

# Kansas Homeland Security Region L Hazard Mitigation Plan

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

Johnson County, Leavenworth County, and  
Wyandotte County

August 2019

Prepared by:



**Blue Umbrella Solutions, LLC**

# Table of Contents

SECTION	PAGE
<b>1.0 Introduction, Assurances and Adoption.....</b>	<b>1-1</b>
1.1 Introduction.....	1-1
1.2 Participating Jurisdictions.....	1-2
1.3 Assurances.....	1-4
1.4 Authorities.....	1-4
1.5 Adoption Resolutions.....	1-5
<b>2.0 Planning Process.....</b>	<b>2-1</b>
2.1 Documentation of the Planning Process.....	2-1
2.2 2019 Plan Changes.....	2-2
2.3 Mitigation Planning Committee.....	2-3
2.4 Jurisdictional Representation.....	2-4
2.5 Local and Regional Stakeholder Participation.....	2-5
2.6 Public Participation.....	2-6
2.7 Planning Meetings.....	2-18
2.8 Existing Plan Incorporation.....	2-19
<b>3.0 Planning Area.....</b>	<b>3-1</b>
3.1 Introduction.....	3-1
3.2 Regional Population Data.....	3-4
3.3 At Risk Population Data.....	3-6
3.4 Regional Housing Data.....	3-8
3.5 Regional Property Valuations.....	3-10
3.6 Jurisdictional Property Valuations.....	3-10
3.7 Critical Facilities.....	3-11
3.8 Unified School Districts.....	3-12
3.9 Regional Land Use.....	3-13
3.10 Regional Land Coverage.....	3-16
3.11 Regional Agricultural Data.....	3-19
3.12 Regional Development Trends.....	3-20
3.13 Participating Jurisdiction Development Trends.....	3-26
3.14 Regional Economic Activity Patterns.....	3-28
3.15 Climate Change.....	3-32
<b>4.0 Hazard Profiles.....</b>	<b>4-1</b>
4.1 Introduction.....	4-1
4.2 Methodology.....	4-1
4.3 Declared Federal Disasters.....	4-1
4.4 Identified Potential Hazards.....	4-2
4.5 Hazard Planning Significance.....	4-3
4.6 Hazard Profiles.....	4-5
4.7 Flood.....	4-6
4.8 Tornado.....	4-26



<b>SECTION</b>	<b>PAGE</b>
4.9	Windstorm..... 4-36
4.10	Drought ..... 4-45
4.11	Winter Storm..... 4-50
4.12	Utility/Infrastructure Failure..... 4-57
4.13	Hazardous Materials ..... 4-61
4.14	Wildfire ..... 4-73
4.15	Civil Disorder..... 4-87
4.16	Lightning..... 4-90
4.17	Major Disease ..... 4-97
4.18	Agricultural Infestation..... 4-100
4.19	Terrorism..... 4-106
4.20	Hailstorms ..... 4-110
4.21	Extreme Temperatures ..... 4-117
4.22	Dam and Levee Failure..... 4-128
4.23	Expansive Soils..... 4-147
4.24	Radiological Incident..... 4-150
4.25	Earthquake ..... 4-153
4.26	Landslides ..... 4-160
4.27	Soil Erosion and Dust ..... 4-163
4.28	Land Subsidence ..... 4-166
<b>5.0</b>	<b>Capability Assessment..... 5-1</b>
5.1	Introduction..... 5-1
5.2	Granted Authority ..... 5-1
5.3	Governance ..... 5-3
5.4	Jurisdictional Capabilities..... 5-3
<b>6.0</b>	<b>Mitigation Strategy ..... 6-1</b>
6.1	Introduction..... 6-1
6.2	Emergency Management Accreditation Program Integration ..... 6-1
6.3	Identification of Goals ..... 6-2
6.4	Problem Statements ..... 6-2
6.5	Completed Mitigation Actions..... 6-4
6.6	Review and Addition of Mitigation Actions..... 6-5
6.7	Prioritization Mitigation Actions ..... 6-7
6.8	Jurisdictional Mitigation Actions..... 6-8
6.9	Mitigation Actions No Longer Under Consideration ..... 6-95
6.10	Action Implementation and Monitoring ..... 6-96
6.11	Jurisdictional Compliance with NFIP..... 6-98
6.12	Flood Loss Mitigation Strategy ..... 6-98
6.13	Primary Mitigation Action Funding Sources..... 6-102
6.14	Additional Mitigation Action Funding Sources..... 6-103
<b>7.0</b>	<b>Plan Maintenance..... 7-1</b>
7.1	Hazard Mitigation Plan Monitoring and Evaluation..... 7-1



<b>SECTION</b>		<b>PAGE</b>
7.2	Jurisdictional Maintenance Requirements .....	7-2
7.3	Plan Maintenance and Update Process .....	7-2
7.4	Post-Disaster Declaration Procedures .....	7-3
7.5	Incorporation of HMP into Other Planning Mechanisms .....	7-3
7.6	Continued Public Involvement .....	7-5

### **List of Appendices**

- A Adoption Resolutions
- B FEMA Approval Documentation
- C Meeting Minutes and Sign-In Sheets
- D Critical Facilities (Restricted)





## List of Acronyms

Acronym	Meaning
BER	Bureau of Environmental Remediation
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
°F	Fahrenheit
FEMA	Federal Emergency Management Agency
HAZUS	FEMA Loss Estimation Software
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
GDP	Gross Domestic Product
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Planning
HazMat	Hazardous Materials
HD	Hemorrhagic Fever
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



<b>Acronym</b>	<b>Meaning</b>
NSFHA	No Special Flood Hazard Area
NGO	Non-Governmental Organization
NRC	Nuclear Regulatory Commission
OHMS	Office of Hazardous Materials Safety
PDSI	Palmer Drought Severity Index
PHMSA	Pipeline and Hazardous Materials Safety Administration
PDM	Pre-Disaster Mitigation
PAL	Provisionally Accredited Levee
RL	Repetitive Loss
Risk MAP	Risk Mapping, Assessment and Planning
REC	Rural Electric Cooperative
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), in which participation is voluntary, 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 L (hereafter referred to as Kansas Region L) 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 L 2014 Hazard Mitigation Plan
- Build for a safer future for all citizens
- Foster cooperation for planning and resiliency
- Identify, prioritize and mitigate against hazards
- Assist with sensible and effective planning and budgeting
- Educate citizens about hazards, mitigation and preparedness
- Comply with federal requirements

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

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



## 1.2 – Participating Jurisdictions

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

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

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

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

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

**Table 1.1: Johnson County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2014 HMP Participant</b>	<b>2019 HMP Participant</b>
Johnson County	X	X
City of DeSoto	X	X
City of Edgerton	X	X
City of Fairway	X	X
City of Gardner	X	X
City of Lake Quivira	X	X
City of Leawood	X	X
City of Lenexa	X	X
City of Merriam	X	X
City of Mission	X	X
City of Mission Hills	X	X
City of Mission Woods	X	X
City of Olathe	X	X
City of Overland Park	X	X
City of Prairie Village	X	X
City of Roeland Park	X	X
City of Shawnee	X	X
City of Spring Hill	X	X
City of Westwood	X	X
City of Westwood Hills	X	X



**Table 1.1: Johnson County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2014 HMP Participant</b>	<b>2019 HMP Participant</b>
Consolidated Fire District No. 2	x	x
Fire District No. 1	x	x
Fire District No. 2	x	x
Fire District No. 3	x	x
Johnson County Community College	x	x
Kansas School for the Deaf	x	x
University of Kansas Edwards Campus	x	x
Unified School District (USD) #229 – Blue Valley	x	x
USD #230 – Spring Hill	x	x
USD #231 – Gardner/Edgerton	x	x
USD #232 – DeSoto	x	x
USD #233 – Olathe	x	x
USD #512 – Shawnee Mission	x	x

**Table 1.2: Leavenworth County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2014 HMP Participant</b>	<b>2019 HMP Participant</b>
Leavenworth County	x	x
City of Basehor	x	x
City of Easton	x	x
City of Lansing	x	x
City of Leavenworth	x	x
City of Linwood	x	x
City of Tonganoxie	x	x
Rural Water District (RWD) 7	x	x
USD #207 – Fort Leavenworth	x	x
USD #449 – Easton	x	x
USD #453 – Leavenworth	x	x
USD #458 – Basehor-Linwood	x	x
USD #464 – Tonganoxie	x	x
USD #469 – Lansing	x	x
University of Saint Mary	x	x

**Table 1.3: Wyandotte County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2014 HMP Participant</b>	<b>2019 HMP Participant</b>
Unified Government of Wyandotte County and Kansas City, Kansas	x	x
City of Bonner Springs	x	x
City of Edwardsville	x	x
Board of Public Utilities	x	x
Kansas City Community College	x	x
Kansas School for the Deaf and Blind	x	x
Kansas University Medical Center	x	x
University of Kansas Hospital	x	x
USD #202 - Turner		x



**Table 1.3: Wyandotte County Participating Jurisdictions**

<b>Jurisdiction</b>	<b>2014 HMP Participant</b>	<b>2019 HMP Participant</b>
USD #203 - Piper		x
USD #204 – Bonner-Edwardsville	x	x
USD #500 – Kansas City, Kansas		x
Boys Scouts of America	x	x
Fairfax Drainage District		x
Kaw Valley Drainage District		x

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

### **1.3 – Assurances**

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

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

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

### **1.4 – Authorities**

For all jurisdictions within Kansas Region L 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 L 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 programming and planning. In all cases of primacy, State of Kansas laws, statutes, and policies will supersede the provisions of the plan. This HMP attempts to be consistent following:

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

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

## 1.5 – Adoption Resolutions

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

Upon review and approved pending adoption status by FEMA Region VII adoption resolutions will be signed by the participating jurisdictions and added to the Appendix documents. Additionally, the following table will be completed noting adoption date for each participating jurisdiction and, if applicable, resolution or adoption number.



**Table 1.4: Jurisdictions of Johnson County Resolutions of Adoption**

<b>Jurisdiction</b>	<b>Adoption Date</b>	<b>Resolution or Adoption Number</b>
Johnson County		
City of DeSoto		
City of Edgerton		
City of Fairway		
City of Gardner		
City of Lake Quivira		
City of Leawood		
City of Lenexa		
City of Merriam		
City of Mission		
City of Mission Hills		
City of Mission Woods		
City of Olathe		
City of Overland Park		
City of Prairie Village		
City of Roeland Park		
City of Shawnee		
City of Spring Hill		
City of Westwood		
City of Westwood Hills		
Consolidated Fire District No. 2		
Fire District No. 1		
Fire District No. 2		
Fire District No. 3		
Johnson County Community College		
Kansas School for the Deaf		
University of Kansas Edwards Campus		
USD #229 – Blue Valley		
USD #230 – Spring Hill		
USD #231 – Gardner/Edgerton		
USD #232 – DeSoto		
USD #233 – Olathe		
USD #512 – Shawnee Mission		

**Table 1.5: Jurisdictions of Leavenworth County Resolutions of Adoption**

<b>Jurisdiction</b>	<b>Adoption Date</b>	<b>Resolution or Adoption Number</b>
Leavenworth County		
City of Basehor		
City of Easton		
City of Lansing		
City of Leavenworth		
City of Linwood		
City of Tonganoxie		
RWD 7		





**Table 1.5: Jurisdictions of Leavenworth County Resolutions of Adoption**

<b>Jurisdiction</b>	<b>Adoption Date</b>	<b>Resolution or Adoption Number</b>
USD #207 – Fort Leavenworth		
USD #449 – Easton		
USD #453 – Leavenworth		
USD #458 – Basehor-Linwood		
USD #464 – Tonganoxie		
USD #469 – Lansing		
University of Saint Mary		

**Table 1.6: Jurisdictions of Wyandotte County Resolutions of Adoption**

<b>Jurisdiction</b>	<b>Adoption Date</b>	<b>Resolution or Adoption Number</b>
Unified Government of Wyandotte County and Kansas City, Kansas		
City of Bonner Springs		
City of Edwardsville		
Board of Public Utilities		
Kansas City Community College		
Kansas School for the Deaf and Blind		
University of Kansas Medical Center		
University of Kansas Hospital		
USD #202 - Turner		
USD #203 - Piper		
USD #204 – Bonner-Edwardsville		
USD #500 – Kansas City, Kansas		
Fairfax Drainage District		
Kaw Valley Drainage District		

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

Completed resolutions of adoption may be found with Kansas Division of Emergency Management (KDEM), the adopting jurisdiction, and in Appendix A.



## 2.0 Planning Process

### 2.1 – Documentation of the Planning Process

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

In September of 2018, Kansas Region L and its participating jurisdictions began the process to update the Kansas Region L 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 L 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 L and its participating jurisdiction undertook the following steps to update and create a robust HMP:

- Review of the 2014 Kansas Region L HMP
- Review of the 2015 Mid-America Regional Council (MARC) HMP
- Review of the MARC Metropolitan Emergency Managers Committee Regional Coordination Guide
- Review of current related planning documents
- Delivery of organizational and planning meetings
- Solicitation of public input as to plan development
- Assessment of potential risks
- Assessment of vulnerabilities and assets
- Development of the mitigation actions
- Development of a draft multi-hazard mitigation plan
- Implementation, adoption, and maintenance of the plan

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

1. Organize resources
2. Assess risks



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

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

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

## 2.2 – 2019 Plan Changes

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

The Kansas Region L 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 L Mitigation Planning Committee**

<b>Participant</b>	<b>Title</b>	<b>Organization</b>
Cary Gerst	Assistant Director, Planning	Johnson County
Chuck Magaha	Emergency Management Director	Leavenworth County
Matt May	Emergency Management Director	Wyandotte County
Jeanne Bunting	Mitigation Planner	State of Kansas
Matt Eyer	President (Plan Author)	Blue Umbrella Solutions

## 2.4 – Jurisdictional Representation

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

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

The following details jurisdictional representation.

**Table 2.2: Johnson County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Representative</b>	<b>Title</b>
City of DeSoto	Steve Chick Jr.	Emergency Manager
City of Edgerton	Trey Whitaker	Public Works Superintendent
City of Fairway	David Brown	Chief of Police
City of Gardner	Lee Krout	Lieutenant of Operations
City of Lake Quivira	Erin Leckey	City Administrator
City of Leawood	Colin Fitzgerald	Deputy Chief
City of Lenexa	Tom Jacobs	Stormwater Engineer
City of Merriam	Todd Allen	Captain (EM Liaison)
City of Mission	Dan Madden	Captain (EM Liaison)
City of Mission Hills	Jennifer Lee	Assistant City Administrator
City of Mission Woods	Dan Madden	Captain (EM Liaison)
City of Olathe	Kevin Weyand	Division Chief
City of Overland Park	Kyle Burns	Emergency Manager
City of Prairie Village	James Carney	Field Superintendent
City of Roeland Park	John Morris	Chief of Police (EM Liaison)
City of Shawnee	Matt Epperson	Emergency Services Chief
City of Spring Hill	Jose Leon	Asst, City Administrator for Public Works
City of Westwood	Greg O'Halloran	Chief of Police
City of Westwood Hills	Beth O'Bryan	City Clerk/Administrator
USD #229 – Blue Valley	Sidney Cumberland	Risk Manager



**Table 2.2: Johnson County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Representative</b>	<b>Title</b>
USD #230 – Spring Hill	Tim Meek	Dir. Construction and Safety
USD #231 – Gardner/Edgerton	Pam Stranatha	Superintendent
USD #232 – DeSoto	Alvie Cater	Assistant Superintendent
USD #233 – Olathe	Ric Castillo	Manager of Safety and Security
USD #512 – Shawnee Mission	Dr. Michael Fulton	Superintendent

**Table 2.3: Leavenworth County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Representative</b>	<b>Title</b>
City of Basehor	Gene Myracle Jr	Superintendent, Public Works
City of Easton	Bobby Watkins	Mayor
City of Lansing	Mike Dickason	Police Lieutenant
City of Leavenworth	Mike McDonald	Director, Public Works
City of Linwood	Brian Christenson	Mayor
City of Tonganoxie	Greg Lawson	Police Chief
USD #207 – Fort Leavenworth	Keith A. Mispagel	Superintendent
USD #449 – Easton	Tim Beying	Superintendent
USD #453 – Leavenworth	Matt Dedekre	Superintendent
USD #458 – Basehor-Linwood	David Howard	Superintendent
USD #464 – Tonganoxie	Loren Feldkamp	Superintendent
USD #469 – Lansing	David Bresser	Emergency Preparedness Coord.

**Table 2.4: Wyandotte County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Representative</b>	<b>Title</b>
City of Bonner Springs	Amber McCullough	Assistant City Manager
City of Edwardsville	Tim Whitham	Fire Chief
USD #202 - Turner	Joe Peterson	Transportation Supervisor
USD #203 - Piper	Jenny Hurley	Dir. HR and Communications
USD #204 – Bonner-Edwardsville	Dan Brungardt	Superintendent
USD #500 – Kansas City, Kansas	Henry Horn	EM Senior Coordinator

## 2.5 – Local and Regional Stakeholder Participation

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

Within Kansas Region L 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 L MPC provided the opportunity for neighboring communities, counties, county assessors, and local and regional development agencies to be involved in the planning process. Where applicable, these entities



were kept informed of the hazard mitigation process during state, regional and local emergency management meetings, gatherings and conferences, in person by MPC members, or were solicited for planning information.

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

In addition, relevant federal, regional, state, local governmental, and private and non-profit entities were also invited to provide input and utilized for information and technical expertise, including, but not limited to:

- American Red Cross
- Center for Disease Control
- FEMA
- Kansas Adjutant General's Office
- Kansas Department of Agriculture, the Kansas Department of Health and Environment
- Kansas Department of Transportation
- Kansas Fire Service, Kansas Water Office
- Kansas Geological Survey
- Kansas State Fire Marshall
- Local and county planning and zoning offices (where available).
- Local business and non-profit entities
- National Oceanic and Atmospheric Administration
- National Weather Service
- Nuclear Regulatory Commission
- Pipeline and Hazardous Materials Safety Administration
- Salvation Army
- United States Army Corp of Engineers, National Resource Conservation Service
- United States Department of Agriculture
- United States Geological Survey

## 2.6 – Public Participation

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

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



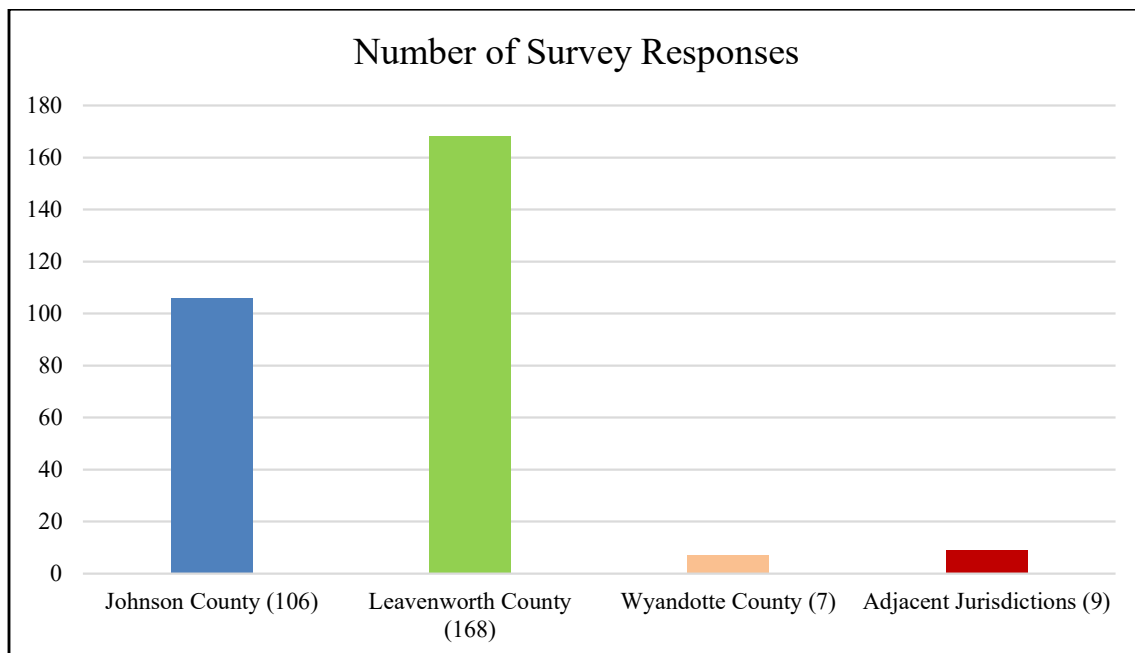
- Advertised meeting invitations on participating jurisdictional websites
- Open meeting opportunities with Kansas Region L MPC members
- Access to an online survey document to provide feedback during the entire planning period
- One-week comment period upon completion of draft plan

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

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

The following graphics represents the feedback received from the public from the online survey document.

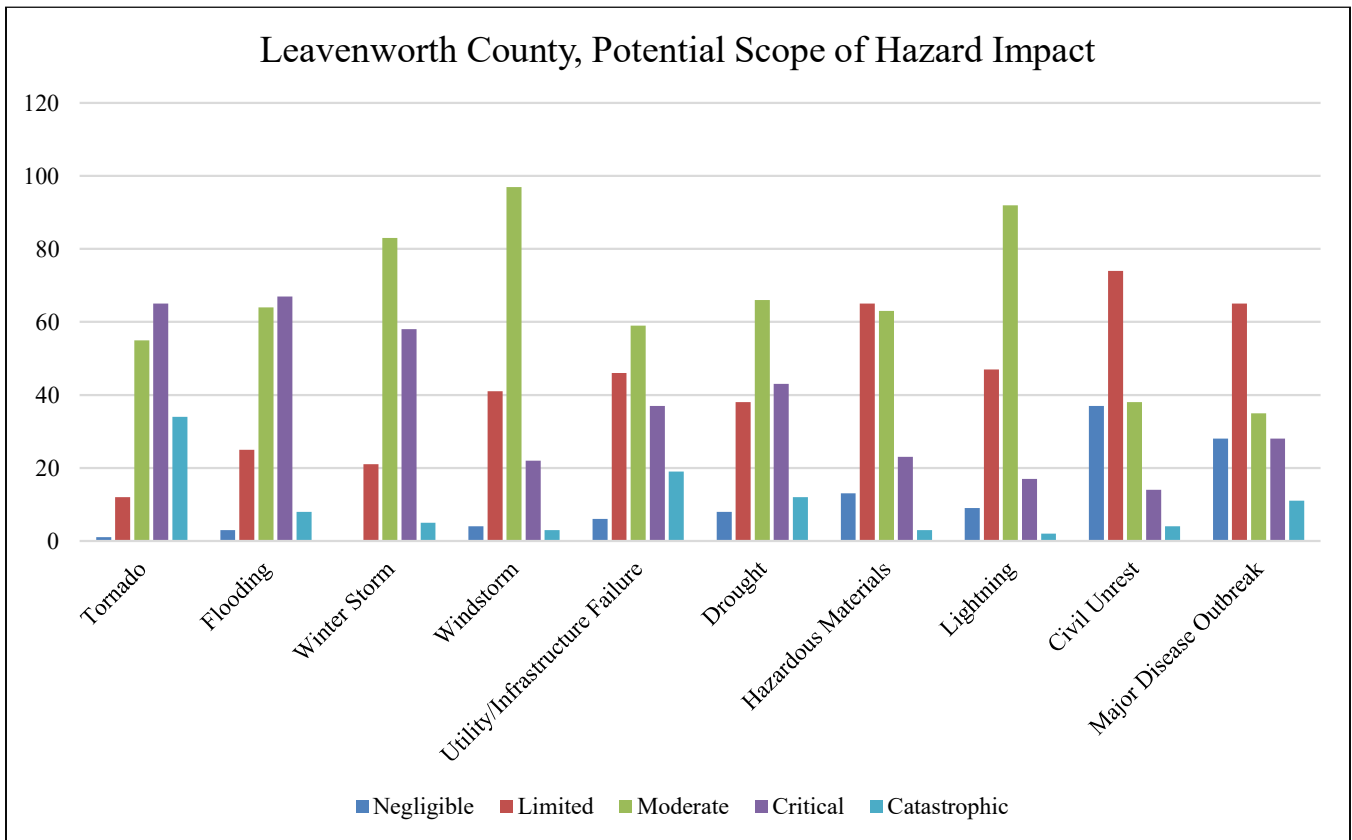
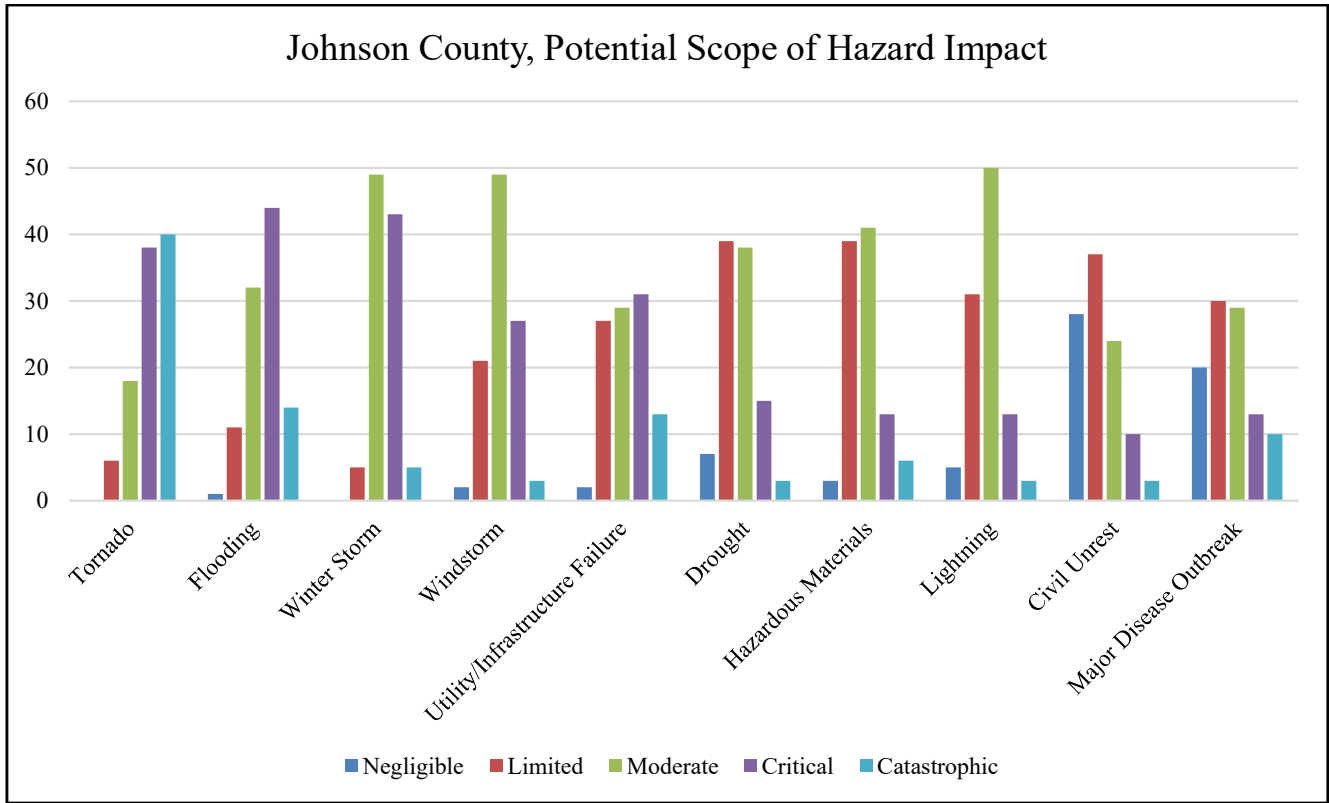
**Question 1:** In which county or jurisdiction do you live?



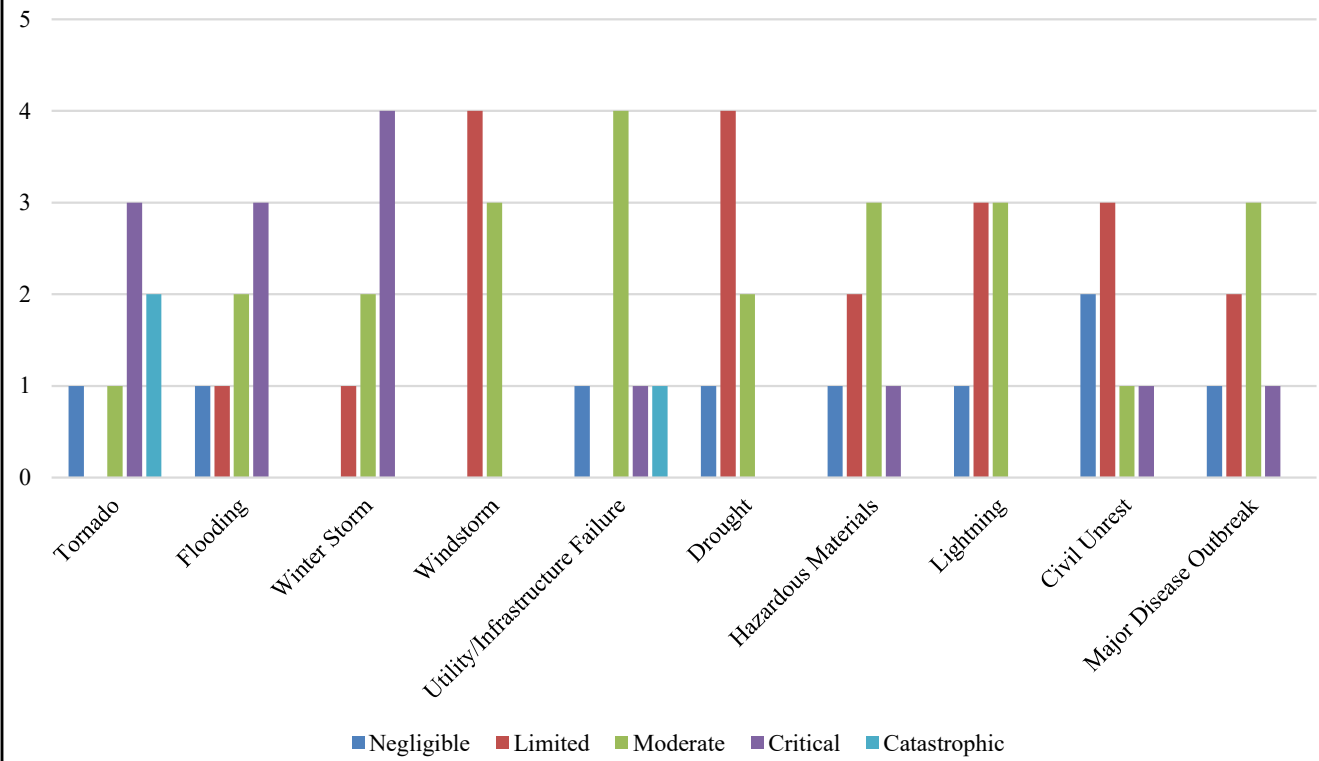
**Question 2:** In 2014, the Region consisting of Johnson, Leavenworth and Wyandotte counties, the planning committee determined that the hazards listed below are important to the area. Indicate the level of risk, or the scope of potential impacts, in the Region, that you perceive for each hazard:



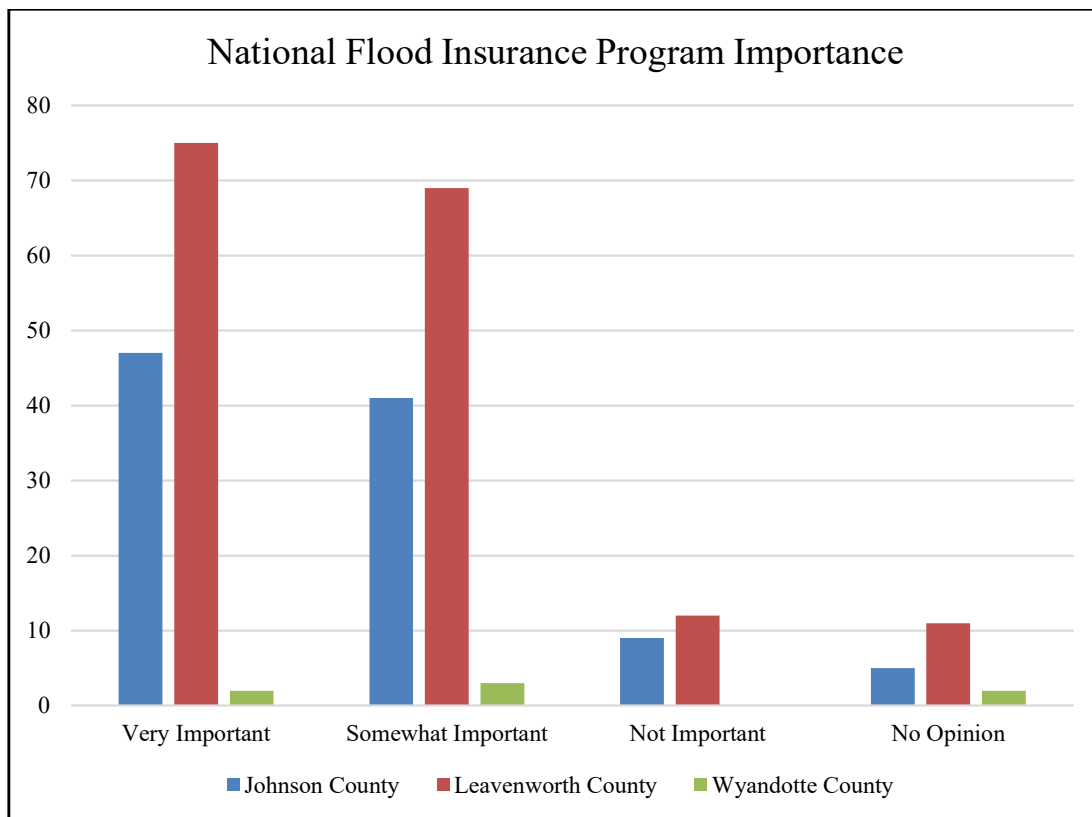




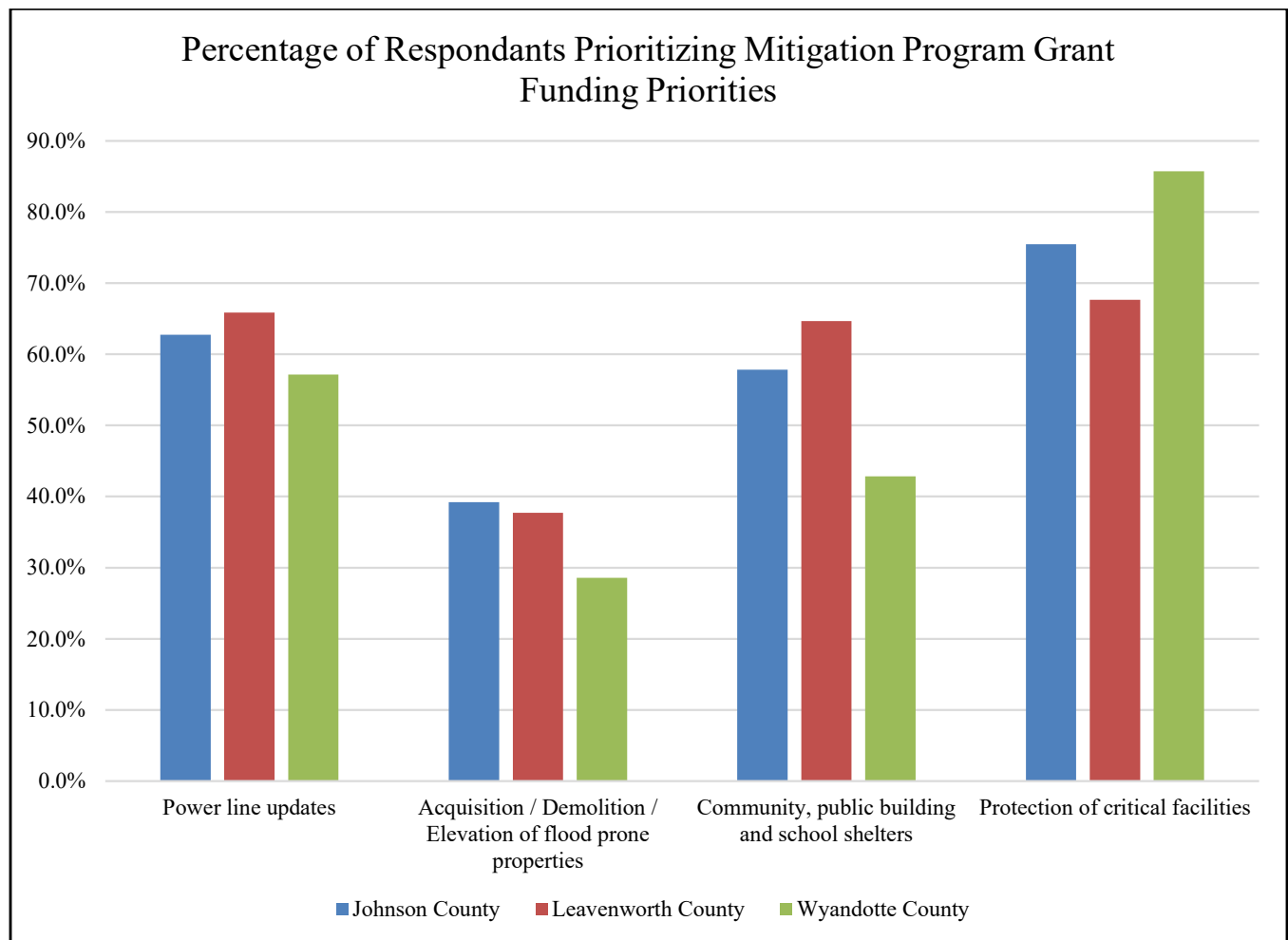
# Wyandotte County, Potential Scope of Hazard Impact



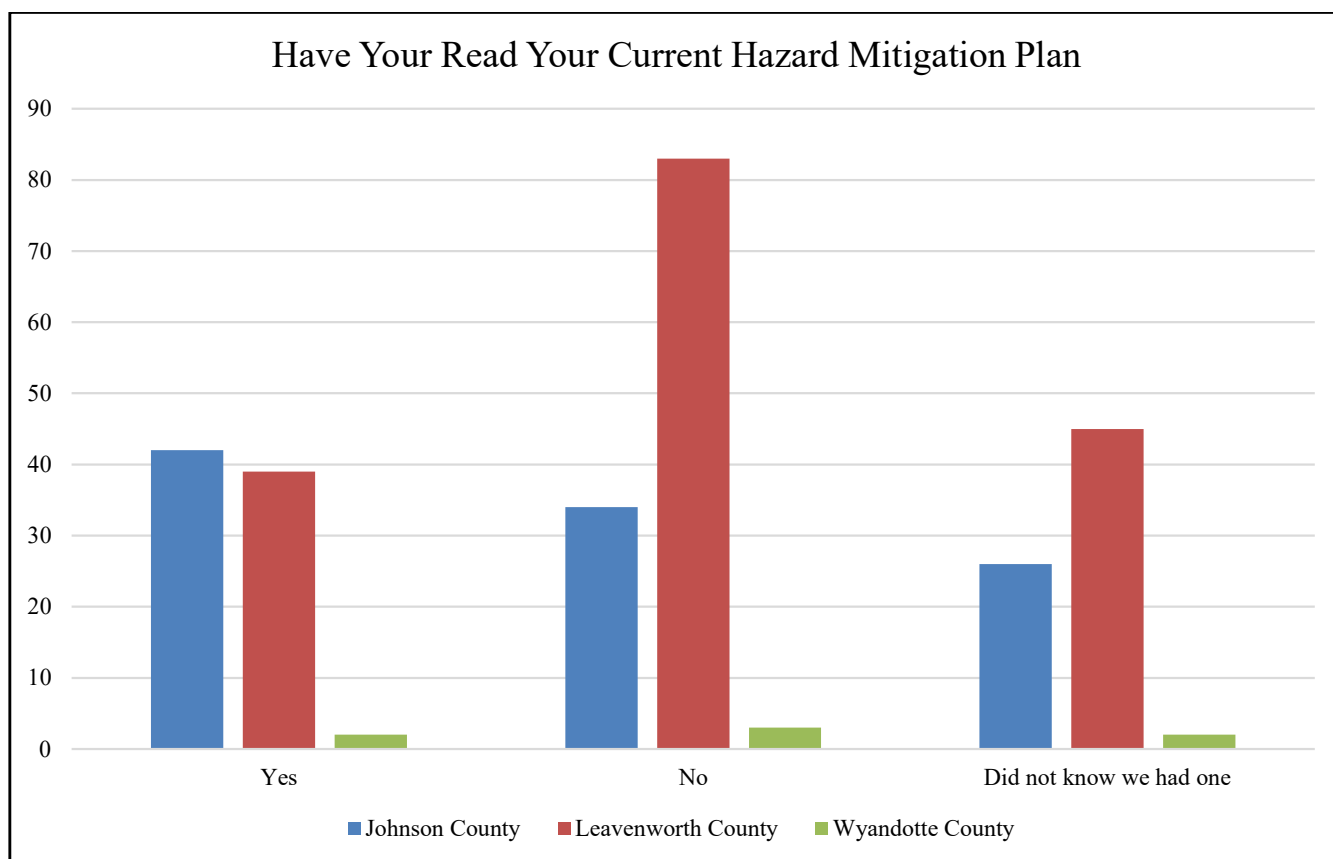
**Question 3:** In the Region, the planning committee has determined that a flood event is the second most critical hazard. How important is it for you to have your community participate in or continue to participate in the National Flood Insurance Program?



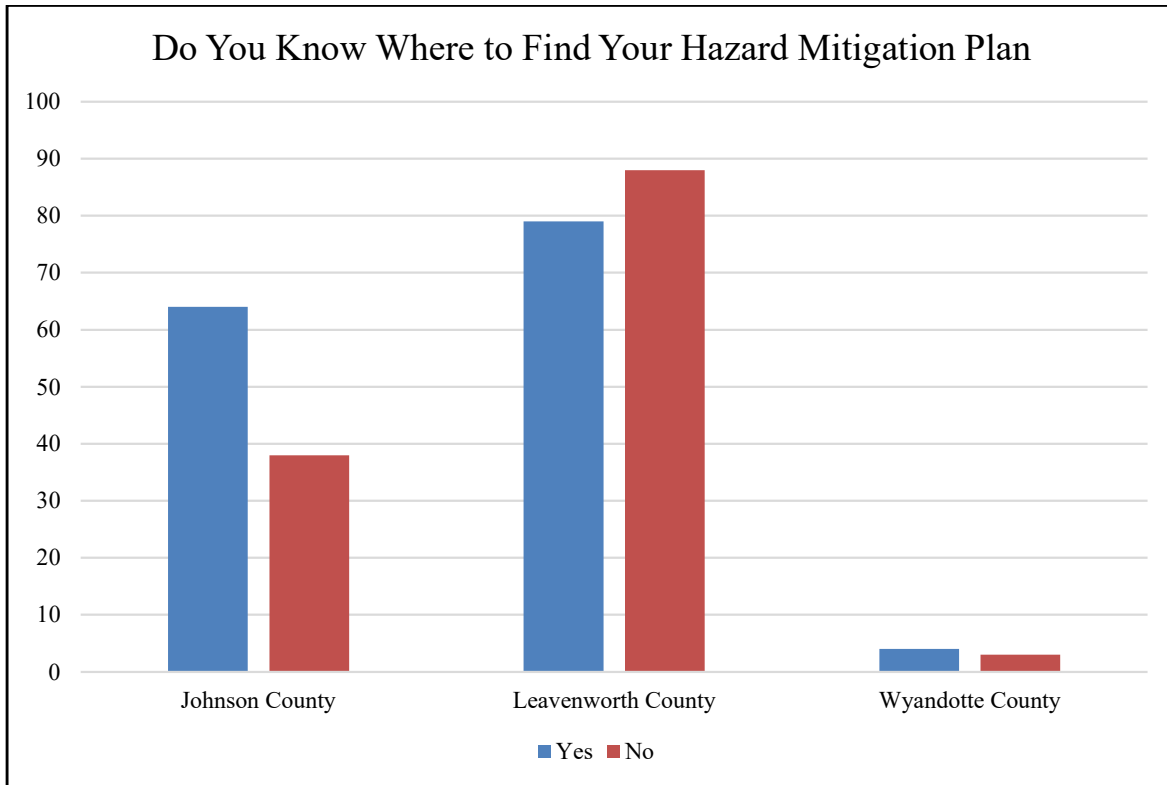
**Question 4:** The Kansas Division of Emergency Management currently reviews the application for funds for the FEMA Risk Mitigation Grant Program. Your current funding priorities are listed below. Please check those that could benefit your community.



**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?



**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.

### Johnson County

- Be aware of older areas of Johnson County with primarily above-ground utility lines and mature trees. Consider special arrangements with public buildings (city halls, libraries, schools) to ensure power at common locations where residents may seek shelter if needed.
- Debris management has always been a huge issue in numerous weather events for every city to handle.
- Electrical and communication infrastructure are both susceptible to wind/tornado/flooding/winter weather and the local power companies have shown that while they can occasionally perform feats of wonder in getting people back on-line, we have seen that they have a difficult time getting past 75-80% restoration in a short time-span. Power problems multiply out to public health problems and a need for shelter (especially in the winter).
- Electrical grid failure, whether through severe storms or EMP.
- Ensuring emergency transportation is included and all applicable area transportation entities.
- Extreme heat (cooling centers & education), wildfires
- I feel all topics were covered.



- I think an abbreviated version of the mitigation plan would be nice. It is difficult to digest the full plan for the layperson.
- I think for many, telecommunications after a major event is a primary concern. With the reliance of cell phones that restoration of cell towers is an early priority so people can find the other resources.
- I think one of the biggest risks is the water/sewer lines and power lines.
- Ice storm
- I'm certain you've covered this but anticipating the effect of climate change on the increased intensity of weather events.
- I'm primarily concerned with the worsening and increasingly random weather events we're experiencing. Things are becoming less predictable and weather events are becoming more severe. I'm not confident we have infrastructure in place to withstand our weather becoming more brutal. I worry about flooding, I worry about tornadoes, but I also worry about our power, water, and heat delivery systems and the beating they're going to take moving into the future.
- Impact climate change has and will continue to have on frequency/severity of weather events. Also, give consideration to how threats/impacts will change because of this.
- Increase coverage outdoor warning devices. Additional electronic signage on interstates and major parkways and boulevards
- Increased public education
- Not everyone in Kansas was born in Kansas. It would be beneficial if communities/apartment complexes/public gathering places had handouts available for folks who know how to protect themselves and their property in an earthquake...but have no clue of what to do in a tornado. (The protection plan is almost the complete opposite of one another in those situations...and I learned that after the EF-1 tornado on May 2 struck our apartment complex...literally right over my head (on the top floor of our complex). I learned the next day of what to do during a tornado. This information should be made WIDELY available to everyone (and yet it isn't). Some people weren't born in the Midwest. Might be nice if new residents could be educated regarding tornado safety, too.
- People without access to a storm shelter. There needs to be a way for people to identify public shelters and those are publicized.
- Permeable sustainable infrastructure. Getting water where it needs to go considering both upstream and downstream users. Cost effective watershed management including combined sewer overflow.
- Please consider how Low income and/or elderly people that have few resources to evacuate or shelter in place.
- The utility/infrastructure system needs to be updated to reduce vulnerability from human and natural interruptions/destruction.
- We just need to realize where we can and can't build homes that will be impacted down the road. We have houses being built in the 500 year flood plans and we have had numerous floods.

## **Leavenworth County**

- Keep the public involvement a priority
- Additional public included emergency exercises. Do one downtown with hundreds of participants to help prepare the community
- Communication is vital in our rural area.



- community participation, education, apathy
- Consider what personnel have overlapping duties between agencies or immediate family members involved in emergency response - could an out of town death have an entire family unavailable for response?
- Cyber attacks
- Due to the location of Leavenworth, evaluation of resources, companies and travel if an event were to impact a major area, how would these services reach the community if a bridge were impacted or railway was offline.
- Eastern Kansas is a major rail hub for the US. Does coordination with the railroads occur to mitigate damage as a result of natural or man-made disasters? What mitigation measures are underway to account for climate change? Fewer, but more severe storms are already being observed. Drinking water supply and security is a concern.
- Embed local weather updates in municipality websites.
- Expand tornado warnings through social media.
- Flash Flooding is underrated as a threat to our Community
- Flooding in Basehor is limited due to geographic advantages. High winds or the tornado threat are an occasional threat.
- flooding This is caused by the bridges that come into are town it was not engineered right it should have been one bride not two. I think this is the big problem to are town flooding problem.
- Food and water emergency distribution plan.
- I believe that the above has covered all issues
- I believe they do a great job. I'm sure there are numerous issues the general public are not even aware of, including myself. I know that electrical service is restored ASAP and emergency services handle an enormous burden at those times and thank God for them.
- I feel we are unprepared for emergencies, both natural and man-made. Historically, our local governing bodies and emergency response departments have built metaphorical "walls" instead of "bridges" throughout the county. We must all work together toward a common goal that is in the public's best interest. Our law enforcement, fire, and EMS agencies are struggling to recruit and retain qualified personnel. Many of our agencies have less-than-spectacular reputations with our KC Metro-area peers and we are often referred to as "training departments," meaning our employees only stay long enough to get a job at higher-paying departments in the KC metro area. Many fire departments are still reliant on volunteers, who in some cases aren't available or interested in acquiring basic certifications and training.
- Information technology infrastructure
- Interoperability and resource outreach
- It's Kansas, we never know what we will have happen here, better to be prepared for it then regret it later. I just think they should look into doing the most they can to help prepare our community. Weather has gotten even more unpredictable lately.
- Keep us informed
- Maybe more attention on providing safe drinking water in relation to a potential biochemical attack.
- More aid to the lower-class municipalities for mitigation actions
- None let them do their job
- Please do not waste taxpayer money.





- Think about earthquakes
- Tornado sirens 2009 Tornado hit my house with NO warning. Since then nothing has been added. When they test you can't hear them. Also, Hemphill Road has turned into a cross road since the I-70 interchange was built. Need to pave Hemphill rd.
- Tornado sirens. There are no audible sirens in the northern part of the county that can be heard in case of emergency
- Water lines located within LV county are not sufficient and need updating. Attempting to build in the county is a nightmare as the current infrastructure cannot handle additional facilities. This needs updating before costs get out of control.
- Weather threat to safe aircraft passage in/out of KCI and over the county.
- Well labeled evacuation routes (for floods, fire)
- what about other hazards such as prison or prisoner-related events or active-shooters? Preparedness activities for health care providers?
- Wide spread uncontrolled fire event.

### **Wyandotte County**

No responses.

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

### **Johnson County**

- 1)Acquisition of property in flood prone area. 2) Do not allow building of residential or commercial property in flood prone areas.
- A move to underground infrastructure.
- Additional public education
- Being a water sensitive city or identifying the integrative path which may consider identifying becoming a water sensitive city within 20-50 years. Implementing commercial (inviting new businesses in) planning with green initiative to reward businesses for taking a part in the urban water management to slow down the runoff from their paved properties, building's roof tops, etc. and reducing the impact to the combined sewer overload.
- City of De Soto depends on sewer pump stations in a disaster we will need emergency power for up to seven pump stations to prevent sewer backups.
- Continue SMAC funding within Johnson County
- Flooding seems to be a critical problem in our area. Development decisions and decisions related to our transportation infrastructure do not seem to be including design guidelines to prevent flooding. The new development that is taking place and the expansion of the highways and other roadways seems to be adding more and more impervious surface in Johnson County - and then we are surprised that placed like 103rd and State Line flood.
- Indian creek flood plain planning. Ensure storm sewers can handle heavy rains and that creek overflow doesn't back up into nearby homes
- More flood mitigation projects.
- More green space in flood prone areas



- More native grassland to absorb floodwaters in all JoCo watersheds.
- Perhaps adding additional "natural" wetlands or habitats for flood control vs. a grass pit or concrete storm sewers.
- RE: Our utility systems -- It makes sense to me to find ways to make these systems more self-contained and more robust. Every home should have solar and wind power. Furnaces and water heaters should be electric with battery backups. Etc.
- Two issues that come to mind: (1) consideration of storm drainage from highways DURING MAINTENANCE AND UPGRADES (lanes are often rerouted, temporary jersey barriers installed, etc. without sufficient regard to what impact the temporary changes will have on storm water drainage such that temporary flooding of areas not usually flooded can result during high precipitation events) and (2) maintenance of existing storm drainage systems from highways (many water inlet grates become plugged with trash which washes onto them during precipitation events [and some have small trees growing out of them!]) thus causing temporary flooding on highways not usually flooded). These issues can cause sudden hydroplaning and loss of control thus resulting in property damage and potential personal injury.
- What can the region do to reduce environmental impact? Natural hazards are going to happen and we should look at those mitigation tactics too, but can we also look at current practices to ensure we're not contributing to making things worse?
- Wildland risk assessment for JoCo.

## **Leavenworth County**

- Safe rooms in all schools and flood prone property be acquired
- Auto stream gauge on Stranger Creek at Potter in Atchison County. What's happening at Potter will affect Easton in a matter of hours.
- Ensure coms are set up, 2-way battery operated radios as backup. Be aware of local store equipment as forklifts are invaluable in unloading supplies.
- Flooding prevention-work along the Missouri River Banks in some critical areas
- I do not have a mitigation project.
- I would encourage setting the 500-year base flood elevation in place of the 100-year. Native American communities in the Southwest built their pueblos outside of the floodplain because they grew tired of repeatedly losing everything. They learned the consequences of building in the floodplain.
- Improve 3-Mile Creek drainage basin to prevent flooding from Shawnee Street upstream to 20th Street
- More buried power lines
- No. I appreciate the work that Emergency Management does. The responses I have seen to crises has been excellent.
- Paved North/South roads West of Stranger Creek for access during flooding.
- Please push for adequate funding through grants and department consolidations, requirements for training/certifications/credentialing, and unity across governing bodies and emergency response departments. Thank you for seeking feedback from the community.
- Road repair, there are still lots of pot-holes that are deep.
- Safe room for new construction, Leavenworth Public Schools



- Safe shelters
- Stranger Creek flood control.
- The natural gas pipeline in Kickapoo township- perhaps residents need a greater awareness?
- Tornado sirens, Improve gravel roads near I-70 interchange.
- Yes. Backup 911 center

## Wyandotte County

No responses.

## 2.7 – Planning Meetings

Within Kansas Region L 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 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 2.5: HMP Planning Meetings**

Meeting Number	Date	Location
1 (Kickoff)	09/10/2018	Johnson County
	09/17/2018	Leavenworth County
	09/17/2018	Wyandotte County
2 (Mid-Term)	12/05/2108	Johnson County
3 (Final)	02/11/2019	Wyandotte County

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

## 2.8 – Existing Plan Incorporation

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

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

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

## Regional Level Plan Integration

The MARC Regional Coordination Guide (RCG) is an all-hazard, capabilities-based guide designed to address any of the hazards potentially affecting the metro area. The RCG ensures that a series of formal actions are in place to facilitate communication and cooperation between the many agencies and organizations in the region that might be involved in emergency events that require some degree of regional coordination. Participation in the activities described in the RCG is voluntary and the RCG is not intended to be an operational document. The RCG is organized using a Base Guide and 15 Emergency Support Function annexes. The Base Guide provides the overall organizational structure for regional coordination, while the ESF annexes address the regional issues associated with specific emergency functions. The RCG was developed with oversight from the MEMC Plans Subcommittee and support from planning task forces and workgroups comprised of local government officials, response personnel, voluntary agency representatives and members of the private sector. In addition, the regional coordination protocols described in the RCG have been endorsed by the Regional Homeland Security Coordinating Committee RHSCC, which provides oversight and policy guidance for homeland security issues and funding in the metro area.

## Integration Challenges

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





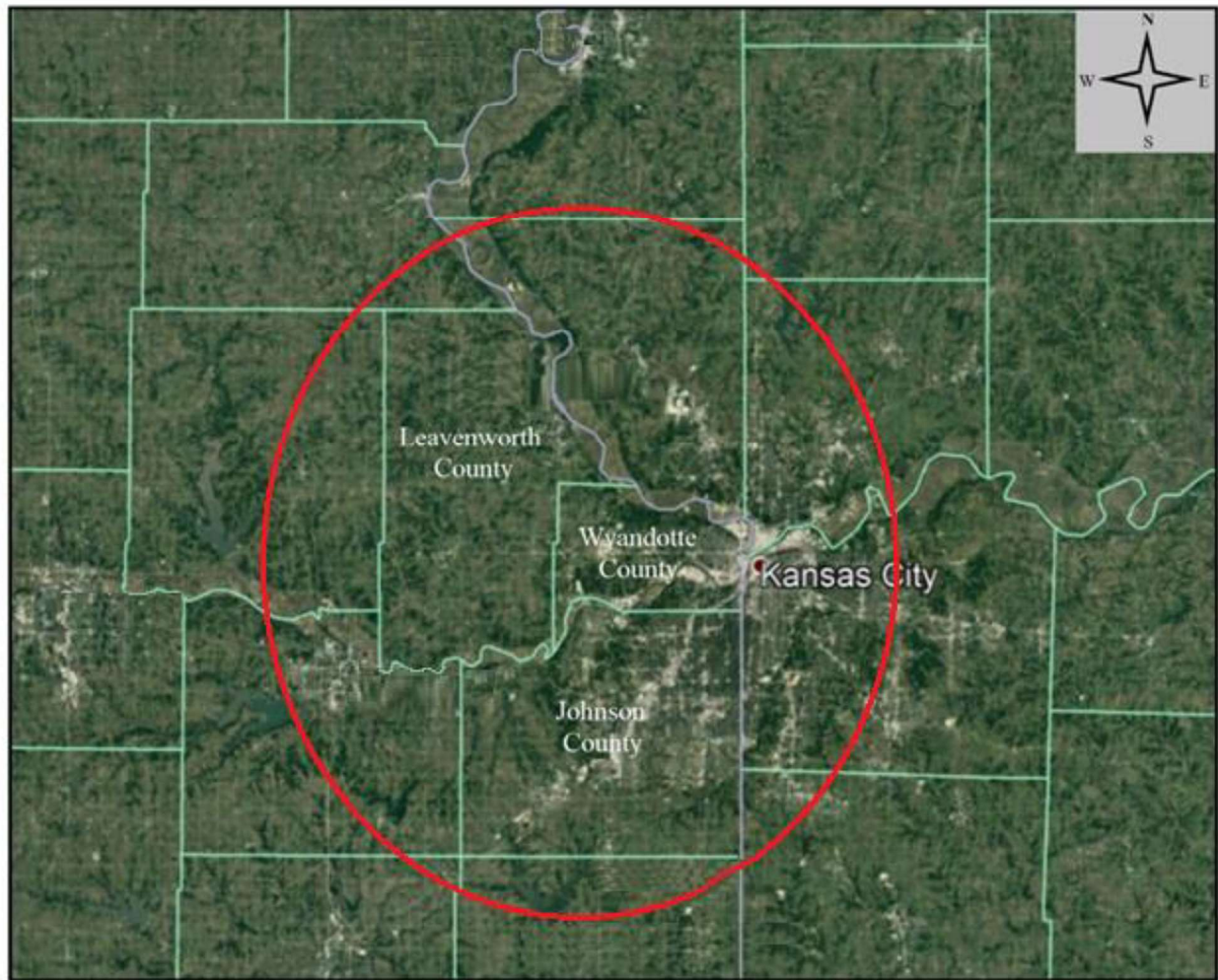
## 3.0 Planning Area

### 3.1 – Introduction

Kansas Region L consists of the following three participating counties and their participating jurisdictions:

- Johnson County
- Leavenworth County
- Wyandotte County

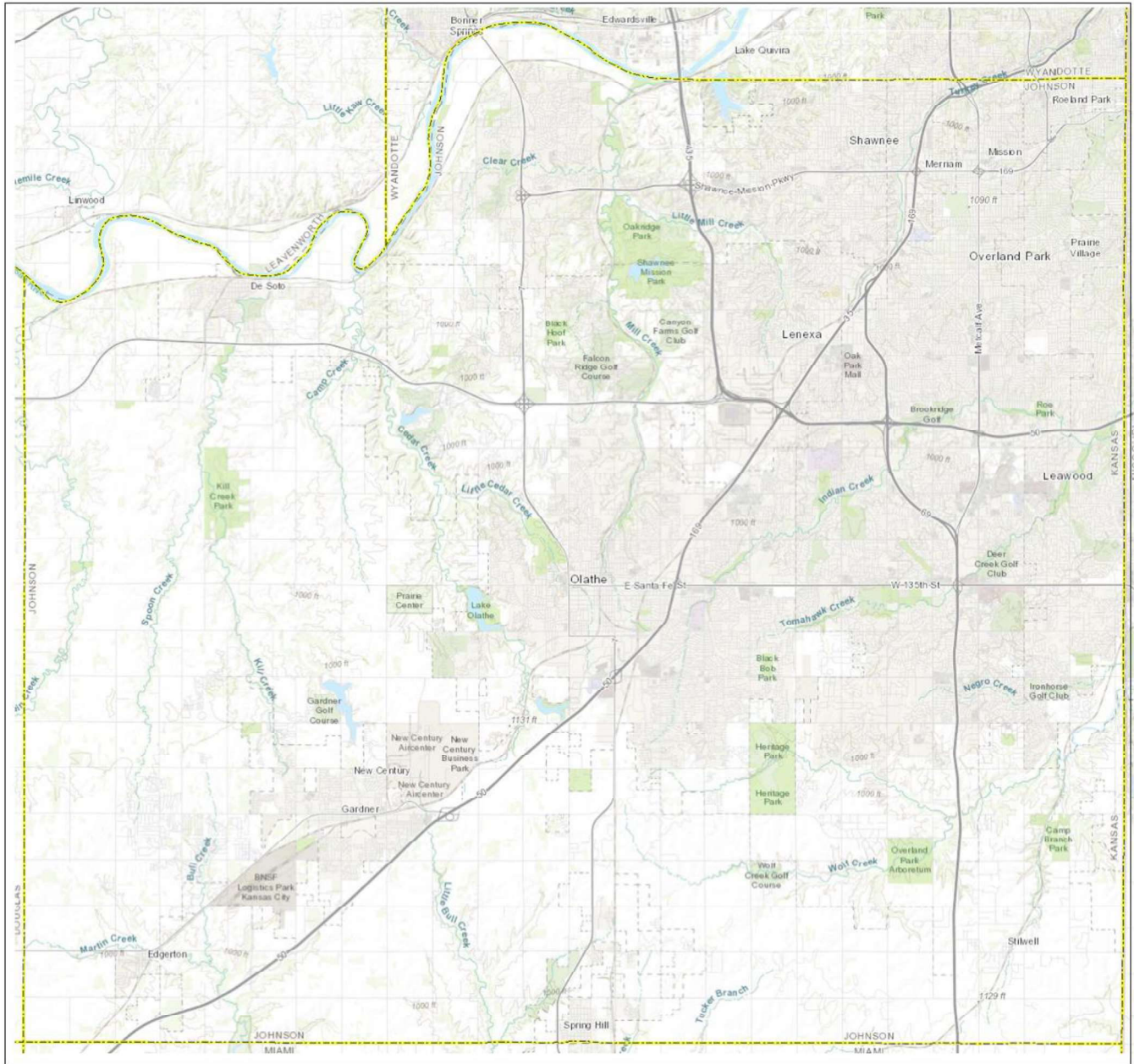
The following map details the locations of these counties.



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



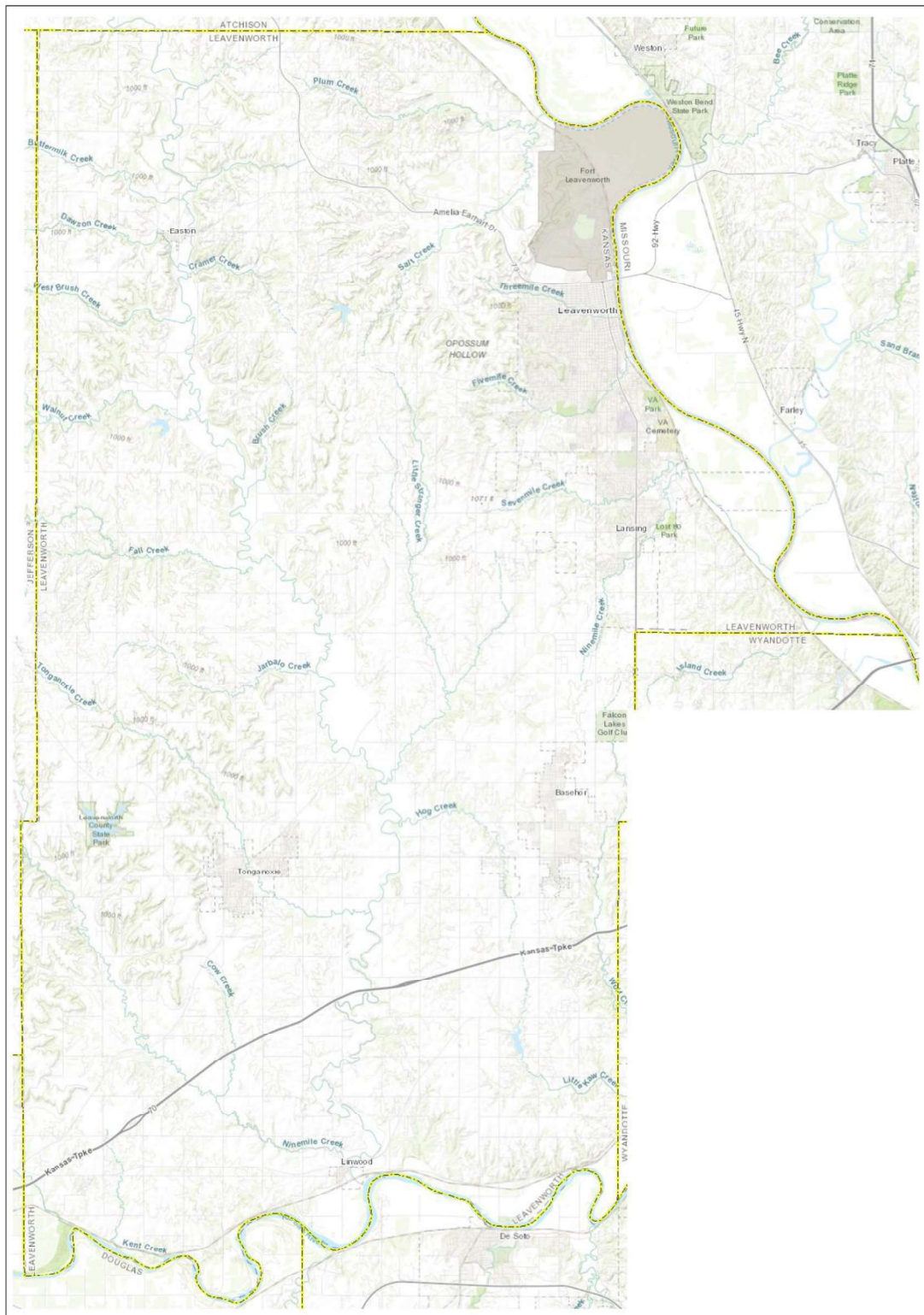
## Map of Johnson County





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

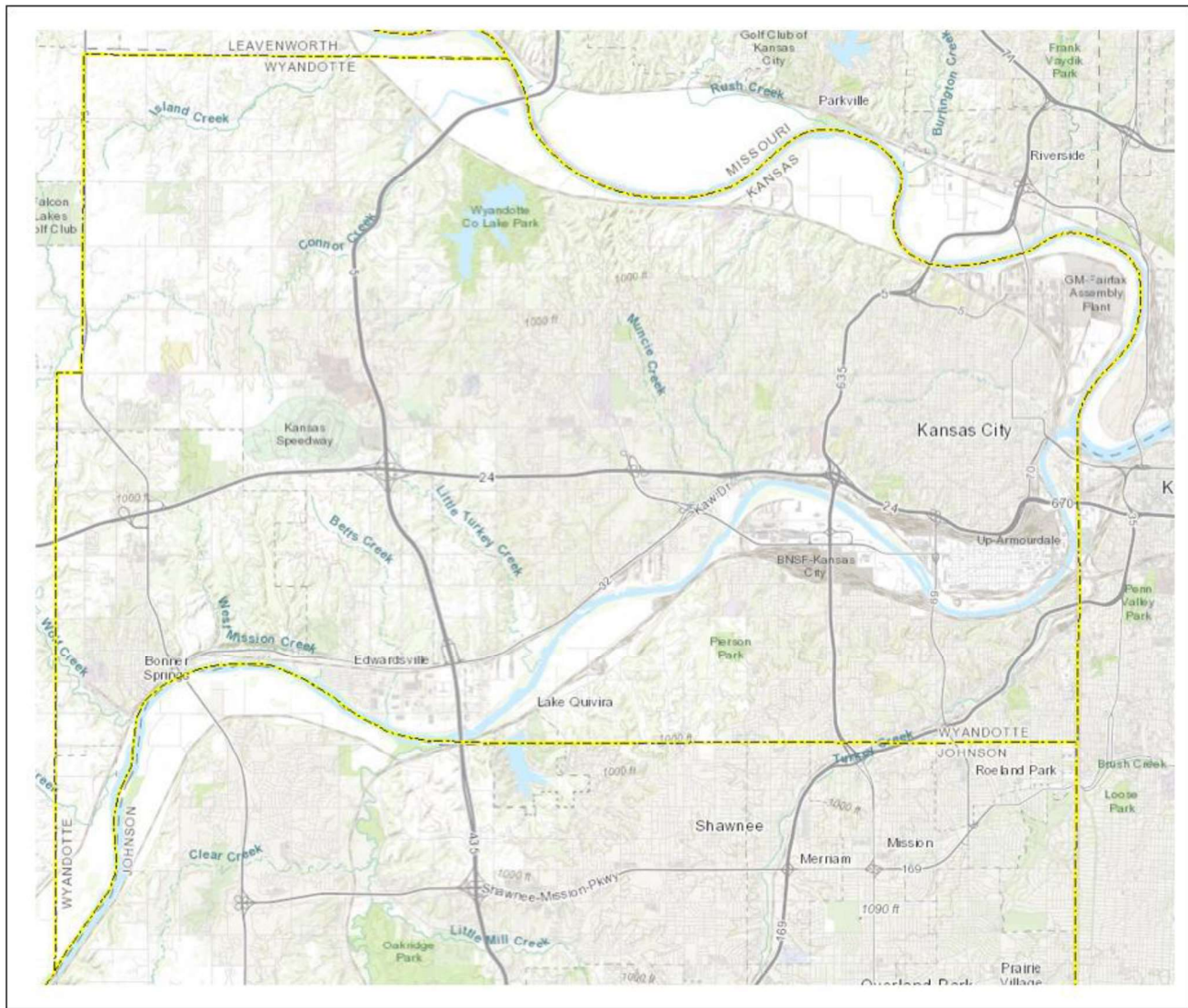
**Map of Leavenworth County**





The map following details the locations of participating jurisdictions for **Wyandotte County**:

**Map of Wyandotte County**



### 3.2 – Regional Population Data

The following tables present population data for counties and participating jurisdictions in Kansas Region L. The higher a jurisdiction’s population the greater the potential vulnerability of its citizens to identified hazards.



**Table 3.1: Johnson County Population Data**

<b>Jurisdiction</b>	<b>Population 2000</b>	<b>Population 2010</b>	<b>Population 2017</b>	<b>Numeric Population Change 2000 - 2017</b>	<b>Percent Population Change 2000 to 2017</b>	<b>Population Density, per Square Mile 2017</b>
<b>Johnson County</b>	<b>451,086</b>	<b>544,179</b>	<b>591,178</b>	<b>140,092</b>	<b>31.06%</b>	<b>1,232</b>
DeSoto	5,732	5,720	6,107	375	6.54%	545
Edgerton	1,440	1,671	1,771	331	22.99%	798
Fairway	3,952	3,882	3,957	5	0.13%	3,441
Gardner	9,396	19,123	21,538	12,142	129.23%	2,118
Lake Quivira	932	906	935	3	0.32%	599
Leawood	27,656	31,867	34,659	7,003	25.32%	2,286
Lenexa	40,238	48,190	53,553	13,315	33.09%	1,555
Merriam	11,008	11,003	11,212	204	1.85%	2,595
Mission	9,727	9,323	9,409	-318	-3.27%	3,511
Mission Hills	3,593	3,498	3,573	-20	-0.56%	1,769
Mission Woods	165	178	195	30	18.18%	1,950
Olathe	92,962	125,872	132,472	39,510	42.50%	2,193
Overland Park	149,080	173,372	191,278	42,198	28.31%	2,538
Prairie Village	22,072	21,447	22,368	296	1.34%	3,602
Roeland Park	6,817	6,731	6,772	-45	-0.66%	4,180
Shawnee	47,996	62,209	65,513	17,517	36.50%	1,529
Spring Hill	2,727	5,437	6,618	3,891	142.68%	768
Westwood	1,533	1,506	1,655	122	7.96%	4,037
Westwood Hills	378	359	395	17	4.50%	5,643

Source: US Census Bureau

Of note for Johnson County and its participating jurisdictions:

- A large population gain was noted in Johnson County, 31% as a whole
- Population gains were noted in 16 of the 19 participating cities
- The cities of Gardner and Spring Hill saw triple digit percentage population growth
- The cities of Edgerton, Leawood, Lenexa, Olathe, Overland Park, and Shawnee saw greater than 20% population growth

**Table 3.2: Leavenworth County Population Data**

<b>Jurisdiction</b>	<b>Population 2000</b>	<b>Population 2010</b>	<b>Population 2017</b>	<b>Numeric Population Change 2000 - 2017</b>	<b>Percent Population Change 2000 to 2017</b>	<b>Population Density, per Square Mile 2017</b>
<b>Leavenworth County</b>	<b>68,691</b>	<b>76,227</b>	<b>81,095</b>	<b>12,404</b>	<b>18.06%</b>	<b>173</b>
Basehor	2,238	4,613	6,015	3,777	168.77%	891
Easton	362	253	260	-102	-28.18%	1,857
Lansing	9,199	11,265	11,947	2,748	29.87%	956
Leavenworth	35,420	35,251	36,210	790	2.23%	1,502
Linwood	374	375	392	18	4.81%	537
Tonganoxie	2,728	4,996	5,444	2,716	99.56%	1,483

Source: US Census Bureau



Of note for Leavenworth County and its participating jurisdictions:

- A large population gain was noted in Leavenworth County, 18% as a whole
- Population gains were noted in five of the six participating cities
- The cities of Basehor and Tonganoxie saw triple digit percentage population growth
- The city of Lansing saw 30% population growth
- Population declines were seen in the city of Easton

**Table 3.3: Wyandotte 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
<b>Wyandotte County</b>	<b>157,882</b>	<b>157,505</b>	<b>165,288</b>	<b>7,406</b>	4.69%	1,060
Bonner Springs	6,768	7,314	7,784	1,016	15.01%	487
Edwardsville	4,146	4,340	4,498	352	8.49%	481
Kansas City	146,968	145,851	153,006	6,039	0.96%	1,195

Source: US Census Bureau

Of note for Wyandotte County and its participating jurisdictions:

- A population gain was noted in Wyandotte County, 5% as a whole
- Population gains were noted in all participating cities
- The city of Bonner Springs saw double digit percentage population growth

### 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 L jurisdiction, by county. The higher a jurisdiction's at-risk population the greater the potential vulnerability of its at-risk citizens to identified hazards.



**Table 3.4: Johnson County Potentially Vulnerable Population Data**

<b>Jurisdiction</b>	<b>Percentage of Population 5 and Under (2017)</b>	<b>Percentage of Population 85+ (2017)</b>	<b>Percentage of Population Speaking Language Other Than English (2017)</b>	<b>Percentage of Population Living Below Poverty Level (2017)</b>
<b>Johnson County</b>	<b>6.7%</b>	<b>1.9%</b>	<b>10.0%</b>	<b>6.0%</b>
DeSoto	9.9%	0.7%	12.2%	18.5%
Edgerton	9.9%	0.9%	1.1%	10.7%
Fairway	8.1%	2.6%	5.0%	2.1%
Gardner	11.8%	0.7%	5.4%	4.4%
Lake Quivira	2.5%	1.0%	1.7%	1.0%
Leawood	5.4%	2.1%	6.0%	2.6%
Lenexa	6.6%	2.6%	8.7%	6.0%
Merriam	4.7%	2.2%	8.1%	8.3%
Mission	5.3%	1.6%	6.9%	7.6%
Mission Hills	5.0%	2.2%	2.9%	2.0%
Mission Woods	6.5%	0.0%	5.6%	6.0%
Olathe	7.6%	1.2%	13.8%	6.8%
Overland Park	6.0%	2.3%	12.1%	5.9%
Prairie Village	6.9%	3.0%	3.3%	4.2%
Roeland Park	8.2%	1.7%	10.3%	6.8%
Shawnee	6.4%	1.5%	7.2%	7.4%
Spring Hill	8.3%	2.5%	1.2%	5.2%
Westwood	6.8%	1.8%	5.8%	1.2%
Westwood Hills	6.8%	1.4%	9.4%	4.6%

Source: US Census Bureau

Of note for Johnson County and its participating jurisdictions:

- Population gains in children under five years of age were noted, from 33,641 to 39,609, a 17.7% increase
- Population gains in adults over 85 years of age were noted, from 5,895 to 11,232, a 90.5% increase
- Population gains were noted for person speaking a language other than English, from 34,221 to 59,118, a 72.8% increase
- A gain was noted in the number of people living below the poverty line, from 15,323 to 35,471, a 131.5% increase

**Table 3.5: Leavenworth County Potentially Vulnerable Population Data**

<b>Jurisdiction</b>	<b>Percentage of Population 5 and Under (2017)</b>	<b>Percentage of Population 85+ (2017)</b>	<b>Percentage of Population Speaking Language Other Than English (2017)</b>	<b>Percentage of Population Living Below Poverty Level (2017)</b>
<b>Leavenworth County</b>	<b>6.4%</b>	<b>1.2%</b>	<b>5.0%</b>	<b>9.9%</b>
Basehor	5.8%	0.3%	3.0%	4.6%
Easton	1.4%	8.1%	3.8%	25.7%
Lansing	3.7%	0.9%	6.4%	7.7%
Leavenworth	8.3%	1.1%	6.5%	14.9%



**Table 3.5: Leavenworth County Potentially Vulnerable Population Data**

<b>Jurisdiction</b>	<b>Percentage of Population 5 and Under (2017)</b>	<b>Percentage of Population 85+ (2017)</b>	<b>Percentage of Population Speaking Language Other Than English (2017)</b>	<b>Percentage of Population Living Below Poverty Level (2017)</b>
Linwood	6.9%	1.3%	1.3%	20.7%
Tonganoxie	8.2%	2.5%	3.7%	6.2%

Source: US Census Bureau

Of note for Leavenworth County and its participating jurisdictions:

- Population gains in children under five years of age were noted, from 4,775 to 5,190, an 8.7% increase
- Population gains in adults over 85 years of age were noted, from 810 to 973, a 20.1% increase
- Slight population gains were noted for person speaking a language other than English, from 4,029 to 4,055, a 0.6% increase
- A gain was noted in the number of people living below the poverty line, from 4,128 to 8,028, a 94.5% increase

**Table 3.6: Wyandotte County Potentially Vulnerable Population Data**

<b>Jurisdiction</b>	<b>Percentage of Population 5 and Under (2017)</b>	<b>Percentage of Population 85+ (2017)</b>	<b>Percentage of Population Speaking Language Other Than English (2017)</b>	<b>Percentage of Population Living Below Poverty Level (2017)</b>
<b>Wyandotte County</b>	<b>8.4%</b>	<b>1.5%</b>	<b>23.5%</b>	<b>22.7%</b>
Bonner Springs	8.6%	2.4%	6.8%	9.5%
Edwardsville	7.1%	1.7%	5.1%	11.7%
Kansas City	8.5%	1.5%	28.0%	22.3%

Source: US Census Bureau

Of note for Wyandotte County and its participating jurisdictions:

- Population gains in children under five years of age were noted, from 12,759 to 13,884, an 8.8% increase
- Population gains in adults over 85 years of age were noted, from 2,226 to 2,479, an 11.4% increase
- Population gains were noted for persons speaking a language other than English, from 22,688 to 38,843, a 71.2% increase
- A gain was noted in the number of people living below the poverty line, from 25,773 to 37,520, a 45.6% increase

### 3.4 – Regional Housing Data

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





**Table 3.7: Johnson County Housing Data**

<b>Jurisdiction</b>	<b>Housing Units 2000</b>	<b>Housing Units 2017</b>	<b>Percent Housing Change 2000 - 2017</b>	<b>Housing Density, Per Square Mile, 2017</b>	<b>Percentage Mobile Homes 2017</b>
<b>Johnson County</b>	<b>181,612</b>	<b>233,108</b>	<b>28.4%</b>	<b>479</b>	<b>0.6%</b>
DeSoto	1,730	2,444	41.3%	199	7.2%
Edgerton	500	632	26.4%	295	5.4%
Fairway	1,842	1,799	-2.3%	1,600	0.0%
Gardner	3,533	7,411	109.8%	722	4.4%
Lake Quivira	388	403	3.9%	61	0.8%
Leawood	10,129	12,865	27.0%	822	0.1%
Lenexa	16,378	21,343	30.3%	611	0.1%
Merriam	5,042	5,468	8.4%	1,210	0.0%
Mission	5,329	5,146	-3.4%	2,054	0.5%
Mission Hills	1,318	1,326	0.6%	656	0.0%
Mission Woods	78	84	7.7%	775	0.0%
Olathe	33,343	47,789	43.3%	785	1.0%
Overland Park	62,586	80,324	28.3%	1,019	0.1%
Prairie Village	10,126	10,205	0.8%	1,649	0.1%
Roeland Park	3,115	3,226	3.6%	2,024	0.5%
Shawnee	19,086	24,982	30.9%	596	0.6%
Spring Hill	873	2,016	130.9%	186	0.0%
Westwood	731	772	5.6%	1,797	0.0%
Westwood Hills	173	197	13.9%	2,668	0.0%

Source: US Census Bureau

Of note for Johnson County and its participating jurisdictions:

- Large gains in housing stock were noted for the period 2000 to 2016, with most participating jurisdictions seeing double digit growth

**Table 3.8: Leavenworth County Housing Data**

<b>Jurisdiction</b>	<b>Housing Units 2000</b>	<b>Housing Units 2017</b>	<b>Percent Housing Change 2000 - 2017</b>	<b>Housing Density, Per Square Mile, 2017</b>	<b>Percentage Mobile Homes 2017</b>
<b>Leavenworth County</b>	<b>24,401</b>	<b>29,106</b>	<b>19.3%</b>	<b>62</b>	<b>2.1%</b>
Basehor	848	1,921	126.5%	282	0.0%
Easton	138	111	-19.6%	727	20.7%
Lansing	2,548	3,405	33.6%	272	4.1%
Leavenworth	12,936	13,643	5.5%	569	1.0%
Linwood	374	155	-58.6%	209	3.3%
Tonganoxie	1,032	2,068	100.4%	539	0.7%

Source: US Census Bureau

Of note for Leavenworth County and its participating jurisdictions:

- Large gains in housing stock were noted for the period 2000 to 2016 for the Cities of Basehor, Lansing and Tonganoxie.



**Table 3.9: Wyandotte County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Percent Housing Change 2000 - 2017	Housing Density, Per Square Mile, 2017	Percentage Mobile Homes 2017
<b>Wyandotte County</b>	<b>68,892</b>	<b>67,297</b>	<b>-2.3%</b>	<b>440</b>	<b>2.3%</b>
Bonner Springs	2,753	3,028	10.0%	201	3.8%
Edwardsville	1,651	1,665	0.8%	190	21.2%
Kansas City	61,446	62,847	2.3%	491	1.8%

Source: US Census Bureau

Of note for Wyandotte County and its participating jurisdictions:

- Housing stock remained relatively static for all jurisdictions, with the City of Bonner Springs experiencing the greatest growth.

### 3.5 – Regional Property Valuations

This section quantifies the built environment exposed to potential hazards in Kansas Region L. The following tables provide monetary value of structures, by category and where available, for each county in Kansas Region L. 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-4.0. HAZUS classifies building stock types into numerous categories, including residential, commercial, industrial, agriculture, government, and education. Values associated with each of these categories reflect 2010 valuations, the latest available HAZUS data.

**Table 3.10: Kansas Region L Property Valuations**

County	Residential	Commercial	Industrial	Agriculture	Education	Government
Johnson	\$90,773,843,000	\$24,020,082,000	\$5,789,822,000	\$314,222,000	\$428,280,000	\$1,256,789,000
Leavenworth	\$10,245,715,000	\$1,694,541,000	\$326,902,000	\$74,938,000	\$120,680,000	\$366,724,000
Wyandotte	\$18,318,559,000	\$7,118,770,000	\$2,529,033,000	\$61,974,000	\$192,007,000	\$543,881,000

**Table 3.11: Kansas Region L Total Property Valuations**

County	Total
Johnson	\$124,279,962,000
Leavenworth	\$13,050,342,000
Wyandotte	\$29,708,946,000

### 3.6 – Jurisdictional Property Valuations

This section quantifies the built environment exposed to potential hazards in Kansas Region L for each participating jurisdiction. The following tables provide monetary value of structures, by category and where available, for each participating jurisdiction in Kansas Region L. 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 county Appraiser’s Offices.



**Table 3.12: Johnson County Participating Jurisdiction Property Valuations**

<b>Jurisdiction</b>	<b>2018 Property Valuation</b>
DeSoto	\$498,173,210
Edgerton	\$667,813,980
Fairway	\$575,812,500
Gardner	\$1,494,689,920
Lake Quivara	\$139,265,230
Leawood	\$5,908,685,190
Lenexa	\$7,041,813,390
Merriam	\$1,169,142,760
Mission	\$978,800,750
Mission Hills	\$873,438,140
Mission Woods	\$41,154,390
Olathe	\$13,111,756,270
Overland Park	\$23,668,588,700
Prairie Village	\$2,452,561,280
Roeland Park	\$596,995,820
Shawnee	\$6,043,031,600
Spring Hill	\$150,507,370
Westwood	\$219,229,530
Westwood Hills	452,787,270

Source: County Assessor's Office

Note: Values represent appraised improvement value only

**Table 3.13: Leavenworth County Participating Jurisdiction Property Valuations**

<b>Jurisdiction</b>	<b>2018 Property Valuation</b>
Basehor	\$550,756,690
Easton	\$4,626,910
Lansing	\$662,229,090
City of Leavenworth	\$1,534,977,590
Linwood	\$17,605,830
Tonganoxie	\$339,227,750

Source: Assessor's Office and US Census Bureau

Note: Values represent appraised improvement value only

**Table 3.14: Wyandotte County Participating Jurisdiction Property Valuations**

<b>Jurisdiction</b>	<b>2018 Property Valuation</b>
Kansas City (Wyandotte County)	\$9,241,738,300
Bonner Springs	\$608,335,200
Edwardsville	\$434,952,180

Source: Wyandotte County Assessor's Office

Note: Values represent appraised improvement value only

## 3.7 – Critical Facilities

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





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

Details concerning critical facilities have been deemed as sensitive, and as such their specific information is not contained in the body of this HMP, but rather a restricted view Appendix D. Inquiries concerning critical facilities may submitted to MPC members.

### 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 3.15: Participating USD Information**

School District	Estimated Enrollment (2018)	Number of Office and School Buildings (2018)	Total Insured Valuation of Structures (2018)
<b>Johnson County</b>			
USD #229 – Blue Valley	22,392	46	\$590,559,544
USD #230 – Spring Hill	3,000	13	\$106,659,024
USD 231 – Gardner/Edgerton	5,450	19	-
USD 232 – DeSoto	6,977	22	\$329,674,250
USD 233 – Olathe	29,031	74	-
USD 512 – Shawnee Mission	27,500	60	\$976,700,331
Kansas School for the Deaf	130	-	-
<b>Leavenworth County</b>			
USD #207 – Fort Leavenworth	2,224	9	\$3,270,000
USD #449 – Easton	668	8	\$29,607,000
USD #453 – Leavenworth	3,539	19	\$152,069,653
USD #458 – Basehor-Linwood	2,200	14	\$126,400,000
USD #464 – Tonganoxie	2,000	10	\$70,400,000
USD #469 – Lansing	2,650	16	\$95,372,600
<b>Wyandotte County</b>			
Kansas School for the Deaf and Blind		14	\$90,000,000
USD #202 - Turner	4,197	13	-
USD #203 - Piper	2,476	8	\$85,817,719
USD #204 – Bonner-Edwardsville	2,700	10	\$125,000,000
USD #500 – Kansas City, Kansas	22,519	68	\$690,000,000

Source: Kansas State Department of Education



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

**Table 3.16: Participating College and University Information**

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
<b>Johnson County</b>			
Johnson County Community College	34,000	25	-
University of Kansas Edwards Campus	1,500	3	-
<b>Leavenworth County</b>			
University of St. Mary	1,100	12	\$178,495,000
<b>Wyandotte County</b>			
Kansas City, Kansas Community College	7,200	14	\$213,295,000

Source: Kansas State Department of Education

### 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:

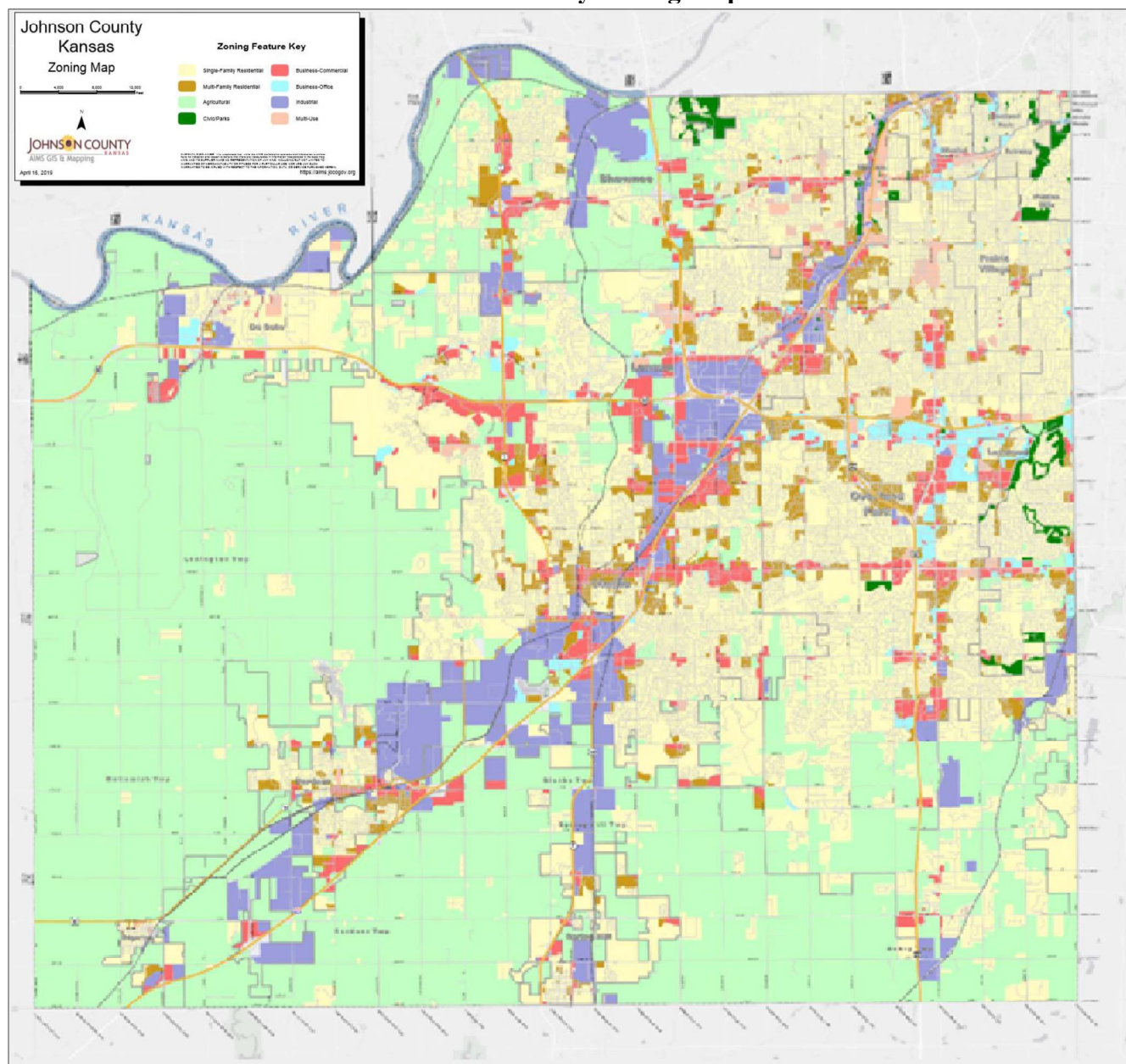
- Unrestricted residential growth which can increase a population's exposure to identified hazard prone areas
- Rapid, unchecked development that can put a strain on a community's vulnerable resources such as its energy infrastructure
- Residential development constructed quickly and inexpensively to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



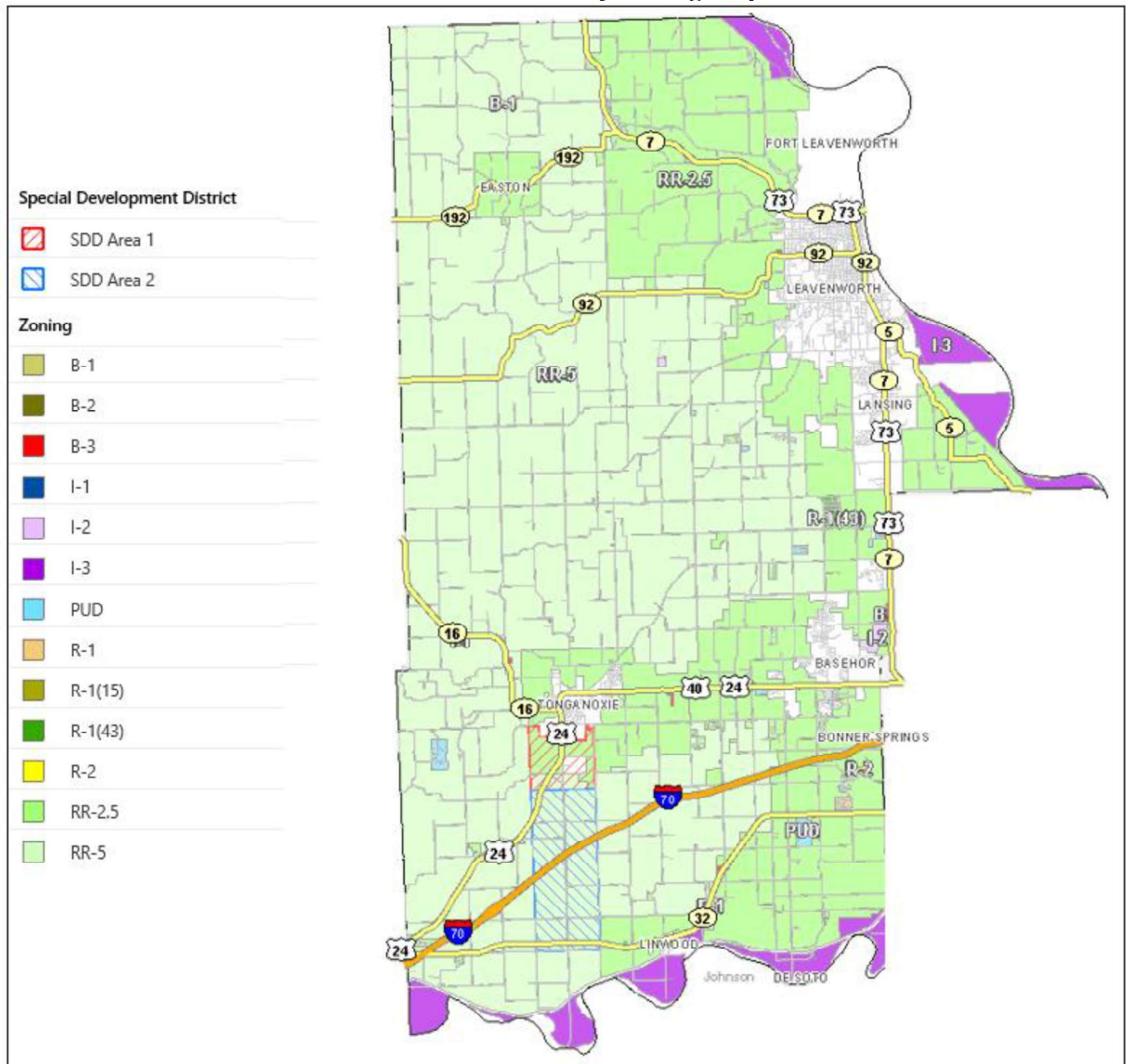
Jurisdictional information on land use regulations is provided in Section 5 – Capability Assessment.

Jurisdictional zoning determines how a landowner can use their land. Zoning restrictions control how property can be developed and what types of activities can occur on that property. The following maps show current zoning conditions for each participating county.

### Johnson County Zoning Map

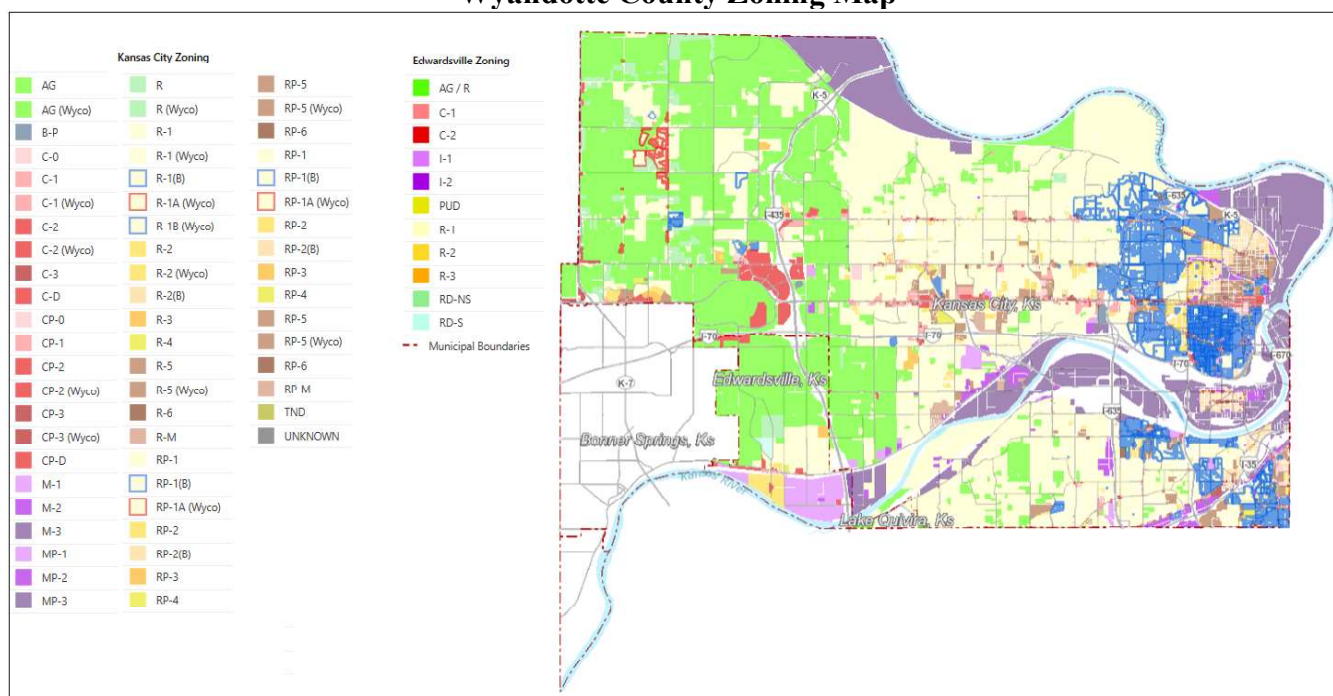


## Leavenworth County Zoning Map





## Wyandotte County Zoning Map

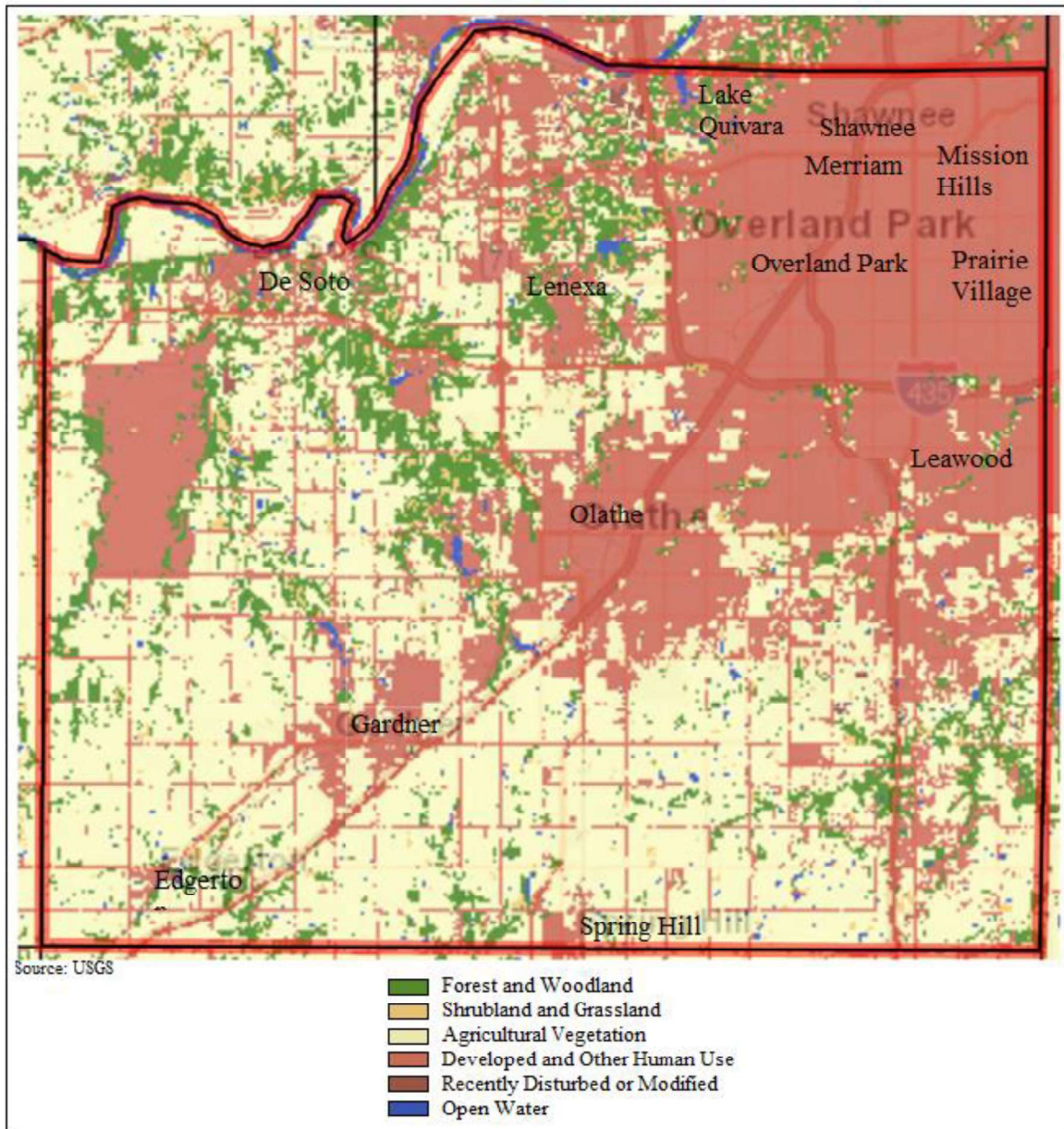


### 3.10 – Regional Land Cover

The following county specific maps from the 2016 USGS land cover map illustrate land usage.

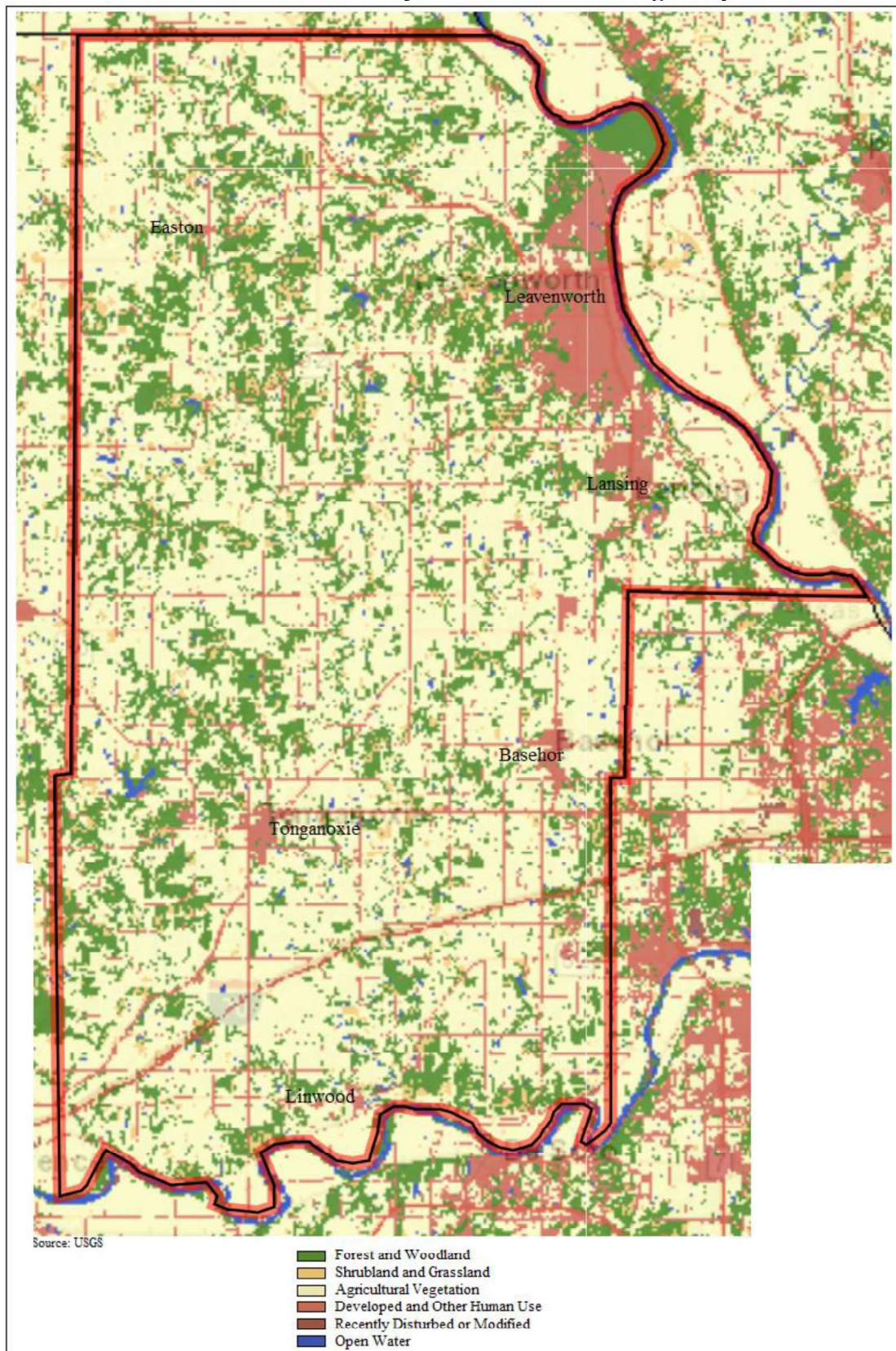


## Johnson County Land Coverage Map



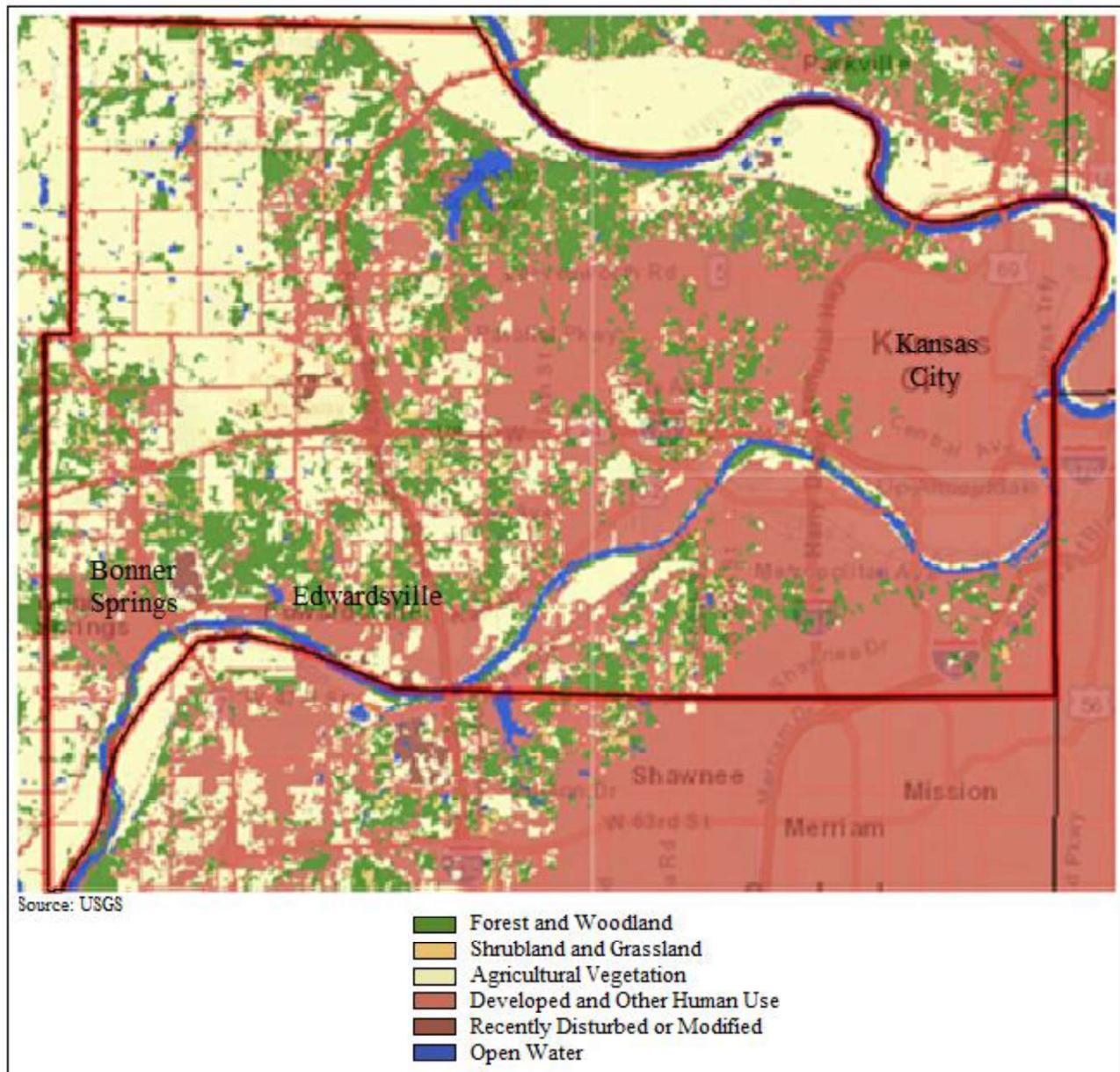


## Leavenworth County NLDC Land Coverage Map





### Wyandotte County NLDC Land Coverage 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 2012 Census of Agriculture (the latest available data) relating to farm totals, agricultural acreage and livestock (cattle, hogs and pigs) for Kansas Region L.





**Table 3.17: Regional Farm Data, 2012 Census of Agriculture**

Jurisdiction	Number of Farms	Farm Acreage	Percent of Acreage as Cropland	Percent of Acreage as Pastureland	Percent of Acreage as Other Uses	Market Value of Products Sold (Yearly)
Johnson	571	99,354	59.6%	30.9%	9.5%	\$24,370,000
Leavenworth	1,133	184,471	55.6%	26.1%	18.3%	\$36,367,000
Wyandotte	164	12,009	61.0%	24.3%	14.7%	3,291,000

Source: United States Department of Agriculture National Agricultural Statistics Service

**Table 3.18: Regional Livestock Data, 2012 Census of Agriculture**

County	Cattle	Hogs and Pigs
Johnson	11,154	-
Leavenworth	21,185	1,516
Wyandotte	1,407	-

Source: United States Department of Agriculture National Agricultural Statistics Service

:- Data not reported due to potential privacy concerns

## 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.

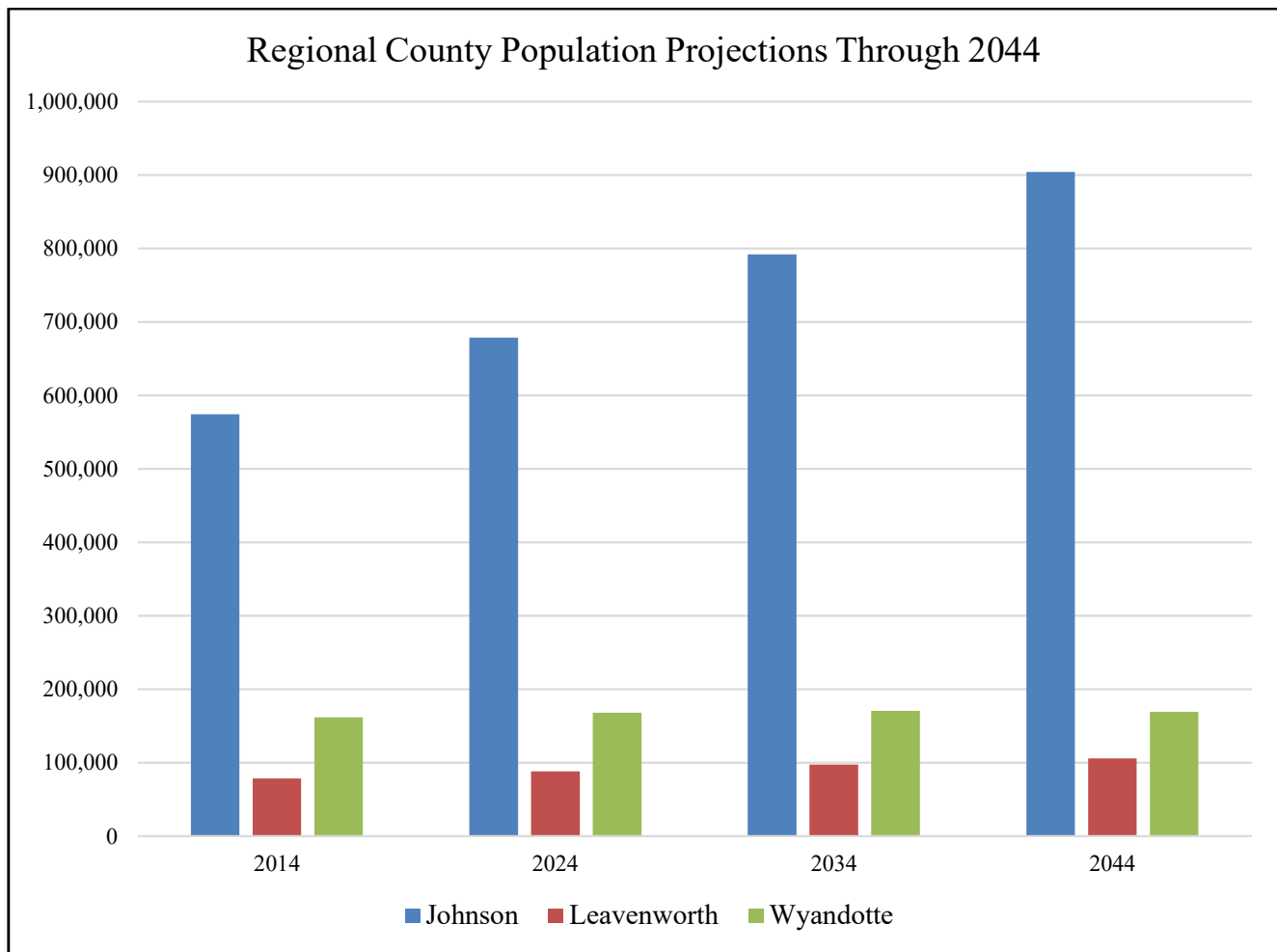
The University of Kansas Institute for Policy and Social Research developed population projections for the region using historical and trend data. Indications are the region will experience a steady increase in the population through the year 2044.

**Table 3.19: Kansas Region L Population Projections Through 2044**

County	2014	2024	2034	2044	Projected Growth Percentage Through 2044
Johnson	574,272	678,449	792,103	904,305	57.5%
Leavenworth	78,797	88,165	97,500	105,844	34.3%
Wyandotte	161,636	168,226	170,521	169,549	4.9%

Source: University of Kansas Institute for Policy and Social Research





Source: University of Kansas Institute for Policy and Social Research

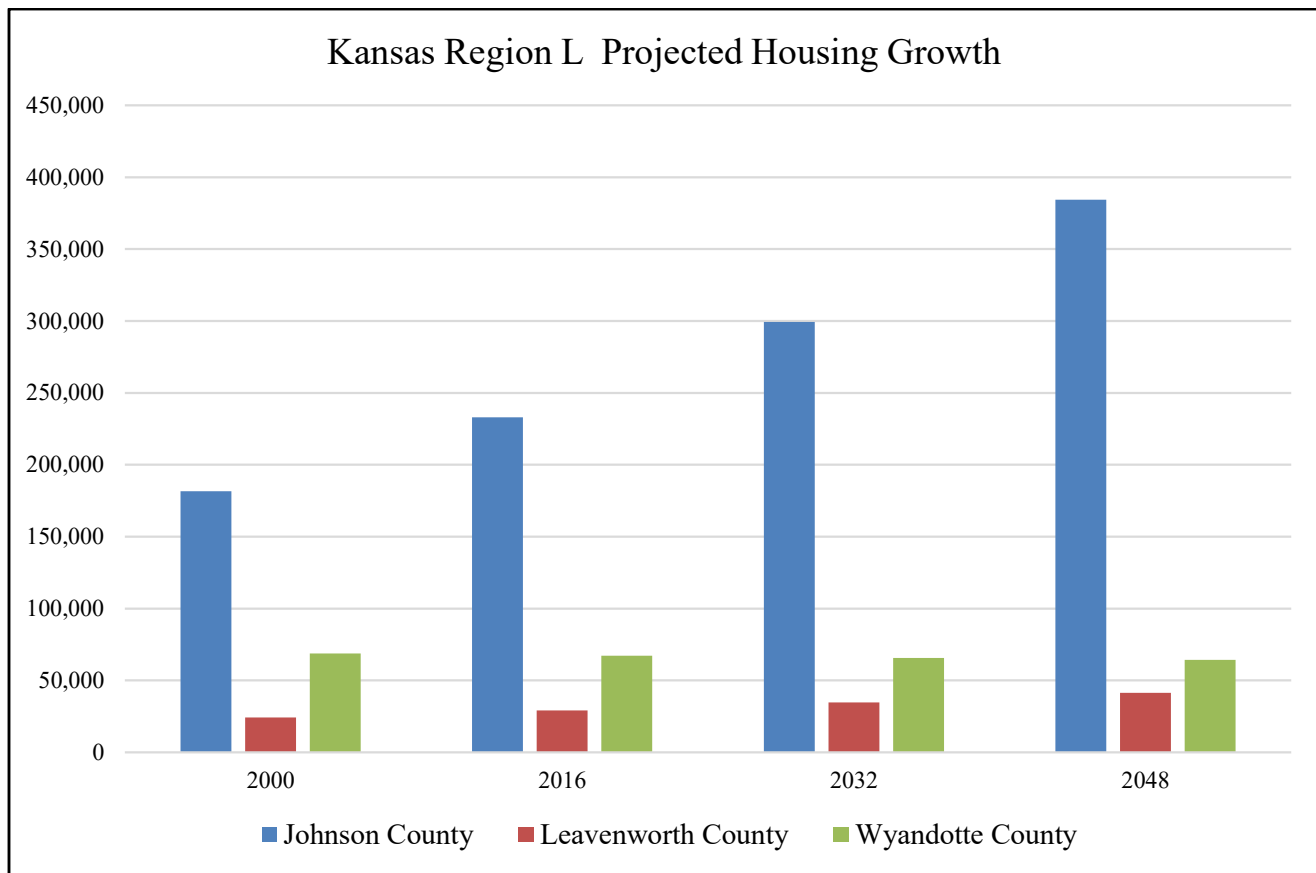
US Census Bureau data was used to develop housing projections for the region using historical and trend data. Indications are the region will experience steady to static growth in housing through the year 2048.

**Table 3.20: Kansas Region L Housing Projections Through 2048**

County	2000	2016	2032	2048	Estimated 16-Year Percentage Growth Rate
Johnson County	181,612	233,108	299,311	384,315	28.40%
Leavenworth County	24,401	29,106	34,723	41,425	19.30%
Wyandotte County	68,892	67,297	65,749	64,237	-2.30%

Source: US Census Bureau





Source: US Census Bureau

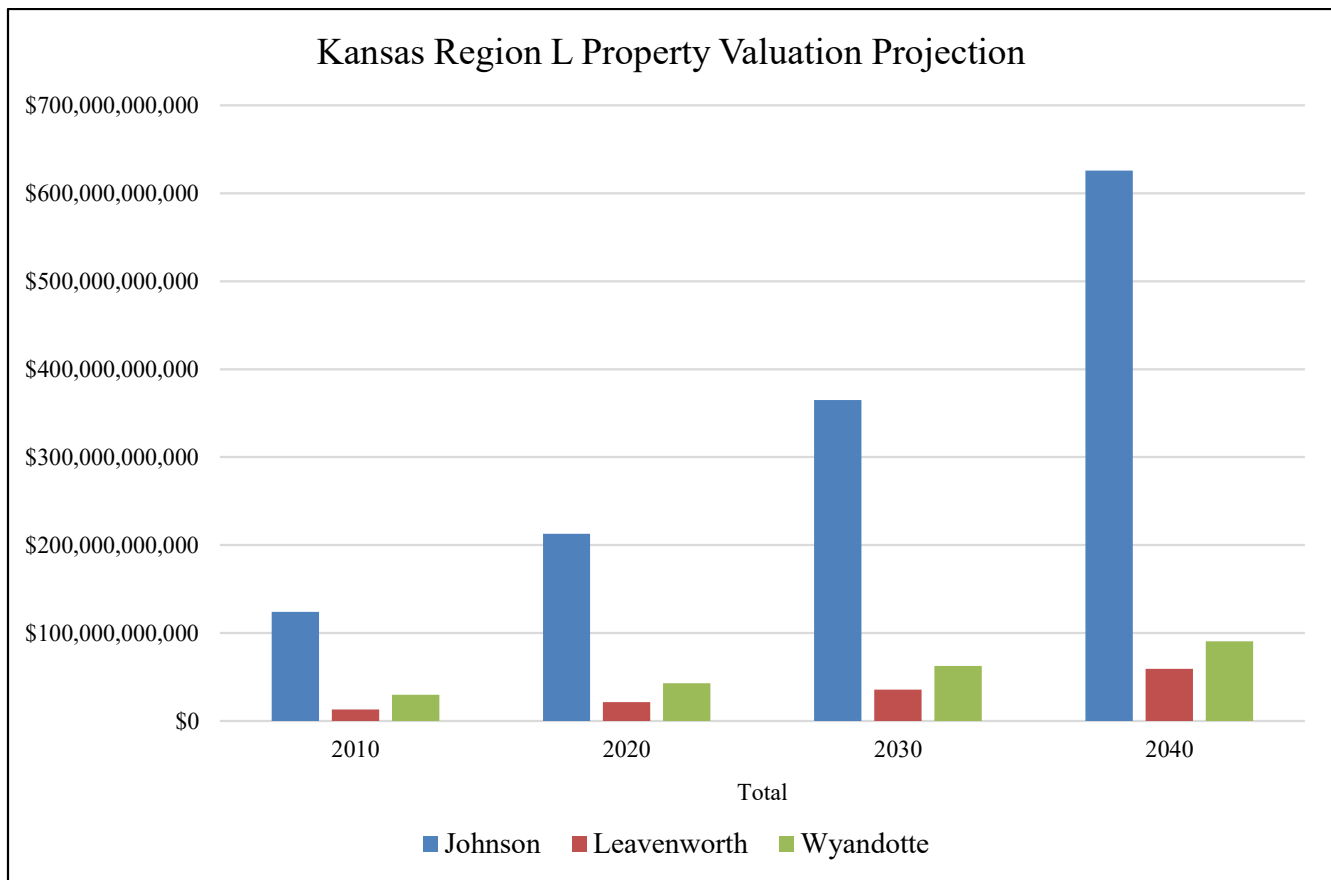
FEMA's loss estimation software HAZUS data was used to develop property valuation projections for the region using historical and trend data. Indications are the region will experience steady growth in the property valuation through the year 2040.

**Table 3.21: Kansas Region L Property Valuation Projections Through 2040**

County	2010	2020	2030	2040	Estimated 10-Year Percentage Growth Rate
Johnson	\$124,279,962,000	\$212,998,632,80	\$365,050,140,413	\$625,645,353,953	57.50%
Leavenworth	\$13,050,342,000	\$21,638,566,959	\$35,878,567,784	\$59,489,689,343	34.30%
Wyandotte	\$29,708,946,000	\$43,080,304,078	\$62,469,823,047	\$90,586,147,774	4.90%

Source: HAZUS





Source: HAZUS

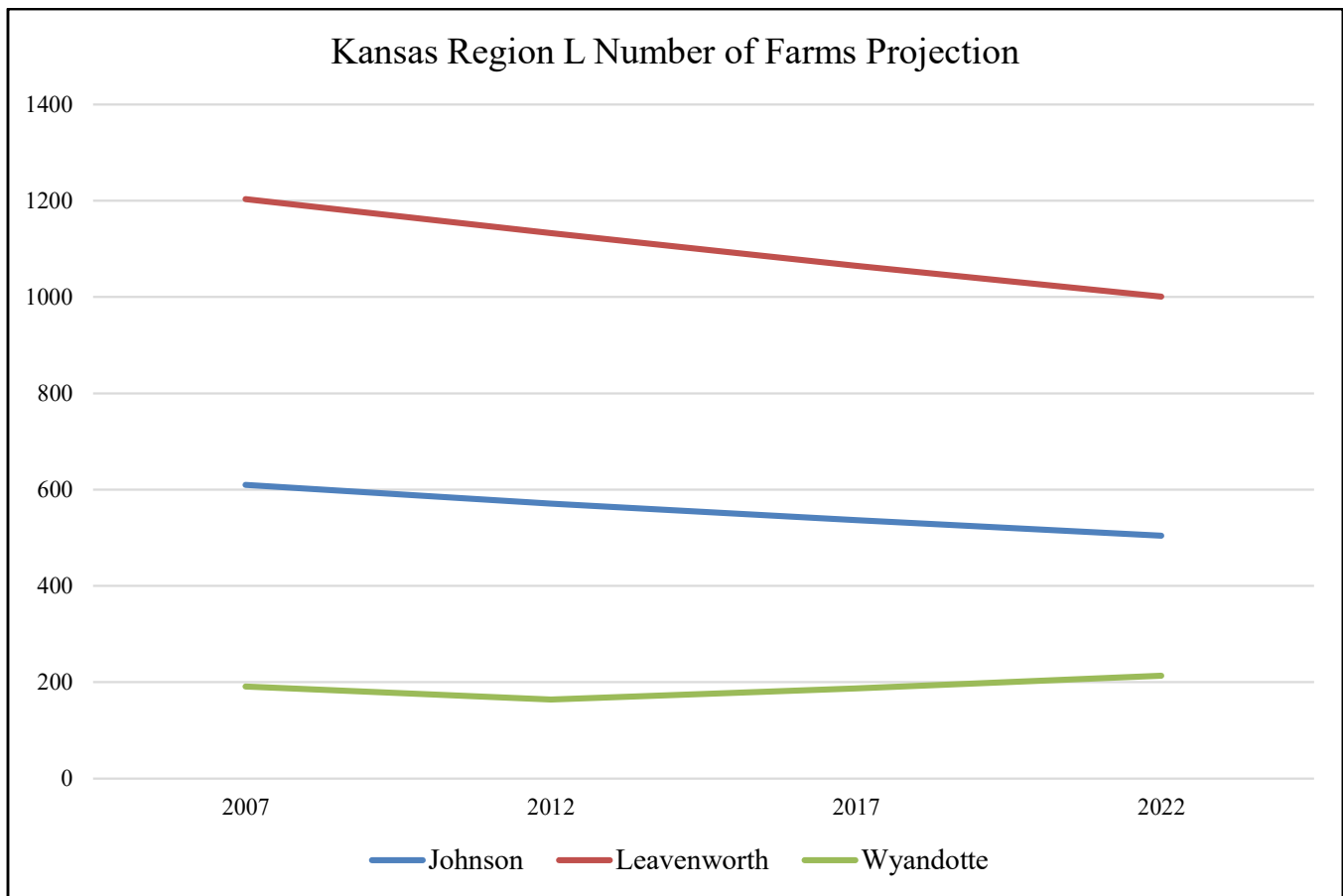
United States Department of Agriculture National Agricultural Statistics Service data was used to develop agricultural projections for the region using historical and trend data. Indications are the region will experience steady decline in the number of farms and the amount of agricultural acreage through the year 2022 (the volatility of the agricultural sector dictates projections beyond this would be not viable).

**Table 3.22: Kansas Region L Farm Data Projections Through 2022**

County	Number of Farms, 2007	Number of Farms, 2012	Number of Farms, 2017	Number of Farms, 2022	Estimated 5-Year Percentage Growth Rate
Johnson	610	571	537	505	-6%
Leavenworth	1,203	1,133	1,065	1,001	-6%
Wyandotte	191	164	187	213	14%

Source: United States Department of Agriculture National Agricultural Statistics Service





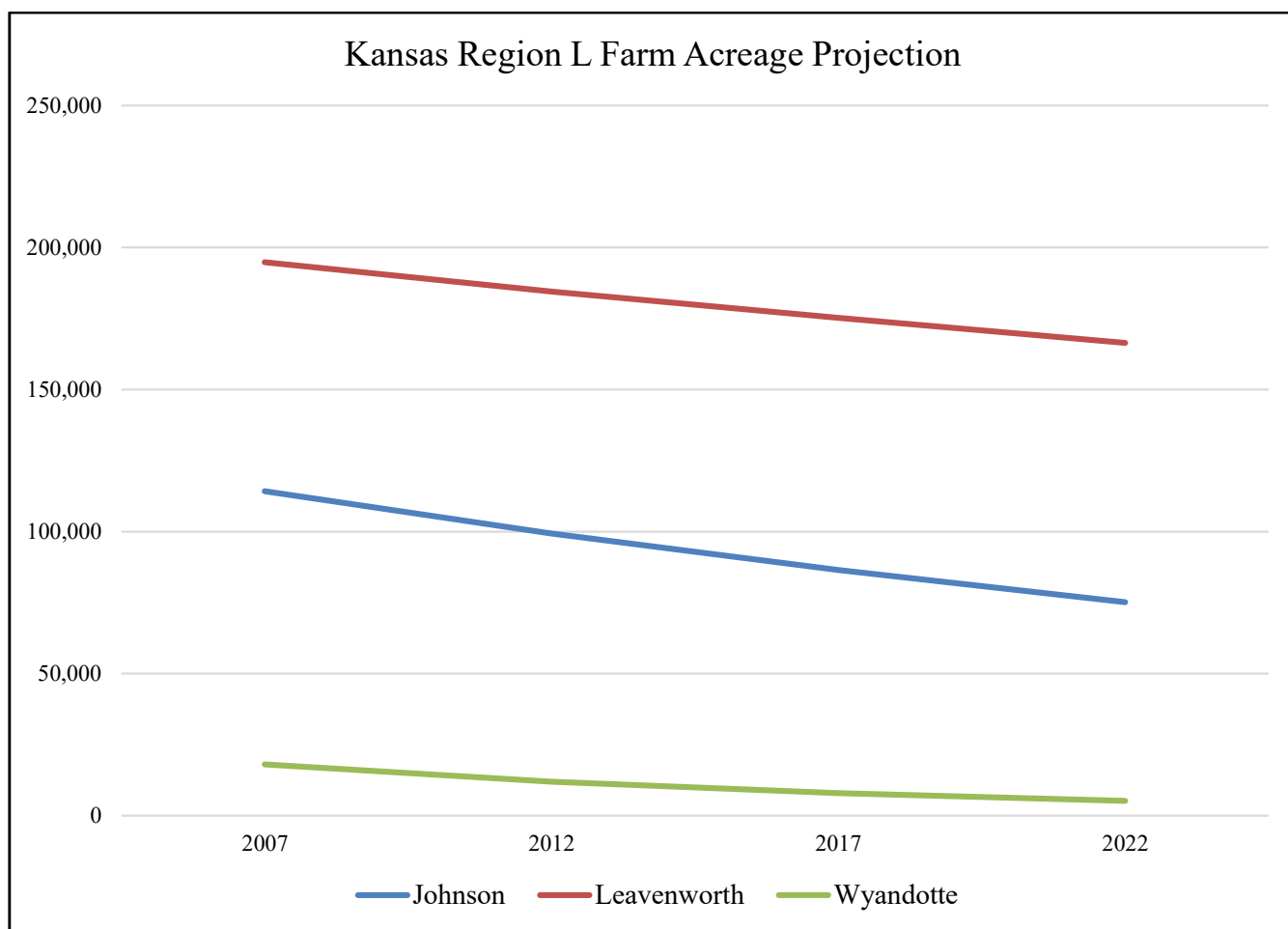
Source: United States Department of Agriculture National Agricultural Statistics Service

**Table 3.23: Kansas Region L Farm Acreage Data Projections, 2002 to 2022**

County	Farm Acreage, 2007	Farm Acreage, 2012	Farm Acreage, 2017	Farm Acreage, 2022	Estimated 5-Year Percentage Growth Rate
Johnson	114,202	99,354	86,438	75,201	-13%
Leavenworth	194,854	184,471	175,247	166,485	-5%
Wyandotte	18,107	12,009	7,926	5,231	-34%

Source: United States Department of Agriculture National Agricultural Statistics Service





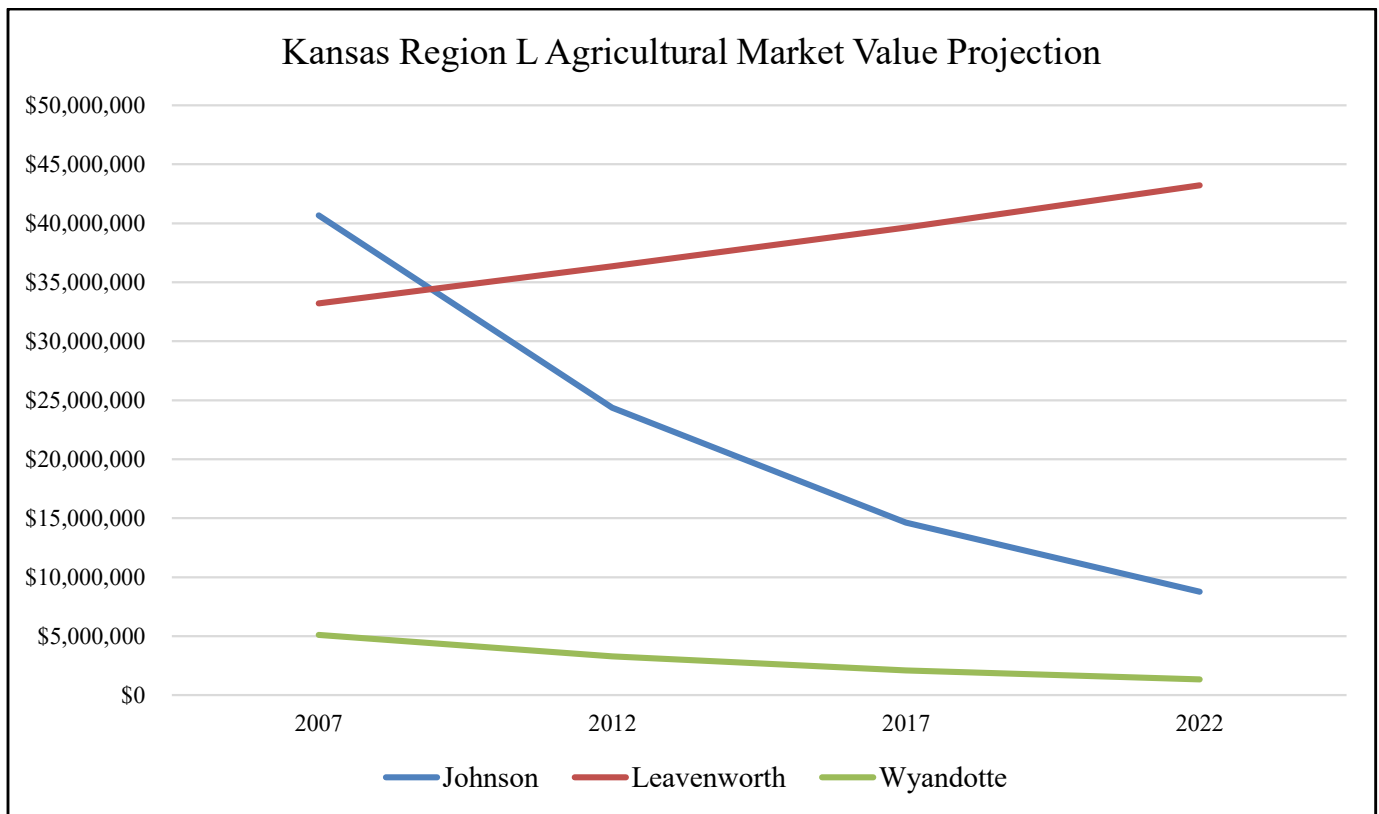
Source: United States Department of Agriculture National Agricultural Statistics Service

**Table 3.24: Kansas Region L Farm Data Projections, 2002 to 2022**

County	Market Value, 2007	Market Value, 2012	Market Value, 2017	Market Value, 2022	Estimated 5-Year Percentage Growth Rate
Johnson	\$40,659,000	\$24,370,000	\$14,622,000	\$8,773,200	-40%
Leavenworth	\$33,219,000	\$36,367,000	\$39,640,030	\$43,207,633	9%
Wyandotte	\$5,112,000	\$3,291,000	\$2,106, 240	\$1,347,994	-36%

Source: United States Department of Agriculture National Agricultural Statistics Service





Source: United States Department of Agriculture National Agricultural Statistics Service

### 3.13 – Participating Jurisdiction Development Trends

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

The following tables present population and housing projection data for participating jurisdictions, by county, in Kansas Region L. The higher a jurisdiction's population and housing growth the greater their hazard vulnerability.

**Table 3.25: Johnson County Participating Jurisdiction Projected Population and Housing Data**

Jurisdiction	Projected Population 2034	Projected Population 2051	Estimated 17-Year Percentage Growth Rate	Projected Housing 2032	Projected Housing 2048	Estimated 16-Year Percentage Growth Rate
DeSoto	6,506	6,932	6.54%	3,453	4,880	41.30%
Edgerton	2,178	2,679	22.99%	799	1,010	26.40%
Fairway	3,962	3,967	0.13%	1,758	1,717	-2.30%
Gardner	49,372	113,174	129.23%	15,548	32,620	109.80%
Leawood	43,435	54,432	25.32%	16,339	20,750	27.00%
Lake Quivira	932	935	0.32%	419	435	3.90%
Lenexa	71,274	94,858	33.09%	27,810	36,236	30.30%



**Table 3.25: Johnson County Participating Jurisdiction Projected Population and Housing Data**

Jurisdiction	Projected Population 2034	Projected Population 2051	Estimated 17-Year Percentage Growth Rate	Projected Housing 2032	Projected Housing 2048	Estimated 16-Year Percentage Growth Rate
Merriam	11,419	11,631	1.85%	5,927	6,425	8.40%
Mission	9,101	8,804	-3.27%	4,971	4,802	-3.40%
Mission Hills	3,553	3,533	-0.56%	1,334	1,342	0.60%
Mission Woods	230	272	18.18%	90	97	7.70%
Olathe	188,773	269,001	42.50%	68,482	98,134	43.30%
Overland Park	245,429	314,910	28.31%	103,056	132,220	28.30%
Prairie Village	22,668	22,971	1.34%	10,287	10,369	0.80%
Roeland Park	6,727	6,683	-0.66%	3,342	3,462	3.60%
Shawnee	89,425	122,065	36.50%	32,701	42,806	30.90%
Spring Hill	16,061	38,976	142.68%	4,655	10,748	130.90%
Westwood	1,787	1,929	7.96%	815	861	5.60%
Westwood Hills	413	431	4.50%	224	256	13.90%

Source: US Census Bureau

**Table 3.26: Leavenworth County Participating Jurisdiction Projected Population and Housing Data**

Jurisdiction	Projected Population 2034	Projected Population 2051	Estimated 17-Year Percentage Growth Rate	Projected Housing 2032	Projected Housing 2048	Estimated 16-Year Percentage Growth Rate
Basehor	16,167	43,451	168.77%	4,351	9,855	126.50%
Easton	187	134	-28.18%	89	72	-19.60%
Lansing	15,516	20,150	29.87%	4,549	6,078	33.60%
Leavenworth	37,017	37,843	2.23%	14,393	15,185	5.50%
Linwood	411	431	4.81%	64	27	-58.60%
Tonganoxie	10,864	21,680	99.56%	4,144	8,305	100.40%

Source: US Census Bureau

**Table 3.27: Wyandotte County Participating Jurisdiction Projected Population and Housing Data**

Jurisdiction	Projected Population 2034	Projected Population 2051	Estimated 17-Year Percentage Growth Rate	Projected Housing 2032	Projected Housing 2048	Estimated 16-Year Percentage Growth Rate
Bonner Springs	6,768	7,784	15.01%	3,331	3,664	10.00%
Edwardsville	4,146	4,498	8.49%	1,678	1,692	0.80%

Source: US Census Bureau

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 increase in population 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 population change itself.

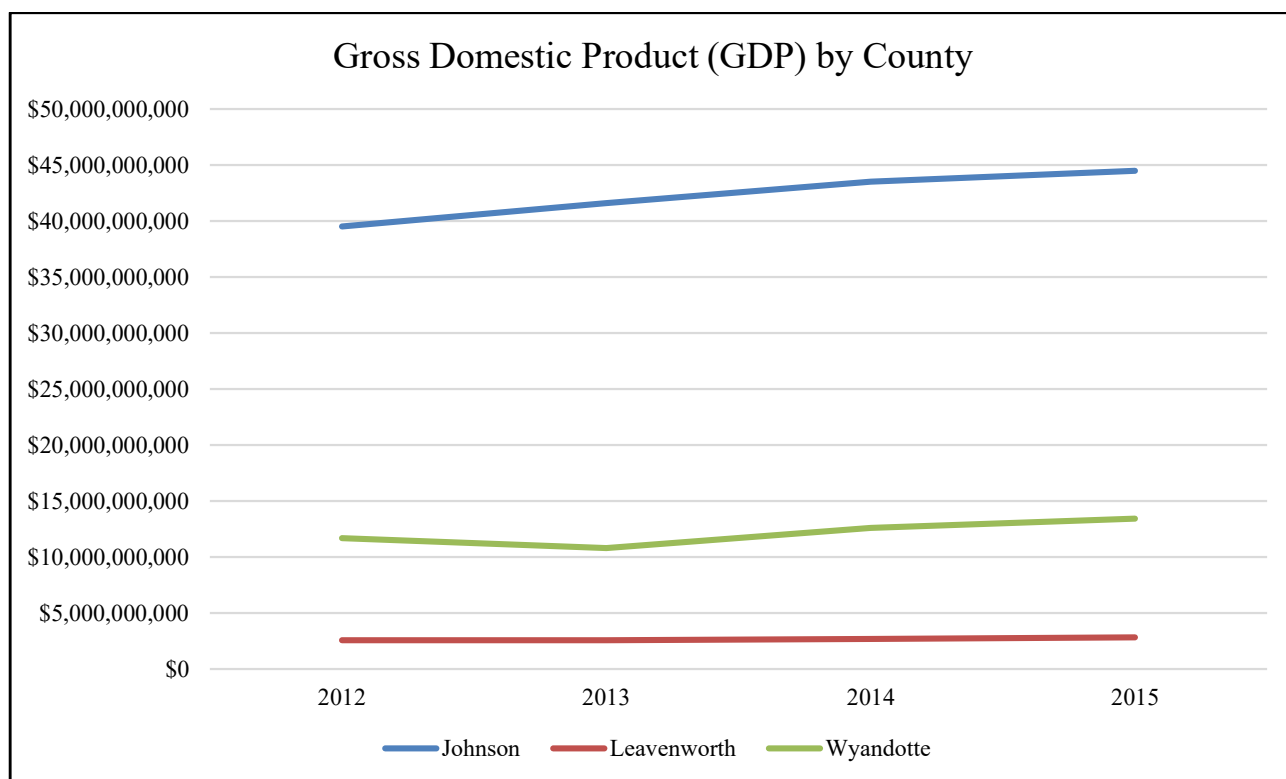
For hazards that affect the entire planning area, the predicted increase in structures will tend to increase potential vulnerability. It is difficult to quantify the exact change in vulnerability, but it can be depicted as generally directly proportional to the change in the number of structures.

As indicated in the data above, the majority of Kansas Region L participating jurisdiction have seen a decrease in farm acreage and, with the exception of Leavenworth County, a decrease in the market value of produced agricultural goods. These continuing agricultural declines could result in decreased exposure to both natural and man-made hazards.

### 3.14 – Regional Economic Activity Patterns

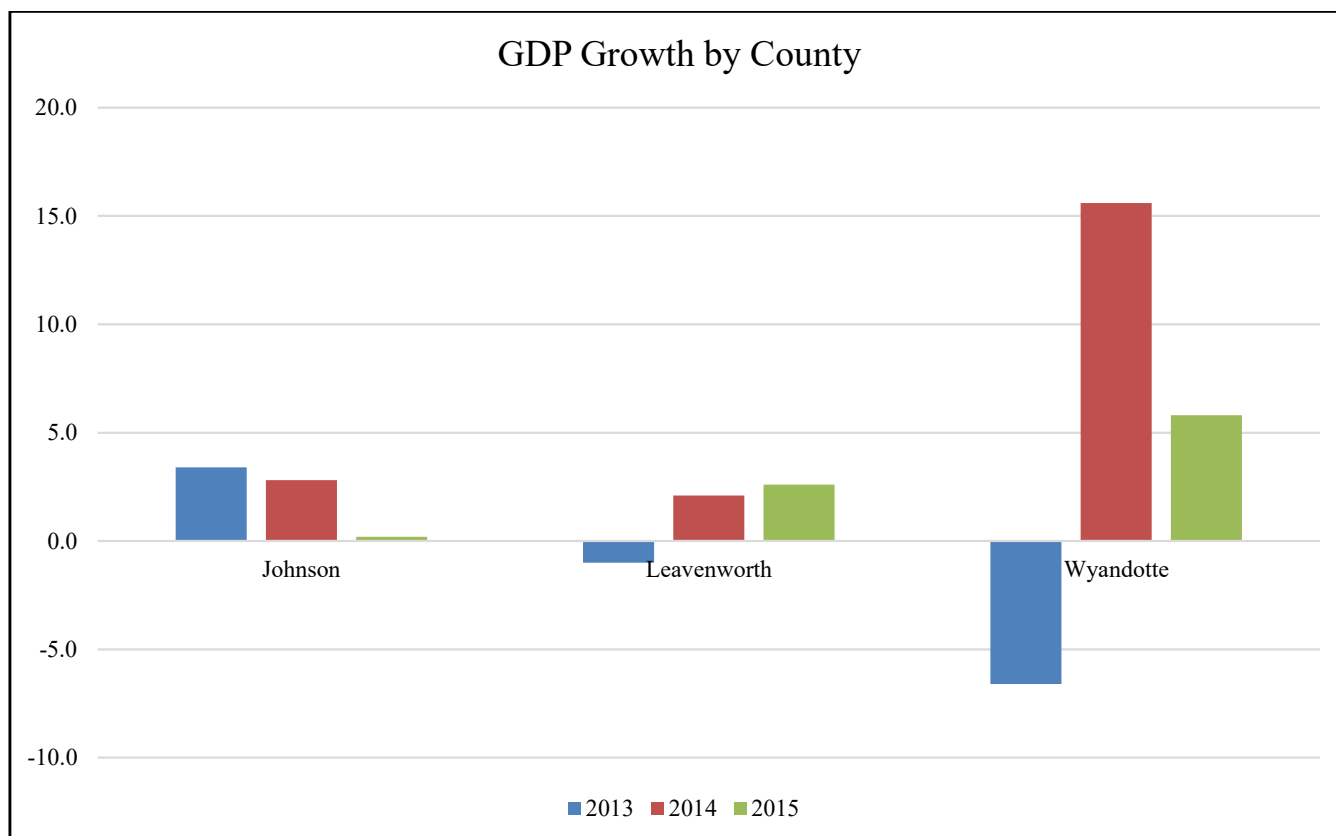
Kansas Region L’s continued economic growth can impact future vulnerability in two ways, by location-based growth in identified hazard prone areas or by the industry type itself, as is the case with chemical manufacturing.

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. Bureau of Economic Analysis data indicates that all three Kansas Region L counties have shown a slight increase in GDP from 2012 to 2015 (the latest available data).



Source: Bureau of Economic Analysis





Source: Bureau of Economic Analysis

The following tables present data from the United States Census Bureau indicating major sources of employment, by county.

**Table 3.28: 2018 Johnson County Employment Data**

Employment Classification	Number of establishments	Value of sales, shipments, receipts, revenue, or business done	Number of employees
Professional, scientific, and technical services	2,669	\$4,846,646,000	29,498
Professional, scientific, and technical services	2,662	-	-
Retail trade	1,868	\$10,481,372,000	35,648
Finance and insurance	1,746	-	25,149
Health care and social assistance	1,739	\$4,657,665,000	37,514
Health care and social assistance	1,615	\$3,464,688,000	27,002
Accommodation and food services	1,158	\$1,225,340,000	25,214
Administrative and support and waste management and remediation services	1,093	\$2,050,090,000	34,133
Other services (except public administration)	969	\$789,405,000	7,032
Wholesale trade	915	\$27,613,717,000	18,267
Real estate and rental and leasing	914	\$1,271,220,000	4,765

Source: US Census Bureau

-: Data unavailable



**Table 3.29: 2018 Leavenworth County Employment Data**

<b>Employment Classification</b>	<b>Number of establishments</b>	<b>Value of sales, shipments, receipts, revenue, or business done</b>	<b>Number of employees</b>
Retail trade	174	\$541,471,000	2,088
Health care and social assistance	137	\$288,242,000	2,981
Professional, scientific, and technical services	125	-	-
Professional, scientific, and technical services	121	-	-
Health care and social assistance	114	-	-
Other services (except public administration)	99	\$36,493,000	447
Accommodation and food services	98	\$66,690,000	1,439
Finance and insurance	84	-	1,035
Other services (except public administration)	83	\$33,153,000	409
Administrative and support and waste management and remediation services	74	-	-

Source: US Census Bureau

-: Data unavailable

**Table 3.30: 2018 Wyandotte County Employment Data**

<b>Employment Classification</b>	<b>Number of establishments</b>	<b>Value of sales, shipments, receipts, revenue, or business done</b>	<b>Number of employees</b>
Retail trade	452	\$1,769,413,000	6,929
Health care and social assistance	320	\$1,568,583,000	13,552
Accommodation and food services	265	\$284,597,000	5,206
Health care and social assistance	246	-	-
Wholesale trade	225	\$5,611,137,000	5,758
Other services (except public administration)	222	\$270,664,000	1,320
Professional, scientific, and technical services	191	\$305,883,000	2,703
Professional, scientific, and technical services	189	-	-
Other services (except public administration)	177	\$97,286,000	908
Manufacturing	174	\$11,105,920,000	10,537

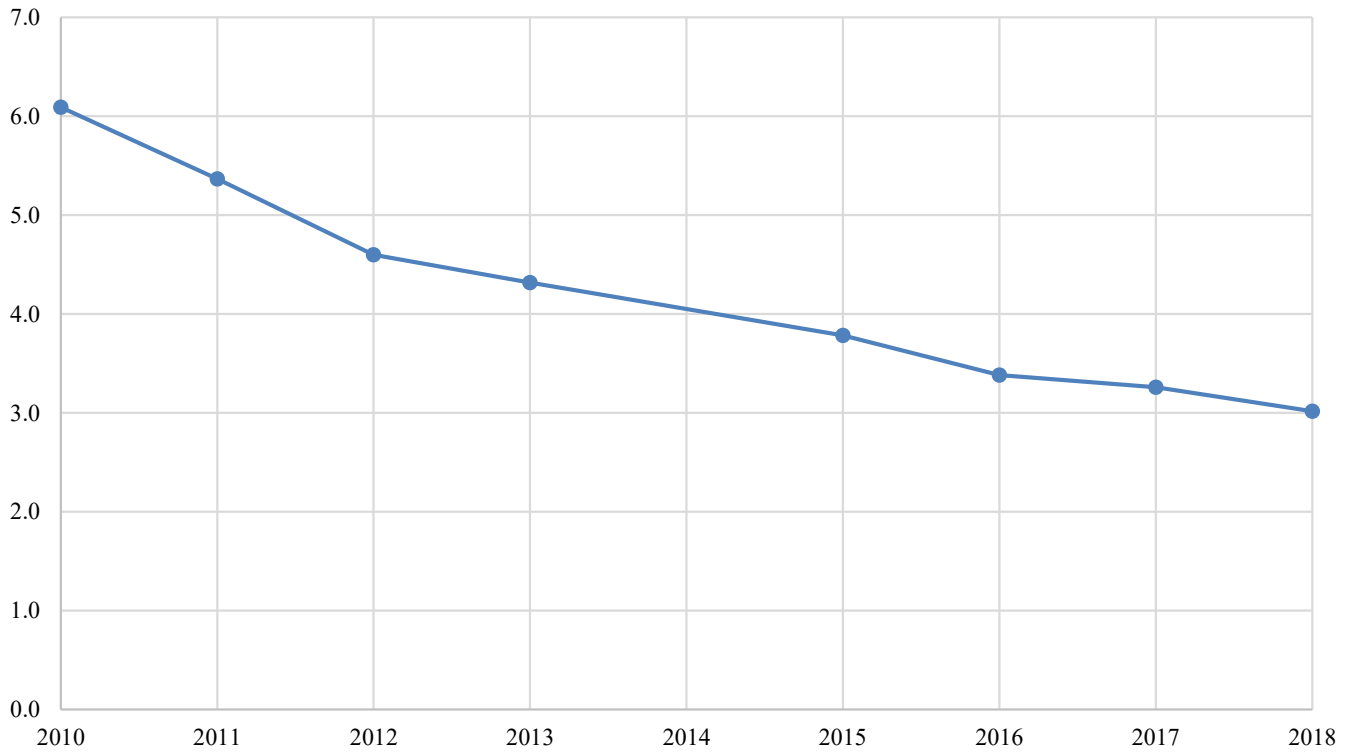
Source: US Census Bureau

-: Data unavailable

The average Kansas Region L unemployment rate of 3.7% in 2018 was slightly higher than the average State of Kansas unemployment rate of 3.4%. The following graphs illustrate Kansas Region L unemployment rates by county from 2010 through end of year 2018.

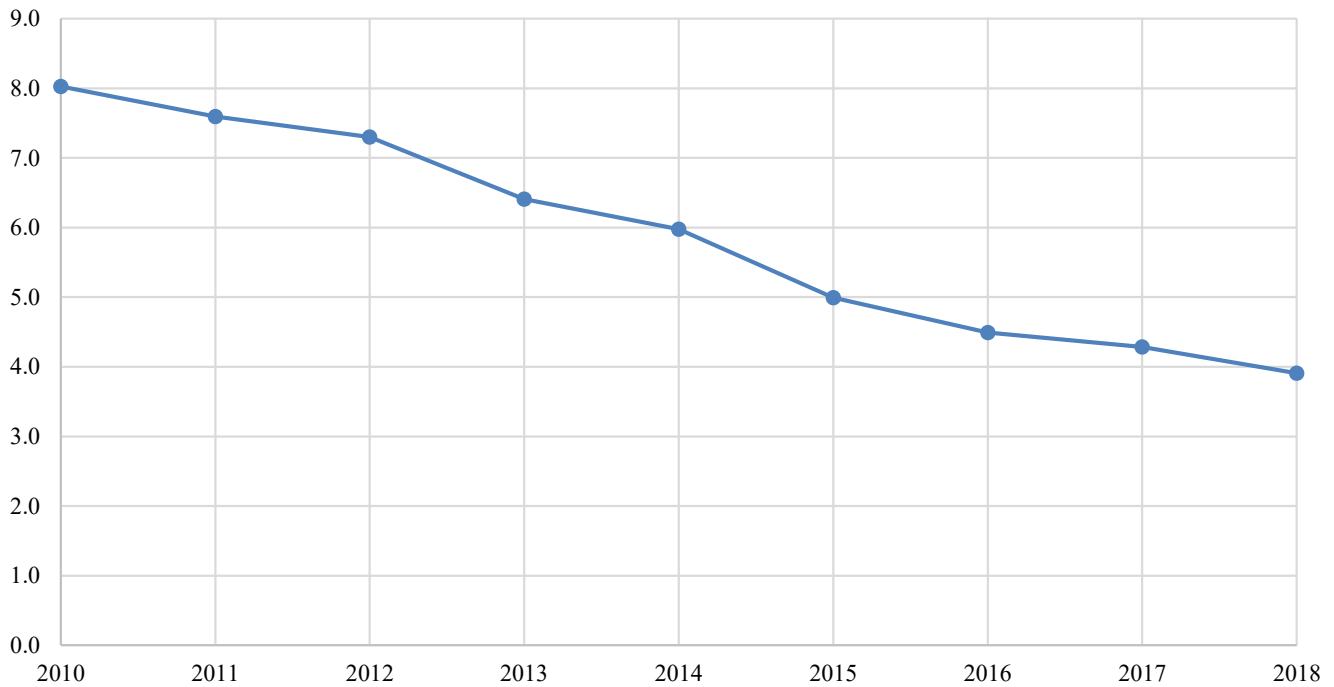


Johnson County Unemployment Rate, 2010 - 2018



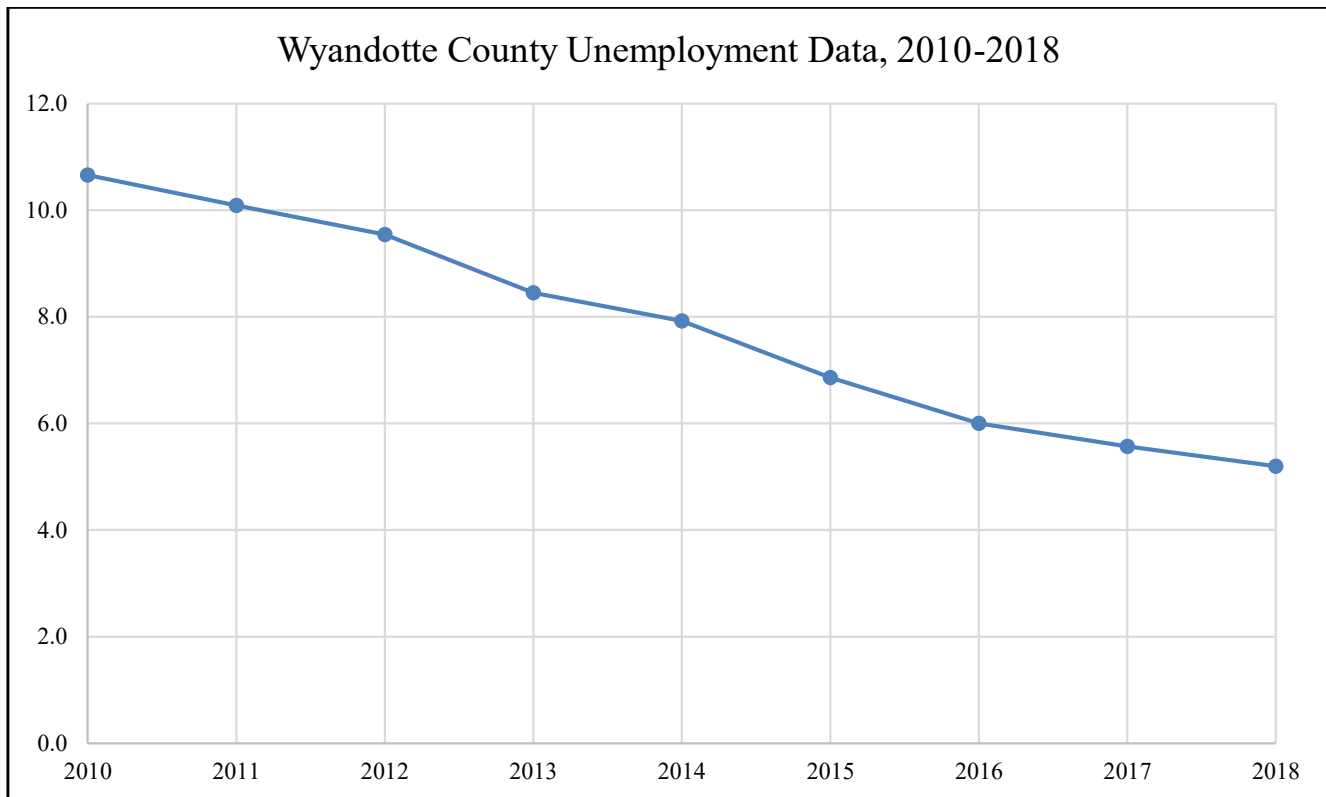
Source: Federal Reserve Bank of St. Louis

Leavenworth County Unemployment Data, 2010-2018



Source: Federal Reserve Bank of St. Louis





Source: Federal Reserve Bank of St. Louis

### 3.15 – 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 L communities. Where applicable, potential climate change factors will be addressed in subsequent sections for relevant identified hazards.

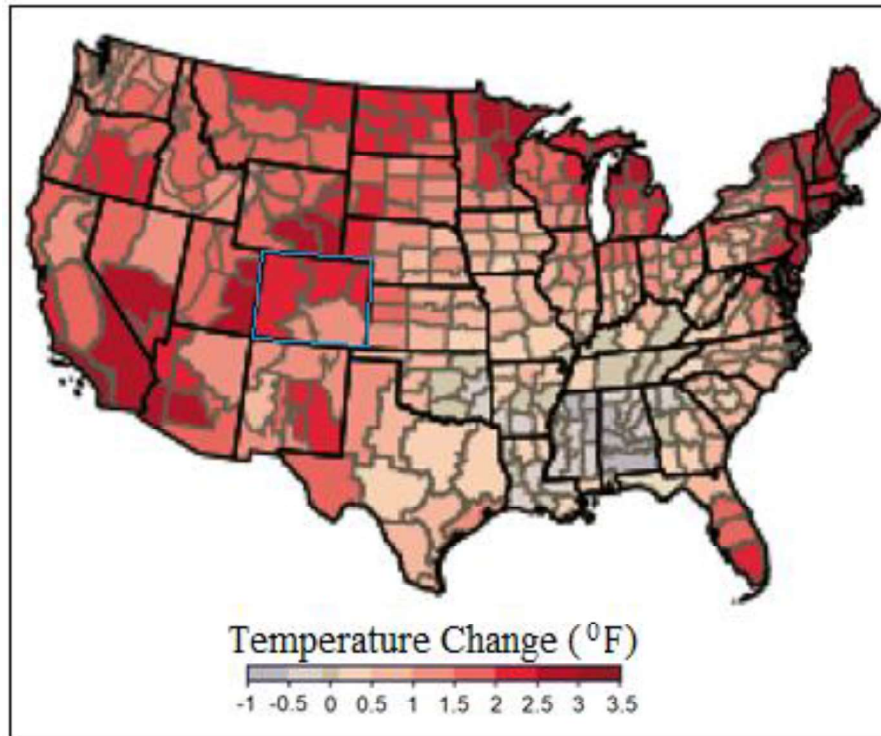
According to the United State Environmental Protection Agency (EPA) “What Climate Change Means for Kansas” (August 2016), “In the past century, most of the state has warmed by at least half a degree (F). The soil is becoming drier. Rainstorms are becoming more intense, and floods are becoming more



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 illustrates EPA modeled temperature changes during the last century.

**USEPA Modeled Temperature Changes During Last Century**



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

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



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

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





# 4.0 Hazard Profiles

## 4.1 – Introduction

The ultimate purpose of this HMP is to minimize the loss of life and property. To accomplish this, all relevant hazards and vulnerabilities the region faces have been identified. Once this identification has been completed, Kansas Region L 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 L 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 (2014 to 2018, with 2013 and 2018 being full data set years) were used to determine agricultural losses. The five-year data set was used to reflect the change in the climate and more accurately depict changes in our state. A review of the 2018 State of Kansas Hazard Mitigation Plan, which utilized a six-year data set for agricultural impacts, indicated that planning critically of hazards did not change based on the length of the data set. Where data sets were unavailable for a hazard, local reporting from participating jurisdictions was relied upon.

In addition, to ensure compliance with the Emergency Management Accreditation Program (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 L hazard mitigation plan in 2013, there



has been one federal disaster declarations for the region. This 2017 declaration, which included Johnson and Wyandotte Counties, and was issued for the following:

- DR 4347: July 22 – 27, 2017 - Severe Storms, Straight-Line Winds, And Flooding

Additionally, for the 20-year period from 2009 to 2018, Kansas Region L has had 12 federal disaster declarations. These declarations included the following identified hazards:

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

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

## **4.4 – Identified Potential Hazards**

Based on the above data, and data contained in previous mitigation plans, Kansas Region L’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 and six man-made hazards that may impact Kansas Region L. These hazards, listed by planning significance, are as follows:

- Flood
- Tornado
- Windstorm
- Winter Storm
- Drought
- Utility/Infrastructure Failure
- Hazardous Materials Incident
- Wildfire
- Civil Disorder
- Lightning
- Major Disease Outbreak
- Agricultural Infestation
- Terrorism/Agri-Terrorism
- Hailstorm
- Extreme Temperatures
- Dam/Levee Failure
- Expansive Soils
- Radiological Event
- Earthquake
- Landslide



- Soil Erosion and Dust
- Land Subsidence

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, and 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. For planning continuity, CPRI is also referenced and utilized for this HMP. CPRI considers the following four elements of risk:

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

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

**Table 4.1: CPRI Element Ratings**

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

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

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

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



**Table 4.2: CPRI Range Planning Significance**

Planning Significance	CPRI Range	
	Low CPRI	High CPRI
<b>High</b>	3.0	4.0
<b>Moderate</b>	2.0	2.9
<b>Low</b>	1.0	1.9

The following table shows the CPRI ratings for Kansas Region L.

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

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Agricultural Infestation	2.0	1.8	1.0	4.0	2.3
Dam and Levee Failure	1.6	2.2	2.4	2.8	2.1
Drought	2.0	2.1	1.1	3.9	2.5
Earthquake	1.6	1.3	3.9	1.6	1.7
Expansive Soils	1.8	1.2	2.8	4.0	2.1
Extreme Temperature	3.1	2.2	1.3	3.5	2.5
Flood	3.6	2.9	2.8	3.0	3.1
Hailstorm	4.0	2.1	3.6	1.0	2.9
Land Subsidence	1.4	1.2	2.9	2.6	2.0
Landslide	1.0	1.2	3.1	1.3	1.7
Lightning	3.2	1.6	3.3	1.3	2.3
Soil Erosion & Dust	3.0	1.4	1.8	3.7	2.1
Tornado	3.8	3.5	4.0	1.6	3.4
Wildfire	3.5	1.8	3.9	2.0	3.0
Windstorm	3.8	2.1	3.4	2.4	3.1
Winter Storm	3.8	2.6	2.6	3.1	3.2

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

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Civil Disorder	3.8	2.1	4.0	2.2	2.9
Hazardous Materials Event	3.2	1.7	1.1	4.0	2.6
Major Disease Outbreak	1.0	1.0	3.7	3.9	1.8
Radiological Event	1.3	2.8	3.5	3.8	2.5
Terrorism, Agri-Terrorism	3.4	2.2	3.6	2.8	3.0
Utility / Infrastructure Failure	3.8	2.1	4.0	2.2	2.9

The average CPRI for each identified hazard remained the same as the calculated CPRI for the 2014 planning effort.



## 4.6 – Hazard Profiles

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

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

The majority of the hazards were identified as having regional implications, and as such are addressed on a county or regional basis. However, for hazards that have a more local bias, such as flooding, data on those local concerns is addressed as appropriate and as available,

The following hazards are presented in order of planning significance.



## 4.7 – Flood

Floods are most common in seasons of rain and thunderstorms. Floods that threaten Kansas Region L 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



### 4.7.1 – Location and Extent

#### Flash Flooding

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

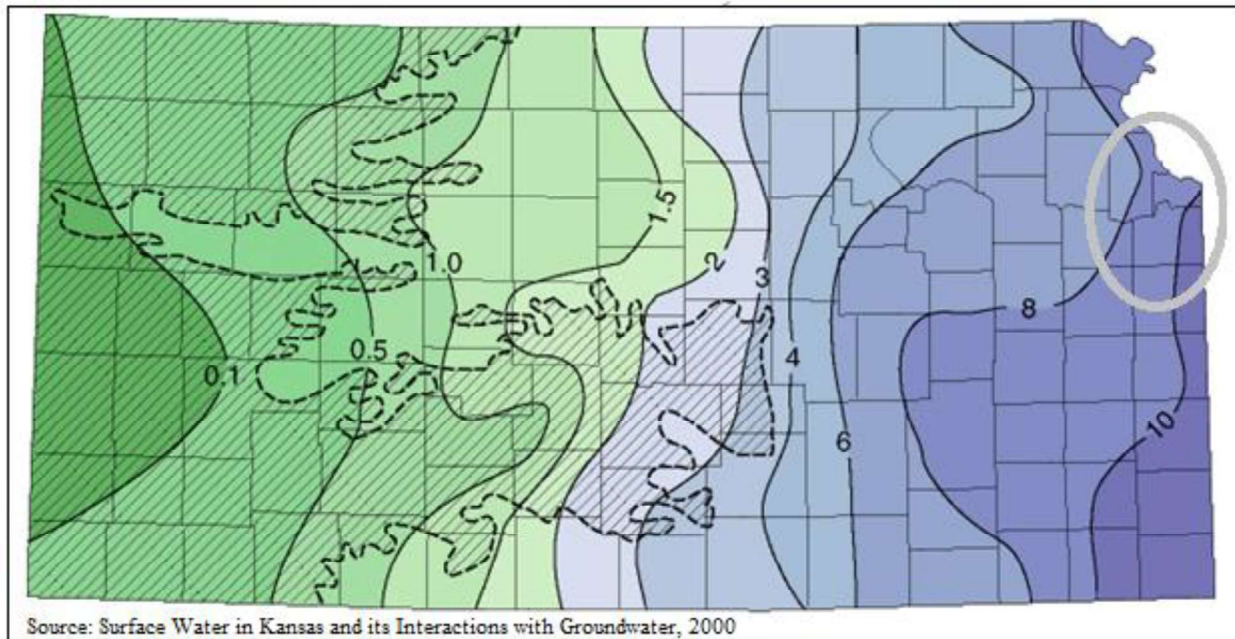
- **Flash Flood Watch:** Issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain or imminent.
- **Flash Flood Warning:** Issued to inform the public, emergency management and other cooperating agencies that flash flooding is in progress, imminent, or highly likely.
- **Flash Flood Statement:** In hydrologic terms, a statement by the National Weather Service (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 Kansas State University indicates that the average annual precipitation for Kansas Region L was 35.5 inches per year for the recorded six-year period of 2013 – 2018. This is below the thirty-year recorded average between 1891 and 2010 of 42.0 inches.

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.



### Annual Runoff, in Inches



### Riverine Flooding

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

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

All areas of Kansas Region L located near a stream or river are at risk of riverine flooding. While riverine floods can and do occur at various levels, the one percent annual chance flood has been chosen as the basis for this risk assessment. This level is the accepted standard for flood insurance and regulatory purposes. Flood probability can be expressed by recurrence interval, the average period of time for a flood that equals or exceeds a given magnitude, expressed as a period of years. The probability of occurrence of a given flood can also be expressed as the odds of recurrence of one or more similar or bigger floods in a certain number of years. Large, catastrophic floods have a very low frequency or probability of occurrence, whereas smaller floods occur more often. The larger the number of years in a recurrence





interval, the smaller the chances of experiencing that flood in a year. However, the odds are never zero, even very large, uncommon floods always have a very small chance of recurring every year. When reviewing flood probability, it is important to note that once a flood occurs its chance of recurring the next year remains the same.

**Table 4.5: Flood Recurrence Interval Probability**

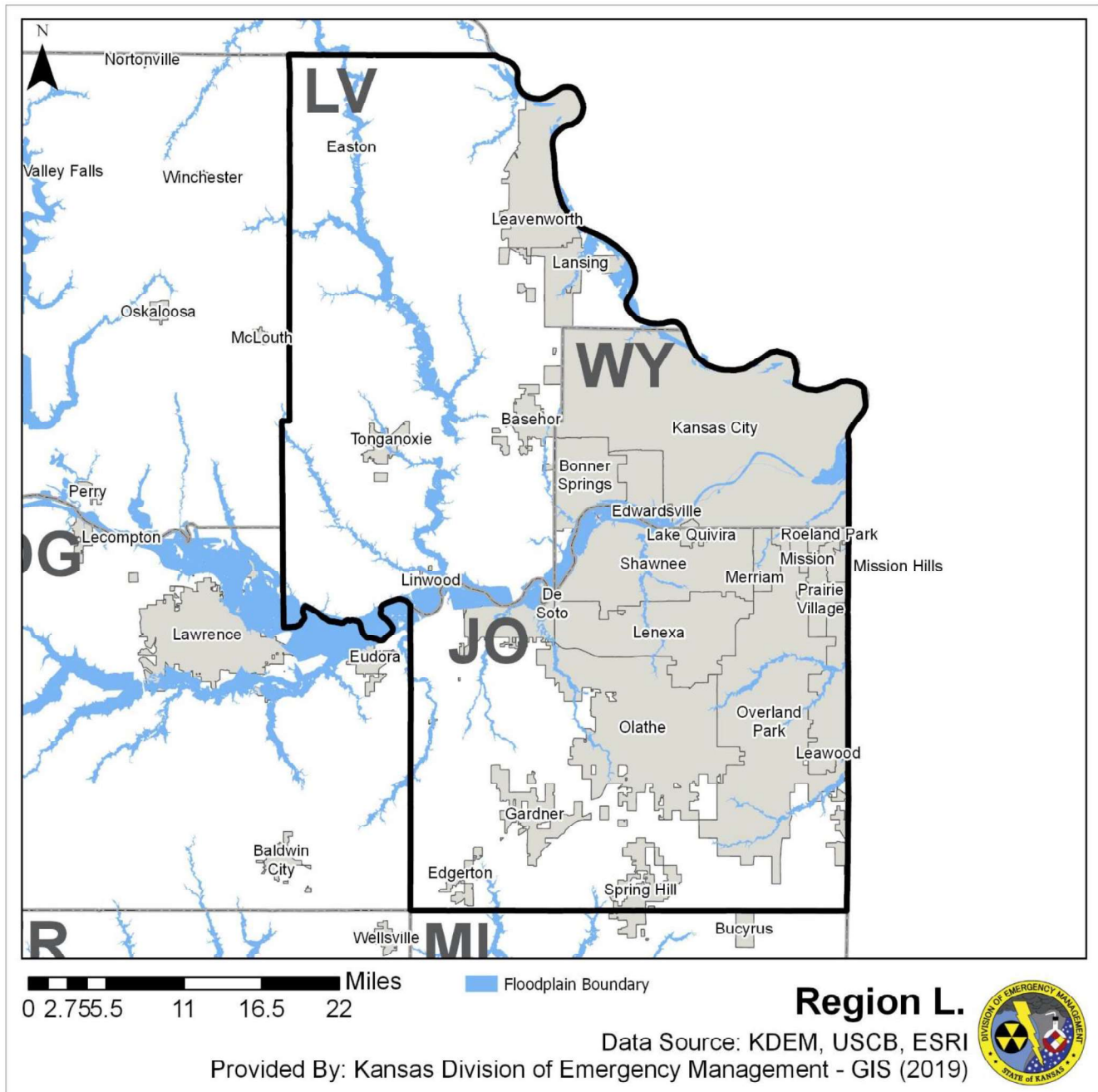
<b>Recurrence Interval, in Years</b>	<b>Probability of Occurrence in Any Given Year</b>	<b>Percent Chance of Occurrence in Any Given Year</b>
100	1 in 100	1
50	1 in 50	2
25	1 in 25	4
10	1 in 10	10
5	1 in 5	20
2	1 in 2	50

Source: FEMA

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



## Regional One Percent Annual Flood Areas

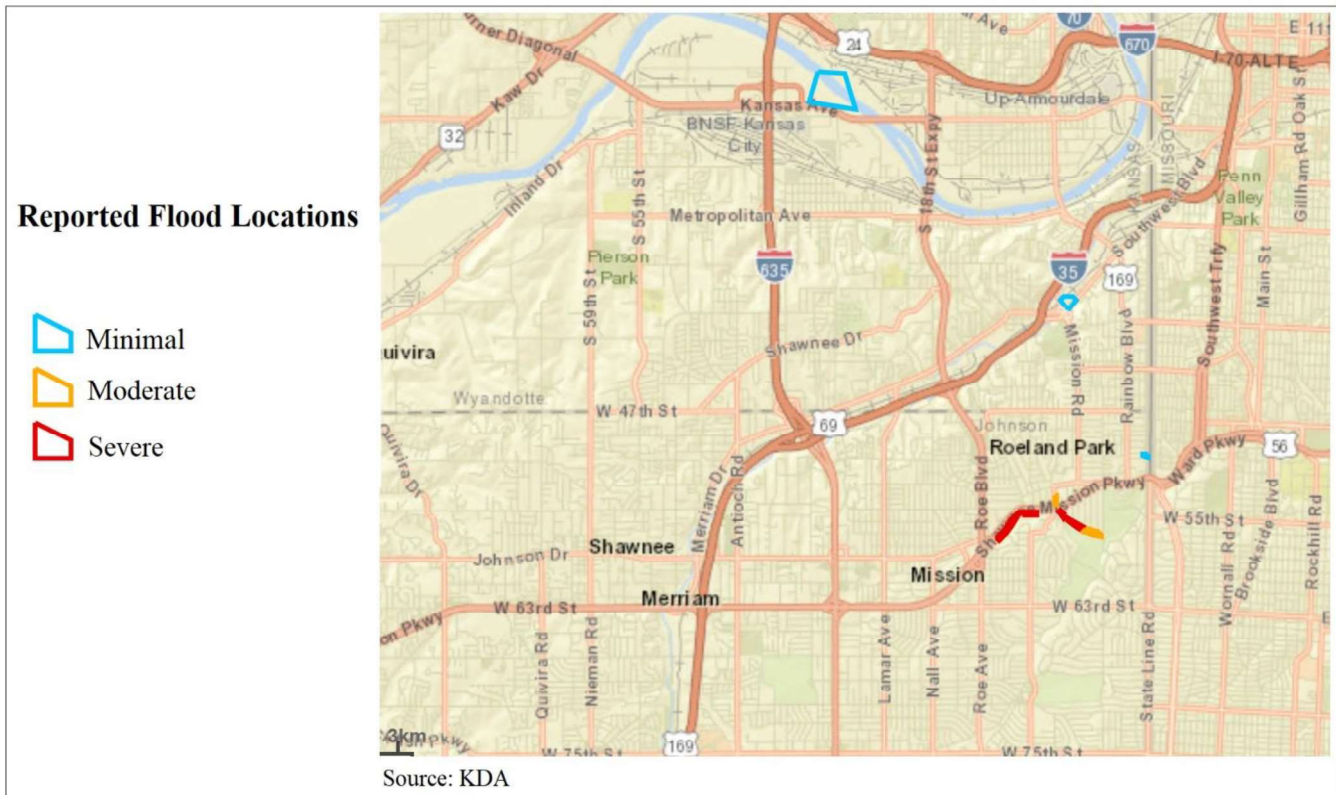


### Local Concerns

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



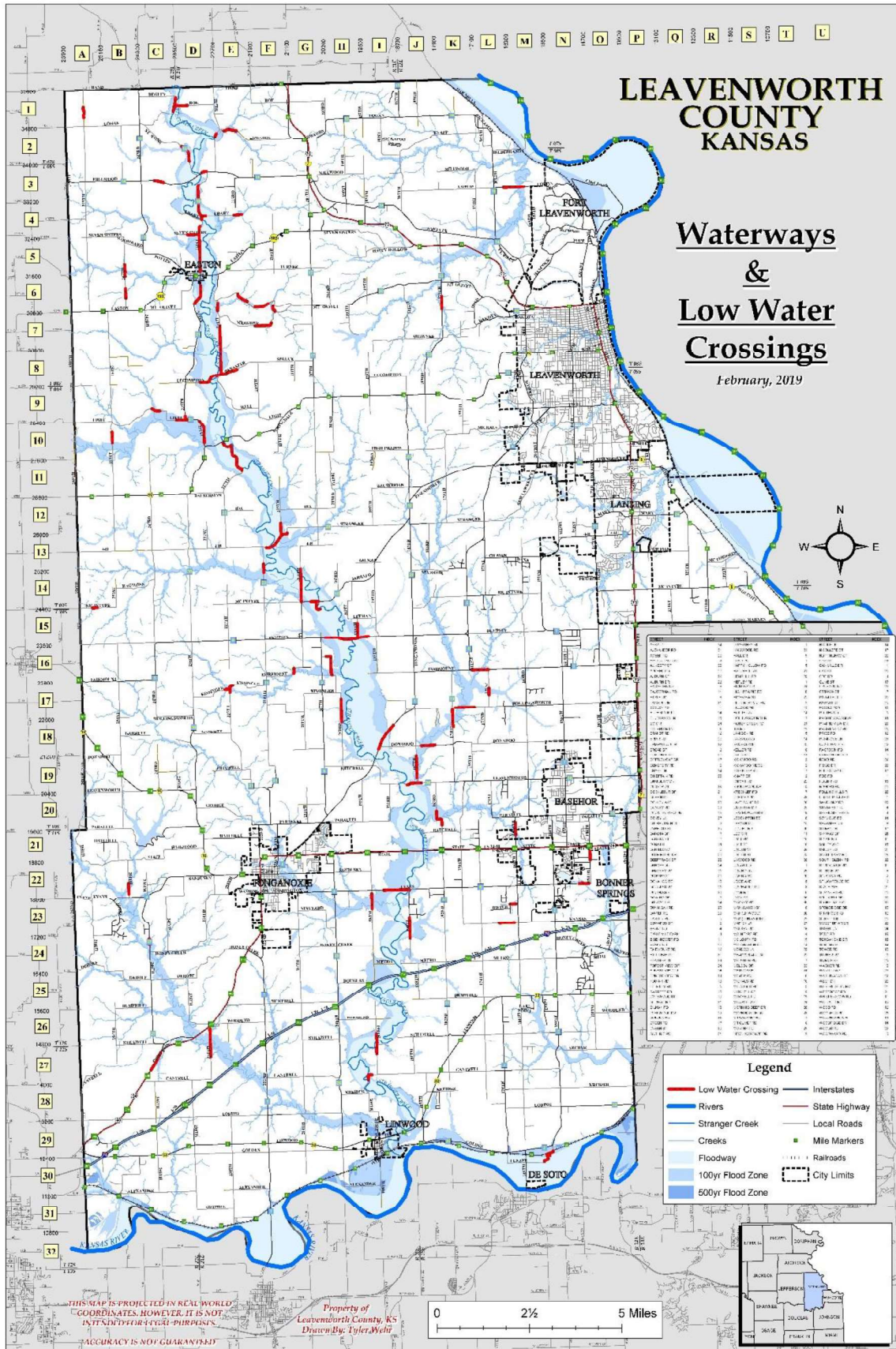
## KDA/Silver Jackets Repeat Flood Locations



The following map shows the location of all low water crossings of concern in Leavenworth County.







#### 4.7.2 – Previous Occurrences

In the 20-year period from 1999 to 2018 (with 1999 and 2018 being full data set years), there have been eight Presidential Disaster Declarations for the Kansas Region L for floods (along with other associated hazard events such as tornados or severe storms). The following 20-year information on past declared disasters is presented to provide a historical perspective on flood events that have impacted the Kansas Region L. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2013.

**Table 4.6: Kansas Region L FEMA Flood Disaster and Emergency Declarations, 1999 -2018**

<b>Declaration Number</b>	<b>Incident Period</b>	<b>Disaster Description</b>	<b>Regional Counties Involved</b>	<b>Dollars Obligated</b>
<b>4347</b>	11/7/2017 (7/22/2017 – 7/27/2017)	Severe Storms, Straight-Line Winds, <b>Flooding</b>	Johnson, Wyandotte	\$6,195,147.97
4035	09/23/2011 (6/1-8/1/2011)	<b>Flooding</b>	Leavenworth and Wyandotte	\$7,462,881
1699	5/6/2007 (5/4/2007)	Severe Storms, Tornados, and <b>Flooding</b>	Leavenworth	\$117,565,269
1615	11/21/2005 (10/1-2/2005)	Severe Storms and <b>Flooding</b>	Leavenworth	\$10,286,064
1579	2/8/2005 (1/4-6/2005)	Severe Winter Storm, Heavy Rains, and <b>Flooding</b>	Leavenworth and Wyandotte	\$106,873,672
1562	09/30/2004 (8/27-30/2004)	Severe Storms, <b>Flooding</b> , and Tornados	Wyandotte	\$2,103,376
1535	8/3/2004 (6/12-7/25/2004)	Severe Storms, <b>Flooding</b> , and Tornados	Wyandotte	\$12,845,892
1462	5/6/2003 (5/4-30/2003)	Severe Storms, Tornados, and <b>Flooding</b>	Leavenworth and Wyandotte	\$988,056

Source: FEMA

The following provides details of the single Presidential Disaster Declarations for Kansas Region L since the last plan update in 2013.

#### **Kansas – Severe Storms, Straight-Line Winds, and Flooding**

##### **FEMA-4347-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 National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) identified flood events and the resulting damage totals in Kansas Region L from the period 2009 - 2018.

**Table 4.7: Kansas Region L NCEI Flood and Flash Flood Events, 2009 - 2018**

County	Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Johnson	Flood	5	\$0	0	0
	Flash Flood	20	\$0	0	0
Leavenworth	Flood	3	\$0	0	0
	Flash Flood	18	\$500	0	0
Wyandotte	Flood	1	\$0	0	0
	Flash Flood	6	\$5,000	0	0

Source: FEMA

The following are descriptions of both NCEI and locally reported events.

- **Edwardsville (Wyandotte County):** July 22-27, 2017  
A flash flood at 98th and Betts Creek causing a temporary road closure and \$14,000 in damages.
- **Leawood (Johnson County):** July 22-27, 2017  
Flooding damaged numerous utilities and facilities. Damages were reported.
- **Mission Hills (Johnson County):** July 22-27, 2017  
Flooding was reported along Brush Creek and its tributaries. During the flood event the City's low water bridges were closed. No damages were reported.
- **Shawnee (Johnson County):** July 22 -27, 2017  
Flooding damaged numerous stormwater utilities. \$500,000 in damages were reported.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of flooding on the region's agricultural base. Crop loss data for the



years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates no tornado related claims.

**Table 4.8: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Flooding**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	2	73	\$5,490
Leavenworth	28	2,801	\$287,841
Wyandotte	0	0	\$0

Source: USDA

### 4.7.3 – Hazard Probability Analysis

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

**Table 4.9: Johnson County Flash Flood Probability Summary**

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

Source: NCEI

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

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

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

**Table 4.10: Leavenworth County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	18
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$500
Average Property Damage per Year	\$50

Source: NCEI

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

- Two events





- No deaths or injuries
- \$50 in property damages

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

**Table 4.11: Wyandotte County Flash Flood Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
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 Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$5,000
Average Property Damage per Year	\$500

Source: NCEI

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

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

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

**Table 4.12: Johnson County Riverine Flood Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
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 Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	2
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	73
Average Number of Acres Damaged per Year	15
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$5,490
Average Crop Damage per Year	\$1,098

Source: NCEI and USDA

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

- One event
- No deaths or injuries
- \$0 in property damages



According to the United States Department of Agriculture (USDA) Risk Management Agency, Johnson County can expect on a yearly basis, relevant to riverine flood occurrences:

- Less than one insurance claims
- 15 acres impacted
- \$1,098 in insurance claims

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

**Table 4.13: Leavenworth County Riverine Flood Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
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 Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	28
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	2,801
Average Number of Acres Damaged per Year	670
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$287,841
Average Crop Damage per Year	\$68,169

Source: NCEI and USDA

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

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

According to the USDA Risk Management Agency, Leavenworth County can expect on a yearly basis, relevant to riverine flood occurrences:

- Six insurance claims
- 560 acres impacted
- \$57,568 in insurance claims

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

**Table 4.14: Wyandotte County Riverine Flood Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	1
Average Events per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	0



**Table 4.14: Wyandotte County Riverine Flood Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

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

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

According to the USDA Risk Management Agency, Wyandotte County can expect on a yearly basis, relevant to riverine flood occurrences:

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

In addition, Kansas Region L has had eight Presidentially Declared Disasters relating to flooding (and other causes) in the last 20 years. This represents an average of less than one declared flood disaster every year.

#### **4.7.4 – 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 L 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 considers 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 L county.

**Table 4.15: Kansas Region L 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
Johnson	9,223	8,089	2,311	1,491	340
Leavenworth	1,140	411	544	81	0
Wyandotte	9,002	8,106	2,104	144	1,981

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 4.16: Kansas Region L 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
Johnson	\$479,561,000	\$491,564,000	\$15,143,000	\$986,268,000	\$3,876,000	\$990,144,000
Leavenworth	\$24,120,000	\$16,964,000	\$280,000	\$41,364,000	\$248,000	\$41,612,000
Wyandotte	\$739,524,000	\$699,333,000	\$39,946,000	\$1,478,803,000	\$3,988,000	\$1,482,791,000

Source: FEMA and HAZUS

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L County. USDA Risk Management Agency crop loss data, from 2014-2018, allows us to quantify the monetary impact of flood conditions on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to flood events.

**Table 4.17: Kansas Region L USDA Annual Flood Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annualized Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	15	0.02%	\$24,370,000	\$1,098	0.005%
Leavenworth	184,471	670	0.36%	\$36,367,000	\$68,169	0.19%
Wyandotte	12,009	0	0.00%	\$3,291,000	\$0	0.00%

Source: USDA

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

The Flood Risk Products and datasets present information that can enhance hazard mitigation planning activities, especially the risk and vulnerability assessment portion of a hazard mitigation plan, and the development of risk-based mitigation strategies. Risk MAP can also help guide land use and development decisions and help you take mitigation action by highlighting areas of highest risk, areas in need of mitigation, and areas of floodplain change. Currently Kansas Region L has no current or scheduled Risk Map projects.

## ***Mold***

Mold is plant-like organism that obtains nourishment it directly from surrounding organic materials. Mold can grow on a variety of materials and thrives in damp environments. As such, a recently flooded home



or business provides an ideal environment for mold growth, especially on materials such as drywall and carpeting. The young, old and ill may be specifically susceptible to the effects of mold, with symptoms including:

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

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

#### 4.7.5 – 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 4.18: Summary of Kansas Region L NFIP Communities**

County	Total Number of NFIP Communities	NFIP Communities
Johnson	20	Johnson County, DeSoto, Edgerton, Fairway, Gardner, Lake Quivira, Leawood, Lenexa, Merriam, Mission, Mission Hills, Mission Woods, Olathe, Overland Park, Prairie Village, Roeland Park, Shawnee, Spring Hill, Westwood, and Westwood Hills
Leavenworth	7	Leavenworth County, Basehor, Easton, Lansing, Leavenworth, Linwood, and Tonganoxie
Wyandotte	4	Wyandotte County, Bonner Springs, Edwardsville, and Kansas City

Source: FEMA and KDEM

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 L communities are currently CRS participants:





**Table 4.19: Kansas Region L CRS Participating Jurisdictions**

Jurisdiction	County	CRS Entry Date	CRS Class	% Discount for SFHA	% Discount for Non-SFHA	Status
Lenexa	Johnson	10/1/2011	8	10%	5%	Current
Olathe	Johnson	10/1/1993	8	10%	5%	Current
Overland Park	Johnson	10/1/2009	7	15%	5%	Current
Shawnee	Johnson	10/1/1991	8	10%	5%	Current
Lansing	Leavenworth	5/1/2011	7	15%	5%	Current
Linwood	Leavenworth	10/01/2013	9	5%	5%	Current
Bonner Springs	Wyandotte	10/01/2014	7	15%	5%	Current
Kansas City	Wyandotte	5/1/2013	6	20%	10%	Current

Source: FEMA and KDEM

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

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

**Table 4.20: Kansas Region L 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
<b>Johnson County</b>				
Desoto	36	\$10,059,100	1	\$0
Edgerton	3	\$414,900	4	\$40,544.34
Fairway	28	\$8,883,200	107	1,472,045.29
Gardner	7	\$1,318,000	0	\$85,051.04
Leawood	99	\$29,803,000	100	\$1,659,684.87
Lenexa	35	\$8,984,100	18	\$54,055.91
Merriam	29	\$8,183,300	96	\$1,675,284.70
Mission	13	\$4,775,000	69	\$332,542.10
Mission Hills	17	\$4,982,400	62	\$1,691,642.11
Olathe	112	\$27,931,900	47	\$609,620.27
Overland Park	391	\$104,072,700	347	\$2,730,657.51
Prairie Village	34	\$12,067,200	123	\$717,777.76



**Table 4.20: Kansas Region L NFIP Policy and Loss Statistics, As of December 31, 2018**

<b>Jurisdiction</b>	<b>Number of Policies in Force</b>	<b>Insurance in Force</b>	<b>Number of Closed Losses</b>	<b>Total Payments</b>
Roeland Park	7	\$1,547,000	41	\$145,364.37
Shawnee -	52	\$15,767,700	63	\$442,161.16
Spring Hill	5	\$832,000	1	\$0
Westwood	3	\$690,000	7	\$34,384.93
Westwood Hills	-	-	2	\$5,973.27
Unincorporated Johnson County	41	\$9,811,100	43	\$425,874.85
<b>Leavenworth County</b>				
Basehor	11	\$3,008,000	2	\$17,928.91
Easton	22	\$3,716,100	112	\$1,511,179.21
Lansing	41	\$10,037,700	7	\$53,764.38
Leavenworth (city)	77	\$19,548,600	68	\$775,644.76
Unincorporated Leavenworth County	37	\$9,531,600	33	\$350,511.41
<b>Wyandotte County</b>				
Bonner Springs	34	\$4,916,300	62	-
Edwardsville	21	\$8,786,400	12	\$32,653.94
Kansas City	167	\$63,128,600	331	\$9,336,506.84
Unincorporated Wyandotte County	-	-	6	\$32,268.64

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

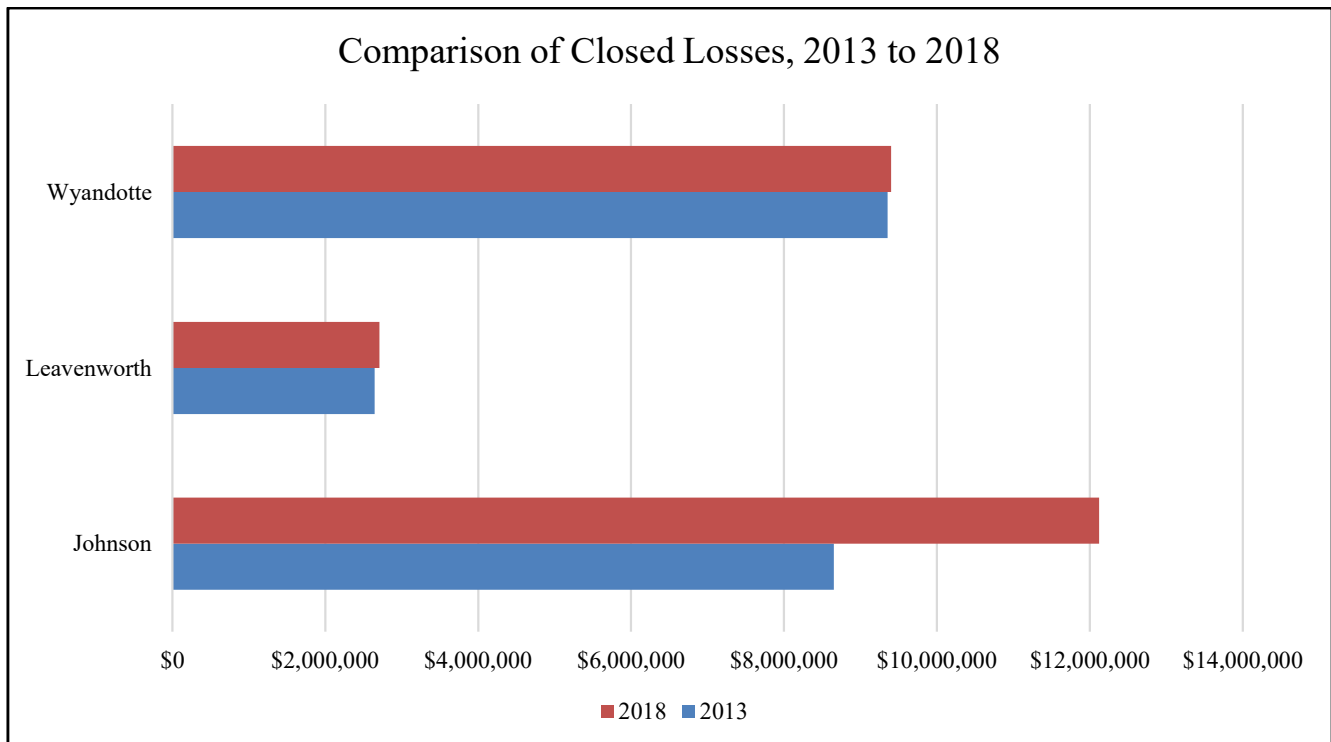
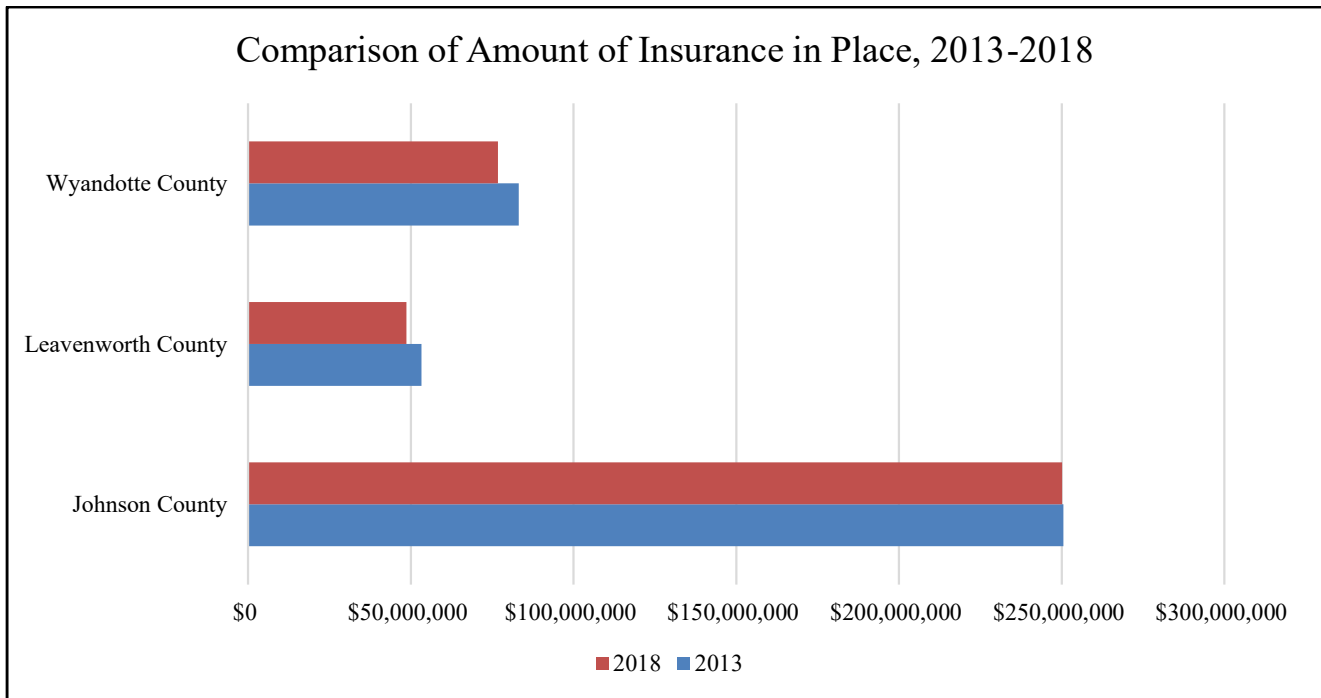
The following table and graphs summarize data from the above table for Kansas Region L in comparison to 2013 data.

**Table 4.21: Kansas Region L NFIP Policy and Loss Statistics, As of December 31, 2018**

<b>County</b>	<b>Number of Policies in Force 2013</b>	<b>Number of Policies in Force 2018</b>	<b>Insurance in Force 2013</b>	<b>Insurance in Force 2018</b>	<b>Closed Loss Payments 2013</b>	<b>Closed Loss Payments 2018</b>
Johnson	1,005	912	\$250,485,700	\$250,122,600	\$8,651,619	\$12,122,664
Leavenworth	264	205	\$53,334,200	\$48,715,400	\$2,647,895	\$2,709,029
Wyandotte	302	222	\$83,151,500	\$76,831,300	\$9,355,138	\$9,401,429

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





#### 4.7.7 – Repetitive Loss Properties

A high priority to Kansas Region L 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 L

**Table 4.22: Kansas Region L Repetitive Loss Properties, As of December 2018**

<b>Jurisdiction</b>	<b>Number of Repetitive Loss Properties</b>	<b>Number of Repetitive Loss Properties Mitigated</b>	<b>Severe Repetitive Loss Properties</b>
<b>Johnson County</b>			
Fairway	15	7	2
Johnson County	3	1	0
Leawood	10	1	0
Lenexa	3	2	0
Merriam	16	9	1
Mission	6	3	0
Mission Hills	8	0	2
Olathe	2	0	0
Overland Park	37	7	0
Prairie Village	15	0	1
Roeland Park	1	0	1
Shawnee	1	3	1
Westwood	1	0	0
<b>Leavenworth County</b>			
Easton	16	12	0
Leavenworth County	3	2	0
Leavenworth	7	0	0
Tonganoxie	1	1	0
<b>Wyandotte County</b>			
Edwardsville	2	0	0
Kansas City	36	6	8
Bonner Springs	8	1	0

Source: FEMA and KDEM



The following table details jurisdiction specific information concerning repetitive loss property type.

**Table 4.23: Kansas Region L Repetitive Loss Properties Type, by Jurisdiction**

Jurisdiction	Number of Non-Mitigated Properties	ASSMD Condo	Business, Non-Residential	Other, Non-Residential	Single Family	2-4 Family
<b>Johnson County</b>						
Johnson County	2	0	0	0	3	0
Fairway	8	0	0	0	15	0
Leawood	9	1	1	3	5	
Lenexa	1	0	0	0	3	0
Merriam	7	0	0	7	9	0
Mission	3	1	0	4	1	0
Mission Hills	0	0	0	0	8	0
Olathe	2	0	0	1	0	1
Overland Park	30	0	1	4	30	2
Prairie Village	15	0	1		14	0
Roeland Park	1	0	0	0	1	0
Westwood	1	0	0	0	1	0
<b>Leavenworth County</b>						
Leavenworth County	2	0	0	0	3	0
Easton	4	0	0	3	12	1
City of Leavenworth	7	0	0	4	1	2
Tonganoxie	0	0	0	0	1	0
<b>Wyandotte County</b>						
Bonner Springs	7	0	0	0	8	0
Kansas City	30	0	0	19	16	1

Source: KDEM

Of the 191 identified RL properties, 52 have been mitigated. The majority of the RL properties were mitigated through acquisition and demolition.

Since the last plan update no SRL properties have been mitigated, although this remains a high priority in the State of Kansas. Kansas continues to reach out to the affected communities to help facilitate the mitigation of all SRL properties. The following table details SRL claims.

**Table 4.24: Kansas Region L Severe Repetitive Loss Property Claims**

Jurisdiction	Total Paid	Losses	SRL Status
<b>Johnson County</b>			
Fairway	\$74,824	5	Validated
Johnson County	\$125,677	5	Validated Uninsured
Merriam	\$171,306	8	Validated Uninsured
Mission	\$307,482	4	Validated
Mission Hills	\$343,821	4	Validated
Roeland Park	\$97,503	15	Validated Uninsured
Shawnee	\$177,471	5	Pending Non-Residential
<b>Wyandotte County</b>			



**Table 4.24: Kansas Region L Severe Repetitive Loss Property Claims**

<b>Jurisdiction</b>	<b>Total Paid</b>	<b>Losses</b>	<b>SRL Status</b>
Kansas City	\$121,269	4	Validated Non-Residential Uninsured
Kansas City	\$98,585	4	Pending Non-Residential Uninsured
Kansas City	\$514,926	8	Validated Non-Residential Uninsured
Kansas City	\$147,317	4	Validated Non-Residential Uninsured
Kansas City	\$599,430	10	Pending Non-Residential Uninsured
Kansas City	\$1,288,116	8	Pending Non-Residential
Kansas City	\$324,730	16	Pending Non-Residential Uninsured
Kansas City	\$829,891	7	Pending Non-Residential
Kansas City	\$213,479	5	Validated Non-Residential Uninsured
Kansas City	\$44,288	7	Validated Uninsured

#### 4.7.8 – Consequence Analysis

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

**Table 4.25: Flood Consequence Analysis**

<b>Subject</b>	<b>Impacts of Flood</b>
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.





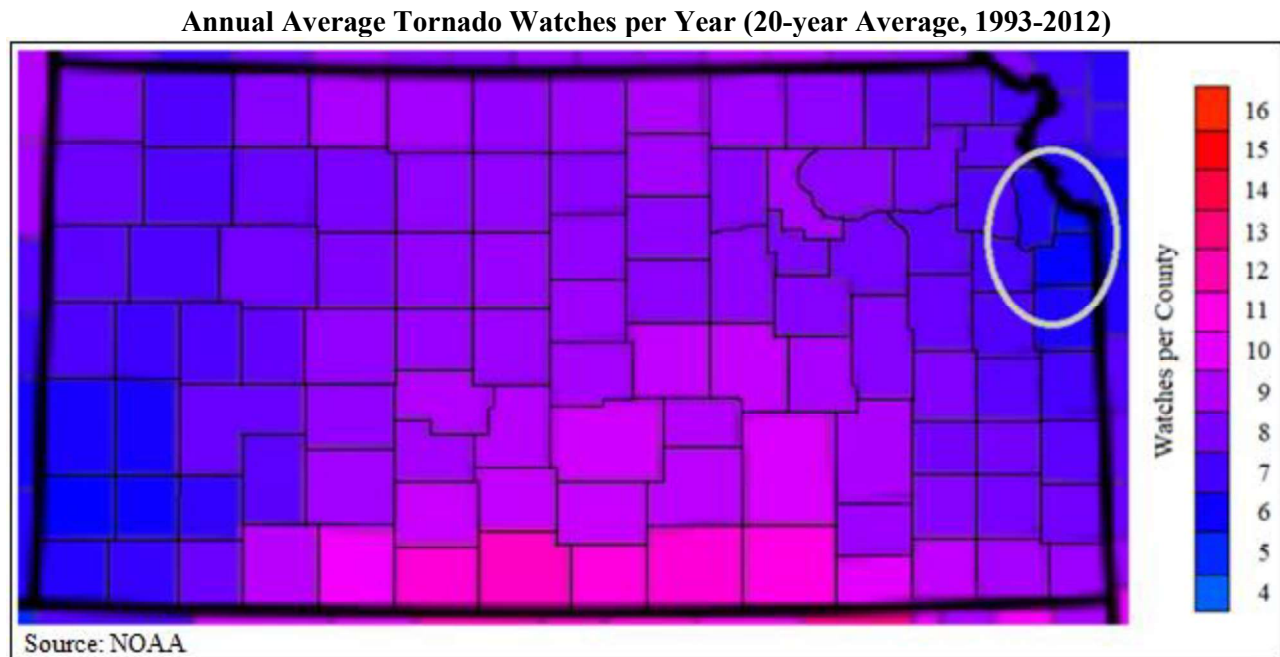
## 4.8 – Tornado

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



### 4.8.1 – Location and Extent

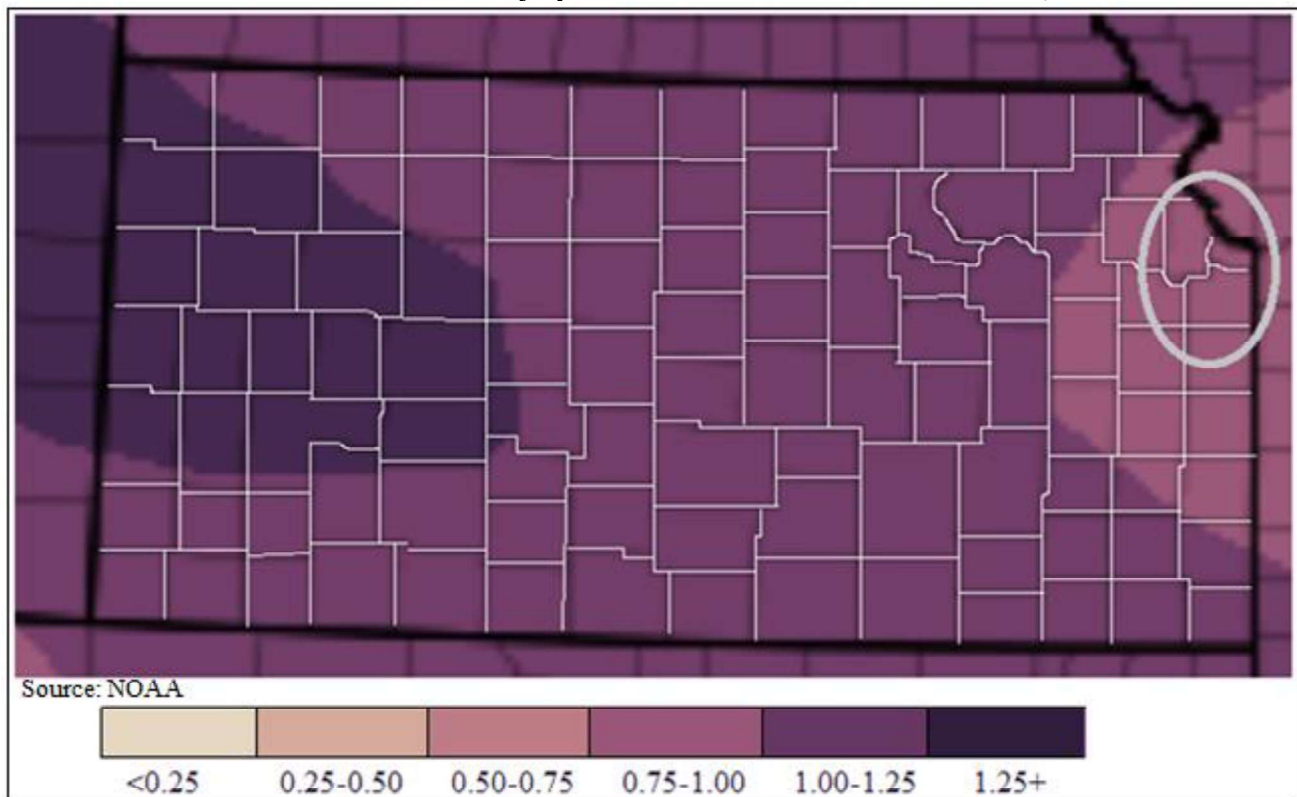
Tornadoes can strike anywhere in Kansas Region L, placing the entire planning area at risk. The following map, generated by NOAA, shows the average annual tornado watches per year for Kansas Region L.



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 4.26: Enhanced Fujita Scale**

Scale	Wind Speed (miles per hour)	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 4.26: Enhanced Fujita Scale**

Scale	Wind Speed (miles per hour)	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

#### 4.8.2 – Previous Occurrences

For the 20-year period from 1999 to 2018 (with 1999 and 2018 being full data set years), there have been five Presidential Disaster Declarations for the Kansas Region L for tornados (along with other components). The following 20-year information on past declared disasters is presented to provide a historical perspective on tornado events that have impacted the Kansas Region L. No declarations have been issued since the previous mitigation plan update in 2013.

**Table 4.27: Kansas Region L FEMA Tornado Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
1699	5/6/2007 (5/4/2007)	Severe Storms, <b>Tornados</b> , and Flooding	Leavenworth	\$117,565,269
1638	4/14/2006 (3/12-13/2006)	Severe Storms, Tornados, and Straight-Line Winds	Wyandotte	\$6,233,044
1562	09/30/2004 (8/27-30/2004)	Severe Storms, Flooding, and <b>Tornados</b>	Wyandotte	\$2,103,376
1535	8/3/2004 (6/12-7/25/2004)	Severe Storms, Flooding, and <b>Tornados</b>	Wyandotte	\$12,845,892
1462	5/6/2003 (5/4-30/2003)	Severe Storms, <b>Tornados</b> , and Flooding	Leavenworth and Wyandotte	\$988,056

Source: FEMA

–: Data unavailable



The following table shows NOAA NCEI information for the six years from 2009 to 2018 (with 2009 and 2018 being full data set years). Additionally, the strongest rated tornado event is indicated.

**Table 4.28: Kansas Region L NCEI Tornado Events, 2009-2018**

County	Number of Days with Tornadoes	Strongest Tornado Event	Deaths	Injuries	Total Property Damage
Johnson	5	EF1	0	0	\$10,000
Leavenworth	1	EF1	0	0	\$400,000
Wyandotte	0	0	0	0	\$0

Source: NOAA NCEI

The following are descriptions of both NCEI and locally reported events.

- **May 25, 2011: Johnson County**

At 1010CST an EF0 tornado touched 1.2 miles south southeast of Stanley. The tornado moved north northeast and lifted at 1012CST, around 0.9 miles southeast of Stanley. Roof damage was observed at the Blue Valley Middle School, and several trees were damaged, north of 159th Street, between Roe and Nall. No deaths or injuries were reported, and property damage was recorded at \$10,000.

- **April 25, 2009: Leavenworth County**

An EF1 tornado touched down at 1735 CST near the intersection of 238th Street and Loring Street. The tornado crossed Interstate 70, and then remained nearly parallel to the Interstate, before lifting at 1750 CST, near the intersection of Metro Avenue and 190th Street. Two homes sustained major damage and several barns were destroyed. Numerous trees were uprooted, and several outbuildings were damaged. No deaths or injuries were reported, and property damage was recorded at \$400,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of tornadoes on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates no tornado related claims.

**Table 4.29: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Tornadoes**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	0	0	\$0
Leavenworth	0	0	\$0
Wyandotte	0	0	\$0

Source: USDA

### 4.8.3 – Hazard Probability Analysis

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



**Table 4.30: Johnson County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	5
Average Event Days per Year	<1
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Deaths and Injuries (2009-2018)	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 (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI

Data from the NCEI indicates that Johnson 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, Johnson 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 **Leavenworth County**.

**Table 4.31: Leavenworth County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	10
Average Event Days per Year	<10
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Deaths and Injuries (2009-2018)	0
Total Reported NCEI Property Damage (2009-2018)	\$400,000
Average Property Damage per Year	\$40,000
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI



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

- <1 event
- No deaths or injuries
- \$40,000 in property damages

According to the USDA Risk Management Agency, Leavenworth 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 **Wyandotte County**.

**Table 4.32: Wyandotte County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	0
Average Event Days per Year	0
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Deaths and Injuries (2009-2018)	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI

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

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

According to the USDA Risk Management Agency, Wyandotte 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 Kansas Region L:

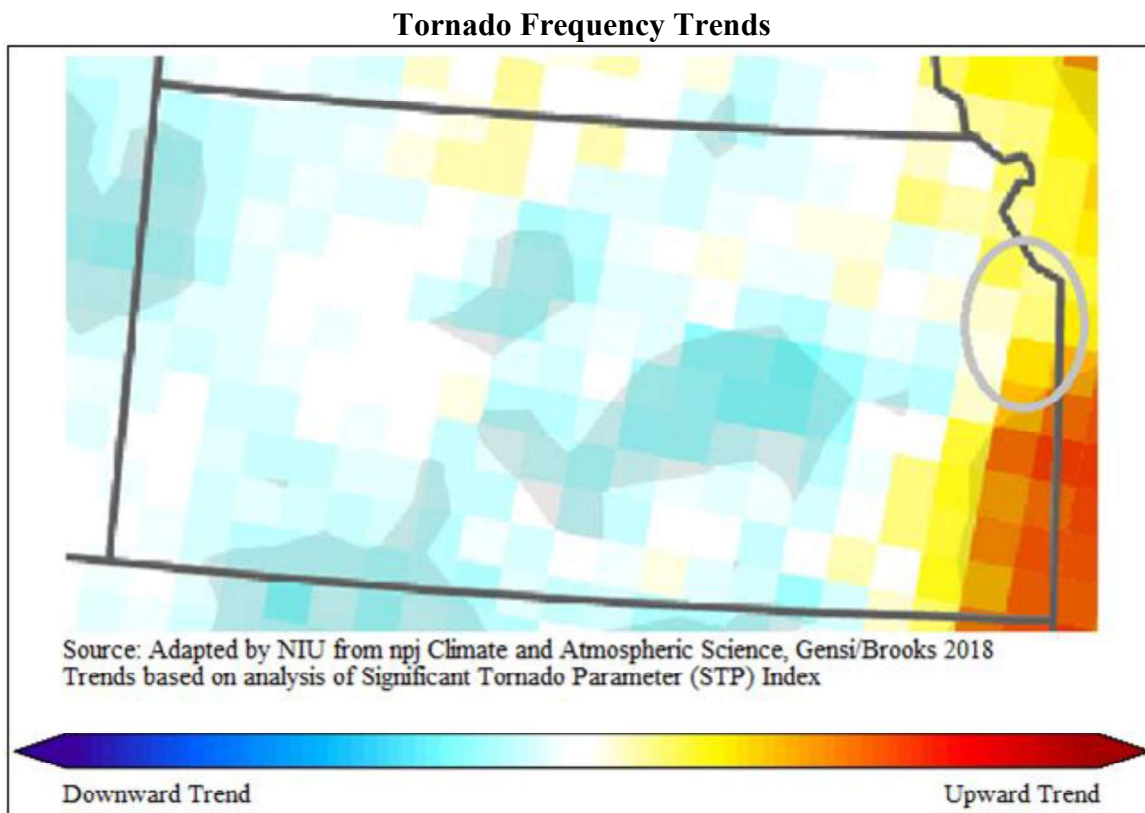
- **Tornado Probability:** Approximately one event per year

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:** No events per year

In addition, Kansas Region L has had five Presidentially Declared Disasters relating to tornados (and other concurrent events such as flooding) in the last 20 years. This represents an average of less than one declared tornado related disaster per year.

Research conducted by the National Severe Storms Lab looked at Significant Tornado Parameter (STP) to help determine future tornado probability. STP is a measurement of the major parameters of tornado conditions, including wind speed and direction, wind at differing altitudes, unstable air patterns, and humidity. The following map, generated by Northern Illinois University and compiled from STP data, indicates that Kansas Region L may see an increasing future number of tornados.



#### 4.8.4 – 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 L county incurring damage over the period 2009 to 2018 from tornado events. A greater percentage of damaged structures damaged may indicate a greater potential future vulnerability.

**Table 4.33: Kansas Region L for Tornado**

County	HAZUS Building Valuation	NCEI Structure Damage, 2009-2018	Percentage of Building Valuation Damaged
Johnson	\$124,279,962,000	\$10,000	0.00001%
Leavenworth	\$13,050,342,000	\$400,000	0.003%
Wyandotte	\$29,708,946,000	\$0	0.0%

Source: NCEI and HAZUS

Counties with a high population and/or a growing population may be at increased risk.

**Table 4.34: Kansas Region L Population Vulnerability Data for Tornado**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value for each Kansas Region L County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of tornados on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to tornado events.

**Table 4.35: Kansas Region L USDA Annual Tornado Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	0	0.0%	\$24,370,000	\$0	0.0%
Leavenworth	184,471	0	0.0%	\$36,367,000	\$0	0.0%
Wyandotte	12,009	0	0.0%	\$3,291,000	\$0	0.0%

Source: USDA

Between 2001 and 2010 51% of those killed by tornados were living in mobile homes, according to the NOAA. A 2012 “Kansas Severe Weather Awareness Week” report indicates that people living in mobile homes are killed by tornados at a rate 20 times higher than people living in permanent homes.



Additionally, a new study from Michigan State University reported that the two biggest factors related to tornado fatalities were housing quality (measured by mobile homes as a proportion of housing units) and income level. When a tornado strikes, a county with double the number of mobile homes as a proportion of all homes will experience 62% more fatalities than a county with fewer mobile homes, according to the study data.

The following participating jurisdictions may have increased vulnerability to tornado events due to the percentage of mobile homes:

- **Participating jurisdictions with 20%-25% of housing stock as mobile homes:** Easton, Leavenworth County and Edwardsville, Wyandotte County

#### 4.8.5 – Impact and Consequence Analysis

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

**Table 4.36: Tornado Consequence Analysis**

Subject	Impacts of Tornadoes
Health and Safety of the Public	Impact of the immediate area could be severe depending on whether individuals were able to seek shelter and get out of the trajectory of the tornado. Casualties are dependent on warning systems and warning times.
Health and Safety of Responders	Impact to responders is expected to be minimal unless responders live within the affected area.
Continuity of Operations	Temporary to permanent relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the trajectory path. Roads, buildings, and communications could be adversely affected. Damage could be severe.
Environment	Impact will be severe for the immediate impacted area. Impact will lessen as distance increases from the immediate incident area.
Economic Conditions	Impacts to the economy will greatly depend on the trajectory of the tornado. If a jurisdiction takes a direct hit then the economic conditions will be severe. With an indirect hit the impact could be low to severe.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems and warning time will also be questioned.



## 4.9 – 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.

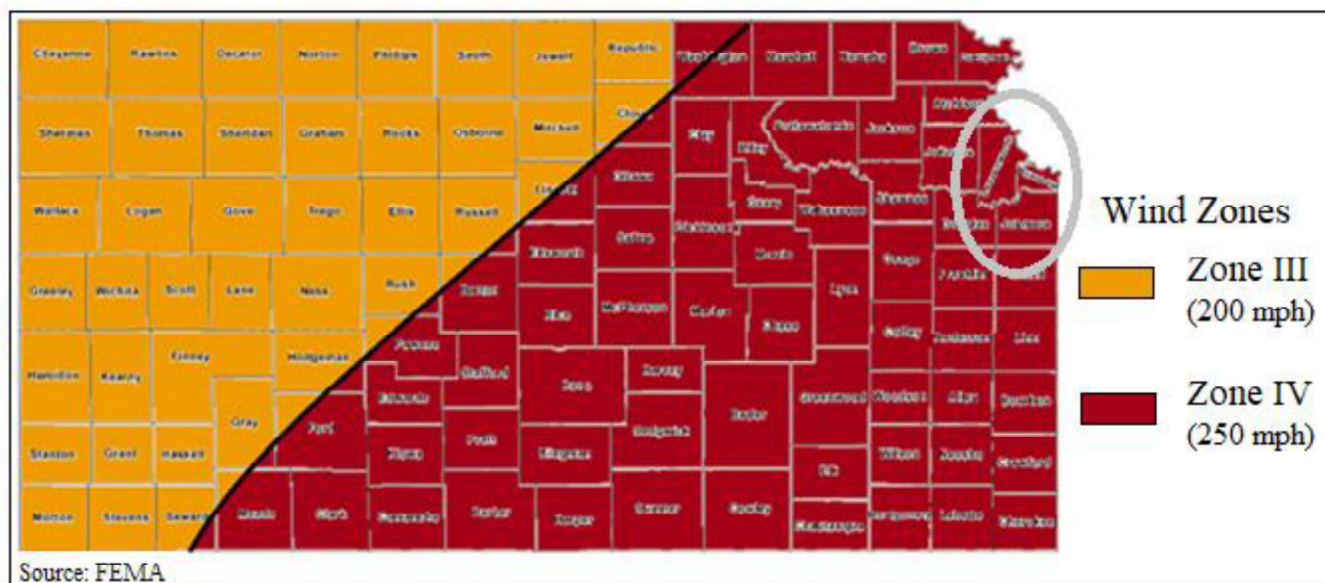


### 4.9.1 – Location and Extent

High winds occur over broad geographic regions. The entire Kansas Region L 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 L is located within wind zone IV, the highest inland category.

Wind Zones in the United States



Severe thunderstorms strike Kansas Region L 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.

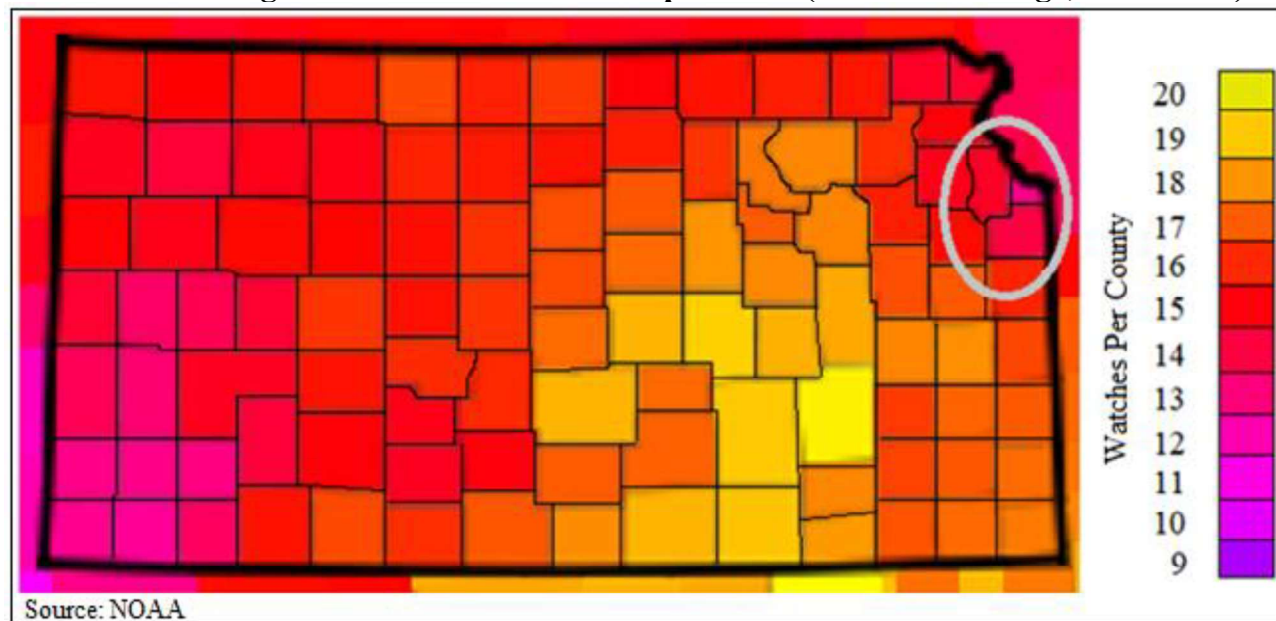
- **Marginal:** Isolated severe thunderstorms, limited in duration and/or coverage and/or intensity



- **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 L.

**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 4.37: 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





## 4.9.2 – Previous Occurrences

In the 20-year period from 1999 to 2018 (with 1999 and 2018 being full data set years), there has been one Presidential Disaster Declaration for the Kansas Region L for straight-line winds. Additionally, there have been five Presidential Disaster Declarations for the Kansas Region L for severe storms (of which a high wind may be a component). The following 20-year information on past declared disasters is presented to provide a historical perspective on both straight-line wind and severe storm (potentially with a high wind component) events that have impacted the Kansas Region L. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2013.

**Table 4.38: Kansas Region L FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018**

<b>Declaration Number</b>	<b>Incident Period</b>	<b>Disaster Description</b>	<b>Regional Counties Involved</b>	<b>Dollars Obligated</b>
<b>4347</b>	11/7/2017 (7/22/2017 – 7/27/2017)	<b>Severe Storms, Straight-Line Winds, Flooding</b>	Johnson, Wyandotte	\$6,195,147.97
1699	5/6/2007 (5/4/2007)	<b>Severe Storms, Tornadoes, and Flooding</b>	Leavenworth	\$117,565,269
1615	11/21/2005 (10/1-2/2005)	<b>Severe Storms and Flooding</b>	Leavenworth	\$10,286,064
1562	09/30/2004 (8/27-30/2004)	<b>Severe Storms, Flooding, and Tornadoes</b>	Wyandotte	\$2,103,376
1535	8/3/2004 (6/12-7/25/2004)	<b>Severe Storms, Flooding, and Tornadoes</b>	Wyandotte	\$12,845,892
1462	5/6/2003 (5/4-30/2003)	<b>Severe Storms, Tornadoes, and Flooding</b>	Leavenworth and Wyandotte	\$988,056

Source: FEMA

The following provides details of the single Presidential Disaster Declaration for Kansas Region L related to severe storms (and potentially lightning) since the last plan update in 2013.

### **Kansas – Severe Storms, Straight-line Winds, and Flooding FEMA-4347-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 L for the 10-year period of 2009 – 2018 (with 2009 and 2018 being full data set years).

**Table 4.39: Kansas Region L NCEI High Wind Events, 2009 - 2018**

County	Number of Days with Events	Property Damage	Highest Recorded Wind Speed	Deaths	Injuries
Johnson	56	\$645,500	75 Knots	0	0
Leavenworth	47	\$70,900	65 Knots	0	0
Wyandotte	19	\$2,000	70 Knots	0	0

Source: NOAA NCEI

The following are descriptions of both NCEI and locally reported events.

- **March 6, 2017: Johnson County**

On the evening of March 6, a squall line with damaging winds moved through the Johnson County Executive Airport and produced significant damage to hangars and aircraft enclosed in the hangars. Several planes were flipped after the building shredded apart by the strong straight-line winds. NWS survey inspected the site and due to damage being spread in a unidirectional fashion the cause of the damage was deemed to be straight line winds. No deaths or injuries were reported, and property damage was recorded at \$500,000.

- **June 6, 2011: Leavenworth County**

Large trees were snapped off at ground level. A barn was destroyed at 155th Street and Fairmont Road. No deaths or injuries were reported, and property damage was recorded at \$25,000.

- **July 28, 2011: Johnson County**

A four-block area in Stilwell, had around one dozen large trees knocked down, with a few of them landing on homes. Multiple power poles were snapped off, with resultant power outages across town. One front porch was knocked a little off the foundation of a home. No deaths or injuries were reported, and property damage was recorded at \$75,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of tornados on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates three high wind related claims on 123 acres for \$7,718.



**Table 4.40: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, High Winds**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	1	45	\$4,233
Leavenworth	2	78	\$3,485
Wyandotte	0	0	\$0

Source: USDA

### 4.9.3 – Hazard Probability Analysis

The following table summarizes high wind event data for **Johnson County**.

**Table 4.41: Johnson County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	56
Average Event Days per Year	6
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Yearly Deaths and Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$645,000
Average Property Damage per Year	\$64,500
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	45
Average Number of Acres Damaged per Year	9
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$4,233
Average Crop Damage per Year	\$847

Source: NCEI and USDA

Data from the NCEI indicates that Johnson County can expect on a yearly basis, relevant to high wind events:

- Six events
- No deaths or injuries
- \$64,500 in property damages

According to the USDA Risk Management Agency, Johnson County can expect on a yearly basis, relevant to high wind occurrences:

- Less than one insurance claims
- Nine acres impacted
- \$847 in insurance claims

The following table summarizes high wind event data for **Leavenworth County**.



**Table 4.42: Leavenworth County High Wind Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	47
Average Event Days per Year	5
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Yearly Deaths and Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$75,900
Average Property Damage per Year	\$7,590
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	2
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	78
Average Number of Acres Damaged per Year	16
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$3,485
Average Crop Damage per Year	\$697

Source: NCEI and USDA

Data from the NCEI indicates that Leavenworth County can expect on a yearly basis, relevant to high wind events:

- Five events
- No deaths or injuries
- \$7,590 in property damages

According to the USDA Risk Management Agency, Leavenworth County can expect on a yearly basis, relevant to high wind occurrences:

- Less than one insurance claims
- 16 acres impacted
- \$697 in insurance claims

The following table summarizes high wind event data for **Wyandotte County**.

**Table 4.43: Wyandotte County High Wind Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	19
Average Event Days per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Yearly Deaths and Injuries	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 (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA



Data from the NCEI indicates that Wyandotte County can expect on a yearly basis, relevant to high wind events:

- Two events
- No deaths or injuries
- \$200 in property damages

According to the USDA Risk Management Agency, Wyandotte County can expect on a yearly basis, relevant to high wind occurrences:

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

In addition, Kansas Region L has had one Presidentially Declared Disaster relating to straight-line winds (and other concurrent events) in the last 20 years. This represents an average of less than one declared straight-line wind related disaster per year. Kansas Region L has also had five Presidentially Declared Disasters relating to severe storms (and other concurrent events) in the last 20 years. This represents an average of less than one declared severe storm related disaster per year.

#### 4.9.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to high wind events. Counties with a higher or increasing population, and/or a high or increasing structural valuation are 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 L county incurring damage over the period 2009 to 2018 from high wind events. A greater percentage of damaged structures damaged may indicate a greater potential future vulnerability.

**Table 4.44: Kansas Region L Structural Vulnerability Data for High Winds**

County	HAZUS Building Valuation	NCEI Structure Damage, 2009-2018	Percentage of Building Valuation Damaged
Johnson	\$124,279,962,000	\$645,500	0.0005%
Leavenworth	\$13,050,342,000	\$70,900	0.0005%
Wyandotte	\$29,708,946,000	\$2,000	0.00001%

Source: NCEI and HAZUS

Counties with a high population and/or a growing population may be at increased risk.

**Table 4.45: Kansas Region L Population Vulnerability Data for High Winds**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%



**Table 4.45: Kansas Region L Population Vulnerability Data for High Winds**

County	2017 Population	Percent Population Change 2000 to 2017
Wyandotte	165,288	4.69%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of high wind on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to high wind events.

**Table 4.46: Kansas Region L USDA Annual High Wind Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	9	0.01%	\$24,370,000	\$847	0.003%
Leavenworth	184,471	16	0.01%	\$36,367,000	\$697	0.00%
Wyandotte	12,009	0	0.00%	\$3,291,000	\$0	0.00%

Source: USDA

As with tornados, the following participating jurisdictions may have increased vulnerability to high wind events due to the percentage of mobile homes:

- **Participating jurisdictions with 20%-25% of housing stock as mobile homes:** Easton, Leavenworth County and Edwardsville, Wyandotte County

#### 4.9.5 – Impact and Consequence Analysis

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

**Table 4.47: 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.



**Table 4.47: High Wind Consequence Analysis**

<b>Subject</b>	<b>Impacts of High Winds</b>
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.





## 4.10 – Drought

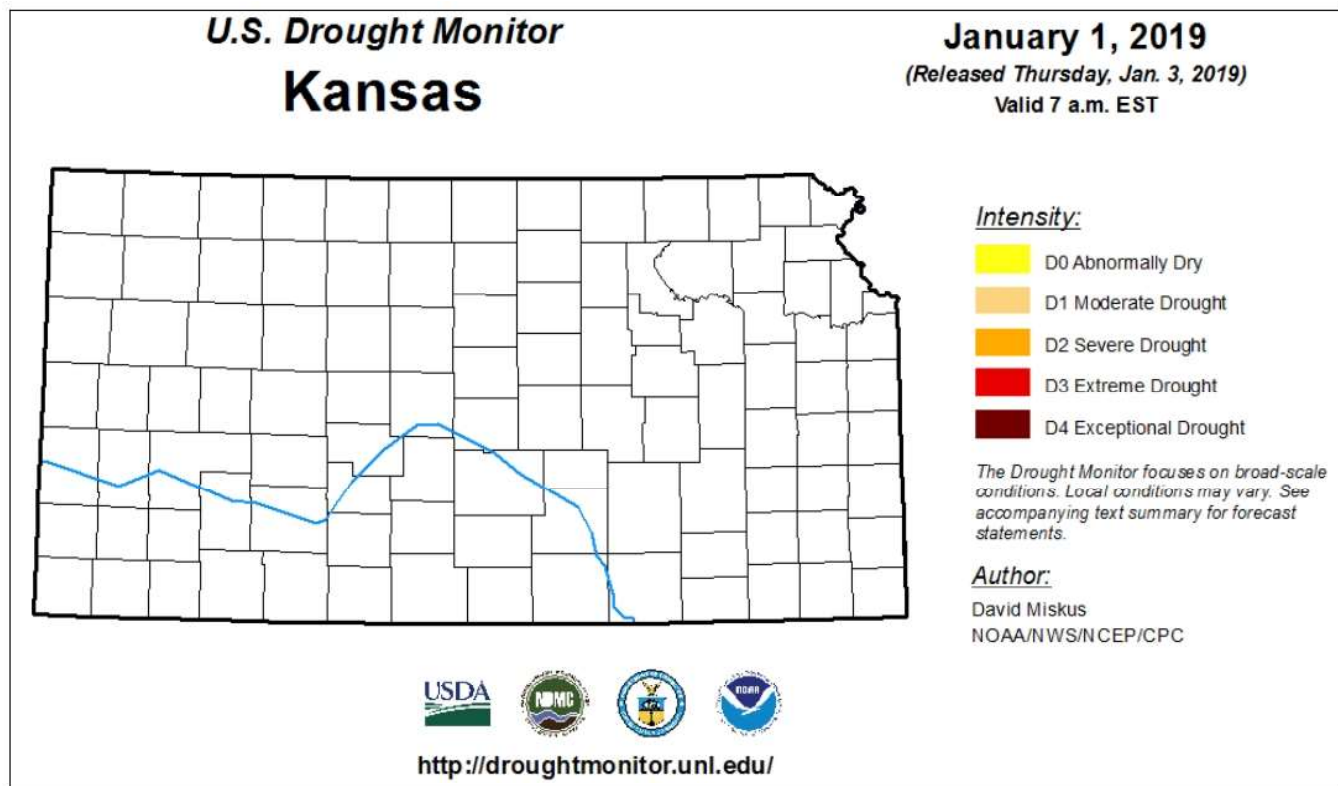
Drought is an abnormally dry period lasting months or years when an area has a deficiency of water and precipitation in its surface and/or underground water supply. The hydrological imbalance can be grouped into the following non-exclusive categories.



- **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.

### 4.10.1 – Location and Extent

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



#### 4.10.2 – 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 4.48: 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 L was in each Drought Monitor category.

**Table 4.49: Percentage of Kansas Region L in U.S. Drought Monitor Category, 2009-2018**

Year	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2018	21.6%	78.4%	30.2%	24.8%	12.5%	3.5%
2017	61.6%	38.4%	9.6%	0.0%	0.0%	0.0%
2016	85.8%	14.2%	0.0%	0.0%	0.0%	0.0%
2015	71.9%	28.1%	0.0%	0.0%	0.0%	0.0%
2014	37.5%	62.5%	18.7%	0.0%	0.0%	0.0%
2013	22.8%	75.3%	32.2%	17.0%	0.0%	0.0%
2012	38.5%	61.5%	53.8%	48.1%	14.7%	6.5%
2011	43.0%	57.0%	19.2%	6.0%	0.0%	0.0%
2010	96.2%	3.8%	0.0%	0.0%	0.0%	0.0%
2009	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Source: U.S. Drought Monitor

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

**Table 4.50: Kansas Region L Secretarial Drought Declarations, 2014 - 2017**

Year	Number of Secretarial Drought Disaster Declarations	Designation Numbers and Region County Included in Designation
2018	10	S4362 (Johnson), S4374 (Johnson), S4400 (Johnson), S4362 (Leavenworth), S4368 (Leavenworth), S4369 (Leavenworth), S4377 (Leavenworth), S4362 (Wyandotte), S4369 (Wyandotte), S4374 (Wyandotte)



**Table 4.50: Kansas Region L Secretarial Drought Declarations, 2014 - 2017**

Year	Number of Secretarial Drought Disaster Declarations	Designation Numbers and Region County Included in Designation
2017	0	-
2016	0	-
2015	0	-
2014	0	-

Source: USDA Farm Service Agency

Available 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 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates 66 drought related claims on 35,915 acres for \$1,681,169.

**Table 4.51: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Drought**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	28	28,597	\$1,025,839
Leavenworth	32	7,035	\$629,882
Wyandotte	6	283	\$25,448

Source: USDA

### 4.10.3 – Hazard Probability Analysis

Reviewing historical data from the U.S. Drought Monitor weekly reports from the years 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 4.52: Kansas Region L Estimated Probability of Being in U.S. Drought Monitor Category**

None	D0-D4	D1-D4	D2-D4	D3-D4	D4
57.9%	41.9%	16.4%	9.6%	2.7%	1.0%

Additionally, over the five-year period 2014 to 2018 there was only one year with a USDA Declared Secretarial Drought Disaster, equating to 20% 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 **Johnson County**

**Table 4.53: Johnson County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	28
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	25,597
Average Number of Acres Damaged per Year	5,719
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$1,025,839
Average Crop Damage per Year	\$205,168

Source: USDA



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

- Six insurance claims
- 5,719 acres impacted
- \$205,168 in insurance claims

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

**Table 4.54: Leavenworth County Drought Agricultural Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	32
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	7,035
Average Number of Acres Damaged per Year	1,407
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$629,882
Average Crop Damage per Year	\$125,976

Source: USDA

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

- Six insurance claims
- 1,407 acres impacted
- \$125,976 in insurance claims

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

**Table 4.55: Wyandotte County Drought Agricultural Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	6
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	283
Average Number of Acres Damaged per Year	57
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$25,448
Average Crop Damage per Year	\$5,089

Source: USDA

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

- One insurance claim
- 57 acres impacted
- \$5,089 in insurance claims



#### 4.10.4 Vulnerability Analysis

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

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L County. USDA Risk Management Agency crop loss data (2015 – 2018) allows us to quantify the monetary impact of drought conditions on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to drought events.

**Table 4.56: Kansas Region L USDA Annual Drought Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	5,719	5.76%	\$24,370,000	\$205,168	0.842%
Leavenworth	184,471	1,407	0.76%	\$36,367,000	\$125,976	0.35%
Wyandotte	12,009	57	0.47%	\$3,291,000	\$5,089	0.15%

Source: USDA

Additional predictions about drought vulnerability can be made by reviewing data with the National Weather Service (NWS) Climate Prediction Center at [www.cpc.ncep.noaa.gov/products/expert\\_assessment/sdo\\_summary.php](http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php).

#### 4.10.5 – Impact and Consequence Analysis

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

**Table 4.56: 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.



## 4.11 – Winter Storm

Winter weather in Kansas Region L 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.



### 4.11.1 – Location and Extent

All of Kansas Region L is susceptible to severe winter storms. For winter weather, the NWS describes the different types of events as follows:

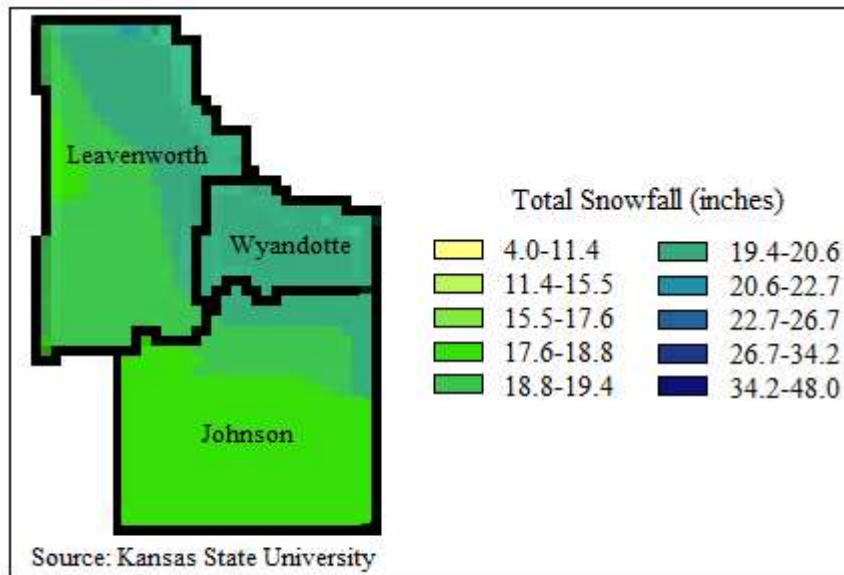
- **Blizzard:** Winds of 35 mph or more with snow and blowing snow reducing visibility to less than 1/4 mile for at least three hours.
- **Blowing Snow:** Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls:** Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- **Snow Showers:** Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Freezing Rain:** Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces forming a coating or glaze of ice. Most freezing-rain events are short lived and occur near sunrise between the months of December and March.
- **Sleet:** Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects.

The following map, generated Kansas State University, indicates the average annual snowfall for Kansas Region L for a given year.



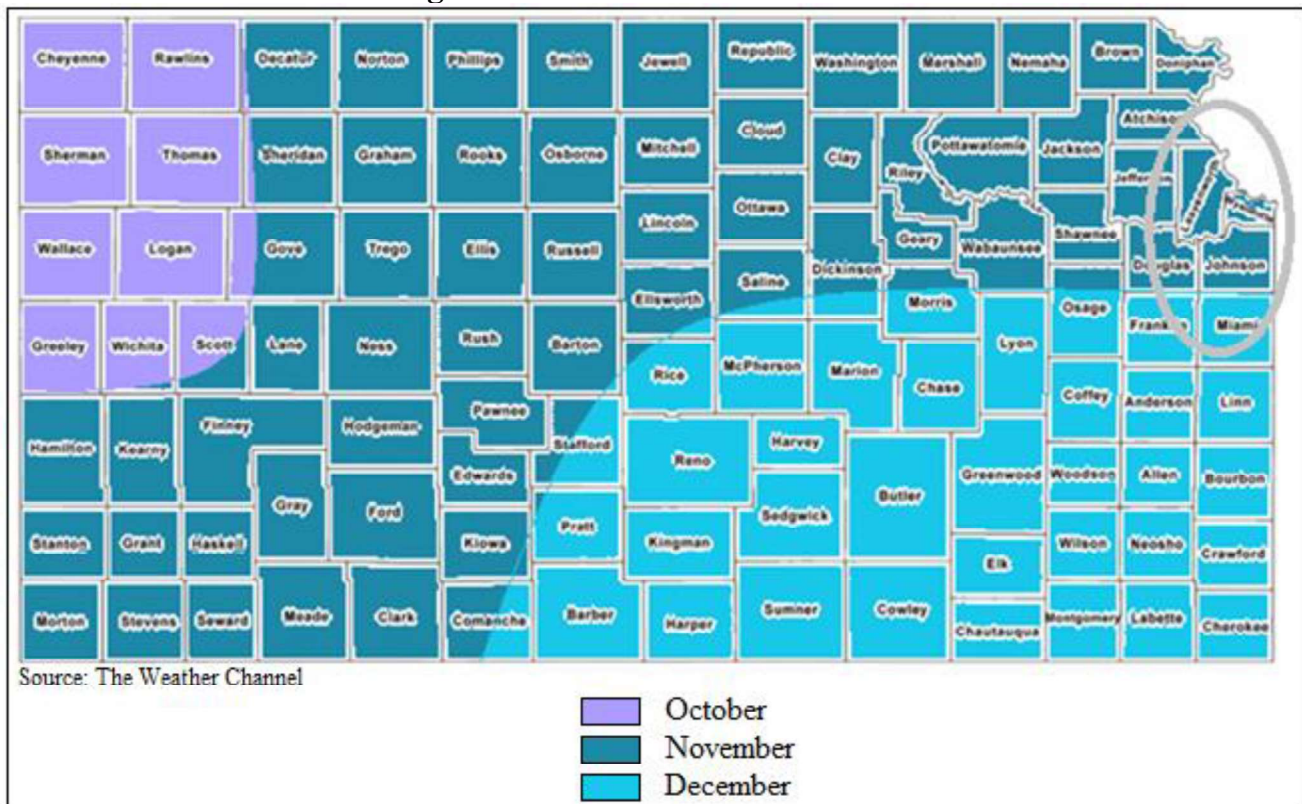


### Average Annual Snowfall, 1981-2010



Additionally, as indicated by the map below, Kansas Region L can expect to receive the first measurable snow in November of each year.

### Average Date of First Measurable Snowfall



#### 4.11.2 – Previous Occurrences

For the 20-year period of 1999 to 2018 (with 1999 and 2018 being full data set years), there have been four Presidential Disaster Declarations for the State of Kansas Region L for severe winter storms. The following information is presented to provide a historical perspective on severe winter storm events that have impacted Kansas Region L. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2013.

**Table 4.57: Kansas Region L FEMA Severe Winter Storms Disaster and Emergency Declarations, 2002 -2017**

<b>Declaration Number</b>	<b>Incident Period</b>	<b>Disaster Description</b>	<b>Regional Counties Involved</b>	<b>Dollars Obligated</b>
1885	03/09/2010 (12/9/2009-1/8/2010)	Severe Winter Storms and Snowstorm	Wyandotte	\$19,100,658
1741	02/01/2008	Severe Winter Storms	Leavenworth	\$359,557,345
1579	2/8/2005 (1/4-6/2005)	Severe Winter Storm, Heavy Rains, and Flooding	Leavenworth and Wyandotte	\$106,873,672
1402	2/6/2002 (1/29-2/15/2002)	Ice Storm	Johnson, Leavenworth, and Wyandotte	\$60,185,754

Source: FEMA

The following presents NOAA NCEI data concerning winter storm events in Kansas Region L. It is worth noting that the NCEI data is regional, and sometimes statewide. As such reported damage is not specific to the county nor to any of the participating jurisdictions.

**Table 4.58: Kansas Region L NCEI Winter Storm Events, 2009 - 2018**

<b>Event Type</b>	<b>Number of Days with Events</b>	<b>Property Damage</b>	<b>Deaths</b>	<b>Injuries</b>
Blizzards	3	\$0	0	0
Ice Storm	1	\$0	0	0
Winter Storms	11	\$0	0	0

Source: NOAA NCEI

As there were no reported damages, deaths, or injuries, descriptions of these events can be found on the NOAA NCEI website:

- [www.NCEI.noaa.gov/stormevents/ftp.jsp](http://www.NCEI.noaa.gov/stormevents/ftp.jsp)

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of winter storms on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates nine winter storm related claims of 753 acres for \$27,700.



**Table 4.59: USDA Risk Management Agency Cause of Loss Indemnities  
2014-2018, Winter Storms**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	7	630	\$26,673
Leavenworth	2	123	\$1,027
Wyandotte	0	0	\$0

Source: USDA

### 4.11.3 – 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 L**.

**Table 4.60: Kansas Region L Winter Storm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	14
Average Event Days per Year	1
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 L can expect on a yearly basis, relevant to winter storm events:

- One event
- No deaths or injuries
- \$0 in property damages

The following table summarizes USDA Risk Management Agency winter storm event data for **Johnson County**.

**Table 4.61: Johnson County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	7
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	630
Average Number of Acres Damaged per Year	126
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$26,673
Average Crop Damage per Year	\$5,335

Source: USDA

According to the USDA Risk Management Agency, Johnson County can expect on a yearly basis, relevant to winter storm occurrences:

- One insurance claim



- 126 acres impacted
- \$5,335 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Leavenworth County**.

**Table 4.62: Leavenworth County Winter Storm Probability Summary (Agricultural)**

<b>Data</b>	<b>Recorded Impact</b>
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	2
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	123
Average Number of Acres Damaged per Year	25
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$1,027
Average Crop Damage per Year	\$205

Source: USDA

According to the USDA Risk Management Agency, Leavenworth County can expect on a yearly basis, relevant to winter storm occurrences:

- Less than one insurance claims
- 25 acres impacted
- \$205 in insurance claims

The following table summarizes USDA Risk Management Agency winter storm event data for **Wyandotte County**.

**Table 4.63: Wyandotte County Winter Storm Probability Summary (Agricultural)**

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

Source: USDA

According to the USDA Risk Management Agency, Wyandotte County can expect on a yearly basis, relevant to winter storm occurrences:

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

In addition, Kansas Region L has had four 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.



#### 4.11.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to winter storm events. Counties with a higher or increasing population, and/or a high or increasing structural valuation are to be considered to have a potentially greater vulnerability.

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region L county incurring damage over the period 2009 to 2018 from winter storm events. A greater percentage of damaged structures damaged may indicate a greater potential future vulnerability.

**Table 4.64: Kansas Region L Structural Vulnerability Data for Winter Storms**

County	HAZUS Building Valuation	NCEI Structure Damage, 2009-2018	Percentage of Building Valuation Damaged
Johnson	\$124,279,962,000	\$0	0.0%
Leavenworth	\$13,050,342,000	\$0	0.0%
Wyandotte	\$29,708,946,000	\$0	0.0%

Source: NCEI and HAZUS

Counties with a high population and/or a growing population may be at increased risk.

**Table 4.65: Kansas Region L Population Vulnerability Data for Winter Storms**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L 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 potential future vulnerability the county may have to winter storm events.

**Table 4.66: Kansas Region L USDA Annual Winter Storm Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	126	0.13%	\$24,370,000	\$5,335	0.02%
Leavenworth	184,471	25	0.01%	\$36,367,000	\$205	0.001%
Wyandotte	12,009	57	0.47%	\$3,291,000	\$5,089	0.15%

Source: USDA



#### 4.11.5 – Impact and Consequence Analysis

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

**Table 4.67: Winter Storm Consequence Analysis**

<b>Subject</b>	<b>Impacts of Winter Storm</b>
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.





## 4.12 – 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 Region L can seriously impact public health, functioning of communities and the region's economy. Disruptions to utilities can occur from many of the hazards detailed in this plan, but the most likely causes include:

- Floods
- Lightning
- Tornadoes and Windstorms
- Winter Storms

In addition to being impacted by another listed hazard, utilities and infrastructure can fail as a result of faulty equipment, lack of maintenance, degradation over time, or accidental damage.

### 4.12.1 – Location and Extent

All of Kansas Region L 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 L is provided by either investor-owned utilities or rural electric cooperatives (RECs). RECs are not-for-profit, member-owned electric utilities. Kansas RECs are governed by a board of trustees elected from the membership. Most Kansas RECs were set up under the Kansas Electric Cooperative Act, which, together with the federal Rural Electrification Act of 1934, made electric power available to rural customers. Information on regional electrical suppliers may be found at [www.kec.org/servicearea\\_map.html](http://www.kec.org/servicearea_map.html). Additionally, locations of electric certified areas and transmission lines may be found at [www.kcc.state.ks.us/maps/ks\\_electric\\_certified\\_areas.pdf](http://www.kcc.state.ks.us/maps/ks_electric_certified_areas.pdf).

#### *Transportation Routes*

Transportation routes can also be impacted by many of the hazards discussed in this plan. The primary hazards that impact transportation are flood, hazardous materials, and winter weather. Flood events can



make roads and bridges impassible due to high water. Flood waters can also erode or scour 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 L is available at [www.kcc.state.ks.us/maps/ks\\_telephone\\_certified\\_areas.pdf](http://www.kcc.state.ks.us/maps/ks_telephone_certified_areas.pdf).

## **4.12.2 – Previous Occurrences**

Each year disruptions to utility services ranging from minor to serious are a secondary result of other hazard events including drought, flood, tornado, windstorm, winter storm, lightning, and extreme heat.

## **4.12.3 – 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 on a regular basis.



#### 4.12.4 – 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 L. 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 4.68: FEMA Benefit-Cost Analysis**

<b>Loss of Electric Power</b>	<b>Cost of Complete Loss of Service</b>
Total Economic Impact	\$131 per person per day
Loss of Potable Water Service	Cost of Complete Loss of Service
Total Economic Impact	\$103 per person per day
Loss of Wastewater Service	Cost of Complete Loss of Service
Total Economic Impact	\$45 per person per day
Loss of Road/Bridge Service	Cost of Complete Loss of Service
Vehicle Delay Detour Time	\$29.63 per vehicle per hour (one-way trips)
Vehicle Delay Mileage	\$0.54 per mile (or current federal mileage rate)

Source: FEMA BCA Reference Guide, June 2009, Appendix C

#### 4.12.5 – Impact and Consequence Analysis

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

**Table 4.69: Utility/Infrastructure Failure Consequence Analysis**

<b>Subject</b>	<b>Impacts of Utility/Infrastructure Failure</b>
Health and Safety of Persons in the Area of the Incident	Localized impact will be moderate to severe for persons with functional and access needs, and the elderly, depending on length of failure and time of year.
Responders	Impact to responders will be minimal if properly trained and equipped.
Continuity of Operations	Due to the nature of the hazard, the COOP plan is not expected to be activated, however, if the recovery time is excessive than temporary relocation may become necessary.
Property, Facilities, and Infrastructure	Impact is dependent on the nature of the incident, e.g., electric, water, sewage, gas, communication disruptions.
Environment	Impact, depending on the nature of the incident, should be minimal.



**Table 4.69: Utility/Infrastructure Failure Consequence Analysis**

<b>Subject</b>	<b>Impacts of Utility/Infrastructure Failure</b>
Economic Conditions	Economic conditions could be adversely affected depending on damages suffered, extent of damages, etc.
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.



## 4.13 – 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.

### 4.13.1 – Location and Extent

In Kansas Region L, 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 540 Tier II Facilities housing hazardous chemicals in Kansas Region L. The following table details the number of Tier II facilities by county.

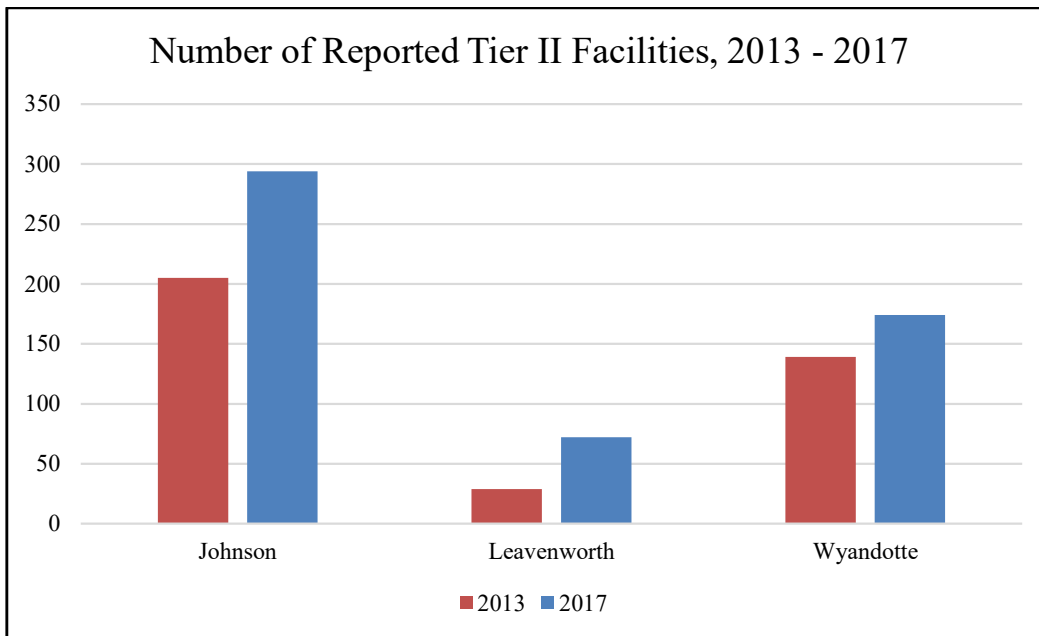
**Table 4.70: Kansas Region L Tier II Facilities by County**

County	Tier II Facilities
Johnson	294
Leavenworth	72
Wyandotte	174

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 Kansas Department of Health and Environment (KDHE) to facilities that house hazardous chemicals





The National Priorities List 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 Environmental Protection Agency (EPA) has indicated that the following Superfund sites are located with Kansas Region L.

**Table 4.71: Kansas Region L National Priorities List Facilities**

Facility Name	Location	County
Chemical Commodities, Inc.	Olathe	Johnson
Doepke Disposal (Holliday)	No Specified	Johnson

Source: EPA

### ***Transportation***

The following table, from Kansas Department of Transportation (KDOT), presents total roadway mileage by county.

**Table 4.72: Kansas Region L Total Roadway Mileage by County**

County	Interstates (Miles)
Johnson	3,389
Leavenworth	1,166
Wyandotte	1,148

Source: KDOT

Kansas Region L 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 L 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

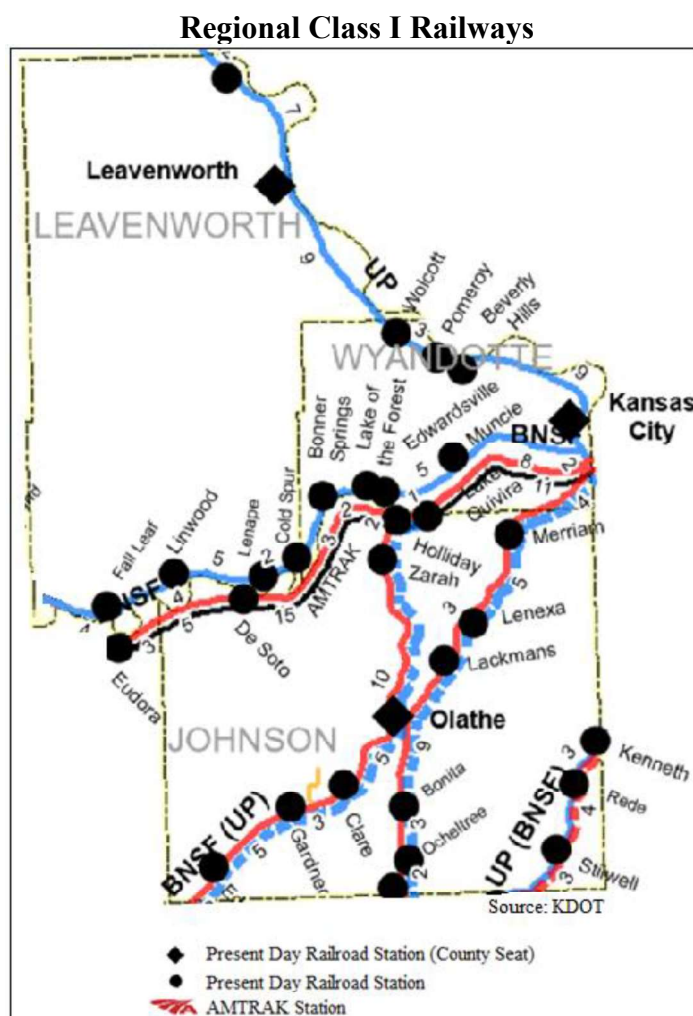
The following table, with information from KDOT, provides the total railroad track mileage of for each county within Kansas Region L.

**Table 4.73: Kansas Region L Railroad Track Mileage**

	Class I Track Mileage
Johnson	85
Leavenworth	34
Wyandotte	86

Source: KDOT

The following map, from KDOT, shows Class I track locations in Kansas Region L.

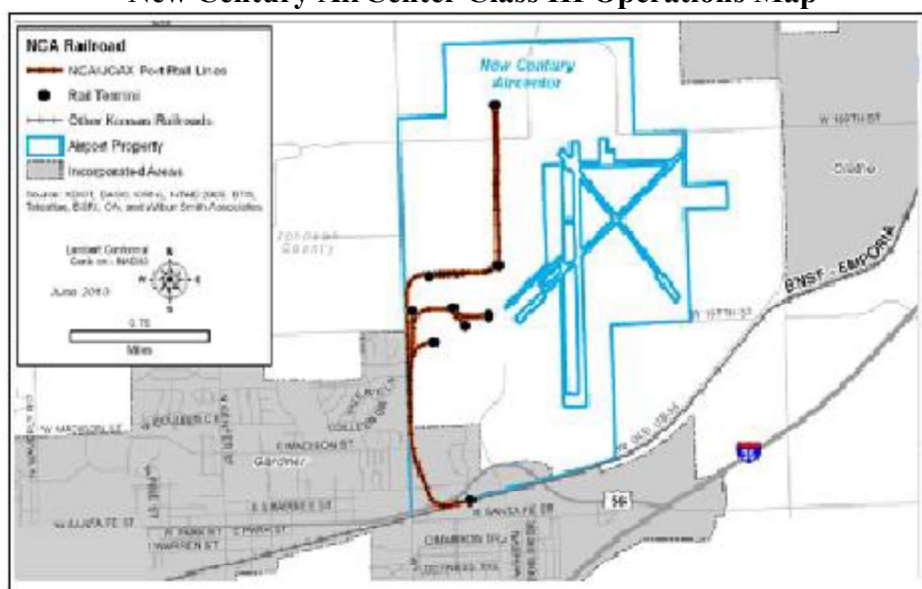


Class III carriers providing line haul services are known as short lines. Class III railroads are small railroads that provide connections for their shippers to the Class I railroads and the national rail system.

Two Class III, or local, terminal and switching railroads, operate in Kansas Region L.

- The Kansas City Terminal Railway Company provides dispatching and switching services for trains in and out of the metropolitan Kansas City area, with approximately three route miles Wyandotte County.
- New Century AirCenter is a 2,300-acre inland port located along the I-35 corridor in Johnson County with five miles of rail lines.

**New Century AirCenter Class III Operations Map**



## 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 4.74: PHMSA Pipeline Mileage by County**

County	Gas (miles)	Liquid (miles)
Johnson	229	137
Leavenworth	107	104
Wyandotte	67	167

Source: KDEM and PHMSA



#### 4.13.2 – 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 L county over the three-year period 2013-2015 (due to system changes, the most current data available).

**Table 4.75: Kansas Region L HazMat KDEM Reported Incidents, 2013-2015**

<b>Jurisdiction</b>	<b>Incidents</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>People Evacuated</b>
Johnson	9	0	0	21
Leavenworth	4	0	0	12
Wyandotte	19	0	0	15

Source: KDEM

Hazardous Materials Regulations (49 CFR Parts 171-180) require certain types of HazMat incidents be reported, with data tracked by PHMSA's Office of Hazardous Materials Safety (OHMS) by transportation category type (Air, Highway, Rail and Water). The OHMS Incident Report Database from 2010 to 2018 indicated 2,153 reported incidents within Kansas Region L for the period 2000 through 2018. The following charts detail the number of events per year per transportation category.

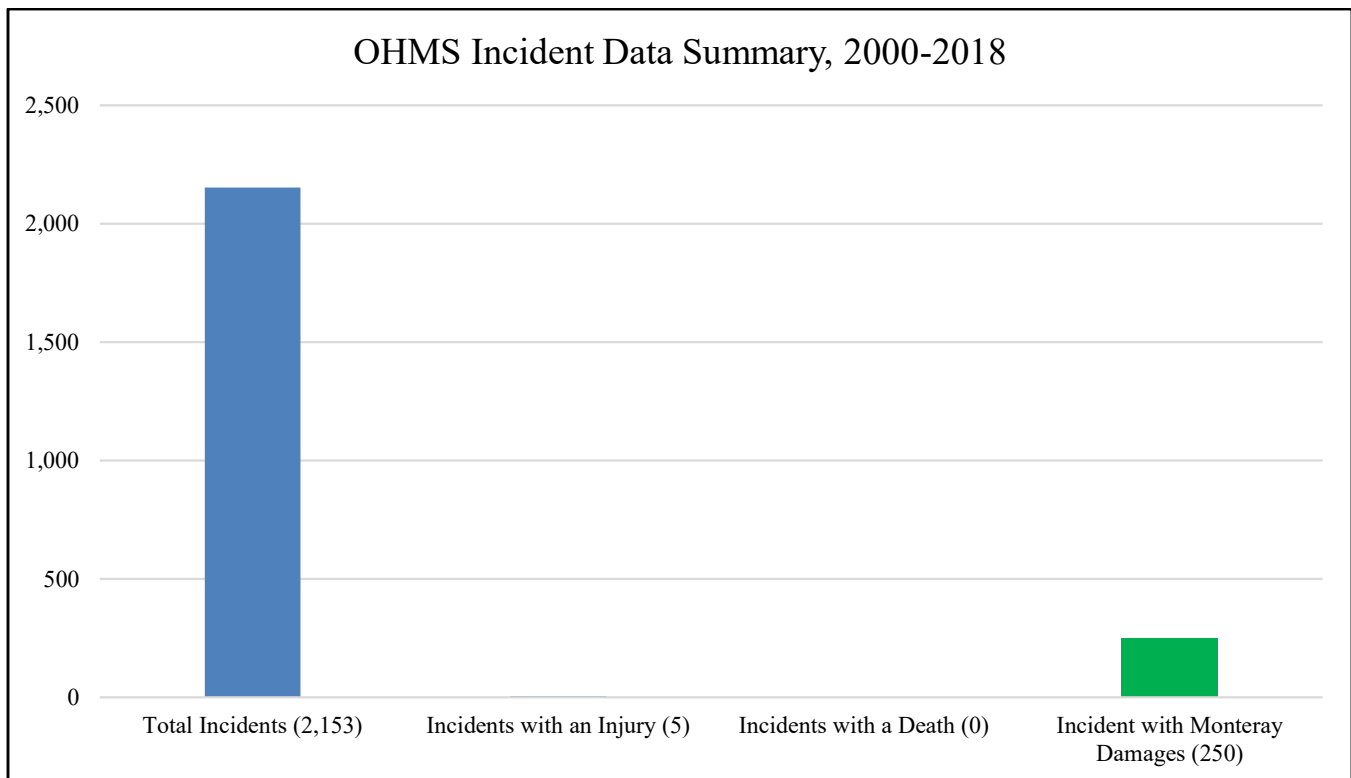
**Table 4.76: Kansas Region L OHMS HazMat Incidents, 2000-2018**

<b>Jurisdiction</b>	<b>Highway</b>	<b>Air</b>	<b>Rail</b>	<b>Damages</b>	<b>Injuries</b>	<b>Deaths</b>
<b>Johnson County</b>						
Edgerton	6	0	0	\$501	0	0
Leawood	1	0	0	\$235,200	0	0
Lenexa	781	27	0	\$3,500	1	0
Mission	1	0	0		0	0
Olathe	10	0	0	\$379,409	0	0
Overland Park	3	0	0	\$3,500	0	0
Shawnee	363	1	0	\$18,150	2	0
<b>Leavenworth County</b>						
Lansing	1	0	0	\$0	0	0
Tonganoxie	1	0	0	\$0	0	0
<b>Wyandotte County</b>						
Edwardsville	352	0	0	\$1,200	0	0
Kansas City	563	5	41	\$737,420	2	0

Source: PHMSA OHMS

The following chart summarizes all reported PHMSA OHMS incidents, including number of deaths and injuries.





Data from PHMSA provides significant incident reports for the pipeline systems in the Kansas Region L. 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 4.77: Kansas Region L PHMSA Reported Pipeline Incidents by County, 2013 to 2017**

County	Number of Incidents	Fatalities	Injuries	Total Damage	Gross Barrels Spilled
Johnson	5	0	0	\$1,910,024	8
Leavenworth	2	0	1	\$38,300	3
Wyandotte	3	0	0	\$261,143	309

Source: PHMSA

### 4.13.3 – 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 **fixed facility related HazMat events** for **Johnson County** using data from KDEM.



**Table 4.78: Johnson County KDEM Fixed Facility Reported  
HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2013-2015)	9
Average Events per Year	3
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Total Number of Evacuated People (2013-2015)	21
Average Number of Evacuated People per Year	7

Source: KDEM

Data indicates that Johnson County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- Three events
- No deaths or injuries
- Seven persons evacuated

The following tables summarize occurrence data and probability for **fixed facility related HazMat events** for **Leavenworth County** using data from KDEM.

**Table 4.79: Leavenworth County KDEM Fixed Facility Reported  
HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2013-2015)	4
Average Events per Year	1
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Total Number of Evacuated People (2013-2015)	12
Average Number of Evacuated People per Year	4

Source: KDEM

Data indicates that Leavenworth County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- One event
- No deaths or injuries
- Four persons evacuated

The following tables summarize occurrence data and probability for **fixed facility related HazMat events** for **Wyandotte County** using data from KDEM.



**Table 4.80: Wyandotte County KDEM Fixed Facility Reported HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2013-2015)	19
Average Events per Year	6
Number of Reported Deaths (2013-2015)	0
Average Deaths per Year	0
Number of Reported Injuries (2013-2015)	0
Average Injuries per Year	0
Total Number of Evacuated People (2013-2015)	15
Average Number of Evacuated People per Year	5

Source: KDEM

Data indicates that Wyandotte County can expect on a yearly basis, relevant to fixed facility related HazMat events:

- Six events
- No deaths or injuries
- Five persons evacuated

The following tables summarize occurrence data and probability for **transportation related HazMat** events for **Johnson County** using data from OHMS.

**Table 4.81: Johnson County Transportation HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2010-2018)	1,188
Average Events per Year	132
Number of Reported Deaths (2010-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2010-2018)	3
Average Injuries per Year	<1
Monetary Damages (2010-2018)	\$640,260
Average Monetary Damages per Year	\$71,140

Source: PHMSA

Data indicates that Johnson County can expect on a yearly basis, relevant to transportation related HazMat events:

- 133 events
- No deaths
- Less than one injury
- \$71,140 in monetary damages

The following tables summarize occurrence data and probability for **transportation related HazMat** events for **Leavenworth County** using data from OHMS.





**Table 4.82: Leavenworth County Transportation HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2010-2018)	2
Average Events per Year	<1
Number of Reported Deaths (2010-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2010-2018)	0
Average Injuries per Year	0
Monetary Damages (2010-2018)	\$0
Average Monetary Damages per Year	\$0

Source: PHMSA

Data indicates that Leavenworth County can expect on a yearly basis, relevant to transportation related HazMat events:

- <1 event
- No deaths or injuries
- No monetary damages

The following tables summarize occurrence data and probability for **transportation related HazMat** events for **Wyandotte County** using data from OHMS.

**Table 4.83: Wyandotte County Transportation HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2010-2018)	963
Average Events per Year	107
Number of Reported Deaths (2010-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2010-2018)	2
Average Injuries per Year	<1
Monetary Damages (2010-2018)	\$738,620
Average Monetary Damages per Year	\$82,069

Source: PHMSA

Data indicates that Wyandotte County can expect on a yearly basis, relevant transportation related HazMat events:

- 107 events
- No deaths
- Less than one injury
- \$82,069 in monetary damages

The following table summarizes PHMSA's OHMS data for **pipeline related HazMat** events for **Johnson County** for the period 2013 through 2017.



**Table 4.84: Johnson County Pipeline HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2013-2017)	5
Average Events per Year	1
Number of Reported Deaths (2013-2017)	0
Average Deaths per Year	0
Number of Reported Injuries (2013-2017)	0
Average Injuries per Year	0
Monetary Damages (2013-2017)	\$1,910,024
Average Monetary Damages per Year	\$382,005

Source: PHMSA

Data indicates that Johnson County can expect on a yearly basis, relevant to pipeline related HazMat events:

- One event
- No deaths or injuries
- \$382,005 in monetary damages

The following table summarizes PHMSA's OHMS data for **pipeline related HazMat events** for **Leavenworth County** for the period 2013 through 2017.

**Table 4.85: Leavenworth County Pipeline HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2013-2017)	2
Average Events per Year	<1
Number of Reported Deaths (2013-2017)	0
Average Deaths per Year	0
Number of Reported Injuries (2013-2017)	0
Average Injuries per Year	0
Monetary Damages (2013-2017)	\$38,300
Average Monetary Damages per Year	\$7,660

Source: PHMSA

Data indicates that Leavenworth County can expect on a yearly basis, relevant to pipeline related HazMat events:

- Less than one event
- No deaths or injuries
- \$7,660 in monetary damages

The following table summarizes PHMSA's OHMS data for **pipeline related HazMat events** for **Wyandotte County** for the period 2013 through 2017.



**Table 4.86: Wyandotte County Pipeline HazMat Incident Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Reported Events (2013-2017)	3
Average Events per Year	<1
Number of Reported Deaths (2013-2017)	0
Average Deaths per Year	0
Number of Reported Injuries (2013-2017)	0
Average Injuries per Year	0
Monetary Damages (2013-2017)	\$261,143
Average Monetary Damages per Year	\$52,229

Source: PHMSA

Data indicates that Wyandotte County can expect on a yearly basis, relevant to pipeline related HazMat events:

- Less than one event
- No deaths or injuries
- \$52,229 in monetary damages

While National Priority List (Superfund) sites have been identified by the EPA as requiring cleanup, the probability of an incident endangering the public from these sites is low due to active identification and remediation measures.

#### 4.13.4 – 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 L county located within ½ mile of a chemical facility. The locations of colleges, educational and correctional institution facilities is from the Kansas Data Access & Support Center, health facilities data is from HAZUS, aging facilities is from KDEM and child care facilities is from KDHE.

**Table 4.87: Kansas Region L Special Population Facilities  
Within 0.5 Miles of a Chemical Facility**

<b>County</b>	<b>Health Facilities</b>	<b>Colleges</b>	<b>Educational Facilities</b>	<b>Aging Facilities</b>	<b>Child Care</b>	<b>Correctional Institutions</b>
Johnson	4	14	53	37	340	5
Leavenworth	1	1	12	2	31	2
Wyandotte	2	2	33	3	102	5

Source: KDEM

Building and structure vulnerability for each county is a function of the following component parts:

- Building and structure change over time
- Building and structure density



Counties with a high and/ or growing number of structures may be at increased risk.

It is worth highlighting all Kansas Region L counties may have increased vulnerability to HazMat events due to a projected increase in the number of structures.

Counties with a high population and/or a growing population may be at increased risk.

**Table 4.88: Kansas Region L Population Vulnerability Data for HazMat Event**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

Source: US Census Bureau

#### 4.24.5 – Impact and Consequence Analysis

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

**Table 4.89: 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.



## 4.14 – Wildfire

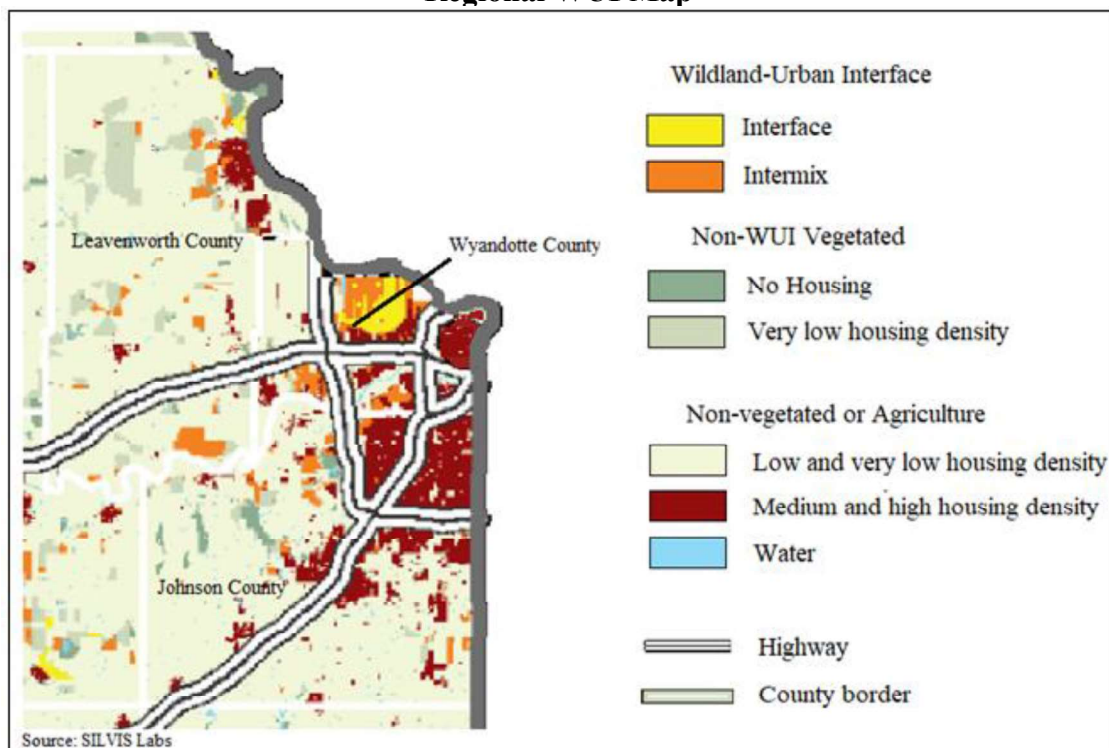
The NWS defines a wildfire as any free burning uncontrollable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. They can occur naturally, by human accident, and on rare occasions by human action. Population de-concentration in the U.S. has resulted in rapid development in the outlying fringe of metropolitan areas and in rural areas with attractive recreational and aesthetic amenities, especially forests. This expansion has increased the likelihood that wildfires will threaten life and property.



### 4.14.1 – Location and Extent

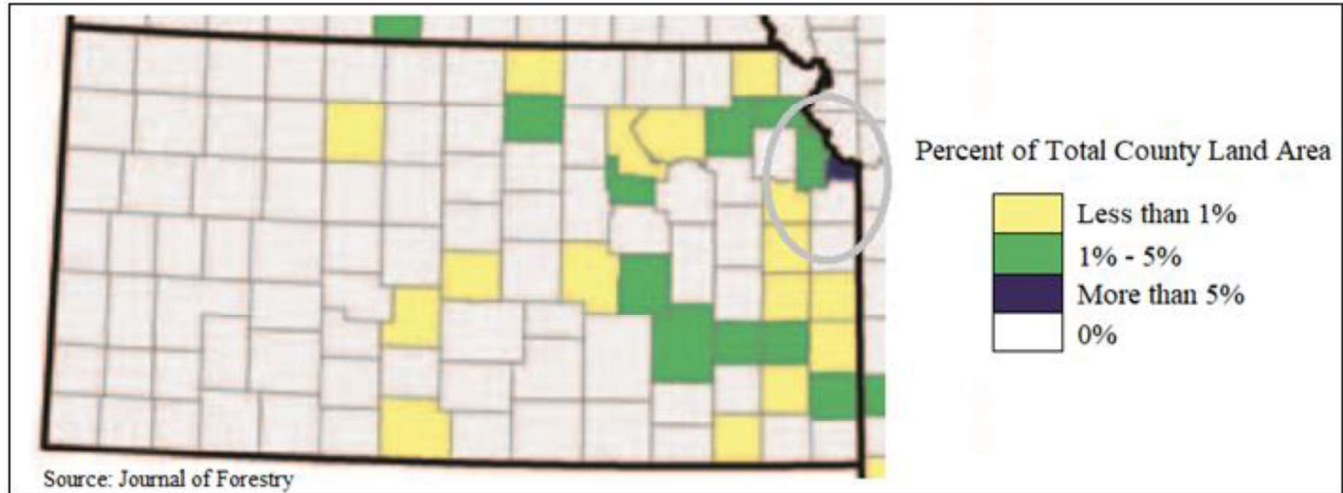
Wildfires in Kansas Region L typically originate in pasture or prairie areas following the ignition of dry grasses (by natural or human sources). According to the 2011 Kansas Forest Action Plan, with the exception of Eastern Redcedar, most forest types in Kansas do not pose significant fire management issues. However, grasslands, which make up a majority of the open areas in Kansas Region L, 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 L.

**Regional WUI Map**



The Eastern Redcedar is of concern to Kansas Region L. 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.

**Percentage of Region Land Area Covered by Eastern Redcedar**



#### 4.14.2 – Previous Occurrences

The Office of the State of Kansas Fire Marshall's Office (KSFM) was contacted concerning the size and origin of reported wildfires for the region. The following table lists all recorded wildfires, by county, for the six-year period 2013-2018 (currently available data).

**Table 4.90: Johnson County State Fire Marshall Recorded Wildfire Events, 2013-2018**

County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Johnson	Paola	2013	Brush, or brush and grass mixture fire	0	0	0	10
Johnson	Spring Hill	2013	Brush, or brush and grass mixture fire	0	0	0	10
Johnson	Olathe	2013	Grass fire	0	0	0	10
Johnson	Gardner	2014	Brush, or brush and grass mixture fire	0	0	0	10
Johnson	Gardner	2014	Grass fire	0	0	0	10
Johnson	Gardner	2014	Grass fire	0	0	1	18
Johnson	Bucyrus	2014	Grass fire	0	0	0	20
Johnson	Lenexa	2014	Grass fire	0	0	0	20
Johnson	Spring Hill	2014	Brush, or brush and grass mixture fire	0	0	0	60
Johnson	Stilwell	2015	Grass fire	0	0	0	10
Johnson	Olathe	2015	Grass fire	0	0	0	10
Johnson	Hillsdale	2015	Brush, or brush and grass mixture fire	0	0	0	10
Johnson	Stilwell	2015	Grass fire	0	0	0	20





County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Johnson	Edgerton	2015	Grass fire	0	0	0	20
Johnson	Spring Hill	2015	Brush, or brush and grass mixture fire	0	0	0	30
Johnson	Spring Hill	2015	Grass fire	0	0	0	60
Johnson	Olathe	2015	Grass fire	0	0	0	60
Johnson	Spring Hill	2015	Grass fire	0	0	0	80
Johnson	Spring Hill	2015	Grass fire	0	0	0	80
Johnson	Spring Hill	2015	Grass fire	0	0	0	80
Johnson	Hillsdale	2015	Brush, or brush and grass mixture fire	0	0	0	250
Johnson	Edgerton	2016	Brush, or brush and grass mixture fire	0	0	0	10
Johnson	Bucyrus	2016	Grass fire	0	0	0	15
Johnson	Olathe	2016	Grass fire	0	0	0	45
Johnson	Edgerton	2017	Brush, or brush and grass mixture fire	0	0	0	10
Johnson	Edgerton	2017	Brush, or brush and grass mixture fire	0	0	0	15
Johnson	Gardner	2017	Grass fire	0	0	0	20
Johnson	Spring Hill	2017	Grass fire	0	0	0	25
Johnson	Gardner	2017	Brush, or brush and grass mixture fire	0	0	0	30
Johnson	Hillsdale	2017	Brush, or brush and grass mixture fire	0	0	0	60
Johnson	Hillsdale	2017	Grass fire	0	0	0	80
Johnson	Hillsdale	2018	Brush, or brush and grass mixture fire	0	0	0	10
Johnson	DeSoto	2018	Grass fire	0	0	0	10
Johnson	Edgerton	2018	Brush, or brush and grass mixture fire	0	0	0	10
Johnson		2018	Grass fire	0	0	0	10
Johnson	Spring Hill	2018	Grass fire	0	0	0	10
Johnson	Bucyrus	2018	Grass fire	0	0	0	12
Johnson	Chiles	2018	Grass fire	0	0	0	12
Johnson	Bucyrus	2018	Brush, or brush and grass mixture fire	0	0	0	15
Johnson	Bucyrus	2018	Brush, or brush and grass mixture fire	0	0	0	15
Johnson	Shawnee	2018	Grass fire	0	0	0	15.5
Johnson	Spring Hill	2018	Brush, or brush and grass mixture fire	0	0	0	16
Johnson	Hillsdale	2018	Grass fire	0	0	0	20
Johnson	Johnson County	2018	Brush, or brush and grass mixture fire	0	0	0	20
Johnson	Olathe	2018	Grass fire	0	0	0	20



County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Johnson	Johnson County	2018	Natural vegetation fire, other	0	0		25
Johnson	Overland Park	2018	Grass fire	0	0	0	27
Johnson	Johnson County	2018	Brush, or brush and grass mixture fire	0	0	0	30
Johnson	Gardner	2018	Brush, or brush and grass mixture fire	0	0	0	30
Johnson	Miami County	2018	Brush, or brush and grass mixture fire	0	0	0	50
Johnson	Johnson County	2018	Natural vegetation fire, other	0	0	0	80
Johnson	Olathe	2018	Brush, or brush and grass mixture fire	0	0	0	80

Source: KSFM

**Table 4.91: Leavenworth County State Fire Marshall Recorded Wildfire Events, 2013-2018**

County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Leavenworth	Linwood	2013	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Tonganoxie	2013	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Tonganoxie	2013	Brush, or brush and grass mixture fire	0	0	0	25
Leavenworth	Tonganoxie	2014	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Bonner Springs	2014	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Basehor	2014	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Basehor	2014	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Easton Twp.	2014	Grass fire	0	0	1	20
Leavenworth	Easton Twp.	2014	Brush, or brush and grass mixture fire	0	0	0	25
Leavenworth	Easton Twp.	2014	Brush, or brush and grass mixture fire	0	0	0	25
Leavenworth	Easton Twp.	2014	Brush, or brush and grass mixture fire	0	0	0	25
Leavenworth	Easton Twp.	2014	Brush, or brush and grass mixture fire	0	0	0	25
Leavenworth	Leavenworth	2014	Grass fire	0	0	0	30
Leavenworth	Leavenworth	2014	Brush, or brush and grass mixture fire	0	0	0	50
Leavenworth	Linwood	2014	Brush, or brush and grass mixture fire	0	0	0	50
Leavenworth	Tonganoxie	2014	Brush, or brush and grass mixture	0	0	0	50



County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Leavenworth	Leavenworth	2014	Brush, or brush and grass mixture fire	0	0	0	75
Leavenworth	Lawrence	2014	Grass fire	0	0	0	100
Leavenworth	Easton Twp.	2014	Brush, or brush and grass mixture fire	0	0	0	250
Leavenworth	Reno Twp.	2015	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	McLouth	2015	Grass fire	0	0	0	10
Leavenworth	Tonganoxie	2015	Grass fire	0	0	0	10
Leavenworth	Tonganoxie	2015	Grass fire	0	0	0	10
Leavenworth	Tonganoxie	2015	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Tonganoxie	2015	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Leavenworth	2015	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Tonganoxie	2015	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Sherman (Township of	2015	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Sherman (Township of	2015	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Leavenworth	2015	Grass fire	0	0	0	15
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	15
Leavenworth	Leavenworth	2015	Grass fire	0	0	0	15
Leavenworth	Linwood	2015	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Tonganoxie	2015	Grass fire	0	0	0	15
Leavenworth	Tonganoxie	2015	Grass fire	0	0	0	15
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	15
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	15
Leavenworth	Basehor	2015	Brush, or brush and grass mixture fire	0	0	0	18
Leavenworth	Tonganoxie	2015	Brush, or brush and grass mixture fire	0	0	0	20
Leavenworth	Tonganoxie	2015	Brush, or brush and grass mixture fire	0	0	0	20
Leavenworth	McLouth	2015	Brush, or brush and grass mixture fire	0	0	0	20
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	25
Leavenworth	Reno Twp.	2015	Brush, or brush and grass mixture fire	0	0	0	25
Leavenworth	Tonganoxie	2015	Brush, or brush and grass mixture fire	0	0	0	25
Leavenworth	Easton	2015	Grass fire	0	0	0	25
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	30



County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Leavenworth	McLouth	2015	Grass fire	0	0	0	30
Leavenworth	Tonganoxie	2015	Grass fire	0	0	0	30
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	30
Leavenworth	Tonganoxie	2015	Grass fire	0	0	0	30
Leavenworth	Tonganoxie	2015	Brush, or brush and grass mixture fire	0	0	0	30
Leavenworth	Linwood	2015	Brush, or brush and grass mixture fire	0	0	0	30
Leavenworth	Linwood	2015	Brush, or brush and grass mixture fire	0	0	0	30
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	30
Leavenworth	Easton Twp.	2015	Brush, or brush and grass mixture fire	0	0	0	30
Leavenworth	Easton Twp.	2015	Brush, or brush and grass mixture fire	0	0	0	30
Leavenworth	Sherman (Township of	2015	Brush, or brush and grass mixture fire	0	0	0	39
Leavenworth	Linwood	2015	Brush, or brush and grass mixture fire	0	0	0	65
Leavenworth	Tonganoxie	2015	Brush, or brush and grass mixture fire	0	0	0	80
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	300
Leavenworth	Easton Twp.	2015	Grass fire	0	0	0	400
Leavenworth	Easton Twp.	2015	Brush, or brush and grass mixture fire	0	0	0	450
Leavenworth	Tonganoxie	2016	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Leavenworth	2016	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Basehor	2016	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Leavenworth	2016	Grass fire	0	0	0	11
Leavenworth	Tonganoxie	2016	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Leavenworth	2016	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Reno Twp.	2016	Natural vegetation fire, other	0	0	0	20
Leavenworth	Reno Twp.	2016	Grass fire	0	0	0	20
Leavenworth	Reno Twp.	2016	Brush, or brush and grass mixture fire	0	0	0	30
Leavenworth	Tonganoxie	2016	Brush, or brush and grass mixture fire	0	0	0	30
Leavenworth	Easton Twp.	2016	Grass fire	0	0	0	30
Leavenworth	Reno Twp.	2016	Grass fire	0	0	0	50
Leavenworth	Leavenworth	2016	Grass fire	0	0	0	50



County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Leavenworth	Reno Twp.	2016	Brush, or brush and grass mixture fire	0	1	0	350
Leavenworth	McLouth	2017	Grass fire	0	0	0	10
Leavenworth	Leavenworth	2017	Grass fire	0	0	0	10
Leavenworth	Tonganoxie	2017	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Tonganoxie	2017	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Alexandria (Township)	2017	Grass fire	0	0	0	15
Leavenworth	Easton Twp.	2017	Grass fire	0	0	0	20
Leavenworth	Tonganoxie (Township)	2017	Brush, or brush and grass mixture fire	0	0	0	20
Leavenworth	Tonganoxie	2017	Brush, or brush and grass mixture fire	0	1	0	20
Leavenworth	Leavenworth	2017	Brush, or brush and grass mixture fire	0	0	0	20
Leavenworth	Tonganoxie	2017	Brush, or brush and grass mixture fire	0	0	0	20
Leavenworth	Sherman (Township of)	2017	Cultivated grain or crop fire	0	0	0	20
Leavenworth	Tonganoxie	2017	Brush, or brush and grass mixture fire	0	0	0	25
Leavenworth	Leavenworth	2017	Grass fire	0	0	0	30
Leavenworth	Lansing	2017	Brush, or brush and grass mixture fire	0	0	0	35
Leavenworth	Easton Twp.	2017	Grass fire	0	0	0	60
Leavenworth	Tonganoxie	2018	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Leavenworth	2018	Grass fire	0	0	0	10
Leavenworth	Leavenworth	2018	Grass fire	0	0	0	10
Leavenworth	Reno Twp.	2018	Brush, or brush and grass mixture fire	0	0	0	10
Leavenworth	Reno Twp.	2018	Grass fire	0	0	0	10
Leavenworth	Easton	2018	Grass fire	0	0	0	12
Leavenworth	Tonganoxie	2018	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Tonganoxie	2018	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Tonganoxie	2018	Brush, or brush and grass mixture fire	0	0	0	15
Leavenworth	Leavenworth	2018	Grass fire	0	0	0	15
Leavenworth	Eudora	2018	Natural vegetation fire, other	0	0	0	15
Leavenworth	Basehor	2018	Brush, or brush and grass mixture fire	0	0	0	20



County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Leavenworth	Tonganoxie	2018	Brush, or brush and grass mixture fire	0	0	0	20
Leavenworth	Easton	2018	Grass fire	0	0	0	25
Leavenworth	Sherman (Township of	2018	Brush, or brush and grass mixture fire	0	0	0	30
Leavenworth	Sherman (Township of	2018	Grass fire	0	0	0	30
Leavenworth	Reno Twp.	2018	Forest, woods or wildland fire	0	0	0	30
Leavenworth	Leavenworth	2018	Grass fire	0	0	0	50
Leavenworth	Leavenworth	2018	Natural vegetation fire, other	0	0	0	52
Leavenworth	Easton	2018	Grass fire	0	0	0	75
Leavenworth	Easton	2018	Grass fire	0	0	0	100
Leavenworth	Basehor	2018	Brush, or brush and grass mixture fire	0	0	0	200

Source: KSFM

**Table 4.92: Wyandotte County State Fire Marshall Recorded Wildfire Events, 2013-2018**

County	City	Year	Incident Description	Deaths	Injuries	Buildings Burned	Burned Acres
Wyandotte	Kansas City	2014	Grass fire	0	0	0	10
Wyandotte	Kansas City	2014	Brush, or brush and grass mixture fire	0	0	0	10
Wyandotte	Kansas City	2015	Brush, or brush and grass mixture fire	0	0	0	10
Wyandotte	Bonner Springs	2015	Grass fire	0	0	0	10.3
Wyandotte	Kansas City	2015	Brush, or brush and grass mixture fire	0	2	0	300
Wyandotte	Kansas City	2017	Brush, or brush and grass mixture fire	0	0	0	10
Wyandotte	Kansas City	2017	Brush, or brush and grass mixture fire	0	0	0	15
Wyandotte	Bonner Springs	2017	Grass fire	0	2	0	30
Wyandotte	Kansas City	2017	Grass fire	0	0	0	40
Wyandotte	Kansas City	2018	Brush, or brush and grass mixture fire	0	0	0	10
Wyandotte	Kansas City	2018	Brush, or brush and grass mixture fire	0	0	0	25

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 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates no wildfire related claims.





**Table 4.93: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Wildfires**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	0	0	\$0
Leavenworth	0	0	\$0
Wyandotte	0	0	\$0

Source: USDA

#### 4.14.3 – Hazard Probability Analysis

The following table summarizes wildfire probability data for **Johnson County**.

**Table 4.94: Johnson County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	51
Average Events per Year	6
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	1
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	1,705
Average Burned Acres per Year	285
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

Data from the KSFM indicates that Johnson County can expect on a yearly basis, relevant to wildfire events:

- Six events
- No deaths or injuries
- <1 building burned
- 285 acres burned

According to the USDA Risk Management Agency, Johnson 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 **Leavenworth County**.



**Table 4.95: Leavenworth County Wildfire Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of KSFM Reported Events (2013-2018)	112
Average Events per Year	19
Number Deaths or Injuries (2013-2018)	2
Average Number of Yearly Deaths and Injuries (2013-2018)	<1
Total Reported Burned Buildings (2013-2018)	1
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	45,632
Average Burned Acres per Year	772
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

Data from the KSFM indicates that Leavenworth County can expect on a yearly basis, relevant to wildfire events:

- Six events
- <1 death or injury
- <1 building burned
- 772 acres burned

According to the USDA Risk Management Agency, Leavenworth 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 **Wyandotte County**.

**Table 4.96: Wyandotte County Wildfire Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of KSFM Reported Events (2013-2018)	11
Average Events per Year	2
Number Deaths or Injuries (2013-2018)	4
Average Number of Yearly Deaths and Injuries (2013-2018)	<1
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	470
Average Burned Acres per Year	78
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0



**Table 4.96: Wyandotte County Wildfire Probability Summary**

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

Source: KSFM and NOAA

Data from the KSFM indicates that Wyandotte County can expect on a yearly basis, relevant to wildfire events:

- Two events
- <1 death or injury
- No buildings burned
- 78 acres burned

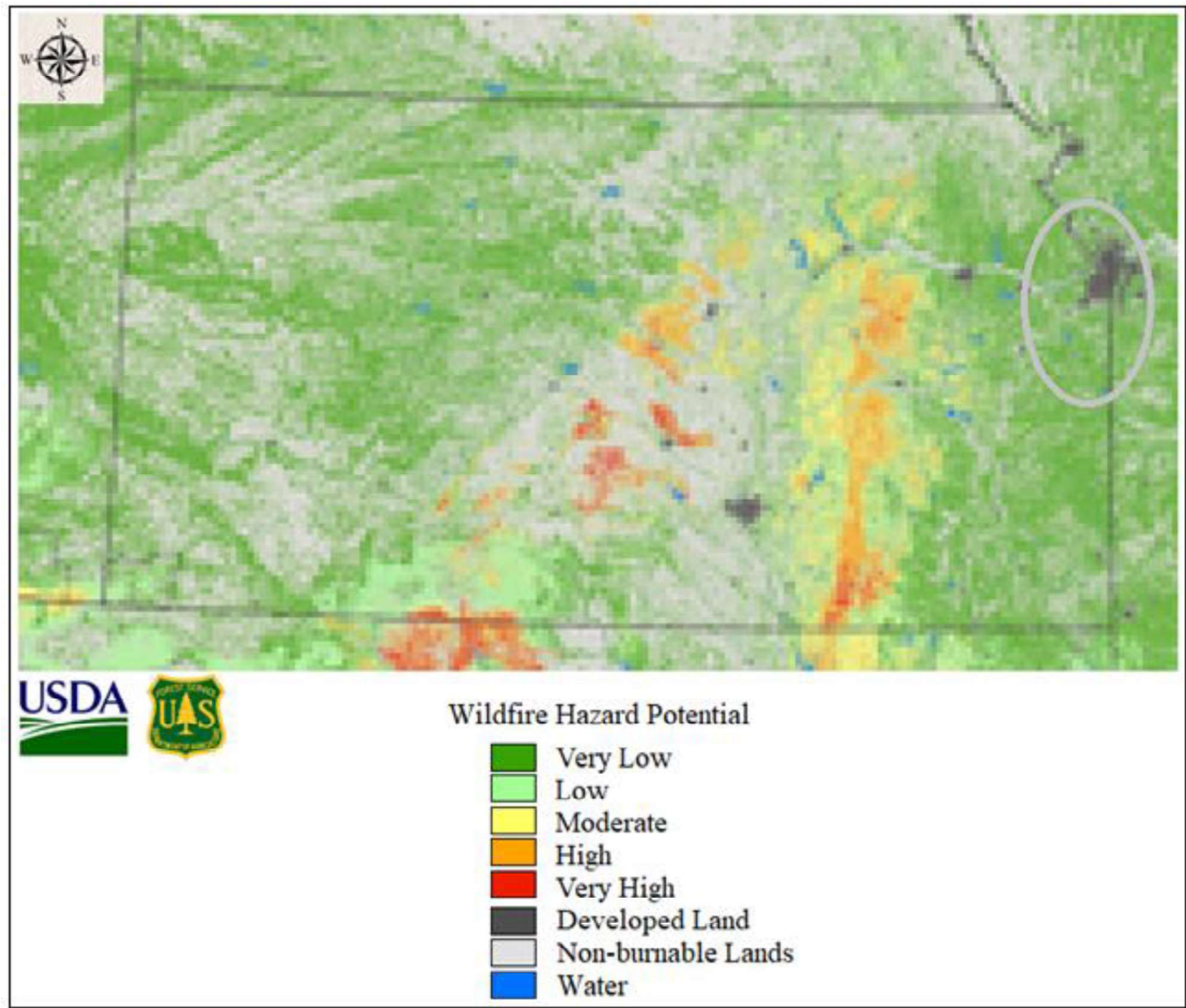
According to the USDA Risk Management Agency, Wyandotte County can expect on a yearly basis, relevant to wildfire occurrences:

- 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. The map indicates that Kansas Region L is the low and very low class.



## Wildfire Hazard Potential 2018



### 4.14.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to wildfire events. Counties with a higher or increasing population, high, or increasing, or having a high structural valuation are to be considered to have a potentially greater vulnerability.

The following table presents data from HAZUS and KSFM concerning the structures and the percentage of structures for each Kansas Region L 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. A greater percentage of damaged structures damaged may indicate a greater potential future vulnerability.



**Table 4.97: Kansas Region H Structural Vulnerability Data for Wildfires, 2009-2018**

County	HAZUS Building Valuation	KSFM Structure Damage	Percentage of Building Valuation Damaged
Johnson	\$124,279,962,000	\$32,000	0.00003%
Leavenworth	\$13,050,342,000	\$32,000	0.0003%
Wyandotte	\$29,708,946,000	\$0	0.0%

Counties with a high population and/or a growing population may be at increased risk.

**Table 4.98: Kansas Region L Population Vulnerability Data for Wildfires**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of wildfires on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to wildfire events.

**Table 4.99: Kansas Region L USDA Annual Wildfire Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	0	0.0%	\$24,370,000	\$0	0.0%
Leavenworth	184,471	0	0.0%	\$36,367,000	\$0	0.0%
Wyandotte	12,009	0	0.0%	\$3,291,000	\$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 Johnson County and Wyandotte County have approved CWPPs.



#### 4.14.5 – Impact and Consequence Analysis

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

**Table 4.100: 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.





## 4.15 – 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.

### 4.15.1 – Location and Extent

All participating jurisdictions within Kansas Region L are susceptible to civil disorder. Kansas Region L is the most densely populated portion of Kansas, making it easier for crowds or mobs to gather for a purported cause. Regionally, there are numerous large venues available for large crowds including the Kansas Speedway, the Sprint Center, and ABA sports arenas.

In general, civil unrest usually accompanies, or is started by, a gathering of people for an event. And while most events occur with no violence, violence can occur with little warning or cause. Unfortunately, large crowds can be subject to control by skillful troublemakers who are often able to incite behavior from members of the crowd that they usually would not consider. When a crowd begins to exhibit signs of disorder, it can be categorized in three categories:

- **Public disorder:** Public disorder is a basic breach of civic order. Individuals or small groups assembling tend 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. Because Region L, specifically Johnson County, is the most densely populated area in Kansas, it is even more important that pre-planning be considered during events that have large crowd participation. 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.

The following identify specific local concerns related to civil disorder.

- Leavenworth County houses the Leavenworth Federal Penitentiary which has documented protests aimed at subject matter that creates a high emotional impact in various groups. The military presence itself is a deterrent to uncontrolled mobs, however, the risk remains due to the various high-profile inmates that are serving their time there.
- All jurisdictions in Kansas Region L are near the major sporting arenas and entertainment venues of the Kansas City Metro region. As such, major events may result in civil unrest occurrences that could spill over into any participating jurisdiction.



#### 4.15.2 – Previous Occurrences

There have been no documented cases of civil disorder of disorder in Kansas Region L during the past ten years.

#### 4.15.3 – 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 L 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.

#### 4.15.4 Vulnerability Analysis

Due to the unknown location and nature of civil disorder, all participating jurisdictions with Kansas Region L are vulnerable. Additionally, and again related to the capricious nature of civil disorder, all buildings and citizens are vulnerable.

Economic impacts and human injury or death are the primary concern with civil disorder. Increases in population or the hosting of major political, economic or social events could increase the likelihood and severity of a civil disturbance.

It is difficult to quantify potential losses of civil disorder due to the many variables and human elements and lack of historical precedence. Therefore, for the purposes of this plan, a **hypothetical scenario** is included for illustrative purposes only.

**Event:** City organizers set up a two-block long fan zone near the local community sports field for an important sporting event. The population density in the fan zone is 6,000 people, with at least five persons per 25 square feet.

**Riot:** The riot began to take shape as the game ended, 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 4.101: 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



#### 4.15.5 – Impact and Consequence Analysis

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

**Table 4.102: Civil Disorder Consequence Analysis**

<b>Subject</b>	<b>Impacts of Civil Disorder</b>
Health and Safety of the Public	Impact could be severe for persons in the incident area.
Health and Safety of Responders	Impact to responders could be severe if not trained and properly equipped. Responders that are properly trained and equipped will have a low to moderate impact.
Continuity of Operations	Depending on damage to facilities/personnel in the incident area, re-location may be necessary and lines of succession execution (minimal to severe).
Property, Facilities, and Infrastructure	Impact within the incident area could be severe, depending on the extent of the event. (minimal to severe)
Environment	Localized impact within the incident area could be severe depending on the type of human caused incident.
Economic Conditions	Economic conditions could be adversely affected and dependent upon time and length of clean up and investigation (minimal to severe).
Public Confidence in the Jurisdiction's Governance	Impact will be dependent on whether or not the incident could have been avoided by government or non-government entities, clean-up and investigation times, and outcomes. (minimal to severe)



## 4.16 – Lightning

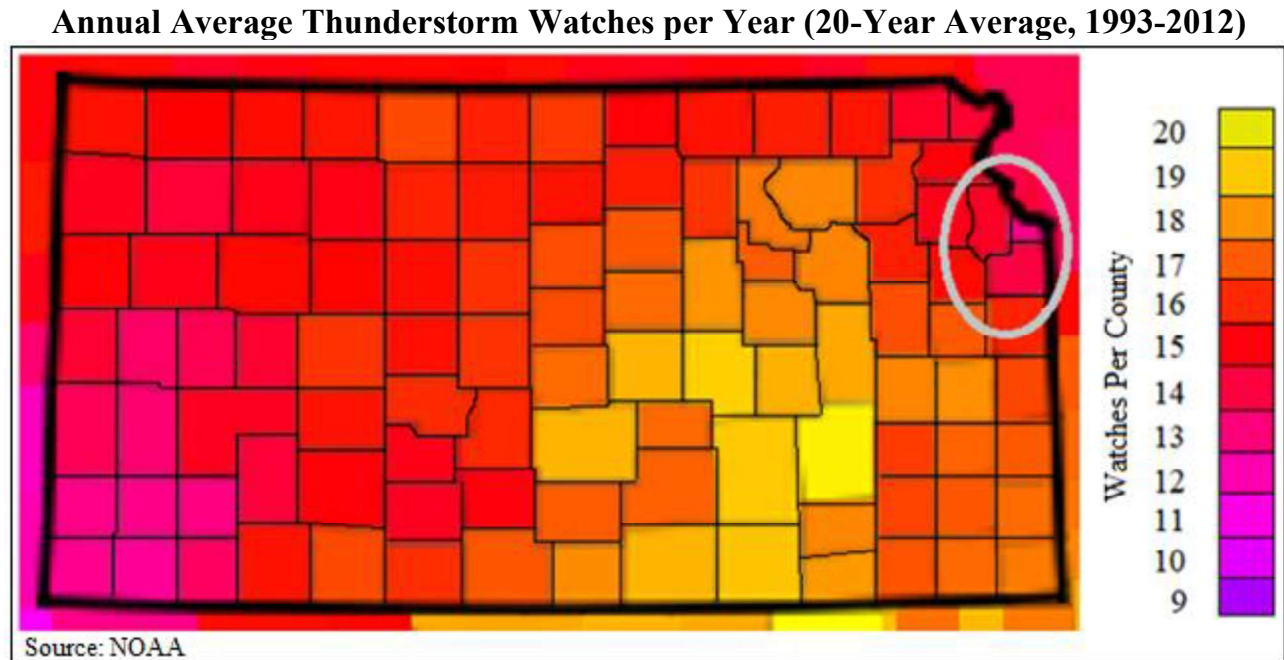
Lightning is a discharge of atmospheric electricity that is triggered by a buildup of differing charges within a cloud. According to the NWS, lightning is one of the most underrated severe weather hazards and is the second deadliest weather killer in the United States.



### 4.16.1 – Location and Extent

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

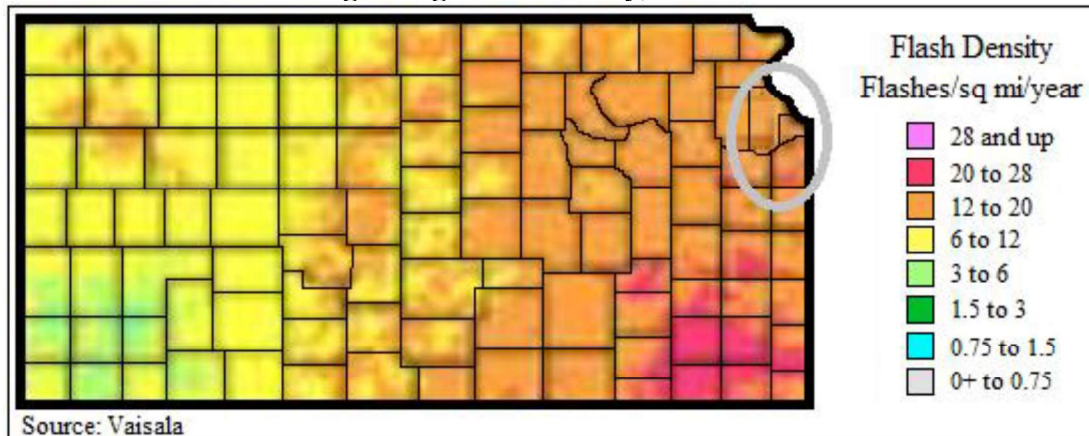
Thunderstorms are often the generator of lightning. The following map, generated by NOAA, indicates the average number severe thunderstorm watches per year for Kansas Region L.



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



### Lightning Flash Density, 2008-2017



#### 4.16.2 – Previous Occurrences

In the 20-year period from 1999 to 2018 (with 1999 and 2018 being full data set years), there have been six Presidential Disaster Declarations for the Kansas Region L for severe storms (of which a lightning may be a component). The following 20-year information on past declared disasters is presented to provide a historical perspective on severe storm (and potentially lightning) events that have impacted the Kansas Region L. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2013.

**Table 4.103: FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4347</b>	11/7/2017 (7/22/2017 – 7/27/2017)	<b>Severe Storms, Straight-Line Winds, Flooding</b>	Johnson, Wyandotte	\$6,195,147.97
1699	5/6/2007 (5/4/2007)	<b>Severe Storms, Tornadoes, and Flooding</b>	Leavenworth	\$117,565,269
1615	11/21/2005 (10/1-2/2005)	<b>Severe Storms and Flooding</b>	Leavenworth	\$10,286,064
1562	09/30/2004 (8/27-30/2004)	<b>Severe Storms, Flooding, and Tornadoes</b>	Wyandotte	\$2,103,376
1535	8/3/2004 (6/12-7/25/2004)	<b>Severe Storms, Flooding, and Tornadoes</b>	Wyandotte	\$12,845,892
1462	5/6/2003 (5/4-30/2003)	<b>Severe Storms, Tornadoes, and Flooding</b>	Leavenworth and Wyandotte	\$988,056

Source: FEMA

The following provides details of the single Presidential Disaster Declaration for Kansas Region L related to severe storms (and potentially lightning) since the last plan update in 2013.



## Kansas – Severe Storms, Straight-Line Winds, and Flooding FEMA-4347-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 lightning events and the resulting damage totals in Kansas Region L for the 10-year period of 2009 – 2018 (with 2009 and 2018 being full data set years).

**Table 4.104: Kansas Region L NCEI Lightning Events, 2009 - 2018**

County	Number of Events	Property Damage	Crop Damage	Deaths	Injuries
Johnson	0	\$0	\$0	0	0
Leavenworth	0	\$0	\$0	0	0
Wyandotte	0	\$0	\$0	0	0

Source: NOAA NCEI

The following details locally reported lightning events:

- **2017: Leavenworth County**

A local Second District Commissioner was struck by lightning and hospitalized.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of lightning on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates no lightning related claims.





**Table 4.105: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Lightning**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	0	0	\$0
Leavenworth	0	0	\$0
Wyandotte	0	0	\$0

Source: USDA

#### 4.16.3 – Hazard Probability Analysis

The following table summarizes lightning probability data for **Johnson County**.

**Table 4.106: Johnson County Lightning Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	0
Average Events per Year	0
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	195
Average Number of Acres Damaged per Year	49
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$5,955
Average Crop Damage per Year	\$1,489

Source: NCEI and USDA

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

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

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

- Less than one insurance claims
- 49 acres impacted
- \$1,489 in insurance claims

The following table summarizes lightning probability data for **Leavenworth County**.



**Table 4.107: Leavenworth County Lightning Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	0
Average Events per Year	0
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

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

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

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

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

The following table summarizes lightning probability data for **Wyandotte County**.

**Table 4.108: Wyandotte County Lightning Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	0
Average Events per Year	0
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA



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

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

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

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

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

#### 4.16.4 – Vulnerability Analysis

For purposes of this assessment, all jurisdictions within the region were determined to be at equal risk to lightning events.

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 L county incurring damage over the period 2009 to 2018 from lightning events. A greater percentage of damaged structures damaged may indicate a greater potential future vulnerability.

**Table 4.109: Kansas Region L Structural Vulnerability Data for Lightning**

County	HAZUS Building Valuation	NCEI Structure Damage, Lightning, 2009-2018	Percentage of Building Valuation Damaged by Lightning
Johnson	\$124,279,962,000	0	0%
Leavenworth	\$13,050,342,000	0	0%
Wyandotte	\$29,708,946,000	0	0%

Source: NCEI and HAZUS

Counties with a high population and/or a growing population may be at increased risk.

**Table 4.110: Kansas Region L Population Vulnerability Data for Lightning**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

Source: US Census Bureau

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L County. USDA Risk Management



Agency crop loss data allows us to quantify the monetary impact of lightning strikes on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to lightning events.

**Table 4.111: Kansas Region L USDA Annual Lightning Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	0	0.0%	\$24,370,000	\$0	0.0%
Leavenworth	184,471	0	0.0%	\$36,367,000	\$0	0.0%
Wyandotte	12,009	0	0.0%	\$3,291,000	\$0	0.0%

Source: USDA

#### 4.16.5 – Impact and Consequence Analysis

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

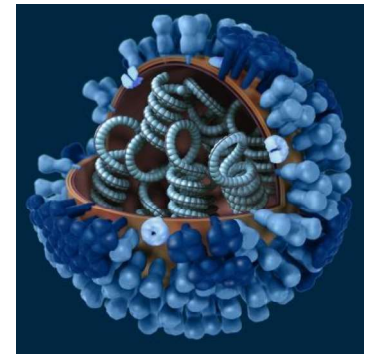
**Table 4.112: Lightning Consequence Analysis**

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.



## 4.17 – 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.



### 4.17.1 – 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.

### 4.17.2 – Previous Occurrences

The KDHE was contacted concerning the epidemiological tracking of contagious and/or human transmissible diseases. The following table provides information concerning select diseases of concern.

**Table 4.113: Kansas Department of Health Epidemiological Tracking, 2006 -2018**

Disease	Johnson County	Leavenworth County	Wyandotte County
Haemophilus Influenzae Invasive Disease	17	3	7
Measles (Rubeola)	14	0	0
Meningococcal Infections	0	0	0
Mumps	36	6	6
Pertussis	67	4	36
Streptococcus pneumoniae, Invasive	63	4	13
West Nile Virus*	4	0	2
Zika Virus Disease*	0	0	1

Source: KDHE

\*: Data from 2017 and 2018 only

### 4.17.3 – Hazard Probability Analysis

Each year the Centers for Disease Control (CDC) produces a report detailing the legally “reportable diseases” in States. While over time this report can serve as a predictor of the likelihood of future disease, it is impossible to predict outbreaks. Based on the relatively limited/controlled outbreak history in Kansas Region L, the possibility of a large-scale major disease outbreak to be limited.



#### 4.17.4 – Vulnerability Analysis

For purposes of this assessment, no facilities or agricultural commodities are considered vulnerable to the major disease hazard.

Due to the person to person transmission of many diseases of concern counties with a higher identified population are to be considered to have a potentially greater vulnerability. The following table indicates the total county population and registered growth over the period 2000 to 2017.

**Table 4.114: Kansas Region L Population Vulnerability Data for Major Disease Event**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

Source: US Census Bureau

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

**Table 4.115: Kansas Region L Potentially Vulnerable Population Data**

Jurisdiction	Percentage of Population 5 and Under (2016)	Percentage of Population 85+ (2016)
Johnson County	6.7%	1.9%
Leavenworth County	6.4%	1.2%
Wyandotte County	8.4%	1.5%

Of note for Johnson County and its participating jurisdictions:

- Population gains in children under 5 years of age were noted for the period 2000 to 2016, from 33,641 to 39,609, a 17.7% increase
- Significant population gains in adults over 85 years of age were noted for the period 2000 to 2016, from 5,895 to 11,232, a 90.5% increase

Of note for Leavenworth County and its participating jurisdictions:

- Population gains in children under 5 years of age were noted for the period 2000 to 2016, from 4,775 to 5,190, an 8.7% increase
- Large population gains in adults over 85 years of age were noted for the period 2000 to 2016, from 810 to 973, a 20.1% increase

Of note for Wyandotte County and its participating jurisdictions:

- Population gains in children under 5 years of age were noted for the period 2000 to 2016, from 12,759 to 13,884, an 8.8% increase





- Population gains in adults over 85 years of age were noted for the period 2000 to 2016, from 2,226 to 2,479, an 11.4% increase

#### 4.17.5 – Impact and Consequence Analysis

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

**Table 4.116: 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.



## 4.18 – 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.

### 4.18.1 –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 KDHE, Bureau of Water, and Livestock Waste Management. The CAFOs may include beef, dairy, sheep, swine, chicken, turkey, and horses. The following is a list of the number of CAFOs per county in Kansas Region L:



- Johnson County: 2
- Leavenworth County: 5
- Wyandotte County: 1

Knowing where diseased and at-risk animals are, where they've been and when, is important to ensuring a rapid response when animal disease events take place. The 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 (Aflatoxin): Corn
- Austro-Asian Rust: Soybean
- Black Stem Rust, Blast: Wheat
- South American strains, Stripe Rust, Leaf Rust, Karnal: Wheat

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

## **Tree Pests**

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

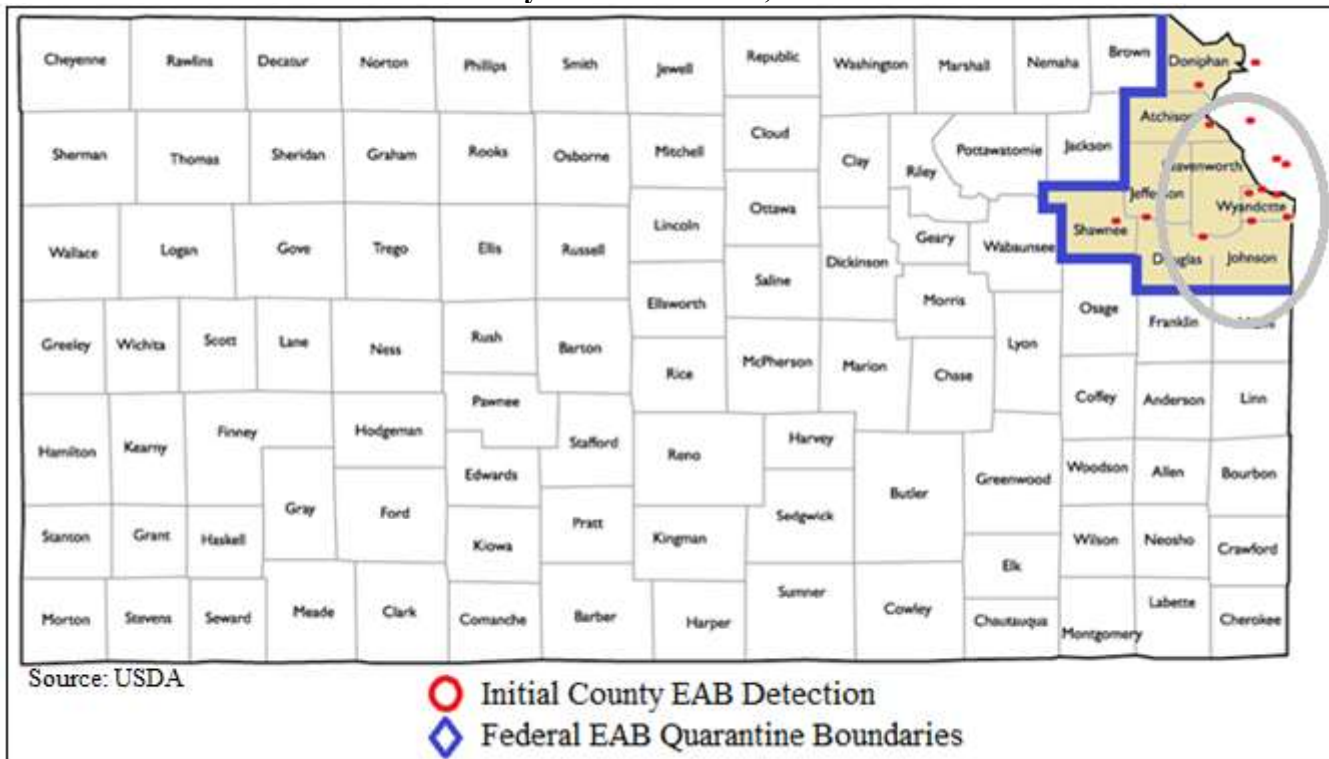
- Emerald Ash Borer (EAB): Ash Trees
- Asian Longhorned Beetle: Maple, Birch, Willow, Mimosa, Ash, Sycamore & Poplar Trees
- Thousand Cankers: Walnut Trees

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 counties, including all three Kansas Region L counties. The following map from the USDA shows the Federal EAB Quarantine area for the State of Kansas, and Kansas Region L.



## 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.

### 4.18.2 – Previous Occurrences

The following detail reported agricultural infestations for Kansas Region L.

The emerald ash borer is a pest of ash trees native to Asia. It was first discovered in North America in 2002. Since then it has killed millions of ash trees and caused thousands more to be removed to slow its spread. The following details Kansas Region L EAB discoveries.



- **Wyandotte County EAB Find Background:** On August 29, 2012, the first-ever presence of emerald ash borer in Kansas was confirmed in Wyandotte County at Wyandotte County Lake. Regulatory officials at USDA's Animal and Plant Health Inspection Service's Plant Protection Quarantine division removed larva from the sample and confirmed the presence of emerald ash borer. The initial emergency quarantine was effective August 29, 2012, for Wyandotte County and became permanent November 9, 2012, and will be in effect until it is rescinded or modified by the order of the Kansas Secretary of Agriculture.
- **Johnson County EAB Find Background:** On July 5, 2013, an adult specimen was removed from an emerald ash borer survey trap located near the Johnson County landfill, during routine monitoring by USDA-APHIS-PPQ. Immediately after confirmation by USDA, Kansas enacted an emergency intrastate quarantine for Johnson County, effective July 15, which became permanent September 24, 2013, and will be in effect until it is rescinded or modified by the order of the Kansas Secretary of Agriculture.
- **Leavenworth County EAB Find Background:** On July 16, 2014, an adult emerald ash borer was caught on a girdled tree trap placed on K-5 southeast of Lansing. A second emerald ash borer was also caught on a second girdled trap tree at Kenneth W. Bernard Community Park. Regulatory officials with the USDA confirmed the presence of emerald ash borer on July 17, 2014.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of infestation on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates nine infestation related claims on 1,622 acres for \$93,318.

**Table 4.117: USDA Risk Management Agency Cause of Loss Indemnities  
2014-2018, Agricultural Infestation**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	6	1,258	\$68,221
Leavenworth	2	261	\$17,205
Wyandotte	1	103	\$7,892

Source: USDA

### 4.18.3 – Hazard Probability Analysis

Kansas Region L 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 L 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.

### 4.18.4 – Vulnerability Assessment

Regional populations and facilities are not directly vulnerable to losses as a result of agricultural infestation. The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L County. The USDA Risk Management Agency provides information on insured crop losses related to identified hazards, with data



from the years 2015 to 2018 used for analysis. The higher the percentage loss, the higher potential future vulnerability the county may have to infestation events.

**Table 4.118: Kansas Region L USDA Annual Agricultural Infestation  
Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	252	0.25%	\$24,370,000	\$13,644	0.06%
Leavenworth	184,471	521	0.28%	\$36,367,000	\$3,441	0.01%
Wyandotte	12,009	21	0.17%	\$3,291,000	\$1,578	0.05%

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 4.119: 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 (Aflatoxin)	Corn	Worldwide, endemic to Kansas	Toxin renders the grain unusable
Black Stem Rust UG99 strain	Wheat	Africa, Asia	Direct Loss to production
Blast – South American strains	Wheat	South America	Direct Loss to production
Stripe Rust (new races)	Wheat	North America	Direct Loss to production
Leaf Rust (new races)	Wheat	North America	Direct Loss to production
Karnal Bunt	Wheat	Asia, Mexico, Arizona	International export quarantines, degradation of flour quality
Thousand Cankers	Walnut	Western US states and PA, VA, TN	Death of municipal trees, loss of nut crop, loss of timber
Emerald Ash Borer	Ash	North Central and North Eastern U.S., including 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.





**Table 4.119: Potential High-Risk Plant Pests**

<b>Pest (Disease Insect, or weed)</b>	<b>Crop or Host Plant</b>	<b>Current Distribution</b>	<b>Type of Loss</b>
Hydrilla	Water Bodies	Southern U.S. and one park pond in Olathe	Economic and environmental.

#### 4.18.5 – Impact and Consequence Analysis

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

**Table 4.120: Agricultural Infestation Consequence Analysis**

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



## 4.19 – 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."

### 4.19.1 – 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.

### 4.19.2 – Previous Occurrences

Kansas Region L has been fortunate to escape a major terrorist incident.

### 4.19.3 – Hazard Probability Analysis

By nature, acts of terrorism are difficult to foresee. However, the probability of a major terrorist event in Kansas Region L 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.

### 4.19.4 – Vulnerability Analysis

For purposes of this assessment, data is not available to quantify vulnerability or estimated losses as a result of terrorism incidents that might impact state-owned facilities.

For this assessment, it is not possible to calculate a specific vulnerability for each county or participating jurisdiction. However, because of the desire for publicity following attacks, it is more likely that counties and jurisdictions with greater population densities and /or larger event venues have a greater risk.

It is difficult to quantify potential losses of terrorism due to the many variables and human elements and lack of historical precedence. Therefore, for the purposes of this plan, the loss estimates will consider 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 4.121: 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 4.122: 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 4.123: 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

### 4.19.5 – 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 4.124: Terrorism Consequence Analysis**

<b>Subject</b>	<b>Impacts of Terrorism</b>
Health and Safety of Persons in the Area of the Incident	Impact could be severe for persons in the incident area.
Responders	Impact to responders could be severe if not trained and properly equipped. Responders that are properly trained and equipped will have a low to moderate impact.
Continuity of Operations	Depending on damage to facilities/personnel in the incident area, relocation may be necessary and lines of succession execution.
Property, Facilities, and Infrastructure	Impact within the incident area could be severe for explosion, moderate to low for Hazmat.
Environment	Localized impact within the incident area could be severe depending on the type of incident.
Economic Conditions	Economic conditions could be adversely affected and dependent upon time and length of clean up and investigation.
Public Confidence in Governance	Impact dependent on if the incident could have been avoided by government entities, clean-up, investigation times and outcomes.



## 4.20 – Hailstorms

According to NOAA, hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere causing them to freeze. The raindrops form into small frozen droplets and then continue to grow as they come into contact with super-cooled water which will freeze on contact with the frozen rain droplet. This frozen rain droplet can continue to grow and form hail.



### 4.20.1 – 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 NOAA's Storm Prediction Center, the following table describes various sizes of hail.

**Table 4.125: Hailstorm Intensity Scale**

Hail Size in Inches	Object Analog Report
.50	Marble, moth ball
.75	Penny
.88	Nickel
1.00	Quarter
1.25	Half dollar
1.50	Walnut, ping pong
1.75	Golf ball
2.00	Hen egg
2.50	Tennis ball
2.75	Baseball
3.00	Tea cup
4.00	Softball
4.50	Grapefruit

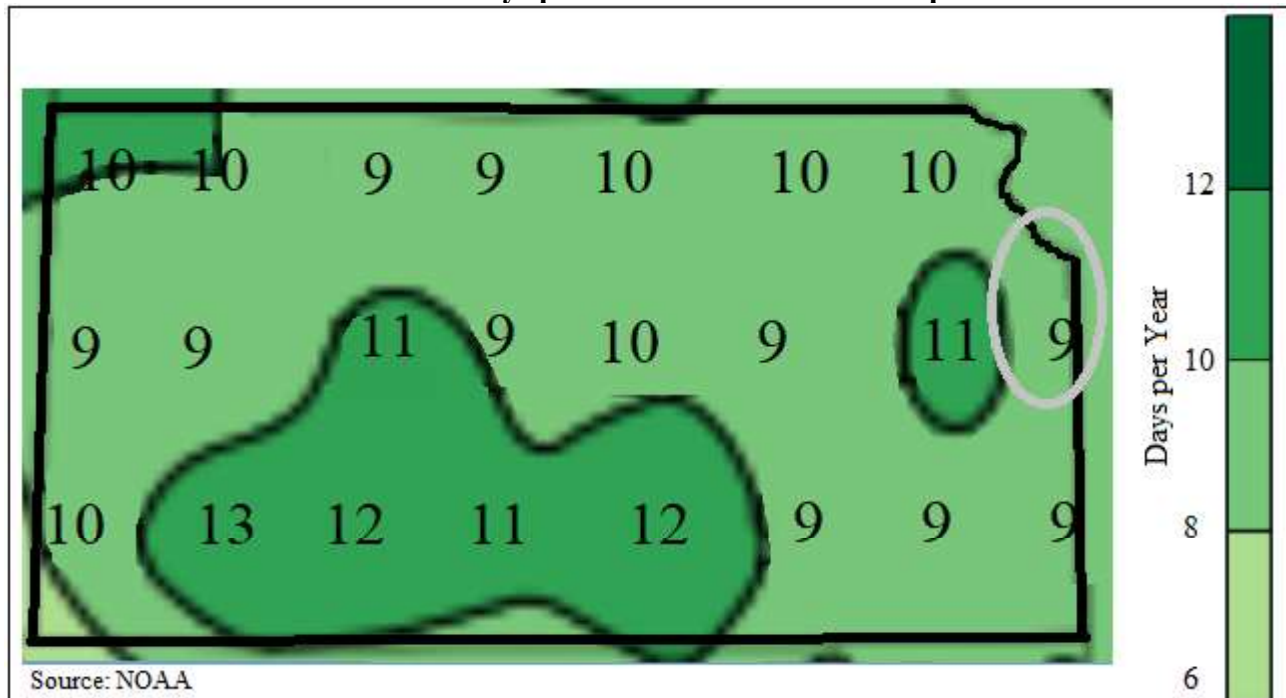
Source: NOAA

The following map, generated by data compiled by NOAA, indicates the average number of severe hail event days for Kansas Region L (9).





### Severe Hail Days per Year from 2003-2012 Reports



#### 4.20.2 – Previous Occurrences

In the 20-year period from 1999 to 2018 (with 1999 and 2018 being full data set years), there have been six Presidential Disaster Declarations for the Kansas Region L for severe storms (of which a component may be hail). The following 20-year information on past declared disasters is presented to provide a historical perspective on severe storm (and potentially hail) events that have impacted the Kansas Region L. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2013.

**Table 4.126: Kansas Region L FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4347</b>	11/7/2017 (7/22/2017 – 7/27/2017)	<b>Severe Storms, Straight-Line Winds, Flooding</b>	Johnson, Wyandotte	\$6,195,147.97
1699	5/6/2007 (5/4/2007)	<b>Severe Storms, Tornadoes, and Flooding</b>	Leavenworth	\$117,565,269
1615	11/21/2005 (10/1-2/2005)	<b>Severe Storms and Flooding</b>	Leavenworth	\$10,286,064
1562	09/30/2004 (8/27-30/2004)	<b>Severe Storms, Flooding, and Tornadoes</b>	Wyandotte	\$2,103,376
1535	8/3/2004 (6/12-7/25/2004)	<b>Severe Storms, Flooding, and Tornadoes</b>	Wyandotte	\$12,845,892



**Table 4.126: Kansas Region L FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018**

<b>Declaration Number</b>	<b>Incident Period</b>	<b>Disaster Description</b>	<b>Regional Counties Involved</b>	<b>Dollars Obligated</b>
1462	5/6/2003 (5/4-30/2003)	Severe Storms, Tornados, and Flooding	Leavenworth and Wyandotte	\$988,056

Source: FEMA

The following provides details of the single Presidential Disaster Declaration for Kansas Region L related to severe storms (and potentially hail) since the last plan update in 2013.

**Kansas – Severe Storms, Straight-line Winds, and Flooding  
FEMA-4347-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 hailstorm events and the resulting damage totals in Kansas Region L from the period 2009 - 2018.

**Table 4.127: Kansas Region L NCEI Hailstorm Events, 2009 - 2018**

<b>County</b>	<b>Number of Days with Events</b>	<b>Property Damage</b>	<b>Deaths</b>	<b>Injuries</b>
Johnson	49	\$130,200	0	0
Leavenworth	39	\$12,000	0	0
Wyandotte	19	\$0	0	0

Source: NOAA NCEI

As no damages or deaths or injuries were reported, descriptions of these events can be found on the NOAA NCEI website:

- [www.NCEI.noaa.gov/stormevents/ftp.jsp](http://www.NCEI.noaa.gov/stormevents/ftp.jsp)



Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of hail on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates one hail related claim on 195 acres for \$5,955.

**Table 4.128: USDA Risk Management Agency Cause of Loss Indemnities 2014-2018, Hail**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	1	195	\$5,955
Leavenworth	3	66	\$5,279
Wyandotte	0	0	\$0

Source: USDA

### 4.20.3 – Hazard Probability Analysis

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

**Table 4.129: Johnson County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	49
Average Events per Year	5
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$130,200
Average Property Damage per Year	\$13,020
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	195
Average Number of Acres Damaged per Year	39
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$5,955
Average Crop Damage per Year	\$1,191

Source: NCEI and USDA

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

- Five events
- No deaths or injuries
- \$13,020 in property damages

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

- Less than one insurance claims
- 39 acres impacted
- \$1,191 in insurance claims

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



**Table 4.130: Leavenworth County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	39
Average Events per Year	4
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	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 (2014-2018)	3
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	66
Average Number of Acres Damaged per Year	13
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$5,279
Average Crop Damage per Year	\$1,056

Source: NCEI and USDA

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

- Four events
- No deaths or injuries
- \$1,200 in property damages

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

- One insurance claim
- 13 acres impacted
- \$1,056 in insurance claims

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

**Table 4.131: Wyandotte County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	19
Average Events per Year	2
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA



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

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

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

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

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

#### 4.20.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to hailstorm events.

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 L county incurring damage over the period 2009 to 2018 from hailstorm events. A greater percentage of damaged structures damaged may indicate a greater potential future vulnerability.

**Table 4.132: Kansas Region L Structural Vulnerability Data for Hailstorms**

County	HAZUS Building Valuation	NCEI Structure Damage, Hail 2009-2018	Percentage of Building Valuation Damaged by Hail
Johnson	\$124,279,962,000	\$13,020	0.00001%
Leavenworth	\$13,050,342,000	\$1,200	0.00001%
Wyandotte	\$29,708,946,000	\$0	0.0%

Source: NCEI and HAZUS

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of hailstorm conditions on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to hailstorm events.



**Table 4.133: Kansas Region L USDA Annual Hailstorm Percentage Impact Data, 2014-2018**

<b>Jurisdiction</b>	<b>Farm Acreage</b>	<b>Annual Acres Impacted</b>	<b>Annual Percentage of Total Acres Impacted</b>	<b>Market Value of Products Sold</b>	<b>Annualized Crop Insurance Paid</b>	<b>Annual Percentage of Market Value Impacted</b>
Johnson	99,354	39	0.004%	\$24,370,000	\$1,191	0.005%
Leavenworth	184,471	13	0.01%	\$36,367,000	\$2,231	0.01%
Wyandotte	12,009	0	0.0%	\$3,291,000	\$0	0.0%

Source: USDA

#### 4.20.5 – Impact and Consequence Analysis

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

**Table 4.134: Hailstorm Consequence Analysis**

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





## 4.21 – 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.

### 4.21.1 – 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 L is vulnerable to both extreme heat and extreme cold, defined as follows.

**Table 4.135: Extreme Temperature Definitions**

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

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

**Table 4.136: Johnson County Average Temperatures**

Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	39.1	21.0	30.1
February	44.5	25.1	34.8
March	55.3	34.5	44.9
April	65.2	45.0	55.1
May	74.4	55.0	64.7
June	82.8	63.8	73.3
July	87.7	68.8	78.3
August	87.4	67.9	77.6
September	78.7	58.5	68.6



**Table 4.136: Johnson County Average Temperatures**

Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
October	66.9	47.1	57.0
November	53.4	34.6	44.0
December	41.0	23.8	32.4

Source: High Plains Regional Climate Center, Olathe Johnson County Executive Airport Station, 1981-2010

**Table 4.137: Leavenworth County Average Temperatures**

Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	38.9	19.4	29.2
February	44.5	23.6	34.1
March	55.7	32.7	44.2
April	66.8	43.3	55.1
May	76.4	54.2	65.3
June	84.9	63.4	74.1
July	89.8	68.5	79.2
August	88.4	66.5	77.4
September	79.6	56.7	68.2
October	68.1	45.7	56.9
November	53.8	33.3	43.5
December	41.1	22.6	31.8

Source: High Plains Regional Climate Center, Leavenworth Station, 1981-2010

**Table 4.138: Wyandotte County Average Temperatures**

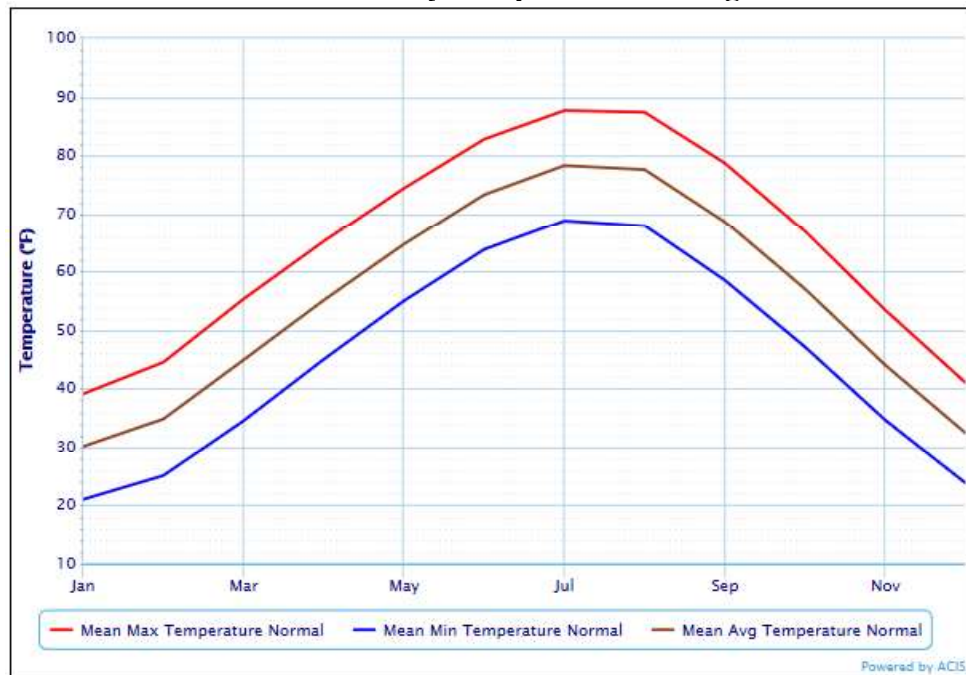
Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	39.3	16.6	28.0
February	44.6	21.2	32.9
March	55.1	31.3	43.2
April	65.2	41.0	53.1
May	74.5	52.6	63.6
June	82.7	62.2	72.5
July	88.1	67.2	77.6
August	87.1	65.2	76.1
September	79.1	56.0	67.6
October	67.3	43.0	55.2
November	54.4	31.7	43.1
December	41.2	20.6	30.9

Source: High Plains Regional Climate Center, Bonner Springs Station, 1981-2010

The following graphs illustrate the above data.

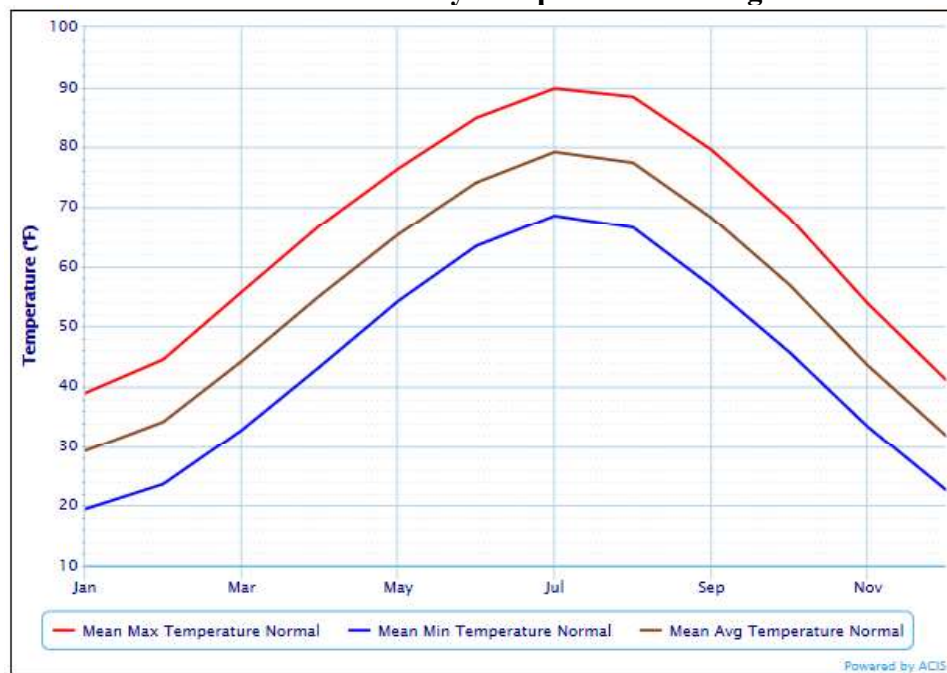


### Johnson County Temperature Averages



Source: High Plains Regional Climate Center, Olathe Johnson County Executive Airport, 1981-2010

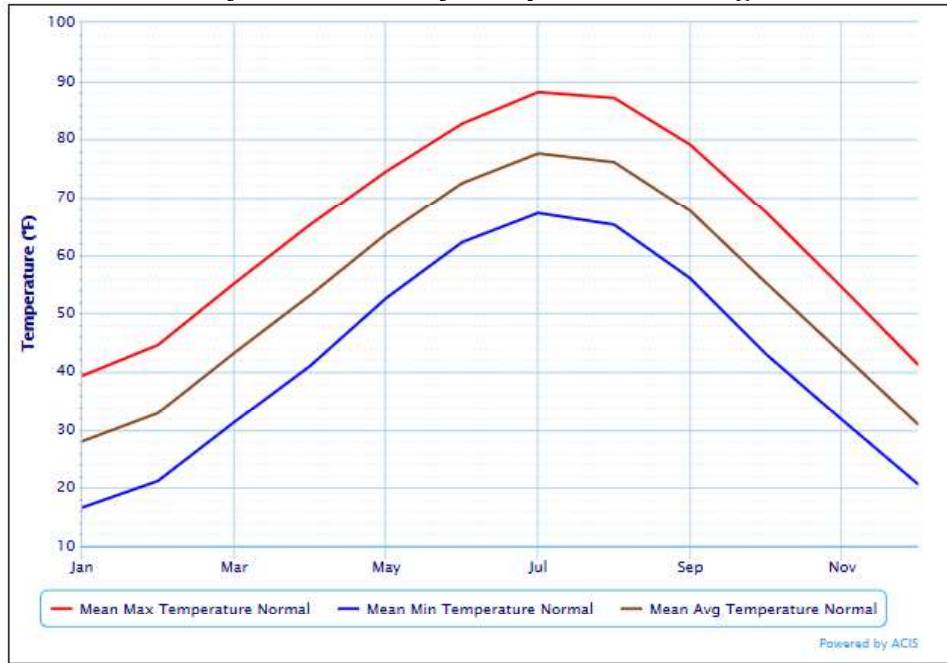
### Leavenworth County Temperature Averages



Source: High Plains Regional Climate Center, Leavenworth Station, 1981-2010



### Wyandotte County Temperature Averages



Source: High Plains Regional Climate Center, Bonner Springs Station, 1981-2010

When discussing weather patterns climate change should be considered 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.

#### 4.21.2 – Previous Occurrences

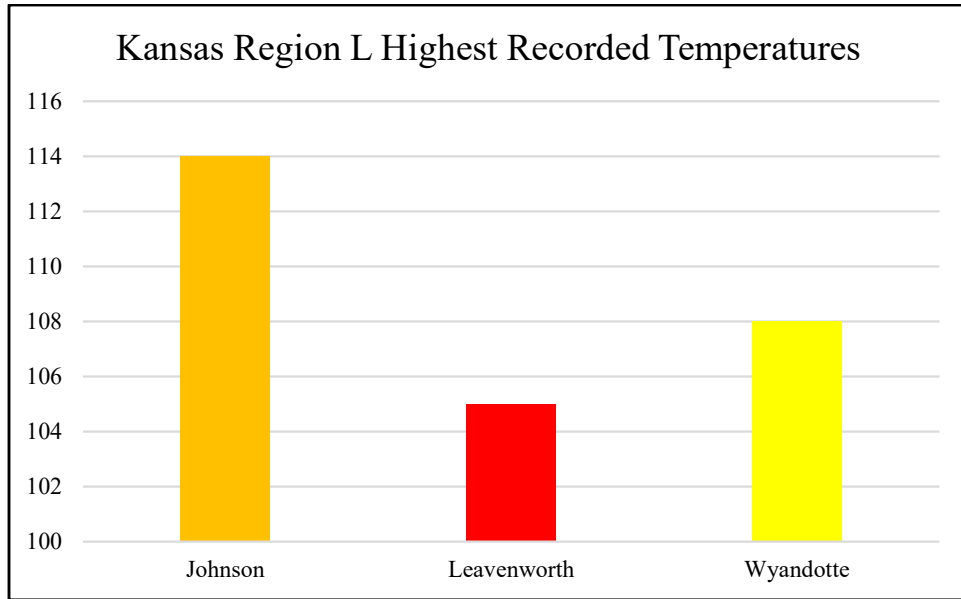
Data from the High Plains Regional Climate Center indicates the following historic high and low temperatures.

**Table 4.139: Kansas Region L Historic Temperatures**

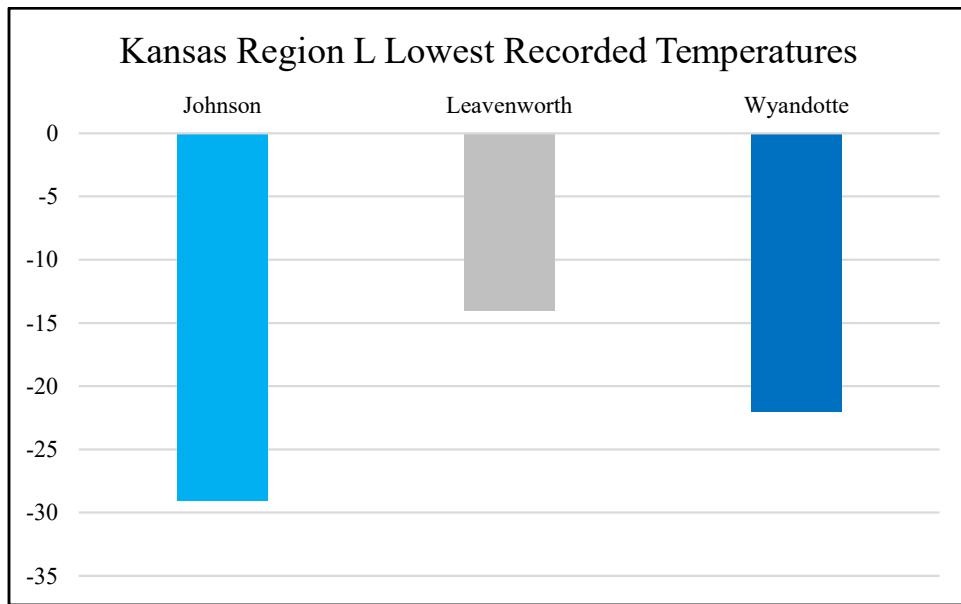
County	Historic Low Temperature (F)	Historic High Temperature (F)
Johnson	-29	114
Leavenworth	-14	105
Wyandotte	-22	108

Source: High Plains Regional Climate Center





Source: High Plains Regional Climate Center



Source: High Plains Regional Climate Center

In addition to the above reported events, 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 L from the period 2013- 2018.



**Table 4.140: Kansas Region L NCEI Extreme Temperature Events, 2009 - 2018**

County	Event Type	Number of Events	Property Damage	Deaths	Injuries
Johnson	Cold	0	\$0	0	0
	Heat	2	\$0	0	0
Leavenworth	Cold	0	\$0	0	0
	Heat	2	\$0	0	0
Wyandotte	Cold	0	\$0	0	0
	Heat	2	\$0	0	0

Source: NOAA NCEI

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of extreme temperature on the region's agricultural base. Crop loss data for the years 2014- 2018 (with 2014 and 2018 being full data years), for the region, indicates seven extreme temperature related claim on 670 acres for \$17,096.

**Table 4.141: USDA Risk Management Agency Cause of Loss Indemnities  
2014-2018, Extreme Temperatures**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Johnson	1	56	\$5,942
Leavenworth	6	673	\$12,356
Wyandotte	0	0	\$0

Source: USDA

### 4.21.3 – 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 L communities.

The following table summarizes extreme temperature event data for **Johnson County**.

**Table 4.142: Johnson County Extreme Temperature 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 Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	56
Average Number of Acres Damaged per Year	11





**Table 4.142: Johnson County Extreme Temperature Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$5,942
Average Crop Damage per Year	\$1,188

Source: NCEI and USDA

Data from the NCEI indicates that Johnson County can expect on a yearly basis, relevant to extreme temperature events:

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

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

- Less than one insurance claims
- 11 acres impacted
- \$1,188 in insurance claims

The following table summarizes extreme temperature event data for **Leavenworth County**.

**Table 4.143: Leavenworth County Extreme Temperature Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	0
Average Events per Year	0
Number of Days with Event and Death or Injury (2009-2018)	0
Average Number of Days with Event and Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	6
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	673
Average Number of Acres Damaged per Year	135
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$12,356
Average Crop Damage per Year	\$2,471

Source: NCEI and USDA

Data from the NCEI indicates that Leavenworth County can expect on a yearly basis, relevant to extreme temperature events:

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

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



- One insurance claim
- 135 acres impacted
- \$2,471 in insurance claims

The following table summarizes extreme temperature event data for **Wyandotte County**.

**Table 4.144: Wyandotte County Extreme Temperature Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
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 Injury or Death	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2014-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2014-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2014-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

Data from the NCEI indicates that Wyandotte County can expect on a yearly basis, relevant to extreme temperature events:

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

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

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

#### **4.21.4 – 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



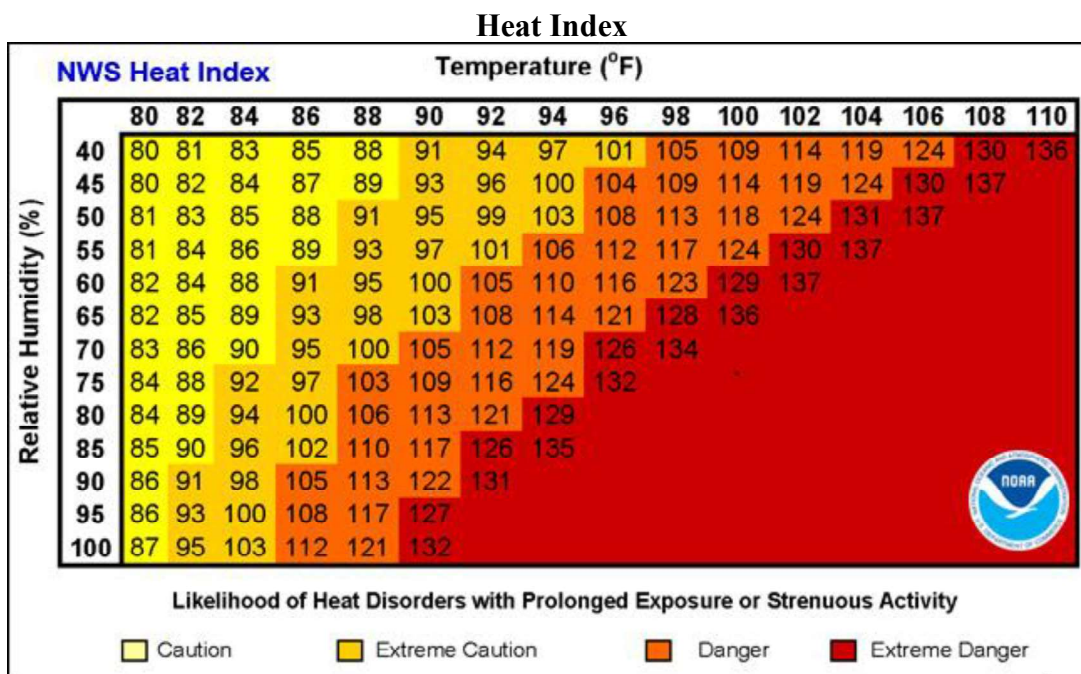
and/or physical activity. The following table discusses potential impacts on human health related to excessive heat.

**Table 4.145: Extreme Heat Impacts on Human Health**

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

Source: National Weather Service Heat Index Program

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

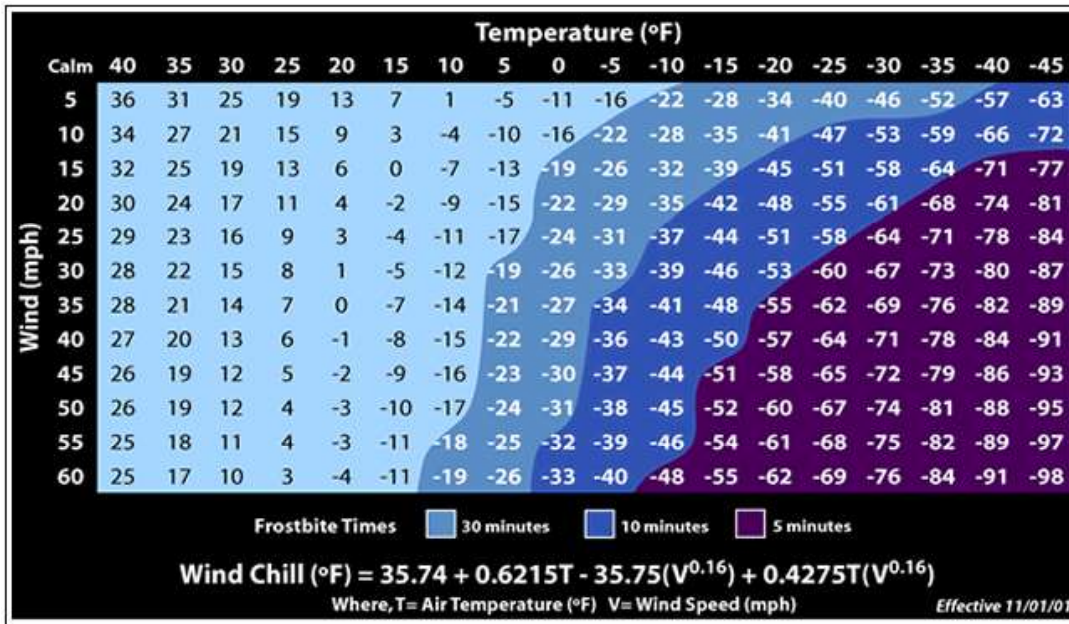


Extreme cold can cause hypothermia, an extreme lowering of the body's temperature, frostbite and death. Infants and the elderly are particularly at risk, but anyone can be affected. Other impacts of extreme cold include asphyxiation from toxic fumes from emergency heaters, household fires, which can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

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



### Wind Chill Values



Counties with a high population and/or a growing population may be at increased risk.

**Table 4.146: Kansas Region L Population Vulnerability Data for Extreme Temperatures**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region L County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of extreme temperature conditions on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to extreme temperature events.

**Table 4.147: Kansas Region L USDA Annual Extreme Temperature Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	39	0.004%	\$24,370,000	\$1,188	0.005%
Leavenworth	184,471	13	0.01%	\$36,367,000	\$2,471	0.01%
Wyandotte	12,009	0	0.0%	\$3,291,000	\$0	0.0%

Source: USDA



#### 4.21.5 – Consequence Analysis

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

**Table 4.148: Extreme Temperature Consequence Analysis**

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



## 4.22 – 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

### 4.22.1 – 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.

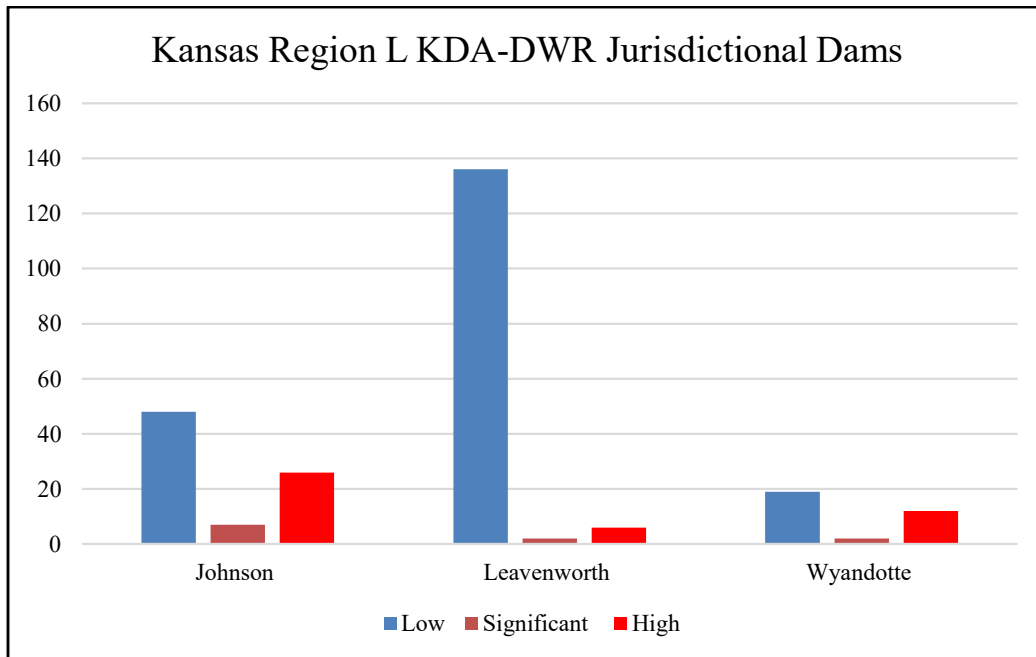
According to the KDA-DWR, there are 258 jurisdictional dams in Kansas Region L. These dams are classified as follows.

**Table 4.149: Kansas Region L KDA-DWR Jurisdictional Dams**

County	Low	Significant	High	High Hazard Without EAP	Total Dams
Johnson	48	7	26	4	81
Leavenworth	136	2	6	0	144
Wyandotte	19	2	12	1	33

Source: KDA-DWR



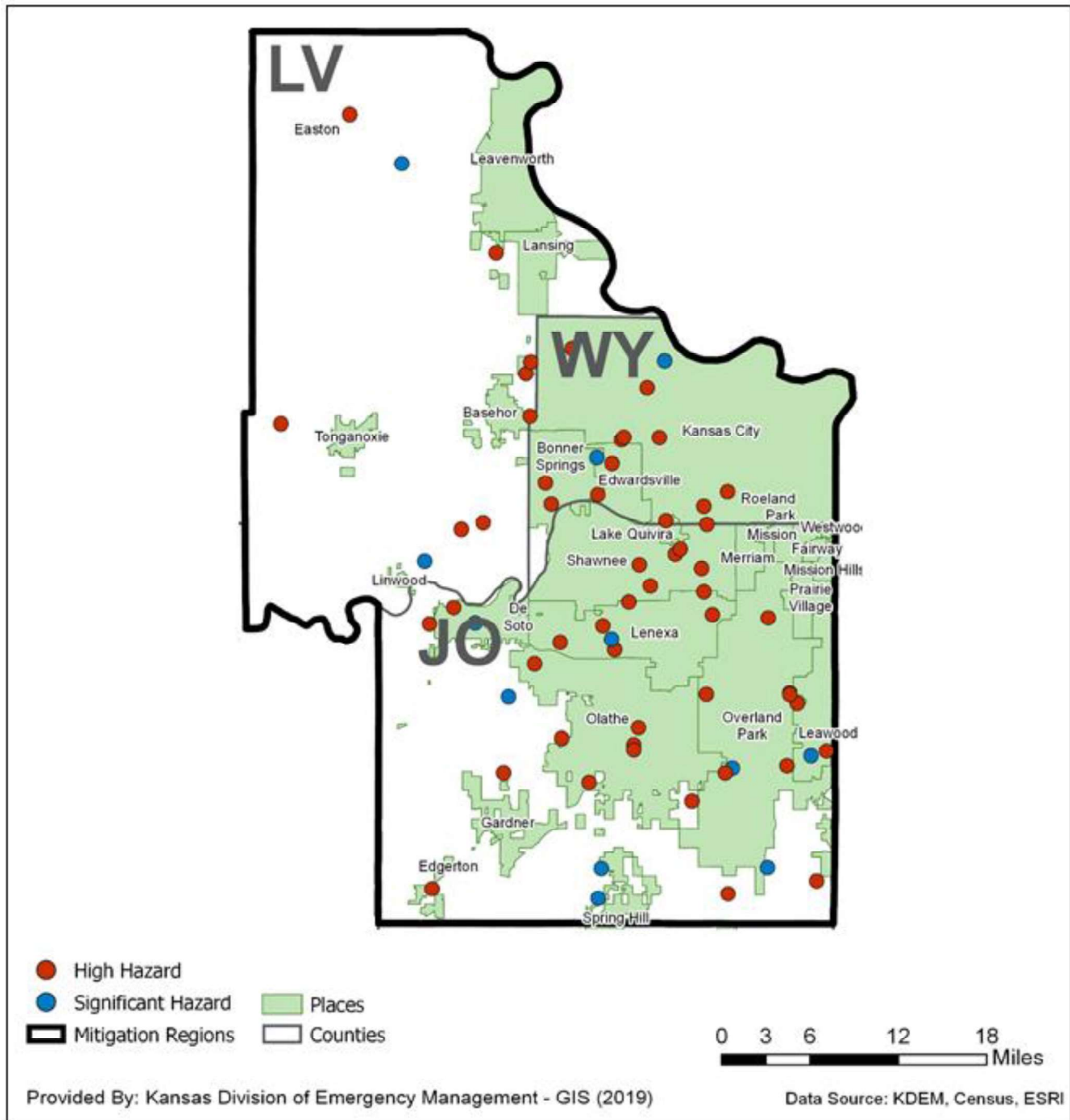


Source: KDA-DWR

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



## Significant and High Hazard Dams in Kansas Region L



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



**Table 4.150: Kansas Region L Federally Operated Dams**

County	Federal Reservoir Name	Operating Agency
Johnson	Sunflower Pond B Dam	United States Army
Leavenworth	Merritt Lake	United States Army
Leavenworth	Smith Lake	United States Army

Source: KDA-DWR

Of particular interest for Region L are the Dams/Reservoirs in Nebraska. As evidenced during the 2011 Missouri River flooding, the dams upstream can play a huge role in what happens downstream. When releases exceed capacity, it creates a domino effect on the dams and levees downstream in Kansas, ultimately leading to the planning area via the Missouri River. There are nine high hazard dams in southern Nebraska that, if a failure were to occur, could potentially impact the region. These dams, and the Nebraska county they are in, are as follows:

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

#### 4.22.2 – 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 USACE Integrated National Levee Database (NLD), containing levees enrolled in the USACE National Levee Safety Program (NLSP).
- The FEMA National Levee Inventory Report (NLIR)

According to the USACE Integrated NLD, there are 65 levees in the NLSP in Kansas Region L. The following table provides available information on these levees.

**Table 4.151: Kansas Region L USACE NLD Levees**

County(ies)	Jurisdiction(s)	Name	Waterway	Segment Count	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Johnson	De Soto	Johnson Kansas River 2	Kansas River	1	3.138663542	1.171584907	Not Inspected	Undefined
Johnson	Shawnee	LJF-0228		1	1.880826342	0.966509033	Not Inspected	
Leavenworth	Eudora	Fall Leaf Drainage District	Kansas River	1	1.060210225	1.101081771	Not Inspected	Fall Leaf Drainage District
Leavenworth	Leavenworth	Ft. Leavenworth, Kansas	Missouri River	1	3.107642331	1.023001878	Not Inspected	Ft. Leavenworth, Kansas
Leavenworth	Leavenworth	Grape-Bollin-Schwartz	Missouri River	1	2.947039767	0.13032937	Not Inspected	Grape-Bollin-



**Table 4.151: Kansas Region L USACE NLD Levees**

County(ies)	Jurisdiction(s)	Name	Waterway	Segment Count	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
		Levee Association						Schwartz Levee Association
Leavenworth	Lansing	Kansas Department of Corrections	Missouri River	1	9.476682866	4.67086285	Not Inspected	Kansas Department of Corrections
Leavenworth	Tonganoxie	LLV-0001, LLV-0103	-	1	1.119446759	0.469225456	Not Inspected	
Leavenworth	Tonganoxie	LLV-0005	-	1	0.383389548	0.022967413	Not Inspected	
Leavenworth	Tonganoxie	LLV-0014	-	1	0.494781772	0.06670672	Not Inspected	
Leavenworth	Easton	LLV-0049	-	1	0.449959295	0.117075614	Not Inspected	
Leavenworth	Tonganoxie	LLV-0055	-	1	0.300857906	0.016785064	Not Inspected	
Leavenworth	De Soto	LLV-0125, LJO-0002, LLV-0003	-	1	0.803962074	0.204667348	Not Inspected	
Leavenworth, Wyandotte	Kansas City	Wolcott Drainage District Section 1	Missouri River	1	4.330172913	1.369581226	Not Inspected	Wolcott Drainage District
Wyandotte	Kansas City	Argentine Unit	Kansas River	1	5.212174127	3.087744981	Minimally Acceptable	Kaw Valley Drainage District
Wyandotte	Kansas City	Armourdale Unit	Kansas River	1	5.301625119	3.080811064	Minimally Acceptable	Kaw Valley Drainage District
Wyandotte	Kansas City	Fairfax-Jersey Creek	Missouri River	2	5.255743514	3.348527932	Minimally Acceptable	Fairfax Drainage District, Kaw Valley Drainage District
Wyandotte	Kansas City	Nearman Creek Power Station Levee	Missouri River	1	1.616033092	0.262886893	Not Inspected	Nearman Creek Power Station
Wyandotte	Kansas City	Turkey Creek LB Levee and Restored Channel	Turkey Creek	1	0.495527618	0.049640974	Not Inspected	United Government of Wyandotte County
Wyandotte	Kansas City	Wolcott Drainage District Section 2	Missouri River	1	3.690474921	1.40295263	Not Inspected	Wolcott Drainage District
Wyandotte	Kansas City	Wolcott Drainage	Missouri River	1	2.411888024	0.304154651	Not Inspected	Wolcott Drainage District



**Table 4.151: Kansas Region L USACE NLD Levees**

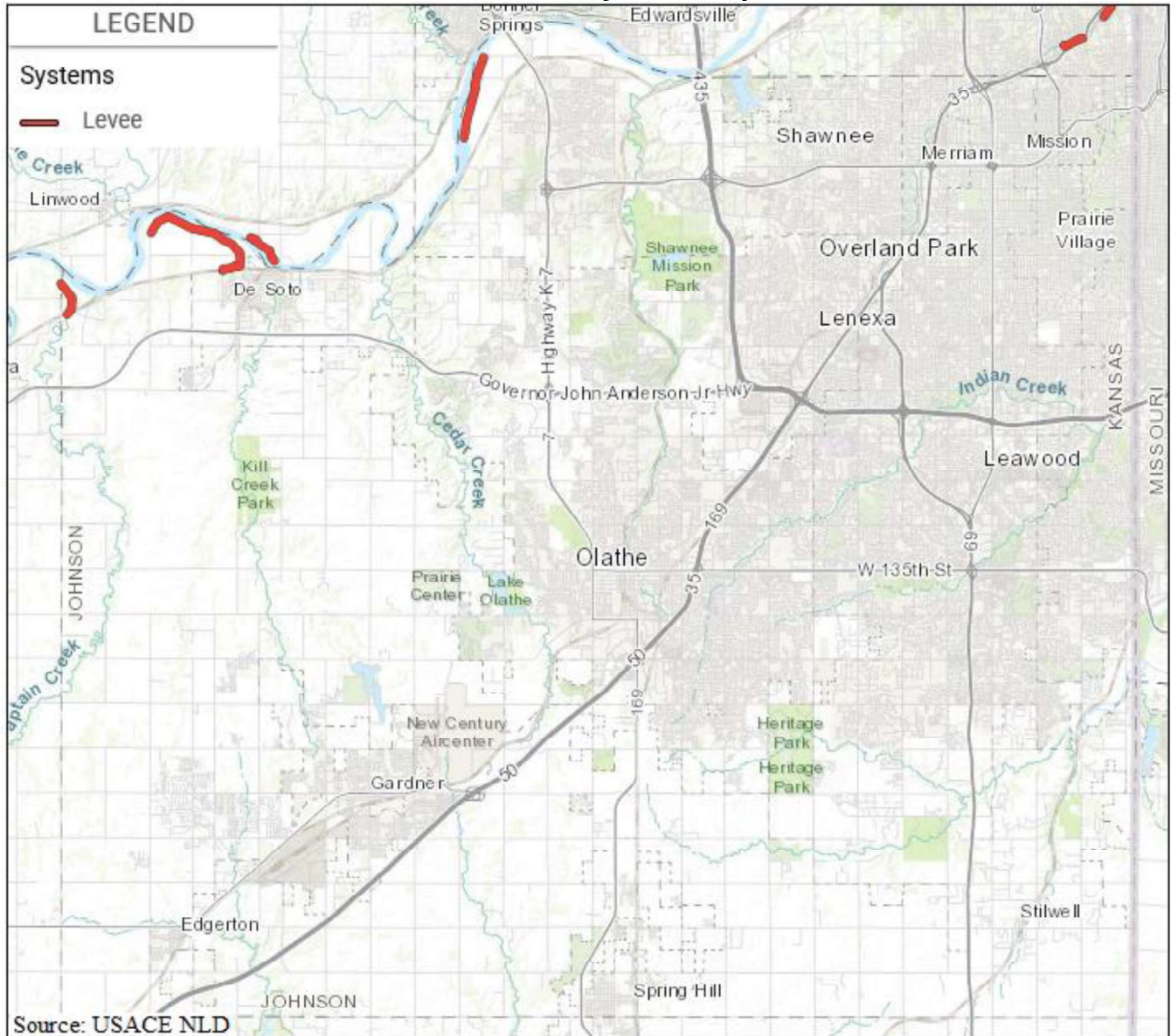
County(ies)	Jurisdiction(s)	Name	Waterway	Segment Count	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
		District Section 3						

Source: USACE

-: Data unknown

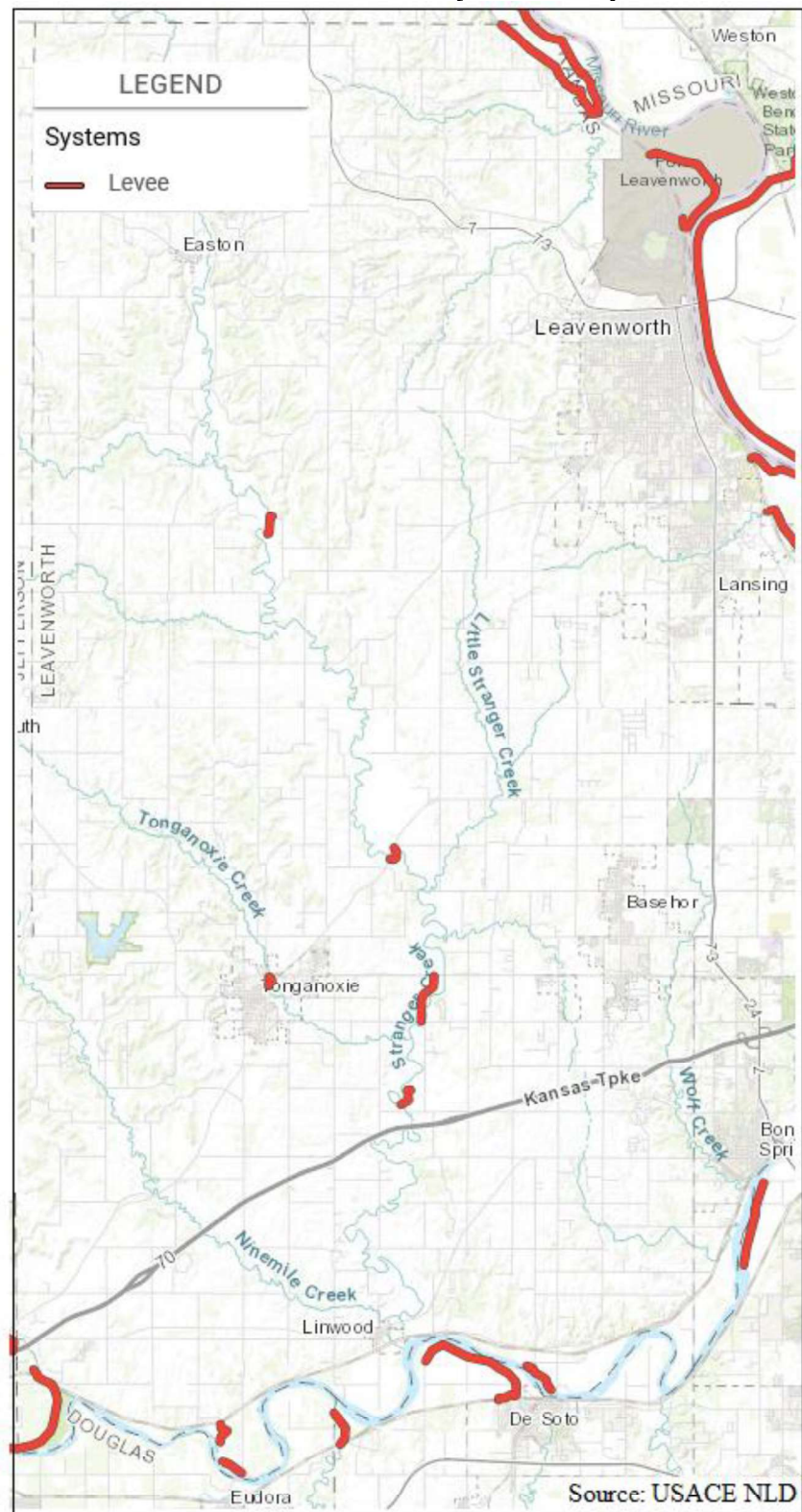
The following maps detail levee locations for each participating Kansas Region L county.

**Johnson County Levee Map**

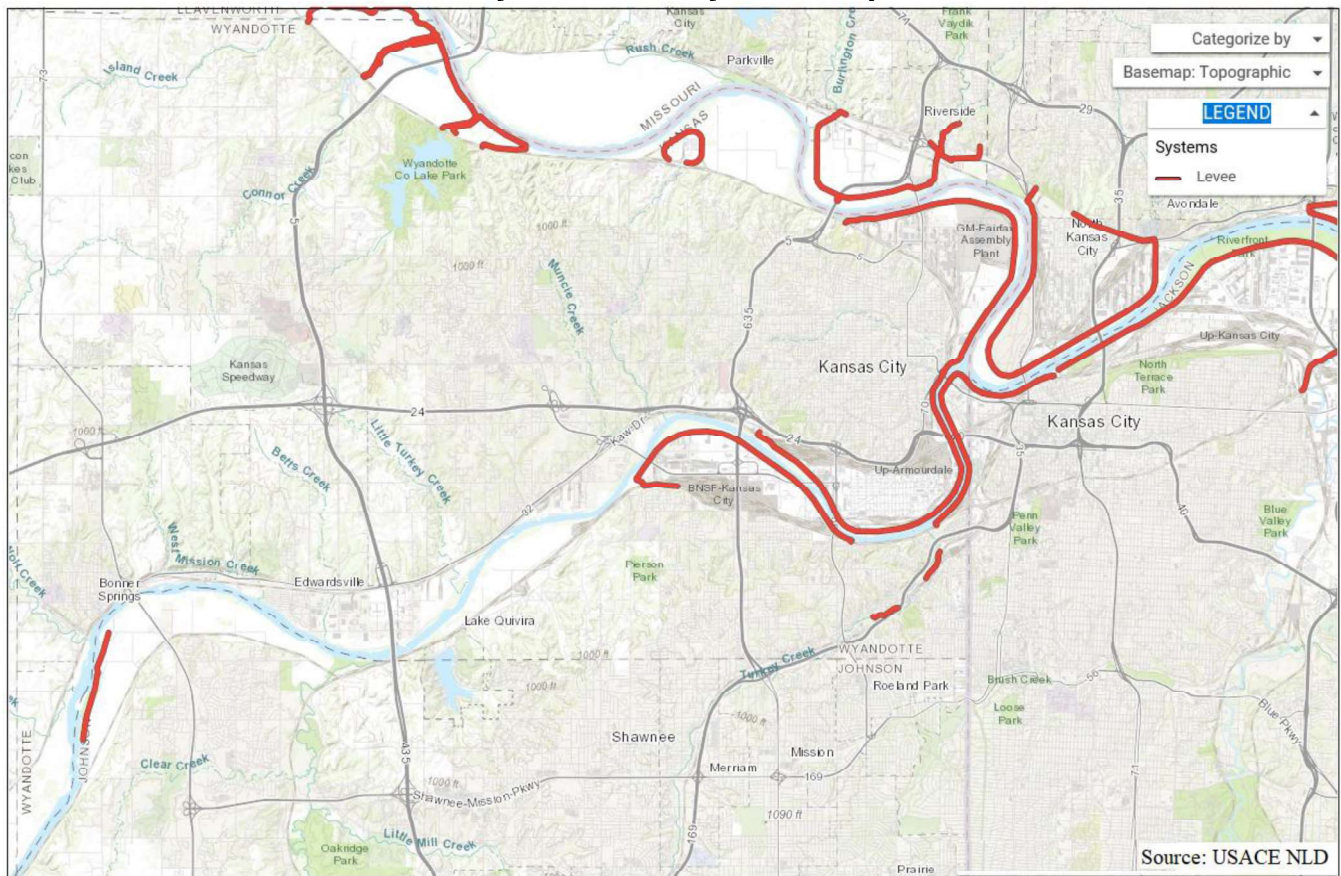




## Leavenworth County Levee Map



## Wyandotte County Levee Map

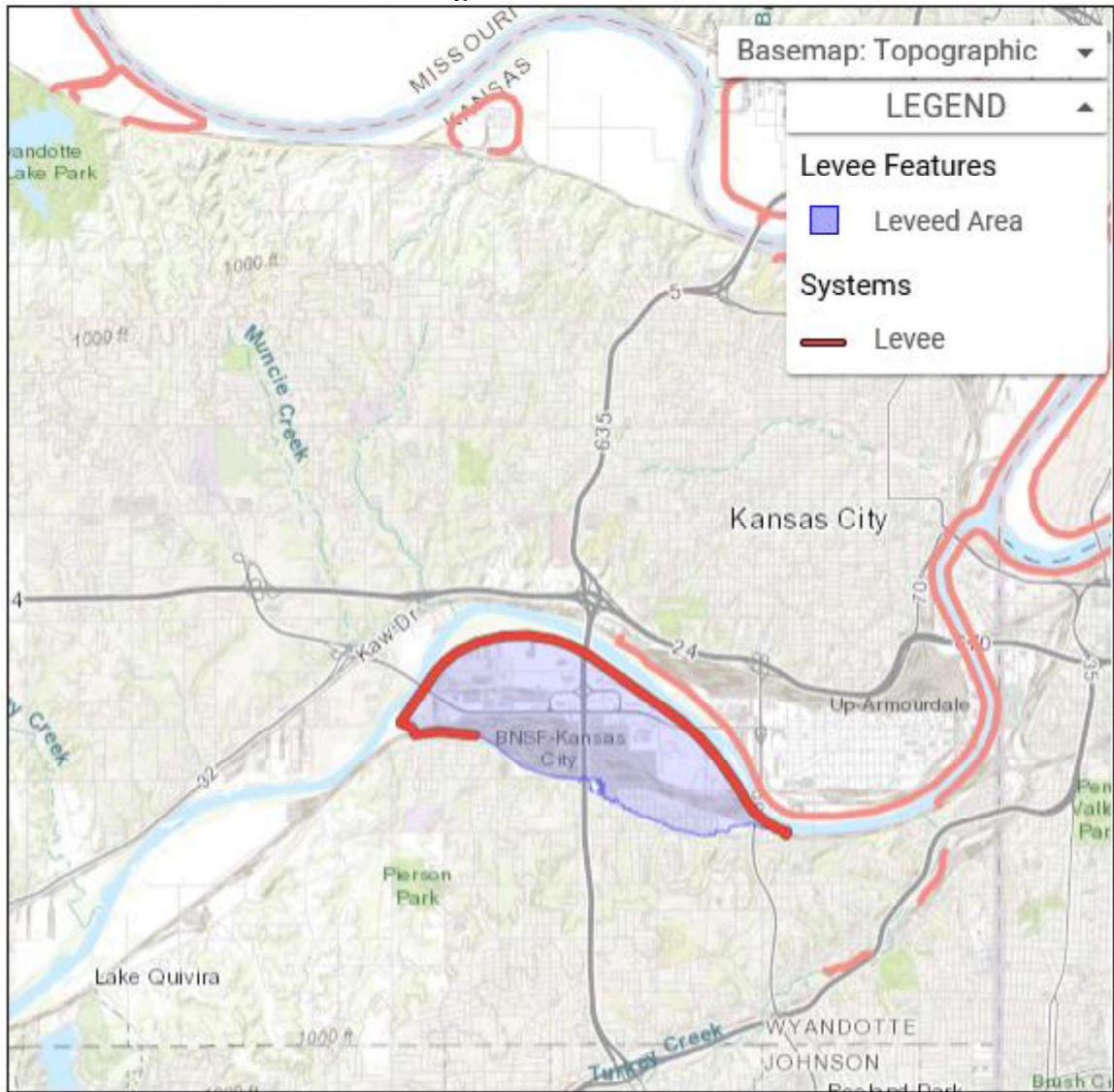


In addition, the following present maps for individual levees identified as protecting larger populations, all in Wyandotte County.

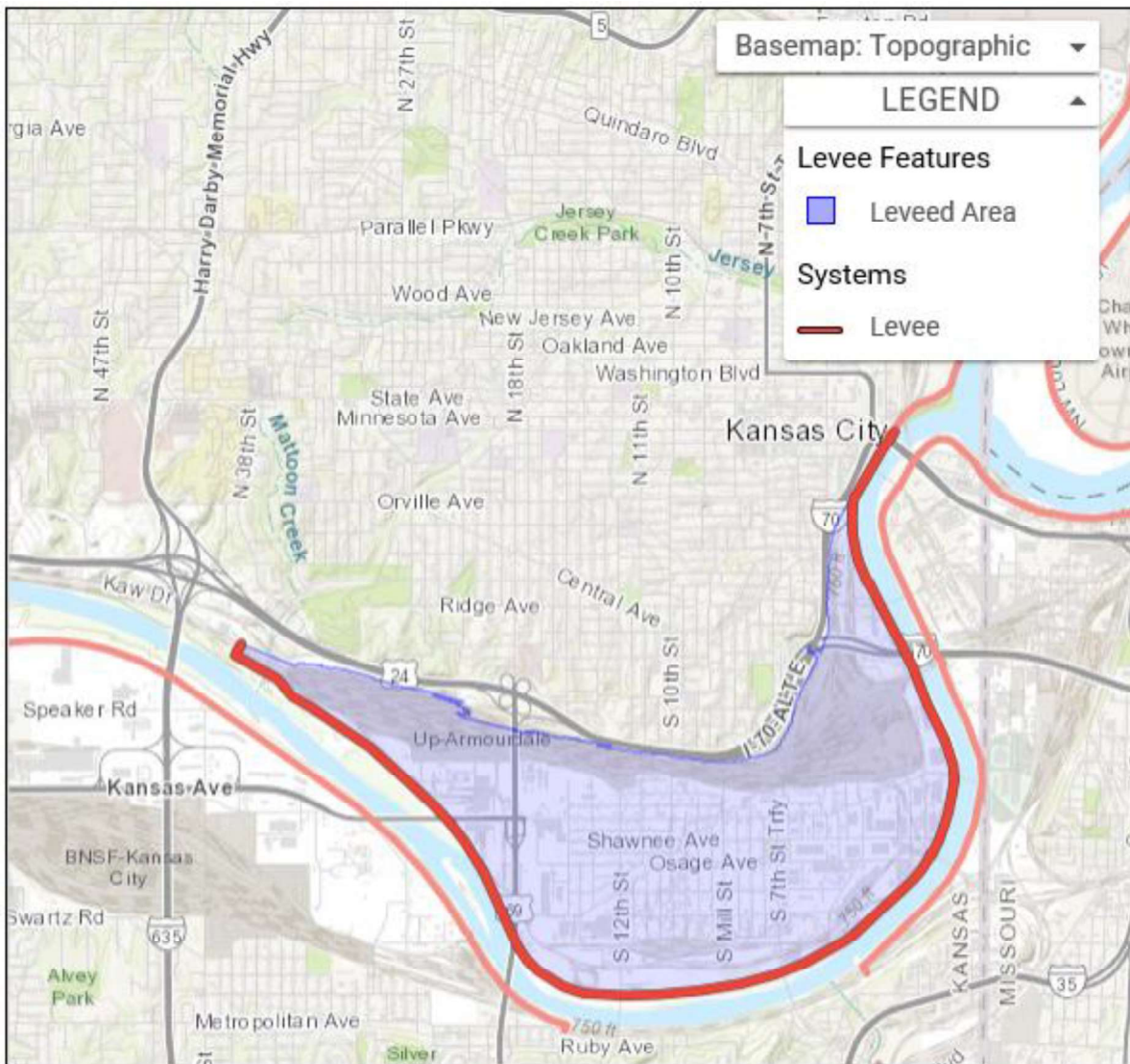




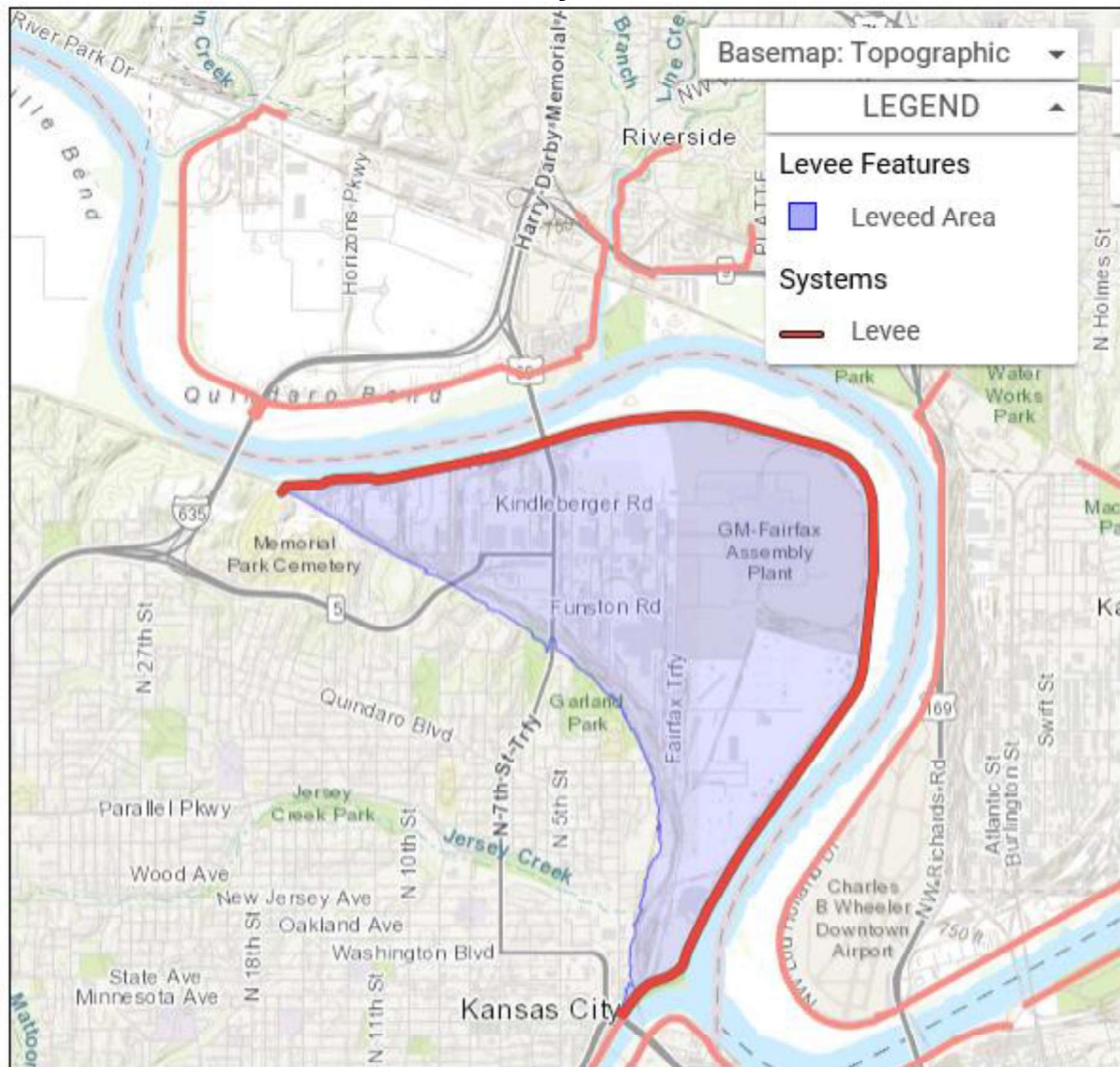
## Argentine Unit Levee



## Armourdale Unit Levee



## Fairfax-Jersey Creek Levee





This topographic map displays the Borington area, highlighting leveed areas in light blue and levees in red. The map includes a legend in the top right corner with the following details:

- Basemap:** Topographic
- LEGEND**
  - Levee Features**
    - Leveed Area (light blue)
  - Systems**
    - Levee (red line)

The map shows various streets including S 12th St, S 11th St, S 10th St, S 9th St, S 8th Pl, S 13th St, S 14th St, S 15th St, S 16th St, S 17th St, S 18th St, S 19th St, S 20th St, S 21st St, S 22nd St, S 23rd St, S 24th St, S 25th St, S 26th St, S 27th St, S 28th St, S 29th St, S 30th St, S 31st St, S 32nd St, S 33rd St, S 34th St, S 35th St, S 36th St, S 37th St, S 38th St, S 39th St, S 40th St, S 41st St, S 42nd St, S 43rd St, S 44th St, S 45th St, S 46th St, S 47th St, S 48th St, S 49th St, S 50th St, S 51st St, S 52nd St, S 53rd St, S 54th St, S 55th St, S 56th St, S 57th St, S 58th St, S 59th St, S 60th St, S 61st St, S 62nd St, S 63rd St, S 64th St, S 65th St, S 66th St, S 67th St, S 68th St, S 69th St, S 70th St, S 71st St, S 72nd St, S 73rd St, S 74th St, S 75th St, S 76th St, S 77th St, S 78th St, S 79th St, S 80th St, S 81st St, S 82nd St, S 83rd St, S 84th St, S 85th St, S 86th St, S 87th St, S 88th St, S 89th St, S 90th St, S 91st St, S 92nd St, S 93rd St, S 94th St, S 95th St, S 96th St, S 97th St, S 98th St, S 99th St, S 100th St. Other features include Merriam Ln, Stine Ln, Dodson Ave, Marty Ave, W 37th Ave, W 39th Ave, W 41st Ave, W 43rd Ave, W 45th Ave, W 47th Ave, W 49th Ave, W 51st Ave, W 53rd Ave, W 55th Ave, W 57th Ave, W 59th Ave, W 61st Ave, W 63rd Ave, W 65th Ave, W 67th Ave, W 69th Ave, W 71st Ave, W 73rd Ave, W 75th Ave, W 77th Ave, W 79th Ave, W 81st Ave, W 83rd Ave, W 85th Ave, W 87th Ave, W 89th Ave, W 91st Ave, W 93rd Ave, W 95th Ave, W 97th Ave, W 99th Ave, W 101st Ave, W 103rd Ave, W 105th Ave, W 107th Ave, W 109th Ave, W 111th Ave, W 113th Ave, W 115th Ave, W 117th Ave, W 119th Ave, W 121st Ave, W 123rd Ave, W 125th Ave, W 127th Ave, W 129th Ave, W 131st Ave, W 133rd Ave, W 135th Ave, W 137th Ave, W 139th Ave, W 141st Ave, W 143rd Ave, W 145th Ave, W 147th Ave, W 149th Ave, W 151st Ave, W 153rd Ave, W 155th Ave, W 157th Ave, W 159th Ave, W 161st Ave, W 163rd Ave, W 165th Ave, W 167th Ave, W 169th Ave, W 171st Ave, W 173rd Ave, W 175th Ave, W 177th Ave, W 179th Ave, W 181st Ave, W 183rd Ave, W 185th Ave, W 187th Ave, W 189th Ave, W 191st Ave, W 193rd Ave, W 195th Ave, W 197th Ave, W 199th Ave, W 201st Ave, W 203rd Ave, W 205th Ave, W 207th Ave, W 209th Ave, W 211th Ave, W 213rd Ave, W 215th Ave, W 217th Ave, W 219th Ave, W 221st Ave, W 223rd Ave, W 225th Ave, W 227th Ave, W 229th Ave, W 231st Ave, W 233rd Ave, W 235th Ave, W 237th Ave, W 239th Ave, W 241st Ave, W 243rd Ave, W 245th Ave, W 247th Ave, W 249th Ave, W 251st Ave, W 253rd Ave, W 255th Ave, W 257th Ave, W 259th Ave, W 261st Ave, W 263rd Ave, W 265th Ave, W 267th Ave, W 269th Ave, W 271st Ave, W 273rd Ave, W 275th Ave, W 277th Ave, W 279th Ave, W 281st Ave, W 283rd Ave, W 285th Ave, W 287th Ave, W 289th Ave, W 291st Ave, W 293rd Ave, W 295th Ave, W 297th Ave, W 299th Ave, W 301st Ave, W 303rd Ave, W 305th Ave, W 307th Ave, W 309th Ave, W 311th Ave, W 313rd Ave, W 315th Ave, W 317th Ave, W 319th Ave, W 321st Ave, W 323rd Ave, W 325th Ave, W 327th Ave, W 329th Ave, W 331st Ave, W 333rd Ave, W 335th Ave, W 337th Ave, W 339th Ave, W 341st Ave, W 343rd Ave, W 345th Ave, W 347th Ave, W 349th Ave, W 351st Ave, W 353rd Ave, W 355th Ave, W 357th Ave, W 359th Ave, W 361st Ave, W 363rd Ave, W 365th Ave, W 367th Ave, W 369th Ave, W 371st Ave, W 373rd Ave, W 375th Ave, W 377th Ave, W 379th Ave, W 381st Ave, W 383rd Ave, W 385th Ave, W 387th Ave, W 389th Ave, W 391st Ave, W 393rd Ave, W 395th Ave, W 397th Ave, W 399th Ave, W 401st Ave, W 403rd Ave, W 405th Ave, W 407th Ave, W 409th Ave, W 411th Ave, W 413rd Ave, W 415th Ave, W 417th Ave, W 419th Ave, W 421st Ave, W 423rd Ave, W 425th Ave, W 427th Ave, W 429th Ave, W 431st Ave, W 433rd Ave, W 435th Ave, W 437th Ave, W 439th Ave, W 441st Ave, W 443rd Ave, W 445th Ave, W 447th Ave, W 449th Ave, W 451st Ave, W 453rd Ave, W 455th Ave, W 457th Ave, W 459th Ave, W 461st Ave, W 463rd Ave, W 465th Ave, W 467th Ave, W 469th Ave, W 471st Ave, W 473rd Ave, W 475th Ave, W 477th Ave, W 479th Ave, W 481st Ave, W 483rd Ave, W 485th Ave, W 487th Ave, W 489th Ave, W 491st Ave, W 493rd Ave, W 495th Ave, W 497th Ave, W 499th Ave, W 501st Ave, W 503rd Ave, W 505th Ave, W 507th Ave, W 509th Ave, W 511th Ave, W 513rd Ave, W 515th Ave, W 517th Ave, W 519th Ave, W 521st Ave, W 523rd Ave, W 525th Ave, W 527th Ave, W 529th Ave, W 531st Ave, W 533rd Ave, W 535th Ave, W 537th Ave, W 539th Ave, W 541st Ave, W 543rd Ave, W 545th Ave, W 547th Ave, W 549th Ave, W 551st Ave, W 553rd Ave, W 555th Ave, W 557th Ave, W 559th Ave, W 561st Ave, W 563rd Ave, W 565th Ave, W 567th Ave, W 569th Ave, W 571st Ave, W 573rd Ave, W 575th Ave, W 577th Ave, W 579th Ave, W 581st Ave, W 583rd Ave, W 585th Ave, W 587th Ave, W 589th Ave, W 591st Ave, W 593rd Ave, W 595th Ave, W 597th Ave, W 599th Ave, W 601st Ave, W 603rd Ave, W 605th Ave, W 607th Ave, W 609th Ave, W 611th Ave, W 613rd Ave, W 615th Ave, W 617th Ave, W 619th Ave, W 621st Ave, W 623rd Ave, W 625th Ave, W 627th Ave, W 629th Ave, W 631st Ave, W 633rd Ave, W 635th Ave, W 637th Ave, W 639th Ave, W 641st Ave, W 643rd Ave, W 645th Ave, W 647th Ave, W 649th Ave, W 651st Ave, W 653rd Ave, W 655th Ave, W 657th Ave, W 659th Ave, W 661st Ave, W 663rd Ave, W 665th Ave, W 667th Ave, W 669th Ave, W 671st Ave, W 673rd Ave, W 675th Ave, W 677th Ave, W 679th Ave, W 681st Ave, W 683rd Ave, W 685th Ave, W 687th Ave, W 689th Ave, W 691st Ave, W 693rd Ave, W 695th Ave, W 697th Ave, W 699th Ave, W 701st Ave, W 703rd Ave, W 705th Ave, W 707th Ave, W 709th Ave, W 711th Ave, W 713rd Ave, W 715th Ave, W 717th Ave, W 719th Ave, W 721st Ave, W 723rd Ave, W 725th Ave, W 727th Ave, W 729th Ave, W 731st Ave, W 733rd Ave, W 735th Ave, W 737th Ave, W 739th Ave, W 741st Ave, W 743rd Ave, W 745th Ave, W 747th Ave, W 749th Ave, W 751st Ave, W 753rd Ave, W 755th Ave, W 757th Ave, W 759th Ave, W 761st Ave, W 763rd Ave, W 765th Ave, W 767th Ave, W 769th Ave, W 771st Ave, W 773rd Ave, W 775th Ave, W 777th Ave, W 779th Ave, W 781st Ave, W 783rd Ave, W 785th Ave, W 787th Ave, W 789th Ave, W 791st Ave, W 793rd Ave, W 795th Ave, W 797th Ave, W 799th Ave, W 801st Ave, W 803rd Ave, W 805th Ave, W 807th Ave, W 809th Ave, W 811th Ave, W 813rd Ave, W 815th Ave, W 817th Ave, W 819th Ave, W 821st Ave, W 823rd Ave, W 825th Ave, W 827th Ave, W 829th Ave, W 831st Ave, W 833rd Ave, W 835th Ave, W 837th Ave, W 839th Ave, W 841st Ave, W 843rd Ave, W 845th Ave, W 847th Ave, W 849th Ave, W 851st Ave, W 853rd Ave, W 855th

Kansas Region L has its borders on the Missouri River and the Kansas River, which are prone to flooding during high precipitation events. As with the floods of 2011, even states as far north as Montana can add to this problem when they have record snow or rainfall, even when Kansas is in a drought. Ensuring that the levees and dams maintain their structural integrity to protect against breeches, overtopping, and failure continues to be a main priority.



KANSAS



### 4.22.3 – Previous Occurrences

Kansas Region L has been fortunate enough to not have any reported dam failures that have resulted in the loss of life. Below are the reported dam failures for the region.

**Table 4.152: Kansas Region L Dam Incidents**

Dam Name	County	Incident Type	Failure	Incident Date	Deaths
Ksnoname 2987	Wyandotte	Seepage; Piping	No	5/14/1997	None Reported
Demaranville, Don, Sarcoxie Lake Dam	Leavenworth	Seepage, head cut in the emergency spillway	No	7/25/2001	None Reported
Larson, Dr. O.M.	Leavenworth	Piping, seepage	No	1/22/2001	None Reported
Ksnoname 2987	Wyandotte	Seepage	No	3/6/2002	None Reported

Source: Stanford University National Performance of Dams Program

There have been three recent notable and reported levee failures in Kansas Region L in the past 15 years.

- **2011 Levee System Failures:** The USACE reported that every non-federal levee from Rulo to Wolcott in the State of Kansas were either overtopped or breached as a result of a large 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
- **Wolcott Levee Section 1 and Wolcott Levee Section 2:** In 2009, these two non-federal levees in Leavenworth and Wyandotte counties were damaged as a result of large floods.
- **1993 Levee System Failures:** During the spring floods of 1993, which covered nine Midwest states, nine of the 15 units in the federally constructed Missouri River Levee System and virtually all the nonfederal farm levees in the district were overtopped.

### 4.8.4 – Hazard Probability Analysis

Due to the variability of the size and construction of the dams in Region L, 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 four reported dam failure events in Kansas Region L over a 22-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 18.2% 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 three reported levee failure events in Kansas Region L over a 25-year period. Using the binomial probability equation, we derive a probability of 12% for a levee failure in a given year. However, it is worth noting that although both federal and nonfederal levees have been damaged in previous regional flood events the damage has not resulted in catastrophic failure and/or damages.



#### 4.22.5 – 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 4.153: 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 L participating county.

**Table 4.154: Kansas Region L 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
Johnson	48	7	26	4	1	151	Medium-High
Leavenworth	136	2	6	0	2	164	Medium-High
Wyandotte	19	2	12	1		61	Medium

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

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



**Table 4.155: Kansas Region L Population Vulnerability Data for Dam Failure**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

Source: US Census Bureau

Counties with a high population and/or a growing population may be at increased risk.

#### 4.22.6 – 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:** 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 4.156: Kansas Region L 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
Johnson	De Soto	Johnson Kansas River 2	5	5	\$1,590,000	Not Screened	Non- Accredited



**Table 4.156: Kansas Region L 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
Johnson	Shawnee	LJF-0228	10	11	\$9,800,000	Not Screened	No Data Entered
Leavenworth	Eudora	Fall Leaf Drainage District	2	10	\$209,000	Low	Non-Accredited
Leavenworth	Leavenworth	Ft. Leavenworth, Kansas	0	0	\$0	Not Screened	Non-Accredited
Leavenworth	Leavenworth	Grape-Bollin-Schwartz Levee Association	13	7	\$186,000	Not Screened	Non-Accredited
Leavenworth	Lansing	Kansas Department of Corrections	1	5	\$418,000	Low	Non-Accredited
Leavenworth	Tonganoxie	LLV-0001, LLV-0103	13	3	\$2,090,000	Not Screened	No Data Entered
Leavenworth	Tonganoxie	LLV-0005	0	0	\$0	Not Screened	No Data Entered
Leavenworth	Tonganoxie	LLV-0014	0	0	\$0	Not Screened	No Data Entered
Leavenworth	Easton	LLV-0049	2	2	\$690,000	Not Screened	No Data Entered
Leavenworth	Tonganoxie	LLV-0055	15	6	\$3,110,000	Not Screened	No Data Entered
Leavenworth	De Soto	LLV-0125, LJO-0002, LLV-0003	2	2	\$700,000	Not Screened	No Data Entered
Leavenworth, Wyandotte	Kansas City	Wolcott Drainage District Section 1	1	10	\$1,450,000	Low	Non-Accredited
Wyandotte	Kansas City	Argentine Unit	10,700	723	\$3,150,000,000	High	Accredited
Wyandotte	Kansas City	Armourdale Unit	6,700	1,349	\$2,760,000,000	Moderate	Accredited
Wyandotte	Kansas City	Fairfax-Jersey Creek	7,961	228	\$921,000,000	Not Screened	Accredited
Wyandotte	Kansas City	Nearman Creek Power Station Levee	0	0	\$0	Not Screened	Provisionally Accredited Levee
Wyandotte	Kansas City	Turkey Creek LB Levee and Restored Channel	360	28	\$55,700,000	Not Screened	Non-Accredited



**Table 4.156: Kansas Region L 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
Wyandotte	Kansas City	Wolcott Drainage District Section 2	0	0	\$2,060,000	Low	Non-Accredited
Wyandotte	Kansas City	Wolcott Drainage District Section 3	0	0	\$27,500	Low	Non-Accredited

Source: USACE NLD

Counties with a higher identified population are to be considered to have a potentially greater vulnerability. As highlighted in the table above, only a very small percentage of the total population for Kansas Region L (3.8%) live in a levee protected area. However, for Wyandotte County, 16.3% of the population has been identified as being a risk due to a levee failure. The following table indicates the total county population, registered growth over the period 2000 to 2017, and percentage of the total population identified as being at risk.

**Table 4.157: Kansas Region L Population Vulnerability Data for Levee Failure**

County	2017 Population	Percent Population Change 2000 to 2017	Percentage of Population Identified at Risk
Johnson	591,178	31.06%	0.003%
Leavenworth	81,095	18.06%	0.07%
Wyandotte	165,288	4.69%	16.3%

In general counties with a high population and/or a growing population may be at increased risk.

#### 4.22.7 – Impact and Consequence Analysis

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

**Table 4.158: Dam and Levee Failure Consequence Analysis**

Subject	Impacts of Dam and Levee Failure
Health and Safety of the Public	In areas of inundation, the impact to the public is expected to be severe. Impacts to the public in adjacent or minimally impacted areas is expected to be minimal to moderate.
Health and Safety of Responders	Impact to responders is expected to be minimal with proper training. Impact could be severe if there is lack of training.
Continuity of Operations	Temporary relocation may be necessary if facilities or infrastructure is damaged.
Property, Facilities, and Infrastructure	In areas of inundation, impacts could be severe to facilities and infrastructure.
Environment	In areas of inundation, impact to the environment are expected to be severe. Impact will lessen as distance increases.



**Table 4.158: Dam and Levee Failure Consequence Analysis**

<b>Subject</b>	<b>Impacts of Dam and Levee Failure</b>
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.





## 4.23 – 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.

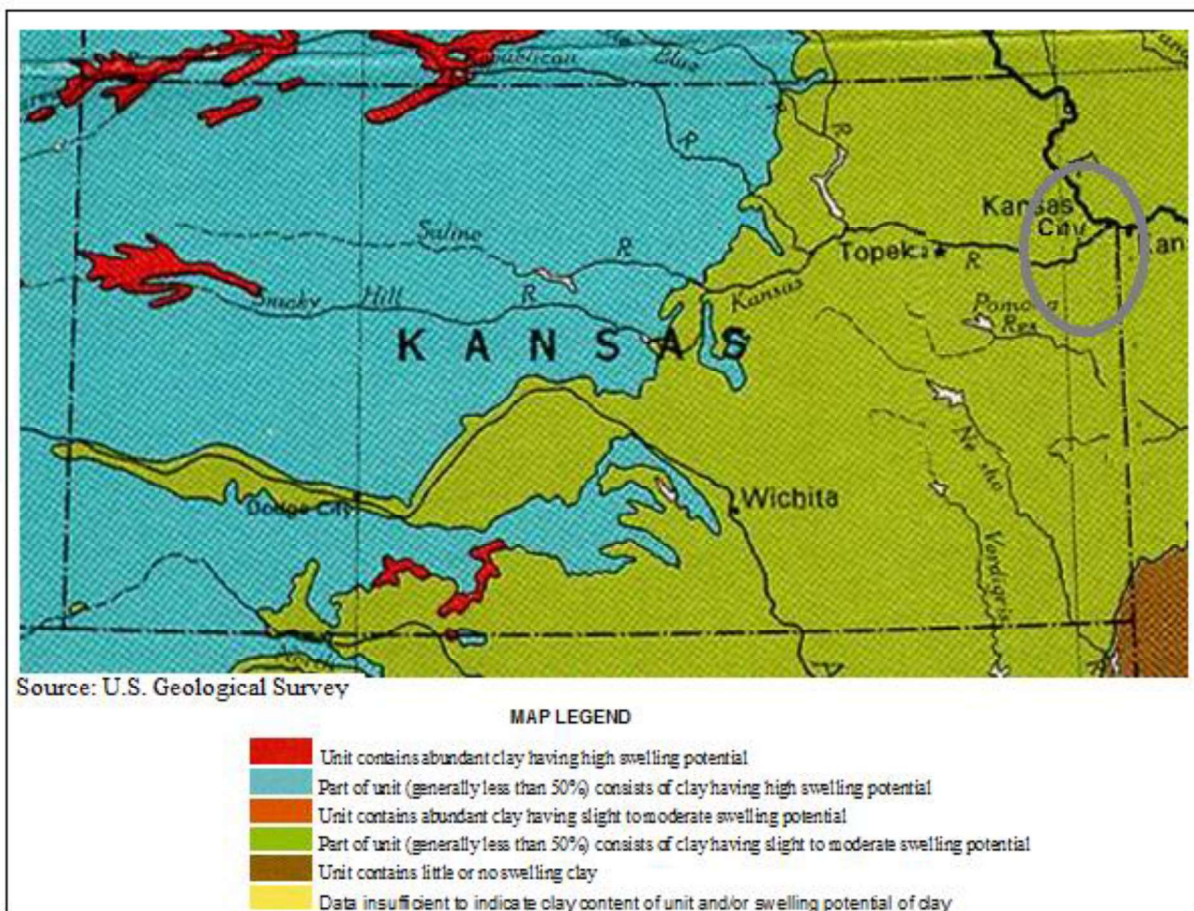


### 4.23.1 – Location and Extent

Kansas Region L 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 L, indicating it is located in an area where part of the soil unit consists of clay having slight to moderate swelling potential.

**Soil Swelling Potential Map**



#### 4.23.2 – Previous Occurrences

No statewide database of expansive soils events is available.

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

#### 4.23.3 – 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 a slight to moderate soil swelling potential in the region, there is an increased probability damages from a soil shrink/swell occurrence. 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.

#### 4.23.4 – 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 4.159: Kansas Region L Estimated Potential Structural Damages, Expansive Soil**

County	Property Valuation	Property Valuation for 10% of Building Stock	Estimated 50% Damage
Johnson	\$124,279,962,000	\$12,427,996,200	\$6,213,998,100
Leavenworth	\$13,050,342,000	\$1,305,034,200	\$652,517,100
Wyandotte	\$29,708,946,000	\$2,970,894,460	\$1,485,447,230

Source: US Census Bureau

#### 4.23.5 – Consequence Analysis

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

**Table 4.160: Expansive Soils Consequence Analysis**

Subject	Impacts of Expansive Soils
Health and Safety of the Public	Minimal impact.
Health and Safety of Responders	Minimal impact.



**Table 4.160: Expansive Soils Consequence Analysis**

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



## 4.24 – 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).



### 4.24.1 – 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:

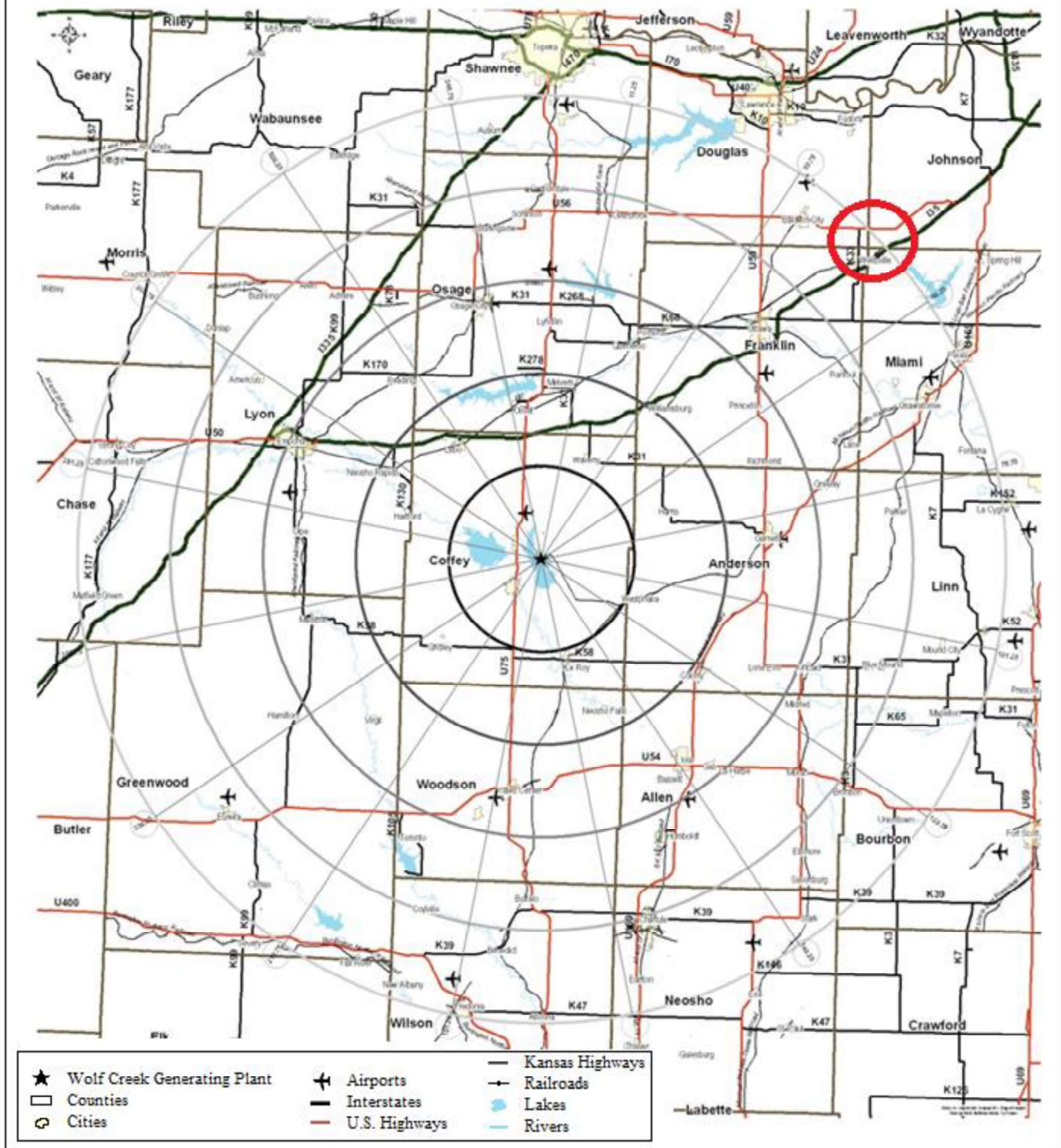
- **Location:** Burlington, Kansas (3.5 miles Northeast)
- **Operator:** Wolf Creek Nuclear Operating Corporation
- **Operating License:** Issued - 06/04/1985
- **Renewed License:** Issued - 11/20/2008
- **License Expires** - 03/11/2045
- **Reactor Type:** Pressurized Water Reactor
- **Licensed MWt:** 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 L is not located in the 10-mile EPZ, and only a small portion of the southwest corner of Johnson County is within the in the 50-mile EPZ a nuclear incident from Wolf Creek is not considered a hazard.



#### 4.24.2 – Previous Occurrences

There have been no previous major radiological events recorded in Kansas Region L.

#### 4.24.3 – Hazard Probability Analysis

Historically there have been no nuclear failure and/or release events in Kansas Region L, 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.

#### 4.24.4 – 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 L from Wolf Creek, and the strict oversight provided by the NRC, the potential vulnerability to Kansas Region L is considered to be very low.

#### 4.24.5 – Impact and Consequence Analysis

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

**Table 4.161: Radiological Incident Consequence Analysis**

<b>Subject</b>	<b>Impacts of Radiological Incident</b>
Health and Safety of Persons in the Area of the Incident	Impact in the immediate area could be severe and long lasting.
Responders	Impact to responders is expected to be severe, potentially even with required safety equipment.
Continuity of Operations	Long term relocation may be necessary if government facilities experience contamination.
Property, Facilities, and Infrastructure	Localized impact could be severe in the incident area. Facilities may need to be abandoned and razed. Large areas may become inaccessible.
Environment	Impact could be severe for the immediate area. Impact will lessen with distance.
Economic Conditions	Local economy and finances may be adversely affected, depending on the nature, extent and duration of the event.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Warning systems and the timeliness of those warnings could be questioned.



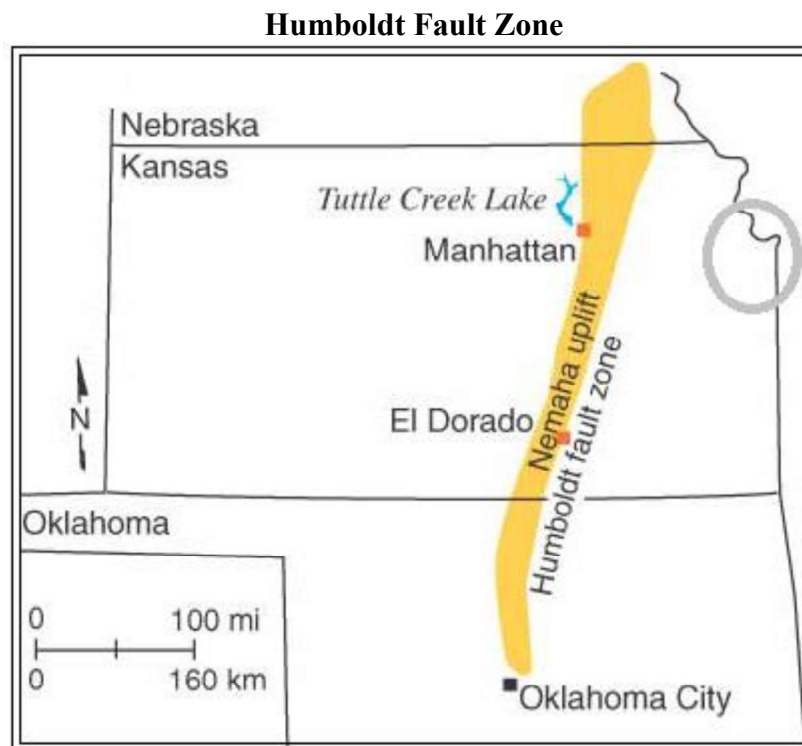


## 4.25 – Earthquake

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.

### 4.25.1 – Location and Extent

Overall, Kansas Region L is in an area of relatively low seismic activity. The closest series of major faults is the Humboldt Fault Zone. Also known as the Nemaha Uplift, the Humboldt Fault Zone runs to the west of the region. Most earthquakes in the Humboldt Fault Zone are small and are detected only with instruments.



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 4.162: 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



**Table 4.162: Earthquake Magnitude Scale Comparison**

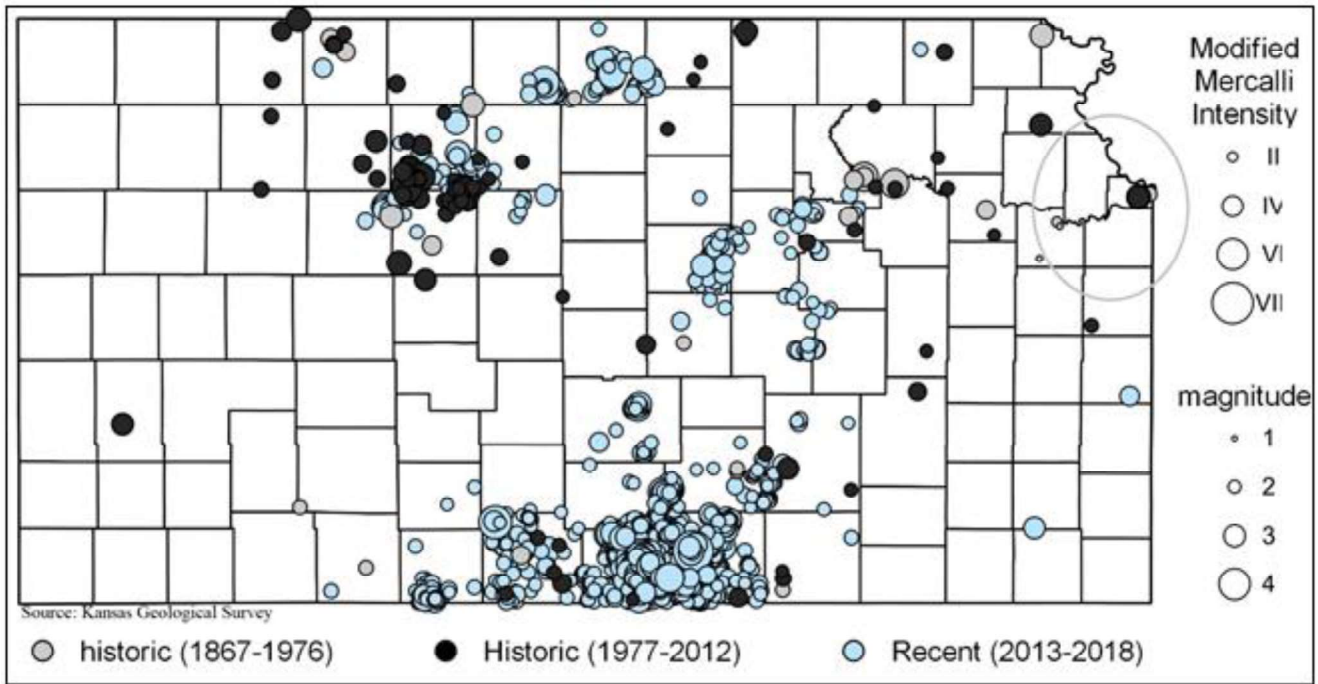
<b>Mercalli Scale Intensity</b>	<b>Verbal Description</b>	<b>Richter Scale Magnitude</b>	<b>Acceleration (%g)</b>	<b>Velocity (cm/s)</b>	<b>Witness Observations</b>
II	Feeble	2 to 3	1.40%	1.1	Noticed only by sensitive people
III	Slight	3 to 4	1.40%	1.1	Resembles vibrations caused by heavy traffic
IV	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

#### 4.25.2 – Previous Occurrences

The following map, from the Kansas Geological Survey (KGS), shows all recorded earthquakes from 1867 through 2018.



### KGS Historic Earthquake Map



In addition to the above map, the KGS Earthquake Catalogue records earthquake events from 1979 through present. According to this archive, Kansas Region L has had one earthquake since 1979.

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

**Table 4.163: 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 +
1	0	0	0	0	0

Source: KGS

The table below represents details about recorded events from the KGS Earthquake Catalogue.

**Table 4.167: Kansas Region L Historic Earthquake Events, 1979 - 2018**

Date	County	Richter Scale Magnitude
5/13/1999	Wyandotte	3

Source: KGS

Recently, concern about earthquakes caused by oil and gas exploration and production operations, has grown. Commonly, detected seismic activity associated with oil and gas operations, also known as induced seismicity, is thought to be triggered when wastewater is injected into disposal wells. According to the KGS, linking earthquakes to wastewater injection is difficult. Complex subsurface geology and limited data about that geology make it hard to pinpoint the cause seismic events. However, an established pattern of increased earthquake activity in an area over time may indicate a correlation between injection and seismic events. Given that only one earthquake has been recorded in Kansas Region L since 1979, induced seismicity is currently not believed to be a potential driver of earthquakes for the region.



### 4.25.3 – Hazard Probability Analysis

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

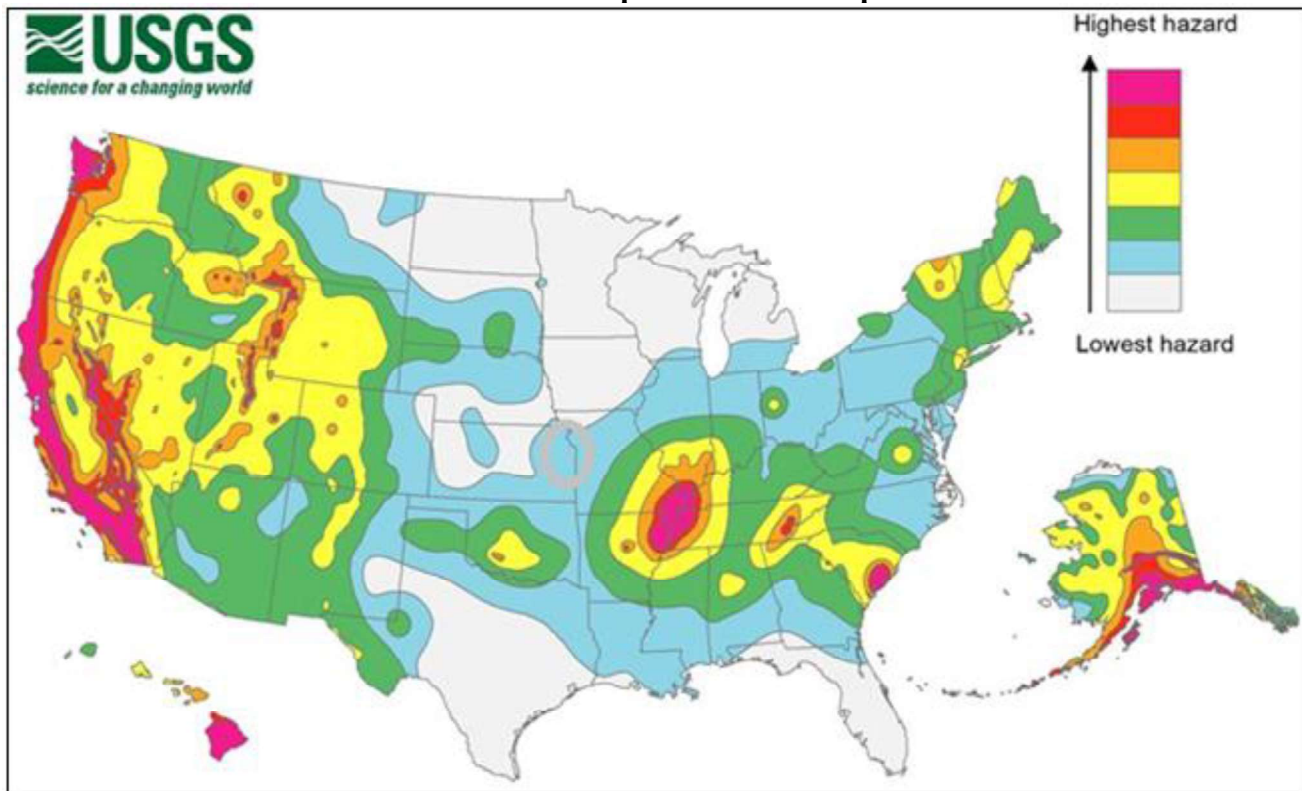
**FEMA Seismic Risk Map**



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. As indicated by the map, Kansas Region L is located in a low hazard area (second lowest rating).



## USGS Earthquake Hazard Map



New research by Stanford University shows that oil and gas production injection limits enacted by the State Legislature has reduced the 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.

### 4.25.4 – Vulnerability Analysis

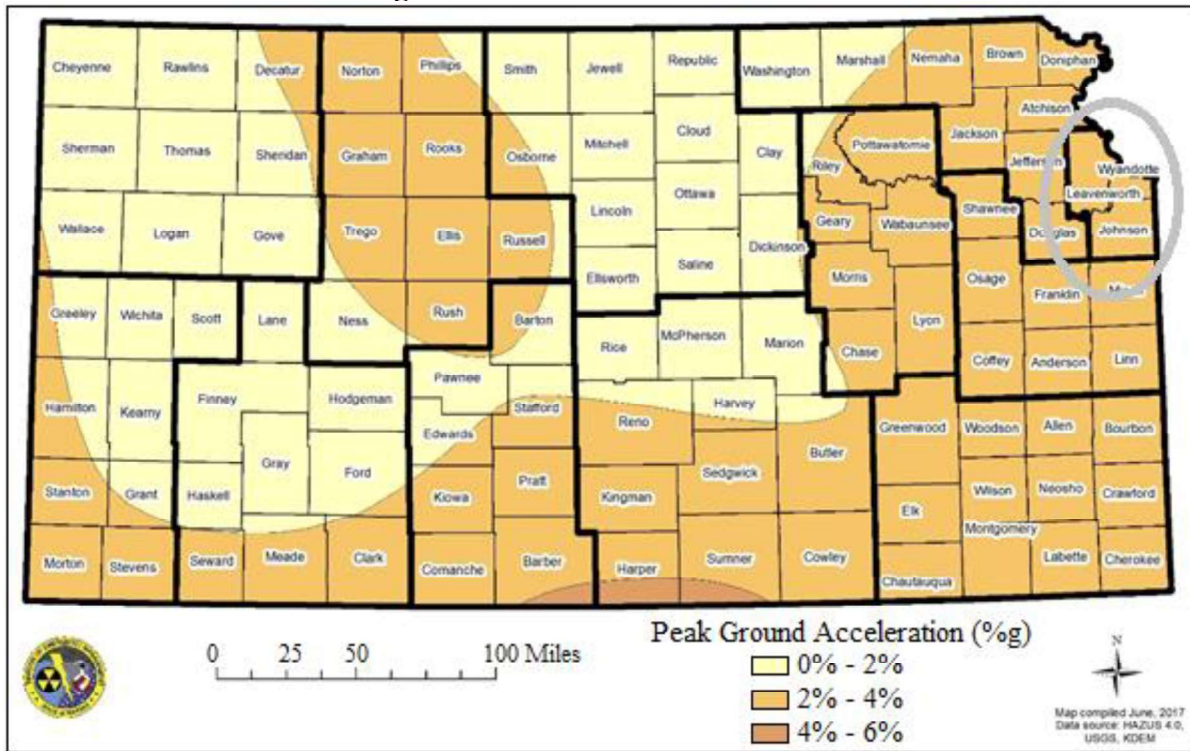
HAZUS, using the default inventory 2010 building valuations, was used to analyze vulnerability and estimate potential losses to earthquakes. A probabilistic, 2,500 Year 6.7 magnitude earthquake scenario was chosen to reveal areas of the region and state that are most vulnerable. These results are not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

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





### Regional Peak Ground Acceleration



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

**Table 4.165: Kansas Region L Probabilistic 6.7 Magnitude Earthquake Damages**

County	Total Earthquake Losses	Displaced Households
Johnson	\$430,715,000	228
Leavenworth	\$39,141,000	17
Wyandotte	\$110,331,000	56

Source: KDEM and HAZUS

Counties with a high population and/or a growing population may be at increased risk.

**Table 4.166: Kansas Region L Population Vulnerability Data for Earthquakes**

County	2017 Population	Percent Population Change 2000 to 2017
Johnson	591,178	31.06%
Leavenworth	81,095	18.06%
Wyandotte	165,288	4.69%

### 4.25.5 – Consequence Analysis

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





**Table 4.167: Earthquake Consequence Analysis**

<b>Subject</b>	<b>Impacts of Earthquake</b>
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.



## 4.26 – Landslides

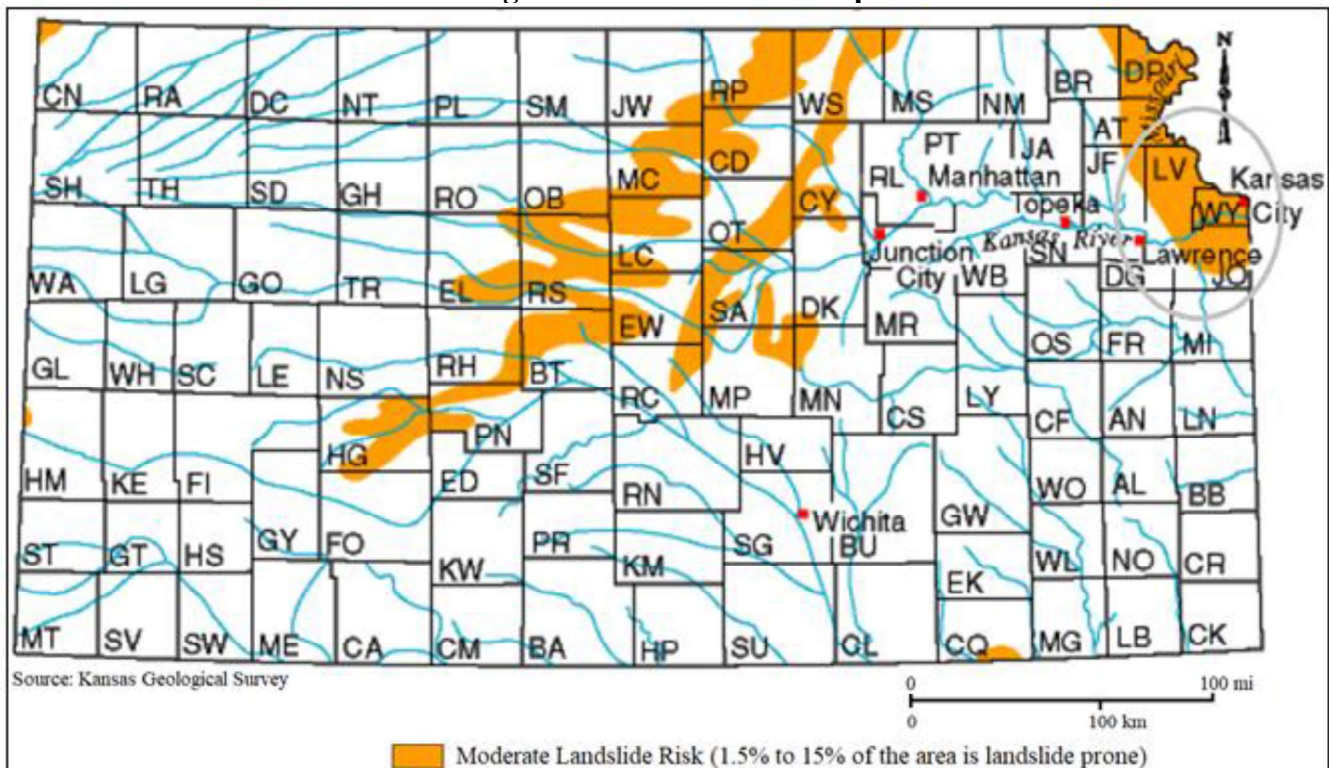
Landslides are the downward and outward movement of slopes. Landslides include a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on and over steepened slopes is the primary reason for a landslide, landslides are often prompted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



### 4.26.1 – 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 KGS, shows areas of the region with a moderate susceptibility of landslides, equating to 1.5% to 15% of the area being landslide prone.

**Regional Landslide Risk Map**



#### 4.26.2 – Previous Occurrences

At present there is no centralized and complete database containing historical records for landslides in Kansas. For Kansas Region L there have been no reported or recorded landslides impacting either participating jurisdictions or the region in the past 10 years. The last recorded landslide was in July of 2001.

#### 4.26.3 – Hazard Probability Analysis

Landslides with the potential to affect Kansas Region L 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, large areas of Kansas Region L have a moderate susceptibility to landslides. However, the limited available past occurrence data indicate that there is a very low rate of occurrence. Based on limited available data, and bearing in mind that many landslides may be unreported as they have no impact on human activities, it is not likely that a major landslide will impact the region, based on zero reported occurrences in 10 years.

#### 4.26.4 Vulnerability Analysis

Based on landslide mapping by the KGS, the area for each county with a moderate landslide risk was estimated. The higher percentage of acreage in a moderate landslide risk area the higher the vulnerability. However, landslides require an earth or rock covered slope, and so flatter areas have a much-decreased risk of occurrence.

**Table 4.168: Kansas Region L Percentage of Land in Moderate Landslide Risk Area**

County	Total County Acreage	Estimated Acreage with Moderate Landslide Potential	Percentage of County Acreage Identified in Potential Slide Area
Johnson	307,200	215,040	70.0%
Leavenworth	300,160	180,000	60.0%
Wyandotte	99,840	99,840	1.07%

Source: ADEM and HAZUS

The following table presents data from HAZUS and local damage reports concerning the value of structures and the percentage of structures for each Kansas Region L county incurring damage over the period 2009 to 2018 from landslide events. A greater percentage of damaged structures damaged may indicate a greater potential future vulnerability.



**Table 4.169: Kansas Region L Structural Vulnerability Data for Landslides**

County	HAZUS Building Valuation	Reported Structure Damage 2009-2018	Percentage of Building Valuation Damaged
Johnson	\$124,279,962,000	\$0	0.0%
Leavenworth	\$13,050,342,000	\$0	0.0%
Wyandotte	\$29,708,946,000	\$0	0.0%

Source: Local reports and HAZUS

Population vulnerabilities to landslide events are expected to be minimal.

#### 4.26.5 – Impact and Consequence Analysis

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

**Table 4.170: 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.





## 4.27 – Soil Erosion and Dust

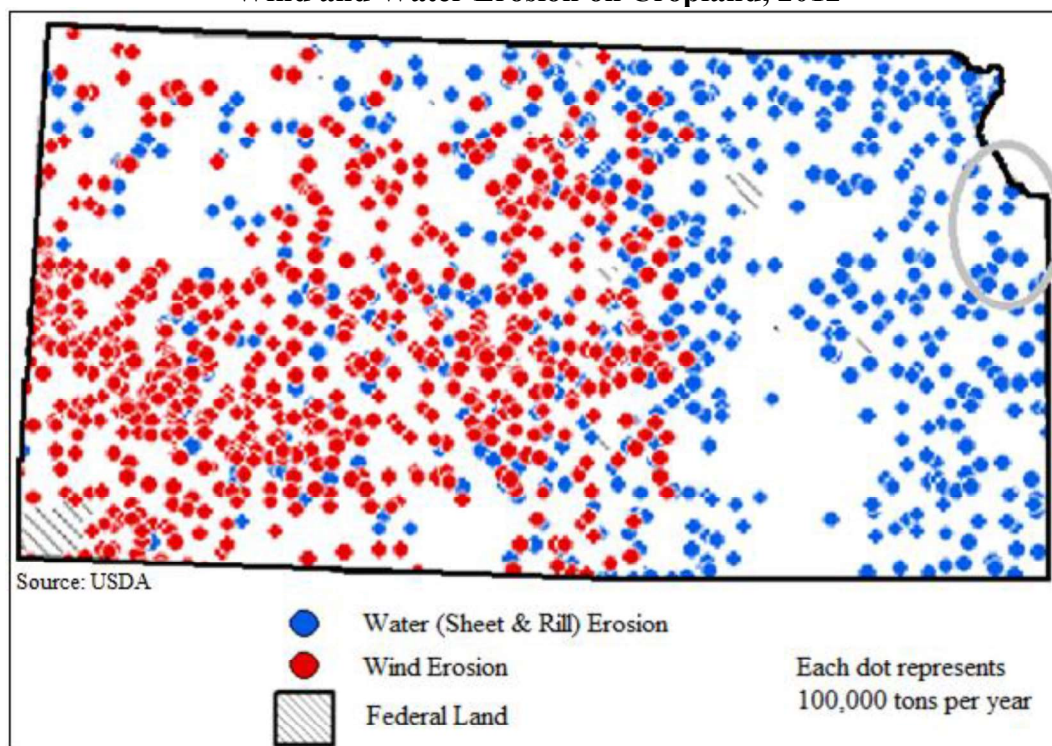
Soil erosion, in general, is a process that removes topsoil through the application of water, wind, or farming activities. Soil erosion can be a slow, unobserved process or can happen quickly due to extreme environmental factors. The United States is losing soil 10 times faster than the natural replenishment 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.



### 4.27.1 – Location and Extent

Soil and erosion and dust occur over broad geographic regions. The entire Kansas Region L planning area, including all participating jurisdictions, is at risk to soil erosion and dust.

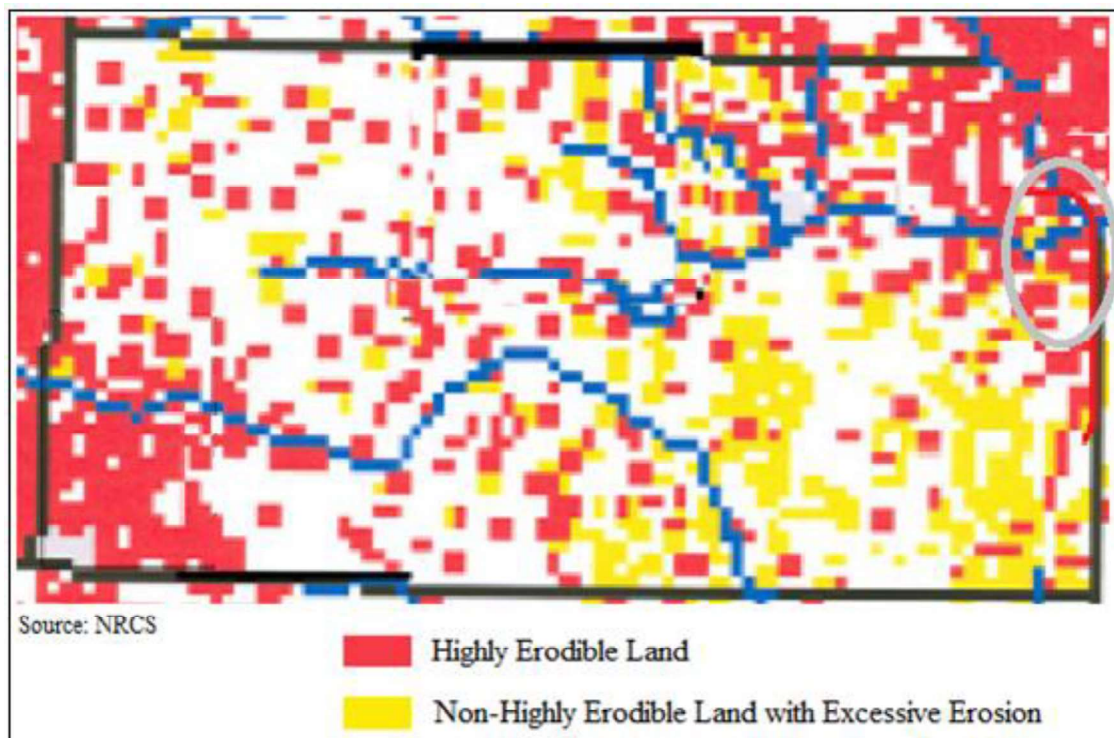
**Wind and Water Erosion on Cropland, 2012**



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 Areas of Excessive Erosion



#### 4.27.2 – Previous Occurrences

At present there is no centralized and complete database containing historical records for soil erosion in Kansas. For Kansas Region L 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 2015- 2018, for the region, indicates no related claims

#### 4.27.3 – 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.

#### 4.27.4 – 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. The USDA 2012 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for





each Kansas Region L County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of soil erosion and dust conditions on the agricultural sector. The higher the percentage loss, the higher potential future vulnerability the county may have to soil erosion and dust events.

**Table 4.171: Kansas Region L USDA Annual Soil Erosion Percentage Impact Data, 2014-2018**

Jurisdiction	Farm Acreage	Annual Acres Impacted	Annual Percentage of Total Acres Impacted	Market Value of Products Sold	Annualized Crop Insurance Paid	Annual Percentage of Market Value Impacted
Johnson	99,354	0	0.0%	\$24,370,000	\$0	0.0%
Leavenworth	184,471	0	0.0%	\$36,367,000	\$0	0.0%
Wyandotte	12,009	0	0.0%	\$3,291,000	\$0	0.0%

Source: USDA

#### 4.27.5 – Impact and Consequence Analysis

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

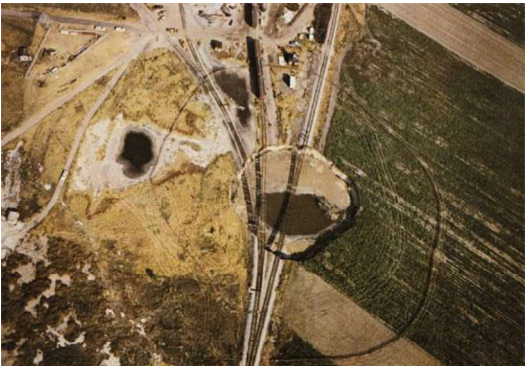
**Table 4.172: Soil Erosion and Dust Consequence Analysis**

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.



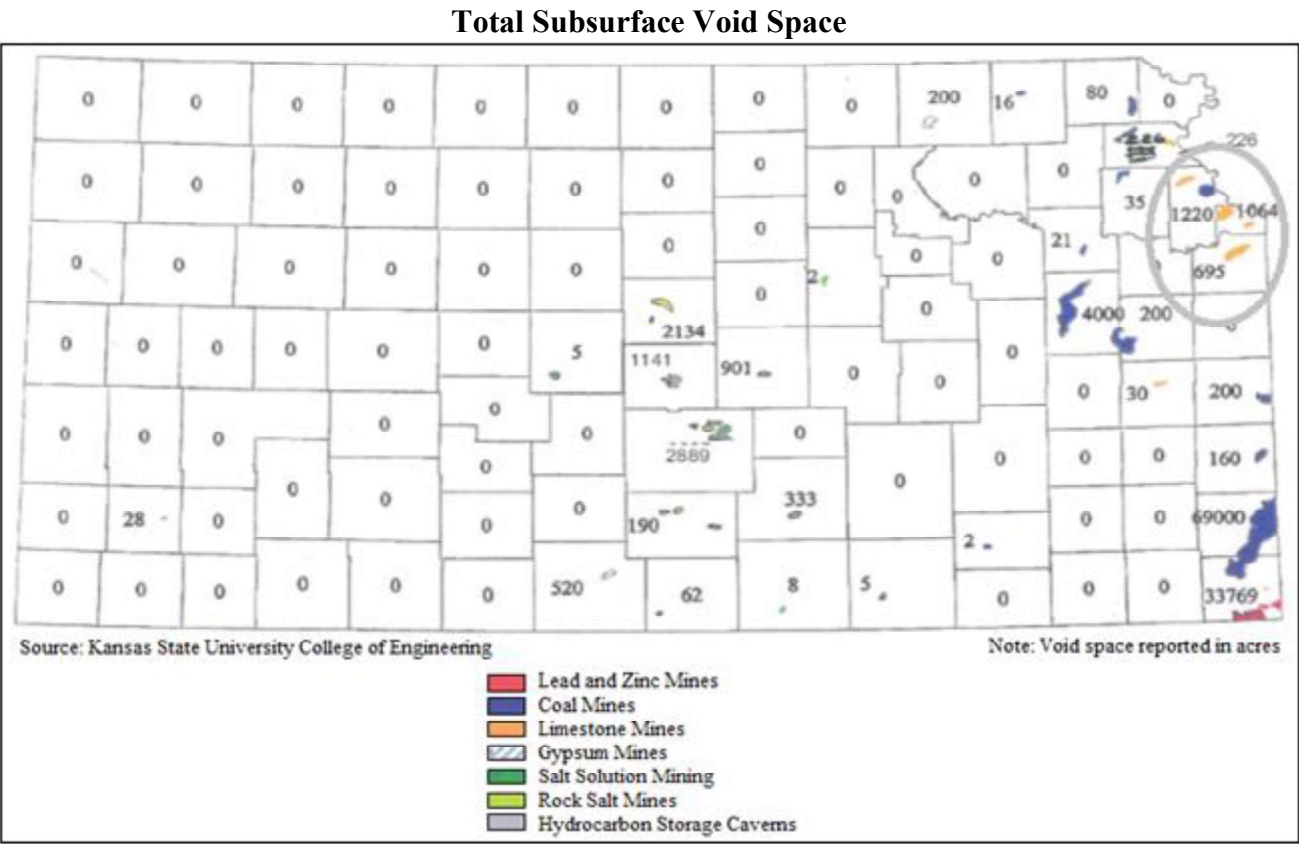
# 4.28 – Land Subsidence

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.



## 4.28.1 – Location and Extent

The 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 L counties.



The following table details the total amount of subsurface void space as calculated using data from the KDHE map.



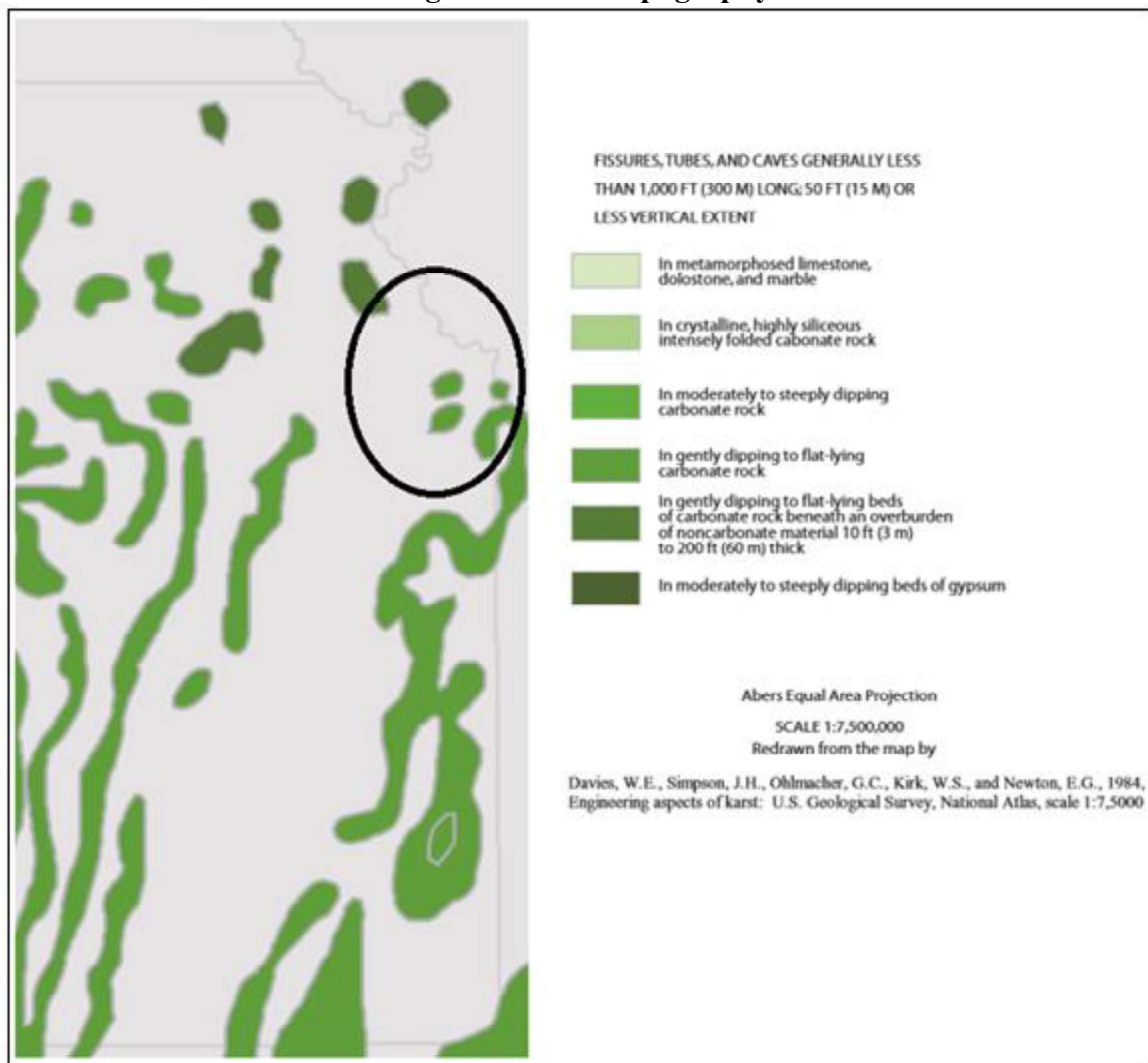
**Table 4.173: Kansas Region L Sub-Surface Void Space**

County	Total Sub-Surface Void Space
Johnson	695
Leavenworth	1,220
Wyandotte	1,064

Source: KDHE

Of additional concern to Kansas Region L is Karst topography. Karst topography is characterized by sinkholes, depressions, caves, and underground drainage created when groundwater dissolves soluble subsurface rocks such as limestone, gypsum, and dolomite. The following map from the United States Geologic Survey (USGS) indicates areas of Karst topography in the region.

### Regional Karst Topography



#### 4.28.2 – Previous Occurrences

There has been one reported land subsidence event in Kansas Region L during the ten-year period from 2009 to 2018.

- **2015:** An isolated sinkhole appeared east of Hole 13 on the Canyon Farms Golf Course in Lenexa, Kansas.

#### 4.28.3 – Hazard Probability Analysis

Land subsidence events with the potential to affect Kansas Region L 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 has been one reported event in the past ten years, and bearing in mind that many land subsidence events may be unreported as they have no impact on human activities, the probability of a reported land subsidence occurrence is 10% in any given year.

#### 4.28.4 Vulnerability Analysis

Jurisdictions with a high or increasing population and/or a high or increasing structural valuation are to be considered to have a potentially greater vulnerability.

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



**Table 4.174: Kansas Region L Sub-Surface Void Space Risk Classification**

County	Coal Category III Acres	Limestone Category I Acres	Limestone Category II Acres	Limestone Category III Acres
Johnson	0	209	209	277
Leavenworth	1,100	40	40	40
Wyandotte	0	394	323	347

Source: KDHE

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

**Table 4.175: Kansas Region L 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
Johnson	307,200	695	0.23%
Leavenworth	300,160	1,220	0.41%
Wyandotte	99,840	1,064	1.07%

Source: KDHE

The following table presents data from HAZUS and local damage reports concerning the value of structures and the percentage of structures for each Kansas Region L county incurring damage over the period 2009 to 2018 from land subsidence events. A greater percentage of damaged structures damaged may indicate a greater potential future vulnerability.

**Table 4.176: Kansas Region L Structural Vulnerability Data for Land Subsidence**

County	HAZUS Building Valuation	Reported Structure Damage 2009-2018	Percentage of Building Valuation Damaged
Johnson	\$124,279,962,000	\$0	0.0%
Leavenworth	\$13,050,342,000	\$0	0.0%
Wyandotte	\$29,708,946,000	\$0	0.0%

Source: Local reports and HAZUS

#### 4.28.5 – Impact and Consequence Analysis

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

**Table 4.177: 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.



**Table 4.177: Land Subsidence Consequence Analysis**

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





# 5.0 Capability Assessment

## 5.1 – Introduction

*44 CFR 201.6 does not require a capability assessment to be completed for local hazard mitigation plans. However, 201.6(c)(3) states "A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools."*

This section of the plan discusses the current capacity of regional communities to mitigate the effects of identified hazards. A capability assessment is conducted to determine the ability of a jurisdiction to execute a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs or projects.

A capability assessment helps to determine which mitigation actions are practical based on a jurisdiction's fiscal, staffing and political resources. A capability assessment consists of:

- An inventory of relevant plans, ordinances, or programs already in place
- An analysis capacity to carry them out.

A thoughtful review of jurisdictional capabilities will assist in determining gaps that could limit current or proposed mitigation activities, or potentially aggravate a jurisdiction's vulnerability to an identified hazard. Additionally, a capability assessment can detail current successful mitigation actions that should continue to receive support.

For this plan each participating jurisdiction was given an opportunity to present their capability assessment information.

## 5.2 – Granted Authority

In implementing a mitigation plan or specific action, a local jurisdiction may utilize any or all of the four broad types of government authority granted by the State of Kansas. The four types of authority are defined as:

- Regulation
- Acquisition
- Taxation
- Spending

### ***Regulation***

The scope of this local authority is subject to constraints, however, as all of Kansas' political subdivisions must not act without proper delegation from the State. Under a principle known as "Dillon's Rule," all power is vested in the State and can only be exercised by local governments to the extent it is delegated.



## ***Acquisition***

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely “hazard-proofing” a particular piece of property or area is to acquire the property, thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Kansas legislation empowers cities, towns, counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain (County Home Rule Powers, K.S.A. 19-101, 19-101a, 19-212).

## ***Taxation***

The power to levy taxes and special assessments is an important tool delegated to local governments by Kansas law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the community. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood control within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development. Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.

## ***Spending***

The Kansas General Assembly allocated the ability to local governments to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption of annual budgets and a Capital Improvement Plan. A Capital Improvement Plan is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a community can control growth to some extent. In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to services. A Capital Improvement Plan that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the Capital Improvement Plan is effective in directing growth away from environmentally sensitive or high hazard areas.



## 5.3 – Governance

All counties within Kansas Region L operate under a county commissioner form of governance, with the elected board of commissioners overseeing county operations.

**Table 5.1: County Governance**

<b>Jurisdiction</b>	<b>Government Structure</b>	<b>Number of Commissioners</b>
Johnson County	Commission	7
Leavenworth County	Commission	5
Wyandotte County	Commission	10

In general, the participating towns and cities in Kansas Region L operate either under a Mayoral form of governance or an elected city council form of governance.

## 5.4 – Jurisdictional Capabilities

Information as to the current capacity of participating jurisdictions is summarized in the following sections and tables. All capability information was provided by jurisdictional officials through the above referenced questions and through outreach from the MPC.

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Many smaller jurisdictions have very limited to no planning, management, response or mitigation capabilities. Often these jurisdictions rely on the county or nearby larger municipalities for assistance. This lack of capabilities is reflected in the following tables. Additionally, many very small or extremely limited participating small jurisdictions, largely townships, are not listed on the capability list. This in no way diminishes the participation in the process of these jurisdictions. Finally, special district capabilities are included in their overarching jurisdiction.

### 5.4.1 – Planning Capabilities

The planning capability assessment is designed to provide a general overview of the key planning and regulatory tools or programs in place or under development. This information helps identify opportunities to address existing planning gaps and provides an opportunity to review areas that mitigation planning actions can be utilized with existing plans. Jurisdictions were asked if they had completed the following plans:

**Comprehensive Plan:** A comprehensive plan establishes the overall vision for a jurisdiction and serves as a guide to governmental decision making. A comprehensive plan 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 jurisdictions critical facilities, including fire stations, police stations, hospitals, schools, day care centers, senior care facilities, major roads and bridges, critical utility sites, and hazardous material storage areas. Additionally, this plan may be used to determine methods to mitigate damage to these facilities.

***Debris Management Plan:*** A debris management plan covers the response and recovery from debris-causing incidents such as tornados or floods. Planning considerations include debris removal and disposal, disposal locations, equipment availability, and personnel training.

***Emergency Operations Plan:*** An emergency operations plan outlines responsibility, means and methods by which resources are deployed during and following an emergency or disaster.

***Evacuation Plan:*** A plan that outlines routes and methods by which populations are evacuated during and following an emergency or disaster.

***Fire Mitigation Plan:*** A fire mitigation plan is used to mitigate a jurisdictions wildfire risk and vulnerability. The plan documents areas with an elevated risk of wildfires, and identifies the actions taken to decrease the risk. A fire mitigaion plan can influence and prioritize future funding for hazardous fuel reduction projects, including where and how federal agencies implement fuel reduction projects on federal lands.

***Flood Mitigation Assistance Plan:*** The purpose of the flood mitigation assistance plan is to reduce or eliminate the long-term risk of flood damage to buildings and other structures insured under the NFIP.

***Recovery Plan:*** A disaster recovery plan guides the recovery and reconstruction process following a disaster. Hazard mitigation principles should be incorporated into disaster recovery plans to assist in breaking the cycle of disaster loss.

***Vulnerable Population Plan and/or Inventory:*** A vulnerable populations plan is used to develop a strategic approach for support to persons with functional or special needs before, during and following a disaster.

The table below summarizes relevant jurisdictional planning capabilities.



**Table 5.2: Jurisdictional Planning Capabilities**

<b>Jurisdiction</b>	<b>Comprehensive Plan</b>	<b>Critical Facilities Plan</b>	<b>Debris Management Plan</b>	<b>Emergency Operations Plan</b>	<b>Evacuation Plan</b>	<b>Fire Mitigation Plan</b>	<b>Flood Mitigation Assistance Plan</b>	<b>Recovery Plan</b>	<b>Vulnerable Population Plan and/or Inventory</b>
<b>Johnson County</b>	x	x	x	x	x	x	x	x	x
City of DeSoto	x			x				x	
City of Edgerton	x								
City of Fairway	x								
City of Gardner	x			x					
City of Lake Quivira	x								
City of Leawood	x			x				x	
City of Lenexa	x		x	x					
City of Merriam	x			x					
City of Mission	x			x					
City of Mission Hills	x			x					
City of Mission Woods	x								
City of Olathe	x			x					
City of Overland Park	x		x	x					
City of Prairie Village	x								
City of Roeland Park	x								
City of Shawnee	x			x			x	x	
City of Spring Hill	x			x					
City of Westwood	x								
City of Westwood Hills	x								
<b>Leavenworth County</b>	x		x	x	x				
City of Basehor		x	x	x	x		x	x	x
City of Easton		x	x	x					
City of Lansing	x	x	x	x					
City of Leavenworth	x	x	x	x	x		x	x	x
City of Linwood		x	x	x					
City of Tonganoxie	x	x	x	x	x		x	x	x
<b>Wyandotte County</b>	x		x	x				x	x
City of Bonner Springs	x			x				x	
City of Edwardsville	x			x				x	



## 5.4.2 – 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 codes and ordinances.

**Table 5.3: Jurisdictional Codes and Ordinances**

<b>Jurisdiction</b>	<b>Building Code</b>	<b>Floodplain Ordinance</b>	<b>Nuisance Ordinance</b>	<b>Storm Water Ordinance</b>	<b>Zoning Ordinance</b>
<b>Johnson County</b>	x	x		x	x
City of DeSoto	x	x		x	x
City of Edgerton	x	x			
City of Fairway	x	x			
City of Gardner	x	x			
City of Lake Quivira	x	x			
City of Leawood	x	x	x	x	x
City of Lenexa	x	x	x	x	x
City of Merriam	x	x			
City of Mission	x	x			
City of Mission Hills	x	x	x	x	x
City of Mission Woods	x	x			
City of Olathe	x	x			
City of Overland Park	x	x			
City of Prairie Village	x	x			
City of Roeland Park	x	x			
City of Shawnee	x	x	x	x	x
City of Spring Hill	x	x			
City of Westwood	x	x			
City of Westwood Hills	x	x			
<b>Leavenworth County</b>		x	x		x
City of Basehor	x	x	x	x	x
City of Easton		x			
City of Lansing	x	x	x	x	x
City of Leavenworth	x	x	x	x	x
City of Linwood		x		x	
City of Tonganoxie		x	x	x	x
<b>Wyandotte County</b>	x	x	x	x	x
City of Bonner Springs	x	x	x	x	x
City of Edwardsville	x	x	x	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 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 Program Capabilities**

<b>Jurisdiction</b>	<b>Community Rating System</b>	<b>Firewise Community Certification</b>	<b>ISO Fire Rating</b>	<b>National Flood Insurance Program</b>	<b>National Weather Service Storm Ready Certification</b>
<b>Johnson County</b>				x	x
City of DeSoto			3/10	x	
City of Edgerton				x	
City of Fairway				x	
City of Gardner				x	
City of Lake Quivira				x	
City of Leawood			1	x	
City of Lenexa	8		x	x	
City of Merriam				x	
City of Mission				x	
City of Mission Hills			1	x	
City of Mission Woods				x	
City of Olathe	8			x	
City of Overland Park	7			x	
City of Prairie Village				x	
City of Roeland Park				x	
City of Shawnee	6		2	x	
City of Spring Hill				x	
City of Westwood				x	
City of Westwood Hills				x	
<b>Leavenworth County</b>				x	x
City of Basehor			4	x	x
City of Easton			6	x	x
City of Lansing	7		4	x	x
City of Leavenworth			2	x	x
City of Linwood	9		5	x	x
City of Tonganoxie			4	x	x
<b>Wyandotte County</b>	6		2/10	x	x
City of Bonner Springs	7		4	x	x
City of Edwardsville			4	x	x

In addition, participating jurisdictions operate with mutual aid agreements. These are understandings among localities to lend assistance across jurisdictional boundaries. Mutual aid may be requested only when an emergency occurs that exceeds local resources.



#### 5.4.4 – Staffing and Departmental Capabilities

A comprehensive mitigation program relies on many skilled professionals. These professionals include:

- Planners
- Emergency managers
- Floodplain managers
- GIS personnel

While exact responsibilities differ from jurisdiction to jurisdiction, the general duties of applicable departments are described below:

***Building Official:*** Building officials are generally the jurisdictional administrator of building and construction codes, engineering calculation supervision, permits, facilities management, and accepted construction procedures. They may also inspect structures to ensure compliance with the plans and to check workmanship as well as code compliance.

***Emergency Management Coordinator:*** The Emergency Management office is responsible for the mitigation, preparedness, response and recovery operations that deal with both natural and man-made disaster events. The formation of an emergency management department in each county is mandated under Kansas General Statutes.

***Local Emergency Planning Committee:*** Local Emergency Planning Committees are generally housed at the county or municipal level. They do not function in actual emergency situations, but attempt to identify and catalogue potential hazards, identify available resources, mitigate hazards when feasible, and write emergency plans. The role of the LEPC is to anticipate and plan the initial response for foreseeable disasters in their jurisdiction.

***Mapping Specialist:*** A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. A GIS mapping specialist uses this data to create county maps, including flood plain, fire hazard, drought and other mitigation maps.

***NFIP Floodplain Administrator:*** The NFIP floodplain administrator ensures a jurisdiction is meeting the minimum requirements of participation in the NFIP, and often is tasked with applying for funding or grants.

***Planning Department:*** A planning department usually provides management and oversight of development through the application of codes, ordinances, building regulations and public input.

***Public Works Official:*** Public works officials usually provide management and oversight of infrastructure projects such as public buildings (municipal buildings, schools, hospitals), transport infrastructure (roads, railroads, bridges, pipelines, airports), public spaces (public squares, parks), public services (water supply, sewage, electrical grid, dams), and other physical assets and facilities.



The table below summarizes relevant local staffing and departmental capabilities.

**Table 5.5: Staffing and Departmental Capabilities**

<b>Jurisdiction</b>	<b>Building Code Official or Inspector</b>	<b>Emergency Management Coordinator</b>	<b>Local Emergency Planning Committee</b>	<b>Mapping Specialist (GIS)</b>	<b>NFIP Floodplain Administrator</b>	<b>Planning Department</b>	<b>Public Works Official</b>
<b>Johnson County</b>	x	x	x	x	x	x	x
City of DeSoto	x	x	x		x	x	x
City of Edgerton	x		x		x		
City of Fairway	x		x		x		
City of Gardner	x	x	x		x		
City of Lake Quivira	x		x		x		
City of Leawood	x	x	x		x	x	x
City of Lenexa	x	x	x	x	x	x	x
City of Merriam	x	x	x		x		
City of Mission	x	x	x		x		
City of Mission Hills	x	x	x		x	x	x
City of Mission Woods	x		x		x		
City of Olathe	x	x	x	x	x	x	x
City of Overland Park	x	x	x	x	x	x	x
City of Prairie Village	x		x		x		
City of Roeland Park	x		x		x		
City of Shawnee	x	x	x	x	x	x	x
City of Spring Hill	x	x	x		x		
City of Westwood	x		x		x		
City of Westwood Hills	x		x		x		
<b>Leavenworth County</b>		x	x	x	x	x	x
City of Basehor	x	x	x	x	x	x	
City of Easton		x	x	x	x		
City of Lansing	x	x	x	x	x	x	x
City of Leavenworth	x	x	x	x	x	x	x
City of Linwood		x	x	x	x		
City of Tonganoxie	x	x	x	x	x	x	x
<b>Wyandotte County</b>	x	x	x	x	x	x	x
City of Bonner Springs			x		x		
City of Edwardsville	x		x		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 offers services in five other areas: community services that help the needy; communications services and comfort for military members and their family members; the collection, processing and distribution of blood and blood products; educational programs on preparedness, health, and safety; and international relief and development programs.

***Salvation Army:*** The Salvation Army is a Christian denomination and international charitable organization. In addition to being among the first to arrive with help after natural or man-made disasters, the Salvation Army runs charity shops and operates shelters for the homeless.

#### 5.4.6 – Fiscal Capabilities

In general, the jurisdictions of the Kansas Region L 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 Fiscal Capabilities**

<b>Jurisdiction</b>	<b>Apply for and Manage Grant Funding</b>	<b>Authority to levy taxes for specific purposes</b>	<b>Authority to Withhold spending in hazard prone areas</b>	<b>Incur Debt through General Obligation Bonds</b>	<b>Usage of Capital Improvement Funding for Mitigation Projects</b>
<b>Johnson County</b>	X	X	X	X	X
City of DeSoto	X	X		X	X
City of Edgerton	X	X			X
City of Fairway	X	X			X
City of Gardner	X	X			X
City of Lake Quivira	X	X			X
City of Leawood	X	X		X	X
City of Lenexa	X	X	X	X	X
City of Merriam	X	X			X
City of Mission	X	X			X
City of Mission Hills	X	X	X	X	X
City of Mission Woods	X	X			X
City of Olathe	X	X			X
City of Overland Park	X	X			X
City of Prairie Village	X	X			X
City of Roeland Park	X	X			X
City of Shawnee	X	X		X	X
City of Spring Hill	X	X			X
City of Westwood	X	X			X
City of Westwood Hills	X	X			X
<b>Leavenworth County</b>	X	X	X	X	X
City of Basehor	X	X	X	X	X
City of Easton		X	X	X	
City of Lansing	X	X	X	X	X
City of Leavenworth	X	X	X	X	X
City of Linwood		X	X	X	
City of Tonganoxie		X	X	X	X
<b>Wyandotte County</b>	X	X	X	X	X
City of Bonner Springs	X	X			X
City of Edwardsville	X	X	X	X	X



### 5.4.7 – School Capability Assessment

Participating school districts were provided with a different set of questions that participating governmental jurisdictions. These questions were asked to ascertain the level of preparedness of the institution.

The following provides brief definitions of terms used in the capability assessment of schools. Please note that some definitions have been provided in previous sections.

***Access to Local, Regional and State Funds:*** The ability to use local, regional and state funding on school activities and improvements.

***Active Shooter Plan:*** An active shooter plan outlines responsibility, means and methods by which resources are deployed during an active shooter scenario.

***Capital Improvement Plan:*** A capital improvement plan guides scheduling of, and spending on, school improvements. A capital improvement plan can guide future development away from identified hazard areas, an incorporate identified mitigation strategies.

***District Master Plan:*** A master plan establishes the overall vision and serves as a guide to decision making. A master plan generally contains information on demographics, land use, transportation, and facilities. As a master plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.

***Emergency Operations Plan/Evacuation Plan:*** An emergency operations plan outlines responsibility, means and methods by which resources are deployed during and following an emergency or disaster. Often included in these plans are detailed evacuation procedures and policies.

***Incur Debt through General Obligation Bonds:*** General obligation bonds are issued with the belief that an entity will be able to repay its debt obligation through taxation or revenue from projects. General obligation bonds can be used to generate funds for mitigation projects.

***School Safety or Resource Officer:*** A person with overall responsibility for safety of the school, students and staff.

Information as to the current capacity of participating schools, colleges and universities is summarized in the following table.



**Table 5.7: College, University or USD Capabilities**

<b>Jurisdiction</b>	<b>Access to Local, Regional and State funds</b>	<b>Active Shooter Plan or Policy</b>	<b>Capital Improvement Plan</b>	<b>District Master Plan</b>	<b>School Emergency and Evacuation Plans</b>	<b>School Safety or Resource Officers or Dedicated Law Enforcement</b>
<b>Johnson County</b>						
USD #229 – Blue Valley	x				x	
USD #230 – Spring Hill	x				x	
USD #231 – Gardner/Edgerton	x				x	
USD #232 – DeSoto	x	x	x	x	x	x
USD #233 – Olathe	x				x	
USD #512 – Shawnee Mission	x				x	
Kansas School for the Deaf	x				x	
Johnson County Community College	x	x	x		x	
University of Kansas Edwards Campus	x	x	x	x	x	x
<b>Leavenworth County</b>						
USD #207 – Fort Leavenworth	x	x			x	
USD #449 – Easton	x	x			x	x
USD #453 – Leavenworth	x	x			x	x
USD #458 – Basehor-Linwood	x	x			x	x
USD #464 – Tonganoxie	x	x	x	x	x	x
USD #469 – Lansing	x	x			x	
University of St. Mary	x	x	x		x	
<b>Wyandotte County</b>						
Kansas School for the Deaf and Blind	x	x	x	x	x	x
USD #202 - Turner	x				x	
USD #203 - Piper	x				x	
USD #204 – Bonner-Edwardsville	x	x	x	x	x	x
USD #500 – Kansas City, Kansas	x	x	x	x	x	x
Kansas City, Kansas Community College	x	x	x		x	x

Additionally, under K.S.A. 72-5457 (General Provisions for the Issuance of Bonds), all Kansas USDs may issue general obligation bonds to:

- Purchase or improve any site or sites necessary for school district purposes including housing and boarding pupils enrolled in an area vocational school
- Acquire, construct, equip, furnish, repair, remodel or make additions to buildings including housing and boarding pupils enrolled in an area vocational school operated under the board of education of a school district



# 6.0 Mitigation Strategy

## 6.1 – Introduction

As part of this planning effort, Kansas Region L 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 – Identification of Goals

*44 CFR 201.6 (c)(3)(i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Through thorough discussions at stakeholder meetings, the MPC determined that the four previously identified primary hazard mitigation goals remained relevant and applicable. This was because the priorities of Kansas Region L 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 L vision for hazard mitigation and disaster resilience.

- **Goal 1:** Reduce or eliminate risk to the people and property of Kansas Region L 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 L 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 L faces due to the impacts of the identified hazards.
- **Goal 4:** Enhance communication and coordination among all agencies and between agencies and the public.

## 6.4 – Problem Statements

Based on the regionally identified hazards, county specific problem statements have been developed to detail identified major concerns that can potentially be addressed through proposed mitigation actions. MPC members were tasked with working with each participating jurisdiction to develop problem statements for their county. Additionally, problem statements from the public survey are incorporated to provide a community wide view. 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 L Problem Statements**

<b>Identified Hazard</b>	<b>Problem Statement</b>	<b>Potential Impact(s)</b>
HazMat	Kansas Region L is a hub for interstate and intrastate commerce, increasing the potential of a HazMat event	Increased injuries, deaths and property damage
Flood	Low-water crossing throughout the region repeatedly flood	Road damage, potential loss of life, cutoff of emergency services
Flood	The number of flood insurance policies have decreased from 2012 to 2018	Loss of coverage for flood prone properties.
Tornado	Predictions indicate a potential increase in the number of tornados per year	Increased injuries, deaths and property damage
Windstorm	Kansas Region L is located in Wind Region IV, the highest classification for inland winds.	High potential for property damages, injuries and/or deaths
Winter Storm	Ice storms may damage utilities, especially as grid ages	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	Lack of service to citizens, potential adverse impacts due to loss of heat or power

The following tables present county specific problem statements as identified through both public and stakeholder input to be utilized in informing the review, modification and development of hazard mitigation actions.

**Table 6.2: Johnson County Problem Statements**

<b>Identified Hazard</b>	<b>Problem Statement</b>
All Hazards	Current public outreach initiatives need to be expanded.
Flood	Flooding is a consistent threat to jurisdictions within the county.
Tornado and Windstorm	All school buildings should have saferooms to accommodate all students and staff.
Utility /Infrastructure Failure	Power outages impact the capabilities of all participating jurisdictions.
Utility Failure	City of De Soto depends on sewer pump stations in a disaster we will need emergency power for up to seven pump stations to prevent sewer backups.

**Table 6.3: Leavenworth County Problem Statements**

<b>Identified Hazard</b>	<b>Problem Statement</b>
Flood	Flooding is a consistent threat to jurisdictions within the county.
Tornado	Safe rooms should be incorporated in all new construction.
Tornado	Safe rooms should be constructed in all schools.
Tornado	Tornado siren system should provide coverage for entire county.
Utility Failure	Power outages impact the capabilities of all participating jurisdictions.





**Table 6.4: Wyandotte County Problem Statements**

Identified Hazard	Problem Statement
All Hazards	Public needs to be engaged with hazard mitigation planning.
All Hazards	Large population centers increase potential for injury or death.
Flood	Flooding is a consistent threat to jurisdictions within the county.
HazMat	Large transportation infrastructure may increase risk of HazMat event.

## 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 6.5: Johnson County and Participating Jurisdictions  
Completed Hazard Mitigation Actions**

Jurisdiction	Action Description
Leawood	Protection of Utilities at a fire station #1 with new generator
Leawood	Installation of additional warning system sirens and computer monitoring system for two areas that lack adequate coverage from existing warning sirens
Mission Hills	Peetwood Park Improvements. Indian lane abuts this park and historically the roadway is overtopped with water when there is a significant rain event.
Mission Hills	Mission Drive Channel that runs from State Line Road to 63rd street abuts property that is in the floodplain (including a church and the City Hall). The flooding also affects two bridges and three public roads.

**Table 6.6: Leavenworth County and Participating Jurisdictions  
Completed Hazard Mitigation Actions**

Jurisdiction	Action Description
Leavenworth County	Establish a local reserve fund to augment the Leavenworth County GIS Department's ability to monitor building trends and erosion patterns across the county through frequent aerial photography.

**Table 6.7: Wyandotte County and Participating Jurisdictions  
Completed Hazard Mitigation Actions**

Jurisdiction	Action Description
Board of Public Utilities (Wyandotte County)	Upgrade UG and BPU's Radio System.
Kansas School for the Deaf and Blind (Wyandotte County)	Design and construct ADA safe rooms in all school buildings.
Kansas School for the Deaf and Blind (Wyandotte County)	Purchase and install mass notification system for deaf (visual notice) and for blind (audio) individuals to provide warnings for intruders, hazards, natural disasters, bomb and civil disorder events.



**Table 6.7: Wyandotte County and Participating Jurisdictions  
Completed Hazard Mitigation Actions**

<b>Jurisdiction</b>	<b>Action Description</b>
Wyandotte County	Develop a Wyandotte County Sheriff's Department Adult/Juvenile Detention Center Evacuation Plan and conduct periodic tabletop exercises.
Wyandotte County	Establish locations for emergency morgues and develop a detailed, coordinated plan for the use of these facilities / locations with proper MOUs / MOAs as required.
Wyandotte County	Develop a plan for using school buses and public transportation to move people to shelters following an incident / disaster.
Wyandotte County	Develop/Update Debris Management Plan to include Memorandums Of Understanding (MOU's) for debris removal between Wyandotte County and outside / local agencies with equipment available for this, establish collection areas and free mulch program.
Wyandotte County	Develop adequate communications systems among and between disaster response agencies and the EOC.
Wyandotte County	Develop a plan for evacuating special needs populations during disasters.
Wyandotte County	Upgrade Local Government 800 Radio System to include placement of radios in all Unified School District Offices plus District Archdiocese Office and others as identified—possibly American Red Cross and Salvation Army Offices.
Wyandotte County	Provide adequate & timely warning system(s) for Scouts, Scouters and campers at Boy Scout Camp Theodore Naish, BSA.

While the Kansas Region L hazard mitigation program has matured over the years, and many actions have been completed, an unfortunate lack of funding and grant opportunities has prevented the completion many major hazard mitigation projects.

## 6.6 – Review and Addition of Mitigation Actions

For this plan update, members of the MPC and participating jurisdictions were asked to complete a thorough review of all not completed mitigation actions. Additionally, MPC members and participating jurisdictions were provided with the opportunity to identify and incorporate newly identified actions based on:

- Hazard events that have occurred since the last plan revision
- Updated risk assessments
- Identified goals and objectives
- Changing local capabilities
- New vulnerabilities.

In identifying new, or reviewing existing mitigation actions, the following general categories were considered:

**Local Plans and Regulations:** Actions that influence the way land and buildings are developed or constructed. Actions may include:



- Revision or institution planning and zoning ordinances
- Revision or institution of building codes
- Open space preservation
- Revision or institution floodplain regulations
- Revision or institution stormwater management regulations
- Drainage system maintenance
- Requirements for riverine setbacks

**Structure and Infrastructure Projects:** Actions that involve the modification of existing structures to protect, or remove from, a hazard or hazard area., such as:

- Acquisition of hazard prone properties
- Relocation of hazard prone properties
- Revision or institution of building elevation requirements
- Critical facilities protection
- Installation or retrofitting of community safe rooms
- Requiring insurance
- Installation or update of warning systems

**Natural Systems Protection:** Actions that minimize hazard losses to natural systems, such as:.  
Actions may include:

- Mandatory floodplain area protection
- Revision or institution of comprehensive watershed management programs
- Requirements for riparian buffers
- Requirements for forest and shrub management
- Revision or institution of erosion and sediment control
- Wetland preservation and restoration
- Slope stabilization programs

**Education and Awareness Programs:** Actions to inform and educate about potential hazards and actions to mitigate against them. Actions may include:

- Educational outreach programs
- Speaker and/ or demonstration events
- Notifying citizens on where to get information
- School educational and event programs

Each action was reviewed using the following metrics, asking if it was:

- **Specific** – The action addresses a hazard or need
- **Measurable** – Achievement or progress can be measured
- **Attainable** – Accepted by those responsible for achieving it



- **Relevant** – Substantively addresses the problem
- **Time-bound** – Time period for achievement is clearly stated

Additionally, the MPC and each jurisdiction was instructed to provide a brief summary regarding the status of each of these actions using the following:

- **Not Started:** Action will provide reason(s) for lack of progress, which may include lack of Funding, differing priorities, changes in political climate, lack of technical skills, etc.
- **In progress:** Action will provide a summary, and if applicable, a of percentage work completed to date.
- **Deleted:** Actions deemed no longer viable were marked for deletion from the plan. These actions are detailed in the next section.

## 6.7 – Prioritization of Mitigation Actions

*44 CFR 201.6 (c)(3)(iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

All participating jurisdictions worked together to review and prioritize both previously identified and newly created hazard mitigation actions, with a self-analysis method used for prioritization. This methodology takes all considerations into account to ensure that, based on capabilities, funding, public wishes, political climate, and legal framework and context, reasonable actions are determined. Major determining factors included the potential effects on the overall risk to life and property, ease of implementation, community and agency support, consistency with mitigation goals, and the availability of Funding.

Of major concern was the potential cost of each action. In general, identified actions were proposed to reduce future damages. As such, it is critical that selected and implemented actions provide a greater saving over the life of the action than the initial cost. For structural and property protection actions cost effectiveness is primarily assessed on:

- Likelihood of damages occurring
- Severity of the damages
- Potential effectiveness

For all other type of actions, including legislative actions, codes and ordinances, maintenance and education, cost effectiveness is primarily assessed on likely future benefits as these actions may not easily result in a quantifiable reduction in damage.

Based on this review, both previously identified and new action items were prioritized as per the following:



**High priority:**

- Actions that should be implemented as soon as possible
- Actions deemed most critical to achieve the identified mitigation goals

**Medium priority:**

- Actions that should be implemented in the long-term
- Actions deemed important to meet identified mitigation goals

**Low priority**

- Actions that should be implemented if Funding becomes available
- Actions that have lowest impact toward achieving mitigation goals

## 6.8 – Jurisdictional Mitigation Actions

*44 CFR 201.6 (c)(3)(ii): A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

*44 CFR 201.6 (c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

The following tables identify mitigation action items for each participating jurisdiction, along with the following information:

- Hazard addressed
- Responsible party
- Overall priority
- Goal(s) addressed
- Estimated cost
- Potential Funding source
- Proposed completion timeframe
- Current status
- New actions that have been added to this plan update are identified as such.
- Actions that are in support of NFIP compliance are identified with a bold type **NFIP**



## 6.8.1 –Johnson County Mitigation Actions

**Table 6.8: Johnson County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Johnson County - 1	Active building code enforcement to align with the national level.	H	1,2	All Hazards	In Progress	Johnson County Planning Building Official	<b>Cost:</b> Staff Time <b>Funding:</b> County Funding, and federal as identified <b>Completion Date:</b> Open Ended
Johnson County - 2	<b>NFIP</b> - Continued regulatory compliance and floodplain management.	H	1,2	Flood	In Progress	Johnson County Public Works, Flood Plain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> State and Federal Sources <b>Completion Date:</b> Open Ended
Johnson County - 3	<b>NFIP</b> - Acquisition/Demolition of flood prone properties. Identify habitable buildings in the floodplain and/or are subject to flooding, prioritize locations, and purchase buildings as Funding becomes available.	H	1	Flood	Not Started, Lack of Funding	Johnson County Public Works, Acting Director	<b>Cost:</b> Cost varies and is dependent on the fair market value. <b>Funding:</b> Stormwater Management Program, State and Federal agencies <b>Completion Date:</b>
Johnson County - 4	Design and construct safe rooms in all future buildings built by the County.	H	1	Hail, Tornado, Windstorm	Not Started, Lack of Funding	Johnson County Facilities, Director	<b>Cost:</b> Project and Size Dependent <b>Funding:</b> County Funding, Federal as identified <b>Completion Date:</b> Open ended
Johnson County - 5	<b>NFIP</b> - Improve flood hazard areas using conveyance system structural improvement.	H	1	Flood	Not Started, Lack of Funding	Johnson County Public Works, Acting Director	<b>Cost:</b> Project and Size Dependent <b>Funding:</b> Stormwater Management Program, state and federal agencies <b>Completion Date:</b> Open Ended





**Table 6.8: Johnson County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Johnson County - 6	NFIP – Complete low-water crossing elimination projects based on risk and traffic count.	M	1	Flood	Not Started, Lack of Funding	Johnson County Public Works, Acting Director	<b>Cost:</b> Project and Size Dependent <b>Funding:</b> Stormwater Management Program, State and federal agencies <b>Completion Date:</b> Open Ended
Johnson County - 7	NFIP – Purchase, install and implement a flood warning system.	M	4	Flood	Not Started, Lack of Funding	Johnson County Public Works and Johnson County Emergency Management, Asst. Director of Operations	<b>Cost:</b> Project and Size Dependent <b>Funding:</b> Stormwater Management Program, state and federal agencies <b>Completion Date:</b> Open Ended
Johnson County - 8	Purchase and install additional outdoor warning sirens with a computer based digital monitoring system so that defects or maintenance issues will be reported immediately as they occur.	M	4	Tornado, Windstorm	Not Started, Lack of Funding	Johnson County Emergency Management, Asst Director of Operations	<b>Cost:</b> Project and Size Dependent <b>Funding:</b> Annual Budget and HMGF grants. <b>Completion Date:</b> Open Ended



## 6.8.2 –DeSoto Mitigation Actions (Johnson County)

**Table 6.9: DeSoto Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
DeSoto -1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> On-going
DeSoto - 2	<b>NFIP</b> - Design and construct flood control projects in all flood prone areas.	H	1,2	Flood, Soil Erosion & Dust	Not Started, Lack of Funding	De Soto Engineering Division	<b>Cost:</b> Project and Size Dependent <b>Funding:</b> City and County General Funds, HMGP Grants and Special Benefit Districts <b>Completion Date:</b> Four years
DeSoto - 3	Purchase and install back-up generators for the City Hall/EOC.	H	2	Lightning, Tornado, Utility /Infrastructure Failure, Winter Storm	Lack of Funding	City of De Soto	<b>Cost:</b> \$55,000, <b>Funding:</b> city funds, Grants, Bonds, and CIP <b>Completion Date:</b> Three years
DeSoto - 4	Install additional outdoor warning sirens with a computer based digital monitoring system.	H	1,2	Tornado	New	City of De Soto	<b>Cost:</b> \$25,000 each <b>Funding:</b> City funds, Grants <b>Completion Date:</b> On-going
DeSoto - 5	Provide for current building code enforcement	H	1,2	All Hazards	New	City of De Soto	<b>Cost:</b> Staff Time <b>Funding:</b> City budget <b>Completion Date:</b> On-going
DeSoto - 6	Provide emergency storm shelter in City Hall	H	1,2	All Hazards	New	City of De Soto	<b>Cost:</b> \$500,000 <b>Funding:</b> City budget, grants <b>Completion Date:</b> Two years



### 6.8.3 – Edgerton Mitigation Actions (Johnson County)

**Table 6.10: Edgerton Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Edgerton - 1	Operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	City of Edgerton	<b>Cost:</b> Staff Time <b>Funding:</b> City funds <b>Completion Date:</b> Continuous
Edgerton - 2	Design, purchase and install an Edgerton storm shelter.	M	1	Tornado	Not Started, Lack of Funding	City of Edgerton	<b>Cost:</b> Project and Size Dependent, \$1,000,000 <b>Funding:</b> HMGF <b>Completion Date:</b> 2021
Edgerton - 3	Purchase portable electric generators	M	1,2	All Hazards	Not Started, Lack of Funding	City of Edgerton	<b>Cost:</b> \$14,400 - \$157,000 <b>Funding:</b> Potential grant <b>Completion Date:</b> 2020
Edgerton - 4	Purchase and install Edgerton storm siren system expansion	M	4	Windstorm, Tornado	Not Started, Lack of Funding	City of Edgerton	<b>Cost:</b> \$21,000 <b>Funding:</b> Capital reserve funds with matching grant <b>Completion Date:</b> 2020
Edgerton - 5	Conduct 207 <sup>th</sup> Street grade separation project	H	1,2	All Hazards	Not Started, Lack of Funding	City of Edgerton, Johnson county	<b>Cost:</b> \$15,000,000 <b>Funding:</b> Federal and State Highway Programs, Federal and State Rail Crossing Programs <b>Completion Date:</b> 2022
Edgerton - 6	<b>NFIP</b> - Construct and complete Edgerton Marias des Cygnes Watershed storm water infrastructure: replace culverts on both 1st and 2 <sup>nd</sup> Street, raise 2nd Street by 1.2 feet for 200 feet, and improve 1,700 feet of flood channel.	L	1,2	Flood	Not Started, Lack of Funding	City of Edgerton	<b>Cost:</b> \$679,200. <b>Funding:</b> Johnson County SMAC, FEMA programs, and the City's capital reserve fund <b>Completion Date:</b> 2022
Edgerton - 7	Dam infrastructure repair and upgrade at Edgerton and South Lakes, including a floodgate in the Big Bull Creek.	L	1,2	Dam and Levee Failure, Flood	Not Started, Lack of Funding	City of Edgerton	<b>Cost:</b> Project and Size Dependent, \$20,000,000 <b>Funding:</b> City's Capital reserve funds with match <b>Completion Date:</b> 2022



## 6.8.4 –Fairway Mitigation Actions (Johnson County)

**Table 6.11: Fairway Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Fairway - 1	Deliver public education to city businesses, homeowners, and residents to be pro-active vs reactive in surviving and recovering from disasters.	H	3	All Hazards	Not Started, Staffing and Funding Limitations	Police Department Chief	<b>Cost:</b> \$20,000 <b>Funding:</b> FEMA/State Mitigation grants. City Fairway would provide matching cost share <b>Completion Date:</b> 2020
Fairway - 2	Operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Codes Department, City of Fairway Building Inspector/Codes Officer	<b>Cost:</b> Staff Time <b>Funding:</b> City funds <b>Completion Date:</b> Continuous
Fairway - 3	<b>NFIP</b> - Design and complete flood control projects and storm sewer upgrades, including open channels and flood plain modifications, or through a combination of below-ground storm sewers and above ground swales.	H	1,2	Flood	Not Started, Lack of Funding	Fairway 3 Public Works Director	<b>Cost:</b> Project and Size Dependent, \$1,000,000+ <b>Funding:</b> FEMA mitigation and repetitive loss grants. JOCO Storm Water Management Program. CARS, Federal, State, City Funding from Stormwater Utility Fund. Private contributions <b>Completion Date:</b> On-going
Fairway - 4	Purchase trailer-mounted, portable generator for police station.	M	2	All Hazards	Not Started, Lack of Funding	Police Department Chief	<b>Cost:</b> \$40,000 <b>Funding:</b> Disaster Contingency Funds with a matching cost share <b>Completion Date:</b> 2022



## 6.8.5 – Gardner Mitigation Actions (Johnson County)

Table 6.12: Gardner Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Gardner - 1	<b>NFIP</b> - Complete a storm watershed master plan study which identifies stream buffer policies, detention requirements, grading plan requirements, and minimum development standards for stormwater.	H	1,3,4	Flood	Not Started, Lack of Funding	Public Works, Engineering Division	<b>Cost:</b> \$400,000+ <b>Funding:</b> SMAC, General Fund, Stormwater Utility fund and property owner contributions <b>Completion Date:</b> 2022
Gardner - 2	<b>NFIP</b> - Design and complete the Doublegate Culvert Replacement flood control project.	H	2	Flood	Not Started, Lack of Funding	Public Works, Engineering Division	<b>Cost:</b> \$1,200,000 <b>Funding:</b> FEMA mitigation repetitive loss grants, SMAC and City funds from the Stormwater Utility fund <b>Completion Date:</b> 2022
Gardner - 3	Purchase both mobile and fixed generators for city facilities.	M	2	Lightning, tornado, Utility/Infrastructure Failure, Winter Storm, windstorm	Not Started, Lack of Funding	Gardner Public Safety	<b>Cost:</b> \$50,000 per generator w/installation <b>Funding:</b> State and Federal agencies <b>Completion Date:</b> 2022
Gardner - 4	Continued operation and management of jurisdictional <b>NFIP</b> activities.	M	1,2	Flood	In Progress	Public Works, Engineering Division	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
Gardner - 5	Tornado Sirens to service a growth in the Garner population. Also, upgrades are needed to replace aged sirens	M	4	All Hazards	Not Started, Lack of Funding	Gardner Public Safety	<b>Cost:</b> \$22,000 per siren <b>Funding:</b> State and Federal agencies <b>Completion Date:</b> 2022



## 6.8.6 – Lake Quivira Mitigation Actions (Johnson County)

Table 6.13: Lake Quivira Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Lake Quivira - 1	Purchase and install an emergency evacuation exit for gated residential community that houses over 400 homes.	H	1	Hazardous Materials	Not Started, Lack of Funding	Emergency Preparedness, Fire Chief	Cost: \$60,000 for initial construction, \$100,000 with road base update <b>Funding:</b> City of Lake Quivira <b>Completion Date:</b> 2022
Lake Quivira - 2	Purchase an emergency power back-up generator for City Hall facility that houses the Fire, Police, and administration departments.	H	2	All Hazards	Not Started, Lack of Funding	City of Lake Quivira Police Department	Cost: \$25,000 <b>Funding:</b> City of Lake Quivira and FEMA <b>Completion Date:</b> 2022





## 6.8.7 – Leawood Mitigation Actions (Johnson County)

**Table 6.14: Leawood Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Leawood - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Director of Public Works	<b>Cost:</b> Staff Time <b>Funding:</b> City of Leawood Funding, <b>Completion Date:</b> open ended.
Leawood - 2	<b>NFIP</b> - Conduct a feasibility study on flooding of Indian Creek west of state line road to determine an appropriate course of action which might include a stormwater project to address improvements to the creek, erosion control, and floodproofing of businesses. Complete the recommended project.	H	1,2	Flood, Soil Erosion and Dust	Not Started, Lack of Funding	Director of Public Works	<b>Cost:</b> \$100,000 <b>Funding:</b> Annual Budget <b>Completion Date:</b> Feasibility study completion would be 12 months after Funding, and construction would be 12 – 36 months after Funding.
Leawood - 3	<b>NFIP</b> - Conduct a feasibility study on flooding of Tomahawk and Indian Creeks to determine an appropriate course of action to remedy severe erosion. Complete the recommended project.	H	1,2	Flood, Soil Erosion and Dust	Not Started, Lack of Funding	Director of Public Works	<b>Cost:</b> \$1,000,000 <b>Funding:</b> Annual budget <b>Completion Date:</b> Up to 12 months for feasibility study and 12 – 36 months for construction after Funding received.
Leawood - 4	Purchase and distribute weather radios to enhance the warning of the public and businesses.	H	2	Tornado, Windstorm, Winter Storm, Lightning	Not Started, Lack of Funding	Leawood Fire Chief	<b>Cost:</b> \$315,000 <b>Funding:</b> Annual Budget <b>Completion Date:</b> 2022



## 6.8.8 – Lenexa Mitigation Actions (Johnson County)

**Table 6.15: Lenexa Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Lenexa - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	City of Lenexa Public Works	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Open ended
Lenexa - 2	Construction of Public Safe Rooms. Currently there are none. The large outdoor festivals have no shelter areas.	H	1	Tornado	Not Started, Lack of Funding	City of Lenexa Public Works	<b>Cost:</b> \$2,000,000 <b>Funding:</b> City Funding, Federal as identified <b>Completion Date:</b> 2022
Lenexa - 3	Purchase back-up generators for critical facilities, Fire Station #2 has no emergency power generator	H	2	Lightning, tornado, Utility/ Infrastructure Failure, Winter Storm, Windstorm	Not Started, Lack of Funding	City of Lenexa Fire Department	<b>Cost:</b> \$60,000 <b>Funding:</b> City of Lenexa, State and Federal Funds <b>Completion Date:</b> 2022
Lenexa- 4	<b>NFIP</b> – Acquire and demolish structures located in floodplains.	H	1,3,4	Flood	New	Public Works, Engineering Division	<b>Cost:</b> \$400,000+ <b>Funding:</b> General Fund, Stormwater Utility fund and property owner contributions <b>Completion Date:</b> 2022



## 6.8.9 – Merriam Mitigation Actions (Johnson County)

Table 6.16: Merriam Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Merriam - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities	H	1,2	Flood	In Progress	City Engineer/Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> City Funds <b>Completions Date:</b> is open ended
Merriam - 2	<b>NFIP</b> - Complete a storm watershed master plan study which identifies stream buffer policies, detention requirements, grading plan requirements, and minimum development standards for stormwater.	H	1,3,4	Flood	New	Public Works, Engineering Division	<b>Cost:</b> \$400,000+ <b>Funding:</b> General Fund, Stormwater Utility fund and property owner contributions <b>Completion Date:</b> 2020
Merriam - 3	<b>NFIP</b> - Acquisition and demolition of properties in floodplains.	H	1,2	Flood	New	City Engineer/Floodplain Manager	<b>Cost:</b> NA <b>Funding:</b> City Funds <b>Completions Date:</b> Open Ended



## 6.8.10 – Mission Mitigation Actions (Johnson County)

Table 6.17: Mission Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Mission 1	Continued operation and management of jurisdictional NFIP activities	H	1,2	Flood	In Progress	City of Mission	Cost: Staff Time Funding: City funds Completion Date: open ended
Mission 2	NFIP - Floodplain management compliance continuation to include regulating new construction in the Special Flood Hazard area.	H	1,2	Flood	In Progress	Floodplain Manager	Cost: Staff Time Funding: City Funds Completion Date: open ended
Mission 3	Design and construct Sylvester Powell Jr. Community Center disaster preparedness project.	M	1	All Hazards	Not Started, Lack of Funding	Emergency Preparedness	Cost: \$1,000,000 Funding: City, county and FEMA Funding Completion Date: 2022
Mission 4	Purchase additional generator for Public Works Facility.	L	2	All Hazards	Not Started, Lack of Funding	Emergency Preparedness	Cost: \$30,000 Funding: Mission General Fund/Federal Funds Completion Date: 2022



## 6.8.11– Mission Hills Mitigation Actions (Johnson County)

**Table 6.18: Mission Hills Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Mission Hills - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	City Administrator	<b>Cost:</b> Staff Time <b>Funding:</b> City funds <b>Completion Date:</b> On-going
Mission Hills - 2	<b>NFIP</b> - Acquiring repetitive loss structures.	H	1,2	Flood	Not Started, Lack of Funding	City Administrator	<b>Cost:</b> \$3,000,000 <b>Funding:</b> City Funds <b>Completion Date:</b> As opportunities arise
Mission Hills - 3	<b>NFIP</b> - Conduct education campaign for residents about the floodplain and <b>NFIP</b>	H	1,2	Flood	Not Started, Lack of Funding	City Administrator	<b>Cost:</b> \$10,000 <b>Funding:</b> City Funds <b>Completion Date:</b> continuous
Mission Hills - 4	Serve as a resource for residents with questions about the floodplain and <b>NFIP</b> .	H	1,2	Flood	In Progress	City Administrator	<b>Cost:</b> Staff Time <b>Funding:</b> City Funds <b>Completion Date:</b> continuous
Mission Hills - 5	<b>NFIP</b> - Hire a firm to forecast flood events and then use the City's Code Red (reverse 911) to notify those that would likely be affected so they can take precautions /evacuate the area.	M	4	Flood	Not Started, Lack of Funding	City Administrator	<b>Cost:</b> \$1,400,000 <b>Funding:</b> City Funds, Johnson County <b>Completion Date:</b> 5 years
Mission Hills - 6	<b>NFIP</b> - Install automatic bollards that come out of the roadway to block traffic when the creek sensors indicate that the roadway will be overtopped with water.	M	4	Flood	Not Started, Lack of Funding	City Administrator	<b>Cost:</b> \$1,400,000 <b>Funding:</b> City Funds, Johnson County <b>Completion Date:</b> 2025
Mission Hills - 7	<b>NFIP</b> - Realign Brush Creek in Hiawasse park.	M	1,2	Flood	Not Started, Lack of Funding	City Administrator	<b>Cost:</b> \$138,600 <b>Funding:</b> City Funds <b>Completion Date:</b> 2022
Mission Hills - 8	Purchase additional generators for Public Works Facility	L	2	All Hazards	Not Started, Lack of Funding	Emergency Preparedness	<b>Cost:</b> \$50,000 <b>Funding:</b> General Fund/Federal Funds <b>Completion Date:</b> 2020



## 6.8.12 – Mission Woods Mitigation Actions (Johnson County)

**Table 6.19: Mission Woods Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Mission Woods - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	City of Mission Woods	<b>Cost:</b> Staff Time <b>Funding:</b> NA <b>Completion Date:</b> On-going.
Mission Woods - 2	<b>NFIP</b> - Obtain entry into CRS program	H	1,2	Flood	In Progress	City Administrator	<b>Cost:</b> Staff Time <b>Funding:</b> City Funds <b>Completion Date:</b> Continuous
Mission Woods - 3	Conduct education campaign for residents about the floodplain and <b>NFIP</b>	H	1,2	Flood	Not Started, Lack of Funding	City Administrator	<b>Cost:</b> \$10,000 <b>Funding:</b> City Funds <b>Completion Date:</b> Continuous
Mission Woods - 4	<b>NFIP</b> - Research flooding issues for the City of Mission Woods, mapping opportunities, and code enforcement for construction within the floodplain.	H	1,2	Flood	Not Started, Staffing Limitations	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> 2022





### 6.8.13 – Olathe Mitigation Actions (Johnson County)

**Table 6.20: Olathe Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Olathe - 1	NFIP - Design and construct the Cedar Creek Wastewater Treatment Plan flood wall modifications.	H	2	Flood	Not Started, Lack of Funding	Wastewater Superintendent	<b>Cost:</b> \$1,000,000 <b>Funding:</b> Revenue bonds, grants <b>Completion Date:</b> 2022 <b>Cost:</b> \$750,000 total for 5 structures <b>Funding:</b> Stormwater Management Advisory Council, (SMAC) Funding. <b>Completion Date:</b> 2022
Olathe - 2	NFIP - Purchase and demolish targeted, single family structures identified in the updated flood plain maps.	H	1	Flood	Not Started, Lack of Funding	Stormwater Director	<b>Cost:</b> \$1,000,000 each <b>Funding:</b> Municipal Finances, Bonds and potential grant sources <b>Completion Date:</b> On-going <b>Cost:</b> \$75,000 each <b>Funding:</b> Cost-share line item from disaster contingency funds <b>Completion Date:</b> 2022
Olathe - 3	Design and construct safe rooms in future public buildings.	M	1	Tornado, windstorm	Not Started, Lack of Funding	Chief Building Official, Olathe, KS	<b>Cost:</b> \$22,000 <b>Funding:</b> Budget, Citizen Corps, and UASI grant <b>Completion Date:</b> Jan and November of each year.
Olathe - 4	Purchase multiple trailer-mounted, portable generators.	M	2	All Hazards	Not Started, Lack of Funding	Olathe Fire Department, Assistant Chief, Special Operations	<b>Cost:</b> \$200,000 <b>Funding:</b> Johnson <b>Completion Date:</b> 2022
Olathe - 5	Deliver CERT training program.	H	3,4	All Hazards	Not Started, Lack of Funding	Assistant Chief, Special Operations	
Olathe - 6	NFIP - Design and complete storm drainage culvert expansion at 147/Brougham Dr.	H	1,2	Flood	Not Started, Lack of Funding	Olathe Storm Water Planning Division Chief	



**Table 6.20: Olathe Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Olathe - 7	Deliver All-Hazard Citizen Education training and purchase accompanying Workbook.	H	3	All Hazards	Not Started, Lack of Funding	Olathe Fire Department, Assistant Chief of Special Ops	<b>Cost:</b> \$21,140 for 10,000 workbooks <b>Funding:</b> Emergency Management Divisions printing line item, Administration division's budget. <b>Completion Date:</b> On-going
Olathe - 8	Purchase and install sirens for the expansion of Olathe Outdoor Warning System.	H	4	Tornado, Windstorm	Not Started, Lack of Funding	Olathe fire Department/Emergency Management Division – Chief Dock	<b>Cost:</b> \$138,000 for six sirens <b>Funding:</b> Grant, budget, developer contribution <b>Completion Date:</b> 2022
Olathe - 9	Purchase and upgrade computers for the Olathe EOC & DOC.	H	4	All Hazards	Not Started, Lack of Funding	City of Olathe I.T. Department director	<b>Cost:</b> \$7,000 <b>Funding:</b> Kansas State Mitigation Grant, City of Olathe Line Item Budget <b>Completion Date:</b> As soon as possible
Olathe - 10	Complete the Water Plant 2 chlorine gas retrofit to sodium hypochlorite.	H	2	Hazardous Materials	Not Started, Lack of Funding	Environmental Services Manager	<b>Cost:</b> \$250,000 <b>Funding:</b> Bonds, Grants <b>Completion Date:</b> 2022
Olathe - 11	Design and construct free-standing safe rooms at Santa Barbara Mobile Home Estates.	H	1	Tornado, Windstorm	Not Started, Lack of Funding	Assistant Chief, OFD	<b>Cost:</b> \$800,000. <b>Funding:</b> KS State Mitigation Grand Funds Only <b>Completion Date:</b> 2020
Olathe - 12	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	City of Olathe, Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Open Ended



## 6.8.14 – Overland Park Mitigation Actions (Johnson County)

**Table 6.21: Overland Park Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Overland Park - 1	Purchase mobile and fixed generators for use at all city facilities.	H	2	Tornadoes, Wind Storms, Winter Storms	Not Started, Lack of Funding	Manager; Facilities Management and Code Administrator; Building Safety Division	<b>Cost:</b> \$250,000 <b>Funding:</b> Grants, Local <b>Completion Date:</b> 6 months after Funding received.
Overland Park - 2	Purchase emergency generators for the Tomahawk Ridge Community Center.	H	2	Tornadoes, Wind Storms, Winter Storms	Not Started, Lack of Funding	Director Recreation Services Department and Manager, Facilities Management	<b>Cost:</b> \$350,000 <b>Funding:</b> Grants, local <b>Completion Date:</b> 6 months after authorization of funds.
Overland Park - 3	Design and construct Fire Station Number 3 safe room to protect up to 50 people.	H	2	Tornado, Wind Storm	Not Started, Lack of Funding	Fire Chief, Fire Department	<b>Cost:</b> \$150,000 <b>Funding:</b> Grants, local <b>Completion Date:</b> 2020
Overland Park - 4	Purchase emergency generator for Fire Station Number 5. The generator would have a fuel reservoir capable of 48-72 hours of operating time.	H	2	Lightning, Tornado, Utility/ Infrastructure Failure, Winter Storm, Windstorm	Not Started, Lack of Funding	Fire Chief, fire Department	<b>Cost:</b> \$75,000 <b>Funding:</b> Grants, Local <b>Completion Date:</b> 2020
Overland Park - 5	Continued operation and management of jurisdictional <b>NFIP</b> activities.	M	1,2	Flood	In Progress	Code Administrator, and Flood plain Administrator	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Open ended
Overland Park - 6	Retrofit four of the five fire stations in Overland Park with wind resistant/energy efficient doors. All large surface area windows would be fitted with storm panels or shutters.	M	2	Tornado, Windstorm	Not Started, Lack of Funding	Fire Chief, Overland park Fire Department	<b>Cost:</b> \$400,000 <b>Funding:</b> Grants, local <b>Completion Date:</b> 2022
Overland Park - 7	Design and construct safe rooms for all critical city facilities.	M	2	Tornado, Windstorm	Not Started, Lack of Funding	Public Works Department City Engineer, and Manager, Facilities Management, and Code Administrator, Building Safety Division	<b>Cost:</b> \$5,000,000 <b>Funding:</b> Local <b>Completions Date:</b> 5 years



**Table 6.21: Overland Park Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Overland Park - 8	Purchase electronic plan review and recording software and conduct building code enforcement	M	4	All Hazards	Not Started, Lack of Funding	Code Administrator, Building Safety Division	<b>Cost:</b> \$400,000 <b>Funding:</b> Local <b>Completion Date:</b> One year after Funding authorized.
Overland Park - 9	Deliver public education of city businesses, home owners and residents and all city staff in OP for disaster preparedness, mitigation and recovery.	M	4	All Hazards	Not Started, Lack of Funding	City Emergency Management Coordinator	<b>Cost:</b> \$100,000 <b>Funding:</b> Local <b>Completion Date:</b> Approximately one year after Funding is authorized.
Overland Park - 10	<b>NFIP</b> - Complete flood control projects and storm sewer upgrades throughout the city. Projects are prioritized based on engineering and economic feasibility; severity of flooding; availability of city funds to pursue the project; and degree of interest in the project by property owners as manifested by the donation to the city of easements necessary to construct the project.	M	1,2	Flood	Not Started, Lack of Funding	Director, Public Works, Floodplain Manager, Engineering Division	<b>Cost:</b> Project Dependent <b>Funding:</b> Stormwater Utility Fund, JOCO Stormwater Management Program, FEMA mitigation and repetitive loss grants. Property owner contributions are often required via benefit districts. <b>Completion Date:</b> 2 – 4 years from initial identification.
Overland Park - 11	<b>NFIP</b> - Acquisition and demolition of structures with repetitive flood losses.	M	1,2	Flood	Not Started, Lack of Funding	Director, Public Works and Floodplain Manager, Engineering Division	<b>Cost:</b> Varies depending on home <b>Funding:</b> Varies with economy <b>Completion Date:</b> 6 months – 2 years from date of approval.
Overland Park - 12	Design and construction of regional storm water detention facilities to control and/or reduce runoff generated by redevelopment of the downstream area.	M	1,2	Flood	Not Started, Lack of Funding	Director, Public Works Department and Manager, Engineering Services	<b>Cost:</b> Project Dependent <b>Funding:</b> Grants, local <b>Completion Date:</b> 2022



### 6.8.15 – Prairie Village Mitigation Actions (Johnson County)

**Table 6.22: Prairie Village Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Prairie Village - 1	Bury underground utility cables	M	1,2	Lightning, Tornado, Utility /Infrastructure Failure, Winter Storm, Windstorm	Not Started, Lack of Funding	Director of Public Works	<b>Cost:</b> \$50,000,000 <b>Funding:</b> NA <b>Completion Date:</b> never ending.
Prairie Village - 2	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Assistant City Administrator	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
Prairie Village - 3	<b>NFIP</b> - Acquisition and demolition of structures with repetitive flood losses.	M	1,2	Flood	Not Started, Lack of Funding	Director, Public Works and Floodplain Manager, Engineering Division	<b>Cost:</b> Varies depending on home <b>Funding:</b> Varies with economy <b>Completion Date:</b> 6 months – 2 years from date of approval.



## 6.8.16 – Roeland Park Mitigation Actions (Johnson County)

**Table 6.23: Roeland Park Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Roeland Park - 1	Construct community tornado shelters	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	Director of Public Works	<b>Cost:</b> \$50,000,000 <b>Funding:</b> NA <b>Completion Date:</b> never ending.
Roeland Park - 2	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Assistant City Administrator	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
Roeland Park - 3	<b>NFIP</b> - Acquisition and demolition of structures with repetitive flood losses.	M	1,2	Flood	Not Started, Lack of Funding	Director, Public Works and Floodplain Manager, Engineering Division	<b>Cost:</b> Varies depending on home <b>Funding:</b> Varies with economy <b>Completion Date:</b> 6 months – 2 years from date of approval.





## 6.8.17 – Shawnee Mitigation Actions (Johnson County)

Table 6.24: Shawnee Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Shawnee - 1	Establish a full time Emergency Management Office.	H	1,2	All Hazards	Not Started, Lack of Funding	City Manager	<b>Cost:</b> \$100,000 per year <b>Funds:</b> General Fund <b>Completion Date:</b> Awaiting approval of City Council
Shawnee - 2	Deliver CERT training program.	M	3	All Hazards	Not Started, Lack of Funding	Acting Emergency Manager	<b>Cost:</b> \$1,000 start-up <b>Funds:</b> State & Federal Grants, Donations <b>Completion Date:</b> Fall 2020
Shawnee - 3	Design and construct safe rooms in all future buildings built by the City.	H	1	Tornado, Windstorm	Not Started, Lack of Funding	Public Works Director	<b>Cost:</b> \$1,000,000 per room <b>Funds:</b> County, Federal <b>Completion Date:</b> Continuous
Shawnee - 4	Deliver public education for city/community in Disaster Preparedness.	M	3	All Hazards	Not Started, Lack of Funding	Acting Emergency Manager	<b>Cost:</b> \$5,000 - \$10,000 <b>Funds:</b> General Fund <b>Completion Date:</b> Continuous
Shawnee - 5	Design and construct free standing storm shelter or underground shelter behind the Justice Center (or in basement).	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	Acting Emergency Manager	<b>Cost:</b> \$100,000 to \$400,000 <b>Funds:</b> Grants <b>Completion Date:</b> 2025
Shawnee - 6	<b>NFIP</b> - Improve flood hazard areas through the use of conveyance system structural improvement.	H	1	Flood	Not Started, Lack of Funding	Public Works Director	<b>Cost:</b> Project Dependent <b>Funds:</b> Stormwater Management Program, State, Federal <b>Completion Date:</b> On-going
Shawnee - 7	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Public Works Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous



**Table 6.24: Shawnee Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Shawnee - 8	Conduct active building code enforcement.	H	1,2	All Hazards	In Progress	Public Works Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Shawnee - 9	<b>NFIP</b> - Acquisition and demolition of flood prone properties.	H	1	Flood	Not Started, Lack of Funding	Public Works Director	<b>Cost:</b> Varies <b>Funds:</b> Stormwater Management Program, State, Federal <b>Completion Date:</b> Continuous
Shawnee - 10	<b>NFIP</b> - Purchase and implement flood warning system to warn residents and the traveling public about potential/actual flooding.	M	4	Flood	Not Started, Lack of Funding	Public Works Director	<b>Cost:</b> \$500,000 <b>Funds:</b> State, Federal <b>Completion Date:</b> On-going
Shawnee - 11	Purchase trailer mounted generators for use throughout the city.	H	1,2	All Hazards	Not Started, Lack of Funding	Acting Emergency Manager	<b>Cost:</b> \$30,000 to \$50,000 <b>Funds:</b> No funds Available <b>Completion Date:</b> On-going
Shawnee - 12	Design and retrofit flood proof building in identified floodplains. Identify habitable buildings in the floodplain and/or are subject to flooding, prioritize locations, install/complete flood proofing techniques for buildings as Funding becomes available if buyout is not an option.	L	1,2	Flood	Not Started, Lack of Funding	Public Works Director	<b>Cost:</b> Project Dependent, \$1,000,000+ <b>Funds:</b> State, Federal <b>Completion Date:</b> Continuous
Shawnee - 13	<b>NFIP</b> - Update the BSEGS to meet the required 5/4 BSEGS rating to improve CRS rating	H	1,2,3	Flood	New	Acting Emergency Manager	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> April 2020
Shawnee - 14	Conduct system wide stormwater drainage maintenance.	M	1,2	Flood	New	Public Works Director	<b>Cost:</b> Project Dependent, Staff Time <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2024



**Table 6.24: Shawnee Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Shawnee - 15	NFIP- Work with developers and property owners to implement water quality streamway corridors to help improve water quality.	H	1,2,3	Flood	New	Environmental Coordinators	Cost: Staff Time Funds: Local Completion Date: April 2024
Shawnee - 16	Work with the USACE Silver Jackets to increase Turn Around Don't Drown signage throughout the city.	H	1,2,3	Flood	New	Acting Emergency Manager	Cost: Staff Time Funds: Local, State, Federal Completion Date: 2024



## 6.8.18 – Spring Hill Mitigation Actions (Johnson County)

Table 6.25: Spring Hill Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Spring Hill - 1	Design and construct safe rooms in all future city buildings.	H	1	Tornado	Not Started, Lack of Funding	Spring Hill Planning & Development	<b>Cost:</b> \$1,000,000 each <b>Funding:</b> City Funding, Federal as identified <b>Completion Date:</b> Continuous
Spring Hill - 2	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	City of Spring Hill	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Open Ended
Spring Hill - 3	Conduct public information distribution after a disaster through primary and secondary distribution points.	M	4	All Hazards	In Progress	Spring Hill Planning Department	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Implemented as needed
Spring Hill - 4	Purchase portable generators for City Hall.	M	2	All Hazards	Not Started, Lack of Funding	Public Works	<b>Cost:</b> \$100,000 <b>Funding:</b> FEMA, State of Kansas, local capital improvement budgeting <b>Completion Date:</b> 2020
Spring Hill - 5	<b>NFIP</b> - Acquisition and demolition of flood prone properties.	H	1	Flood	New	Public Works Director	<b>Cost:</b> Varies <b>Funds:</b> Stormwater Management Program, State, Federal <b>Completion Date:</b> Continuous



## 6.8.19 – Westwood Mitigation Actions (Johnson County)

**Table 6.26: Westwood Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Westwood - 1	Purchase and install back-up generators for critical facilities.	M	2	Lightning, Tornado, Utility/Infrastructure Failure, Winter Storm, Windstorm	Not Started, Lack of Funding	Police Department/Public Works	<b>Cost:</b> \$75,000 - \$100,000 each <b>Funding:</b> State and federal agencies <b>Completion Date:</b> 1 – 2 years
Westwood - 2	<b>NFIP</b> - Acquisition and demolition of flood prone properties.	H	1	Flood	New	Floodplain Manager	<b>Cost:</b> Varies <b>Funds:</b> Stormwater Management Program, State, Federal <b>Completion Date:</b> Continuous
Westwood - 3	<b>NFIP</b> - Continue to regulate construction in the floodplain and ensure regulatory guidelines are met.	H	1,2	Flood	New	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> On-going



## 6.8.20 – Westwood Hills Mitigation Actions (Johnson County)

**Table 6.27: Westwood Hills Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Westwood Hills - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	City of Westwood Hills	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Open Ended
Westwood Hills - 2	<b>NFIP</b> - Acquisition and demolition of flood prone properties.	H	1	Flood	New	Floodplain Manager	<b>Cost:</b> Varies <b>Funds:</b> Stormwater Management Program, State, Federal <b>Completion Date:</b> Continuous
Westwood Hills - 3	Purchase and install back-up generators for critical facilities.	M	2	Lightning, Tornado, Utility/Infrastructure Failure, Winter Storm, Windstorm	Not Started, Lack of Funding	Police Department/Public Works	<b>Cost:</b> \$75,000 - \$100,000 each <b>Funding:</b> State and federal agencies <b>Completion Date:</b> 1 – 2 years





## 6.8.21 – USD #229 Mitigation Actions (Johnson County)

**Table 6.28: USD#229 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #229 - 1	Design and construct safe rooms in all school district buildings.	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	Director of Blue Valley Safety & Security	Cost: \$1,000,000 each <b>Funding:</b> HMGP <b>Completion Date:</b> Ongoing as Funding becomes available



## 6.8.22 – USD #230 Mitigation Actions (Johnson County)

Table 6.29: USD#230 Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #230 - 1	Design and construct safe rooms in all school district buildings.	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	Superintendent/Asst. Superintendent	Cost: \$1,000,000+ each \$500,000 to 750,000 total Funding: bond issues and HMGF Completion Date: 2022



## 6.8.23 – USD #231 Mitigation Actions (Johnson County)

Table 6.30: USD#231 Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #231 - 1	Conduct severe weather refuge area improvements study and complete recommended improvements.	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	USD231 Director of Operations	Cost: \$36,000 for thorough study <b>Funding:</b> FEMA grants, existing capital revenue, and future school bond revenue <b>Completion Date:</b> 2010
USD #231 - 2	Design and construct safe rooms in all school district buildings.	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	School district administration	Cost: \$1,000,000 each <b>Funding:</b> HMGP <b>Completion Date:</b> 2025



## 6.8.24 – USD #232 Mitigation Actions (Johnson County)

**Table 6.31: USD#232 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #232 - 1	Design and construct safe rooms in all school district buildings.	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	Crisis Plan Coordinator, Facility Department	Cost: \$1,000,000 each Funding: HMGF Completion Date: 2025
USD #232 - 2	Use USD 232 community school resources to disseminate news and information to students, staff and patrons about possible hazards and steps they can take to protect themselves. .	M	3	All Hazards	In Progress	Schools	Cost: Staff Time Funding: USD232 Completion Date: Open Ended



## 6.8.25 – USD #233 Mitigation Actions (Johnson County)

**Table 6.32: USD#233 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #233 - 1	Design and construct safe rooms in all school district buildings.	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	School District Administration	<b>Cost:</b> \$1,000,000 each <b>Funding:</b> HMGF <b>Completion Date:</b> 1 – 5 years
USD #233 - 2	Purchase backup generators for food production center, central office, and designated Jr High for community shelter and for all future school buildings	M	2	Lightning, Tornado, Utility/ Infrastructure Failure, Sinter Storm, Windstorm	Not Started, Lack of Funding	School District Administration	<b>Cost:</b> \$50,000 each <b>Funding:</b> Grant, local <b>Completion Date:</b> 1 – 5 years



6.8.27 – USD #512 Mitigation Actions (Johnson County)

Table 6.33: USD#512 Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #512 - 1	Design and construct safe rooms in all school district buildings.	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	Shawnee - Mission Operations & Maintenance Department	Cost: \$1,000,000 each Funds: Bond and/or capital funds, HMGF Completion Date: 2025





## 6.8.28– Kansas School for the Deaf Mitigation Actions (Johnson County)

**Table 6.34: Kansas School for the Deaf Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
KSD - 1	Design and construct safe rooms in all school buildings.	H	1,2	Windstorm, Tornado	Not Started, Lack of Funding	Unified Government, KSSDB Superintendent	<b>Cost:</b> \$1,000,000 each <b>Funds:</b> FEMA Grant <b>Completion Date:</b> 12 – 18 months
KSD - 2	Purchase backup generators for all facilities.	H	1,2	Utility Failure, Windstorm, Winter Storm	Not Started, Lack of Funding	Unified Government, KSSB Superintendent	<b>Cost:</b> \$230,000 total <b>Funds:</b> FEMA <b>Completion Date:</b> 8 – 10 months
KSD - 3	Provide vaccination services at on-site clinic using the qualified medical staff.	H	1,2	Major Disease Outbreak	In Progress	Unified Government, KSSB Superintendent	<b>Cost:</b> Staff Time, Vaccine Cost <b>Funds:</b> FEMA Grant <b>Completion Date -On-going</b>
KSD - 4	Purchase and install mass notification system for deaf (visual notice) and for blind (audio) individuals to provide warnings for intruders, hazards, natural disasters, bomb and civil disorder events.	H	1,2,4	All Hazards	Not Started, Lack of Funding	School for the Blind Operations Director	<b>Cost:</b> \$800,000 <b>Funds:</b> State, FEMA <b>Completion Date:</b> 5 year phased implementation
KSD - 5	Create an all hazard staff and student evacuation plan and education students and staff on plan. Update plan on a yearly basis,	H	1,3,4	All Hazards	In Progress	Crisis Management Team and Emergency Management Department	<b>Cost:</b> \$185 for 20-40 handbooks <b>Funds:</b> Instructional Operational Funding <b>Completion Date:</b> FY 2013 On-going



## 6.8.29 – Johnson County Community College Mitigation Actions (Johnson County)

Table 6.35: Johnson County Community College Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
JCCC - 1	Upgrade new library and other new buildings with safe rooms.	H	1,2	All Hazards	Not Started, Lack of Funding	JCCC Police Department and Emergency Preparedness Manager	Cost: \$30,000,000 For library and safe room. <b>Funds:</b> Bonds, Grants, College Budget, Donations <b>Completion Date:</b> 2022



### 6.8.30 – University of Kansas Edwards Mitigation Actions (Johnson County)

**Table 6.36: University of Kansas Edwards Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
KU Edwards - 1	Update Emergency Management Plan	M	1,3,4	All Hazards	Not Started, Staffing Limitations	Mary E. Ryan, Associate Dean, Academic and Student Affairs, KU Edwards Campus	<b>Cost:</b> Staff Time <b>Funds:</b> No funds <b>Completion Date:</b> 2025
KU Edwards - 2	Deliver public education to provide educational preparedness material to students, staff, and faculty.	M	3	All Hazards	In Progress	Mary E. Ryan, Associate Dean, Academic and Student Affairs, KU Edwards Campus	<b>Cost:</b> Staff Time <b>Funds:</b> No funds <b>Completion Date:</b> 2025
KU Edwards - 3	Design and construct all future buildings with safe rooms.	M	1,2	All Hazards	Not Started, Lack of Funding	Mary E. Ryan, Associate Dean, Academic and Student Affairs, KU Edwards Campus	<b>Cost:</b> \$1,000,000 each <b>Funds:</b> KDEM, FEMA <b>Completion Date:</b> 2025
KU Edwards - 4	Develop mutual aid agreements with nearby response agencies	M	4	All Hazards	In Progress	Mary E. Ryan, Associate Dean, Academic and Student Affairs, KU Edwards Campus	<b>Cost:</b> Staff Time <b>Funds:</b> No funds <b>Completion Date:</b> 2025



## 6.8.31 – Consolidated Fire District 2 Mitigation Actions (Johnson County)

**Table 6.37: Consolidated Fire District 2 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Consolidated Fire District 2 - 1	Replacement of doors at emergency fire protection facility. The plan is to retrofit or replace the existing apparatus bay doors with wind storm resistant, quick opening bi-fold doors.	H	2	Windstorm	Not Started, Lack of Funding	Consolidated FD #2	Cost: \$60,000 Funds: Grant, Local Completion Date: 18 months



## 6.8.32 – Fire District 1 Mitigation Actions (Johnson County)

**Table 6.38: Fire District 1 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Fire District 1 - 1	Design, purchase and retrofit fire stations within the Fire District with wind resistant / energy efficient doors. All large surface area windows would be fitted with storm panels.	H	2	Windstorm	Not Started, Lack of Funding	Fire District #1 Johnson County, Fire chief	Cost: \$250,000 Funds: Budget, Bonds, Mitigation Grant funds if available Completion Date: 2022



### 6.8.33 – Fire District 2 Mitigation Actions (Johnson County)

**Table 6.39: Fire District 2 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Fire District 2 - 1	Design, purchase and retrofit fire stations within the Fire District with wind resistant / energy efficient doors. All large surface area windows would be fitted with storm panels.	H	2	Windstorm	Not Started, Lack of Funding	Fire District #2, Fire Chief	<b>Cost:</b> \$250,000 <b>Funds:</b> Budget, Bonds, Mitigation Grant funds if available. <b>Completion Date:</b> 2025
Fire District 2 - 2	Purchase backup generators for all fire stations.	H	2	All Hazards	Not Started, Lack of Funding	Fire District #2, Fire chief	<b>Cost:</b> \$30,000 each <b>Funds:</b> Grants, capital improvement, and bonds <b>Completion Date:</b> 2025





### 6.8.34– Fire District 3 Mitigation Actions (Johnson County)

**Table 6.40: Fire District 3 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Fire District 3 - 1	Purchase backup generators for all fire stations.	M	2	All Hazards	Not Started, Lack of Funding	Fire District #3, Johnson County	Cost: \$30,000 each Funds: Grants, capital improvement, and bonds Completion Date: 2025



### 6.8.35 – Leavenworth County Mitigation Actions

**Table 6.41: Leavenworth County Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Leavenworth County - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
Leavenworth County - 2	<b>NFIP</b> - Acquire and demolish or preserve parcels of land subject to repetitive flooding from willing and voluntary property owners.	H	1,2	Flood	Not Started, Lack of Funding	Emergency Management Planner	<b>Cost:</b> Project Dependent <b>Funds:</b> FEMA, KDEM. Local <b>Completion Date:</b> Continuous
Leavenworth County - 3	<b>NFIP</b> - Regularly calculate and document the amount of flood prone property that is preserved as open space to reduce flood insurance burden to the county.	H	1,2	Flood	Not Started, Staffing Limitations	Planner, Flood Plain Administrator	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 4	<b>NFIP</b> - Identify flash-flood prone areas to consider flood reduction measures to county planners.	H	1,2	Flood	Not Started, Staffing Limitations	Planner	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 5	<b>NFIP</b> - Amend the Floodplain Management Ordinance to include a “no-rise (in base flood elevation)” clause for Leavenworth County.	H	1,2	Flood	Not Started, Staffing Limitations	Planning Commission, Planner	<b>Cost:</b> Staff Time <b>Funds:</b> FEMA Mapping Project <b>Completion Date:</b> 2022
Leavenworth County - 5	<b>NFIP</b> - 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.	H	1,2	Flood	Not Started, Staffing Limitations	Planning Commission, Planner	<b>Cost:</b> Staff Time <b>Funds:</b> FEMA/State/Local. Levee Districts <b>Completion Date:</b> 31 Dec 2017
Leavenworth County - 6	<b>NFIP</b> - Identify levee owners in the jurisdiction.	H	1,2	Flood	Not Started, Staffing Limitations	Planner, emergency Management, Levee Districts	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 7	<b>NFIP</b> - Implement a study to determine the residual flood risk in levee-protected areas.	M	1,2	Flood	Not Started, Staffing Limitations	Planner, Levee Districts	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022



**Table 6.41: Leavenworth County Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Leavenworth County - 8	Identify the county's most at-risk critical facilities and evaluate potential mitigation techniques for protecting each facility to the maximum extent possible.	M	1,2	All Hazards	Not Started, Staffing Limitations	Emergency Management	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 9	Conduct an inventory/survey for the county's emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	M	1	All Hazards	Not Started, Staffing Limitations	Emergency Management, GIS	<b>Cost:</b> Staff Time <b>Funds:</b> Local/State <b>Completion Date:</b> 2022
Leavenworth County - 10	Research, develop, and recommend an ordinance/resolution to require installation of tornado shelters for major manufactured and/or mobile home parks with more than 10 mobile home spaces.	H	1,2	Tornado, Windstorm	Not Started, Staffing Limitations	Planning and Zoning Department	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 11	Evaluate the firefighting water supply resources within the County.	M	1,2	Wildfire	Not Started, Staffing Limitations	Fire Officials, Emergency Management	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 12	Distribute assessment report examples provided by the Kansas Forest Service to applicable parties to develop an understanding of the Community Wildfire Protection Plan (CWPP).	H	3,4	Wildfire	Not Started, Staffing Limitations	Rural Fire, Emergency Management	<b>Cost:</b> Staff Time <b>Funds:</b> Local, State, Federal Grant programs. <b>Completion Date:</b> On-going
Leavenworth County - 13	Develop and implement a wildfire prevention/education program.	M	3,4	Wildfire	Not Started, Staffing Limitations	Fire Officials, Emergency Management	<b>Cost:</b> Dependent on size <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Leavenworth County - 14	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources.	H	4	Wildfire	Not Started, Staffing Limitations	Fire Officials, Emergency Management	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Leavenworth County - 15	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 Community Wildfire Protection Program (CWPP).	M	3,4	Wildfire	Not Started, Staffing Limitations	Rural Fire, Emergency Management	<b>Cost:</b> Staff Time <b>Funds:</b> Local/State/Federal <b>Completion Date:</b> 2022



**Table 6.41: Leavenworth County Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Leavenworth County - 16	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.	M	1,4	Wildfire	Not Started, Staffing Limitations	Rural Fire, Emergency Management	<b>Cost:</b> Staff Time <b>Funds:</b> Local, Federal, State <b>Completion Date:</b> 2022
Leavenworth County - 17	Develop cross-departmental information collection capabilities and incorporate cadastral (building/parcel) data utilizing a GIS for purposes of conducting more detailed hazard risk assessments and for tracking permitting / land use patterns, buildings and infrastructure replacement costs, and overall structural accounting for the county.	M	4	All Hazards	Not Started, Staffing Limitations	Emergency Management, GIS	<b>Cost:</b> Staff Time <b>Funds:</b> KDEM, Local, grants <b>Completion Date:</b> Continuous
Leavenworth County - 18	Develop an annex to the Local Emergency Operations Plan (LEOP) for dam/levee failure response and evacuation plans for high hazard dams/levees in Leavenworth County.	H	1,2	Dam/Levee	Not Started, Staffing Limitations	Emergency Management Department	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 19	<b>NFIP</b> - Seek Funding to complete a stormwater drainage study for Leavenworth County that will lead to a stormwater management ordinance that maintains pre-development runoff rates.	M	1,2	Flood	Not Started, Lack of Funding	Planner, Public Works	<b>Cost:</b> \$100,000 <b>Funds:</b> State of Kansas, FEMA <b>Completion Date:</b> 2022
Leavenworth County - 20	Research and contact all owners of high hazard dams in the county and inform them of their responsibility to provide Emergency Action Plans to the Leavenworth County Emergency Management. Additionally, Levee owners should be contacted regarding potential PM 43 requirements for continued validation of protected areas behind the levees.	H	3,4	Dam/Levee Failure	Not Started, Staffing Limitations	Emergency Management Department	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 21	Research and recommend appropriate building codes for the jurisdiction that	H	1,4	All Hazards	Not Started,	Planning Commission, Planner, BOCC	<b>Cost:</b> Staff Time <b>Funds:</b> Local



**Table 6.41: Leavenworth County Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
	includes wind resistant design techniques for new construction.				Staffing Limitations		<b>Completion Date: 2022</b>
Leavenworth County - 22	Conduct debris removal in Big Stranger Creek that is located within the Drainage District.	M	1,2	Dam/Levee, Flood	Not Started, Lack of Funding	Big Strange Drainage District	<b>Cost:</b> \$200,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> Continuous
Leavenworth County - 23	The Leavenworth County Consolidated Rural Water District (RWD) No. 1 will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Water District will also seek Funding sources to mitigate damage to critical infrastructure and seek Funding for various water main improvement projects.	M	1,2	Utility/ Infrastructure Failure	Not Started, Lack of Funding	Leavenworth county Consolidated RWD #1	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> Continuous
Leavenworth County - 24	The Leavenworth County Rural Water District (RWD) No. 7 will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Water District will also seek Funding sources to mitigate damage to critical infrastructure and seek Funding for various water main improvement projects..	M	1,2	All Hazards	Not Started, Lack of Funding	Leavenworth County RWD 7	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> Continuous
Leavenworth County - 25	Obtain Funding for the purchase of mobile backup power generators for the groundwater well facilities of Leavenworth County Rural Water District (RWD) 7.	M	1,2	All hazards	Not Started, Lack of Funding	Leavenworth County RWD 7	<b>Cost:</b> \$150,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Leavenworth County - 26	The Leavenworth Water Department will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Department will also seek additional Funding sources to mitigate damage to critical infrastructure.	M	1,2	All Hazards	Not Started, Lack of Funding	Leavenworth Water Department, Leavenworth County	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> Continuous



**Table 6.41: Leavenworth County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Leavenworth County - 27	Coordinate county and local government mitigation efforts with Rural Electric Cooperatives (REC's), encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies.	M	1,2,4	Utility/ Infrastructure Failure	Not Started, Staffing Limitations	City, county Planners, RECs	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Leavenworth County - 28	<b>NFIP</b> - Contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the FEMA program, in addition to other flood protection measures.	H	3	Flood	Not Started, Staffing Limitations	County Planners, City Officials	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Leavenworth County - 29	<b>NFIP</b> - Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	H	3	Flood	In Progress	County Planners, City Officials	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
Leavenworth County - 30	Collect educational materials on individual and family preparedness / mitigation measures for property owners, and display at both the library and routinely visited government offices.	H	3	All Hazards	Not Started, Staffing Limitations	Chamber of Commerce, Emergency Management, City Officials	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Leavenworth County - 31	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other appropriate events.	H	3,4	All Hazards	Not Started, Staffing Limitations	City and County Planners, Emergency Management	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Leavenworth County - 32	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues that can severely impact the county and regional economies and develop and implement plans to address these issues.	H	1,2,3,4	Terrorism, Agriterrorism	Not Started, Staffing Limitations	County Health Department, County Emergency Management, county Extension, Local Producers	<b>Cost:</b> Staff Time <b>Funds:</b> Local/State <b>Completion Date:</b> Continuous
Leavenworth County - 33	<b>NFIP</b> - The County and local governments will work with the Kansas Dept. of Ag - Division of Water Resources to educate	H	3,4	Flood	Not Started, Staffing Limitations	Emergency Management, City Officials	<b>Cost:</b> Staff Time <b>Funds:</b> Local/State <b>Completion Date:</b> Continuous





**Table 6.41: Leavenworth County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
	and promote local jurisdictional participation in the NFIP CRS.						
Leavenworth County - 34	Establish, promote, and fund continuity of water systems between rural water districts to larger water departments to manage future growth in the county.	M	4	All Hazards	Not Started, Lack of Funding	Water Departments, Water Districts	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2025
Leavenworth County - 35	Fund the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	H	1,2	Tornado	Not Started, Lack of Funding	School Districts, City Officials, State of Kansas, FEMA	<b>Cost:</b> \$1,000,000+ each room <b>Funds:</b> FEMA, State, Local <b>Completion Date:</b> Continuous
Leavenworth County - 36	Prepare and adopt an Outdoor Warning Sirens Plan for the county, including consideration of the unique geographical locations, technical requirements, system types and operational procedures of each local jurisdiction.	M	1,2	All Hazards	Not Started, Lack of Funding	Leavenworth County Emergency Management, Emergency Services	<b>Cost:</b> \$200,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2025



### 6.8.36 – Basehor Mitigation Actions (Leavenworth County)

**Table 6.42: Basehor Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Basehor - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
Basehor - 2	<b>NFIP</b> - Identify flash-flood prone areas to consider flood reduction measures to city/county planners.	L	1,2	Flood	Not Started, Staffing Limitations	Floodplain Manager, City Planner, City Superintendent Public Works	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Basehor - 3	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.	M	1,2	Winter Storm, Wind Storms	Not Started, Staffing Limitations	City Superintendent, Codes Enforcement Officer	<b>Cost:</b> Staff Time <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Basehor - 4	Purchase fixed and mobile generators for all city facilities.	H	2	All Hazards	Not Started, Lack of Funding	City Superintendent,	<b>Cost:</b> Staff Time <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Basehor - 5	Design and construct a safe room within the City of Basehor City Hall / Police Department.	L	1,2	Tornado, Windstorm	Not Started, Lack of Funding	City Engineer, Planner	<b>Cost:</b> \$2,000,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Basehor - 6	Design and construct a safe room within the new City Hall / Police Department when constructed.	L	1,2	Tornado, Windstorm	Not Started, Lack of Funding	City Engineer, Planner	<b>Cost:</b> \$2,000,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Basehor - 7	Develop a radio communications plan between the City of Basehor Public Works Department / Street Department and City Hall to ensure interoperability between entities.	M	4	All Hazards	Not Started, Staffing Limitations	City Administrator, Chief of Police, City Superintendent	<b>Cost:</b> Staff Time <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> Continuous
Basehor - 8	Purchase a brine applicator and mixer to apply chemicals to roads within the City of	L	1,2	All Hazards	Not Started, Lack of Funding	City Superintendent	<b>Cost:</b> \$200,000 <b>Funds:</b> Local, State, Federal



**Table 6.42: Basehor Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date: 2022
	Basehor prior to major winter storm events, including ice storms.						
Basehor - 9	Purchase of equipment to assist in the removal of debris and assist with cleanups after major storms.	M	1,2	All Hazards	Not Started, Lack of Funding	City Superintendent	Cost: \$400,000 Funds: Local, State, Federal Completion Date: 2022



## 6.8.37 – Easton Mitigation Actions (Leavenworth County)

**Table 6.43: Easton Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Easton – 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
Easton – 2	<b>NFIP</b> - Identify flash-flood prone areas to consider flood reduction measures to city officials / county planners.	H	1,2	Flood	Not Started, Staffing Limitations	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Easton – 3	<b>NFIP</b> - Seek Funding to raise the casings around the potable water wells utilized by the City of Easton to protect them from flood water contamination.	M	1,2	Flood	Not Started, Lack of Funding	City of Easton Manager	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> Continuous
Easton – 4	Purchase and install a backup generator for the City of Easton Water Treatment Plant in the event of severe weather events.	H	1,2	All Hazards	Not Started, Lack of Funding	City of Easton Manager	<b>Cost:</b> \$150,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Easton – 5	<b>NFIP</b> - Purchase and install control valves for the City of Easton Water Treatment Plant and storage facility in the event of flooding events.	M	1,2	Flood	Not Started, Lack of Funding	City of Easton Manager	<b>Cost:</b> \$150,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Easton – 6	<b>NFIP</b> - Acquire and demolish flood prone properties within the city.	M	1,2	Flood	Not Started, Lack of Funding	City of Easton Manager	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Easton – 7	Design and construct community safe rooms within the city	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	City of Easton Manager	<b>Cost:</b> \$1,000,000 each <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Easton – 8	<b>NFIP</b> - Conduct an engineering study and complete the project to raise the State highway 300 yards east of First Street to the twin bridges over Stranger Creek.	M	1,2	Flood	Not Started, Lack of Funding	City of Easton Manager	<b>Cost:</b> \$50,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022



## 6.8.38 – Lansing Mitigation Actions (Leavenworth County)

**Table 6.44: Lansing Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Lansing - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Floodplain Manager	Cost: Staff Time Funding: Local Completion Date: Continuous
Lansing - 2	<b>NFIP</b> - Identify flash-flood prone areas to consider flood reduction measures to city planners.	H	1,2	Flood	Not Started, Staffing Limitations	Public Works Director	Cost: \$20,000 Funds: Local/Grant Completion Date: 3 years
Lansing - 3	Design and construct storm shelters for existing mobile home parks in the City of Lansing that currently do not have storm shelters or have inadequate storm shelters.	H	1,2	Tornado, Windstorms	Not Started, Lack of Funding	Community Development Superintendent	Cost: \$783,153 Funds: Local, State, Federal Completion Date: 6 years
Lansing - 4	<b>NFIP</b> - Develop and fund professional services to augment the City of Lansing's GIS capability.	M	1,2	Flood	Not Started, Lack of Funding	Public Works Director	Cost: \$40,000 Funds: Local, State, Federal Completion Date: 2 years
Lansing - 5	<b>NFIP</b> - Conduct engineering studies, and then design and construct levees to protect the Rock Creek West/Rock Creek West #5 neighborhood and the Fawn Valley Replat neighborhood from flooding events.	M	1,2	Flood	Not Started, Lack of Funding	Public Works Director	Cost: \$275,000 Funds: Local, State, Federal Completion Date: 6 months
Lansing - 6	<b>NFIP</b> - Conduct engineering studies, and then design and reconstruct an engineered storm water channel within the city limits of Lansing in the Holiday Hills neighborhood.	<b>H</b>	1,2	Flood	Not Started, Lack of Funding	Public Works Director	Cost: \$250,000 Funds: Local, Grant Completion Date: 3
Lansing - 7	<b>NFIP</b> - Research and fund engineering services for a city-wide storm water infrastructure-needs assessment.	H	1,2	Flood	Not Started, Lack of Funding	Public Works Director	Cost: \$150,000 Funds: Local, Grant Completion Date: 2022
Lansing - 8	<b>NFIP</b> - Design and complete construction of stream bank stabilization on Nine Mile	M	1,2	Flood	Not Started,	Public Works Director	Cost: \$200,000 Funds: Local, Grant



**Table 6.44: Lansing Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date: 2022</b>
	Creek and Seven Mile Creek within the city limits of Lansing.				Lack of Funding		
Lansing - 9	<b>NFIP</b> - Perform maintenance activities along Nine Mile Creek and Seven Mile Creek, including the contractor removal or deadfall and/or log jams.	M	1,2	Flood	Not Started, Lack of Funding	Public Works Director	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Lansing - 10	<b>NFIP</b> - Perform storm water quality monitoring in the City of Lansing. .	M	1,2	Flood	Not Started, Lack of Funding	Public Works Director	<b>Cost:</b> \$100,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022





### 6.8.39 – City of Leavenworth Mitigation Actions (Leavenworth County)

**Table 6.45: City of Leavenworth Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
City of Leavenworth – 1	<b>NFIP</b> - Identify flash-flood prone areas to consider flood reduction measures to city planners.	H	1,2	Flood	Not Started, Staffing Limitations	City Planner, Floodplain Manager, Public Works Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
City of Leavenworth - 2	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
City of Leavenworth - 3	<b>NFIP</b> - Acquire and demolish flood prone properties within the city.	M	1,2	Flood	Not Started, Lack of Funding	City of Leavenworth	<b>Cost:</b> Varies <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> Continuous
City of Leavenworth - 4	<b>NFIP</b> - Purchase a portable dam system to reduce exposure from flooding to the Leavenworth Community Center.	M	1,2	Flood	Not Started, Lack of Funding	City of Leavenworth	<b>Cost:</b> \$200,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
City of Leavenworth - 5	<b>NFIP</b> - Purchase a portable dam system to reduce exposure from flooding to the City of Leavenworth Wastewater Treatment Plant.	M	1,2	Flood	Not Started, Lack of Funding	City of Leavenworth	<b>Cost:</b> \$200,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
City of Leavenworth - 6	<b>NFIP</b> - Seek Funding to construct a new City of Leavenworth Animal Control Shelter Building to replace the existing structure which is susceptible to repeated flooding events.	L	1,2	Flood	Not Started, Lack of Funding	City of Leavenworth	<b>Cost:</b> \$2,000,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022



## 6.8.40 – Linwood Mitigation Actions (Leavenworth County)

**Table 6.46: Linwood Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Linwood - 1	<b>NFIP</b> - Identify flash-flood prone areas to consider flood reduction measures to city planners.	H	1,2	Flood	Not Started, Staffing Limitations	Planning Board Commissioner	Cost: Staff Time Funds: Local Completion Date: 2022
Linwood - 2	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	Floodplain Manager	Cost: Staff Time Funding: Local Completion Date: Continuous



## 6.8.41 – Tonganoxie Mitigation Actions (Leavenworth County)

**Table 6.47: Tonganoxie Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Tonganoxie - 1	Identify flash-flood prone areas to consider flood reduction measures to city planners. Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard.	H	1,2	Flood	Not Started, Lack of Funding	City Planning Committee, Floodplain Manager, City Engineer	<b>Cost:</b> \$100,000 <b>Funds:</b> Local <b>Completion Date:</b> 2022
Tonganoxie - 2	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	Not Started, Staffing Limitations	Floodplain Manager	<b>Cost:</b> Staff Time <b>Funding:</b> Local <b>Completion Date:</b> Continuous
Tonganoxie - 3	Develop and fund professional services to augment the City of Tonganoxie's GIS capability.	M	1,2	Flood	Not Started, Lack of Funding	City of Tonganoxie Planner, City Engineer	<b>Cost:</b> 65,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Tonganoxie - 4	Design and complete and construction of stream bank stabilization on Tonganoxie Creek within the city limits of Tonganoxie.	M	1,2	Flood	Not Started, Lack of Funding	City of Tonganoxie, City Engineer	<b>Cost:</b> \$25,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Tonganoxie - 5	Research and fund engineering services for a city-wide storm water infrastructure-needs assessment.	M	1,2	Flood	Not Started, Lack of Funding	City of Tonganoxie Engineer	<b>Cost:</b> \$25,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Tonganoxie - 6	Perform maintenance activities along Tonganoxie Creek within the city limits of Tonganoxie to include contractor removal or deadfall and/or log jams.	M	1,2	Flood	Not Started, Lack of Funding	City of Tonganoxie, City Engineer	<b>Cost:</b> \$15,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Tonganoxie - 7	Perform storm water quality monitoring in the City of Tonganoxie.	M	1,2	Flood	Not Started, Staffing Limitations	City of Tonganoxie Engineer	<b>Cost:</b> \$10,000+ <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022



**Table 6.47: Tonganoxie Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Tonganoxie - 8	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 during ice storms. Create a working group to assess the county's firefighting / EMS resources to identify any existing needs or shortfalls in terms of personnel, equipment or additional required resources. Complete all recommendations.	M	1,2	Ice Storm	Not Started, Lack of Funding	City of Tonganoxie and Local Utility Companies	<b>Cost:</b> \$10,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> Continuous
Tonganoxie - 9		M	4	All Hazards	Not Started, Lack of Funding	City of Tonganoxie Fire Chief, EMS	<b>Cost:</b> \$30,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
Tonganoxie - 10	Design and construct safe rooms within the City of Tonganoxie City Hall and Fire Station.	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	City of Tonganoxie Fire Chief/Work Group	<b>Cost:</b> \$5,000,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022



## 6.8.42 – University of St. Mary Mitigation Actions (Leavenworth County)

**Table 6.48: University of St. Mary Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
St. Mary - 1	Incorporate the inspection and management of trees into the University's routine maintenance process to remove trees that may increase the risk of power failure throughout the campus infrastructure.	M	1,2	Utility/ Infrastructure Failure	Not Started, Staffing Limitations	University of St. Mary	<b>Cost:</b> \$10,000 <b>Funds:</b> Local <b>Completion Date:</b> Continuous
St. Mary - 2	Appoint a committee to develop a radio communications plan between campus security units and outside agencies of Leavenworth County and the City of Leavenworth to ensure interoperability between all communities.	M	4	All Hazards	Not Started, Staffing Limitations	University of St. Mary, City of Leavenworth, Leavenworth County	<b>Cost:</b> Staff Time <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
St. Mary - 3	Appoint a committee to research and implement enhancement to the University's early warning systems for students and staff for weather alerts and campus emergencies.	M	1,2,4	All Hazards	Not Started, Staffing Limitations	University of St. Mary	<b>Cost:</b> Staff Time <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022



## 6.8.43 – USD #207 Mitigation Actions (Leavenworth County)

**Table 6.49: USD #207 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #207 - 1	The safe room for the new school will be located on the lower level; however, it will have an on-grade entrance/exit due to the terrain of the site. Three walls are below grade. The elevator will allow the 2nd and 3rd floor staff and students with disabilities (and wheelchair bound students) to access the safe room.	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	USD 207 Board of Education; CFO (business manager) will tract progress of project.	<b>Cost:</b> \$28,600,00 <b>Funds:</b> FEMA Grant and USD 207 <b>Completion Date:</b> 2022
USD #207 - 2	Design and construct a safe room for MacArthur Elementary School.	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	USD 207 Board of Education; CFO (business manager) will tract progress of project along with architectural firm (BCDM) and Titan Construction Company	<b>Cost:</b> \$1,200,00 <b>Funds:</b> Local <b>Completion Date:</b> 2022





6.8.44 – USD #449 Mitigation Actions (Leavenworth County)

Table 6.50: USD #449 Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #449 - 1	Design and construct safe rooms for all district school buildings.	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	School District, State, FEMA	Cost: \$1,000,000 each Funds: FEMA Completion Date: 2022



6.8.45 – USD #453 Mitigation Actions (Leavenworth County)

Table 6.51: USD #453 Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #453 - 1	Design and construct safe rooms for all district school buildings	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	School District, FEMA	Cost: \$1,000,000 each Funds: FEMA Completion Date: 2022



## 6.8.46 – USD #458 Mitigation Actions (Leavenworth County)

**Table 6.52: USD #458 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #458 - 1	Design and construct safe rooms for all district school buildings	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	School District, FEMA	Cost: \$1,000,000 each Funds: FEMA Completion Date: 2022
USD #458 - 2	Assess elevations and water flow in the district to qualify the benefit of flood control projects in the District. Complete recommended projects.	M	1,2	Flood	Not Started, Lack of Funding	School District	Cost: Project Dependent Funds: Local, State, Federal Completion Date: 2022



## 6.8.47 – USD# 464 Mitigation Actions (Leavenworth County)

**Table 6.53: USD #464 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #464 - 1	Design and construct safe rooms for all district school buildings	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	Superintendent of Schools	<b>Cost:</b> \$1,00,000 each <b>Funds:</b> Local <b>Completion Date:</b> Continuous
USD #464 - 2	Purchase and install backup power generators for the schools of USD 464.	M	1,2	All Hazards	Not Started, Lack of Funding	Superintendent of Schools	<b>Cost:</b> \$50,000 each <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022
USD #464 - 3	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.	M	1,2,3	Terrorism, Civil Disorder	Not Started, Lack of Funding	Superintendent of Schools	<b>Cost:</b> \$50,000 <b>Funds:</b> Local, State, Federal <b>Completion Date:</b> 2022



## 6.8.48 – USD #469 Mitigation Actions (Leavenworth County)

**Table 6.54: USD #469 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #469 - 1	Design and construct safe rooms for all district school buildings	M	1,2	Tornado, Windstorm	Not Started, Lack of Funding	School District, State, FEMA	Cost: \$1,000,000 Each Funds: Local Completion Date: Continuous
USD #469 - 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.	M	1,2,3	Terrorism, Civil Disorder	Not Started, Lack of Funding	Board of Education, School superintendent	Cost: \$50,000 Funds: Local, State, Federal Completion Date: 2022



## 6.8.49 – Leavenworth Rural Water District #7 Mitigation Actions (Leavenworth County)

**Table 6.55: Leavenworth Rural Water District #7 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
LVRWD7 - 1	Maintain, repair, and collect GPS locations of fire hydrants within the area served by Leavenworth RWD#7.	M	4	Wildfire	In Progress	Operations, Leavenworth RDW7	Cost: Staff Time Funds: District Funds Completion Date: 2022





## 6.8.50 – Wyandotte County Mitigation Actions

**Table 6.56: Wyandotte County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Wyandotte – 1	<b>NFIP</b> - Develop alternative ways to better monitor, in real-time, water levels of the Kansas & Missouri Rivers, Turkey Creek and other smaller streams / tributaries throughout the county for the purposes of advance planning, response & warning.	H	1,2, 4	Flood	In Progress 10% complete	Emergency Management Director	<b>Cost:</b> \$10,000 <b>Funds:</b> FEMA <b>Completion Date:</b> 2 – 5 years
Wyandotte – 2	Adopt building codes to require safe rooms in residential structures and public buildings, including schools.	H	1,2	Windstorm, Tornadoes	In Progress Residential is in code now. Schools and Public buildings is on-going	UG Planning Department working with UG Commissioners and Bonner Springs, KS and Edwardsville, KS Planning and Zoning	<b>Cost:</b> Staff Time <b>Funds:</b> Grants, local Funding, individual Funding. <b>Completion Date:</b> 3 – 10 years
Wyandotte – 3	Work with large venues to ascertain the best available locations to direct their visitors/fans to in case of the need for sheltering. Emphasize the need for each large venue (and those to be constructed) to provide adequate sheltering from storms (tornadoes, hail, lightning, etc.) as a minimum within their design or added as a retrofit.	H	1,2	All Hazards	In Progress Some venues have developed plans that identify shelter areas, others have not.	Emergency Management Director	<b>Cost:</b> Project Dependent, Staff Time <b>Funds:</b> Local, large venue funds, grant Funding <b>Completion Date:</b> 3 – 10 years
Wyandotte – 4	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	On Going	Flood Plain Manager (Planning Department), County Emergency Management	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Wyandotte – 5	<b>NFIP</b> - Purchase flood prone properties. Especially repetitive loss properties.	H	1,2	Flood	On Going	Wyandotte county Emergency Management Director	<b>Cost:</b> Project Dependent <b>Funds:</b> Federal HMGP, Local, Combination of both <b>Completion Date:</b> Continuous
Wyandotte – 6	Provide back-up generators for critical facilities within the county. The County	H	1,2	All Hazards	In Progress	Emergency Management Director	<b>Cost:</b> \$3,000,000 <b>Funds:</b> Grant, Local



**Table 6.56: Wyandotte County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
	has 57 facilities that require backup power to function should line power be lost.				Some facilities have installed generators (Fleet, Dispatch) and others are waiting for Funding		<b>Completion Date:</b> Continuous
Wyandotte – 7	Develop low water plans for utilities, businesses and organizations dependent on the water supply from the rivers.	H	1,2,4	Drought	Not Started,, Lack of Funding	Emergency Management Department director	<b>Cost:</b> \$100,000 annually <b>Funds:</b> Local <b>Completion Date:</b>
Wyandotte – 8	<b>NFIP</b> - Protect or relocate flood prone critical facilities.	H	1,2	Flood	On Going	Emergency Management Department Director	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, Grant <b>Completion Date:</b> One to several years – depending on the prevention method(s) chosen to be used, and/or the need to relocate the critical facility.
Wyandotte – 9	<b>NFIP</b> - Build bridges and/or raise roads in low-lying areas.	H	1,2	Flood	On Going	UG Public Works Street Department Director	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, CMIP, Excise Taxes, Grants <b>Completion Date:</b> Continuous
Wyandotte – 10	Expand and improve outdoor warning system network in Wyandotte County.	H	1,2	Windstorm, Tornadoes	In Progress Typically one new siren is installed each year	Emergency Management Director	<b>Cost:</b> \$25,000 to \$50,000 per siren, plus on-going annual required maintenance. <b>Funds:</b> Grants, HMIP, revenue-sharing, other local funds. <b>Completion Date:</b> Continuous



**Table 6.56: Wyandotte County Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Wyandotte – 11	Continue Participation in the StormReady Community Certification Program thru the National Weather Service.	H	3,4	All Hazards	On Going	Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Wyandotte – 12	Provide public education sessions on extreme temperature (heat / cold) conditions.	H	1,2,3,4	Extreme Temperatures	In Progress With emphasis on social media and web based information	Emergency Management & Public Health Departments Directors	<b>Cost:</b> Program size dependent <b>Funds:</b> Grants, local, combination <b>Completion Date:</b> Continuous
Wyandotte – 13	Promote NOAA all-hazards weather radios and support the KC Metro Region's "Project Community Alert" all-hazards weather radio program.	H	1,2,3,4	All Hazards	In Progress The PCA is in hiatus due to Lack of Funding	Emergency Management Department Director	<b>Cost:</b> Program size dependent <b>Funds:</b> Grants, local, combination <b>Completion Date:</b> Continuous
Wyandotte – 14	Provide public education sessions on how to protect from, prepare for, respond to, and recover from tornados and severe weather.	H	1,2,3	Tornados	In progress Public presentations are provided ad hoc	Emergency Management Department Director	<b>Cost:</b> Program size dependent <b>Funds:</b> Grants, local, combination <b>Completion Date:</b> Continuous
Wyandotte – 15	Provide public education sessions on winter weather driving.	H	1,2,3	Winter Storms	In progress Public presentations are provided ad hoc	Emergency Management Department Director	<b>Cost:</b> Program size dependent <b>Funds:</b> Grants, local, combination <b>Completion Date:</b> Continuous
Wyandotte – 16	Provide public education sessions on the dangers of lightning.	H	1,2,3	Lightning	In progress Public presentations are provided ad hoc	Emergency Management Department Director	<b>Cost:</b> Program size dependent <b>Funds:</b> Grants, local, combination <b>Completion Date:</b> Continuous
Wyandotte – 17	Provide public education sessions to encourage ALL citizens to have a disaster	H	1,2,3	All Hazards	In progress	Emergency Management Department Director	<b>Cost:</b> Program size dependent



**Table 6.56: Wyandotte County Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
	kit which contains food, water, flashlight, batteries, battery operated radio, medications, etc.				Public presentations are provided ad hoc		<b>Funds:</b> Grants, local, combination <b>Completion Date:</b> Continuous
Wyandotte – 18	Continue review / revision of the Wyandotte County Emergency Operations Plan (EOP).	H	4	All Hazards	In Progress Monthly meetings are held to review each CEOP Annex	Emergency Management Department Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Wyandotte – 19	Develop and maintain a Continuity of Operations Plan (COOP) for the Unified Government.	H	1,2,3,4	All Hazards	Not Started, Lack of Funding	Wyandotte County emergency management Director	<b>Cost:</b> Staff Time <b>Funds:</b> Grant DHS, Federal & State Grants, Local, combination <b>Completion Date:</b> 1 to 1 ½ years after start.
Wyandotte – 20	Develop and maintain a Multi-Hazards Evacuation Plan.	H	1,2,3,4	All Hazards	In Progress Several key facilities have had plans developed	Wyandotte County Emergency Management Director	<b>Cost:</b> \$400,00 <b>Funds:</b> DHS Grant, Federal and State Grants, Local, combination <b>Completion Date:</b> 1 to 1 1/2 years after start.
Wyandotte – 21	<b>NFIP</b> - Conduct removal of debris from floodways to mitigate floodwater back-up.	H	1,2	Flood	On Going	Public Works Department Director	<b>Cost:</b> Project Dependent <b>Funds:</b> Local, Grant <b>Completion Date:</b> Continuous
Wyandotte – 22	Coordinate with NASCAR to develop a formal emergency response plan for the Kansas Speedway...	H	1,2	All Hazards	Not Started, Lack of Funding	Emergency Management Director	<b>Cost:</b> \$30,000 <b>Funds:</b> NASCAR <b>Completion Date:</b> 3 months
Wyandotte – 23	<b>NFIP</b> - Continue Participation in the Community Emergency Response Team (CERT) program by recruiting, training, equipping and fielding CERT Teams.	H	1,2,3	Flood	On Going	Emergency Management Director	<b>Cost:</b> \$4,000 per class of 25 <b>Funds:</b> Grant, Local, Individual, combination <b>Completion Date:</b> Continuous



**Table 6.56: Wyandotte County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Wyandotte – 24	Construct a boat ramp to the Kansas River near the I-435 Bridge for joint use by KDOT, local law enforcement and fire departments, and other potential first responders.	H	1,2	All Hazards	Not Started, Lack of Funding	UG Public Works Department Director	<b>Cost:</b> \$100,000 <b>Funds:</b> HMGP, DHS Grant, CMIP, local <b>Completion Date:</b> 2 – 5 years
Wyandotte – 25	Construct a boat ramp to the Kansas River beneath the Turner Diagonal Bridge and 7 <sup>th</sup> St. for joint use by KDOT, local law enforcement and fire departments, and other potential first responders.	H	1,2	All Hazards	In Progress 50% complete 7 <sup>th</sup> Street ramp is done	UG Public Works Director	<b>Cost:</b> \$60,000 <b>Funds:</b> HMGP, DHS Grant, CMIP, local <b>Completion Date:</b> 2 – 5 years
Wyandotte – 26	Establish priority reconnects with local utility companies after outages created by severe storms or other type incidents.	H	1,2	Utility/ Infrastructure Failure	In Progress all three of the power providers have priority reconnect lists but the data must be maintained	County Emergency Management Director/all utilities in Wyandotte County	<b>Cost:</b> Staff Time <b>Funding:</b> Local, State <b>Completion Date:</b> 6 month – 2 years
Wyandotte – 27	Establish periodic reviews / updates of Wyandotte County Multi-Jurisdictional All-Hazards Mitigation Plan, conducting a major review every five years.	H	1,2	All Hazards	On Going	Wyandotte County Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> On-going
Wyandotte – 28	Adopt / implement / enforce building code standards for the installation of lightning protection systems.	H	1,2	Lightning	In Progress UG has done this. BS and Edwardsville in progress	UG, Bonner Springs, Edwardsville Planning Departments, Director of Neighborhood Resource Center	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2 – 5 years
Wyandotte – 29	Create a public notification system to alert the public about an epidemic and how to prevent or treat the disease.	H	1,2,4	Major Disease Outbreak	Complete Current plans call for the use of mass media to share this information	Wyandotte County Emergency Management Director, Wyandotte county Public Health Department Director	<b>Cost:</b> \$500,000 <b>Funds:</b> Federal, State Grant Funding through DHS/MMRS Local, combination <b>Completion Date:</b> 6 months – 1 ½ years



**Table 6.56: Wyandotte County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Wyandotte – 30	Offer / provide Damage Assessment Team training annually for designated damage assessment personnel.	H	4	All Hazards	In Progress Local codes officials are trained on this and refreshed with JIT training pre-deployment	Wyandotte County Emergency management Director	<b>Cost:</b> Staff Time <b>Funds:</b> KDEM, IAW FEMA guidelines <b>Completion Date:</b> Continuous
Wyandotte – 31	Identify large venues, ball fields, parks and other areas countywide for installation of lightning detectors and develop a program for their installation.	H	1,2	Lightning	In Progress Lightning detection systems have been installed at the Adult and Youth Soccer Training facilities.	Wyandotte County emergency Management Director	<b>Cost:</b> \$5,000,000 <b>Funds:</b> HMGP, DHS Grant, Local, Combination <b>Completion Date:</b> 1 – 3 years
Wyandotte – 32	Partner with local school districts to ensure they have coordinated, well-prepared plans for school evacuations and sheltering-in-place.	H	1,2,3,4	All Hazards	Not Started, Lack of Funding	Wyandotte County Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous, on-going. Wyandotte County has gotten with the districts, however, as plan are revised the cycle begins over.
Wyandotte – 33	Support the continuation of Tabletop, Functional and Full-Scale Exercises and other training events for responders and support personnel.	H	1,2,4	All Hazards	In Progress Routinely Wy Co EMA participates in 5 to 7 exercises per year with at least 2 being	Wyandotte County Emergency management Director	<b>Cost:</b> Staff Time <b>Funds:</b> SHSG, UASI, County, EMPG, HMEP <b>Completion Date:</b> Continuous





**Table 6.56: Wyandotte County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
					functional or full scale		
Wyandotte – 34	Create a method for parents to reach their children during disaster emergencies.	H	4	All Hazards	Not Started, Lack of Funding	Wyandotte County Emergency Management Director	<b>Cost:</b> \$250,000 annually <b>Funds:</b> NA <b>Completion Date:</b> Continuous
Wyandotte – 35	Involve the Local Emergency Planning Committee (LEPC) in all hazard identification and response / recovery / mitigation planning.	H	4	All Hazards	In Progress Wy Co is a member of the Mid America Regional LEPC and participates in the planning process there.	Wyandotte County Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Wyandotte – 36	Provide public education sessions on aggressive smoke detector installation.	H	3	Wildfire	In Progress In partnership with Red Cross provide and install smoke detectors	Kansas City, Kansas fire Department, Bonner Springs, Edwardsville, and Fire Inspector	<b>Cost:</b> Provided by ARC <b>Funds:</b> Unknown <b>Completion Date:</b> Continuous
Wyandotte – 37	<b>NFIP</b> - Upgrade / expand / improve storm water Management Systems.	H	1,2	Flood	In Progress	UG Water Pollution Control, Public Works Departments of Bonner springs, Edwardsville, and Lake Quivira	<b>Cost:</b> \$50,000,000 to \$10,000,000 <b>Funding:</b> Grant, Local, combination <b>Completion Date:</b> Continuous
Wyandotte –38	Develop / improve early warning system and work with Media Partners / Outlets to ensure that the same, clear, consistent message is being sent out by everyone	H	3,4	All Hazards	In Progress Wy Co PIO group has been established to address this issue	Wyandotte county Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous



**Table 6.56: Wyandotte County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Wyandotte – 39	Create and deliver seminars / training on planning for special event venues to include all hazard events, emergency response plans and continuity of business plans.	H	1,2,4	All Hazards	In Progress Training is scheduled for Feb 2019 to address this	Wyandotte County emergency Management Director	<b>Cost:</b> \$20,000 <b>Funds:</b> Grants, Donations, Local <b>Completion Date:</b> TBD
Wyandotte – 40	Invite critical organizations to be part of the KC TEW for advance notification of terrorist activity in the area.	H	1,2,3,4	Terrorism/Agri-Terrorism	In Progress	Wyandotte County Sheriff's Chief & KCK Police Department	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Wyandotte – 41	Develop / maintain an Early Warning System to notify the Public on potential Haz-Mat dangers integrating it with existing early warning capabilities.	H	1,2,4	Hazardous Materials	Not Started, Lack of Funding	Wyandotte County emergency Management Director	<b>Cost:</b> \$150,000 annually <b>Funds:</b> DHS Grant, Local, Combination <b>Completion Date:</b> 1 – 3 years
Wyandotte – 42	Develop / maintain an Early Warning System to notify Hospitals and other critical facilities of impending hazard threats integrating it with existing early warning capabilities.	H	1,2,4	All Hazards	Not Started, Lack of Funding	Wyandotte County Emergency Management Director	<b>Cost:</b> \$150,000 annually <b>Funds:</b> DHS Grant, Local, combination <b>Completion Date:</b> 1 – 3 years
Wyandotte – 43	Implement usage of electronic signs on highways to notify motorists of weather warnings and other hazards.	H	1,2, 4	All Hazards	In Progress We would use the SCOUT sign system to do this	Wyandotte County Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> KDOT / MoDOT <b>Completion Date:</b> 6 month – 1 ½ years
Wyandotte – 44	<b>NFIP</b> - Update all Flood Insurance Maps.	H	1,2	Flood	Not Started, Lack of Funding	UG Planning Department Director	<b>Cost:</b> \$250,000 <b>Funds:</b> Local and grants <b>Completion Date:</b> 6 months – 1 ½ years
Wyandotte – 45	<b>NFIP</b> - Notify all homeowners and businesses in flood prone areas of their possible risk.	H	1,2	Flood	In Progress	UG Planning and Zoning Department; Bonner springs and Edwardsville Planning Departments	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 1 – 2 years
Wyandotte – 46	Require fixed HazMat facilities to have their emergency response procedures coordinated with the city and county first responder plans.	H	1,4	Utility/ Infrastructure Failure	In Progress This is done when Fire	Wyandotte County Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 1+ years



**Table 6.56: Wyandotte County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
					Depts meet with facilities		
Wyandotte – 47	Identify and develop a list of those areas susceptible to explosive fires, such as grain elevators, etc., and map them.	M	1,2	Wildfire	On going Mapped in our GIS department	Wyandotte County emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> DHS Grant, Local, combination <b>Completion Date:</b> 1 – 3 years then continuous.
Wyandotte – 48	Develop a Memorandum of Understanding (MOU) with/between area building departments for post-disaster damage assessment.	M	4	All Hazards	Not Started, Lack of Funding	Wyandotte County Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> DHS Grant, Local, combination <b>Completion Date:</b> 6 month – 1 years then continuous
Wyandotte – 49	Map all geological hazards countywide and make this information available. Identify and map specific void space areas prone to collapse failure and limit future development in these areas.	M	1,2	All Hazards	Not Started, Lack of Funding	Map all geological hazards countywide and make this information available. Identify and map specific underground void space areas prone to collapse failure and limit future development in these areas.	<b>Cost:</b> \$50,000 annually <b>Funds:</b> DHS Grant, Local, Combination <b>Completion Date:</b> Continuous
Wyandotte – 50	Provide preparedness planning training and information for small business owners.	M	3	All Hazards	Not Started, Lack of Funding	Provide preparedness planning training and information for small business owners.	<b>Cost:</b> \$5,000 <b>Funds:</b> Grants, Corporate Sponsors <b>Completion Date:</b> TBD
Wyandotte – 51	Develop and enforce building restrictions in dam inundation areas.	M	1,2	Dam and Levees	Not Started, Consider moving to Urban Planning and Land Use	Wyandotte County Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> None <b>Completion Date:</b> 1 – 5 years
Wyandotte – 52	<b>NFIP</b> - Install and maintain fog warning flashing lights and flash flood warnings (lights and signs) in low-lying and flood prone areas.	M	1,2	Flood	In Progress Lights and gates installed on Mill St at	Wyandotte County Emergency Management Director	<b>Cost:</b> \$100,000 per crossing <b>Funds:</b> Grant, Local, Combination <b>Completion Date:</b>



**Table 6.56: Wyandotte County Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
					Turkey Creek crossing		
Wyandotte – 53	Identify potential landslide areas and install reinforcement barriers to nullify potential disasters and protect infrastructure.	M	1,2	Landslides	Not Started, Lack of Funding	Wyandotte County Emergency Management Director, Public Works Departments of the UG, Bonner springs and Edwardsville	<b>Cost:</b> \$90,000 annually <b>Funds:</b> State, Federal, Local, Combination <b>Completion Date:</b> :2020
Wyandotte – 54	<b>NFIP</b> - Provide an early warning system on streams with the most potential for flood damage to structures.	M	1,2	Flood	In Progress Stream gauge installed at Mill St & Turkey Creek crossing	Wyandotte County Emergency Management Director	<b>Cost:</b> \$50,000 each <b>Funds:</b> HMGP, DHS Grants, Local <b>Completion Date:</b> 3 – 5 years
Wyandotte – 55	Identify critical businesses and public service agencies and work to ensure their Continuity of Operations during / following a disaster.	M	4	All Hazards	Not Started, Lack of Funding	Wyandotte County Emergency Management Director	<b>Cost:</b> \$100,000 annually <b>Funds:</b> HMGP, DHS Grants, Local, Individual business/agency Funding or donations, combination <b>Completion Date:</b> 2 – 5 years
Wyandotte – 56	Create / develop and maintain a plan for pet and livestock rescue, care and sheltering during / following disasters.	M	2	All Hazards	Not Started, Lack of Funding	Wyandotte County Emergency Management Director	<b>Cost:</b> Staff Time <b>Funds:</b> DHS Grants, Local, State, Federal <b>Completion Date:</b> 2 – 5 years
Wyandotte – 57	Develop / review / update EAPs for High & Significant hazard dams in Wyandotte County.	M	1,2	Dams and Levees	In Progress Plans are reviewed as received	Owner of Dam – UG Urban Planning and KS Dept of AG	<b>Cost:</b> Staff Time <b>Funds:</b> Individual owner <b>Completion Date:</b> 6 months after start of plan
Wyandotte - 58	Develop a vaccination strategy and a hospital mass prophylaxis plan.	H	1,2	Major Disease Outbreak	Not Started, Lack of Funding	County, Manager Infection Control Director, Health Department, Administrator	<b>Cost:</b> TBD <b>Funds:</b> MMRS, and the SNS <b>Completion Date:</b> Continuous



## 6.8.51 –Bonner Springs Mitigation Actions (Wyandotte County)

**Table 6.57: Bonner Springs Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Bonner Springs - 1	Conduct a study and complete the recommended detention actions along Mission Creek north of Kaw Dr. (K-32) near Shawnee Rock.	H	1,2	Flood	Not Started, Lack of Funding	City of Bonner Springs, City Planner/Floodplain Administrator, Public Works Director	<b>Cost:</b> \$500,000 <b>Funds:</b> FEMA, Local, combination <b>Completion Date:</b> 1 – 3 years
Bonner Springs - 2	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2,4	Flood	In Progress	Bonner springs Planning Department, City Planning Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> Continuous
Bonner Springs - 4	Purchase and mount a camera at Fire Department for storm monitoring.	H	1,2	Hailstorm, Lightning, Tornado, Windstorm, Winter Storm	Not Started, Lack of Funding	Bonner springs Fire Department, Fire Chief, and WYCO Emergency Management Director	<b>Cost:</b> \$10,000 <b>Funds:</b> Local, State <b>Completion Date:</b> 1 year
Bonner Springs - 5	Complete Continuity of Operations plans for the City of Bonner Springs Government utilizing a contractor.	H	1,4	All Hazards	Not Started, Lack of Funding	City of Bonner springs City Manager	<b>Cost:</b> \$15,000 <b>Funds:</b> State, Local <b>Completion Date:</b> 2020
Bonner Springs - 6	Develop family preparedness handbook in multiple languages and promote family preparedness planning with brochures, website and community outreach. Evaluate program outcomes with surveys and website	H	1,2,3	All Hazards	Not Started, Lack of Funding	City of Bonner Springs, City Manager	<b>Cost:</b> \$50,000 <b>Funds:</b> DHS Grant, UASI Homeland Security Funds <b>Completion Date:</b> 2021
Bonner Springs - 7	<b>NFIP</b> - Provide public education sessions on the Turn Around Don't Drown program.	H	1,2,3	Flood	Not Started, Lack of Funding	City of Bonner Springs Fire Department Fire Chief	<b>Cost:</b> \$2,000 <b>Funds:</b> Corporate Sponsors <b>Completion Date:</b> 2020
Bonner Springs - 8	<b>NFIP</b> - Conduct Spring Creek storm drainage improvements to address flooding that occurs as a result of inadequate drainage. Replace and construct additional culverts to reduce flooding.	M	1,2	Flood	Not Started, Lack of Funding	City of Bonner Springs Public Works Director	<b>Cost:</b> \$1,900,000 (Project Dependent) <b>Funds:</b> Local, State, Grant <b>Completion Date:</b> 2022



**Table 6.57: Bonner Springs Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Bonner Springs - 9	<b>NFIP</b> - Conduct Spring Creek storm drainage / Springdale Avenue to Morse Avenue stream bank improvements.	M	1,2	Flood	Not Started, Lack of Funding	City of Bonner Springs Public Works Director	<b>Cost:</b> \$782,700 (Project Dependent) <b>Funds:</b> FEMA HMGP, other Grants <b>Completion Date:</b> 2022
Bonner Springs - 10	Develop procedures to activate the Emergency Alert System (EAS) and National Weather Service (NWS) All Hazard Radios for chemical events, exercise the program, and Review After Action and make any necessary changes	M	1,2,4	Hazardous Materials	Not Started, Lack of Funding	City of Bonner Springs Police Chief and Fire Chief	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2022
Bonner Springs - 11	<b>NFIP</b> - Institute a streambank setback ordinance controlling development along streambanks.	M	1,2,4	Flood	Not Started, Lack of Funding	City of Bonner Springs City Planning Director	<b>Cost:</b> Staff Time <b>Funds:</b> Local <b>Completion Date:</b> 2021
Bonner Springs - 12	<b>NFIP</b> - Provide hydrologic and hydraulic analysis and storm drainage improvement design along Wolf Creek watershed.	L	2	Flood	Not Started, Lack of Funding	City of Bonner Springs City Planning Director	<b>Cost:</b> \$100,000 <b>Funds:</b> FEMA HMGP, County <b>Completion Date:</b> 2021
Bonner Springs - 13	<b>NFIP</b> - Conduct improvements needed to address the undersized drainage features in the Clark Area Drainage Watershed.	L	2	Flood	Not Started, Lack of Funding	City of Bonner Springs Public Works Director	<b>Cost:</b> \$1,1753,000 (Project Dependent) <b>Funds:</b> FEMA HMGP, other Grants <b>Completion Date:</b> 2022
Bonner Springs - 14	Design and deliver a Shelter-in-Place program to educate individuals on how to receive notification regarding a chemical incident and necessary actions to take.	L	3	Hazardous Materials	Not Started, Lack of Funding	City of Bonner Springs Police Chief and Fire Chief	<b>Cost:</b> \$7,500 <b>Funds:</b> Local <b>Completion Date:</b> 2020





## 6.8.52 –Edwardsville Mitigation Actions (Wyandotte County)

**Table 6.58: Edwardsville Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Edwardsville - 1	Continued operation and management of jurisdictional <b>NFIP</b> activities.	H	1,2	Flood	In Progress	City of Edwardsville, City Administrator	<b>Cost:</b> Staff Time <b>Funds:</b> Staff Time <b>Completion Date:</b> Continuous
Edwardsville - 2	Purchase and install generator at Community Center.	H	1,2	Extreme Temperatures, Earthquake, Flood, Utility Failure, Windstorm, Winter Storm	Not Started, Lack of Funding	City of Edwardsville, City Administrator	<b>Cost:</b> \$13,500 <b>Funds:</b> FEMA HMGP, Local, In-Kind <b>Completion Date:</b> 1 year
Edwardsville - 3	Development of the North Fire Station into a remote facility that will support continuation of City Services. Renovation of the facility, purchase and installation of necessary equipment to make the North Fire Station operable for all services of the city.	M	4	All Hazards	Not Started, Lack of Funding	City of Edwardsville, Fire Department Chief	<b>Cost:</b> Project Size Dependent <b>Funds:</b> DHS Grants, Assistance to Firefighters Grant <b>Completion Date:</b> 3 years
Edwardsville - 4	<b>NFIP</b> - Acquire and demolish properties in flood prone areas	H	1,2	Flood	New	City of Edwardsville, City Administrator	<b>Cost:</b> Varied <b>Funds:</b> FEMA HMGP, Local <b>Completion Date:</b> 2022



### 6.8.53 - USD #202 Mitigation Actions (Wyandotte County)

**Table 6.59: USD#202 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #202 - 1	Purchase and install camera system (or system updates) in all school district buildings.	H	1,2,4	Terrorism, Civil Disorder	Not Started, Lack of Funding	USD204, IT Department, Administration, Local Police Departments	<b>Cost:</b> \$70,000 <b>Funds:</b> <b>Completion Date:</b> 4 months after Funding is secured
USD #202 - 2	Design and construct safe rooms in all school district buildings.	H	1,2	Windstorm, Tornado	Not Started, Lack of Funding	USD 204 Superintendent	<b>Cost:</b> <b>Funds:</b> HMGP, In-kind <b>Completion Date:</b> Within 1 year of project approval
USD #202 - 3	Radios that will provide communications between School District staff and local Law Enforcement to establish a common operating picture and situational awareness and to meet the new Safe and Secure standards #3	H	2,4	Windstorm, Tornado	Not Started, Lack of Funding	USD 202 Superintendent	<b>Cost:</b> \$50,000 to \$100,000 <b>Funds:</b> HMGP, In-kind <b>Completion Date:</b> Within 1 year of project approval
USD #202 - 4	Design and construct an Outdoor Venue Storm Shelter	H	1	Windstorm, Tornado	Not Started, Lack of Funding	USD 202 Superintendent	<b>Cost:</b> \$50,000 to \$500,000 <b>Funds:</b> HMGP, In-kind <b>Completion Date:</b> Within 1 year of project approval
USD #202 - 5	Lightning Detection which will provide advance warning of potentially life threatening storms.	H	1,4	Windstorm, Tornado	Not Started, Lack of Funding	USD 202 Superintendent	<b>Cost:</b> \$50,000 to \$100,000 <b>Funds:</b> HMGP, In-kind <b>Completion Date:</b> Within 1 year of project approval



6.8.54 - USD #203 Mitigation Actions (Wyandotte County)

Table 6.60: USD#203 Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #203 - 1	Purchase and install camera system (or system updates) in all school district buildings.	H	1,2,4	Terrorism, Civil Disorder	Not Started, Lack of Funding	USD 203 Superintendent	Cost: \$70,000 <b>Funds:</b> <b>Completion Date:</b> 4 months after Funding is secured



### 6.8.55 - USD #204 Mitigation Actions (Wyandotte County)

**Table 6.61: USD#204 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #204 - 1	Purchase and install camera system (or system updates) in all school district buildings.	H	1,2,4	Terrorism, Civil Disorder	Not Started, Lack of Funding	USD204, IT Department, Administration, Local Police Departments	<b>Cost:</b> \$70,000 <b>Funds:</b> <b>Completion Date:</b> 4 months after Funding is secured
USD #204 - 2	Design and construct safe rooms in all school district buildings.	H	1,2	Windstorm, Tornado	Not Started, Lack of Funding	USD 204 Superintendent	<b>Cost:</b> HMGP, In-kind <b>Completion Date:</b> Within 1 year of project approval



## 6.8.56 - USD #500 Mitigation Actions (Wyandotte County)

**Table 6.62: USD#500 Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
USD #500 - 1	Design and construct safe rooms in all school district buildings.	H	1,2	Windstorm, Tornado	Not Started, Lack of Funding	USD 500 Superintendent	<b>Cost:</b> HMGP, In-kind <b>Completion Date:</b> Within 1 year of project approval
USD #500 - 2	Radios provide communications between School District staff, Transportation, and our Police Department to establish interoperability and situational awareness and to meet the new Safe and Secure standards #3	H	2,4	Windstorm, Tornado	Not Started, Lack of Funding	USD 500 Superintendent	<b>Cost:</b> \$250,000 to \$1,000,000 <b>Funds:</b> HMGP, In-kind <b>Completion Date:</b> Within 1 year of project approval
USD #500 - 3	Purchase backup generators for food production center, central office building(s), high schools, and middle schools for shelter and for all future school buildings.	H	1,2,4	All Hazards	Not Started, Lack of Funding	USD 500 Superintendent	<b>Cost:</b> \$750,000 <b>Funds:</b> HMGP, In-kind <b>Completion Date:</b> 12 months after funding is secured
USD #500 - 4	Lightning Detection which will provide advance warning of potentially life threatening storms.	H	1,4	Windstorm, Tornado	Not Started, Lack of Funding	USD 500 Superintendent	<b>Cost:</b> \$50,000 to \$100,000 <b>Funds:</b> HMGP, In-kind <b>Completion Date:</b> Within 1 year of project approval



## 6.8.57 – Kansas State School for the Blind Mitigation Actions (Wyandotte County)

**Table 6.63: Kansas State School for the Blind Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
KSSB - 1	Purchase back-up generators for all school buildings	H	1,2	Utility Failure, Windstorm, Winter Storm	In Progress Waiting for Funding	Unified Government, KSSB Superintendent	<b>Cost:</b> \$230,000 total <b>Funds:</b> FEMA HMGP <b>Completion Date:</b> 8 – 10 months
KSSB - 2	Provide vaccination services at on-site clinic using the qualified medical staff.	H	1,2	Major Disease Outbreak	In Progress	Unified Government, KSSB Superintendent	<b>Cost:</b> Staff Time <b>Funds:</b> FEMA Grant <b>Completion Date:</b> On-going
KSSB - 3	Create an all hazard staff and student evacuation plan and education students and staff on plan. Update plan on a yearly basis,	H	1,3,4	All Hazards	In Progress Requires renewal annually	Crisis Management Team and Emergency Management Department	<b>Cost:</b> \$185 for 20-40 handbooks <b>Funds:</b> In structural Operational Funding <b>Completion Date:</b> 2020





## 6.8.58 – Kansas City, Kansas Community College Mitigation Actions (Wyandotte County)

**Table 6.64: Kansas City, Kansas Community College Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
KCKCC - 1	Design and construct groundwater control runoff projects for KCKCC Campus.	M	1,2	Flood	Not Started, Lack of Funding	KCKCC Buildings and Grounds Department	<b>Cost:</b> \$100,000 <b>Funds:</b> College Funds <b>Completion Date:</b> 8 months.
KCKCC - 2	Develop Emergency Action Plans for the dam on the Kansas City Kansas Community College's campus.	M	1,2	Dam and Levees	Not Started, Lack of Funding	KCK Community college	<b>Cost:</b> \$50,000 <b>Funds:</b> Grants, Local, combination <b>Completion Date:</b> 1 – 1 ½ years



6.8.59 – University of Kansas Hospital Mitigation Actions (Wyandotte County)

Table 6.65: University of Kansas Hospital Mitigation Actions

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
KU Hospital - 1	Construct Saferoom as part of new office complex construction and for any new facilities.	H	1,2	Windstorm, Tornado	Not Started, Lack of Funding	University of Kansas Hospital	Cost: \$120 sq. ft @ 5 ft per person Funds: FEMA Completion Date:



## 6.8.60 – University of Kansas Medical Center Mitigation Actions (Wyandotte County)

**Table 6.66: University of Kansas Medical Center Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
UK Medical Center - 1	Acquire audio and visual emergency equipment for exterior and interior grounds on campus.	H	1,2,4	All Hazards	Not Started, Lack of Funding	University Emergency Management Coordinator	<b>Cost:</b> \$50,000+ <b>Funds:</b> Grants and Internal Funding <b>Completion Date:</b> Approximately 2 years.
UK Medical Center - 2	Conduct regular emergency preparedness drills for higher education students, staff, and faculty, including fire drills and tornado drills.	H	1,3,4	All Hazards	Not Started, Lack of Funding	University Emergency Management Coordinator	<b>Cost:</b> \$2,500 <b>Funds:</b> Internally funded <b>Completion Date:</b> less than one year
UK Medical Center - 3	Design and construct saferooms at school and public buildings.	H	1,2	Tornado, Windstorm	Not Started, Lack of Funding	University Emergency Management Coordinator	<b>Cost:</b> \$100,000+ <b>Funds:</b> Grants and Internal Funding <b>Completion Date:</b> 5 years



## 6.8.61 – Wyandotte County Board of Public Utilities Mitigation Actions (Wyandotte County)

**Table 6.67: Wyandotte County Board of Public Utilities Mitigation Actions**

<b>Action Identification</b>	<b>Description</b>	<b>Overall Priority</b>	<b>Goal(s) Addressed</b>	<b>Hazard Addressed</b>	<b>Status</b>	<b>Responsible Entity</b>	<b>Estimated cost, Funding Source, and Completion Date</b>
Board of Public Utilities - 1	Install additional lightning arrestors on power infrastructure.	H	1,2	Lightning, Utility/ Infrastructure Failure	In Progress Limited by Lack of Funding	Board of Public Utilities and other utility companies	<b>Cost:</b> <b>Funds:</b> Grant, Local, Combination <b>Completion Date:</b> 1 – 5 years
Board of Public Utilities - 2	Provide public education sessions on energy consumption during extreme heat events; cooling center locations and free fan programs.	H	3	Extreme Temperatures, Utility/ Infrastructure Failure	In Progress Limited by Lack of Funding	Wyandotte County emergency Management Director	<b>Cost:</b> NA <b>Funds:</b> None <b>Completion Date:</b> Continuous
Board of Public Utilities - 3	Provide public education sessions on home improvement programs to conserve water and electricity usage to lower consumption during peak demand periods.	H	3	Utility/ Infrastructure Failure	In Progress Limited by Lack of Funding	Wyandotte County Emergency Management Director	<b>Cost:</b> NA <b>Funds:</b> NA <b>Completion Date:</b> Continuous
Board of Public Utilities - 4	Create Redundancy in Utility Distribution Lines (Loops) and Key Equipment at Production Facilities.	H	1,2	Utility/ Infrastructure Failure	In Progress Limited by Lack of Funding	Board of Public Utilities (BPU), KCP&L, Operations	<b>Cost:</b> <b>Funds:</b> Grant, Local, combination <b>Completion Date:</b> 3 – 5 years, then continuous.
Board of Public Utilities - 5	Upgrade power distribution systems through replacement of porcelain insulators and switches with polymer components.	M	1,2	Utility/ Infrastructure Failure	In Progress Limited by Lack of Funding	Board of Public Utilities and KCPL	<b>Cost:</b> <b>Funds:</b> Local Utility Funded, Grant <b>Completion Date:</b> 2022
Board of Public Utilities - 6	Strengthen, bury and/or upgrade utility power lines / distribution systems to reduce power failures.	H	1,2	Utility/ Infrastructure Failure	In Progress New developments are required to put local power lines underground.	Board of Public Utilities, KCP&L, other utilities as needed	<b>Cost:</b> \$20,000,000 to \$500,000,000 <b>Funds:</b> HMGP Funding/Local Match, Local <b>Completion Date:</b> Continuous



## 6.8.62 – Boy Scouts of America Mitigation Actions (Wyandotte County)

**Table 6.68: Boy Scouts of America Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Boy Scouts of America - 1	Purchase and install an adequate communications system(s) for Scouts, Scouters and campers at Boy Scout Camp Theodore Naish, BSA.	High	4	All Hazards	Not Started, Lack of Funding	Wyandotte County Emergency Management Director	<b>Cost:</b> <b>Funds:</b> Grant Funding with in-kind match, contributions of local material, manpower & monetary resources. <b>Completion Date:</b>
Boy Scouts of America - 2	Flood Control Dam – To be installed on East Mission Creek above Lake of the Forest	High	4	Flooding	Not Started, Lack of Funding	Wyandotte County Flood Plain Management Program	<b>Cost:</b> \$2 Million <b>Funds:</b> Grant funding and flood management funds.



### 6.8.63 – Kaw Valley Drainage District Mitigation Actions (Wyandotte County)

**Table 6.69: Kaw Valley Drainage District Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Kaw Valley Drainage District - 1	Provide adequate communications & warning system(s) for Kaw Valley Drainage District.	H	1,2,4	Flood, Dam and Levee	Not Started, Lack of Funding	KVDD and County Emergency Management Department	<b>Cost:</b> Funds: FEMA, Local, combination <b>Completion Date:</b> 2022
Kaw Valley Drainage District - 2	Place/re-place riprap along the slopes of the Kaw Valley Drainage District's levees to protect them from erosive forces.	H	1,2	Flood, Dam and Levee	Not Started, Lack of Funding	Kaw Valley Drainage District	<b>Cost:</b> \$18,000,000 Funds: FEMA, Local, combination <b>Completion Date:</b> 2 years
Kaw Valley Drainage District - 3	Raise the top of the levees 4 – 5' in order to meet the requirements for the 500-year flood event.	H	1,2	Flood, Dam and Levee	Not Started, Lack of Funding	Kaw Valley Drainage District	<b>Cost:</b> \$250,000,000 Funds: FEMA, Local, Combination <b>Completion Date:</b> 10 years
Kaw Valley Drainage District - 4	Meet FEMA requirements relating to levee 100-year certification.	H	1,2	Flood, Dam and Levee	Not Started, Lack of Funding	Kaw Valley Drainage District	<b>Cost:</b> \$1,300,000 Funds: Federal, Local <b>Completion Date:</b> 2 years



### 6.8.64 – Fairfax Drainage District Mitigation Actions (Wyandotte County)

**Table 6.70: Fairfax Drainage District Mitigation Actions**

Action Identification	Description	Overall Priority	Goal(s) Addressed	Hazard Addressed	Status	Responsible Entity	Estimated cost, Funding Source, and Completion Date
Fairfax Drainage District - 1	Complete floodwall improvements at the Quindaro Power Plant owned by BPU by strengthening or replacing sections of the floodwall.	H	1,2	Flood, Dam & Levee	Not Started, Lack of Funding	Fairfax Drainage District General Manager	Cost: \$9,000,000 Funds: USACE, 65%, Local 35% Completion Date: 5 - 10 years





## 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. Actions deemed no longer viable were removed from consideration and are detailed below.

**Table 6.71: Johnson County and Participating Jurisdictions  
Removed Hazard Mitigation Actions**

<b>Jurisdiction</b>	<b>Action Description</b>	<b>Rationale for Removal</b>
Johnson County	Educate the public on the impacts of all hazards through all means necessary in order to facilitate mitigation techniques to reduce the impacts of hazards.	Program Oriented
Johnson County	All-Hazard education for mitigation, preparedness, response, & recovery. The County will work with all citizens and businesses to help them understand the hazards and how to prepare themselves as well as how to mitigate hazards if possible	Program Oriented
Johnson County	Actively promote the purchase of private insurance to county residents	Program Oriented
Johnson County	Actively promote the purchase of crop insurance to county residents	Program Oriented
Johnson County	Design and retrofit flood proof building in identified floodplains. Identify habitable buildings in the floodplain and/or are subject to flooding, prioritize locations, install/complete flood proofing techniques for buildings as Funding becomes available if buyout is not an option.	Not Feasible
Johnson County	Design and construct safe rooms in Private Non-Profit Schools.	<u>Not a County Function</u>
Johnson County	Provide homeowner education on wildfire mitigation in wildland-urban interface.	Program Oriented
Johnson County	Reduce hazardous fuels in prioritized wildfire risk areas.	Not Feasible

**Table 6.72: Leavenworth County and Participating Jurisdictions  
Removed Hazard Mitigation Actions**

<b>Jurisdiction</b>	<b>Action Description</b>	<b>Rationale for Removal</b>
Leavenworth County	Establish a local reserve fund to augment the Leavenworth County GIS Department's ability to monitor building trends and erosion patterns across the county through frequent aerial photography.	Local Funding

**Table 6.73: Wyandotte County and Participating Jurisdictions  
Removed Hazard Mitigation Actions**

<b>Jurisdiction</b>	<b>Action Description</b>	<b>Rationale for Removal</b>
Wyandotte County	Ability to continue to provide outpatient Mental Health services to current consumers, as well as provide services to those affected	Program Oriented



**Table 6.73: Wyandotte County and Participating Jurisdictions  
Removed Hazard Mitigation Actions**

<b>Jurisdiction</b>	<b>Action Description</b>	<b>Rationale for Removal</b>
Wyandotte County	Develop protocols for delivering vaccine / providing vaccinations.	Program Oriented
Wyandotte County	Provide public education sessions on public health and what actions to take to prepare for an event, prevent illness, and care for the ill.	Program Oriented
Wyandotte County	Provide public education sessions on public health and what actions to take to prepare for an event, prevent illness, and care for the ill.	Program Oriented
Wyandotte County	Enforce strict compliance on dam and levee deficiencies found during periodic inspections.	KDA Function
Wyandotte County	Provide public education sessions to encourage the use of grounded outlets and surge protectors in homes and businesses.	<u>No longer viable</u>
Wyandotte County	Adopt / enforce codes to bury utility lines in future developments.	Not Feasible
Wyandotte County	Create a website to allow citizens to communicate with each other following a large disaster.	Not Feasible
Wyandotte County	Encourage the use of flashing fire alarms for the hearing impaired.	Program Oriented
Wyandotte County	Prepare procedures and sites for decontamination.	Program Oriented
Wyandotte County	Use traffic simulations to predict evacuation problems and plan for these problems.	Not Feasible
Wyandotte County	Create and train volunteer search & rescue teams to support professional first responders.	Not Feasible
Wyandotte County	Provide public education sessions on hailstorm damage prevention.	Not Required
Wyandotte County	Identify the locations of special needs populations and develop a disaster early warning system for them.	Not Viable
Wyandotte County	Promote Wyandotte County Multi-Jurisdictional All-Hazards Mitigation Plan to the public.	Program Oriented
Wyandotte County	Continue review / revision of the Wyandotte County Metropolitan Medical Response System (MMRS) Plan.	MMRS Program No Longer Exists
Wyandotte County	Conduct periodic site visits to hazardous materials (Haz-Mat) critical facilities for familiarization with the facility and to determine site capabilities and limitations for response.	Program Oriented

## 6.10 – Action Implementation and Monitoring

*44 CFR 201.6 (c)(3)(iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*



Kansas Region L 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 L 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 L 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 –Flood Loss Mitigation Strategy

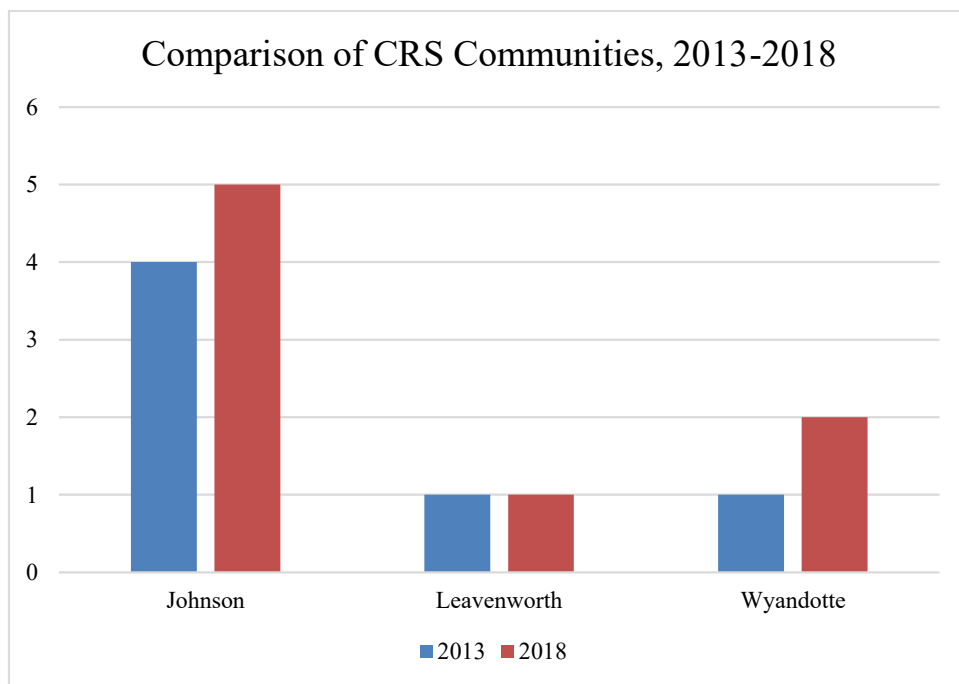
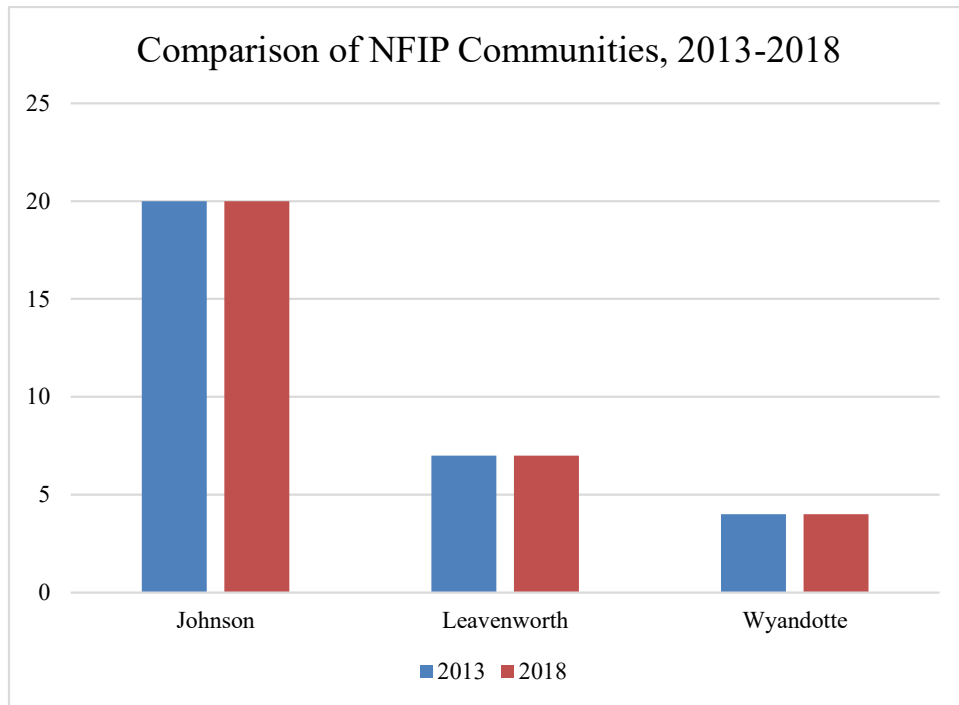
Kansas Region L has a long-standing commitment to the reduction of losses caused by flooding. The following section provides an overview of this commitment and further details strategies to continue decreasing both vulnerability and losses.

As part of the commitment and long-term strategy to minimizing flood losses, Kansas Region L prioritizes membership and adherence to the requirements of the NFIP.

The following graphs illustrate the comparison of the number of NFIP and CRS communities from 2013 to 2018. Of note:

- The number of NFIP communities in the region remained the same, with no communities dropping out of the program
- The number of CRS communities increased during the five-year span





As part of a continuing strategy, and as noted in detailed mitigation actions, the State of Kansas, Kansas Region L, and regional counties continue to stress the importance of participation in the NFIP. Strategies to increase program enrollment include:

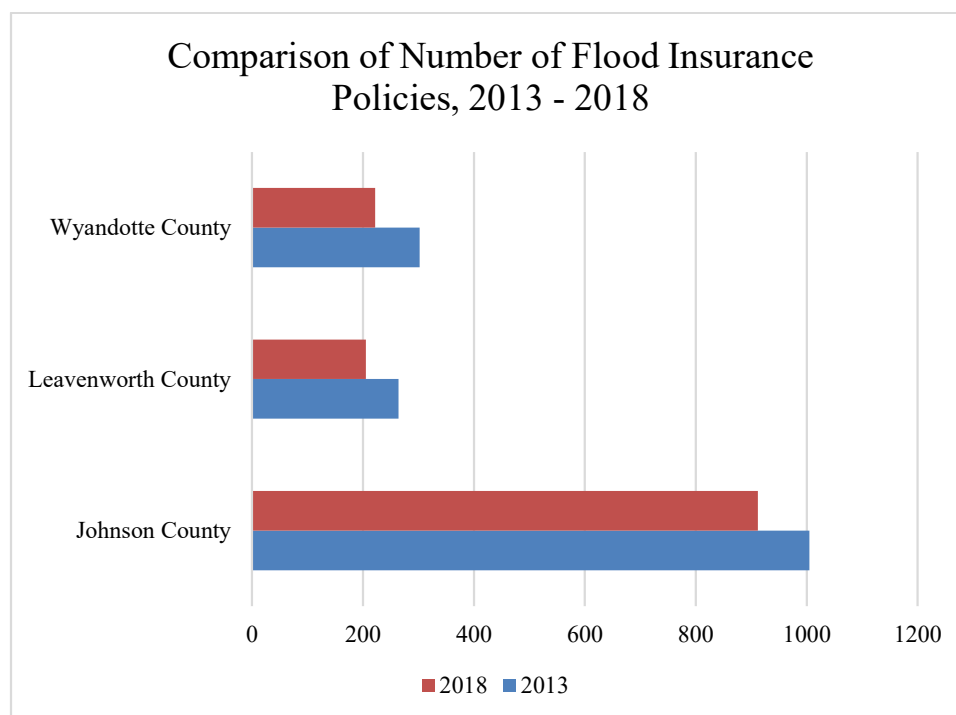
- Continued technical assistance from KDEM to communities participating, and wishing to participate in the NFIP

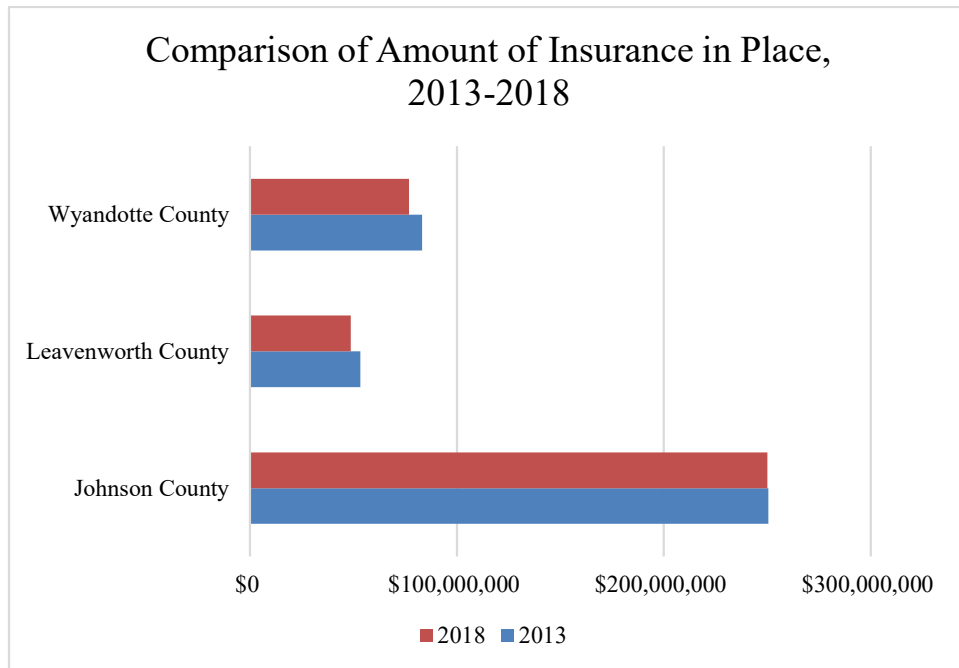


- Continued technical assistance from KDEM to communities participating, and wishing to participate in the CRS program
- Continued provision of details concerning these programs at local and regional meetings

Additionally, Kansas Region L communities actively encourage the purchase of flood insurance by homeowners. The following graphs illustrate both the number of policies in force, and the amount of coverage provided by those policies. Of note:

- The number of flood insurance policies decreased during the five-year period of 2013 to 2018
- The amount of coverage provided by these policies decreased during the five-year period of 2013 to 2018





As part of a continuing strategy, and as noted in detailed mitigation actions, Kansas Region L jurisdictions continue to stress the importance of flood insurance. Strategies to increase insurance coverage include:

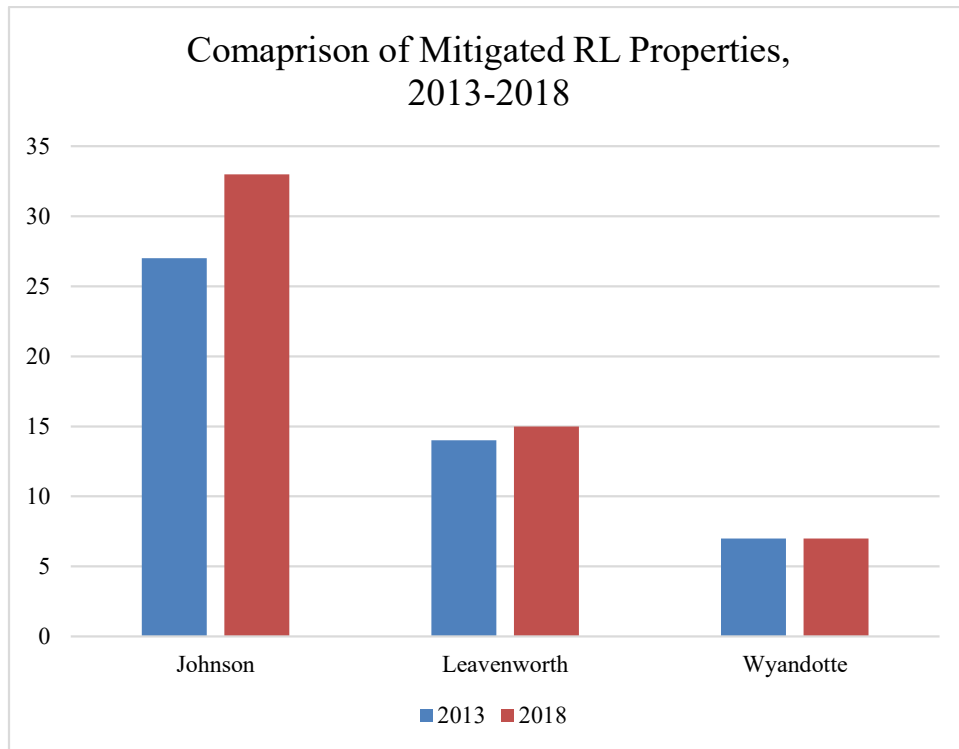
- Continued technical assistance from Kansas Region L jurisdictions to assist homeowners with insurance questions
- Continued public outreach and education programs to stress the importance and accessibility of flood insurance
- NFIP participation to allow for the purchase of flood insurance
- CRS participation to provide policy holders with pricing discounts

A further part of this commitment is the reduction of the number of RL and SRL properties within the region. The following graphs illustrate the comparison of the number of mitigated RL and SRL properties from 2013 to 2018. Of note:

- The number of mitigated properties increased by seven over the five-year period







Since the last plan update, no SRL properties have been mitigated. Kansas Region L continues to reach out to the all communities to help facilitate the mitigation of all SRL properties.

As part of a continuing strategy, and as noted in detailed mitigation actions, the State of Kansas, Kansas Region L, and regional jurisdictions continue to stress the importance of RL and SRL mitigation. Strategies to continue with RL and SRL mitigation include:

- Continued technical assistance from KDEM concerning RL and SRL properties
- Continued technical assistance form KDEM concerning available grant Funding opportunities for RL and SRL mitigation projects
- Continued enforcement of floodplain regulations and ordinances to minimize properties in identified floodplains

## 6.13 –Primary Mitigation Action Funding Sources

It is generally recognized that mitigation actions help communities realize long term savings by preventing future losses due to hazard events. However, many mitigation actions are beyond the budgetary capabilities a jurisdiction and Funding assistance, often in the form of grants, may be required. This following table provides a general description of some of the primary avenues available to jurisdictions to defray the cost of implementing mitigation actions.



**Table 6.74: Primary Hazard Mitigation Funding Mechanisms**

Program	Funding Agency	Funding Match Requirement	Program Description
Community Development Block Grant Program	Department of Housing and Urban Development	N/A	Program is a competitive grant process through which about half of the Funding goes to support the development of community facilities and water and sewer projects. grants in four categories, community improvement, urgent need, Kansas Small Towns Environment Program and economic development.
Federal Public Assistance	FEMA	Varied	Provides Funding used to restore the parts of a structure that was damaged during a disaster. The restoration must provide protection from subsequent events.
Federal Individual Assistance	FEMA	Varied	Provides assistance for qualified homeowners/renters whose primary residence was damaged or destroyed in a declared designated area.
Flood Mitigation Assistance	FEMA	Varied	Program provides Funding to States, Territories, federally recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. Funding is also available for management costs.
Hazard Mitigation Grant Program	FEMA	25%	Program is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. Funding is available, when authorized under the Presidential Major Disaster Declaration, in the areas of the state requested by the governor. The amount of Funding available to the applicant is based upon the total federal assistance provided by FEMA for disaster recovery under the major disaster declaration.
Pre-Disaster Mitigation Program	FEMA	25%	Program is designed to assist states, territories, Indian tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on federal Funding from future major disaster declarations.

## 6.14 – 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 6.75: 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.



**Table 6.75: Additional Potential Hazard Mitigation Funding Mechanisms**

<b>Department</b>	<b>Program</b>	<b>Program Description</b>
FEMA	Risk Mapping, Assessment, and Planning (Risk Map)	The Risk MAP strategy incorporates Flood (NFIP) plain 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 Flood (NFIP)ing. 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 (NFIP) insurance, and moving and storage. The current maximum allowable amount for any one disaster to individuals or families is \$25,000.
Council of Western State Foresters	Wildland Urban Interface (WUI) Grants	The WUI Grant may be used to apply for financial assistance towards hazardous fuels and educational projects within the four goals of: improved prevention, reduction of hazardous fuels, restoration of fire-adapted ecosystems and promotion of community assistance.
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 (NFIP) control and water supply and/or recreational purposes. It requires a general plan of works and a local nonpoint source pollution control plan.
(KDA-DoC)	State Assistance to Watershed Dam Construction	Provides state cost-share assistance to a government entity for the construction or renovation of a dam for Flood (NFIP) control and water supply and/or recreational purposes. It requires a general plan of works and a local nonpoint source pollution control plan.



**Table 6.75: Additional Potential Hazard Mitigation Funding Mechanisms**

<b>Department</b>	<b>Program</b>	<b>Program Description</b>
(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-DWR	Flood (NFIP)plain Management Program	Program provides technical assistance for local, state and federal Flood (NFIP)plain management, including managing the NFIP and Flood (NFIP)plain 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.
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.
KFS	Forest Health Program	Program monitors the impacts of insects, diseases, drought, Flood (NFIP)ing 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.



# 7.0 Plan Maintenance

## 7.1 – Hazard Mitigation Plan Monitoring and Evaluation

*44 CFR 201.6 (c)(4) A plan maintenance process that includes: (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

The Kansas Region L 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, in conjunction with the MPC and participating jurisdictions, 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 L

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 L and all participating jurisdictions will be tasked with plan monitoring, evaluation, and maintenance. All participating jurisdictions, led by MPC, will:

- Regularly monitor and evaluate the implementation of the plan
- When applicable, after a disaster event, evaluate the effectiveness of the plan
- Act as a think tank for all issues related to hazard mitigation planning
- Act as a clearinghouse for hazard mitigation ideas and activities
- Assist with the implementation of all identified actions with available resources
- Monitor all available funding opportunities for mitigation actions
- Coordinate the cycle for the revision and update of the mitigation plan
- Report on plan progress and recommended changes to the relevant governing bodies
- Inform and solicit input from the public

Each participating jurisdiction will also be responsible for promoting the integration of the hazard mitigation plan into all relevant plans, policies, procedures and ordinances.

## 7.3 – Plan Maintenance and Update Process

*44 CFR 201.6 (c)(4) A plan maintenance process that includes: (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle."*

Kansas Region L, 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, with work beginning approximately one year before plan expiration.

- **Three years before plan expiration, Spring:** The MPC will begin updating the plan risk assessment. Hazards will be analyzed for continued relevancy and a review will be conducted to determine and new potential hazards.
- **Three years before plan expiration, Fall:** The MPC will begin updating the vulnerability assessment. Data will be gathered on jurisdictional assets, critical facilities, building stock values, crop losses, jurisdictional damages, etc.
- **Two years before plan expiration, Spring:** The MPC will review all information from previous meetings and determine if hazard mitigation goals and objectives are still relevant. Actions will be reviewed for currency and applicability. Work will begin on HMP revision.
- **Two years before plan expiration, Fall:** The MPC will evaluate the policies, programs, capabilities, and funding sources from the previous plan and plan revision to determine if they are still accurate and determine if additions are required.



- **One year before plan expiration:** Work will begin on the revision of the 2019 HMP.
- **Six months before plan expiration:** The MPC will review the final draft copy of the mitigation plan and make comments and updates if necessary. All participating jurisdictions and the public will be given an opportunity to review and comment on draft HMP.
- **Two months before plan expiration:** Formal submittal to FEMA for re-approval.

As part of the plan maintenance process, and consistently during the five-year HMP approval period, the MPC will continually monitor all elements of the plan, including:

- The incorporation of the HMP into other planning mechanisms
- All revisions and updates to the HMP
- Continued public participation

This monitoring will be done through outreach efforts to include:

- Email communication
- Phone communication
- In person communication at meetings, relevant conferences, and local planning events

Through consistent monitoring the MPC will then be able to efficiently incorporate these elements into the next plan revision.

Upon each successive revision, the plan will need to be re-adopted by all participating jurisdictions. Circumstances, including a major disaster or a change in regulations or laws, may modify the required five-year planning cycle.

## 7.4 – Post-Disaster Declaration Procedures

Following a disaster, each participating jurisdiction and the MPC may review the plan to determine if any additional actions need to be identified, additional funding has become available, or any identified actions need to be re-prioritized.

## 7.5 – Incorporation of HMP into Other Planning Mechanisms

*44 CFR 201.6 (c)(4)(ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

The hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various county and local plans. Under the leadership of the MPC, it is hoped that when each of these other plans is updated, they will be measured against the contents of this HMP.

Below is a list of the various jurisdictional planning efforts, either solely or jointly administered, and relevant planning documents. While each plan can stand alone, each participating jurisdiction, under the





leadership of their MPC member, will actively work to incorporate relevant parts of this hazard mitigation plan into the following:

- All participating jurisdictions Codes and Ordinances
- All participating jurisdictions Comprehensive Plans
- All participating jurisdictions Critical Facilities Plans
- All participating jurisdictions Economic Development Strategic Plans
- All participating jurisdictions Emergency Operations Plans
- All participating jurisdictions Flood Mitigation Assistance Plan
- All participating jurisdiction Land-Use Plans
- Community Wildfire Protection Plans

Additionally, in cooperation with the MPC, each participating jurisdiction will be actively courted on incorporating elements of this hazard mitigation plan for any relevant plan, code or ordinance revision or creation.

Each participating jurisdiction has committed to actively encourage all departments to implement actions that minimize loss of life and property damage. Whenever possible, each participating jurisdiction will use existing plans, policies, procedures and programs to aid in the implementation of identified hazard mitigation actions. Potential avenues for implementation may include:

- Budget revisions or adoptions
- Capital improvement plans
- General or master plans
- Hiring of staff
- Land use planning
- Operation plans
- Ordinances
- Stormwater planning

Participating jurisdictions are encouraged to utilize all available budget avenues for the completion of hazard mitigation items. Budgetary options may include:

- Annual budgets
- Application for grant funding
- Departmental budgets
- In-kind donations

Where appropriate, the MPC will take the lead in integrating this HMP into overarching, countywide plans, code, ordinances and any other relevant documents, policies or procedures.



## 7.6 – Continued Public Involvement

*44 CFR 201.6 (c)(4)(iii) Discussion on how the community will continue public participation in the plan maintenance process.*

Public participation is an important part of the continued mitigation planning process. Every effort will be made to keep the public informed on both relevant mitigation issues and the five-year plan revision cycle. Strategies for continued public involvement may include:

- Postings on electronic media, to include websites
- Notifications, when possible, in local media
- Making plans available for review in public locations
- A review of local mitigation strategies and goals
- A review completed and remaining hazard mitigation actions



# **Appendix A**

## **Adoption Resolutions**



# **Appendix B**

## **FEMA Approval Documents**



# **Appendix C**

## **Meeting Minutes and Sign-In Sheets**



To **Region “L” 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 **10 September 2018**

Subject **Minutes from the Region “L” Mitigation Planning Meeting held on 10 September 2018 in Olathe, KS.**

This document is a record of attendance and a summary of the issues discussed during the above Kickoff meeting. Topics covered during the meeting included: (1) an introduction to the purpose of hazard mitigation planning, (2) the benefits of a multi-jurisdictional approach, (3) the reasons for the regional mitigation planning process, (4) grant programs linked to an approved plan and (5) action items in the previous county hazard mitigation plans. 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 planning committee reviewed the list of hazards to be used as a part of the regional plan. The group discussed mitigation actions and the availability of grant programs during the meeting. The meeting concluded with a discussion of the next steps in the planning process. The formal presentation portion of the meeting began at 0900 am CDT and concluded at 10:30 am CDT.

## Attendees

Name	Organization	County
David Brown	Fairway PD, Chief of Police	Johnson
Kyle Burns	Overland Park Emergency Manager	Johnson
Rick Castillo	USD 233, Olathe Public Schools, Manager of Safety & Security	Johnson
Alvie Cater	USD 232, Desoto Schools, Asst Superintendent	Johnson
Steve Chick Sr	City of De Soto, Emergency Manager	Johnson
Sidney Cumberland	Blue Valley School District, Risk Manager	Johnson
Matt Epperson	Shawnee FD, Emergency Services Chief	Johnson
Lester Estelle	WaterOne, Process Management Coordinator	Johnson
Colin Fitzgerald	City of Leawood, Deputy Chief	Johnson
Rebecca Galati	KCP&L and Westar Energy, Community Business Manager	Johnson
Jennifer Lee	City of Mission Hills, Assistant City Administrator	Johnson
Roger Lippert	Johnson County MED-ACT, Division Chief	Johnson
Lana McPherson	City of De Soto, City Clerk	Johnson
Trig Morley	FD #1, Johnson County, Battalion Chief	Johnson
Harold Nelson	Atmos Energy, Safety Specialist	Johnson
Alisa Pacer	Johnson County CC, Emergency Manager	Johnson
Gary Tolle	Southern Star Central Gas Pipeline, Compliance Pipeline Safety	Johnson
Kevin Weyand	Olathe FD, Division Chief	Johnson
Cary Gerst	JOCO Emergency Management, Asst. Dir.	Johnson

	Planning	
Jeanne Bunting	KDEM, Mitigation Planner	State
Susan McMahan	KDEM, Planner	State
Josh Smith	KDEM, Regional Coordinator	State
Emily Hatcher	FEMA, Floodplain Specialist	Federal
Jacob Gray	KDEM, SHMO	State
Steve Samuelson	DWR, NFIP Coordinator	State
Justin Sorg	FEMA, Community Planner	Federal

## Introductions

---

Jeanne Bunting with KDEM began the meeting by welcoming and thanking the attendees. Participants introduced themselves and identified what jurisdiction they represented.

## Introduction to Hazard Mitigation Planning

---

Ms. Bunting presented information on the purpose and requirements of the Disaster Mitigation Act of 2000. The attendees were reminded that this is a regional planning effort which will update the current Region L mitigation plan. The plan includes: Leavenworth, Johnson, and Wyandotte Counties. The presentation also addressed the benefits for jurisdictions participating in this mitigation plan update, including eligibility for federal hazard mitigation assistance funding programs. The region has received funds in the amount of \$7, 939, 351 toward mitigation projects and planning.

Ms. Bunting described the benefits of participating in a multi-jurisdictional plan as improving coordination and communication among local jurisdictions and that these hazards do not stop at jurisdictional boundaries thus this multi-jurisdictional plan allows for a more comprehensive approach. The group also heard information regarding the significant cost savings being realized by the regional approach to planning. The regional approach now being used allows planning services to be provided to each county for the update at no cost to the county. Matt Eyer with Blue Umbrella will be completing the Region "L" mitigation plan for committee review.

Jeanne Bunting also described the role of the Hazard Mitigation Planning Committee (HMPC). Each jurisdiction participating in development of the plan must meet the following minimum requirements:

- Designate a representative to serve on the Region "L" Hazard Mitigation Planning Committee, which will meet twice during the planning process, Emergency Managers will meet three times.
- Provide data for and assist in the development of the updated risk assessment that describes how various hazards impact your jurisdiction,
- Provide data to describe current capabilities,
- Develop/update mitigation actions (at least one) specific to your jurisdiction,
- Provide comments on plan drafts as requested,
- Inform the public, local officials, and other interested parties about the planning process and provide opportunities for them to comment on the plan, and
- Formally adopt the mitigation plan.



---

## **Planning for Public Involvement**

---

The local/regional hazard mitigation plan requirements state that the public must have the opportunity to comment on the plan. The public will be given two opportunities to comment on the plan, once during the drafting stage and another when the plan is complete in the final draft stage. KDEM is planning to utilize a questionnaire on SurveyMonkey.com to ask the public's opinion about hazards that affect them during the drafting stage. The HMPC members in the county are also requested to post the SurveyMonkey.com link, once available, on their websites and newsletters to the public and to distribute the survey as widely as possible.

## **Data Collection Process**

---

The participating jurisdictions at the meeting were provided hard copies of Data Collection Guides. Local County Emergency Management Agencies will follow-up with jurisdictions that were not in attendance at this meeting to provide an overview of the process being used and copies of data collection guides for completion. Ms Bunting briefed on the Data Collection Guides, and reminded the attendees that they are specific for local units of government and schools. There are two different guides, one for local governments, and one for schools and universities. The jurisdictions were requested to provide data regarding hazards that had occurred in their jurisdiction since the last plan update (2014) for the 22 hazards that are in the Regional Plan. The Data Collection Guides were requested to be returned to Jeanne Bunting 10 October 2018.

## **Plan Format/ Regional and Countywide Risk Assessment**

---

The list of hazards in the State of Kansas plan is the list that is being used for the regional plans. All of the hazards included in the State Plan were included in the current plan for the counties in Region L. Blue Umbrella staff will be updating the regional hazard ranking using the State Plan methodology for hazards in their current plan.

## **Hazard Mitigation Assistance Grants Available Linked to Approved Plan**

---

The following three Hazard Mitigation Assistance grant programs were outlined, priority activities discussed, deadline of grants, and current funds available for:

- Hazard Mitigation Grant Program (HMGP)
- Pre-disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- POST HMGP Fire

Other state and federal grant programs for mitigation projects were also mentioned.

## Mitigation Actions

---

The planning committee was provided an introduction to update and development of mitigation actions. Jurisdictional representatives were requested to provide updates as to: (1) action status – in a measureable format, i.e. 100% complete. They were also advised of the FEMA SMART action criteria and the four categories for actions. The group was reminded that each participating jurisdiction must have at least one action and that all NFIP jurisdictions must have at least two NFIP-related actions. Participants were also given a copy of the form for adding new actions to the plan. The updates on the current actions and any new actions were requested to be returned to Jeanne Bunting by 10 October 2018. The date for the final planning meeting will be sent to each agency. At that final meeting, the mitigation actions for the plan will be prioritized.

## Next Steps

---

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- **October 10, 2018— Data Collection Guides Due to KDEM**
- **October 10, 2018 — Mitigation Action Updates + New Actions Due to KDEM**
- **December 2018, TBD – Meeting #2 for Emergency Management Officials**
- **TBD (Beginning of March 2019) – Meeting #3 All Committee Members – Action Priorities**
- **March 2019 (end of) — Submit Plan to FEMA**