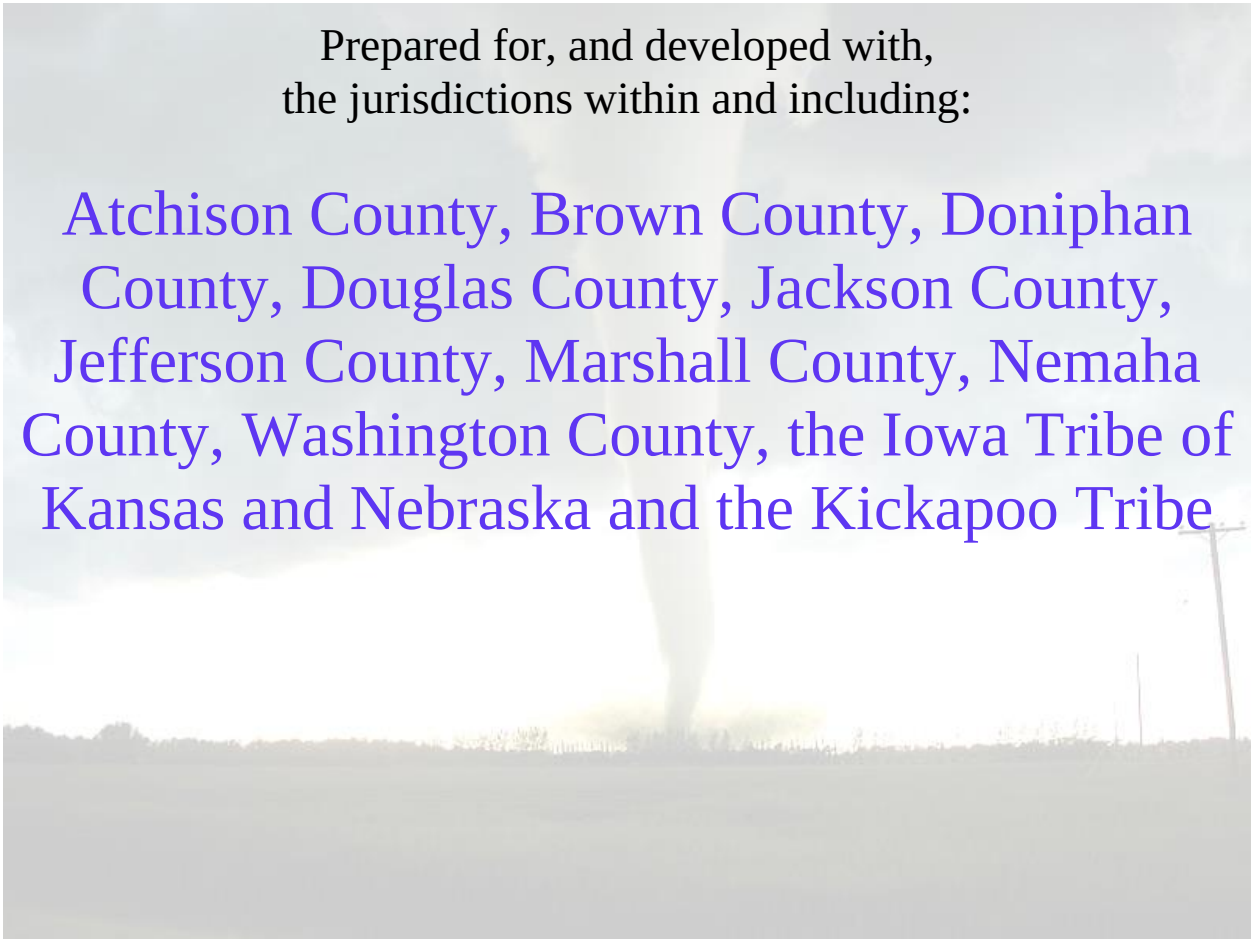
Kansas Homeland Security Region K Hazard Mitigation Plan



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

Atchison County, Brown County, Doniphan County, Douglas County, Jackson County, Jefferson County, Marshall County, Nemaha County, Washington County, the Iowa Tribe of Kansas and Nebraska and the Kickapoo Tribe

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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
EPZ	Emergency Planning Zone
EF	Enhanced Fujita
EPA	Environmental Protection Agency
ºF	Fahrenheit
FEMA	Federal Emergency Management Agency
HAZUS	FEMA Loss Estimation Software
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
GDP	Gross Domestic Product
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation 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

Acronym	Meaning
NGO	Non-Governmental Organization
NRC	Nuclear Regulatory Commission
OHMS	Office of Hazardous Materials Safety
PDSI	Palmer Drought Severity Index
PHMSA	Pipeline and Hazardous Materials Safety Administration
PDM	Pre-Disaster Mitigation
PAL	Provisionally Accredited Levee
RL	Repetitive Loss
Risk MAP	Risk Mapping, Assessment and Planning
REC	Rural Electric Cooperative
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 K (hereafter referred to as Kansas Region K) 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 K 2014 Hazard Mitigation Plan
- Build for a safer future for all citizens
- Foster cooperation for planning and resiliency
- Identify, prioritize and mitigate against hazards
- Asist with sensible and effective planning and budgeting
- Educate citizens about hazards, mitigation and preparedness
- Comply with federal regulations

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 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 HMP was prepared to meet the requirements of the DMA 2000, as defined in regulations set forth by 44 CFR Part 201.6 and 44 CFR Part 201.7.

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 the citizens of Kansas Region K.

1.2 – Participating Jurisdictions

*44 CFR 201.6(a)(4): Multi-jurisdictional plans (**e.g.** watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan. State-wide plans will not be accepted as multi-jurisdictional plans.*

44 CFR 201.7(a)(4): Multi-jurisdictional plans (e.g. county-wide or watershed plans) may be accepted, as appropriate, as long as the Indian tribal government has participated in the process and has officially adopted the plan. Indian tribal governments must address all the elements identified in this section to ensure eligibility as a grantee or as a subgrantee.

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: Atchison County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Atchison County	x	x
City of Atchison	x	x
City of Effingham	x	x
City of Huron	x	x
City of Lancaster	x	x
City of Muscotah	x	x
Highland Community College	x	x
USD #377 - Atchison County	x	x
USD #409 - Atchison	x	x

Table 1.2: Brown County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Brown County	x	x
City of Everest	x	x
City of Fairview	x	x
City of Hiawatha	x	x
City of Horton	x	x
City of Morrill	x	x
City of Reserve	x	x
City of Robinson	x	x
City of Willis	x	x
USD #415 - Hiawatha	x	x
USD #430 - Horton	x	x

Table 1.3: Doniphan County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Doniphan County	x	x
City of Denton	x	x
City of Elwood	x	x
City of Highland	x	x
City of Troy	x	x
City of Wathena	x	x
Highland Community College	x	x
USD #111 – Doniphan West		x
USD #429 - Troy	x	x

Table 1.4: Douglas County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Douglas County	x	x
City of Baldwin City	x	x
City of Eudora	x	x
City of Lawrence	x	x
City of Lecompton	x	x
Clinton Township	x	x
Eudora Township		x
Kanawaka Township	x	x
Lecompton Township	x	x
Marion Township	x	x
Palmyra Township	x	x
Wakarusa Township	x	x
Willow Springs Township	x	x
Baker University	x	x
University of Kansas	x	x
USD #343 - Perry / Lecompton	x	x
USD #348 - Baldwin City	x	x

Table 1.4: Douglas County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
USD #491 - Eudora	x	x
USD #497 - Lawrence	x	x
Rural Water District #2	x	x
Rural Water District #5	x	x
Rural Water District #6	x	x
Lawrence Memorial Hospital	x	x

Table 1.5: Iowa Tribe of Kansas and Nebraska

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Iowa Tribe		x

Table 1.6: Jackson County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Jackson County	x	x
City of Circleville	x	x
City of Delia	x	x
City of Denison	x	x
City of Holton	x	x
City of Hoyt	x	x
City of Mayetta	x	x
City of Netawaka	x	x
City of Soldier	x	x
City of Whiting		x
USD #335 - North Jackson	x	x
USD #336 - Holton	x	x
USD #337 - Royal Valley	x	x
Blue Stem Electric Coop	x	x
Nemaha Marshall Electric Coop	x	x

Table 1.7: Jefferson County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Jefferson County	x	x
City of McLouth	x	x
City of Meriden	x	x
City of Nortonville	x	x
City of Oskaloosa	x	x
City of Perry	x	x
City of Valley Falls	x	x
City of Winchester	x	x
USD #338 - Valley Falls	x	x
USD #339 - Jefferson County North	x	x
USD #340 - Jefferson West	x	x
USD #341 - Okaloosa	x	x
USD #342 - McLouth	x	x

Table 1.7: Jefferson County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
USD #343 - Perry / Lecompton	x	x
Free State Electric Coop		x

Table 1.8: Kickapoo Tribe

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Kickapoo Tribe	x	x

Table 1.9: Marshall County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Marshall County	x	x
City of Axtell	x	x
City of Beattie	x	x
City of Blue Rapids	x	x
City of Frankfort	x	x
City of Marysville	x	x
City of Oketo	x	x
City of Summerfield	x	x
City of Vermillion	x	x
City of Waterville		x
Good Shepherd School	x	x
St. Gregory School	x	x
St Michael's School	x	x
USD #113 - Prairie Hills	x	x
USD #364 - Marysville	x	x
USD #380 - Vermillion	x	x
USD #498 - Valley Heights	x	x
Blue Stem Electric Coop	x	x
Free State Electric Coop		x
Nemaha Marshall Electric Coop	x	x

Table 1.10: Nemaha County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Nemaha County	x	x
City of Bern	x	x
City of Centralia	x	x
City of Corning	x	x
City of Goff	x	x
City of Oneida	x	x
City of Sabetha	x	x
City of Seneca	x	x
City of Wetmore	x	x
Saints Peter and Paul School		x
USD #113 - Prairie Hills	x	x
USD #115 - Nemaha Central	x	x

Table 1.10: Nemaha County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
USD #380 - Vermillion	x	x
Nemaha Marshall Electric Coop	x	x

Table 1.11: Washington County Participating Jurisdictions

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Washington County	x	x
City of Barnes		
City of Clifton	x	x
City of Greenleaf	x	x
City of Haddam	x	x
City of Hanover	x	x
City of Hollenberg	x	x
City of Linn	x	x
City of Mahaska		
City of Morrowville	x	x
City of Palmer	x	x
City of Vining		x
City of Washington	x	x
USD #108 - Washington County	x	x
USD #223 - Barnes / Hanover / Linn		x
USD #224 – Clifton/Clyde		x
Blue Stem Electric Coop	x	x
Nemaha Marshall Electric Coop	x	x

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

1.3 – Assurances

Kansas Region K 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 – Tribal Assurances

44 CFR 201.7(c)(6): The plan must include assurances that the Indian Tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including 2 CFR parts 200 and 3002.. The Indian Tribal government will amend its plan whenever necessary to reflect changes in Tribal or Federal laws and statutes.

As required by 44 CFR 201.7(c)(6), the Iowa and Kickapoo Tribes will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 13.11(c). The Iowa and Kickapoo Tribal governments will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 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.

1.5 – Authorities

For all jurisdictions within Kansas Region K 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 K 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.

1.6 – Tribal Authorities

The Iowa Tribe of Kansas and Nebraska (Iowa Tribe) is a federally recognized sovereign Indian Tribe and is organized in accordance with section 16 of the Indian Reorganization Act of 1934, as amended by the Act of June 15, 1935. Its first constitution and bylaws were adopted on November 6, 1978. The Executive Committee was established as the governing body of the tribe. It consists of a chairman, vice-chairman, secretary, treasurer and one member. They have enumerated powers as to negotiate with Federal, State, and local governments.

The Kickapoo Tribe in Kansas is a federally recognized sovereign Indian Tribe and is organized in accordance with section 16 of the Indian Reorganization Act of 1934, as amended by the Act of June 15, 1935. Kickapoo Constitution and By-Laws established the procedures to elect a governing body called the Kickapoo Tribal Council, a body of seven elected enrolled members of the Kickapoo Tribe to serve two-year terms. The Kickapoo Tribal Council is the official governing body for the Kickapoo Tribe and is so authorized in Section 1, in Article III of the Kickapoo Constitution and By-Laws. They have enumerated powers as to negotiate with Federal, State, and local governments.

As a Sovereign Indian Nations, the Iowa and Kickapoo Tribal Councils carries the same unique powers and duties as any city council officials across the United States. Regular meetings are held by Tribal Councils to discuss, and vote on tribal matters that affect the communities, enterprises, legal issues, and overall tribal government operations.

1.7 – 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.

44 CFR Requirement 201.7(c)(5): The plan must be formally adopted by the governing body of the Indian tribal government prior to submittal to FEMA for final review and approval.

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.

44 CFR 201.7(c)(1): Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

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

The State of Kansas contracted with Blue Umbrella Solutions to assist in updating the 2014 Kansas Region K 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 K and its participating jurisdictions undertook the following steps to update and create a robust HMP:

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

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

1. Organize resources
2. Assess risks

3. Develop a mitigation plan
4. Implement plan and monitor progress

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

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

2.2 – 2019 Plan Changes

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

44 CFR 201.7(d)(3): Indian tribal governments must review and revise their 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 non-emergency Stafford Act assistance and FEMA mitigation grant funding, with the exception of the Repetitive Flood Claims program.

The Kansas Region K 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 K Mitigation Planning Committee

Participant	Title	Organization
Wes Lanter	Emergency Manager	Atchison County
Lydia Theurer	Assistant Emergency Manager	Atchison County
Randy Linck	Emergency Manager	Brown County
Rich Liehmkuhal	Assistant Director	Brown County
Julie Meng	Emergency Manager	Doniphan County
Joe Hoelscher	Emergency Manager	Douglas County
Kelli Cheek	Treasurer	Iowa Tribe
Pat Korte	Emergency Manager	Jackson County
Sherri Ladner	Assistant Director	Jackson County
Keith Jeffers	Emergency Manager	Jefferson County
Moud Safadi	Environmental Specialist	Kickapoo Tribe
William Schwindamann	Emergency Manager	Marshall County
Leslie Jeter	Assistant Director	Marshall County
Russel Lierz	Emergency Manager	Nemaha County
Steve Duryea	Assistant Director	Nemaha County
Randy Hubbard	Emergency Manager	Washington County
Tim Mueller	Assistant Director	Washington County
Jeanne Bunting	Mitigation Planner	Kansas Division of Emergency Management
Matt Eyer	Plan Author	Blue Umbrella Solutions

2.4 – Local and Regional Stakeholder Participation

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

44 CFR Requirement 201.7(c)(1)(ii): As appropriate, an opportunity for neighboring communities, tribal 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 nonprofit interests to be involved in the planning process

Within Kansas Region K 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 K 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

2.5 – Public Participation

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

44 CFR Requirement 201.7(c)(1)(i): An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval, including a description of how the Indian tribal government defined "public"

For region K participating jurisdictions, the public is defined as any citizen living within or adjacent to Kansas Region K. The Kickapoo Tribe considers tribal members and non-natives living within the Kickapoo Reservation boundaries as the public. 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:

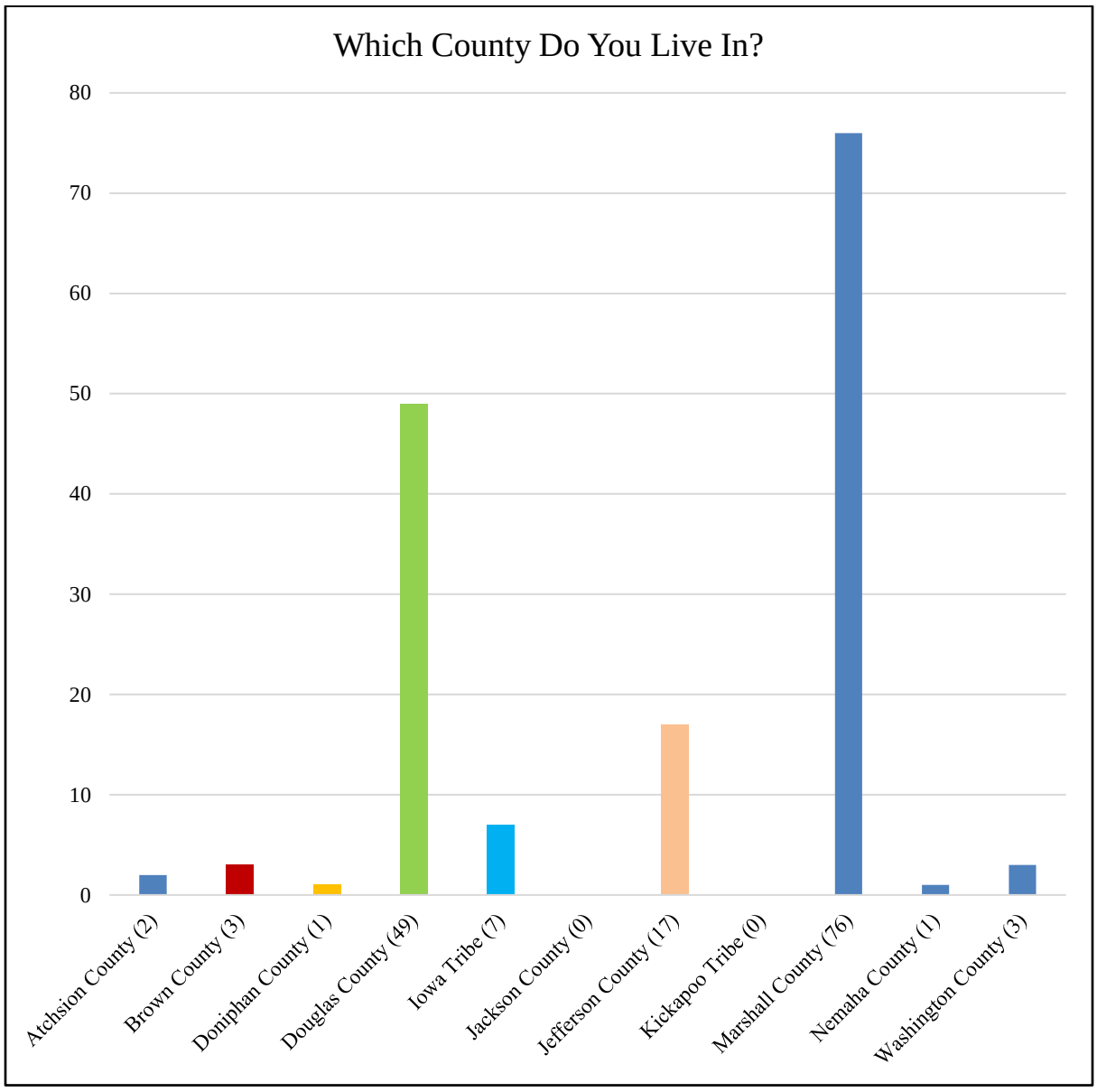
- Advertised meeting invitations on participating jurisdictional websites
- Open meeting opportunities with Kansas Region K MPC members
- Access to an online survey document to provide feedback
- Comment period upon completion of draft plan

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

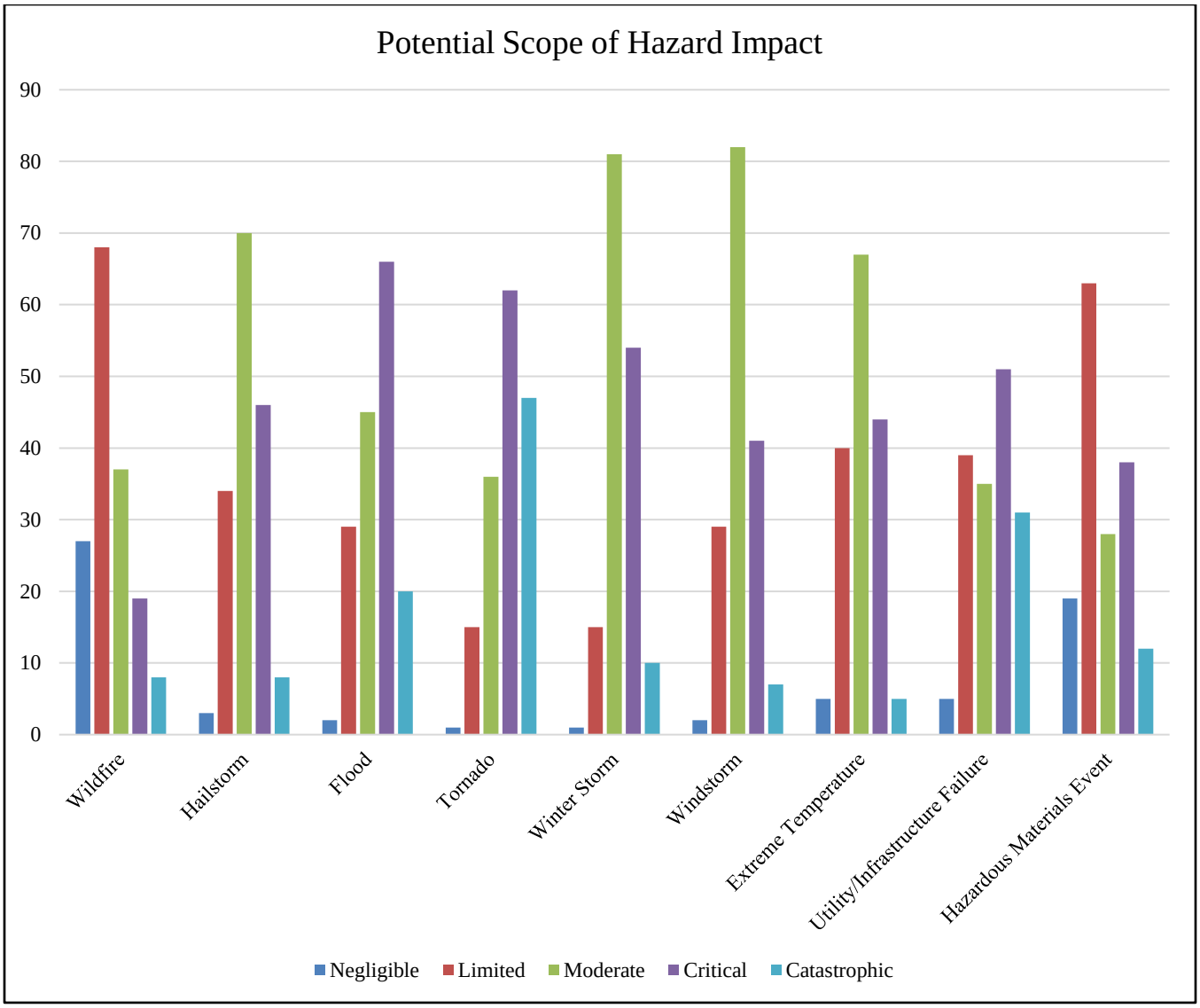
Additionally, as citizens were made more aware of potential hazards and the local process to mitigation against their impacts, it was believed that they would take a stronger role in making their homes, neighborhoods, schools, and businesses safer from the potential effects of natural hazards.

With 161 responses, the following graphics represents the feedback received from the public from the online survey document.

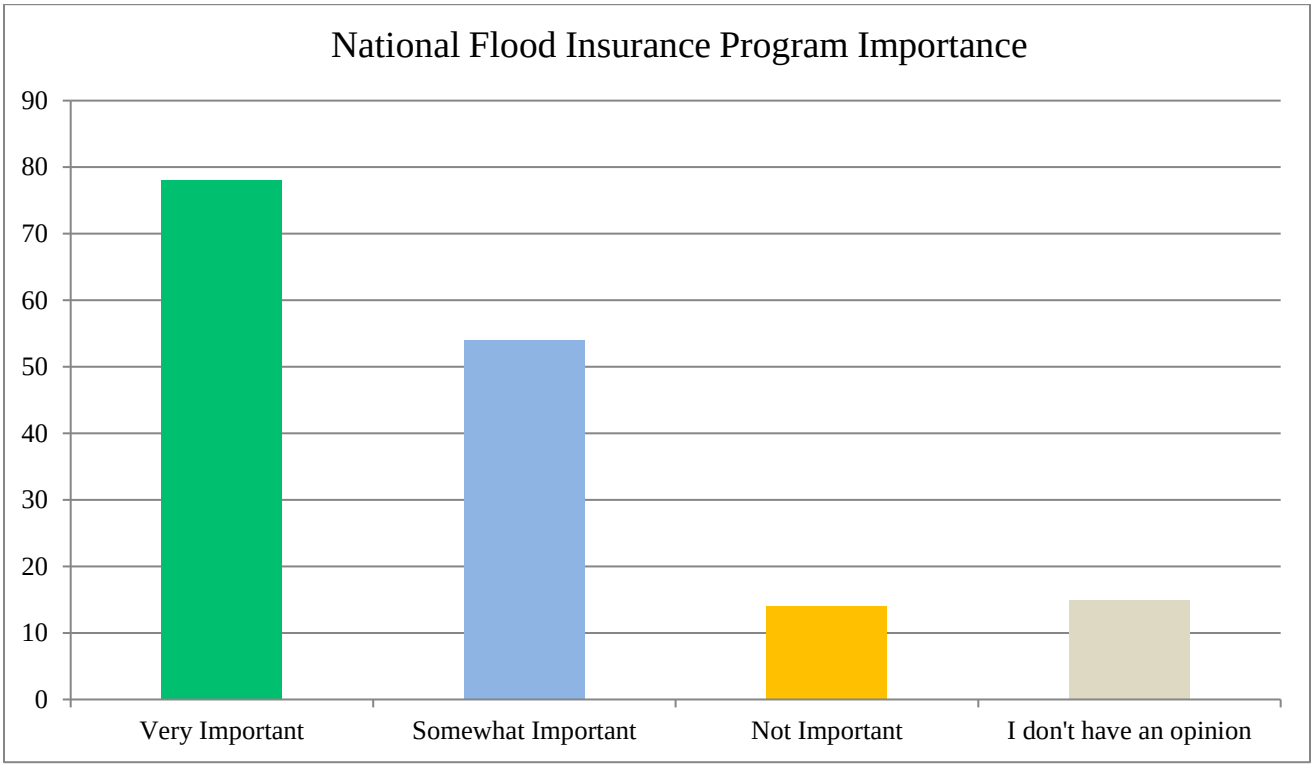
Question 1: In which county or jurisdiction do you live?



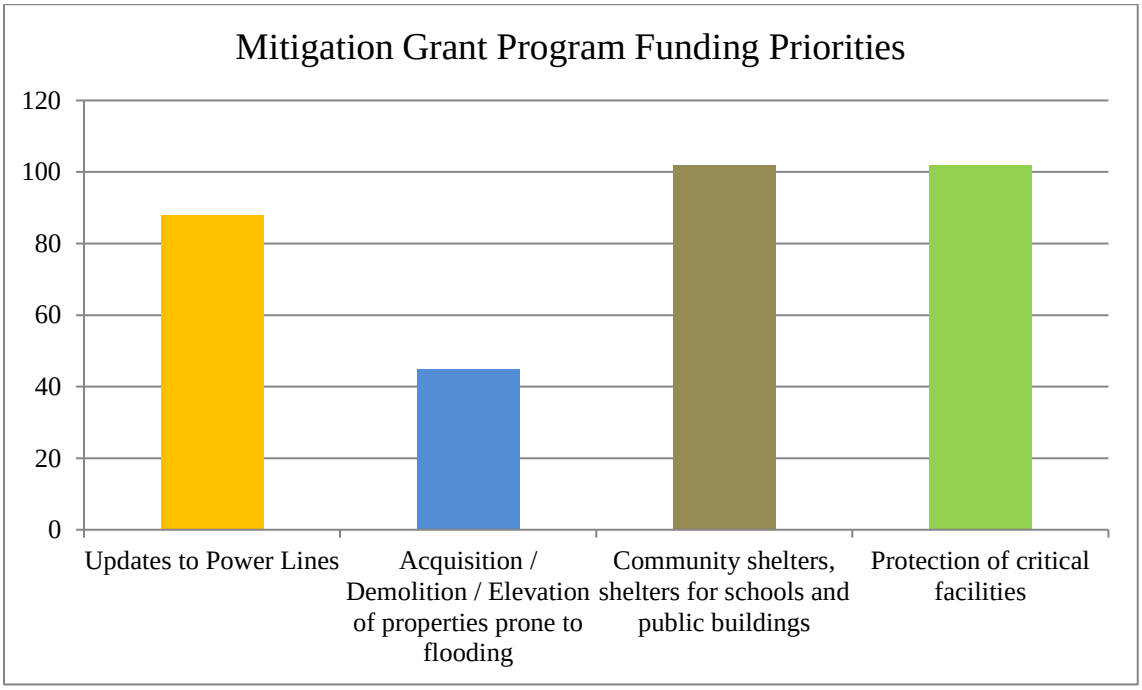
Question 2: In 2015, the Region consisting of Atchison, Brown, Doniphan, Douglas, Jackson, Jefferson, Kickapoo Tribe, Marshall, Nemaha, and Washington counties, the planning committee determined that the hazards listed below are important to the area. Indicate the level of risk, or the scope of potential impacts, in the Region, that you perceive for each hazard:



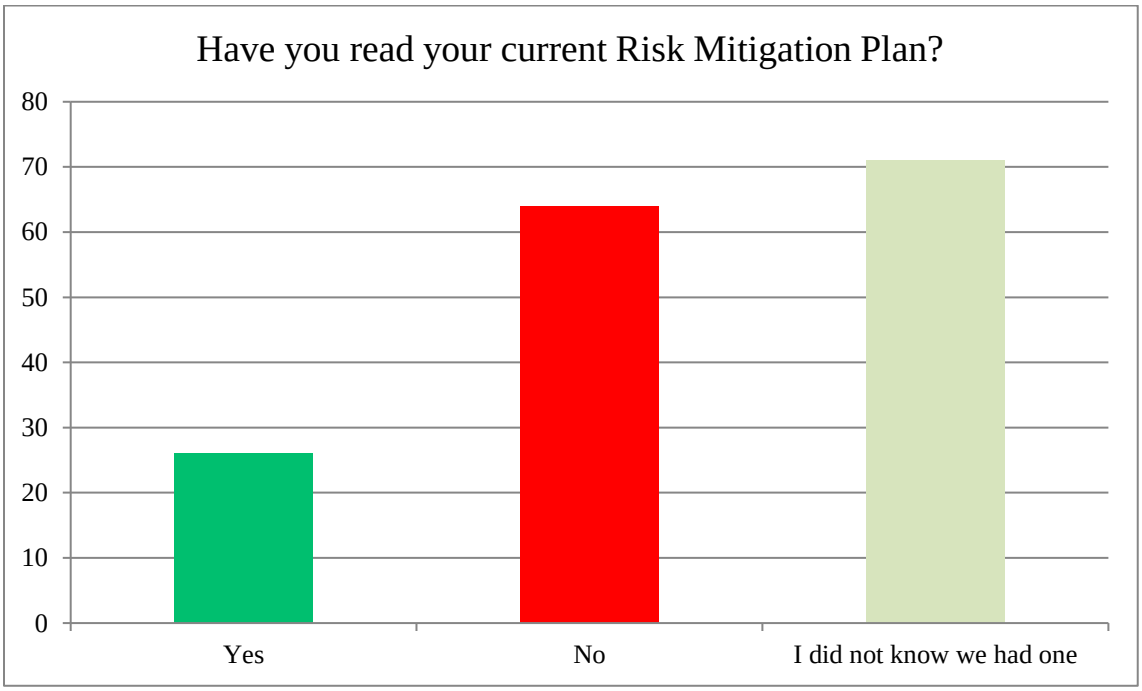
Question 3: In the Region, the planning committee has determined that a flood event is the third most critical hazard. How important is it for you to have your community participate in or continue to participate in the National Flood Insurance Program?



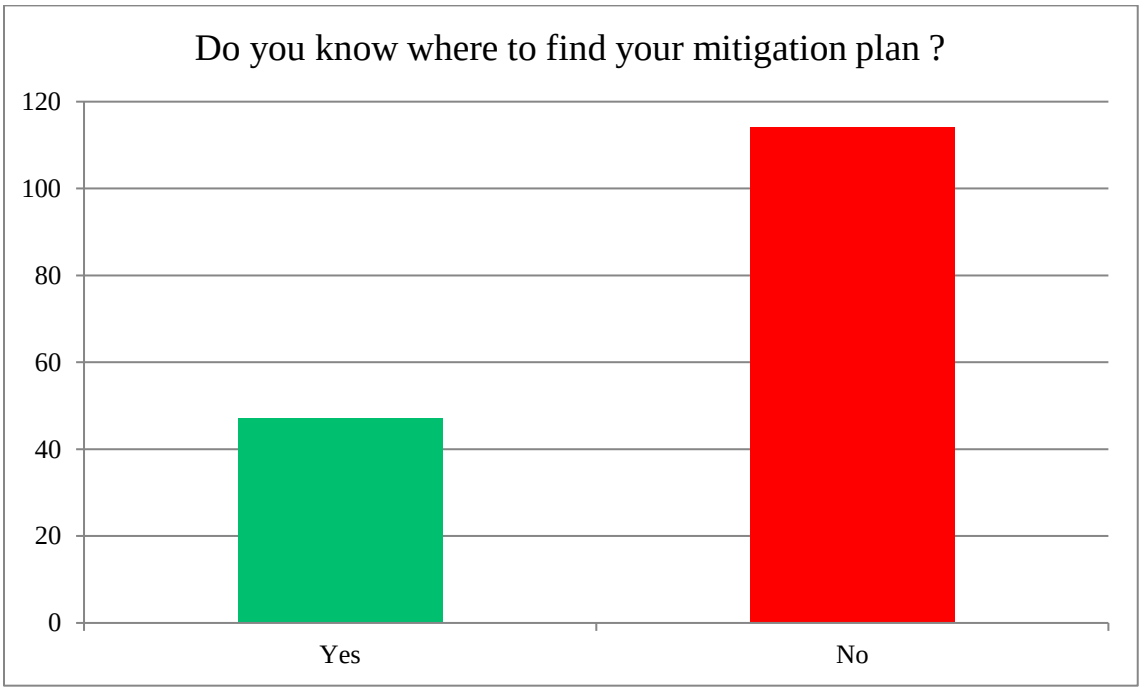
Question 4: The Kansas Division of Emergency Management currently reviews the application for funds for the FEMA Risk Mitigation Grant Program. Your current funding priorities are listed below. Please check those that could benefit your community.



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



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



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

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

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

Jurisdiction	Comments
Douglas County	Community involvement plan
Douglas County	Outreach to let communities know how the insurance process works and that the Federal dollars will not meet the gap.
Douglas County	PLEASE provide public service announcements about the dangers of flood waters with regard to not just to drowning, being swept away by receding waters, infection and disease, but the dangers resulting from flood waters that disrupt homeless and transient campsites such as those at Bircham Park in Lawrence. These parks also depositories for used drug paraphernalia such as hypodermic needles and razor blades which can be very harmful.
Douglas County	Please look at the predicted effects of climate change in this area when developing strategies. https://nca2014.globalchange.gov/report/regions/great-plains This is a fantastic resource. Keep in mind that storms, floods, droughts, and temperature extremes will continue to get more severe and frequent and plan accordingly.

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

Jurisdiction	Comments
Douglas County	Advance warning of events is crucial to survival, as shown by the recent tornado. Maintaining and improving communication is essential, no matter the hazard.
Douglas County	It is really hard to say. Douglas County has a great response to all forms of hazards and the surrounding counties are there to help also.
Douglas County	I trust you will rely on previous and current science, research and experience of FEMA!
Douglas County	county-wide ditch maintenance and improvements (flood)
Douglas County	Consider infrastructure that isn't as immediately noticeable. When the power goes out, places like sewage treatment facilities need immediate attention to prevent sewage overflows. Updating these facilities would be helpful, especially when power outages are widespread and affect multiple stations.
Douglas County	+Lecompton FIRE/EMS Station #1 designated as a community shelter.
Douglas County	Allow space for the rivers to flood. Do not allow building in the flood plain.
Douglas County	Schools and other heavily populated buildings should all have tornado shelters. New construction should be required to incorporate a tornado shelter.
Douglas County, Lawrence	Tornado shelters
Jefferson County	Provide funding and grants to agencies that have little or no money to update their infrastructure.
Jefferson County	Making sure all communities have shelter available to the residents in the event of a tornado.
Jefferson County	Drinking water
Jefferson County	This is a start. Communication of the fact the plan exists and starting the conversation.
Jefferson County	Information needs to be conveyed to all residents in a timely manner and the information needs to be accurate. With social media, there will always be rumors. However, when you have emergency management and law enforcement relaying information to citizens that contradicts meteorologists and the national weather service, the community's faith in its leaders suffers dramatically.
Jefferson County	Better community communication I'm the mayor in the city of Oskaloosa Kansas and have not had the county emergency preparedness director ever contact the city.
Jefferson County	Community education of "safe locations" during times of emergency. To include winter storms and extended power outages.
Marshall County	Notify citizens of road closures
Marshall County	Power loss during bad weather
Marshall County	Roads and infrastructure are affected by all weather events. With the rains this year, it is extremely difficult for townships to maintain and keep roads open and drivable.
Marshall County	More information given by text message. Email does not alert residents.
Marshall County	Make sure the sirens actually work
Marshall County	Storm drainage. Specifically, in Frankfort
Marshall County	Bridges and communication networks are crucial in times of disaster. Internet and telephone must be available for emergency personnel. This should be every county's priority
Marshall County	I have no clue how to answer this question.

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

Jurisdiction	Comments
Marshall County, City of Marysville	Basic services, Water, Sewer, Electric

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

Table 2.3: Kansas Region K Survey Comments, Requested Projects

Jurisdiction	Comments
Atchison County	FEMA Tornado shelters
Brown County	New Fire Station
Douglas County	Increase flood mitigation projects. Flooding is the single most common hazard.
Douglas County	Large event issues specifically KU.
Douglas County	Although Wolf Creek nuclear power plant is located in Coffey County, it may behoove officials in our area to have knowledge of how a worst-case scenario could impact this area.
Douglas County	We are currently affected by the high waters at Clinton Lake. It's for recreational purposes and this is a record setting year, but still impacts us. Improvements to help prevent major disruptions to the use of the lake and facilities would be helpful so we learn from this event and apply those lessons moving forward.
Douglas County	I have nothing in my area. I would like to see more power lines and utilities put underground instead of poles.
Douglas County	No suggestions, but I do want to say I am glad for the prominence of Douglas County Emergency Management in the last month. You've helped a whole lot of people connect for the good of all.
Douglas County	Not at this time
Douglas County	Not mitigation, but I'm alarmed that there do not appear to be any community shelters in our area. There are a lot of people here who live in trailers and other non-safe locations, when tornadoes are prevalent in our area.
Douglas County	Backup power supply for Lecompton FIRE/EMS Station #1 Natural gas generator as a backup power supply.
Douglas County	Restore vegetation along the rivers
Douglas County	Would love if a grant was available to give homeowners financial help in adding a tornado shelter or having one retrofitted.
Douglas County	Make sure you're working with critical businesses to make sure they get up and running as quickly as possible following a disaster. This would include grocery and hardware stores as well as gas stations.
Douglas County, Lawrence	The city, state and federal parks in the region need storm shelters. The F4 skirted Clinton State Park and if it had struck it many, many people would have been killed.
Jefferson County	A new well for water district 10 that is not in a flood zone.
Jefferson County	Would like to see a community shelter built or more than one built for people who live in areas such as Trailer Courts or areas where there is no shelter from Tornado's. Getting to a shelter in appropriate time or having access to one quickly is critical. Majority of shelters in the community are at least 2 to 5 minutes away give or take traffic or personnel available to unlock such shelters.

Table 2.3: Kansas Region K Survey Comments, Requested Projects

Jurisdiction	Comments
Jefferson County	Wells on higher ground
Jefferson County	Regarding question #4, I'm not sure on three of the four (in terms of our community) but I do not concern has been expressed for a community tornado shelter/safe space.
Jefferson County	There are numerous abandon homes that no one lives in, that need to be removed. It makes the towns look old and run down. They are also harboring numerous cats that apparently own the city streets.
Jefferson County	Community storm shelter for the city of Oskaloosa we have money but would like to know if there are grants or cost share programs.
Marshall County	Poor communication infrastructure means loss of means of communication during emergency.
Marshall County	Improve drainage at the Marshall county fairgrounds. This would help the flooding in the area and keep insect population down.
Marshall County	We would like to strengthen our building, specifically the windows and doors. Glass that is designed to stand up to high speed projectiles (such as those in a tornado) but still easily opened for evacuations would be ideal.
Marshall County	Hazmat release training die to train derailment or tanker overturn
Marshall County	Disaster protocol for ALL health care workers in the area! Not just those that are working in local entities like the health departments or hospital settings
Marshall County	Update sirens, generators at government, schools, major infrastructures, shelters
Marshall County, City of Marysville	Ensure all communities have standby power for water and sewer pumps and treatment.
Washington County	A tornado shelter on the south side of the highway in Washington

2.6 – Planning Meetings

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

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

A series of kick-off meetings were held with MPC members, available representatives from jurisdictions within the planning region, local and regional stakeholders, and the public invited. At the kickoff meeting, the planning process, project coordination, scope, participation requirements, strategies for public involvement, and schedule were discussed in detail. During the meeting, participants were led through a guided discussion concerning hazard data sourced from their previous hazard mitigation plans.

Additionally, research was conducted prior to the meeting on recent regional hazard events to further inform the discussion. Participants were encouraged to discuss past hazard events, past impacts, and the future probability for all identified hazards. At the conclusion of the meeting, all participants were provided with a data collection 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.

A mid-term planning meeting was held with MPC members. Based upon the initial research, discussions held during the kickoff meetings, information obtained from the data collection forms, additional research, and subsequent discussion with MPC members, the results of the hazard identification, classification, and delineation were discussed in detail. In addition, sections of the HMP were made available for review and comment. Based on the supplied hazard information, participants were asked to assist in the development and review of mitigation goals and actions.

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

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

Table 2.4: Kansas Region K Planning Meetings

Meeting Number	Date	Location
1 (Kickoff)	02/12/2019	Marshall County
	02/13/2019	Atchison County
	02/13/2019	Jefferson County
2 (Mid-Term)	05/21/2019	On-Line
3 (Final)	06/25/2019	Marshall County
	06/25/2019	Atchison County
	06/26/2019	Douglass County

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

2.7 – Existing Plan Incorporation

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

44 CFR 20176(c)(1)(iii): 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 K'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 K's mitigation efforts.

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

Integration Challenges

The 2014 plan update successfully integrated approved Kansas Region K 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 or planning and response. However, and as always, challenges exist due to the day to day demands of the working environment, including scheduling conflicts, budget restrictions, and staffing

changes and shortages related to both the utilization and incorporation of the HMP and completion of identified hazard mitigation projects.

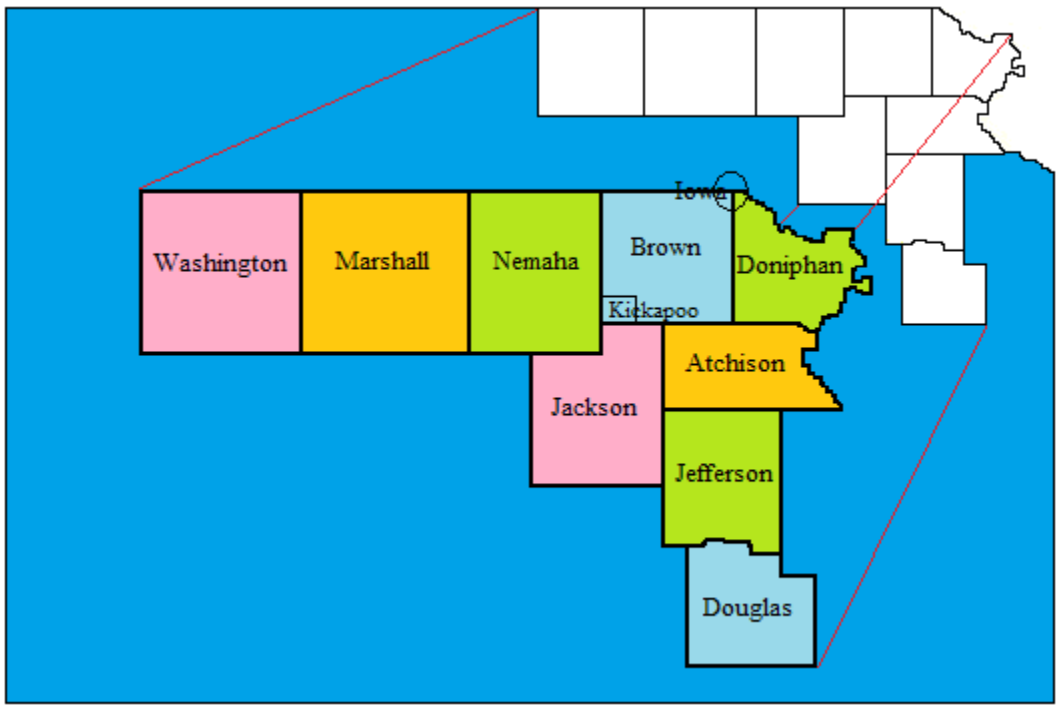
3.0 Planning Area

3.1 – Introduction

Kansas Region K consists of the following participating counties, Tribes, and their participating jurisdictions:

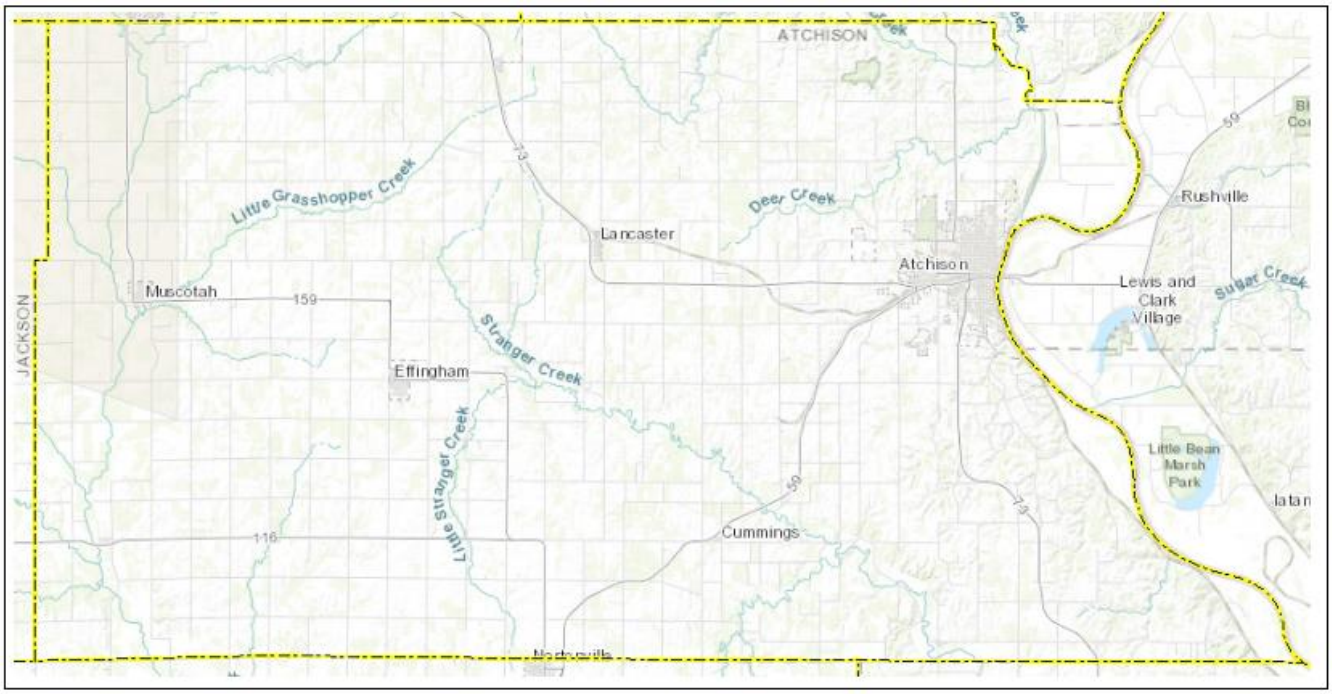
- Atchison County
- Brown County
- Doniphan County
- Douglas County
- Iowa Tribe
- Jackson County
- Jefferson County
- Kickapoo Tribe
- Marshall County
- Nemaha County
- Washington County

The following map details the locations of these counties.



The following map, provided by the Kansas Department of Transportation (KDOT), detail the locations of participating jurisdictions for Atchison County:

Atchison County

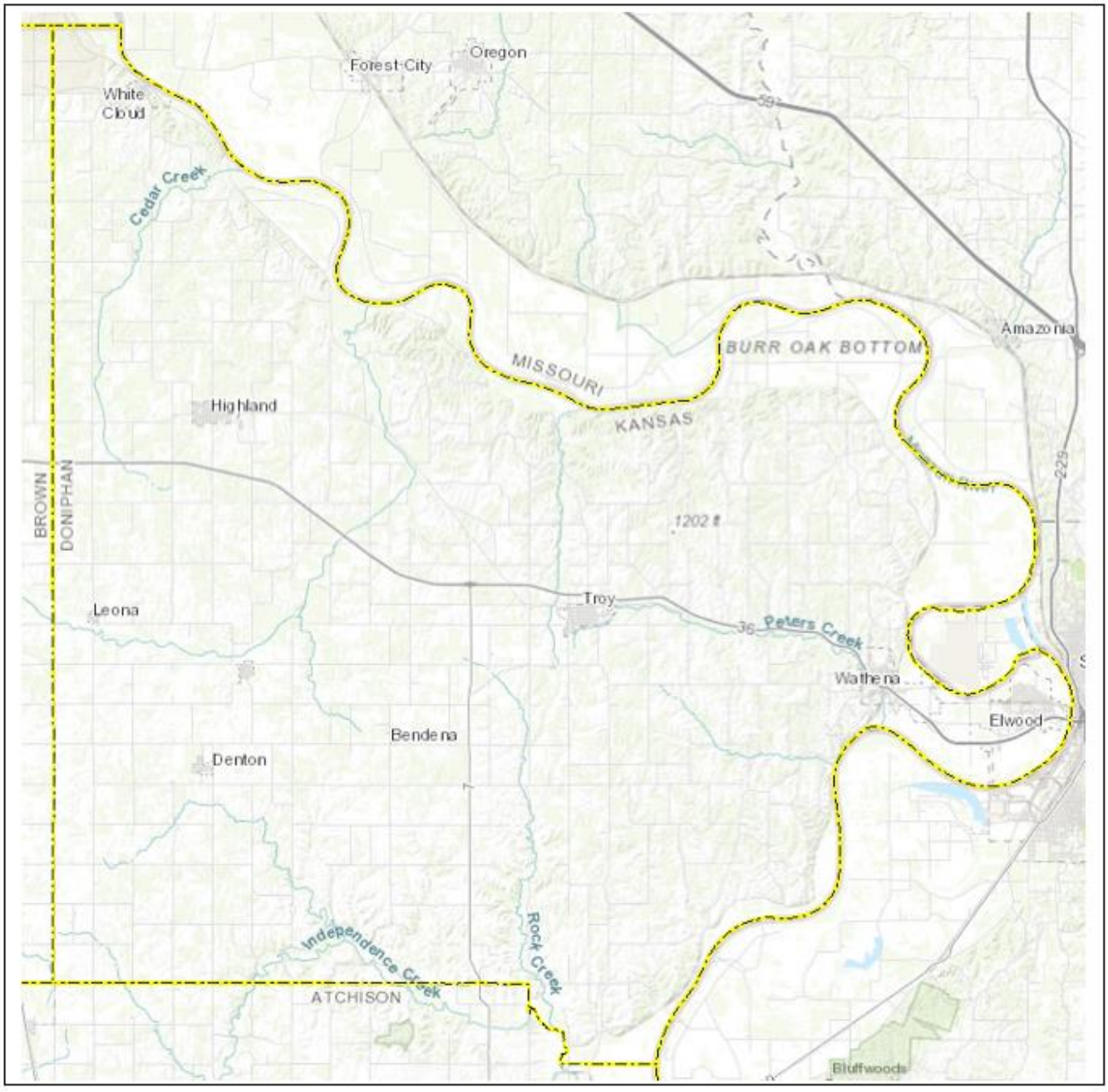


The following map, provided by KDOT, details the locations of participating jurisdictions for Brown County:

Brown County

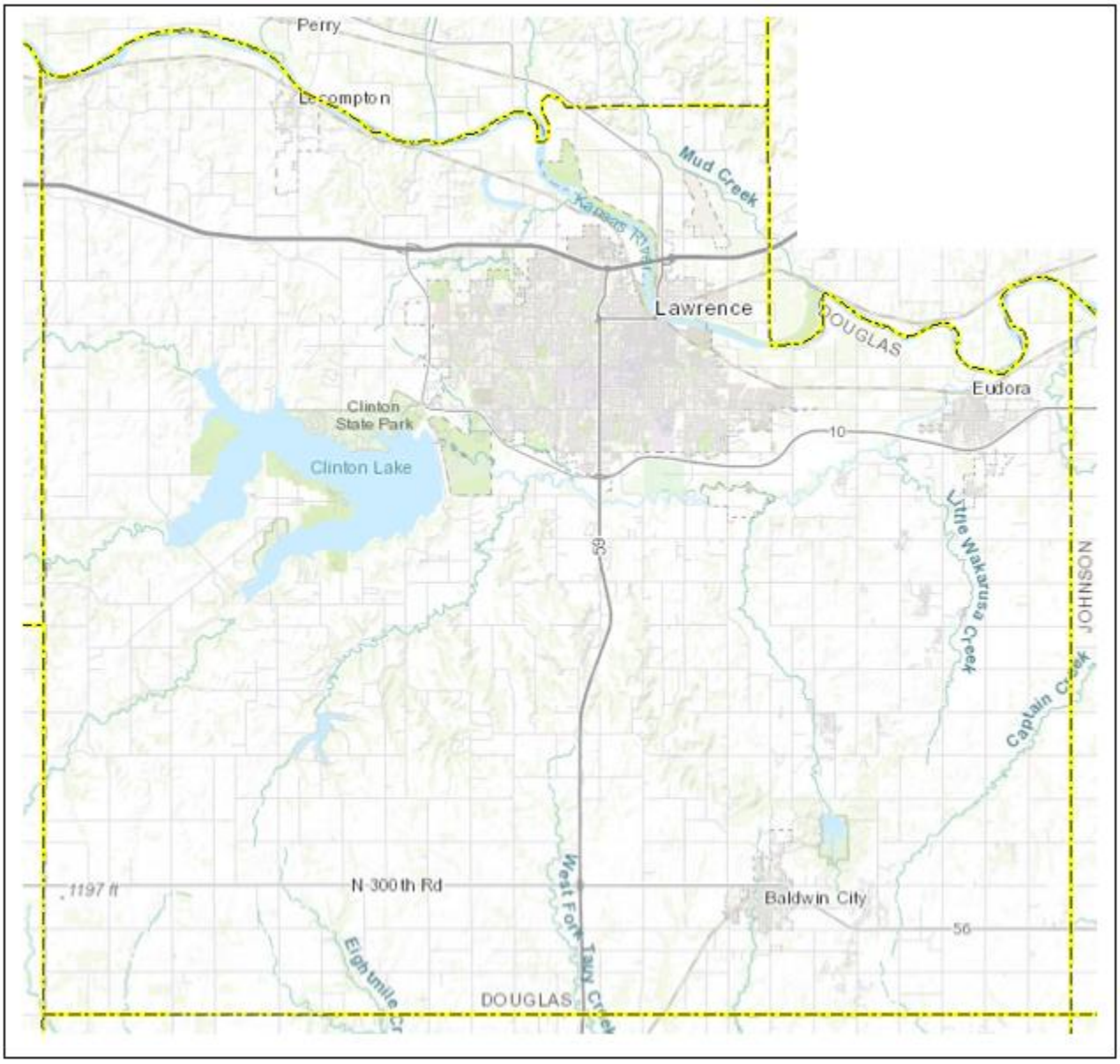
The following map, provided by KDOT, details the locations of participating jurisdictions for Doniphan County:

Doniphan County



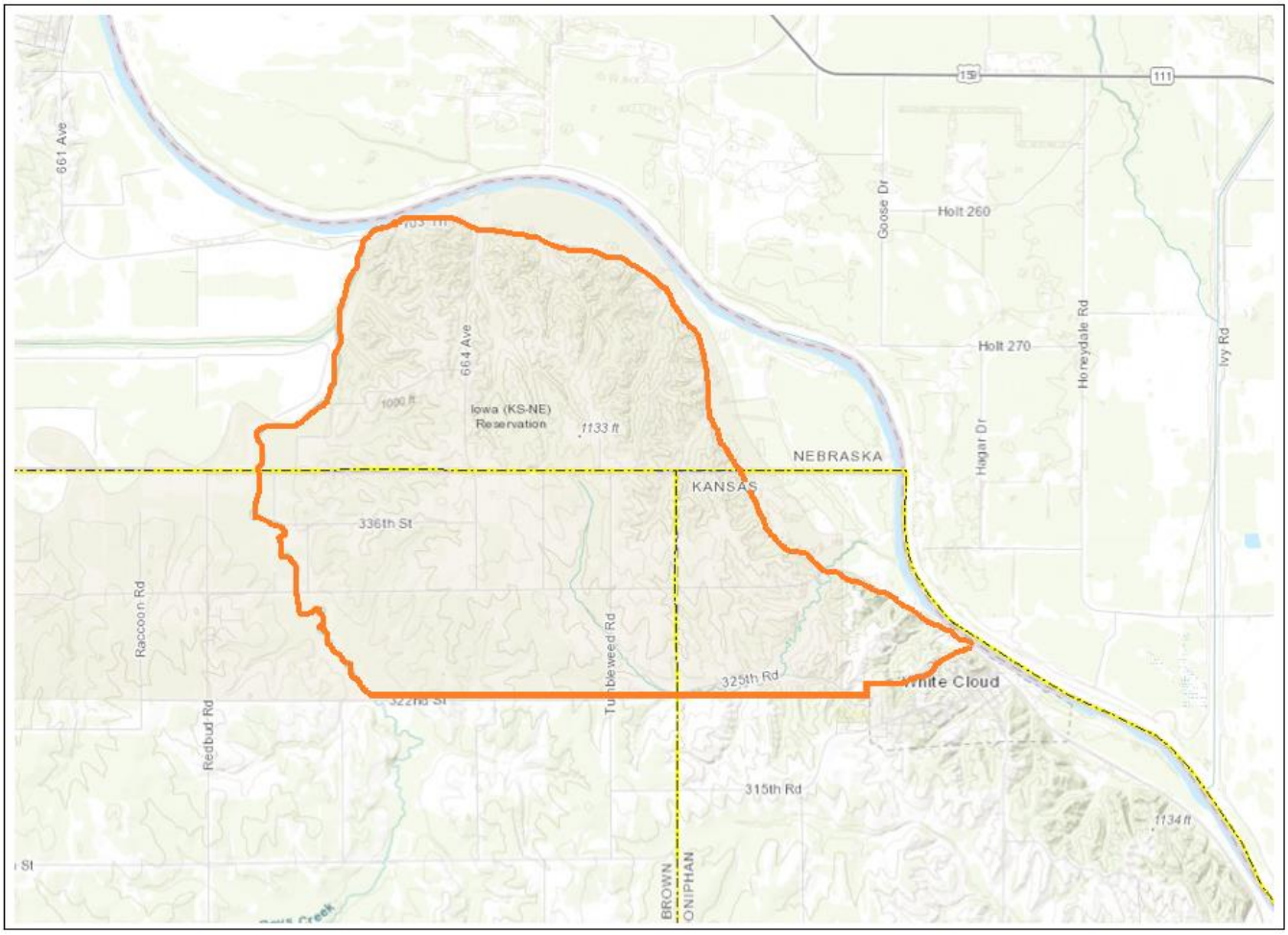
The following map, provided by KDOT, details the locations of participating jurisdictions for Douglas County:

Douglas County



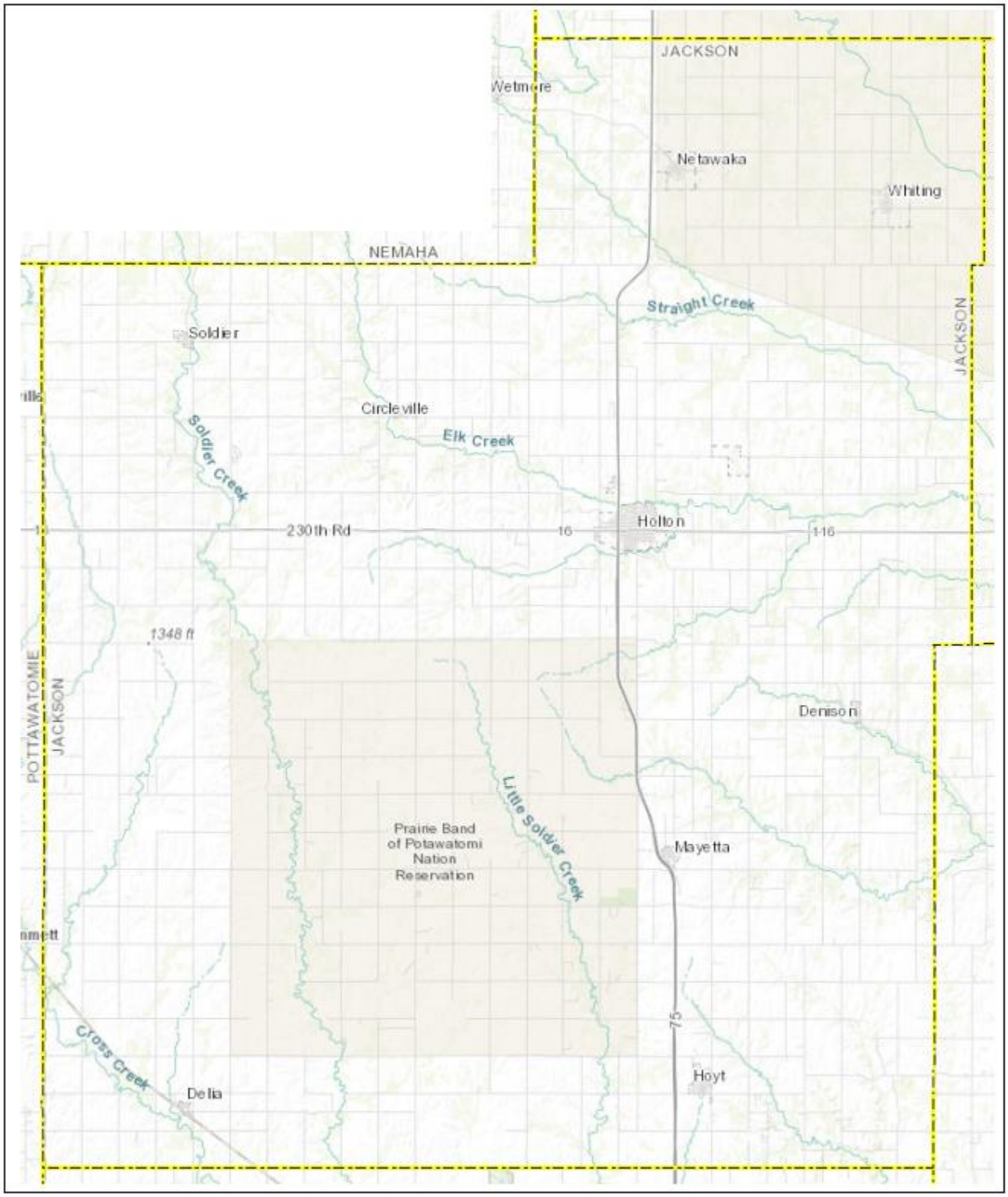
The following map, provided by KDOT, details the location of the Iowa Tribal Reservation:

Iowa Tribal Reservation



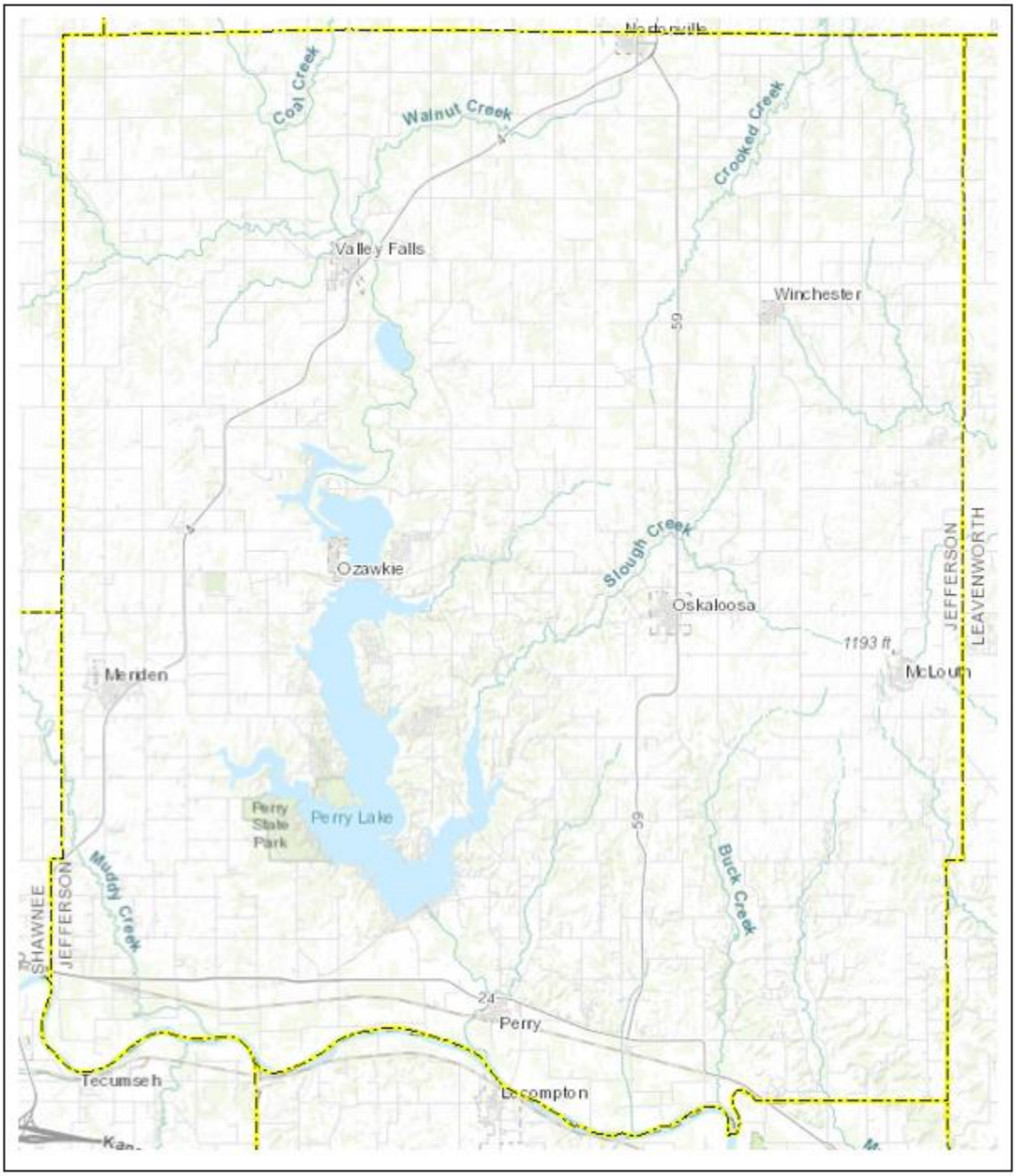
The following map, provided by KDOT, details the locations of participating jurisdictions for Jackson County:

Jackson County



The following map, provided by KDOT, details the locations of participating jurisdictions for Jefferson County:

Jefferson County

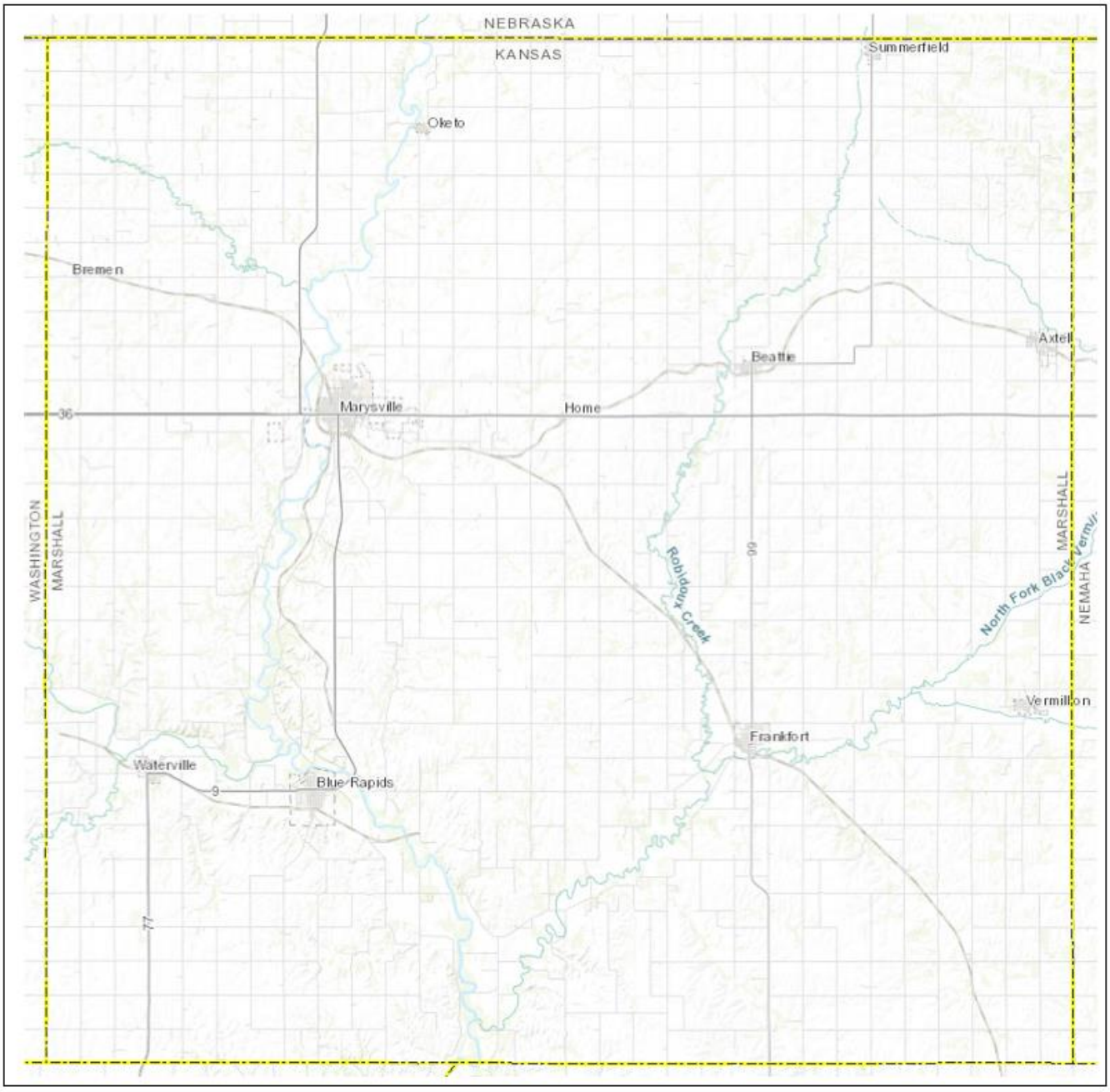


The following map, provided by KDOT, details the location of the Kickapoo Tribal Reservation:

Kickapoo Tribal Reservation

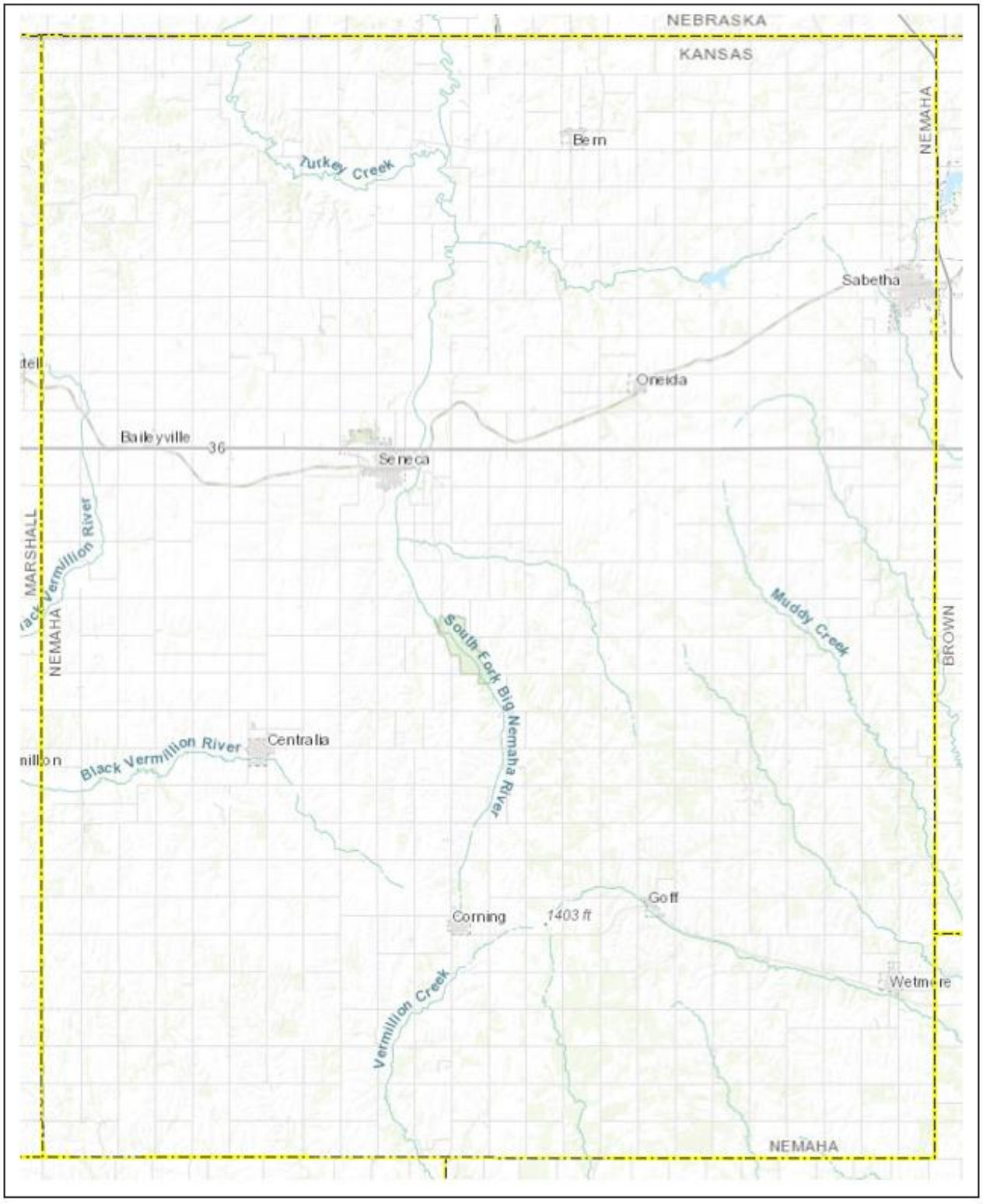
The following map, provided by KDOT, details the locations of participating jurisdictions for Marshall County:

Marshall County



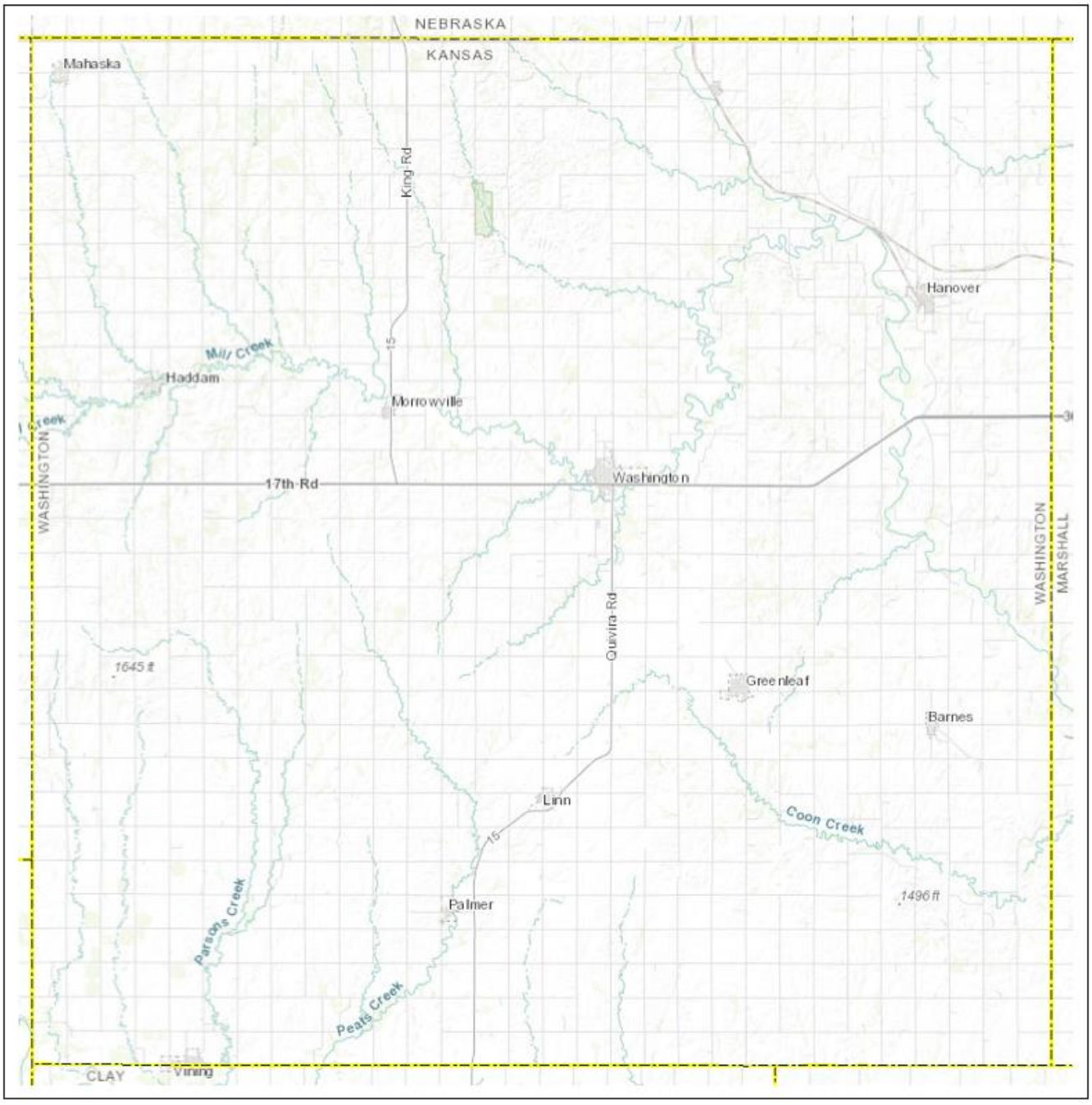
The following map, provided by KDOT, details the locations of participating jurisdictions for Nemaha County:

Nemaha County



The following map, provided by KDOT, details the locations of participating jurisdictions for Washington County:

Washington County



3.2 – Regional Population Data

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

Table 3.1: Atchison County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Atchison County	**16,774**	**16,924**	**16,193**	**-581**	**-3.5%**	**37**
City of Atchison	10,232	11,021	10,727	495	4.8%	1,488
City of Effingham	588	546	587	-1	-0.2%	1,087
City of Huron	87	54	137	50	57.5%	161
City of Lancaster	291	298	250	-41	-14.1%	1,136
City of Muscotah	200	176	208	8	4.0%	612

Source: US Census Bureau

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

- A population decline was noted in Atchison County, -3.5% as a whole
- Population gains were noted in three participating cities
- Population declines were noted in two participating cities

Table 3.2: Brown County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Brown County	**10,724**	**9,984**	**9,736**	**-988**	**-9.2%**	**17**
City of Everest	314	284	323	9	2.9%	1,242
City of Fairview	271	260	340	69	25.5%	1,133
City of Hiawatha	3,417	3,172	3,176	-241	-7.1%	1,424
City of Horton	1967	1776	1773	-194	-9.9%	1,007
City of Morrill	277	230	297	20	7.2%	1,414
City of Reserve	100	84	70	-30	-30.0%	636
City of Robinson	216	234	201	-15	-6.9%	838
City of Willis	69	38	26	-43	-62.3%	153

Source: US Census Bureau

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

- A population decline was noted in Brown County, -9.2% as a whole
- Population gains were noted in three participating cities
- Population declines were noted in five participating cities

Table 3.3: Doniphan County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Doniphan County	**8,249**	**7,945**	**7,790**	**-459**	**-5.6%**	**20**
City of Denton	186	148	177	-9	-4.8%	1,264
City of Elwood	1145	1224	1017	-128	-11.2%	499
City of Highland	976	1,012	1,043	67	6.9%	1,968
City of Troy	1054	1010	893	-161	-15.3%	1,240
City of Wathena	1,348	1,364	1,253	-95	-7.0%	643

Source: US Census Bureau

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

- A population decline was noted in Doniphan County, -5.6% as a whole
- Population gains were noted in one participating city
- Population declines were noted in four participating cities

Table 3.4: Douglas County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Douglas County	**99,962**	**110,826**	**117,806**	**17,844**	**17.9%**	**248**
City of Baldwin City	3,400	4,515	4,627	1,227	36.1%	2,132
City of Eudora	4307	6136	6272	1,965	45.6%	3,120
City of Lawrence	80,098	87,643	93,954	13,856	17.3%	3,274
City of Lecompton	608	625	660	52	8.6%	673

Source: US Census Bureau

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

- A population gain was noted in Douglas County, 17.9% as a whole
- Population gains were noted in all participating cities

Table 3.5: Iowa Tribe Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Iowa Tribe	**129**	**162**	**191**	**62**	**48.1%**	**44**

Source: Iowa Tribe

Of note for the Iowa Tribe for the period 2000 to 2017:

- A population gain was noted for the Iowa Tribal Reservation, 48.1% as a whole

Table 3.6: Jackson County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Jackson County	**12,657**	**13,462**	**13,322**	**665**	**5.3%**	**20**
City of Circleville	185	170	174	-11	-5.9%	967
City of Delia	179	169	147	-32	-17.9%	1,336
City of Denison	231	187	124	-107	-46.3%	1,033
City of Holton	3353	3329	3268	-85	-2.5%	1,287
City of Hoyt	571	669	663	92	16.1%	1,542
City of Mayetta	312	341	320	8	2.6%	1,882
City of Netawaka	170	143	176	6	3.5%	180
City of Soldier	122	136	94	-28	-23.0%	627
City of Whiting	206	187	205	-1	-0.5%	203

Source: US Census Bureau

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

- A population gain was noted in Jackson County, 5.3% as a whole
- Population gains were noted in three participating cities
- Population declines were noted in six participating cities

Table 3.7: Jefferson County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Jefferson County	**18,426**	**19,126**	**18,856**	**430**	**2.3%**	**34**
City of McLouth	868	880	1,012	144	16.6%	2,108
City of Meriden	706	813	904	198	28.0%	2,511
City of Nortonville	620	637	595	-25	-4.0%	1,384
City of Oskaloosa	1165	1113	1503	338	29.0%	1,652
City of Perry	901	929	909	8	0.9%	1,165
City of Valley Falls	1.254	1192	1071	-183	-14.6%	1,428
City of Winchester	579	551	552	-27	-4.7%	1,840

Source: US Census Bureau

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

- A population gain was noted in Jefferson County, 2.3% as a whole
- Population gains were noted in four participating cities
- Population declines were noted in three participating cities

Table 3.8: Kickapoo Tribe Population Data

Jurisdiction	Population 2000	Population 2013	Population 2017	Numeric Population Change 2013 - 2017	Percent Population Change 2013 to 2017	Population Density, per Square Mile 2017
Kickapoo Tribe	**-**	**1,271**	**1,610**	**339**	**26.7%**	**54**

Source: Kickapoo Tribe
-: Data not available

Of note for the Kickapoo Tribe for the period 2013 to 2017:

- A population gain was noted for the Kickapoo Tribal Reservation, 26.7% as a whole

Table 3.9: Marshall County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Marshall County	**10,965**	**10,117**	**9,859**	**-1,106**	**-10.1%**	**11**
City of Axtell	445	406	374	-71	-16.0%	748
City of Beattie	277	200	193	-84	-30.3%	839
City of Blue Rapids	1,088	1,019	975	-113	-10.4%	469
City of Frankfort	855	726	678	-177	-20.7%	665
City of Marysville	3,271	3,294	3,288	17	0.5%	1,006
City of Oketo	87	66	50	-37	-42.5%	455
City of Summerfield	211	156	117	-94	-44.5%	344
City of Vermillion	107	112	99	-8	-7.5%	396
City of Waterville	681	680	745	64	9.4%	1,490

Source: US Census Bureau

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

- A population decline was noted in Marshall County, -10.1% as a whole
- Population gains were noted in two participating cities
- Population declines were noted in seven participating cities

Table 3.10: Nemaha County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Nemaha County	**10,717**	**10,178**	**10,095**	**-622**	**-5.8%**	**14**
City of Bern	204	166	165	-39	-19.1%	611
City of Centralia	534	512	623	89	16.7%	1,384
City of Corning	170	157	187	17	10.0%	668
City of Goff	181	126	125	-56	-30.9%	595
City of Oneida	70	75	60	-10	-14.3%	261
City of Sabetha	2589	2571	2544	-45	-1.7%	1,398

Table 3.10: Nemaha County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
City of Seneca	2,122	1,991	2,072	-50	-2.4%	1,345
City of Wetmore	362	368	357	-5	-1.4%	939

Source: US Census Bureau

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

- A population decline was noted in Nemaha County, -5.8% as a whole
- Population gains were noted in two participating cities
- Population declines were noted in six participating cities

Table 3.11: Washington County Population Data

Jurisdiction	Population 2000	Population 2010	Population 2017	Numeric Population Change 2000 - 2017	Percent Population Change 2000 to 2017	Population Density, per Square Mile 2017
Washington County	**6,483**	**5,799**	**5,572**	**-911**	**-14.1%**	**6**
City of Clifton	557	554	566	9	1.6%	2,264
City of Greenleaf	357	331	424	67	18.8%	922
City of Haddam	169	104	80	-89	-52.7%	229
City of Hanover	653	682	715	62	9.5%	1,430
City of Hollenberg	31	21	20	-11	-35.5%	250
City of Linn	425	410	501	76	17.9%	1,518
City of Morrowville	168	155	156	-12	-7.1%	1,114
City of Palmer	108	111	144	36	33.3%	450
City of Vining	58	45	67	9	15.5%	479
City of Washington	1223	1131	1116	-107	-8.7%	1,255

Source: US Census Bureau

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

- A population decline was noted in Washington County, -14.1% as a whole
- Population gains were noted in six participating cities
- Population declines were noted in four 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 K jurisdiction, by county. This information, from the U.S. Census Bureau QuickFacts, was available for cities and towns with a population greater than 5,000 persons only. In general, the higher a jurisdiction's at-risk population the greater the potential vulnerability to identified hazards.

Table 3.12: Kansas Region K Potentially Vulnerable Population Data, Jurisdictions Over 5,000 Persons

Jurisdiction	Percentage of Population 5 and Under (2017)	Percentage of Population 65+ (2017)	Percentage of Population Speaking Language Other Than English (2017)	Percentage of Population Living Below Poverty Level (2017)	Persons with a Disability, Under the Age of 65 (2017)
Atchison County	**6.0%**	**16.8%**	**1.4%**	**14.3%**	**11.3%**
City of Atchison	5.9%	13.9%	1.4%	24.0%	11.6%
Brown County	**6.6%**	**19.8%**	**1.8%**	**15.0%**	**10.9%**
Doniphan County	**5.9%**	**19.1%**	**1.3%**	**14.8%**	**10.4%**
Douglas County	**5.3%**	**11.7%**	**9.3%**	**15.9%**	**8.4%**
City of Eudora	6.8%	8.3%	6.5%	11.7%	9.8%
City of Lawrence	5.2%	9.9%	10.9%	21.8%	8.3%
Jackson County	**6.7%**	**18.6%**	**2.5%**	**11.0%**	**12.0%**
Jefferson County	**5.3%**	**18.1%**	**1.4%**	**8.5%**	**10.8%**
Marshall County	**6.8%**	**21.3%**	**2.3%**	**10.8%**	**9.4%**
Nemaha County	**7.6%**	**20.0%**	**1.7%**	**8.2%**	**7.4%**
Washington County	**7.1%**	**23.8%**	**4.0%**	**10.0%**	**7.4%**

Source: US Census Bureau

Of note for Kanas Region K and its participating jurisdictions:

- Regionally, 6.1% of the total population is under the age of 5, below the State of Kansas average of 6.6%.
- Regionally, 18.9% of the total population is over the age of 65, above the State of Kansas average of 15.4%.
- Regionally, 6.2% of the total population speak a language other than English at home, below the State of Kansas average of 11.5%.
- Regionally, approximately 12.2% of the total population are living below the poverty line, above the State of Kansas average of 8.8%.

- Regionally, 9.6% of persons under the age of 65 have an identified disability, below the State of Kansas average of 11.9%.

3.4 – Regional Housing Data

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

Table 3.13: Atchison County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Atchison County	**6,818**	**6,990**	**6,960**	**142**	**2.1%**	**16**	**4.5%**
City of Atchison	4,220	4,442	4,243	23	0.5%	588	0.4%
City of Effingham	255	252	283	28	11.0%	524	8.5%
City of Huron	32	25	52	20	62.5%	61	34.6%
City of Lancaster	117	117	121	4	3.4%	550	6.6%
City of Muscotah	90	90	104	14	15.6%	306	16.3%

Source: US Census Bureau

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

- A housing gain was noted in Atchison County, 2.1% as a whole
- Housing gains were noted in all participating cities

Table 3.14: Brown County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Brown County	**4,815**	**4,779**	**4,742**	**-73**	**-1.5%**	**8**	**4.0%**
City of Everest	156	155	186	30	19.2%	715	12.9%
City of Fairview	149	146	149	0	0.0%	497	8.7%
City of Hiawatha	1,646	1,588	1,621	-25	-1.5%	727	0.0%
City of Horton	906	904	1004	98	10.8%	570	6.2%
City of Morrill	113	105	134	21	18.6%	638	6.0%
City of Reserve	60	58	58	-2	-3.3%	527	3.4%
City of Robinson	111	109	111	0	0.0%	463	16.2%
City of Willis	29	27	29	0	0.0%	171	0.0%

Source: US Census Bureau
-: No Data

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

- A housing decline was noted in Brown County, -1.5% as a whole
- Housing gains were noted in three out eight participating cities
- Housing declines were noted in two out of eight participating cities

Table 3.15: Doniphan County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Doniphan County	**3,588**	**3,576**	**3,588**	**0**	**0.0%**	**9**	**12.4%**
City of Denton	74	74	89	15	20.3%	636	5.6%
City of Elwood	494	533	560	66	13.4%	275	38.4%
City of Highland	344	372	295	-49	-14.2%	557	7.1%
City of Troy	474	467	448	-26	-5.5%	622	5.8%
City of Wathena	566	587	573	7	1.2%	294	6.1%

Source: US Census Bureau

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

- Housing was static in Doniphan County, with a 0.0% change
- Housing gains were noted in three out five participating cities
- Housing declines were noted in two out of five participating cities

Table 3.16: Douglas County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Douglas County	**40,250**	**46,731**	**49,106**	**8,856**	**22.0%**	**103**	**2.3%**
City of Baldwin City	1,165	1,665	1,569	404	34.7%	723	0.0%
City of Eudora	1,664	2,306	2,241	577	34.7%	1,115	5.3%
City of Lawrence	32,761	37,502	39,928	7,167	21.9%	1,391	1.7%
City of Lecompton	233	254	231	-2	-0.9%	236	23.4%

Source: US Census Bureau

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

- A housing gain was noted in Douglas County, 22.0% as a whole
- Housing gains were noted in three out four participating cities
- Housing declines were noted in one out of four participating cities

Table 3.17: Iowa Tribe Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Iowa Tribe	**55**	**75**	**75**	20	36.4%	17	-

Source: Iowa Tribe
-: Data not available

Of note for the Iowa Tribe for the period 2000 to 2017:

- A housing gain was noted for the Iowa Tribal Reservation, 36.4% as a whole

Table 3.18: Jackson County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Jackson County	**5,094**	**5,779**	**5,835**	**741**	**14.5%**	**9**	**7.4%**
City of Circleville	80	77	90	10	12.5%	500	6.7%
City of Delia	58	58	50	-8	-13.8%	455	10.0%
City of Denison	88	87	78	-10	-11.4%	650	6.4%
City of Holton	1522	1652	1662	140	9.2%	654	1.9%
City of Hoyt	219	269	277	58	26.5%	644	13.0%
City of Mayetta	121	131	163	42	34.7%	959	8.0%
City of Netawaka	66	62	77	11	16.7%	79	13.0%
City of Soldier	58	56	58	0	0.0%	387	22.4%
City of Whiting	109	95	104	-5	-4.6%	103	12.5%

Source: US Census Bureau

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

- A housing gain was noted in Jackson County, 14.5% as a whole
- Housing gains were noted in five out nine participating cities
- Housing declines were noted in three out of nine participating cities

Table 3.19: Jefferson County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Jefferson County	**7,491**	**8,160**	**8,308**	**817**	**10.9%**	**15**	**9.4%**
City of McLouth	350	384	446	96	27.4%	929	11.7%
City of Meriden	279	336	346	67	24.0%	961	13.6%
City of Nortonville	255	261	261	6	2.4%	607	11.5%
City of Oskaloosa	478	480	639	161	33.7%	702	10.5%
City of Perry	395	392	426	31	7.8%	546	18.3%
City of Valley Falls	521	518	491	-30	-5.8%	655	4.9%

Table 3.19: Jefferson County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
City of Winchester	221	261	325	104	47.1%	1,083	2.2%

Source: US Census Bureau

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

- A housing gain was noted in Jefferson County, 10.9% as a whole
- Housing gains were noted in six out seven participating cities
- Housing declines were noted in one out of seven participating cities

Table 3.20: Kickapoo Tribe Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Kickapoo Tribe	**52**	**64**	**68**	**16**	**30.9%**	**2**	**-**

-: Data not available

Of note for the Kickapoo Tribe for the period 2000 to 2017:

- A housing gain was noted for the Kickapoo Tribal Reservation, 30.9% as a whole

Table 3.21: Marshall County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Marshall County	**4,999**	**4,866**	**4,890**	**-109**	**-2.2%**	**5**	**2.7%**
City of Axtell	204	194	189	-15	-7.4%	378	1.1%
City of Beattie	115	104	87	-28	-24.3%	378	5.7%
City of Blue Rapids	494	465	451	-43	-8.7%	217	2.9%
City of Frankfort	411	363	347	-64	-15.6%	340	4.6%
City of Marysville	1,614	1,646	1,763	149	9.2%	539	1.4%
City of Oketo	47	38	30	-17	-36.2%	273	0.0%
City of Summerfield	92	107	83	-9	-9.8%	244	13.3%
City of Vermillion	82	74	74	-8	-9.8%	296	5.4%
City of Waterville	328	331	362	34	10.4%	724	2.2%

Source: US Census Bureau

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

- A housing decline was noted in Marshall County, -2.2% as a whole
- Housing gains were noted in two out nine participating cities
- Housing declines were noted in seven out of nine participating cities

Table 3.22: Nemaha County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Nemaha County	**4,340**	**4,562**	**4,589**	**249**	**5.7%**	**6**	**4.4%**
City of Bern	102	95	97	-5	-4.9%	359	5.2%
City of Centralia	235	238	281	46	19.6%	624	7.5%
City of Corning	70	67	76	6	8.6%	271	11.8%
City of Goff	72	62	57	-15	-20.8%	271	1.8%
City of Oneida	36	34	32	-4	-11.1%	139	18.8%
City of Sabetha	1049	1227	1229	180	17.2%	675	0.2%
City of Seneca	978	982	1,124	146	14.9%	730	5.2%
City of Wetmore	156	152	161	5	3.2%	424	24.2%

Source: US Census Bureau

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

- A housing gain was noted in Nemaha County, 5.7% as a whole
- Housing gains were noted in five out eight participating cities
- Housing declines were noted in three out of eight participating cities

Table 3.23: Washington County Housing Data

Jurisdiction	Housing Units 2000	Housing Units 2010	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
Washington County	**3,142**	**2,955**	**2,943**	**-199**	**-6.3%**	**3**	**3.5%**
City of Clifton	278	151	237	-41	-14.7%	948	0.4%
City of Greenleaf	202	199	193	-9	-4.5%	420	0.0%
City of Haddam	96	88	64	-32	-33.3%	183	3.1%
City of Hanover	332	314	330	-2	-0.6%	660	3.9%
City of Hollenberg	28	23	22	-6	-21.4%	275	0.0%
City of Linn	186	165	203	17	9.1%	615	2.0%
City of Morrowville	93	90	97	4	4.3%	693	13.4%
City of Palmer	55	62	73	18	32.7%	228	0.0%
City of Vining	29	27	31	2	6.9%	221	0.0%
City of Washington	644	582	566	-78	-12.1%	637	1.4%

Source: US Census Bureau

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

- A housing decline was noted in Washington County, -6.3% as a whole
- Housing gains were noted in four out ten participating cities
- Housing declines were noted in six out of ten participating cities

3.5 – Regional Property Valuations

This section quantifies the built environment exposed to potential hazards in Kansas Region K. The following tables provide monetary value of structures, by category and where available, for each county in Kansas Region K. 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 and from Tribal participants.

Table 3.24: Kansas Region K Property Valuations, Residential, Commercial and Industrial

County	Residential	Commercial	Industrial
Atchison	$1,473,238,000	$318,870,000	$174,307,000
Brown	$830,487,000	$181,994,000	$44,433,000
Doniphan	$698,298,000	$104,303,000	$33,291,000
Douglas	$9,914,359,000	$1,613,351,000	$445,073,000
Jackson	$1,231,822,000	$128,354,000	$36,066,000
Jefferson	$1,896,855,000	$169,452,000	$59,327,000
Marshall	$869,634,000	$163,819,000	$89,198,000
Nemaha	$964,612,000	$160,681,000	$54,897,000
Washington	$462,844,000	$95,510,000	$12,748,000

Source: FEMA HAZUS

Table 3.25: Kansas Region K Property Valuations, Agriculture, Government and Education

County	Agriculture	Government	Education
Atchison	$26,752,000	$10,264,000	$29,569,000
Brown	$24,713,000	$10,492,000	$19,259,000
Doniphan	$26,761,000	$7,603,000	$70,489,000
Douglas	$53,829,000	$59,265,000	$220,151,000
Jackson	$21,085,000	$15,745,000	$20,289,000
Jefferson	$23,789,000	$19,224,000	$34,136,000
Marshall	$43,033,000	$9,618,000	$24,404,000
Nemaha	$45,398,000	$9,104,000	$25,797,000
Washington	$38,074,000	$6,002,000	$16,225,000

Source: FEMA HAZUS

Table 3.26: Kansas Region K Total Property Valuations

County	Total
Atchison	$2,077,340,000
Brown	$1,135,773,000
Doniphan	$953,610,000
Douglas	$12,489,840,000
Iowa Tribal Reservation*	$7,712,800
Jackson	$1,477,185,000
Jefferson	$2,239,834,000
Kickapoo Tribal Reservation*	$6,000,000
Marshall	$1,231,049,000
Nemaha	$1,282,096,000

Table 3.26: Kansas Region K Total Property Valuations

County	Total
Washington	$650,841,000

Source: FEMA HAZUS
* Source: Tribal Government

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 in restricted Appendix D.

3.7 – Cultural and Sacred Sites

44 CFR 201.7 (c)(2)(ii)(D): Cultural and sacred sites that are significant, even if they cannot be valued in monetary terms.

Native American sacred sites are defined differently depending on the tribe. For this plan, sacred sites are defined as sites that have an important historical, tribal or spiritual resonance. Details concerning these sacred sites have been deemed as sensitive information, and as such their specific information is not contained in the body of this HMP, but in restricted Appendix D.

3.8 – 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 3.27: Participating USD Information

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
Atchison County			
USD #377 - Atchison County	500	5	$34,000,000
USD #409 - Atchison	1,691	4	$104,694,277
Brown County			
USD #415 - Hiawatha	925	11	-
USD #430 - Horton	570	9	-
Doniphan County			
USD #111- Doniphan West	323	-	-
USD #114 - Riverside	642	10	-
USD #429 - Troy	337	7	-
Douglas County			
USD #343 - Perry / Lecompton	743	8	-
USD #348 - Baldwin City	1,450	6	$120,000,000
USD #491 - Eudora	1,768	8	-
USD #497 - Lawrence	11,970	9	-
Jackson County			
USD #335 - North Jackson	404	3	$17,000,000
USD #336 - Holton	1,133	5	$54,853,393
USD #337 - Royal Valley	850	5	$31,000,000
Jefferson County			
USD #338 - Valley Falls	372	8	-
USD #339 - Jefferson County North	471	9	$21,141,025
USD #340 - Jefferson West	845	8	$39,927,135
USD #341 - Okaloosa	511	1	$23,269,742
USD #342 - McLouth	492	8	-
USD #343 - Perry / Lecompton	743	8	-
Marshall County			
USD #113 - Prairie Hills	1,093	12	-
USD #364 - Marysville	777	9	-
USD #380 - Vermillion	300	2	$15,000,000
USD #498 - Valley Heights	407	10	-
Nemaha County			
USD #113 - Prairie Hills	511	4	-
USD #115 - Nemaha Central	680	3	-
Washington County			
USD #108 - Washington County	334	10	$7,665,876
USD #223 - Barnes / Hanover / Linn	444	4	$17,033,885
USD #224 – Clifton/Clyde		-	-

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

The following table presents participating college and university enrollment information, the number of school structures, and the insured valuation of these structures and contents within (if information is available).

Table 3.28: Participating College and University Information

College or University	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
Atchison County			
Highland Community College	3,260	38	-
Doniphan County			
Highland Community College	3,260	38	-
Douglas County			
Baker University	2,879	42	-
University of Kansas	28,447	147	-

Source: Kansas State Department of Education and Participating college or university
-: Information unavailable

3.9 – 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:

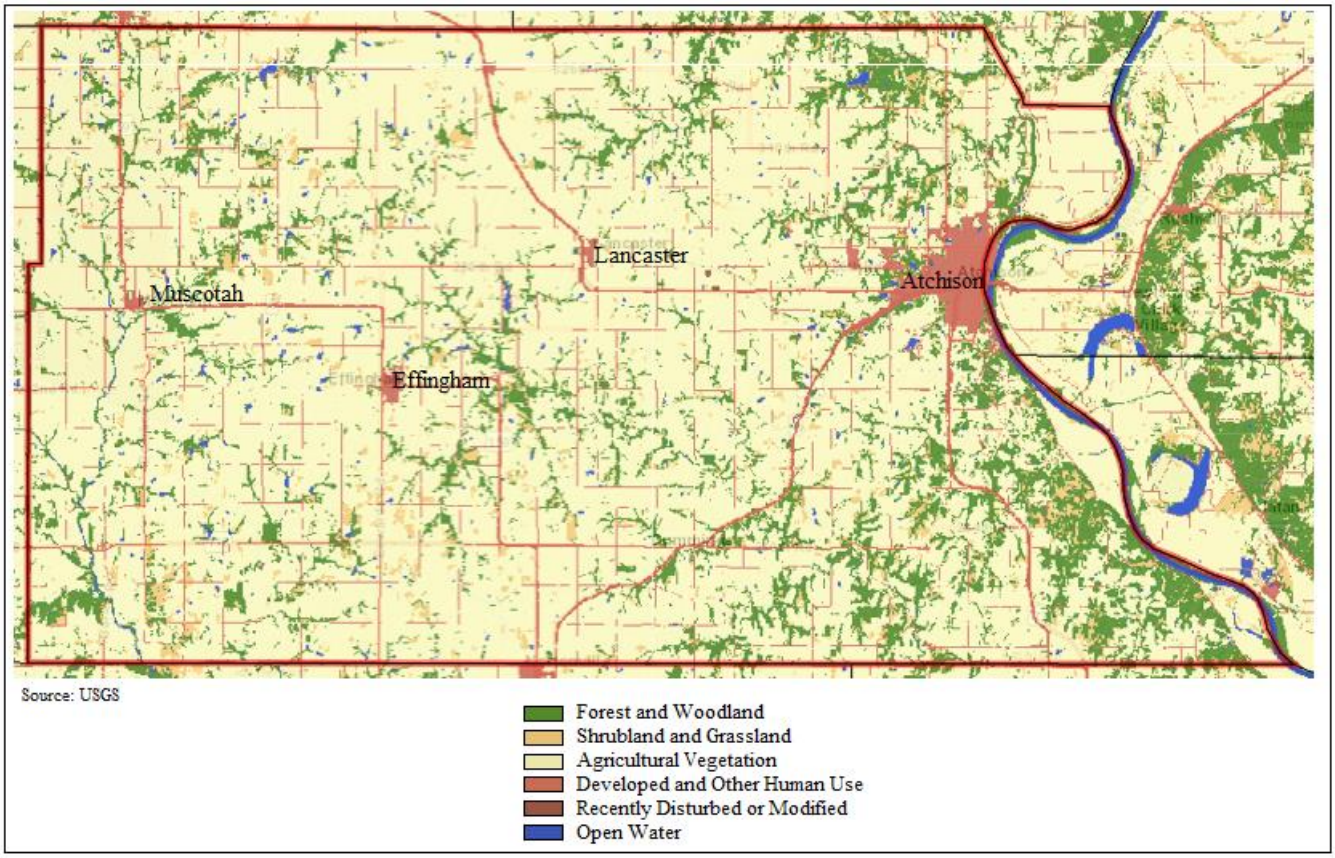
- Unrestricted residential growth which can increase a population's exposure to identified hazard prone areas
- Rapid, unchecked development that can put a strain on a community's vulnerable resources such as its energy infrastructure
- Residential development constructed quickly and inexpensively to 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.

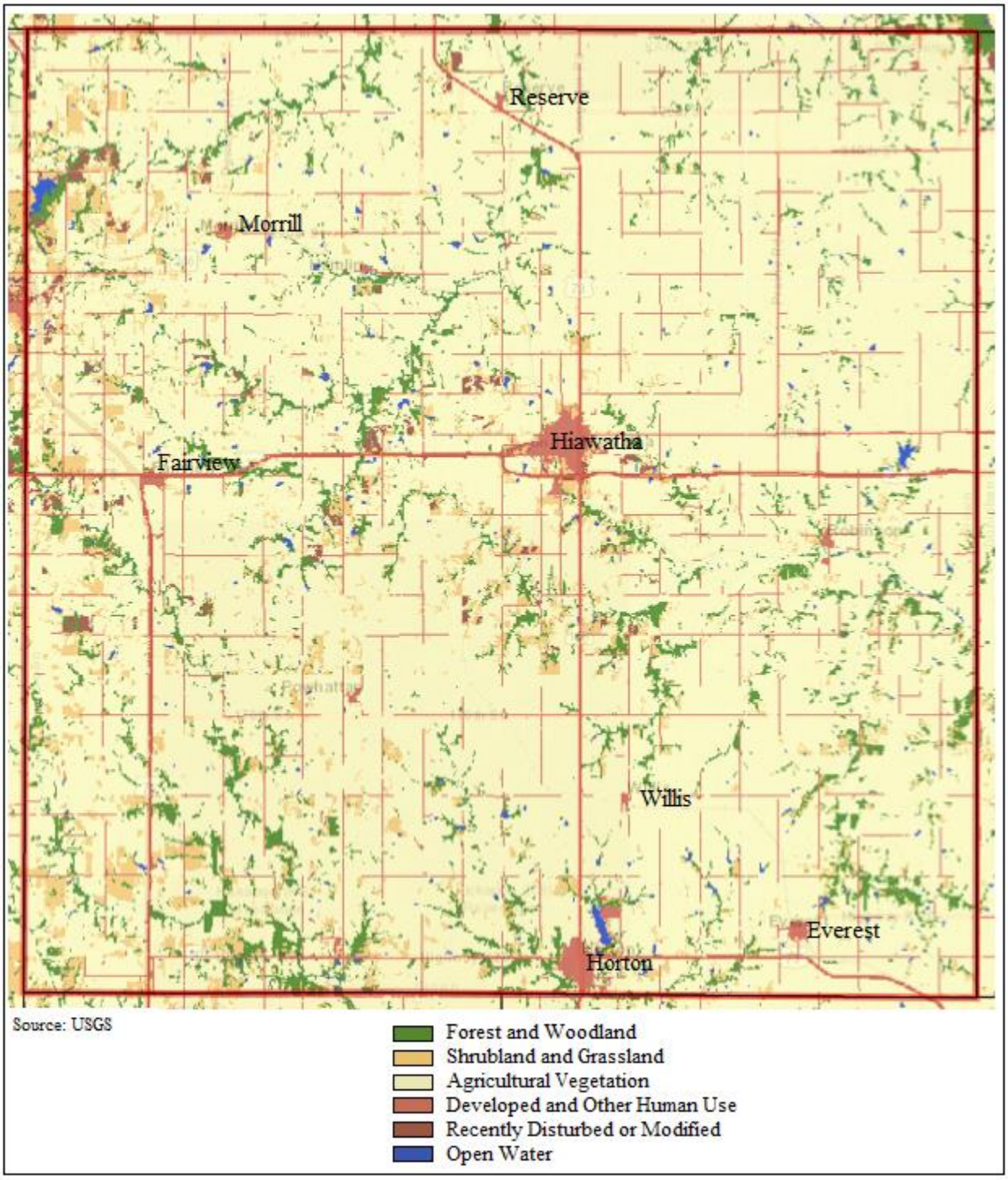
3.10 – Regional Land Cover

The 2016 USGS land cover map illustrates land usage. As indicated by the following maps, 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.

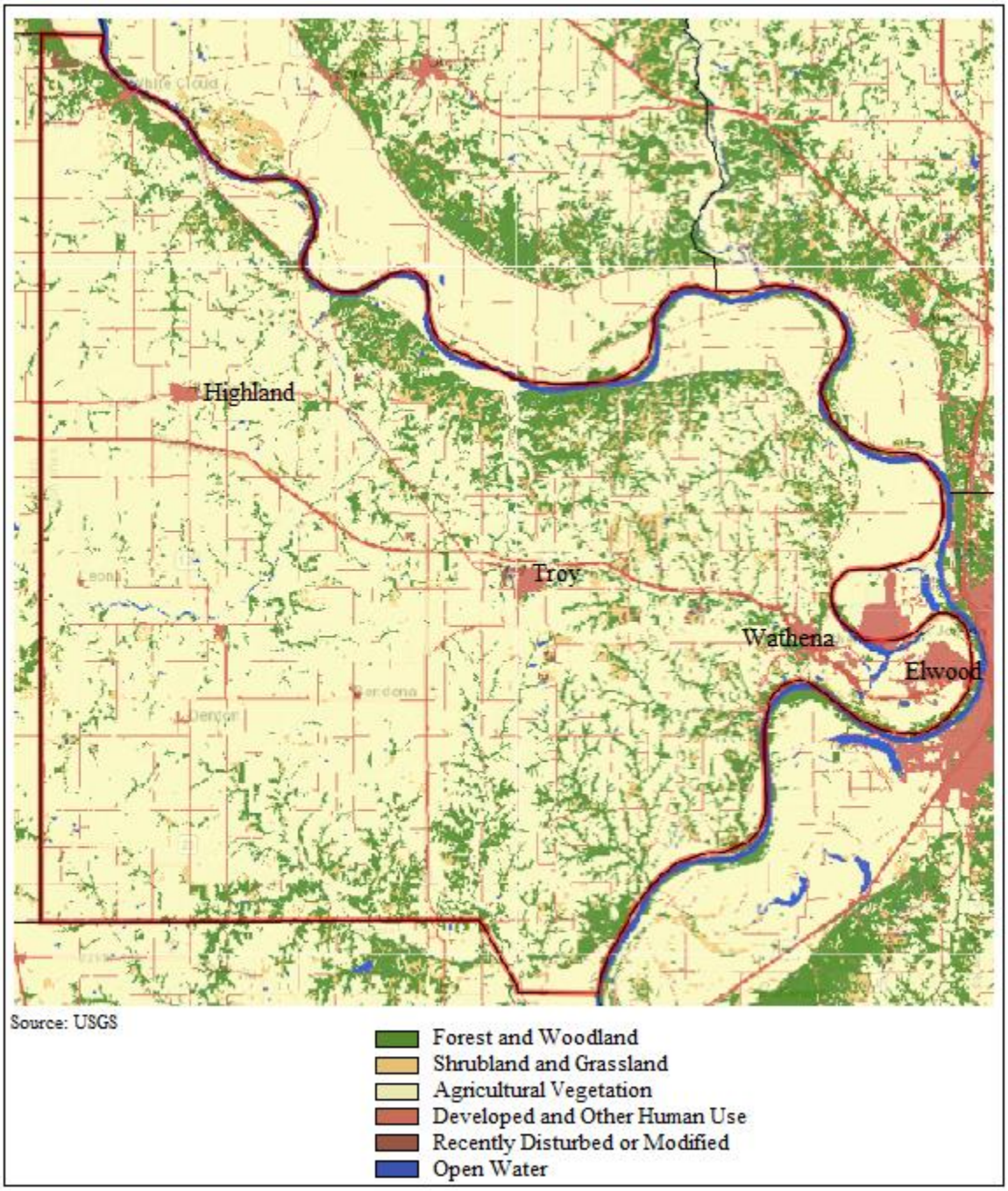
Atchison County Land Cover Map



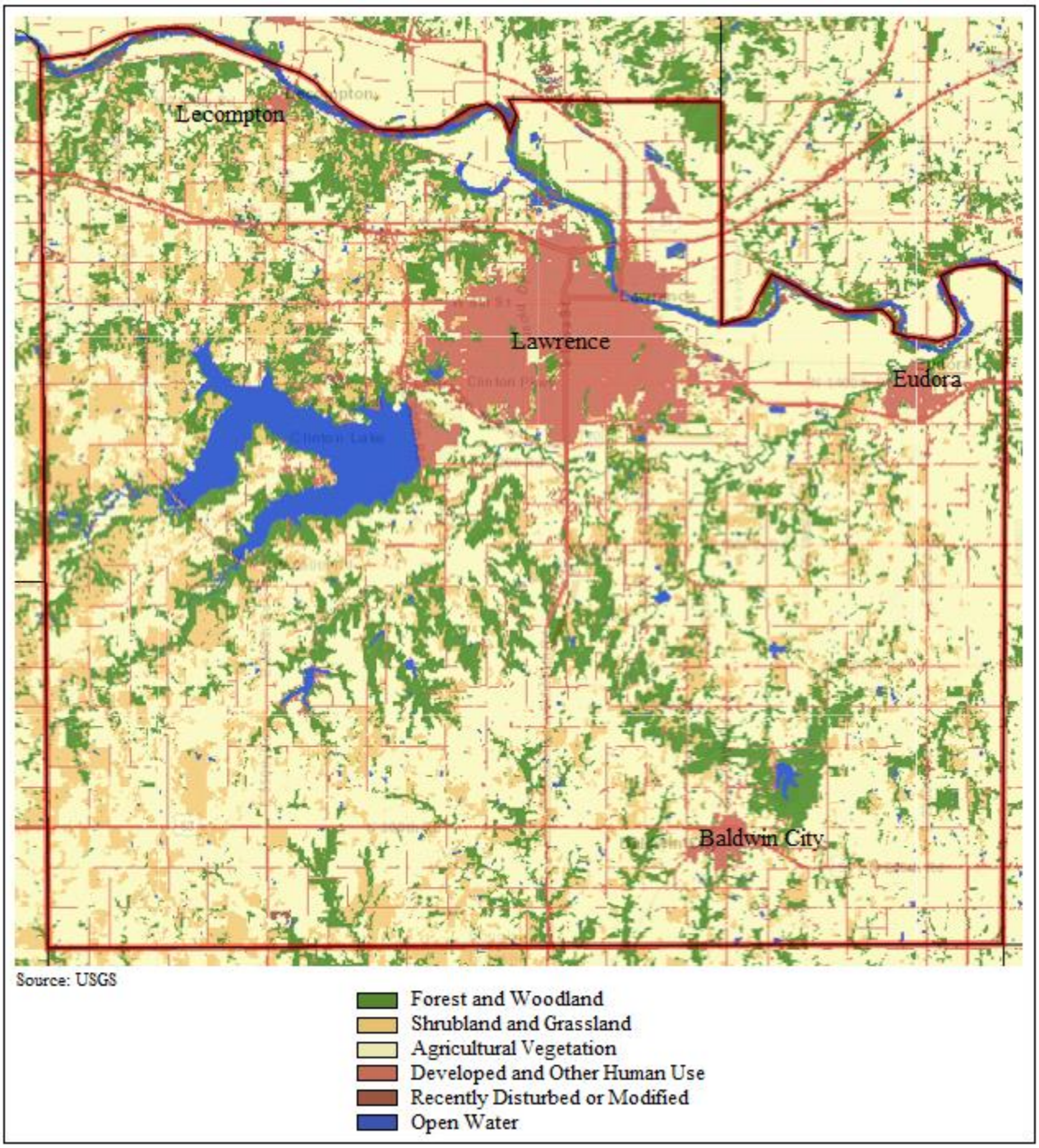
Brown County Land Cover Map



Doniphan County Land Cover Map

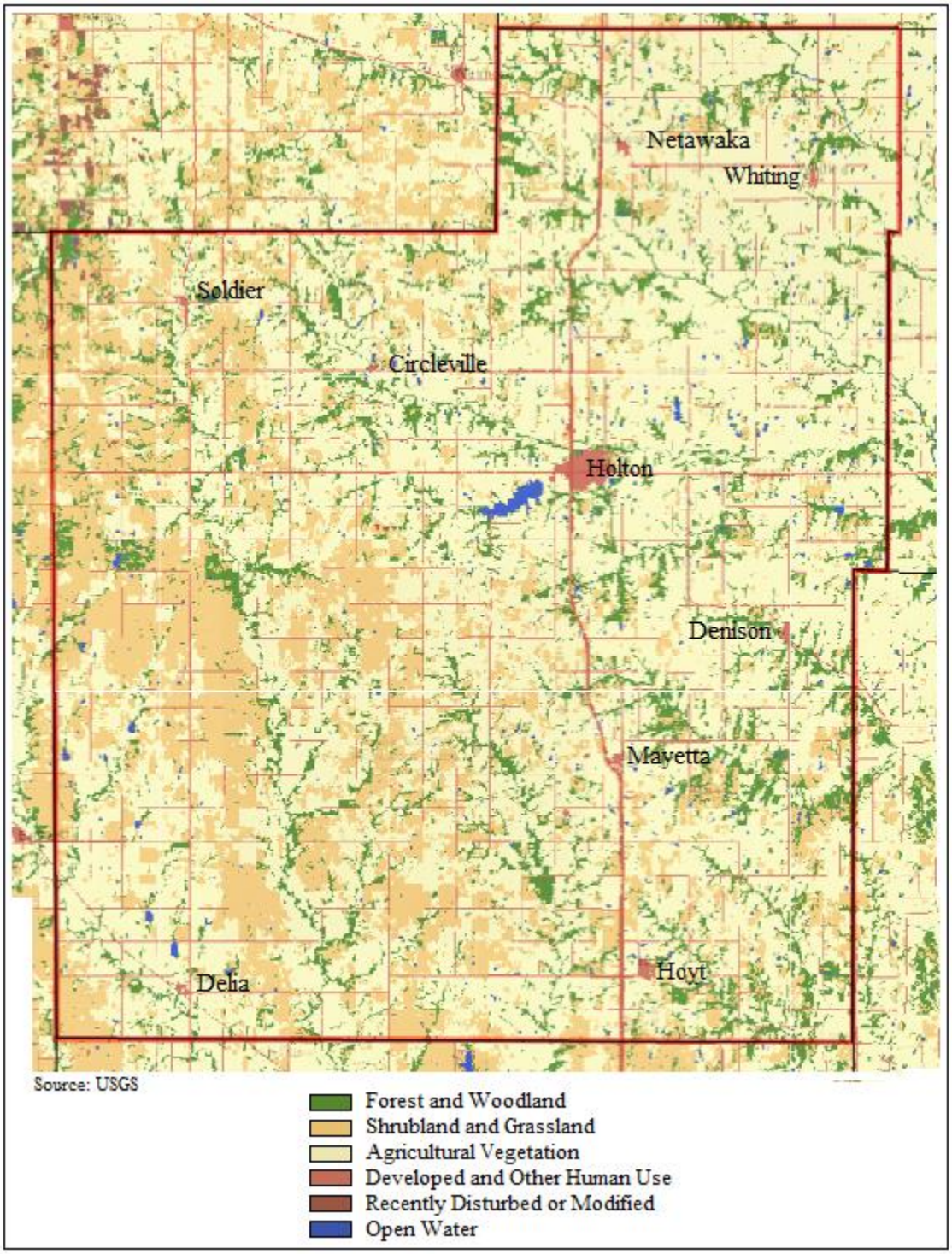


Douglas County Land Cover Map

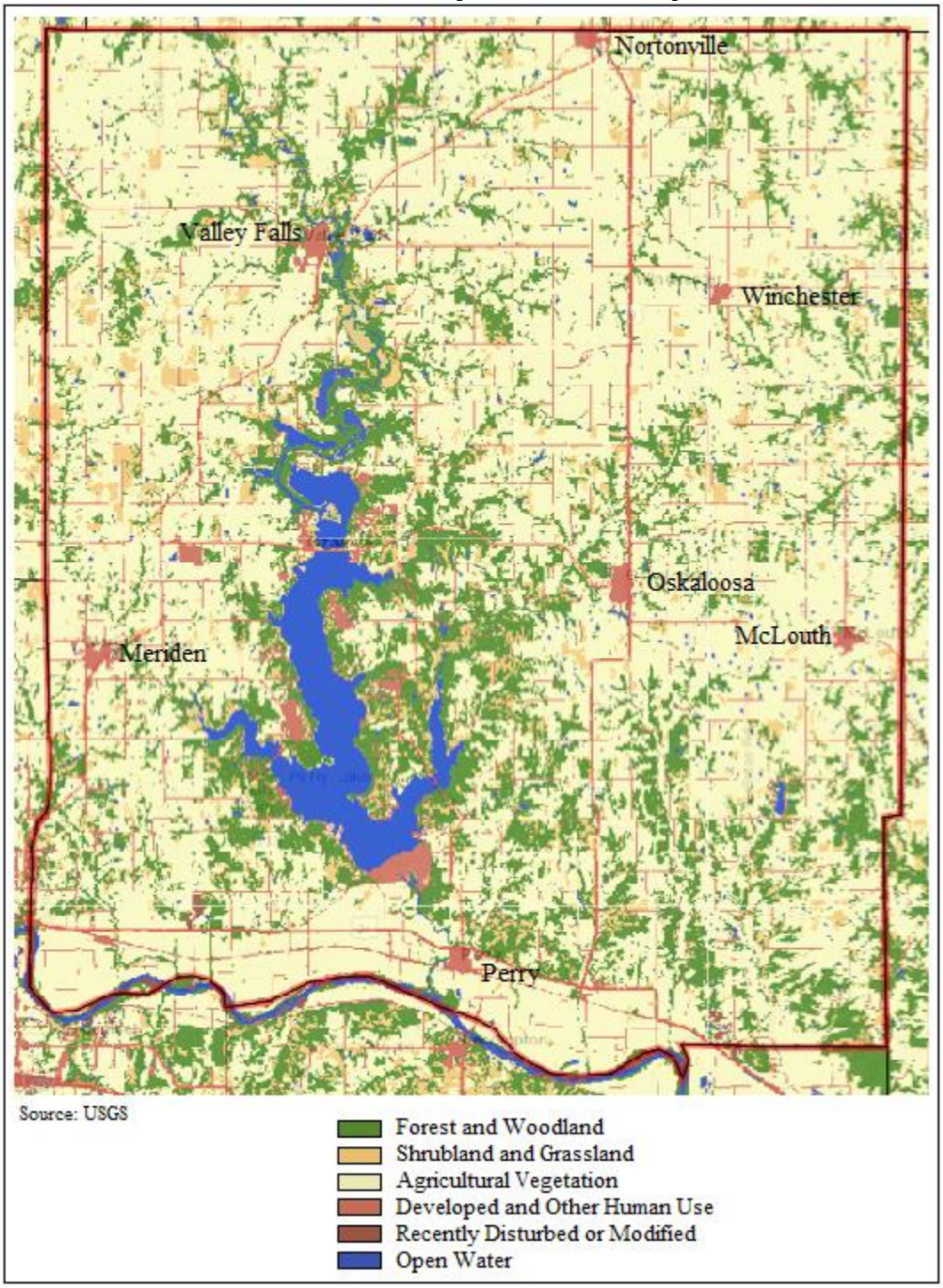


Iowa Tribal Reservation Land Cover Map

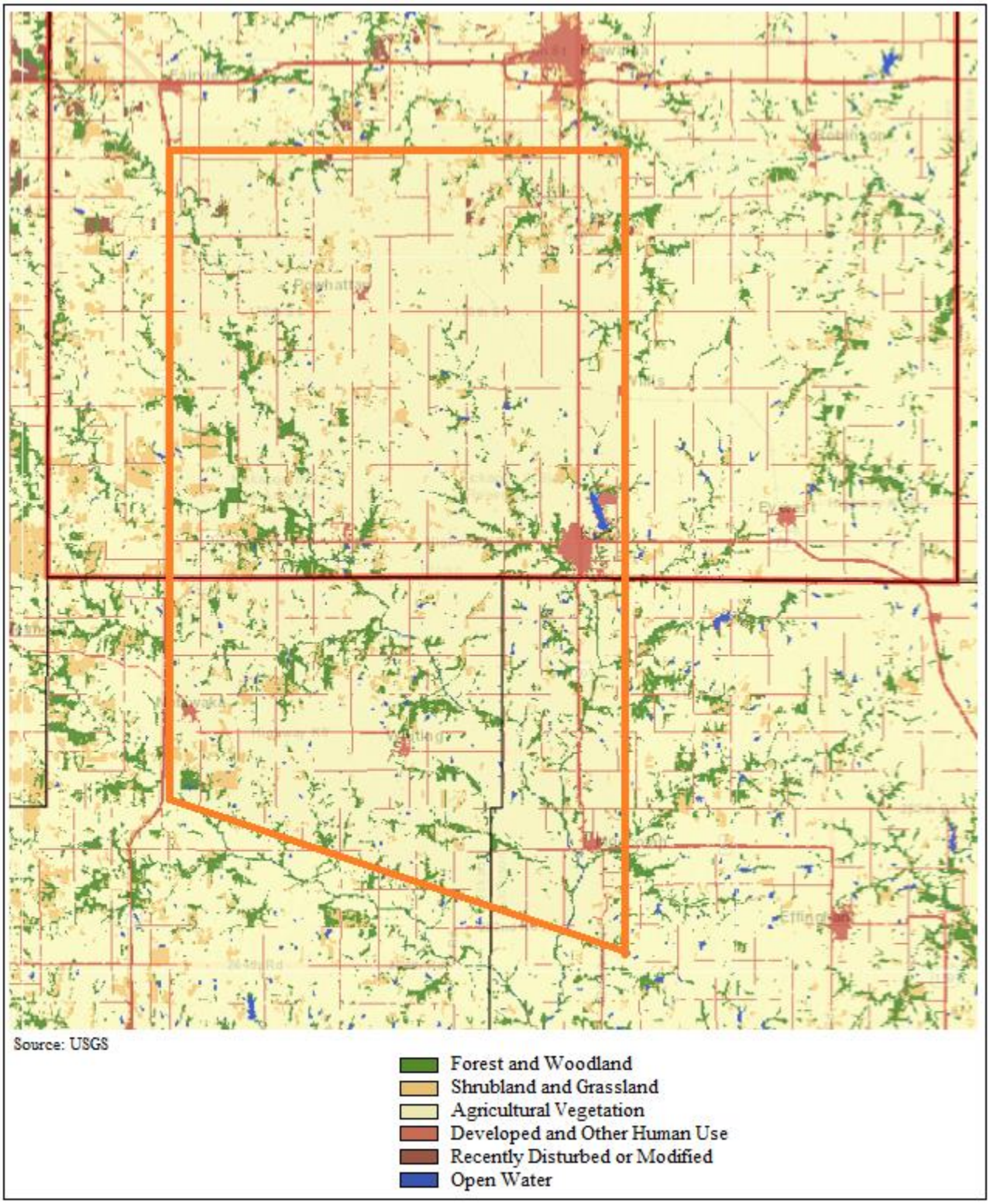
Jackson County Land Cover Map



Jefferson County Land Cover Map

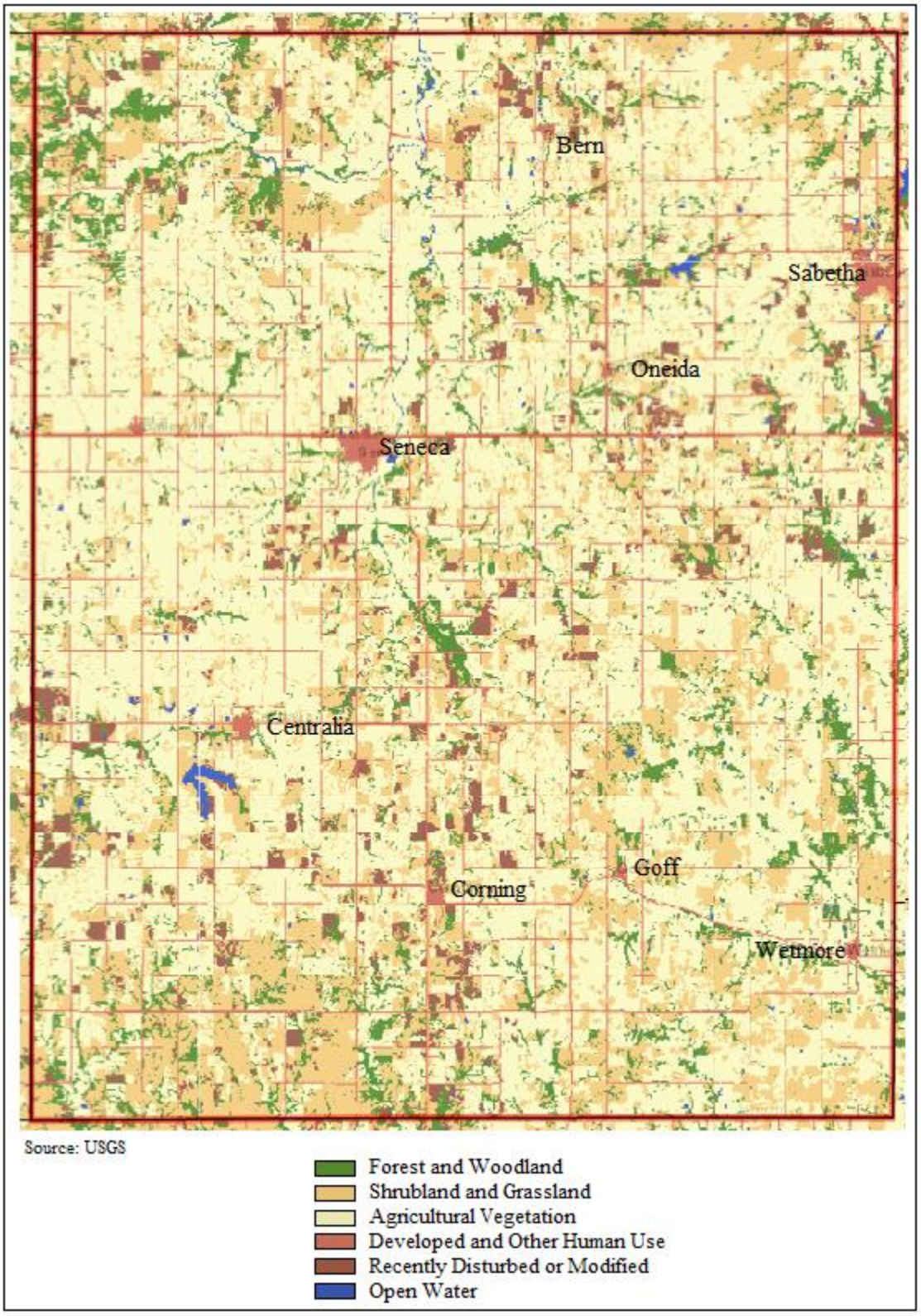


Kickapoo Tribal Reservation Land Cover Map

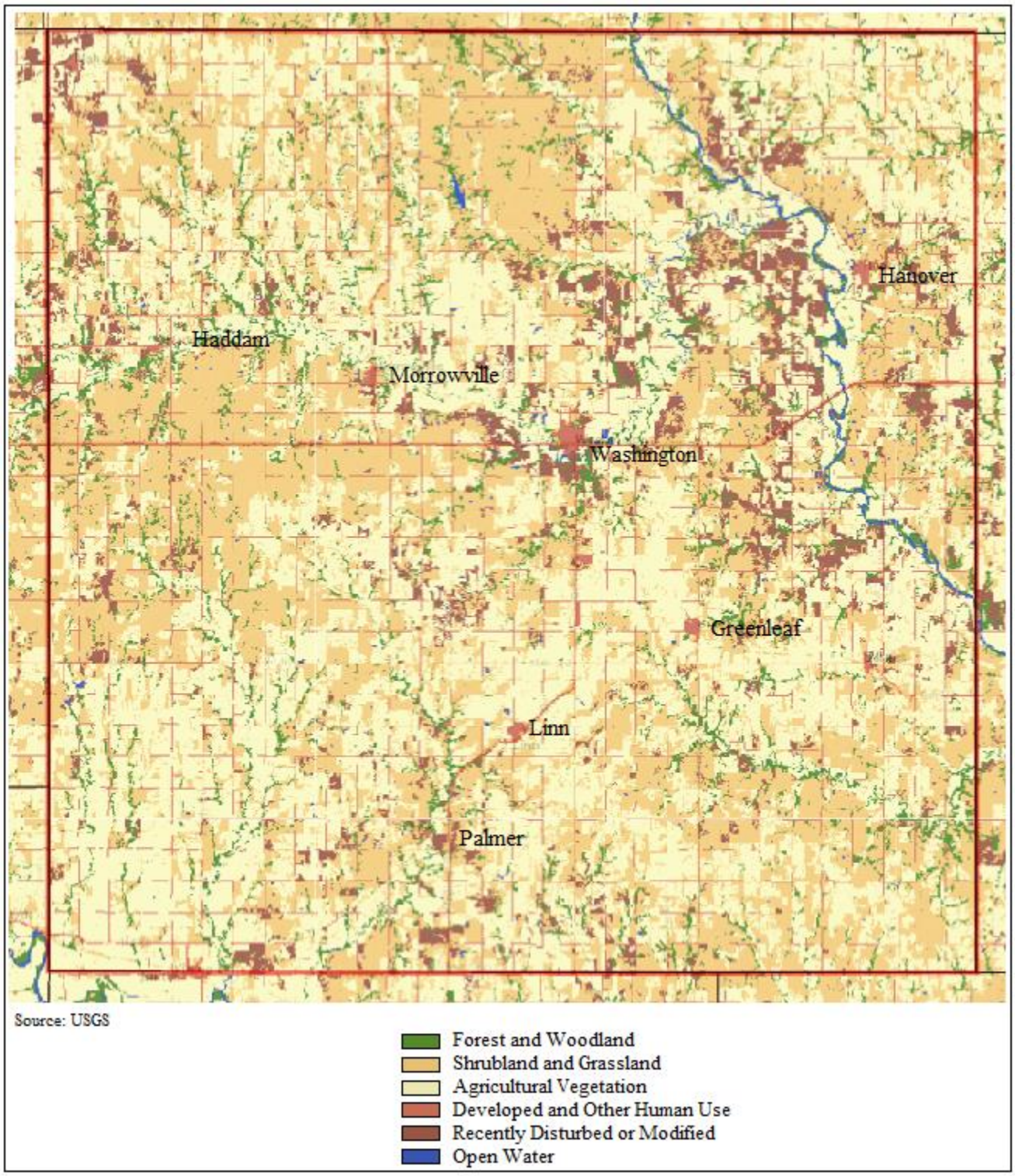


Marshall County Land Cover Map

Nemaha County Land Cover Map



Washington County Land Cover Map



3.11 – Regional Agricultural Data

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

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

Table 3.29: Kansas Region K Farm Data, 2017 Census of Agriculture

Jurisdiction	Number of Farms	Farm Acreage	Cropland Acreage	Pasture and Other Usage Acreage
Atchison	642	232,748	171,068	61,680
Brown	593	317,352	253,664	63,688
Doniphan	516	210,383	164,084	46,299
Douglas	905	213,635	144,030	69,605
Jackson	1,109	305,431	177,522	127,909
Jefferson	1,097	258,703	168,315	90,388
Marshall	910	472,591	329,099	143,492
Nemaha	1,001	393,331	285,470	107,861
Washington	786	509,631	334,163	175,468

Source: United States Department of Agriculture National Agricultural Statistics Service

Table 3.30: Kansas Region K Farm Data, 2017 Census of Agriculture

Jurisdiction	Cattle	Beef Cattle	Milk Cattle	Hogs	Sheep	Chicken Layers
Atchison	32,525	12,661	729	8,982	167	885
Brown	28,125	8,695	952	25,440	1,363	324
Doniphan	16,385	7,536	513	3,779	850	374
Douglas	26,964	9,585	1,129	6,277	782	979
Jackson	44,990	22,077	612	4,722	1,143	683
Jefferson	37,272	15,208	1,771	5,103	500	1,327
Marshall	39,908	15,596	1,687	24,515	1,084	668
Nemaha	59,170	15,750	5,076	101,834	1,009	(D)
Washington	58,788	21,841	1,468	111,471	585	1,043

Source: United States Department of Agriculture National Agricultural Statistics Service
(D): Data not reported due to privacy concerns

Table 3.31: Kansas Region K Farm Data, 2017 Census of Agriculture

Jurisdiction	Total Agricultural Commodity Sales	Crop Sales	Animal Sales
Atchison	$34,484,000	$22,748,000	$11,736,000
Brown	$67,473,000	$44,878,000	$22,595,000
Doniphan	$44,177,000	$37,236,000	$6,941,000
Douglas	$38,198,000	$21,095,000	$17,103,000
Jackson	$27,486,000	$12,760,000	$14,727,000
Jefferson	$33,526,000	$18,359,000	$15,167,000
Marshall	$65,381,000	$40,989,000	$24,392,000

Table 3.31: Kansas Region K Farm Data, 2017 Census of Agriculture

Jurisdiction	Total Agricultural Commodity Sales	Crop Sales	Animal Sales
Nemaha	$86,038,000	$31,268,000	$54,770,000
Washington	$82,073,000	$34,665,000	$47,408,000

Source: United States Department of Agriculture National Agricultural Statistics Service

3.12 – 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.

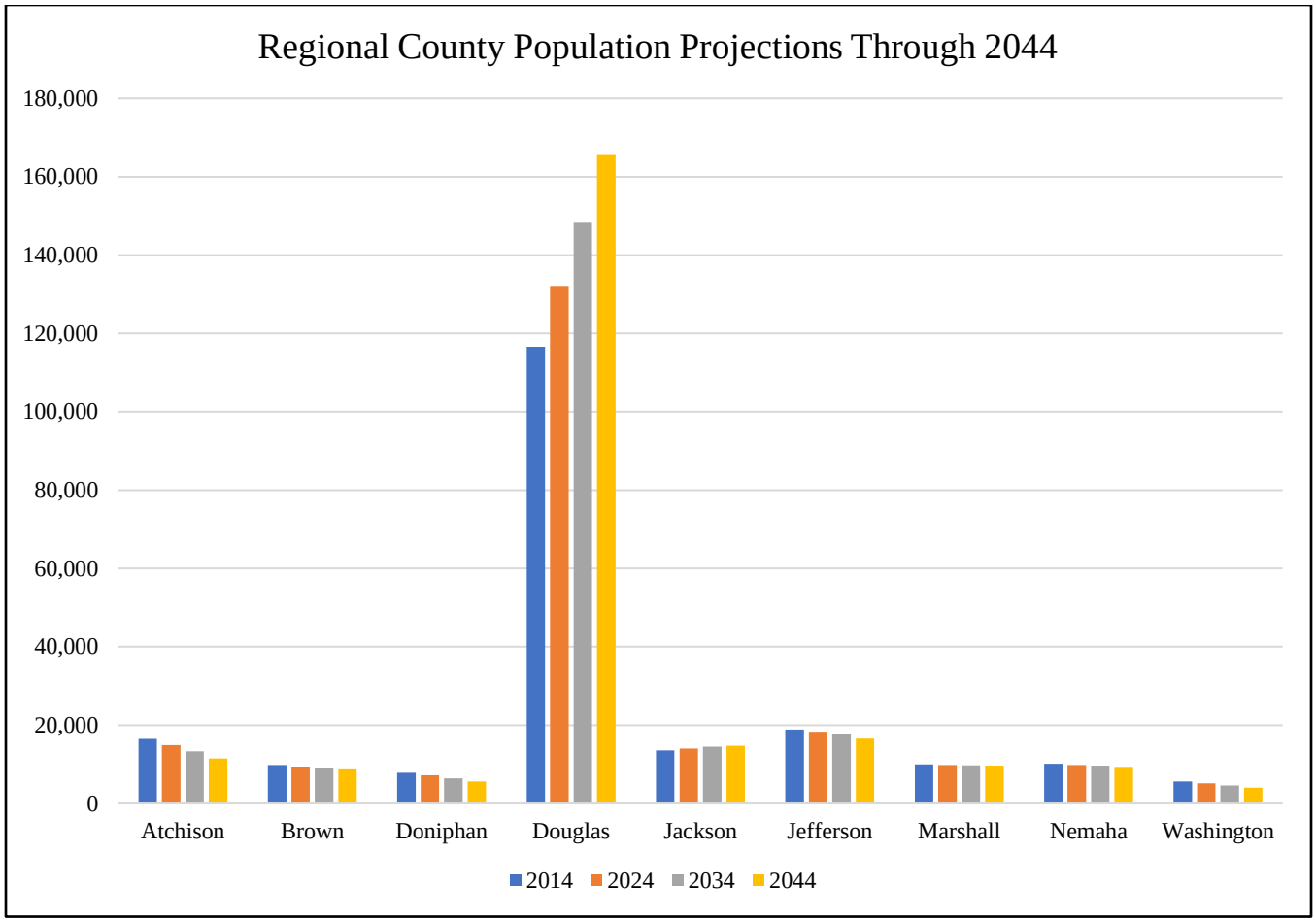
The University of Kansas Institute for Policy and Social Research developed population projections for the region using historical and trend data. Indications are that most counties and tribes in the region will experience a steady decline in the population through the year 2044.

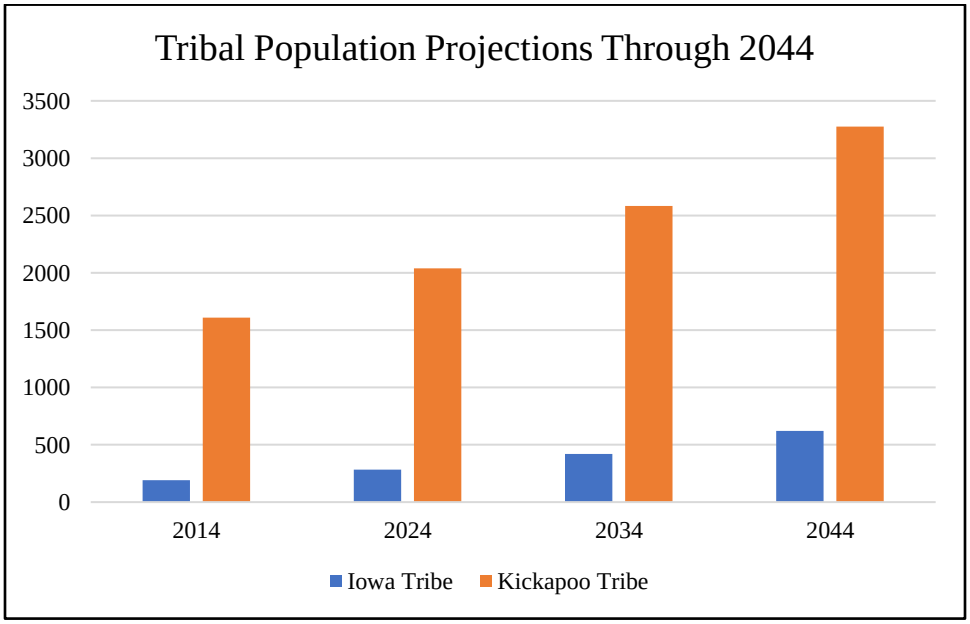
Table 3.32: Kansas Region K Population Projections Through 2044

County	2014	2024	2034	2044	Projected Growth Percentage Through 2044
Atchison	16,513	14,946	13,331	11,493	-30.4%
Brown	9,815	9,465	9,117	8,706	-11.3%
Doniphan	7,847	7,180	6,459	5,611	-28.7%
Douglas	116,585	132,148	148,208	165,504	42.0%
Iowa Tribe*	191	283	419	620	48.10%
Jackson	13,539	14,024	14,499	14,767	9.1%
Jefferson	18,855	18,291	17,677	16,596	12.0%
Kickapoo Tribe*	1,610	2,040	2,585	3,275	26.7%
Marshall	10,006	9,837	9,746	9,643	-3.6%
Nemaha	10,148	9,830	9,640	9,390	-7.5%
Washington	5,598	5,134	4,605	4,035	-27.9%

Source: University of Kansas Institute for Policy and Social Research
*: Tribal data

The following charts illustrates the above data.


Regional County Population Projections Through 2044
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Atchison
Brown
Doniphan
Douglas
Jackson
Jefferson
Marshall
Nemaha
Washington
2014
2024
2034
2044


Tribal Population Projections Through 2044
3500
3000
2500
2000
1500
1000
500
0
2014
2024
2034
2044
Iowa Tribe
Kickapoo Tribe

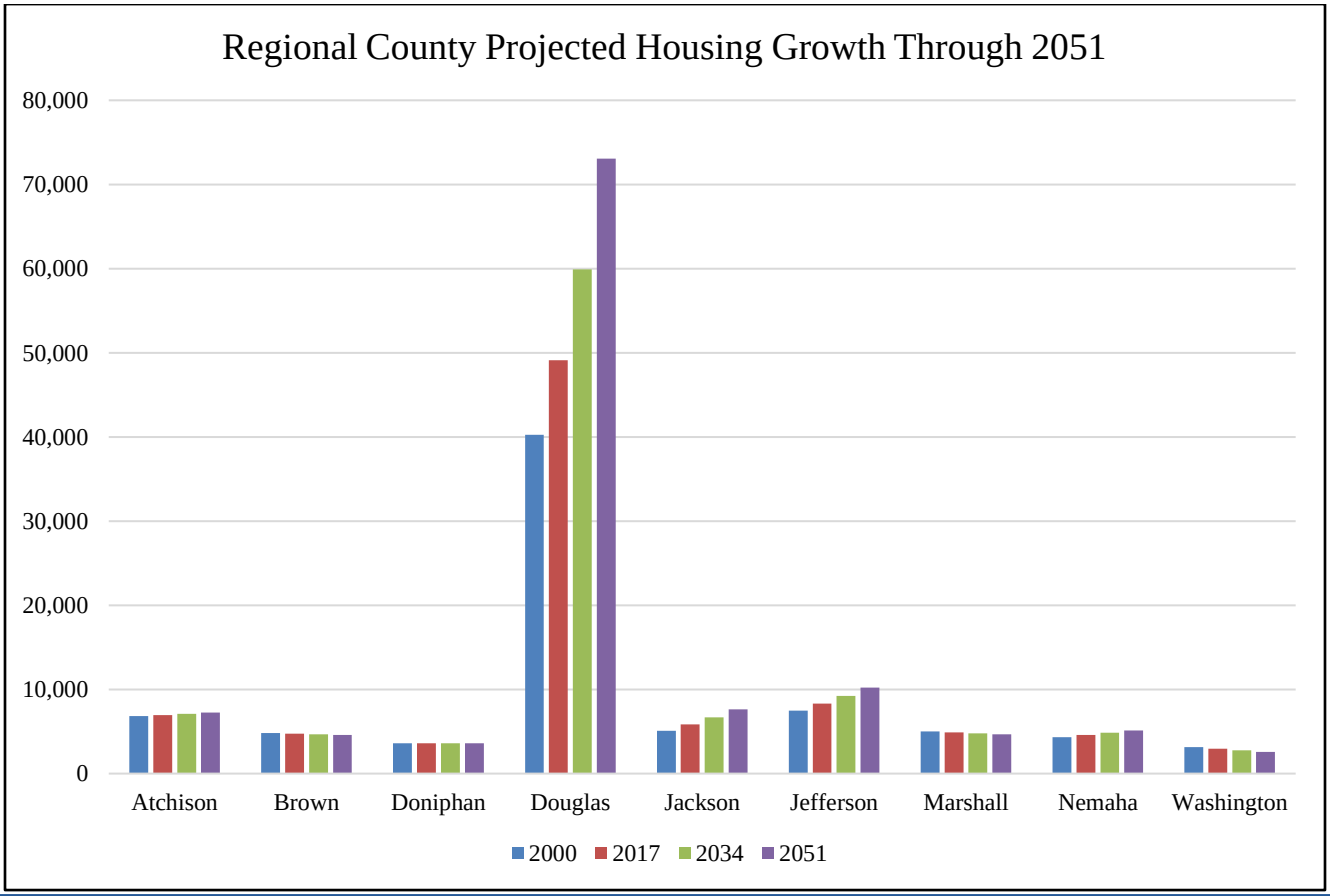
US Census Bureau and tribal data was used to develop housing projections for the region using historical and trend data. Indications are that most counties and tribes in the region will experience a steady increase in housing through the year 2051.

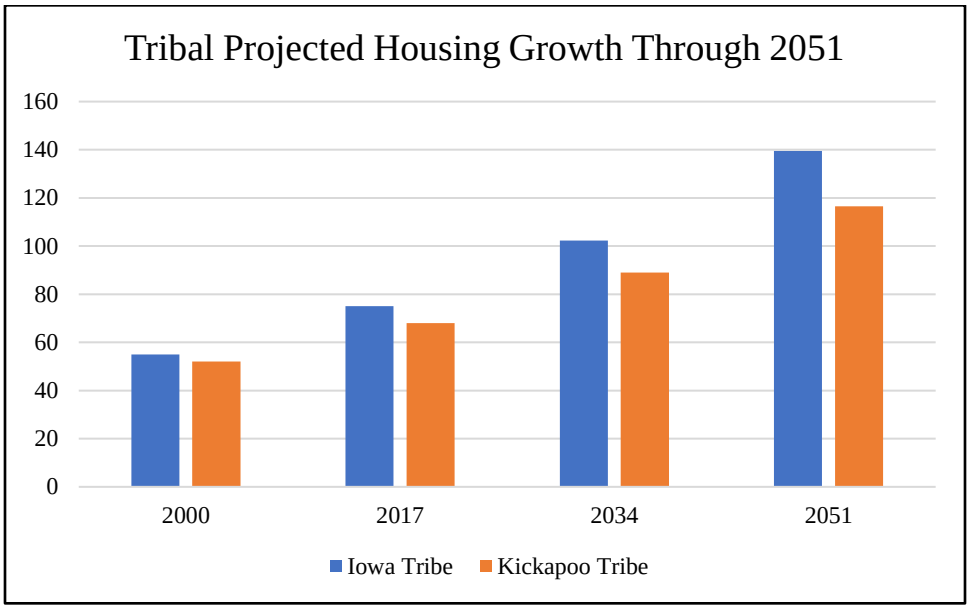
Table 3.33: Kansas Region K Housing Projections Through 2051

County	2000	2017	2034	2051	Projected Growth Percentage Through 2051
Atchison	6,818	6,960	7,106	7,255	2.1%
Brown	4,815	4,742	4,671	4,601	-1.5%
Doniphan	3,588	3,588	3,588	3,588	0.0%
Douglas	40,250	49,106	59,909	73,089	22.0%
Iowa Tribe*	55	75	102	140	36.4%
Jackson	5,094	5,835	6,681	7,650	14.5%
Jefferson	7,491	8,308	9,214	10,218	10.9%
Kickapoo Tribe*	52	68	89	117	30.9%
Marshall	4,999	4,890	4,782	4,677	-2.2%
Nemaha	4,340	4,589	4,851	5,127	5.7%
Washington	3,142	2,943	2,758	2,584	-6.3%

Source: US Census Bureau
*: Tribal data
-Data not available

The following charts illustrates the above data.





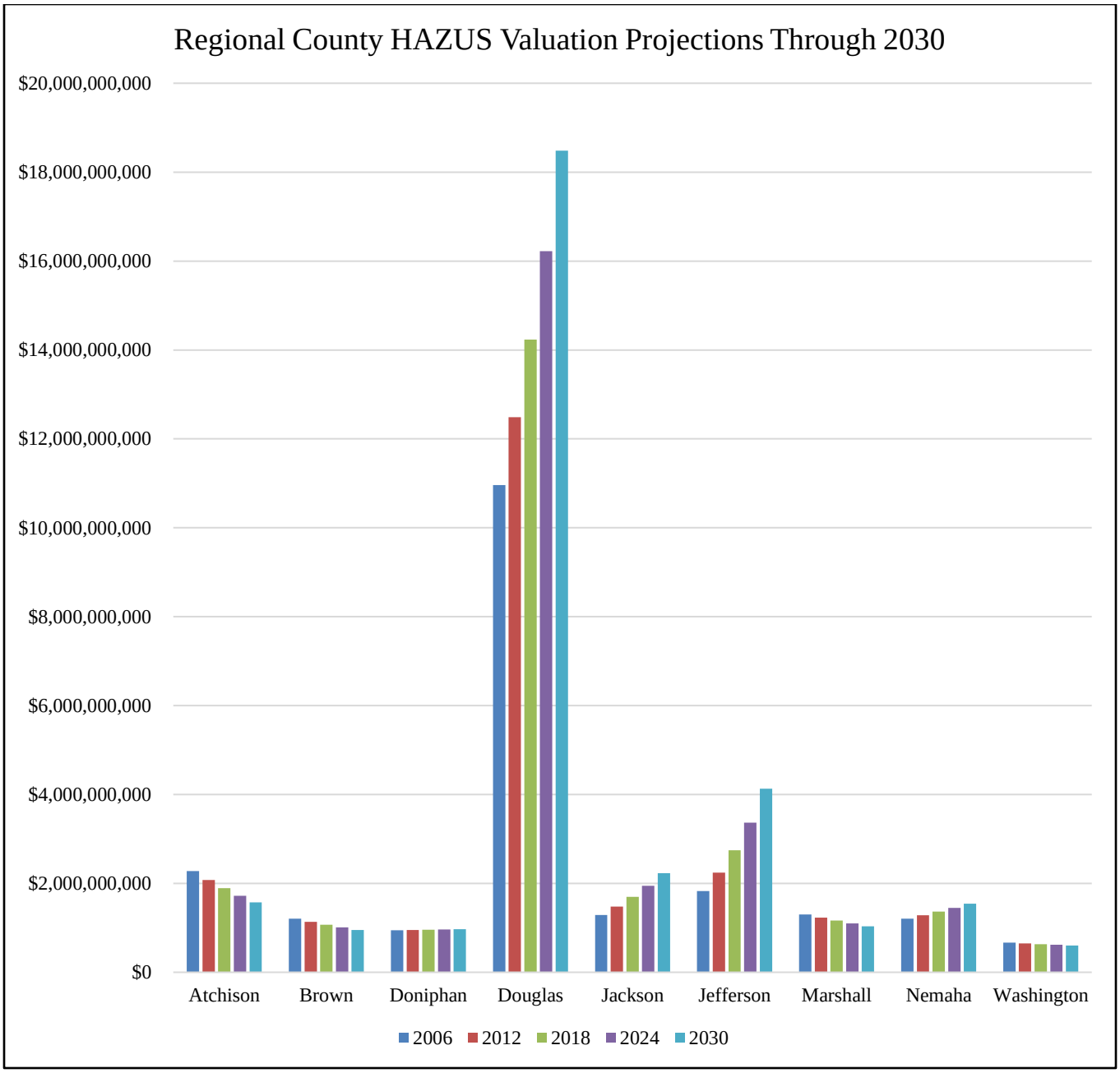
FEMA's loss estimation software HAZUS data was used to developed property valuation projections for the region using historical and trend data. Indications are that approximately half of the counties in the region will experience continued growth in the property valuation through the year 2030.

Table 3.34: Kansas Region K Property Valuation Projections Through 2030

County	2006	2012	2018	2024	2030	Projected Growth Percentage Through 2030
Atchison	$2,280,366,000	$2,077,340,000	$1,892,389,851	$1,723,906,221	$1,570,423,059	-8.9%
Brown	$1,205,618,000	$1,135,773,000	$1,069,974,326	$1,007,987,564	$949,591,877	-5.8%
Doniphan	$948,397,000	$953,610,000	$958,851,654	$964,122,120	$969,421,555	0.5%
Douglas	$10,959,548,000	$12,489,840,000	$14,233,808,112	$16,221,288,132	$18,486,281,858	14.0%
Jackson	$1,287,648,000	$1,477,185,000	$1,694,621,142	$1,944,063,076	$2,230,221,936	14.7%
Jefferson	$1,826,921,000	$2,239,834,000	$2,746,071,859	$3,366,727,471	$4,127,661,052	22.6%
Marshall	$1,303,504,000	$1,231,049,000	$1,162,621,396	$1,097,997,327	$1,036,965,372	-5.6%
Nemaha	$1,205,024,000	$1,282,096,000	$1,364,097,440	$1,451,343,601	$1,544,169,929	6.4%
Washington	$667,368,000	$650,841,000	$634,723,282	$619,004,710	$603,675,401	-2.5%

Source: HAZUS

The following chart illustrates the above data.



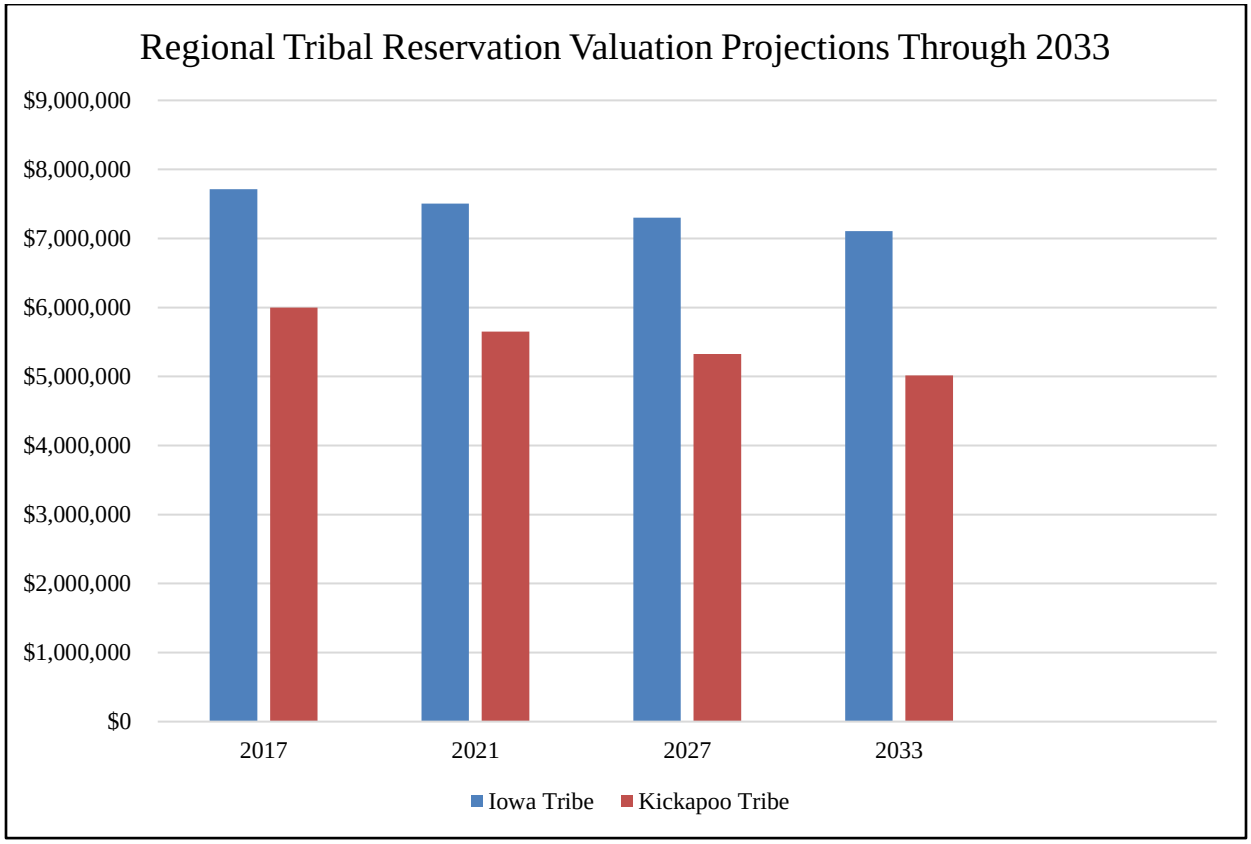
Individual tribal data was used to developed property valuation projections using historical and trend data. Growth projections were based on an average growth percentage from the Kansas counties each tribal reservation spans, using 2017 valuation data provide by each tribe. Indications are that the tribal reservations will see a steady decline in the property valuation through the year 2033.

Table 3.34: Kansas Region K Tribal Property Valuation Projections Through 2033

County	2017	2021	2027	2033	Projected Growth Percentage Through 2033
Iowa Tribe	$7,712,800	$7,504,554	$7,301,931	$7,104,779	-2.7%
Kickapoo Tribe	$6,000,000	$5,652,000	$5,324,184	$5,015,381	-5.8%

Source: Tribal data
-: Data not available

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. Tribal data was not broken out by the USDA National Agricultural Statistics Service but is included in the counties the tribal reservations span. Indications are the region will experience a steady decrease in the number of farms through the year 2037.

Table 3.35: Kansas Region K Number of Farms Data Projections Through 2037

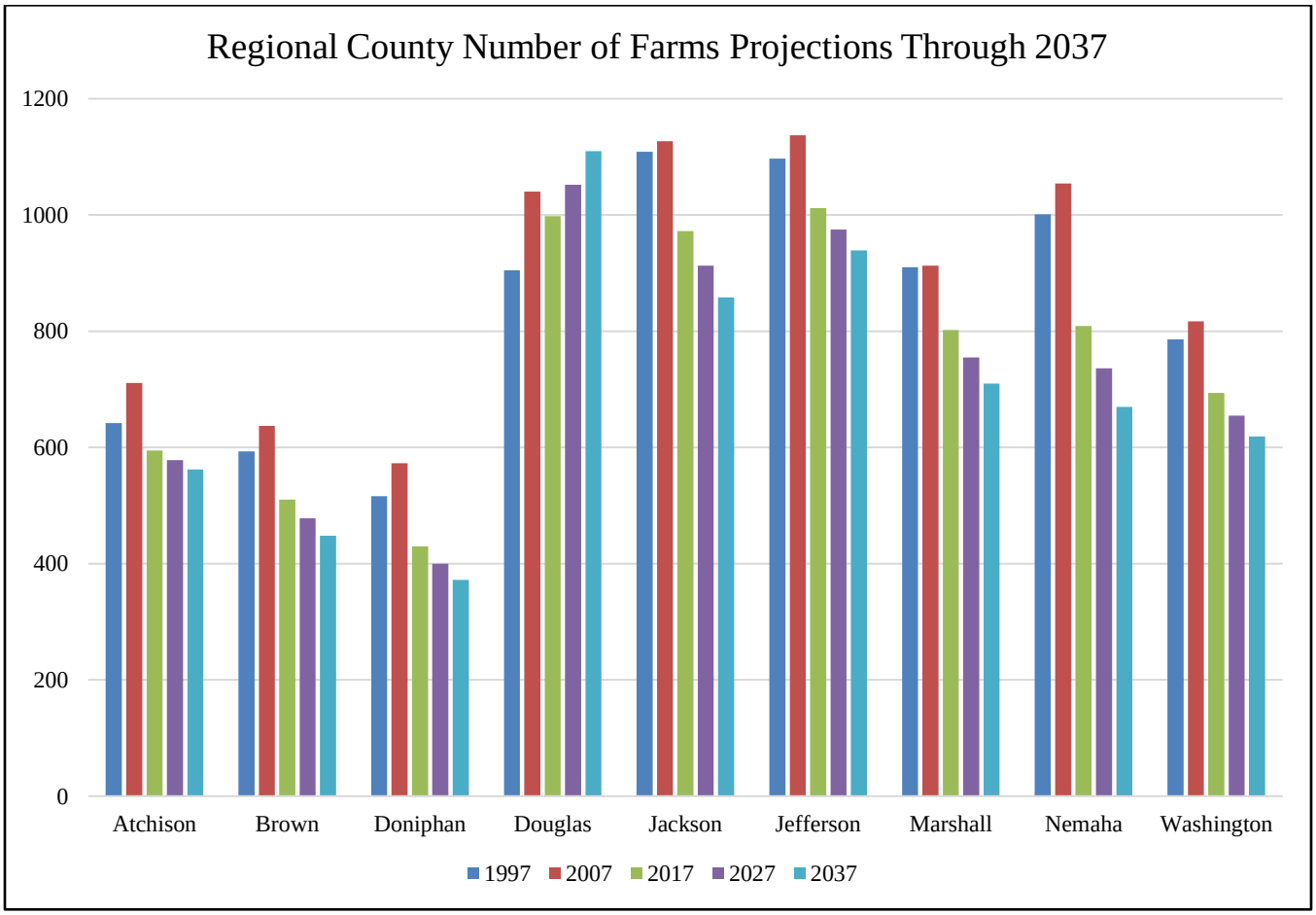
County	Number of Farms, 1997	Number of Farms, 2007	Number of Farms, 2017	Number of Farms, 2027	Number of Farms, 2037	Projected Growth Percentage Through 2037
Atchison	642	711	595	578	562	-2.8%

Table 3.35: Kansas Region K Number of Farms Data Projections Through 2037

County	Number of Farms, 1997	Number of Farms, 2007	Number of Farms, 2017	Number of Farms, 2027	Number of Farms, 2037	Projected Growth Percentage Through 2037
Brown	593	637	510	478	448	-6.3%
Doniphan	516	573	430	400	372	-7.0%
Douglas	905	1,040	998	1,052	1,110	5.4%
Jackson	1,109	1,127	972	913	858	-6.1%
Jefferson	1,097	1,137	1,012	975	939	-3.7%
Marshall	910	913	802	755	710	-5.9%
Nemaha	1,001	1,054	809	736	670	-9.0%
Washington	786	817	694	655	619	-5.6%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.



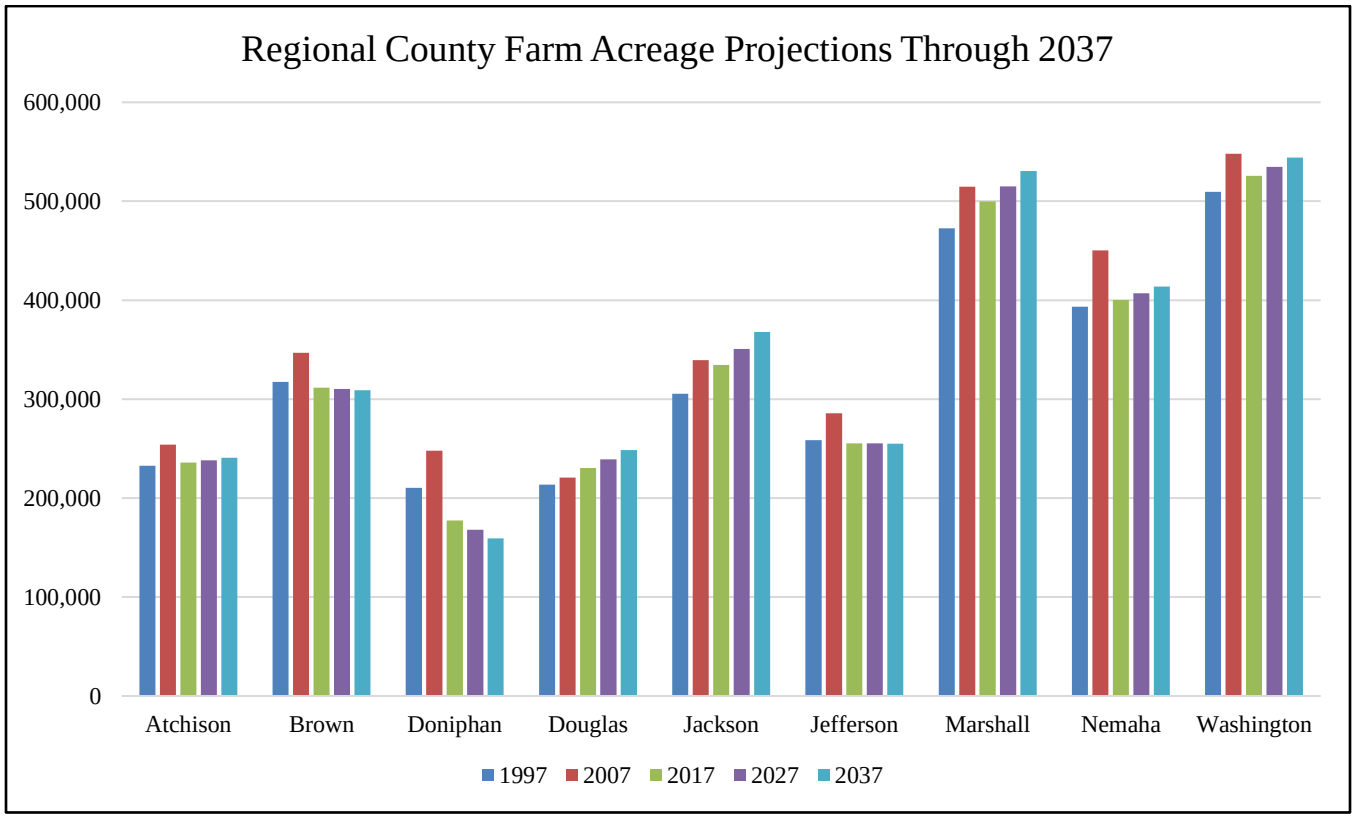
The USDA National Agricultural Statistics Service data indicates the region will experience steady increase in the total farm acreage through the year 2037.

Table 3.36: Kansas Region K Farm Acreage Data Projections Through 2037

County	Farm Acreage, 1997	Farm Acreage, 2007	Farm Acreage, 2017	Farm Acreage, 2027	Farm Acreage, 2037	Projected Growth Percentage Through 2037
Atchison	232,748	254,101	235,896	238,267	240,661	1.0%
Brown	317,352	346,758	311,595	310,233	308,876	-0.4%
Doniphan	210,383	247,815	177,485	168,089	159,191	-5.3%
Douglas	213,635	220,636	230,364	239,217	248,410	3.8%
Jackson	305,431	339,291	334,572	350,791	367,795	4.8%
Jefferson	258,703	285,803	255,404	255,198	254,993	-0.1%
Marshall	472,591	514,818	499,934	515,042	530,607	3.0%
Nemaha	393,331	450,508	400,274	407,051	413,942	1.7%
Washington	509,631	548,034	525,675	534,758	543,997	1.7%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.



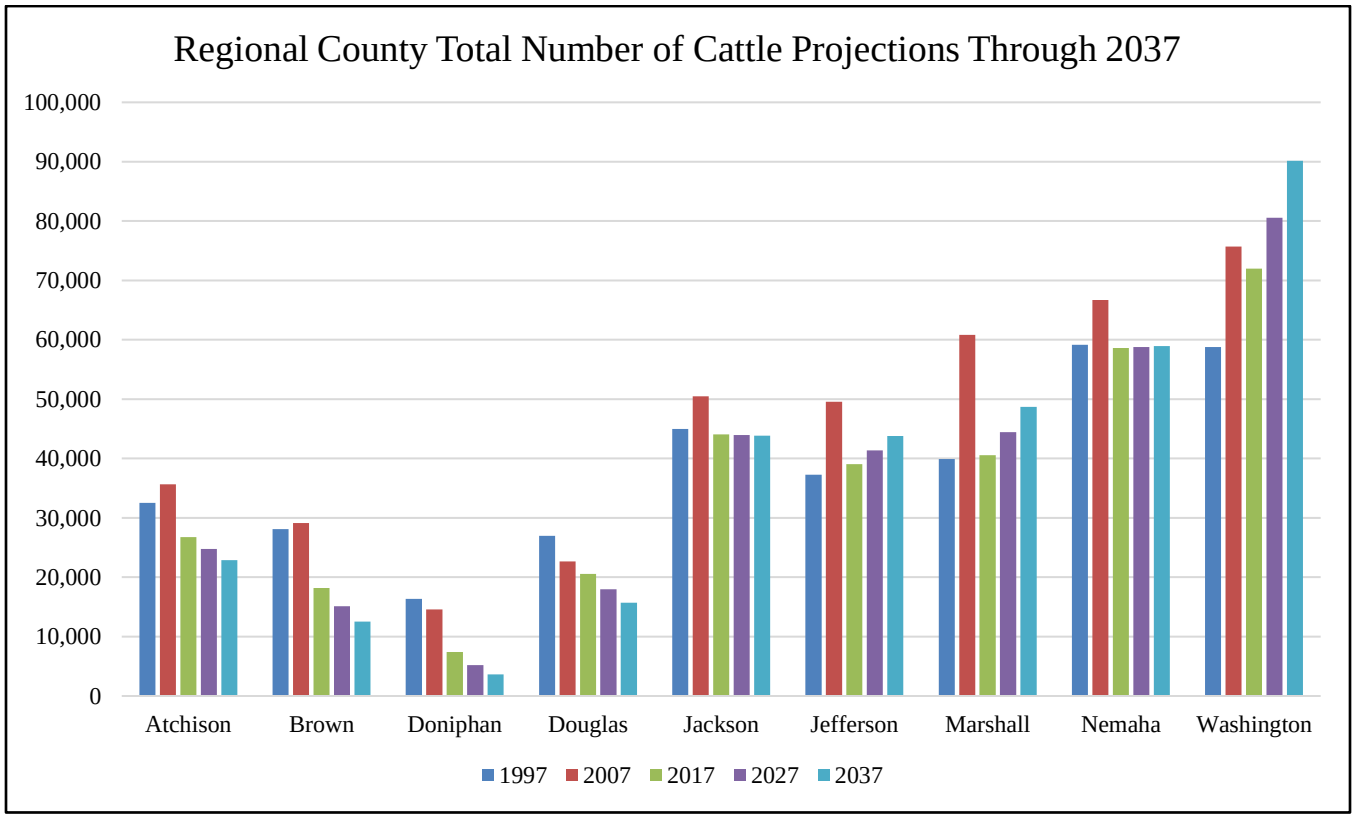
The USDA National Agricultural Statistics Service data indicates that approximately half of the counties in the region will experience a steady decrease in the total number of cattle through the year 2037.

Table 3.37: Kansas Region K Total Number of Cattle Data Projections Through 2037

County	Farm Acreage, 1997	Farm Acreage, 2007	Farm Acreage, 2017	Farm Acreage, 2027	Farm Acreage, 2037	Projected Growth Percentage Through 2037
Atchison	32,525	35,656	26,787	24,745	22,858	-7.6%
Brown	28,125	29,122	18,195	15,104	12,538	-17.0%
Doniphan	16,385	14,563	7,424	5,192	3,630	-30.1%
Douglas	26,964	22,642	20,579	17,992	15,731	-12.6%
Jackson	44,990	50,453	44,078	43,969	43,861	-0.2%
Jefferson	37,272	49,569	39,069	41,376	43,819	5.9%
Marshall	39,908	60,831	40,561	44,436	48,681	9.6%
Nemaha	59,170	66,730	58,596	58,768	58,941	0.3%
Washington	58,788	75,725	71,976	80,563	90,173	11.9%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.



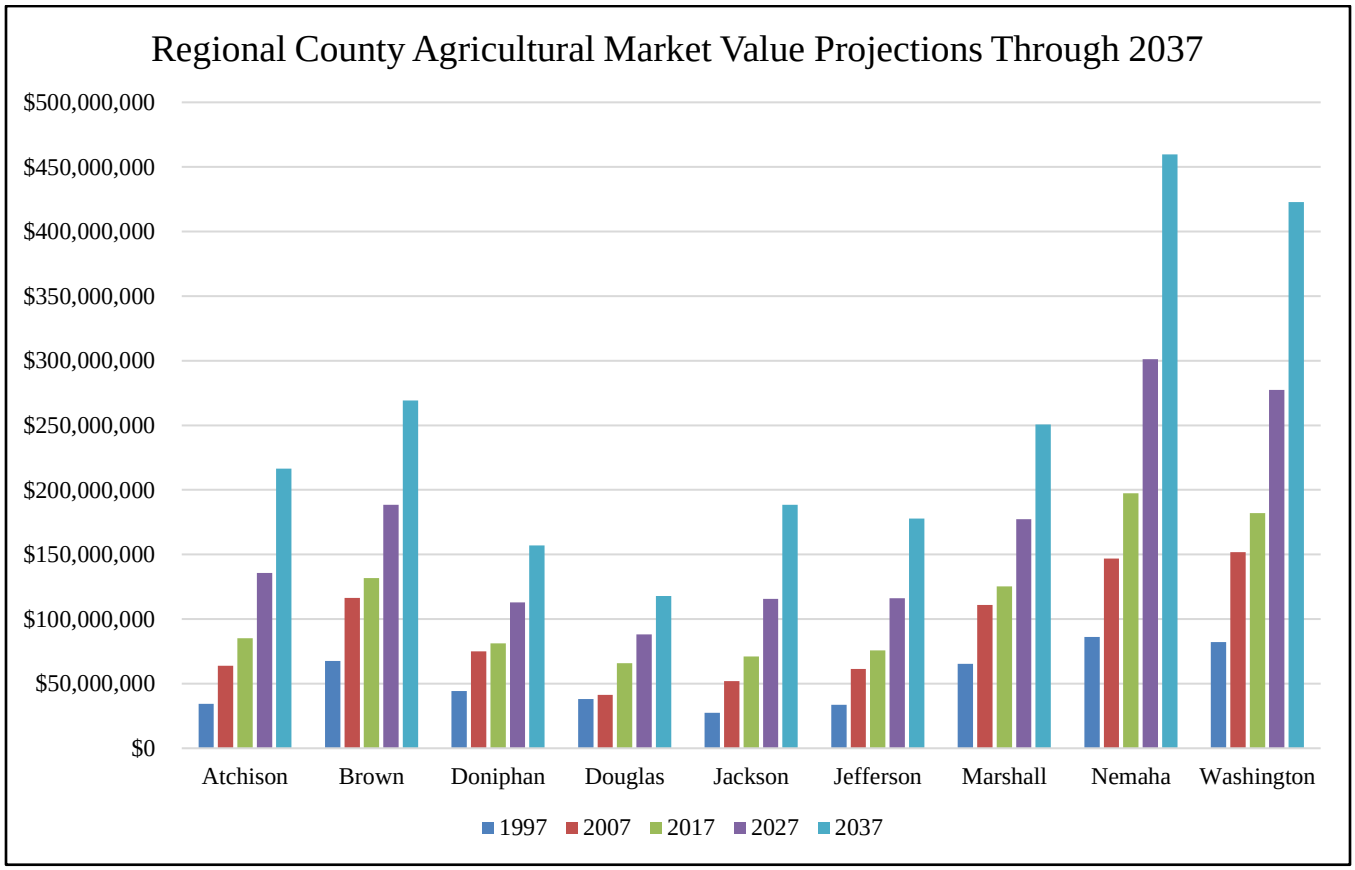
The USDA National Agricultural Statistics Service data indicates that the region will experience an increase in the total number of cattle through the year 2037.

Table 3.38: Kansas Region K Agricultural Market Value Projections Through 2037

County	Market Value, 1997	Market Value, 2007	Market Value, 2017	Market Value, 2027	Market Value, 2037	Projected Growth Percentage Through 2037
Atchison	$34,484,000	$63,982,000	$85,204,000	$135,776,759	$216,366,935	59.4%
Brown	$67,473,000	$116,368,000	$131,843,000	$188,380,148	$269,161,655	42.9%
Doniphan	$44,177,000	$74,956,000	$81,227,000	$112,921,062	$156,981,868	39.0%
Douglas	$38,198,000	$41,262,000	$65,867,000	$88,147,336	$117,964,274	33.8%
Jackson	$27,486,000	$51,998,000	$71,039,000	$115,722,056	$188,510,455	62.9%
Jefferson	$33,526,000	$61,344,000	$75,731,000	$116,030,265	$177,774,259	53.2%
Marshall	$65,381,000	$111,011,000	$125,395,000	$177,276,048	$250,622,410	41.4%
Nemaha	$86,038,000	$146,896,000	$197,436,000	$301,227,271	$459,581,176	52.6%
Washington	$82,073,000	$151,846,000	$181,979,000	$277,388,578	$422,820,344	52.4%

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 overall 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 overall increase in structures will tend to increase potential vulnerability. 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 majority of Kansas Region K participating jurisdiction have seen a slight increase or steady hold in farm acreage and an increase in the market value of produced agricultural goods. These continuing agricultural gains could result in increased exposure to both natural and man-made hazards.

3.13 – Regional Economic Activity Patterns

Kansas Region K'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 K counties for the period 2012 to 2015 (the latest available data). Tribal data was not broken out by the Bureau of Economic Analysis but is included in the counties the tribal reservations span.

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

County	2012	2013	2014	2015	State Rank in 2015 (out of 105)
Atchison	462,352	437,442	458,188	465,193	35
Brown	407,244	437,567	420,266	405,237	42
Doniphan	201,829	207,283	197,121	186,220	66
Douglas	3,970,883	4,047,613	4,143,378	4,198,350	5
Jackson	268,583	296,858	284,176	293,230	49
Jefferson	269,697	290,807	289,324	298,111	47
Marshall	619,559	573,139	514,709	476,579	33
Nemaha	418,814	468,106	474,285	483,461	31
Washington	177,496	198,010	169,924	167,601	73

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 2012 to 2015 (the latest available data).

Table 3.40: Kansas Region K GDP Percentage Change from Preceding Period, 2012 to 2015

County	2013	2014	2015	State Rank in 2015 (out of 105)
Atchison	-5.4%	4.7%	1.5%	28
Brown	7.4%	-4.0%	-3.6%	75
Doniphan	2.7%	-4.9%	-5.5%	86
Douglas	1.9%	2.4%	1.3%	31
Jackson	10.5%	-4.3%	3.2%	15
Jefferson	7.8%	-0.5%	3.0%	18
Marshall	-7.5%	-10.2%	-7.4%	99
Nemaha	11.8%	1.3%	1.9%	27
Washington	11.6%	-14.2%	-1.4%	57

Source: Bureau of Economic Analysis

The average Kansas Region K unemployment rate for March 2019 of 4.9% is higher than the average State of Kansas unemployment rate of 3.5%. The following chart details the regional unemployment rates, using data from the Kansas Department of Labor, for the months of March 2014 and March 2019.

Table 3.41: Kansas Region K Unemployment Rate, March 2014 and March 2015

County	March 2014	March 2019
Atchison	6.6%	5.1%
Brown	4.6%	3.7%
Doniphan	5.4%	4.1%
Douglas	4.7%	3.3%
Jackson	5.3%	3.7%
Jefferson	6.1%	3.9%
Marshall	3.8%	3.8%
Nemaha	3.4%	3.1%
Washington	4.0%	4.1%

Source: Kansas Department of Labor

3.14 – 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:

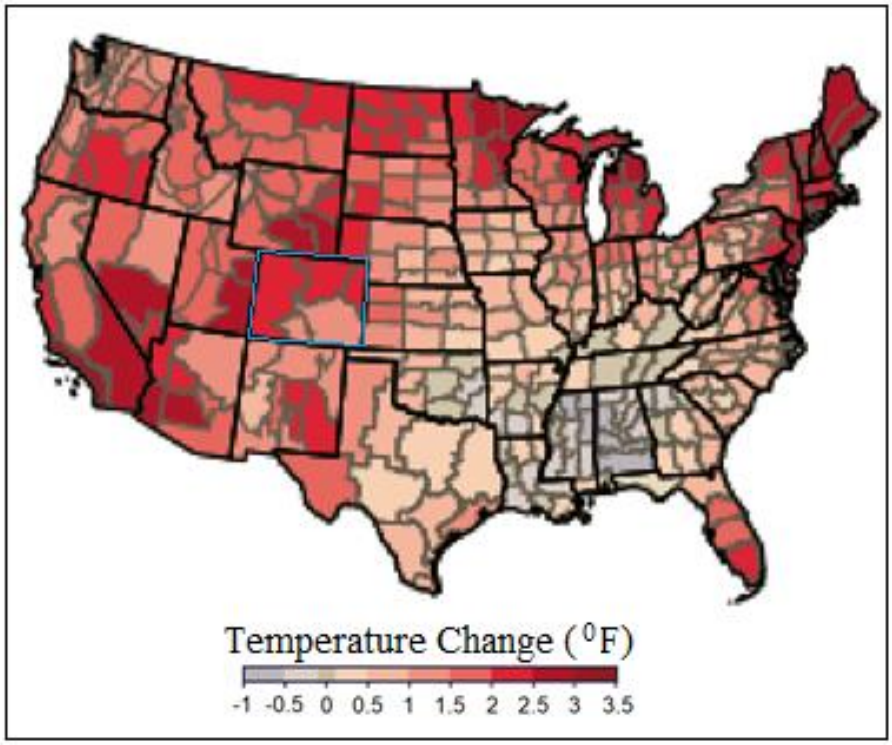
- Longer and hotter heat waves
- An increased risk of wildfires
- Higher wind speeds
- Greater rainfall intensity
- Increased tornado activity.

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 K 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 (EPA) "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 EPA Climate Change Indicators in the United States, illustrates modeled temperature changes during the last century.

EPA 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 K 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 K 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) (2009 to 2018, with 2009 and 2018 being full data set years) were used, where applicable, for hazard occurrence and impact data. Five-year data sets from the United States Department of Agriculture (USDA) Risk Management Agency (2009 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 K hazard mitigation plan in 2013, there have been two federal disaster declaration for the region, as follows:

- DR 4417: Declared on February 25, 2019 – Severe Storms, Straight-Line Winds and Flooding

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

Since the 2013 plan there have be no Fire Management Assistance Declarations

For the 20-year period from 2009 to 2018, Kansas Region K has had 17 federal disaster declarations. These declarations included the following identified hazards:

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

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

4.4 – Identified Potential Hazards

Based on the above data, and data contained in previous mitigation plans, Kansas Region K'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 K, as listed below:

- Agricultural Infestation
- Dam/Levee Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Temperatures
- Flood
- Hailstorm
- Land Subsidence
- Landslide

- Lightning
- Soil Erosion and Dust
- Tornado
- Wildfire
- Wind Storm
- Winter Storm

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

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

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

4.5 – Hazard Planning Significance

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

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

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

Table 4.1: CPRI Element Ratings

CPRI Element	Rating Number and Definition			
	1	2	3	4
Probability	Unlikely (10% chance of occurrence)	Occasional (20% chance of occurrence)	Likely (33% chance of occurrence)	Highly Likely (100% chance of occurrence)

Magnitude	Negligible (Minor injuries and <10% of property severely damaged)	Limited (Multiple injuries and 10-25% of property severely damaged)	Critical (Multiple disabling injuries and 25-50% of property severely damaged)	Catastrophic (Multiple deaths and 50% of property severely damaged)
Warning Time	24+ hours	12-24 hours	6-12 hours	<6 hours
Duration	< 6 hours	< 1 day	< 1 week	1 week +

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

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

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

Table 4.2: CPRI Planning Significance Range

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

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

Table 4.3: Kansas Region K Natural Hazard CPRI Planning Significance

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Agricultural Infestation	1.5	2.0	1.0	4.0	**1.7**
Dam and Levee Failure	1.5	3.0	2.0	3.5	**2.1**
Drought	2.5	2.0	1.0	4.0	**2.2**
Earthquake	1.0	1.0	4.0	1.0	**1.5**
Expansive Soils	1.5	1.0	1.0	4.0	**1.6**
Extreme Temperature	3.0	2.0	1.0	3.0	**2.4**
Flood	3.0	3.0	2.5	3.0	**3.0**
Hailstorm	4.0	2.5	3.0	1.0	**3.0**
Land Subsidence	1.0	1.0	2.0	4.0	**1.5**
Landslide	1.0	1.0	3.5	1.0	**1.4**
Lightning	2.5	1.0	2.5	1.0	**1.9**
Soil Erosion & Dust	2.0	1.0	1.0	4.0	**1.7**
Tornado	3.0	3.0	4.0	1.0	**2.9**

Table 4.3: Kansas Region K Natural Hazard CPRI Planning Significance

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Wildfire	3.0	3.0	4.0	2.0	**3.0**
Windstorm	3.5	2.5	3.0	2.0	**3.0**
Winter Storm	4.0	2.5	2.0	3.0	**3.1**

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

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Civil Disorder	1.0	2.0	4.0	1.0	**1.8**
Hazardous Materials Event	2.0	2.0	4.0	2.0	**2.3**
Major Disease Outbreak	1.0	3.0	1.0	4.0	**2.0**
Radiological Event	1.0	1.5	3.5	4.0	**1.8**
Terrorism, Agri-Terrorism	1.0	2.5	4.0	1.5	**1.9**
Utility / Infrastructure Failure	3.0	2.0	3.5	3.0	**2.9**

The average CPRI for each identified hazard remained the same as the calculated CPRI for the 2014 planning effort, where individual county rankings were combined into a regional ranking.

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.

44 CFR 201.7(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 from 2016, in Kansas Region K:

- Atchison County: 3
- Brown County: 14
- Doniphan County: 2
- Douglas County: 2
- Jackson County: 5
- Jefferson County: 1
- Marshall County: 16
- Nemaha County: 84
- Washington County: 69

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, Washington weevil, red flour beetle, and rusty grain beetle costs the United States about $500 million annually.

Tree Pests

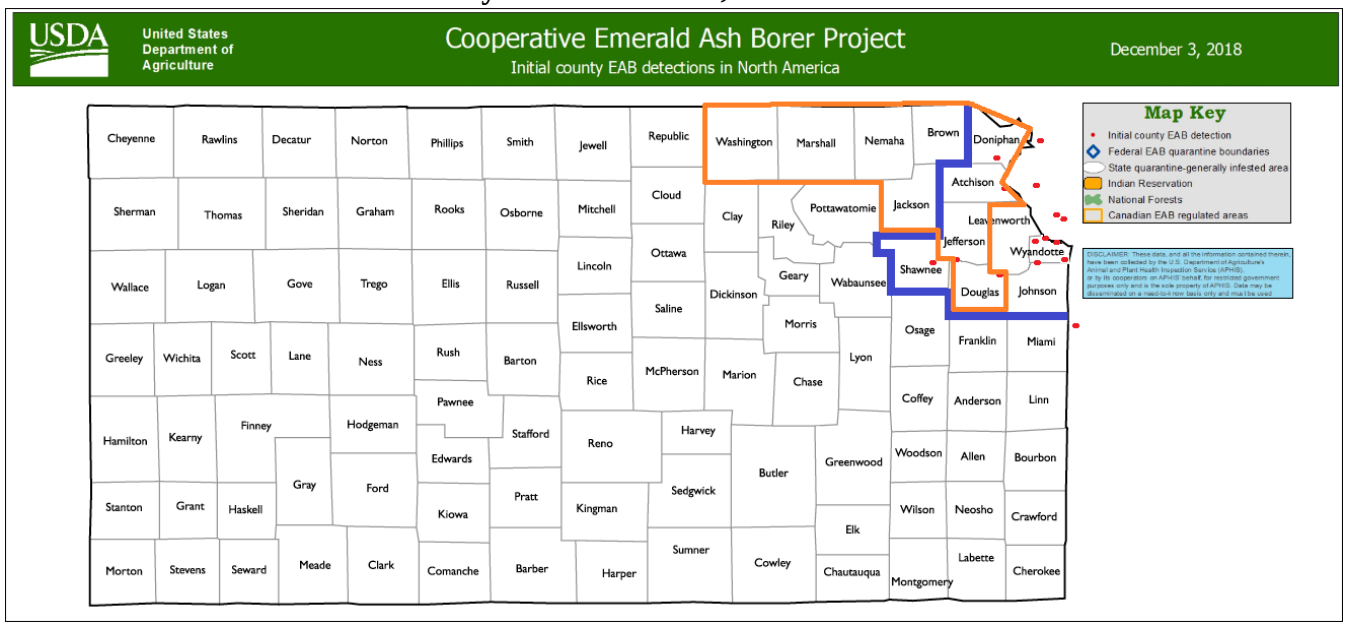
According to the KDA, Plant Protection and Weed Control Division, the following are the highest risk plant pests by host to Kansas Region K:

- 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, including Atchison, Doniphan, Douglas and Jefferson in Region K. The following map from the USDA shows the Federal EAB Quarantine area for the State of Kansas in relation to Kansas Region K.

Initial County EAB Detections, December 2018



Wildlife Pests

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

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

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

4.7.2 – Previous Occurrences

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

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 years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 166 claims on 30,050 acres for $2,442,785.

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
Atchison	8	1,102	$200,143
Brown	11	930	$140,277
Doniphan	14	818	$147,373
Douglas	19	1,922	$296,327
Jackson	6	1,897	$325,068
Jefferson	12	884	$103,591
Marshall	21	4,454	$471,481
Nemaha	15	2,121	$257,252
Washington	48	5,461	$373,461

Source: USDA Farm Service Agency

4.7.3 – Hazard Probability Analysis

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

4.7.4 – Vulnerability Assessment

Regional populations and facilities are not directly vulnerable to losses as a result of agricultural infestation. The USDA 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 K 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 vulnerability the county has to agricultural infestation events.

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

Jurisdiction	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
Atchison	174,297	110	0.06%	$66,913,000	$20,014	0.03%
Brown	258,601	93	0.04%	$112,057,000	$14,028	0.01%
Doniphan	144,927	82	0.06%	$76,581,000	$14,737	0.02%
Douglas	159,261	192	0.12%	$65,867,000	$29,633	0.04%
Jackson	168,682	190	0.11%	$40,215,000	$32,507	0.08%
Jefferson	153,276	88	0.06%	$44,922,000	$10,359	0.02%
Marshall	361,473	445	0.12%	$92,882,000	$47,148	0.05%
Nemaha	268,088	212	0.08%	$76,127,000	$25,725	0.03%
Washington	336,673	546	0.16%	$87,087,000	$37,346	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

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

Table 4.7: Potential High-Risk Plant Pests

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

4.7.5 – Impact and Consequence Analysis

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

Table 4.8: Agricultural Infestation Consequence Analysis

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

4.8 – Dam and Levee Failure

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

- Flooding
- Sub-standard construction materials/techniques
- Spillway design error
- Geological instability caused by changes to water levels during filling or poor surveying
- Sliding of a mountain into the reservoir
- 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

4.8.1 – Dam Location and Extent

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

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

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

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

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

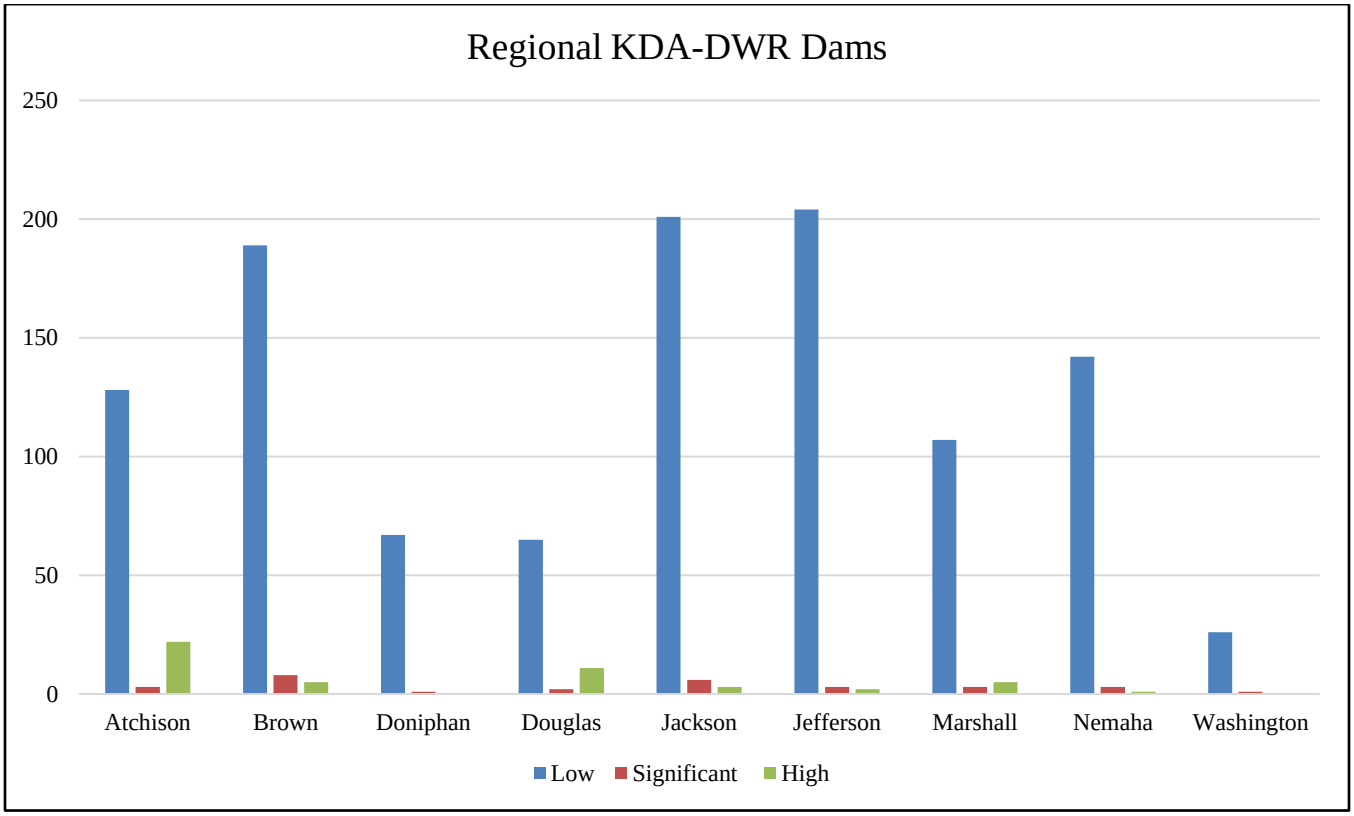
- **High Hazard (Class C):** Dams assigned the high hazard-potential classification are those where failure could result in any of the following: extensive loss of life, damage to more than one home, damage to industrial or commercial facilities, interruption of a public utility serving a large number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

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

Table 4.9: Kansas Region K KDA-DWR Jurisdictional Dams

County	Low	Significant	High	High Hazard Without EAP
Atchison	128	3	22	0
Brown	189	8	5	0
Doniphan	67	1	0	0
Douglas	65	2	11	0
Jackson	201	6	3	0
Jefferson	204	3	2	0
Marshall	107	3	5	0
Nemaha	142	3	1	0
Washington	26	1	0	0

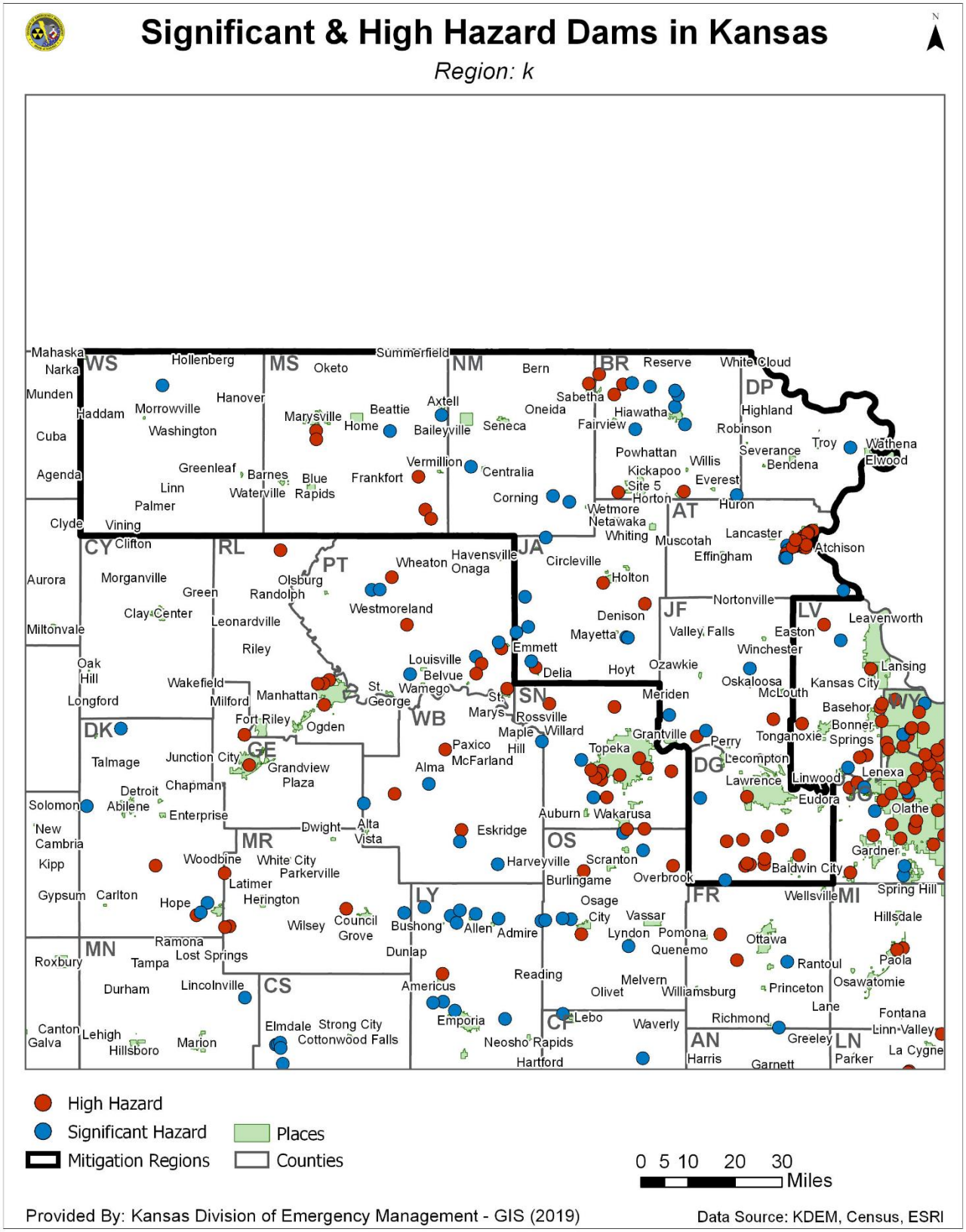
Source: KDA-DWR

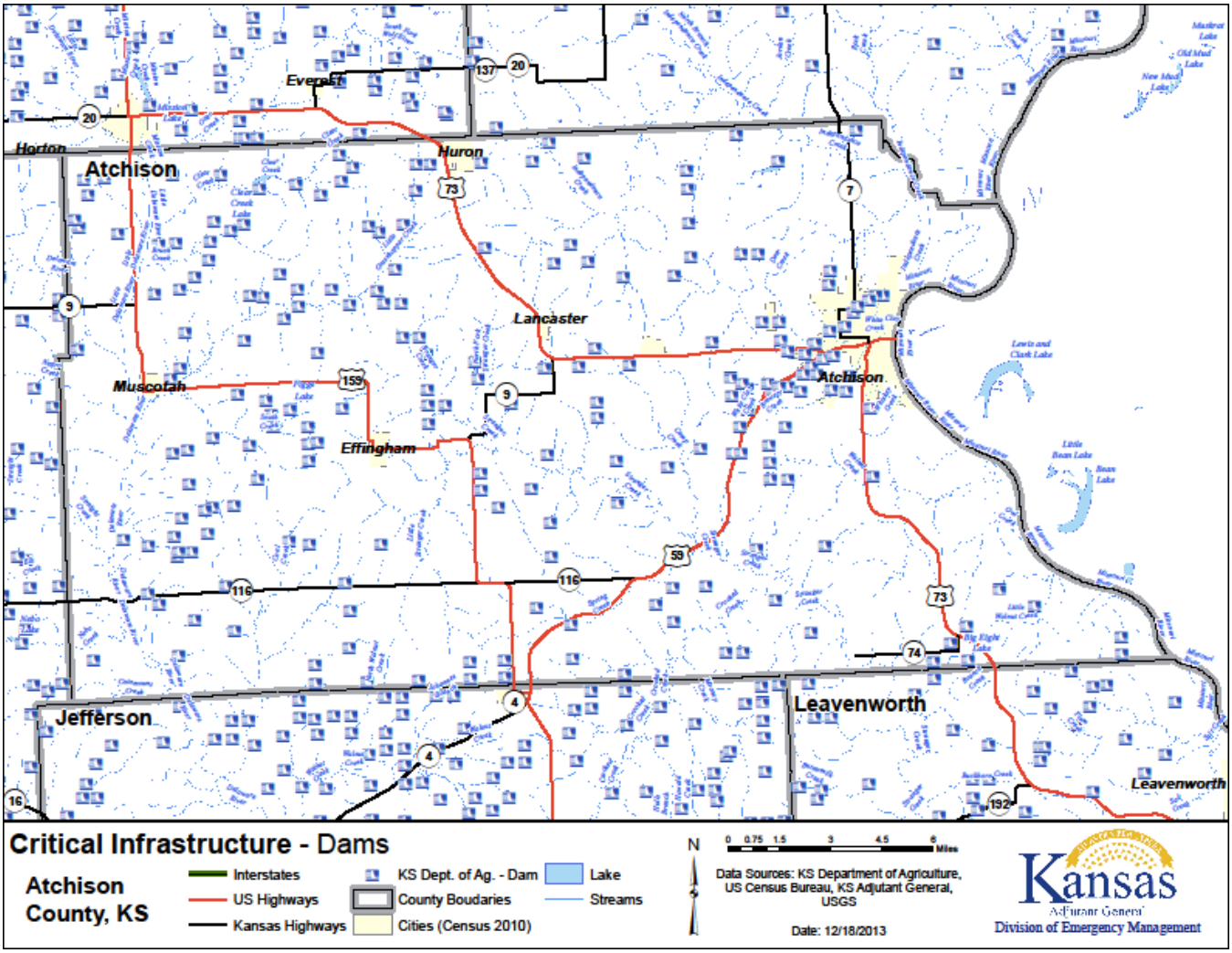


The following is a discussion of select high hazard dams within the region. It is worth noting that a many of these dams did not have inundation data completed, or the information is considered classified.

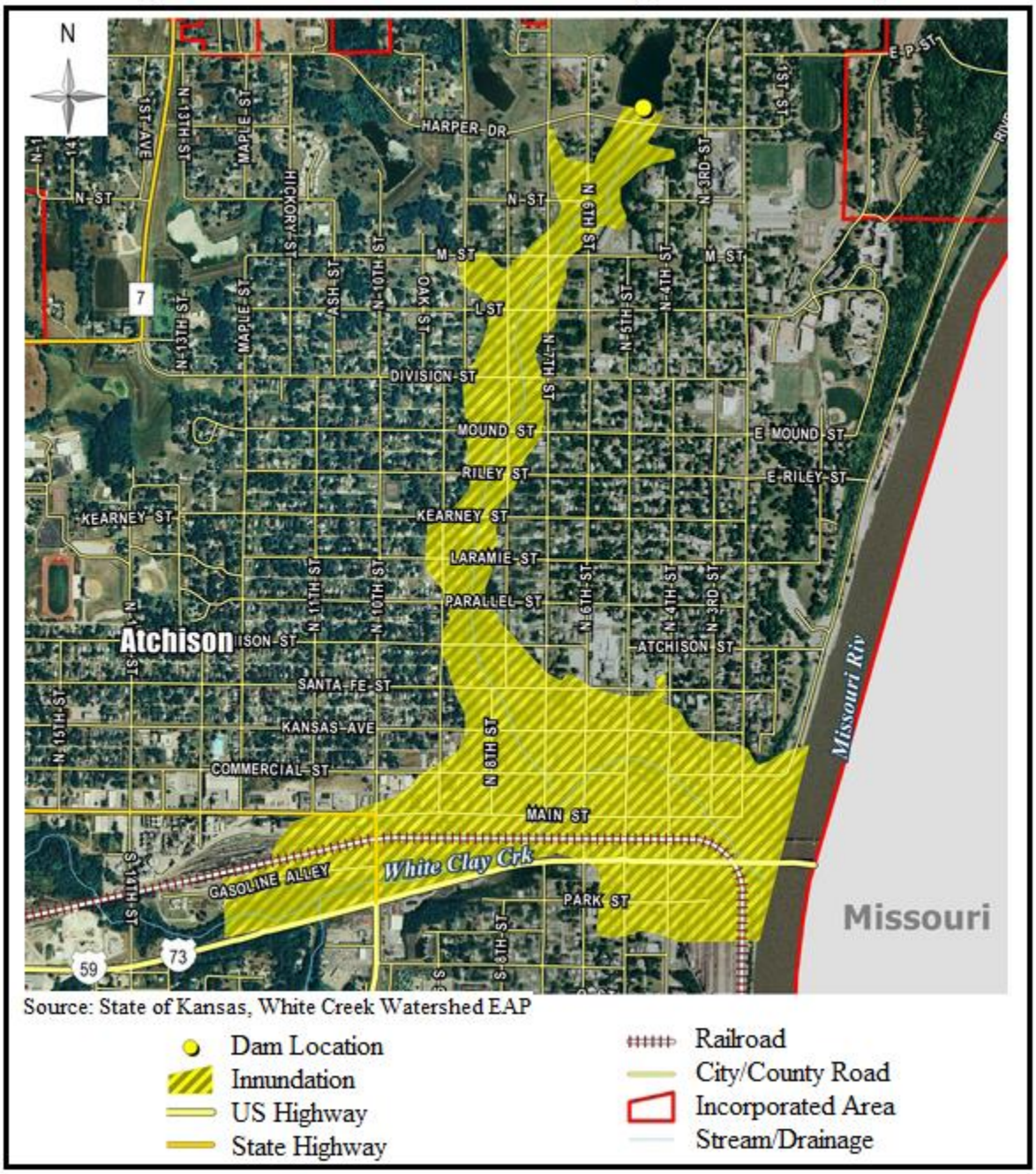
The following maps show all identified dams within Kansas Region K with a Significant or High classification, and available inundation and location mapping.

Kansas Region K Significant and High Hazard Dams


Significant & High Hazard Dams in Kansas
Region: k
N
Mahaska
Narka
Munden
Haddam
Cuba
Agenda
Clyde
Vining
Palmer
Linn
Greenleaf
Washington
Morrowville
Hollenberg
Hanover
Barnes
Waterville
Blue
Rapids
Marysville
Beattie
Home
Oketo
Summerfield
Axtell
Baileyville
Seneca
Vermillion
Frankfort
Centralia
Corning
Bern
Oneida
Sabetha
Fairview
Hiawatha
Reserve
White Cloud
Highland
Robinson
Powhattan
Kickapoo
Site 5
Horton
Willis
Everest
Severance
Bendena
Troy
Wathena
Elwood
Huron
Wetmore
Netawaka
Whiting
Muscotah
Lancaster
Atchison
Effingham
Circleville
Holton
Havensville
Onaga
Wheaton
Olsburg
Randolph
Westmoreland
Aurora
Morganville
Green
Clay Center
Miltonvale
Clifton
Leonardville
Riley
Oak Hill
Longford
Wakefield
Milford
Manhattan
Fort Riley
Ogden
Junction City
Grandview Plaza
Talmage
Detroit
Chapman
Abilene
Enterprise
Solomon
New Cambria
Kipp
Gypsum
Carlton
Hope
Woodbine
White City
Parkerville
Latimer
Herington
Dwight
Alta Vista
Eskridge
Wilsey
Council Grove
Bushong
Allen
Admire
Dunlap
Americus
Reading
Emporia
Elmdale
Strong City
Cottonwood Falls
Lehigh
Hillsboro
Marion
Canton
Galva
Durham
Lincolnville
Ramona
Lost Springs
Tampa
Roxbury
Louisville
Belvue
St. George
Wamego
St. Marys
Rossville
Maple Hill
Willard
Paxico
McFarland
Alma
Auburn
Wakarusa
Harveyville
Burlingame
Osage City
Olivet
Melvern
Williamsburg
Lebo
Waverly
Neosho Rapids
Hartford
Denison
Mayetta
Emmett
Delia
Hoyt
Ozawkie
Meriden
Topeka
Grantville
Perry
Lecompton
Lawrence
Scranton
Overbrook
Vassar
Lyndon
Pomona
Quenemo
Osaweatomie
Princeton
Richmond
Harris
Garnett
Greeley
Parker
Nortonville
Valley Falls
Easton
Winchester
Oskaloosa
McLouth
Kansas City
Leavenworth
Lansing
Basehor
Bonner Springs
Tonganoxie
Linwood
Lenexa
Eudora
Olathe
Gardner
Baldwin City
Spring Hill
Wellsville
Hillsdale
Ottawa
Rantoul
Paola
Fontana
Linn Valley
La Cygne
WS
MS
NM
BR
DP
CY
RL
PT
JA
AT
JF
LV
SN
WB
DK
GE
DG
JO
OV
MR
OS
LY
FR
MI
MN
CS
CF
AN
LN
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


Critical Infrastructure - Dams
Atchison County, KS
Interstates
US Highways
Kansas Highways
KS Dept. of Ag. - Dam
County Boudaries
Cities (Census 2010)
Lake
Streams
N
0 0.75 1.5 3 4.5 6 Miles
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General, USGS
Date: 12/18/2013
Kansas
Adjutant General
Division of Emergency Management
Atchison
Horton
Everest
Huron
Lancaster
Muscotah
Effingham
Jefferson
Leavenworth

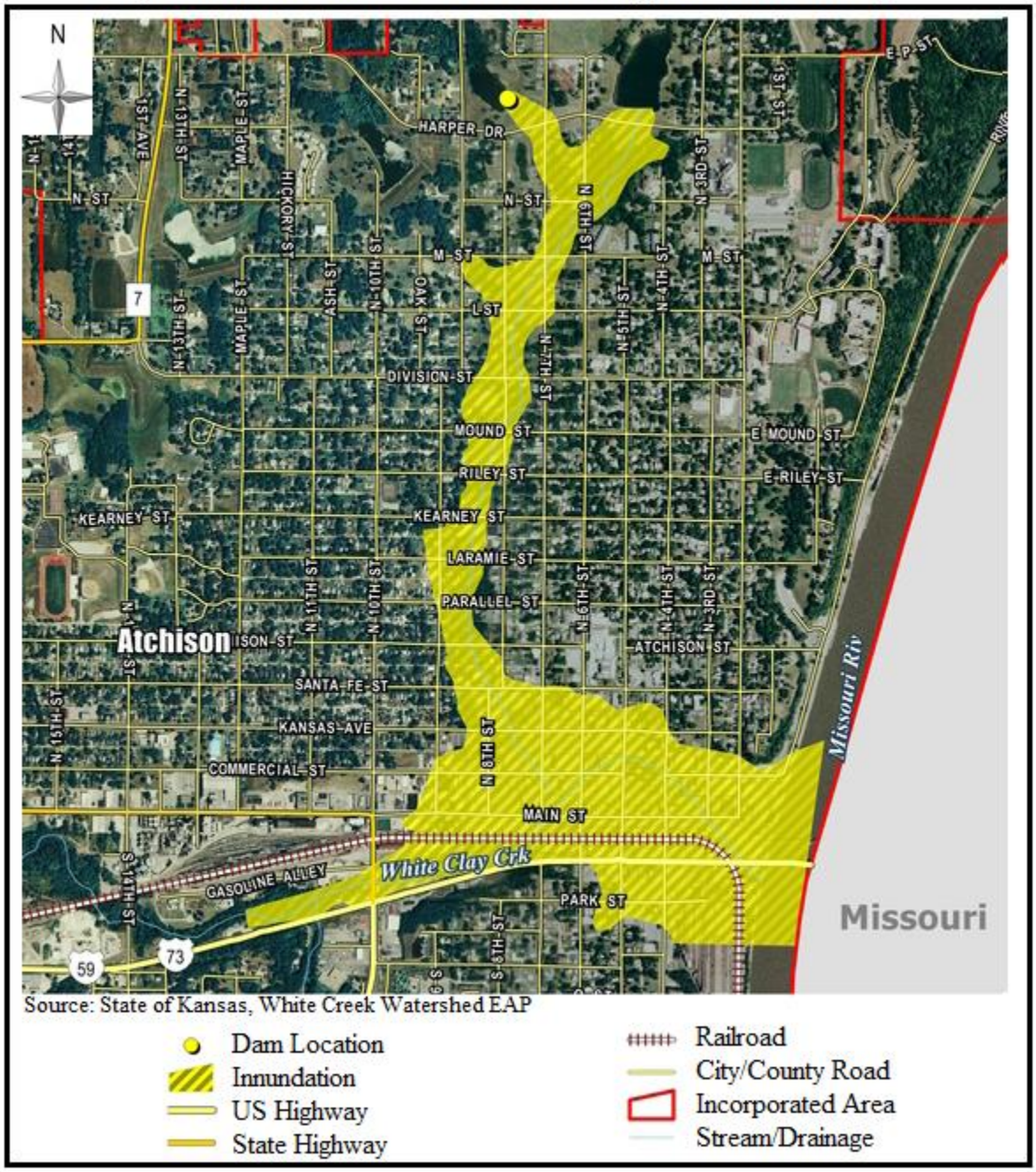
City of Atchison Dam #1 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

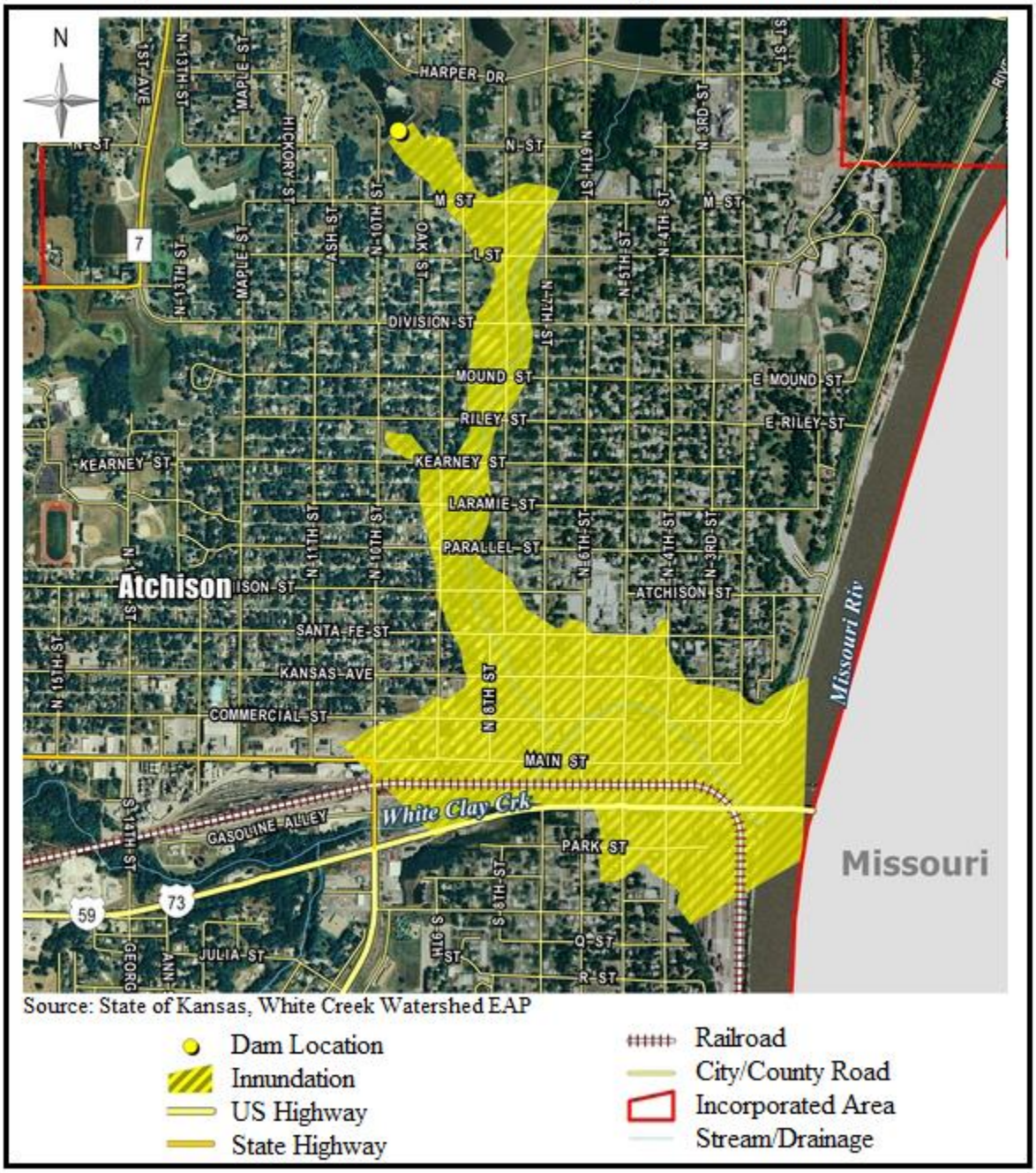
City of Atchison Dam #2 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

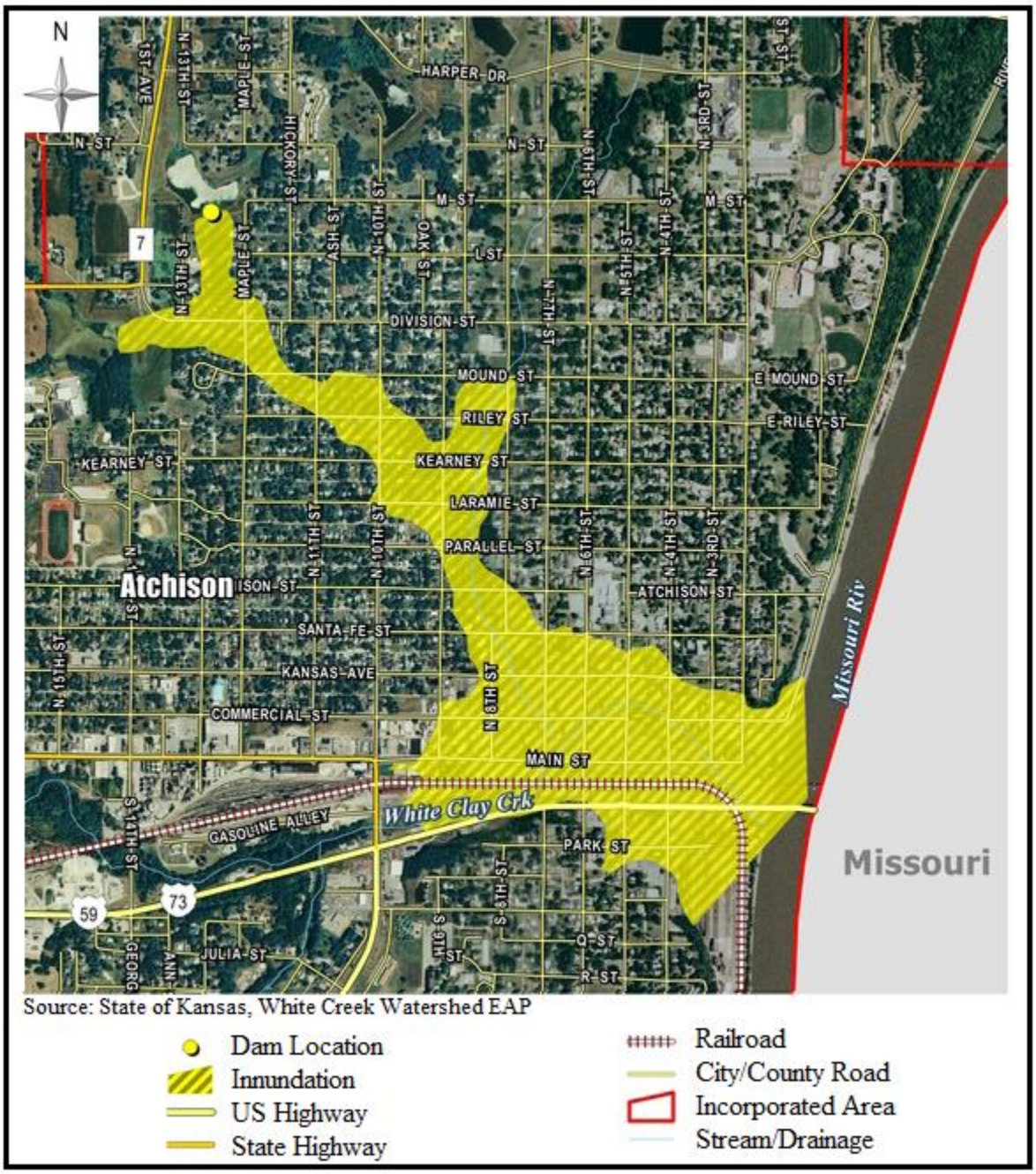
City of Atchison Dam #3 Inundation Map, Atchison County



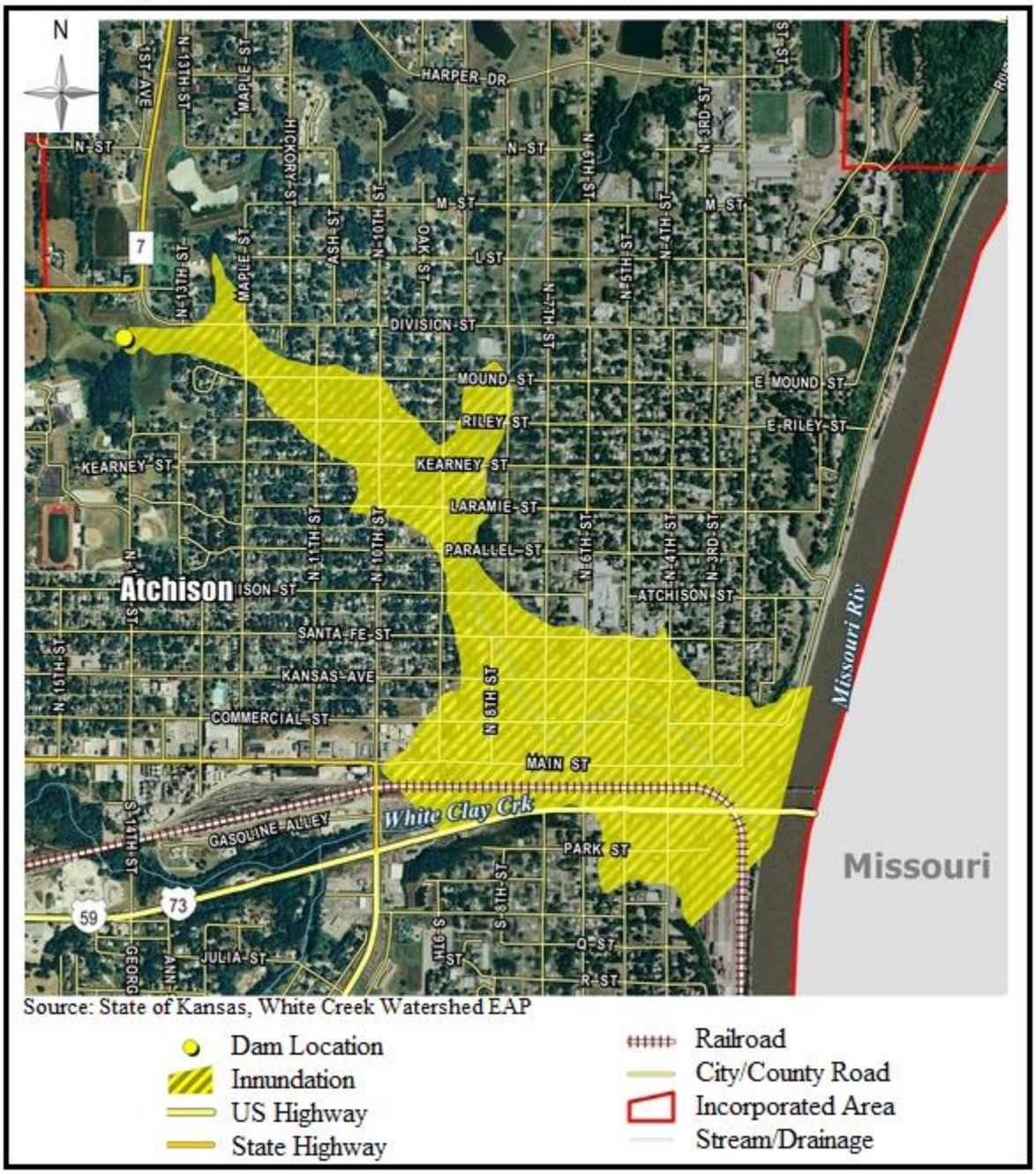
Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Innundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

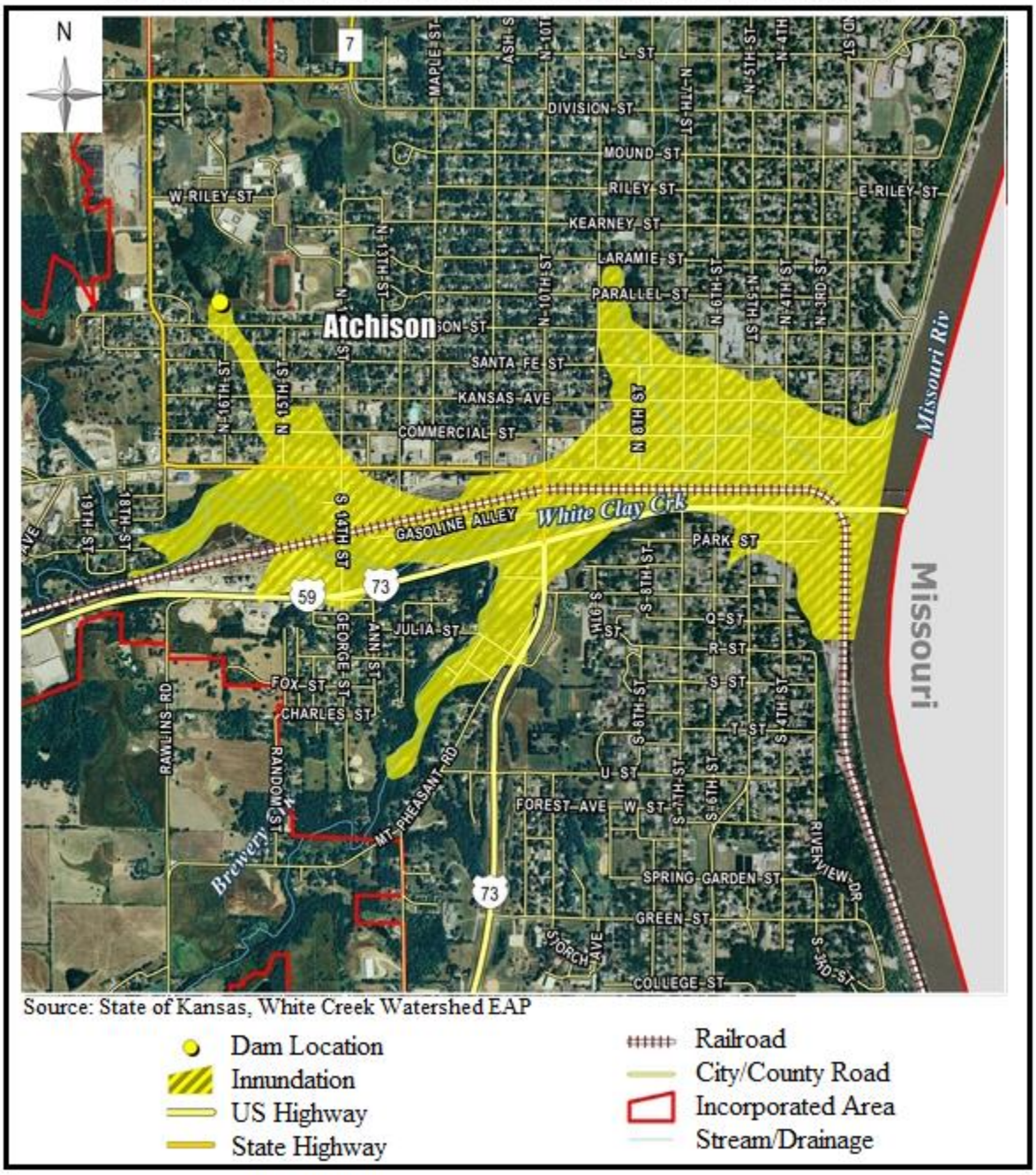
City of Atchison Dam #4 Inundation Map, Atchison County



City of Atchison Dam #5 Inundation Map, Atchison County



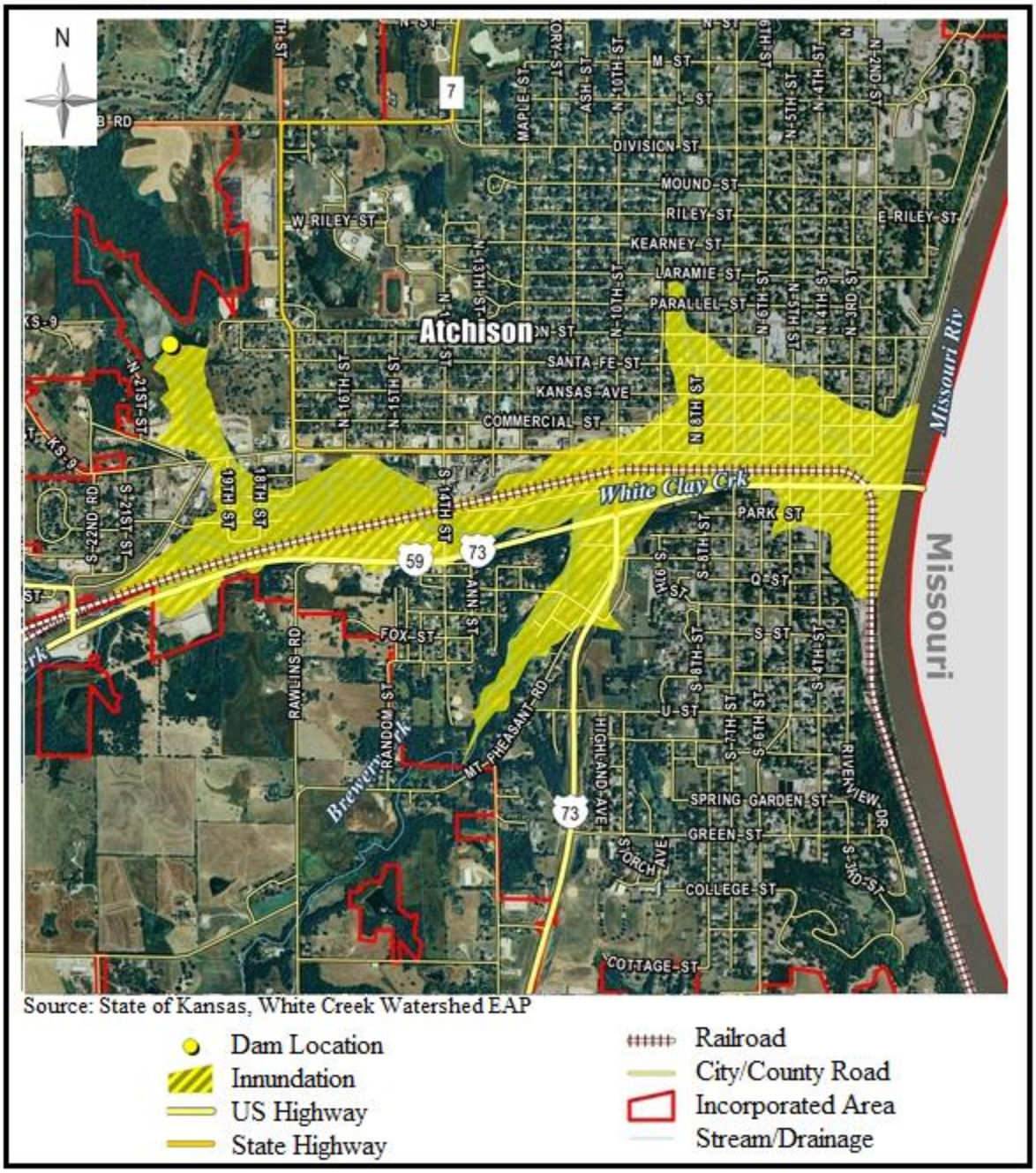
City of Atchison Dam #6 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

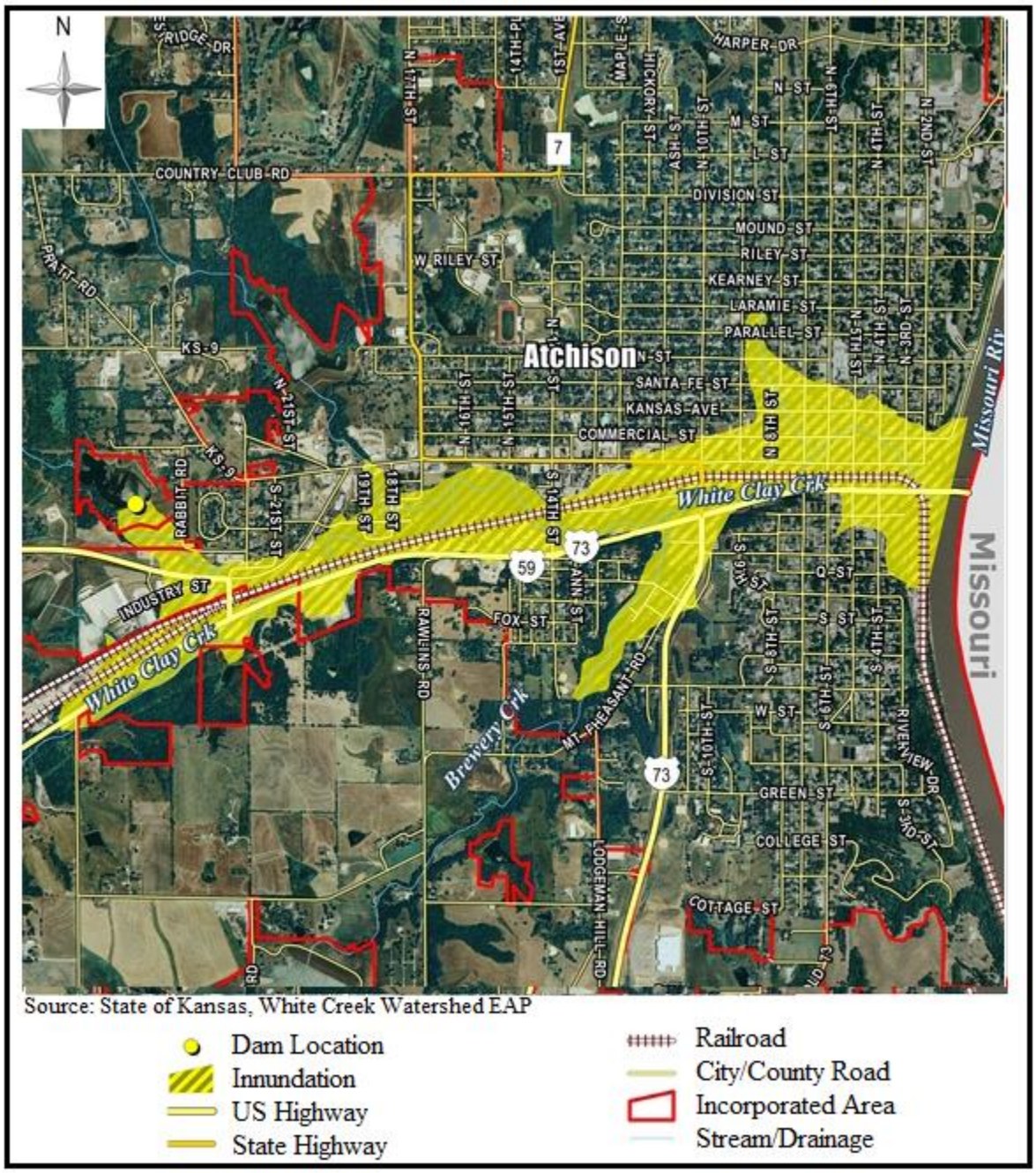
City of Atchison Dam #7 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

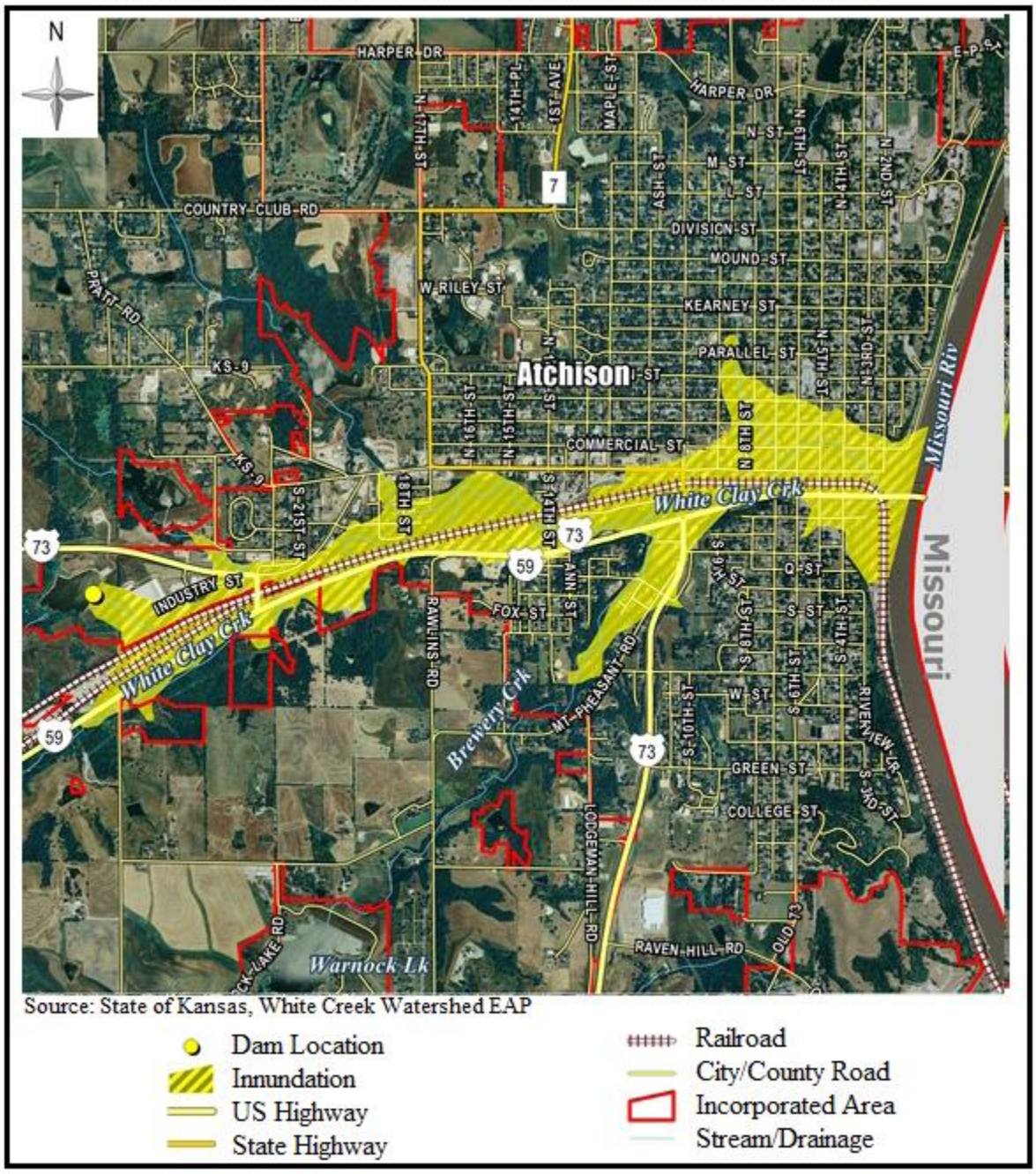
City of Atchison Dam #8 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Innundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

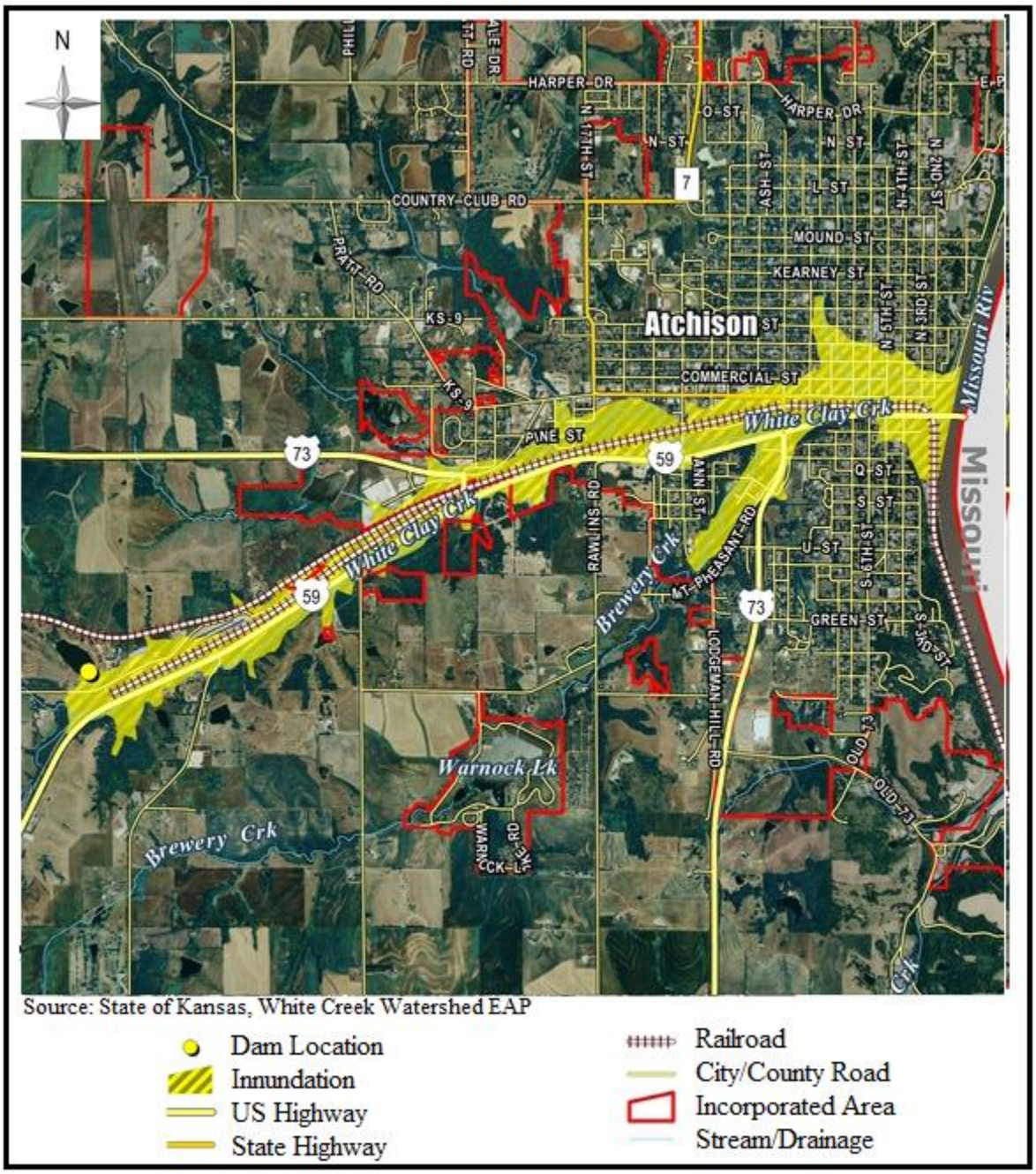
City of Atchison Dam #9 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Innundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

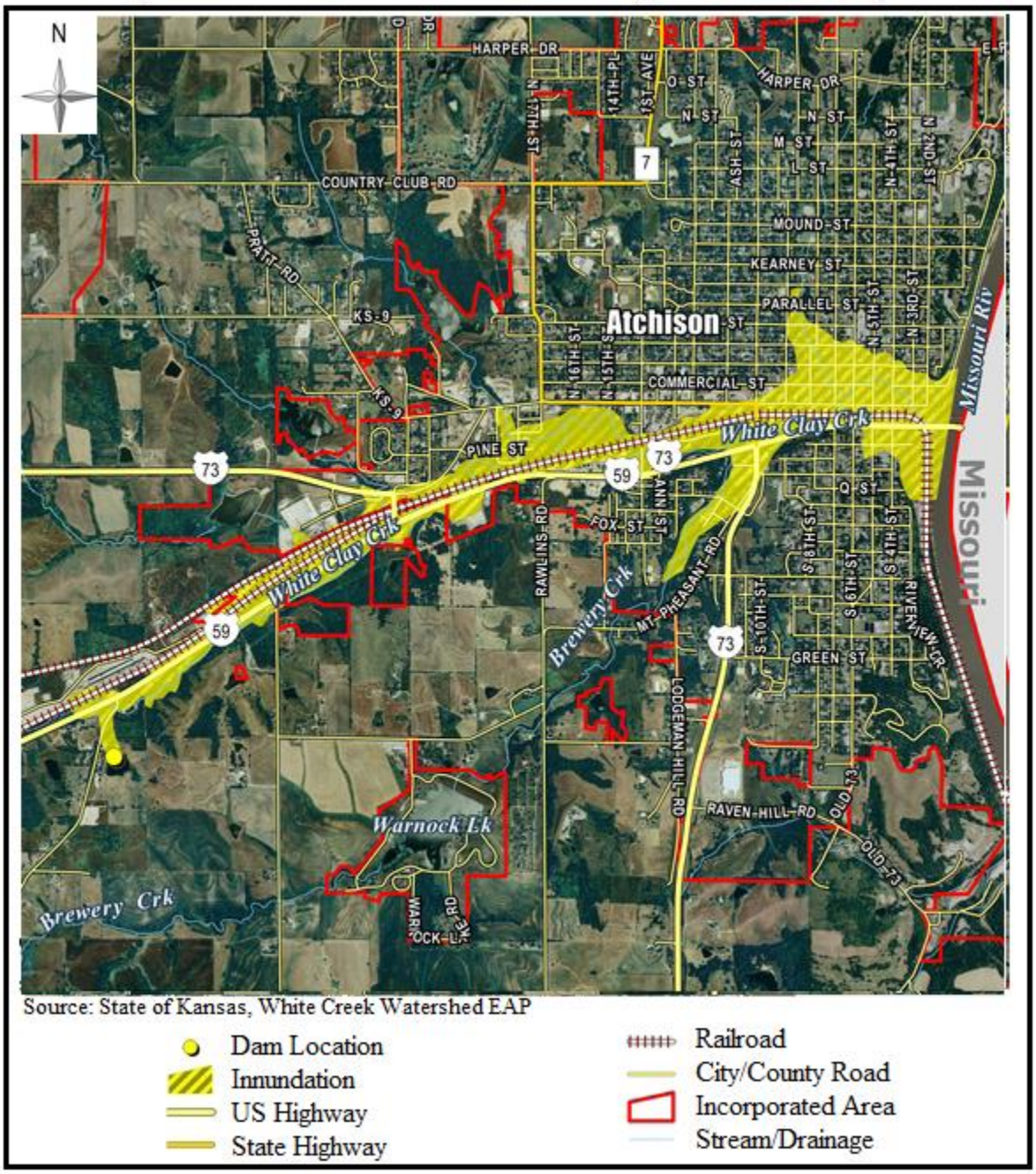
City of Atchison Dam#10 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

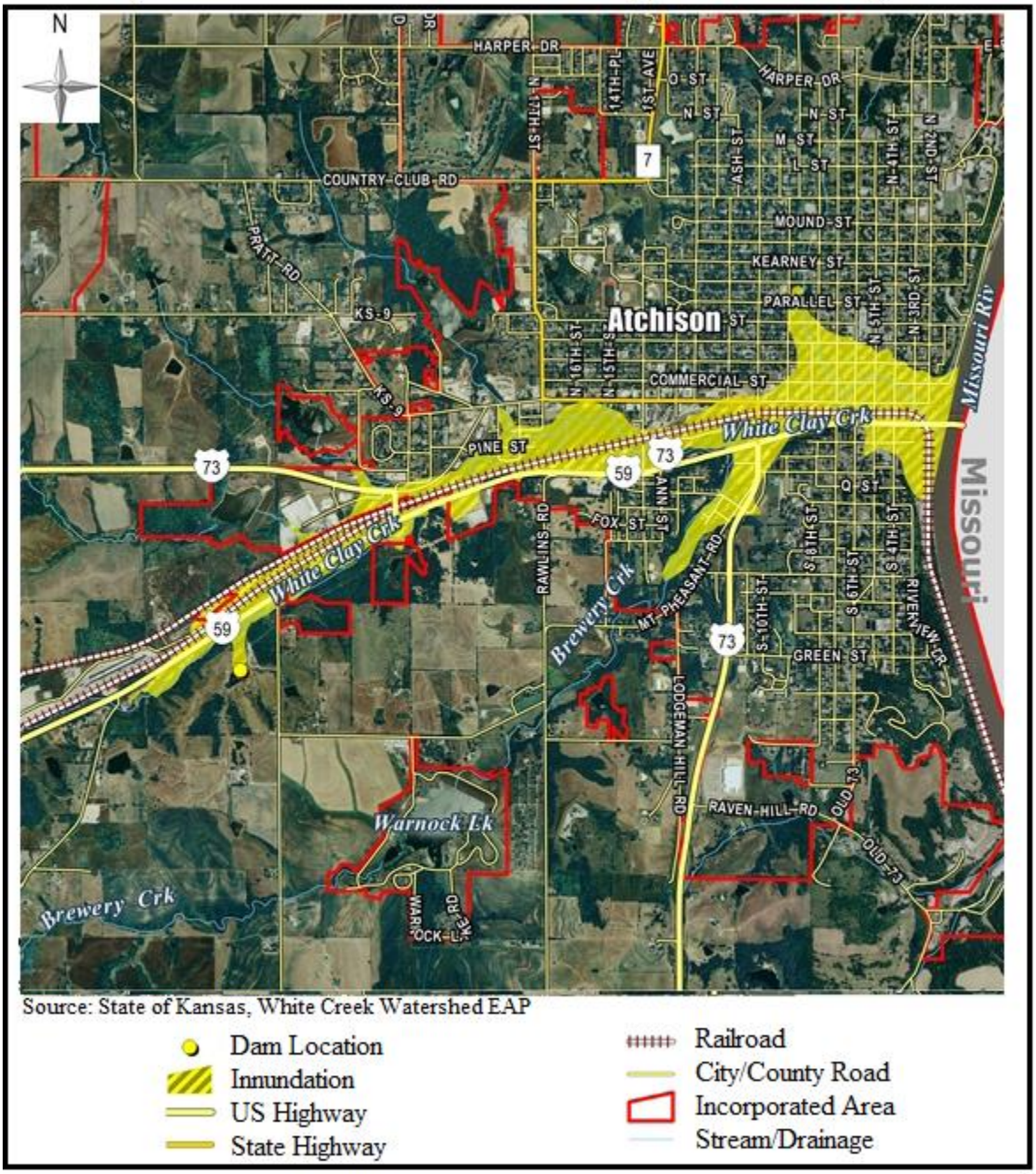
City of Atchison Dam#19 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

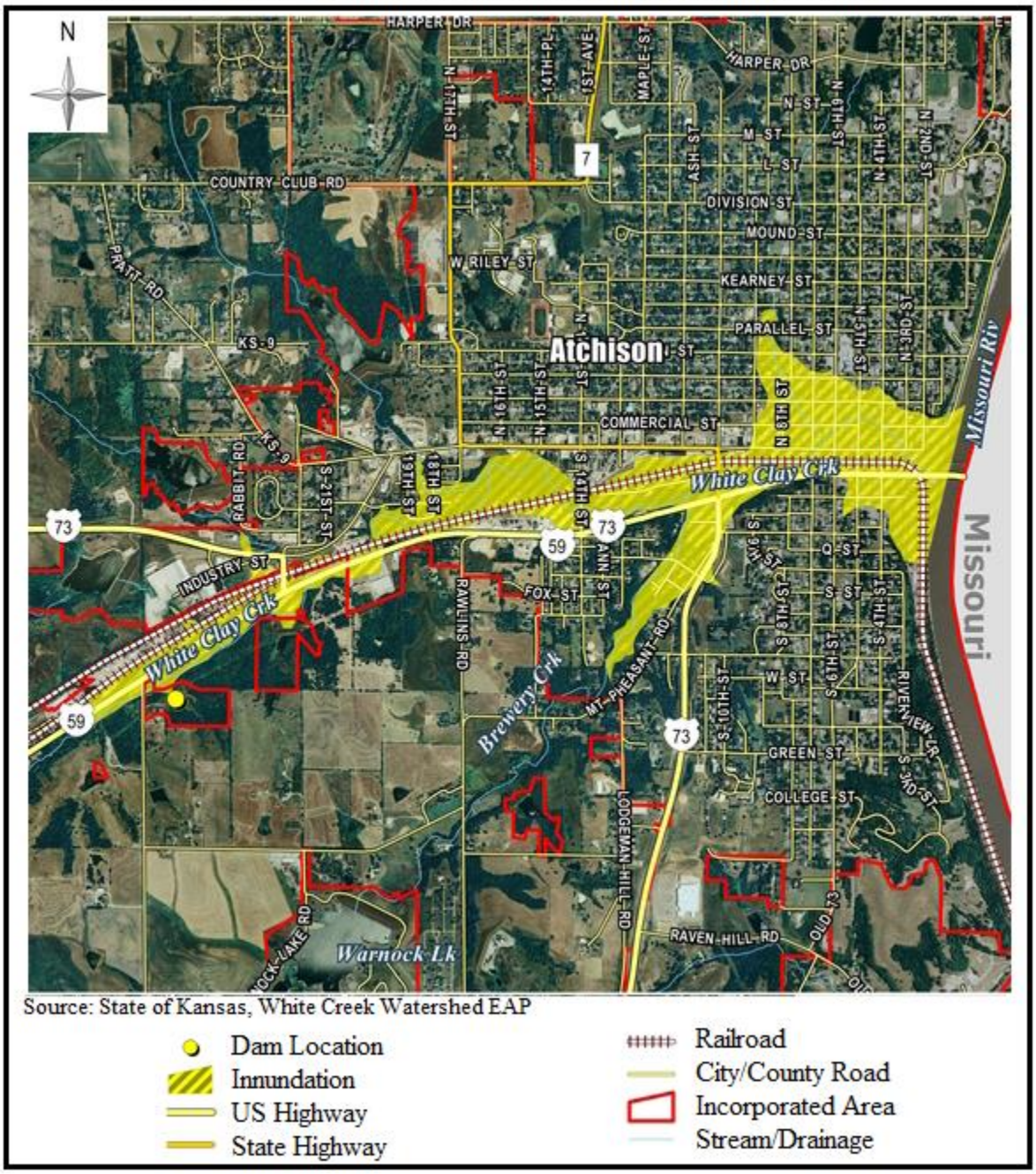
City of Atchison Dam#20 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

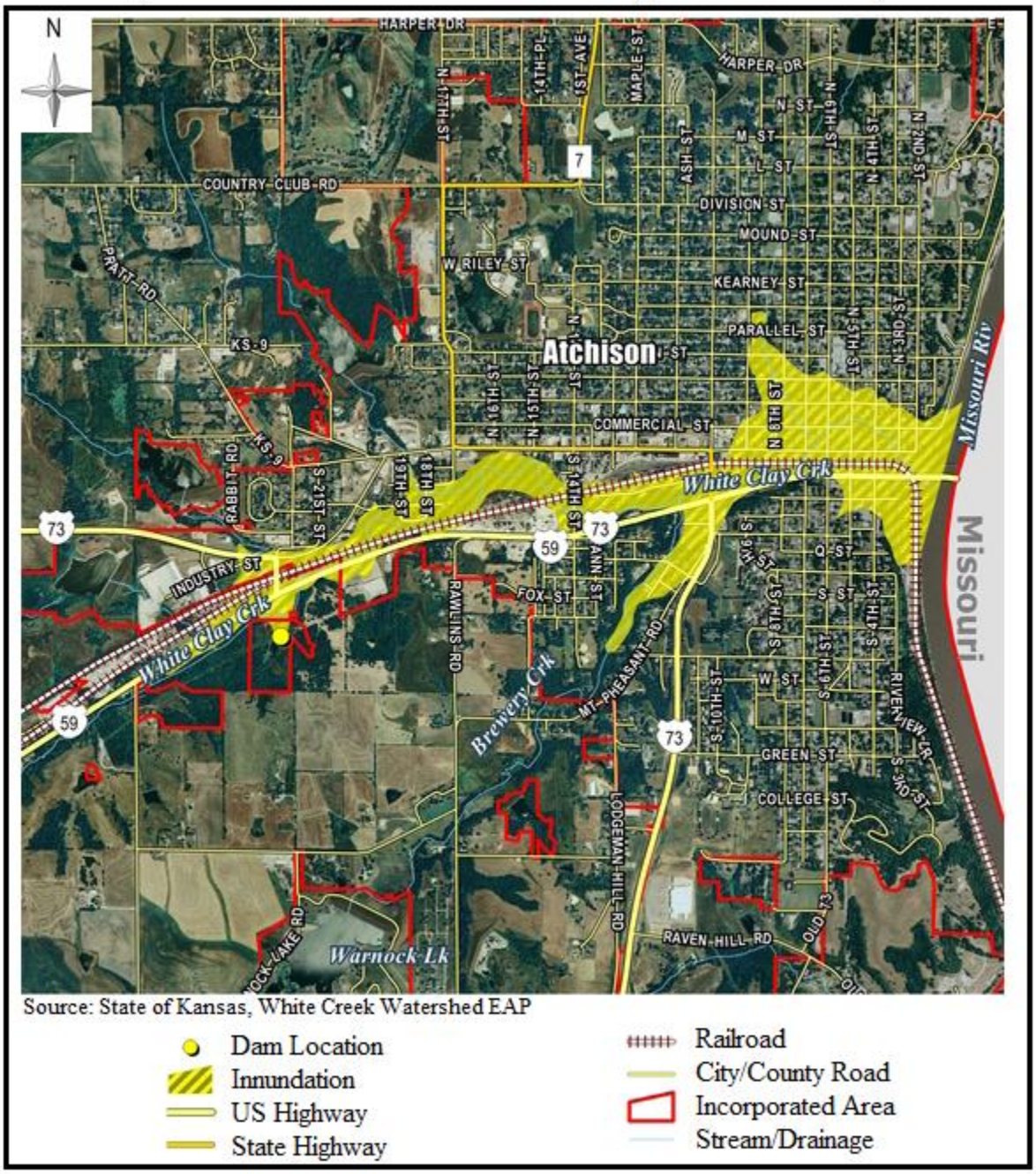
City of Atchison Dam#21 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Innundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

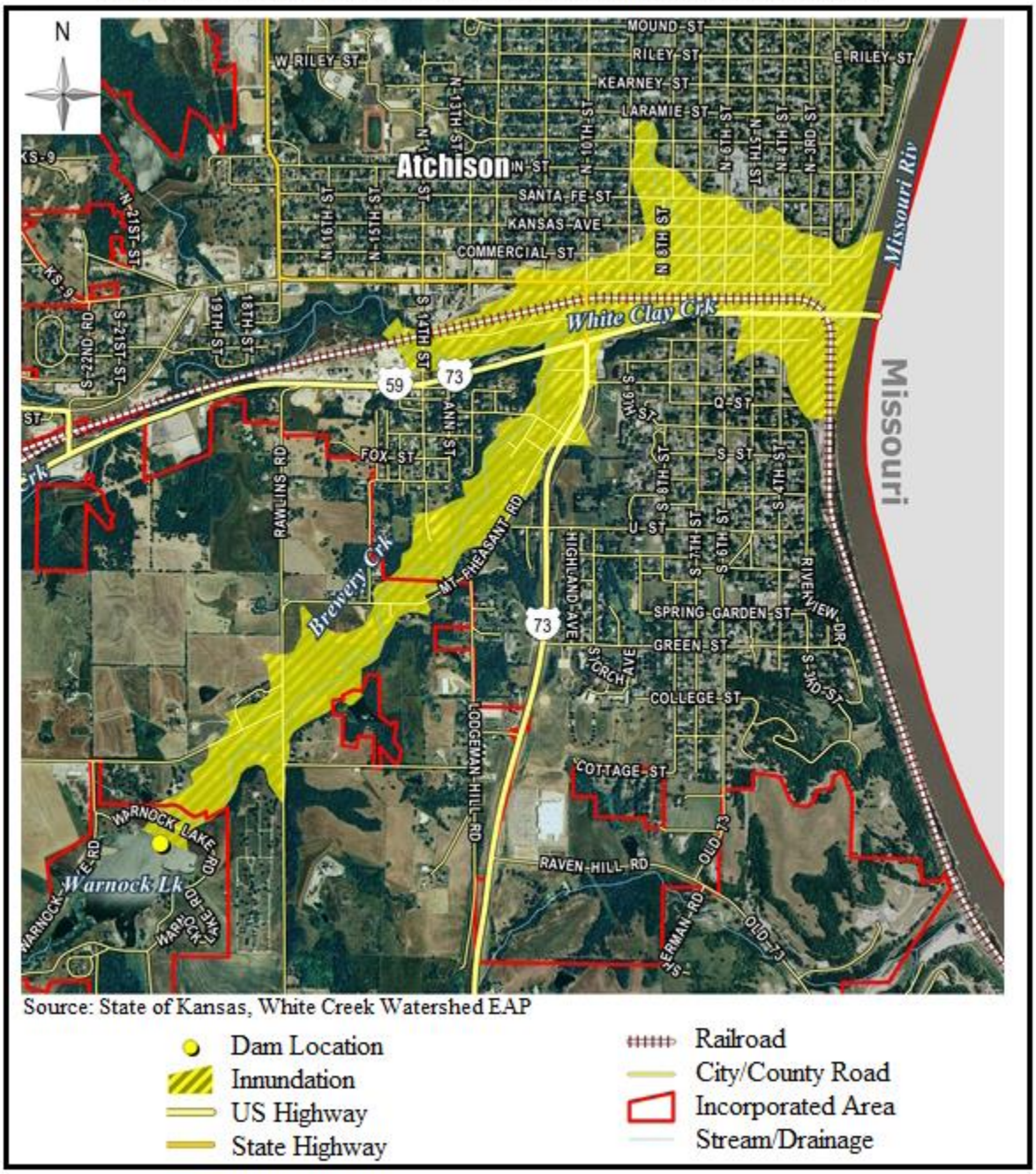
City of Atchison Dam#22 Inundation Map, Atchison County



Source: State of Kansas, White Creek Watershed EAP

- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

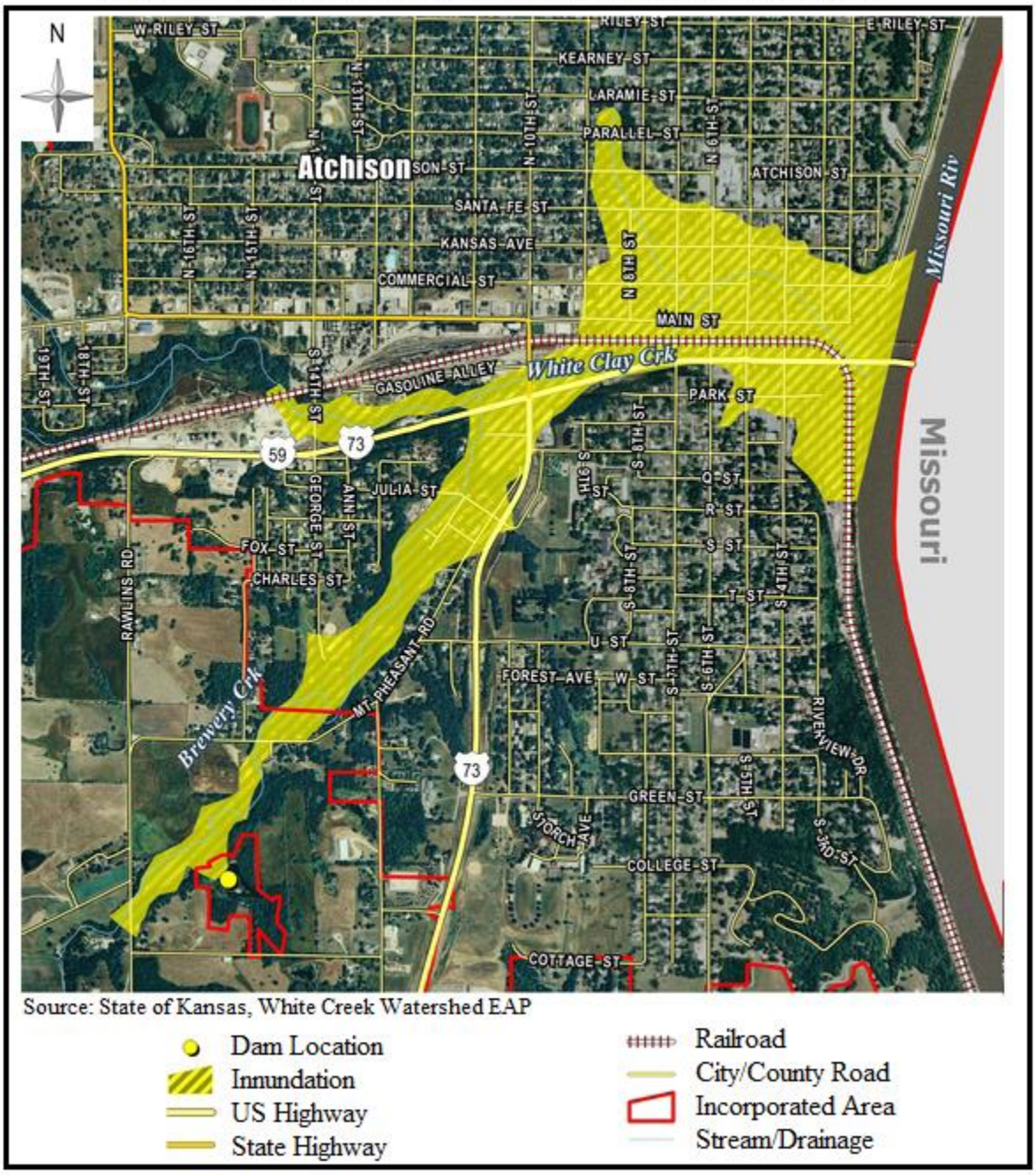
City of Atchison Dam#23 Inundation Map, Atchison County



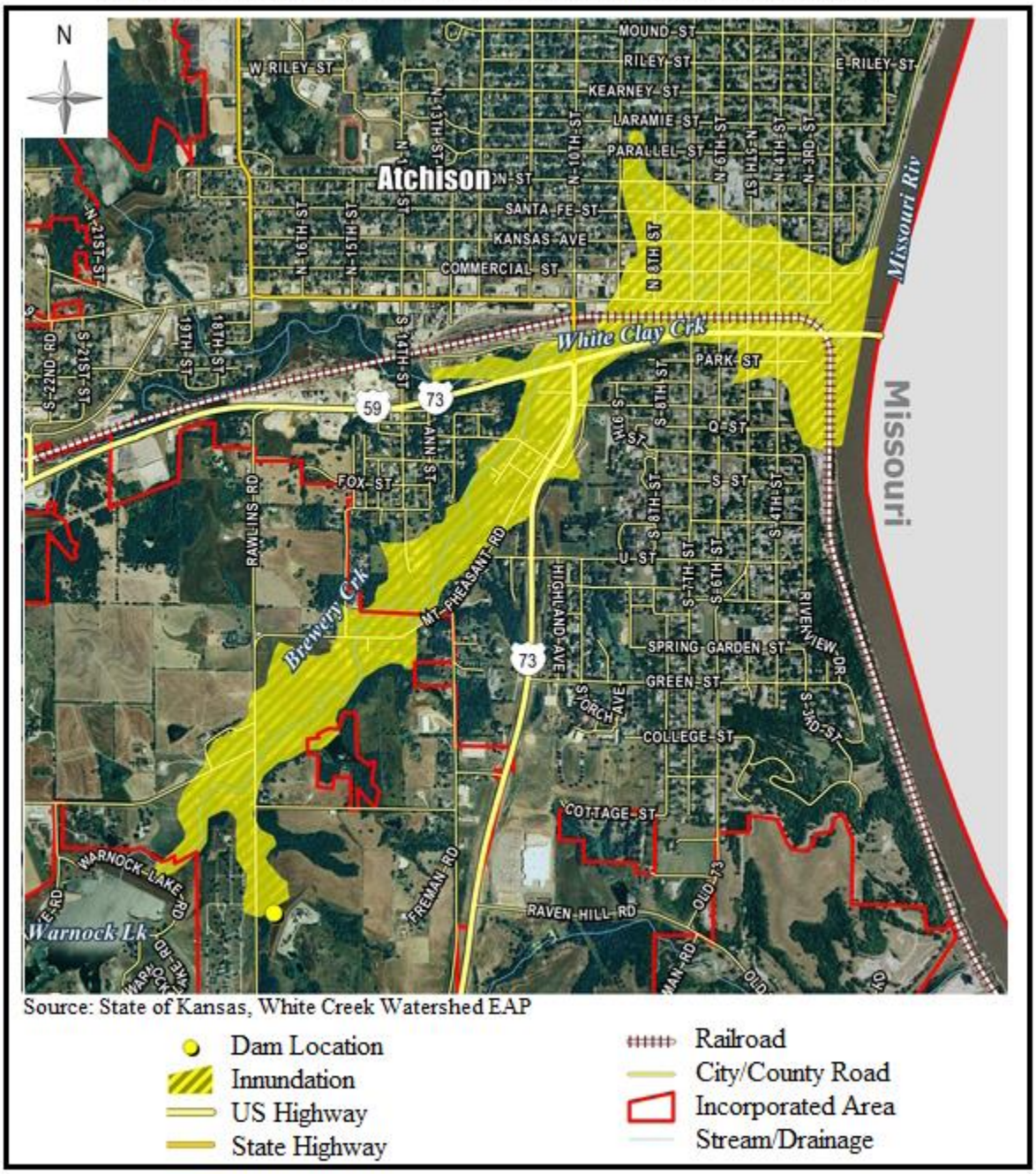
Source: State of Kansas, White Creek Watershed EAP

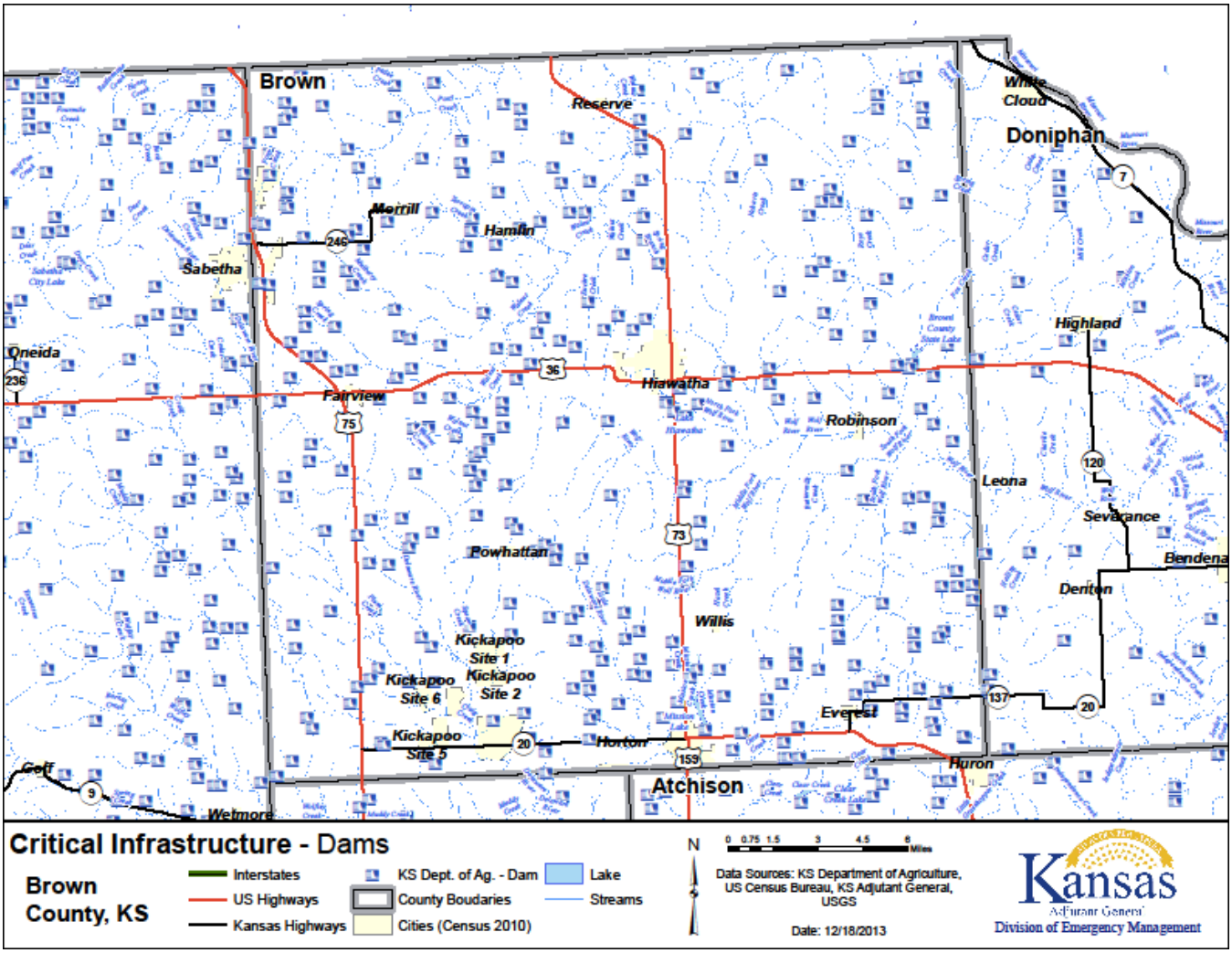
- Dam Location
- Inundation
- US Highway
- State Highway
- Railroad
- City/County Road
- Incorporated Area
- Stream/Drainage

City of Atchison Dam #24 Inundation Map, Atchison County

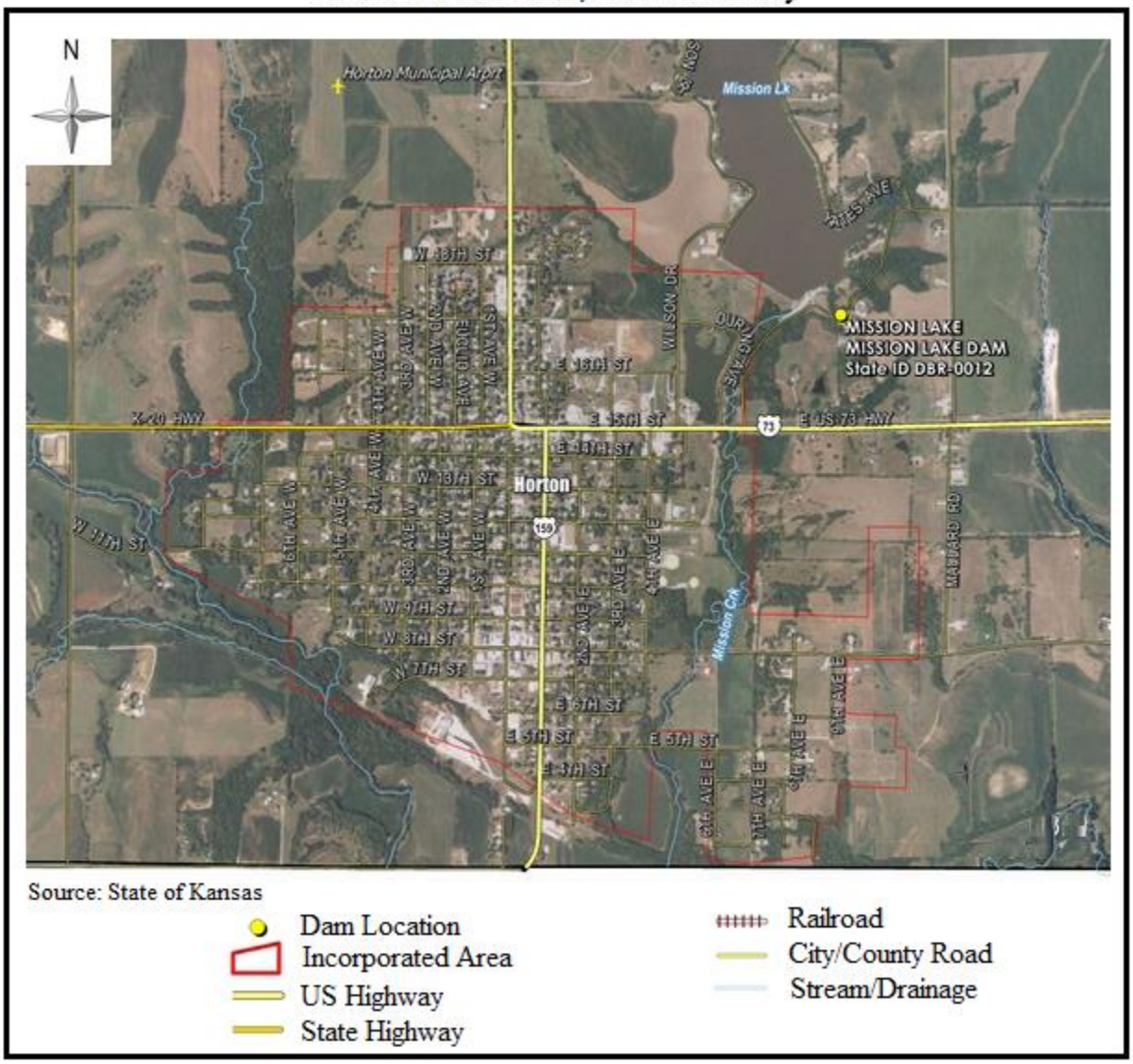


City of Atchison Dam#25 Inundation Map, Atchison County

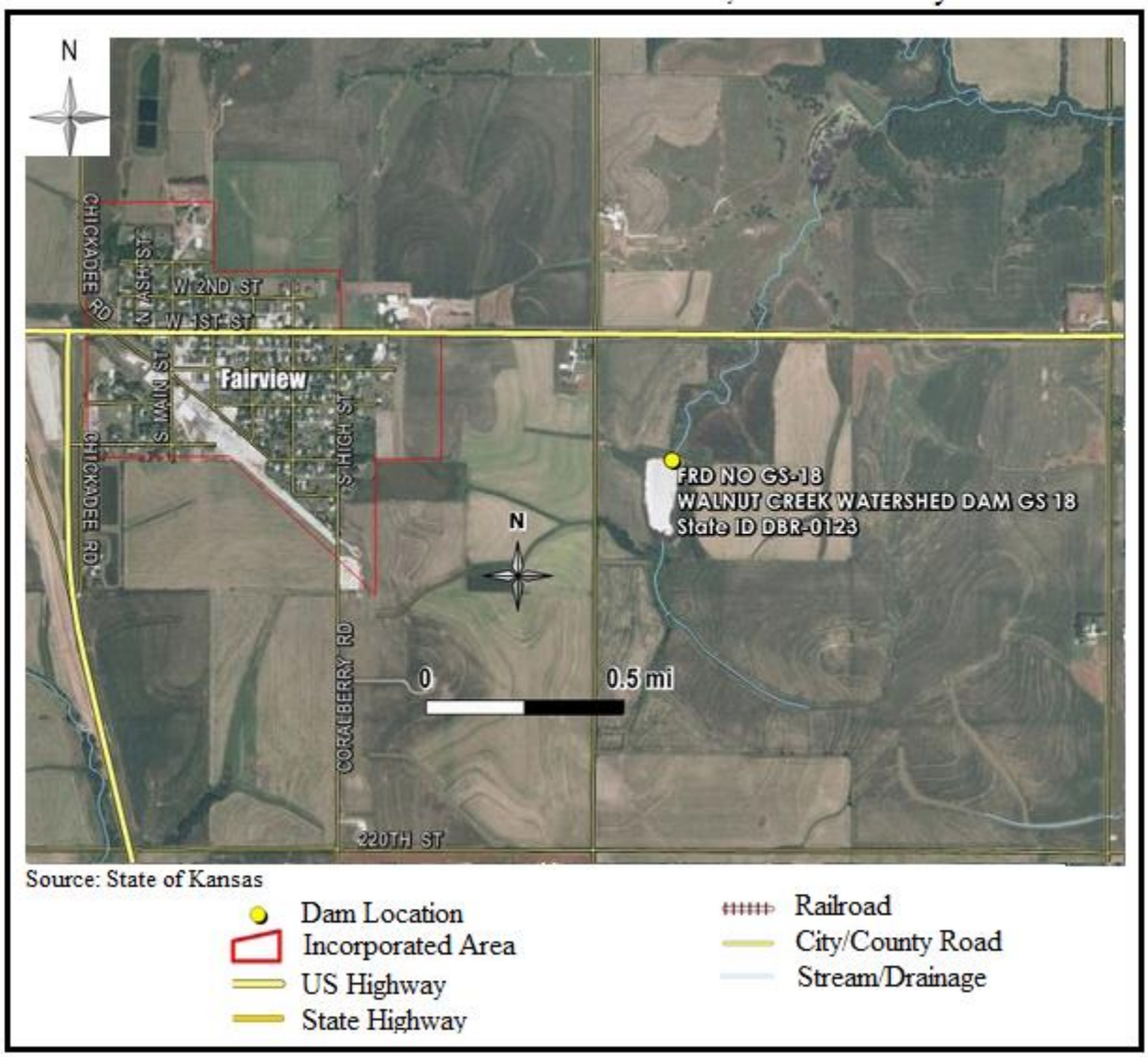



Brown
Reserve
White Cloud
Doniphan
Merrill
Hamlin
Sabetha
Oneida
Fairview
Hiawatha
Highland
Robinson
Leona
Severance
Bendena
Denton
Powhattan
Willis
Kickapoo Site 1
Kickapoo Site 2
Kickapoo Site 6
Kickapoo Site 5
Everest
Horton
Huron
Atchison
Goff
Wetmore
Critical Infrastructure - Dams
Brown County, KS
Interstates
US Highways
Kansas Highways
KS Dept. of Ag. - Dam
County Boudaries
Cities (Census 2010)
Lake
Streams
N
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General, USGS
Date: 12/18/2013
Kansas
Adjutant General
Division of Emergency Management

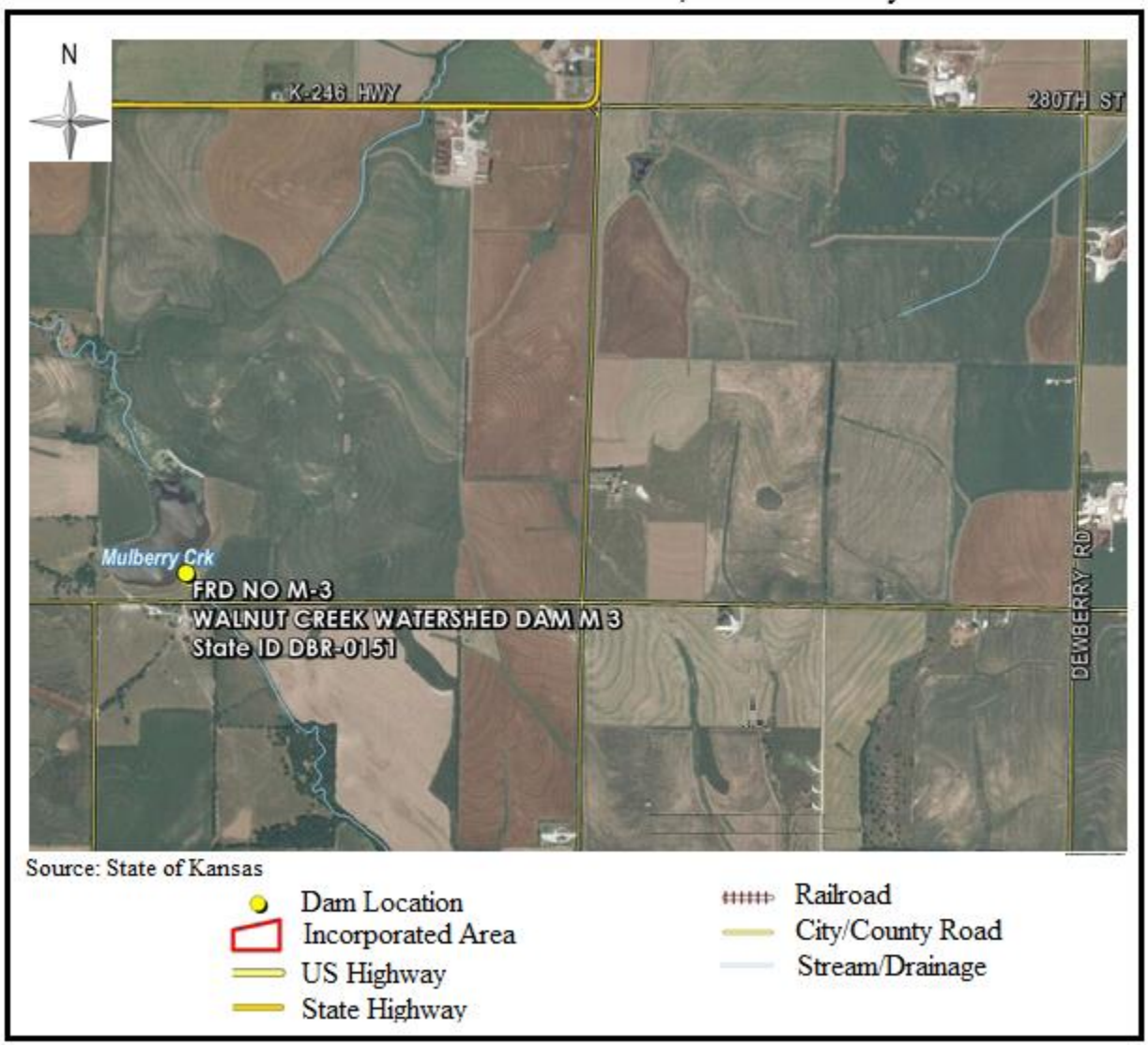
Mission Lake Dam, Brown County



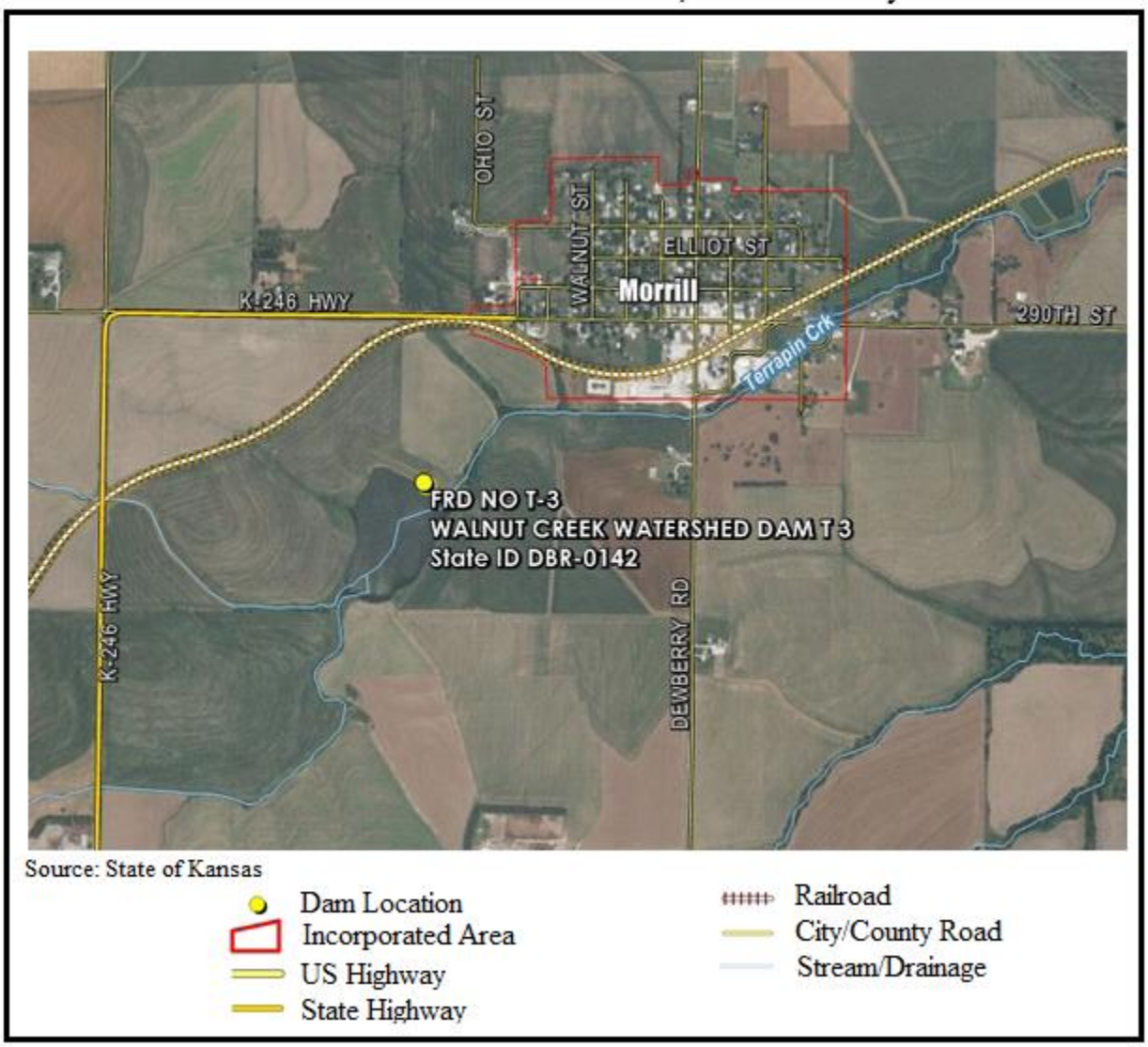
Walnut Creek Watershed Dam GS-18, Brown County

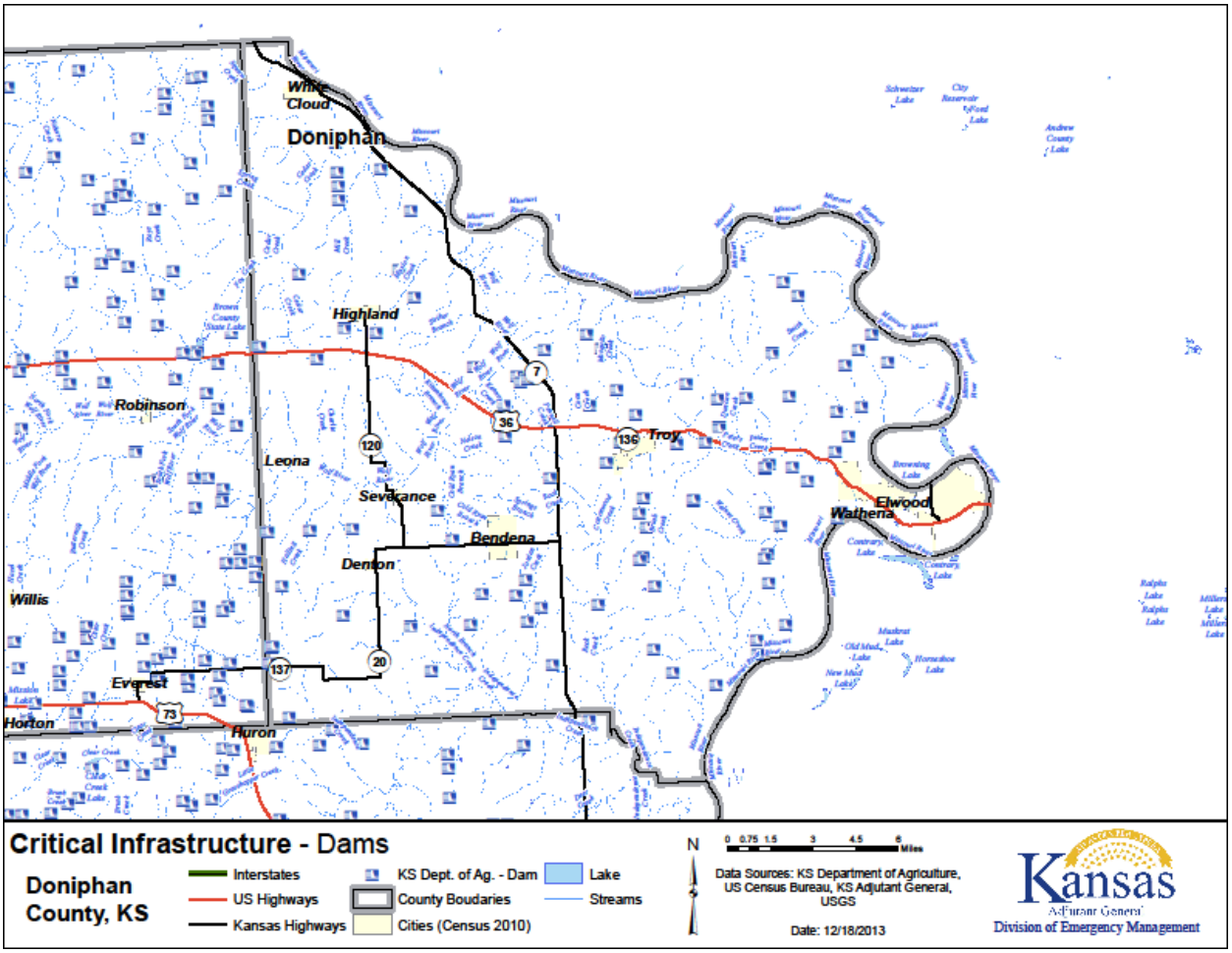


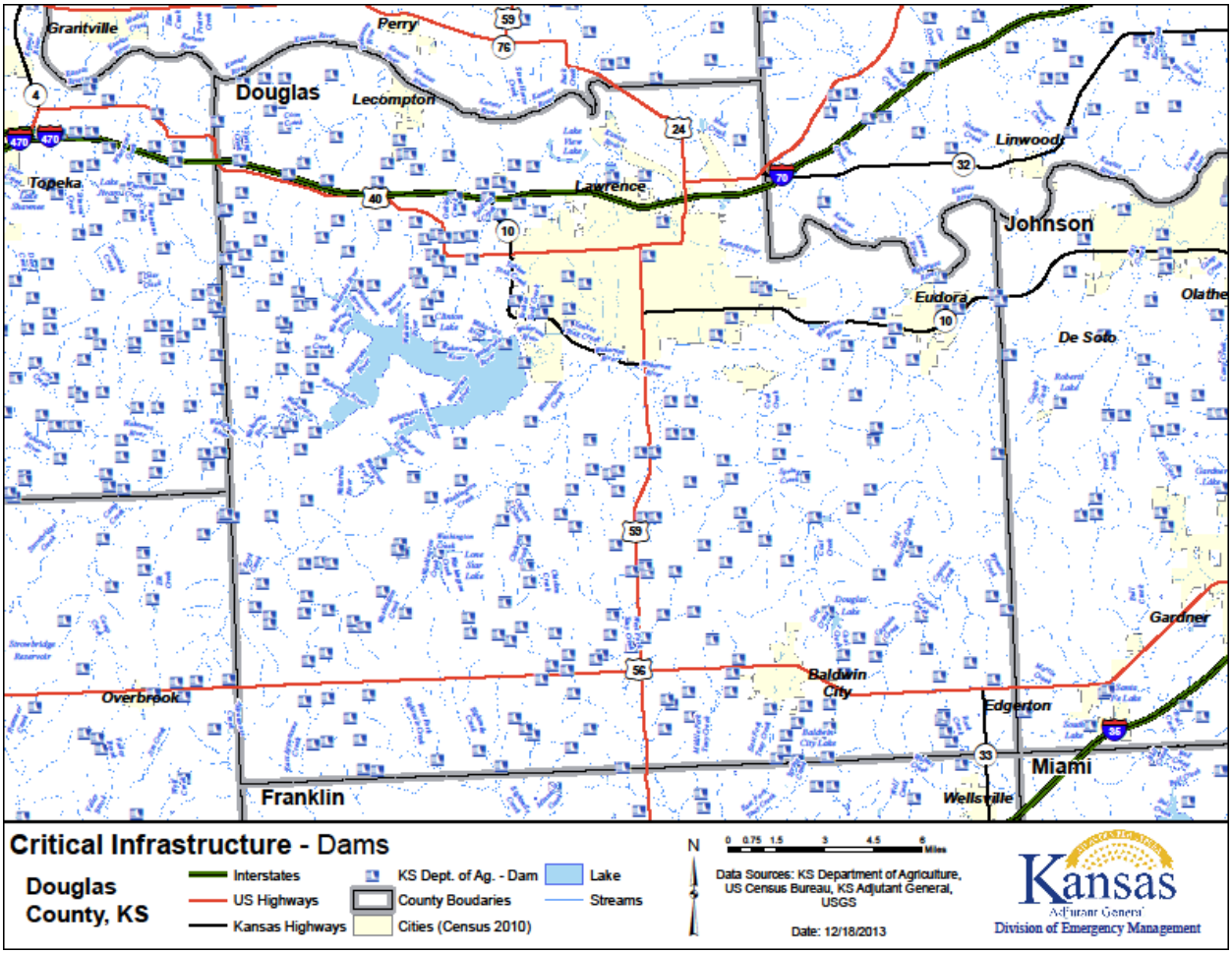
Walnut Creek Watershed Dam M-3, Brown County



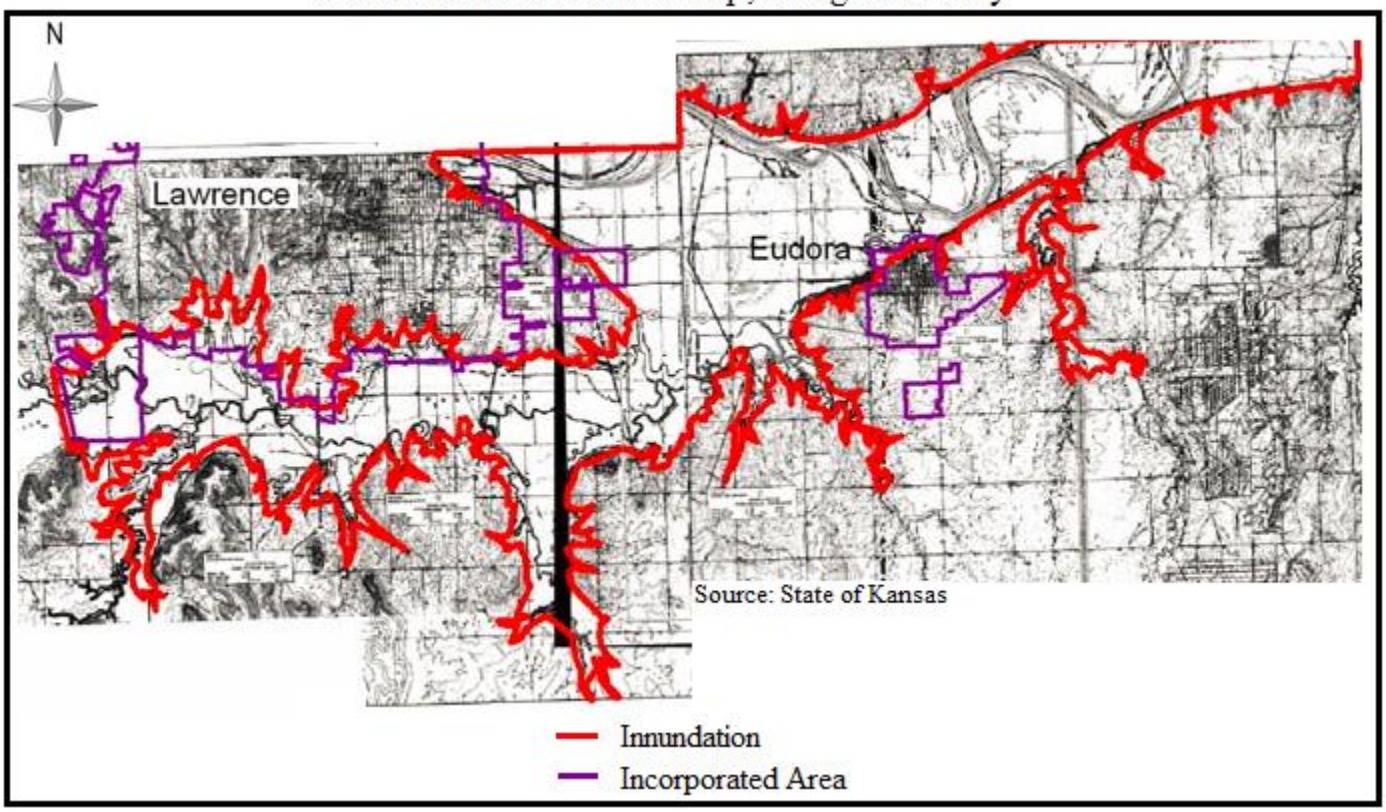
Walnut Creek Watershed Dam T-3, Brown County




White Cloud
Doniphan
Highland
Robinson
Leona
Severance
Bendena
Denton
Willis
Everest
Horton
Huron
Troy
Elwood
Wathena
7
36
120
136
137
20
73
Critical Infrastructure - Dams
Doniphan County, KS
Interstates
US Highways
Kansas Highways
KS Dept. of Ag. - Dam
County Boudaries
Cities (Census 2010)
Lake
Streams
N
0 0.75 1.5 3 4.5 6 Miles
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General, USGS
Date: 12/18/2013
Kansas
Adjutant General
Division of Emergency Management

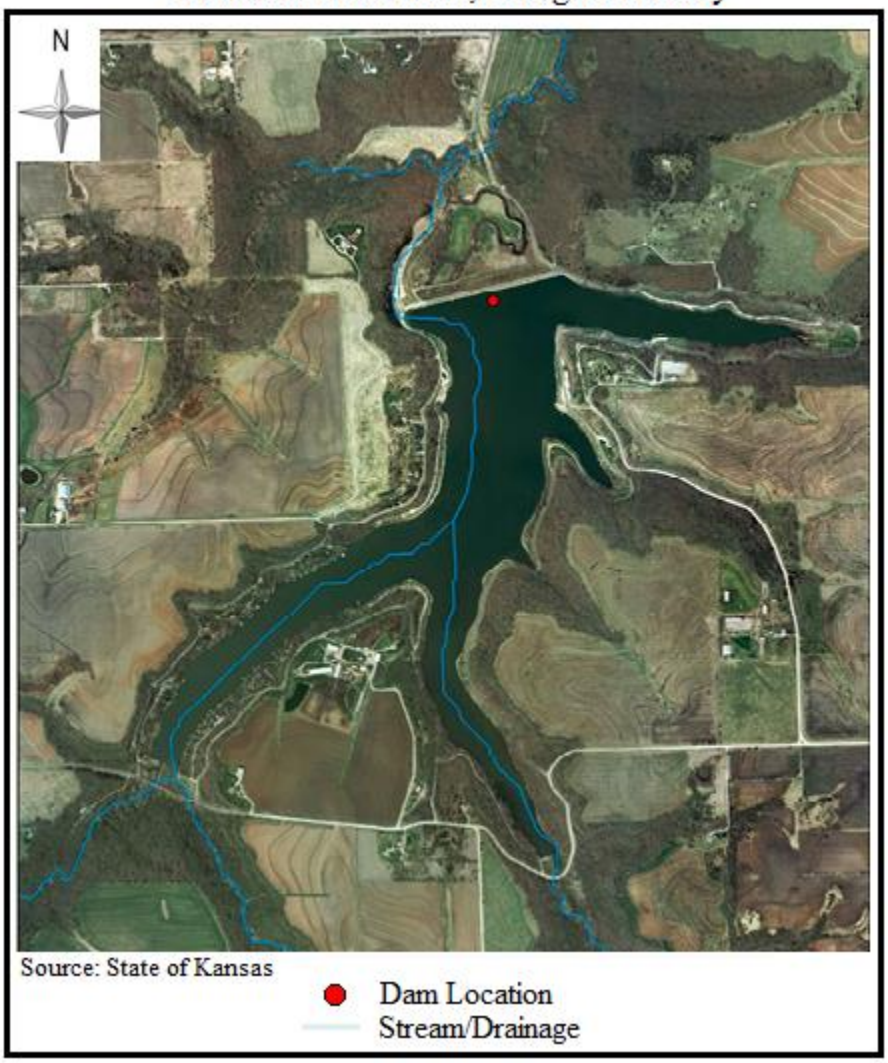

Graitville
Perry
Douglas
Lecompton
Topeka
Lawrence
Linwood
Johnson
Eudora
De Soto
Olathe
Gardner
Baldwin City
Edgerton
Overbrook
Franklin
Miami
Wellsville
Critical Infrastructure - Dams
Douglas County, KS
Interstates
US Highways
Kansas Highways
KS Dept. of Ag. - Dam
County Boudaries
Cities (Census 2010)
Lake
Streams
N
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General, USGS
Date: 12/18/2013
Kansas
Adjutant General
Division of Emergency Management

Clinton Dam Inundation Map, Douglas County

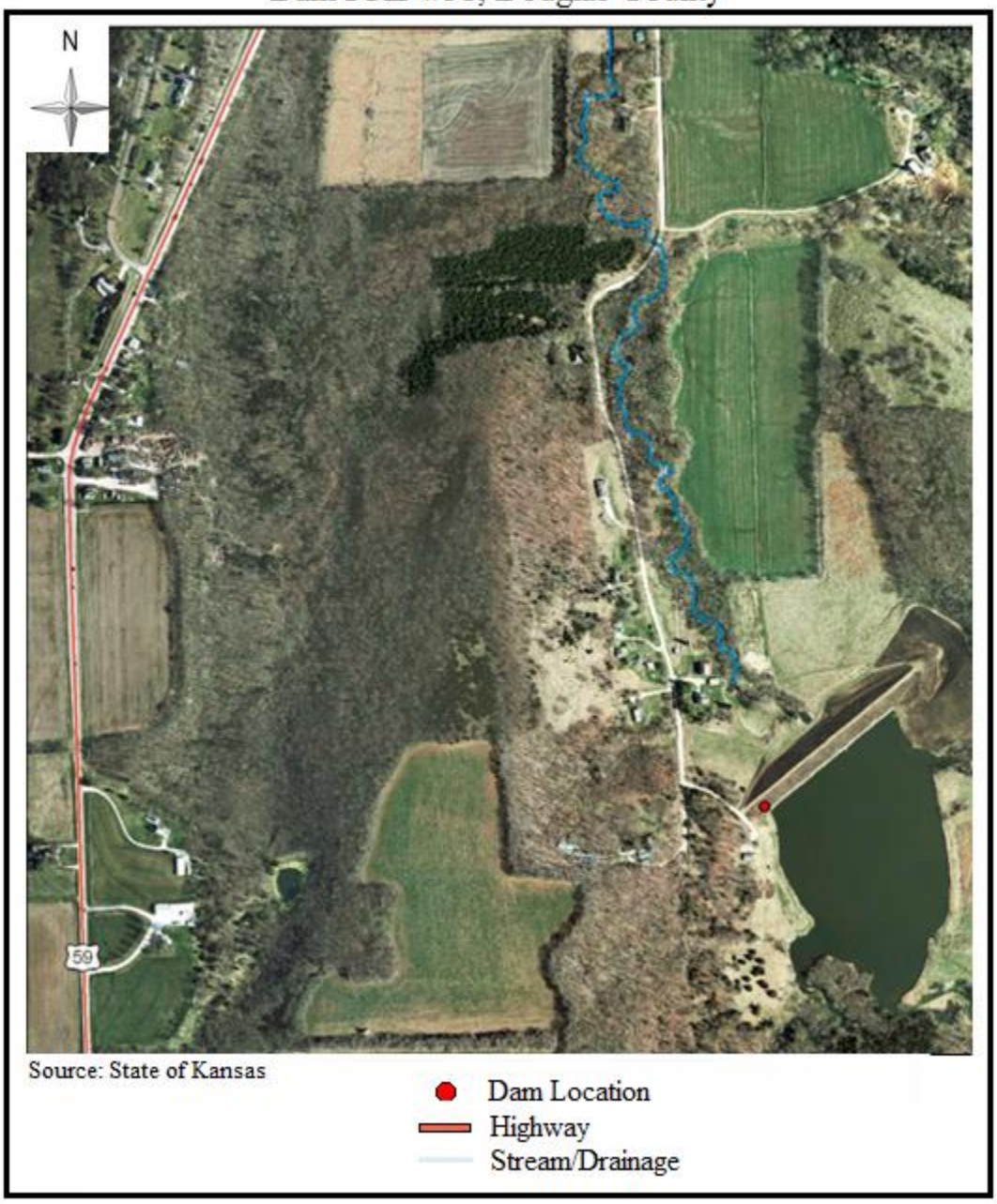


Dam FRD #24, Douglas County

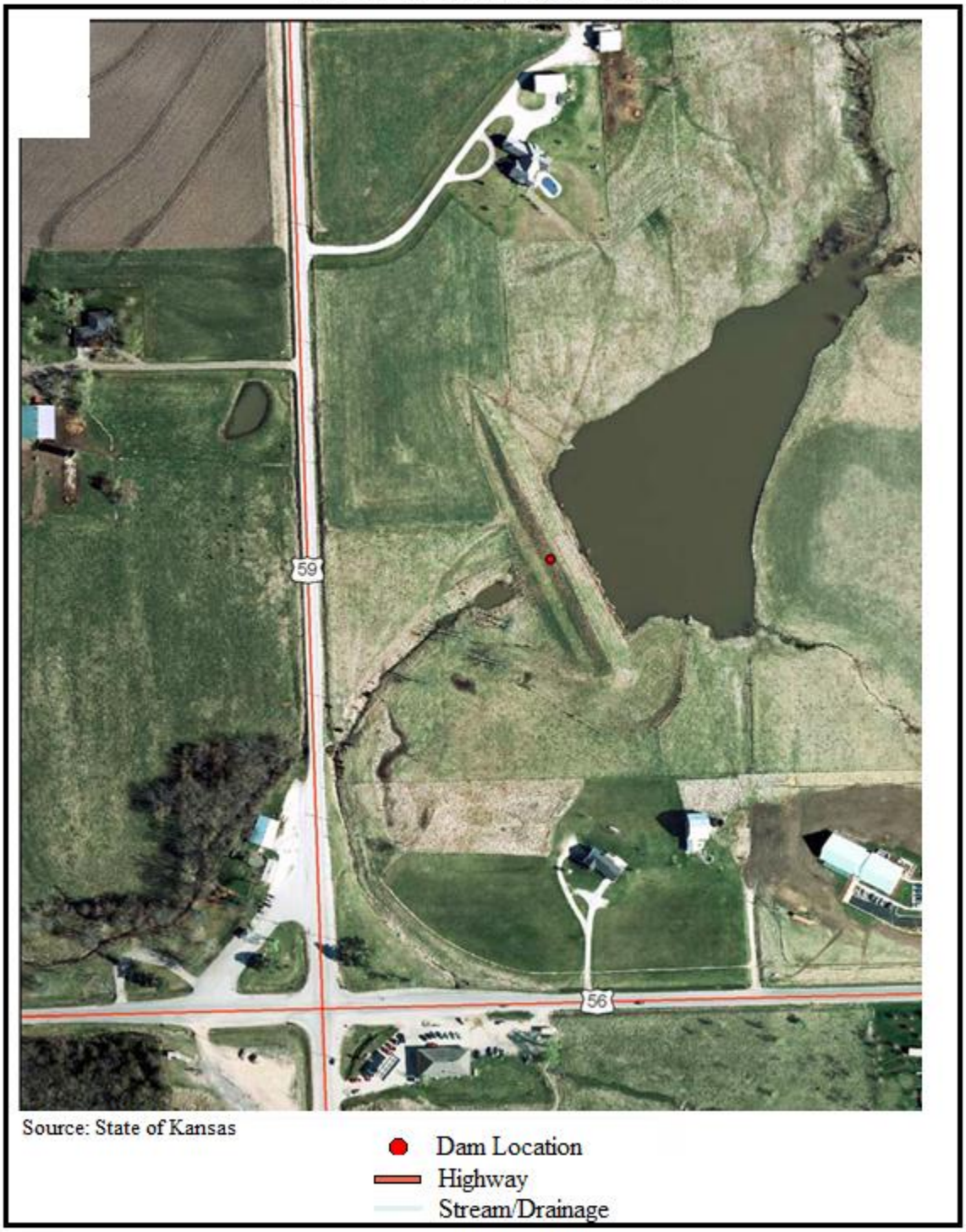
Lonestar Lake Dam, Douglas County



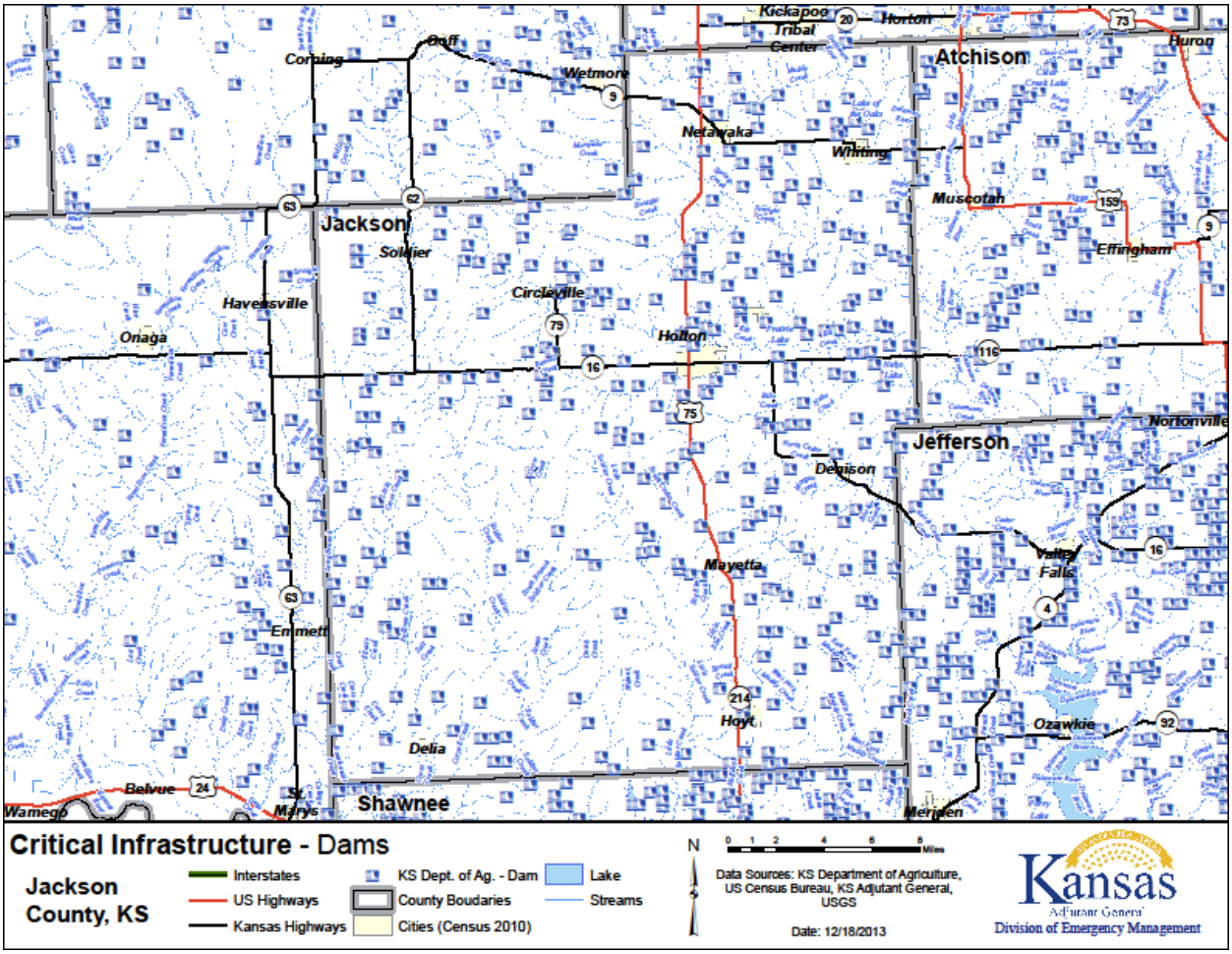
Dam FRD #31, Douglas County



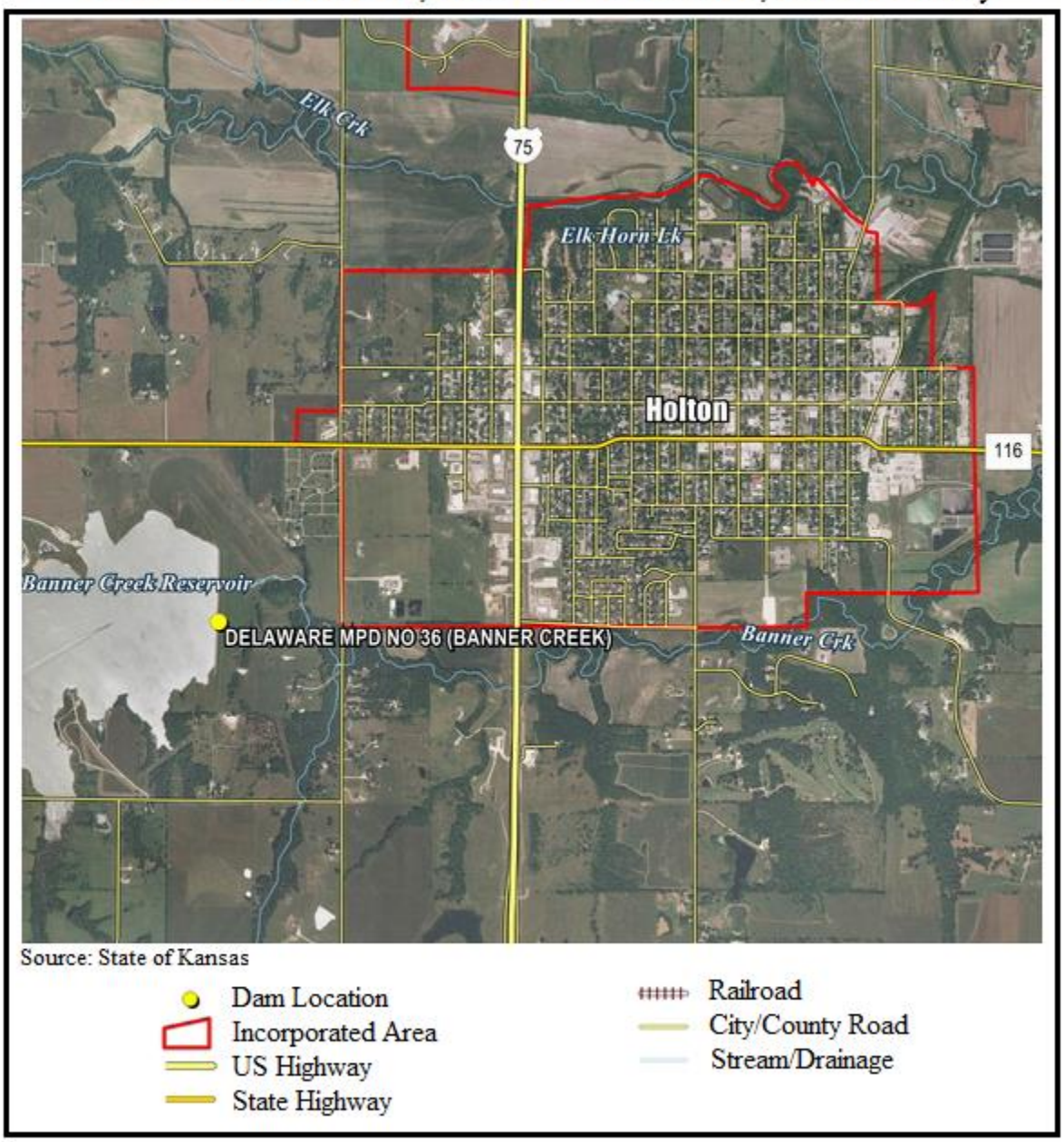
Dam DD #7-35, Douglas County

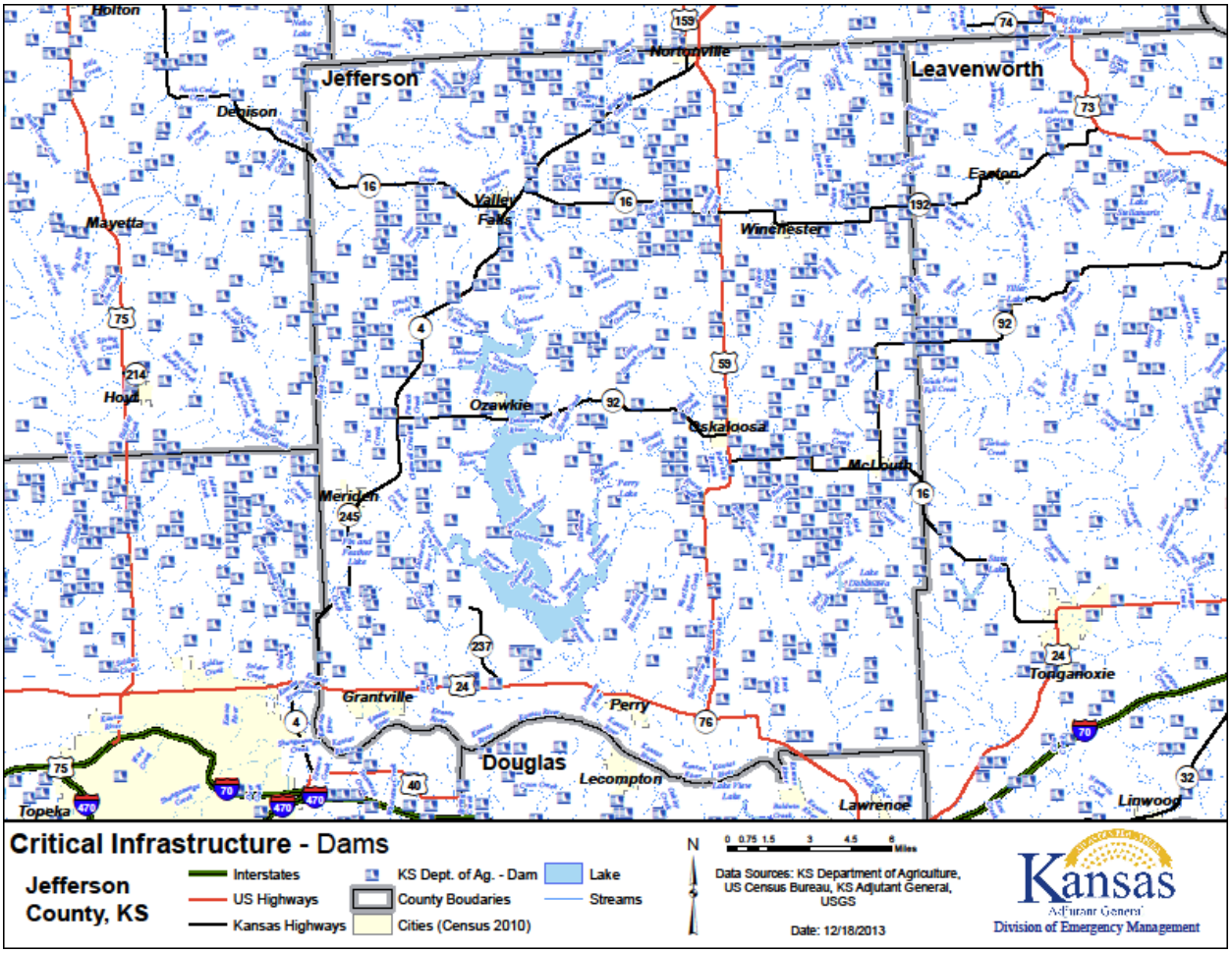


Dam FRD #26, Douglas County


Critical Infrastructure - Dams
Jackson County, KS
Interstates
US Highways
Kansas Highways
KS Dept. of Ag. - Dam
County Boudaries
Cities (Census 2010)
Lake
Streams
N
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General, USGS
Date: 12/18/2013
Kansas
Adjutant General
Division of Emergency Management
Kickapoo Tribal Center
Horton
Atchison
Hiawatha
Corning
Wetmore
Netawaka
Whiting
Muscotah
Effingham
Jackson
Soldier
Circleville
Havensville
Onaga
Holton
Jefferson
Nortonville
Denison
Mayetta
Valley Falls
Emmett
Hoyt
Ozawkie
Delia
Belvue
Wamego
St. Marys
Shawnee
Meriden

Delaware MPD #36 Dam, Banner Creek Reservoir, Jackson County

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Denison
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Mayetta
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Ozawkie
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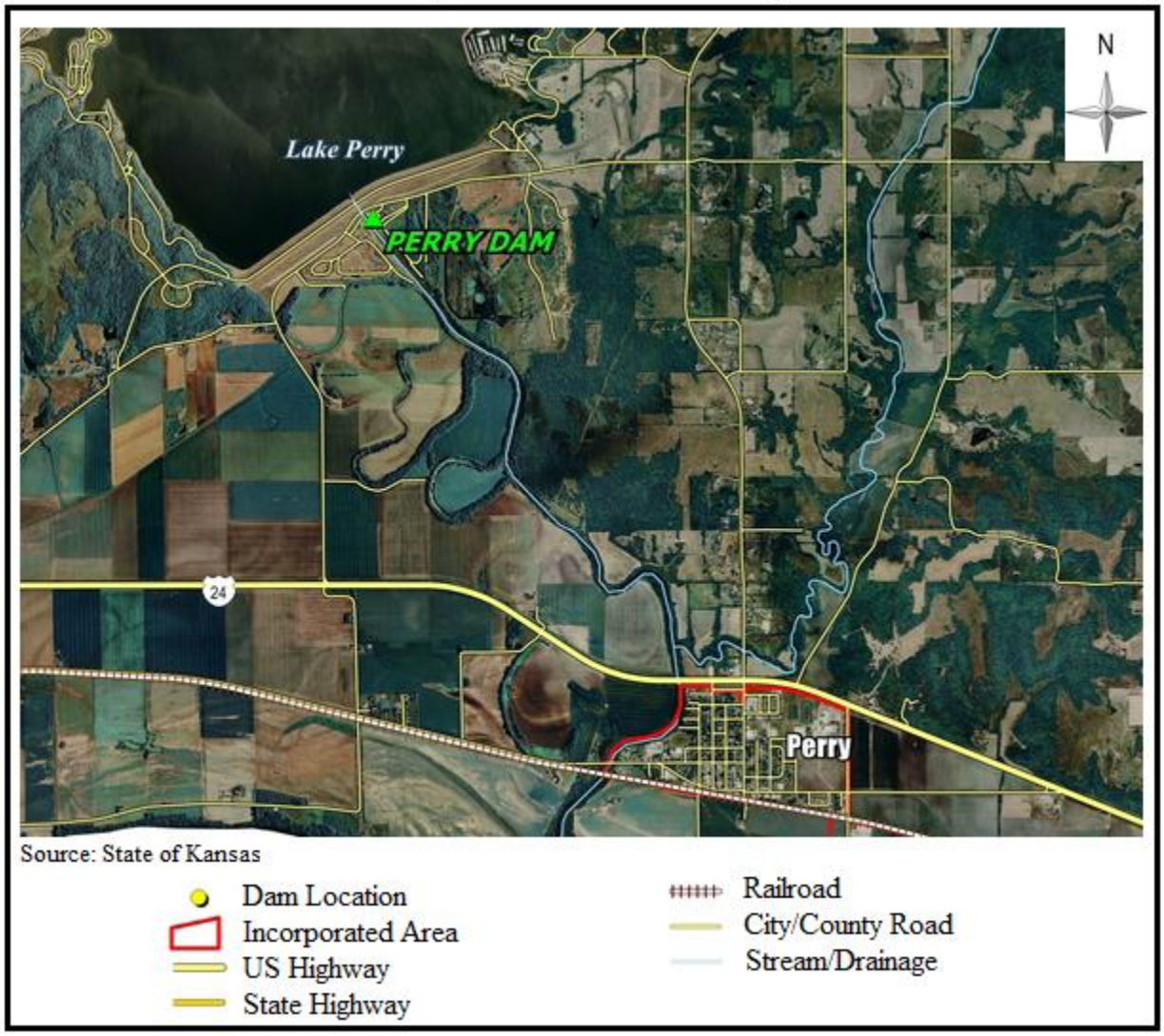
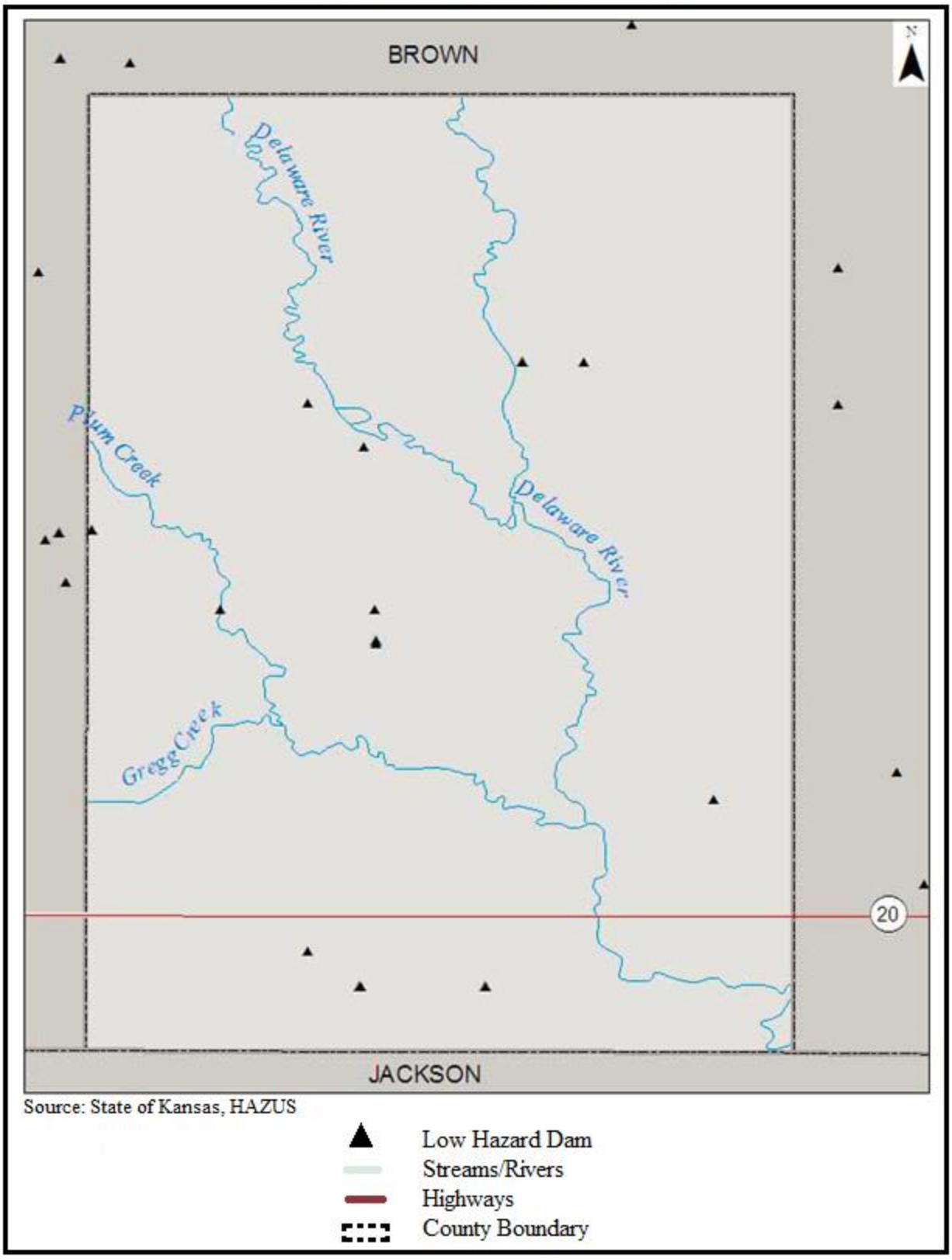
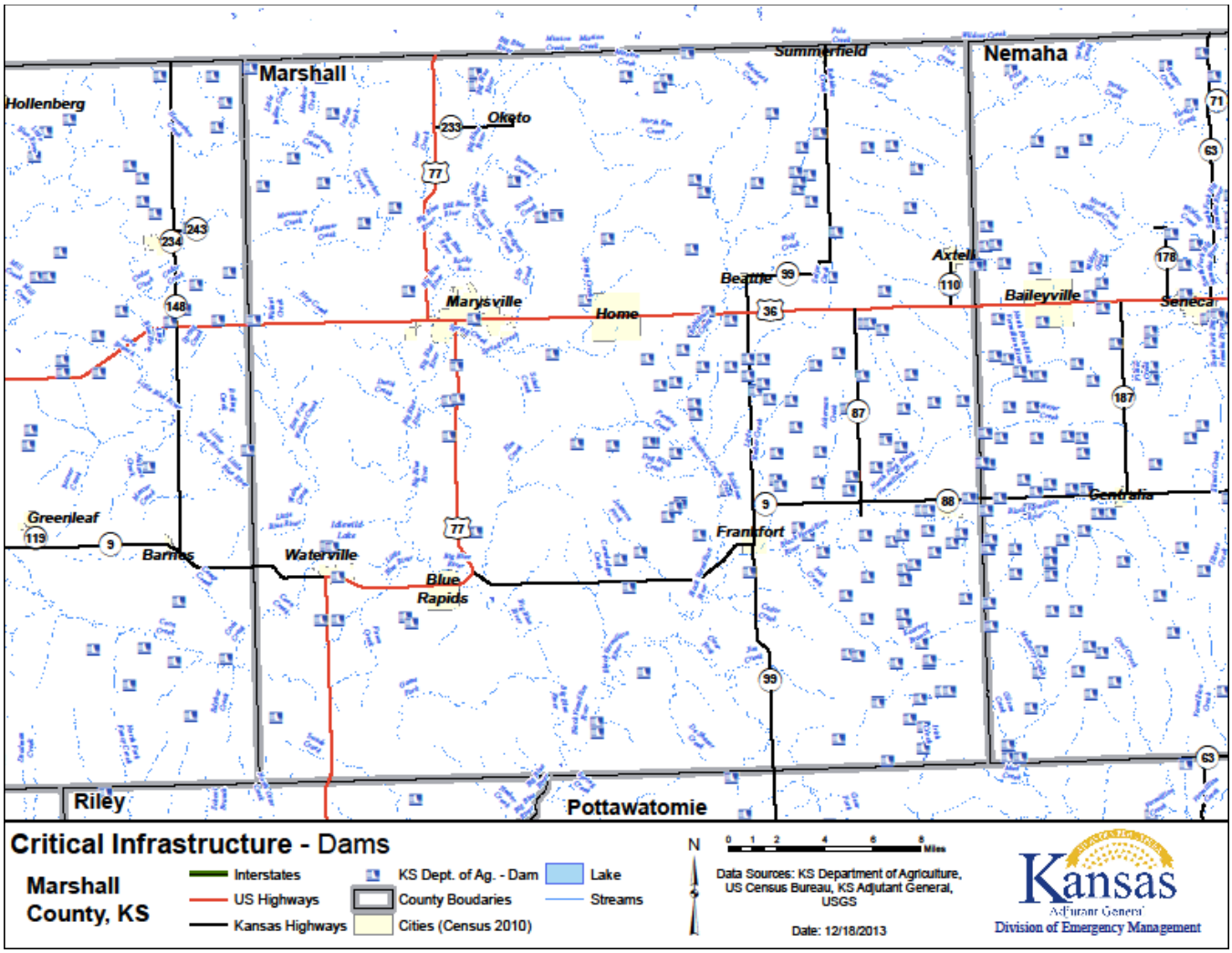
McLouth
Meriden
Grantville
Perry
Douglas
Lecompton
Lawrence
Tonganoxie
Linwood
Topeka
Critical Infrastructure - Dams
Jefferson County, KS
Interstates
US Highways
Kansas Highways
KS Dept. of Ag. - Dam
County Boudaries
Cities (Census 2010)
Lake
Streams
N
0 0.75 1.5 3 4.5 6 Miles
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General, USGS
Date: 12/18/2013
Kansas
Adjutant General
Division of Emergency Management

Perry Dam, Jefferson County



Kickapoo Tribe Dam Location Map

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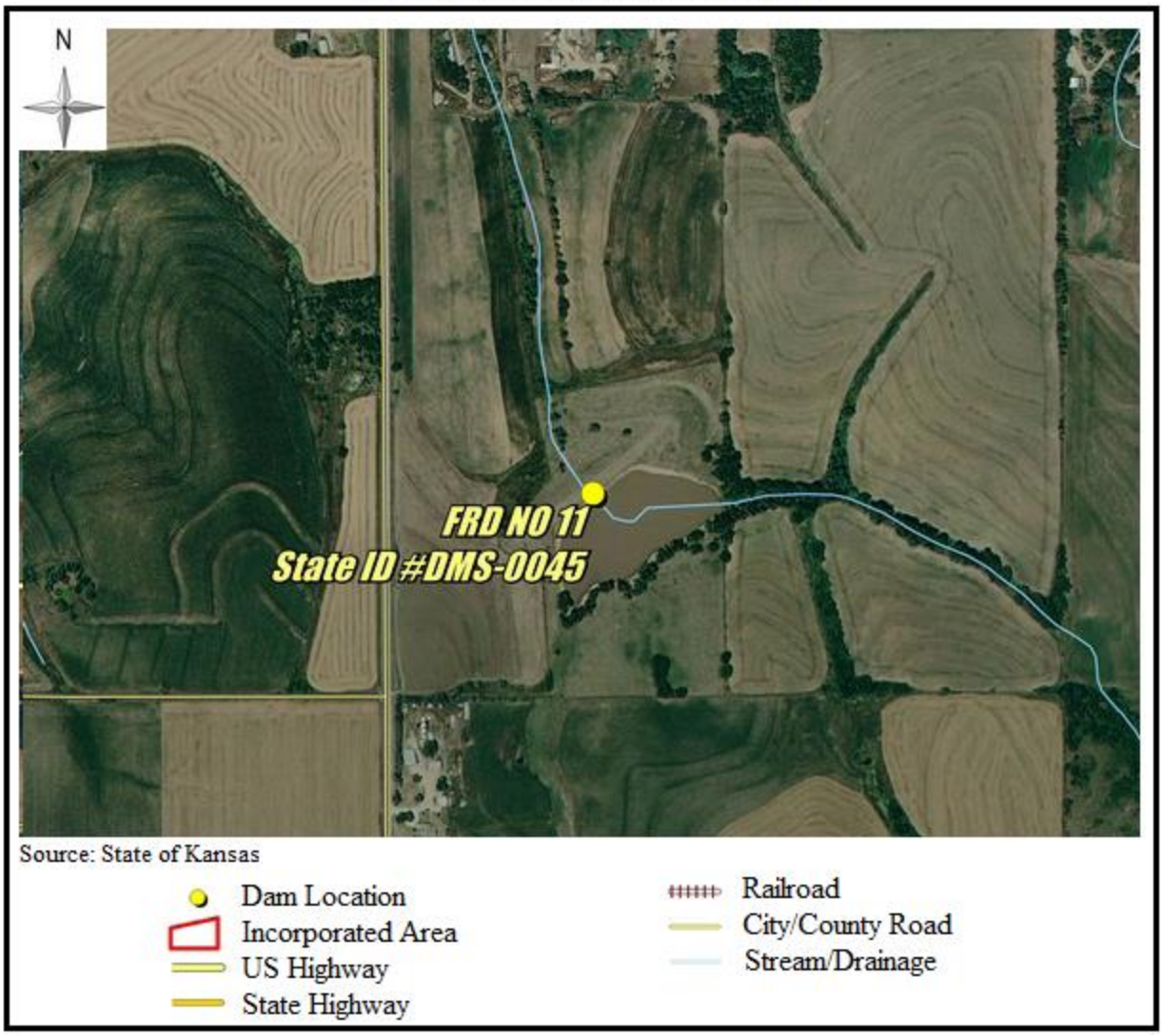
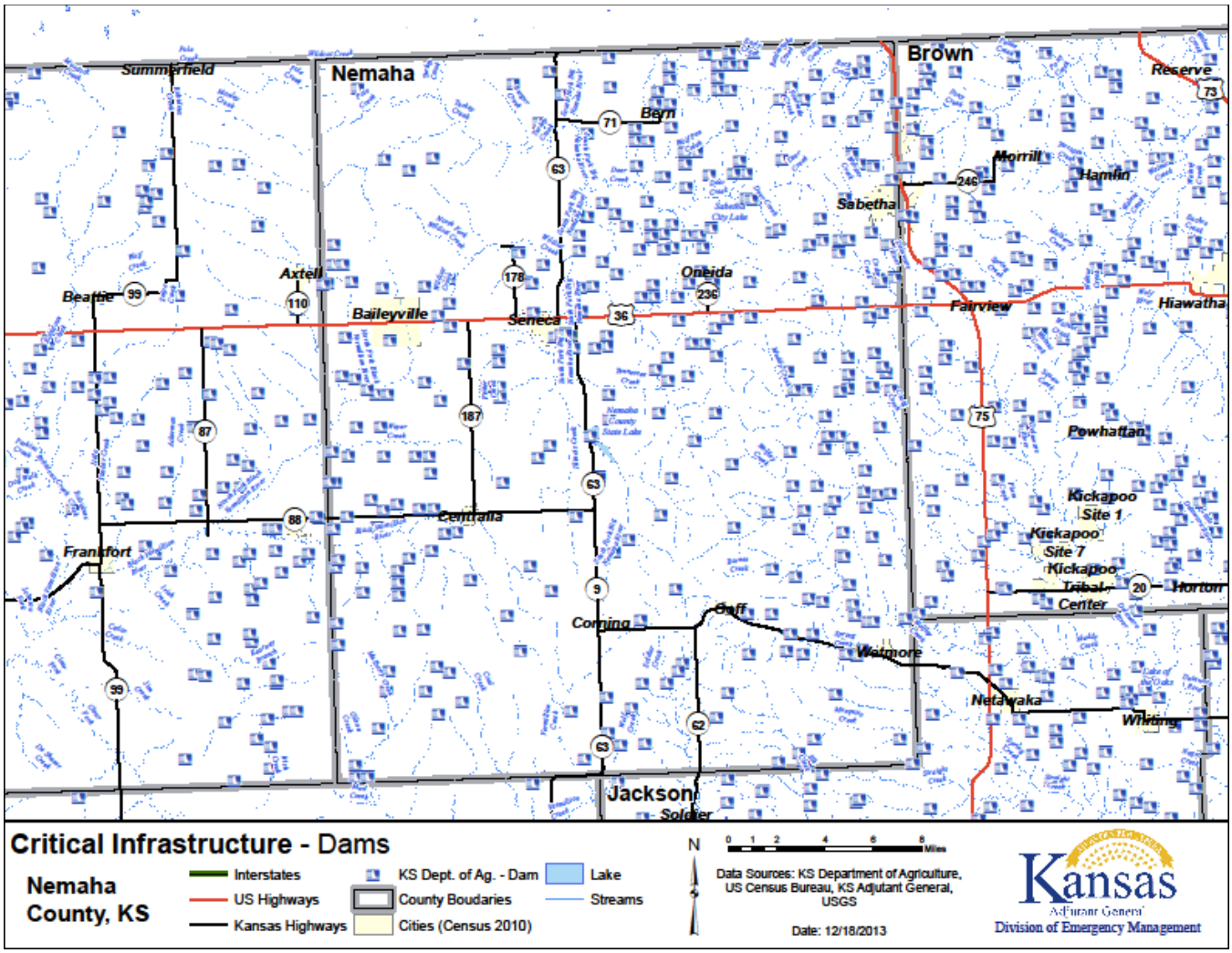
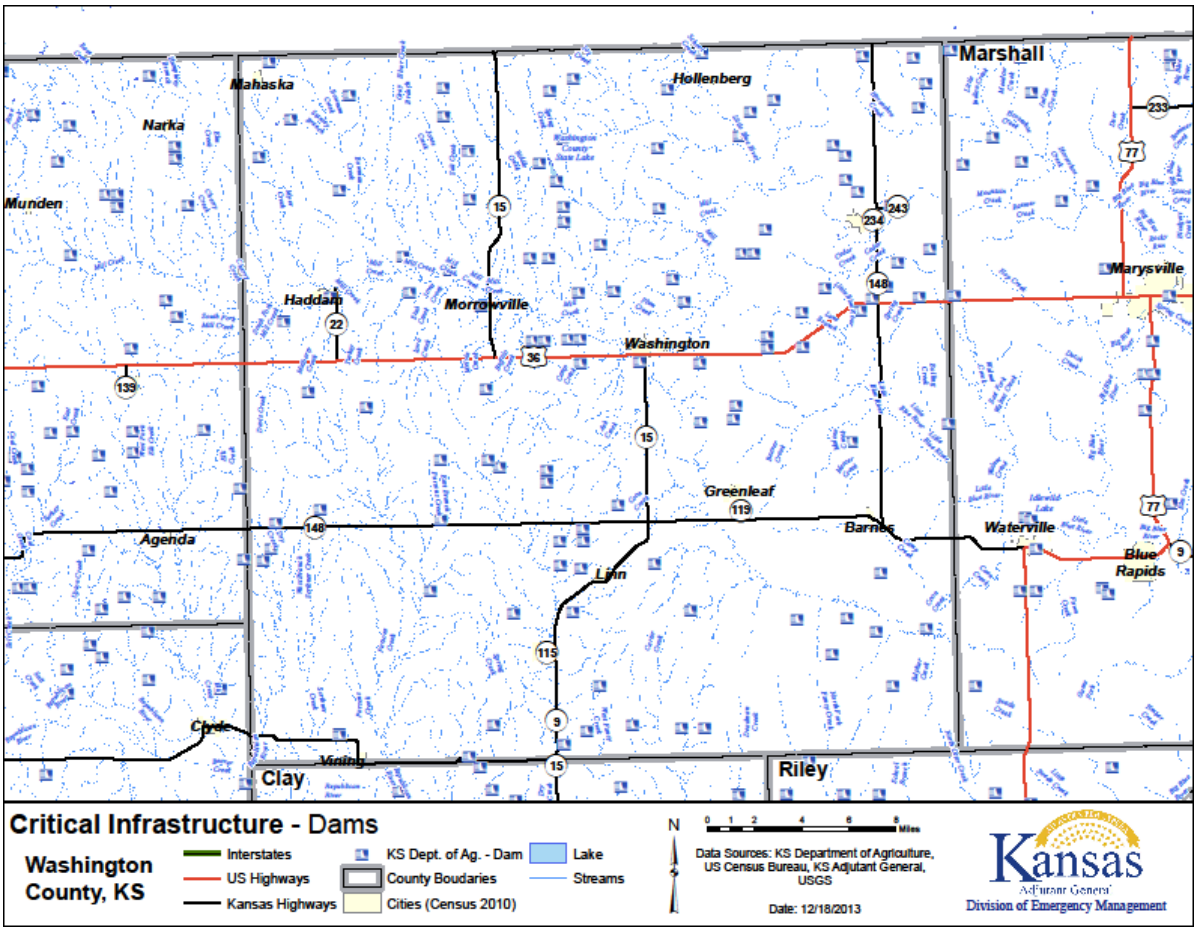
Pottawatomie
Hollenberg
Oketo
Summerfield
Axtell
Baileyville
Seneca
Beattie
Marysville
Home
Greenleaf
Barnes
Waterville
Blue Rapids
Frankfort
Centralia
Critical Infrastructure - Dams
Marshall County, KS
Interstates
US Highways
Kansas Highways
KS Dept. of Ag. - Dam
County Boudaries
Cities (Census 2010)
Lake
Streams
N
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General, USGS
Date: 12/18/2013
Kansas
Adjutant General
Division of Emergency Management

Dam FRD #68, Marshall County




Critical Infrastructure - Dams
Nemaha County, KS
Interstates
US Highways
Kansas Highways
KS Dept. of Ag. - Dam
County Boudaries
Cities (Census 2010)
Lake
Streams
N
Data Sources: KS Department of Agriculture, US Census Bureau, KS Adjutant General, USGS
Date: 12/18/2013
Kansas
Adjutant General
Division of Emergency Management
Nemaha
Brown
Jackson
Summerfield
Beattie
Axtell
Baileyville
Seneca
Centralia
Frankfort
Corning
Oneida
Beyn
Morrill
Hamlin
Sabetha
Fairview
Hiawatha
Reserve
Powhattan
Kickapoo Site 1
Kickapoo Site 7
Kickapoo Tribal Center
Horton
Onaga
Wetmore
Netawaka
Whiting
Soldier



In addition, the KDA-DWR indicates that there are three dams within the state that are operated by Federal Government agencies.

Table 4.10: Kansas Region K Federally Operated Dams

County	Federal Reservoir Name	Operating Agency
Douglas	Clinton	United States Army Corps of Engineers (USACE)
Jefferson	Perry	USACE

Source: KDA-DWR

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

- Gage County - Little Indian Creek 15A Dam
- Gage County - Upper Big Nemaha 25C Dam
- Gage County - Mud Creek 2A Dam
- Gage County - Big Indian Creek 14B Dam
- Richardson County-Long Branch 21 Dam
- Thayer County - Hebron Dam

4.8.2 – Levee Location and Extent

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

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

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

Table 4.11: Kansas Region K USACE NLD Levees

County(ies)	Jurisdiction(s)	Name	Waterway	Segments	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Atchison	Atchison County	Henry Pohl Levee	Missouri River	1	3.96	1.07	-	Henry Pohl Levee
Atchison	Atchison Count	Henry Pohl Levee	Cedar River	1	0.50	0.96	-	Henry Pohl Levee District
Atchison	Denison,	LAT-0001	-	1	0.73	0.14	-	-
Atchison	Muscotah	LAT-0002	-	1	1.02	0.21	-	-
Atchison	Denison	LAT-0003-C	-	1	1.44	0.42	-	-
Atchison	Muscotah	LAT-0006-C	-	1	0.56	0.23	-	-
Atchison	Muscotah	LAT-0007-C	-	1	0.25	0.18	-	-
Atchison	Muscotah	LAT-0008	-	1	0.12	0.06	-	-
Atchison	Denison	LAT-0009	-	1	0.65	0.09	-	-
Atchison	Atchison County	LAT-0013	-	1	3.08	0.94	-	-
Atchison	Atchison County	LAT-0015	-	1	3.62	1.12	-	-
Atchison	Muscotah	LAT-0028	-	1	0.37	0.13	-	-
Atchison, Doniphan	Atchison	MRLS 440-R	Missouri River	1	10.57	6.88	Minimally Acceptable	Drainage District No. 15-45 of Atchison and Doniphan Counties, Kansas
Atchison, Leavenworth	Leavenworth	Grape-Bollin-Schwartz Levee Association	Missouri River	1	4.69	1.71	-	Grape-Bollin-Schwartz Levee Association

Table 4.11: Kansas Region K USACE NLD Levees

County(ies)	Jurisdiction(s)	Name	Waterway	Segments	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Brown	Leona	LBR-0006	-	1	0.92	0.19	-	-
Brown, Iowa Tribal Reservation	Rulo	MRLS-512-513-R SE	Big Nemaha River	1	5.76	3.57	-	-
Buchanan, Doniphan	St. Joseph	MRLS 471-460-R	Missouri River	1	13.80	20.64	Minimally Acceptable	Elwood-Gladden Drainage District and St. Joseph Airport Levee District
Doniphan	Doniphan County	MRLS 482-R	Missouri River	1	8.26	7.47	Minimally Acceptable	Doniphan County - Burr Oak Drainage District #3
Doniphan	Doniphan County	MRLS 482-R Doniphan-Burr Oak 1	Missouri River Canal	1	1.86	0.31	-	-
Doniphan	Doniphan County	MRLS 482-R Doniphan-Burr Oak 2	Missouri River Canal	1	1.38	0.92	-	-
Doniphan	Doniphan County	MRLS 500-R	Missouri River	1	4.14	2.33	Minimally Acceptable	Iowa Point Drainage District No. 4
Doniphan	Doniphan County	Old 471 front levee	Missouri River	1	0.49	0.37	-	-
Douglas	Lawrence	Douglas County Drainage District	Kansas River	1	4.08	2.24	-	Douglas County Drainage District
Douglas	Lawrence	LDG-0017	-	1	0.62	0.10	-	-
Douglas, Jefferson, Leavenworth	Lawrence	Lawrence Unit	Kansas River	1	15.81	13.38	Minimally Acceptable	City of Lawrence, Kansas
Douglas, Johnson	Linwood	Johnson Kansas River 1	Kansas River	1	0.82	0.27	-	-
Jackson	Muscotah	LJA-0004	Missouri River	1	9.15	6.77	-	-
Jackson	Circleville	LJA-0013	Straight Creek	1	0.71	0.25	-	Undefined

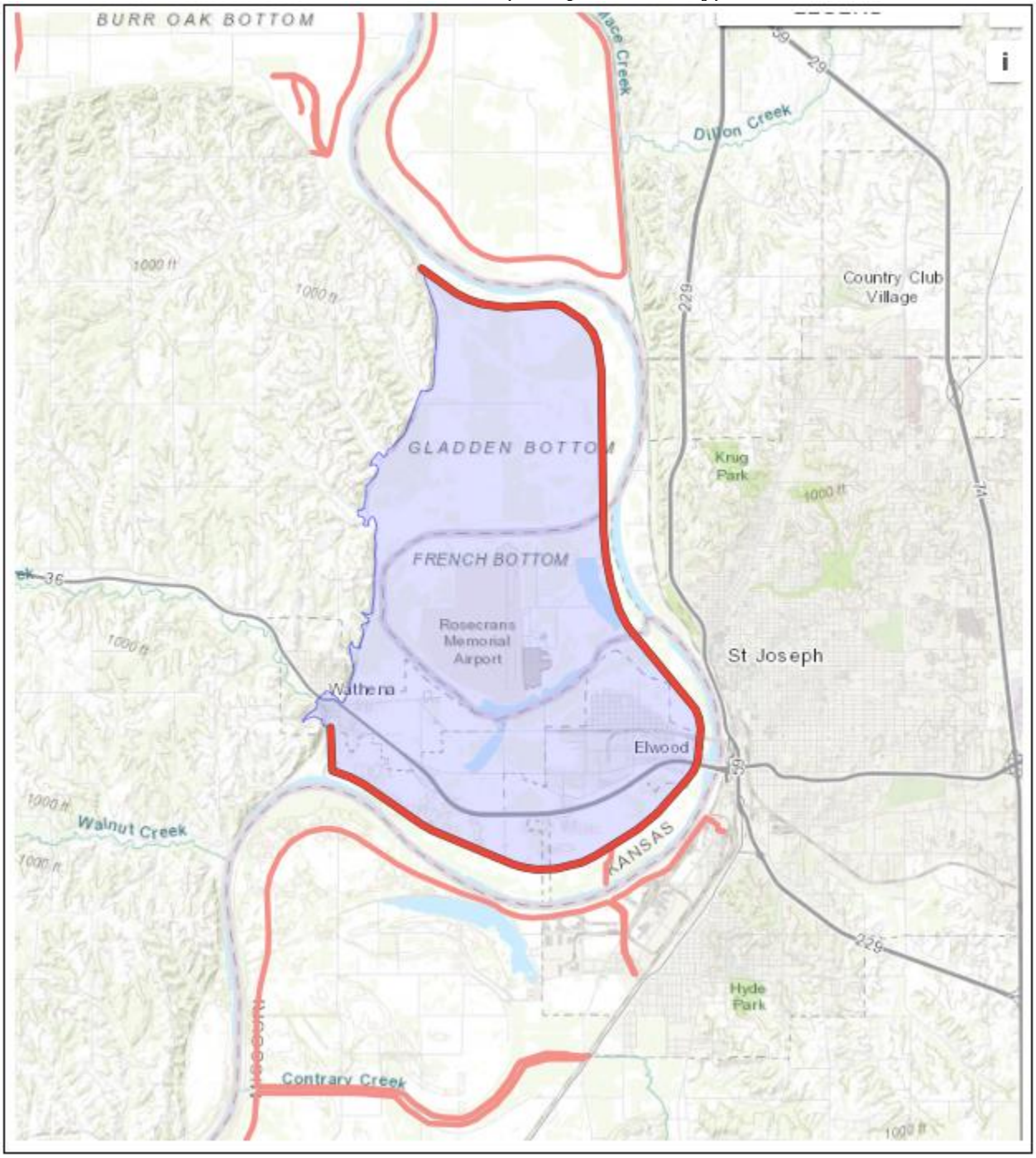
Table 4.11: Kansas Region K USACE NLD Levees

County(ies)	Jurisdiction(s)	Name	Waterway	Segments	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Jackson	Independence	Fire Prairie Creek Levee 1	-	1	0.28	0.12	-	-
Jefferson	Grantville	LJF-0006	-	1	0.65	0.10	-	-
Jefferson	Perry	LJF-0018	-	1	1.11	1.06	-	-
Jefferson	Perry	Stonehouse Creek Drainage District No. 1	Kansas River	2	0.89	0.31	Minimally Acceptable	Stonehouse Creek Drainage District No. 1, Stonehouse Creek RR embankment
Marshall	Frankfort	Frankfort, Kansas	Black Vermillion River	1	3.24	0.60	Minimally Acceptable	City of Frankfort, Kansas
Marshall	Vermillion	LMS-0007	-	1	0.50	0.06	-	-
Marshall	Vermillion	LMS-0022	-	1	0.50	0.04	-	-
Marshall	Vermillion	LMS-0032, LMS-0027		1	0.72	0.15	-	-
Marshall	Frankfort	LMS-0069, LMS-0056		1	1.12	0.11	-	-
Marshall	Marysville	Marysville, Kansas	Big Blue River	1	3.03	0.83	-	Marysville, Kansas
Nemaha	Bern	LNM-0010-LMN-0012	-	1	0.49	0.078	-	-
Washington	Barnes	LWS-0002	-	1	1.04	0.076	-	-
Washington	Barnes	LWS-0009	-	1	0.42	0.067	-	-

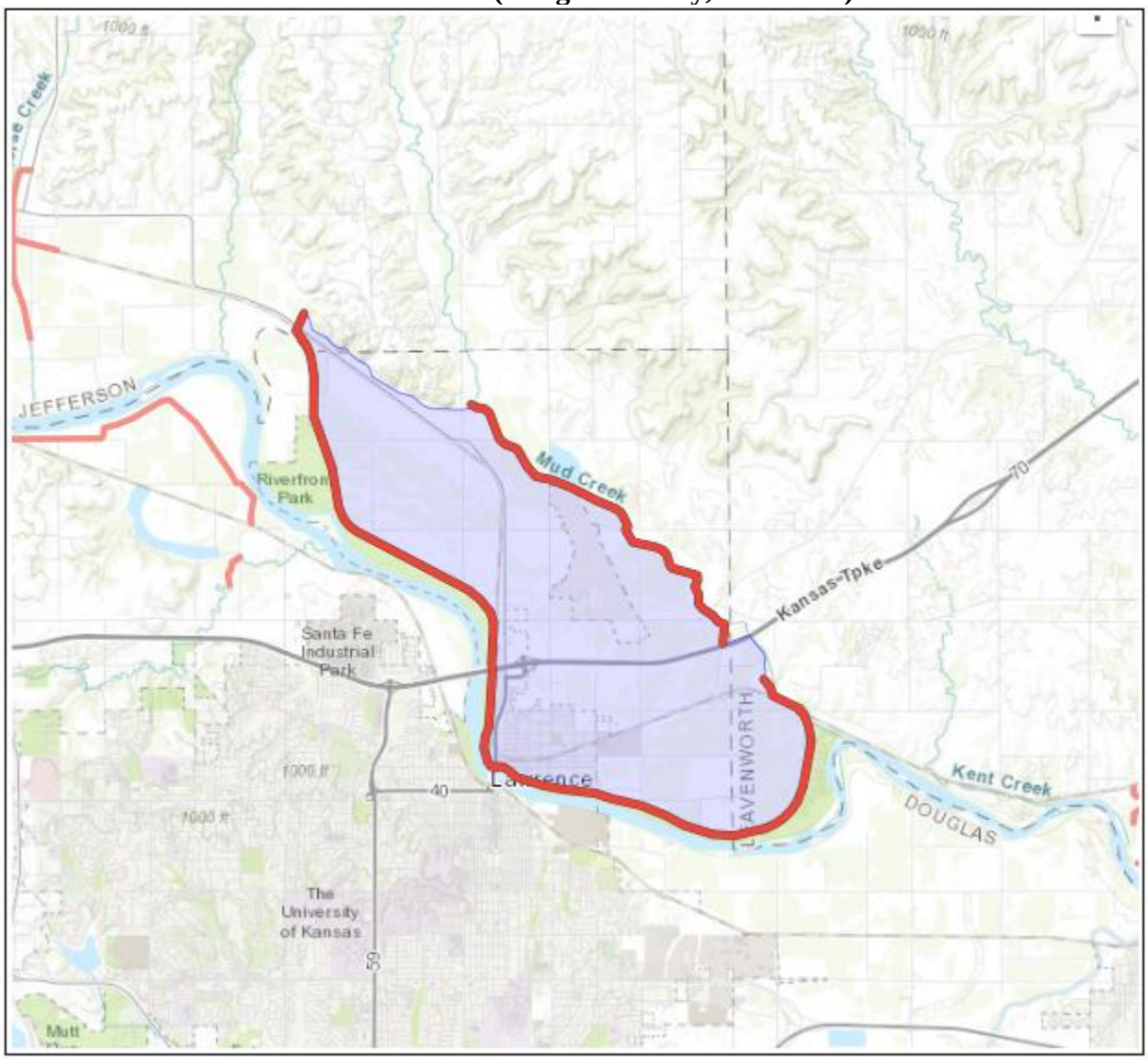
Source: USACE
-: Data unknown

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

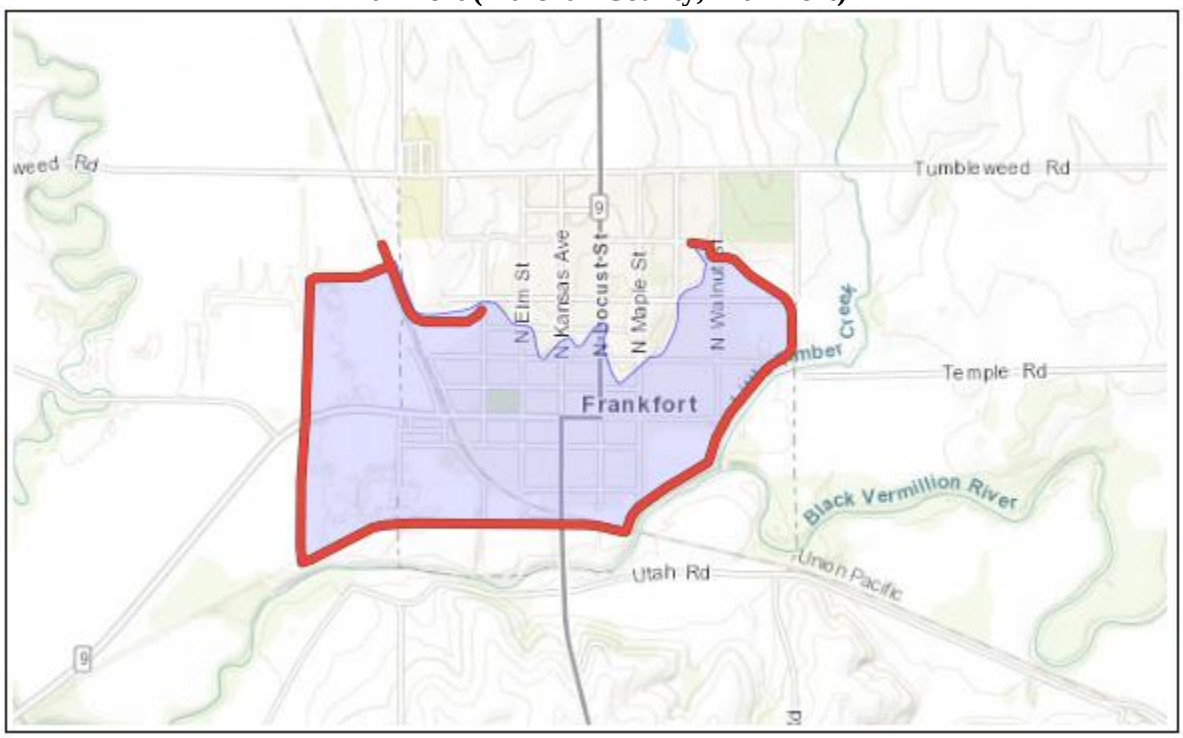
MRLS 471-460-R (Doniphan County)



Lawrence Unit (Douglas County, Lawrence)



Frankfort (Marshall County, Frankfort)



4.8.3 – Previous Occurrences

Kansas Region K has been fortunate enough to not have any catastrophic dam failures. Below are the reported dam failures for the region for the 20-year period from 1999-2018.

Table 4.12: Kansas Region K Dam Incidents

County	Dam Name	Incident Type	Failure	Incident Date	Deaths
Douglas	KS00310	Erosion/Animal Burrows	No	3/8/2001	None Reported
Douglas	KS02540	Cracking, Embankment Erosion	No	8/15/2001	None Reported

Source: Stanford University National Performance of Dams Program

The following details notable or reported levee failures in Kansas Region K in the past 20 years.

- **2011 Flood:** USACE reported that every non-federal levee from Rulo, NE to Wolcott,KS on both sides of the river were either overtopped or breached as a result of this flood. Specifically, the following levees along the Missouri River and tributaries in Leavenworth County were breached.
  - Grape Bollin-Schwartz levee
  - Sherman Airfield Levee (federal levee)—water reached the hangars which had been evacuated.
  - Ft. Leavenworth levee
  - Kansas Department of Corrections Levee

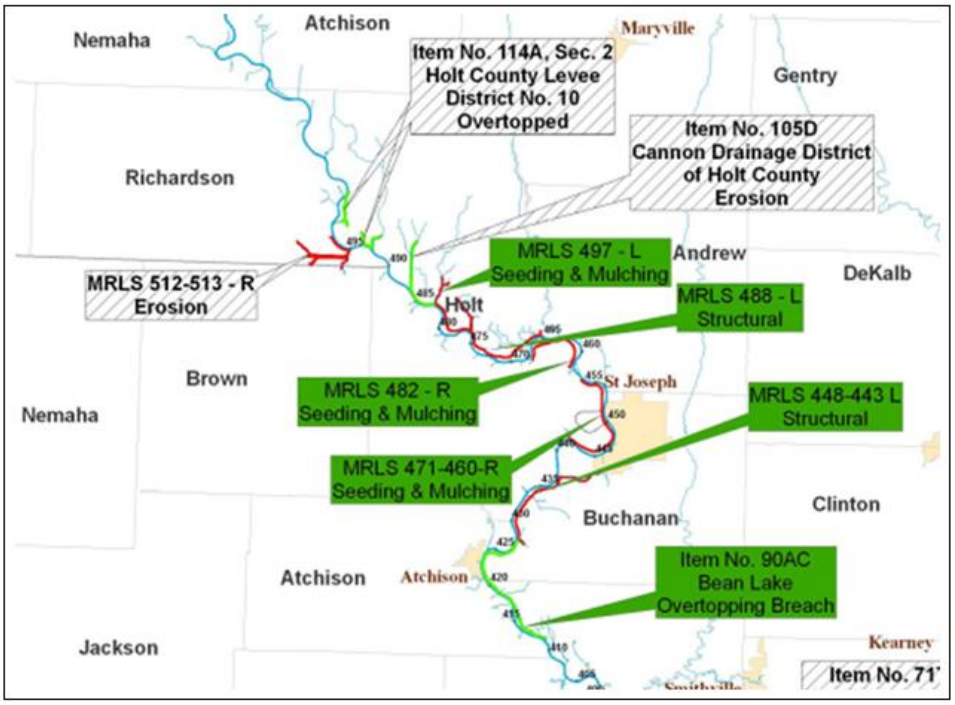
The Levee Repair Working Group of the Missouri River Flood Task Force, established in response to the Missouri River Basin flood of 2011, reported that the following federal and non-federal levees in Kansas were damaged by the flooding.

Table 4.13: 2011 Damaged Levees

Project Type	Project Name	MR Mile Markers	State	City
Federal	MRLS 500-R	501.8 to 496.8	KS	Doniphan
Federal	MRLS 482-R	467.0 to 458.0	KS	Doniphan
Federal	MRLS 471-460-R	456.6 to 441.7	MO / KS	Elwood / St. Joseph
Non-Federal	Henry Pohl Levee	412.3 to 409.9	KS	Atchison
Non-Federal	Grape-Bollin-Schwartz Levee Association	409.9 to 406.2	KS	Leavenworth
Federal	MRLS 440-R	401.35 to 391.2	KS	Atchison

Source: Missouri River Flood Task Force, http://www.nwdmr.usace.army.mil/rcc/MRFTF/docs/20JunListofLeveeRehabsv1.pdf

- **2008 Flooding:** Flooding in 2008 caused minor damage to several Kansas Levees as follows: MRLS 5-12-513 R, MRLS 482-R, MRLS 471-460. The map in **Figure 3.24** shows these levees along with several levees in Missouri that were damaged.



4.8.4 – Hazard Probability Analysis

Due to the variability of the size and construction of the dams in Region K, 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 three reported dam failure events in Kansas Region K 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 probability 15% of a dam failure in a given year. However, it is worth noting that none of the historically reported event resulted in a catastrophic failure, had no loss of life, and no property damages.

Historically, the limited available data indicates there have been no reported levee failure events in Kansas Region K 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 4.14: 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 K participating county.

Table 4.15: Kansas Region K 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
Atchison	128	3	22	0		200	Medium-High
Brown	189	8	5	0		220	High
Doniphan	67	1	0	0		69	Medium
Douglas	65	2	11	0	1	105	Medium-High
Jackson	201	6	3	0		222	High
Jefferson	204	3	2	0	1	219	High
Marshall	107	3	5	0		128	Medium-High
Nemaha	142	3	1	0		151	Medium-High
Washington	26	1	0	0		28	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 or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.16: Kansas Region K Population Vulnerability Data for Dam Failure

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

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

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

Table 4.17: Kansas Region K 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
Atchison	Atchison County	Henry Pohl Levee	0	0	$0	Not Screened	Non-Accredited
Atchison	Atchison Count	Henry Pohl Levee	0	0	$1,140,000	Low	Non-Accredited
Atchison	Denison,	LAT-0001	1	1	$350,000	Not Screened	-
Atchison	Muscotah	LAT-0002	4	1	$350,000	Not Screened	-
Atchison	Denison	LAT-0003-C	0	0	$0	Not Screened	-
Atchison	Muscotah	LAT-0006-C	10	4	$1,120,000	Not Screened	-
Atchison	Muscotah	LAT-0007-C	0	0	$0	Not Screened	-
Atchison	Muscotah	LAT-0008	2	1	$350,000	Not Screened	-
Atchison	Denison	LAT-0009	0	0	$0	Not Screened	-
Atchison	Atchison County	LAT-0013	0	0	$0	Not Screened	-
Atchison	Atchison County	LAT-0015	0	0	$0	Not Screened	-
Atchison	Muscotah	LAT-0028	0	0	$0	Not Screened	-
Atchison, Doniphan	Atchison	MRLS 440-R	1	0	$71,600	Low	Non-Accredited
Atchison, Leavenworth	Leavenworth	Grape-Bollin-Schwartz Levee Association	13	7	$186,000	Low	Non-Accredited
Brown	Leona	LBR-0006	0	0	$0	Not Screened	-

Table 4.17: Kansas Region K 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
Brown, Iowa Tribal Reservation	Rulo	MRLS-512-513-R SE	2	2	$205,000	Low	Non-Accredited
Doniphan	Doniphan County	MRLS 482-R	7	36	$1,560,000	Low	Accredited
Buchanan, Doniphan	St. Joseph	MRLS 471-460-R	2,773	797	$746,000,000	Moderate	PAL
Doniphan	Doniphan County	MRLS 482-R DONIPHAN-BURR OAK 1	0	0	$0	Not Screened	Non-Accredited
Doniphan	Doniphan County	MRLS 482-R DONIPHAN-BURR OAK 2	0	0	$0	Not Screened	Non-Accredited
Doniphan	Doniphan County	MRLS 500-R	0	0	$2,050,000	Low	Accredited
Doniphan	Doniphan County	Old 471 front levee	0	0	$0	Not Screened	Non-Accredited
Douglas	Lawrence	Douglas County Drainage District	16	24	$4,870,000	Low	Non-Accredited
Douglas	Lawrence	LDG-0017	0	0	$0	Not Screened	-
Douglas, Jefferson, Leavenworth	Lawrence	Lawrence Unit	2,215	1,236	$336,000,000	Moderate	Accredited
Douglas, Johnson	Linwood	Johnson Kansas River 1	0	0	$0	Not Screened	Non-Accredited
Jackson	Muscotah	LJA-0004	0	0	$0	Not Screened	-
Jackson	Circleville	LJA-0013	0	1	$360,000	Not Screened	-
Jefferson	Grantville	LJF-0006	0	0	$0	Not Screened	-
Jefferson	Perry	LJF-0018	6	5	$1,840,000	Not Screened	-
Jefferson	Perry	Stonehouse Creek Drainage District No. 1	94	40	$15,800,000	Not Screened	Non-Accredited
Marshall	Frankfort	Frankfort, Kansas	336	323	$60,500,000	Low	Accredited
Marshall	Vermillion	LMS-0007	0	0	$0	Not Screened	-
Marshall	Vermillion	LMS-0022	0	0	$0	Not Screened	-
Marshall	Vermillion	LMS-0032, LMS-0027	0	0	$0	Not Screened	-

Table 4.17: Kansas Region K 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
Marshall	Frankfort	LMS-0069, LMS-0056	0	0	$0	Not Screened	-
Marshall	Marysville	Marysville, Kansas	754	601	$154,000,000	Low	Accredited
Marshall	Blue Rapids	Tuttle Creek Dam	243	113	$26,700,000	Not Screened	-
Nemaha	Bern	LNM-0010-LMN-0012	0	0	$0	Not Screened	-
Washington	Barnes	LWS-002	0	0	$0	Not Screened	-
	Barnes	LWS-0009	0	1	$360,000	Not Screened	-

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 4.18: Kansas Region K Population 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
Atchison	32	0.48%	25	0.15%
Brown	2	0.04%	2	0.02%
Doniphan	2,780	77.48%	833	10.69%
Douglas	2,231	4.54%	1,260	7.06%
Jackson	0	0.00%	1	0.01%
Jefferson	100	1.20%	45	0.24%
Marshall	1,333	27.26%	1,037	10.52%
Nemaha	0	0.00%	0	0.00%
Washington	0	0.00%	1	0.02%

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 4.19: 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.

Table 4.19: Dam and Levee Failure Consequence Analysis

Subject	Impacts of Dam and Levee Failure
Property, Facilities, and Infrastructure	In areas of inundation, impacts could be severe to facilities and infrastructure. .
Environment	In areas of inundation, impact to the environment are expected to be severe. Impact will lessen as distance increases.
Economic Conditions	In areas of inundation, impacts to the economy will depend on the scope of the inundation and the time it takes for the water to recede.
Public Confidence in the Jurisdiction's Governance	Perception of whether the failure could have been prevented, warning time, and response and recovery time will greatly impact the public's confidence.

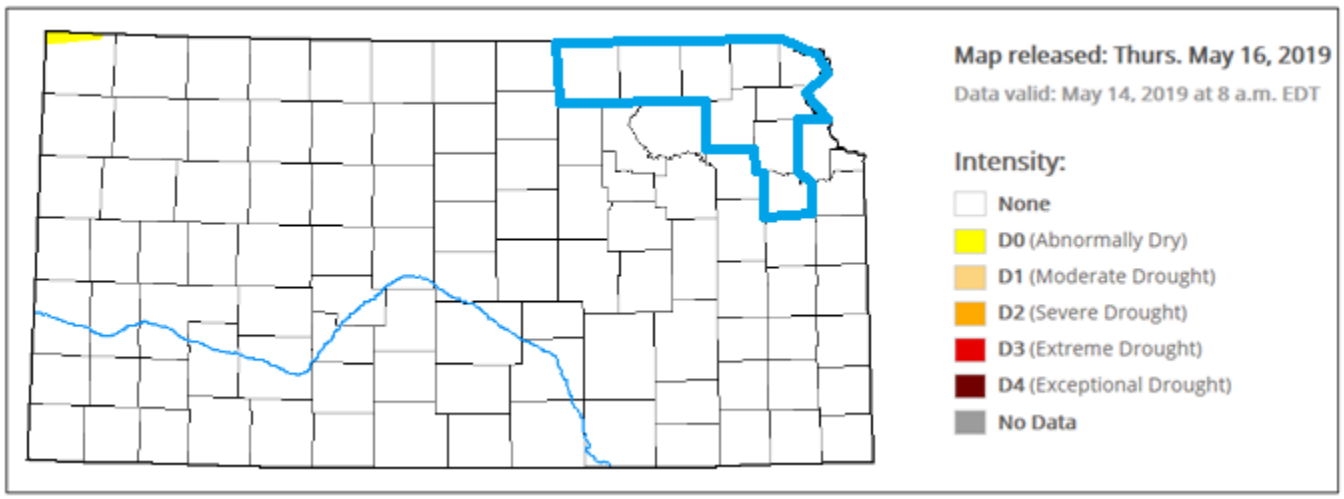
4.9 – Drought

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

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

4.9.1 – Location and Extent

While all of Kansas Region K is vulnerable to drought, it is most disastrous in the rural areas where the majority of agricultural businesses are located. The map below indicates the drought conditions for Kansas Region K through January 1, 2019.



4.9.2 – Previous Occurrences

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

Table 4.20: U.S. Drought Monitor Categories

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

Source: U.S. Drought Monitor

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

Table 4.21: Percentage of Kansas Region K in U.S. Drought Monitor Category, 2009-2018

Year	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2019*	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2018	25.3%	74.7%	52.2%	15.9%	3.1%	0.0%
2017	61.0%	39.0%	7.2%	2.2%	0.0%	0.0%
2016	84.6%	15.4%	0.0%	0.0%	0.0%	0.0%
2015	72.9%	27.1%	6.3%	0.0%	0.0%	0.0%
2014	25.2%	74.8%	29.6%	0.0%	0.0%	0.0%
2013	44.4%	55.6%	34.0%	28.5%	0.0%	0.0%
2012	39.6%	60.4%	53.8%	44.0%	18.8%	0.7%
2011	56.0%	44.0%	5.4%	0.0%	0.0%	0.0%
2010	94.0%	6.0%	0.0%	0.0%	0.0%	0.0%
2009	92.4%	7.6%	0.0%	0.0%	0.0%	0.0%

Source: U.S. Drought Monitor
*: Data through March 16, 2019

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

Table 4.22: Kansas Region K Secretarial Drought Declarations, 2009 - 2018

Year	Number of Secretarial Drought Disaster Declarations
2018	9
2017	1
2016	0
2015	0
2014	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 years

2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 1,491 claims on 2,043,328 acres for $133,428,420.

Table 4.23: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Drought

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Atchison	70	101,673	$19,936,990
Brown	89	196,222	$29,904,396
Doniphan	65	75,157	$10,298,687
Douglas	65	75,047	$13,224,687
Jackson	100	114,692	$18,222,727
Jefferson	80	95,162	$17,487,729
Marshall	191	416,297	$41,567,809
Nemaha	143	495,648	$76,802,248
Washington	197	194,916	$18,913,388

Source: USDA

4.9.3 – Hazard Probability Analysis

Reviewing historical data from the U.S. Drought Monitor weekly reports from the ten-year period of 2009 through 2018 (with 2009 and 2018 being full data set years) 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 4.24: Kansas Region K Estimated Probability of Being in U.S. Drought Monitor Category

None	D0-D4	D1-D4	D2-D4	D3-D4	D4
59.5%	40.5%	18.9%	9.1%	2.2%	0.1%

Source: U.S. Drought Monitor

Additionally, over the five-year period 2014 to 2018 three years recorded a USDA Declared Secretarial Drought Disaster, equating to 60% chance of occurrence.

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

Table 4.25: Atchison County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	70
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	101,673
Average Number of Acres Damaged per Year	10,167
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$19,936,990
Average Crop Damage per Year	$1,993,699

Source: USDA

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

- Seven insurance claims
- 10,167 acres impacted
- $1,993,699 in insurance claims

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

Table 4.26: Brown County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	89
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	196,222
Average Number of Acres Damaged per Year	19,622
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$29,904,396
Average Crop Damage per Year	$2,990,440

Source: USDA

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

- Nine insurance claims
- 19,622 acres impacted
- $2,990,440 in insurance claims

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

Table 4.27: Doniphan County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	89
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	75,157
Average Number of Acres Damaged per Year	7,516
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$10,298,687
Average Crop Damage per Year	$1,029,869

Source: USDA

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

- Nine insurance claims
- 7,516acres impacted
- $1,029,869 in insurance claims

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

Table 4.28: Douglas County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	65
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	75,047
Average Number of Acres Damaged per Year	7,505
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$13,224,687
Average Crop Damage per Year	$1,322,469

Source: USDA

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

- Seven insurance claims
- 7,505 acres impacted
- $1,322,469 in insurance claims

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

Table 4.29: Jackson County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	100
Average Number of Claims per Year	10
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	114,692
Average Number of Acres Damaged per Year	11,469
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$18,222,727
Average Crop Damage per Year	$1,822,273

Source: USDA

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

- 10 insurance claims
- 11,469 acres impacted
- $1,822,273 in insurance claims

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

Table 4.30: Jefferson County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	80
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	95,162
Average Number of Acres Damaged per Year	9,516
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$17,487,729
Average Crop Damage per Year	$1,748,773

Source: USDA

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

- Eight insurance claims
- 9,516 acres impacted
- $1,748,773 in insurance claims

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

Table 4.31: Marshall County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	191
Average Number of Claims per Year	19
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	416,297
Average Number of Acres Damaged per Year	41,630
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$41,567,809
Average Crop Damage per Year	$4,156,781

Source: USDA

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

- 19 insurance claims
- 41,630 acres impacted
- $4,156,781 in insurance claims

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

Table 4.32: Nemaha County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	143
Average Number of Claims per Year	14
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	495,648
Average Number of Acres Damaged per Year	49,565
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$76,802,248
Average Crop Damage per Year	$7,680,225

Source: USDA

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

- 14 insurance claims
- 49,565 acres impacted
- $7,680,225 in insurance claims

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

Table 4.33: Washington County Drought Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	197
Average Number of Claims per Year	20
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	194,916
Average Number of Acres Damaged per Year	19,492
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$18,913,388
Average Crop Damage per Year	$1,891,339

Source: USDA

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

- 20 insurance claims
- 19,492 acres impacted
- $1,891,339 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.

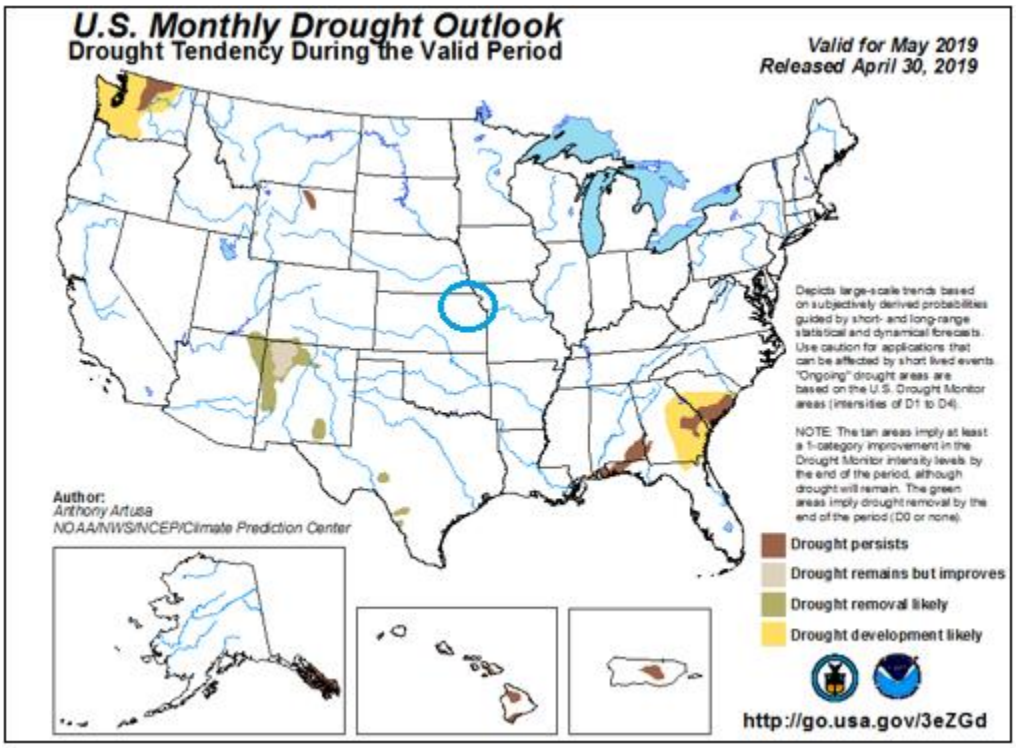
The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region K County. USDA Risk Management Agency crop loss data (for the five-year period from 2014 – 2018) allows us to quantify the monetary impact of drought conditions on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to drought events.

Table 4.34: Drought Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	10,167	5.83%	$66,913,000	$1,993,699	2.98%
Brown	258,601	19,622	7.59%	$112,057,000	$2,990,440	2.67%
Doniphan	144,927	7,516	5.19%	$76,581,000	$1,029,869	1.34%
Douglas	159,261	7,505	4.71%	$65,867,000	$1,322,469	2.01%
Jackson	168,682	11,469	6.80%	$40,215,000	$1,822,273	4.53%
Jefferson	153,276	9,516	6.21%	$44,922,000	$1,748,773	3.89%
Marshall	361,473	41,630	11.52%	$92,882,000	$4,156,781	4.48%
Nemaha	268,088	49,565	18.49%	$76,127,000	$7,680,225	10.09%
Washington	336,673	19,492	5.79%	$87,087,000	$1,891,339	2.17%

Source: USDA

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



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

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

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

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

4.9.5 – Impact and Consequence Analysis

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

Table 4.35: Drought Consequence Analysis

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

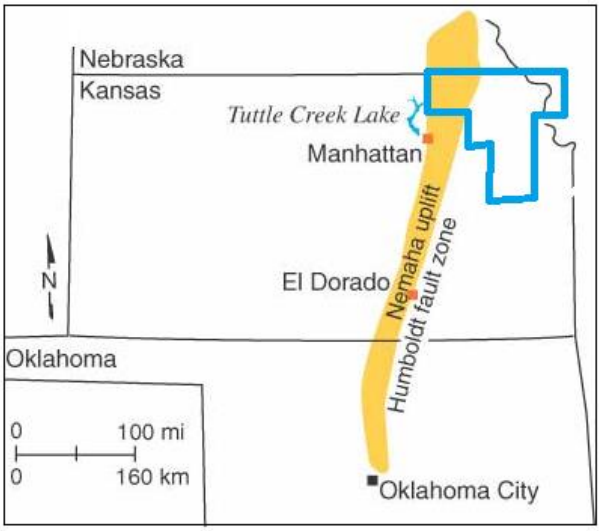
4.10 – Earthquake

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

4.10.1 – Location and Extent

Kansas Region K is in an area of potential seismic activity, with the Humboldt Fault (also known as the Nemaha Uplift) passing through the western portion of the region, including Marshall, Nemaha and Washington counties. Most earthquakes in the Humboldt Fault Zone are small and are detected only with instruments.

Humboldt Fault Zone



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

The following table equates the above referenced earthquake scales.

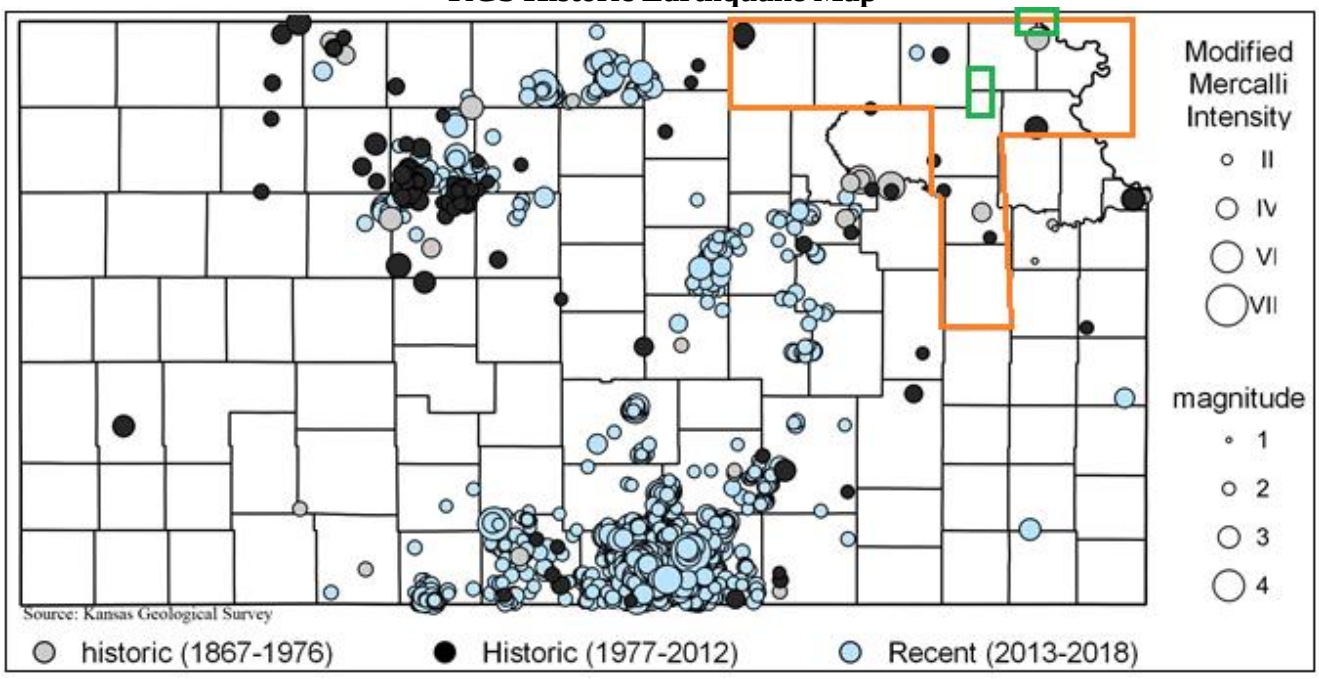
Table 4.36: Earthquake Magnitude Scale Comparison

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

4.10.2 – Previous Occurrences

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

KGS Historic Earthquake Map



The KGS Earthquake Catalog records earthquake events from 1979 through present. According to this archive Kansas Region K has had seven recorded earthquakes since 1979. The following table details the Richter Scale Magnitude of any recorded events in the catalogue.

Table 4.37: Region K 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
Atchison	1	0	0	0	0	0	3.1
Brown	0	0	0	0	0	0	-
Doniphan	0	0	0	0	0	0	-
Douglas	0	0	0	0	0	0	-
Jackson	1	0	0	0	0	0	2.0
Jefferson	0	0	0	0	0	0	-
Marshall	0	0	0	0	0	0	-
Nemaha	2	0	0	0	0	0	2.4
Washington	3	0	0	0	0	0	3.1

Source: KGS

According to this archive, Kansas Region K has had no magnitude 4+ earthquakes (with the highest being recorded at a magnitude 3.1) since 1979.

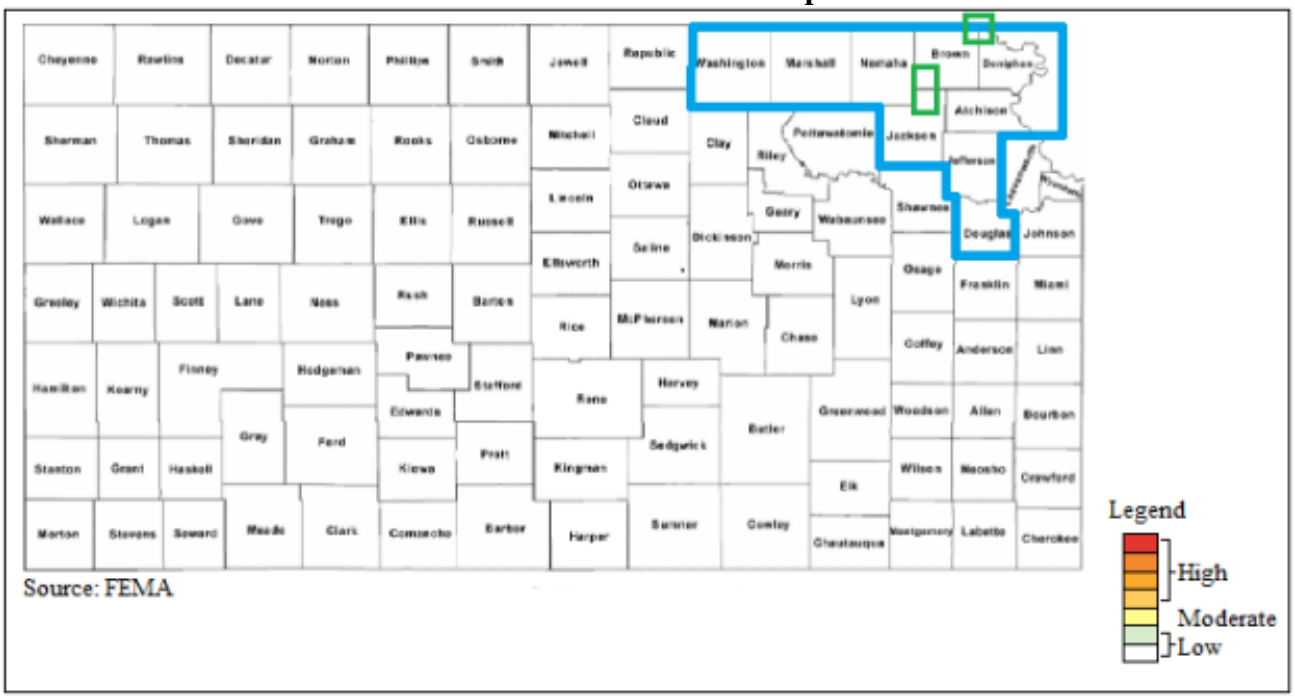
Recently, concern about earthquakes caused by oil and gas exploration and production operations, has grown. Commonly, detected seismic activity associated with oil and gas operations, also known as induced seismicity, is thought to be triggered when wastewater is injected into disposal wells. According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

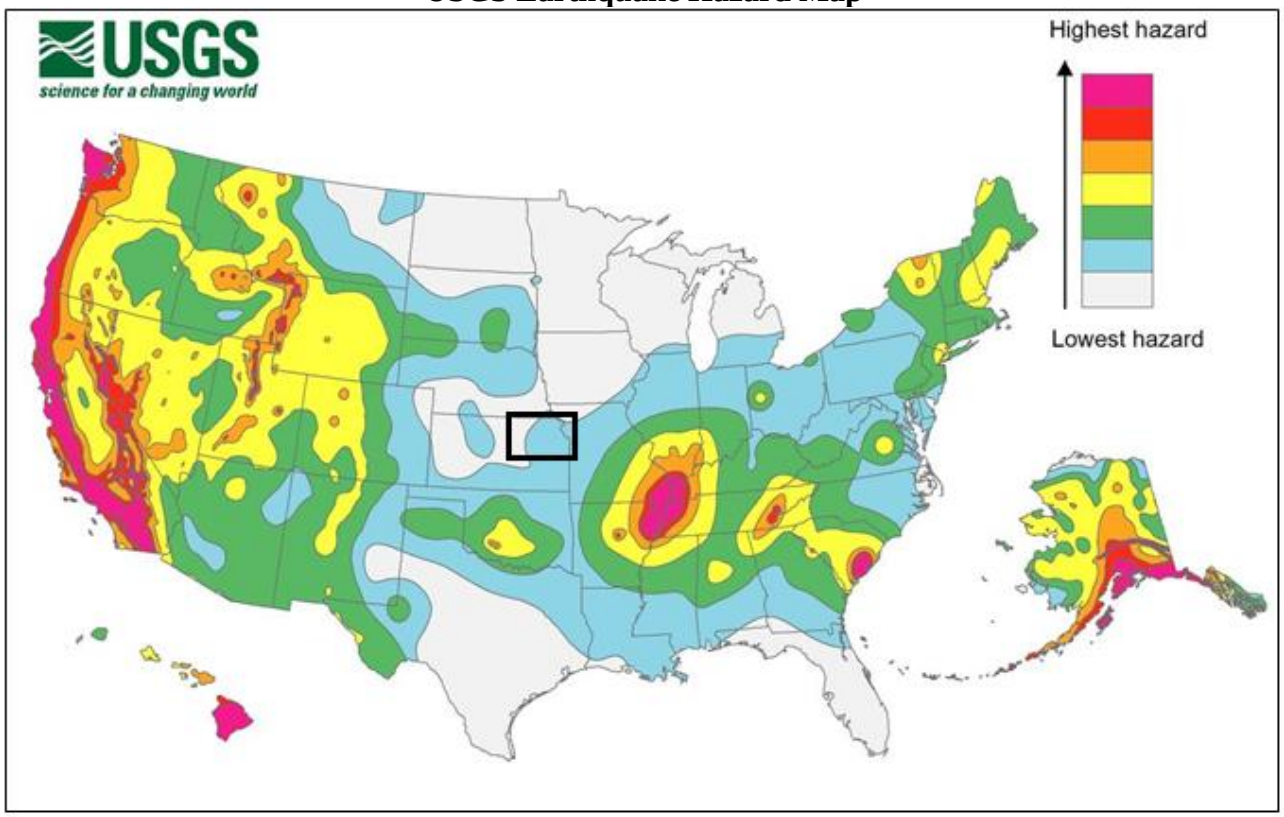
The following FEMA Seismic Risk Map for the United States indicates that all of the State of Kansas, including Kansas Region K, falls into the low hazard rankings.

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



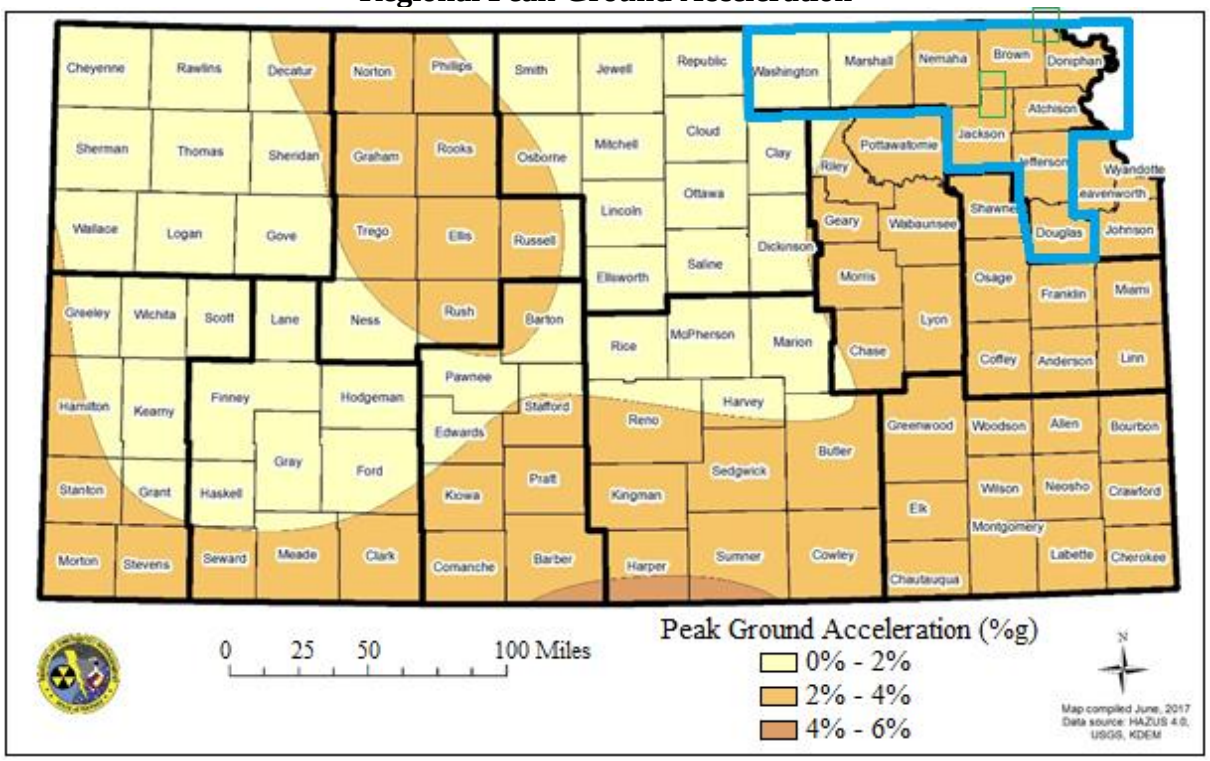
New research by Stanford University shows that oil and gas production injection limits enacted by the State Legislature has reduced he frequency of induced seismicity. Current modelling predicts that at current injection rates the number of widely felt earthquakes in Kansas will decrease to as few as 100 by 2020.

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. However, these assumed vulnerabilities should be viewed as theoretical due to the tremendous number of variables involved in a potential earthquake event.

Table 4.38: Kansas Region K Probabilistic 6.7 Magnitude Earthquake Damages

County	Total Earthquake Losses	Displaced Households
Atchison	$10,463,000	3
Brown	$4,916,000	2
Doniphan	$4,090,000	1
Douglas	$69,623,000	56
Jackson	$6,530,000	2
Marshall	$10,176,000	2
Jefferson	$4,049,000	1
Nemaha	$4,832,000	1
Washington	$1,839,000	<1

Source: KDEM and HAZUS

Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.39: Kansas Region K Population Vulnerability Data for Earthquakes

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

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

Table 4.40: Kansas Region K Structure Vulnerability Data for Earthquakes

County or Tribe	2017 Housing Units	Percent Change 2000 to 2017
Atchison	6,690	2.1%
Brown	4,742	-1.5%
Doniphan	3,588	0.0%
Douglas	49,106	22.0%
Iowa Tribe	75	36.4%
Jackson	5,835	14.5%
Jefferson	8,308	10.9%
Kickapoo Tribe	68	30.9%
Marshall	4,890	-2.2%
Nemaha	4,589	5.7%
Washington	2,943	-6.3%

Source: US Census Bureau or Tribal Government
-: Data Unavailable

4.10.5 – Consequence Analysis

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

Table 4.41: Earthquake Consequence Analysis

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

4.11 – Expansive Soils

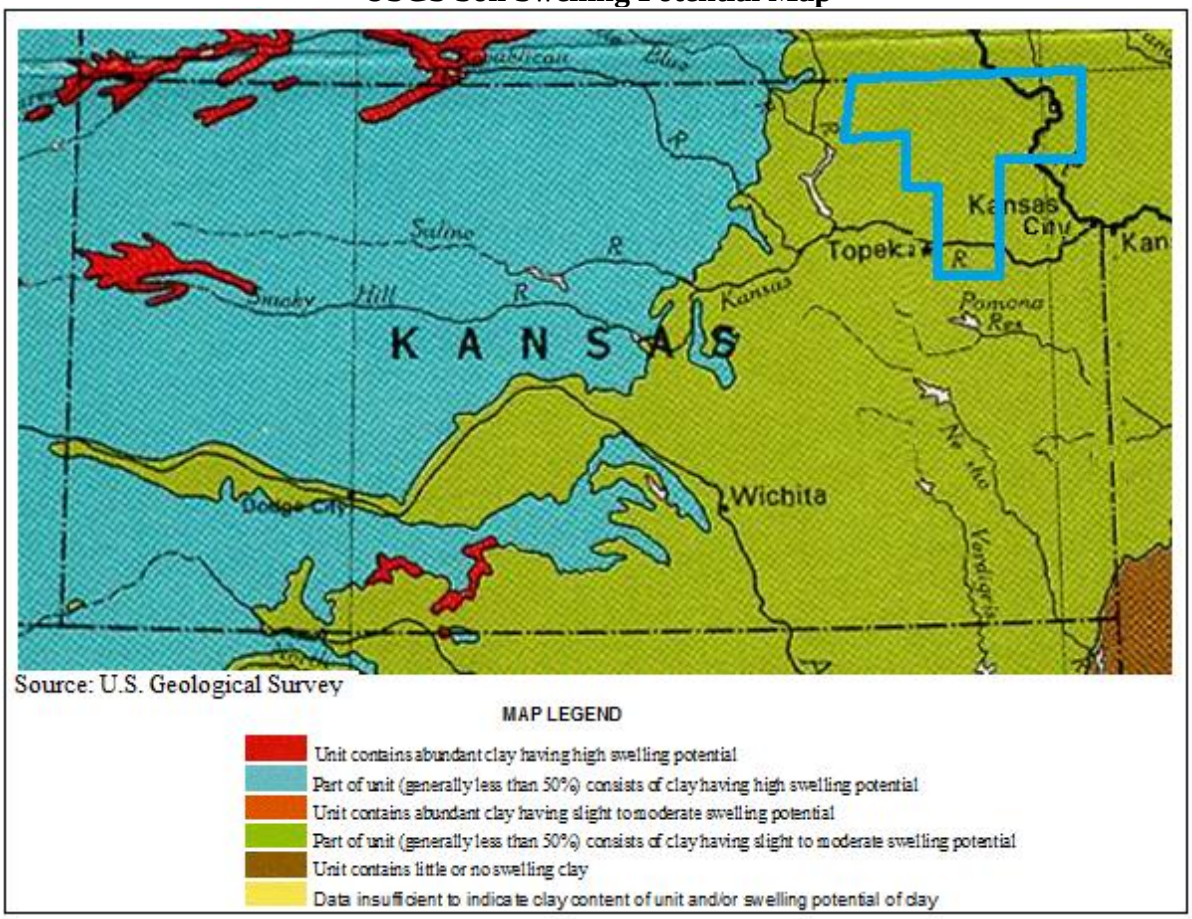
Expansive soils are slow to develop and do not usually pose a risk to public safety. The slow expansion and contraction of the clays and soils places pressure on structural foundations and subsurface dwellings. This pressure can become so great it damages foundations, cracks walls, and deforms structures.

4.11.1 – Location and Extent

Kansas Region K 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 K, indicating it is located in an area where the majority of the soil unit consists of clay having a moderate swelling potential.

USGS Soil Swelling Potential Map



Source: U.S. Geological Survey

4.11.2 – Previous Occurrences

No statewide database of expansive soils events is available.

Locally, there have been no reported expansive soil events within the past five years.

4.11.3 – Hazard Probability Analysis

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

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

4.11.4 – Vulnerability Analysis

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

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

County	HAZUS Structure Valuation	Property Valuation for 10% of Building Stock	Estimated 50% Damage
Atchison	$2,077,340,000	$207,734,000	$103,867,000
Brown	$1,135,773,000	$113,577,300	$56,788,650
Doniphan	$953,610,000	$95,361,000	$47,680,500
Douglas	$12,489,840,000	$1,248,984,000	$624,492,000
Iowa Tribal Reservation*	$7,712,800	$771,280	$385,640
Jackson	$1,477,185,000	$147,718,500	$73,859,250
Jefferson	$2,239,834,000	$223,983,400	$111,991,700
Kickapoo Tribal Reservation*	$6,000,000	$600,000	$300,000
Marshall	$1,231,049,000	$123,104,900	$61,552,450
Nemaha	$1,282,096,000	$128,209,600	$64,104,800
Washington	$650,841,000	$65,084,100	$32,542,050

Source: US Census Bureau
*: Tribal Data

4.11.5 – Consequence Analysis

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

Table 4.43: Expansive Soils Consequence Analysis

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

4.12 – Extreme Temperatures

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

4.12.1 – Location and Extent

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

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

Table 4.44: Extreme Temperature Definitions

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

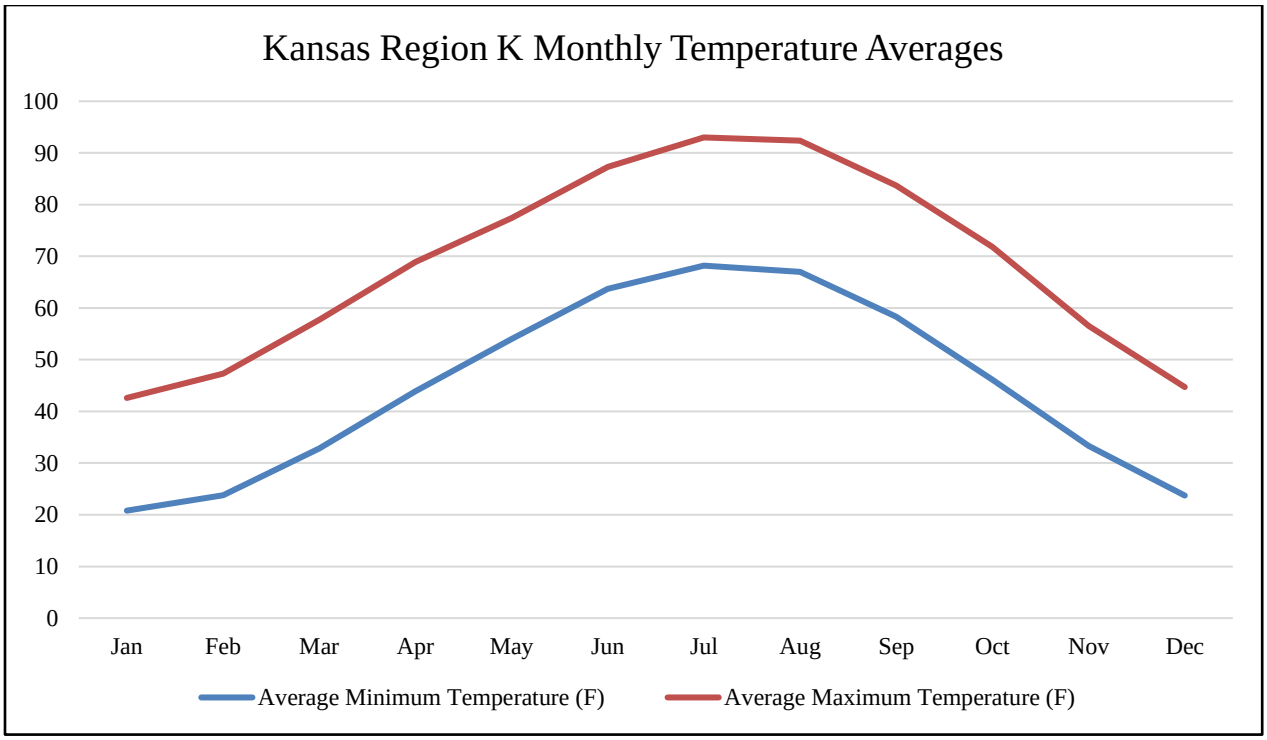
Data from the following High Plains Regional Climate Center weather stations from the first available date to present was obtained to illustrate regional temperature norms.

Table 4.45: Regional Average Temperatures

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Minimum Temperature (F)	16.5	21.0	31.0	42.1	52.5	62.9	66.9	65.0	55.5	44.0	31.6	20.6	42.5
Average Maximum Temperature (F)	37.2	43.0	54.4	66.6	75.5	85.3	89.7	88.5	80.5	69.3	53.7	40.4	65.3

Source: High Plains Regional Climate Center

The following graph illustrates the above data.



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

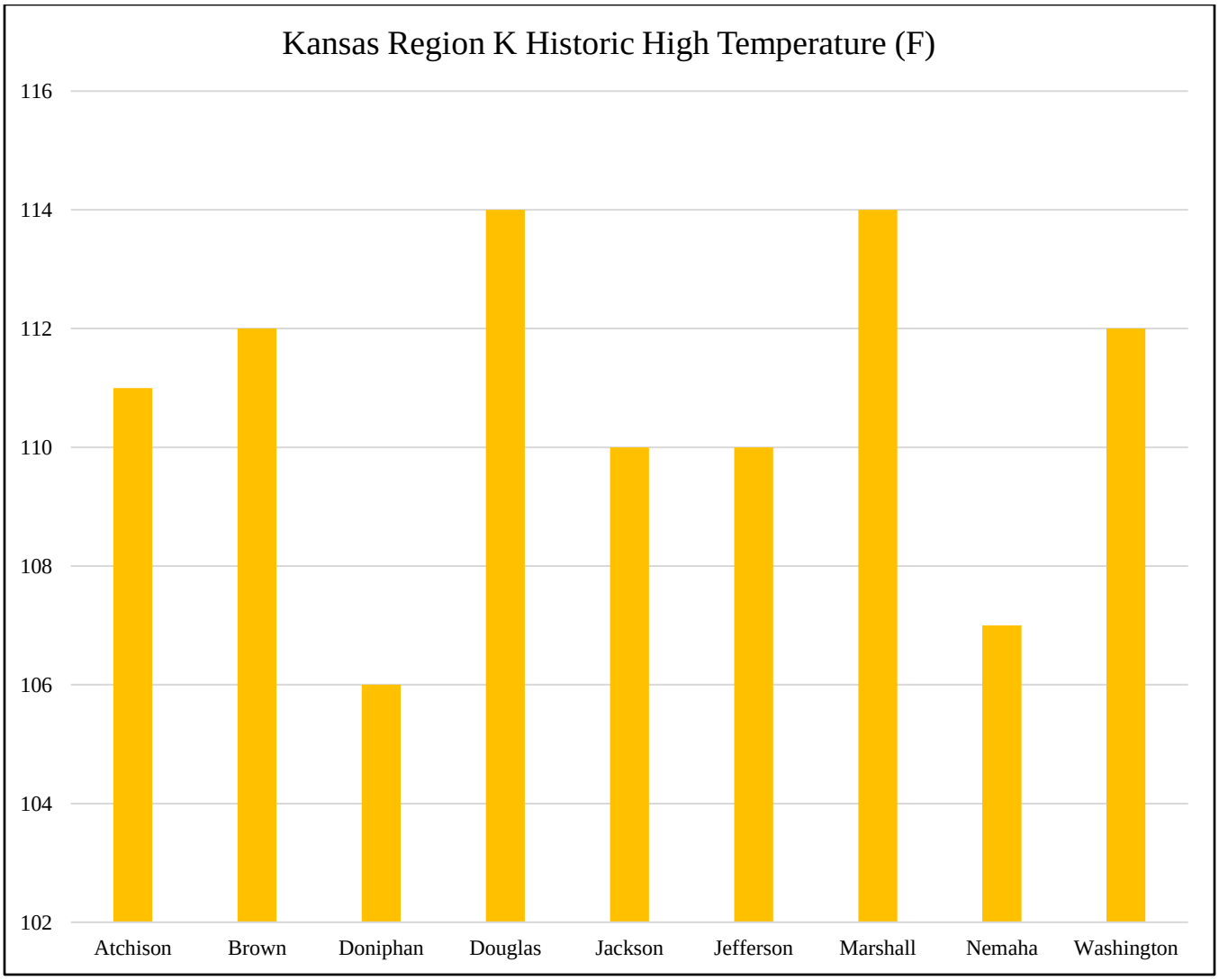
4.12.2 – Previous Occurrences

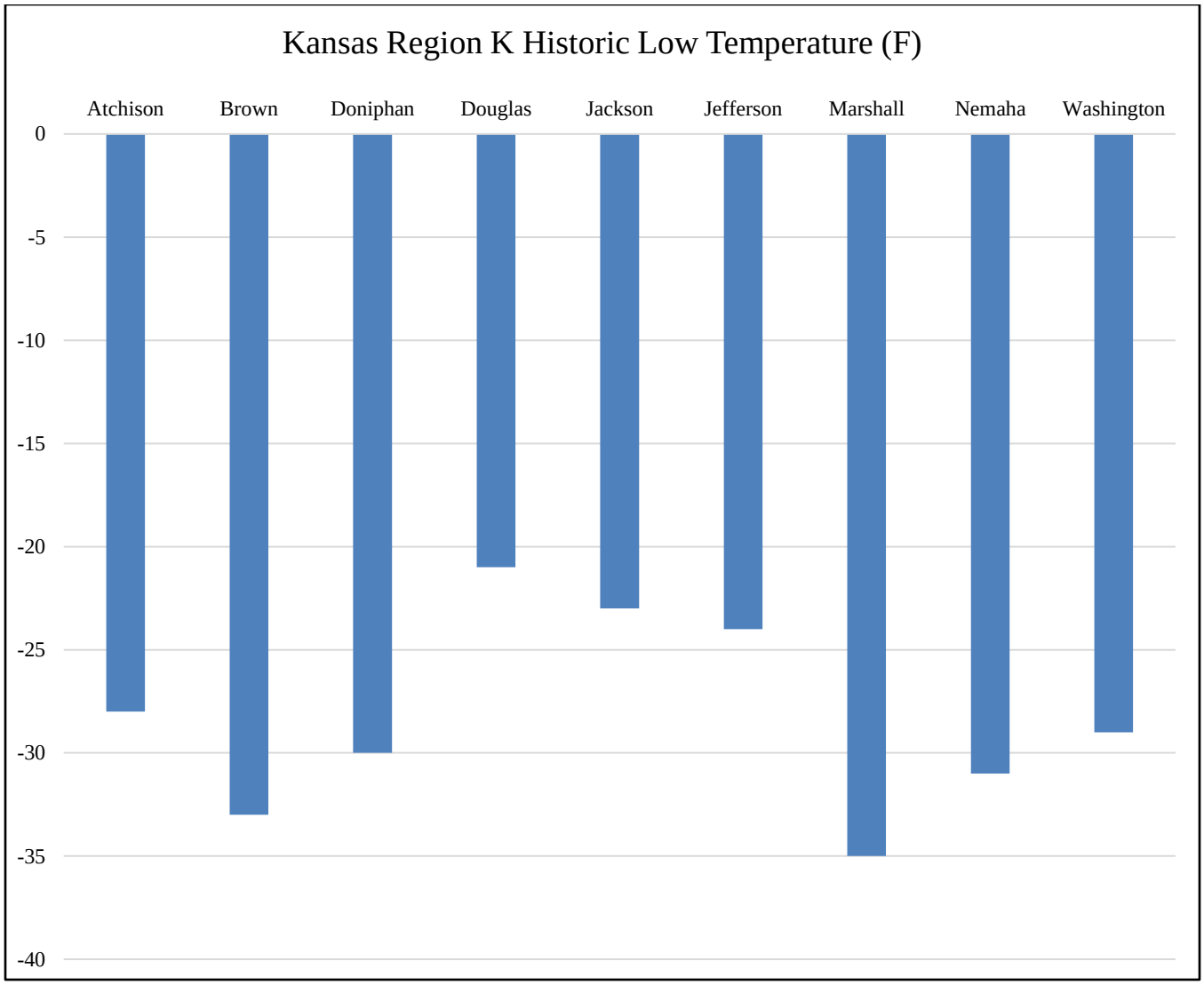
Data from the High Plains Regional Climate Center indicates the following historic high and low temperatures.

Table 4.46: Kansas Region K Historic Temperatures

County	Historic Low Temperature (F)	Historic High Temperature (F)
Atchison	-28 (1930)	111 (1936)
Brown	-33 (1892)	112 (1936)
Doniphan	-30 (1899)	106 (1954)
Douglas	-21 (1912)	114 (1936)
Jackson	-23 (1989)	110 (1980)
Jefferson	-24 (1989)	110 (1980)
Marshall	-35 (1905)	114 (1911)
Nemaha	-31 (1899)	107 (1901)
Washington	-29 (1989)	112 (1954)

Source: High Plains Regional Climate Center


Kansas Region K Historic High Temperature (F)
116
114
112
110
108
106
104
102
Atchison
Brown
Doniphan
Douglas
Jackson
Jefferson
Marshall
Nemaha
Washington



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 K from the period 2009-2018.

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

County	Event Type	Number of Events	Property Damage	Deaths	Injuries
Atchison	Cold	0	$0	0	0
	Heat	1	$0	0	0
Brown	Cold	1	$0	0	0
	Heat	7	$0	0	0
Doniphan	Cold	0	$0	0	0
	Heat	1	$0	0	0
Douglas	Cold	0	$0	0	0
	Heat	0	$0	0	0
Jackson	Cold	1	$0	0	0

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

County	Event Type	Number of Events	Property Damage	Deaths	Injuries
	Heat	9	$0	0	0
Jefferson	Cold	1	$0	0	0
	Heat	10	$0	0	0
Marshall	Cold	0	$0	0	0
	Heat	6	$0	0	0
Nemaha	Cold	1	$0	0	0
	Heat	8	$0	3	0
Washington	Cold	1	$0	0	0
	Heat	5	$0	0	0

Source: NOAA NCEI

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 years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 338 claims on 115,064 acres for $14,504,532.

Table 4.48: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Extreme Temperatures

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Atchison	15	3,591	$586,422
Brown	22	5,933	$904,687
Doniphan	11	1,178	$223,984
Douglas	47	26,345	$3,879,891
Jackson	30	13,208	$1,313,233
Jefferson	34	8,241	$1,262,715
Marshall	70	21,944	$2,061,521
Nemaha	45	18,753	$2,185,009
Washington	64	15,870	$2,087,070

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 K communities.

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

Table 4.49: Kansas Region K Extreme Temperature Probability Summary

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

Source: NCEI

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

- One event
- No deaths or 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 **Atchison County**

Table 4.50: Atchison County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	15
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,591
Average Number of Acres Damaged per Year	359
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$586,422
Average Crop Damage per Year	$58,642

Source: USDA

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

- Two insurance claims
- 359 acres impacted
- $58,642 in insurance claims

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

Table 4.51: Brown County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	22
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	5,933
Average Number of Acres Damaged per Year	593
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$904,687
Average Crop Damage per Year	$90,469

Source: USDA

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

- Two insurance claims
- 593 acres impacted
- $90,469 in insurance claims

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

Table 4.52: Doniphan County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	22
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,178
Average Number of Acres Damaged per Year	118
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$223,984
Average Crop Damage per Year	$22,398

Source: USDA

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

- Two insurance claims
- 118 acres impacted
- $22,398 in insurance claims

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

Table 4.53: Douglas County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	47
Average Number of Claims per Year	5
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	26,345
Average Number of Acres Damaged per Year	2,635
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$3,879,891
Average Crop Damage per Year	$387,989

Source: USDA

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

- Five insurance claims
- 2,635 acres impacted
- $387,989 in insurance claims

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

Table 4.54: Jackson County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
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)	13,208
Average Number of Acres Damaged per Year	1,321
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$1,313,233
Average Crop Damage per Year	$131,323

Source: USDA

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

- Three insurance claims
- 1,321 acres impacted
- $131,323 in insurance claims

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

Table 4.55: Jefferson County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	34
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	8,241
Average Number of Acres Damaged per Year	824
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$1,262,715
Average Crop Damage per Year	$126,272

Source: USDA

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

- Three insurance claims
- 824 acres impacted
- $126,272 in insurance claims

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

Table 4.56: Marshall County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	70
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	21,944
Average Number of Acres Damaged per Year	2,194
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$2,061,521
Average Crop Damage per Year	$206,152

Source: USDA

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

- Seven insurance claims
- 2,194 acres impacted
- $206,152 in insurance claims

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

Table 4.57: Nemaha County Extreme Temperatures Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	45
Average Number of Claims per Year	5
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	18,753
Average Number of Acres Damaged per Year	1,875
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$2,185,009
Average Crop Damage per Year	$218,501

Source: USDA

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

- Five insurance claims
- 1,875 acres impacted
- $218,501 in insurance claims

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

Table 4.58: Washington 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)	15,870
Average Number of Acres Damaged per Year	1,587
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$2,087,070
Average Crop Damage per Year	$208,707

Source: USDA

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

- Six insurance claims
- 1,587acres impacted
- $208,707 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.

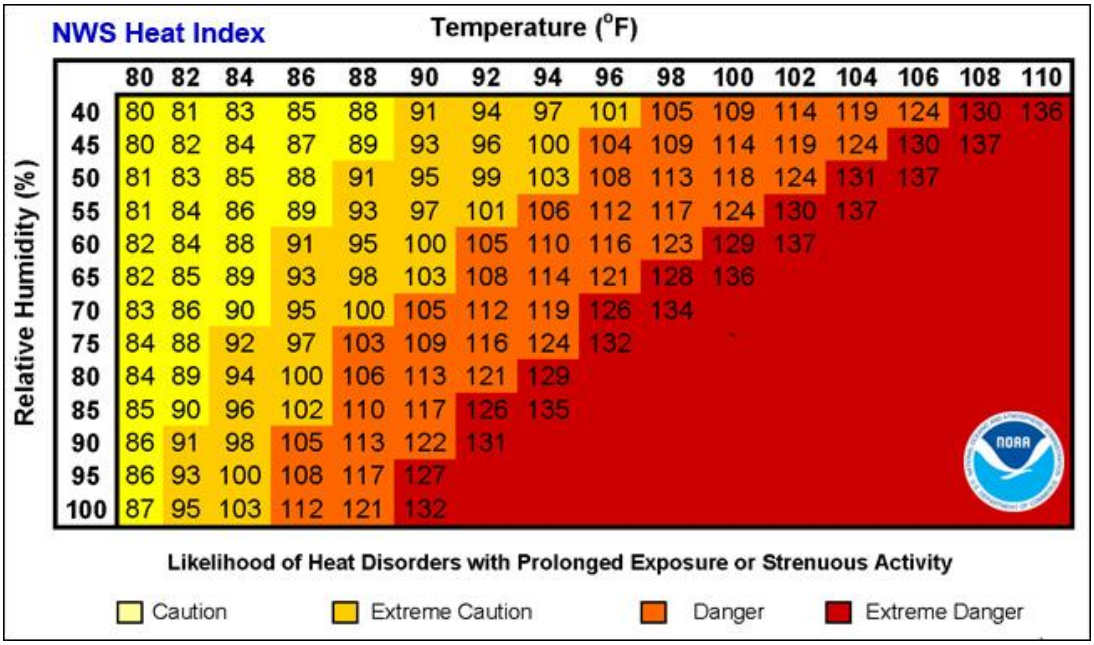
Table 4.59: Extreme Heat Impacts on Human Health

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

Source: National Weather Service Heat Index Program

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

Heat Index

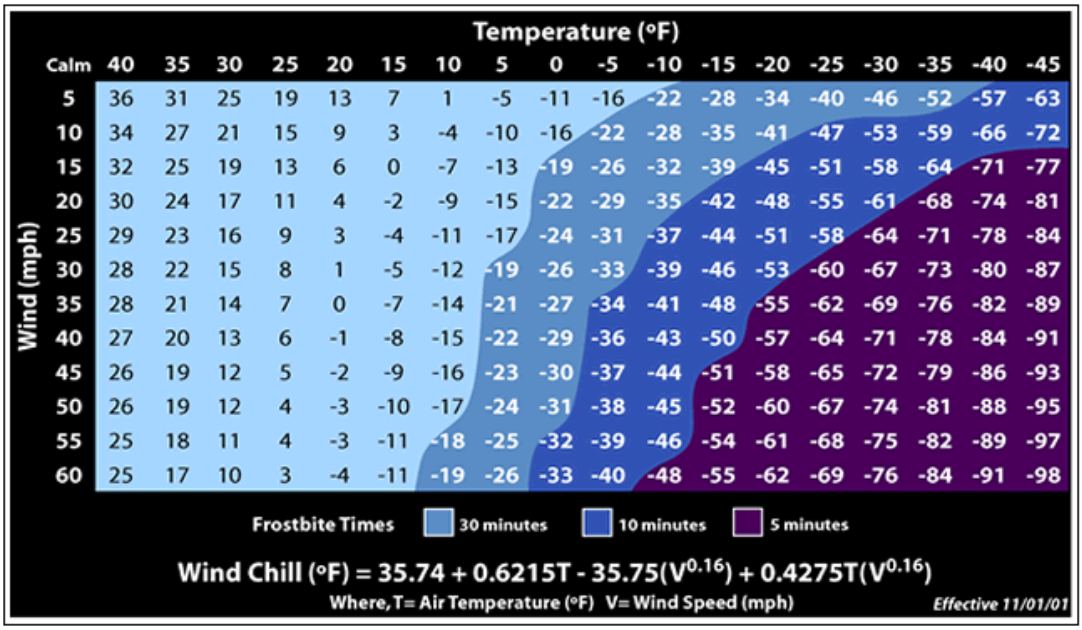


Extreme cold can cause hypothermia, an extreme lowering of the body's temperature, frostbite and death. Infants and the elderly are particularly at risk, but anyone can be affected. Other impacts of extreme cold include asphyxiation from toxic fumes from emergency heaters, household fires, which can be caused by

fireplaces and emergency heaters, and frozen/burst water pipes. There are no specific data sources recording cold related deaths in east-central Kansas.

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

Wind Chill Values



Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.60: Kansas Region K Population Vulnerability Data for Extreme Temperatures

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

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

Table 4.61: Kansas Region K Vulnerable Population Vulnerability Data for Extreme Temperatures

County	Percentage of Population 5 and Under (2017)	Percentage of Population 65+ (2017)
Atchison	6.0%	16.8%
Brown	6.6%	19.8%
Doniphan	5.9%	19.1%
Douglas	5.3%	11.7%
Iowa Tribe	-	-
Jackson	6.7%	18.6%
Jefferson	5.3%	18.1%
Kickapoo Tribe	-	-
Marshall	6.8%	21.3%
Nemaha	7.6%	20.0%
Washington	7.1%	23.8%

Source: US Census Bureau

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 K County. USDA Risk Management Agency crop loss data for the five-year period 2009 - 2018 (data set includes full years for 2014 and 2018) allows us to quantify the monetary impact of extreme temperature conditions on the agricultural sector. In general, the higher the percentage loss, the higher the vulnerability the county has to extreme temperature events.

Table 4.62: Extreme Temperature Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	359	0.21%	$66,913,000	$58,642	0.09%
Brown	258,601	593	0.23%	$112,057,000	$90,469	0.08%
Doniphan	144,927	118	0.08%	$76,581,000	$22,398	0.03%
Douglas	159,261	2,635	1.65%	$65,867,000	$387,989	0.59%
Jackson	168,682	1,321	0.78%	$40,215,000	$131,323	0.33%
Jefferson	153,276	824	0.54%	$44,922,000	$126,272	0.28%
Marshall	361,473	2,194	0.61%	$92,882,000	$206,152	0.22%
Nemaha	268,088	1,875	0.70%	$76,127,000	$218,501	0.29%
Washington	336,673	1,587	0.47%	$87,087,000	$208,707	0.24%

Source: USDA

4.12.5 – Consequence Analysis

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

Table 4.63: Extreme Temperature Consequence Analysis

Subject	Impacts of Expansive Soils
Health and Safety of the Public	Depending on the duration of the event, impact is expected to be severe for unprepared and unprotected persons. Impact will be minimal to moderate for prepared and protected persons.
Health and Safety of Responders	Impact could be severe if proper precautions are not taken, i.e. hydration in heat, clothing in extreme cold. With proper preparedness and protection, the impact would be minimal.
Continuity of Operations	Minimal expectation for utilization of the COOP.
Property, Facilities, and Infrastructure	Impact to infrastructure could be minimal to severe depending on the temperature extremes.
Environment	The impact to the environment could be severe. Extreme heat and or cold could seriously damage wildlife and plants, trees and crops.
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 K can be generally classified under two categories:

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

4.13.1 – Location and Extent

Flash Flooding

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

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

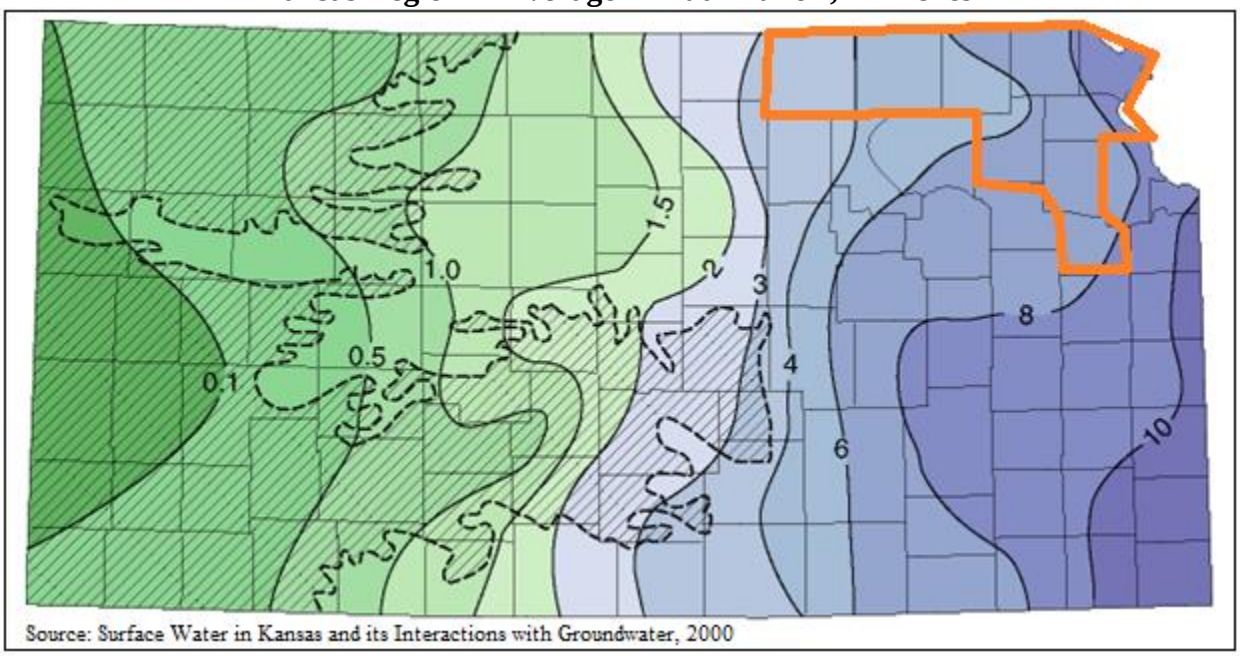
In general, flash flooding occurs in those locations in the planning area that are low-lying and/or do not have adequate drainage. Data from University of Kanas indicates that the average annual precipitation for Kansas Region K counties for 2017:

- Atchison County: 31.22 inches
- Brown County: 29.56 inches
- Doniphan County: 21.29 inches
- Douglas County: 38.48 inches
- Jackson County: 33.79 inches
- Jefferson County: 32.58 inches
- Marshall County: 27.61 inches
- Nemaha County: 28.30 inches
- Washington County: 29.65 inches

This equates to a regional average of 30.28 inches of precipitation for 2017.

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

Kansas Region K Average Annual Runoff, In Inches



Source: Surface Water in Kansas and its Interactions with Groundwater, 2000

Riverine Flooding

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 K located near a stream or river are at risk of riverine flooding. While riverine floods can and do occur at various levels, the one percent annual chance flood has been chosen as the basis for this risk assessment. This level is the accepted standard for flood insurance and regulatory purposes.

In general, flood probability can be expressed by recurrence interval, the average period of time for a flood that equals or exceeds a given magnitude, expressed as a period of years. The probability of occurrence of a given flood can also be expressed as the odds of recurrence of one or more similar or bigger floods in a certain number of years. Large, catastrophic floods have a very low frequency or probability of occurrence, whereas smaller floods occur more often. The larger the number of years in a recurrence interval, the smaller the chances of experiencing that flood in a year. However, the odds are never zero, even very large, uncommon floods always have a very small chance of recurring every year. When reviewing flood probability, it is important to note that once a flood occurs its chance of recurring the next year remains the same.

Table 4.64: Flood Recurrence Interval Probability

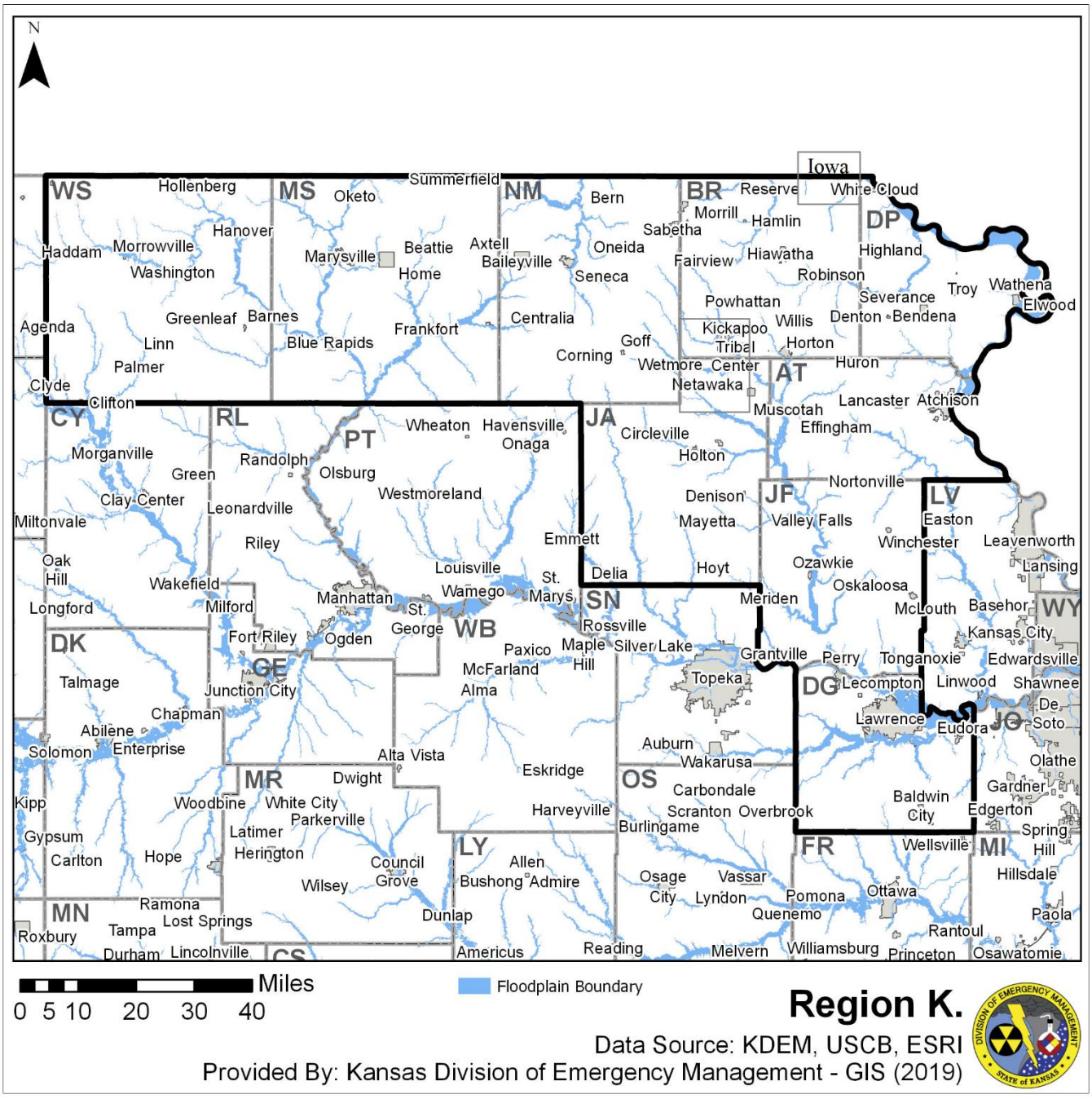
Recurrence Interval, in Years	Probability of Occurrence in Any Given Year	Percent Chance of Occurrence in Any Given Year
100	1 in 100	1
50	1 in 50	2
25	1 in 25	4
10	1 in 10	10
5	1 in 5	20
2	1 in 2	50

Source: FEMA

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

Local Concerns

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



Local Concerns

Many local jurisdictions are subject to areas of repeat flooding. In an effort to identify these areas the KDA, in conjunction with the USACE Silver Jackets, has created a mapping system under the Recurring Flood Identification Project. This system allows for the local mapping of known flood areas within regional jurisdictions. Three classifications of flooding areas are used, minimal moderate and severe. No repeat flood areas within the region were mapped.

4.13.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 12 Presidential Disaster Declarations for Kansas Region K for floods (along with other associates hazard events such as tornados or severe storms), totaling $373,722,379 in damages. The following 20-year information on past declared disasters is presented to provide a historical perspective on flood events that have impacted Kansas Region K. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2013.

Table 4.65: Kansas Region K FEMA Flood Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4230	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, Tornados, Straight-Line Winds, and **Flooding**	Atchison, Brown, Doniphan, Jackson, Jefferson, Marshall, McPherson, Nemaha, Neosho, and Washington.	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	Severe Storms, Straight-Line Winds, Tornados, and **Flooding**	Washington	$11,412,827
4035	09/23/2011 (6/1-8/1/2011)	**Flooding**	Atchison and Doniphan,	$7,462,881
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, Straight-Line Winds, Tornados and **Flooding**	Washington	$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	Severe Storms, **Flooding** and Tornados	Atchison, Brown, Doniphan, Jackson, Marshall and Washington	$9,279,257
1849	06/25/2009 (4/25-5/16/2009)	Severe Storms, **Flooding**, Straight-Line Winds, and Tornados	Marshall	$15,013,488
1776	07/09/2008	Severe Storms, **Flooding**, and Tornados	Brown and Jackson	$70,629,544
1699	5/6/2007 (5/4/2007)	Severe Storms, Tornados, and **Flooding**	Brown, Doniphan, Douglas, Jackson, Marshall, Nemaha and Washington	$117,565,269
1615	11/21/2005 (10/1-2/2005)	Severe Storms and **Flooding**	Atchison, Jackson and Jefferson	$10,286,064
1579	2/8/2005 (1/4-6/2005)	Severe Winter Storm, Heavy Rains, and **Flooding**	Atchison, Brown, Douglas, Jackson and Jefferson,	$106,873,672
1562	09/30/2004 (8/27-30/2004)	Severe Storms, **Flooding**, and Tornados	Douglas	$2,103,376
1462	5/6/2003 (5/4-30/2003)	Severe Storms, Tornados, and **Flooding**	Douglas	$988,056
Emergency Declaration 3324	6/25/2011	**Flooding**	Atchison, Doniphan, Leavenworth and Wyandotte	n/a

Source: FEMA

The following provides details of the one Presidential Disaster Declaration for Kansas Region K since the last plan update in 2014.

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

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

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

In addition to the above reported events, the following table presents NOAA NCEI identified flood events and the resulting damage totals in Kansas Region K from the period 2009 - 2018. This data is limited to reported events.

Table 4.66: Kansas Region K NCEI Flood and Flash Flood Events, 2009 - 2018

County	Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Atchison	Flood	2	$	0	0
	Flash Flood	3	$0	0	0
Brown	Flood	4	$0	0	0
	Flash Flood	8	$1,000	0	0
Doniphan	Flood	1	$0	0	0
	Flash Flood	5	$0	0	0
Douglas	Flood	4	$0	0	0
	Flash Flood	11	$0	0	0
Jackson	Flood	3	$0	0	0
	Flash Flood	5	$0	0	0
Jefferson	Flood	4	$0	0	0
	Flash Flood	6	$0	0	0

Table 4.66: Kansas Region K NCEI Flood and Flash Flood Events, 2009 - 2018

County	Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Marshall	Flood	2	$0	0	0
	Flash Flood	13	$0	0	0
Nemaha	Flood	2	$0	0	0
	Flash Flood	10	$0	0	0
Washington	Flood	3	$0	0	0
	Flash Flood	4	$0	0	0

Source: FEMA

The following provides local accounts of notable flood events:

- **October 5 – 9, 2018: Regional**
  .
- **October 9, 2018: Sedgwick (Douglas County)**

- **October 2018: Lyons (Jackson County)**
  Damages were estimated at $300,000.

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 2015- 2018, for the region, indicates 255 flood related claims on 37,974 acres for $19,946,797.

Table 4.67: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Flooding

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Atchison	35	7,300	$1,970,359
Brown	9	891	$44,584
Doniphan	60	16,447	$6,052,308
Douglas	9	898	$127,444
Jackson	12	948	$42,472
Jefferson	21	1,513	$132,142
Marshall	66	6,652	$1,287,564
Nemaha	10	1,210	$47,524
Washington	33	2,115	$242,399

Source: USDA Farm Service Agency

4.13.3 – Hazard Probability Analysis

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

Table 4.68: Atchison County Riverine Flood Probability Summary

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

Source: NCEI

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

Table 4.69: Atchison County Flash Flood Probability Summary

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

Source: NCEI

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

Table 4.70: Atchison County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	35
Average Number of Claims per Year	4
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	7,300
Average Number of Acres Damaged per Year	730
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$1,970,359
Average Crop Damage per Year	$197,036

Source: USDA

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

- Four insurance claims
- 730 acres impacted
- $197,036 in insurance claims

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

Table 4.71: Brown County Riverine Flood Probability Summary

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

Source: NCEI

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

Table 4.72: Brown County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	8
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$1,000
Average Property Damage per Year	$100

Source: NCEI

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

- One event
- 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 **Brown County.**

Table 4.73: Brown County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	9
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	891
Average Number of Acres Damaged per Year	89
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$44,584
Average Crop Damage per Year	$4,458

Source: USDA

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

- One insurance claim
- 89 acres impacted
- $4,458 in insurance claims

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

Table 4.74: Doniphan County Riverine Flood Probability Summary

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

Source: NCEI

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

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

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

Table 4.75: Doniphan County Flash Flood Probability Summary

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

Source: NCEI

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

- One event
- No deaths or injuries
- $500,000 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 **Doniphan County.**

Table 4.876: Doniphan County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	9
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	16,447
Average Number of Acres Damaged per Year	1,645
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$6,052,308
Average Crop Damage per Year	$605,231

Source: USDA

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

- One insurance claim
- 1,645 acres impacted
- $605,231 in insurance claims

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

Table 4.77: Douglas County Riverine Flood Probability Summary

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

Source: NCEI

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

Table 4.78: Douglas County Flash Flood Probability Summary

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

Source: NCEI

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

Table 4.79: Douglas County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	9
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	898
Average Number of Acres Damaged per Year	90
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$127,444
Average Crop Damage per Year	$12,744

Source: USDA

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

- One insurance claim
- 90 acres impacted
- $12,744 in insurance claims

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

Table 4.80: Jackson County Riverine Flood Probability Summary

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

Source: NCEI

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

Table 4.81: Jackson County Flash Flood Probability Summary

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

Source: NCEI

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

Table 4.82: Jackson County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	12
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	948
Average Number of Acres Damaged per Year	95
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$42,472
Average Crop Damage per Year	$4,247

Source: USDA

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

- One insurance claim
- 95 acres impacted
- $4,247 in insurance claims

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

Table 4.83: Jefferson County Riverine Flood Probability Summary

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

Source: NCEI

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

Table 4.84: Jefferson County Flash Flood Probability Summary

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

Source: NCEI

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

Table 4.85: Jefferson County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	21
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,513
Average Number of Acres Damaged per Year	151
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$132,142
Average Crop Damage per Year	$13,214

Source: USDA

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

- Two insurance claims
- 151 acres impacted
- $13,214 in insurance claims

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

Table 4.86: Marshall County Riverine Flood Probability Summary

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

Source: NCEI

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

Table 4.87: Marshall County Flash Flood Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	13
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0

Source: NCEI

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

Table 4.88: Marshall County Flooding 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)	6,652
Average Number of Acres Damaged per Year	665
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$1,287,564
Average Crop Damage per Year	$128,756

Source: USDA

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

- Seven insurance claims
- 665 acres impacted
- $128,756 in insurance claims

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

Table 4.89: Nemaha County Riverine Flood Probability Summary

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

Source: NCEI

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

Table 4.90: Nemaha County Flash Flood Probability Summary

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

Source: NCEI

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

Table 4.91: Nemaha County Flooding Agricultural Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	10
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,210
Average Number of Acres Damaged per Year	121
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$47,524
Average Crop Damage per Year	$4,752

Source: USDA

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

- One insurance claim
- 121 acres impacted
- $4,752 in insurance claims

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

Table 4.92: Washington County Riverine Flood Probability Summary

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

Source: NCEI

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

Table 4.93: Washington County Flash Flood Probability Summary

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

Source: NCEI

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

Table 4.94: Washington County Flooding Agricultural Probability Summary

Data	Recorded Impact
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)	2,115
Average Number of Acres Damaged per Year	211
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$242,399
Average Crop Damage per Year	$24,240

Source: USDA

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

- Three insurance claims
- 211 acres impacted
- $24,240 in insurance claims

In addition, Kansas Region K has had 12 Presidentially Declared Disasters relating to flooding (and other causes) in the last 20 years. This represents an average of one declared flood disaster per 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 K 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 K county.

Table 4.95: Kansas Region K 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
Atchison	219	7	198	8	0
Brown	211	9	63	8	0
Doniphan	165	60	619	13	0
Douglas	850	295	1778	65	0
Jackson	422	58	243	19	0
Jefferson	365	26	230	6	0
Marshall	325	48	240	31	0
Nemaha	274	13	79	5	0
Washington	138	4	95	4	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 4.96: Kansas Region K 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
Atchison	$14,246,000	$27,466,000	$1,011,000	$42,723,000	$260,000	$42,983,000
Brown	$3,870,000	$3,312,000	$113,000	$7,295,000	$13,000	$7,308,000
Doniphan	$1,974,000	$1,310,000	$42,000	$3,326,000	$1,000	$3,327,000
Douglas	$26,333,000	$39,360,000	$1,676,000	$67,369,000	$564,000	$67,933,000
Jackson	$8,402,000	$7,227,000	$352,000	$15,981,000	$58,000	$16,039,000
Jefferson	$9,423,000	$7,936,000	$120,000	$17,479,000	$149,000	$17,628,000
Marshall	$6,653,000	$8,535,000	$618,000	$15,806,000	$38,000	$15,844,000
Nemaha	$5,602,000	$4,295,000	$193,000	$10,090,000	$18,000	$10,108,000
Washington	$3,302,000	$3,372,000	$276,000	$6,950,000	$22,000	$6,972,000

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 K 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 vulnerability the county has to flood events.

Table 4.97: Flood Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	730	0.42%	$66,913,000	$197,036	0.29%
Brown	258,601	89	0.03%	$112,057,000	$4,458	0.00%
Doniphan	144,927	1,645	1.13%	$76,581,000	$605,231	0.79%
Douglas	159,261	90	0.06%	$65,867,000	$12,744	0.02%
Jackson	168,682	95	0.06%	$40,215,000	$4,247	0.01%
Jefferson	153,276	151	0.10%	$44,922,000	$13,214	0.03%
Marshall	361,473	665	0.18%	$92,882,000	$128,756	0.14%
Nemaha	268,088	121	0.05%	$76,127,000	$4,752	0.01%
Washington	336,673	211	0.06%	$87,087,000	$24,240	0.03%

Source: USDA

Flood risk can also change over time because of new building and development, weather patterns and other factors. Although the frequency or severity of impacts cannot be changed, FEMA is working with federal, state, tribal and local partners across the nation to identify flood risk and promote informed planning and development practices to help reduce that risk through the Risk Mapping, Assessment and Planning (Risk MAP) program. Risk MAP uses the watershed boundaries to conduct studies. This watershed approach allows communities to come together to develop partnerships, combine resources, share flood risk information with FEMA, and identify broader opportunities for mitigation action.

The Flood Risk Products and datasets present information that can enhance hazard mitigation planning activities, especially the risk and vulnerability assessment portion of a hazard mitigation plan, and the

development of risk-based mitigation strategies. Risk MAP can also help guide land use and development decisions and help you take mitigation action by highlighting areas of highest risk, areas in need of mitigation, and areas of floodplain change. Currently Kansas Region K has no current or scheduled Risk Map projects.

Mold

In general, mold is plant-like organism that obtains nourishment it directly from surrounding organic materials. Mold can grow on a variety of materials and thrives in damp environments. As such, a recently flooded home or business provides an ideal environment for mold growth, especially on materials such as drywall and carpeting. The young, old and ill may be specifically susceptible to the effects of mold, with symptoms including:

- congestion
- cough
- breathing difficulties
- sore throat
- membrane irritation
- upper respiratory infections

As such, any instance of flood related mold should be remediated as soon as possible.

4.13.5 – National Flood Insurance Program Communities

The National Flood Insurance Program (NFIP) is a federal program, managed by FEMA, that exists to provide flood insurance for property owners in participating communities, to improve floodplain management practices, and to develop maps of flood hazard areas. The following table presents the number of NFIP participating communities in each county.

Table 4.98: Kansas Region K NFIP Communities

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
Atchison County			
Atchison County	5/31/1977	12/1/2007	12/01/07(L)
City of Atchison	2/8/1974	6/1/1978	6/1/1978
Effingham	2/1/1974	-	NSFHA
Muscotah	11/22/1974	-	7/9/1976
Brown County			
Brown County	5/17/1977	9/1/1987	09/01/87(L)
Hiawatha	2/8/1974	-	NSFHA
Horton	2/15/1974	-	NSFHA
Morrill	11/22/1974	-	12/12/1975
Robinson	11/29/1974	5/1/1990	05/01/90(L)
Doniphan County			
Doniphan County	6/3/1977	6/1/1978	6/1/1978
Elwood	6/28/1974	-	NSFHA

Table 4.98: Kansas Region K NFIP Communities

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
Highland	4/23/1976	9/1/2011	09/01/11(L)
Troy	2/15/1974	-	NSFHA
Wathena	3/22/1974	-	NSFHA
Douglas County			
Douglas County	6/17/1977	3/2/1981	8/5/2010
Baldwin City	2/15/1974	1/2/1980	8/5/2010
Eudora	1/9/1974	1/16/1981	8/5/2010
Lawrence	6/14/1974	3/2/1981	8/5/2010
Lecompton	1/23/1974	3/15/1979	8/5/2010
Jackson County			
Jackson County	5/31/1977	12/15/1989	5/3/2010
Circleville	12/20/1974	5/3/2010	5/3/2010
Delia	8/30/1974	5/3/2010	5/3/2010
Denison	-	5/3/2010	NSFHA
Holton	2/22/1974	1/16/1981	5/3/2010
Hoyt	12/20/1974	5/3/2010	NSFHA
Mayetta	11/8/1974	5/3/2010	NSFHA
Soldier	11/22/1974	5/3/2010	5/3/2010
Whiting	11/29/1974	5/3/2010	5/3/2010
Jefferson County			
Jefferson County	8/16/1977	9/4/1991	12/17/2010
McLouth	3/22/1974	11/4/2009	11/04/09(M)
Meriden	11/5/1976	11/4/2009	11/04/09(M)
Nortonville	3/1/1974	11/4/2009	11/04/09(M)
Oskaloosa	5/24/1974	11/4/2009	11/04/09(M)
Perry	12/7/1973	3/2/1981	11/4/2009
Valley Falls	10/10/1975	11/4/2009	11/04/09(M)
Winchester	-	11/4/2009	NSFHA
Marshall County			
Marshall County	6/28/1977	5/1/1990	05/01/90(L)
Axtell	3/26/1976	-	NSFHA
Blue Rapids	3/26/1976	11/1/2011	11/01/11(L)
Frankfort	1/23/1974	9/27/1985	09/27/85(M)
Marysville	12/7/1973	12/1/1977	12/1/1977
Vermillion	12/20/1974	5/1/1990	05/01/90(L)
Waterville	8/29/1975	-	NSFHA
Nemaha County			
Nemaha County	7/5/1977	8/19/1985	08/19/85(M)
Centralia	5/24/1974	9/1/1986	09/01/86(L)
Corning	-	-	-
Goff	11/8/1974	-	12/26/1975
Wathena	3/22/1974	-	NSFHA
Sabetha	4/16/1976	-	NSFHA
Seneca	2/8/1974	9/27/1985	09/27/85(M)

Table 4.98: Kansas Region K NFIP Communities

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
Washington County			
Washington County	-	-	1/1/1950
Haddam	12/27/1974	-	12/27/1974
Hanover	7/18/1975	9/27/1985	09/27/85(M)
Morrowville	12/6/1974	-	12/6/1974
Palmer	12/20/1974	-	12/20/1974
City of Washington	8/15/1975	9/27/1985	09/27/85(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. The following Region K communities are currently CRS participants:

Table 4.99: Kansas Region K CRS Participating Jurisdictions

Jurisdiction	County	CRS Entry Date	CRS Class	% Discount for SFHA	% Discount for Non-SFHA	Status
Douglas County	Douglas	10/02/13	7	15%	5%	Current
Jefferson County	Jefferson	05/01/15	7	15%	5%	Current
Lawrence	Douglas	10/01/04	7	15%	5%	Current

Source: FEMA and KDEM

4.13.6 – FEMA Flood Policy and Loss Data

Kansas Region K 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 K. Loss statistics include losses through December 31, 2018.

Table 4.100: Kansas Region K NFIP Policy and Loss Statistics, As of December 31. 2018

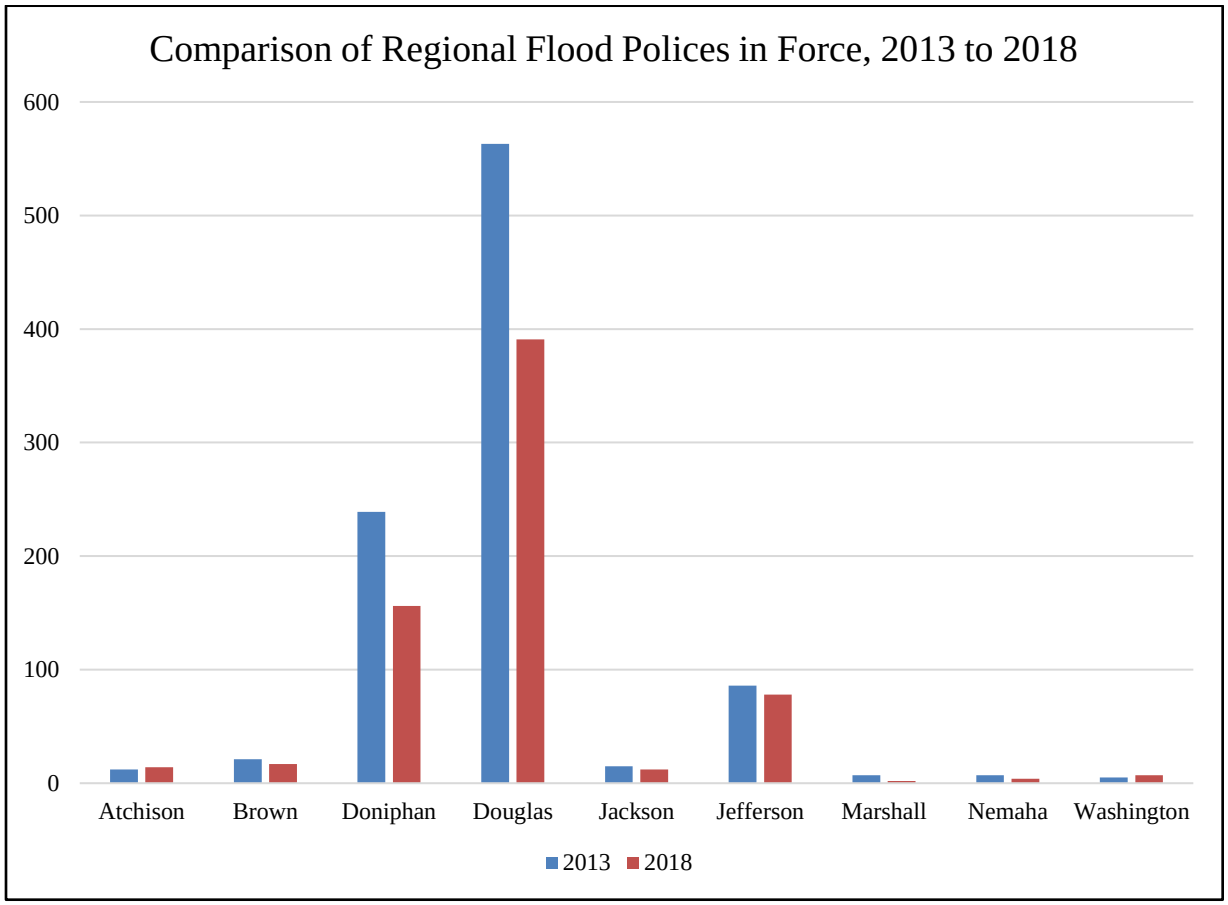
Jurisdiction	Number of Policies in Force	Insurance in Force	Number of Closed Losses	Total Payments
Atchison County				
Atchison County	7	$939,300	0	$0
City of Atchison	7	$2,826,700	1	$15,391
Brown County				
Brown County	1	$29,100	0	$0
Robinson	16	$380,100	0	$0
Doniphan County				
Doniphan County	49	$13,187,100	19	$78,043
Elwood	89	$18,248,900	48	$630,717
Wathena	18	$3,125,500	0	$0
Douglas County				
Douglas County	69	$17,076,400	26	$673,690
Baldwin City	27	$5,744,500	6	$74,764
Eudora	21	$3,066,700	6	$77,589
Lawrence	272	$62,804,300	63	$519,920
Lecompton	2	$512,800	2	$18,427
Jackson County				
Jackson County	9	$1,816,400	2	$103,609
Circleville	1	$60,000	0	$0
Holton	2	$660,000	1	$16,000
Jefferson County				
Jefferson County	56	$8,838,500	22	$579,049
Meriden	1	$45,000	0	$0
Oskaloosa	1	$280,000	0	$0
Perry	20	$4,466,800	21	$21,103
Marshall County				
Marshall County	1	$105,000	2	$33,839
Marysville	1	$70,000	14	$67,847
Nemaha County				
Centralia	3	$450,200	0	$0
Seneca	1	$70,000	1	$5,264
Washington County				
Washington County	5	$266,500	0	$0
Hanover	2	$296,000	0	$0

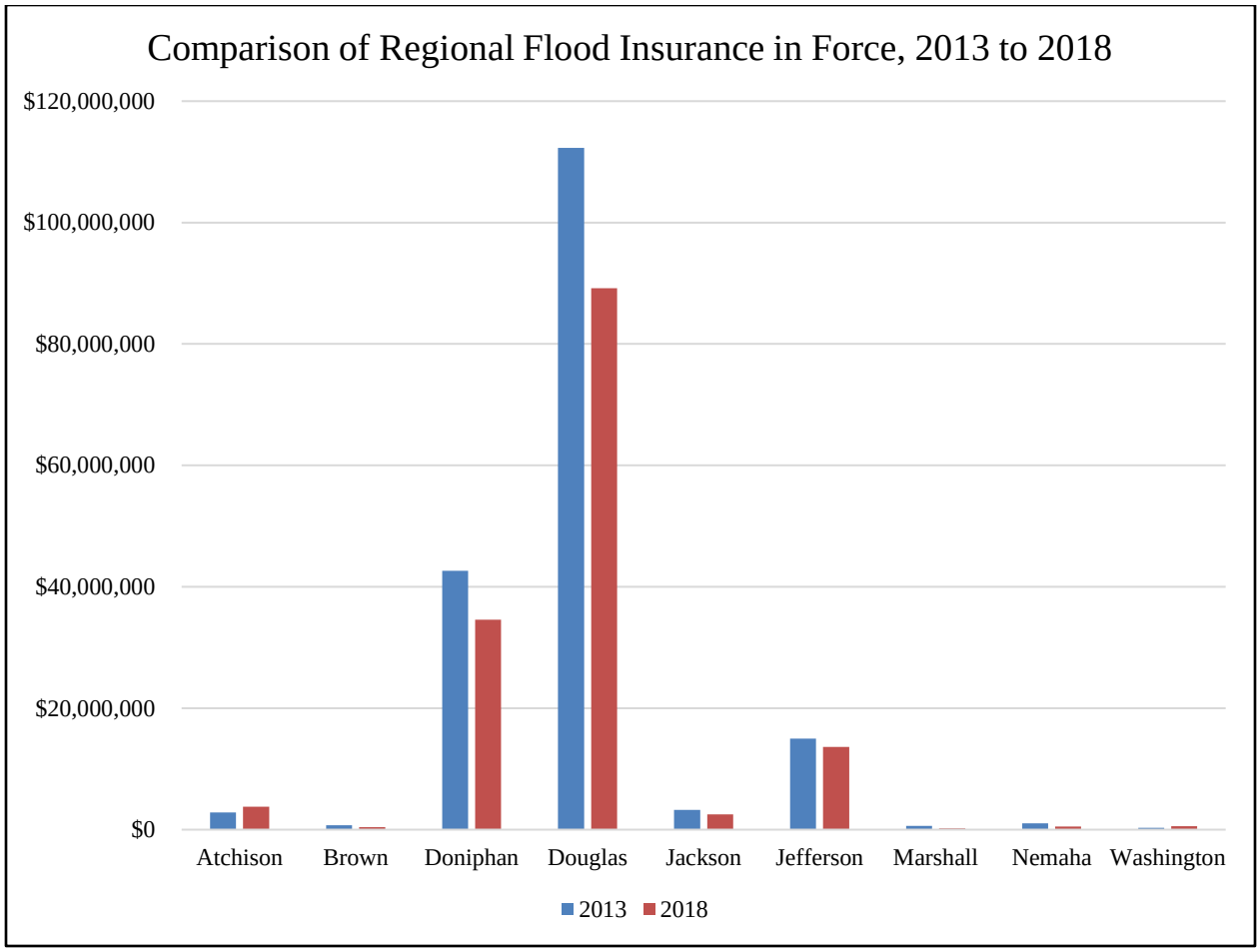
Source: FEMA, "Policy and Loss Data by Community with County and State Data"

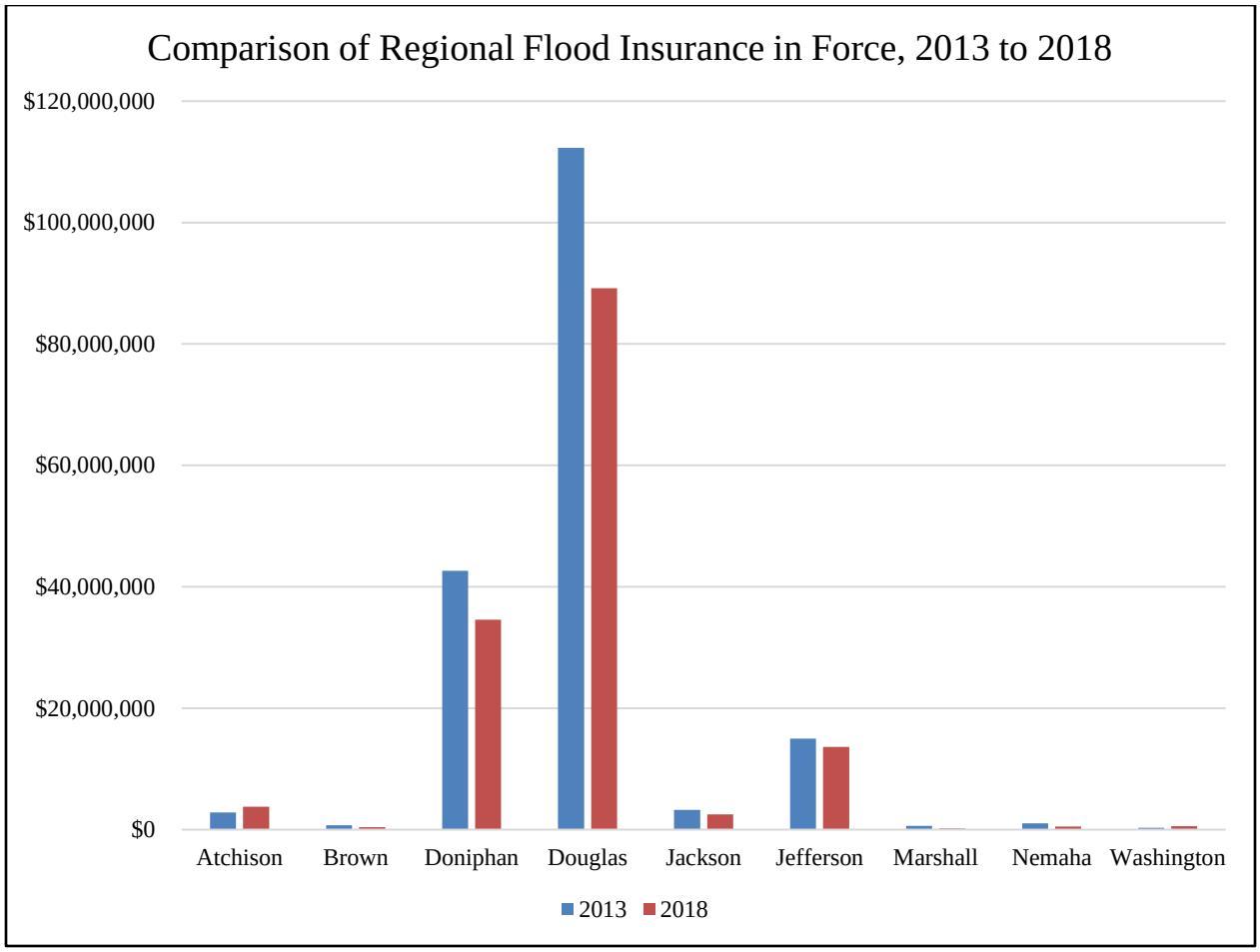
The following graphs summarize data from the above table for Kansas Region K in comparison to 2013 data. Of note:

- Regionally the number of flood policies has decreased from 2013 to 2018, from 955 to 681
- Regionally the amount of flood insurance in-force decreased from 2013 to 2018, from $178,703,000 to $145,365,800

- Regionally the number of flood insurance closed losses increased from 2013 to 2018, from 147 to 153




Comparison of Regional Flood Insurance in Force, 2013 to 2018
$120,000,000
$100,000,000
$80,000,000
$60,000,000
$40,000,000
$20,000,000
$0
Atchison
Brown
Doniphan
Douglas
Jackson
Jefferson
Marshall
Nemaha
Washington
2013
2018



4.13.7 – Repetitive Loss Properties

A high priority to Kansas Region K is the reduction of losses to Repetitive Loss (RL) and Severe Repetitive Loss (SRL) structures. The NFIP defines a RL property as:

- Any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978

At least two of the claims must be more than 10 days apart.

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended, 42 U.S.C. 4102a. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- That has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both of the above, at least two of the referenced claims must have occurred within any ten-year period and must be greater than ten days apart.

The following table details RL and SRL properties in Kansas Region K.

Table 4.101: Kansas Region K Repetitive Loss Properties, As of December 2018

County	Number of RL Properties	Number of RL Properties Mitigated	Number of RL Properties Insured	Number of Losses	Total Paid
Atchison	0	0	0	0	$0
Brown	0	0	0	0	$0
Doniphan	5	1	0	10	$182,203
Douglas	7	1	1	17	$165,194
Jackson	0	0	0	0	$0
Jefferson	2	0	1	4	$112,240
Marshall	2	2	0	4	$40,204
Nemaha	0	0	0	0	$0
Washington	0	0	0	0	$0

The following table details jurisdiction specific information concerning RL property type.

Table 4.102: Kansas Region K Repetitive Loss Properties Type, by Jurisdiction

Jurisdiction	Number of Non-Mitigated RL Properties	Other, Non-Residential	Single Family	2-4 Family
Doniphan County				
Doniphan County	3	0	2	
Elwood	1	0	2	
Douglas County				
Baldwin City	3	1	2	0
Douglas County	2	0	2	0
Eudora	1	0	1	0
Lawrence	1	0	0	1
Jefferson County				
Jefferson County	2	0	2	0
Marshall County				
Marshall County	1	0	1	0
Marysville	1	1	0	0

Source: KDEM

No regional SRL properties have been identified.

4.13.8 – Consequence Analysis

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

Table 4.103: 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.

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4.14.1 – Location and Extent

Hailstorms occur over broad geographic regions. The entire planning area, including all participating jurisdictions, is at risk to hailstorms.

Based on information provided by the Tornado and Storm Research Organization, the following table describes typical damage impacts of the various sizes of hail.

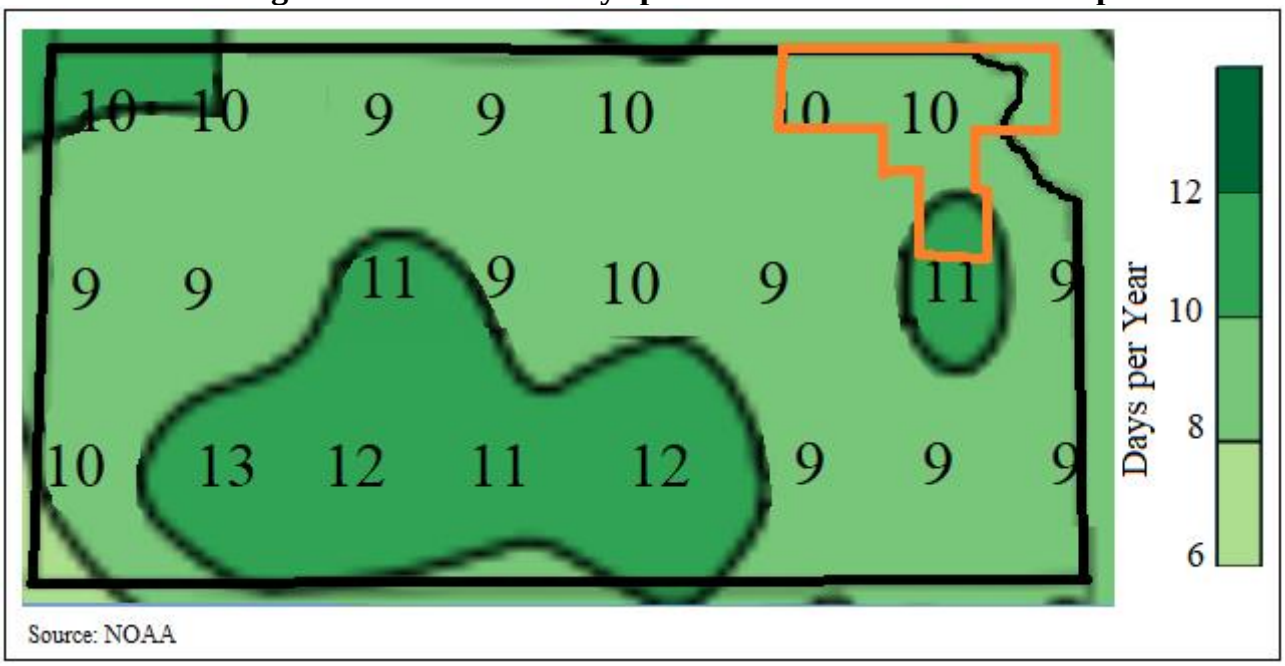
Table 4.104: Hailstorm Intensity Scale

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 K (9).

Kansas Region K Severe Hail Days per Year from 2003 to 2012 Reports



4.14.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 11 Presidential Disaster Declarations for Kansas Region K for severe storms (along with other associates hazard event), of which hail may be a component. The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on hail events that have impacted Kansas Region K. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.105: Kansas Region K FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4230	07/20/2015 (05/04/2015 – 06/21/2015)	**Severe Storms**, Tornados, Straight-Line Winds, and Flooding	Atchison, Brown, Doniphan, Jackson, Jefferson, Marshall, McPherson, Nemaha, Neosho, and Washington.	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	**Severe Storms**, Straight-Line Winds, Tornados, and Flooding	Washington	$11,412,827
4010	07/29/2011 (5/19-6/4/2011)	**Severe Storms**, Straight-Line Winds, Tornados and Flooding	Washington	$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	**Severe Storms**, Flooding and Tornados	Atchison, Brown, Doniphan, Jackson, Marshall and Washington	$9,279,257

Table 4.105: Kansas Region K FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
1849	06/25/2009 (4/25-5/16/2009)	**Severe Storms**, Flooding, Straight-Line Winds, and Tornados	Marshall	$15,013,488
1776	07/09/2008	**Severe Storms**, Flooding, and Tornados	Brown and Jackson	$70,629,544
1699	5/6/2007 (5/4/2007)	**Severe Storms**, Tornados, and Flooding	Brown, Doniphan, Douglas, Jackson, Marshall, Nemaha and Washington	$117,565,269
1638	4/14/2006 (3/12-13/2006)	**Severe Storms**, Tornados, and Straight-Line Winds	Douglas	$6,233,044
1615	11/21/2005 (10/1-2/2005)	**Severe Storms** and Flooding	Atchison, Jackson and Jefferson	$10,286,064
1562	09/30/2004 (8/27-30/2004)	**Severe Storms**, Flooding, and Tornados	Douglas	$2,103,376
1462	5/6/2003 (5/4-30/2003)	**Severe Storms**, Tornados, and Flooding	Douglas	$988,056

Source: FEMA
-: Data unavailable

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

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

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

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

Direct Federal assistance was also authorized. Finally, this declaration made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

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

Table 4.106: Kansas Region K NCEI Hailstorm Events, 2009 - 2018

County	Number of Days with Events	Property Damage	Deaths	Injuries
Atchison	27	$2,000	0	0
Brown	31	$1,000	0	0
Doniphan	12	$0	0	0
Douglas	35	$0	0	0
Jackson	35	$24,000	0	0
Jefferson	25	$8,000	0	2
Marshall	43	$9,000	0	0
Nemaha	32	$0	0	0
Washington	41	$0	0	0

Source: NOAA NCEI

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

- **May 25, 2016: Jefferson County**
  Two injuries reported by the Emergency Manager caused by hail. The victims refused treatment. Time was based on radar.

- **August 19, 2011: Jackson County and Kickapoo Tribal Reservation**
  Multiple windows were broken out due to large hail and gusty winds. Property damage was recorded at $15,000.

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 266 hail related claims on 110,543 acres for $12,294,003.

Table 4.107: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Hail

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Atchison	21	7,385	$960,799
Brown	19	1,616	$149,404
Doniphan	7	1,015	$33,724
Douglas	11	444	$15,332
Jackson	15	3,463	$383,026
Jefferson	11	2,382	$167,056
Marshall	59	26,955	$2,835,792
Nemaha	34	9,831	$1,267,739

Table 4.107: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Hail

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Washington	89	57,454	$6,481,131

Source: USDA Farm Service Agency

4.12.3 – Hazard Probability Analysis

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

Table 4.108: Atchison County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	27
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$2,000
Average Property Damage per Year	$200
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	21
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	7,385
Average Number of Acres Damaged per Year	738
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$960,799
Average Crop Damage per Year	$96,080

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- $200 in property damages

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

- Two insurance claims
- 738 acres impacted
- $96,080 in insurance claims

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

Table 4.109: Brown County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	31
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0

Table 4.109: Brown County Hailstorm Probability Summary

Data	Recorded Impact
Total Reported NCEI Property Damage (2009-2018)	$1,000
Average Property Damage per Year	$100
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	19
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,616
Average Number of Acres Damaged per Year	162
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$149,404
Average Crop Damage per Year	$14,940

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- $100 in property damages

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

- Two insurance claims
- 162 acres impacted
- $14,940 in insurance claims

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

Table 4.110: Doniphan County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	12
Average Events per Year	1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	19
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,015
Average Number of Acres Damaged per Year	102
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$33,724
Average Crop Damage per Year	$3,372

Source: NCEI and USDA

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

- One event
- No deaths or injuries

- $0 in property damages

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

- Two insurance claims
- 102 acres impacted
- $3,372 in insurance claims

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

Table 4.111: Douglas County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	35
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	11
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	444
Average Number of Acres Damaged per Year	44
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$15,332
Average Crop Damage per Year	$1,533

Source: NCEI and USDA

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

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

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

- One insurance claim
- 44 acres impacted
- $1,533 in insurance claims

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

Table 4.112: Jackson County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	35
Average Events per Year	4

Table 4.112: Jackson County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$24,000
Average Property Damage per Year	$2,400
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	15
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,463
Average Number of Acres Damaged per Year	346
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$383,026
Average Crop Damage per Year	$38,303

Source: NCEI and USDA

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

- Four events
- No deaths or injuries
- $2,400 in property damages

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

- Two insurance claims
- 346 acres impacted
- $38,303 in insurance claims

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

Table 4.113: Jefferson County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	25
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	2
Average Number of Days with Event and Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$8,000
Average Property Damage per Year	$800
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	11
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	2,382
Average Number of Acres Damaged per Year	238
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$167,056
Average Crop Damage per Year	$16,706

Source: NCEI and USDA

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

- Three events
- <1 death or injury
- $800 in property damages

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

- One insurance claim
- 238 acres impacted
- $16,706 in insurance claims

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

Table 4.114: Marshall County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	43
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$9,000
Average Property Damage per Year	$900
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	59
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	26,955
Average Number of Acres Damaged per Year	2,696
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$2,835,792
Average Crop Damage per Year	$283,579

Source: NCEI and USDA

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

- Four events
- No deaths or injuries
- $900 in property damages

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

- Six insurance claims
- 2,696 acres impacted
- $283,579 in insurance claims

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

Table 4.115: Nemaha County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	32
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	34
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	9,831
Average Number of Acres Damaged per Year	983
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$1,267,739
Average Crop Damage per Year	$126,774

Source: NCEI and USDA

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

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

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

- Three insurance claims
- 983 acres impacted
- $126,774 in insurance claims

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

Table 4.116: Washington County Hailstorm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	41
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	89
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	57,454
Average Number of Acres Damaged per Year	5,745
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$6,481,131
Average Crop Damage per Year	$648,113

Source: NCEI and USDA

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

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

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

- Nine insurance claims
- 5,745 acres impacted
- $648,113 in insurance claims

In addition, Kansas Region K has had 11 Presidentially Declared Disasters relating to severe storms (of which hail is a potential component) in the last 20 years. This represents an average of one declared severe storm disaster per year.

4.14.4 – Vulnerability Analysis

For purposes of this assessment, all counties and tribal reservations within the region were determined to be at equal risk to hailstorm events. In general, counties and reservations 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 K county incurring damage over the period 2009 to 2018 from hailstorm events. NCEI does not provide data for tribal reservations, rather data for the tribal reservation is included in the county or counties it resides within. Building valuations are provided, if available, for each tribal reservation as a reference against county valuations and percentage damage. The greater the percentage of structures damaged the greater overall potential vulnerability to future events.

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Table 4.117: Kansas Region K Structural Vulnerability Data for Hail, 2009 -2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Atchison	$2,077,340,000	$2,000	0.0%
Brown	$1,135,773,000	$1,000	0.0%
Doniphan	$953,610,000	$0	0.0%
Douglas	$12,489,840,000	$0	0.0%
Iowa Tribal Reservation*	$7,712,800	-	-
Jackson	$1,477,185,000	$24,000	0.0%
Jefferson	$2,239,834,000	$8,000	0.0%
Kickapoo Tribal Reservation*	$6,000,000	-	-
Marshall	$1,231,049,000	$9,000	0.0%
Nemaha	$1,282,096,000	$0	0.0%
Washington	$650,841,000	$0	0.0%

Source: NCEI and HAZUS
*: Data provided by Tribal Government
-: Data unavailable

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

Table 4.118: Hailstorm Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	738	0.42%	$66,913,000	$96,080	0.14%
Brown	258,601	162	0.06%	$112,057,000	$14,940	0.01%
Doniphan	144,927	102	0.07%	$76,581,000	$3,372	0.00%
Douglas	159,261	44	0.03%	$65,867,000	$1,533	0.00%
Jackson	168,682	346	0.21%	$40,215,000	$38,303	0.10%
Jefferson	153,276	238	0.16%	$44,922,000	$16,706	0.04%
Marshall	361,473	2,696	0.75%	$92,882,000	$283,579	0.31%
Nemaha	268,088	983	0.37%	$76,127,000	$126,774	0.17%
Washington	336,673	5,745	1.71%	$87,087,000	$648,113	0.74%

Source: USDA

4.14.5 – Impact and Consequence Analysis

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

Table 4.119: Hailstorm Consequence Analysis

Subject	Impacts of Hailstorm
Health and Safety of the Public	Severity and location dependent. Impacts on persons in the areas of hail are expected to be severe if caught without proper shelter.
Health and Safety of Responders	Impacts will be predicated on the severity of the event. Damaged infrastructure will likely result in hazards such as downed utility lines, main breakages and debris on roadways. .
Continuity of Operations	Temporary relocation may be necessary if government facilities experience damage. Services may be limited to essential tasks if utilities are impacted.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the location and structural capacity of the facility. Loss of structural integrity of buildings and infrastructure could occur. Utility lines, roads, residential and business properties will be affected.
Environment	Impact could be severe for the immediate impacted area, depending on the size of the event. Impact will lessen as distance increases from the immediate incident area
Economic Conditions	Impacts to the economy will be dependent severity of the event and the impact on structures and infrastructure. Impacts could be severe if roads/utilities are affected.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems in place and the timeliness of those warnings could be questioned.

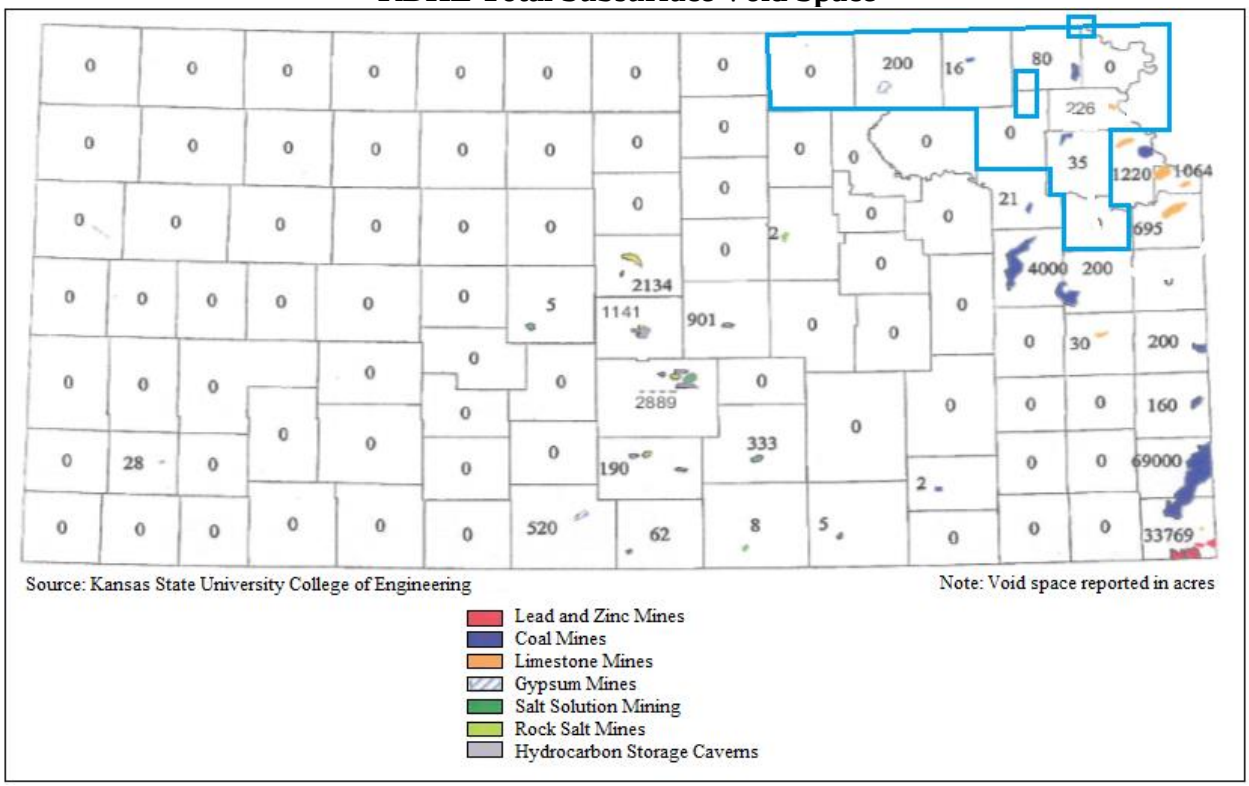
4.15 – Land Subsidence

Land subsidence is caused when the ground above manmade or natural voids collapses. Subsidence can be related to mine collapse, water and oil withdrawal, or natural causes such as shrinking of expansive soils, salt dissolution (which may also be related to mining activities), and cave collapses. The surface depression is known as a sinkhole. If sinkholes appear beneath developed areas, damage or destruction of buildings, roads and rails, or other infrastructure can result. The rate of subsidence, which ranges from gradual to catastrophic, correlates to its risk to public safety and property damage.

4.15.1 – Location and Extent

The Kansas Department of Health and Environment (KDHE) prepared a report on "Subsurface Void Space and Sinkhole/Subsidence Area Inventory for the State of Kansas." The report inventoried subsurface void space from oil and gas exploration and production, natural sources, shaft mining, and solution mining. The following map details the distribution of total acres and major cause of void spaces for all Kansas Region K 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.

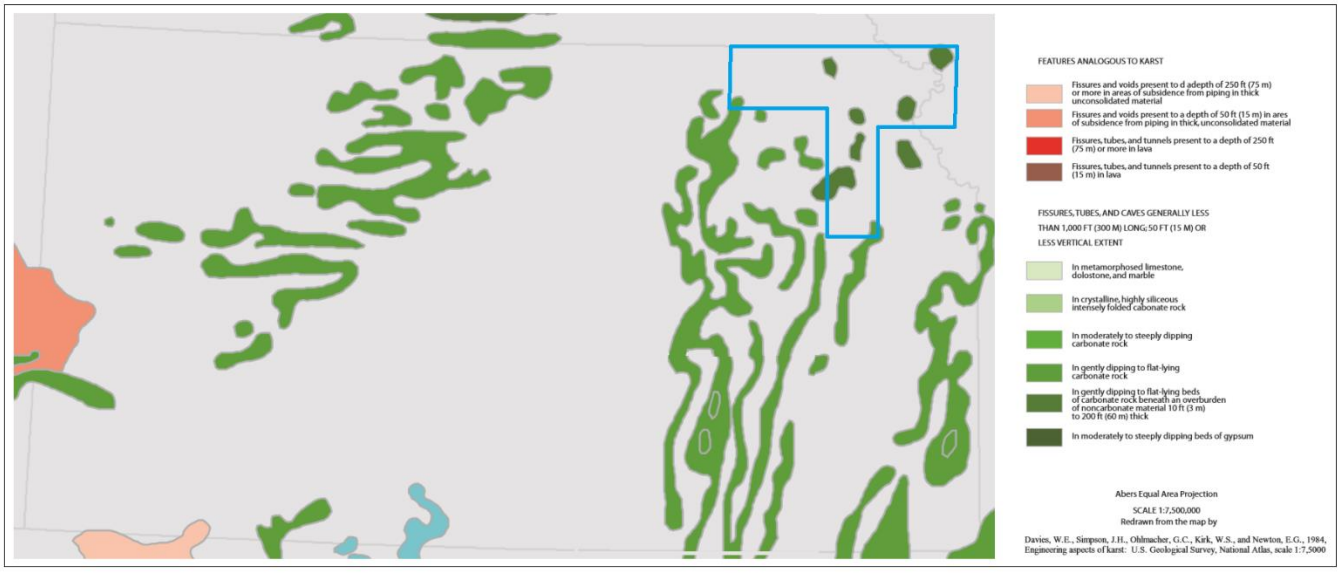
Table 4.120: Kansas Region K Sub-Surface Void Space

County	Total Sub-Surface Void Space
Atchison	226
Brown	80
Doniphan	0
Douglas	0
Jackson	0
Jefferson	35
Marshall	200
Nemaha	16
Washington	0

Source: KDHE

Of additional concern to Kansas Region K 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 K.

USGS Karst Topography



4.15.2 – Previous Occurrences

There have been no reported land subsidence events in Kansas Region K during the ten-year period from 2009 to 2018.

4.15.3 – Hazard Probability Analysis

Land subsidence events with the potential to affect Kansas Region K are incredibly difficult to quantify and forecast. Compounding the difficulty, land subsidence events occur on their own or occur as a secondary hazard with incidents of heavy rain, melting snow, and earthquakes as a primary cause. Hence, their future occurrences are highly dependent on the likelihood of the mentioned hazards.

Based on limited available data, indicating that there have been no reported events in the past ten years, and bearing in mind that many events may be unreported as they have no impact on human activities, the probability of a reported land subsidence occurrence in any given year is very low.

4.15.4 Vulnerability Analysis

In general, counties with a higher or increasing population, high, or increasing, or having a high structural valuation are to be considered to have a potentially greater vulnerability. Population vulnerabilities to land subsidence events are expected to be minimal.

Vulnerability to land subsidence in Kansas Region K 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 K counties. Please note that not all classifications with identified acreage are shown.

Table 4.121: Kansas Region K Sub-Surface Void Space Risk Classification

County	Coal Category II	Coal Category III	Limestone Category I	Limestone Category II	Limestone Category III	Hydrocarbon Storage Category III	Total Sub-Surface Void Space
Atchison	0	27	66	66	67	0	226
Brown	0	80	0	0	0	0	80
Doniphan	0	0	0	0	0	0	0
Douglas	0	0	0	0	0	0	0
Jackson	0	0	0	0	0	0	0
Jefferson	30	0	0	5	0	0	35
Marshall	0	0	0	0	200	0	200
Nemaha	16	0	0	0	0	0	16
Washington	0	0	0	0	0	0	0

Source: KDHE, "Subsurface Void Space and Sinkhole/Subsidence Area Inventory for the State of Kansas" 2006.

Based on this data, the area for each county underlain by sub-surface void acreage was determined. In general, the higher percentage of acreage underlain by void area the higher the vulnerability.

Table 4.122: Kansas Region K 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
Atchison	278,400	226	0.08%
Brown	366,208	80	0.02%
Doniphan	254,144	0	0.00%
Douglas	303,680	0	0.00%
Iowa Tribal Reservation	948	0	0.00%
Jackson	421,030	0	0.00%
Jefferson	356,442	35	0.01%
Kickapoo Tribal Reservation	19,200	0	0.00%
Marshal	578,816	200	0.03%
Nemaha	460,416	16	0.00%
Washington	575,258	0	0.00%

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 K county incurring damage over the period 2009 to 2018 from land subsidence events. NCEI does not provide data for tribal reservations, rather data for the tribal reservation is included in the county or counties it resides within. Building valuations are provided, if available, for each tribal reservation as a reference against county valuations and percentage damage. The greater the percentage of structures damaged the greater overall potential vulnerability to future events.

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Table 4.123: Kansas Region K Structural Vulnerability Data for Land Subsidence, 2009 -2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Atchison	$2,077,340,000	$0	0.00%
Brown	$1,135,773,000	$0	0.0%
Doniphan	$953,610,000	$0	0.0%
Douglas	$12,489,840,000	$0	0.0%
Iowa Tribal Reservation*	$7,712,800	-	-
Jackson	$1,477,185,000	$0	0.0%
Jefferson	$2,239,834,000	$0	0.0%
Kickapoo Tribal Reservation*	$6,000,000	-	-
Marshall	$1,231,049,000	$0	0.0%
Nemaha	$1,282,096,000	$0	0.0%
Washington	$650,841,000	$0	0.0%

Source: NCEI, HAZUS and Tribal data
*: Data provided by Tribal Government
-: Data unavailable

4.15.5 – Impact and Consequence Analysis

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

Table 4.124: Land Subsidence Consequence Analysis

Subject	Impacts of Land Subsidence
Health and Safety of the Public	Local impact expected to be moderate to severe for the incident area, depending on the scale of the area.
Health and Safety of Responders	Impact to responders would be minimal.
Continuity of Operations	Minimal expectation of execution of the COOP, unless a facility is impacted.
Property, Facilities, and Infrastructure	Localized impact to facilities and infrastructure in the incident area has the potential to do severe damage.
Environment	Impact to the area would be minimal.
Economic Conditions	Impacts to the economy will depend on the severity of the damage.
Public Confidence in the Jurisdiction's Governance	Local development policies will be questioned

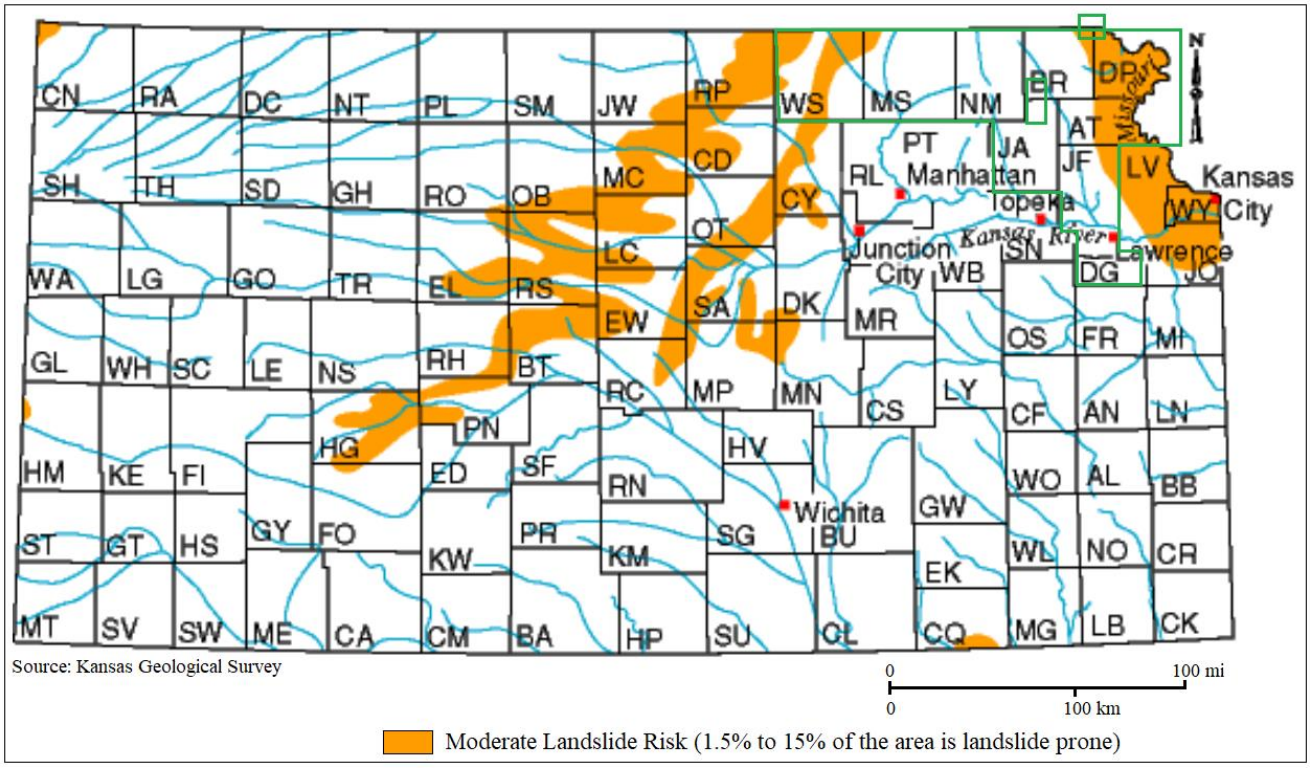
4.16 – Landslides

Landslides are the downward and outward movement of slopes. Landslides include a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on and over steepened slopes is the primary reason for a landslide, landslides are often prompted by the occurrence of other disasters. Other contributing factors include erosion, steep slopes, rain and snow, and earthquakes.

4.16.1 – Location and Extent

Landslides are classified based mostly on their character of movement and degree of internal disruption. These landslide classes are rock fall, flow, slide, and creep. Although these are clear divisions, in the real world a landslide may have components of more than one type. Areas prone to landslides can cover broad geographic regions, but occurrences are generally localized. The entire planning area, including all participating jurisdictions, is potentially at risk to landslides. However, landslides require an earth or rock covered slope, and so flatter areas have a much-decreased risk of occurrence. The following map, produced by the Kansas Geological Survey (KGS), shows areas of the region with a moderate susceptibility of landslides, equating to 1.5% to 15% of the area being landslide prone.

KGS Regional Landslide Map



4.16.2 – Previous Occurrences

At present there is no centralized and complete database containing historical records for landslides in Kansas. For Kansas Region K there has been one reported landslide in the past 10 years.

- **Fall, 2018: Atchison County**
  A slow-moving landslide impacted Atchison High School. Property damage was reported at $14,850.

4.16.3 – Hazard Probability Analysis

Landslides with the potential to affect Kansas Region K 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 K (in Washington, Jefferson and Marshall counties) 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 one 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. In general, 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 4.125: Kansas Region K Percentage of Land in Moderate Landslide Risk Area

County	Total County Acreage	Percentage of County Acreage Identified in Potential Slide Area	Estimated Acreage with Moderate Landslide Potential
Atchison	278,400	50%	139,200
Brown	366,208	5%	18,310
Doniphan	254,144	100%	254,144
Douglas	303,680	0%	0
Iowa Tribal Reservation	948	100%	948
Jackson	421,030	0%	0
Jefferson	356,442	15%	53,466
Kickapoo Tribal Reservation	19,200	0%	0
Marshal	578,816	0%	0
Nemaha	460,416	0%	0
Washington	575,258	50%	287,629

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 K county incurring damage over the period 2009 to 2018 from landslide events. NCEI does not provide data for tribal reservations, rather data for the tribal reservation is included in the county or counties it resides within. Building valuations are provided, if available, for each tribal reservation as a reference against county valuations and percentage damage. The greater the percentage of structures damaged the greater overall potential vulnerability to future events.

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Table 4.126: Kansas Region K Structural Vulnerability Data for Landslide, 2009 -2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Atchison	$2,077,340,000	$0	0.0%
Brown	$1,135,773,000	$0	0.0%
Doniphan	$953,610,000	$0	0.0%
Douglas	$12,489,840,000	$0	0.0%
Iowa Tribal Reservation	$7,712,800	-	-
Jackson	$1,477,185,000	$0	0.0%
Jefferson	$2,239,834,000	$0	0.0%
Kickapoo Tribal Reservation	$6,000,000	-	-
Marshall	$1,231,049,000	$0	0.0%
Nemaha	$1,282,096,000	$0	0.0%
Washington	$650,841,000	$0	0.0%

Source: NCEI, HAZUS and Tribal data
-: Data unavailable

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 4.127: Landslide Consequence Analysis

Subject	Impacts of Landslide
Health and Safety of the Public	Severity and location dependent. Impacts on persons in the path of the slide are expected to be severe.
Health and Safety of Responders	Impacts are expected to be minimal.
Continuity of Operations	Minimal expectation of execution of the COOP, unless a facility is impacted.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the location of the facility in relation to the slide. Loss of structural integrity of buildings and infrastructure could occur.
Environment	Impact to the area would be minimal other than the immediate area.
Economic Conditions	Impacts to the economy will be dependent severity of landslide and the impact on structures and infrastructure. Impacts could be severe if roads/utilities are affected. Otherwise impact would be non-existent to minimal.
Public Confidence in the Jurisdiction's Governance	Confidence could be an issue if local development policies are questioned.

4.17 – Lightning

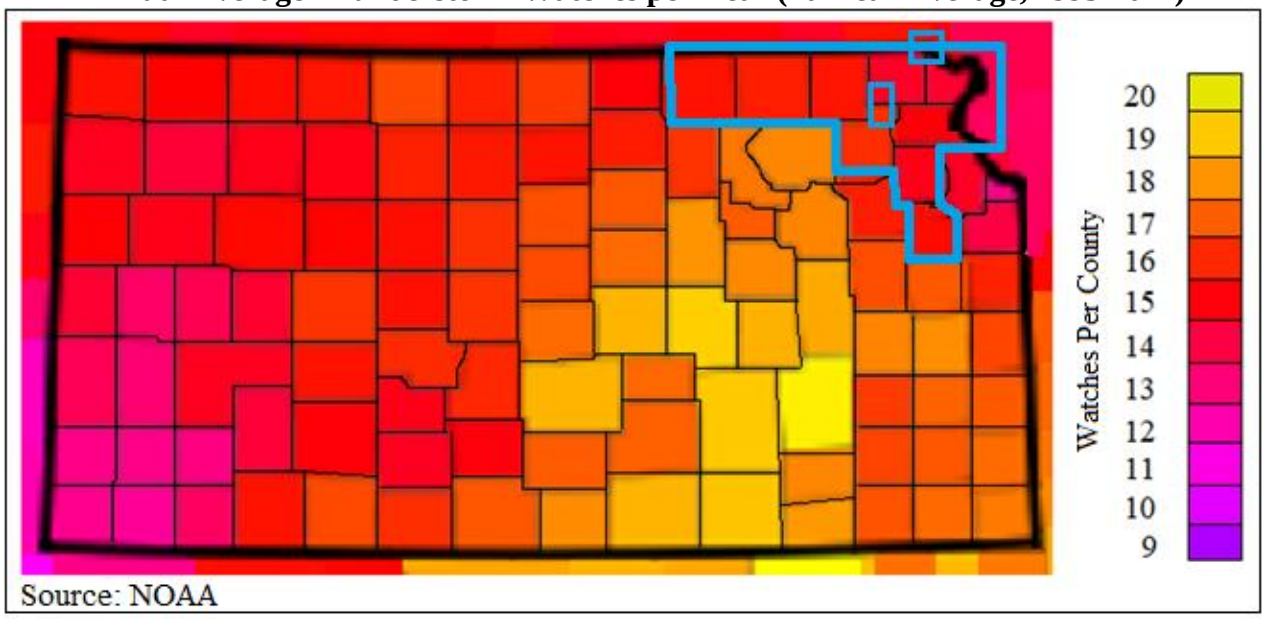
Lightning is a discharge of atmospheric electricity that is triggered by a buildup of differing charges within a cloud. According to the NWS, lightning is one of the most underrated severe weather hazards and is the second deadliest weather killer in the United States.

4.17.1 – Location and Extent

Lightning occurs over broad geographic regions. The entire Kansas Region K planning area, including all participating jurisdictions, is at risk to lightning.

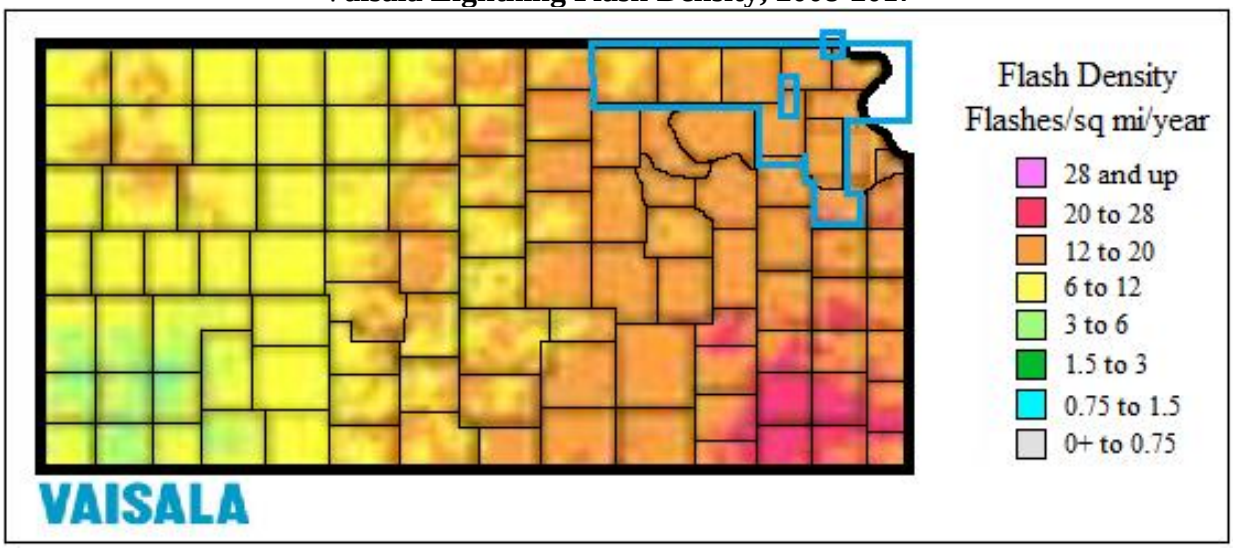
Thunderstorms are often the generator of lightning. The following map, generated by NOAA, indicates the average number severe thunderstorm watches per year for Kansas Region K.

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 K. In general, the more recorded flashes the greater the potential for lightning strikes.

Vaisala Lightning Flash Density, 2008-2017



4.17.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 11 Presidential Disaster Declarations for Kansas Region K for severe storms (along with other associates hazard event), of which lightning may be a component. The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on hail events that have impacted Kansas Region K. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.128: Kansas Region K FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4230	07/20/2015 (05/04/2015 – 06/21/2015)	**Severe Storms**, Tornados, Straight-Line Winds, and Flooding	Atchison, Brown, Doniphan, Jackson, Jefferson, Marshall, McPherson, Nemaha, Neosho, and Washington.	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	**Severe Storms**, Straight-Line Winds, Tornados, and Flooding	Washington	$11,412,827
4010	07/29/2011 (5/19-6/4/2011)	**Severe Storms**, Straight-Line Winds, Tornados and Flooding	Washington	$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	**Severe Storms**, Flooding and Tornados	Atchison, Brown, Doniphan, Jackson, Marshall and Washington	$9,279,257
1849	06/25/2009 (4/25-5/16/2009)	**Severe Storms**, Flooding, Straight-Line Winds, and Tornados	Marshall	$15,013,488
1776	07/09/2008	**Severe Storms**, Flooding, and Tornados	Brown and Jackson	$70,629,544
1699	5/6/2007 (5/4/2007)	**Severe Storms**, Tornados, and Flooding	Brown, Doniphan, Douglas, Jackson, Marshall, Nemaha and Washington	$117,565,269

Table 4.128: Kansas Region K FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
1638	4/14/2006 (3/12-13/2006)	**Severe Storms**, Tornados, and Straight-Line Winds	Douglas	$6,233,044
1615	11/21/2005 (10/1-2/2005)	**Severe Storms** and Flooding	Atchison, Jackson and Jefferson	$10,286,064
1562	09/30/2004 (8/27-30/2004)	**Severe Storms**, Flooding, and Tornados	Douglas	$2,103,376
1462	5/6/2003 (5/4-30/2003)	**Severe Storms**, Tornados, and Flooding	Douglas	$988,056

Source: FEMA
-: Data unavailable

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

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

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

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

In addition to the above reported events, the following table presents NOAA NCEI identified lightning events and the resulting damage totals in Kansas Region K from the period 2009 - 2018.

Table 4.129: Kansas Region K NCEI Lightning Events, 2009 - 2018

County	Number of Events	Property Damage	Deaths	Injuries
Atchison	0	$0	0	0
Brown	0	$0	0	0
Doniphan	0	$0	0	0
Douglas	0	$0	0	0
Jackson	0	$0	0	0
Jefferson	1	$0	1	1
Marshall	0	$0	0	0
Nemaha	0	$0	0	0
Washington	0	$0	0	0

Source: NOAA NCEI

The following local events were reported.

- **April 25, 2009: Jefferson County**
  A group of seven motorcyclists riding together as members of the group Bikers Against Child Abuse were struck by lightning just before 5pm on the 25th. One biker was killed by the strike, and the rider next to him was injured and taken to the hospital but released later that evening. The other 5 were not injured.

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 4.130: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Lightning

County	USDA Crop Loss	Acres Impacted	Number of Claims
Atchison	$0	0	0
Brown	$0	0	0
Doniphan	$0	0	0
Douglas	$0	0	0
Jackson	$0	0	0
Marshall	$0	0	0
Jefferson	$0	0	0
Nemaha	$0	0	0
Washington	$0	0	0

Source: USDA

4.17.3 – Hazard Probability Analysis

Data from the NCEI indicates that Region K counties can expect on a yearly basis, relevant to lightning events:

- One events
- <1 death
- <1 injury

- $0 in property damages

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

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

In addition, Kansas Region K has had 11 Presidentially Declared Disasters relating to severe storms (of which lightning is a potential component) in the last 20 years. This represents an average of one declared severe storm 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 K county incurring damage over the period 2009 to 2018 from lightning events. NCEI does not provide data for tribal reservations, rather data for the tribal reservation is included in the county or counties it resides within. Building valuations are provided, if available, for each tribal reservation as a reference against county valuations and percentage damage. The greater the percentage of structures damaged the greater overall potential vulnerability to future events.

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Table 4.131: Kansas Region K Structural Vulnerability Data for Lightning, 2009 -2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Atchison	$2,077,340,000	$0	0.0%
Brown	$1,135,773,000	$0	0.0%
Doniphan	$953,610,000	$0	0.0%
Douglas	$12,489,840,000	$0	0.0%
Iowa Tribal Reservation*	$7,712,800	-	-
Jackson	$1,477,185,000	$0	0.0%
Jefferson	$2,239,834,000	$0	0.0%
Kickapoo Tribal Reservation*	$6,000,000	-	-
Marshall	$1,231,049,000	$0	0.0%
Nemaha	$1,282,096,000	$0	0.0%
Washington	$650,841,000	$0	0.0%

Source: NCEI, HAZUS and Tribal data
-: Data unavailable

Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.132: Kansas Region K Population Vulnerability Data for Lightning

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

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 K County. USDA Risk Management Agency crop loss data (2014 – 2018) allows us to quantify the monetary impact of lightning strikes on the agricultural sector. In general, the higher the percentage loss, the higher the vulnerability the county has to lightning events.

Table 4.133: Lightning Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	0	0.0%	$66,913,000	$0	0.0%
Brown	258,601	0	0.0%	$112,057,000	$0	0.0%
Doniphan	144,927	0	0.0%	$76,581,000	$0	0.0%
Douglas	159,261	0	0.0%	$65,867,000	$0	0.0%
Jackson	168,682	0	0.0%	$40,215,000	$0	0.0%
Jefferson	153,276	0	0.0%	$44,922,000	$0	0.0%
Marshall	361,473	0	0.0%	$92,882,000	$0	0.0%
Nemaha	268,088	0	0.0%	$76,127,000	$0	0.0%
Washington	336,673	0	0.0%	$87,087,000	$0	0.0%

Source: USDA

4.17.5 – Impact and Consequence Analysis

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

Table 4.134: Lightning Consequence Analysis

Subject	Impacts of Lightning
Health and Safety of the Public	Severity and location dependent. Impacts on persons in the areas of lightning are expected to be severe if caught without proper shelter.
Health and Safety of Responders	Impacts will be predicated on the severity of the event. Damaged infrastructure will likely result in hazards such as downed utility lines, main breakages and debris on roadways.
Continuity of Operations	Temporary relocation may be necessary if government facilities experience damage. Services may be limited to essential tasks if utilities are impacted.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be minimal to severe, depending on the location and structural capacity of the facility. Loss of utility infrastructure could occur. Utility lines, residential and business properties will be affected.
Environment	Impact could be severe for the immediate impacted area, depending on the size of the event. Impact will lessen as distance increases from the immediate incident area
Economic Conditions	Impacts to the economy will be dependent severity of the event and the impact on structures and infrastructure. Impacts could be severe if utilities are affected.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems in place and the timeliness of those warnings could be questioned.

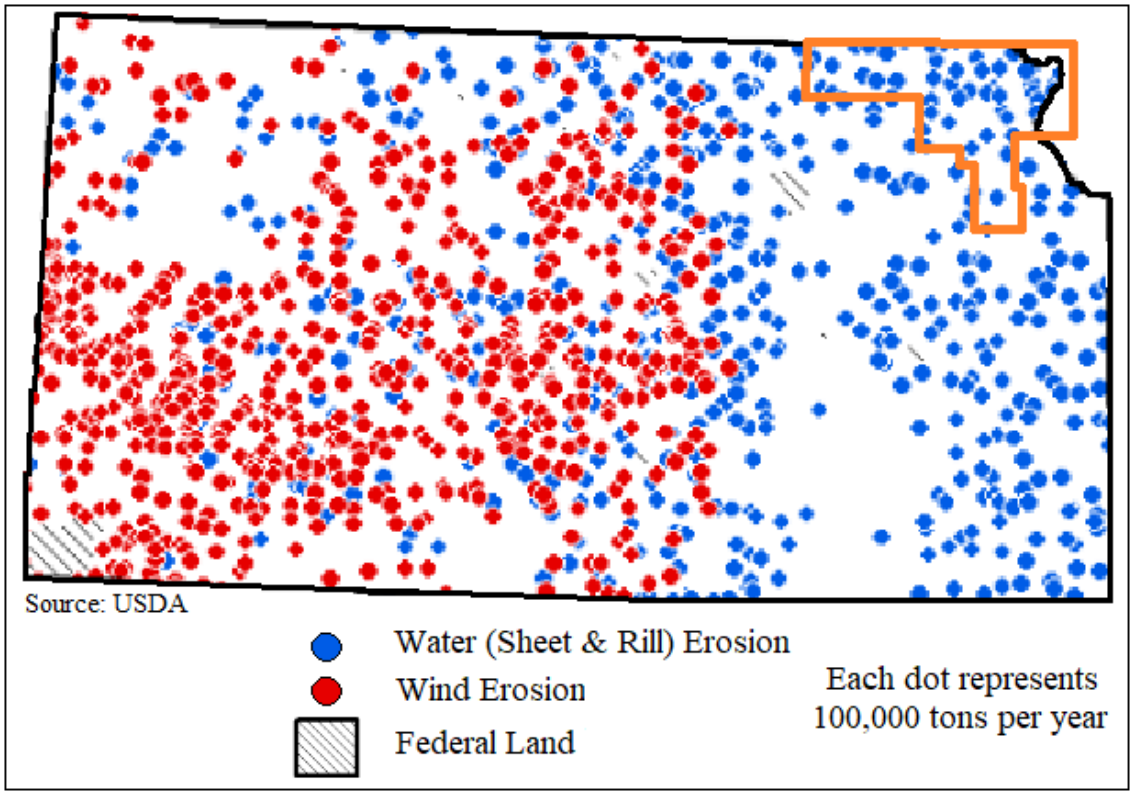
4.18 – Soil Erosion and Dust

Soil erosion, in general, is a process that removes topsoil through the application of water, wind, or farming activities. Soil erosion can be a slow, unobserved process or can happen quickly due to extreme environmental factors. The United States is losing soil 10 times faster than the natural replenishment rate, and related production losses cost the country about $44,000,000,000 each year. On average, wind erosion is responsible for about 40% of this loss and can increase markedly in drought years.

4.18.1 – Location and Extent

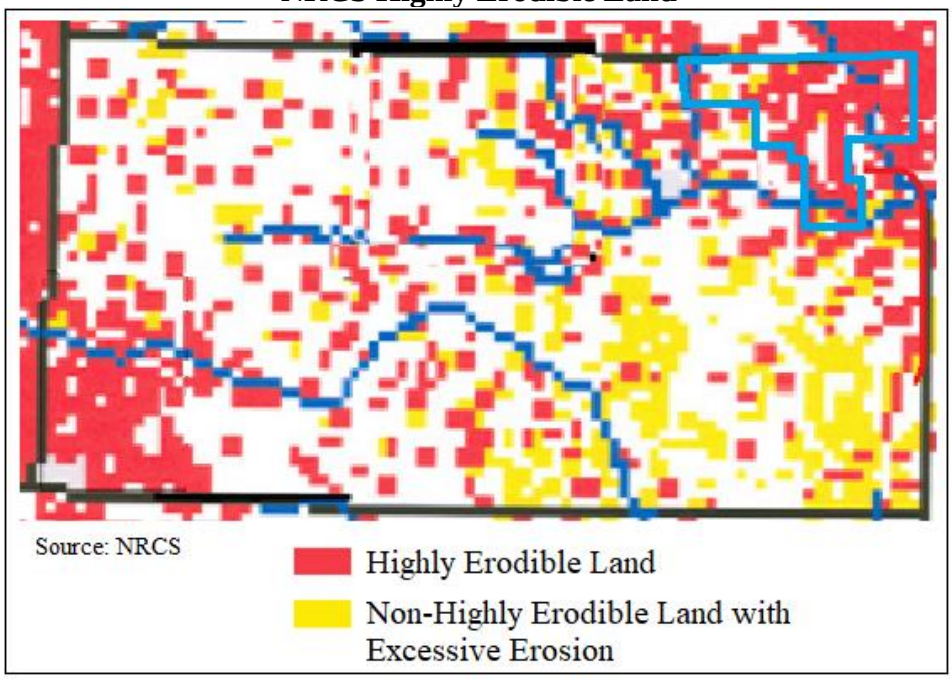
Soil erosion and dust occurs over broad geographic regions. The entire Kansas Region K planning area, including all participating jurisdictions, is at risk to soil erosion and dust.

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 K 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, for the region, indicates no related claims

4.18.3 – Hazard Probability Analysis

Predicting future erosion amounts is problematic as much relies on farm management practices, available moisture and crop type. Due to the on-going nature of this hazard, and the small agricultural base for the region, it is expected that future events causing minimally measurable impact to the regions crops and farmers will continue occur. Again, the rate of occurrence and potential future occurrence will be predicated on farm management practices and drought and water conditions.

4.18.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to soil erosion and dust events. Additionally, as this hazard disproportionately impacts the agricultural sector, only data on that sector was reviewed for potential vulnerability. Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of soil erosion on the region's agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates no soil erosion related claims.

Table 4.135: Soil Erosion and Dust Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	0	0.0%	$66,913,000	$0	0.0%
Brown	258,601	0	0.0%	$112,057,000	$0	0.0%
Doniphan	144,927	0	0.0%	$76,581,000	$0	0.0%
Douglas	159,261	0	0.0%	$65,867,000	$0	0.0%
Jackson	168,682	0	0.0%	$40,215,000	$0	0.0%
Jefferson	153,276	0	0.0%	$44,922,000	$0	0.0%
Marshall	361,473	0	0.0%	$92,882,000	$0	0.0%
Nemaha	268,088	0	0.0%	$76,127,000	$0	0.0%
Washington	336,673	0	0.0%	$87,087,000	$0	0.0%

Source: USDA

4.18.5 – Impact and Consequence Analysis

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

Table 4.136: Soil Erosion and Dust Consequence Analysis

Subject	Impacts of Soil Erosion and Dust
Health and Safety of the Public	Impact tends to be agricultural; however, dust can be a danger to susceptible individuals in the form of air pollutants.
Health and Safety of Responders	With proper preparedness and protection, impact to the responders is expected to be minimal.
Continuity of Operations	Minimal expectation for utilization of the COOP.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be severe, depending on the site of the soil erosion. This could adversely affect utility poles/lines, and facilities. Dust can also adversely affect machinery, air conditioners, etc.
Environment	The impact to the environment could be severe. Soil erosion and dust can severely affect farming, ranching, wildlife and plants due to production losses and habitat changes.
Economic Conditions	Impacts to the economy will be dependent on how extreme the soil erosion and dust are. Potentially it could severely affect crop yield and productivity. Seedling survival and growth is stressed by erosion and dust, as is the top soil which agriculture is dependent on.
Public Confidence in the Jurisdiction's Governance	Planning, response, and recovery may be questioned if not timely and effective.

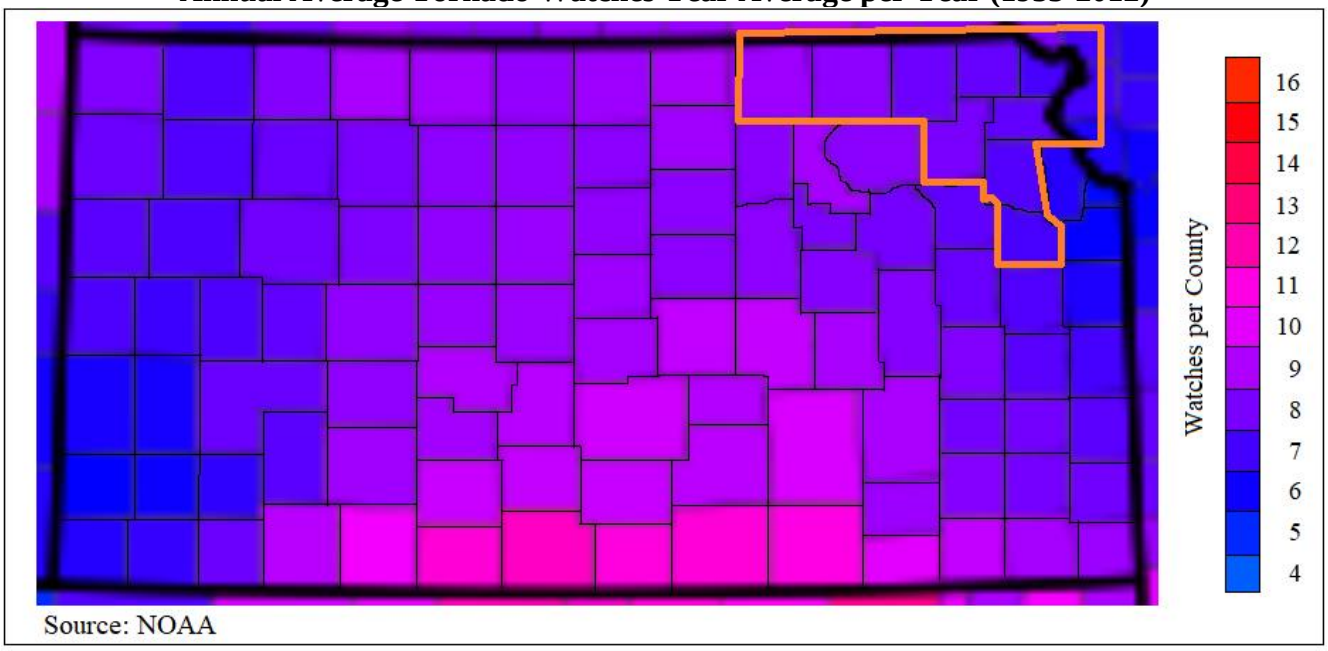
4.19 – Tornado

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

4.19.1 – Location and Extent

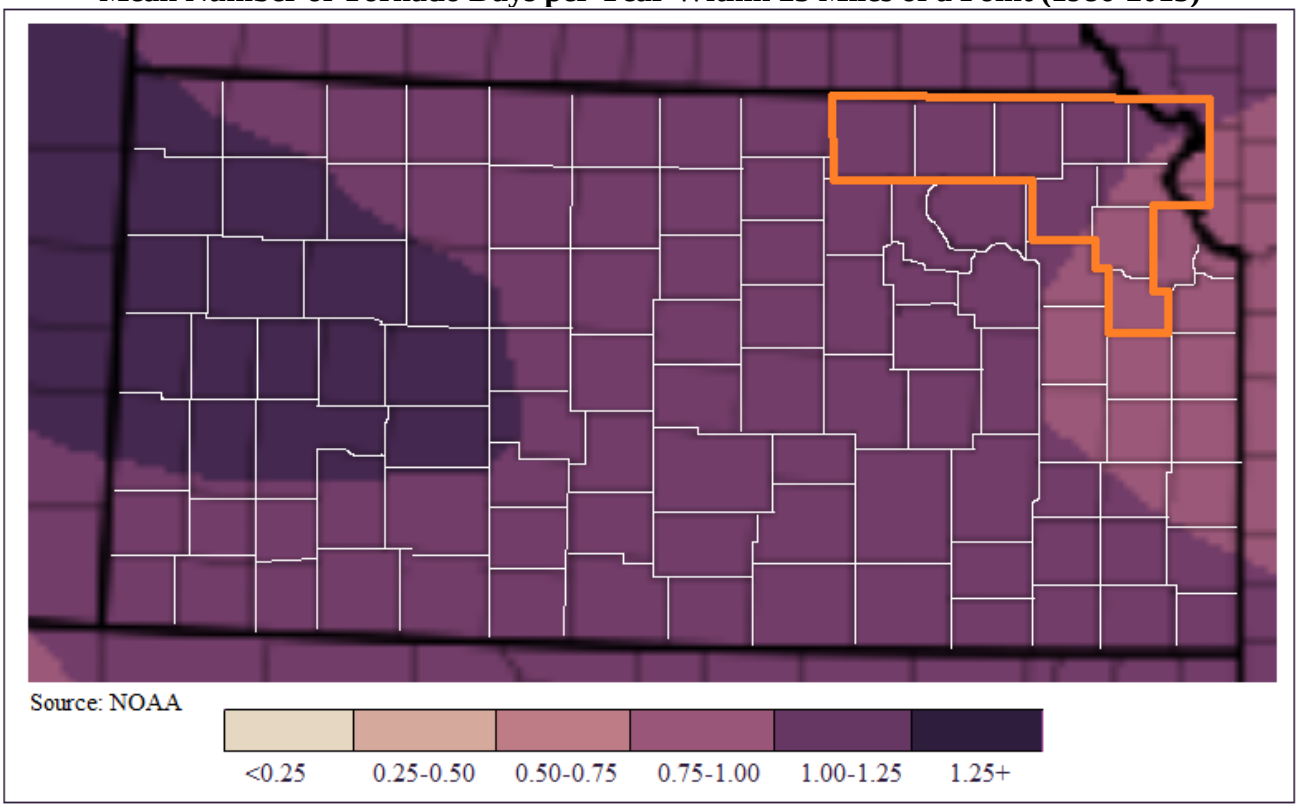
Tornados can strike anywhere in Kansas Region K, placing the entire planning area at risk. The following map, generated by NOAA, shows the average annual tornado watches per year for Kansas Region K.

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 4.137: Enhanced Fujita Scale

Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
EF0	65-85	53.5%	Light. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornados with no reported damage (i.e. those that remain in open fields) are always rated EF0.
EF1	86-110	31.6%	Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	10.7%	Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes complete destroyed; large trees

Table 4.137: Enhanced Fujita Scale

Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
			snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	0.7%	Devastating. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	<0.1%	Explosive. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur.

Source: NOAA Storm Prediction Center

4.19.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 10 Presidential Disaster Declarations for Kansas Region K for tornados (along with other associates hazard event), of which hail may be a component. The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on tornado events that have impacted Kansas Region K. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.138: Kansas Region K FEMA Tornado Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4230	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, **Tornados**, Straight-Line Winds, and Flooding	Atchison, Brown, Doniphan, Jackson, Jefferson, Marshall, McPherson, Nemaha, Neosho, and Washington.	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	Severe Storms, Straight-Line Winds, **Tornados**, and Flooding	Washington	$11,412,827
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, Straight-Line Winds, **Tornados** and Flooding	Washington	$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	Severe Storms, Flooding and **Tornados**	Atchison, Brown, Doniphan, Jackson, Marshall and Washington	$9,279,257
1849	06/25/2009 (4/25-5/16/2009)	Severe Storms, Flooding, Straight-Line Winds, and **Tornados**	Marshall	$15,013,488
1776	07/09/2008	Severe Storms, Flooding, and **Tornados**	Brown and Jackson	$70,629,544
1699	5/6/2007 (5/4/2007)	Severe Storms, **Tornados**, and Flooding	Brown, Doniphan, Douglas, Jackson, Marshall, Nemaha and Washington	$117,565,269

Table 4.138: Kansas Region K FEMA Tornado Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
1638	4/14/2006 (3/12-13/2006)	Severe Storms, **Tornados**, and Straight-Line Winds	Douglas	$6,233,044
1562	09/30/2004 (8/27-30/2004)	Severe Storms, Flooding, and **Tornados**	Douglas	$2,103,376
1462	5/6/2003 (5/4-30/2003)	Severe Storms, **Tornados**, and Flooding	Douglas	$988,056

Source: FEMA
-: Data unavailable

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

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

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

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

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

Table 4.139: Kansas Region K NCEI Tornado Events, 2009 - 2018

County	Number of Days with Event	Property Damage	Deaths	Injuries	Highest Rated Tornado
Atchison	0	$0	0	0	-
Brown	3	$0	0	0	EF1
Doniphan	2	$0	0	0	EF0
Douglas	3	$0	0	0	EF1
Jackson	2	$25,000	0	0	EF0
Jefferson	2	$0	0	0	EF0
Marshall	4	$0	0	0	EF2
Nemaha	4	$0	0	2	EF3
Washington	5	$10,000	0	0	EF1

Source: NOAA NCEI

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

- **June 3, 2014: Nemaha County**
  A tornado touched down around the intersection of highway 71 and 63 around 1030 pm CDT. The damage path moved southeast and included several homes that were severely damaged, and one totally destroyed. The worst damage occurred to a slab home anchored to the foundation by anchor bolts installed with nuts and washers every 12-18 inches. All exterior and interior walls were destroyed however the debris was primarily laid on top of the slab with some debris blown to the south. Two adult residents took shelter in a tub and survived with minor injuries although the tub was gone and it was suspected to have been blown into a lake to the south.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of tornados on the region's agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates no tornado related claims.

Table 4.140: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Tornados

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Atchison	0	0	$0
Brown	0	0	$0
Doniphan	0	0	$0
Douglas	0	0	$0
Jackson	0	0	$0
Jefferson	0	0	$0
Marshall	0	0	$0
Nemaha	4	610	$27,739
Washington	0	0	$0
Sedgwick	0	0	$0

Source: USDA

4.19.3 – Hazard Probability Analysis

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

Table 4.141: Atchison County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	0
Average Events per Year	0
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$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 Atchison County can expect on a yearly basis, relevant to tornado events:

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

According to the USDA Risk Management Agency, Atchison 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 **Brown County**.

Table 4.142: Brown County Tornado Probability Summary

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

Table 4.142: Brown County Tornado Probability Summary

Data	Recorded Impact
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 Brown 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, Brown 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 **Doniphan County**.

Table 4.143: Doniphan County Tornado Probability Summary

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

Table 4.144: Douglas County Tornado Probability Summary

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

Table 4.145: Jackson County Tornado Probability Summary

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

Table 4.145: Jackson County Tornado Probability Summary

Data	Recorded Impact
Total Reported NCEI Property Damage (2009-2018)	$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 Jackson County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $2,500 in property damages

According to the USDA Risk Management Agency, Jackson 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 **Jefferson County**.

Table 4.146: Jefferson County Tornado Probability Summary

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

Table 4.147: Marshall County Tornado Probability Summary

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

Table 4.148: Nemaha County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	4
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	2
Average Number of Days with a Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	4
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	610
Average Number of Acres Damaged per Year	61
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$27,739
Average Crop Damage per Year	$2,774

Source: NCEI and USDA

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

- <1 event
- <1 death or injury
- $0 in property damages

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

- <1 insurance claim
- 61 acres impacted
- $2,774 in insurance claims

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

Table 4.149: Washington County Tornado Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	5
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$10,000
Average Property Damage per Year	$1,000
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 Washington County can expect on a yearly basis, relevant to tornado events:

- <1 event
- No deaths or injuries
- $1,000 in property damages

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

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

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

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

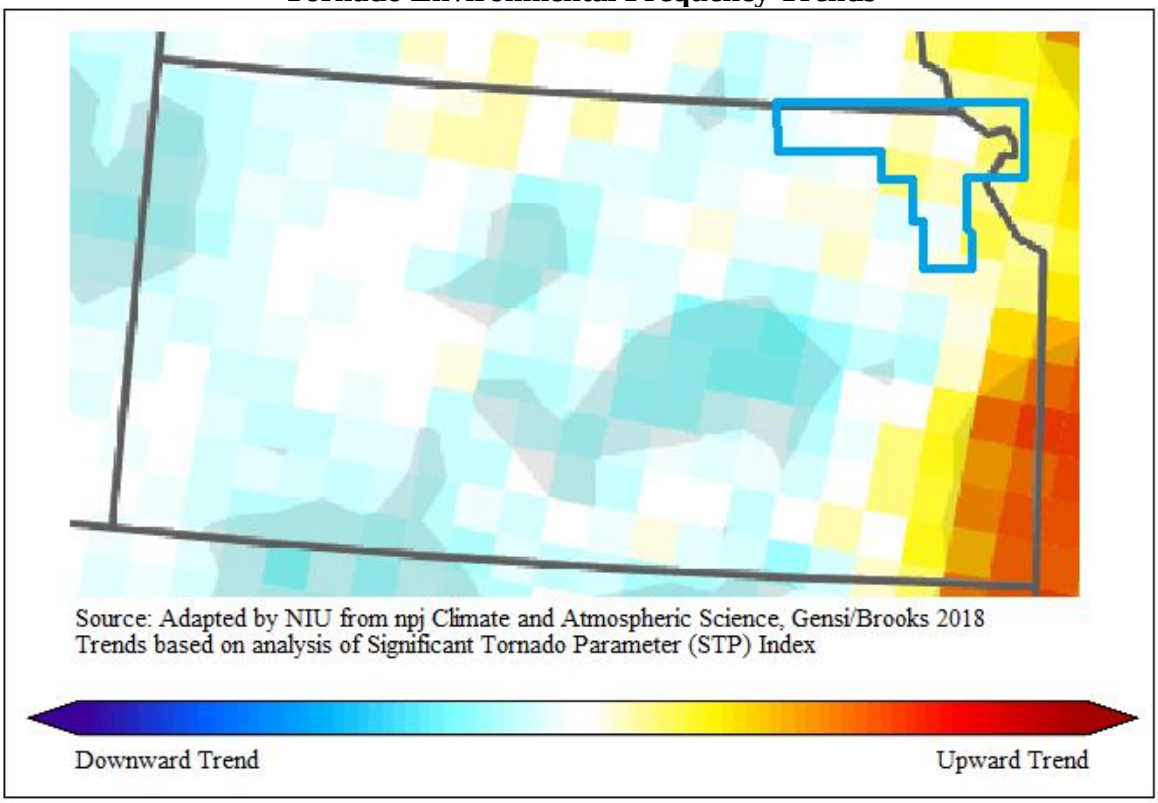
However, if events are normalized for tornados rated above an EF2, we derive the following probability for event occurrence:

- **Probability of an EF2 or greater tornado:** <1 event per year

In addition, Kansas Region K has had 10 Presidentially Declared Disasters relating to tornados (and other concurrent events such as flooding) in the last 20 years. This represents an average of one declared tornado 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 K 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 K county incurring damage over the period 2009 to 2018 from tornado events. NCEI does not provide data for tribal reservations, rather data for the tribal reservation is included in the county or counties it resides within. Building valuations are provided, if available, for each tribal reservation as a reference against county valuations and percentage damage. The greater the percentage of structures damaged the greater overall potential vulnerability to future events.

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Table 4.150: Kansas Region K Structural Vulnerability Data for Tornados, 2009 -2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Atchison	$2,077,340,000	$0	0.0%
Brown	$1,135,773,000	$0	0.0%
Doniphan	$953,610,000	$0	0.0%
Douglas	$12,489,840,000	$0	0.0%
Iowa Tribal Reservation*	$7,712,800	-	-
Jackson	$1,477,185,000	$25,000	0.002%
Jefferson	$2,239,834,000	$0	0.00%

Table 4.150: Kansas Region K Structural Vulnerability Data for Tornados, 2009 -2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Kickapoo Tribal Reservation	$6,000,000	-	-
Marshall	$1,231,049,000	$0	0.00%
Nemaha	$1,282,096,000	$0	0.00%
Washington	$650,841,000	$27,739	0.004%

Source: NCEI, HAZUS and Tribal data
-: Data unavailable

Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.151: Kansas Region K Population Vulnerability Data for Tornados

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

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 K County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of tornados on the agricultural sector. In general, the higher the percentage loss, the higher the vulnerability the county has to tornado events.

Table 4.152: Tornado Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	0	0.00%	$66,913,000	$0	0.00%
Brown	258,601	0	0.00%	$112,057,000	$0	0.00%
Doniphan	144,927	0	0.00%	$76,581,000	$0	0.00%
Douglas	159,261	0	0.00%	$65,867,000	$0	0.00%
Jackson	168,682	0	0.00%	$40,215,000	$0	0.00%
Jefferson	153,276	0	0.00%	$44,922,000	$0	0.00%
Marshall	361,473	0	0.00%	$92,882,000	$0	0.00%
Nemaha	268,088	61	0.02%	$76,127,000	$2,774	0.00%

Table 4.152: Tornado Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Washington	336,673	0	0.00%	$87,087,000	$0	0.00%

Source: USDA

Between 2001 and 2010 51% of those killed by tornados were living in mobile homes, according to the NOAA. A 2012 "Kansas Severe Weather Awareness Week" report indicates that people living in mobile homes are killed by tornados at a rate 20 times higher than people living in permanent homes. Additionally, a new study from Michigan State University reported that the two biggest factors related to tornado fatalities were housing quality (measured by mobile homes as a proportion of housing units) and income level. When a tornado strikes, a county with double the number of mobile homes as a proportion of all homes will experience 62% more fatalities than a county with fewer mobile homes, according to the study data.

The following participating jurisdictions may have increased vulnerability to tornado events due to having greater than 20% of housing stock as mobile homes:

- **Huron** (Atchison County)
- **Elwood** (Doniphan County)
- **Lecompton** (Douglas County)
- **Soldier** (Jackson County)
- **Wetmore** (Nemaha County)

4.19.5 – Impact and Consequence Analysis

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

Table 4.153: Tornado Consequence Analysis

Subject	Impacts of Tornado
Health and Safety of the Public	Impact of the immediate area could be severe depending on whether individuals were able to seek shelter and get out of the trajectory of the tornado. Casualties are dependent on warning systems and warning times.
Health and Safety of Responders	Impact to responders is expected to be minimal unless responders live within the affected area.
Continuity of Operations	Temporary to permanent relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the trajectory path. Roads, buildings, and communications could be adversely affected. Damage could be severe.
Environment	Impact will be severe for the immediate impacted area. Impact will lessen as distance increases from the immediate incident area.
Economic Conditions	Impacts to the economy will greatly depend on the trajectory of the tornado. If a jurisdiction takes a direct hit then the economic conditions will be severe. With an indirect hit the impact could be low to severe.

Table 4.153: Tornado Consequence Analysis

Subject	Impacts of Tornado
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems and warning time will also be questioned.

4.20 – Wildfire

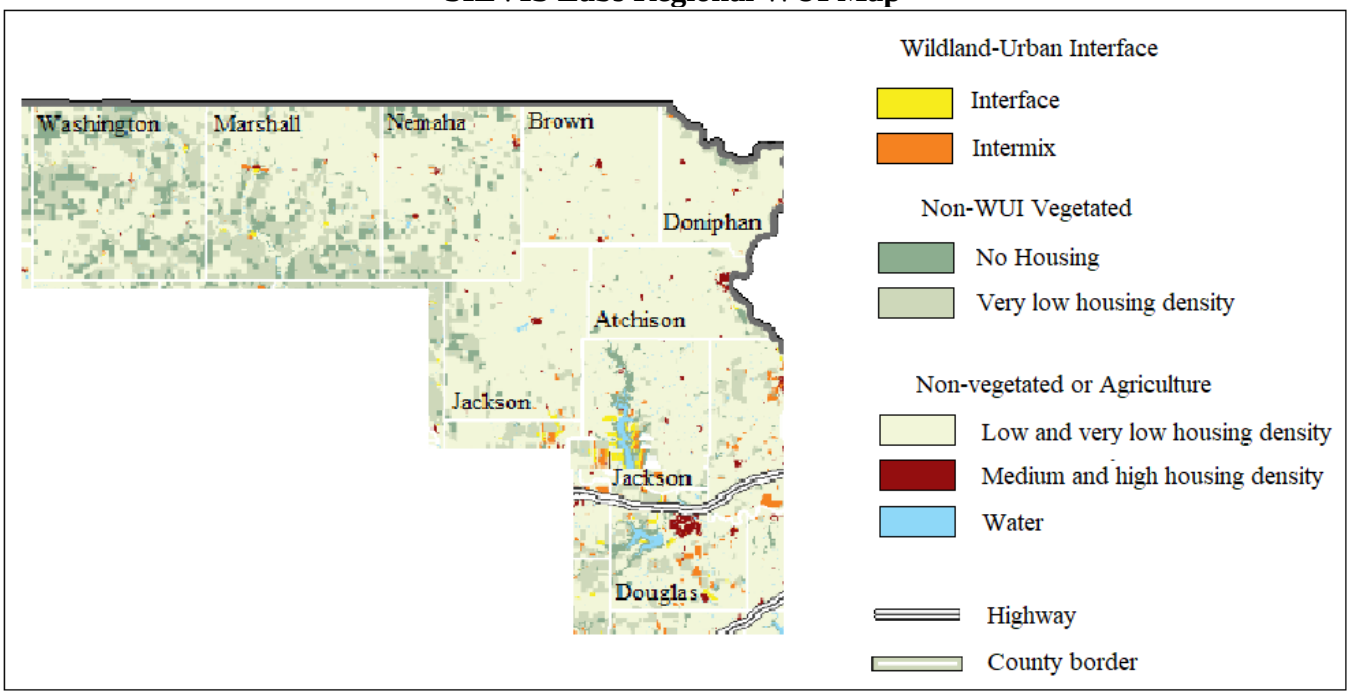
The NWS defines a wildfire as any free burning uncontainable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. They can occur naturally, by human accident, and on rare occasions by human action. Population de-concentration in the U.S. has resulted in rapid development in the outlying fringe of metropolitan areas and in rural areas with attractive recreational and aesthetic amenities, especially forests. This expansion has increased the likelihood that wildfires will threaten life and property.

4.20.1 – Location and Extent

Wildfires in Kansas Region K 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 K, do pose fire management issues due to the expansion of the Wildland Urban Interface (WUI) in recent decades.

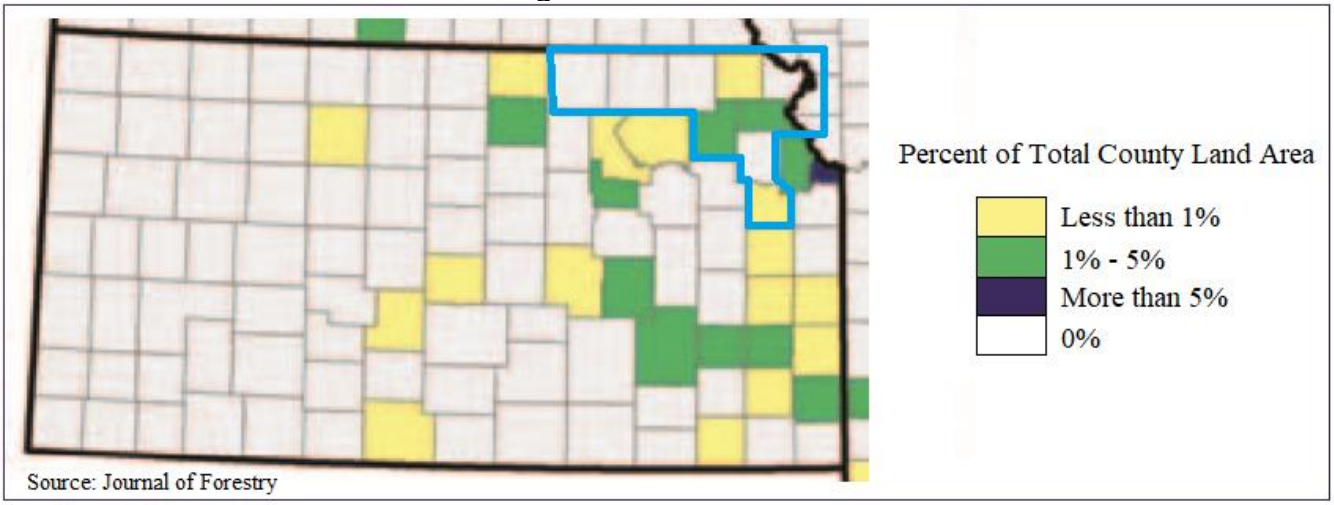
The WUI creates an environment in which fire can move readily between structural and vegetation fuels. Two types of WUI are mapped: intermixed and interface. Intermix WUI are areas where housing and vegetation intermingle; interface WUI are areas with housing in the vicinity of dense, contiguous wildland vegetation. The following maps detail WUI areas and information for Kansas Region K.

SILVIS Labs Regional WUI Map



The Eastern Redcedar is of concern to Kansas Region K. This invasive evergreen species can take over fence rows and un-planted fields, adding to wildfire fuel and risk. The following 2012 map, from the Journal of Forestry, indicates the percent of the total regional acreage impacted by Eastern Redcedar.

Percent of Total Regional Land Area of Eastern Redcedar



4.20.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been no Presidential Disaster Declarations or Fire Management Assistance Declarations for Kansas Region K 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, with 2013 and 2018 being full data set years).

Table 4.154: Kansas Region K State Fire Marshall Recorded Wildfire Events, 2013-2018

County	Number of Reported Fires	Deaths	Injuries	Buildings Burned	Burned Acres
Atchison	72	0	0	0	1,775
Brown	72	0	0	0	1,775
Doniphan	25	0	0	0	1,585
Douglas	155	0	4	2	6,228
Jackson	182	0	5	0	10,262
Jefferson	134	0	0	0	4,442
Marshall	108	0	0	0	6,826
Nemaha	96	0	0	0	6,811
Washington	27	0	0	0	1,405

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 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates nine wildfire related claims on 126 acres for $7,490.

Table 4.155: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Wildfires

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Atchison	0	0	$0
Brown	0	0	$0
Doniphan	0	0	$0
Douglas	0	0	$0
Jackson	0	0	$0
Marshall	0	0	$0
Jefferson	0	0	$0
Nemaha	0	0	$0
Washington	0	0	$0

Source: USDA

4.20.3 – Hazard Probability Analysis

The following table summarizes wildfire probability data for **Atchison County**.

Table 4.156: Atchison County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	72
Average Events per Year	12
Number Deaths or Injuries (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0

Table 4.156: Atchison County Wildfire Probability Summary

Data	Recorded Impact
Total Reported Burned Buildings (2009-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2009-2018)	1,775
Average Burned Acres per Year	296
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 NOAA

Data from the KSFM indicates that Atchison County can expect on a yearly basis, relevant to wildfire events:

- Four events
- No death or injuries
- No buildings burned
- 101 acres burned

According to the USDA Risk Management Agency, Atchison 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 **Brown County**.

Table 4.157: Brown County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	72
Average Events per Year	12
Number Deaths or Injuries (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0
Total Reported Burned Buildings (2009-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2009-2018)	1,775
Average Burned Acres per Year	296
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

Table 4.157: Brown County Wildfire Probability Summary

Data	Recorded Impact
Average Crop Damage per Year	$0

Source: KSFM and NOAA

Data from the KSFM indicates that Brown County can expect on a yearly basis, relevant to wildfire events:

- 12 events
- No death or injuries
- No buildings burned
- 296 acres burned

According to the USDA Risk Management Agency, Brown 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 **Doniphan County**.

Table 4.158: Doniphan County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	25
Average Events per Year	4
Number Deaths or Injuries (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0
Total Reported Burned Buildings (2009-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2009-2018)	1,585
Average Burned Acres per Year	264
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 NOAA

Data from the KSFM indicates that Doniphan County can expect on a yearly basis, relevant to wildfire events:

- Four events
- No deaths or injuries
- No buildings burned
- 264 acres burned

According to the USDA Risk Management Agency, Doniphan 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 **Douglas County**.

Table 4.159: Douglas County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	155
Average Events per Year	26
Number Deaths or Injuries (2009-2018)	4
Average Number of Yearly Deaths and Injuries (2009-2018)	1
Total Reported Burned Buildings (2009-2018)	2
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2009-2018)	6,228
Average Burned Acres per Year	1,038
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 NOAA

Data from the KSFM indicates that Douglas County can expect on a yearly basis, relevant to wildfire events:

- 26 events
- One death or injury
- <1 building burned
- 1,038 acres burned

According to the USDA Risk Management Agency, Douglas 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 **Jackson County**.

Table 4.160: Jackson County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	182
Average Events per Year	30
Number Deaths or Injuries (2009-2018)	5
Average Number of Yearly Deaths and Injuries (2009-2018)	1
Total Reported Burned Buildings (2009-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2009-2018)	10,262
Average Burned Acres per Year	1,710
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 NOAA

Data from the KSFM indicates that Jackson County can expect on a yearly basis, relevant to wildfire events:

- 30 events
- One death or injury
- No buildings burned
- 1,710 acres burned

According to the USDA Risk Management Agency, Jackson 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 **Jefferson County**.

Table 4.161: Jefferson County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	134
Average Events per Year	22
Number Deaths or Injuries (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0
Total Reported Burned Buildings (2009-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2009-2018)	4,442
Average Burned Acres per Year	740
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0

Table 4.161: Jefferson County Wildfire Probability Summary

Data	Recorded Impact
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 NOAA

Data from the KSFM indicates that Jefferson County can expect on a yearly basis, relevant to wildfire events:

- 22 events
- No deaths or injuries
- No buildings burned
- 740 acres burned

According to the USDA Risk Management Agency, Jefferson 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 **Marshall County**.

Table 4.162: Marshall County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	108
Average Events per Year	18
Number Deaths or Injuries (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0
Total Reported Burned Buildings (2009-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2009-2018)	6,826
Average Burned Acres per Year	1,138
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 NOAA

Data from the KSFM indicates that Marshall County can expect on a yearly basis, relevant to wildfire events:

- 18 events
- No death or injuries

- No buildings burned
- 1,138 acres burned

According to the USDA Risk Management Agency, Marshall 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 **Nemaha County**.

Table 4.163: Nemaha County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	96
Average Events per Year	16
Number Deaths or Injuries (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0
Total Reported Burned Buildings (2009-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2009-2018)	6,811
Average Burned Acres per Year	1,135
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 NOAA

Data from the KSFM indicates that Nemaha County can expect on a yearly basis, relevant to wildfire events:

- 16 events
- No death or injuries
- No buildings burned
- 1,135 acres burned

According to the USDA Risk Management Agency, Nemaha 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 **Washington County**.

Table 4.164: Washington County Wildfire Probability Summary

Data	Recorded Impact
Number of KSFM Reported Events (2009-2018)	27
Average Events per Year	5
Number Deaths or Injuries (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0
Total Reported Burned Buildings (2009-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2009-2018)	1,405
Average Burned Acres per Year	234
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 NOAA

Data from the KSFM indicates that Washington County can expect on a yearly basis, relevant to wildfire events:

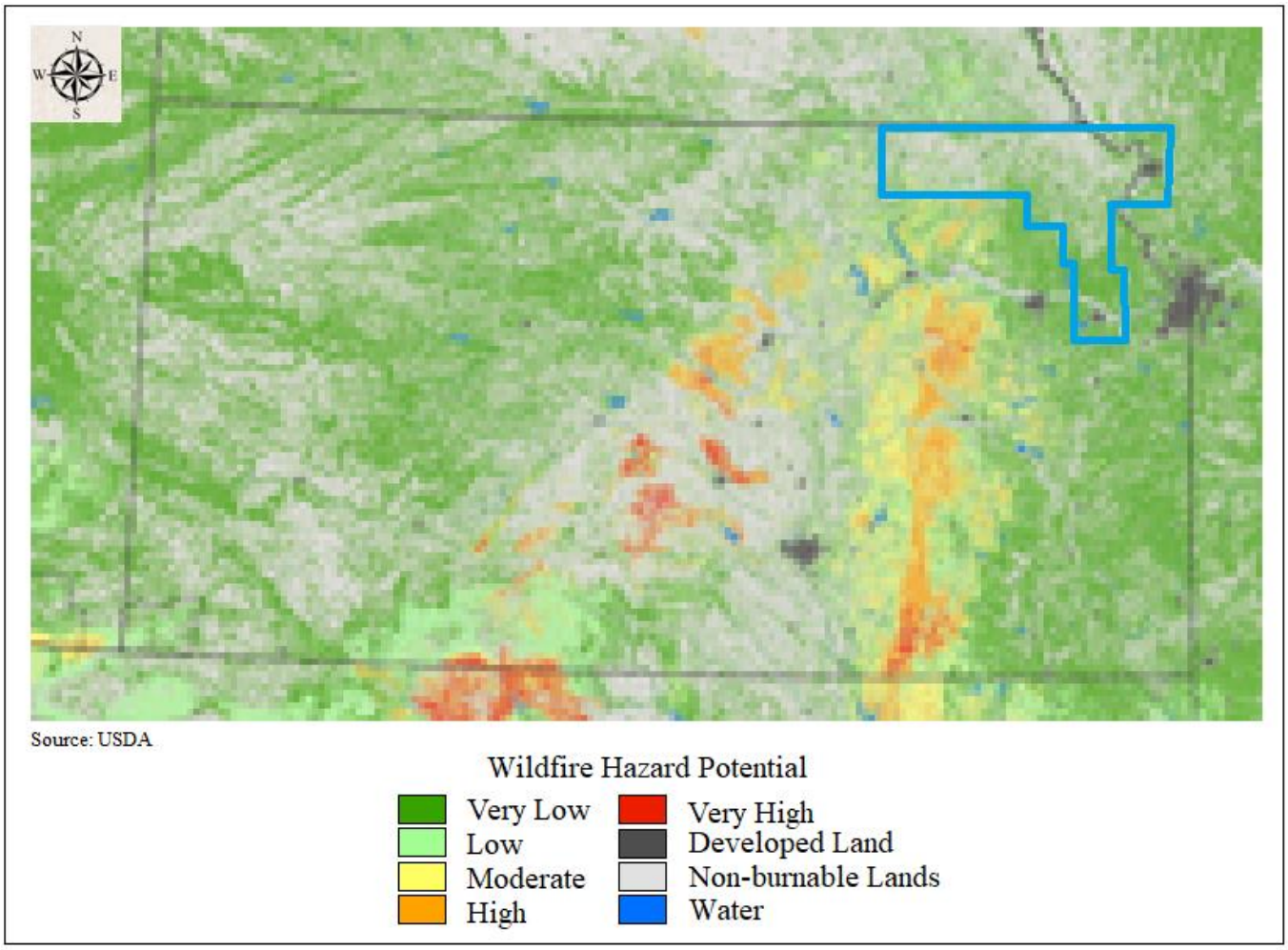
- Five events
- No deaths or injuries
- No buildings burned
- 324 acres burned

According to the USDA Risk Management Agency, Washington 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 K is the low and moderate/high potential class.

USDA Wildfire Potential Map



4.20.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to wildfire events. Counties with a higher or increasing population, high, or increasing, or having a high structural valuation are to be considered to have a potentially greater vulnerability. It is worth highlighting the majority of Kansas Region K counties may have increased vulnerability to wildfire events due to a projected increase in the number of structures.

The following table presents data from HAZUS and KSFM concerning the structures and the percentage of structures for each Kansas Region K county incurring damage over the six-year period of 2013 to 2018 (current available data) from wildfire events. As KSFM did not assign a value to the structures burned, an estimate of $32,000 per structure (value determined using a commercial cost calculator for an 800 square foot general purpose barn at $40 per square foot) was used as reports indicate the majority of structures burned were farm out-buildings. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

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Table 4.165: Kansas Region K Structural Vulnerability Data for Wildfires, 2009-2018

County	HAZUS Building Valuation	KSFM Structure Damage	Percentage of Building Valuation Damaged
Atchison	$6,664,946,000	$0	0.0%
Brown	$3,626,310,000	$0	0.0%
Doniphan	$779,563,000	$0	0.0%
Douglas	$3,863,763,000	$32,000	0.001%
Jackson	$1,041,969,000	$0	0.0%
Jefferson	$3,766,723,000	$0	0.0%
Marshall	$1,538,178,000	$0	0.0%
Nemaha	$7,100,181,000	$0	0.0%
Washington	$1,198,508,000	$0	0.0%

Source: NCEI and HAZUS

Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.166: Kansas Region K Population Vulnerability Data for Wildfires

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

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 K County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of wildfires on the agricultural sector. In general, the higher the percentage loss, the higher the vulnerability the county has to wildfire events.

Table 4.167: Wildfire Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	0	0.0%	$66,913,000	$0	0.0%
Brown	258,601	0	0.0%	$112,057,000	$0	0.0%
Doniphan	144,927	0	0.0%	$76,581,000	$0	0.0%

Table 4.167: Wildfire Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Douglas	159,261	0	0.0%	$65,867,000	$0	0.0%
Jackson	168,682	0	0.0%	$40,215,000	$0	0.0%
Jefferson	153,276	0	0.0%	$44,922,000	$0	0.0%
Marshall	361,473	0	0.0%	$92,882,000	$0	0.0%
Nemaha	268,088	0	0.0%	$76,127,000	$0	0.0%
Washington	336,673	0	0.0%	$87,087,000	$0	0.0%

Source: USDA

Potentially lessening future vulnerability to wildfires are Community Wildfire Protection Plans (CWPPs). A CWPP is the most effective way to take advantage of various Federal programs to include the Healthy Forests Restoration Act. By having a CWPP, communities are given priority for funding of Healthy Forests Restoration Act hazardous fuels reduction projects. The three main components of a CWPP are:

- Collaboration between all affected or potentially affected jurisdictions,
- Assessment of the wildfire hazards in an area that leads to recommendation for prioritized fuel reduction, and
- A section on recommendations towards reducing structural ignitability.

Currently the following Kansas Region K counties have approved CWPPs.

- Douglas County

4.20.5 – Impact and Consequence Analysis

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

Table 4.168: Wildfire Consequence Analysis

Subject	Impacts of Wildfire
Health and Safety of the Public	Impact could be severe for people living and working in the immediate area. Surrounding communities may also be impacted by evacuees.
Health and Safety of Responders	Impact to responders could be severe depending on the size and scope of the fire, especially for firefighters. Impact will be low to moderate for support responders with the main threat as smoke inhalation.
Continuity of Operations	Temporary relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Delivery of services could be affected if there is any disruption to the roads and/or utilities due to damages sustained.
Environment	Impact will be severe for the immediate area with regards to trees, bushes, animals, and crops. Impact will lessen as distance increases.
Economic Conditions	Impacts to the economy could be moderate in the immediate area.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Evacuation orders and shelter availability could be called in to question.

4.21 – Windstorm

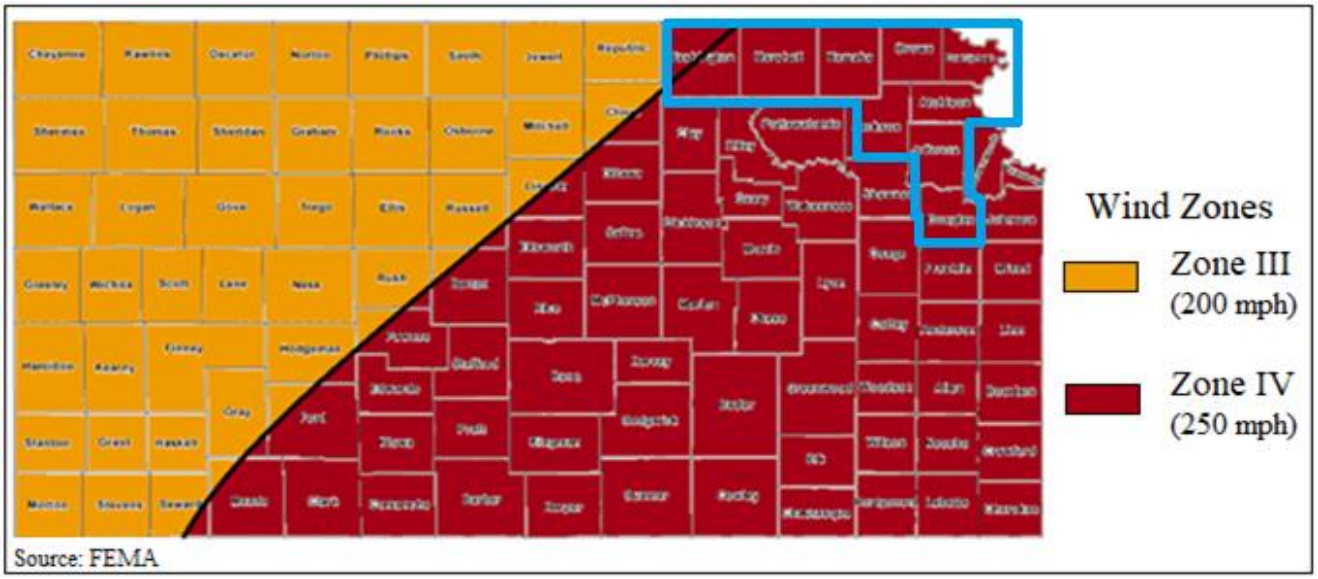
Straight-line winds are generally any thunderstorm wind that is not associated with rotation. It is these winds, which can exceed 100 mph that represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks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

4.21.1 – Location and Extent

High winds occur over broad geographic regions. The entire Kansas Region K 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 K is located within wind zone IV, the highest inland category.

Wind Zones in the Unites States



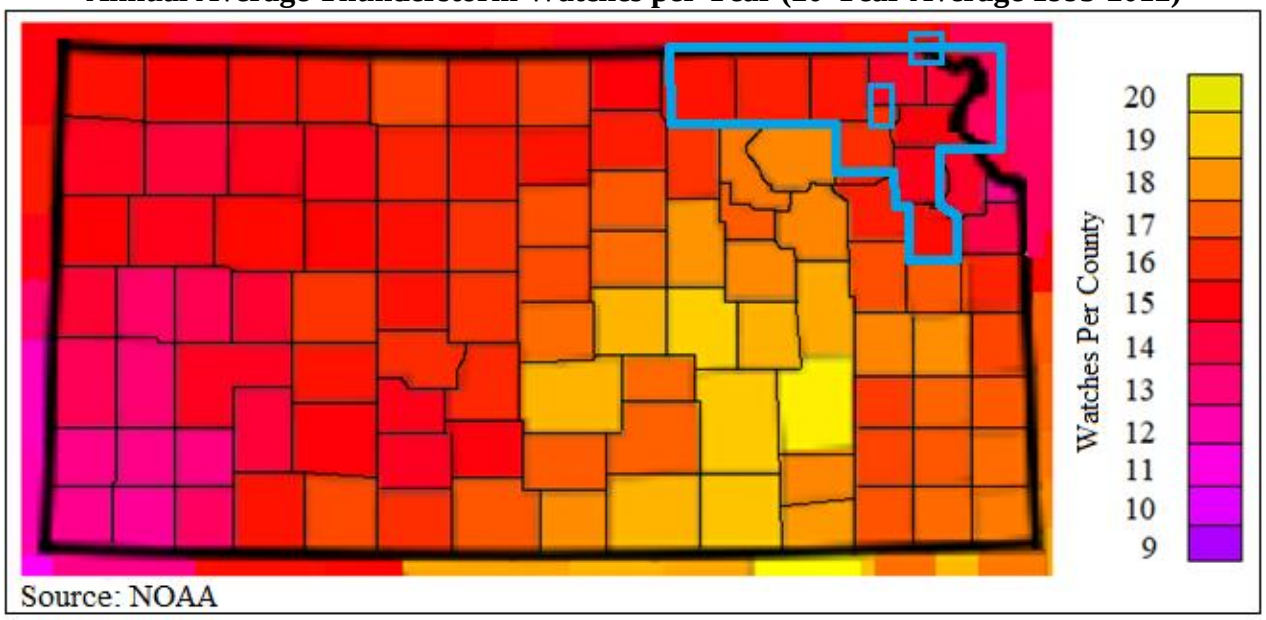
Severe thunderstorms strike Kansas Region K regularly, with accompanying high wind that can cause injury, death, and property damage. The widespread and frequent nature of thunderstorms makes high wind a relatively common occurrence. The NWS classifies thunderstorms, often the generator of high winds, 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 K.

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



To measure wind speed and its correlating potential for damage, experts use the Beaufort scale as shown below.

Table 4.169: Beaufort Scale

Beaufort Number	Wind Speed (mph)	Effects on Land
0	Under 1	Calm, smoke rises vertically
1	1-3	Smoke drift indicates wind direction, vanes do not move
2	4-7	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Leaves, small twigs in constant motion. Light flags extended.
4	13-18	Dust, leaves and loose paper raised up, small branches move
5	19-24	Small trees begin to sway
6	25-31	Large branches of trees in motion, whistling heard in wires
7	32-38	While trees in motion, resistance felt in walking against the wind
8	39-46	Twigs and small branches broken off trees
9	47-54	Slight structural damage occurs, slate blown from roofs
10	55-63	Seldom experienced on land, trees broken, structural damage occurs
11	64-72	Very rarely experienced on land, usually with widespread damage
12	73 or higher	Violence and destruction

4.21.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been five Presidential Disaster Declarations for Kansas Region K for Straight-Line Winds (along with other associates hazard events). The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on high wind events that have impacted Kansas Region K. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.170: Kansas Region K FEMA Straight-Line Winds Disaster and Emergency Declarations, 1999 -2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4230	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, Tornados, **Straight-Line Winds**, and Flooding	Atchison, Brown, Doniphan, Jackson, Jefferson, Marshall, McPherson, Nemaha, Neosho, and Washington.	$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	Severe Storms, **Straight-Line Winds**, Tornados, and Flooding	Washington	$11,412,827
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, **Straight-Line Winds**, Tornados and Flooding	Washington	$8,259,620
1849	06/25/2009 (4/25-5/16/2009)	Severe Storms, Flooding, **Straight-Line Winds**, and Tornados	Marshall	$15,013,488
1638	4/14/2006 (3/12-13/2006)	Severe Storms, Tornados, and **Straight-Line Winds**	Douglas	$6,233,044

Source: FEMA
-: Data unavailable

The following provides details of the two Presidential Disaster Declaration for Kansas Region K related to severe storms (and potentially lightning) since the last plan update in 2014.

Kansas – Severe Storms, Straight-Line Winds, and Flooding
FEMA-4230-DR
Declared November 7, 2017

On August 31, 2017, Governor Sam Brownback requested a major disaster declaration due to severe storms, straight-line winds, and flooding during the period of July 22-27, 2017. The Governor requested a declaration for Public Assistance for two counties and Hazard Mitigation statewide. During the period of August 18-24, 2017, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

On November 7, 2017, President Trump declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible

local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, straight-line winds, and flooding in Johnson and Wyandotte Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

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

Table 4.171: Kansas Region K NCEI High Wind Events, 2009 - 2018

County	Number of Days with Events	Property Damage	Deaths	Injuries	Highest Recorded Wind Speed
Atchison	17	$17,000	0	0	72 Knots
Brown	20	$20,000	0	0	70 Knots
Doniphan	16	$220,000	0	0	65 Knots
Douglas	48	$61,500	0	0	77 Knots
Jackson	27	$11,500	0	0	78 Knots
Jefferson	38	$12,000	0	0	78 Knots
Marshall	34	$24,500	0	0	70 Knots
Nemaha	30	$31,000	0	0	70 Knots
Washington	26	$8,000	0	0	70 Knots

Source: NOAA NCEI

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

- **July 18, 2012: Doniphan County**
  High winds caused several barns to be destroyed, including the historic Round Barn landmark. Thunderstorm wind gusts were estimated up to 70 mph. 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 high 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 12 high wind related claims on 751 acres for $48,485.

Table 4.172: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, High Winds

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Atchison	8	327	$17,534
Brown	19	3,101	$356,105
Doniphan	13	3,956	$1,021,071
Douglas	5	1,043	$123,212
Jackson	7	105	$11,874
Jefferson	2	451	$22,227
Marshall	31	3,170	$356,191

Table 4.172: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, High Winds

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Nemaha	15	2,289	$184,314
Washington	25	2,954	$475,545

Source: USDA

4.21.3 – Hazard Probability Analysis

The following table summarizes high wind probability data for **Atchison County**.

Table 4.173: Atchison County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	17
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$17,000
Average Property Damage per Year	$1,700
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	8
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	327
Average Number of Acres Damaged per Year	33
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$17,534
Average Crop Damage per Year	$1,753

Source: NCEI and USDA

Data from the NCEI indicates that Atchison County can expect on a yearly basis, relevant to high wind events:

- Two events
- No deaths or injuries
- $1,700 in property damages

According to the USDA Risk Management Agency, Atchison County can expect on a yearly basis, relevant to high wind occurrences:

- One insurance claim
- 33 acres impacted
- $1,753 in insurance claims

The following table summarizes high wind probability data for **Brown County**.

Table 4.174: Brown County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	20
Average Events per Year	2

Table 4.174: Brown County High Wind Probability Summary

Data	Recorded Impact
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$20,000
Average Property Damage per Year	$2,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	19
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,101
Average Number of Acres Damaged per Year	310
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$356,105
Average Crop Damage per Year	$35,610

Source: NCEI and USDA

Data from the NCEI indicates that Brown County can expect on a yearly basis, relevant to high wind events:

- Two events
- No deaths or injuries
- $2,000 in property damages

According to the USDA Risk Management Agency, Brown County can expect on a yearly basis, relevant to high wind occurrences:

- Two insurance claims
- 310 acres impacted
- $35,610 in insurance claims

The following table summarizes High wind probability data for **Doniphan County**.

Table 4.175: Doniphan County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	16
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$220,000
Average Property Damage per Year	$22,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	19
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,956
Average Number of Acres Damaged per Year	396
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$1,021,071
Average Crop Damage per Year	$102,107

Source: NCEI and USDA

Data from the NCEI indicates that Doniphan County can expect on a yearly basis, relevant to high wind events:

- Two events
- No deaths or injuries
- $22,000 in property damages

According to the USDA Risk Management Agency, Doniphan County can expect on a yearly basis, relevant to high wind occurrences:

- Two insurance claims
- 396 acres impacted
- $102,107 in insurance claims

The following table summarizes high wind probability data for **Douglas County**.

Table 4.176: Douglas County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	48
Average Events per Year	5
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$61,500
Average Property Damage per Year	$6,150
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	5
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,043
Average Number of Acres Damaged per Year	104
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$123,212
Average Crop Damage per Year	$12,321

Source: NCEI and USDA

Data from the NCEI indicates that Douglas County can expect on a yearly basis, relevant to high wind events:

- Five events
- No deaths or injuries
- $6,150 in property damages

According to the USDA Risk Management Agency, Douglas County can expect on a yearly basis, relevant to high wind occurrences:

- One insurance claim
- 104 acres impacted
- $12,321 in insurance claims

The following table summarizes high wind probability data for **Jackson County**.

Table 4.177: Jackson County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	27
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$11,500
Average Property Damage per Year	$1,150
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	7
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	105
Average Number of Acres Damaged per Year	10
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$11,874
Average Crop Damage per Year	$1,187

Source: NCEI and USDA

Data from the NCEI indicates that Jackson County can expect on a yearly basis, relevant to high wind events:

- Three events
- No deaths or injuries
- $1,150 in property damages

According to the USDA Risk Management Agency, Jackson County can expect on a yearly basis, relevant to high wind occurrences:

- One insurance claim
- 10 acres impacted
- $1,187 in insurance claims

The following table summarizes high wind probability data for **Jefferson County**.

Table 4.178: Jefferson County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	38
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$12,000
Average Property Damage per Year	$1,200
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)	451
Average Number of Acres Damaged per Year	45

Table 4.178: Jefferson County High Wind Probability Summary

Data	Recorded Impact
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$22,227
Average Crop Damage per Year	$2,223

Source: NCEI and USDA

Data from the NCEI indicates that Jefferson County can expect on a yearly basis, relevant to high wind events:

- Four events
- No deaths or injuries
- $1,200 in property damages

According to the USDA Risk Management Agency, Jefferson County can expect on a yearly basis, relevant to high wind occurrences:

- <1 insurance claim
- 45 acres impacted
- $2,223 in insurance claims

The following table summarizes High wind probability data for **Marshall County**.

Table 4.179: Marshall County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	34
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$24,500
Average Property Damage per Year	$2,450
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	31
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,170
Average Number of Acres Damaged per Year	317
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$356,191
Average Crop Damage per Year	$35,619

Source: NCEI and USDA

Data from the NCEI indicates that Marshall County can expect on a yearly basis, relevant to high wind events:

- Three events
- No deaths or injuries
- $2,450 in property damages

According to the USDA Risk Management Agency, Marshall County can expect on a yearly basis, relevant to high wind occurrences:

- Three insurance claims
- 317 acres impacted
- $35,619 in insurance claims

The following table summarizes high wind probability data for **Nemaha County**.

Table 4.180: Nemaha County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	30
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$31,000
Average Property Damage per Year	$3,100
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	15
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	2,289
Average Number of Acres Damaged per Year	229
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$184,314
Average Crop Damage per Year	$18,431

Source: NCEI and USDA

Data from the NCEI indicates that Nemaha County can expect on a yearly basis, relevant to high wind events:

- Three events
- No deaths or injuries
- $3,100 in property damages

According to the USDA Risk Management Agency, Nemaha County can expect on a yearly basis, relevant to high wind occurrences:

- Two insurance claims
- 229 acres impacted
- $18,431 in insurance claims

The following table summarizes high wind probability data for **Washington County**.

Table 4.181: Washington County High Wind Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	26
Average Events per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0

Table 4.181: Washington County High Wind Probability Summary

Data	Recorded Impact
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	$8,000
Average Property Damage per Year	$800
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)	2,954
Average Number of Acres Damaged per Year	295
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$475,545
Average Crop Damage per Year	$47,555

Source: NCEI and USDA

Data from the NCEI indicates that Washington County can expect on a yearly basis, relevant to high wind events:

- Three events
- No deaths or injuries
- $8,000 in property damages

According to the USDA Risk Management Agency, Washington County can expect on a yearly basis, relevant to high wind occurrences:

- Three insurance claims
- 295 acres impacted
- $47,555 in insurance claims

In addition, Kansas Region K has had five 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 disaster per year.

4.21.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to high wind events. In general, counties with a higher or increasing population, and/or a high or increasing structural valuation are to be considered to have a potentially greater vulnerability. However, these assumed vulnerabilities should be viewed as theoretical due to the tremendous number of variables involved in a potential high wind event. It is worth highlighting the majority of Kansas Region K counties may have increased vulnerability to high wind events due to a projected increase in the number of structures.

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region K county incurring damage over the period 2009 to 2018 from high wind events. NCEI does not provide data for tribal reservations, rather data for the tribal reservation is included in the county or counties it resides within. Building valuations are provided, if available, for each tribal reservation as a reference against county valuations and percentage damage.

The greater the percentage of structures damaged the greater overall potential vulnerability to future events.

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Table 4.182: Kansas Region K Structural Vulnerability Data for High Winds, 2009 -2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Atchison	$2,077,340,000	$17,000	0.001%
Brown	$1,135,773,000	$20,000	0.002%
Doniphan	$953,610,000	$220,000	0.023%
Douglas	$12,489,840,000	$61,500	0.000%
Iowa Tribal Reservation	$7,712,800	-	-
Jackson	$1,477,185,000	$11,500	0.001%
Jefferson	$2,239,834,000	$12,000	0.001%
Kickapoo Tribal Reservation	$6,000,000	-	-
Marshall	$1,231,049,000	$24,500	0.002%
Nemaha	$1,282,096,000	$31,000	0.002%
Washington	$650,841,000	$8,000	0.001%

Source: NCEI, HAZUS and Tribal data
-: Data unavailable

Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.183: Kansas Region K Population Vulnerability Data for High Winds

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

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 K County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of high wind on the agricultural sector. In general, the higher the percentage loss, the higher the vulnerability the county has to high wind events.

Table 4.184: High Wind Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	33	0.02%	$66,913,000	$1,753	0.00%
Brown	258,601	310	0.12%	$112,057,000	$35,610	0.03%
Doniphan	144,927	396	0.27%	$76,581,000	$102,107	0.13%
Douglas	159,261	104	0.07%	$65,867,000	$12,321	0.02%
Jackson	168,682	10	0.01%	$40,215,000	$1,187	0.00%
Jefferson	153,276	45	0.03%	$44,922,000	$2,223	0.00%
Marshall	361,473	317	0.09%	$92,882,000	$35,619	0.04%
Nemaha	268,088	229	0.09%	$76,127,000	$18,431	0.02%
Washington	336,673	295	0.09%	$87,087,000	$47,555	0.05%

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:

- **Huron** (Atchison County)
- **Elwood** (Doniphan County)
- **Lecompton** (Douglas County)
- **Soldier** (Jackson County)
- **Wetmore** (Nemaha County)

4.21.5 – Impact and Consequence Analysis

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

Table 4.185: High Wind Consequence Analysis

Subject	Impacts of High Winds
Health and Safety of the Public	Impact of the immediate area could be severe depending on whether individuals were able to seek shelter. Casualties are dependent on warning systems and warning times.
Health and Safety of Responders	Impact to responders is expected to be minimal unless responders live within the affected area.
Continuity of Operations	Temporary to permanent relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the wind path. Roads, buildings, and communications could be adversely affected. Damage could be severe.
Environment	Impact will be severe for the immediate impacted area. Impact will lessen as distance increases from the immediate incident area.
Economic Conditions	Impacts to the economy will greatly depend on the wind severity. Potential economic impact conditions could be minor to severe.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems and warning time will also be questioned.

4.22 – Winter Storms

Winter weather in Kansas Region K 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.

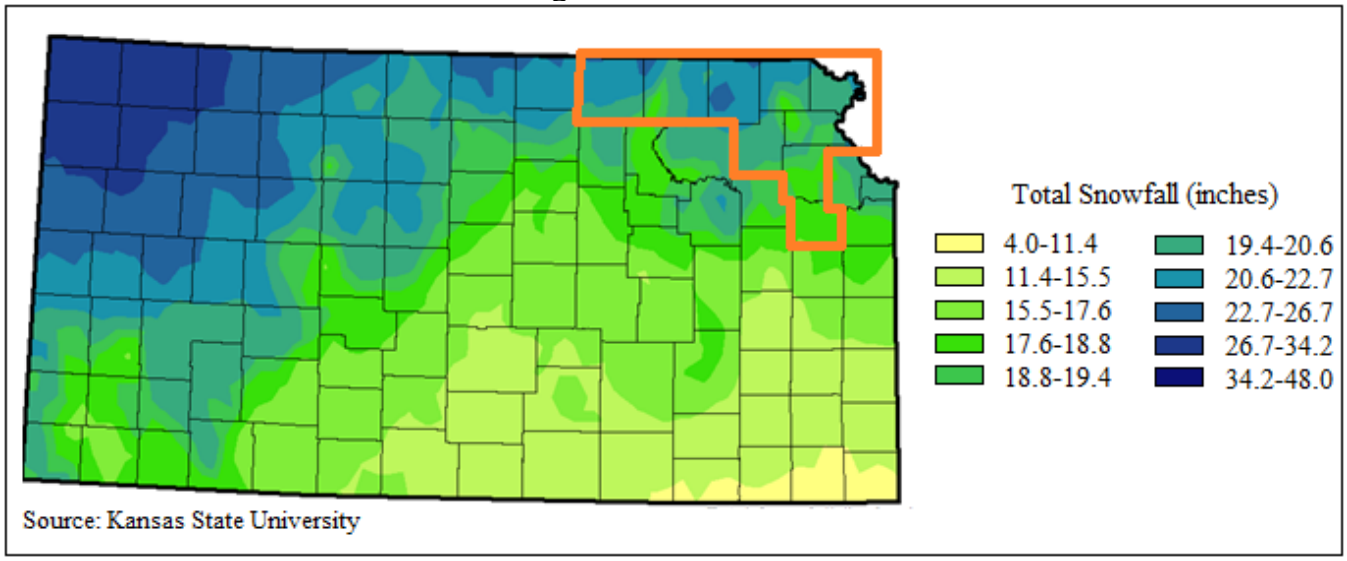
4.22.1 – Location and Extent

All of Kansas Region K is susceptible to severe winter storms. For winter weather, the NWS describes the different types of events as follows:

- **Blizzard:** Winds of 35 mph or more with snow and blowing snow reducing visibility to less than 1/4 mile for at least three hours.
- **Blowing Snow:** Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls:** Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- **Snow Showers:** Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Freezing Rain:** Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces forming a coating or glaze of ice. Most freezing-rain events are short lived and occur near sunrise between the months of December and March.
- **Sleet:** Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects.

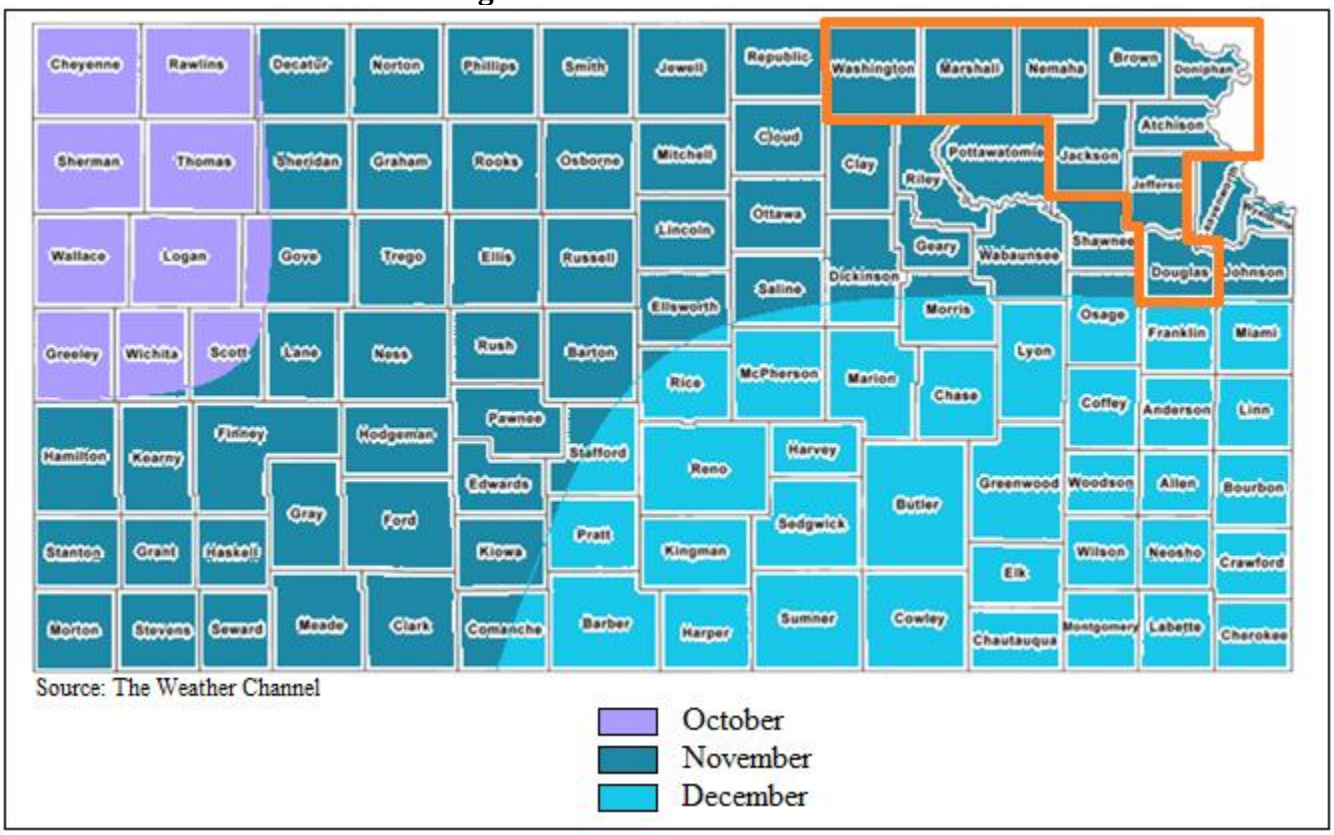
The following map, generated Kansa State University, using the latest available data, indicates the average annual snowfall for Kansas Region K for a given year.

Average Annual Snowfall, 1981-2010



Additionally, as indicated by the map below, Kansas Region K can expect to receive the first measurable snow in December 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 five Presidential Disaster Declarations for Kansas Region K for severe winter storms. The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on winter storm events that have impacted Kansas Region K. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

Table 4.186: Kansas Region K FEMA Severe Winter Storms Disaster and Emergency Declarations, 1999 - 2018

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
1885	03/09/2010 (12/9/2009-1/8/2010)	Severe Winter Storms and Snowstorm	Atchison, Brown, Doniphan, Jackson, Jefferson, Marshall, Nemaha and Washington	$19,100,658
1868	12/23/2009 (11/14-11/16/2009)	Severe Winter Storm	Marshall and Washington	$43,217,690
1741	02/01/2008	Severe Winter Storms	Atchison, Brown, Doniphan, Jackson, Jefferson, Marshall, Nemaha and Washington	$359,557,345
1579	2/8/2005 (1/4-6/2005)	Severe Winter Storm, Heavy Rains, and Flooding	Atchison, Brown, Douglas, Jackson and Jefferson,	$106,873,672
1402	2/6/2002 (1/29-2/15/2002)	Ice Storm	Douglas and Jefferson,	$60,185,754

Source: FEMA

The following presents NOAA NCEI data concerning winter storm events in Kansas Region K. 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 4.187: Kansas Region K NCEI Winter Storm Events, 2009 - 2018

Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Blizzards	6	$0	0	0
Ice Storm	2	$0	0	0
Winter Storms	26	$0	0	0

Source: NOAA NCEI

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

- **January 20,2016: Regional**
  A compact storm system moved slowly across Kansas and dumped 5-8 inches of snow across parts of north central and central Kansas.

- **November 26, 2015: Regional**
  Law Enforcement reported ice on roads county wide and provided a rough estimate of anywhere from .20 to .30 of ice on elevated surfaces including vehicles.

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 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 368 winter storm related claims on 136,595 acres for $8,439,848.

Table 4.188: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Winter Storms

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Atchison	32	5,954	$436,398
Brown	40	4,007	$296,370
Doniphan	9	806	$30,683
Douglas	21	2,712	$119,413
Jackson	33	4,145	$248,863
Marshall	24	1,794	$51,852
Jefferson	97	16,377	$1,533,177
Nemaha	63	6,020	$446,910
Washington	102	29,400	$2,521,564

Source: USDA

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 K.

Table 4.189: Kansas Region K Winter Storm Probability Summary

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	34
Average Event Days per Year	3
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Yearly Deaths and Injuries (2009-2018)	0
Total Reported NCEI Property Damage (2009-2018)	$0
Average Property Damage per Year	$0

Source: NCEI

Data from the NCEI indicates that Kansas Region K can expect on a yearly basis, relevant to winter storm events:

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

The following table summarizes USDA Risk Management Agency winter storm event data for **Atchison County**.

Table 4.190: Atchison County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	32
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	5,954
Average Number of Acres Damaged per Year	595
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$436,398
Average Crop Damage per Year	$43,640

Source: USDA

According to the USDA Risk Management Agency, Atchison County can expect on a yearly basis, relevant to winter storm occurrences:

- Three insurance claims
- 595 acres impacted
- $43,640 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Brown County**.

Table 4.191: Brown County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	40
Average Number of Claims per Year	4
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	4,007
Average Number of Acres Damaged per Year	401
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$296,370
Average Crop Damage per Year	$29,637

Source: USDA

According to the USDA Risk Management Agency, Brown County can expect on a yearly basis, relevant to winter storm occurrences:

- Four insurance claims
- 401 acres impacted
- $29,637 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Doniphan County**.

Table 4.192: Doniphan County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	40
Average Number of Claims per Year	4
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	806
Average Number of Acres Damaged per Year	81
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$30,683
Average Crop Damage per Year	$3,068

Source: USDA

According to the USDA Risk Management Agency, Doniphan County can expect on a yearly basis, relevant to winter storm occurrences:

- Four insurance claims
- 81acres impacted
- $3,068 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Douglas County**.

Table 4.193: Douglas County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	21
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	2,712
Average Number of Acres Damaged per Year	271
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$119,413
Average Crop Damage per Year	$11,941

Source: USDA

According to the USDA Risk Management Agency, Douglas County can expect on a yearly basis, relevant to winter storm occurrences:

- Two insurance claims
- 271 acres impacted
- $11,941 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Jackson County**.

Table 4.194: Jackson County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
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)	4,145
Average Number of Acres Damaged per Year	415
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$248,863

Table 4.194: Jackson County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
Average Crop Damage per Year	$24,886

Source: USDA

According to the USDA Risk Management Agency, Jackson County can expect on a yearly basis, relevant to winter storm occurrences:

- Three insurance claims
- 415 acres impacted
- $24,886 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Jefferson County**.

Table 4.195: Jefferson County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
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)	1,794
Average Number of Acres Damaged per Year	179
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$51,852
Average Crop Damage per Year	$5,185

Source: USDA

According to the USDA Risk Management Agency, Jefferson County can expect on a yearly basis, relevant to winter storm occurrences:

- Two insurance claims
- 179 acres impacted
- $5,185 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Marshall County**.

Table 4.196: Marshall County Winter Storm Probability Summary (Agricultural)

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)	16,377
Average Number of Acres Damaged per Year	1,638
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$1,533,177
Average Crop Damage per Year	$153,318

Source: USDA

According to the USDA Risk Management Agency, Marshall County can expect on a yearly basis, relevant to winter storm occurrences:

- Ten insurance claims
- 1,638 acres impacted
- $153,318 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Nemaha County**.

Table 4.197: Nemaha 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)	6,020
Average Number of Acres Damaged per Year	602
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$446,910
Average Crop Damage per Year	$44,691

Source: USDA

According to the USDA Risk Management Agency, Nemaha County can expect on a yearly basis, relevant to winter storm occurrences:

- Six insurance claims
- 602 acres impacted
- $44,691 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Washington County**.

Table 4.198: Washington County Winter Storm Probability Summary (Agricultural)

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	102
Average Number of Claims per Year	10
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	29,400
Average Number of Acres Damaged per Year	2,940
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	$2,521,564
Average Crop Damage per Year	$252,156

Source: USDA

According to the USDA Risk Management Agency, Washington County can expect on a yearly basis, relevant to winter storm occurrences:

- Ten insurance claims
- 2,940 acres impacted
- $252,156 in insurance claims

In addition, Kansas Region K has had five Presidentially Declared Disasters relating to winter storms (and other concurrent events) in the last 20 years. This represents an average of less than one declared winter storm related disaster per year.

4.22.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to winter storm events. In general, counties with a higher or increasing population, and/or a high or increasing structural valuation are to be considered to have a potentially greater vulnerability. However, these assumed vulnerabilities should be viewed as theoretical due to the tremendous number of variables involved in a potential high wind event. It is worth highlighting the majority of Kansas Region K counties may have increased vulnerability to winter storm events due to a projected increase in the number of structures.

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region K county (in total, due to the regional nature of both storms and NCEI reporting) incurring damage over the period 2009 to 2018 from winter storm events. NCEI does not provide data for tribal reservations, rather data for the tribal reservation is included in the county or counties it resides within. The greater the percentage of structures damaged the greater overall potential vulnerability to future events.

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Table 4.199: Kansas Region K Structural Vulnerability Data for Winter Storms, 2009-2018

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Regional Counties	$23,545,280,800	$0	0.0%

Source: NCEI and HAZUS

Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.200: Kansas Region K Population Vulnerability Data for Winter Storms

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

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 K County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of winter storms on the agricultural sector. The higher the percentage loss, the higher the vulnerability the county has to winter storm events.

Table 4.201: Winter Storm Acres Impacted and Crop Insurance Paid per County from 2009-2018

Jurisdiction	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
Atchison	174,297	595	0.34%	$66,913,000	$43,640	0.07%
Brown	258,601	401	0.15%	$112,057,000	$29,637	0.03%
Doniphan	144,927	81	0.06%	$76,581,000	$3,068	0.00%
Douglas	159,261	271	0.17%	$65,867,000	$11,941	0.02%
Jackson	168,682	415	0.25%	$40,215,000	$24,886	0.06%
Jefferson	153,276	179	0.12%	$44,922,000	$5,185	0.01%
Marshall	361,473	1,638	0.45%	$92,882,000	$153,318	0.17%
Nemaha	268,088	602	0.22%	$76,127,000	$44,691	0.06%
Washington	336,673	2,940	0.87%	$87,087,000	$252,156	0.29%

Source: USDA

4.22.5 – Impact and Consequence Analysis

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

Table 4.202: 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. . In general, when a crowd begins to exhibit signs of disorder, it can be categorized in three categories:

- **Public disorder:** Public disorder is a basic breach of civic order. Individuals or small groups assembling have a tendency to disrupt the normal flow of things around them.
- **Public disturbance:** Public disturbance is designed to cause turmoil on top of the disruption. Individuals and groups assembling into a crowd begin chanting, yelling, singing, and voicing individual or collective opinions.
- **Riot:** A riot is a disturbance that turns violent. Assembled crowds become a mob that violently expresses itself by destroying property, assaulting others, and creating an extremely volatile environment.

While civil disorder is not an everyday occurrence in the planning area, when they do occur they are extremely disruptive and difficult to control. Should a civil disorder event occur in the planning area the result could be measured in loss of life, economic upheaval, and destruction of property.

4.23.2 – Previous Occurrences

There have been no documented cases of civil unrest of disorder in Kansas Region K during the past five years.

4.23.3 – Hazard Probability Analysis

By nature, acts of civil disorder are difficult to foresee. However, the probability of a major civil disorder event in Kansas Region K 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 K are vulnerable. Additionally, and again related to the capricious nature of civil disorder, all buildings and citizens are vulnerable.

Economic impacts and human injury or death are the primary concern with civil disorder. Increases in population or the hosting of major political, economic or social events could increase the likelihood and severity of a civil disturbance.

In general, it is difficult to quantify potential losses of Civil Disorder due to the many variables and human elements and lack of historical precedence. Therefore, for the purposes of this plan, a **hypothetical scenario** is included for illustrative purposes only.

> **Event:** City organizers set up a two-block long fan zone near the local community sports field for an important sporting event. The population density in the fan zone is 6,000 people, with at least five persons per 25 square feet.
>
> **Riot:** The riot began to take shape as the game came to a close, with some spectators throwing bottles and other objects. Small fires were started and soon some rioters overturned a vehicle and set it alight. Fist fights broke out and in a nearby parking lot and two police cars were also set on fire. Riot police eventually managed to disperse the rioters and all fires were extinguished.
>
> **Results:** The following table presents potential event results:

Table 4.203: 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 4.204: Civil Disorder Consequence Analysis

Subject	Civil Disorder Potential Impacts
Health and Safety of the Public	Impact could be severe for persons in the incident area.
Health and Safety of Responders	Impact to responders could be severe if not trained and properly equipped. Responders that are properly trained and equipped will have a low to moderate impact.

Table 4.204: Civil Disorder Consequence Analysis

Subject	Civil Disorder Potential Impacts
Continuity of Operations	Depending on damage to facilities/personnel in the incident area, re-location may be necessary and lines of succession execution (minimal to severe).
Property, Facilities, and Infrastructure	Impact within the incident area could be severe, depending on the extent of the event. (minimal to severe)
Environment	Localized impact within the incident area could be severe depending on the type of human caused incident.
Economic Conditions	Economic conditions could be adversely affected and dependent upon time and length of clean up and investigation (minimal to severe).
Public Confidence in the Jurisdiction's Governance	Impact will be dependent on whether or not the incident could have been avoided by government or non-government entities, clean-up and investigation times, and outcomes. (minimal to severe)

4.24 – Hazardous Materials

Hazardous materials (HazMat) are any substances that pose a risk to health, life, or property when released or improperly handled. Generally, the term refers to materials with hazardous chemical or physical properties, though sometimes biological agents can fall under this category. The basic types of hazardous materials may be categorized according to more than six different systems; but the categories of U.S. Emergency Planning and Community Right-to-Know Act (42 U.S.C. 11002) provide a general guide to hazardous materials:

- ***Extremely Hazardous Substances:*** Materials that have acutely toxic chemical or physical properties and may cause irreversible damage or death to people or harm the environment if released or used outside their intended use.
- ***Hazardous Substances:*** Materials posing a threat to human health and/or the environment, or any substance designated by the EPA to be reported if a designated quantity of the substance is spilled into waterways, aquifers, or water supplies or is otherwise released into the environment.

4.24.1 – Location and Extent

In Kansas Region K, 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 292 Tier II Facilities housing hazardous chemicals in Kansas Region K. The following table details the number of Tier II facilities by county.

Table 4.205: Kansas Region K Tier II Facilities by County

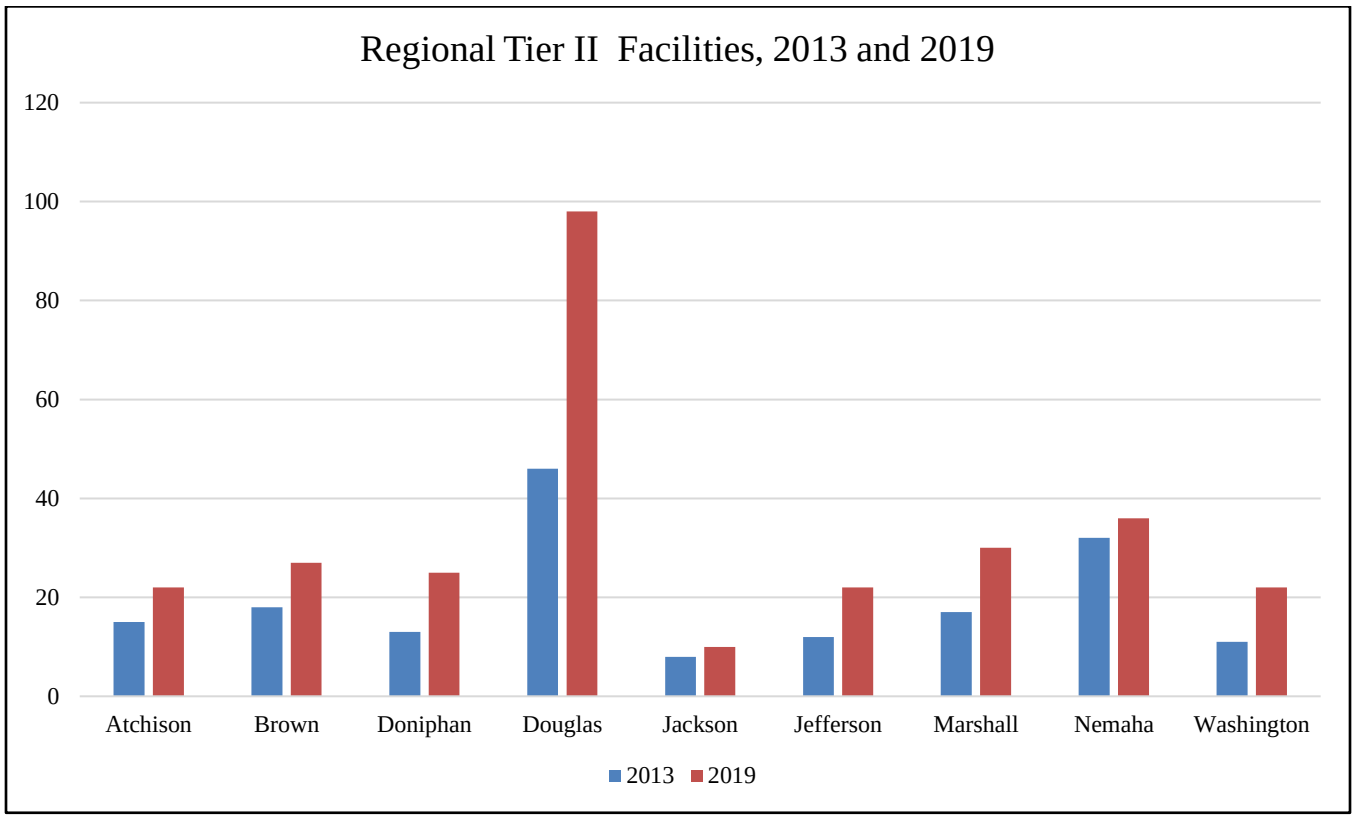
County	Tier II Facilities
Atchison	22
Brown	27
Doniphan	25
Douglas	98
Jackson	10
Jefferson	22
Marshall	30

Table 4.205: Kansas Region K Tier II Facilities by County

County	Tier II Facilities
Nemaha	36
Washington	22

Source: KDEM

As illustrated in the following graph, the number of Tier II facilities has increased for the region, primarily to due to an extensive outreach effort by KDHE to facilities that house hazardous chemicals



The National Priorities List (NPL) is a published list of hazardous waste sites in the country that are eligible for extensive, long-term cleanup under the Superfund program. A Superfund site is an uncontrolled or abandoned location where hazardous waste is located which may affect local ecosystems and/or people. The EPA has indicated no Superfund sites are located with Kansas Region K.

Transportation

The following table, from Kansas Department of Transportation (KDOT), presents total roadway mileage by county and tribal reservation.

Table 4.206: Kansas Region K Total Roadway Mileage by County and Tribal Reservation

County	Roadways (Miles)
Atchison	938
Brown	1,238
Doniphan	735

Table 4.206: Kansas Region K Total Roadway Mileage by County and Tribal Reservation

County	Roadways (Miles)
Douglas	1,391
Iowa Tribal Reservation	23
Jackson	1,254
Jefferson	1,232
Kickapoo Tribal Reservation	59
Marshall	1,705
Nemaha	1,452
Washington	1,727

Source: KDOT

Kansas Region K 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 K providing service with long-haul deliveries to national market areas and intermodal rail/truck service providers:

- Burlington Northern and Santa Fe Railway
- Kansas City Southern Railway
- Union Pacific Railroad

The following table, with information from KDOT, provides the total railroad track mileage of for each county within Kansas Region K.

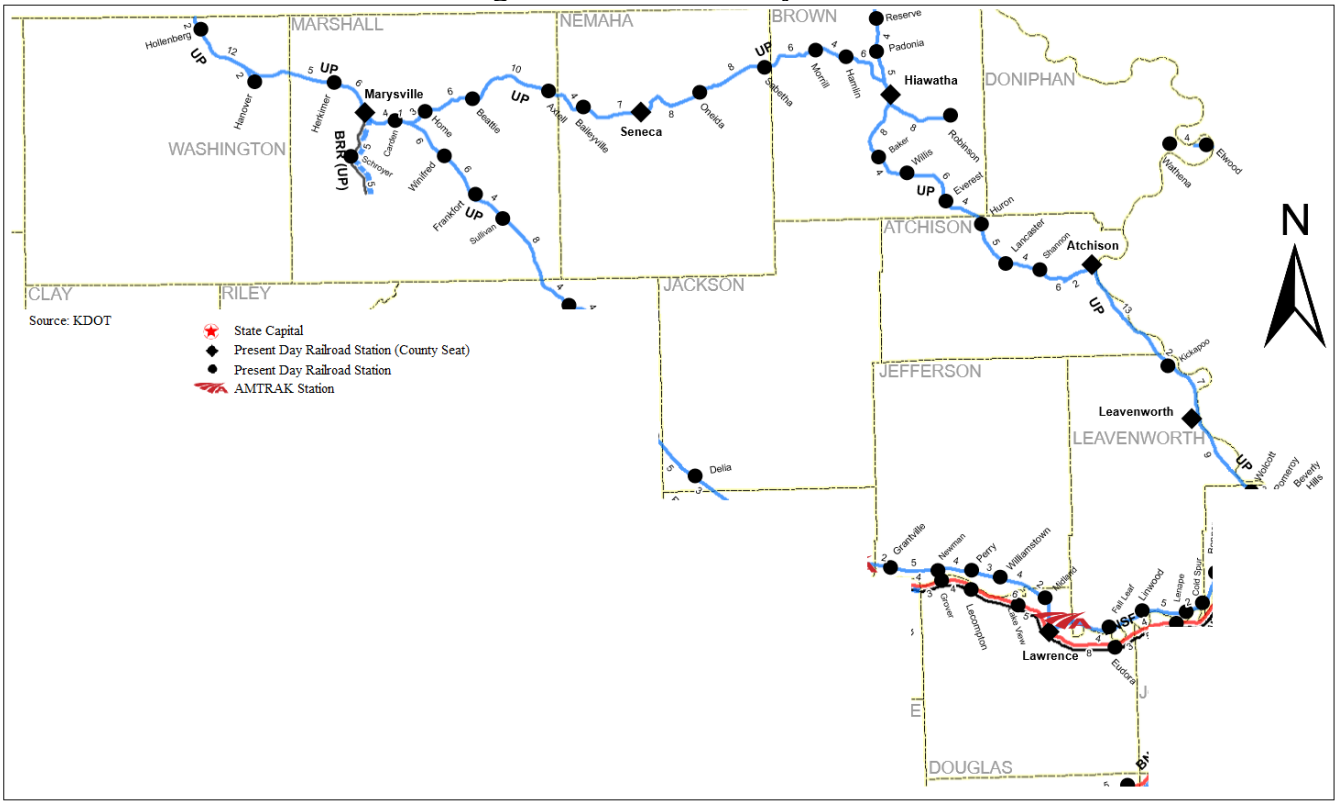
Table 4.207: Kansas Region K Total Class I Railroad Mileage by County

County	Railroad Track (Miles)
Atchison	34
Brown	56
Doniphan	5
Douglas	36
Jackson	8
Jefferson	18
Marshall	69
Nemaha	28
Washington	18

Source: KDOT

The following map, from KDOT, shows Class I track locations in Kansas Region K.

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 4.208: PHMSA Pipeline Mileage by County

County	Gas (miles)	Liquid (miles)
Atchison	40	95
Brown	132	93
Doniphan	22	81
Douglas	88	42
Jackson	37	55
Jefferson	77	65
Marshall	94	90
Nemaha	78	64
Washington	349	214

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 K county over the three-year period 2013-2015 (due to system changes, the most current data available).

Table 4.209: Kansas Region K HazMat KDEM Reported Incidents, 2013-2015

Jurisdiction	Incidents	Injuries	Fatalities	People Evacuated
Atchison	2	0	0	0
Brown	3	1	0	2
Doniphan	1	0	0	15
Douglas	1	0	0	0
Jackson	0	0	0	0
Jefferson	1	0	0	14
Marshall	1	1	0	0
Nemaha	1	0	0	0
Washington	1	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 11 reported incidents within Kansas Region K. The following charts detail the number of events per year per transportation category.

Table 4.210: Kansas Region K OHMS HazMat Incidents, 2000-2018

Jurisdiction	Highway	Air	Rail	Damages	Injuries	Deaths
Atchison County						
City of Atchison	2	0	1	$109,708	1	0
Brown County						
Hiawatha	1	0	0	$0	0	0
Doniphan County						
-	-	-	0	-	-	-
Douglas County						
Lawrence	5	0	0	$161,095	0	0
Jackson County						
Mayetta	1	0	0	$0	0	0
Jefferson County						
McLouth	1	0	0	$237,718	0	0
Marshall County						
-	-	-	0	-	-	-
Nemaha County						
-	-	-	0	-	-	-
Washington County						
-	-	-	0	-	-	-

Source: PHMSA OHMS

Data from PHMSA provides significant incident reports for the pipeline systems in Kansas Region K. Data from the period 2013 to 2017 indicate that there were ten pipeline incidents that no fatalities, no injuries and $2,209,467 in damages. The following table details reported pipeline incident details for each county with a reported event.

Table 4.211: Kansas Region K PHMSA Reported Pipeline Incidents by County, 2013 to 2017

County	Number of Incidents	Fatalities	Injuries	Total Damage	Gross Barrels Spilled
Atchison	0	0	0	$0	0
Brown	1	0	0	$217,618	0
Doniphan	0	0	0	$0	0
Douglas	0	0	0	$0	0
Jackson	0	0	0	$0	0
Jefferson	1	0	0	$142,000	5
Marshall	0	0	0	$0	0
Nemaha	0	0	0	$0	0
Washington	1	0	0	$96,972	25

Source: PHMSA

- **October 21, 2016: City of Atchison, Atchison County**
  Sulfuric Acid and Sodium Hypochlorite were inadvertently mixed resulting in a cloud on Chlorine gas that covered a 5.5 square mile area causing 146 injuries.

- **September 17, 2015: Douglas County**
  Crude oil was released into the berm and area surrounding the oil lease. KCC was called and worked with the owner and operator. The leak and was cleaned up in 2016.

- **July 29, 2015: Douglas County**
  Well pump dysfunctional. 40+ barrels of crude oil released into crop fields, culverts and to the top of the berm.

- **July 12, 2014: Douglas County**
  919 lbs. of chlorine gas were released within the facility due to a faulty valve. This was the second release at this facility, the first being 34 lbs lost on 7/13. On the initial alarm on 7/13, the water plant was shut down as the building was evacuated.

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 HazMat events for **Atchison County** using data from KDEM.

Table 4.212: Atchison County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	2
Average Events per Year	1
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM and PHMSA

Data indicates that Atchison County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- One event
- No deaths
- No injury
- No evacuations

The following tables summarize occurrence data and probability for HazMat events for **Brown County** using data from KDEM.

Table 4.213: Brown County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	3
Average Events per Year	1
Number of Reported Injuries (2013-2015)	1
Average Injuries per Year	<1
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	2
Average Evacuations per Year	1

Source: KDEM and PHMSA

Data indicates that Brown County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- One event
- No deaths
- <1 injury
- One evacuation

The following tables summarize occurrence data and probability for HazMat events for **Doniphan County** using data from KDEM.

Table 4.214: Doniphan County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	1
Average Events per Year	<1
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	15
Average Evacuations per Year	5

Source: KDEM and PHMSA

Data indicates that Doniphan County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- <1 event
- No deaths
- No injury
- Five evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Douglas County** using data from KDEM and PHMSA.

Table 4.215: Douglas County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	1
Average Events per Year	<1
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM and PHMSA

Data indicates that Douglas County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- <1 event
- No deaths
- No injury
- No evacuations

The following tables summarize occurrence data and probability for HazMat events for **Jackson County** using data from KDEM.

Table 4.216: Jackson County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	0
Average Events per Year	0
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM and PHMSA

Data indicates that Jackson County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- No events
- No deaths
- No injury
- No evacuations

The following tables summarize occurrence data and probability for HazMat events for **Jefferson County** using data from KDEM.

Table 4.217: Jefferson County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	1
Average Events per Year	<1
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	14
Average Evacuations per Year	5

Source: KDEM and PHMSA

Data indicates that Jefferson County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- <1 event
- No deaths
- No injury
- Five evacuations

The following tables summarize occurrence data and probability for HazMat events for **Marshall County** using data from KDEM.

Table 4.218: Marshall County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	1
Average Events per Year	<1
Number of Reported Injuries (2013-2015)	1
Average Injuries per Year	<1
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM and PHMSA

Data indicates that Marshall County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- <1 event
- No deaths
- <1 injury
- No evacuations

The following tables summarize occurrence data and probability for HazMat events for **Nemaha County** using data from KDEM.

Table 4.219: Nemaha County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	1
Average Events per Year	<1
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM and PHMSA

Data indicates that Nemaha County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- <1 event
- No deaths
- No injury
- No evacuations

The following tables summarize occurrence data and probability for HazMat events for **Washington County** using data from KDEM.

Table 4.220: Washington County HazMat Incident Probability Summary

Data	Recorded Impact
Number of Reported Events (2013-2015)	1
Average Events per Year	<1
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM and PHMSA

Data indicates that Washington County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- <1 event
- 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 K 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 4.221: Kansas Region K Special Population Facilities Within 0.5 Miles of a Chemical Facility

County	Health Facilities	Colleges	Educational Facilities	Aging Facilities	Child Care	Correctional Institutions
Atchison	0	0	4	1	20	1
Brown	1	0	5	4	19	2
Doniphan	0	1	7	0	12	1
Douglas	1	1	8	9	81	1
Jackson	0	0	3	4	9	0
Jefferson	1	0	6	4	13	0
Marshall	1	0	8	3	18	1
Nemaha	2	0	8	6	20	1
Washington	2	0	4	0	13	0

Source: KDEM

Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards. The following table indicates the total county population and registered growth over the period 2000 to 2017.

Table 4.222: Kansas Region K Population Vulnerability Data for HazMat Event

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

4.24.5 – Impact and Consequence Analysis

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

Table 4.223: HazMat Incident Consequence Analysis

Subject	Impacts of Hazardous Materials Incident
Health and Safety of Persons in the Area of the Incident	Impact in the immediate area could be severe and long lasting.
Responders	Impact to responders is expected to be moderate to severe, potentially even with required safety equipment.
Continuity of Operations	Long term relocation may be necessary if government facilities experience contamination or damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the incident area. Facilities may need to be abandoned and razed. Large areas may become inaccessible.
Environment	Impact could be severe for the immediate area. Impact will lessen with distance. The proximity of open bodies of water could compound the impact.
Economic Conditions	Local economy and finances may be adversely affected, depending on the nature, extent and duration of the event.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Warning systems and the timeliness of those warnings could be questioned.

4.25 – Major Disease

For this plan, major disease is classified as infectious diseases caused by microscopic agents, including viruses, bacteria, parasites, and fungi or by their toxins, that may impact humans. They may be spread by direct contact with an infected person or animal, ingesting contaminated food or water, vectors such as mosquitoes or ticks, contact with contaminated surroundings such as animal droppings, infected droplets, or by aerosolization.

4.25.1 – Location and Extent

Human transmissible disease and infectious diseases are illnesses caused by microscopic agents, including viruses, bacteria, parasites, and fungi or by their toxins. They may be spread by direct contact with an infected person or animal, ingesting contaminated food or water, vectors such as mosquitoes or ticks, contact with contaminated surroundings such as animal droppings, infected droplets, or by aerosolization.

The entire planning area is susceptible to a transmissible disease outbreak. However, more densely populated areas may be more susceptible.

4.25.2 – Previous Occurrences

The KDHE was contacted concerning the epidemiological tracking of contagious and/or human transmissible diseases. Data was solicited concerning the following diseases of concern:

- Haemophilus Influenzae Invasive Disease
- Measles (Rubeola)
- Meningococcal Infections
- Mumps
- Pertussis
- Streptococcus pneumoniae, Invasive
- West Nile Virus
- Zika Virus

A review of available data indicates there have been no unusual or concerning spikes in these diseases. Additionally, no new novel pathogens of concern have been tracked or reported.

4.25.3 – Hazard Probability Analysis

Each year the Centers for Disease Control (CDC) produces a report detailing the legally reportable diseases in the United States. While over time this report can serve as a predictor of the likelihood of future disease, it is impossible to predict outbreaks. Data from the CDC report does not indicate any areas of concern for Kansas Region K. Based on the relatively limited/controlled outbreak history in Kansas Region K, the possibility of a large-scale major disease outbreak to be limited.

4.25.4 – Vulnerability Analysis

For purposes of this assessment, no facilities or agricultural commodities are considered vulnerable to the major disease hazard.

Due to the person to person transmission of many diseases of concern Counties or tribal reservations with a higher identified population are to be considered to have a potentially greater vulnerability. The following table indicates the total county population and registered growth over the period 2000 to 2017. Counties or tribal reservations with a higher identified and/or increasing population are to be considered to have a potentially greater vulnerability to hazards.

Table 4.224: Kansas Region K Population Vulnerability Data for Major Disease

County or Tribe	2017 Population	Percent Population Change 2000 to 2017
Atchison	16,193	-3.5%
Brown	9,736	-9.2%
Doniphan	7,790	-5.6%
Douglas	17,844	17.9%
Iowa Tribe	191	48.1%
Jackson	13,322	5.3%
Jefferson	18,856	2.3%
Kickapoo Tribe	1,610	26.7%
Marshall	9,859	-10.1%
Nemaha	10,095	-5.8%
Washington	5,572	-14.1%

Source: US Census Bureau and Tribal Government

Additionally, there is an increased likelihood of mortality for very young and very old populations due to transmissible disease. However, these assumed vulnerabilities should be viewed as theoretical due to the tremendous number of variables involved in a potential major disease event. The following table indicates the percentage of the total county population that may be considered especially vulnerable to a major disease.

Table 4.225: Kansas Region K Vulnerable Population Vulnerability Data for Major Disease

County	Percentage of Population 5 and Under (2017)	Percentage of Population 65+ (2017)
Atchison	6.0%	16.8%
Brown	6.6%	19.8%
Doniphan	5.9%	19.1%
Douglas	5.3%	11.7%
Iowa Tribe	-	-
Jackson	6.7%	18.6%
Jefferson	5.3%	18.1%
Kickapoo Tribe	-	-
Marshall	6.8%	21.3%
Nemaha	7.6%	20.0%
Washington	7.1%	23.8%

Source: US Census Bureau

4.25.5 – Impact and Consequence Analysis

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

Table 4.226: Major Disease Consequence Analysis

Subject	Impacts of Major Disease Outbreak
Health and Safety of Persons in the Area of the Incident	Impact over a widespread area could be severe depending on type of outbreak and whether it is a communicable disease. Casualties are dependent on warning systems, warning times and the availability of vaccines, antidotes, and medical svc.
Responders	Impact to responders could be severe, especially if they reside in the area and or their type of exposure during response. With proper precautions and safety nets in place the impact is lessened.
Continuity of Operations	Continuity of Operations will be greatly dependent on availability of healthy individuals. COOP is not expected to be exercised.
Property, Facilities, and Infrastructure	Access to facilities and infrastructure could be affected until decontamination is completed
Environment	Impact could be severe for the immediate impacted area depending on the source of the outbreak. Impact could have far-reaching implications if disease is transferable between humans and animals or to wildlife.
Economic Conditions	Impacts to the economy could be severe if the disease is communicable. Loss of tourism, revenue, and business as usual will greatly affect the local economy and the state as a whole.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Availability of medical supplies, vaccines, and treatments will come into question.

4.26 – Radiological Incident

For purposes of this plan, a radiological incident is considered an accident involving a release of radioactive materials from a nuclear reactor. Radiological accidents could cause injury or death, contaminate property and valuable environmental resources, as well as disrupt the functioning of communities and their economies. Since 1980, each utility that owns a commercial nuclear power plant in the United States has been required to have both an onsite and offsite emergency response plan as a condition of obtaining and maintaining a license to operate that plant. Onsite emergency response plans are approved by the U.S. Nuclear Regulatory Commission (NRC).

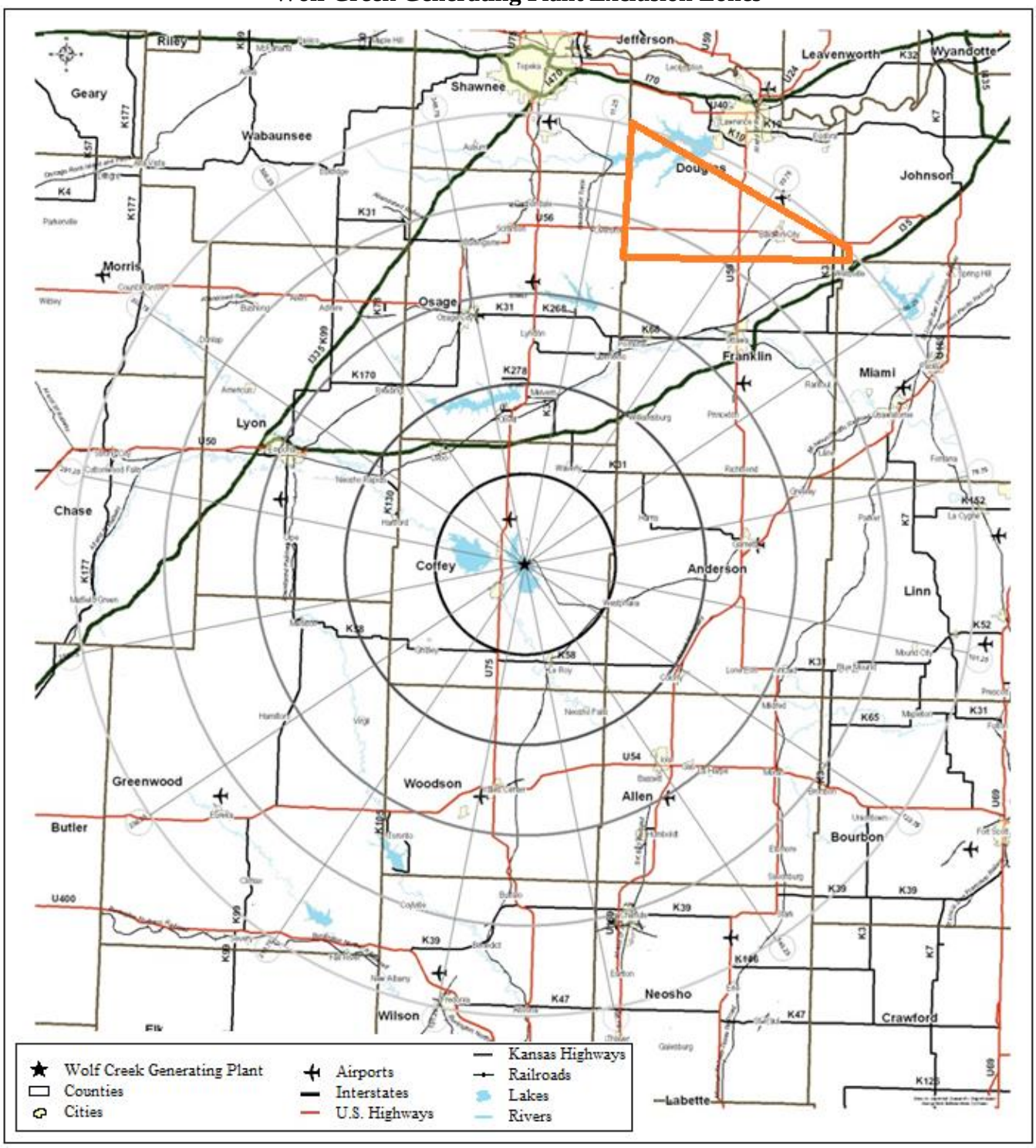
4.26.1 – Location and Extent

The only active commercial nuclear reactor within the State of Kansas is the Wolf Creek Nuclear Power Plant (Wolf Creek) in Coffey County. The following information, from the NRC, pertains to Wolf Creek:

- **Location:** Burlington, KS (3.5 miles NE of Burlington, KS)
- **Operator:** Wolf Creek Nuclear Operating Corp.
- **Operating License:** Issued - 06/04/1985
- **Renewed License:** Issued - 11/20/2008
- **License Expires** - 03/11/2045
- **Reactor Type:** Pressurized Water Reactor
- **Licensed MWt:** 3,565
- **Reactor Vendor/Type:** Westinghouse Four-Loop
- **Containment Type:** Dry, Ambient Pressure

The following map, from KDEM, illustrates both the 10-mile 50-mile emergency planning zones (EPZs) for Wolf Creek.

Wolf Creek Generating Plant Exclusion Zones



Because Region K is not located in the 10-mile EPZ, and only the southern half of Douglas County (excluding the major population center of Lawrence) is within the in the 50-mile EPZ, a nuclear incident from Wolf Creek is not considered a hazard.

4.26.2 – Previous Occurrences

There have been no previous major radiological events recorded in Kansas Region K.

4.26.3 – Hazard Probability Analysis

Historically there have been no nuclear failure and/or release events in Kansas Region K, or at Wolf Creek. The firm regulations imposed by the NRC on Wolf Creek work to ensure its safe operation. The amount of radioactivity released by a nuclear power plant is monitored continuously to be sure it does not go above allowed levels. The same sophisticated monitoring equipment provides exact information about any accidental release. The risk to the public from radioactivity released from nuclear power plants is smaller than the amount, and associated risk, we receive naturally on a daily basis.

4.26.4 – Vulnerability Assessment

Assuming the vulnerability to both structures and populations is not possible due to the tremendous number of variables involved in a potential nuclear release event. However, due to the relative distance of Kansas Region K from Wolf Creek, and the strict oversight provided by the NRC, the potential vulnerability to Kansas Region K is considered to be very low.

4.26.5 – Impact and Consequence Analysis

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

Table 4.227: Radiological Incident Consequence Analysis

Subject	Impacts of Nuclear Incident
Health and Safety of Persons in the Area of the Incident	Impact in the immediate area could be severe and long lasting.
Responders	Impact to responders is expected to be severe, potentially even with required safety equipment.
Continuity of Operations	Long term relocation may be necessary if government facilities experience contamination.
Property, Facilities, and Infrastructure	Localized impact could be severe in the incident area. Facilities may need to be abandoned and razed. Large areas may become inaccessible.
Environment	Impact could be severe for the immediate area. Impact will lessen with distance.
Economic Conditions	Local economy and finances may be adversely affected, depending on the nature, extent and duration of the event.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Warning systems and the timeliness of those warnings could be questioned.

4.27 – Terrorism

The United States does not have a standardized definition of terrorism that is agreed upon by all agencies. The Federal Bureau of Investigation generally defines terrorism as:

> "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."

4.27.1 – Location and Extent

Kansas is home to a wide variety of criminal extremist groups. The Southern Poverty Law Center reported that in 2018 there were three active hate groups in Kansas: one neo-Nazi group, the National Socialist Movement in Lansing, one racist skinhead group, the Midland Hammerskins in Wichita, and one anti-homosexual group, the Westboro Baptist Church in Topeka. Other groups, such as the Animal Liberation Front, Earth Liberation Front, and People for the Ethical Treatment of Animals may have sympathizers in the region. Although no major terrorist acts have been attributed to any of these latter groups, their involvement in violent acts is meant to disrupt governmental functions and cannot be discounted.

4.27.2 – Previous Occurrences

Kansas Region K 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 K is considered very low due the lack of any documented historical events. Again, it is worth noting that no previous occurrences in no way guarantees no future occurrences.

4.27.4 – Vulnerability Analysis

For purposes of this assessment, data is not available to quantify vulnerability or estimated losses as a result of terrorism incidents that might impact state-owned facilities.

For this assessment, it is not possible to calculate a specific vulnerability for each county or participating jurisdiction. However, because of the desire for publicity following attacks, it is more likely that counties and jurisdictions with greater population densities and /or larger evet venues have a greater risk.

In general, it is difficult to quantify potential losses of terrorism due to the many variables and human elements and lack of historical precedence. Therefore, for the purposes of this plan, the loss estimates will take into account three hypothetical scenarios. The estimated impact of each event was calculated using the Electronic Mass Casualty Assessment and Planning Scenarios developed by Johns Hopkins University.

Please note that the hypothetical scenarios are included for illustrative purposes only.

Scenario #1: Mustard Gas Release

Event: Mustard gas is released from a light aircraft onto the stadium during a home football game. The agent directly contaminates the stadium and the immediate surrounding area. This attack would cause harm to humans and could render portions of the stadium unusable for a short time period in order to allow for a costly clean-up. There might also be a fear by the public of long-term contamination of the stadium and subsequent boycott of games resulting in a loss of revenue and tourism dollars.

Event Assumptions: For this scenario the number of people in the stadium is 50,000 with an additional 5,000 persons remain outside the stadium in the adjacent parking areas. The agent used, mustard gas, is extremely toxic and may damage eyes, skin and respiratory tract with death sometimes resulting from secondary respiratory infections. Death rate from exposure estimated to be 3%. The estimated decontamination cost is $12 person. For this scenario it is assumed that all persons with skin injuries will require decontamination.

Results: The following table presents the estimated human and economic impacts of the scenario.

Table 4.228: 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 4.229: 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 4.230: 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 4.231: Terrorism Consequence Analysis

Subject	Impacts of Terrorism
Health and Safety of Persons in the Area of the Incident	Impact could be severe for persons in the incident area.
Responders	Impact to responders could be severe if not trained and properly equipped. Responders that are properly trained and equipped will have a low to moderate impact.
Continuity of Operations	Depending on damage to facilities/personnel in the incident area, relocation may be necessary and lines of succession execution.
Property, Facilities, and Infrastructure	Impact within the incident area could be severe for explosion, moderate to low for Hazmat.
Environment	Localized impact within the incident area could be severe depending on the type of incident.
Economic Conditions	Economic conditions could be adversely affected and dependent upon time and length of clean up and investigation.
Public Confidence in Governance	Impact dependent on if the incident could have been avoided by government entities, clean-up, investigation times and outcomes.

4.28 – Utility/Infrastructure Failure

Critical infrastructure involves several different types of facilities and systems including:

- Electric power
- Transportation routes
- Natural gas and oil pipelines
- Water and sewer systems, storage networks
- Internet/telecommunications systems

Failure of utilities or infrastructure components in south-southwest Kansas can seriously impact public health, functioning of communities and the region's economy. Disruptions to utilities can occur from many of the hazards detailed in this plan, but the most likely causes include:

- Floods
- Lightning
- Tornados and Windstorms
- Winter Storms

In addition to being impacted by another listed hazard, utilities and infrastructure can fail as a result of faulty equipment, lack of maintenance, degradation over time, or accidental damage.

4.28.1 – Location and Extent

All of Kansas Region K 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 K is provided by either investor-owned utilities or rural electric cooperatives (RECs). RECs are not-for-profit, member-owned electric utilities. Kansas RECs are governed by a board of trustees elected from the membership. Most Kansas RECs were set up under the Kansas Electric Cooperative Act, which, together with the federal Rural Electrification Act of 1934, made electric power available to rural customers. Information on regional electrical suppliers may be found at www.kec.org/servicearea_map.html. Additionally, locations of electric certified areas and transmission lines may be found at www.kcc.state.ks.us/maps/ks_electric_certified_areas.pdf.

Transportation Routes

Transportation routes can also be impacted by many of the hazards discussed in this plan. The primary hazards that impact transportation are flood, hazardous materials, and winter weather. Flood events can make roads and bridges impassible due to high water. Flood waters can also erode or scour road beds and bridge abutments. Highway and railroad accidents that involve hazardous materials can impact transportation routes through closures and/or evacuations. Winter weather frequently impacts transportation as roads become treacherous or impassible due to ice and snow. Other hazards that impact transportation routes include dam and levee failures if routes are in inundation areas, extreme temperatures that can cause damage to pavement, land subsidence that can damage roads/railroads, landslides that can cause debris and rock falls onto roadways, terrorism that can target routes, tornados that can directly damage infrastructure or deposit debris in routes, wildfires that can cause decreased visibility on transportation routes due to smoke, and windstorms that can cause vehicle accidents or overturning.

Pipelines Systems

Hazards that can impact natural gas and oil pipelines include earthquakes, expansive soils, land subsidence, landslide, and terrorism

Water and Sewer Systems

The primary hazards that can impact water supply systems include drought, floods, hazardous materials, and terrorism. Water district boundary maps are available for review at https://krwa.net/ONLINE-RESOURCES/RWD-Maps.

Internet and Telecommunications

Internet and telecommunications infrastructure can be impacted by floods, lightning, tornados, windstorms, and winter weather. Land line phone lines often utilize the same poles as electric lines, so when weather events such as windstorm or winter weather cause lines to break both electricity and telephone services may experience outages. With the increasing utilization of cellular phones, hazard events such as tornado that can damage cellular repeaters can cause outages. In addition, during any hazard event, internet and telecommunications systems can become overwhelmed due to the surge in call and usage volume. A map indicating telephone service providers in Kansas Region K is available at www.kcc.state.ks.us/maps /ks_telephone_certified_areas.pdf.

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 K. 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 4.232: FEMA Benefit-Cost Analysis

Loss of Electric Power	Cost of Complete Loss of Service
Total Economic Impact	$131 per person per day
Loss of Potable Water Service	Cost of Complete Loss of Service
Total Economic Impact	$103 per person per day
Loss of Wastewater Service	Cost of Complete Loss of Service
Total Economic Impact	$45 per person per day
Loss of Road/Bridge Service	Cost of Complete Loss of Service
Vehicle Delay Detour Time	$29.63 per vehicle per hour (one-way trips)
Vehicle Delay Mileage	$0.54 per mile (or current federal mileage rate)

Source: FEMA BCA Reference Guide, June 2009, Appendix C

4.28.5 – Impact and Consequence Analysis

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

Table 4.233: Utility/Infrastructure Failure Consequence Analysis

Subject	Impacts of Utility/Infrastructure Failure
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 4.233: Utility/Infrastructure Failure Consequence Analysis

Subject	Impacts of Utility/Infrastructure Failure
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."

44 CFR 201.7 does not require a capability assessment to be completed for local hazard mitigation plans. However, 201.7(c)(3) states "A mitigation strategy that provides the Indian tribal government's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools."

This section of the plan discusses the current capacity of regional communities to mitigate the effects of identified hazards. A capability assessment is conducted to determine the ability of a jurisdiction to execute a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs or projects.

A capability assessment helps to determine which mitigation actions are practical based on a jurisdiction's fiscal, staffing and political resources. A capability assessment consists of:

- An inventory of relevant plans, ordinances, or programs already in place
- An analysis capacity to carry them out.

A thoughtful review of jurisdictional capabilities will assist in determining gaps that could limit current or proposed mitigation activities, or potentially aggravate a jurisdictions vulnerability to an identified hazard. Additionally, a capability assessment can detail current successful mitigation actions that should continue to receive support.

For this plan each participating jurisdiction was given an opportunity to present their capability assessment information.

5.2 – Granted Authority

In implementing a mitigation plan or specific action, a local jurisdiction may utilize any or all of the four broad types of government authority granted by the State of Kansas. The four types of authority are defined as:

- Regulation
- Acquisition
- Taxation
- Spending

Regulation

The scope of this local authority is subject to constraints, however, as all of Kansas' political subdivisions must not act without proper delegation from the State. Under a principle known as "Dillon's Rule," all power is vested in the State and can only be exercised by local governments to the extent it is delegated.

Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely "hazard-proofing" a particular piece of property or area is to acquire the property, thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Kansas legislation empowers cities, towns, counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain (County Home Rule Powers, K.S.A. 19-101, 19-101a, 19-212).

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by Kansas law. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in the community. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood control within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development. Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.

Spending

The Kansas General Assembly allocated the ability to local governments to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption of annual budgets and a Capital Improvement Plan. A Capital Improvement Plan is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a community can control growth to some extent. In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to services. A Capital Improvement Plan that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth.

If the Capital Improvement Plan is effective in directing growth away from environmentally sensitive or high hazard areas.

5.3 – Governance

All counties within Kansas Region K operate under a county commissioner form of governance, with the elected board of commissioners overseeing county operations. Participating tribes operate under a Tribal Council or Executive Committee form of government

Table 5.1: County and Tribal Governance

Jurisdiction	Government Structure	Number of Commissioners
Atchison County	Commission	3
Brown County	Commission	3
Doniphan County	Commission	3
Douglas County	Commission	3
Iowa Tribe	Executive Committee	5
Jackson County	Commission	3
Jefferson County	Commission	3
Kickapoo Tribe	Tribal Council	7
Marshall County	Commission	3
Nemaha County	Commission	3
Washington County	Commission	3

In general, the participating towns and cities in Kansas Region K 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 – Jurisdictional 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 plans:

Comprehensive Plan: A comprehensive plan establishes the overall vision for a jurisdiction and serves as a guide to decision making, and generally contains information on demographics, land use, transportation, and facilities. As a comprehensive plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.

Critical Facilities Plan: A critical facilities plan is used to identify a jurisdiction's critical facilities, including fire stations, police stations, hospitals, schools, day care centers, senior care facilities, major roads and bridges, critical utility sites, and hazardous material storage areas. Additionally, this plan may be used to determine methods to mitigate damage to these facilities.

Debris Management Plan: A debris management plan covers the response and recovery from debris-causing incidents such as tornados or floods. Planning considerations include debris removal and disposal, disposal locations, equipment availability, and personnel training.

Emergency Operations Plan: An emergency operations plan outlines responsibility, means and methods by which resources are deployed during and following an emergency or disaster.

Evacuation Plan: A plan that outlines routes and methods by which populations are evacuated during and following an emergency or disaster.

Fire Mitigation Plan: A fire mitigation plan is used to mitigate a jurisdictions wildfire risk and vulnerability. The plan documents areas with an elevated risk of wildfires, and identifies the actions taken to decrease the risk. A fire mitigaion plan can influence and prioritize future funding for hazardous fuel reduction projects, including where and how federal agencies implement fuel reduction projects on federal lands.

Flood Mitigation Assistance Plan: The purpose of the flood mitigation assistance plan is to reduce or eliminate the long-term risk of flood damage to buildings and other structures insured under the NFIP.

Recovery Plan: A disaster recovery plan guides the recovery and reconstruction process following a disaster. Hazard mitigation principles should be incorporated into disaster recovery plans to assist in breaking the cycle of disaster loss.

Vulnerable Population Plan and/or Inventory: A vulnerable populations plan is used to develop a strategic approach for support to persons with functional or special needs before, during and following a disaster.

The table below summarizes relevant jurisdictional planning capabilities.

Table 5.2: Jurisdictional Planning Capabilities

Jurisdiction	Comprehensive Plan	Critical Facilities Plan	Debris Management Plan	Emergency Operations Plan	Evacuation Plan	Firewise or other Fire Mitigation Plan	Flood Mitigation Assistance Plan	Recovery Plan	Vulnerable Population Plan or Inventory
Atchison County	x	x	x	x	x		x	x	x
City of Atchison	x	x	x	x	x		x	x	x
City of Effingham	x	x	x	x	x		x	x	x
City of Huron	x	x	x	x	x		x	x	x
City of Lancaster	x	x	x	x	x		x	x	x
City of Musotah	x	x	x	x	x		x	x	
Brown County			x	x	x		x	x	
City of Everest			x	x					
City of Fairview	x		x	x					
City of Hiawatha	x		x	x			x		
City of Horton			x	x					
City of Morrill			x	x					
City of Reserve			x	x					
City of Robinson	x		x	x					
City of Willis			x	x					
Doniphan County	x			x				x	
City of Denton				x					
City of Elwood	x			x					
City of Highland				x					
City of Troy	x			x					
City of Wathena				x					
Douglas County	x		x	x		x		x	
City of Baldwin City	x	x		x					
City of Eudora	x	x		x					
City of Lawrence	x			x					
City of Lecompton	x			x			x		
Iowa Tribe	x			x				x	
Jackson County	x			x					
City of Circleville		x		x					
City of Delia				x					

Table 5.2: Jurisdictional Planning Capabilities

Jurisdiction	Comprehensive Plan	Critical Facilities Plan	Debris Management Plan	Emergency Operations Plan	Evacuation Plan	Firewise or other Fire Mitigation Plan	Flood Mitigation Assistance Plan	Recovery Plan	Vulnerable Population Plan or Inventory
City of Denison				x					
City of Holton	x	x		x			x		
City of Hoyt				x					
City of Mayetta	x			x					
City of Netawaka				x					
City of Soldier				x	x				
City of Whiting				x					
Jefferson County	x	x	x	x	x		x	x	x
City of McLouth	x	x		x	x	x		x	
City of Meriden	x			x					
City of Nortonville				x					
City of Oskaloosa	x		x	x		x		x	
City of Perry				x					
City of Valley Falls	x		x	x		x		x	
City of Winchester	x		x	x		x		x	
Kickapoo Tribe	x	x	x	x	x	x	x	x	x
Marshall County	x	x	x	x	x	x	x	x	x
City of Axtell	x		x	x					
City of Beattie			x	x	x	x	x	x	x
City of Blue Rapids	x	x	x	x	x		x	x	x
City of Frankfort	x	x	x	x	x		x	x	x
City of Marysville	x	x	x	x	x		x	x	
City of Oketo			x	x					
City of Summerfield	x		x	x					
City of Vermillion			x	x					
City of Waterville	x	x	x	x	x	x	x	x	x
Nemaha County	x		x	x					
City of Bern				x	x				
City of Centralia				x	x	x	x		
City of Corning				x	x				
City of Goff			x	x	x	x			
City of Oneida				x	x				
City of Sabetha				x	x				
City of Seneca	x	x	x	x	x	x		x	x
City of Wetmore				x	x		x		

Table 5.2: Jurisdictional Planning Capabilities

Jurisdiction	Comprehensive Plan	Critical Facilities Plan	Debris Management Plan	Emergency Operations Plan	Evacuation Plan	Firewise or other Fire Mitigation Plan	Flood Mitigation Assistance Plan	Recovery Plan	Vulnerable Population Plan or Inventory
Washington County				x			x	x	x
City of Barnes				x				x	
City of Clinton				x				x	
City of Greenleaf				x				x	
City of Haddam				x				x	
City of Hanover				x				x	
City of Hollenberg				x				x	
City of Linn				x				x	x
City of Mahaska				x				x	
City of Morrowville				x				x	
City of Palmer				x				x	
City of Vining				x				x	
City of Washington				x	x			x	x

5.4.2 – Jurisdictional Codes and Ordinances

Participating jurisdictions were asked if the following codes 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 Codes and Ordinances

Jurisdiction	Building Code	Floodplain Ordinance	Nuisance Ordinance	Storm Water Ordinance	Zoning Ordinance
Atchison County		x	x	x	
City of Atchison	x	x	x	x	x
City of Effingham	x	x	x		
City of Huron		x	x		
City of Lancaster		x	x		
City of Musotah		x	x		
Brown County		x	x		
City of Everest			x		
City of Fairview			x		
City of Hiawatha	x	x	x	x	x
City of Horton	x	x	x		x

Table 5.3: Jurisdictional Codes and Ordinances

Jurisdiction	Building Code	Floodplain Ordinance	Nuisance Ordinance	Storm Water Ordinance	Zoning Ordinance
City of Morrill	x	x	x	x	
City of Reserve			x		
City of Robinson		x	x		
City of Willis			x		
Doniphan County		x	x		x
City of Denton			x		
City of Elwood		x	x		x
City of Highland		x	x		x
City of Troy		x	x		x
City of Wathena		x	x		x
Douglas County		x		x	
City of Baldwin City	x	x	x	x	x
City of Eudora	x	x	x	x	x
City of Lawrence	x	x	x	x	x
City of Lecompton	x	x	x		x
Iowa Tribe			x		
Jackson County		x			x
City of Circleville	x	x	x		x
City of Delia		x	x		
City of Denison	x	x	x		x
City of Holton	x	x	x		x
City of Hoyt	x	x	x		x
City of Mayetta	x	x	x		x
City of Netawaka	x		x		
City of Soldier		x	x		
City of Whiting	x	x	x		
Jefferson County	x	x	x		x
City of McLouth	x	x	x	x	x
City of Meriden	x	x	x		x
City of Nortonville		x			
City of Oskaloosa	x	x			x
City of Perry	x	x	x		x
City of Valley Falls	x	x	x	x	x
City of Winchester	x	x			x

Table 5.3: Jurisdictional Codes and Ordinances

Jurisdiction	Building Code	Floodplain Ordinance	Nuisance Ordinance	Storm Water Ordinance	Zoning Ordinance
Kickapoo Tribe	x	x	x	x	x
Marshall County		x	x		
City of Axtell	x	x	x		
City of Beattie		x	x		
City of Blue Rapids	x	x	x	x	x
City of Frankfort	x	x	x	x	
City of Marysville	x	x	x	x	x
City of Oketo			x		
City of Summerfield			x		
City of Vermillion			x		
City of Waterville	x	x	x	x	x
Nemaha County		x			
City of Bern			x		
City of Centralia		x		x	
City of Corning		x			
City of Goff		x			
City of Oneida					
City of Sabetha	x	x			
City of Seneca	x	x	x	x	x
City of Wetmore			x		
Washington County		x	x		
City of Barnes			x		
City of Clinton			x		
City of Greenleaf	x		x		
City of Haddam		x	x		
City of Hanover		x	x		
City of Hollenberg			x		
City of Linn			x		
City of Mahaska			x		
City of Morrowville		x	x		x
City of Palmer		x	x		
City of Vining			x		
City of Washington		x	x		

5.4.3 – Jurisdictional Programs

This part of the capability's assessment includes the identification and evaluation of existing programs for each participating jurisdiction:

Community Rating System program under the National Flood Insurance Program: The NFIP's Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Participants are offered flood insurance premium rates at a discount to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS. These goals are the reduction of flood damage to insurable property, the strengthening and support of insurance aspects of the NFIP, and the encouragement of a comprehensive approach to floodplain management.

Firewise Community Certification: The Firewise Communities Program encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes from the risk of wildfire. Firewise is a key component of Fire Adapted Communities, a collaborative approach that connects all those who play a role in wildfire education, planning and action with comprehensive resources to help reduce risk. The program is co-sponsored by the USDA Forest Service, the US Department of the Interior, and the National Association of State Foresters.

ISO Fire Rating: This assessment also includes the identification and evaluation of existing ISO fire ratings. The Fire Suppression Rating Schedule is a manual containing the criteria ISO uses in reviewing the fire prevention and fire suppression capabilities of individual communities or fire protection areas. The schedule measures the major elements of a community's fire protection system and develops a numerical grading called a Public Protection Classification.

National Flood Insurance Program: In 1968, Congress created the NFIP to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding.

***National Weather Service StormReady Program*:** StormReady uses a grassroots approach to help communities develop plans to handle all types of severe weather. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations

The table below summarizes relevant local programs.

Table 5.4: Jurisdictional Programs

Jurisdiction	Community Rating System program	Firewise Community Certification	ISO Fire Rating	National Flood Insurance Program	National Weather Service Storm Ready Certification
Atchison County	x		x	x	x
City of Atchison			3	x	x
City of Effingham			x	x	x
City of Huron			x		x
City of Lancaster			x		x
City of Musotah			x	x	x
Brown County				x	
City of Everest			6		
City of Fairview			x		
City of Hiawatha			5	x	
City of Horton				x	
City of Morrill			7	x	
City of Reserve					
City of Robinson				x	
City of Willis					
Doniphan County			9	x	
City of Denton			9		
City of Elwood			5	x	
City of Highland			8	x	
City of Troy			7	x	
City of Wathena			6	x	
Douglas County	x			x	x
City of Baldwin City			x	x	
City of Eudora			6	x	
City of Lawrence				x	
City of Lecompton			4/4y	x	
Iowa Tribe					
Jackson County	x		7-10	x	
City of Circleville			5	x	
City of Delia			6x	x	
City of Denison			5x	x	
City of Holton			5	x	
City of Hoyt			5	x	
City of Mayetta			7	x	
City of Netawaka			7		

Table 5.4: Jurisdictional Programs

Jurisdiction	Community Rating System program	Firewise Community Certification	ISO Fire Rating	National Flood Insurance Program	National Weather Service Storm Ready Certification
City of Soldier			6/6y	x	
City of Whiting			9	x	
Jefferson County	x		x	x	x
City of McLouth			5	x	
City of Meriden				x	
City of Nortonville				x	
City of Oskaloosa			8	x	
City of Perry				x	
City of Valley Falls			8	x	
City of Winchester			9	x	
Kickapoo Tribe		x	x	x	x
Marshall County			x	x	
City of Axtell			7	x	
City of Beattie		x	x		
City of Blue Rapids			x	x	
City of Frankfort			x	x	
City of Marysville			x	x	
City of Oketo			x		
City of Summerfield			x		
City of Vermillion			x	x	
City of Waterville		x	x	x	
Nemaha County				x	
City of Bern		x			x
City of Centralia		x		x	x
City of Corning		x		x	x
City of Goff		x		x	x
City of Oneida		x			
City of Sabetha		x		x	x
City of Seneca		x		x	x
City of Wetmore		x			x
Washington County				x	
City of Barnes					
City of Clinton					
City of Greenleaf					

Table 5.4: Jurisdictional Programs

Jurisdiction	Community Rating System program	Firewise Community Certification	ISO Fire Rating	National Flood Insurance Program	National Weather Service Storm Ready Certification
City of Haddam			8	x	
City of Hanover			5	x	
City of Hollenberg			10		
City of Linn			8		
City of Mahaska					
City of Morrowville				x	
City of Palmer			10	x	
City of Vining					
City of Washington			6	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 – Jurisdictional Staffing and Departmental Capabilities

A comprehensive mitigation program relies on many skilled professionals. These professionals include:

- Planners
- Emergency managers
- Floodplain managers
- GIS personnel

While exact responsibilities differ from jurisdiction to jurisdiction, the general duties of applicable departments are described below:

Building Official: Building officials are generally the jurisdictional administrator of building and construction codes, engineering calculation supervision, permits, facilities management, and accepted construction procedures. They may also inspect structures to ensure compliance with the plans and to check workmanship as well as code compliance.

Emergency Management Coordinator: The Emergency Management office is responsible for the mitigation, preparedness, response and recovery operations that deal with both natural and man-made disaster events. The formation of an emergency management department in each county is mandated under Kansas General Statutes.

Local Emergency Planning Committee: Local Emergency Planning Committees are generally housed at the county or municipal level. They do not function in actual emergency situations, but attempt to identify and catalogue potential hazards, identify available resources, mitigate hazards when feasible, and write emergency plans. The role of the LEPC is to anticipate and plan the initial response for foreseeable disasters in their jurisdiction.

Mapping Specialist: A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. A GIS mapping specialist uses this data to create county maps, including flood plain, fire hazard, drought and other mitigation maps.

NFIP Floodplain Administrator: The NFIP floodplain administrator ensures a jurisdiction is meeting the minimum requirements of participation in the NFIP, and often is tasked with applying for funding or grants.

Planning Department: A planning department usually provides management and oversight of development through the application of codes, ordinances, building regulations and public input.

Public Works Official: Public works officials usually provide management and oversight of infrastructure projects such as public buildings (municipal buildings, schools, hospitals), transport infrastructure (roads, railroads, bridges, pipelines, airports), public spaces (public squares, parks), public services (water supply, sewage, electrical grid, dams), and other physical assets and facilities.

The table below summarizes relevant local staffing and departmental capabilities.

Table 5.5: Jurisdictional 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
Atchison County		x	x	x	x	x	x
City of Atchison	x	x	x	x	x	x	x
City of Effingham	x	x	x	x	x		x
City of Huron		x	x	x			x
City of Lancaster		x	x	x			x
City of Musotah		x	x	x	x		x
Brown County		x	x	x	x		x
City of Everest			x				x
City of Fairview			x				x
City of Hiawatha	x		x		x		x

Table 5.5: Jurisdictional 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
City of Horton	x		x		x		x
City of Morrill			x		x		x
City of Reserve			x				x
City of Robinson					x		x
City of Willis			x				x
Doniphan County		x	x		x		x
City of Denton			x				x
City of Elwood			x		x		x
City of Highland			x		x		x
City of Troy			x		x		x
City of Wathena			x		x		x
Douglas County	x	x	x	x	x	x	x
City of Baldwin City	x		x		x		x
City of Eudora	x		x		x		x
City of Lawrence	x		x		x		x
City of Lecompton		x	x		x		x
Iowa Tribe			x				
Jackson County		x	x	x	x	x	x
City of Circleville			x		x		x
City of Delia			x		x		x
City of Denison	x		x		x		x
City of Holton	x		x		x	x	x
City of Hoyt			x		x		x
City of Mayetta	x		x		x	x	x
City of Netawaka	x		x				x
City of Soldier			x		x		x
City of Whiting			x		x		x
Jefferson County	x	x	x	x	x	x	x
City of McLouth	x	x	x	x	x	x	x
City of Meriden			x		x		x
City of Nortonville			x		x		x
City of Oskaloosa			x		x		x
City of Perry			x		x		x
City of Valley Falls			x		x		x
City of Winchester			x		x		x

Table 5.5: Jurisdictional 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
Kickapoo Tribe	x	x	x	x		x	
Marshall County		x	x	x	x		x
City of Axtell		x	x		x	x	x
City of Beattie	x	x	x	x			x
City of Blue Rapids	x	x	x	x	x	x	x
City of Frankfort		x	x	x	x		x
City of Marysville	x	x	x		x		x
City of Oketo		x	x				x
City of Summerfield		x	x				x
City of Vermillion		x	x		x		x
City of Waterville	x	x	x	x	x		x
Nemaha County		x	x	x	x		x
City of Bern		x	x	x			x
City of Centralia	x	x	x	x	x		x
City of Corning		x	x	x	x		x
City of Goff		x	x	x	x		x
City of Oneida		x	x	x			x
City of Sabetha		x	x	x	x		x
City of Seneca	x	x	x	x	x	x	x
City of Wetmore		x	x	x			x
Washington County		x	x	x	x		x
City of Barnes			x				x
City of Clinton			x				x
City of Greenleaf			x				x
City of Haddam			x		x		x
City of Hanover			x		x		x
City of Hollenberg			x				x
City of Linn			x				x
City of Mahaska			x				x
City of Morrowville			x		x		x
City of Palmer			x		x		x
City of Vining			x				x
City of Washington			x		x		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 offer 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 – Jurisdictional Fiscal Capabilities

In general, the jurisdictions of the Kansas Region K receive the majority of their revenue through state and local sales tax and federal and state pass through dollars. Based on available revenue information, and given that both the state and counties are experiencing budget deficits, funding for mitigation programs and disaster response is at a premium. Adding to the budget crunch is the increased reliance on local accountability by the federal government.

The following provide brief definitions of applicable fiscal programs:

Application and Management of Grant Funding: The jurisdiction has the staffing and capabilities to apply for grant funding and oversee all necessary provisions of the funding.

Authority to Levy Taxes: The authority to levy taxes would allow the jurisdiction to tax its population base.

Authority to Withhold Spending in Hazard Prone Areas: The ability of a jurisdiction to not provide funding for activities or actions in an area that is known to be prone to specific hazards.

Incur Debt through General Obligation Bonds: General obligation bonds are issued with the belief that a municipality will be able to repay its debt obligation through taxation or revenue from projects. General obligation bonds can be used to generate funds for mitigation projects.

Usage of Capital Improvement Funding for Mitigation Projects: Capital improvement allows for spending on identified capital projects and for equipment purchases, in this context related to mitigation projects.

The following table highlights each jurisdiction's fiscal capabilities.

Table 5.6: Jurisdictional Financial Capabilities

Jurisdiction	Apply for and Manage Grant Funding	Authority to levy taxes for specific purposes	Authority to Withhold spending in hazard prone areas	Incur Debt through General Obligation Bonds	Usage of Capital Improvement Funding for Mitigation Projects
Atchison County	x	x	x	x	x
City of Atchison	x	x	x	x	x
City of Effingham	x	x		x	x
City of Huron					
City of Lancaster	x	x		x	x
City of Musotah					
Brown County	x	x		x	x
City of Everest	x	x		x	x
City of Fairview	x	x		x	x
City of Hiawatha	x	x		x	x
City of Horton	x	x		x	x
City of Morrill	x	x		x	x
City of Reserve	x	x		x	x
City of Robinson	x	x		x	x
City of Willis	x	x		x	x
Doniphan County	x	x		x	x
City of Denton	x	x		x	x
City of Elwood	x	x		x	x
City of Highland	x	x		x	x
City of Troy	x	x		x	x
City of Wathena	x	x		x	x
Douglas County	x				x
City of Baldwin City	x	x		x	x
City of Eudora	x	x		x	x
City of Lawrence	x	x		x	x
City of Lecompton	x	x		x	x
Iowa Tribe	x				x
Jackson County	x	x		x	x
City of Circleville	x	x		x	x
City of Delia	x	x		x	x
City of Denison	x	x		x	x
City of Holton	x	x		x	x
City of Hoyt	x	x		x	x

Table 5.6: Jurisdictional Financial Capabilities

Jurisdiction	Apply for and Manage Grant Funding	Authority to levy taxes for specific purposes	Authority to Withhold spending in hazard prone areas	Incur Debt through General Obligation Bonds	Usage of Capital Improvement Funding for Mitigation Projects
City of Mayetta	x	x		x	x
City of Netawaka	x	x		x	x
City of Soldier	x	x		x	x
City of Whiting	x	x		x	x
Jefferson County	x	x	x	x	x
City of McLouth	x	x			x
City of Meriden	x	x		x	x
City of Nortonville	x	x		x	x
City of Oskaloosa	x	x		x	x
City of Perry	x	x		x	x
City of Valley Falls	x	x		x	x
City of Winchester	x	x		x	x
Kickapoo Tribe	x	x	x	x	
Marshall County	x	x		x	x
City of Axtell	x	x	x	x	x
City of Beattie	x	x		x	x
City of Blue Rapids	x	x	x	x	x
City of Frankfort	x	x	x	x	x
City of Marysville	x	x		x	x
City of Oketo	x	x		x	x
City of Summerfield	x	x	x	x	x
City of Vermillion	x	x		x	x
City of Waterville	x	x		x	x
Nemaha County	x	x		x	x
City of Bern	x	x		x	x
City of Centralia	x	x		x	x
City of Corning	x	x		x	x
City of Goff	x	x		x	x
City of Oneida	x	x		x	x
City of Sabetha	x	x		x	x
City of Seneca	x	x		x	x
City of Wetmore	x	x		x	x
Washington County	x	x		x	x
City of Barnes	x	x		x	x
City of Clinton	x	x		x	x

Table 5.6: Jurisdictional Financial Capabilities

Jurisdiction	Apply for and Manage Grant Funding	Authority to levy taxes for specific purposes	Authority to Withhold spending in hazard prone areas	Incur Debt through General Obligation Bonds	Usage of Capital Improvement Funding for Mitigation Projects
City of Greenleaf	x	x		x	x
City of Haddam	x	x		x	x
City of Hanover	x	x		x	x
City of Hollenberg	x	x		x	x
City of Linn	x	x		x	x
City of Mahaska	x	x		x	x
City of Morrowville	x	x		x	x
City of Palmer	x	x		x	x
City of Vining	x	x		x	x
City of Washington	x	x		x	x

5.4.7 – College, School and University Capability Assessment

Participating school districts were provided with a different set of questions that participating governmental jurisdictions. These questions were asked to ascertain the level of preparedness of the institution.

The following provides brief definitions of terms used in the capability assessment of schools. Please note that some definitions have been provided in previous sections.

Access to Local, Regional and State Funds: The ability to use local, regional and state funding on school activities and improvements.

Active Shooter Plan: An active shooter plan outlines responsibility, means and methods by which resources are deployed during an active shooter scenario.

Capital Improvement Plan: A capital improvement plan guides scheduling of, and spending on, school improvements. A capital improvement plan can guide future development away from identified hazard areas, an incorporate identified mitigation strategies.

District Master Plan: A master plan establishes the overall vision and serves as a guide to decision making. A master plan generally contains information on demographics, land use, transportation, and facilities. As a master plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.

Emergency Operations Plan/Evacuation Plan: An emergency operations plan outlines responsibility, means and methods by which resources are deployed during and following an emergency or disaster. Often included in these plans are detailed evacuation procedures and policies.

Incur Debt through General Obligation Bonds: General obligation bonds are issued with the belief that an entity will be able to repay its debt obligation through taxation or revenue from projects. General obligation bonds can be used to generate funds for mitigation projects.

School Safety or Resource Officer: A person with overall responsibility for safety of the school, students and staff.

Information as to the current capacity of participating schools, colleges and universities is summarized in the following table.

Table 5.7: College, Unified School District or University Capabilities

Jurisdiction	Access to Local, Regional and State funds	Active Shooter Plan or Policy	Capital Improvement Plan	District Master Plan	School Emergency and Evacuation Plans	School Safety or Resource Officers or Dedicated Law Enforcement
Atchison County						
USD #377 - Atchison County	x	x		x	x	
USD #409 - Atchison	x	x	x	x	x	
Brown Countyx						
USD #415 - Hiawatha	x	x			x	
USD #430 - Horton	x	x		x	x	
Doniphan County						
USD #111- Doniphan West	x	x			x	
USD #114 - Riverside	x	x	x	x	x	
USD #429 - Troy	x	x			x	
Douglas County						
Baker University	x	x	x	x	x	
University of Kansas	x	x	x	x	x	x
USD #343 - Perry / Lecompton	x	x			x	
USD #348 - Baldwin City	x	x	x	x	x	x
USD #491 - Eudora	x	x		x	x	
USD #497 - Lawrence	x	x	x	x	x	
Jackson County						
USD #335 - Jackson Heights	x	x	x	x	x	
USD #336 - Holton	x	x	x	x	x	x
USD #337 - Royal Valley	x	x	x	x	x	

Table 5.7: College, Unified School District or University Capabilities

Jurisdiction	Access to Local, Regional and State funds	Active Shooter Plan or Policy	Capital Improvement Plan	District Master Plan	School Emergency and Evacuation Plans	School Safety or Resource Officers or Dedicated Law Enforcement
Jefferson County						
USD #338 - Valley Falls	x	x			x	
USD #339 - Jefferson County North	x	x	x	x	x	
USD #340 - Jefferson West	x	x	x	x	x	x
USD #341 - Okaloosa	x	x	x		x	
USD #342 - McLouth	x	x	x		x	
USD #343 - Perry / Lecompton	x	x			x	
Kickapoo Nation						
Kickapoo Nation School	x	x			x	
Marshall County						
Good Shepherd School					x	
St. Gregory School	x	x		x	x	
St. Michael's School	x	x			x	
USD #113- Prairie Hills	x	x			x	
USD #364 - Maryville	x	x	x	x	x	
USD #380 - Vermillion	x	x	x		x	
USD #498 - Valley Heights	x	x				
Nemaha County						
Saints Peter and Paul	x	x	x		x	x
USD #113 - Prairie Hills	x	x	x	x	x	x
USD #115 - Nemaha Central	x	x	x	x	x	x
Washington County						
USD #108 - Washington County	x	x	x	x	x	
USD #223 - Barnes / Hanover / Linn	x	x		x	x	
USD #224 – Clifton/Barnes	x	x			x	

Additionally, under K.S.A. 72-5457 (General Provisions for the Issuance of Bonds), all Kansas USDs may issue general obligation bonds to:

- Purchase or improve any site or sites necessary for school district purposes including housing and boarding pupils enrolled in an area vocational school
- Acquire, construct, equip, furnish, repair, remodel or make additions to buildings including housing and boarding pupils enrolled in an area vocational school operated under the board of education of a school district

5.5 – Opportunities for Capability Improvement

As part of this plan update, the MPC identified the following opportunities for improvement across the region 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

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- **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 K and its participating jurisdictions worked to minimize the risk of future impacts from identified hazards to all citizens. In an attempt to shape future regulations, ordinances and policy decisions, the MPC reviewed and developed a hazard mitigation strategy. This comprehensive strategy includes:

- The consistent review and revision, as necessary, of obtainable goals and objectives
- The consistent review, revision and development of a comprehensive list of potential hazard mitigation actions

The development of a robust mitigation strategy allows for:

- The ability to effectively direct limited resources for maximum benefit
- The ability to prioritize identified hazard mitigation projects to maximize positive outcomes
- The increase in public and private level participation in hazard mitigation through transparency and awareness
- The potential direction of future policy decisions through awareness and education
- The achievement of the ultimate goal of a safer region for all our citizens

Considering the factors listed above, the MPC continues to implement the following mitigation strategy:

- **Implement** the recommendations of this plan.
- **Utilize** existing regulations, policies, programs, procedures, and plans already in place.
- **Share** information on Funding opportunities.
- **Communicate** the information contained in this plan so all jurisdictions and citizens have a clearer understanding of the hazards facing the region and what can be done to mitigate their impacts.
- **Publicize** the success stories that have been achieved through the region's ongoing mitigation efforts.

6.2 – Emergency Management Accreditation Program Integration

As per requirements, in identifying and reviewing mitigation actions the following activities recommended by the EMAP were considered:

- The use of applicable building construction standards
- Hazard avoidance through appropriate land-use practices
- Relocation, retrofitting, or removal of structures at risk
- Removal or elimination of the hazard
- Reduction or limitation of the amount or size of the hazard
- Segregation of the hazard from that which is to be protected
- Modification of the basic characteristics of the hazard
- Control of the rate of release of the hazard
- Provision of protective systems or equipment for both cyber or physical risks

- Establishment of hazard warning and communication procedures
- Redundancy or duplication of essential personnel, critical systems, equipment, and information materials.

6.3 – Problem Statements

Based on the regionally identified hazards, 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 K Problem Statements

Identified Hazard	Problem Statement	Current Condition (Same, Improving, Worsening)	Potential Impact(s)
Flood	Numerous low-water crossing throughout the region repeatedly flood	Same	Road damage, potential loss of life, cutoff of emergency services
Flood	The number of flood insurance policies have decreased from 2012 to 2019	Worsening	Loss of coverage for flood prone properties.
Tornado	Predictions indicate the number of tornados per year is expected to remain the same	Same	Increased injuries, deaths and property damage
Tornado	Current saferooms may not provide enough space to shelter all of those in need.	Same	Injuries and/or loss of life
Windstorm	Region K is located in Wind Region IV, the highest classification for inland winds.	Same	High potential for property damages, injuries and/or deaths
Windstorm	Current saferooms may not provide enough space to shelter all of those in need.	Same	Injuries and/or loss of life
Winter Storm	Ice storms may damage utilities	Same	Lack of service to citizens, potential adverse impacts due to loss of heat or power
Utility Failure	Power infrastructure is above ground and susceptible to a range of hazards	Worsening with age of infrastructure	Lack of service to citizens, potential adverse impacts due to loss of heat or power

Additionally, problem statements from the public survey are incorporated to provide a community wide view. Problems statements were developed using the following inputs:

- Location
- Identified hazard
- Key point of concern

The following table present problem statements for each county, generated through discussions with participating jurisdictions within that county, to be utilized in informing the review, modification and development of hazard mitigation actions.

Table 6.2: Kansas Region K Community Problem Statements

Jurisdiction	Identified Hazard(s)	Problem Statement
Atchison County	Flood	Poor drainage systems exacerbate flood situations.
Atchison County	Tornado	A lack of saferoom access in jurisdictions throughout the county.
Atchison County	Utility /Infrastructure Failure	Power failures occur on an occasional basis causing problems for vulnerable populations and businesses.
Brown County	Flood	Flooding is a consistent threat to jurisdictions within the county.
Brown County	Utility /Infrastructure Failure	Power outages impact the capabilities of all participating jurisdictions.
Doniphan County	All Hazards	A lack of saferoom access in jurisdictions throughout the county.
Doniphan County	Flood	Flooding of roads and communities is a concern for all jurisdictions
Doniphan County	Tornado	Not all communities and schools have adequate saferooms.
Douglas County	All Hazards	Current public outreach initiatives need to be expanded
Douglas County	Flood	Roads and communities are susceptible to negative impacts from flood events
Douglas County	Civil Disorder	A large university student population increases the probability of a civil unrest event.
Douglas County	Civil Disorder	Major university sporting events increases the probability of a civil unrest event.
Douglas County	Hazardous Materials	Interstate 70, which bisects the county, is a route for the transportation of hazardous materials.
Iowa Tribe	All Hazards	Current public outreach initiatives need to be expanded
Iowa Tribe	Tornado and Windstorm	A lack saferooms on the tribal reservation.
Jackson County	Flood	Roads and communities are susceptible to negative impacts from flood events
Jackson County	Utility /Infrastructure Failure	Power outages impact the capabilities of all participating jurisdictions.
Jefferson County	All Hazards	Current public outreach initiatives need to be expanded
Jefferson County	Flood	Flooding is a consistent threat to jurisdictions within the county.

Table 6.2: Kansas Region K Community Problem Statements

Jurisdiction	Identified Hazard(s)	Problem Statement
Jefferson County	Tornado	A lack of saferoom access in jurisdictions throughout the county.
Kickapoo Tribe	All Hazards	Current public outreach initiatives need to be expanded
Marshall County	Flood	Roads and communities are susceptible to negative impacts from flood events
Marshall County	Utility /Infrastructure Failure	Unchecked tree growth and infrequent trimming cause power failures.
Nemaha County	Flood	Washed up brush in creeks and rivers that cause unnecessary flooding issues.
Washington County	All Hazards	Current public outreach initiatives need to be expanded
Washington County	Flood	Flooding of roads and communities is a concern for all jurisdictions
Washington County	All Hazards	Current public outreach initiatives need to be expanded

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.

44 CFR 201.7 (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 K 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 K vision for hazard mitigation and disaster resilience.

- **Goal 1:** Reduce or eliminate risk to the people and property of Kansas Region K 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 K 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 K 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: County and Participating Jurisdictions Completed Hazard Mitigation Actions

Jurisdiction	Action Description
Douglas County	Wakarusa Township Fire Department Backup Generator
Douglas County	Bishop Seabury Academy (BSA) Safe Room
Circleville, Jackson County	Install generator at shelter location
Holton, Jackson County	Update of all outdoor warning systems
Holton, Jackson County	Tree Trimming - establish an aggressive tree trimming program.
Mayetta, Jackson County	Seek funding for the purchase and installation of warning sirens
Whiting, Jackson County	Install generators to maintain power in the event of severe weather events.

Kansas Region K is committed to pursuing funding to complete all major hazard mitigation projects.

6.6 – Review and Addition of Mitigation Actions

For this plan update, members of the MPC and participating jurisdictions were asked to complete a thorough review of all not completed mitigation actions. Additionally, MPC members and participating jurisdictions were provided with the opportunity to identify and incorporate newly identified actions based on:

- Hazard events that have occurred since the last plan revision
- Updated risk assessments
- Identified goals and objectives
- Changing local capabilities
- New vulnerabilities.

In identifying new, or reviewing existing mitigation actions, the following general categories were considered:

Local Plans and Regulations: Actions that influence the way land and buildings are developed or constructed. Actions may include:

- Revision or institution planning and zoning ordinances
- Revision or institution of building codes

- Open space preservation
- Revision or institution floodplain regulations
- Revision or institution stormwater management regulations
- Drainage system maintenance
- Requirements for riverine setbacks

Structure and Infrastructure Projects: Actions that involve the modification of existing structures to protect, or remove from, a hazard or hazard area. Actions may include:

- 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.

44 CFR 201.7 (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 Indian Tribal Government.

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.

44 CFR 201.7 (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.

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 – Atchison County and Participating Jurisdictions Mitigation Actions

Table 6.4: Atchison County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Atchison County-1	Educate and promote participation in the NFIP.	Flood	Emergency Management Coordinator	High	2,4	Unknown	Local, State	Continuous	On-going
Atchison County-2	Annually host a public "hazards workshop" at public venues to educate the public on the risk of hazards that threaten the county.	All Hazards	Emergency Management Coordinator	High	4	Unknown	Local	Continuous	On-going, Continuous
Atchison County-3	Provide educational material on individual and family preparedness/mitigation measures for property owners.	All Hazards	Emergency Management Coordinator	Medium	4	Unknown	Local	Continuous	On-going, Continuous
Atchison County-4	Encourage and construct safe rooms and storm shelters in public and private schools, day care centers, and senior care facilities.	Tornado, Windstorm	Emergency Management Coordinator	High	2,3	Unknown	Local, State, Federal	Continuous	On-going
Atchison County-5	Educate residents about driving in winter storms and educate them on winter related health effects.	Winter Storm	Emergency Management Coordinator	High	4	Unknown	Local	Continuous	On-going, Continuous
Atchison County-6	Educate public and private sectors on potential agricultural terrorism and bio-terrorism.	Terrorism / Agri-Terrorism, Civil Disorder	Emergency Management Coordinator	Medium	3,4	Unknown	Local, State, Federal	Three years	On-going
Atchison County-7	Coordinate county and local mitigation efforts with Rural Electric Cooperatives (RECs).	Utility / Infrastructure Failure	Emergency Management Coordinator	High	3	Unknown	Local	Three Years	On-going
Atchison County-8	Research and recommend appropriate building codes for the county for new construction. County should adopt and enforce codes that require certain minimum building practices and contractor licensing for wind loss reduction.	Tornado, Windstorm	Emergency Management Coordinator	High	2	Unknown	Local	Three years	On-going

Table 6.4: Atchison County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Atchison County-10	Develop a program to acquire and preserve parcels of land subject to repetitive flooding.	Flood	Floodplain Manager	Medium	1,2,3	Unknown	Local, State, Federal	Three years	On-going
Atchison County-11	Annually contact property owners with property in the high-risk flood areas about various programs/buy-outs, grants that are available to them and to gauge their interest.	Flood	Floodplain Manager	High	3,4	Unknown	Local	Continuous	On-going, Continuous
Atchison County-12	Identify flash-flood prone areas to consider flood reduction measures to county planners.	Flood	Floodplain Manager	Medium	1,2	Unknown	Local	Three years	On-going
Atchison County-13	Research and design an appropriate stream buffer ordinance to further protect water resources and limit future flood damages adjacent to major waterways.	Flood	Floodplain Manager	Medium	1,2	Unknown	Local, State, Federal	Three years	On-going
Atchison County-14	Inventory/survey the emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Emergency Management Coordinator	Medium	1	Unknown	Local, State	Three Years	On-going
Atchison County-15	Research and recommend ordinance/resolution to require tornado saferooms for new major manufactures and/or mobile home parks with more than 10 mobile home spaces.	Tornado, Windstorm	Emergency Management Coordinator	High	2	Unknown	Local	Three years	On-going
Atchison County-16	Develop cross-departmental information collection capabilities and incorporate cadastral data utilizing a GIS for more detailed hazard risk assessments and tracking.	All Hazards	County Appraiser	High	1	Unknown	Local, State, Federal	Three Years	On-going
Atchison County-17	Develop and implement a wildfire prevention/education program.	Wildfire	Emergency Management Coordinator	Medium	1,4	Unknown	Local	Three years	On-going
Atchison County-18	Examine the current agreements within the county and assess the need to expand or	Wildfire	Emergency Management Coordinator	High	1,3	Unknown	Local	Three Years	On-going

Table 6.4: Atchison County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	update cooperative agreements for firefighting resources.								
Atchison County-19	Create a working group to evaluate the firefighting water supply resources within the county.	Wildfire	Emergency Management Coordinator	Medium	1,3	Unknown	Local	Three years	On-going
Atchison County-20	Atchison County and Atchison-Doniphan Drainage District No.15-45 will review and update current inspection criteria for levee no. LAT-0021.	Dam and Levee Failure	Emergency Management Coordinator	Medium	1,3	Unknown	Local	Three Years	On-going
Atchison County-21	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	Emergency Management Coordinator	High	4	Unknown	Local	Continuous	On-going, Continuous
Atchison County-22	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 Management Coordinator	Medium	1,3	Unknown	Local	Three years	On-going
Atchison County-23	Develop an annex to the Local Emergency Operations Plan (LEOP) for dam failure response and evacuation for high hazard dams in Atchison County.	Dam and Levee Failure	Emergency Management Coordinator	High	1,3	Unknown	Local	Three Years	On-going
Atchison-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	2,4	Staff Time	Local, State	Continuous	On-going
Atchison-2	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local	Continuous	On-going
Atchison-3	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local	Continuous	On-going
Atchison-4	Seek funding for the design and construction of safe rooms and storm shelters in public and private	Tornado, Windstorm	Mayor	High	2,3	Staff Time	Local, State, Federal	Three Years	Not started, lack of funding

Table 6.4: Atchison County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	schools, day care centers and senior care facilities								
Atchison-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local	Continuous	On-going
Atchison-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Three Years	On-going
Atchison-7	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local	Three Years	On-going
Atchison-8	The City of Atchison is committed to participation and compliance with the NFIP.	Flood	City Planners	Medium	1,2	Staff Time	Local	Continuous	On-going
Effingham-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	2,4	Staff Time	Local, State	Three Years	On-going
Effingham-2	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Unknown	Local	Continuous	On-going, Continuous
Effingham-3	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	Unknown	Local	Continuous	On-going, Continuous
Effingham-4	Seek funding for the design and construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities	Tornado, Windstorm	Mayor	High	2,3	Unknown	Local, State, Federal	Three Years	On-going
Effingham-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Unknown	Local	Continuous	On-going, Continuous

Table 6.4: Atchison County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Effingham-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Three Years	On-going
Effingham-7	Promote the use of NOAA All Hazards Weather Radios for the entire community of Effingham. Seek funding to subsidize purchase and distribution of weather radios.	All Hazards	Mayor	Medium	3,4	$3,000	Local, State, Federal	Three Years	On-going
Huron-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	2,4	Staff Time	Local, State	Three Years	On-going
Huron-2	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Unknown	Local	Continuous	On-going, Continuous
Huron-3	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	Unknown	Local	Continuous	On-going, Continuous
Huron-4	Seek funding for the design and construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities	Tornado, Windstorm	Mayor	High	2,3	Unknown	Local, State, Federal	Three Years	On-going
Huron-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Unknown	Local	Continuous	On-going, Continuous
Huron-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Three Years	On-going
Huron-7	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Unknown	Local	Four years	On-going

Table 6.4: Atchison County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Huron-8	Seek funding to repair and/or install new sirens as needed to ensure area coverage	All Hazards	Mayor	Medium	1,3	$5,000	Local, State, Federal	Four years	On-going
Huron-9	Seek funding to design and construct a community tornado shelter.	Tornado	Mayor	Low	2,3	$500,000	FEMA	Four years	On-going
Lancaster-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	2,4	Staff Time	Local, State	Continuous	On-going
Lancaster-2	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local	Continuous	On-going
Lancaster-3	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local	Continuous	On-going
Lancaster-4	Seek funding for the design and construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities	Tornado, Windstorm	Mayor	High	2,3	Staff Time	Local, State, Federal	Three Years	Not started, lack of funding
Lancaster-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local	Continuous	On-going
Lancaster-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Three Years	On-going
Lancaster-7	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local	Three Years	On-going
Lancaster-8	Seek funding to design and construct a community tornado shelter.	Tornado	Mayor	Low	2,3	$500,000	FEMA	Four years	Not started, lack of funding

Table 6.4: Atchison County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Muscotah-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	2,4	Staff Time	Local, State	Continuous	On-going
Muscotah-2	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local	Continuous	On-going
Muscotah-3	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local	Continuous	On-going
Muscotah-4	Seek funding for the design and construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities	Tornado, Windstorm	Mayor	High	2,3	Staff Time	Local, State, Federal	Three Years	Not started, lack of funding
Muscotah-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local	Continuous	On-going
Muscotah-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Three Years	On-going
Muscotah-7	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local	Three Years	On-going
Muscotah-8	Seek funding to subsidize purchase and distribution of weather radios.	All Hazards	Mayor	Low	3,4	$4,000	Local, State, Federal	Four years	Not started, lack of funding
Highland Community College HCC-1	Seek funding for the construction of a tornado safe room for the Electrical Technology Building located in the City of Atchison.	Tornado	President	Low	2,3	Unknown	Local, State, Federal	Four years	On-going

Table 6.4: Atchison County and Participating Jurisdictions 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 #377-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all Unified School District 377 school buildings.	Tornado	Superintendent	Low	2,3	$1,000,000	Local, State, Federal	Three years	On-going
USD #409-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all Unified School District 409 school buildings.	Tornado	Superintendent	Low	2,3	$1,000,000	Local, State, Federal	Three years	On-going

6.8.2 – Brown County and Participating Jurisdictions Mitigation Actions

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Brown County-1	Brown County is committed to continued participation and compliance with the NFIP.	Flood	Emergency Manager	High	1,2,3	Staff Time	State, FEMA Grants	Continuous	On-going, Continuous
Brown County-2	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program	Flood	Emergency Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Brown County-3	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year	Flood	Emergency Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Brown County-4	Educate and promote local jurisdictional participation in the NFIP.	Flood	Emergency Manager	Medium	4	Staff Time	Local, State	Continuous	On-going
Brown County-5	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners	All Hazards	Emergency Manager	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Brown County-6	Coordinate county and local government mitigation efforts with RECs	Utility/ Infrastructure Failure	Emergency Manager	High	3	Staff Time	Local/State/ Federal	Continuous	On-going
Brown County-7	Annually host a public “hazards workshop” for the residents in combination with local festivals, fairs, or other appropriate events	All Hazards	Emergency Manager	Medium	4	$1,00o per workshop	Local/State	Continuous	On-going, Continuous
Brown County-8	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and senior care facilities and early alert systems.	Tornado, Windstorm	Emergency Manager	High	3	Staff Time	Local, School Districts, State, Federal	Continuous	On-going, Projects not started, lack of funding
Brown County-9	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	4	Staff Time	Local, State	Continuous	On-going, Continuous

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Brown County-10	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues	Terrorism/ Agri-Terrorism	Emergency Manager	Medium	4	Staff Time n	Local, State, KS Animal Health, Federal	Continuous	On-going, Continuous
Brown County-11	Appoint a planning committee to develop and adopt an annex to the LEOP for dam/levee failure response and evacuation for high hazard dams/levees in the jurisdiction.	Dam and Levee Failure	Emergency Manager	High	1,3	Staff Time	Local	Three years	Not started, lack of staff
Brown County-12	Seek funding to purchase and install new warning sirens	All Hazards	Emergency Manager	Medium	1,3	$60,000	Local, State, Federal	Three years	Not started. lack of funding
Brown County-13	Appoint a planning committee to research and develop a Comprehensive Land Use Plan for Brown County.	Flood	County Planner	Medium	1,2	Staff Time	Local	Three years	Not started, lack of staff
Brown County-14	Appoint a planning committee to identify flash-flood prone areas to consider flood reduction measures to county planners.	Flood	Floodplain Manager	Medium	1,2,3	Staff Time	Local	Three years	Not started, lack of staff
Brown County-15	Develop and recommend an amendment to the County Flood Damage Prevention Ordinance to include a "no-rise (in base flood elevation)" clause for the county.	Flood	Floodplain Manager	Medium	1,2	Staff Time	Local	Three years	Not started, lack of staff
Brown County-16	Research, design, implement, and recommend an appropriate stream buffer ordinance to protect water resources and to limit future flood damages.	Flood	County Planner, Floodplain Manager	Medium	1,2	$40,000	Local, State, Federal	Three years	Not started, lack of funding
Brown County-18	Develop cross-departmental information collection capabilities, and incorporate (building/parcel) data utilizing GIS	All Hazards	County Planner, county Appraiser	High	1,3	$10,000	Local, State, Grants	Continuous	On-going, Continuous
Brown County-19	Conduct inventory/survey for the county's emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Emergency Manager	Medium	1	Staff Time	Local, State	Three years	Not started, lack of staff

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Brown County-20	Identify the county's most at-risk critical facilities and evaluate potential mitigation techniques for protecting each to the maximum extent possible.	All Hazards	Emergency Manager	Medium	1,3	Staff Time	Local	Three years	Not started, lack of staff
Brown County-21	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources.	Wildfire	Emergency Manager	Medium	1,3	Staff Time	Local	Continuous	On-going, Continuous
Brown County-22	Create a working group to evaluate the firefighting water supply resources within the County, including both fixed and mobile supply issues.	Wildfire	Emergency Manager	Medium	1,3	Staff Time	Local	Three years	Not started, lack of staff
Brown County-23	Research and recommend appropriate building codes that includes wind-resistant design techniques for new construction.	Tornado, Windstorm	County Planner, County Appraiser	High	2	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Brown County-24	Distribute assessment report examples provided by the Kansas Forest Service to applicable parties to develop an understanding of the Community Wildfire Protection Plan (CWPP). Recommend joining the program and completing an assessment report for approval.	Wildfire	Emergency Manager	High	1,3,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Brown County-25	Appoint a rural fire committee to schedule meetings with the Kansas Forest Service to map suspected hazardous wildfire areas in the county for potential participation in the CWPP.	Wildfire	Emergency Manager	High	1,3,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Brown County-26	Incorporate wildfire maps, develop actions and projects for wildfire prevention, and complete an assessment report to meet CWPP requirements for submittal to the Kansas Forest Service.	Wildfire	Emergency Manager	High	1,3,4	$5,000	Local, State, Federal	Three years	Not started, lack of staff

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Brown County-27	Incorporate the inspection and management of trees that may pose a threat to the county's routine maintenance process.	Windstorm, Tornado, Utility/ Infrastructure Failure	Emergency Manager	Medium	1,3	$10,000	Local	Continuous	Not started, lack of funding
Brown County-28	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	Emergency Manager	High	2,3	Unknown	Local	Three years	On-going
Brown County-29	Pony Creek Joint Watershed District No. 78 will continue to protect the water and land resources within its jurisdiction. It will evaluate the need for further floodwater control and erosion control actions or projects. Additional effort will be made to seek alternative funding resources as they become available.	Flood	Emergency Manager	Medium	1,2,3	Unknown	Local, State, Federal	Continuous	Not started, lack of funding
Brown County-30	Walnut Creek Watershed will continue to protect the water and land resources within its jurisdiction. It will evaluate the need for further floodwater control and erosion control actions or projects. Additional effort will be made to seek alternative funding resources as they become available.	Flood	Emergency Manager	Medium	1,2,3	Unknown	Local, State, Federal	Continuous	On-going, Continuous
Brown County-31	Appoint a committee to develop and submit an Emergency Action Plan (EAP) for each of the three High Hazard Dams owned and maintained by the Walnut Creek Watershed.	Dam and Levee Failure	Emergency Manager	High	1,2,3	Staff Time	Local	Three years	Not started, lack of staff
Brown County-32	Wolf River Watershed will continue to protect the water and land resources within its jurisdiction. It will evaluate the need for further floodwater control and erosion control actions or projects.	Flood	Emergency Manager	High	1,2,3	Unknown	Local, State, Federal	Continuous	On-going

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	Additional effort will be made to seek alternative funding resources as they become available.								
Everest-1	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program.	Flood	Floodplain Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Everest-2	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year.	Flood	Floodplain Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Everest-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	Floodplain Manager	Medium	4	Staff Time	Local, State	Three years	On-going
Everest-4	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Everest-5	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local, State, FEMA	Three years	On-going
Everest-6	Annually host a public "hazards workshop" for the residents in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local, State	Continuous	Not started, lack of funding
Everest-7	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and senior care facilities and improve advanced warning systems.	Tornado, Windstorm	Mayor	High	3	Staff Time and $500,000 per project	Local, School Districts, State, Federal	Continuous	Not started, lack of funding
Everest-8	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Everest-9	Promote and educate the jurisdiction's public and private sectors on potential	Terrorism/ Agri-	Mayor	Medium	4	Staff Time	Local, State, KS Animal	Continuous	On-going, Continuous

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	agricultural terrorism and bio-terrorism issues.	Terrorism, Civil Disorder					Health, Federal		
Everest-10	Appoint a planning committee to develop and adopt an annex to the LEOP for dam/levee failure response and evacuation for high hazard dams/levees in the jurisdiction.	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	Three years	Not started, lack of staff
Everest-11	Seek grant funding to purchase and install the new warning sirens.	All Hazards	Mayor	Medium	1,3	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Everest-12	Appoint a planning committee to research and develop a Comprehensive Land Use Plan.	All Hazards	Mayor	High	1,3	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Everest-13	Seek funding to purchase and install a backup power generator for the second outdoor warning siren.	Utility/ Infrastructure Failure	Mayor	Medium	1,3	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Fairview-1	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program.	Flood	Floodplain Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Fairview-2	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year.	Flood	Floodplain Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Fairview-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	Floodplain Manager	Medium	4	Staff Time	Local, State	Three years	On-going
Fairview-4	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Fairview-5	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local, State, FEMA	Three years	On-going
Fairview-6	Annually host a public “hazards workshop” for the residents in combination with local festivals, fairs, or	All Hazards	Mayor	Medium	4	$300 per workshop	Local, State	Continuous	Not started, lack of funding

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	other appropriate events drawing large crowds.								
Fairview-7	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and senior care facilities and improve advanced warning systems.	Tornado, Windstorm	Mayor	High	3	Staff Time and $500,000 per project	Local, School Districts, State, Federal	Continuous	Not started, lack of funding
Fairview-8	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Fairview-9	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism, Civil Disorder	Mayor	Medium	4	Staff Time	Local, State, KS Animal Health, Federal	Continuous	On-going, Continuous
Fairview-10	Appoint a planning committee to develop and adopt an annex to the LEOP for dam/levee failure response and evacuation for high hazard dams/levees in the jurisdiction.	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	Three years	Not started, lack of staff
Fairview-11	Seek grant funding to purchase and install the new warning sirens.	All Hazards	Mayor	Medium	1,3	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Fairview-12	Seek funding to design and build safe rooms for the town of Fairview	Tornado	Mayor	High	2,3	$300,000	Local, State, Federal	Three years	On-going
Fairview-13	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	On-going
Hiawatha-1	Hiawatha is committed to continued participation and compliance with the NFIP.	Flood	Floodplain Manager	High	1,2,3	Staff Time	State, FEMA Grants	Continuous	On-going, Continuous
Hiawatha-2	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood	Flood	Floodplain Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	Mitigation Assistance (FEMA) program, in addition to other flood protection measures.								
Hiawatha-3	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year.	Flood	Floodplain Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Hiawatha-4	Educate and promote local jurisdictional participation in the NFIP.	Flood	Floodplain Manager	Medium	4	Staff Time	Local, State	Three years	On-going
Hiawatha-5	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Hiawatha-6	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local, State, FEMA	Three years	On-going
Hiawatha-7	Annually host a public "hazards workshop" for the residents in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local, State	Continuous	Not started, lack of funding
Hiawatha-8	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and senior care facilities and improve advanced warning systems.	Tornado, Windstorm	Mayor	High	3	Staff Time and $500,000 per project	Local, School Districts, State, Federal	Continuous	Not started, lack of funding
Hiawatha-9	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Hiawatha-10	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism, Civil Disorder	Mayor	Medium	4	Staff Time	Local, State, KS Animal Health, Federal	Continuous	On-going, Continuous
Hiawatha-11	Appoint a planning committee to develop and adopt an annex to the LEOP for dam/levee failure response and	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	Three years	Not started, lack of staff

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	evacuation for high hazard dams/levees in the jurisdiction.								
Hiawatha-12	Seek grant funding to purchase and install the new warning sirens.	All Hazards	Mayor	Medium	1,3	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Hiawatha-13	Appoint a planning committee to identify flash-flood prone areas to consider flood reduction measures to city planners.	Flood	Mayor	Medium	1,2,3	Staff Time	Local	Three years	Not started, lack of staff
Hiawatha-14	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$10,000	Local, State, Federal	Three years	Not started, lack of funding
Hiawatha-15	Encourage the repositioning of as many utility lines as possible underground. Consider local regulations to require the placement of all new utility lines underground. Encourage utility providers and municipalities within the county to require that utility lines and mains be installed underground.	Utility/ Infrastructure Failure	Mayor	High	1,3	Staff Time	Local	12/31/2014	On-going
Hiawatha-16	Seek funding to complete a stormwater drainage study for the jurisdiction that will lead to a stormwater management ordinance that maintains pre-development runoff rates.	Flood	City Planner	Medium	1	Unknown	Local, State, Federal	12/31/2014	On-going
Horton-1	Horton is committed to continued participation and compliance with the NFIP.	Flood	Floodplain Manager	High	1,2,3	Staff Time	State, FEMA Grants	Continuous	On-going, Continuous
Horton-2	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program,	Flood	Floodplain Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous

Table 6.5: Brown County and Participating Jurisdictions 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 addition to other flood protection measures.								
Horton-3	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year.	Flood	Floodplain Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Horton-4	Educate and promote local jurisdictional participation in the NFIP.	Flood	Floodplain Manager	Medium	4	Staff Time	Local, State	Three years	On-going
Horton-5	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Horton-6	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local, State, FEMA	Three years	On-going
Horton-7	Annually host a public "hazards workshop" for the residents in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local, State	Continuous	Not started, lack of funding
Horton-8	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and senior care facilities and improve advanced warning systems.	Tornado, Windstorm	Mayor	High	3	Staff Time and $500,000 per project	Local, School Districts, State, Federal	Continuous	Not started, lack of funding
Horton-9	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Horton-10	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism, Civil Disorder	Mayor	Medium	4	Staff Time	Local, State, KS Animal Health, Federal	Continuous	On-going, Continuous
Horton-11	Appoint a planning committee to develop and adopt an annex to the LEOP for dam/levee failure response and evacuation for high hazard dams/levees in the jurisdiction.	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	Three years	Not started, lack of staff

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Horton-12	Seek grant funding to purchase and install the new warning sirens.	All Hazards	Mayor	Medium	1,3	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Horton-13	Appoint a planning committee to identify flash-flood prone areas to consider flood reduction measures to city planners.	Flood	Mayor	Medium	1,2,3	Staff Time	Local	Three years	Not started, lack of staff
Horton-14	Appoint a planning committee to develop an Evacuation Plan for Horton in the event of dam failure. Coordinate efforts with County Emergency Management to include the evacuation plan in the LEOP.	Dam and Levee Failure	Mayor	High	1,3	Staff Time	NA	12/31/2014	On-going
Horton-15	Seek out grant programs that may sponsor NOAA emergency radio distribution and/or subsidized costs and then purchase and distribute radios.	All Hazards	Mayor	High	1,3	$8,000	Local, State, Federal	Continuous	Not started, lack of funding
Horton-16	Incorporate the inspection and management of trees into the city's routine maintenance process to remove trees that may pose a threat to people and the infrastructure.	Tornado, Windstorm, Utility/ Infrastructure Failure	Mayor	High	1,3	$10,000	Local	12/31/2014	Not started, lack of funding
Horton-17	Encourage the repositioning of as many utility lines as possible underground. Consider local regulations to require the placement of all new utility lines underground. Encourage utility providers and municipalities within the county to require that utility lines and mains be installed underground.	Winter Storm	Mayor	High	1,3	Staff Time	Local	12/31/2014	On-going
Horton-18	Appoint a team to evaluate and assess potential downstream damage in the event of dam failure from the Mission Lake Dam and update the current Emergency Action Plan. The City should also contact the Kansas	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	7/31/2011	Not started, lack of staff

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	Department of Agriculture, Structures Division, to apply for inundation mapping and evaluation assistance for their high hazard dam.								
Morrill-1	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program.	Flood	Floodplain Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Morrill-2	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year.	Flood	Floodplain Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Morrill-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	Floodplain Manager	Medium	4	Staff Time	Local, State	Three years	On-going
Morrill-4	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Morrill-5	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local, State, FEMA	Three years	On-going
Morrill-6	Annually host a public "hazards workshop" for the residents in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local, State	Continuous	Not started, lack of funding
Morrill-7	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and senior care facilities and improve advanced warning systems.	Tornado, Windstorm	Mayor	High	3	Staff Time and $500,000 per project	Local, School Districts, State, Federal	Continuous	Not started, lack of funding
Morrill-8	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Morrill-9	Promote and educate the jurisdiction's public and private sectors on potential	Terrorism/ Agri-	Mayor	Medium	4	Staff Time	Local, State, KS Animal	Continuous	On-going, Continuous

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	agricultural terrorism and bio-terrorism issues.	Terrorism, Civil Disorder					Health, Federal		
Morrill-10	Appoint a planning committee to develop and adopt an annex to the LEOP for dam/levee failure response and evacuation for high hazard dams/levees in the jurisdiction.	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	Three years	Not started, lack of staff
Morrill-11	Seek grant funding to purchase and install the new warning sirens.	All Hazards	Mayor	Medium	1,3	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Morrill-12	Appoint a committee to research and develop a FEMA application package for participation in the NFIP.	Flood	Mayor	High	1,2	Staff Time	Local	12/31/2014	Not started, lack of staff
Morrill-13	Incorporate the inspection and management of trees that may pose a threat to the electrical lines that could result in power outages during severe winter/ice storms into the city maintenance program.	Winter Storm	Mayor	Medium	1,3	$5,000	Local, State, Federal	12/31/2014	Not started, lack of funding
Reserve-1	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program.	Flood	Floodplain Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Reserve-2	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year.	Flood	Floodplain Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Reserve-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	Floodplain Manager	Medium	4	Staff Time	Local, State	Three years	On-going
Reserve-4	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Reserve-5	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local, State, FEMA	Three years	On-going

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Reserve-6	Annually host a public "hazards workshop" for the residents in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local, State	Continuous	Not started, lack of funding
Reserve-7	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and senior care facilities and improve advanced warning systems.	Tornado, Windstorm	Mayor	High	3	Staff Time and $500,000 per project	Local, School Districts, State, Federal	Continuous	Not started, lack of funding
Reserve-8	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Reserve-9	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism, Civil Disorder	Mayor	Medium	4	Staff Time	Local, State, KS Animal Health, Federal	Continuous	On-going, Continuous
Reserve-10	Appoint a planning committee to develop and adopt an annex to the LEOP for dam/levee failure response and evacuation for high hazard dams/levees in the jurisdiction.	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	Three years	Not started, lack of staff
Reserve-11	Seek grant funding to purchase and install the new warning sirens.	All Hazards	Mayor	Medium	1,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Reserve-12	Seek funding to design and build safe rooms for the town of Reserve.	Tornado	Mayor	High	1,2,3	$250,000	Local, State, Federal	Four years	Not started, lack of funding
Reserve-13	Seek funding to subsidize, purchase and distribution of NOAA weather radios.	All Hazards	Mayor	High	1,3,4	$8,000	Local	Three years	Not started, lack of funding
Robinson-1	Robinson is committed to continued participation and compliance with the NFIP.	Flood	Floodplain Manager	High	1,2,3	Staff Time	State, FEMA Grants	Continuous	On-going, Continuous
Robinson-2	On an annual basis, contact owners identified in high-risk flood areas and	Flood	Floodplain Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program, in addition to other flood protection measures.								
Robinson-3	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year.	Flood	Floodplain Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Robinson-4	Educate and promote local jurisdictional participation in the NFIP.	Flood	Floodplain Manager	Medium	4	Staff Time	Local, State	Three years	On-going
Robinson-5	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Robinson-6	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local, State, FEMA	Three years	On-going
Robinson-7	Annually host a public "hazards workshop" for the residents in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local, State	Continuous	Not started, lack of funding
Robinson-8	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and senior care facilities and improve advanced warning systems.	Tornado, Windstorm	Mayor	High	3	Staff Time and $500,000 per project	Local, School Districts, State, Federal	Continuous	Not started, lack of funding
Robinson-9	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Robinson-10	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism, Civil Disorder	Mayor	Medium	4	Staff Time	Local, State, KS Animal Health, Federal	Continuous	On-going, Continuous
Robinson-11	Appoint a planning committee to develop and adopt an annex to the LEOP	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	Three years	Not started, lack of staff

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	for dam/levee failure response and evacuation for high hazard dams/levees in the jurisdiction.								
Robinson-12	Seek grant funding to purchase and install the new warning sirens.	All Hazards	Mayor	Medium	1,3	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Robinson-13	Appoint a planning committee to identify flash-flood prone areas to consider flood reduction measures to city planners.	Flood	Mayor	Medium	1,2,3	Staff Time	Local	Three years	Not started, lack of staff
Willis-1	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program.	Flood	Floodplain Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Willis-2	Advertise and promote the availability of flood insurance to county property owners by direct mail once a year.	Flood	Floodplain Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Willis-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	Floodplain Manager	Medium	4	Staff Time	Local, State	Three years	On-going
Willis-4	Collect and distribute educational materials on individual and family preparedness and/or mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Willis-5	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3	Staff Time	Local, State, FEMA	Three years	On-going
Willis-6	Annually host a public “hazards workshop” for the residents in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	Medium	4	$300 per workshop	Local, State	Continuous	Not started, lack of funding
Willis-7	Encourage and seek funding for the construction of safe rooms in public and private schools, day care centers and	Tornado, Windstorm	Mayor	High	3	Staff Time and $500,000 per project	Local, School Districts,	Continuous	Not started, lack of funding

Table 6.5: Brown County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	senior care facilities and improve advanced warning systems.						State, Federal		
Willis-8	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local, State	Continuous	On-going, Continuous
Willis-9	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism, Civil Disorder	Mayor	Medium	4	Staff Time	Local, State, KS Animal Health, Federal	Continuous	On-going, Continuous
Willis-10	Appoint a planning committee to develop and adopt an annex to the LEOP for dam/levee failure response and evacuation for high hazard dams/levees in the jurisdiction.	Dam and Levee Failure	Mayor	High	1,3	Staff Time	Local	Three years	Not started, lack of staff
Willis-11	Seek grant funding to purchase and install the new warning sirens.	All Hazards	Mayor	Medium	1,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Willis-12	Seek funding to design and build safe rooms for the town of Willis.	Tornado	Mayor	High	1,2,3	$250,000	Local, State, Federal	Four years	Not started, lack of funding
Willis-13	Seek funding to subsidize, purchase and distribution of NOAA weather radios.	All Hazards	Mayor	High	1,3,4	$8,000	Local	Three years	Not started, lack of funding
Willis-14	Develop a workshop to educate citizens of Willis regarding the Severe Weather Alert System and develop an Action Plan for distribution.	All Hazards	Mayor	High	1,4	$200 per workshop	Local, State	Three years	Not started, lack of funding
USD 415-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 415 school buildings.	Tornado	Superintendent	Low	2,3	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
USD 430-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 430 school buildings.	Tornado	Superintendent	Low	2,3	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding

6.8.3 – Doniphan County and Participating Jurisdictions Mitigation Actions

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Doniphan County-1	Doniphan County and the incorporated cities will work in coordination with the KDA-DWR and FEMA to develop D-FIRMs for the county and incorporated cities.	Flood	Emergency Manager	High	2	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Doniphan County-1a	Continued participation in the NFIP. Adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the NFIP.	Flood	Zoning Administrator	High	2	Staff Time	None	Continuous	On-going, Continuous
Doniphan County-2	The County and local governments will work with the KDA-DWR to educate and promote local jurisdictional participation in the NFIP.	Flood	Emergency Manager	High	1,2	Staff Time	Local, State	Continuous	On-going
Doniphan County-3	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Emergency Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Doniphan County-4	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other community events drawing large crowds.	All Hazards	Emergency Manager	High	3,4	$1,000 per workshop	Local, State, Federal	Continuous	Not started, lack of funding
Doniphan County-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Emergency Manager	High	2,3,4	Staff Time, $500,000	Local, State, Federal	Continuous	Not started, lack of funding
Doniphan County-6	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	4	Staff Time	Local	Continuous	On-going, Continuous
Doniphan County-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues	Terrorism/ Agri-Terrorism	Emergency Manager	High	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Doniphan County-8	Coordinate county and local government mitigation efforts with RECs	Utility/ Infrastructure Failure	Emergency Manager	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Doniphan County-9	Develop cross-departmental information collection capabilities, and incorporate cadastral (building/parcel) data utilizing GIS	All Hazards	Emergency Manager	Medium	4	Staff Time	Local, State	Three years	Not started, lack of staff
Doniphan County-10	Doniphan County is committed to continued participation and compliance with the NFIP.	Flood	Emergency Manager	High	1,2	Staff Time	Local	Continuous	On-going, Continuous
Doniphan County-11	Update the Comprehensive Land Use Plan for the County.	All Hazards	Emergency Manager	Medium	1,2	Staff Time	Local	Three years	On-going
Doniphan County-12	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners.	Flood	Emergency Manager	High	1,2	Fair market value	Local, State, Federal	Continuous	Not started, lack of funding
Doniphan County-13	Contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program	Flood	Emergency Manager	High	1,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Doniphan County-14	Identify flash-flood prone areas to consider flood reduction measures to county planners.	Flood	Emergency Manager	High	1,2,4	Staff Time	Local	Three years	Not started, lack of staff
Doniphan County-15	Research and design an appropriate stream buffer ordinance to further protect the jurisdiction's water resources and to limit future flood damages adjacent to major waterways.	Flood	Emergency Manager	High	1,2	$40,000	Local, State, Federal	Three years	Not started, lack of funding
Doniphan County-16	Consider researching and recommending appropriate building codes for the County that include wind-resistant design techniques for new construction.	Tornado, Windstorm	Emergency Manager	High	2	Staff Time	Local	Three years	Not started, lack of staff g
Doniphan County-17	Research, develop and recommend an ordinance /resolution to require installation of tornado shelters for any	Tornado, Windstorm	Emergency Manager	High	2,3	Staff Time	Local	Three years	Not started, lack of staff

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	new major manufactured and/or mobile home parks with more than 10 mobile home spaces.								
Doniphan County-18	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources.	Wildfire	Emergency Manager	High	1,3	Staff Time	Local	Three years	Not started, lack of staff
Doniphan County-19	Evaluate the firefighting water supply resources within the County., including both fixed and mobile supply issues.	Wildfire	Emergency Manager	Medium	1,3	Staff Time	Local	Three years	Not started, lack of staff
Doniphan County-20	Develop and implement a wildfire prevention/education program.	Wildfire	Emergency Manager	Medium	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Doniphan County-21	Conduct inventory/survey for the county emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Emergency Manager	Medium	1,3	Staff Time	Local, State	Three years	Not started, lack of staff
Doniphan County-22	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner.	All Hazards	Emergency Manager	Medium	1,3,4	Staff Time	Local, State	Three years	Not started, lack of staff
Doniphan County-23	Incorporate the inspection and management of trees that may pose a threat to the county's routine maintenance system process.	Utility/ Infrastructure Failure	Emergency Manager	Medium	3	$8,000	Local	Continuous	On-going, Continuous
Doniphan County-24	The Doniphan Electric Cooperative Association, Inc. will continue to coordinate mitigation efforts with county and local governments	Utility/ Infrastructure Failure	Emergency Manager	Medium	3,4	Staff Time	Local, State, Federal	Three years	On-going
Doniphan County-25	The Elwood-Gladden Drainage District will continue to operate and maintain their levee in accordance with appropriate regulatory requirements.	Dam and Levee Failure	Emergency Manager	High	1	Staff Time	Local, State, Federal	Continuous	On-going, Continuous

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Doniphan County-26	Emergency Generators. Acquire and install a permanently mounted generator capable of handling all emergency operations at the Doniphan County Courthouse	Utility/ Infrastructure Failure	Emergency Management Coordinator	High	1,2	$30,000	Local, Grant	Five years	Not started, lack of funding
Doniphan County-27	The Elwood Gladden Drainage District will work in coordination with Doniphan County and the cities of Elwood and Wathena to research and pursue funding options for the purchase and installation of discharge pumps and outlet drainages for both city's sewage lagoons, allowing effluent discharge to flow beyond the levee systems to the Missouri River.	Utility/ Infrastructure Failure	Emergency Manager	Medium	3	Staff Time	Local, State, Federal	Three years	On-going
Doniphan County-28	The Burr Oak Drainage District will continue to maintain and operate flood control structures and channels, allowing storm water runoff to pass through the district without causing flooding of property.	Dam and Levee Failure	Emergency Manager	Medium	1	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Denton-1	Doniphan County and the incorporated cities will work in coordination with the KDA-DWR and FEMA to develop D-FIRMs for the county and incorporated cities.	Flood	Mayor	Medium	2	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Denton-2	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	1,2	Staff Time	Local, State	Three years	On-going
Denton-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Denton-4	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other community events drawing large crowds.	All Hazards	Mayor	High	3,4	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Denton-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	2,3,4	Staff Time, $500,000	Local, State, Federal	Continuous	Not started, lack of funding
Denton-6	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Denton-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	High	3,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Denton-8	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Denton-8a	Acquire and Install emergency generator for the City.	Utility/ Infrastructure Failure	Council Member/ Coordinator	High	1,2	$30,000	Local, Grant	Five years	Not started, lack of funding
Denton-9	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$5,000	Local, State	Three years	Not started, lack of staff
Denton-10	Seek funding to purchase and install an outside warning system for the City.	All Hazards	Council Member/ Coordinator	High	1,2	$30,000	Local, State, Federal	Five years	Not started, lack of funding
Elwood-1	Doniphan County and the incorporated cities will work in coordination with the KDA-DWR and FEMA to develop D-FIRMs for the county and incorporated cities.	Flood	Mayor	Medium	2	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Elwood-2	NFIP. Participation in the NFIP ensures that citizens are provided the opportunity to purchase flood insurance to protect themselves against flood losses. Adopt and	Flood	City Clerk	High	2	None-	None	Continuous	On-going

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	enforce floodplain management regulations that meet or exceed the minimum requirements of the NFIP.								
Elwood-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	1,2	Staff Time	Local, State	Three years	On-going
Elwood-4	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Elwood-5	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other community events drawing large crowds.	All Hazards	Mayor	High	3,4	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding
Elwood-6	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	2,3,4	Staff Time, $500,000	Local, State, Federal	Continuous	Not started, lack of funding
Elwood-7	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Elwood-8	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	High	3,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Elwood-9	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Elwood-10	Acquire and Install emergency generators for the City of Elwood's water tower, Community Buildings and City Hall.	Utility/ Infrastructure Failure	Council Member/ Coordinator	High	1,2	$30,000	Local, Grant	Five years	Not started, lack of funding
Elwood-11	Seek funding to design community tornado shelters and	Tornado, Windstorm	Mayor	Medium	4	$500,000	Local, State	Three years	Not started, lack of staff

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	apply for grant funding for construction.								
Elwood-12	Research and pursue funding options to map and upgrade the city of Elwood storm drain system to minimize overflow and subsequent damage to property.	Flood	Mayor	High	1,2	$300,000	Local, State, Federal	Five years	Not started, lack of funding
Elwood-13	Research and pursue funding options for the mapping of utility services provided in the city of Elwood, including water, sewer, and electrical utilities	Utility/ Infrastructure Failure	Mayor	Medium	1,3	$15,000	Local, State, Federal	12/31/2015	On-going
Elwood-14	The city of Elwood will work in coordination with Doniphan County and the Elwood Gladden Drainage District to research and pursue funding options for the purchase and installation of discharge pumps and outlet drainages for the city of Elwood's sewage lagoon, allowing effluent discharge to flow beyond the levee system to the Missouri River.	Flood	Mayor	Medium	1,3,4	Unknown	Local, State, Federal	12/31/2015	On-going
Highland-1	Doniphan County and the incorporated cities will work in coordination with the KDA-DWR and FEMA to develop D-FIRMs for the county and incorporated cities.	Flood	Mayor	Medium	2	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Highland-2	NFIP. Participation in the NFIP ensures that citizens are provided the opportunity to purchase flood insurance to protect themselves against flood losses. Adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the NFIP.	Flood	City Clerk	High	2	None-	None	Continuous	On-going
Highland-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	1,2	Staff Time	Local, State	Three years	On-going

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Highland-4	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Highland-5	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other community events drawing large crowds.	All Hazards	Mayor	High	3,4	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding
Highland-6	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	2,3,4	Staff Time, $500,000	Local, State, Federal	Continuous	Not started, lack of funding
Highland-7	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Highland-8	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	High	3,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Highland-9	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Highland-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	Unknown	Local, State	Three years	Not started, lack of staff
Highland-11	The City of Highland is committed to continued participation and compliance with the NFIP.	Flood	City Clerk, City Attorney	High	1,2	Unknown	Local	Continuous	On-going, Continuous
Highland-12	Research funding options and consider the purchase of emergency generators and/or transfer switches to provide backup power for Critical Facilities, including the City of Elwood's city hall,	Utility/ Infrastructure Failure	Mayor	Medium	1,3	Unknown	Local, State, Federal	Four years	On-going

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	emergency shelters, and emergency services building.								
Highland-13	Research and pursue funding options for the mapping of utility services provided in the city of Highland, including water, sewer, and electrical utilities.	All Hazards	Mayor	Medium	1,3	$10,000	Local, State, Federal	Four years	On-going
Troy-1	Doniphan County and the incorporated cities will work in coordination with the KDA-DWR and FEMA to develop D-FIRMs for the county and incorporated cities.	Flood	Mayor	Medium	2	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Troy-2	NFIP. Participation in the NFIP ensures that citizens are provided the opportunity to purchase flood insurance to protect themselves against flood losses. Adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the NFIP.	Flood	City Clerk	High	2	None-	None	Continuous	On-going
Troy-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	1,2	Staff Time	Local, State	Three years	On-going
Troy-4	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Troy-5	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other community events drawing large crowds.	All Hazards	Mayor	High	3,4	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding
Troy-6	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	2,3,4	Staff Time, $500,000	Local, State, Federal	Continuous	Not started, lack of funding
Troy-7	Educate residents about driving in winter storms and	Winter Storm	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	handling winter-related health effects.								
Troy-8	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	High	3,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Troy-9	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Troy-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	Unknown	Local, State	Three years	Not started, lack of staff
Troy-11	The City of Troy is committed to continued participation and compliance with the NFIP.	Flood	City Clerk, City Attorney	High	1,2	Staff Time	Local	Continuous	On-going, Continuous
Troy-12	Research funding options and purchase emergency generators and/or transfer switches to provide backup power for Critical Facilities.	Utility/ Infrastructure Failure	Mayor	Medium	1,3	$50,000	Local, State, Federal	Three years	Not started, lack of funding
Troy-13	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood		Medium	1,3	Staff Time and mailing costs	Local, State, Federal	Two years	Not started, lack of staff
Troy-13	Research and pursue funding options to map and upgrade the city storm drain system to minimize overflow and subsequent damage to property.	Flood	Mayor	Medium	1,3,4	$300,000	Local, State, Federal	Three years	Not started, lack of funding
Troy-14	Seek funding for the purchase and installation of an additional outdoor warning siren in the city.	All Hazards	Mayor	Medium	1,3	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Wathena-1	Doniphan County and the incorporated cities will work in coordination with the KDA-DWR and FEMA to develop D-FIRMs for the county and incorporated cities.	Flood	Mayor	Medium	2	Staff Time	Local, State, Federal	Three years	Not started, lack of funding

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Wathena-2	NFIP. Participation in the NFIP ensures that citizens are provided the opportunity to purchase flood insurance to protect themselves against flood losses. Adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the NFIP.	Flood	City Clerk	High	2	None-	None	Continuous	On-going
Wathena-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	Mayor	High	1,2	Staff Time	Local, State	Three years	On-going
Wathena-4	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Wathena-5	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other community events drawing large crowds.	All Hazards	Mayor	High	3,4	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding
Wathena-6	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	2,3,4	Staff Time, $500,000	Local, State, Federal	Continuous	Not started, lack of funding
Wathena-7	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	4	Staff Time	Local	Continuous	On-going, Continuous
Wathena-8	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/ Agri-Terrorism	Mayor	High	3,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Wathena-9	Coordinate county and local government mitigation efforts with RECs.	Utility/ Infrastructure Failure	Mayor	High	3,4	Staff Time	Local	Continuous	On-going, Continuous
Wathena-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	Unknown	Local, State	Three years	Not started, lack of staff

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Wathena-11	The City is committed to continued participation and compliance with the NFIP.	Flood	City Clerk	High	1,2	Staff Time	Local	Continuous	On-going, Continuous
Wathena-12	Seek funding to design community tornado shelters and apply for grant funding for construction.	Tornado, Windstorm	Mayor	Medium	2,3	$500,000	Local, State, Federal	Three years	Not started, lack of funding
Wathena-13	Research and pursue funding options for the mapping of utility services provided in the city of Wathena, including water, sewer, and electrical utilities.	Utility/ Infrastructure Failure	Mayor	Medium	1,3	$10,000	Local, State, Federal	Three years	Not started, lack of funding
Wathena-14	Research and developing a Comprehensive Land Use Plan for the city of Wathena, as well as the creation and adoption of Zoning Ordinances for the city.	All Hazards	Mayor	Medium	1,3,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Wathena-15	Research funding options and purchase of emergency generators and/or transfer switches to provide backup power for Critical Facilities, including the water treatment plant and pumping station in the city of Wathena.	Utility/ Infrastructure Failure	Mayor	Medium	1,3	$50,000	Local, State, Federal	Three years	Not started, lack of funding
Wathena-16	The city of Wathena will work in coordination with Doniphan County and the Elwood Gladden Drainage District to research and pursue funding options for the purchase and installation of discharge pumps and outlet drainages for the city of Wathena's sewage lagoon, allowing effluent discharge to flow beyond the levee system to the Missouri River.	Flood, Dam and Levee Failure	Mayor	Medium	3	Unknown	Local, State, Federal	Three years	Not started, lack of funding
Highland Community College-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all HCC buildings.	Tornado	President	Low	2,3	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding

Table 6.6: Doniphan County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD114-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 114 school buildings.	Tornado	Superintendent	Low	2,3	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
USD114-2	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism/ Agri-Terrorism, Civil Disorder	Superintendent	Low	1,3	$50,000	Local, State, Federal	Three years	Not started, lack of funding
USD429-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 429 school buildings. .	Tornado, Windstorm	Superintendent	High	1,2	$1,000,000	Local, State, Federal	Five years	Not started, lack of funding
USD429-2	Acquire audio and visual emergency communication and notification systems for interior and exterior of school grounds.	All Hazards	Superintendent	High	1,2	$25,000	Local, State, Federal	Five years	Not started, lack of funding

6.8.4– Douglas County and Participating Jurisdictions Mitigation Actions

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Douglas County-1	Promote and continue to participate in the National Flood Insurance Program.	Flood	Emergency Manager	High	1	Staff Time	Local	Continuous	On-going, Continuous
Douglas County-2	Provide additional support to the Community Rating System to raise the rating to the next level	Flood	Emergency Manager	High	1	Staff Time	Local, State, Federal	Two years	On-going
Douglas County-3	Proactive management of tree and debris removal from roadways and elevation of roadways.	Tornado, Winter Storm, Windstorm	Emergency Manager	High	1	$60,000	Local	Continuous	On-going, Continuous
Douglas County-4	Evaluate existing buildings for safe areas and prioritize replacements and upgrades to existing facilities. Obtain funding for those retrofits / new construction.	Tornado, Winter Storm, Windstorm	Emergency Manager	High	2	Staff Time	Local	Two years	Not started, lack of staff
Douglas County-5	Develop and conduct a seminar for builders, developers, and home buyers on wind resistant and safe room construction.	Tornado, Windstorm	Emergency Manager	High	3	$1,500 per seminar	Local	Continuous	Not started, lack of staff
Douglas County-6	Promote and seek funding for all hazard radios.	All Hazards	Emergency Manager	High	2,3	$10,000	Local	Continuous	Not started, lack of funding
Douglas County-7	Purchase software that allows management and essential staff to operate in a virtual office environment.	All Hazards	Emergency Manager	High	4	$229,500	Local	Four years	Not started, lack of funding
Douglas County-8	Enhance existing GIS systems.	All Hazards	Emergency Manager	High	1	$6,000	Local	On-going	Not started, lack of funding
Douglas County-9	Identify and clearly mark evacuation routes. Allow for quick and safe evacuation if needed.	All Hazards	Emergency Manager	High	1	$15,000	Local	On-going	Not started, lack of funding
Douglas County-10	Acquire outdoor tornado warning sirens for the Douglas County area. Effectively notify entire county of tornado warnings.	Tornado	Emergency Manager	High	1,2,3,4	$20,000 per siren	Unknown	Continuous	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Douglas County--11	Public education of drought impacts on tree roots and preventative measures to take.	Tornado, Windstorm, Winter Storm	Emergency Manager	High	1,2,3	$3,000	Unknown	On-going	Not started, lack of funding
Douglas County-12	Acquire and install a permanently mounted emergency generator for the Douglas county Courthouse.	Utility/ Infrastructure Failure	Emergency Manager	High	1,2	$30,000	Unknown	Unknown	Not started, lack of funding
Douglas County-13	Conduct regular emergency preparedness drills for school children at all levels, including tornado drills, and fire evacuation drills.	Tornado, Wildfire, Terrorism/ Agri-Terrorism, Civil Disorder	Emergency Manager	High	1,2,3	Staff Time	Unknown	Continuous	Not started, lack of staff
Douglas County-14	Assess vulnerability of critical facilities, including police/fire stations, hospitals, schools, and others, to identify and prioritize projects for risk reduction.	All Hazards	Emergency Manager	High	1,2	Staff Time	Unknown	Continuous	Not started, lack of staff
DouoglasCo-15	Provide educational materials about natural hazards and risks in Douglas county to customers in utility bills.	All Hazards	Emergency Manager	High	1,2,3	$5,000	Unknown	Continuous	Not started, lack of funding
Douglas County-16	Public education program of all hazards and previous measures taken.	All Hazards	Emergency Manager	High	1,2,3	Staff Time	Unknown	Continuous	Not started, lack of staff
Douglas County-17	Study drainage issues of the Baldwin Creek drainage basin and NW Lawrence caused by the development of Rock Chalk Sports complex.	Flood	Emergency Manager	High	1,2	$75,000	Unknown	Three years	Not started, lack of funding
Baldwin-1	Promote and continue to participate in the National Flood Insurance Program.	Flood	Mayor	High	1,2	Staff Time	Local	Continuous	On-going, Continuous
Baldwin-2	Provide additional support to the Community Rating System to raise the rating to the next level.	Flood	Mayor	High	3,4	Staff Time	Local	Two years	Not started, lack of staff

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Baldwin-3	Upgrade / repair / upsize 8 culverts within Baldwin City to prevent continued flooding issues.	Flood	Mayor	High	1,2	$565,000	Local	Two years	Not started, lack of funding
Baldwin-4	Proactive management of tree and debris removal from roadways and elevation of roadways.	Tornado, Winter Storm, Windstorm	Mayor	High	1,2	$60,000	Local	Continuous	Not started, lack of funding
Baldwin-5	Obtain funding for safe room retrofits / new construction.	Tornado, Winter Storm, Windstorm	Mayor	High	1,2	Staff Time and $500,000	Local	Three years	Not started, lack of funding
Baldwin-6	Develop and conduct a seminar for builders, developers, and home buyers on wind resistant and safe room construction.	Tornado, Windstorm	Mayor	High	3	$1,000 per seminar	Local	Continuous	Not started, lack of staff
Baldwin-7	Promote the use of all hazard radios and seek funding to supplement the purchase of NOAA weather radios	All Hazards	Mayor	High	1,2,3,4	Staff Time	Local	Continuous	Not started, lack of funding
Baldwin-8	Study drainage issues throughout the county in flood prone areas, and make recommendations for flood control measures, flood management procedures, and low-water crossing improvements.	Flood	Mayor	High	1,2	Staff Time	Local	Two years	Not started, lack of staff
Baldwin-9	Enhance existing GIS systems.	Flood	Mayor	High	1,2	$5,000	Local	Three years	Not started, lack of funding
Eudora-1	Develop procedures to activate EAS and NWS all-hazard radios for emergency situations affecting a large portion of the population and provide education on shelter-in-place versus evacuation.	All Hazards	Fire Chief, Emergency Manager	High	4	Staff Time	Local	One year	Not started, lack of staff
Eudora-2	Seek funding to purchase and install available systems that can be utilized to warn citizens of an emergency.	All Hazards	Fire Chief, Emergency Manager	High	3,4	Staff Time	Unknown	Two years	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Eudora-3	Provide backup power generators for critical facilities in Eudora.	Utility/ Infrastructure Failure	Fire Chief, Emergency Manager	High	2	$60,000	Local, Grants	Three years	Not started, lack of funding
Eudora-4	Continue to participate in the NFIP	Flood	Mayor	High	1,3	Fair market value	Local	Continuous	On-going, Continuous
Eudora-5	Provide additional support to the Community Rating System to raise the rating to the next level.	Flood	Mayor	High	1	Staff Time	Local	Three years	Not started, lack of staff
Eudora-6	Purchase structures in the 100-year flood plain	Flood	Mayor	High	1	Fair market value	Local, State, Federal	Three years	Not started, lack of funding
Eudora-7	Develop procedures to activate EAS and NWS all-hazard radios for chemical events and provide education on shelter in- place related to a chemical release event.	Hazardous Material	Mayor	High	1,2,4	Staff Time	Local	Four years	Not started, lack of staff
Eudora-8	Provide educational materials for COOP Planning for small business and government.	All Hazards	Mayor	High	3	$60,000	Local	Three years	Not started, lack of funding
Eudora-9	Proactive management of tree and debris removal from roadways	Tornado, Windstorm, Winter Storm	Mayor	High	1,2	$60,000	Local	Three years	Not started, lack of funding
Eudora-10	Provide homeowner education on wildfire mitigation in wildland-urban interface.	Wildfire	Mayor	High	3	$500 per workshop	Local	Two years	Not started, lack of funding
Eudora-11	Research stream bank set back ordinances.	Flood	Mayor	High	1	Staff Time	Local	Three years	Not started, lack of staff
Eudora-12	Seek funding for safe rooms and prioritize replacements and upgrades to existing facilities.	Tornado, Windstorm, Winter Storm	Mayor	High	1,2	$350,000	Local, State, Federal	Three years	Not started, lack of funding
Eudora-14	Develop and conduct a seminar for builders, developers, and home buyers on wind resistant and safe room construction.	Tornado, Windstorm, Winter Storm	Mayor	High	1,2	$300 per seminar	Local	Two years	Not started, lack of staff

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Eudora-15	Promote the early warning notification with the use of all hazard radios.	All Hazards	Mayor	High	1,2,4	$2,000	Local	Continuous	Not started, lack of staff
Eudora-16	Enhance existing GIS systems	All Hazards	Mayor	High	1,2,4	$3,000	Local	Two years	Not started, lack of funding
Eudora-17	Provide hydrologic and hydraulic analysis and storm damage improvement designs for the City of Eudora.	Flood	Mayor	High	1,2	$20,000	Local	Two years	Not started, lack of funding
Lawrence-1	Promote and continue to participate in the NFIP.	Flood	Planning & Development Services Department; Asst Director, Planning	High	1,2	Staff Time	Local	Continuous	On-going, Continuous
Lawrence-2	Provide additional support to the Community Rating System to raise the rating to the next level.	Flood	Planning & Development Services Department; Asst Director, Planning	High	3	Staff Time	Local, State, Federal	12/31/2015	Not started, lack of staff
Lawrence-3	Proactive management of tree and debris removal from roadways and elevated areas next to the roadway, such as Right of way or other easements	Tornado, Winter Storm, Windstorm	Parks & Rec Department; Horticulture Manager	High	1,2	$60,000	Local	Continuous	Not started, lack of funding
Lawrence-4	Upgrade storm water pumps for Maple Grove drainage and additional pumping capacity to the existing pump station. An infrastructure tax to support this project is on the November 2009 ballot.	Utility/ Infrastructure Failure	Public Works Department; Stormwater Engineer	High	1,2	$1,000,000	Local	Unknown	Not started, lack of funding
Lawrence-5	Seek funding to evaluate and construct existing buildings for safe rooms, and construct replacements and upgrades to existing facilities.	Tornado, Windstorm, Winter Storm		High	2	$500,000	Local	Continuous	Not started, lack of funding
Lawrence-6	Develop and conduct a seminar for builders, developers, and home buyers	Tornado, Windstorm	Planning & Development Services	High	3	$2,000 per seminar	Local	Continuous	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	on wind resistant and safe room construction.		Department; Asst Director Development Svcs						
Lawrence-7	Seek funding to promote and purchase NOAA weather radios	All Hazards	Emergency Manager	High	3,4	$8,000	Local	Continuous	Not started, lack of funding
Lawrence-8	Enhance and maintain existing GIS systems.	Flood	Dept of Information Technology; GIS Coordinator	High	1,2	$10,000	Local	On-going	Not started, lack of funding
Lawrence-9	Create a stream buffer ordinance.	Flood	Dept of Public Works; Stormwater Engineer	High	1,2	Staff Time	Local	On-going	Not started, lack of staff
Lawrence-10	Relocate the Public Works Facility and Fuel Station outside of flood zone.	Flood	Public Works Director	High	1,2	$5,000,000	Local, State and Federal	On-going	Not started, lack of funding
Lawrence-11	Develop a map layer of lower water crossing bridges.	Flood	Dept of Public Works; Stormwater Engineer	High	1,2	Staff Time	Local	On-going	Not started, lack of staff
Lecompton-1	Promote and continue to participate in the NFIP.	Flood	Planning & Development Services Department; Asst Director, Planning	High	1,2	Staff Time	Local	Continuous	On-going, Continuous
Lecompton-2	Provide additional support to the Community Rating System to raise the rating to the next level.	Flood	Planning & Development Services Department; Asst Director, Planning	High	3	Staff Time	Local, State, Federal	12/31/2015	Not started, lack of staff
Lecompton-3	Proactive management of tree and debris removal from roadways and elevated areas next to the roadway, such as Right of way or other easements	Tornado, Winter Storm, Windstorm	Parks & Rec Department; Horticulture Manager	High	1,2	$60,000	Local	Continuous	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Lecompton-4	Upgrade storm water pumps for Maple Grove drainage and additional pumping capacity to the existing pump station. An infrastructure tax to support this project is on the November 2009 ballot.	Utility/ Infrastructure Failure	Public Works Department; Stormwater Engineer	High	1,2	$1,000,000	Local	Unknown	Not started, lack of funding
Lecompton-5	Seek funding to evaluate and construct existing buildings for safe rooms, and construct replacements and upgrades to existing facilities.	Tornado, Windstorm, Winter Storm		High	2	$500,000	Local	Continuous	Not started, lack of funding
Lecompton-6	Develop and conduct a seminar for builders, developers, and home buyers on wind resistant and safe room construction.	Tornado, Windstorm	Planning & Development Services Department; Asst Director Development Svcs	High	3	$2,000 per seminar	Local	Continuous	Not started, lack of funding
Lecompton-7	Seek funding to promote and purchase NOAA weather radios	All Hazards	Emergency Manager	High	3,4	$8,000	Local	Continuous	Not started, lack of funding
Lecompton-8	Enhance and maintain existing GIS systems.	Flood	Dept of Information Technology; GIS Coordinator	High	1,2	$10,000	Local	On-going	Not started, lack of funding
Eudora Township - 1	Purchase emergency generators for facilities to ensure continued operations.	Utility/ Infrastructure Failure	Administrator	High	1,2	$30,000	Local	Five years	New
Clinton Township - 1	Proactive management of tree and debris removal from roadways and elevated areas next to the roadway, such as Right of way or other easements	Tornado, Winter Storm, Windstorm	Parks & Rec Department; Horticulture Manager	High	1,2	$60,000	Local	Continuous	Not started, lack of funding
Clinton Township-2	Provide homeowner education on wildfire mitigation in wildland-urban interface.	Wildfire	Administrator	M	3	$500 per workshop	Local	Six months	Not started, lack of funding
Clinton Township - 3	Seek funding to evaluate and construct existing buildings for safe rooms, and	Tornado, Windstorm, Winter Storm		High	2	$500,000	Local	Three years	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	construct replacements and upgrades to existing facilities.								
Clinton Township - 4	Identify critical facilities that are vulnerable to natural and man-made hazards. Bring fire stations up to code and have back up heat, electricity and water to use for emergency shelters. Also make improvements to Station #2 to improve facilities for use if needed for emergency shelters.	All Hazards	Fire Chief	High	2	$500,000	Clinton Township Tax Base	Five years	Not started, lack of funding
Kanawaka Township - 1	We would like to procure and provide warning sirens and weather radios for the safety of our citizens.	All Hazards	Fire Chief	M	1,2	Unknown	Local, State, Federal	Three years	Not started, lack of funding
Kanawaka Township-2	Provide education on wildfire mitigation in wildland-urban interface through educational workshops for homeowners with property in wildland-urban interface areas, including steps they can take to defend their property from wildfire.	Wildfire	Administrator	High	3	$500 per workshop	Local	Three years	Not started, lack of funding
Lecompton Township - 1	Seek funding to evaluate and construct existing buildings for safe rooms, and construct replacements and upgrades to existing facilities.	Tornado, Windstorm, Winter Storm		High	2	$500,000	Local	Three years	Not started, lack of funding
Lecompton Township - 2	Provide education on wildfire mitigation in wildland-urban interface through educational workshops for homeowners with property in wildland-urban interface areas, including steps they can take to defend their property from wildfire.	Wildfire	Administrator	High	3	$500 per workshop	Local	Three years	Not started, lack of funding
Lecompton Township - 3	Seek funding to promote and purchase NOAA weather radios	All Hazards	Emergency Manager	High	3,4	$8,000	Local	Continuous	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Marion Township - 1	Provide education on wildfire mitigation in wildland-urban interface through educational workshops for homeowners with property in wildland-urban interface areas, including steps they can take to defend their property from wildfire.	Wildfire	Administrator	High	3	$500 per workshop	Local	Three years	Not started, lack of funding
Palmyra Township-1	Provide education on wildfire mitigation in wildland-urban interface through educational workshops for homeowners with property in wildland-urban interface areas, including steps they can take to defend their property from wildfire.	Wildfire	Administrator	High	3	$500 per workshop	Local	Three years	Not started, lack of funding
Wakarusa Township - 1	Seek funding to evaluate and construct existing buildings for safe rooms, and construct replacements and upgrades to existing facilities.	Tornado, Windstorm, Winter Storm		High	2	$500,000	Local	Three years	Not started, lack of funding
Wakarusa Township - 2	Provide education on wildfire mitigation in wildland-urban interface through educational workshops for homeowners with property in wildland-urban interface areas, including steps they can take to defend their property from wildfire.	Wildfire	Administrator	High	3	$500 per workshop	Local	Three years	Not started, lack of funding
Wakarusa Township - 3	Proactive management of tree and debris removal from roadways and elevated areas next to the roadway, such as Right of way or other easements	Tornado, Winter Storm, Windstorm	Parks & Rec Department; Horticulture Manager	High	1,2	$60,000	Local	Continuous	Not started, lack of funding
Willow Springs Township - 1	Provide education on wildfire mitigation in wildland-urban interface through educational workshops for homeowners with property in wildland-urban interface areas, including steps they can take to defend their property from wildfire.	Wildfire	Administrator	High	3	$500 per workshop	Local	Three years	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD343-1	Conduct regular emergency preparedness drills for school children at all levels, including tornado drills and fire evacuation drills. The drills include tornado, fire, and general evacuation drills and are conducted at routine intervals. Corrective action is taken for each drill where problems are determined to exist.	Flood, Tornado	Superintendent	High	3	Staff Time	Local	Continuous	On-going, Continuous
USD343-2	Seek funding to design and construct safe rooms for USD 343 facilities	Tornado, Winter, Utility/ Infrastructure Failure	Superintendent	High	1,2	$1,000,000	Local	Unknown	Not started, lack of funding
USD348-1	Conduct regular emergency preparedness drills for school children at all levels, including tornado drills and fire evacuation drills. The drills include tornado, fire, and general evacuation drills and are conducted at routine intervals. Corrective action is taken for each drill where problems are determined to exist.	Flood, Tornado	Superintendent	High	3	Staff Time	Local	Continuous	On-going, Continuous
USD348-2	Seek funding to design and construct safe rooms for USD 348 facilities	Tornado, Winter, Utility/ Infrastructure Failure	Superintendent	High	1,2	$1,000,000	Local	Unknown	Not started, lack of funding
USD491-1	Conduct regular emergency preparedness drills for school children at all levels, including tornado drills and fire evacuation drills. The drills include tornado, fire, and general evacuation drills and are conducted at routine intervals. Corrective action is taken for	Flood, Tornado	Superintendent	High	3	Staff Time	Local	Continuous	On-going, Continuous

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	each drill where problems are determined to exist.								
USD491-2	Seek funding to design and construct safe rooms for USD 491 facilities	Tornado, Winter, Utility/ Infrastructure Failure	Superintendent	High	1,2	$1,000,000	Local	Two years	Not started, lack of funding
USD491-4	Implement a program promoting the purchase and use of NOAA weather radios in school district classrooms.	Tornado, Windstorm, Winter Storm	Superintendent	Medium	1, 2, 3	$10,000	Local, State, Federal	Two years	Not started, lack of funding
USD497-1	Implement a program promoting the purchase and use of NOAA weather radios in school district classrooms.	Flood, Tornado	Superintendent	High	3	$10,000	Local	Two years	Not started, lack of funding
USD497-2	Develop a plan for supporting medically fragile and special needs students at each school site during emergency events.	All Hazards	Superintendent	High	2	Staff Time	Local	2017	Not started, lack of staff
USD497-3	Seek funding to design and construct safe rooms for USD 497 facilities	Tornado, Winter, Utility/ Infrastructure Failure	Superintendent	High	1,2	$1,000,000	Local	Two years	Not started, lack of funding
USD497-4	Implement an emergency communication system that will allow for communication in district and with county emergency personnel in the event of power loss	All Hazards	Director of Administrative Services	High	4	$10,000 - $100,000	Local, Grants	Four years	Not started, lack of funding
USD497-5	Conduct regular emergency preparedness drills for school children at all levels, including tornado drills and fire evacuation drills.	Utility/ Infrastructure Failure	Director of Administrative Services	High	3	Staff Time	None	Continuous	On-going, Continuous
USD497-6	Acquire and install emergency generators for buildings prioritized on building usage for USD 497.	Utility/ Infrastructure Failure	Director of Administrative Services	High	1,2	$500,000	Local, Grants	Four years	Not started, lack of funding
USD497-7	Construct secure entrances for each building in USD 497.	Terrorism/ Agri-	Director of Administrative Services	High	1,2	$1,300,000	Local, Grants	Four years	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
		Terrorism, Civil Disorder							
Baker University-1	Seek funding to design and construct safe rooms for Baker University facilities	Tornado, Winter, Utility/ Infrastructure Failure	Superintendent	High	1,2	$1,000,000	Local	Two years	Not started, lack of funding
Baker University-2	Campus Safety. Constant attention and upgrading of campus safety protocols for on campus violence. Increase amount of Campus Safety staff on campus at one time. Install cameras and or call boxes. Improve campus lighting and line of sight across entire campus. Maintain adequate security for access to dorms and other buildings on campus during operating hours and after hours.	All Hazards	Physical Plant Director	M	1,2,3	$25,000	None	Three years	Not started, lack of funding
KU-1	Develop a campus wide alert website to include emergency numbers and instructions for emergency preparedness.	All Hazards	President	High	1,2,4	$8,000	Local	Three years	Not started, lack of funding
KU-2	Seek funding to design and construct safe rooms for KU facilities	Tornado, Winter, Utility/ Infrastructure Failure	Superintendent	High	1,2	$1,000,000	Local	Two years	Not started, lack of funding
KU-3	Install Electronic building access controls on KU campus.	Terrorism/ Agri-Terrorism, Civil Disorder	Deputy Director of Design & Construction Management	High	1,2	$03,000	State, private, Grant	Three years	Not started, lack of funding
KU-4	Enhance Emergency public address system on KU Campus. To improve public safety with situation-specific voice and text messages in response to natural and man-made threats.	All Hazards	City Administrator	M	1,2,4	$1,000,000	State, private, Grant	Two years	Not started, lack of funding

Table 6.7: Douglas County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
RWD#2-1	Purchase and install remote telemetry for rural water systems including controls for water tanks and pump stations.	Utility/ Infrastructure Failure	Director	High	1,2	$58,000	Local	Three years	Not started, lack of funding
RWD#2-2	Review and update emergency water supply plan.	All Hazards	Director	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
RWD#2-3	Communication Link Protection. Lightning strikes cause loss of communication between the water tower and remote telemetry equipment located in the District office building.	Lightning, Utility/ Infrastructure Failure	Director	High	1,2,4	$200	General Funds	Four years	Not started, lack of funding
RWD#5-1	Purchase emergency generators for facilities to ensure continued operations. Loss of power could potentially curtail services to the community.	All Hazards	Director	High	1,2	$100,000	Local, State, Federal	Two years	Not started, lack of funding
RWD#5-1	Replace and upgrade pump stations and water towers.	All Hazards	Director	High	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
RWD#6-1	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	All Hazards	Director	High	1,2	$60,000	Local	Three years	Not started, lack of funding
Lawrence Memorial Hospital-1	Install shatter proof hardened windows throughout hospital.	Hail, Windstorm and Tornado	CEO	High	1,2	$100,000	State and Federal Funding	Four years	Not started, lack of funding

6.8.5 – Iowa Tribe Jurisdictions Mitigation Actions

Table 6.8: Iowa Tribe Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Iowa Tribe-1	Seek funding for the design and construction of a community safe rooms	Tornado, Windstorm, All Hazards	Tribal Council	High	1,2	$500,000	Federal Grants, Tribal Funds	Three years	New
Iowa Tribe-2	Raise all low water crossings on reservation.	Flood	Tribal Departments	High	1,2	$100,000 each	Federal Grants, Tribal Funds	Three years	New
Iowa Tribe-3	Improve, upgrade and enhance hazard warning systems, to include sirens, internal warning systems and NWS satellite coverage	Tornado, All Hazards	Tribal Departments	High	1,2	$80,000	Tribal, Federal, State	Three years	New

6.8.6 – Jackson County and Participating Jurisdictions Mitigation Actions

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Jackson County-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	County Planner	High	1,2,3	Staff time	Local, State	Continuous	On-going
Jackson County-2	Jackson County is committed to continued participation and compliance with the NFIP.	Flood	Emergency Manager	High	1,2,3	Staff time	State, FEMA	Continuous	On-going, Continuous
Jackson County-3	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Jackson County-4	Collect and distribute educational materials on individual and family preparedness \ mitigation measures for property owners	All Hazards	Emergency Manager	High	3	Staff time	Local	Continuous	On-going, Continuous
Jackson County-5	Annually host a public "hazards workshop" for the residents of the county in combination with local festivals, fairs, or other events drawing large crowds.	All Hazards	Emergency Manager	High	3	$1,000 per workshop	Local	continuous	Not started, lack of funding s
Jackson County-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Jackson County-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues	Terrorism/Agri -Terrorism,	Emergency Manager	Medium	3	Staff time	Local, State, Federal	Continuous	Not started, lack of staff
Jackson County-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County	Dam and Levee Failure	Emergency Manager	High	1,2	Staff time	Local	Three years	Not started, lack of staff
Jackson County-9	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-	Utility/ Infrastructure Failure, All Hazards	Emergency Manager	Medium	1,2	Staff time	Local, State	Three years	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	effective manner. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events								
Jackson County-10	Conduct inventory/survey for the county and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Emergency Manager	Medium	1,2	Staff time	Local, State	Three years	Not started, lack of staff
Jackson County-11	Develop cross-departmental information collection capabilities, and incorporate cadastral (building/parcel) data utilizing GIS	All Hazards	Emergency Manager	Medium	4	$3,000	State	Three years	Not started, lack of funding
Jackson County-12	Coordinate county and local government mitigation efforts with RECs	Utility/ Infrastructure Failure	Emergency Manager	High	4	Staff Time	Local	Three years	On-going
Jackson County-13	Research and recommend appropriate building codes for the County that include Wind -resistant design techniques for new construction.	Tornado, Windstorm	County Planner	High	1,2	Staff time	Local	Three years	Not started, lack of staff
Jackson County-14	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners	Flood	County Planner, Emergency Management Director	High	1,2	Subject to fair market value	Local, KDEM, FEMA	Three years	Not started, lack of funding
Jackson County-15	Contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program	Flood	Jackson County Emergency Management Director	High	1,2,4	Staff Time	Local	Continuous	On-going, Continuous
Jackson County-16	Identify flash-flood prone areas to consider flood reduction measures to county planners	Flood	County Planner, Emergency	High	1,2,4	Staff Time	Local	Three years	On-going

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
			Management Director						
Jackson County-17	Research and design an appropriate stream buffer ordinance to further protect the jurisdiction's water resources and to limit future flood damages adjacent to major waterways.	Flood	County Planner, Floodplain Manager	High	1,2	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Jackson County-18	The Delaware Watershed District No. 10 will continue to construct, operate, and maintain water detention dams for flood reduction in the watershed district. The organization will evaluate the need for further construction, operation, and maintenance projects, and additional effort will be made to seek alternative funding as they become available.	Tornado, Windstorm	County Planner	High	1,2	Staff Time	Local	Three years	On-going
Jackson County-19	Develop an ordinance/resolution to require the jurisdiction's Manufactured Housing and Travel Trailer Park Ordinance to install tornado shelters for major manufactured and/or mobile home parks with more than 10 spaces.	Tornado, Windstorm	County Planner	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Jackson County-20	Develop and implement a wildfire prevention/education program/workshop.	Wildfire	Emergency Manager	Medium	3	$500 per workshop	Local	Continuous	Not started, lack of funding
Jackson County-21	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources.	Wildfire	Emergency Manager	High	3,4	Staff Time	Local	Three years	Not started, lack of staff
Jackson County-22	Evaluate the firefighting water supply resources within the County, including both fixed and mobile supply issues.	Wildfire	Emergency Manager	Medium	1,2	Staff Time	Local	Three years	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Jackson County-23	The Jackson County RWDs will seek funding sources to mitigate damage to critical infrastructure, including water line enhancements and the replacement of equipment including water pumps, meters, and valves. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Emergency Manager	Low	1,2	$10,000,000	Local, State, Federal	Continuous	Not started, lack of funding
Circleville-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Circleville-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Circleville-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Circleville-4	Annually host a public “hazards workshop” for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Circleville-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Circleville-6	Promote and educate the jurisdiction’s public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Circleville-7	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Circleville-8	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding
Circleville-9	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Circleville-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Circleville-11	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	12/31/2030	On-going
Circleville-12	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Circleville-13	Seek funding for the purchase of generators for all Critical Facilities	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Delia-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Delia-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Delia-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Delia-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Delia-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Delia-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Delia-7	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Delia-8	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding
Delia-9	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Delia-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Delia-11	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	12/31/2030	On-going

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Delia-12	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Delia-13	Seek funding for the purchase of generators for all Critical Facilities	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Delia-14	The City of Delia will continue to assess the impact of natural hazards on water lines throughout the city and will seek funding sources to upgrade existing water lines.	Utility/ Infrastructure Failure	Mayor	Low	1,2	$700,000	Local, State, Federal	Ten years	On-going
Denison-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Denison-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Denison-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Denison-4	Annually host a public “hazards workshop” for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Denison-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Denison-6	Promote and educate the jurisdiction’s public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Denison-7	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Denison-8	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding
Denison-9	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Denison-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Denison-11	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	12/31/2030	On-going
Denison-12	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Denison-13	Seek funding for the purchase of generators for all Critical Facilities	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Holton-1	We would like to rebuild and update the water treatment plant to ensure high quality drinking and potable water for residents.	Utility/ Infrastructure Failure	City Manager	High	1,2	$10,000,000	Unknown	Three years	In progress
Holton-2	Educate and promote local jurisdictional participation in the NFIP.	Flood	County Planner	High	1,2,4	Staff Time	Local, State	Continuous	On-going
Holton-3	Holton is committed to continued participation and compliance with the NFIP.	Flood	NFIP Coordinator	High	1,2	Staff Time	State, FEMA	Continuous	On-going

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Holton-4	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	On-going, Continuous
Holton-5	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Holton-6	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Holton-7	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Holton-8	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Holton-9	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Holton-10	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding
Holton-11	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Holton-12	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Holton-13	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Continuous	On-going
Holton-14	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Holton-15	The City of Holton will continue to assess the impact of natural hazards on the city sewer system and will seek funding sources to upgrade the existing sewer system.	Utility/ Infrastructure Failure	Mayor	Low	1,2	Staff Time, $1,000,000	Local, State, Federal	Ten years	Not started, lack of funding
Holton-16	The City of Holton will continue to assess the impact of natural hazards on water lines throughout the city and will seek funding sources to upgrade existing water lines.	Utility/ Infrastructure Failure	Mayor	Low	1,2	Staff Time, $1,000,000	Local, State, Federal	Ten years	Not started, lack of funding
Holton-17	Seek funding options to purchase and install security fencing at the city-owned power plant, water plant, and wastewater plant to improve site security.	Terrorism/Agri -terrorism, Civil Disorder	Mayor	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Holton-18	Repair the Prairie Lake Spillway (NFIP)	Flood	Mayor	Medium	1,2	$100,000	Local, State, Federal	Three years	New
Hoyt-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Hoyt-2	Continued participation and compliance with the NFIP.	Flood	NFIP Coordinator	High	1,2	Staff Time	State, FEMA	Continuous	On-going
Hoyt-3	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Hoyt-4	Collect educational materials on individual and family preparedness /	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	mitigation measures for property owners.								
Hoyt-5	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Hoyt-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Hoyt-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Hoyt-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Hoyt-9	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding
Hoyt-10	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Hoyt-11	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Hoyt-12	Coordinate county and local government mitigation efforts with RECs.	Utility	Mayor	High	4	Staff Time	Local	Continuous	On-going

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
		/Infrastructure Failure							
Hoyt-13	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	Mayor	High	1,2	Staff Time	Local	Continuous	Not started, lack of staff
Hoyt-14	Seek funding for the purchase and installation of warning sirens	Tornado	Mayor	Medium	1,2	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Hoyt-15	Seek funding for the purchase of generators for all Critical Facilities	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Mayetta-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Mayetta-2	Continued participation and compliance with the NFIP.	Flood	NFIP Coordinator	High	1,2	Staff Time	State, FEMA	Continuous	On-going
Mayetta-4	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Mayetta-5	Annually host a public “hazards workshop” for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of staff
Mayetta-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Mayetta-7	Promote and educate the jurisdiction’s public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Mayetta-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Mayetta-9	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding
Mayetta-10	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Mayetta-11	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Mayetta-12	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Continuous	On-going
Mayetta-13	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	Mayor	High	1,2	Staff Time	Local	Continuous	Not started, lack of staff
Mayetta-14	Seek funding for the purchase of generators for all Critical Facilities	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Mayetta-15	Seek funding to design and construct a community safe room.	Tornado	Mayor	Medium	1,2	$500,000	Local, State, Federal	Three years	Not started, lack of funding
Netawaka-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Netawaka-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Netawaka-3	Collect educational materials on individual and family preparedness /	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	mitigation measures for property owners.								
Netawaka-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Netawaka-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Netawaka-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Netawaka-7	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Netawaka-8	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding
Netawaka-9	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Netawaka-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Netawaka-11	Coordinate county and local government mitigation efforts with RECs.	Utility	Mayor	High	4	Staff Time	Local	12/31/2030	On-going

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
		/Infrastructure Failure							
Netawaka-12	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Netawaka-13	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Soldier-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Soldier-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Soldier-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Soldier-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Soldier-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Soldier-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Soldier-7	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Soldier-8	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner. Also seek funding sources options for	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	generators and/or transfer switches to maintain power in the event of severe weather events.								
Soldier-9	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Soldier-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Soldier-11	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	12/31/2030	On-going
Soldier-12	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Soldier-13	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Whiting-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Whiting-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Whiting-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Whiting-4	Annually host a public “hazards workshop” for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Whiting-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Whiting-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Whiting-7	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jackson County.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Whiting-8	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner.	Utility/ Infrastructure Failure	Mayor	Medium	1,2,4	$20,000	Local, State	Three years	Not started, lack of funding
Whiting-9	Conduct inventory/survey for the city and incorporated cities emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Mayor	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Whiting-10	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Whiting-11	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	12/31/2030	On-going
Whiting-12	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Whiting-13	Seek funding for the purchase of generators for all Critical Facilities	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
USD335-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 335 school buildings.	Tornado	Superintendent	Low	2,3	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD335-2	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism, Civil Disorder	Superintendent	Low	1,3	$50,000	Local, State, Federal	Three years	Not started, lack of funding
USD336-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 336 school buildings.	Tornado	Superintendent	Low	2,3	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
USD336-2	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism, Civil Disorder	Superintendent	Low	1,3	$50,000	Local, State, Federal	Three years	Not started, lack of funding
USD337-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 337 school buildings.	Tornado	Superintendent	Low	2,3	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
USD337-2	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism, Civil Disorder	Superintendent	Low	1,3	$50,000	Local, State, Federal	Three years	Not started, lack of funding
Blue Stem Electric Coop-1	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$5,000,000	Local, State, Federal	Ten years	Not started, lack of funding
Nemaha-Marshall Electric Coop-1	The Nemaha Marshall Electric Cooperative will continue to coordinate mitigation efforts with county and local governments, 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	President	Medium	4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous

Table 6.9: Jackson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Nemaha-Marshall Electric Coop-2	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$5,000,000	Local, State, Federal	Ten years	Not started, lack of funding

6.8.7– Jefferson County and Participating Jurisdictions Mitigation Actions

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Jefferson County-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	County Planner	High	1,2,3	Staff time	Local, State	Continuous	On-going
Jefferson County-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Jefferson County-3	Collect and distribute educational materials on individual and family preparedness \ mitigation measures for property owners	All Hazards	Emergency Manager	High	3	Staff time	Local	Continuous	On-going, Continuous
Jefferson County-4	Annually host a public "hazards workshop" for the residents of the county in combination with local festivals, fairs, or other events drawing large crowds.	All Hazards	Emergency Manager	High	3	$1,000 per workshop	Local	continuous	Not started, lack of funding s
Jefferson County-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Jefferson County-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues	Terrorism/Agri -Terrorism,	Emergency Manager	Medium	3	Staff time	Local, State, Federal	Continuous	Not started, lack of staff
Jefferson County-7	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams in Jefferson County	Dam and Levee Failure	Emergency Manager	High	1,2	Staff time	Local	Three years	Not started, lack of staff
Jefferson County-8	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Jefferson County-9	Coordinate county and local government mitigation efforts with RECs	Utility/ Infrastructure Failure	Emergency Manager	High	4	Staff Time	Local	Three years	On-going
Jefferson County-10	Seek funding to purchase and install new warning sirens	All Hazards	Emergency Management Director	High	1,2,3,4	$100,000	Local, State, Federal	Three years	Not started, lack of funding

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Jefferson County-11	Work with county and city leaders in developing standardized procedures for identifying shelters as pre-disaster tornado shelters, and post-disaster shelters.	Tornado, Windstorm	Emergency Management Director	High	4	Staff Time	Local	Three years	Not started, lack of staff
Jefferson County-12	Develop a centralized county database of shelter facilities, both pre-disaster and Post -disaster, for jurisdictions.	All Hazards	Emergency Management Director	High	1,2,3,4	$3,000	Local	Three years	Not started, lack of funding
Jefferson County-13	Establish, promote, and fund continuity of water systems supply between rural water districts and water departments.	Utility/ Infrastructure Failure	Emergency Management Director	Low	1,2	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Jefferson County-14	Jefferson County is committed to voluntary continued participation and compliance with the NFIP.	Flood	Planning and Zoning Director	High	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Jefferson County-15	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners.	Flood	Mitigation Officer, County Planner	High	1,2,3	Fair market value	Local, State, Federal	Three years	Not started, lack of funding
Jefferson County-16	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program.	Flood	Mitigation Officer	High	1,3	Staff Time	Local	Continuous	Not started, lack of staff
Jefferson County-17	Identify flash-flood prone areas to consider flood reduction measures to county planners.	Flood	County Planner	Medium	1,2	Staff Time	Local	Three years	Not started, lack of staff
Jefferson County-18	Research and design an appropriate stream buffer ordinance to further protect the jurisdiction's water resources and to limit future flood damages adjacent to major waterways.	Flood	County Planner	Medium	1,2	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Jefferson County-19	Conduct an inventory/survey for the emergency response services to identify any existing needs or	All Hazards	Emergency Management Director	High	4	Staff Time	Local, State	Three years	Not started, lack of staff

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	shortfalls in terms of personnel, equipment or required resources.								
Jefferson County-20	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	County Appraiser	High	4	$3,000	Local, State, Federal	Three years	Not started, lack of funding
Jefferson County-21	Develop and implement a wildfire prevention/education program.	Wildfire	Emergency Management Director	Medium	3	$300 per program	Local	Continuous	Not started, lack of funding
Jefferson County-22	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources.	Wildfire	Emergency Management Director	Medium	4	Staff Time	Local	Three years	Not started, lack of staff
Jefferson County-23	Create a working group to evaluate the firefighting water supply resources within the County, including both fixed and mobile supply issues.	Wildfire	Emergency Management Director	Medium	4	Staff Time	Local	Three years	Not started, lack of staff
Jefferson County-24	Identify the most at-risk critical facilities and evaluate potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Emergency Management Director	Medium	1,2	Staff Time	Local	Three years	Not started, lack of staff
Jefferson County-25	Appoint a committee to explore the feasibility of participation in the NFIP CRS.	Flood	Floodplain Manager	Medium	4	Staff Time	Local	12/31/2015	Not started, lack of staff
McLouth-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
McLouth-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
McLouth-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
McLouth-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	City Administrator	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
McLouth-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
McLouth-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
McLouth-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	City Administrator	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
McLouth-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams.	Dam and Levee Failure	City Administrator	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
McLouth-9	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	City Administrator	High	4	Staff Time	Local	Three years	On-going
McLouth-10	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	City Administrator	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
McLouth-11	Work with county and city leaders in developing standardized procedures for identifying shelters as pre-disaster tornado shelters, and post-disaster shelters.	Tornado, Windstorm	City Administrator	High	4	Staff Time	Local	Three years	On-going
McLouth-12	Develop a centralized county database of shelter facilities, both pre-disaster and Post -disaster, for jurisdictions.	All Hazards	City Administrator	High	1,2,4	Staff Time	Local	Three years	On-going

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
McLouth-13	Establish, promote, and fund continuity of water systems supply between rural water districts and water departments.	Utility/ Infrastructure Failure	City Administrator	Low	1,2,3	Staff Time	Local, State, Federal	Three years	On-going
McLouth-14	McLouth is committed to voluntary continued participation and compliance with the NFIP.	Flood	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going
McLouth-15	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	City Administrator	Medium	1,2	Staff Time	Local	Three years	On-going
Meriden-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous
Meriden-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Meriden-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Meriden-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	City Administrator	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Meriden-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Meriden-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Meriden-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	City Administrator	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Meriden-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams.	Dam and Levee Failure	City Administrator	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Meriden-9	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	City Administrator	High	4	Staff Time	Local	Three years	On-going
Meriden-10	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	City Administrator	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Meriden-11	Work with county and city leaders in developing standardized procedures for identifying shelters as pre-disaster tornado shelters, and post-disaster shelters.	Tornado, Windstorm	City Administrator	High	4	Staff Time	Local	Three years	On-going
Meriden-12	Develop a centralized county database of shelter facilities, both pre-disaster and Post -disaster, for jurisdictions.	All Hazards	City Administrator	High	1,2,4	Staff Time	Local	Three years	Not started, lack of staff
Meriden-13	Establish, promote, and fund continuity of water systems supply between rural water districts and water departments.	Utility/ Infrastructure Failure	City Administrator	Low	1,2,3	Staff Time	Local, State, Federal	Three years	On-going
Meriden-14	The City is committed to voluntary continued participation and compliance with the NFIP.	Flood	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going
Meriden-15	Seek funding to perform improvements to minimize flood damage to existing development by maximizing the effectiveness of the storm sewer infrastructure.	Flood	City Administrator	Low	1,2,3	$500,000	Local, State, Federal	Ten years	Not started, lack of funding
Meriden-16	Seek funding to design and construct a tornado shelter.	Tornado, Windstorm	City Administrator	Low	1,2	$500,000	Federal	Four years	Not started, lack of funding
Meriden-17	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	City Administrator	Medium	1,2	Staff Time	Local	Three years	On-going
Nortonville-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going, Continuous

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Nortonville-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Nortonville-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Nortonville-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	City Administrator	High	4	$300 per workshop	Local	Continuous	Not started, lack of funding
Nortonville-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Nortonville-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Nortonville-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	City Administrator	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Nortonville-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams.	Dam and Levee Failure	City Administrator	High	1,2	Staff Time	Local	Three years	Not started, lack of staff
Nortonville-9	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	City Administrator	High	4	Staff Time	Local	Three years	On-going
Nortonville-10	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	City Administrator	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Nortonville-11	Work with county and city leaders in developing standardized procedures for identifying shelters as pre-disaster	Tornado, Windstorm	City Administrator	High	4	Staff Time	Local	Three years	On-going

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	tornado shelters, and post-disaster shelters.								
Nortonville-12	Develop a centralized county database of shelter facilities, both pre-disaster and Post -disaster, for jurisdictions.	All Hazards	City Administrator	High	1,2,4	Staff Time	Local	Three years	Not started, lack of staff
Nortonville-13	Establish, promote, and fund continuity of water systems supply between rural water districts and water departments.	Utility/ Infrastructure Failure	City Administrator	Low	1,2,3	Staff Time	Local, State, Federal	Three years	On-going
Nortonville-14	The City is committed to voluntary continued participation and compliance with the NFIP.	Flood	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going
Nortonville-15	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	NFIP Coordinator	Medium	1,2,3,4	Staff Time	Local,	Continuous	On-going, Continuous
Oskaloosa-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Oskaloosa-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	On-going, Continuous
Oskaloosa-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	On-going, Continuous
Oskaloosa-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	City Administrator	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Oskaloosa-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Oskaloosa-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Oskaloosa-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	City Administrator	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding
Oskaloosa-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams.	Dam and Levee Failure	City Administrator	High	1,2	Staff Time	Local	Three years	On-going, Continuous
Oskaloosa-9	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	City Administrator	High	4	Staff Time	Local	Three years	Not started, lack of staff
Oskaloosa-10	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	City Administrator	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of staff
Oskaloosa-11	Work with county and city leaders in developing standardized procedures for identifying shelters as pre-disaster tornado shelters, and post-disaster shelters.	Tornado, Windstorm	City Administrator	High	4	Staff Time	Local	Three years	Not started, lack of staff
Oskaloosa-12	Develop a centralized county database of shelter facilities, both pre-disaster and Post -disaster, for jurisdictions.	All Hazards	City Administrator	High	1,2,4	Staff Time	Local	Three years	On-going
Oskaloosa-13	Establish, promote, and fund continuity of water systems supply between rural water districts and water departments.	Utility/ Infrastructure Failure	City Administrator	Low	1,2,3	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Oskaloosa-14	The City is committed to voluntary continued participation and compliance with the NFIP.	Flood	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going
Oskaloosa-15	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	NFIP Coordinator	Medium	1,2,3,4	Staff Time	Local,	Continuous	Not started, lack of staff
Oskaloosa-16	Seek funding to retain an engineer to design a community tornado shelter and apply for grant funding for construction.	Tornado, Windstorm	City Administrator	Low	1,2	$500,000	Federal	Three years	Not started, lack of funding
Perry-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Perry-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	On-going, Continuous
Perry-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	On-going, Continuous
Perry-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	City Administrator	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Perry-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Perry-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Perry-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	City Administrator	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding
Perry-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams.	Dam and Levee Failure	City Administrator	High	1,2	Staff Time	Local	Three years	On-going, Continuous
Perry-9	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	City Administrator	High	4	Staff Time	Local	Three years	Not started, lack of staff
Perry-10	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	City Administrator	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of staff
Perry-11	Work with county and city leaders in developing standardized procedures for identifying shelters as pre-disaster	Tornado, Windstorm	City Administrator	High	4	Staff Time	Local	Three years	Not started, lack of staff

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	tornado shelters, and post-disaster shelters.								
Perry-12	Develop a centralized county database of shelter facilities, both pre-disaster and Post -disaster, for jurisdictions.	All Hazards	City Administrator	High	1,2,4	Staff Time	Local	Three years	On-going
Perry-13	Establish, promote, and fund continuity of water systems supply between rural water districts and water departments.	Utility/ Infrastructure Failure	City Administrator	Low	1,2,3	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Perry-14	The City is committed to voluntary continued participation and compliance with the NFIP.	Flood	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going
Perry-15	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	NFIP Coordinator	Medium	1,2,3,4	Staff Time	Local,	Continuous	Not started, lack of staff
ValleyFalls-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
ValleyFalls-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	On-going, Continuous
ValleyFalls-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	On-going, Continuous
ValleyFalls-4	Annually host a public “hazards workshop” for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	City Administrator	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
ValleyFalls-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
ValleyFalls-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
ValleyFalls-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	City Administrator	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding
ValleyFalls-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams.	Dam and Levee Failure	City Administrator	High	1,2	Staff Time	Local	Three years	On-going, Continuous
ValleyFalls-9	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	City Administrator	High	4	Staff Time	Local	Three years	Not started, lack of staff
ValleyFalls-10	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	City Administrator	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of staff
ValleyFalls-11	Work with county and city leaders in developing standardized procedures for identifying shelters as pre-disaster tornado shelters, and post-disaster shelters.	Tornado, Windstorm	City Administrator	High	4	Staff Time	Local	Three years	Not started, lack of staff
ValleyFalls-12	Develop a centralized county database of shelter facilities, both pre-disaster and Post -disaster, for jurisdictions.	All Hazards	City Administrator	High	1,2,4	Staff Time	Local	Three years	On-going
ValleyFalls-13	Establish, promote, and fund continuity of water systems supply between rural water districts and water departments.	Utility/ Infrastructure Failure	City Administrator	Low	1,2,3	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
ValleyFalls-14	The City is committed to voluntary continued participation and compliance with the NFIP.	Flood	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going
ValleyFalls-15	Seek funding to design and construct a tornado shelter.	Tornado	City Administrator	Low	1,2	$500,000	Local, Federal	Three years	Not started, lack of funding
ValleyFalls-16	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	NFIP Coordinator	Medium	1,2,3,4	Staff Time	Local,	Continuous	Not started, lack of staff
Winchester-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Winchester-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	NFIP Coordinator	High	3	Staff Time	Local	Continuous	On-going, Continuous
Winchester-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	On-going, Continuous
Winchester-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	City Administrator	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Winchester-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	City Administrator	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Winchester-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	City Administrator	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Winchester-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	City Administrator	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of funding
Winchester-8	Develop an annex to the LEOP for dam failure response and evacuation plans for high hazard dams.	Dam and Levee Failure	City Administrator	High	1,2	Staff Time	Local	Three years	On-going, Continuous
Winchester-9	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	City Administrator	High	4	Staff Time	Local	Three years	Not started, lack of staff
Winchester-10	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	City Administrator	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of staff
Winchester-11	Work with county and city leaders in developing standardized procedures for identifying shelters as pre-disaster	Tornado, Windstorm	City Administrator	High	4	Staff Time	Local	Three years	Not started, lack of staff

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	tornado shelters, and post-disaster shelters.								
Winchester-12	Develop a centralized county database of shelter facilities, both pre-disaster and Post -disaster, for jurisdictions.	All Hazards	City Administrator	High	1,2,4	Staff Time	Local	Three years	On-going
Winchester-13	Establish, promote, and fund continuity of water systems supply between rural water districts and water departments.	Utility/ Infrastructure Failure	City Administrator	Low	1,2,3	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Winchester-14	Coordinate county and local government mitigation efforts with RECs.	All Hazards	City Administrator	Medium	1,2,3	Staff Time	Local, State, Federal	Continuous	On-going
Winchester-15	Seek funding for the purchase of backup generators for the city's community building and well house.	Utility/ Infrastructure Failure	City Administrator	Medium	1,2	$50,000	Local, State, Federal	Three years	Not started, lack of funding
USD338-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 338 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
USD339-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 338 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
USD339-2	Seek funding for the purchase and installation of backup power sources in all USD 339 facilities.	Utility/ Infrastructure Failure	Superintendent	Low	1,2	$150,000	Local, State, Federal	Three years	Not started, lack of funding
USD 340-1	Develop plans and fund tornado safe rooms in Unified School District 340 schools.	Tornado & Severe Weather	Superintendent	High	1,2	$500,000 to $1,000,000	Local, State, Federal	Three Years	On-Going
USD 340-2	Install hurricane rated film on windows and doors to provide for a safe area in school buildings for tornado/severe weather and increased security	Tornado, Windstorm, Winter Storm	Superintendent	High	1,2	$200,000 - $500,000	Local, State, Federal	Three Years	On-Going
USD 340-3	Power Generator –Seek funding for the purchase and installation of backup power sources in USD 340 Facilities	Utility/ Infrastructure Failure	Superintendent	High	1,2	$50,000 - $100,000	Local, State, Federal	Three Years	On-Going
USD 340-4	Seek funding of comprehensive first aid equipment & supplies, AED devices, cots, life sustaining products ie water,	Tornado, Windstorm, Winter Storm	Superintendent	High	1,2	$10,000 - $20,000	Local, State, Federal	Three Years	On-Going

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	MREs, blankets, tarps, etc., in the event of a catastrophic event								
USD 340-5	Seek funding for response equipment i.e. barriers, vests, marking tape, frames/traps, and other resources in the event of a catastrophic storm or event	Tornado, Windstorm, Winter Storm	Superintendent	High	1,2	$5,000 - $20,000	Local, State, Federal	Three Years	On-Going
USD341-1	Plan, Design and Construct a water containment well and irrigation system for exterior grass and ground conservation.	Drought	Superintendent	Medium	1,2	$140,000	Local, State, Federal	Three years	Not started, lack of funding
USD341-2	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 341 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
USD342-1	Install hurricane rated film on windows and doors to provide for a safe area in school buildings.	Tornado, Windstorm, Civil Unrest	Superintendent	High	1,2,	$300,000	Local, State, Federal	Three years	Not started, lack of funding
USD342-2	Seek funding for comprehensive first aid equipment and AED devices, cots and life sustaining products.	All Hazards	Superintendent	High	1,2	$20,000	Local, State, Federal	Three years	Not started, lack of funding
USD342-3	Seek funding for the purchase and installation of backup power sources in all USD 342 facilities.	Utility/ Infrastructure Failure	Superintendent	High	1,2	$150,000	Local, State, Federal	Three years	Not started, lack of funding
USD342-4	Seek funding for the purchase of response equipment, including barriers, vests, marking tape, frames/traps and other resources.	All Hazards	Superintendent	High	1,2	$15,000	Local, State, Federal	Three years	Not started, lack of funding
USD343-1	Develop and fund mitigation projects for the construction of tornado safe rooms in all USD 343 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
USD343-2	Research and evaluate the benefits of purchasing flood insurance for the school district buildings.	Flood	Superintendent	Medium	1,2	Staff Time	Local	Two years	Not started, lack of staff
USD 343-3	Assess elevations and water flow in the district to qualify the benefit of flood control projects in the District.	Flood	Superintendent	Low	1,2	$50,000	Local, State, Federal	Four years	Not started, lack of funding

Table 6.10: Jefferson County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD343-4	Seek funding for the purchase and installation of backup power sources in all USD 343 facilities.	Utility/ Infrastructure Failure	Superintendent	Low	1,2	$150,000	Local, State, Federal	Three years	Not started, lack of funding
Free State Electric Coop-1	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$5,000,000	Local, State, Federal	Three years	New

6.8.8 – Kickapoo Tribe Mitigation Actions

Table 6.11: Kickapoo Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Kickapoo-1	Seek funding for the design and construction of a community safe room	Tornado, Windstorm, All Hazards	Kickapoo Tribal Council	High	1,2	$200,000	Federal Grants, Tribal Funds	Three years	Not started, lack of funding
Kickapoo-2	Seek funding for the design and construction of a safe room for the Kickapoo Nation School	Tornado, Windstorm, All Hazards	Tribal Departments	High	1,2	$75,000	Federal Grants, Tribal Funds	Three years	Not started, lack of funding
Kickapoo-3	Improve, upgrade and enhance Kickapoo hazard warning systems, to include sirens, internal warning systems and NWS satellite coverage	Tornado, All Hazards	Tribal Departments, NWS, Contractors	High	1,2	$225,000	Tribal, Federal, State	Three years	Not started, lack of funding
Kickapoo-4	Repair and upgrade the water supply for the Kickapoo Water Plant, which is unable to pump from the Delaware River. To meet the needs of the current customers, the weir needs repaired to return the storage capacity to its previous state. Before the flood event the storage structure was constructed of metal and wood. The new design will use concrete to improve the support and satiability of the structure.	Drought, Flooding, Wildfire, Utility Infra-structure Failure	Kickapoo Environmental office, Tribal Council, Tribal programs	High	1,2	$170,000	Tribal, Federal, State	Three years	Not started, lack of funding
Kickapoo-5	Educate the public om identified hazards.	All Hazards	Kickapoo Environmental Office, Kickapoo Police Department, Fire Department, and Health Clinic	M	3,4	$20,000	Federal Grants, Tribal Funds	Continuous	On-going, Continuous
Kickapoo-6	Continue emergency drills for KNS on a routine basis.	Tornado, Terrorism/Agri-Terrorism, Wildfire	Kickapoo Safety Office, Police Department, Fire Department,	M	1,2,3,4	$15,000	Federal Grants, Tribal Funds	Continuous	On-going, Continuous

Table 6.11: Kickapoo Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
			Environmental Office						
Kickapoo-7	Develop maps of existing and potential hazard areas. Include shelters on maps.	All Hazards	Kickapoo Environmental Office, Planning, Tribal Council	Medium	1,2	$15,000	Federal Grants, Tribal Funds	Three years	Not started, lack of funding
Kickapoo-8	Coordinate and participate in trainings with tribal, federal, state, county, and local agencies on prevention, preparedness, response and recovery to common risks.	Flood, Tornado, Winter Storm, All Hazards	Tribal Council, Police Department, Fire Department, Environmental Office, Road and Bridge Department, Water Plant	Medium	4	$25,000	Federal Grants, Tribal Funds	Continuous	On-going, Continuous
Kickapoo-9	Seek funding for Power line and pole upgrades, trimming trees and trenching lines.	Utility/ Infrastructure Failure, Winter Storm	Kickapoo Tribe, Road and Bridge Department, Maintenance Department	Medium	1,2	$200,000	Federal Grants, Tribal Funds	Five years	Not started, lack of funding
Kickapoo-10	Revise and approve the Tribal Emergency Response Plan and conduct exercises to test the plan.	All Hazards	Kickapoo Environmental Office	Medium	1,2,3,4	$5,000	Tribal Funds	Two years	Not started, lack of funding
Kickapoo-11	Establish emergency management team/coordinator. Require certification under the Kansas Certified Emergency Management Program within 18 months of hiring.	All Hazards	Kickapoo Tribal Council	Medium	4	$70,000	Kickapoo Tribe, FEMA, KDEM	Continuous	On-going, Continuous
Kickapoo-12	Plan for prophylaxis of itinerant/vulnerable population (i.e. Casino clientele).	Major Disease Outbreak	Kickapoo Tribal Council and Departments	Medium	1,2	$60,000	Tribal, State, Federal	Two years	Not started, lack of funding
Kickapoo-13	Purchase and install backup generator for critical facilities.	Tornado, Flood, Windstorm, Winter Strom	Kickapoo Tribal Council and Departments	Medium	1,2	$175,000	FEMA, KDEM, Contractors	Two years	Not started, lack of funding

Table 6.11: Kickapoo Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Kickapoo-14	Continue and enhance Police and Fire Department mutual aid agreements.	Wildfire, Tornado, Terrorism/Agri Terrorism, Winter Storm	Kickapoo Police and Fire Departments	Medium	1,2,4	$15,000	Tribal, Local, Federal, State	Continuous	On-going, Continuous
Kickapoo-15	Participate in federally-sponsored vulnerability assessment training to implement pre-disaster mitigation measures at critical sites.	Flood, Tornado, Winter Storm	Kickapoo Tribe in Kansas	Medium	3,4	$25,000	Tribal, Federal, State	Two years	Not started, lack of funding
Kickapoo-16	Foster the practice of sustainable agriculture. Examples of practices include no till farming, grass buffers, filter strips, reserve programs, acceptable grazing techniques, the use of fire for range control, and using pesticides wisely.	Agricultural Infestation, Wildfire	Kickapoo Tribe in Kansas	Medium	1,2,3,4	$300,000	Tribal, Federal, State	Continuous	On-going, Continuous
Kickapoo-17	Participate in the NFIP and request flood hazards affecting the Reservation be mapped by FEMA.	Flood	Kickapoo Tribal Council	Medium	1,2,3,4	$30,000	Tribal, State, Federal	Three years	Not started, lack of funding
Kickapoo-18	Provide education and outreach material for community members.	All Hazards	Kickapoo Tribal Council	Medium	3	Unknown	Unknown	Continuous	On-going, Continuous
Kickapoo-19	Update emergency services radio communications.	All Hazards	Kickapoo Tribe in Kansas Fire and Police Chiefs	Medium	1,2,3,4	$145,000	Federal, State	Two years	Not started, lack of funding
Kickapoo School-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all school buildings.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Dependent upon funding.	Not started, lack of funding
Kickapoo School-1	Seek funding to retain a professional school safety firm to review and create a Security Plan for building security, and contagious disease response.	Civil Disorder, Major Disease	Superintendent	Medium	1,2,3,4	$50,000	Local, State, Federal	Three years	Not started, lack of funding

6.8.9 – Marshall County and Participating Jurisdictions Mitigation Actions

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Marshall County-1	Enhance existing GIS for mitigation, preparedness, and response.	All Hazards	Emergency Management Director	High	1,2	$150,000	Unknown	Five years	Not started, lack of funding
Marshall County-2	Marshall County is committed to continued voluntary participation and compliance with the NFIP	Flood	Emergency Management Director	High	1,2,3,4	Staff Time	State, Federal	Continuous	On-going
Marshall County-3	Educate and promote local jurisdictional participation in the NFIP.	Flood	County Planner	High	1,2,3	Staff time	Local, State	Continuous	On-going
Marshall County-4	Collect and distribute educational materials on individual and family preparedness \ mitigation measures for property owners	All Hazards	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Marshall County-5	Annually host a public "hazards workshop" for the residents of the county in combination with local festivals, fairs, or other events drawing large crowds.	All Hazards	Emergency Manager	High	3	$1,000 per workshop	Local	Continuous	Not started, lack of funding s
Marshall County-6	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Emergency Management Director	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Marshall County-7	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Marshall County-8	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues	Terrorism/Agri -Terrorism,	Emergency Manager	Medium	3	Staff time	Local, State, Federal	Continuous	Not started, lack of staff
Marshall County-9	Coordinate county and local government mitigation efforts with RECs	Utility/ Infrastructure Failure	Emergency Manager	High	4	Staff Time	Local	Three years	On-going

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Marshall County-10	Develop cross-departmental information collection capabilities, and incorporate cadastral (building/parcel) data utilizing GIS	All Hazards	Emergency Management Director	Medium	4	Staff Time	Local, State	Three years	Not started, lack of staff
Marshall County-11	Incorporate the inspection and management of trees that may pose a threat to the county and incorporated cities routine maintenance system process.	Tornado, Windstorm, Winter Storm	Emergency Management Director	Medium	1,2	$10,000	Local	Continuous	On-going, Continuous
Marshall County-12	Consider development of a Comprehensive Land Use Plan for Marshall County.	All Hazards	Mitigation Officer	High	4	Staff Time	Local	Three years	Not started, lack of staff
Marshall County-13	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners.	Flood	Mitigation Officer	High	1,2	Staff Time and fair market value	Local, State, Federal	Continuous	Not started, lack of funding
Marshall County-14	Contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA)	Flood	Mitigation Officer	High	1,2,3	Staff Time	Local	Continuous	On-going, Continuous
Marshall County-15	Identify flash-flood prone areas to consider flood reduction measures to county planners	Flood	Emergency Management Director	High	1,2,4	Staff Time	Local	Three years	On-going
Marshall County-16	Research and design an appropriate stream buffer ordinance to further protect the jurisdiction's water resources and to limit future flood damages adjacent to major waterways	Flood	Emergency Management Director	High	1,2,4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Marshall County-17	Research, develop and recommend an ordinance /resolution to require installation of tornado saferooms for any new major manufactured and/or mobile home parks with more than 10 mobile home spaces	Tornado, Windstorm	Emergency Management Director	High	1,2,4	Staff Time	Local	Three years	Not started, lack of staff

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Marshall County-18	Regularly calculate and document the amount of flood prone property that is preserved as open space to reduce flood insurance burden to the county.	Flood	Emergency Management Director	High	1,2,3,4	Staff Time	Local	Continuous	On-going, Continuous
Marshall County-19	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources.	Wildfire	Emergency Management Director	High	4	Staff Time	Local	Three years	Not started, lack of staff
Marshall County-20	Evaluate the firefighting water supply resources within the County, including both fixed and mobile supply issues.	Wildfire	Emergency Management Director	Medium	4	Staff Time	Local	Three years	Not started, lack of staff
Marshall County-21	Develop and implement a wildfire prevention/education program.	Wildfire	Emergency Management Director	Medium	3	$500	Local	Continuous	Not started, lack of funding
Marshall County-22	Conduct inventory/survey for the county emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources	All Hazards	Emergency Management Director	Medium	4	Staff Time	Local, State	Three years	Not started, lack of staff
Marshall County-23	Identify the most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner.	All Hazards	Emergency Management Director	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Marshall County-24	Contact owners of high hazard dams in the county and inform them of their responsibility to provide and/or update EAPs to Marshall County Emergency Management as prescribed by the KDA-DWR, Chief Engineer.	Dam and Levee Failure	Emergency Management Director	High	`1,2,3,4	Staff Time	Local	Three years	Not started, lack of staff
Marshall County-25	Develop an annex to the LEOP for dam failure response and evacuation for high hazard dams in Marshall County.	Dam / Levee Failure	Emergency Management Director	High	4	Staff Time	Local	Three years	Not started, lack of staff
Marshall County-26	The Blue Valley Telephone Cooperative will seek funding sources for possible, but not exclusively, capital improvement projects including updating head ends	Utility/ Infrastructure Failure	Emergency Management Director	Medium	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions 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, overbuilds of cable plants, dial tones over the cable plants, cellular solutions, and fiber capabilities in Marshall County, among other possible projects.								
Marshall County-27	The Marshall County Rural Water District No. 3 will seek funding sources to mitigate damage to critical infrastructure, including line extensions, updating of radio read software, water line enhancements and the replacement of equipment including water pumps, meters, and valves. Also seek funding for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Emergency Management Director	Medium	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
Marshall County-28	The Washington County Rural Water District No. 1 will seek funding sources to mitigate damage to critical infrastructure, including extending and replacing water lines, water line enhancements, installing new wells and water towers, and the replacement/purchase of equipment including water pumps, meters, and valves. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility /Infrastructure Failure	Emergency Management Director	Medium	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
Marshall County-29	The Home Rural Water District will seek funding sources to mitigate damage to critical infrastructure, including water line enhancements and the replacement of equipment including water pumps, meters, and valves. Also seek funding sources options for generators and/or	Utility/ Infrastructure Failure	Emergency Management Director	Medium	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	transfer switches to maintain power in the event of severe weather events.								
Marshall County-30	The Pottawatomie County Rural Water District No. 3 will seek funding sources to mitigate damage to critical infrastructure, including water line enhancements and the replacement of equipment including water pumps, meters, and valves. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Emergency Management Director	Medium	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
Marshall County-31	The Nemaha County Rural Water District No. 3 will seek funding sources to mitigate damage to critical infrastructure, including water line enhancements and the replacement of equipment including water pumps, meters, and valves. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Emergency Management Director	Medium	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
Marshall County-32	The Marshall County Rural Water District No. 2 will seek funding sources to mitigate damage to critical infrastructure, including water line enhancements and the replacement of equipment including water pumps, meters, and valves. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Dam and Levee Failure	Emergency Management Director	Medium	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
Marshall County-33	The Mission Creek Watershed District No. 51 will continue to maintain watershed-related structures within their	Dam and Levee Failure	Emergency Management Director	Medium	1,2	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	district, including the maintenance and repair of structure-related fences								
Marshall County-34	The Watershed District No. 69 will continue to construct, operate, and maintain water detention dams and related structures for flood reduction in their watershed district	Dam and Levee Failure	Emergency Management Director	Medium	1,2	Staff Time	Local, State, Federal	Three years	On-going
Marshall County-35	The Horseshoe Creek Watershed District No. 10 will continue to construct, operate, and maintain water detention dams and related structures for flood reduction in their watershed district.	Dam and Levee Failure	Emergency Management Director	Medium	1,2	Staff Time	Local, State, Federal	Three years	On-going
Marshall County-36	The Robiboux Watershed No. 70 will continue to construct, operate, and maintain water detention dams and related structures for flood reduction in their watershed district.	Dam and Levee Failure	Emergency Management Director	Medium	1,2	Staff Time	Local, State, Federal	Three years	On-going
Marshall County-37	The Upper Black Vermillion Watershed will continue to construct, operate, and maintain water detention dams and related structures for flood reduction in their watershed district.	Dam and Levee Failure	Emergency Management Director	Medium	1,2	Staff Time	Local, State, Federal	Three years	On-going
Marshall County-38	The Spring Creek Watershed No. 80 will continue to construct, operate, and maintain water detention dams and related structures for flood reduction in their watershed district.	Dam and Levee Failure	Emergency Management Director	Medium	1,2	Staff Time	Local, State, Federal	Three years	On-going
Marshall County-39	The Bluestem Electric Cooperative, Inc. will continue to coordinate mitigation efforts with county and local governments, 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	Emergency Management Director	Medium	4	Staff Time	Local, State, Federal	Three years	On-going

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Marshall County-40	The Nemaha Marshall Electric Cooperative will continue to coordinate mitigation efforts with county and local governments, 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	Emergency Management Director	Medium	4	Staff Time	Local, State, Federal	Three years	On-going
Axtell-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Axtell-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Axtell-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Axtell-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Axtell-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Axtell-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Axtell-7	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Axtell-8	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Axtell-9	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	On-going
Axtell-10	Provide backup power generators for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	2	$60,000	Local, Grants	Three years	Not started, lack of funding
Beattie-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Beattie-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Beattie-3	Annually host a public “hazards workshop” for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Beattie-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Beattie-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Beattie-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Beattie-7	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Beattie-8	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Beattie-9	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	On-going
Beattie-10	Purchase and provide backup power generators for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	2	$60,000	Local, Grants	Three years	Not started, lack of funding
Beattie-11	The city of Beattie, on behalf of the Twin Valley Developmental Services, Inc. organization, will research funding options and consider the purchase of emergency generators to provide backup power for Twin Valley's sheltered workshop site in the city.	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$40,000n	Local, State, Federal	Three years	Not started, lack of funding
BlueRapids-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
BlueRapids-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
BlueRapids-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	festivals, fairs, or other appropriate events drawing large crowds.								
BlueRapids-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
BlueRapids-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
BlueRapids-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
BlueRapids-7	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
BlueRapids-8	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
BlueRapids-9	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	On-going
BlueRapids-10	Consider developing an application package for participation in the NFIP.	Flood	Mayor	High	1,2,3,4	Staff Time	Local	Two years	Not started, lack of staff
BlueRapids-11	Purchase and provide backup power generators for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	2	$60,000	Local, Grants	Three years	Not started, lack of funding
Frankfort-1	Frankfort is committed to continued voluntary participation and compliance with the NFIP.	Flood	Mayor	High	1,2,3,4	Staff Time	State, Federal	Continuous	On-going, Continuous
Frankfort-2	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Frankfort-3	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Frankfort-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Frankfort-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Frankfort-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Frankfort-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Frankfort-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Frankfort-9	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Frankfort-10	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	Not started, lack of funding
Frankfort-11	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	Mayor	High	1,2,4	Staff Time	Local	12/31/2015	Not started, lack of staff

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Frankfort-12	Purchase and provide backup power generators for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	2	$60,000	Local, Grants	Three years	Not started, lack of funding
Marysville-1	Marysville is committed to continued voluntary participation and compliance with the NFIP.	Flood	Mayor	High	1,2,3,4	Staff Time	State, Federal	Continuous	On-going, Continuous
Marysville-2	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Marysville-3	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Marysville-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Marysville-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Marysville-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Marysville-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Marysville-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Marysville-9	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Marysville-10	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	Not started, lack of funding
Marysville-11	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	Mayor	High	1,2,4	Staff Time	Local	12/31/2015	Not started, lack of staff
Marysville-12	The City of Marysville will continue to assess the impact of natural hazards on potable water supplies, distribution lines, pumps, systems, and equipment. Seek funding sources to mitigate damage to critical infrastructure and replace necessary equipment. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Mayor	Medium	1,2	Unknown	Local, State, Federal	Three years	Not started, lack of funding
Marysville-13	The City of Marysville will continue to assess the impact of natural hazards on its sewage lift station. Seek funding sources to mitigate damage to critical infrastructure and replace necessary equipment.	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$100,000	Local, State, Federal	Three years	Not started, lack of funding
Marysville-14	The City of Marysville will continue to operate and maintain their levee system in accordance with the appropriate regulatory requirements.	Dam and Levee Failure	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Marysville-15	Research funding options and consider the purchase of a pumping system to aid in dewatering of the levee system in Marysville. The city of Marysville has identified a need to install a pumping system in the areas of the levee located in the city. This pumping system will be utilized to aid in dewatering of the	Dam and Levee Failure	Mayor	Medium	1,2	Unknown	Local, State, Federal	Three years	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	ponding areas adjacent to the levee system.								
Marysville-16	Purchase and provide backup power generators or transfer switches for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	2	$60,000	Local, Grants	Three years	Not started, lack of funding
Marysville-17	The city of Marysville, on behalf of the Twin Valley Developmental Services, Inc. organization, will research funding options and consider the purchase of emergency generators to provide backup power for Twin Valley's residential homes in the city of Marysville.	Utility/ Infrastructure Failure	Mayor	Medium	1,2	$40,000	Local, State, Federal	Three years	Not started, lack of funding
Oketo-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Oketo-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Oketo-3	Annually host a public “hazards workshop” for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Oketo-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Oketo-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Oketo-6	Promote and educate the jurisdiction’s public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Oketo-7	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Oketo-8	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Oketo-9	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	Not started, lack of funding
Oketo-10	Purchase and provide backup power generators or transfer switches for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	2	$60,000	Local, Grants	Three years	Not started, lack of funding
Summerfield-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Summerfield-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Summerfield-3	Annually host a public “hazards workshop” for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Summerfield-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Summerfield-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Summerfield-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Summerfield-7	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Summerfield-8	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Summerfield-9	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	Not started, lack of funding
Summerfield-10	Purchase and provide backup power generators or transfer switches for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	2	$60,000	Local, Grants	Three years	Not started, lack of funding
Vermillion-1	Vermillion is committed to continued voluntary participation and compliance with the NFIP. .	Flood	Mayor	High	1,2,3,4	Staff Time	State, Federal	Continuous	On-going, Continuous
Vermillion-2	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Vermillion-3	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Vermillion-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Vermillion-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools,	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	day care centers and senior care facilities.								
Vermillion-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Vermillion-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Vermillion-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Vermillion-9	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Vermillion-10	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	Not started, lack of funding
Vermillion-11	Assess flood prone areas and recommend flood reduction measures to city officials.	Flood	Mayor	High	1,2	Staff Time	State, Federal	Continuous	On-going, Continuous
Waterville-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Waterville-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Waterville-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Waterville-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Waterville-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Waterville-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Waterville-7	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Waterville-8	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing GIS.	All Hazards	Mayor	Medium	4	$2,000	State	Three years	Not started, lack of funding
Waterville-9	Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages.	Winter Storm, Utility/ Infrastructure Failure	Mayor	Medium	1,3	$5,000	Local, State, Federal	Three years	Not started, lack of funding
Waterville-10	Purchase and provide backup power generators or transfer switches for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	2	$60,000	Local, Grants	Three years	Not started, lack of funding
USD113-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 113 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Dependent upon funding.	Not started, lack of funding
USD364-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 364 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Dependent upon funding.	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD364-2	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism/Agri-terrorism, Civil Disorder	Superintendent	Medium	1,2,3,4	$50,000	Local, State, Federal	Three years	Not started, lack of funding
USD364-3	Seek funding options for the purchase and installation of backup power generators for the schools of USD 364.	Utility/ Infrastructure Failure	Superintendent	Medium	1,2	$150,000	Local, State, Federal	Three years	Not started, lack of funding
USD364-4	Seek funding to evaluate and update the existing School Emergency Plans / Evacuation Plans for technological hazards caused by severe weather events.	All Hazards	Superintendent	Medium	1,2,3,4	$40,000	Local, State, Federal	Four years	Not started, lack of funding
USD380-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 380 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Dependent upon funding.	Not started, lack of funding
USD498-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 498 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Dependent upon funding.	Not started, lack of funding
USD498-2	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism/Agri-terrorism, Civil Disorder	Superintendent	Medium	1,2,3,4	$50,000	Local, State, Federal	Three years	Not started, lack of funding
USD498-3	Seek funding options for the purchase and installation of backup power generators for the schools of USD 498.	Utility/ Infrastructure Failure	Superintendent	Medium	1,2	$150,000	Local, State, Federal	Three years	Not started, lack of funding
USD498-4	Seek funding to evaluate and update the existing School Emergency Plans / Evacuation Plans for technological hazards caused by severe weather events.	All Hazards	Superintendent	Medium	1,2,3,4	$40,000	Local, State, Federal	Four years	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Good Shepherd School-1	Develop and fund mitigation projects for the construction of tornado safe rooms for Good Shepherd School.	Tornado	Superintendent	Low	1,2	$500,000	Local, State, Federal	Dependent upon funding.	Not started, lack of funding
Good Shepherd School -2	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism/Agri-terrorism, Civil Disorder	Superintendent	Medium	1,2,3,4	$50,000	Local, State, Federal	Three years	Not started, lack of funding
Good Shepherd School -3	Seek funding options for the purchase and installation of backup power generators for the schools of Good Shepherd School.	Utility/ Infrastructure Failure	Superintendent	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Good Shepherd School -4	Seek funding to evaluate and update the existing School Emergency Plans / Evacuation Plans for technological hazards caused by severe weather events.	All Hazards	Superintendent	Medium	1,2,3,4	$30,000	Local, State, Federal	Four years	Not started, lack of funding
St. Gregory School-1	Develop and fund mitigation projects for the construction of tornado safe rooms for St. Gregory School.	Tornado	Superintendent	Low	1,2	$500,000	Local, State, Federal	Dependent upon funding.	Not started, lack of funding
St. Gregory School-2	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism/Agri-terrorism, Civil Disorder	Superintendent	Medium	1,2,3,4	$50,000	Local, State, Federal	Three years	Not started, lack of funding
St. Gregory School-3	Seek funding options for the purchase and installation of backup power generators for the schools of St. Gregory School.	Utility/ Infrastructure Failure	Superintendent	Medium	1,2	$30,000	Local, State, Federal	Three years	Not started, lack of funding
St. Gregory School-4	Seek funding to evaluate and update the existing School Emergency Plans / Evacuation Plans for technological hazards caused by severe weather events.	All Hazards	Superintendent	Medium	1,2,3,4	$30,000	Local, State, Federal	Four years	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
St. Michael's School-1	Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.	Terrorism, Civil Disorder	Superintendent	Medium	1,2,3,4	$500,000	Local, State, Federal	Three years	Not started, lack of funding
St. Michaels School-2	Seek funding options for the purchase and installation of backup power generators for the schools of Good Shepherd School.	Utility/ Infrastructure Failure	Superintendent	Medium	1,2	$50,000	Local, State, Federal	Three years	Not started, lack of funding
St. Michaels School-3	Seek funding to evaluate and update the existing School Emergency Plans / Evacuation Plans for technological hazards caused by severe weather events.	All Hazards	Superintendent	Medium	1,2,3,4	$30,000	Local, State, Federal	Four years	Not started, lack of funding
St. Michael School-4	Seek funding to retain a professional school safety and security firm to review and update the school's evacuation plan.	Terrorism/, Civil Disorder	Superintendent	Medium	1,2,3,4	$30,000	Local, State, Federal	Three years	Not started, lack of funding
Blue Stem Electric Coop-1	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$5,000,000	Local, State, Federal	Ten years	Not started, lack of funding
Free State Electric Coop-1	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$5,000,000	Local, State, Federal	Three years	New
Nemaha-Marshall Electric Coop-1	The Nemaha Marshall Electric Cooperative will continue to coordinate mitigation efforts with county and local governments, encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies.	Utility/ Infra-structure Failure	President	Medium	4	Staff Time	Local, State, Federal	Three years	Not started, lack of funding
Nemaha-Marshall	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$5,000,000	Local, State, Federal	Three years	Not started, lack of funding

Table 6.12: Marshall County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Electric Coop-2									

6.8.10 – Nemaha County and Participating Jurisdictions Mitigation Actions

Table 6.13: Nemaha County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Nemaha County-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library	All Hazards	Emergency Manager	High	3,4	$6,000	Local, State, Federal	Continuous	Not started, lack of funding
Nemaha County-2	Conduct training and public outreach to Nemaha county citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Emergency Manager	High	3,4	$6,000	Local, State, Federal	Continuous	Not started, lack of funding
Nemaha County-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Emergency Manager	High	1,2	$130,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Nemaha County-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Emergency Manager	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Nemaha County-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency services structures and facilities, and how these can be mitigated.	All Hazards	Emergency Manager	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Nemaha County-6	Utilize the Hazard Mitigation Grant Program and other funding means to identify structures and facilities located within the 100-year floodplain and implement a buy-out program to demolish or remove structures from hazardous areas.	Flood	Emergency Manager	Medium	1,2,3,4	$291,000	Local, State, Federal	Two years	Not started, lack of funding
Nemaha County-7	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	Emergency Manager	Medium	3,4	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Nemaha County-8	Continue participation for communities already in NFIP.	Flood	Emergency Manager	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous

Table 6.13: Nemaha County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Bern-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Bern-2	Conduct training and public outreach to Bern citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Bern-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Bern-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Mayor	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Bern-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency services structures and facilities, and how these can be mitigated.	All Hazards	Mayor	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Bern-6	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	NFIP Administrator	Medium	1,2	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Bern-7	Continue participation in NFIP.	Flood	NFIP Administrator	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous
Centralia-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Centralia-2	Conduct training and public outreach to Bern citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Centralia-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding

Table 6.13: Nemaha County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Centralia-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Mayor	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Centralia-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency services structures and facilities, and how these can be mitigated.	All Hazards	Mayor	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Centralia-6	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	NFIP Administrator	Medium	1,2	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Centralia-7	Continue participation in NFIP.	Flood	NFIP Administrator	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous
Corning-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Corning-2	Conduct training and public outreach to Bern citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Corning-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Corning-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Mayor	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Corning-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency services structures and facilities, and how these can be mitigated.	All Hazards	Mayor	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Corning-6	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	NFIP Administrator	Medium	1,2	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding

Table 6.13: Nemaha County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Corning-7	Continue participation in NFIP.	Flood	NFIP Administrator	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous
Goff-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Goff-2	Conduct training and public outreach to Bern citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Goff-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Goff-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Mayor	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Goff-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency services structures and facilities, and how these can be mitigated.	All Hazards	Mayor	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Goff-6	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	NFIP Administrator	Medium	1,2	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Goff-7	Continue participation in NFIP.	Flood	NFIP Administrator	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous
Oneida-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Oneida-2	Conduct training and public outreach to Bern citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous

Table 6.13: Nemaha County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Oneida-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Oneida-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Mayor	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Oneida-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency services structures and facilities, and how these can be mitigated.	All Hazards	Mayor	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Oneida-6	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	NFIP Administrator	Medium	1,2	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Oneida-7	Continue participation in NFIP.	Flood	NFIP Administrator	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous
Sabetha-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Sabetha-2	Conduct training and public outreach to Bern citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Sabetha-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Sabetha-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Mayor	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Sabetha-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency	All Hazards	Mayor	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding

Table 6.13: Nemaha County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	services structures and facilities, and how these can be mitigated.								
Sabetha-6	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	NFIP Administrator	Medium	1,2	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Sabetha-7	Continue participation in NFIP.	Flood	NFIP Administrator	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous
Seneca-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Seneca-2	Conduct training and public outreach to Bern citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Seneca-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Seneca-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Mayor	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Seneca-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency services structures and facilities, and how these can be mitigated.	All Hazards	Mayor	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Seneca-6	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	NFIP Administrator	Medium	1,2	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Seneca-7	Continue participation in NFIP.	Flood	NFIP Administrator	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous
Wetmore-1	Awareness. Provide information regarding hazard mitigation via the county website or the public library.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous

Table 6.13: Nemaha County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Wetmore-2	Conduct training and public outreach to Bern citizens, businesses and local government regarding ways to protect against and mitigate natural hazards.	All Hazards	Mayor	High	3,4	$6,000	Local, State, Federal	Continuous	On-going, Continuous
Wetmore-3	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Wetmore-4	Seek funding for an outdoor emergency warning system that allow for voice communications.	All Hazards	Mayor	High	1,2	$700,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Wetmore-5	A study will be conducted to ascertain the vulnerability to hazards affecting government and emergency services structures and facilities, and how these can be mitigated.	All Hazards	Mayor	Medium	1,2,3,4	$36,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Wetmore-6	Review or develop and promote plans and ordinances for restrictions to construction in flood hazard areas.	Flood	NFIP Administrator	Medium	1,2	$12,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Wetmore-7	Continue participation in NFIP.	Flood	NFIP Administrator	High	1,2,3,4	$12,000	Local, State, Federal	Continuous	On-going, Continuous
Saints Peter and Paul School-1	Purchase and install backup power generators for each school building.	Utility/ Infrastructure Failure	School Director	High	1,2	$50,000	Local, State, Federal	Three years	New
USD113-1	Develop and fund mitigation projects for the construction of tornado safe rooms for Unified School District 113 schools. school additions, or as retrofits.	Tornado	Superintendent	Low	1,2	$50,000 x 6 bldgs = $3,000,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
USD113-2	Purchase and install backup power generators for each building.	Utility/ Infrastructure Failure	Superintendent	Medium	1,2	$500,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
USD115-1	Storm/Safe Rooms. Create safe areas/rooms for students and staff in the event of severe weather. Use existing structure components in schools for protection against high winds.	All Hazards	Superintendent	High	1,2	$500,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding

Table 6.13: Nemaha County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD380-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 380 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State, Federal	Dependent upon funding.	Not started, lack of funding
Nemaha-Marshall Electric Coop-1	The Nemaha Marshall Electric Cooperative will continue to coordinate mitigation efforts with county and local governments, 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	President	Medium	4	$1,000,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Nemaha-Marshall Electric Coop-2	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$1,000,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding

6.8.11 – Washington County and Participating Jurisdictions Mitigation Actions

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Washington County-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	County Planner	High	1,2,3	Staff time	Local, State	Continuous	On-going
Washington County-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Washington County-3	Collect and distribute educational materials on individual and family preparedness \ mitigation measures for property owners	All Hazards	Emergency Manager	High	3	Staff time	Local	Continuous	On-going, Continuous
Washington County-4	Annually host a public "hazards workshop" for the residents of the county in combination with local festivals, fairs, or other events drawing large crowds.	All Hazards	Emergency Manager	High	3	$1,000 per workshop	Local	continuous	Not started, lack of funding s
Washington County-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Emergency Manager	High	3	Staff time	Local	Continuous	Not started, lack of staff
Washington County-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues	Terrorism/Agri -Terrorism,	Emergency Manager	Medium	3	Staff time	Local, State, Federal	Continuous	Not started, lack of staff
Washington County-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	City Administrator	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Washington County-8	Coordinate county and local government mitigation efforts with RECs	Utility/ Infrastructure Failure	Emergency Manager	High	4	Staff Time	Local	Three years	On-going
Washington County-9	Research and recommend a floodplain management ordinance for admittance to the NFIP to make flood insurance available to residents in the jurisdiction.	Flood	Emergency Manager	High	1,2,3,4	Staff Time	Local	Three years	Not started, lack of staff

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Washington County-10	Research and consider appropriate building codes for the County that include wind-resistant design techniques for new construction.	Windstorm	Emergency Manager	Medium	1,2,4	Staff Time	Local	Three years	Not started, lack of staff
Washington County-11	Research and consider development of a Comprehensive Land Use Plan for Washington County.	Flood	Emergency Manager	High	1,2,4	Staff Time	Local	Three years	Not started, lack of staff
Washington County-12	Conduct an inventory/survey for the emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Emergency Manager	Medium	1,2,4	Staff Time	Local, State	Three years	Not started, lack of staff
Washington County-13	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.	Tornado, Windstorm	Emergency Manager	Medium	1,2	Staff Time	Local	Three years	Not started, lack of staff
Washington County-14	Develop cross-departmental information collection capabilities, and incorporate cadastral data utilizing GIS	All Hazards	Emergency Manager	High	4	Staff Time	Local, State, Federal	Three years	Not started, lack of staff
Washington County-15	Develop and implement a wildfire prevention/education program.	Wildfire	Emergency Manager	Medium	1,2,3,4	Staff Time	Local	Three years	Not started, lack of staff
Washington County-16	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources.	Wildfire	Emergency Manager	Medium	4	Staff Time	Local	Three years	Not started, lack of staff
Washington County-17	Create a working group to evaluate the firefighting water supply resources within the County, including both fixed and mobile supply issues.	Wildfire	Emergency Manager	Medium	4	Staff Time	Local	Three years	Not started, lack of staff
Washington County-18	The Washington County Rural Water District No. 1 will seek funding sources to mitigate damage to critical infrastructure, including extending and replacing water lines, water line enhancements, installing new wells and	Utility/ Infrastructure Failure	Emergency Manager	Medium	1,2	$1,000.000	Local, State, Federal	Continuous	Not started, lack of staff

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	water towers, and the replacement/purchase of equipment including water pumps, meters, and valves. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.								
Washington County-19	The Little Blue Rural Water District No. 1 will seek funding sources to mitigate damage to critical infrastructure, including extending and replacing water lines, water line enhancements, installing new wells and water towers, and the replacement/purchase of equipment including water pumps, meters, and valves. Also seek funding sources options for generators and/or transfer switches to maintain power in the event of severe weather events.	Utility/ Infrastructure Failure	Emergency Manager	Medium	1,2	$1,000.000	Local, State, Federal	Continuous	Not started, lack of staff
Washington County-20	The Bluestem Electric Cooperative, Inc. will continue to coordinate mitigation efforts with county and local governments, 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	Emergency Manager	High	1,2,4	$1,000.000	Local, State, Federal	Continuous	Not started, lack of staff
Washington County-21	The Nemaha Marshall Electric Cooperative will continue to coordinate mitigation efforts with county and local governments, encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to	Utility /Infrastructure Failure	Emergency Manager	High	1,2,4	$1,000.000	Local, State, Federal	Continuous	Not started, lack of staff

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	these hazards, and identification of mitigation strategies.								
Washington County-22	The Prairie Land Electric Cooperative will continue to coordinate mitigation efforts with county and local governments, 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	Emergency Manager	High	1,2,4	$1,000.000	Local, State, Federal	Continuous	Not started, lack of staff
Washington County-23	The Rolling Hills Electric Cooperative will continue to coordinate mitigation efforts with county and local governments, 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	Emergency Manager	High	1,2,4	$1,000.000	Local, State, Federal	Continuous	Not started, lack of staff
Washington County-24	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	1,2,4	$1,000.000	Local	12/31/2015	On-going
Barnes-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Barnes-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Barnes-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Barnes-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Barnes-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Barnes-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Barnes-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Barnes-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Barnes-9	Seek funding to retain an engineer to design a community tornado shelter and apply for grant funding for construction.	Tornado, Windstorm	Mayor	Low	1,2	$500,000	Federal	Three years	Not started, lack of funding
Barnes-10	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Clifton-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Clifton-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Clifton-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Clifton-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Clifton-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Clifton-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Clifton-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Clifton-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Clifton-9	Seek funding to retain an engineer to design a community tornado shelter and apply for grant funding for construction.	Tornado, Windstorm	Mayor	Low	1,2	$500,000	Federal	Three years	Not started, lack of funding
Clifton-10	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Greenleaf-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Greenleaf-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Greenleaf-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	festivals, fairs, or other appropriate events drawing large crowds.								
Greenleaf-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Greenleaf-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Greenleaf-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Greenleaf-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Greenleaf-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Greenleaf-9	Seek funding to retain an engineer to design a community tornado shelter and apply for grant funding for construction.	Tornado, Windstorm	Mayor	Low	1,2	$500,000	Federal	Three years	Not started, lack of funding
Greenleaf-10	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Haddam-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Haddam-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Haddam-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	festivals, fairs, or other appropriate events drawing large crowds.								
Haddam-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Haddam-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Haddam-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Haddam-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Haddam-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Haddam-9	Seek funding to retain an engineer to design a community tornado shelter and apply for grant funding for construction.	Tornado, Windstorm	Mayor	Low	1,2	$500,000	Federal	Three years	Not started, lack of funding
Haddam-10	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Hanover-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Hanover-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Hanover-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	festivals, fairs, or other appropriate events drawing large crowds.								
Hanover-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Hanover-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Hanover-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Hanover-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Hanover-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Hanover-9	The City of Hanover is committed to continued voluntary participation and compliance with the NFIP.	Flood	Mayor	High	1,2,3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Hanover-10	Assess flood prone areas and recommend flood reduction measures to city planners.	Flood	Mayor	Medium	1,2,3,4	Staff Time	Local	Continuous	On-going, Continuous
Hanover-11	Purchase and install generator at public storm shelter for the Kloppenberg Center.	Utility/ Infrastructure Failure	Mayor	High	1,2	$5,000 - $10,000	Local	Three years	Not started, lack of funding
Hollenberg-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Hollenberg-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Hollenberg-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
Hollenberg-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Hollenberg-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Hollenberg-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Hollenberg-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Hollenberg-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Hollenberg-9	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Linn-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Linn-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Linn-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	festivals, fairs, or other appropriate events drawing large crowds.								
Linn-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Linn-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Linn-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Linn-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Linn-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Linn-9	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Linn-10	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Mahaska-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Mahaska-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Mahaska-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Mahaska-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Mahaska-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Mahaska-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Mahaska-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Mahaska-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Mahaska-9	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Mahaska-10	Seek funding to retain an engineer to design a community tornado shelter and apply for grant funding for construction.	Tornado, Windstorm	Mayor	Low	1,2	$500,000	Federal	Three years	Not started, lack of funding
Morrowville-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Morrowville-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Morrowville-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Morrowville-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Morrowville-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Morrowville-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Morrowville-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Morrowville-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Morrowville-9	Purchase emergency back-up power generators to operate Morrowville's storm-warning alert system in the event of a power failure	Utility/ Infrastructure Failure	Mayor	High	1,2	$6,500	Local, State, Federal	Three years	Not started, lack of staff
Morrowville-10	Assess flood prone areas and recommend flood reduction measures to city planners.	Flood	Mayor	Medium	1,2,4	Staff Time	Local	Three years	Not started, lack of staff
Palmer-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Palmer-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Palmer-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Palmer-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Palmer-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Palmer-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Palmer-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Palmer-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Palmer-9	Assess flood prone areas and recommend flood reduction measures to city planners.	Flood	Mayor	Medium	1,2,4	Staff Time	Local	Three years	Not started, lack of staff
Palmer-10	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Vining-1	Upgrade/Expand/Improve Stormwater Management System.	Flood	Mayor	High	1,2	$500,000	Local, and County	Three years	Not started, lack of staff
Vining-2	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
Vining-3	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
Vining-4	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	festivals, fairs, or other appropriate events drawing large crowds.								
Vining-5	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
Vining-6	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
Vining-7	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri -Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
Vining-8	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
Vining-9	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
Vining-10	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
Vining-11	Develop a program or system for supporting vulnerable populations during emergency events.	All Hazards	Mayor	Low	1,2,3,4	$15,000	Local, County, State, Federal	Contingent upon funding	Not started, lack of funding
Vining-12	Improve lighting and traffic controls at critical intersections and roadways to improve safety. \	Utility/ Infrastructure Failure	Mayor	Low	1,2	$25,000	Local, County	Contingent upon funding	Not started, lack of funding
City of Washington-1	Educate and promote local jurisdictional participation in the NFIP.	Flood	NFIP Coordinator	High	1,3,4	Staff Time	Local, State	Continuous	On-going
City of Washington-2	Collect and distribute educational materials on individual and family preparedness / mitigation measures for property owners	All Hazards	Mayor	Medium	3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
City of Washington-3	Annually host a public "hazards workshop" for the residents of the jurisdiction, in combination with local festivals, fairs, or other appropriate events drawing large crowds.	All Hazards	Mayor	High	4	$300 per workshop	Local	Continuous	On-going, Continuous
City of Washington-4	Encourage and seek funding for the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Mayor	High	1,2	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff
City of Washington-5	Educate residents about driving in winter storms and handling winter-related health effects.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	Not started, lack of staff
City of Washington-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues.	Terrorism/Agri-Terrorism	Mayor	Medium	3	Staff Time	Local, State, Federal	Continuous	Not started, lack of staff.
City of Washington-7	Seek funding for the purchase and installation of warning sirens, to include updating and retrofitting	Tornado	Mayor	Medium	1,2,3	$20,000	Local, State, Federal	Three years	Not started, lack of funding
City of Washington-8	Coordinate county and local government mitigation efforts with RECs.	Utility /Infrastructure Failure	Mayor	High	4	Staff Time	Local	Three years	Not started, lack of staff
City of Washington-9	The City of Washington is committed to continued voluntary participation and compliance with the NFIP. .	Flood	Mayor	High	1,2,3,4	Staff Time	Local, State, Federal	Continuous	On-going, Continuous
City of Washington-10	Assess flood prone areas and recommend flood reduction measures to city planners.	Flood	Mayor	Medium	1,2,4	Staff Time	Local	Three years	Not started, lack of staff
City of Washington-11	Seek funding to assure that all citizens are equipped with NOAA Weather Radios.	All Hazards	Mayor	High	1,2	$5,000	Local, State, Federal	Contingent upon funding	Not started, lack of funding
USD108-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 108 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State	Three years	Not started, lack of funding

Table 6.14: Washington County and Participating Jurisdictions Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD223-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 223 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State	Three years	Not started, lack of funding
USD224-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 223 schools.	Tornado	Superintendent	Low	1,2	$1,000,000	Local, State	Three years	Not started, lack of funding
Blue Stem Electric Coop-1	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$5,000,000	Local, State, Federal	Ten years	Not started, lack of funding
Nemaha-Marshall Electric Coop-1	The Nemaha Marshall Electric Cooperative will continue to coordinate mitigation efforts with county and local governments, 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	President	Medium	4	$1,000,000	Local, State, Federal	Three years	Not started, lack of funding
Nemaha-Marshall Electric Coop-2	Refit poles and electrical wire throughout the county.	Utility/ Infrastructure Failure	President	Medium	1,2	$1,000,000	Local, State, Federal	Ten 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 2013 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.

44 CFR 201.7 (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 Indian Tribal Government.

Kansas Region K 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 K MPC and KDEM, in conjunction with participating jurisdictions, will compile a list of projects funded and completed. Additionally, the MPC and participating jurisdictions will be solicited annually to provide information on any other mitigation projects that were not funded through hazard mitigation grants for tracking and update purposes.

To track mitigation projects from initiation to closeout, participating jurisdictions will use a project tracking methodology that includes, at a minimum, the following information:

- Applicant data
- Grant identifier
- Award date
- Awarded contractor
- Period of Performance
- Total project cost, including local share of project
- Quarterly Reports

Upon completion of a project the awarded participating jurisdiction will conduct a closeout site visit to:

- Review all project documents
- Review all procurement documents and contracts
- Photograph completed project

Project closeout packages will generally be submitted no more than 90 days after a project has been completed, and should include the following:

- All available documentation
- Photographs of completed project
- Materials, labor and equipment documentation
- Close-out certification

6.11 – Jurisdictional Compliance with NFIP

44 CFR 201.6 (c)(3)(ii) All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Participating jurisdictions are committed to continued involvement and compliance with the NFIP. To help facilitate compliance, each participating jurisdiction:

- Adopts floodplain regulations through local ordinance
- Enforces floodplain ordinances through building restrictions as detailed in relevant ordinance
- Regulates new construction in Special Flood Hazard Areas as outlined in their floodplain ordinance
- Utilizes FEMA FIRMs
- Monitors floodplain activities

Currently, no participating jurisdiction has available funding to complete local requests for floodplain map updates. Additionally, as of this plan, there are no active community assistance or monitoring activities occurring in any participating jurisdiction. Key to achieving across the board reduction in flood damages is a robust community assistance, education and awareness program. As such, Kansas Region K 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

44 CFR 201.7 (c)(3)(v): Identification of current and potential sources of Federal, tribal, or private funding to implement mitigation activities.

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 6.15: 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

Table 6.15: Primary Hazard Mitigation Funding Mechanisms

Program	Funding Agency	Funding Match Requirement	Program Description
			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 6.16: 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.

Table 6.16: Additional Potential Hazard Mitigation Funding Mechanisms

Department	Program	Program Description
Council of Western State Foresters	Wildland Urban Interface (WUI) Grants	The WUI Grant may be used to apply for financial assistance towards hazardous fuels and educational projects within the four goals of: improved prevention, reduction of hazardous fuels, restoration of fire-adapted ecosystems and promotion of community assistance.
Small Business Administration	Disaster Loans	SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.
Kansas Department of Agriculture – Division of Conservation (KDA-DoC)	Multipurpose Small Lakes Program	Provides state cost-share assistance to a government entity for the construction or renovation of a dam for flood control and water supply and/or recreational purposes. It requires a general plan of works and a local nonpoint source pollution control plan.
(KDA-DoC)	State Assistance to Watershed Dam Construction	Provides cost-share assistance to organized watershed districts and other special purpose districts for the implementation of structural and nonstructural practices that reduce flood damage. Structural practices must be approved by the chief engineer of the Division of Water Resources.
(KDA-DoC)	Water Resources Cost Share Program	Provides state cost-share assistance to landowners for the establishment of enduring water conservation practices to protect and improve the quality and quantity of Kansas water resources.
KDA- Division of Water Resources	Floodplain Management Program	Program provides technical assistance for local, state and federal floodplain management, including managing the NFIP and floodplain ordinances and regulations adopted by city and county governments.
Kansas Department of Commerce (KDC)	Community Service Tax Credit	Program offers Kansas tax credits to for nonprofit organizations for contributions to approved projects. Projects eligible for tax credit awards include community service, crime prevention and health care
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.
Bureau of Indian Affairs	Various	These programs exist to help recognized tribal entities.
KDHE-BER	Kansas Brownfields Program	Programs to assist communities with the redevelopment of brownfields properties
Kansas Forest Service (KFS)	Community Forestry Program	Program provides assistance, education, and support to communities and municipalities in organizing urban and community forestry programs, identifying resource needs, setting priorities of work, and training city employees.
KFS	Rural Forestry Program	Professional foresters provide on-site forest management and agro-forestry analysis and recommendations through inventory of forests, woodlands and windbreaks.
KFS	Firewise Program	The Kansas Firewise program offers prevention materials for homeowners to reduce the threat of wildland fire in rural and high-risk areas.

Table 6.16: Additional Potential Hazard Mitigation Funding Mechanisms

Department	Program	Program Description
KFS	Forest Health Program	Program monitors the impacts of insects, diseases, drought, flooding and other health issues in forests, woodlands, windbreaks and conservation tree plantings by providing diagnosis and control recommendations and mitigation and planning for Emerald Ash Borer, Asian Bush Honeysuckles and other invasive species.
KFS	Landowner Education	Provides information and education to farmers regarding the benefits of good forest management. This includes information about federal cost share practices including the Environmental Quality Incentives Program, Conservation Reserve Program, and the Riparian and Wetland Protection Program.
KFS	Rural Fire Protection	Program provides fire support services to rural fire departments, including wildfire training, Smokey Bear fire prevention materials, and the acquisition and distribution of excess military vehicles for conversion to firefighting units.

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.

44 CFR 201.7 (c)(4) A plan maintenance process that includes: (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan.

The Kansas Region K 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 K

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 K 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.

44 CFR 201.7 (c)(4) A plan maintenance process that includes: (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan.

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Kansas Region K, the State of Kansas, and the MPC will facilitate a yearly plan review and the subsequent hazard mitigation plan revision and re-adoption process within the required five-year period.

Information from the annual meetings will be incorporated in to the plan update. Starting in calendar year 2022, the formal update process will begin. A thorough review and revision of the plan will take place, following all requirements detailed in 44 CFR 201.4, FEMA guidance documents, and DMA 2000. The following represents a general timeline for the next required plan revision.

- **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.

44 CFR 201.6 (c)(4)(iii): A process by which the Indian tribal government incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

44 CFR 201.6 (c)(1)(iv): Be integrated to the extent possible with other ongoing tribal planning efforts as well as other FEMA programs and initiatives.

The hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various county and local plans. Under the leadership of the MPC, it is hoped that when each of these other plans is updated, they will be measured against the contents of this Hazard Mitigation Plan.

Below is a list of the various jurisdictional planning efforts, either solely or jointly administered, and relevant planning documents. While each plan can stand alone, each participating jurisdiction, under the leadership of their MPC member, will actively work to incorporate relevant parts of this hazard mitigation plan into the following:

- All participating jurisdictions Codes and Ordinances
- All participating jurisdictions Comprehensive Plans
- All participating jurisdictions Critical Facilities Plans
- All participating jurisdictions Economic Development Strategic Plans
- All participating jurisdictions Emergency Operations Plans
- All participating jurisdictions Flood Mitigation Assistance Plan
- All participating jurisdiction Land-Use Plans
- All Tribal planning efforts
- All Tribal FEMA programs and initiatives
- 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.

Each participating jurisdiction has committed to actively encourage all departments to implement actions that minimize loss of life and property damage from hazards. Whenever possible, each participating jurisdiction will use existing plans, policies, procedures and programs to aid in the implementation of identified hazard mitigation actions. Potential avenues for implementation may include:

- Budget revisions or adoptions
- Capital improvement plans

- General or master plans
- Hiring of staff
- Land use planning
- Operation plans
- Ordinances
- Stormwater planning
- Tribal FEMA programs
- Tribal plans

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 and tribal-wide 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.

44 CFR 201.7 (c)(4)(iv) 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 K 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 K 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 K 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 K 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 and Sign-In Sheets

To **Region "K" Hazard Mitigation Planning Committee**

Through **Jeanne Bunting, Mitigation Planner**
Kansas Division of Emergency Management (KDEM)

From **Jeanne Bunting, Mitigation Planner**
Tel / E-mail **Kansas Division of Emergency Management (KDEM)**

Date **May 2019**

Subject **Minutes from the Region "K" Mitigation Planning Meeting held through phone and email due to flooding.**

This document is a record of attendance and a summary of the issues discussed during the above meeting. Topics covered during the meeting included: (1) Strategy, (2) Goals, and (3) actions. The hazard mitigation planning process was reviewed to include requirements for public involvement and the use of data collection guides, and the new action criteria. The meeting concluded with a discussion of the next steps in the planning process with the final meeting being held in June 2019 with time, date and location TBD.

Attendees

Participant	Title	Organization
Wes Lanter	Emergency Manager	Atchison County
Lydia Theurer	Assistant Emergency Manager	Atchison County
Randy Linck	Emergency Manager	Brown County
Rich Liehmkuhal	Assistant Director	Brown County
Julie Meng	Emergency Manager	Doniphan County
Joe Hoelscher	Emergency Manager	Douglas County
Kelli Cheek	Treasurer	Iowa Tribe
Pat Korte	Emergency Manager	Jackson County
Sherri Ladner	Assistant Director	Jackson County
Keith Jeffers	Emergency Manager	Jefferson County
Moud Safadi	Environmental Specialist	Kickapoo Tribe
William Schwindamann	Emergency Manager	Marshall County
Leslie Jeter	Assistant Director	Marshall County
Russel Lierz	Emergency Manager	Nemaha County
Steve Duryea	Assistant Director	Nemaha County
Randy Hubbard	Emergency Manager	Washington County
Tim Mueller	Assistant Director	Washington County
Jeanne Bunting	Mitigation Planner	Kansas Division of Emergency Management
Matt Eyer	Plan Author	Blue Umbrella Solutions
Wes Lanter	Emergency Manager	Atchison County
Lydia Theurer	Assistant Emergency Manager	Atchison County
Randy Linck	Emergency Manager	Brown County
Rich Liehmkuhal	Assistant Director	Brown County
Julie Meng	Emergency Manager	Doniphan County

Agenda

Matt Eyer, the plan author, reviewed the strategy, goals, and went in depth on the necessary steps needed in order to bring the actions up to par and in accordance with SMART objectives via phone and email communication due to the cancellation of the meeting for flooding. Actions are due back to Jeanne Bunting by 10 June 2019 for inclusion in the 2019 plan update.

Next Steps

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- **June 10, 2019— Actions Due to KDEM**
- **June 25, 2019 — Final Meeting for Region J**
- **July 2019 — Submit Plan to FEMA**

//s//
Jeanne Bunting, Mitigation Planner, KDEM

To	**Region "K" Hazard Mitigation Planning Committee**
Through	**Jeanne Bunting, Mitigation Planner** **Kansas Division of Emergency Management (KDEM)**
From Tel / E-mail	**Jeanne Bunting, Mitigation Planner** **Kansas Division of Emergency Management (KDEM)**
Date	**26 and 27 June, 2019**
Subject	**Minutes from the Region "K" Mitigation Planning Meeting held on 26 and 27 June 2019, in Marshall , Atchison and Douglas Counties for all the counties within the region.**

This document is a record of attendance and a summary of the issues discussed during the above meeting. Topics covered during the meeting included: (1) Strategy, (2) Goals, and (3) actions, 4) final steps, 5) draft plan. 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

Name	Organization	County

See attached.

Agenda

Meetings were scheduled in order to finalize the draft plan of Region K. Matt Eyer, the plan author, reviewed the strategy, goals, and went in depth on the next steps, which include public comments.

Next Steps

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- **July 2019 – Submit Plan to FEMA**

//s//
Jeanne Bunting, Mitigation Planner, KDEM

SIGN-UP SHEET Regional Hazard Mitigation

06/27/2019

Name (print) CAROL VONCLOEDT Signature

Name (print) Jeanne Bunting Signature

Name (print) Branden Boyd Signature bboyd@cityofeudoraks.gov

Name (print) Ken Keiter Signature

Name (print) KEITH JEFFERS Signature

Name (print) Jillian Rodrigue Signature

Name (print) JOE HOELSCHER Signature

Name (print) Shawn Showman Signature

Name (print) Tyler Fleming Signature

Name (print) Tony Foster Signature

Name (print) Keith Browning Signature

Name (print) H. Wayne Riley Signature

Name (print) Mike Baxter Signature
(Eudora Township + Wakarusa)

Name (print) Signature

Name (print) Signature

Name (print) Signature

Name (print) Signature

Name (print) Signature

Name (print) Signature

Name (print) Signature

Name (print) Signature

Regional Mitigation Kick Off Meeting 6/26/2019

NAME	DEPARTMENT	EMAIL	CONTACT NUMBER
Wm Schwind Jr	MSCO EM	msco911ep@bluevalley.ne	785-562-4550
Leslie Jeter	msco EM	msco911@bluevalley.net	785-562-4550
Randy Hubbard	WSCO EM	wscoem@washingtoncountyks.gov	785-325-2134
Chuck Traylor	City Waterville	watcity@sbcglobal.net	785 562 7485
Jeanne Bunting	KDEM		
Matt Eyer	Blue Umbrella	Matt@BlueUmbrellaCo	303 552 1181

Region K Atchison 6-26-2019

Wes Leg Lorter	EM Director	Wlorter@Atcoks.org
Jeanne Bunting	KDEM	
Jessica Housh	EM Assistant	jhoush@atcoks.org