Kansas Homeland Security Region A Hazard Mitigation Plan, and approved it contingent upon this official adoption of the participating governing body; and

**Whereas**, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Kansas Homeland Security Region A Hazard Mitigation Plan; and

**Whereas**, adoption by the governing body for the (Name of Government/District/Organization) demonstrates the jurisdictions’ commitment to fulfilling the mitigation goals and objectives outlined in this plan, and

**Whereas**, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

**Now, therefore, be it resolved**, that the (Name of Government/District/Organization) adopts the Kansas Homeland Security Region A Hazard Mitigation Plan as an official plan; and

**Be it further resolved**, the (Name of Government/District/Organization) will submit this Adoption Resolution to the Kansas Division of Emergency Management and FEMA Region VII officials to enable the plan’s final approval.

\_\_\_\_\_:Date \_\_\_\_\_: Approved by





# **Appendix B**

## **FEMA Approval Documents**



# **Appendix C**

## **Meeting Minutes**



**To** Region A Hazard Mitigation Planning Committee  
**Through** Jenni Ellerman, Mitigation Planner  
Kansas Division of Emergency Management (KDEM)  
**From** Jenni Ellerman, Hazard Mitigation Planner  
Kansas Division of Emergency Management (KDEM)  
**Date** 09 June 2020  
**Subject** Minutes from the Region A Kickoff Mitigation Planning Meeting

## **Agenda**

The meeting was scheduled to review the process for completing the Hazard Mitigation Plan for Kansas Region A. Topics covered during the meeting include: (1) an introduction to hazard mitigation planning, (2) participating jurisdictions, (3) hazards, (4) grant funding opportunities, (5) required participation requirements, (6) first step paperwork, and (7) next steps. The meeting concluded with a discussion of the next steps in the planning process.

## **Introductions**

Jeanne Bunting with KDEM began the meeting by welcoming and thanking the attendees. Participants introduced themselves and identified what jurisdiction they represented.

## **Hazard Mitigation Planning Process**

Matt Eyer, the plan author contractor, presented information on the purpose and requirements of the Disaster Mitigation Act of 2000. The attendees were reminded that this is a regional planning effort which will update the current Region A mitigation plan. The plan includes Cheyenne, Decatur, Gove, Logan, Rawlins, Sheridan, Sherman, Thomas, and Wallace counties. The presentation also addressed the benefits for jurisdictions participating in this mitigation plan update, including eligibility for federal hazard mitigation assistance funding programs.

Matt Eyer described the benefits of participating in a multi-jurisdictional plan as improving coordination and communication among local jurisdictions and that these hazards do not stop at jurisdictional boundaries thus this multi-jurisdictional plan allows for a more comprehensive approach. The group also heard information regarding the significant cost savings being realized by the regional approach to planning. The regional approach now being used allows planning services to be provided to each county for the update at no cost to the county. Matt Eyer with Blue Umbrella will be completing the Region “C” mitigation plan for committee review.

Mr. Eyer also described the role of the Mitigation Planning Committee (MPC). Each jurisdiction participating in development of the plan must meet the following minimum requirements:

- Designate a representative to serve on the Region A MPC, which will meet twice during the planning process, Emergency Managers will meet three times.
- Provide data for and assist in the development of the updated risk assessment that describes how various hazards impact your jurisdiction,
- Provide data to describe current capabilities,
- Develop/update mitigation actions (at least one) specific to your jurisdiction,
- Provide comments on plan drafts as requested,
- Inform the public, local officials, and other interested parties about the planning process and provide opportunities for them to comment on the plan, and
- Formally adopt the mitigation plan.

## Planning for Public Involvement

The local/regional hazard mitigation plan requirements state that the public must have the opportunity to comment on the plan. The public will be given two opportunities to comment on the plan, once during the drafting stage and another when the plan is complete in the final draft stage. KDEM is planning to utilize a questionnaire on SurveyMonkey.com to ask the public's opinion about hazards that affect them during the drafting stage. The MPC members in the county are also requested to post the SurveyMonkey.com link, once available, on their websites and newsletters to the public and to distribute the survey as widely as possible.

## Data Collection Process

The participating jurisdictions at the meeting were provided hard copies of Data Collection Guides. Local County Emergency Management Agencies will follow-up with jurisdictions that were not in attendance at this meeting to provide an overview of the process being used and copies of data collection guides for completion. Mr. Eyer briefed on the Data Collection Guides and reminded the attendees that they are specific for local units of government and schools. There are two different guides, one for local governments, and one for schools and universities. The jurisdictions were requested to provide data regarding hazards that had occurred in their jurisdiction since the last plan update for the hazards in the Regional Plan.

## Plan Format/ Regional and Countywide Risk Assessment

The list of hazards in the State of Kansas plan is the list that is being used for the regional plans. All of the hazards included in the State Plan were included in the current plan for the counties in Region A. Blue Umbrella staff will be updating the regional hazard ranking using the State Plan methodology for hazards in their current plan.

## Hazard Mitigation Assistance Grants Available Linked to Approved Plan

The following four Hazard Mitigation Assistance grant programs were outlined, priority activities discussed, deadline of grants, and current funds available for:

- Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities (BRIC)
- Flood Mitigation Assistance (FMA)
- POST HMGP Fire

## Attendees

This meeting was conducted online due to the COVID-19 pandemic and social distancing requirements. Due to the online nature of this meeting, no attendance form was circulated. The following MPC members were charged with overseeing jurisdictional participants from their county.

MPC Member	Title	Organization
Ryan Murray	Emergency Manager	Cheyenne County
Jenni Cravens	Assistant Director	Cheyenne County
Jacque Boultinghouse	Emergency Manager	Decatur County
Mike Haase	Emergency Manager	Gove County
George Pappy Lies	Emergency Manager	Logan County
Ryan Murray	Emergency Manager	Rawlins County

<b>MPC Member</b>	<b>Title</b>	<b>Organization</b>
Jenni Cravens	Assistant Director	Rawlins County
Don Koerperich	Emergency Manager	Sheridan County
Ryan Murray	Emergency Manager	Sherman County
Jenni Cravens	Assistant Director	Sherman County
David Becker	Emergency Manager	Thomas County
Larry Townsend	Emergency Manager	Wallace County

## Next Steps

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- October 2020 – Mid-Term Meeting
- November 2020 – Final Meeting
- November 2020 – Submit plan to FEMA

//s//

Jennifer Ellerman, Hazard Mitigation Planner, KDEM

**To** Region A Hazard Mitigation Planning Committee  
**Through** Jenni Ellerman, Mitigation Planner  
Kansas Division of Emergency Management (KDEM)  
**From** Jenni Ellerman, Hazard Mitigation Planner  
Kansas Division of Emergency Management (KDEM)  
**Date** 14 October 2020  
**Subject** Minutes from the Region A Mid-Term Mitigation Planning Meeting

## Agenda

The meeting was scheduled to review the draft Hazard Mitigation Plan for Kansas Region A. Topics covered during the meeting include: (1) participating jurisdictions, (2) mitigation actions, (3) capability assessment, (4) public feedback, (5) plan review, and (6) next steps. The meeting concluded with a discussion of the next steps in the planning process and the necessity to open the plan for public comment.

## Attendees

This meeting was conducted online due to the COVID-19 pandemic and social distancing requirements. Due to the online nature of this meeting, no attendance form was circulated. The following MPC members were in attendance.

<b>MPC Member</b>	<b>Title</b>	<b>Organization</b>
Ryan Murray	Emergency Manager	Cheyenne County
Jenni Cravens	Assistant Director	Cheyenne County
Jacque Boultinghouse	Emergency Manager	Decatur County
Mike Haase	Emergency Manager	Gove County
George Pappy Lies	Emergency Manager	Logan County
Ryan Murray	Emergency Manager	Rawlins County
Jenni Cravens	Assistant Director	Rawlins County
Don Koerperich	Emergency Manager	Sheridan County
Ryan Murray	Emergency Manager	Sherman County
Jenni Cravens	Assistant Director	Sherman County
David Becker	Emergency Manager	Thomas County
Larry Townsend	Emergency Manager	Wallace County

## Next Steps

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- November 4, 2020 – Final Meeting
- November 16, 2020 – Submit plan to FEMA

//s//

Jennifer Ellerman, Hazard Mitigation Planner, KDEM



**To** Region A Hazard Mitigation Planning Committee  
**Through** Jenni Ellerman, Mitigation Planner  
Kansas Division of Emergency Management (KDEM)  
**From** Jenni Ellerman, Hazard Mitigation Planner  
Kansas Division of Emergency Management (KDEM)  
**Date** 11 November 2020  
**Subject** Minutes from the Region A Final Mitigation Planning Meeting

## Agenda

The meeting was scheduled to finalize the draft Hazard Mitigation Plan for Kansas Region A. Topics covered during the meeting included: (1) process review, (2) review of participation jurisdictions, (3) final steps, and (4) public plan review, and (5) FEMA submission. The meeting concluded with a discussion of the next steps in the planning process and the necessity to open the plan for public comment.

## Attendees

This meeting was conducted online due to the COVID-19 pandemic and social distancing requirements. Due to the online nature of this meeting, no attendance form was circulated. To ensure wide circulation and participation, the following Hazard Mitigation Committee members were tasked with conducting outreach to participating jurisdictions within their county.

MPC Member	Title	Organization
Ryan Murray	Emergency Manager	Cheyenne County
Jenni Cravens	Assistant Director	Cheyenne County
Jacque Boultinghouse	Emergency Manager	Decatur County
Mike Haase	Emergency Manager	Gove County
George Pappy Lies	Emergency Manager	Logan County
Ryan Murray	Emergency Manager	Rawlins County
Jenni Cravens	Assistant Director	Rawlins County
Don Koerperich	Emergency Manager	Sheridan County
Ryan Murray	Emergency Manager	Sherman County
Jenni Cravens	Assistant Director	Sherman County
David Becker	Emergency Manager	Thomas County
Larry Townsend	Emergency Manager	Wallace County

## Next Steps

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- November 16, 2020 – Submit Plan to FEMA

//s//

Jeanne Bunting, State Hazard Mitigation Officer, KDEM

**Appendix D**  
**Critical Facilities**  
**(Restricted, Not for Release)**

RESTRICTED



## Introduction to Critical Facilities

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
- HazMat Facilities
- Hospitals and other medical facilities
- Police stations
- As deemed necessary by the jurisdiction

The information below is the inventory of critical facilities for all participating jurisdictions who elected to provide this information for this plan. All information was gathered from the Kansas Division of Emergency Management, participating jurisdictions, and prior plans.

**Details concerning critical facilities have been deemed as sensitive information, and as such their specific information is not for release to the general public.**



## Cheyenne County Critical Facilities

Cheyenne County			
Facility and/or Asset Name	Number of Facilities	Replacement or Estimated Value	Occupancy
Communications (radio, TV, similar)	1	\$8,410	0
County Emergency Operations Center	1	\$0	0
Fire / EMS stations	0	\$0	0
Hospital	1	\$2,502,500	95
Law Enforcement (Sheriff / Police Bldgs)	0	\$0	0
Emergency shelters (Schools, other)	0	\$0	0
Major government buildings	3	\$1,276,210	39
Major roads	193 miles	\$644,044,000	0
Bridges	97	\$31,684,000	0
Fuel storage areas	1	\$50,000	0
Electric / Gas utilities	3	\$210,036,000	0
Pumping stations	0	\$0	0
Response staging areas	0	\$0	0
Sewage treatment plants	0	\$0	0
Transportation systems	4	\$217,189,000	0
Water treatment plants	1	\$63,270,000	1
Wells and storage tanks	0	\$0	0



## Decatur Critical Facilities

Decatur County			
Facility and/or Asset Name	Number of Facilities	Replacement or Estimated Value	Occupancy
Communications (radio, TV, similar)	2	\$190,000	5
County Emergency Operations Center (	1	\$153,630	12
Fire / EMS stations	1	\$570,000	4
Hospital	1	\$6,650,000	100
Law Enforcement (Sheriff/Police Bldgs)	3	\$3,990,000	7
Emergency shelters (Schools, other)	4	\$1,900,000	40
Major roads (	177 miles	\$698,011,000	0
Bridges	51	\$34,153,000	0
Electric / Gas utilities	1	\$104,500,000	0
Sewage treatment plants	2	\$126,540,000	0
*Transportation systems	4	\$116,267,000	0



## Gove County Critical Facilities

Gove County			
Facility and/or Asset Name	Number of Facilities	Replacement or Estimated Value	Occupancy
Hospital	1	\$5,925,540	50
Major government buildings (EOC and LEC located in Courthouse)	2	\$1,766,503	25
Major roads	76 miles	\$468,854,127	0
Bridges	114	\$54,918,292	0
Transportation systems	2	\$0	0





## Logan Critical Facilities

Logan County			
Facility and/or Asset Name	Number of Facilities	Replacement or Estimated Value	Occupancy
Fire / EMS stations	2	\$1,019,460	30
Hospital	1	\$4,332,510	140
Major government buildings (LEC and EOC located in Courthouse)	1	\$826,090	24
Major roads	138	\$840,341,850	0
Bridges	46	\$25,262,690	0



## Rawlins County Critical Facilities

Rawlins County			
Facility and/or Asset Name	Number of Facilities	Replacement or Estimated Value	Occupancy
Fire / EMS stations	2	\$1,140,000	3
Hospital / Clinics	1	\$3,325,000	60
Law Enforcement Center (Sheriff/Police)	2	\$2,660,000	8
Major government buildings	2	\$772,160	22
Major roads	136	\$500,280,000	0
Bridges	138	\$39,303,000	0
Electric / Gas utilities	3	\$210,036,000	6
Sewage treatment plants	1	\$181,014,000	0
Transportation systems	4	\$181,014,000	0



## Sheridan County Critical Facilities

Sheridan County			
Facility and/or Asset Name	Address	Replacement or Estimated Value	Occupancy
Communications (radio, TV, similar)	2	\$300,000	0
County Emergency Operations Center (see LE below)	0	\$0	0
Fire / EMS stations	8	\$1,140,000	10
Hospital(s)	1	\$6,650,000	150
Law Enforcement (Sheriff/Police Bldgs)	2	\$2,660,000	9
Emergency shelters (Schools, Other)	3	\$1,425,000	30
Major government buildings	9	\$25,000,000	25
Major roads	149 miles	\$512,359,000	0
Bridges	42	\$24,398,000	0
Fuel storage areas	4	\$24,000	0
Electric / Gas utilities	2	\$105,536,000	4
Pumping stations	2	\$50,000	0
Response staging areas	0	\$0	0
Sewage treatment plants	2	\$63,400,000	2
Transportation systems	4	\$86,400,000	10
Water treatment plants	0	\$0	0
Wells and storage tanks	6	\$600,000	0



## Sherman County Critical Facilities

Sherman County			
Facility and/or Asset Name	Number of Facilities	Replacement or Estimated Value	Occupancy
Communications (radio, TV, similar)	5	\$475,000	20
County Emergency Operations Center (EOC)	1	\$950,000	1
Fire / EMS stations	1	\$570,000	1
Hospital(s)	1	\$5,986,700	160
Law Enforcement (Sheriff/Police Bldgs)	2	\$2,660,000	10
Major government buildings	4	\$2,401,870	75
Major roads	114	\$457,689,500	0
Bridges	113	\$54,643,890	0
Electric / Gas utilities	1	\$104,500,000	0
Transportation systems	48	\$244,070,000	0



## Thomas County Critical Facilities

Thomas County			
Facility and/or Asset Name	Address	Replacement or Estimated Value	Occupancy
Communications (radio, TV, similar)	4	\$380,000	10
County Emergency Operations Center (EOC)	1	\$100,000	2
Fire / EMS stations	2	\$1,140,000	10
Hospital (Citizens Medical Center)	1	\$6,650,000	250
Law Enforcement (Sheriff/Police Bldgs)	2	\$2,660,000	21
Emergency shelters (Schools)	9	\$4,275,000	350
Major government buildings	8	\$0	0
Major roads	310	\$1,188,412,000	0
Bridges	79	\$39,893,500	0
Fuel storage areas	0	\$0	0
Electric / Gas utilities	5	\$105,535,000	10
Pumping stations	0	\$0	0
Response staging areas	0	\$0	0
Sewage treatment plants	1	\$8,500,000	1
Transportation systems	4	\$164,963,500	10
Water treatment plants	1	\$63,270,000	1
Wells and storage tanks	9	\$2,250,000	5



## Wallace County Critical Facilities

Wallace County			
Facility and/or Asset Name	Address	Replacement or Estimated Value	Occupancy
Communications (radio, TV, similar)	-	-	-
County Emergency Operations Center	-	-	-
Fire / EMS stations	-	-	-
Hospital	-	-	-
Law Enforcement (Sheriff / Police Bldgs)	-	-	-
Emergency shelters (Schools, other)	-	-	-
Major government buildings	-	-	-
Major roads	-	-	-
Bridges	-	-	-
Fuel storage areas	-	-	-
Electric / Gas utilities	-	-	-
Pumping stations	-	-	-
Response staging areas	-	-	-
Sewage treatment plants	-	-	-
Transportation systems	-	-	-
Water treatment plants	-	-	-
Wells and storage tanks	-	-	-

-: No information provided





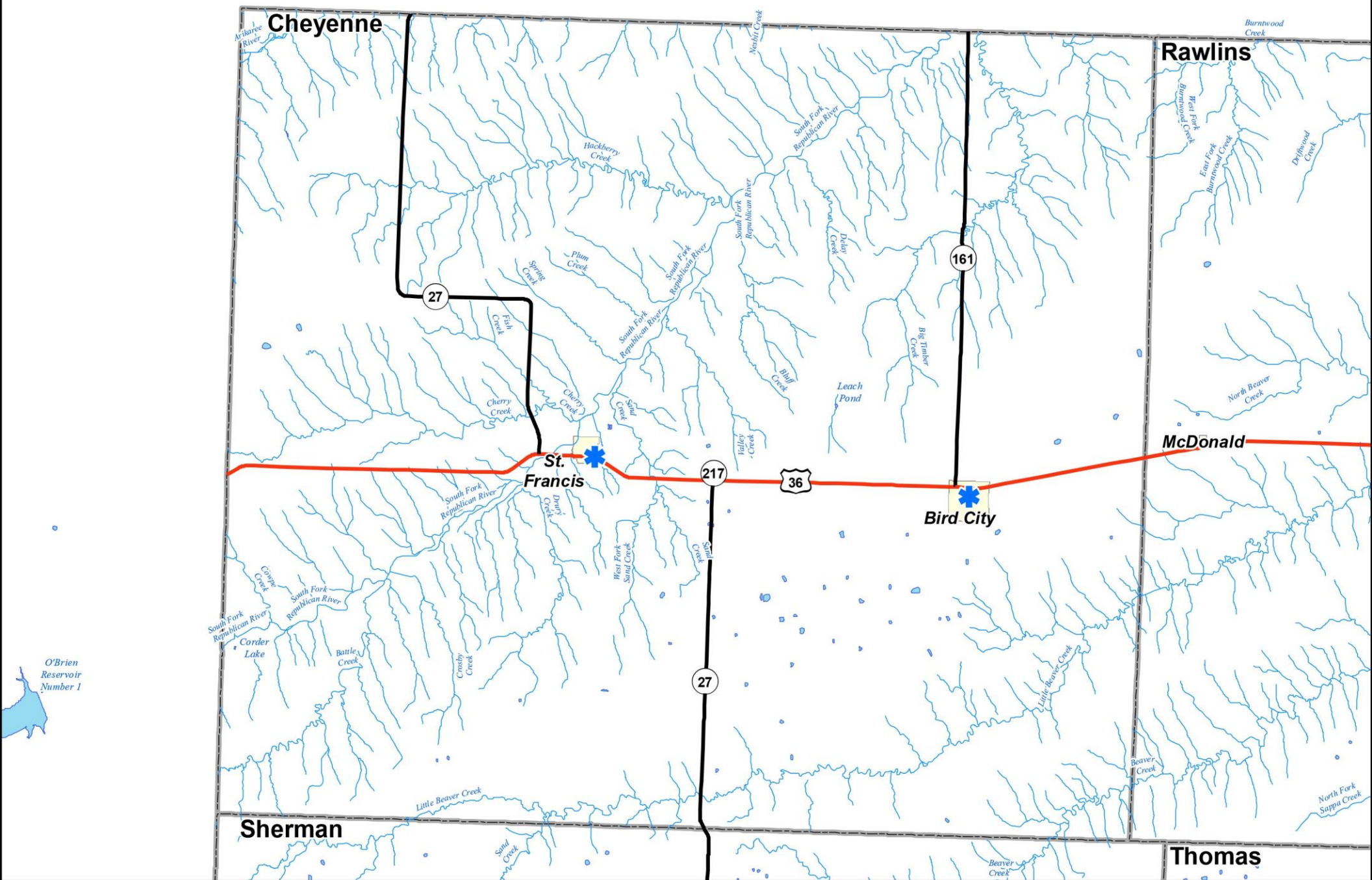
## Critical Facilities in Flood Plains

The following county maps show critical facilities located in flood plains, if flood plain information was available for the county. If flood plain information was not available, the location of the facilities is shown in relation to streams and bodies of water. Identified critical facilities include:

- Schools
- Police Stations
- Fire Stations
- Hospitals (if information made available)
- Elderly care facilities (if information made available)

Please note that not all participating counties and/or jurisdictions had this data available.





# **EMS locations, and Floodplains Cheyenne County, KS**

- ★ EMS
- Interstates
- US Highways
- Kansas Highways
- Lake
- Streams
- County Boudaries
- 0.2% chance flood hazard
- 1% chance flood hazard
- Cities (Census 2010)



0 2.5 5 10 Miles

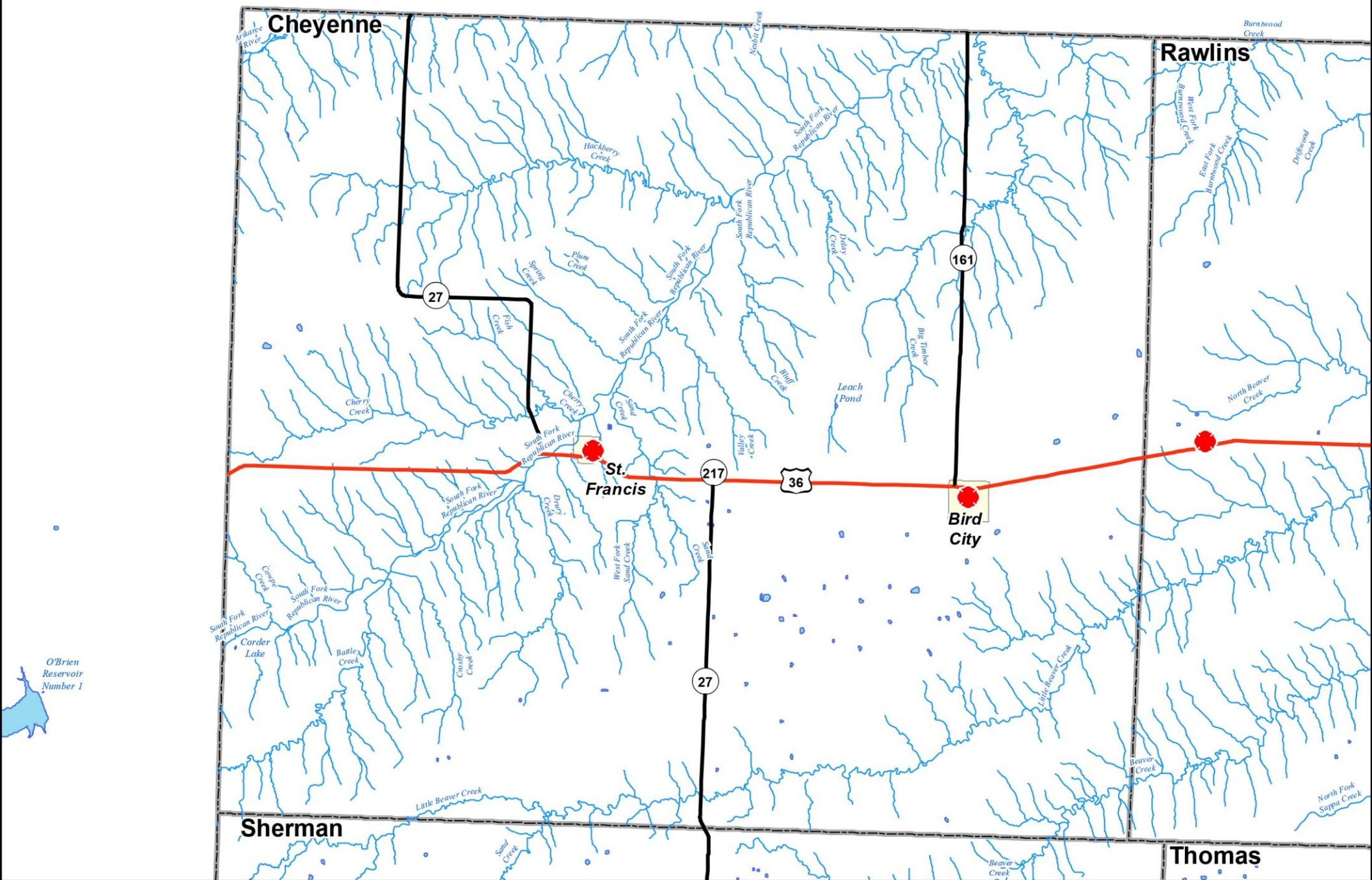
Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014



**Division of Emergency Management**





**Fire Stations  
and Floodplains  
Cheyenne  
County, KS**

- |                                                                                                  |                                                                                                            |                                                                                                              |
|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  Fire Station |  Interstates            |  County Boudaries         |
|  US Highways  |  Kansas Highways        |  0.2% chance flood hazard |
|  Lake         |  1% chance flood hazard |  Cities (Census 2010)     |
|  Streams      |                                                                                                            |                                                                                                              |

N

0 2.5 5 10 Miles

Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014

  
**Kansas**  
Adjutant General  
Division of Emergency Management

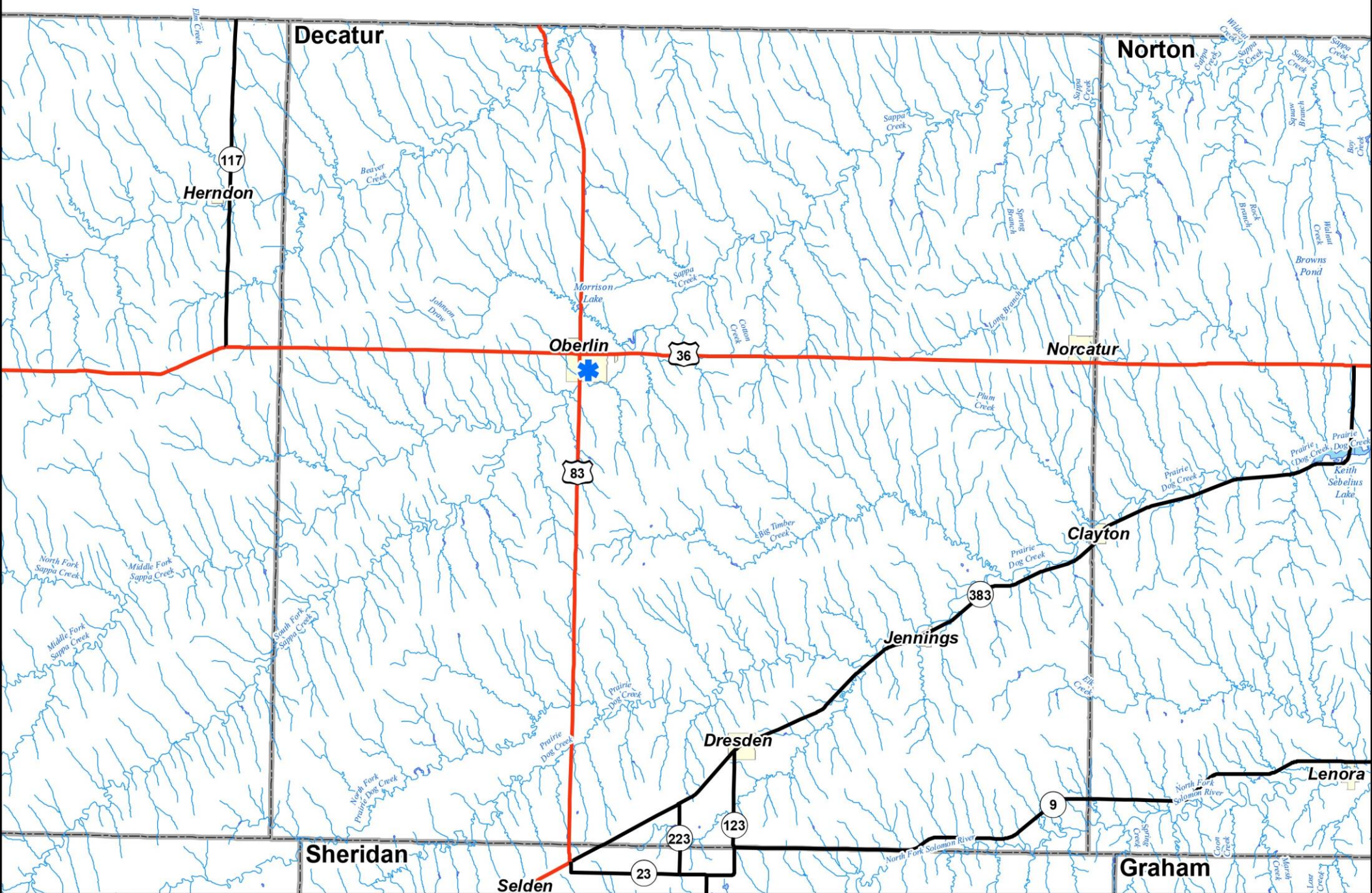













# **EMS locations, and Floodplains Decatur County, KS**

-  EMS
-  US Highways
-  Kansas Highways
-  Lake
-  Streams
-  County Boudaries
-  0.2% chance flood hazard
-  1% chance flood hazard
-  Cities (Census 2010)



0 2.5 5 10 Miles

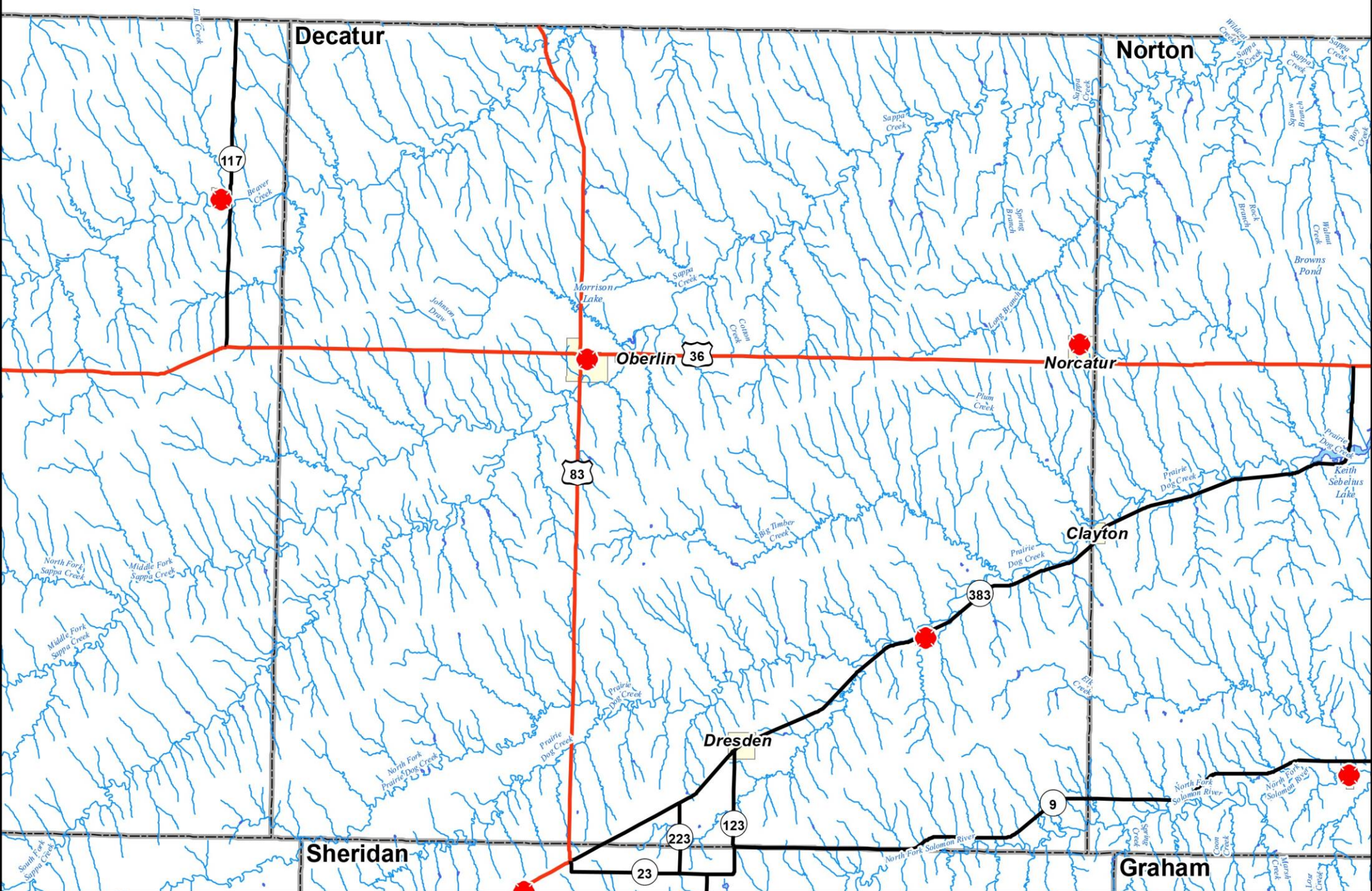
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Date: 2/10/2014





Division of Emergency Management





**Fire Stations  
and Floodplains  
Decatur  
County, KS**

- |                                                                                                     |                                                                                                              |                                                                                                          |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|  Fire Station    |  Interstates              |  County Boudaries     |
|  US Highways     |  0.2% chance flood hazard |  Cities (Census 2010) |
|  Kansas Highways |  1% chance flood hazard   |                                                                                                          |
|  Lake            |  Streams                  |                                                                                                          |

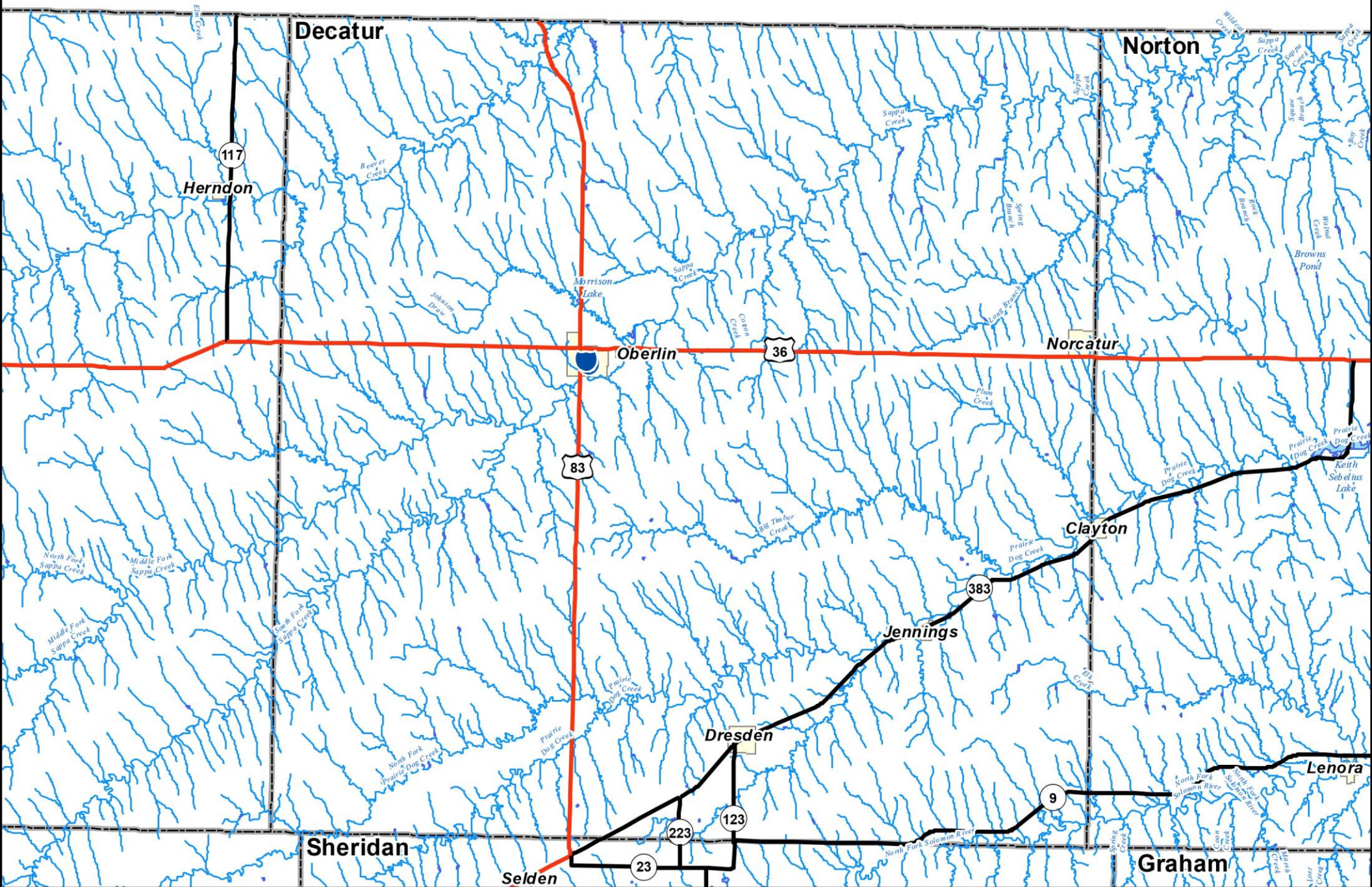
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0 2.5 5 10 Miles


Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

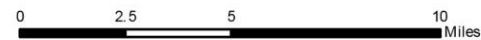
Date: 2/10/2014





**Law Enforcement  
and Floodplains  
Decatur  
County, KS**

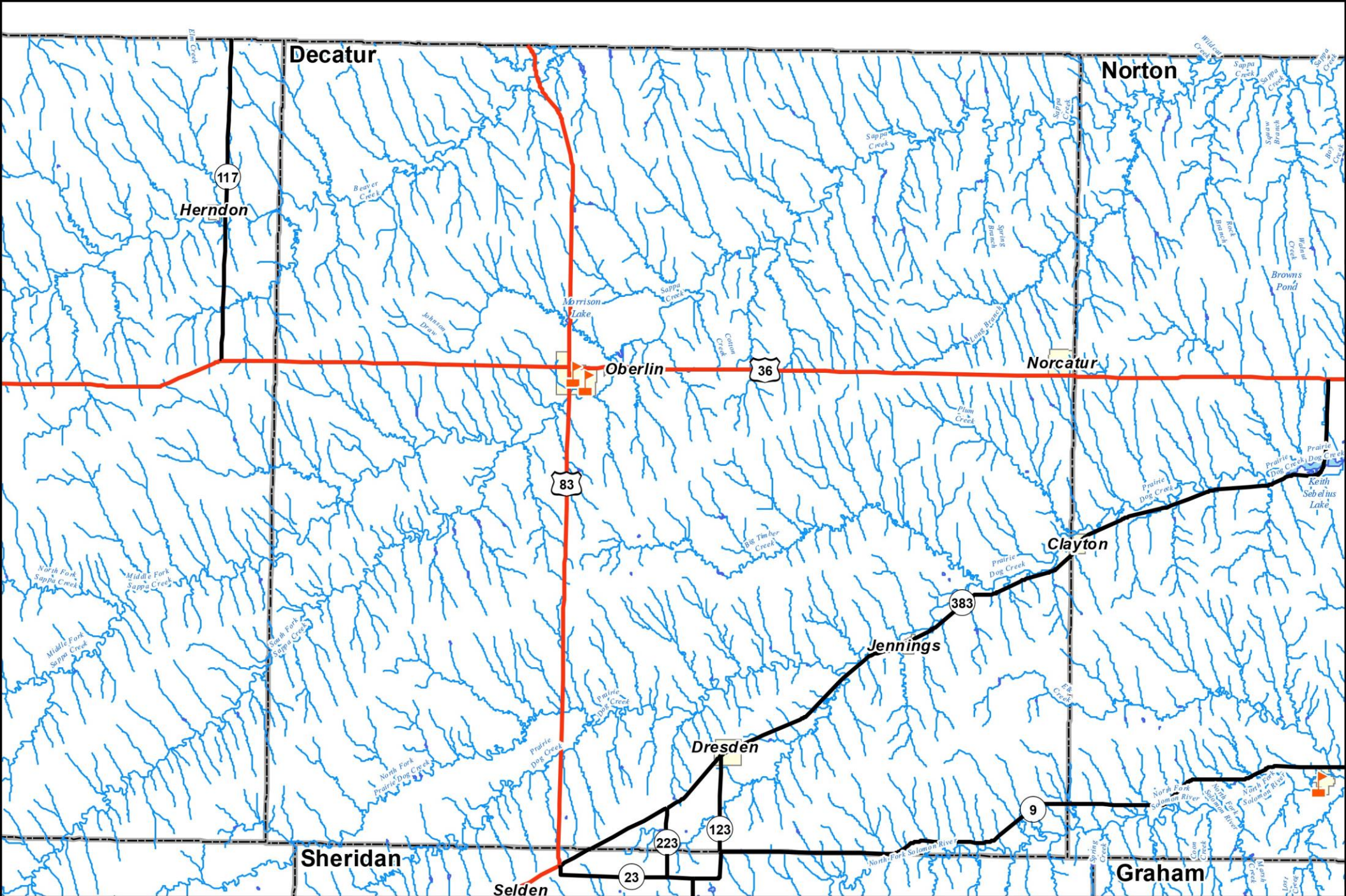
- |                                                                                     |                          |                                                                                     |                 |                                                                                     |                  |
|-------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|------------------|
|  | Law Enforcement          |  | Interstates     |  | County Boudaries |
|  | 0.2% chance flood hazard |  | US Highways     |  | City Boundaries  |
|  | 1% chance flood hazard   |  | Kansas Highways |  | Streams          |
|                                                                                     |                          |  | Lake            |                                                                                     |                  |




Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 3/6/2014





**Schools, Colleges  
and Floodplains  
Decatur  
County, KS**

- |                                                                                             |                                                                                                     |                                                                                                              |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  School  |  Interstates     |  County Boudaries         |
|  College |  US Highways     |  City Boundaries          |
|                                                                                             |  Kansas Highways |  0.2% chance flood hazard |
|                                                                                             |  Streams         |  1% chance flood hazard   |
|                                                                                             |  Lake            |                                                                                                              |

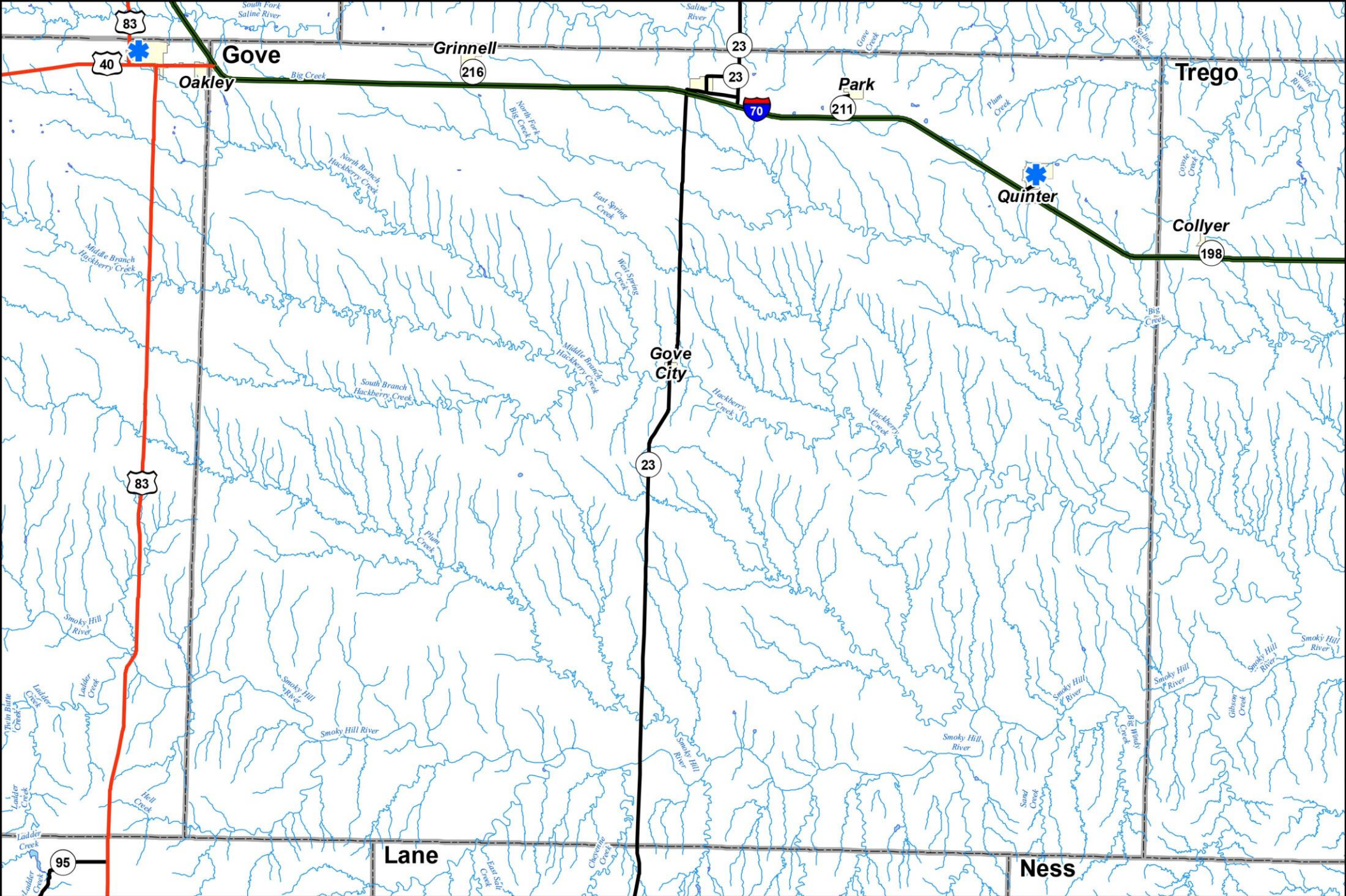
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0 2.5 5 10 Miles

Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 4/1/2014





# **EMS locations, and Floodplains** **Gove County, KS**

-  EMS
-  Interstates
-  US Highways
-  Kansas Highways
-  Lake
-  Streams
-  County Boudaries
-  0.2% chance flood hazard
-  1% chance flood hazard
-  Cities (Census 2010)



0 2.5 5 10 Miles

Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014

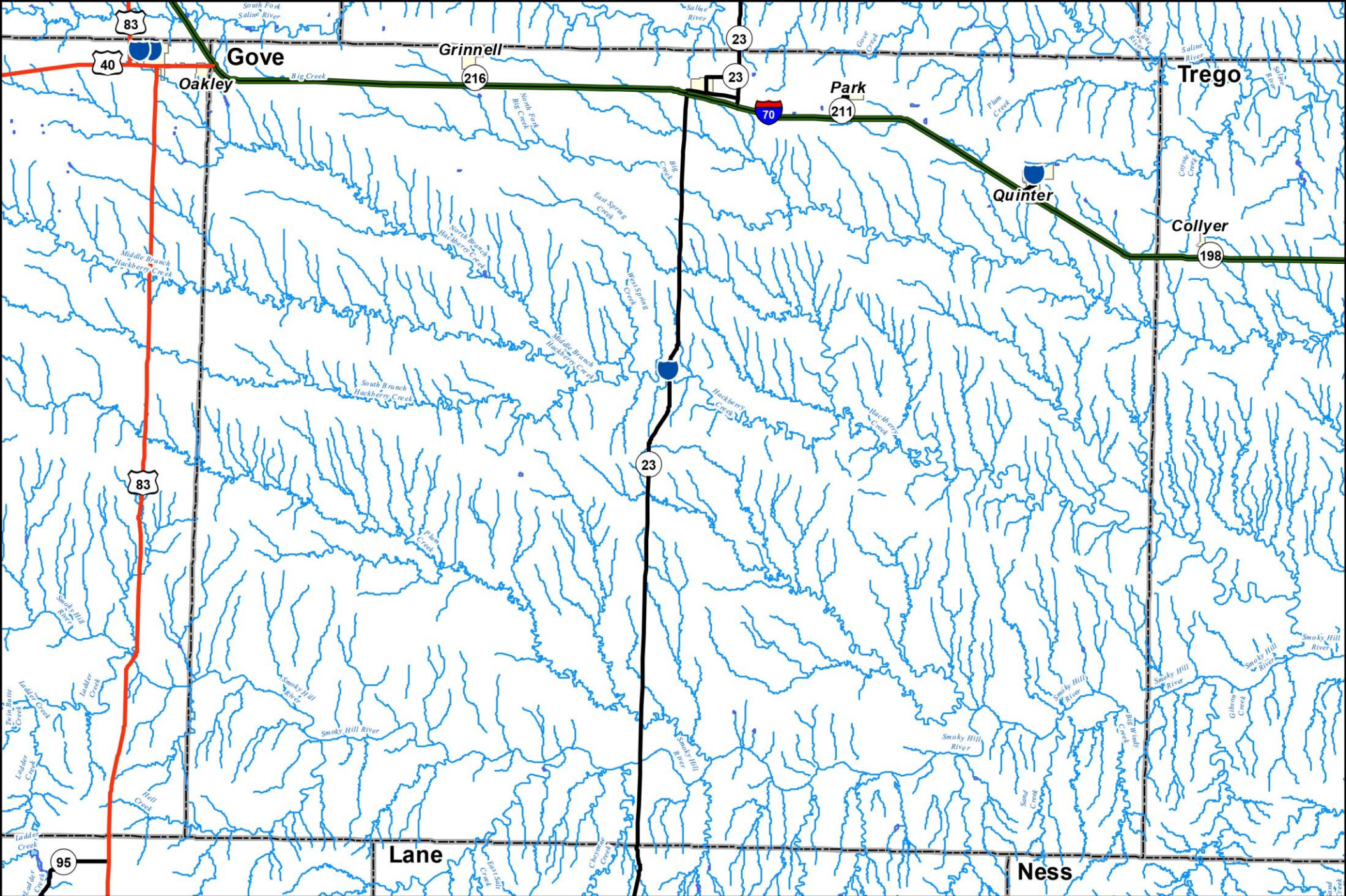


Division of Emergency Management



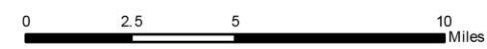






# **Law Enforcement and Floodplains** **Gove County, KS**

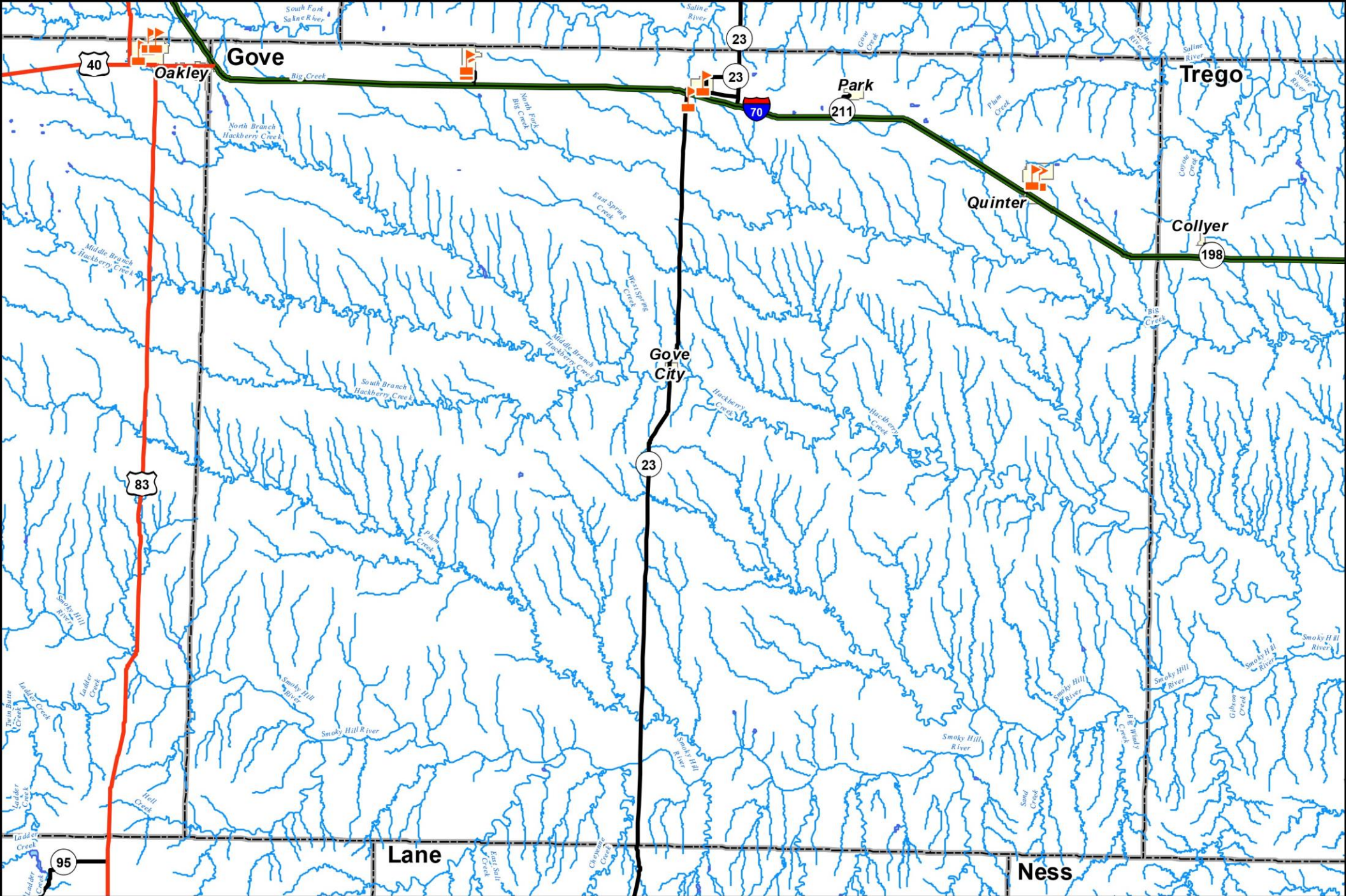
- Law Enforcement
- 0.2% chance flood hazard
- 1% chance flood hazard
- Interstates
- US Highways
- Kansas Highways
- Streams
- Lake
- County Boudaries
- City Boundaries



Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 3/6/2014

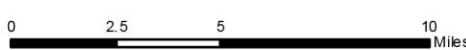




# Schools, Colleges and Floodplains

## Gove County, KS

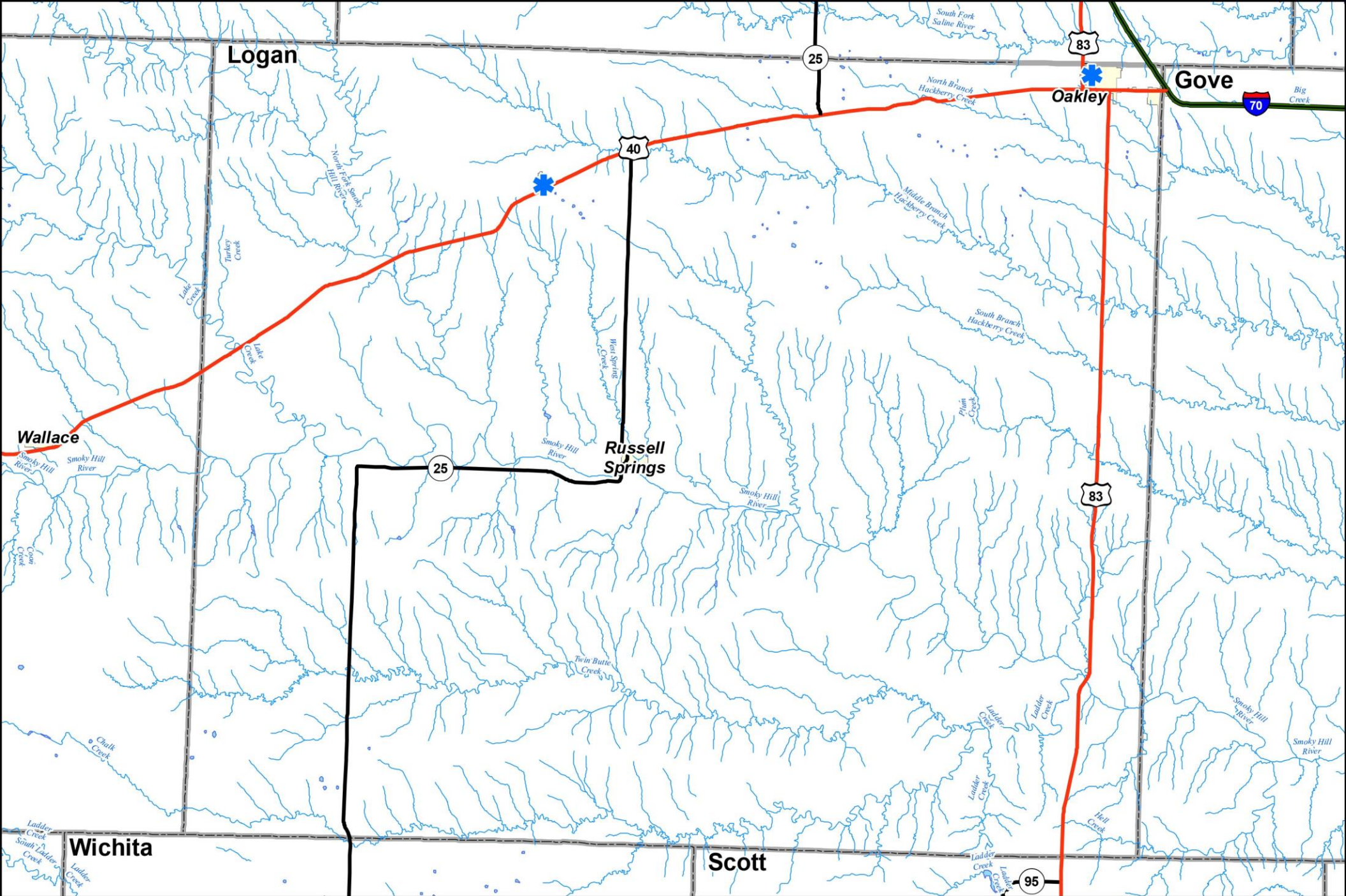
- |                                                                                             |                                                                                                     |                                                                                                              |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  School  |  Interstates     |  County Boudaries         |
|  College |  US Highways     |  City Boundaries          |
|                                                                                             |  Kansas Highways |  0.2% chance flood hazard |
|                                                                                             |  Streams         |  1% chance flood hazard   |
|                                                                                             |  Lake            |                                                                                                              |



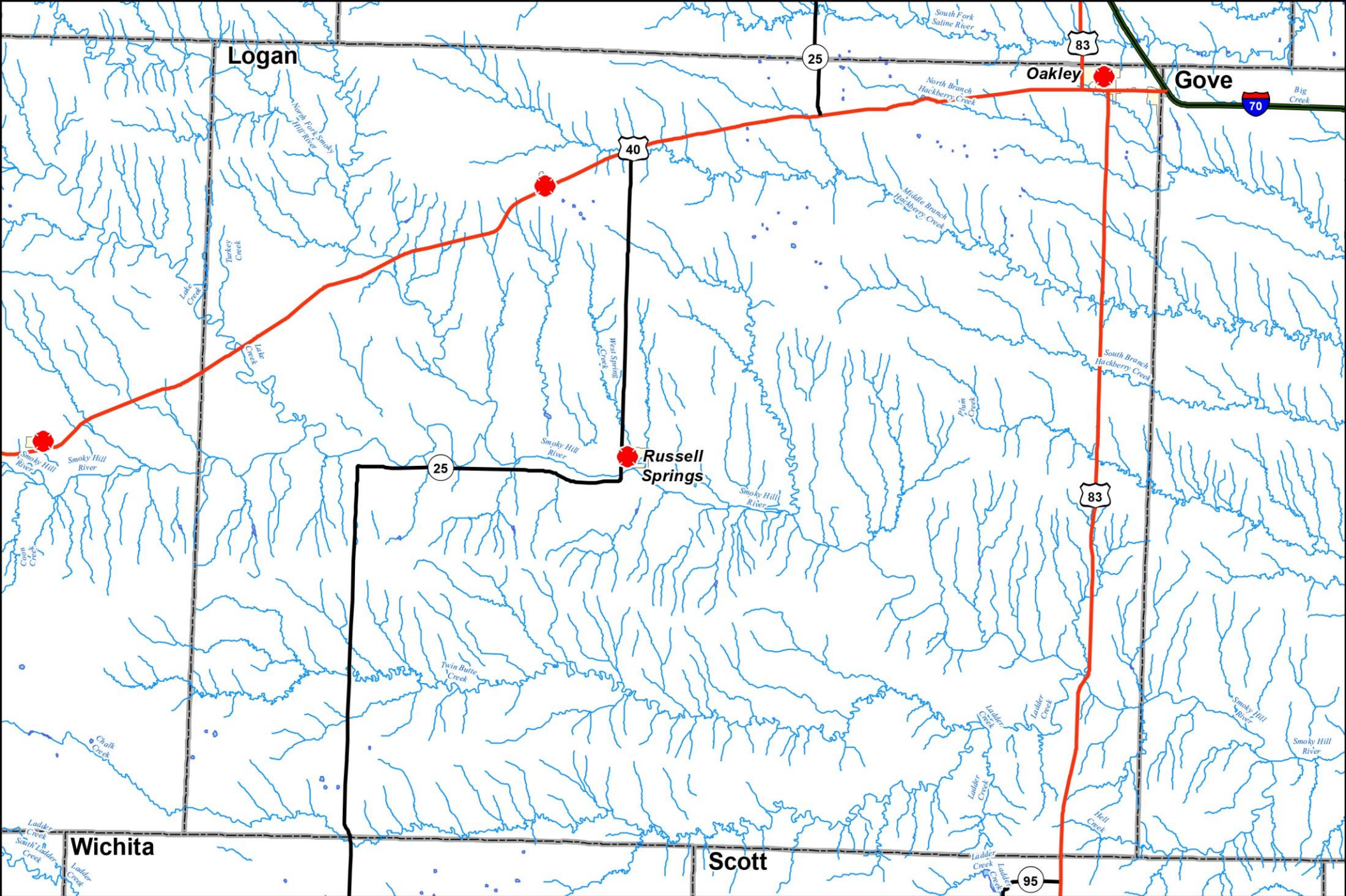
Data Sources: USGS, US Census Bureau, KS Adjutant General, KDOT, USDA

Date: 4/1/2014









# Fire Stations and Floodplains Logan County, KS

- Fire Station
- Interstates
- US Highways
- Kansas Highways
- Lake
- Streams
- County Boudaries
- 0.2% chance flood hazard
- 1% chance flood hazard
- Cities (Census 2010)



0 2.5 5 10 Miles

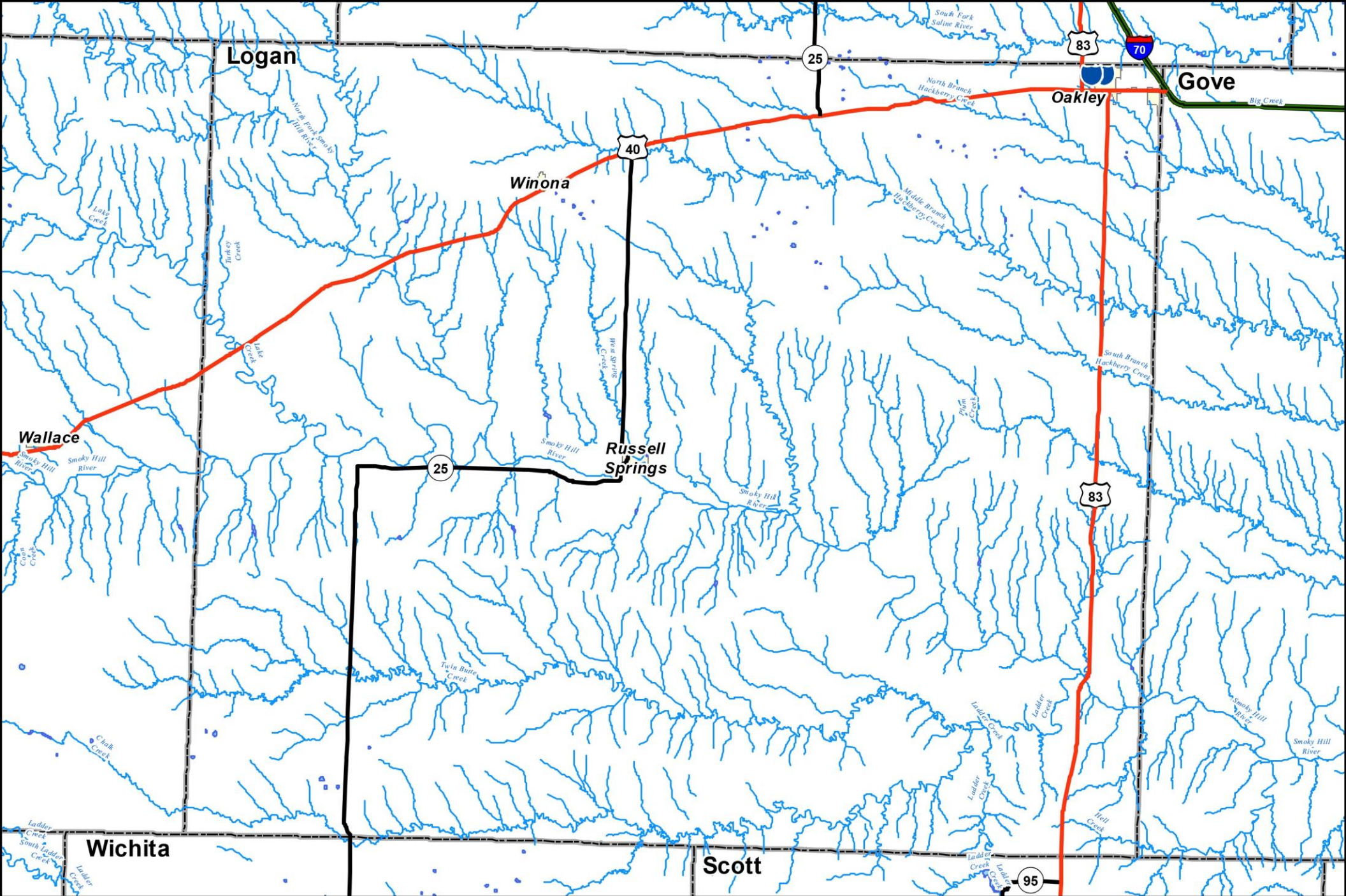
Data Sources: USGS, US Census Bureau, KS Adjutant General, KDOT, USDA

Date: 2/10/2014



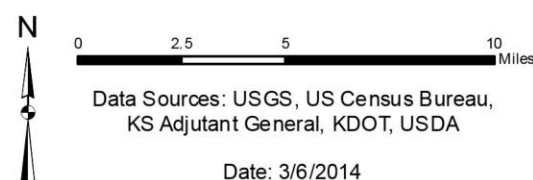
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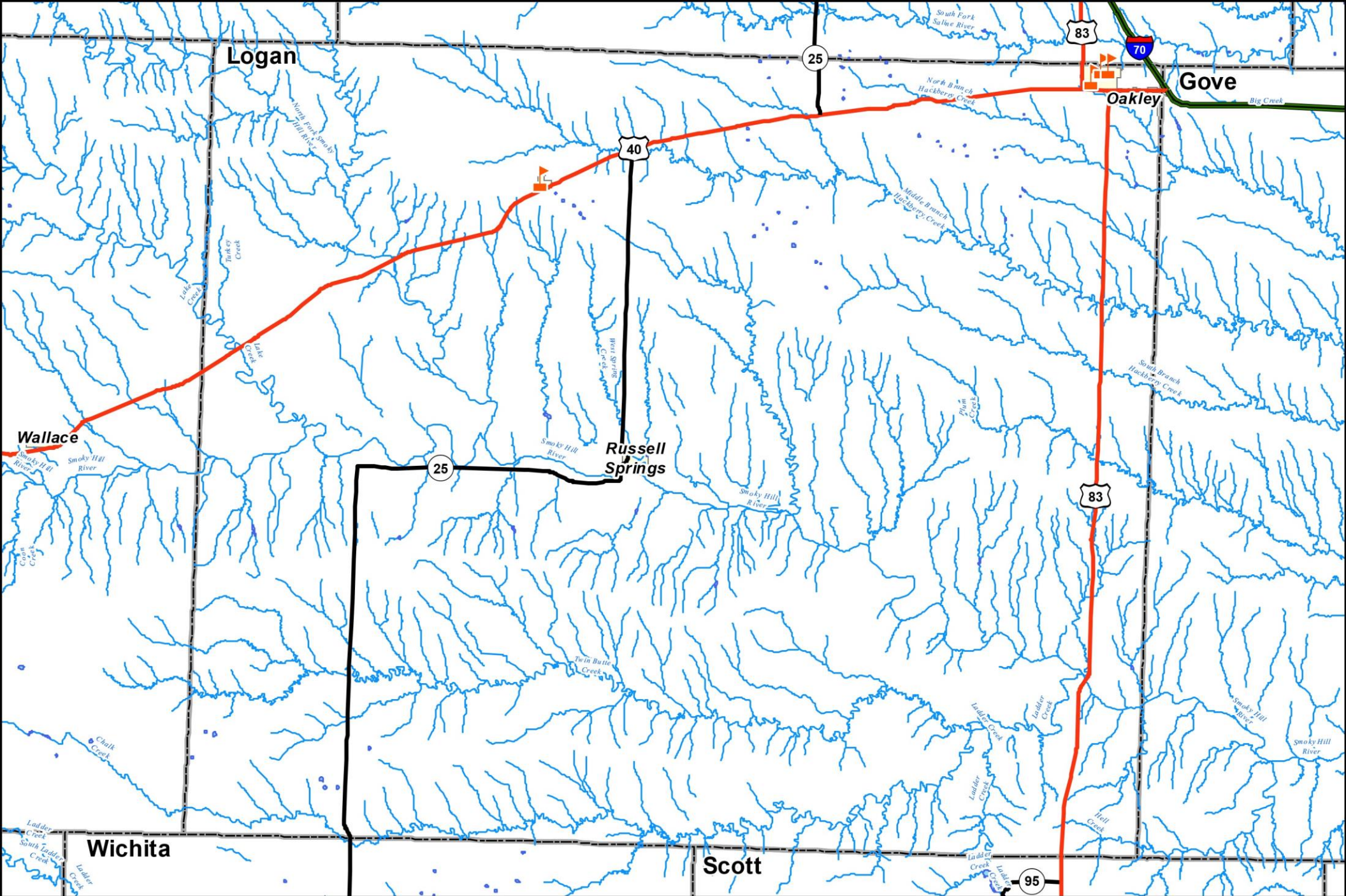


# **Law Enforcement and Floodplains** **Logan County, KS**


- Law Enforcement
- 0.2% chance flood hazard
- 1% chance flood hazard
- Interstates
- US Highways
- Kansas Highways
- Streams
- Lake
- County Boudaries
- City Boundaries

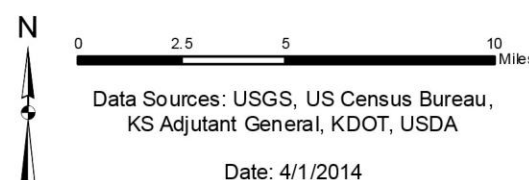




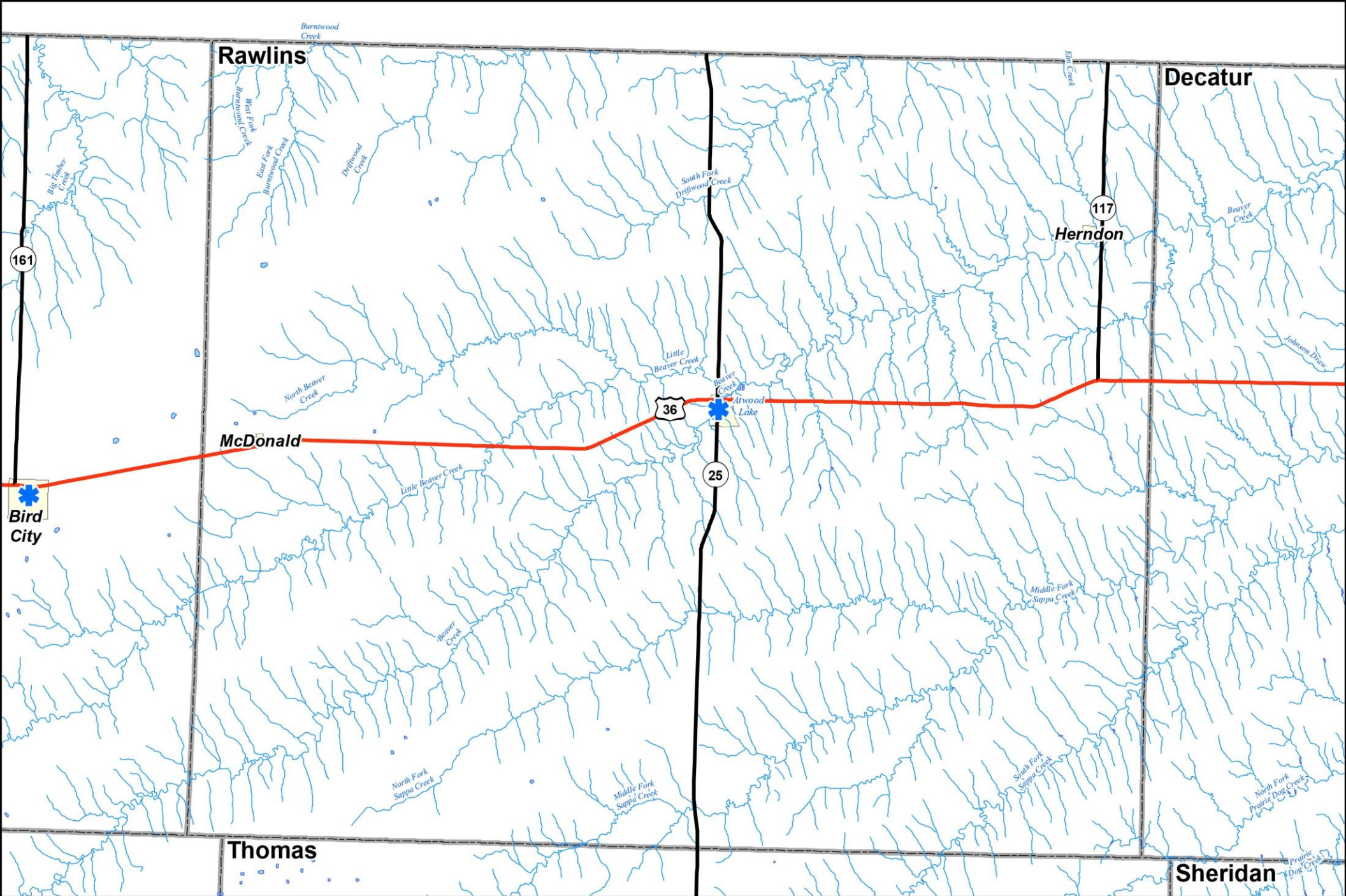


# **Schools, Colleges and Floodplains Logan County, KS**


- |                                                                                             |                                                                                                     |                                                                                                              |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  School  |  Interstates     |  County Boudaries         |
|  College |  US Highways     |  City Boundaries          |
|                                                                                             |  Kansas Highways |  0.2% chance flood hazard |
|                                                                                             |  Streams         |  1% chance flood hazard   |
|                                                                                             |  Lake            |                                                                                                              |







# **EMS locations, and Floodplains Rawlins County, KS**

-  EMS
-  Interstates
-  US Highways
-  Kansas Highways
-  Lake
-  Streams
-  County Boudaries
-  0.2% chance flood hazard
-  1% chance flood hazard
-  Cities (Census 2010)



0 2.5 5 10 Miles

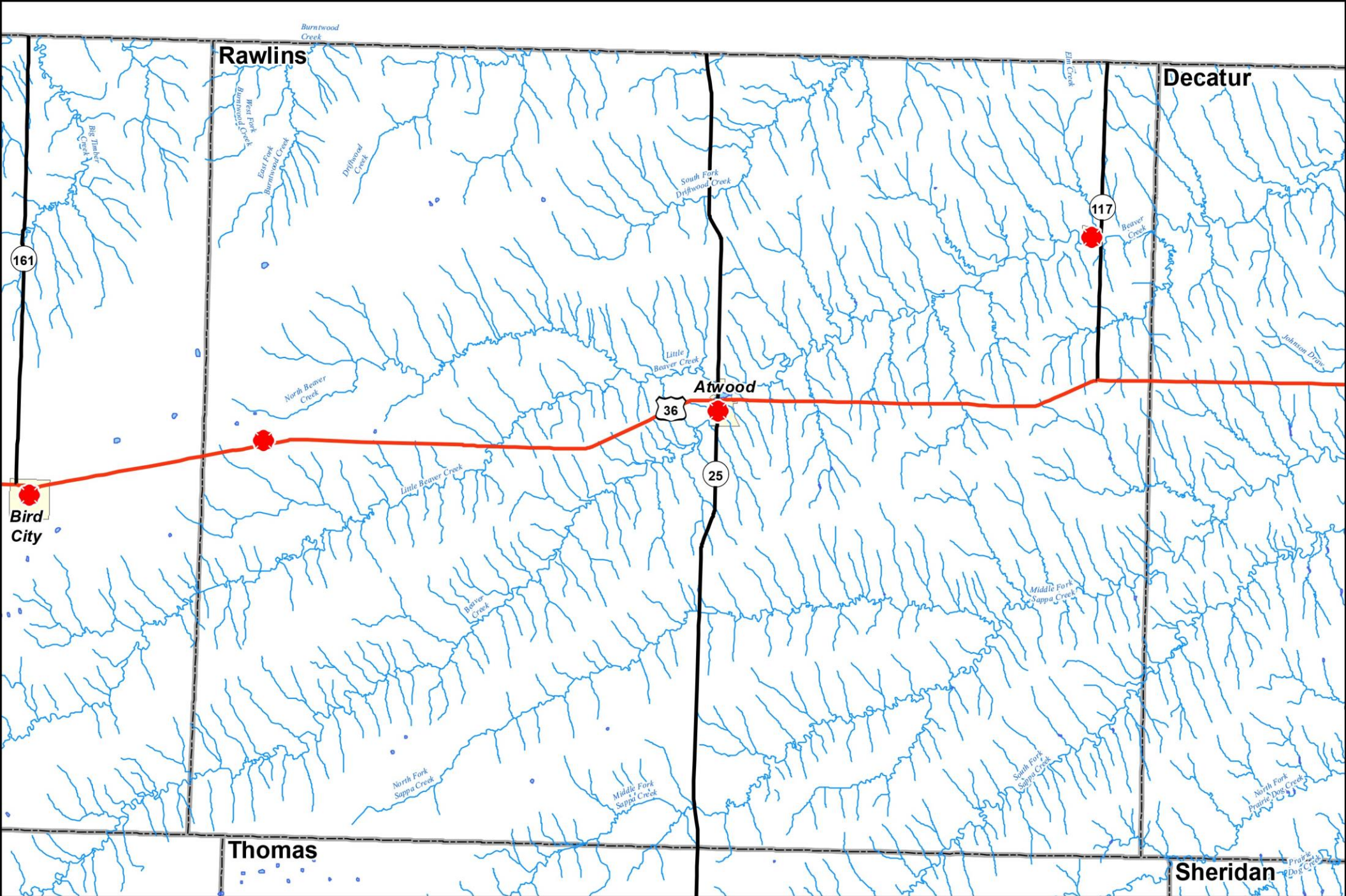
Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014



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**Fire Stations  
and Floodplains  
Rawlins  
County, KS**

- |                                                                                                     |                                                                                                              |                                                                                                      |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|  Fire Station    |  Interstates              |  County Boudaries |
|  US Highways     |  0.2% chance flood hazard |                                                                                                      |
|  Kansas Highways |  1% chance flood hazard   |                                                                                                      |
|  Lake            |  Cities (Census 2010)     |                                                                                                      |
|  Streams         |                                                                                                              |                                                                                                      |



0 2.5 5 10 Miles

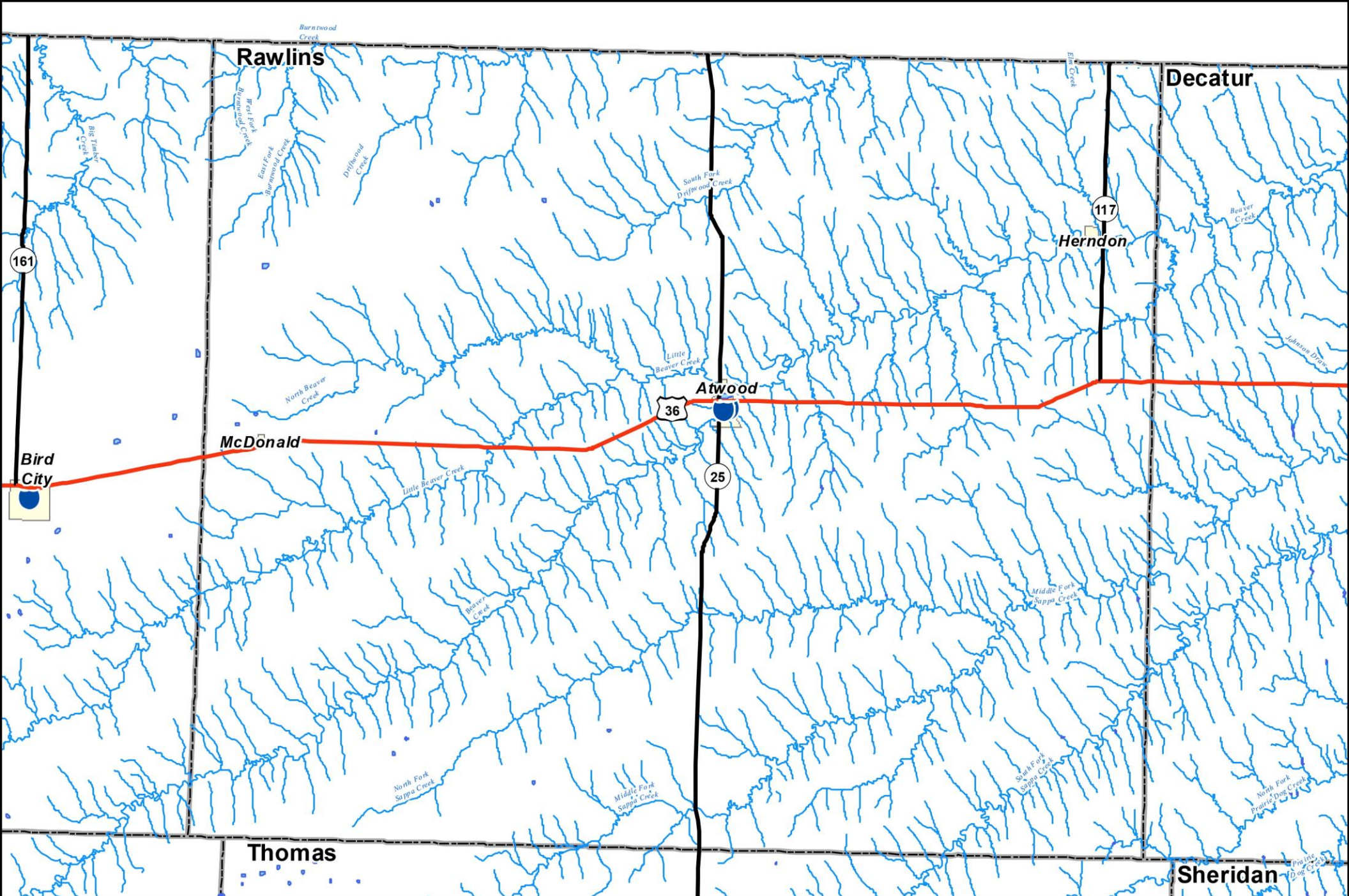
Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014



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# **Law Enforcement and Floodplains Rawlins County, KS**

- |                                                                                     |                          |                                                                                     |                 |                                                                                     |                  |
|-------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|------------------|
|  | Law Enforcement          |  | Interstates     |  | County Boudaries |
|  | 0.2% chance flood hazard |  | US Highways     |  | City Boundaries  |
|  | 1% chance flood hazard   |  | Kansas Highways |  | Streams          |
|                                                                                     |                          |  | Lake            |                                                                                     |                  |

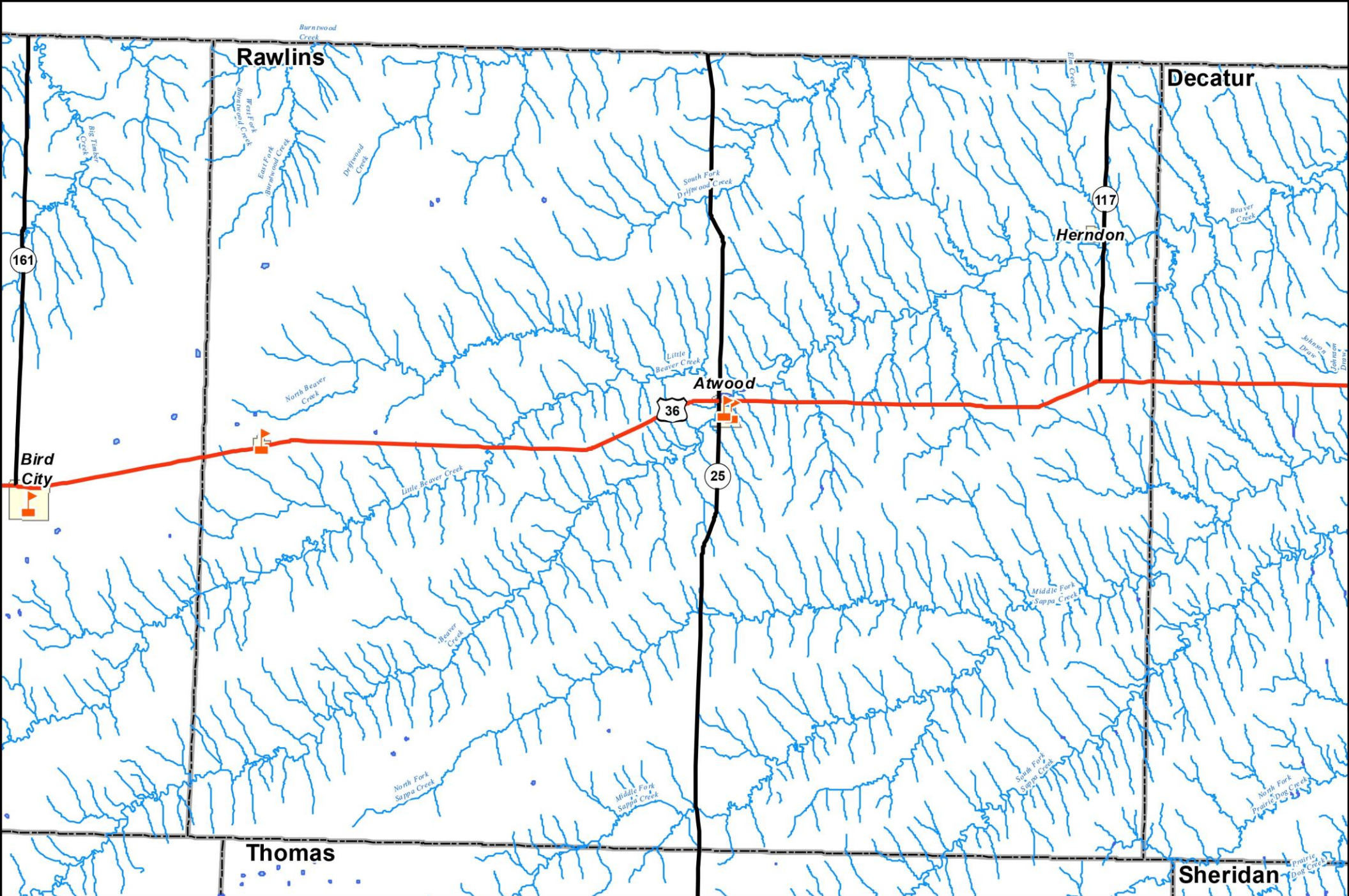


0 2.5 5 10 Miles

Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 3/6/2014





# Schools, Colleges and Floodplains Rawlins County, KS

- |                                                                                             |                                                                                                     |                                                                                                              |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  School  |  Interstates     |  County Boudaries         |
|  College |  US Highways     |  City Boundaries          |
|                                                                                             |  Kansas Highways |  0.2% chance flood hazard |
|                                                                                             |  Streams         |  1% chance flood hazard   |
|                                                                                             |  Lake            |                                                                                                              |

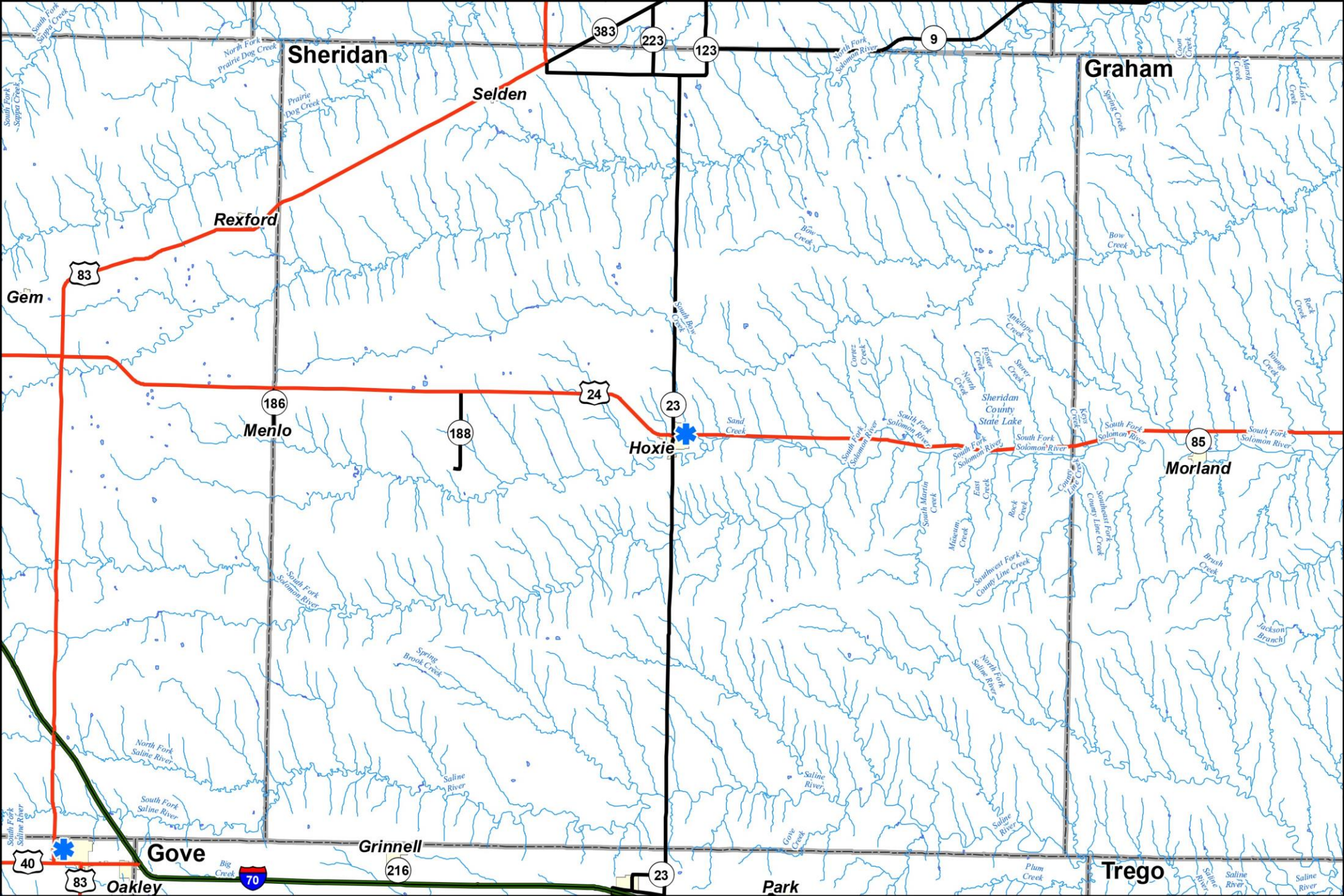
N

0 2.5 5 10 Miles

Data Sources: USGS, US Census Bureau, KS Adjutant General, KDOT, USDA

Date: 4/1/2014





# EMS locations, and Floodplains Sheridan County, KS



EMS



Interstates



US Highways



Kansas Highways



Lake



Streams



County Boudaries



0.2% chance flood hazard



1% chance flood hazard



Cities (Census 2010)



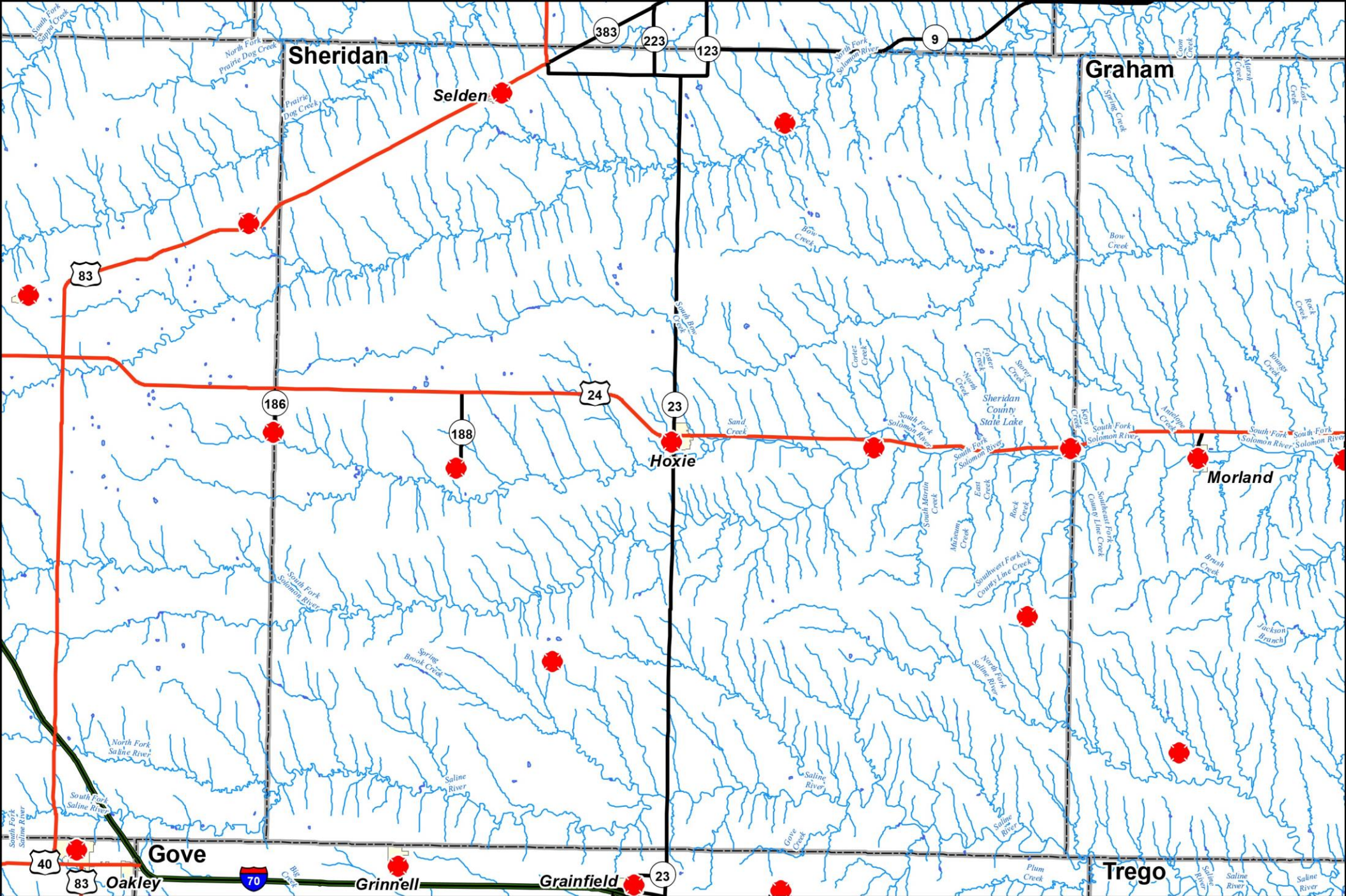
Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014



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# Fire Stations and Floodplains Sheridan County, KS

- Fire Station
- Interstates
- US Highways
- Kansas Highways
- Lake
- Streams
- County Boudaries
- 0.2% chance flood hazard
- 1% chance flood hazard
- Cities (Census 2010)

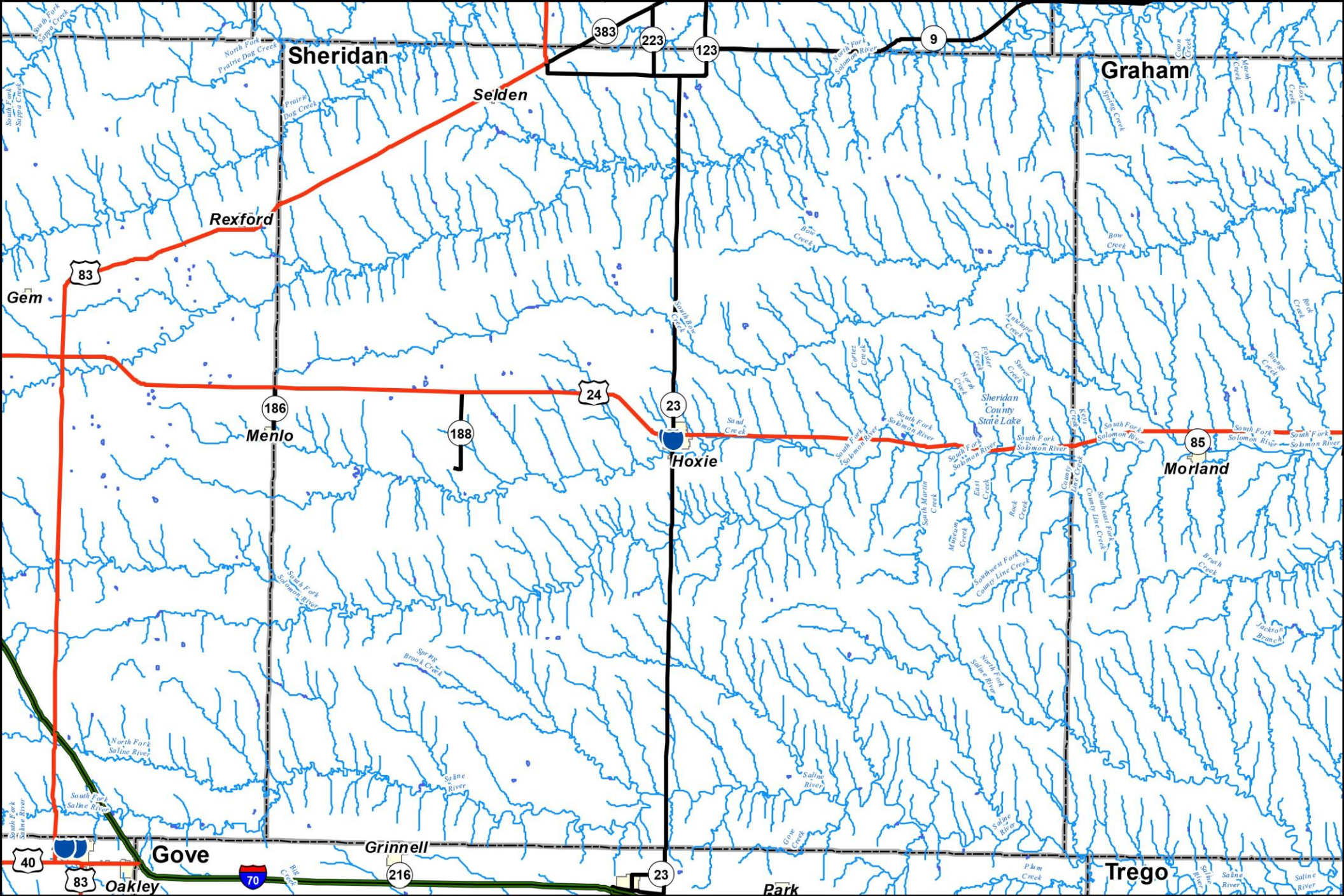


0 2.5 5 10 Miles


Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014





# **Law Enforcement and Floodplains Sheridan County, KS**

- |                                                                                     |                          |                                                                                     |                 |                                                                                     |                  |
|-------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|------------------|
|  | Law Enforcement          |  | Interstates     |  | County Boudaries |
|  | 0.2% chance flood hazard |  | US Highways     |  | City Boundaries  |
|  | 1% chance flood hazard   |  | Kansas Highways |  | Streams          |
|                                                                                     |                          |  | Lake            |                                                                                     |                  |

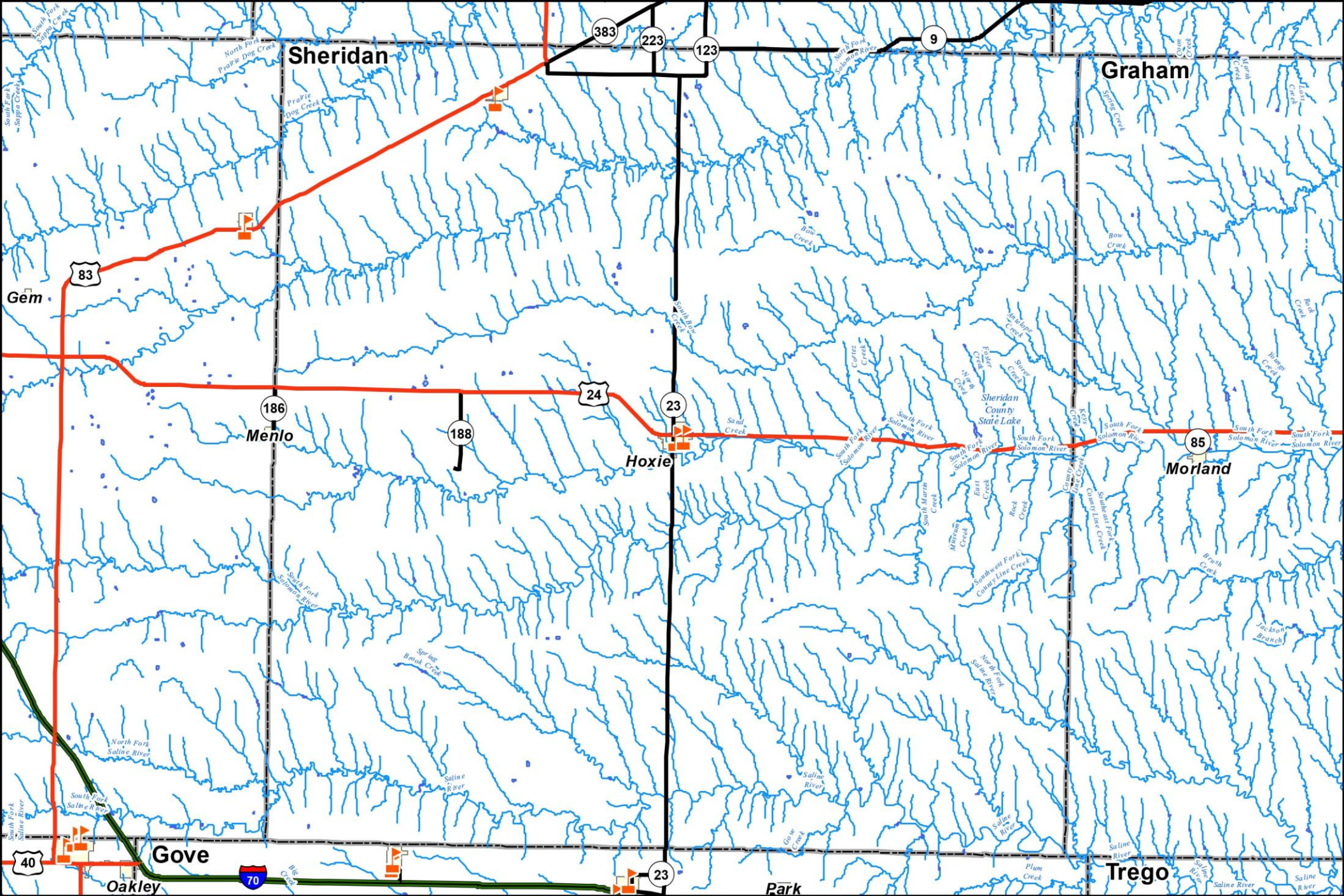


0 2.5 5 10 Miles

Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 3/6/2014





# **Schools, Colleges and Floodplains Sheridan County, KS**

- |                                                                                             |                                                                                                     |                                                                                                              |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  School  |  Interstates     |  County Boudaries         |
|  College |  US Highways     |  City Boundaries          |
|                                                                                             |  Kansas Highways |  0.2% chance flood hazard |
|                                                                                             |  Streams         |  1% chance flood hazard   |
|                                                                                             |  Lake            |                                                                                                              |

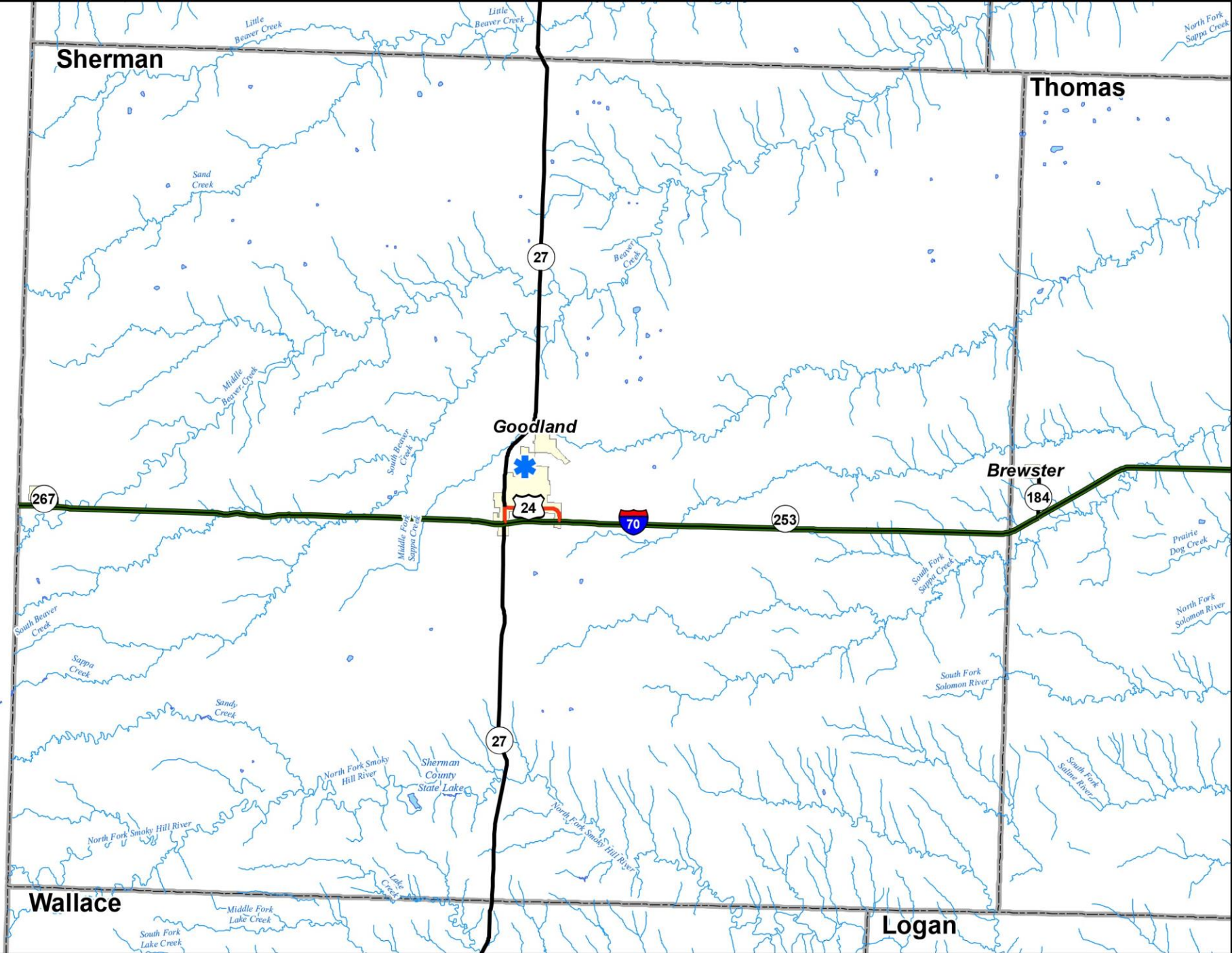


0 2.5 5 10 Miles

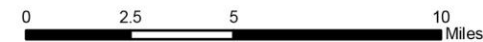
Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 4/1/2014





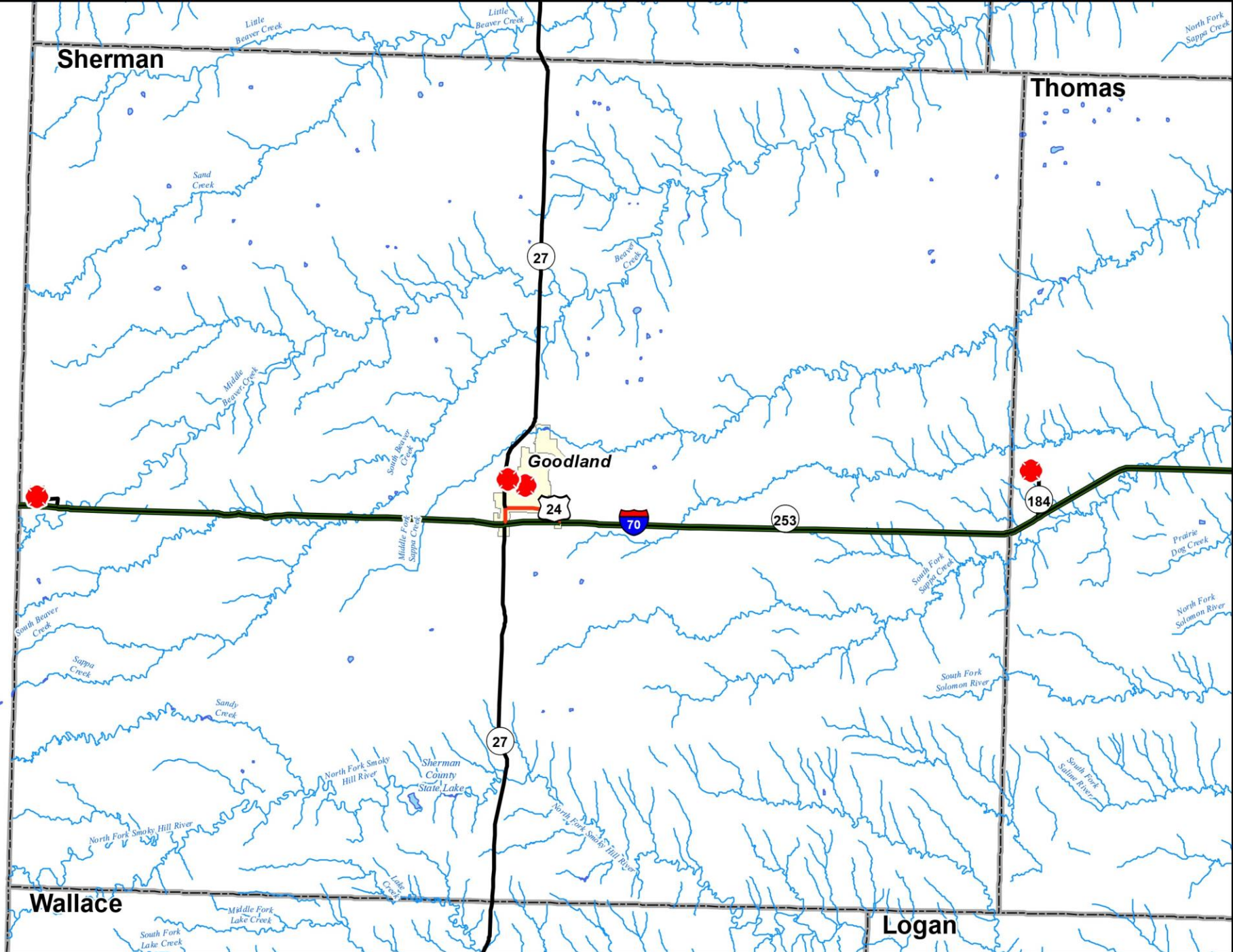
# **EMS locations, and Floodplains Sherman County, KS**



Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014





**Fire Stations  
and Floodplains  
Sherman  
County, KS**



Fire Station

Interstates

US Highways

Kansas Highways

Lake

Streams



County Boudaries

0.2% chance flood hazard

1% chance flood hazard

Cities (Census 2010)



0 2.5 5 10 Miles

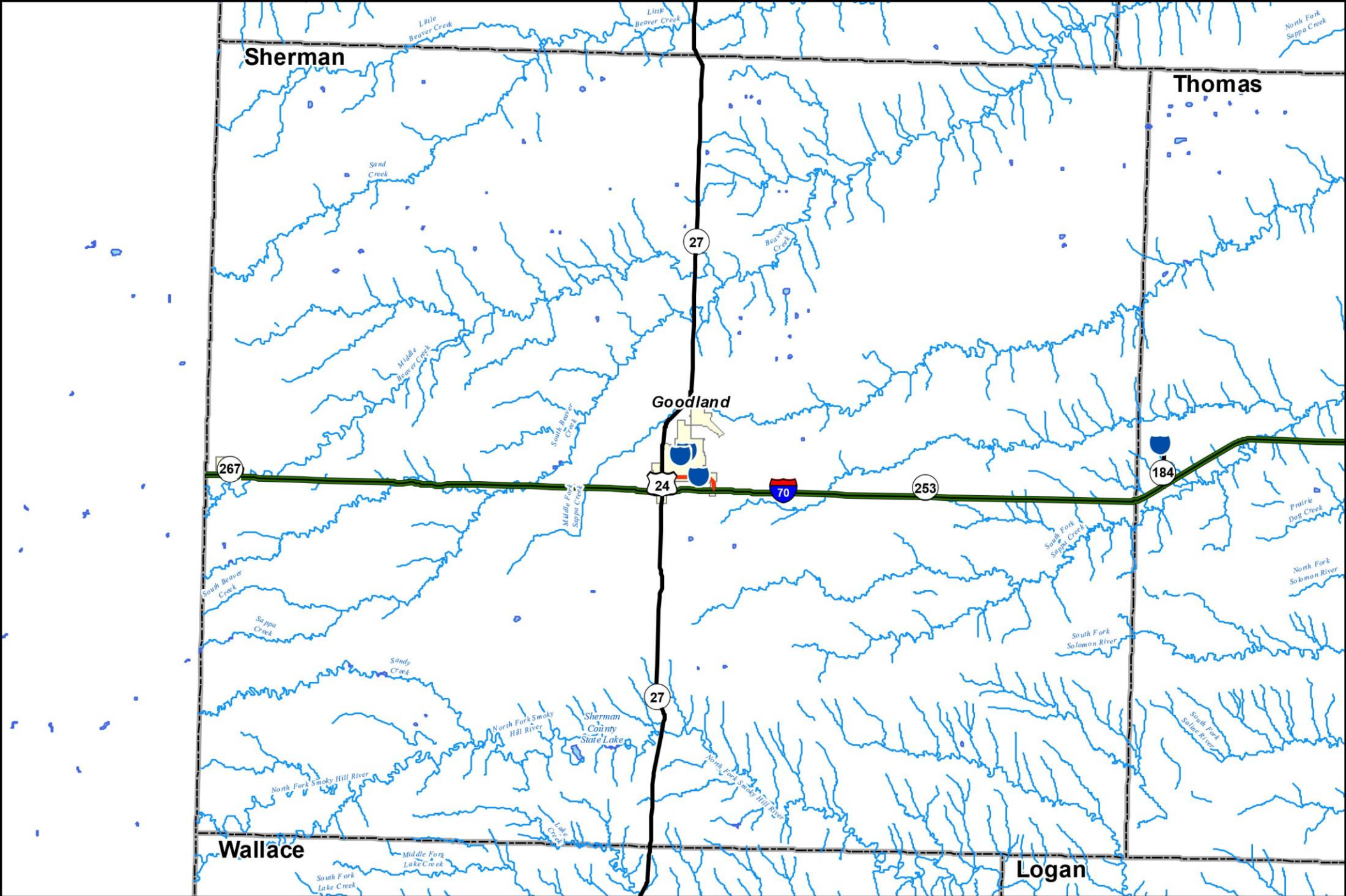
Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014













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# **Law Enforcement and Floodplains Sherman County, KS**

-  Law Enforcement
-  0.2% chance flood hazard
-  1% chance flood hazard
-  Interstates
-  US Highways
-  Kansas Highways
-  Streams
-  Lake
-  County Boudaries
-  City Boundaries



0 2.5 5 10 Miles

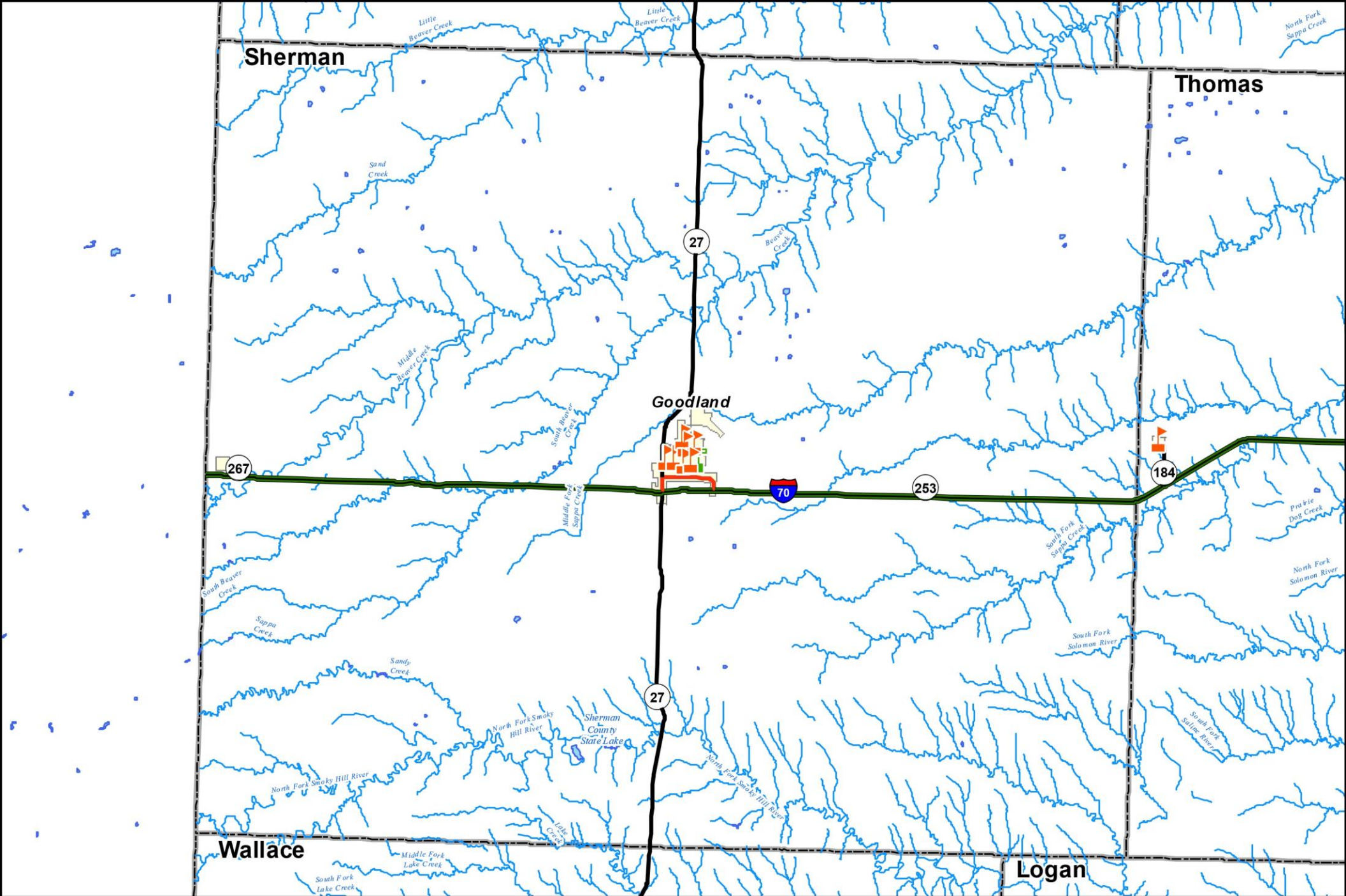
Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 3/6/2014



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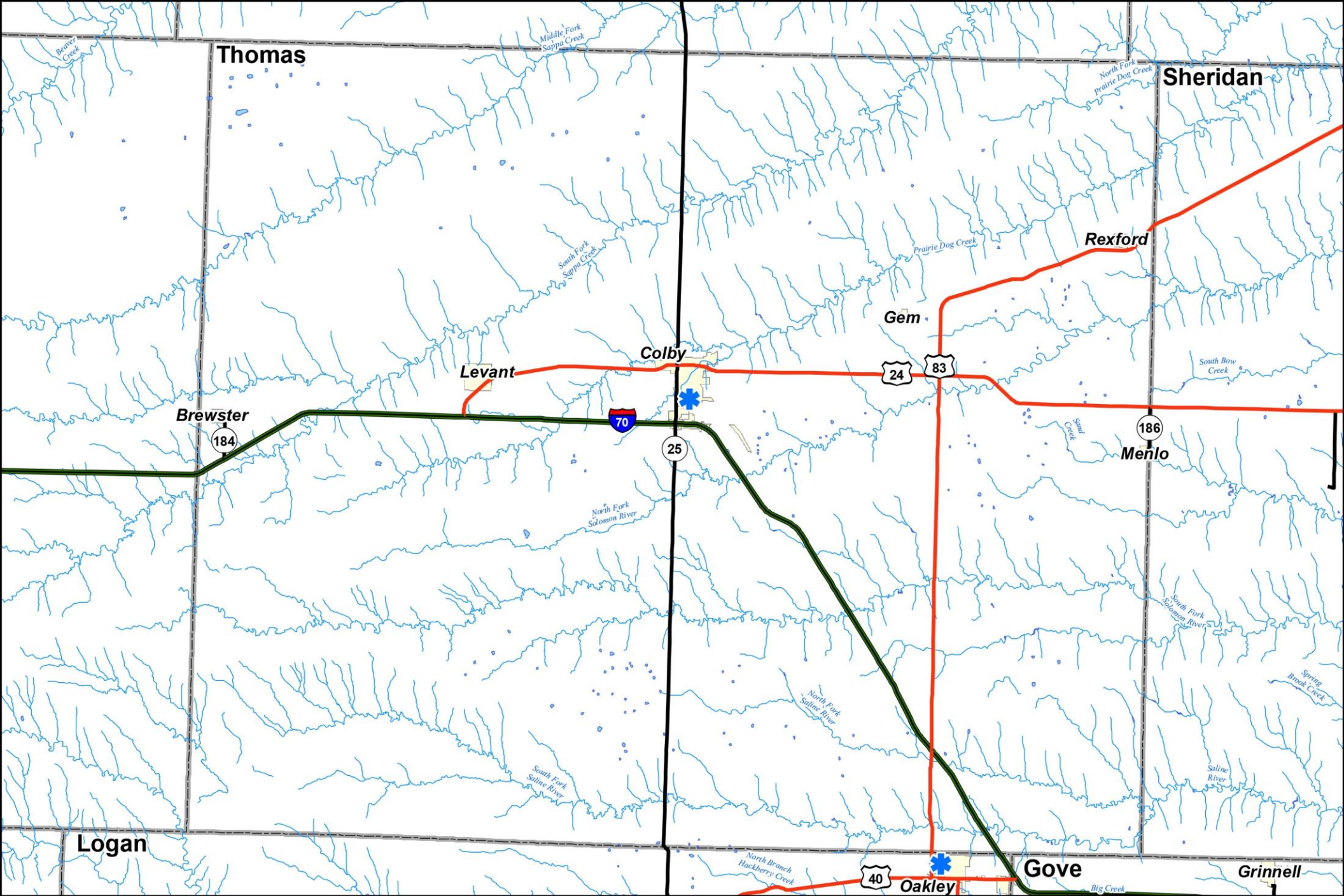
# **Schools, Colleges and Floodplains Sherman County, KS**






Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

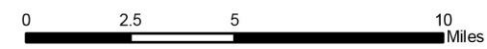
Date: 4/1/2014





**EMS locations,  
and Floodplains  
Thomas  
County, KS**

-  EMS
-  Interstates
-  US Highways
-  Kansas Highways
-  Lake
-  Streams
-  County Boudaries
-  0.2% chance flood hazard
-  1% chance flood hazard
-  Cities (Census 2010)

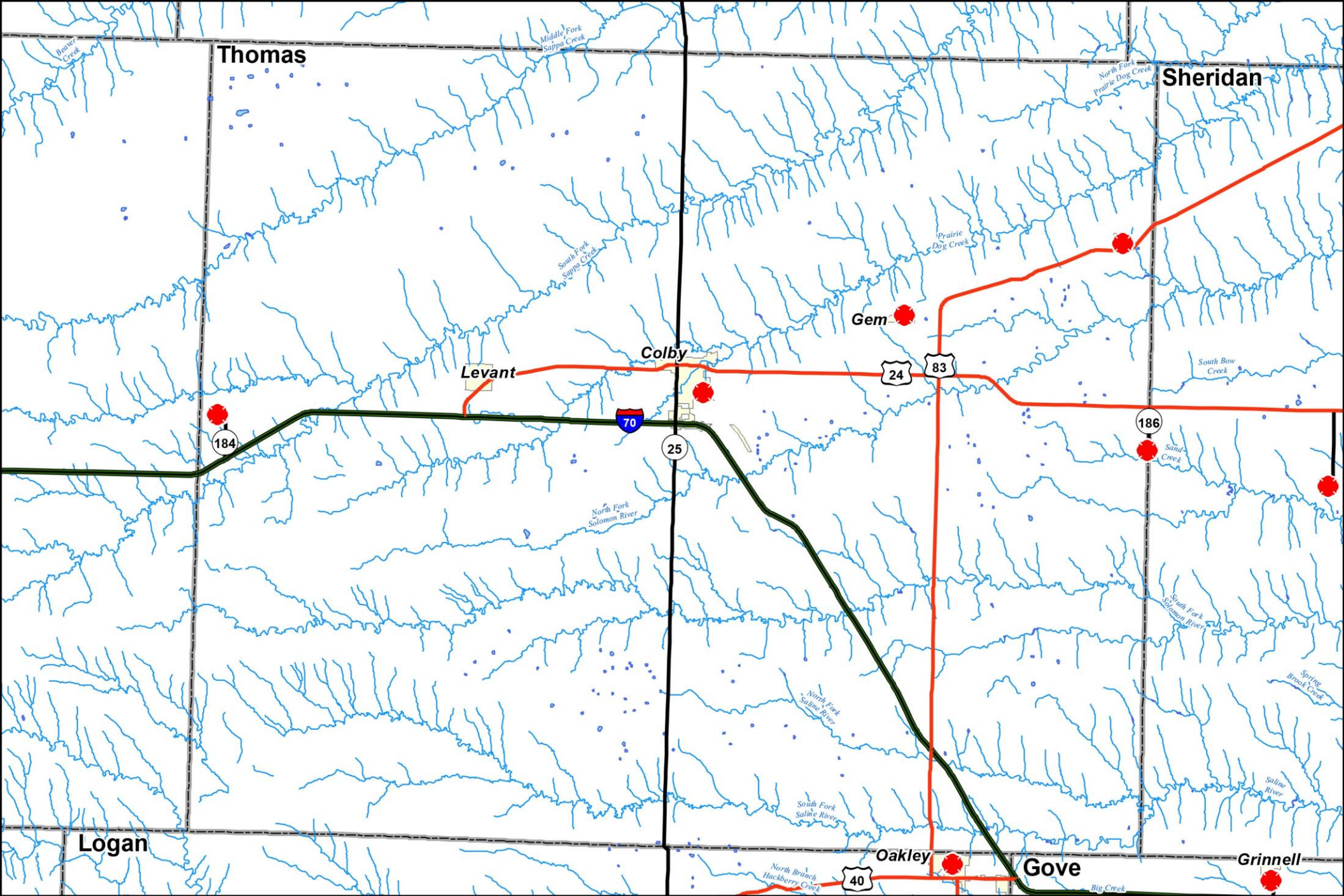


Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014







**Fire Stations  
and Floodplains  
Thomas  
County, KS**

- |                                                                                                     |                                                                                                              |                                                                                                          |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|  Fire Station    |  Interstates              |  County Boudaries     |
|  US Highways     |  0.2% chance flood hazard |  Cities (Census 2010) |
|  Kansas Highways |  1% chance flood hazard   |                                                                                                          |
|  Lake            |  Streams                  |                                                                                                          |

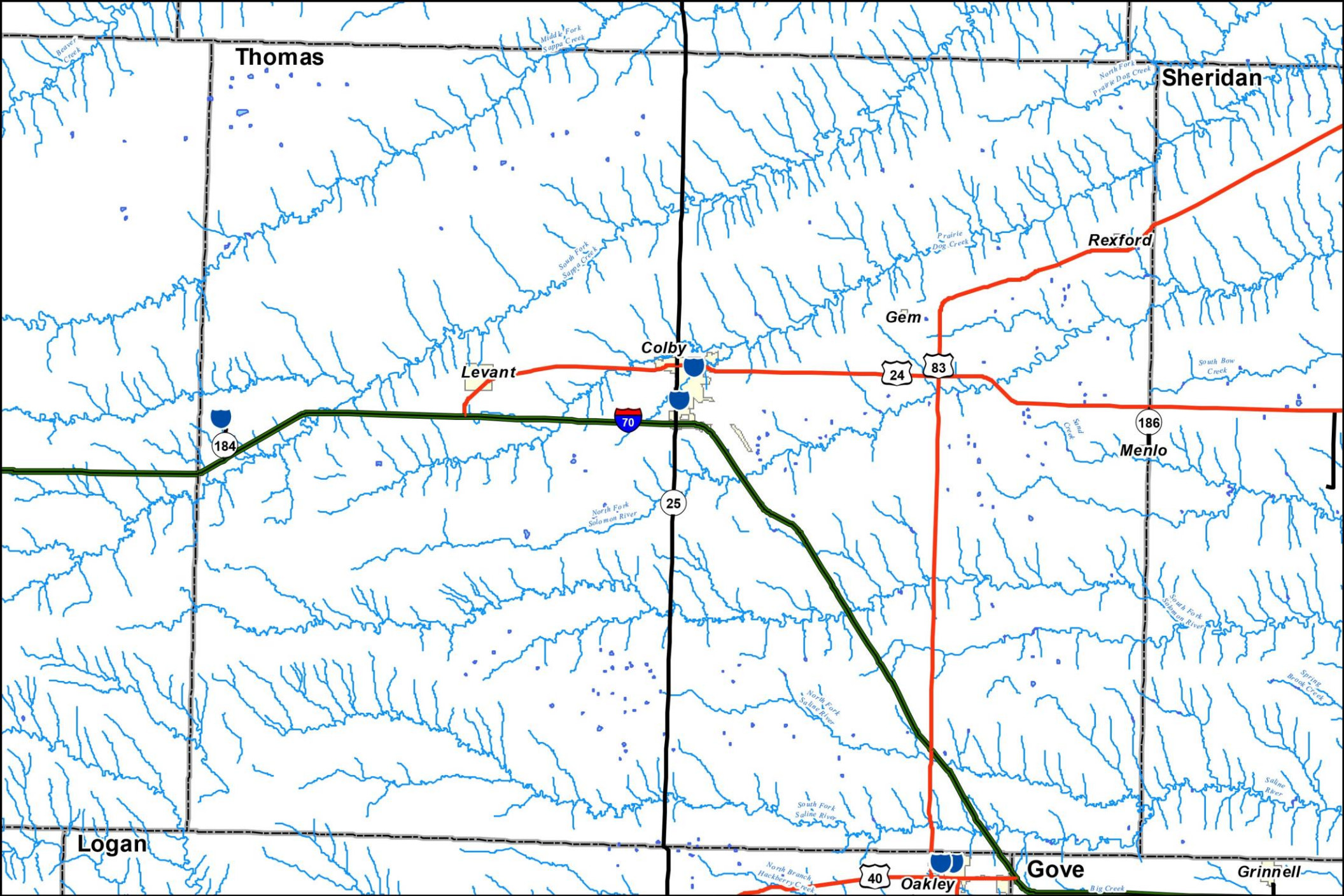


0 2.5 5 10 Miles






Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

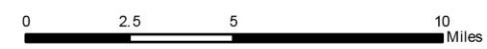
Date: 2/10/2014





**Law Enforcement  
and Floodplains  
Thomas  
County, KS**

- |                                                                                     |                          |                                                                                     |                 |                                                                                     |                  |
|-------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|------------------|
|  | Law Enforcement          |  | Interstates     |  | County Boudaries |
|  | 0.2% chance flood hazard |  | US Highways     |  | City Boundaries  |
|  | 1% chance flood hazard   |  | Kansas Highways |  | Streams          |
|                                                                                     |                          |  | Lake            |                                                                                     |                  |

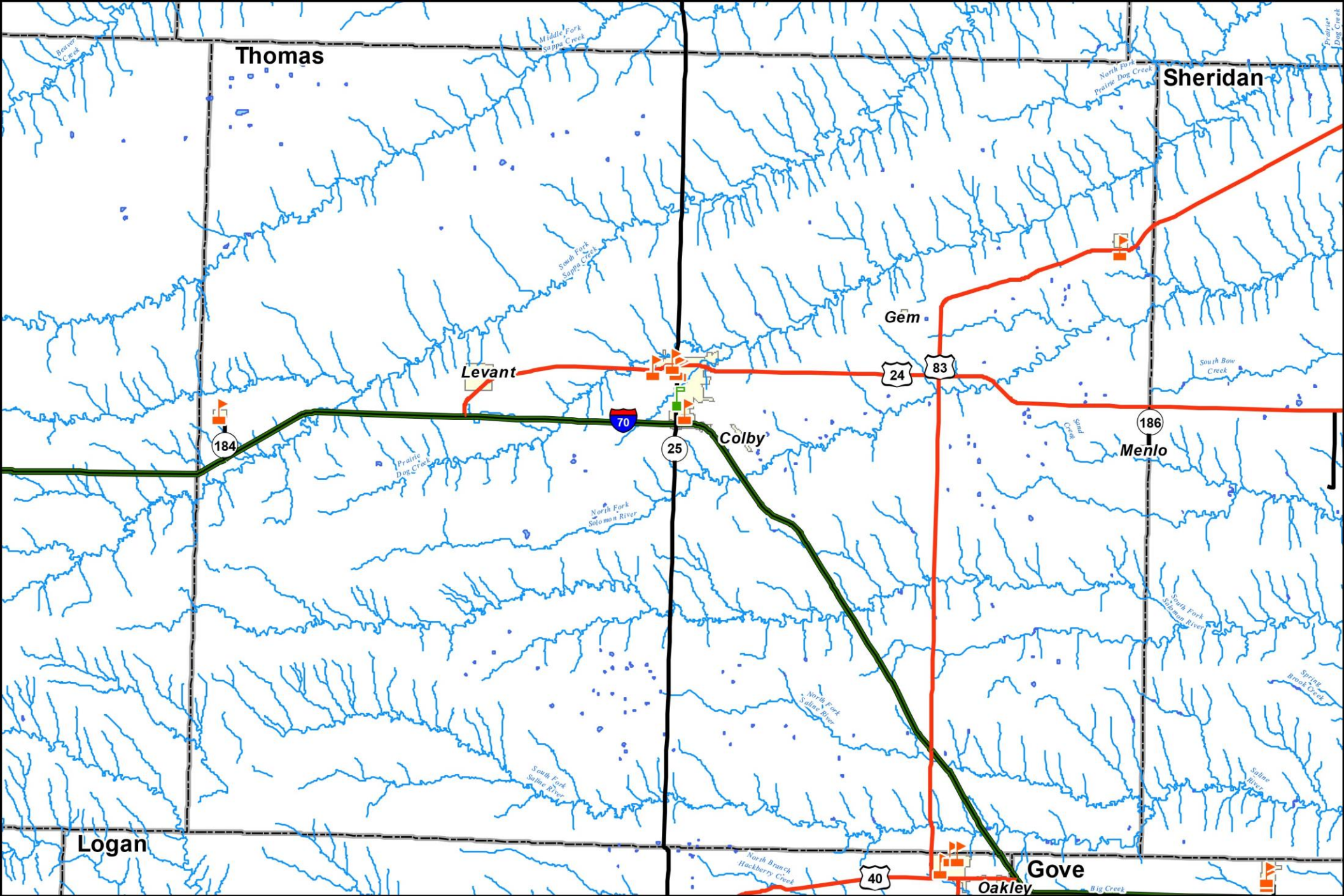


Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 3/6/2014







# **Schools, Colleges and Floodplains Thomas County, KS**

- |                                                                                             |                                                                                                     |                                                                                                              |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  School  |  Interstates     |  County Boudaries         |
|  College |  US Highways     |  City Boundaries          |
|                                                                                             |  Kansas Highways |  0.2% chance flood hazard |
|                                                                                             |  Streams         |  1% chance flood hazard   |
|                                                                                             |  Lake            |                                                                                                              |

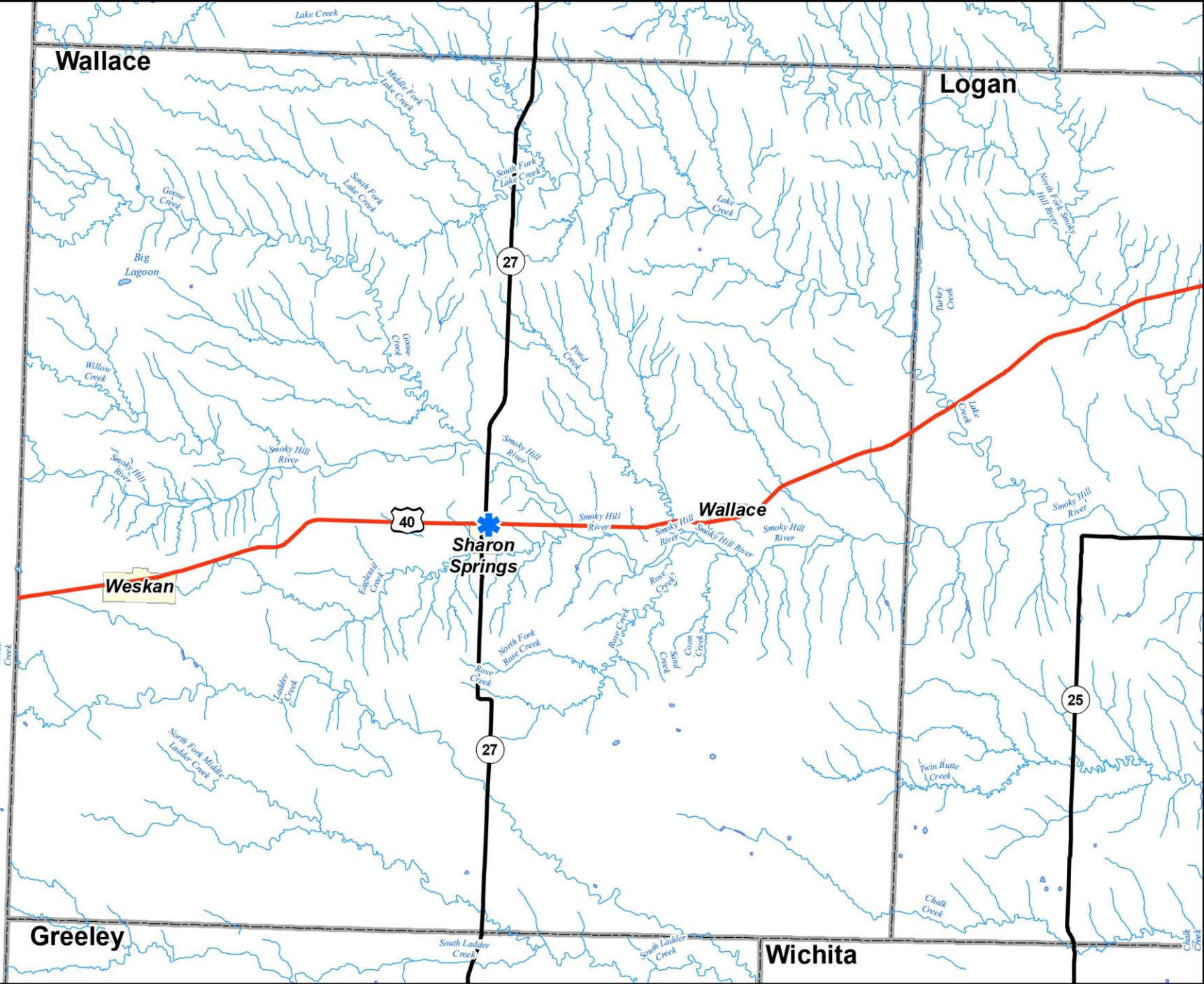


0 2.5 5 10 Miles









Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 4/1/2014





# **EMS locations, and Floodplains Wallace County, KS**

-  EMS
-  US Highways
-  Kansas Highways
-  Lake
-  Streams
-  County Boudaries
-  0.2% chance flood hazard
-  1% chance flood hazard
-  Cities (Census 2010)



0 2.5 5 10 Miles

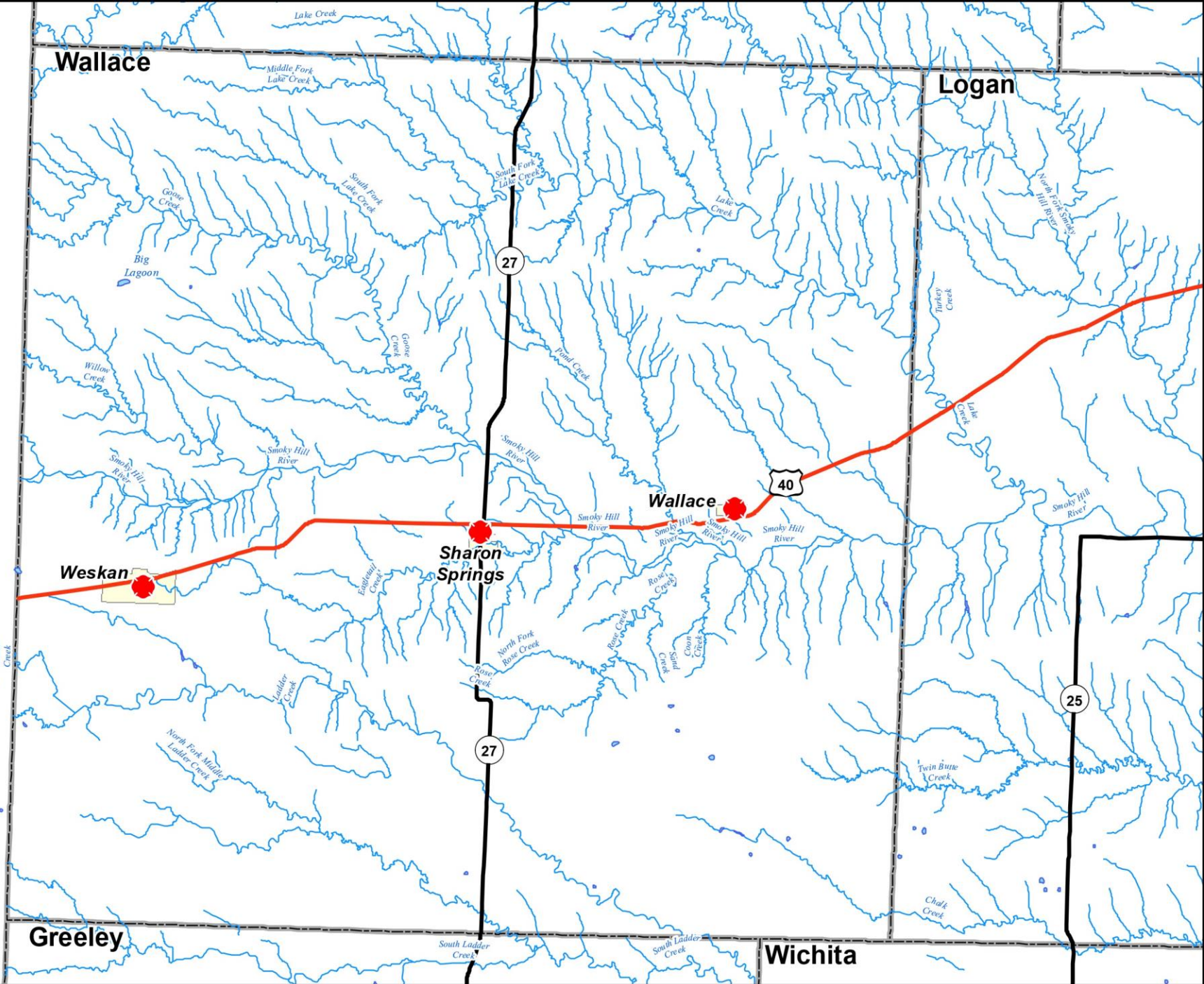
Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014



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# **Fire Stations and Floodplains Wallace County, KS**

- |                                                                                                  |                                                                                                     |                                                                                                              |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  Fire Station |  Interstates     |  County Boudaries         |
|  US Highways  |  Kansas Highways |  0.2% chance flood hazard |
|  Lake         |  Streams         |  1% chance flood hazard   |
|                                                                                                  |                                                                                                     |  Cities (Census 2010)     |

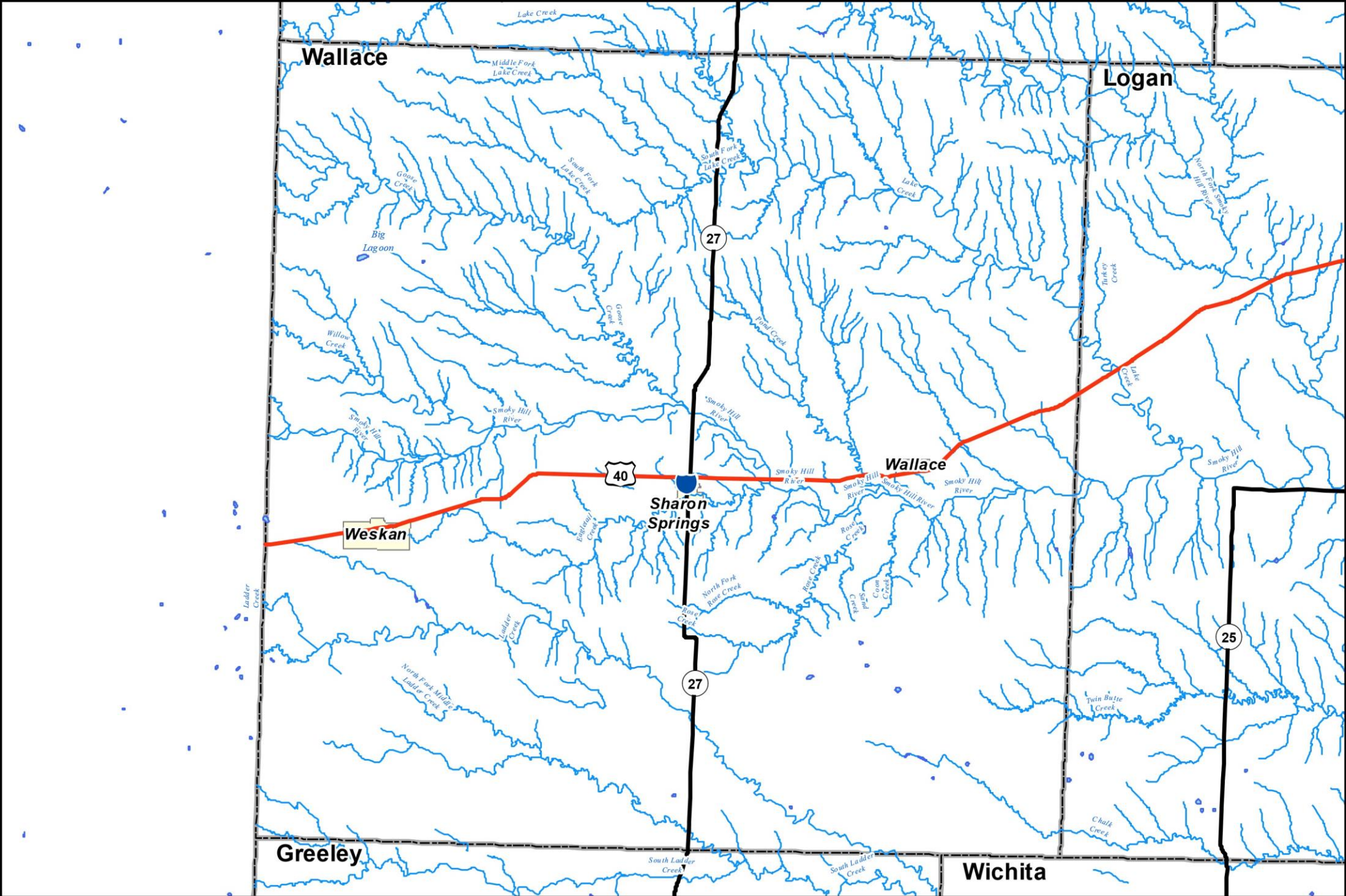


0 2.5 5 10 Miles

Data Sources: USGS, US Census Bureau,  
KS Adjutant General, KDOT, USDA

Date: 2/10/2014





# **Law Enforcement and Floodplains** **Wallace** **County, KS**

- |                                                                                     |                          |                                                                                     |                 |                                                                                     |                  |
|-------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|------------------|
|  | Law Enforcement          |  | Interstates     |  | County Boudaries |
|  | 0.2% chance flood hazard |  | US Highways     |  | City Boundaries  |
|  | 1% chance flood hazard   |  | Kansas Highways |  | Streams          |
|                                                                                     |                          |  | Lake            |                                                                                     |                  |



0 2.5 5 10 Miles

Data Sources: USGS, US Census Bureau,  
 KS Adjutant General, KDOT, USDA

Date: 3/6/2014



