

# Kansas Homeland Security Region F Hazard Mitigation Plan

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

Clay County, Cloud County, Dickinson County,  
Ellsworth County, Jewell County, Lincoln  
County, Mitchell County, Osborne County,  
Ottawa County, Republic County, Saline  
County and Smith County

November 2019

Prepared By:



**Blue Umbrella Solutions, LLC**

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## List of Commonly Used Acronyms

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





<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) 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 F (hereafter referred to as Kansas Region F) 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 F 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 of this plan will ensure future eligibility for federal disaster mitigation funds through the Hazard Mitigation Grant Program (HMGP), 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 F.





## 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: Clay County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Clay County</b>	X	X
City of Clay Center	X	X
City of Longford	X	X
City of Morganville	X	X
City of Oak Hill	X	X
City of Wakefield	X	X
USD #379 - Clay Center	X	X
Blue Stem REC	X	X
Prairie Hills REC	X	X
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X

**Table 1.2: Cloud County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Cloud County</b>	X	X
City of Aurora	X	X
City of Clyde	X	X
City of Concordia	X	X
City of Glasco	X	X
City Jamestown	X	X





**Table 1.2: Cloud County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
City of Miltonvale	X	X
City of Simpson	X	X
Cloud County Community College	X	X
USD #224 - Clifton/Clyde	X	X
USD #333 - Concordia	X	X
USD #334 - Southern Cloud	X	X
Prairie Land REC	X	X
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X

**Table 1.3: Dickinson County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Dickinson County</b>	X	X
City of Abilene	X	X
City of Chapman	X	X
City of Carlton	X	X
City of Enterprise	X	X
City of Herington	X	X
City of Hope	X	X
City of Manchester	X	X
City of Solomon	X	X
City of Woodbine	X	X
USD #393 - Solomon	X	X
USD #435 - Abilene	X	X
USD #473 - Chapman	X	X
USD #481 - Rural Vista	X	X
USD #487 - Herington	X	X
DS&O Electric	X	X
Flint Hills REC	X	X
Rural Water Districts (all)	X	X

**Table 1.4: Ellsworth County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Ellsworth County</b>	X	X
City of Ellsworth	X	X
City of Holyrood	X	X
City of Kanopolis	X	X
City of Lorraine	X	X
City of Wilson	X	X
USD #112 - Central Plains	X	X
USD #327 - Ellsworth	X	X
Arkansas Valley REC	X	X
Midwest REC	X	X
Rolling Hills REC	X	X





**Table 1.4: Ellsworth County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Rural Water Districts (all)	X	X

**Table 1.5: Jewell County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Jewell County</b>	X	X
City of Burr Oak	X	X
City of Esbon	X	X
City of Formoso	X	X
City of Jewell	X	X
City of Mankato	X	X
City of Randall	X	X
City of Weber	X	X
USD #107 - Rock Hill	X	X
Jewell County Hospital	X	X
Prairie Land REC	X	X
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X

**Table 1.6: Lincoln County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Lincoln County</b>	X	X
City of Barnard	X	X
City of Beverly	X	X
City of Lincoln Center	X	X
City of Sylvan Grove	X	X
USD #298 - Lincoln	X	X
USD #299 - Sylvan Grove	X	X
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X

**Table 1.7: Mitchell County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Mitchell County</b>	X	X
City of Beloit	X	X
City of Cawker City	X	X
City of Glen Elder	X	X
City of Hunter	X	X
City of Scottsville	X	X
City of Simpson	X	X
City of Tipton	X	X
North Central Technical College	X	X
Tipton Catholic High School	X	X
USD #272 - Waconda	X	X
USD #273 - Beloit	X	X





**Table 1.7: Mitchell County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X

**Table 1.8: Osborne County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Osborne County</b>	X	X
City of Alton	X	X
City of Downs	X	X
City of Natoma	X	X
City of Osborne	X	X
City of Portis	X	X
USD #272 - Waconda		X
USD #392 - Osborne	X	X
USD #399 - Natoma	X	X
Midwest REC	X	X
Prairie Land REC	X	X
Rolling Hills REC	X	X
Rural Fire District #3	X	X
Rural Water Districts (all)	X	X

**Table 1.9: Ottawa County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Ottawa County</b>	X	X
City of Bennington	X	X
City of Culver	X	X
City of Delphos	X	X
City of Minneapolis	X	X
City of Tescott	X	X
USD #239 - North Ottawa County	X	X
USD #240 - Twin Valley	X	X
Ottawa County Health Center	X	X
DS&O Electric	X	X
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X

**Table 1.10: Republic County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Republic County</b>	X	X
City of Agenda	X	X
City of Bellville	X	X
City of Courtland	X	X
City of Cuba	X	X
City of Munden	X	X
City of Narka	X	X





**Table 1.10: Republic County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
City of Republic	X	X
City of Scandia	X	X
USD #109 - Republic County	X	X
USD #426 - Pike Valley	X	X
Prairie Land REC	X	X
Republic County Hospital	X	X
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X
Rural Fire Districts #1-12	X	X

**Table 1.11: Saline County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Saline County</b>	X	X
City of Assaria	X	X
City of Brookville	X	X
City of Gypsum	X	X
City of New Cambria	X	X
City of Salina	X	X
City of Smolan	X	X
Kansas Wesleyan University	X	X
Salina Area Technical College	X	X
USD #240 – Twin Valley	X	X
USD #305 - Salina	X	X
USD #306 - Southeast of Salina	X	X
USD #307 - Ell/Salina	X	X
Arkansas Valley REC	X	X
DS&O Electric	X	X
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X

**Table 1.12: Smith County Participating Jurisdictions**

Jurisdiction	2014 HMP Participant	2019 HMP Participant
<b>Smith County</b>	X	X
City of Cedar	X	X
City of Gaylord	X	X
City of Kensington	X	X
City of Lebanon	X	X
City of Smith Center	X	X
USD #110 – Thunder Ridge	X	X
USD #237 - Smith Center		X
Midwest REC	X	X
Rolling Hills REC	X	X
Rural Water Districts (all)	X	X







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

### 1.3 – Assurances

Kansas Region F 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 F 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 F 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 tracked by the Regional Mitigation Plan Project Manager with KDEM.

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

Adoption resolutions may be found in Appendix A.



# 2.0 Planning Process

## 2.1 – Documentation of the Planning Process

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

In June 2019, Kansas Region F and its participating jurisdictions began the process to update the Kansas Region F 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 F 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 F and its participating jurisdiction undertook the following steps to update and create a robust HMP:

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

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

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





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

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

## 2.2 – 2019 Plan Changes

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

The Kansas Region F 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 it 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 F Mitigation Planning Committee**

<b>Participant</b>	<b>Title</b>	<b>Organization</b>
Pam Kemp	Emergency Manager	Clay County
Brent Gering	Emergency Manager	Cloud County
Chancy Smith	Emergency Manager	Dickinson County
Eric Voss	Emergency Manager	Ellsworth County
Gail Bartley	Emergency Manager	Jewell County
David Dohe	Emergency Manager	Lincoln County
Rick Horn	Emergency Manager	Mitchell County
Chris Rhodes	Emergency Manager	Osborne County
John Cary	Assistant Director	Osborne County
Marie Ballou	Emergency Manager	Ottawa County
Raymond Raney	Emergency Manager	Republic County
Susan Aaron	Assistant Director	Republic County
Hannah Stambaugh	Emergency Manager	Saline County
Bernard Boston Jr.	Assistant Director	Saline County
Chad Meyer	Emergency Manager	Smith County
Jeanne Bunting	Mitigation Planner	State of Kansas
Matt Eyer	Plan Author	Blue Umbrella Solutions

## 2.4 – Jurisdictional Representation

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

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

The following details jurisdictional representation.

**Table 2.2: Clay County Jurisdictional Representatives**

<b>Jurisdiction</b>	<b>Representative</b>	<b>Title</b>
City of Clay Center	Kerry Rozman	City Clerk
City of Longford	Kim Kramer	Mayor
City of Morganville	Darrel Jones	Mayor
City of Oak Hill	Lonny Moore	Mayor
City of Wakefield	Chris Dumler	Mayor
USD #379 - Clay Center	Brett Nelson	Superintendent
Blue Stem REC	Bruce Meyer	Secretary





**Table 2.2: Clay County Jurisdictional Representatives**

Jurisdiction	Representative	Title
Prairie Hills REC	Ronald Griffith	Trustee
Rolling Hills REC	Doug Jackson	General Manager
Rural Water Districts (all)	Various, Pam Kemp (proxy)	Emergency Manager

**Table 2.3: Cloud County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Aurora	Eric Voss	Emergency Manager
City of Clyde	Gayla Rogers	City Clerk
City of Concordia	Stacey Smith	City Clerk
City of Glasco	Brenda Wisbey	City Clerk
City Jamestown	Jessica Pressler	City Clerk
City of Miltonvale	Darla Bebber	Clerk
City of Simpson	Bradley Heidrick	Mayor
Cloud County Community College	Adrian H. Douglas	President
USD #224 - Clifton/Clyde	Art Baker	Superintendent
USD #333 - Concordia	Quentin Breese	Superintendent
USD #334 - Southern Cloud	Roger Perkins	Superintendent
Prairie Land REC	Ronald Griffith	Trustee
Rolling Hills REC	Doug Jackson	General Manager
Rural Water Districts (all)	Various, Brent Gering (proxy)	Emergency Manager

**Table 2.4: Dickinson County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Abilene	Penny Soukup	City Clerk
City of Chapman	Brittany Bennet	City Clerk
City of Carlton	Patty Schlesener	City Clerk
City of Enterprise	Deana Payne	City Clerk
City of Herington	David Jones	Mayor
City of Hope	Joni Rikard	Clerk
City of Manchester	Ashley Tatro	City Clerk
City of Solomon	Dana Eye	City Clerk
City of Woodbine	Janet Conner	City Clerk
USD #393 - Solomon	Justin Coup	Superintendent
USD #435 - Abilene	Greg Brown	Superintendent
USD #473 - Chapman	Jerry Hodson	Superintendent
USD #481 - Rural Vista	Ron Meitler	Superintendent
USD #487 - Herington	Ron Wilson	Superintendent
DS&O Electric	James Christopher	President
Flint Hills REC	Korby Effland	Secretary/Treasurer
Rural Water Districts (all)	Various, Chancy Smith (proxy)	Emergency Manager





**Table 2.5: Ellsworth County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Ellsworth	Angela Mueller	Deputy City Clerk
City of Holyrood	Kenny Scheppman	Mayor
City of Kanopolis	Anthony Hopkins	Mayor
City of Lorraine	Dennis Boyer	Mayor
City of Wilson	Larry Ptacek	Mayor
USD #112 - Central Plains	Todd Evans	Superintendent
USD #327 - Ellsworth	Dale Brungardt	Superintendent
Arkansas Valley REC	Jackie Holmberg	Representative
Midwest REC	Dale Giebler	Representative
Rolling Hills REC	Doug Jackson	General Manager
Rural Water Districts (all)	Various, Eric Voss (proxy)	Emergency Manager

**Table 2.6: Jewell County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Burr Oak	Mike Harris	Mayor
City of Esbon	Daphne Broadwater-Manning	Mayor
City of Formoso	LaVernia Peters	Mayor
City of Jewell	Amber Loomis	City Clerk
City of Mankato	Darrell Miller	City Clerk
City of Randall	Wayne McElroy	Mayor
City of Weber	Gail Bartley	Emergency Manager
USD #107 - Rock Hill	Dr. Kari Kephart	Superintendent
Jewell County Hospital	Doyle McKimmy	Chief Executive Officer
Prairie Land REC	Ronald Griffith	Trustee
Rolling Hills REC	Doug Jackson	General Manager
Rural Water Districts (all)	Various, Gail Bartley (proxy)	Emergency Manager

**Table 2.7: Lincoln County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Barnard	Barb Rathbun	City Clerk
City of Beverly	Tina Church	City Clerk
City of Lincoln Center	Heather Hilligeist	City Clerk
City of Sylvan Grove	Jennifer Huehl	City Clerk
USD #298 - Lincoln	Betty Summers	Superintendent
USD #299 - Sylvan Grove	Jude Stecklein	Superintendent
Rolling Hills REC	Doug Jackson	General Manager
Rural Water Districts (all)	Various, David Dohe (proxy)	Emergency Manager

**Table 2.8: Mitchell County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Beloit	Amanda Lomax	City Clerk
City of Cawker City	Denelle Mick	City Clerk
City of Glen Elder	Jerri Senger	City Clerk
City of Hunter	Robert Wiles	Mayor





**Table 2.8: Mitchell County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Scottsville	Rick Horn	Representative
City of Simpson	Rick Horn	Representative
City of Tipton	Joanne Brummer	City Clerk
North Central Technical College	Brandi Zimmer	Dean of Administrative Services
Tipton Catholic High School	Gery Hake	Principal
USD #272 - Waconda	Sandy Hake	School Board Clerk
USD #273 - Beloit	Doris Gasper	Clerk of the Boar
Rolling Hills REC	Doug Jackson	General Manager
Rural Water Districts (all)	Various, Rick Horn (proxy)	Emergency Manager

**Table 2.9: Osborne County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Alton	Lillian Conway	Clerk
City of Downs	John Bisnette	Mayor
City of Natoma	Celia Young	City Clerk
City of Osborne	Hanna Eilert	City Clerk
City of Portis	Jared McCoy	Mayor
USD #272 - Waconda	Sandy Hake	School Board Clerk
USD #392 - Osborne	Kathy Grabast	Clerk
USD #399 - Natoma	Larry D. Geist	Superintendent
Midwest REC	Dale Giebler	Representative
Prairie Land REC	Jim Coash	Operations Manager
Rolling Hills REC	Doug Jackson	General Manager
Rural Fire District #3	John Cary	Assistant Director
Rural Water Districts (all)	Various, Chris Rhodes (proxy)	Emergency Manger

**Table 2.10: Ottawa County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Bennington	Adrienne Luthi	City Clerk
City of Culver	Lou Ann Inscho	City Clerk
City of Delphos	Karen Kiser	Clerk
City of Minneapolis	Barry Hodges	City Clerk
City of Tescott	Joanna Schwindt	City Clerk
USD #239 - North Ottawa County	Chris Vignery	Superintendent
USD #240 - Twin Valley	Fred Van Ranken	Superintendent
Ottawa County Health Center	Cheryl Lanoue	Chief Financial Officer
DS&O Electric	James Christopher	President
Rolling Hills REC	Doug Jackson	General Manager
Rural Water Districts (all)	Various, Marie Ballou (proxy)	Emergency Manager

**Table 2.11: Republic County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Agenda	Kent Kalivoda	Mayor
City of Bellville	Kim Lapo	Mayor



**Table 2.11: Republic County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Courtland	Tim Garman	Mayor
City of Cuba	Joe Chizek	Mayor
City of Munden	Jimmie Blecha	Mayor
City of Narka	Nathan Svoboda	Mayor
City of Republic	Randy Thayer	Mayor
City of Scandia	Gary Cline	Mayor
USD #109 - Republic County	Michael Couch	Superintendent
USD #426 - Pike Valley	Steve Joonas	Superintendent
Prairie Land REC	Jim Coash	Head of Operations, Concordia Ofc
Republic County Hospital	David Paul Cavazos	CEO
Rolling Hills REC	Doug Jackson	General Manager
Rural Water Districts (all)	Various, Brian Stindt (proxy)	Chairman
Rural Fire Districts #1-12	Lewis Novak	Rural Fire Chief

**Table 2.12: Saline County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Assaria	Kristie Trimble	Clerk
City of Brookville	Kay Vanderbilt	City Clerk
City of Gypsum	Judy Scanlan	City Clerk
City of New Cambria	Mack Villalpando	Mayor
City of Salina	Trent Davis	Mayor
City of Smolan	Tom Hawks	Mayor
Kansas Wesleyan University	Lonnie Booker	Emergency Manager
Salina Area Technical College	Fernanda Lopez	Student Services Administrator
USD #240 – Twin Valley	Fred Van Ranken	Superintendent
USD #305 - Salina	Linn Exline	Superintendent
USD #306 - Southeast of Saline	Kelsey Loader	Clerk
USD #307 - Ell/Saline	David Graf	Director of Maintenance
Arkansas Valley REC	Jackie Holmberg	Representative
DS&O Electric	Mike Olberding	Operations Manager
Rolling Hills REC	Marc Martin	Operations Manager
Rural Water Districts (all)	Various, Adriane Feeny (proxy)	Manager

**Table 2.13: Smith County Jurisdictional Representatives**

Jurisdiction	Representative	Title
City of Cedar	Francis Ludington	Mayor
City of Gaylord	David Tucker	Mayor
City of Kensington	Leland Rajhes	Mayor
City of Lebanon	Duane Ream	Mayor
City of Smith Center	Jill Conaway	City Clerk
USD #110 – Thunder Ridge	Jeff Yoxallr	Superintendent
USD #237 - Smith Center	Ron Meitler	Superintendent
Midwest REC	Dale Giebler	Representative
Rolling Hills REC	Doug Jackson	General Manager





**Table 2.13: Smith County Jurisdictional Representatives**

Jurisdiction	Representative	Title
Rural Water Districts (all)	Various, Chad Meyer (proxy)	Emergency Manager

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

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

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

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





- Pipeline and Hazardous Materials Safety Administration
- Salvation Army
- United States Army Corp of Engineers, National Resource Conservation Service
- United States Department of Agriculture
- United States Geological Survey

## 2.6 – Public Participation

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

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

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

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

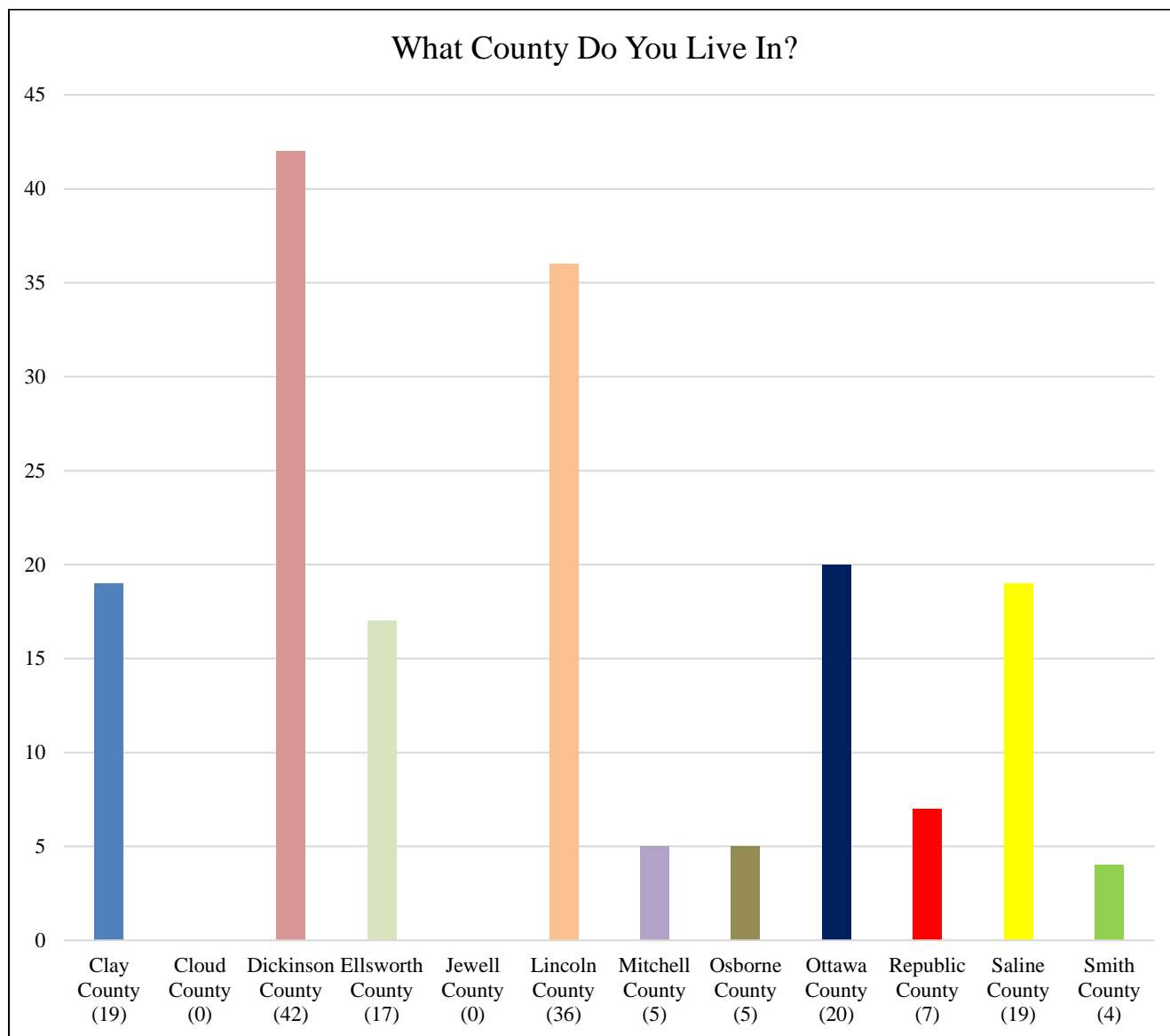
Additionally, as citizens were made more aware of potential hazards and the local process to mitigation against their impacts, it was believed that they would take a stronger role in making their homes, neighborhoods, schools, and businesses safer from the potential effects of natural hazards.

The following graphics represents the feedback received from the public from the online survey document (180 participants).



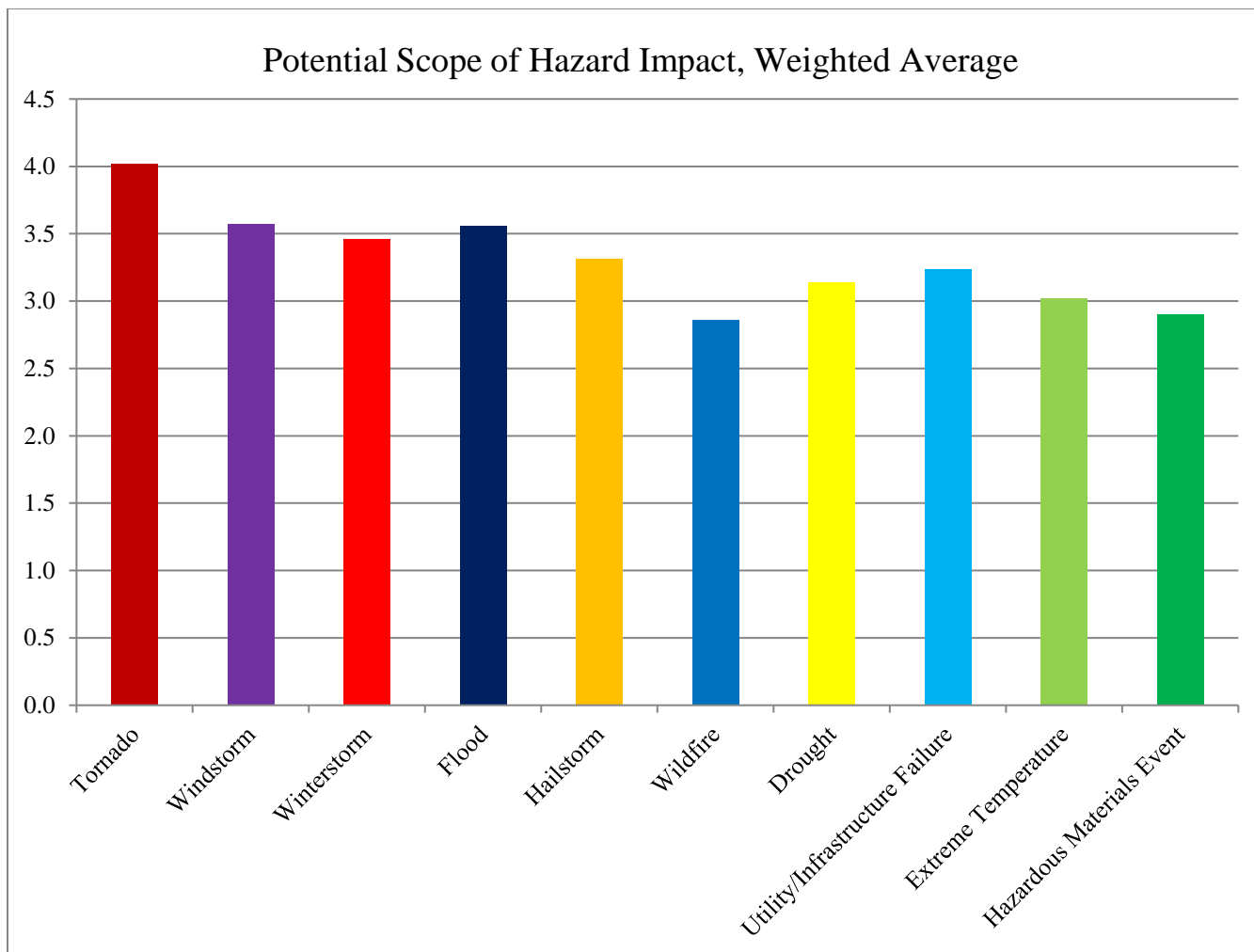


**Question 1:** In which county or jurisdiction do you live?



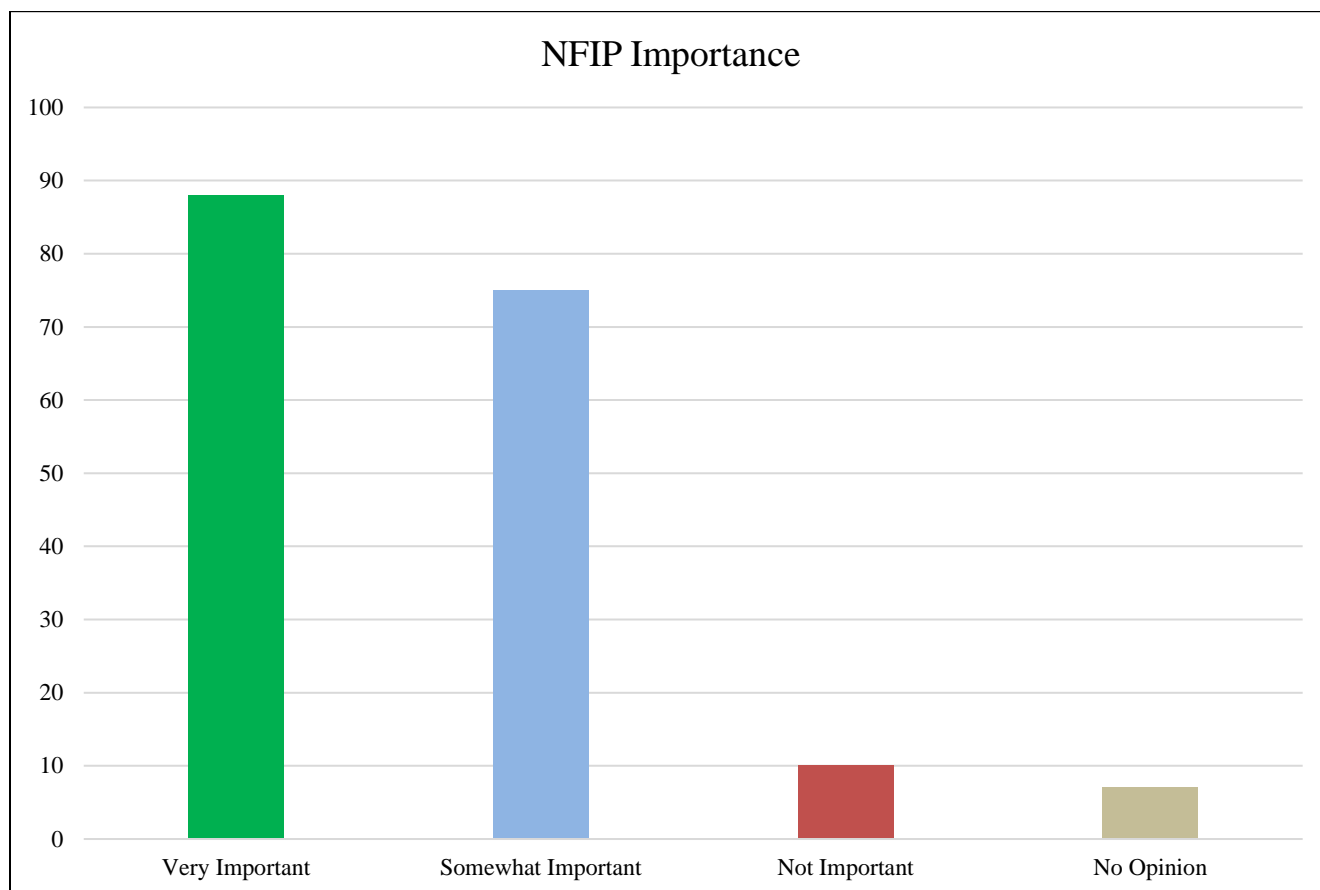


**Question 2:** In 2014, the Region consisting of Clay, Cloud, Dickinson, Ellsworth, Jewell, Lincoln, Mitchell, Osborne, Ottawa, Republic, Saline and Smith Counties, the planning committee determined that the hazards listed below are important to the area. Indicate the level of risk, or the scope of potential impacts, in the Region, that you perceive for each hazard:



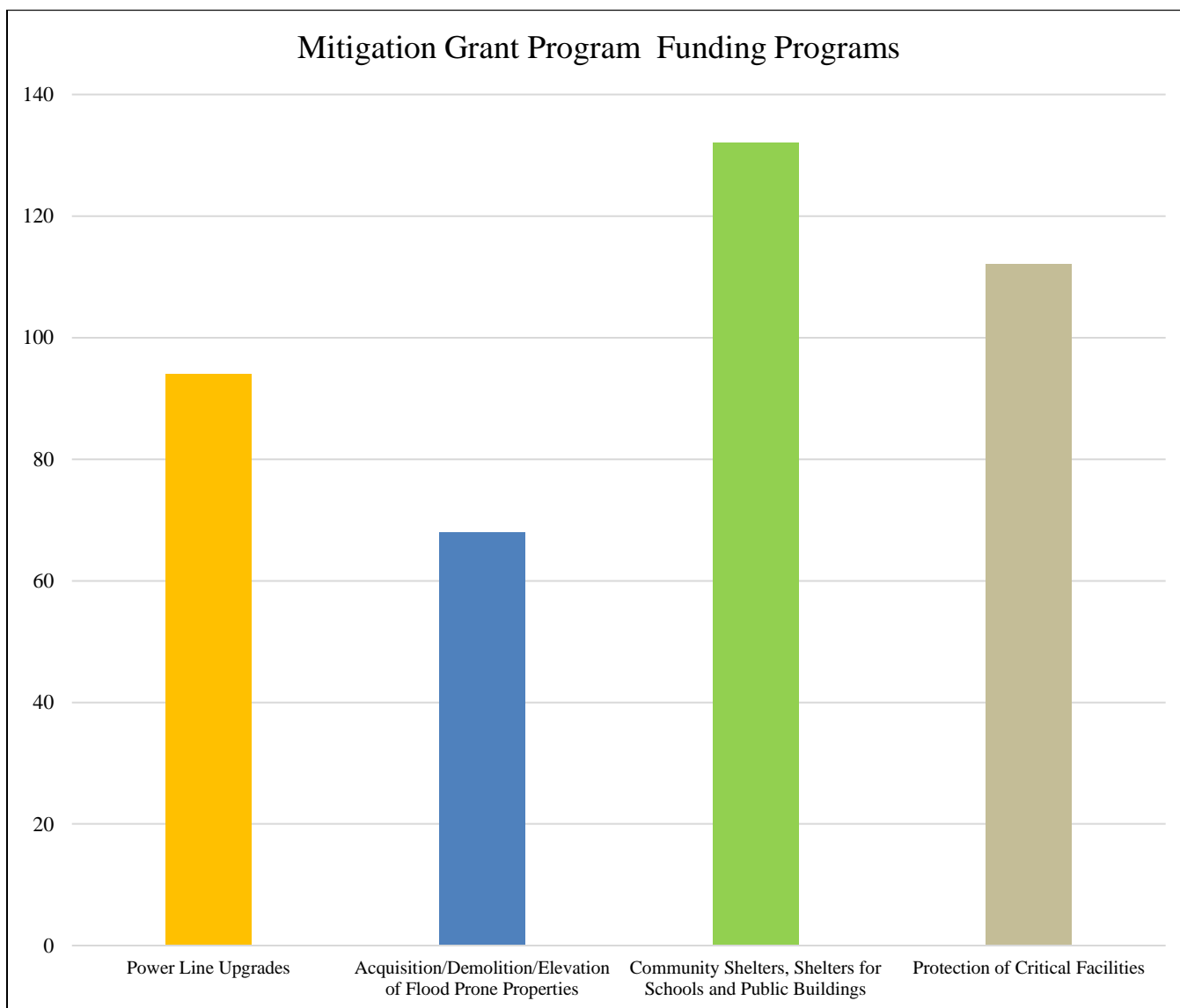


**Question 3:** In the Region, the planning committee has determined that a flood event is the third most critical hazard. How important is it for you to have your community participate in or continue to participate in the National Flood Insurance Program?





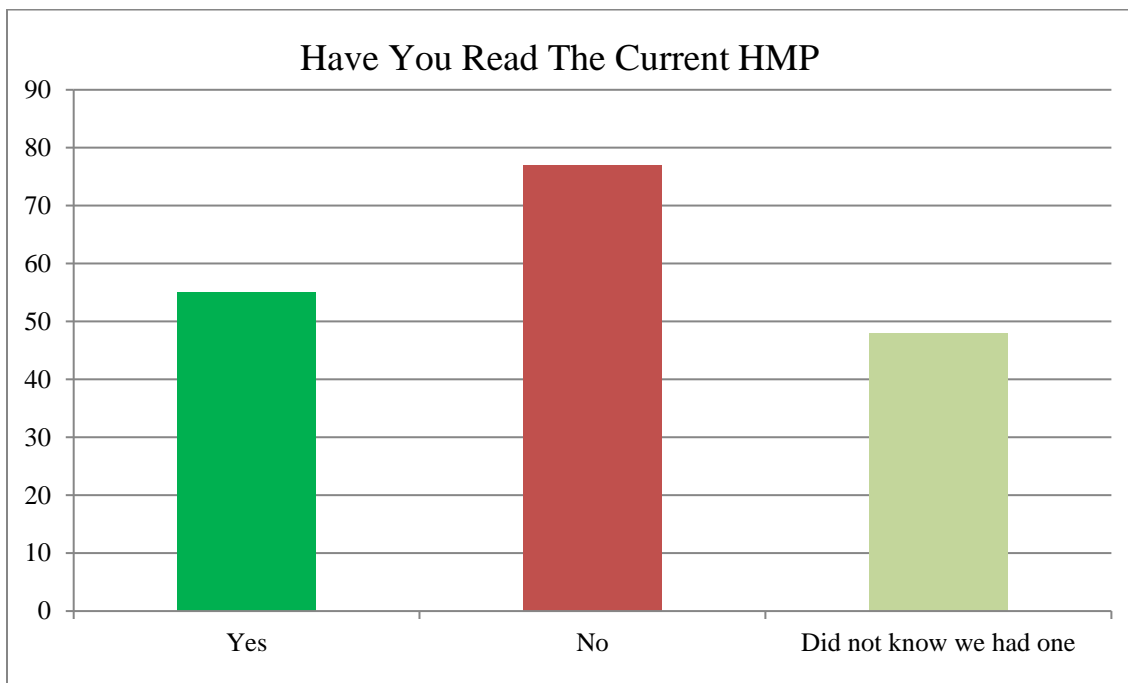
**Question 4:** The Kansas Division of Emergency Management currently reviews the application for funds for the FEMA Risk Mitigation Grant Program. Your current funding priorities are listed below. Please check those that could benefit your community.



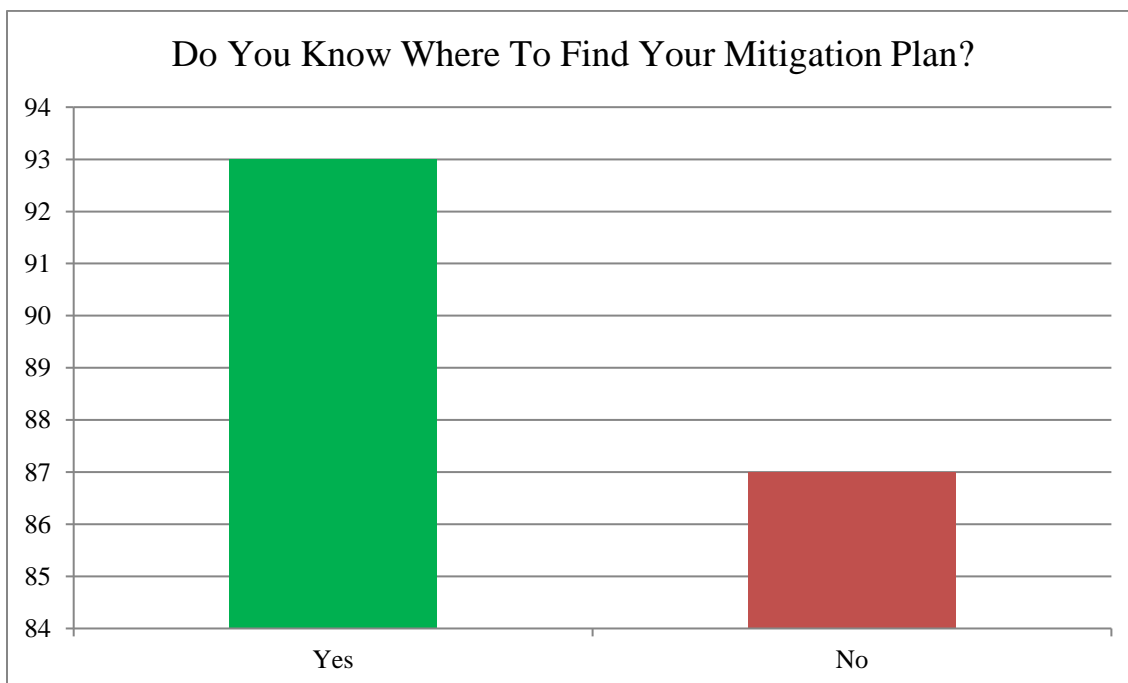




**Question 5:** Have you had the opportunity to read your current Risk Mitigation Plan?



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



In addition, respondents were given the opportunity to address any local concerns or issues of concern to them.





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

**Table 2.14: Kansas Region F Survey Comments, Areas of Concern**

Jurisdiction	Comments
Clay County	Generators and electrical work for critical service providers and infrastructure such as churches used for shelters,
Clay County	Knowledge of Earthquakes & steps to take to stay safe.
Clay County, Clay Center	Develop a strategy in preparation for a catastrophic Earthquake and also to provide healthcare, feed and house a large influx of persons if one occurs here or in neighboring county
Clay County, Wakefield	continual communication--scheduled meetings throughout the year
Dickinson County	Thank you and please continue to look out for us even when leadership often doesn't see the importance.
Dickinson County	2019 flooding has highly impacted our county and was close to flooding some communities. I feel we need to keep flood planning a high priority.
Dickinson County, Dickinson	Mitigation for damaged roadways and eroded banks that have been hit hard by the constant flooding along the Smokey hill river and flood zones, especially where commonly used roads travel through eroded areas.
Dickinson County, Manchester	I live in the city of Manchester and I'm very concerned about power outages since we are so far out, I'm guessing we would be last to get power/help.
Ellsworth County	Put in a flood retention pond
Ellsworth County	Look at working on better flood control and updated drainage etc. also implementing an emergency stock pile and staging area for sand and sandbags for public access during flood emergency's.
Ellsworth County	I believe our mitigation plan needs to be reproduced in a more accessible fashion. Some of the ESFs are not familiar at all with the content.
Lincoln County	discourage construction in flood plain and rebuilding in flood plain or flood ways of watershed ponds
Lincoln County	List a point of contacts for the public to determine what to do in an emergency. Inform the general public better.
Lincoln County	We are currently working with a FEMA grant for the tornado shelter. I think \$\$ for road repairs due to recent flooding is a huge concern and need for our county.
Lincoln County	We need an Emergency Management director.
Lincoln County, City of Lincoln	Being the fact that we reside in a mostly agricultural location. I would like to see the planning committee develop a plan for a major livestock disease outbreak. As this could have a negative impact on our County.
Lincoln County, Lincoln Center, Lincoln County Hospital	Hospitals in each of these counties are required by federal regulation to participate in an annual mass casualty event. Our county has lost it's Emergency Manager, who helped us plan that annual event. Our funding for such events is limited. These events should be part of the mitigation plan and should be appropriately funded at the local level.
Mitchell County	Recovery





**Table 2.14: Kansas Region F Survey Comments, Areas of Concern**

<b>Jurisdiction</b>	<b>Comments</b>
Mitchell County, Cawker City	Electricity, Internet and Phones.
Osborne County	Develop and practice the plans made by first responders.
Ottawa County	improvements and repairs on our roads and bridges
Ottawa County	More tornado sirens for small communities
Ottawa County	Have a Crisis team for each individual town in the county. With Training on natural hazard events. This could prevent lookie loos who cause more damage.
Ottawa County	Upgrades of roads and bridges
Ottawa County, North Central Kansas	Ottawa County would greatly benefit from having storm shelters installed across the county. Currently there are no public easily accessible storm shelters.
Republic County	Beef up the county highway department and the roads and bridges which suffered greatly during the wet spring and summer.
Republic County	Condition Of Gravel Roads...Training The Grater Operators How To Effective Do The Job.
Republic County, Rural Munden	Better communication and heads-up from KDEM when funds and grants are available.
Saline County	Thank you for reminding me of these matters.
Saline County	Reinforcing the power grid will provide additional security for citizens, especially in Salina. As whenever there is a storm the power flicks and may even go out for several hours.
Saline County	More training for community leaders on what mitigation is and examples of projects that have been done in other communities. More education for homeowners, real estate agents, renters etc. on flood hazards and the importance of flood insurance.
Saline County	Burying powerlines and replacing aging and vulnerable critical infrastructure should be a top priority
Saline County	More Outdoor Warning Sirens for the City of Salina

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

**Table 2.15: Kansas Region F Survey Comments, Requested Projects**

<b>Jurisdiction</b>	<b>Comments</b>
Clay County	This is a good list
Clay County, Clay Center	Active shooter or bomb threat. I do not think businesses in the region have developed plans or trained their employees
Clay County, Wakefield	utility failures-protection of city facilities community shelter school shelter
Clay County, City of Clay Center	Community Storm Shelters
Dickinson County	Establishment of shelters in Abilene and consistent review of shelters throughout Dickinson County
Dickinson County	Flood pump for city of Enterprise
Dickinson County	Looking father into flood planning
Dickinson County, Dickinson	More controlled burning of overgrown fields and properties to aid in limiting wildfire hazards.





**Table 2.15: Kansas Region F Survey Comments, Requested Projects**

<b>Jurisdiction</b>	<b>Comments</b>
Dickinson County, Manchester	I'm concerned about power outages.
Ellsworth County	I think each county needs to have a community shelter with generator back-up large enough to accommodate an appropriate percentage of the population likely to need sheltering. Also, it is critical that key infrastructure agencies have needed emergency back-up generator capabilities.
Ellsworth County	You've already mentioned the safe room / storm shelters; I would make sure that generator capacity is available for existing community shelters.
Lincoln County	updating of flood maps and the base flood elevation
Lincoln County	Community Storm Shelter
Lincoln County	Fix more bridges and roads
Lincoln County	I think \$\$ for road repairs due to recent flooding is a huge concern and need for our county.
Lincoln County	Food storage and First aid to the general public
Lincoln County, City of Lincoln	Improvement of and upgrading our infrastructure. Bridges and roads are of great importance. Waterlines, and functional hydrants for fire protection are of great importance as well and are in need of serious attention in the City of Lincoln. A properly equipped Fire and EMS Dept is also of great importance to me when disaster hits our community. Functional trucks and equipment should be a priority!
Mitchell County	Storm shelters
Mitchell County, Cawker City	Backup power generation.
Osborne County	I would like to see a mass notification system be put in place for Mitchell County.
Ottawa County	Internet infrastructure.
Ottawa County	community shelter county fair grounds
Ottawa County	Have a minimum of 100 sandbags in each community already filled, stored in a airtight shed. Pick up sandbags when done, dry them out and save for another time.
Republic County	Improve road width, create shoulders, replace aging bridges.
Republic County, rural Munden	Strong PA System and a severe weather shelter at the county fairgrounds.
Saline County	Road surface improvements in flood prone areas, mass notification systems in all Kansas Counties, rivers to be cleaned out of tree debris and banks re-shaped, robust education for citizens on hazards, training for volunteer fire departments on wildfires, equipment improvement for fire departments.
Saline County	Removal of all above ground and suspended powerlines to reduce the threat of weather to power outages.
Saline County	We have a few short sections of roadway that wash out regularly that could be paved.
Saline County	We are constantly working on our system and making upgrades to our existing infrastructure. This includes substation rebuilds throughout the region as well as transmission and distribution investments.
Smith County, Memorial Hospital	Better HazMat training, regional exercises on issues that we don't encounter often, or maybe have never encountered such as an SNS request exercise, training on the inventory system of the region.





## 2.7 – Planning Meetings

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

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

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

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

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

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





**Table 2.16: Kansas Region F Planning Meetings**

Meeting Number	Date	Location
1 (Kickoff)	05/22/2019	Jewell County
	05/22/2019	Lincoln County
	05/23/2019	Saline County
2 (Mid-Term)	08/22/2019	Ottawa County
3 (Final)	11/07/2019	Ottawa County
	11/07/2019	Osborne 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 F’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 F’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
- 2015 Cow Creek Watershed Flood Mapping Project

### ***Integration Challenges***

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



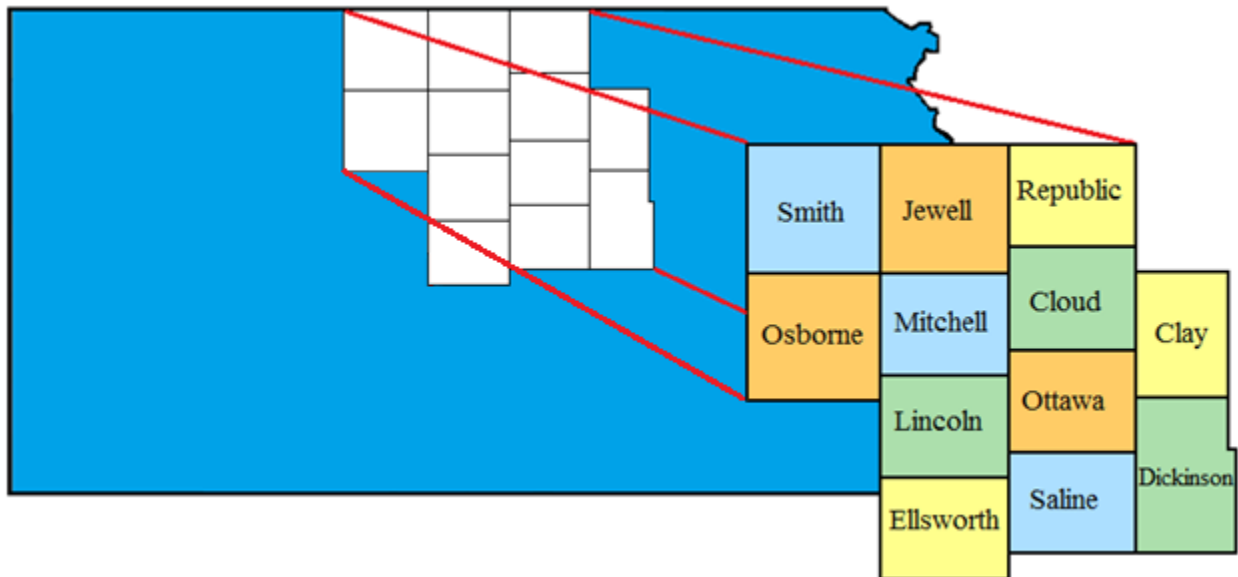
# 3.0 Planning Area

## 3.1 – Introduction

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

- Clay County
- Cloud County
- Dickinson County
- Ellsworth County
- Jewell County
- Lincoln County
- Mitchell County
- Osborne County
- Ottawa County
- Republic County
- Saline County
- Smith County

The following map details the locations of these counties.

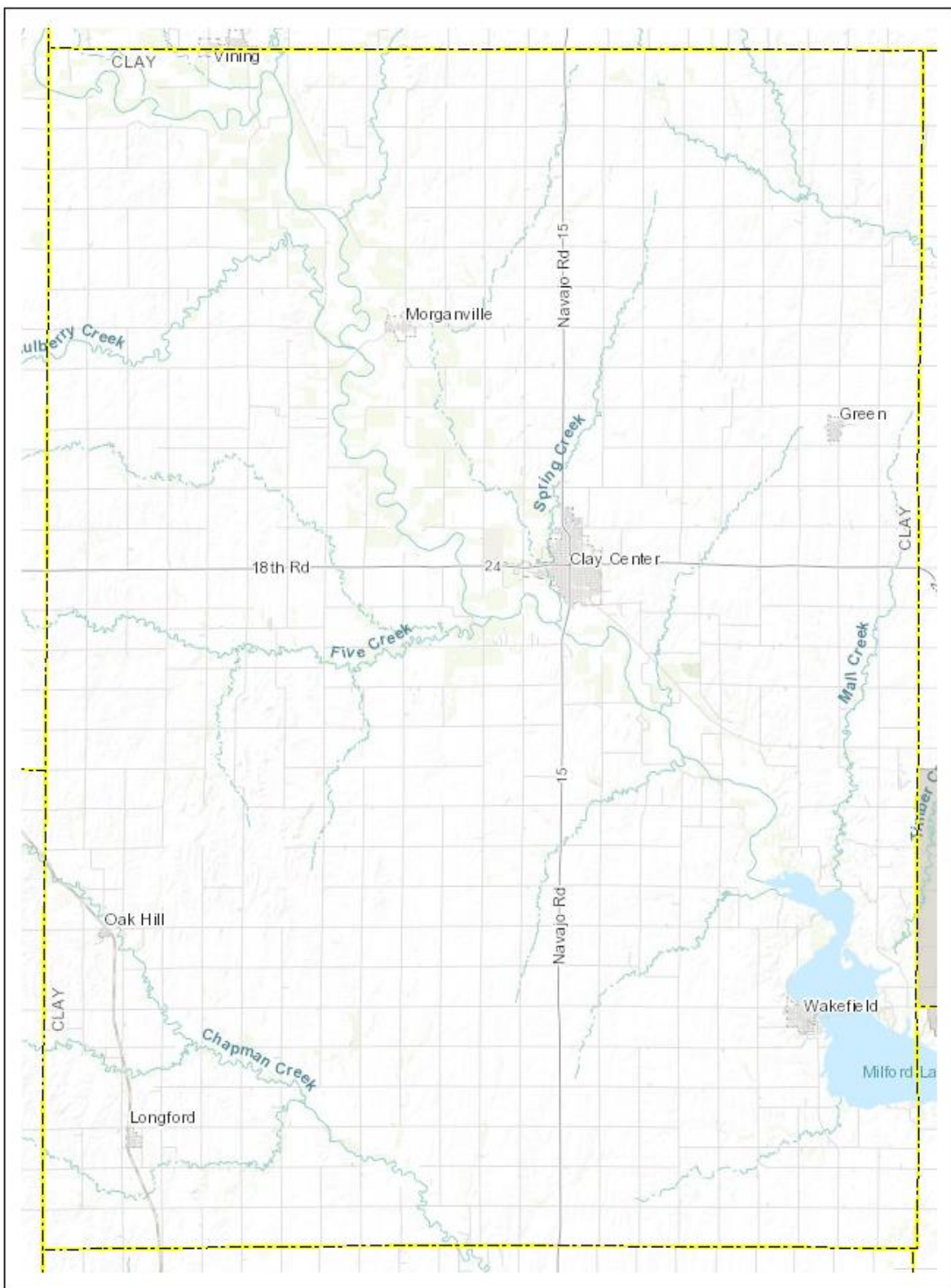






The following is a map of **Clay County**, provided by the Kansas Department of Transportation (KDOT).

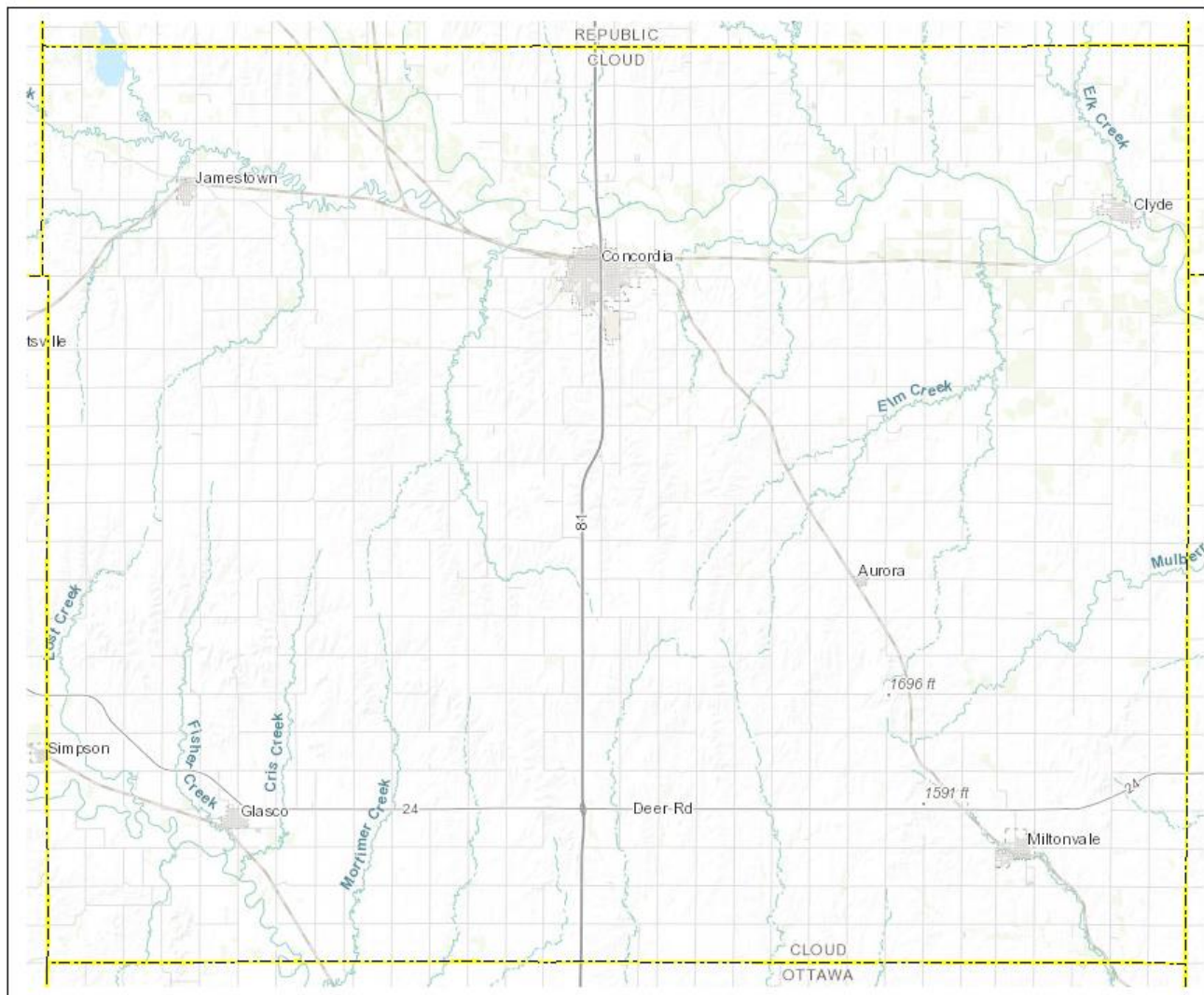
### Map of Clay County





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

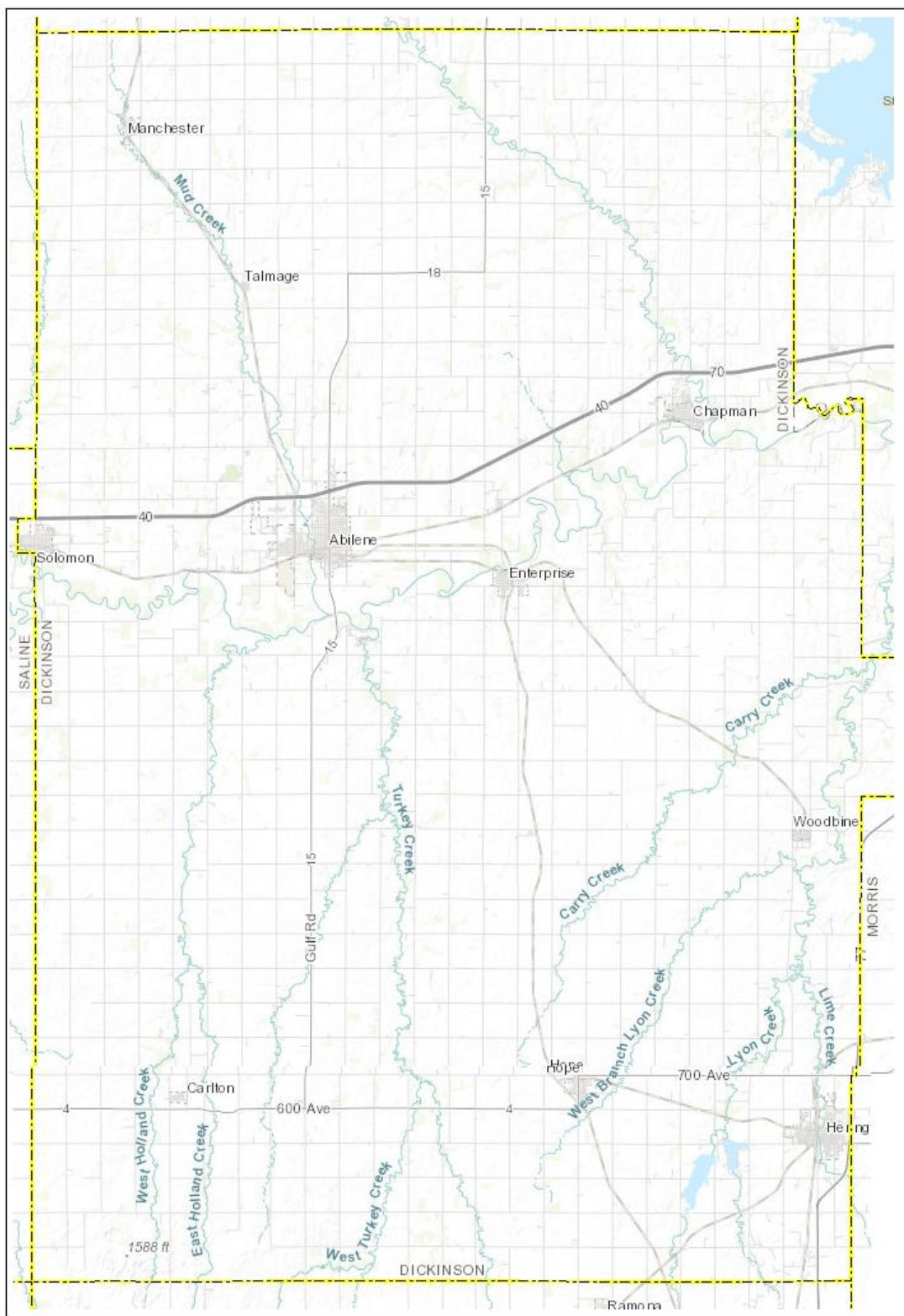
**Map of Cloud County**





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

### Map of Dickinson County

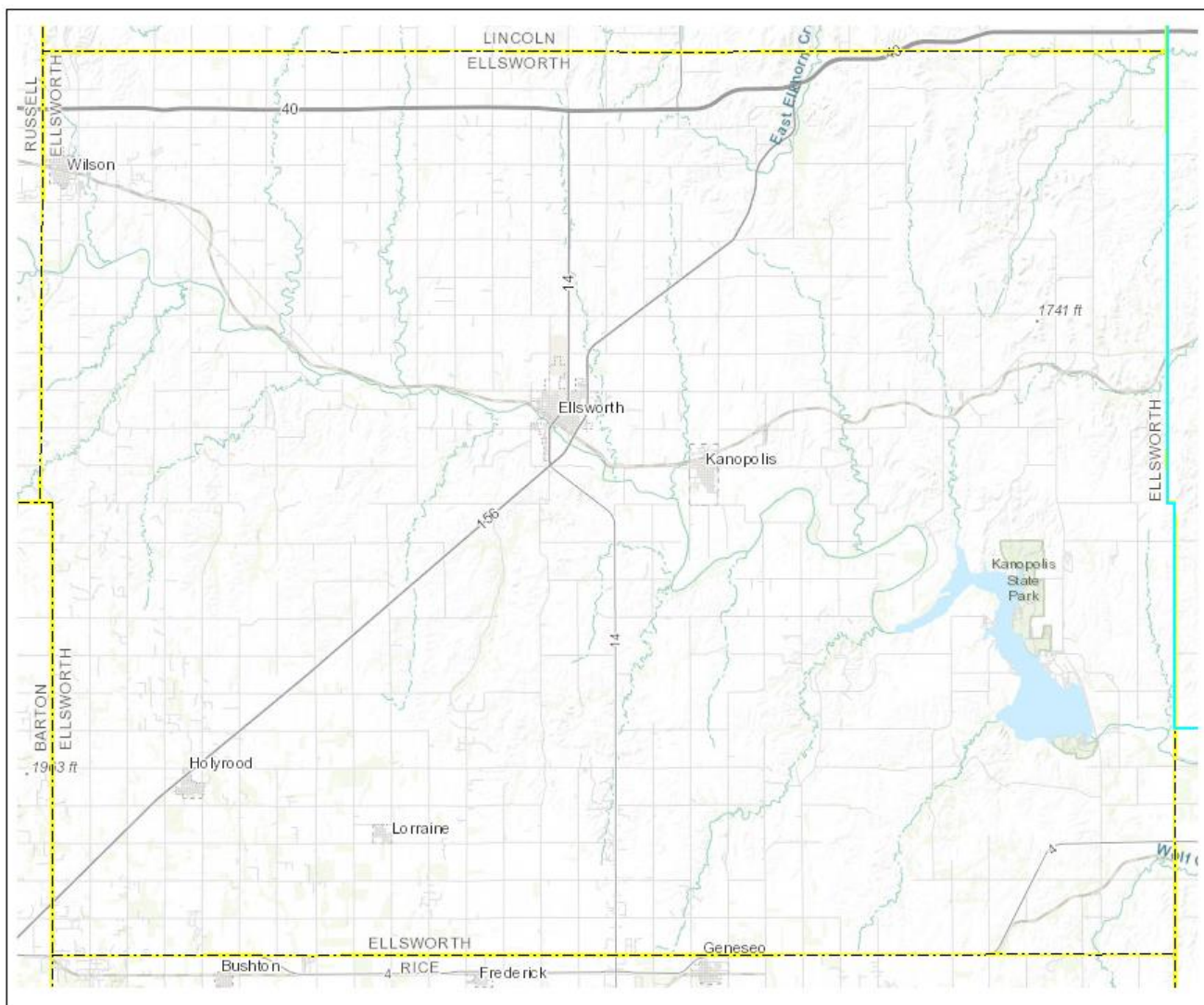






The following is a map of **Ellsworth County**, provided by KDOT.

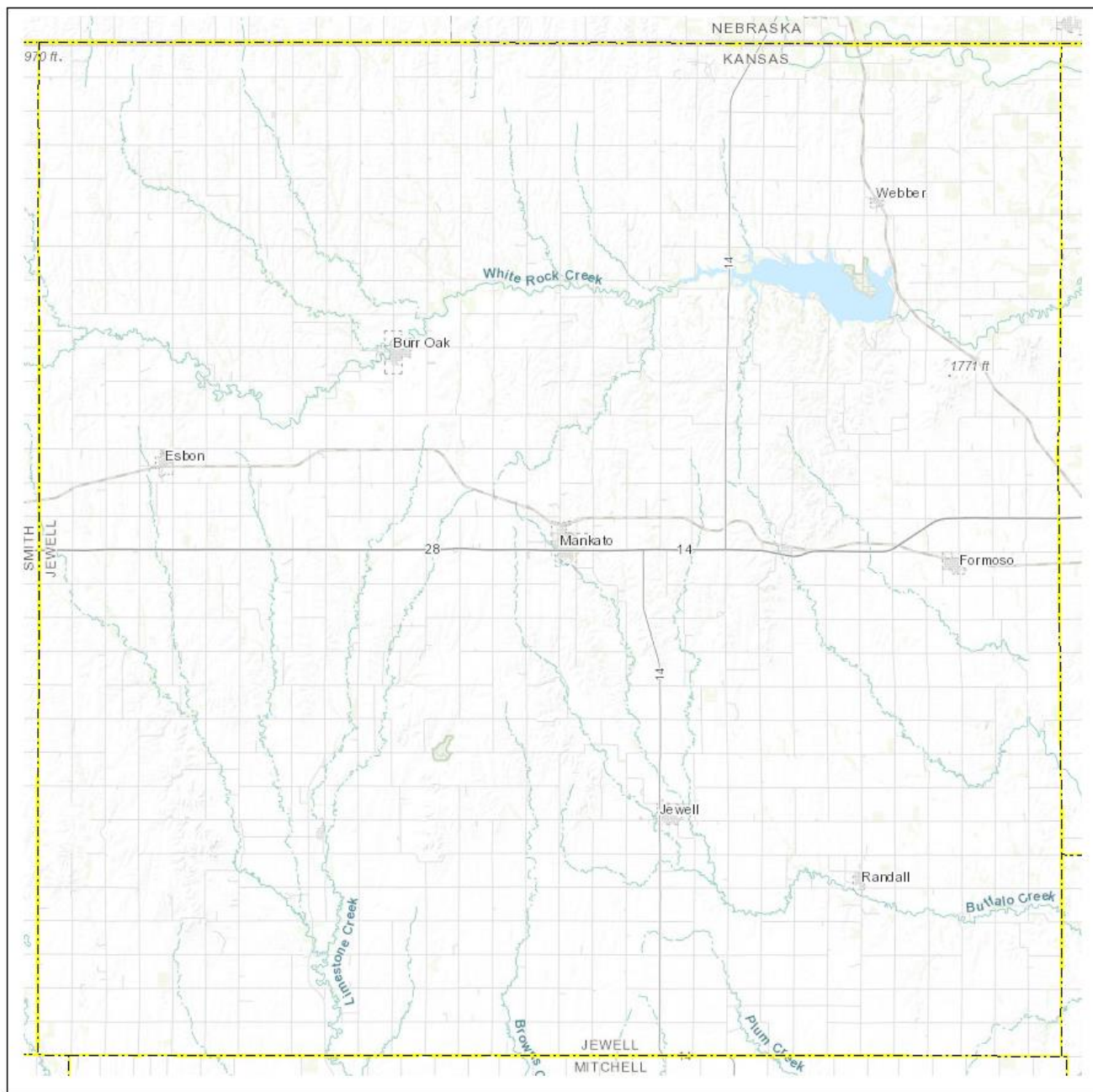
### Map of Ellsworth County





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

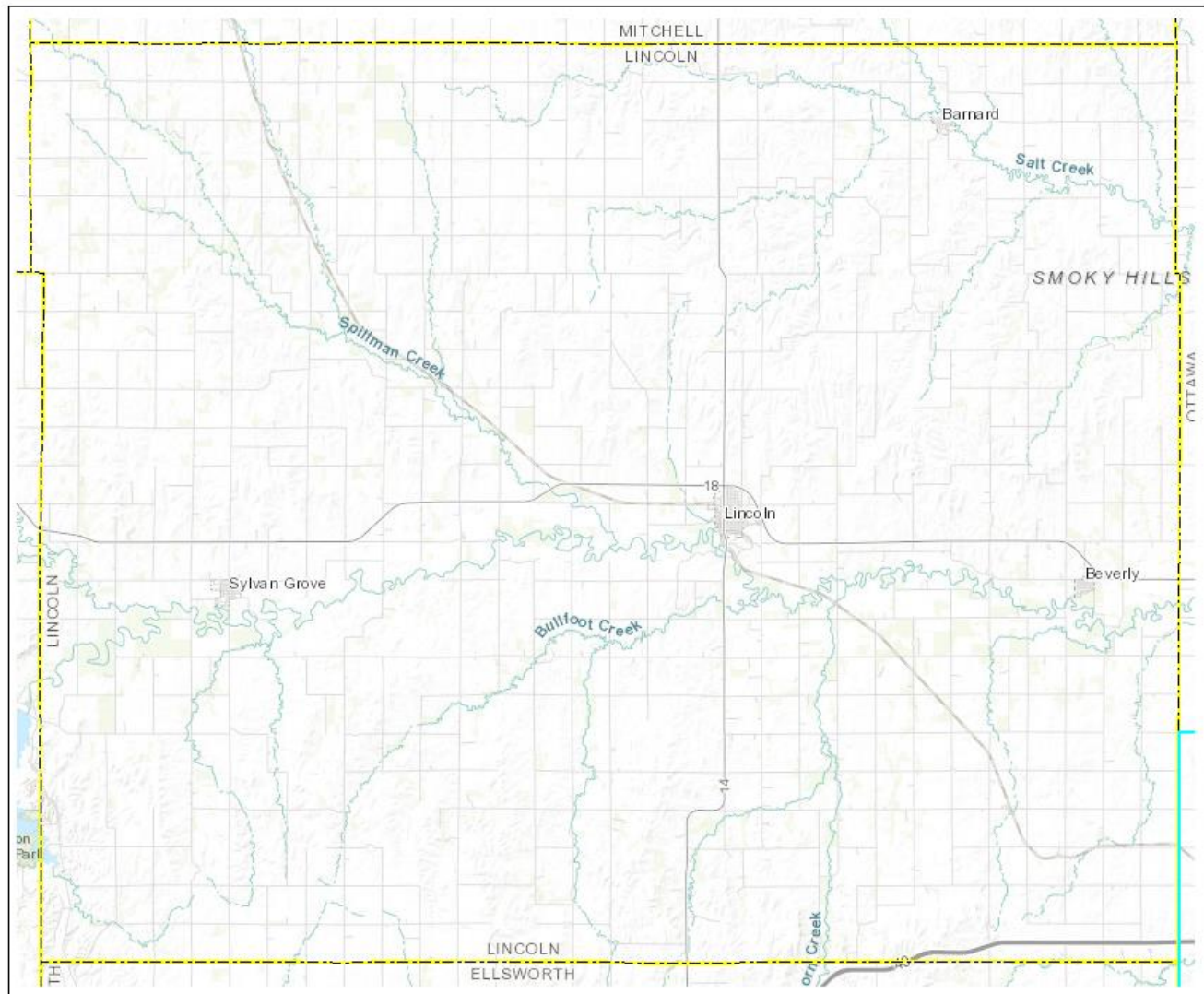
### Map of Jewell County





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

### Map of Lincoln County

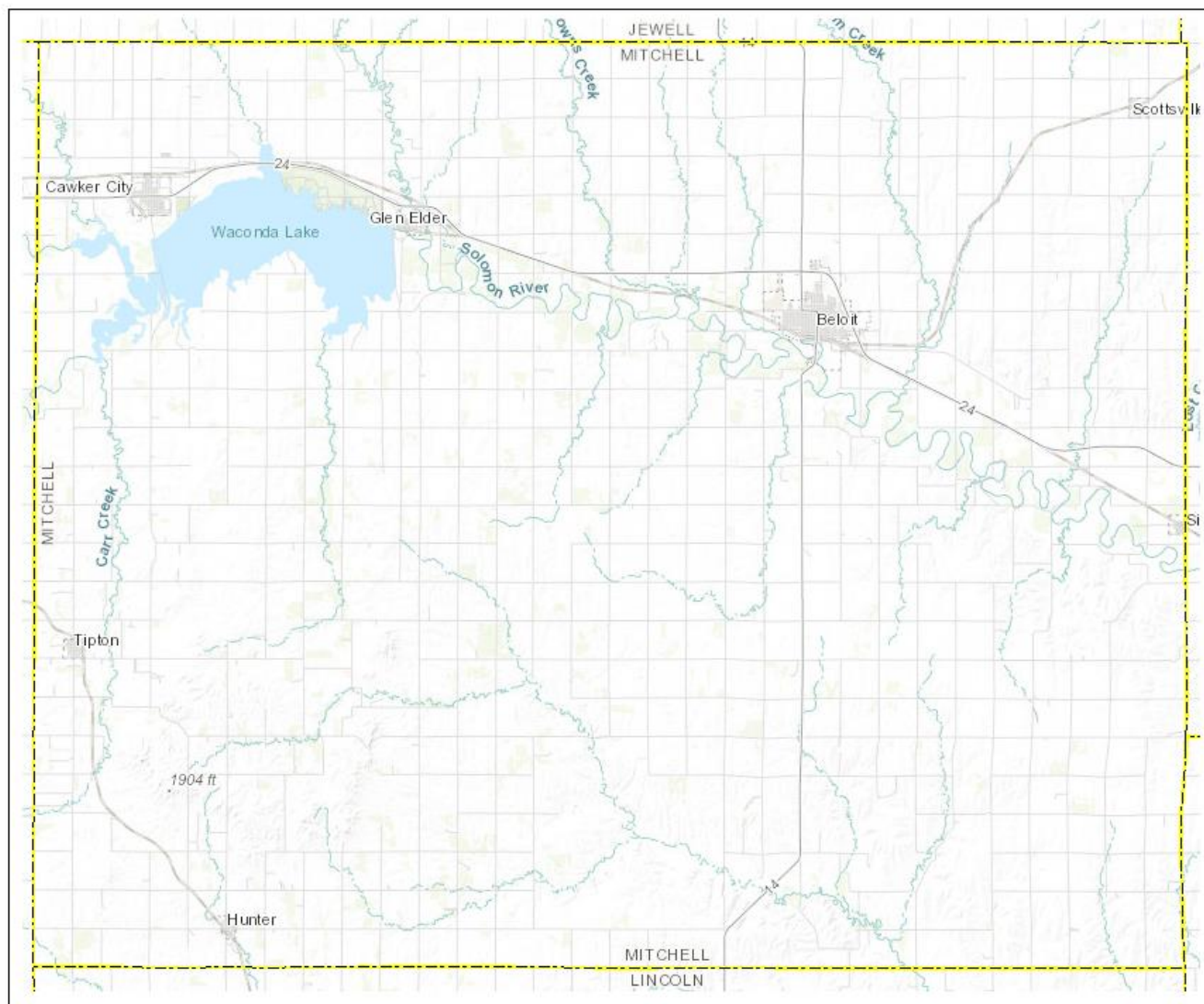






The following is a map of **Mitchell County**, provided by KDOT.

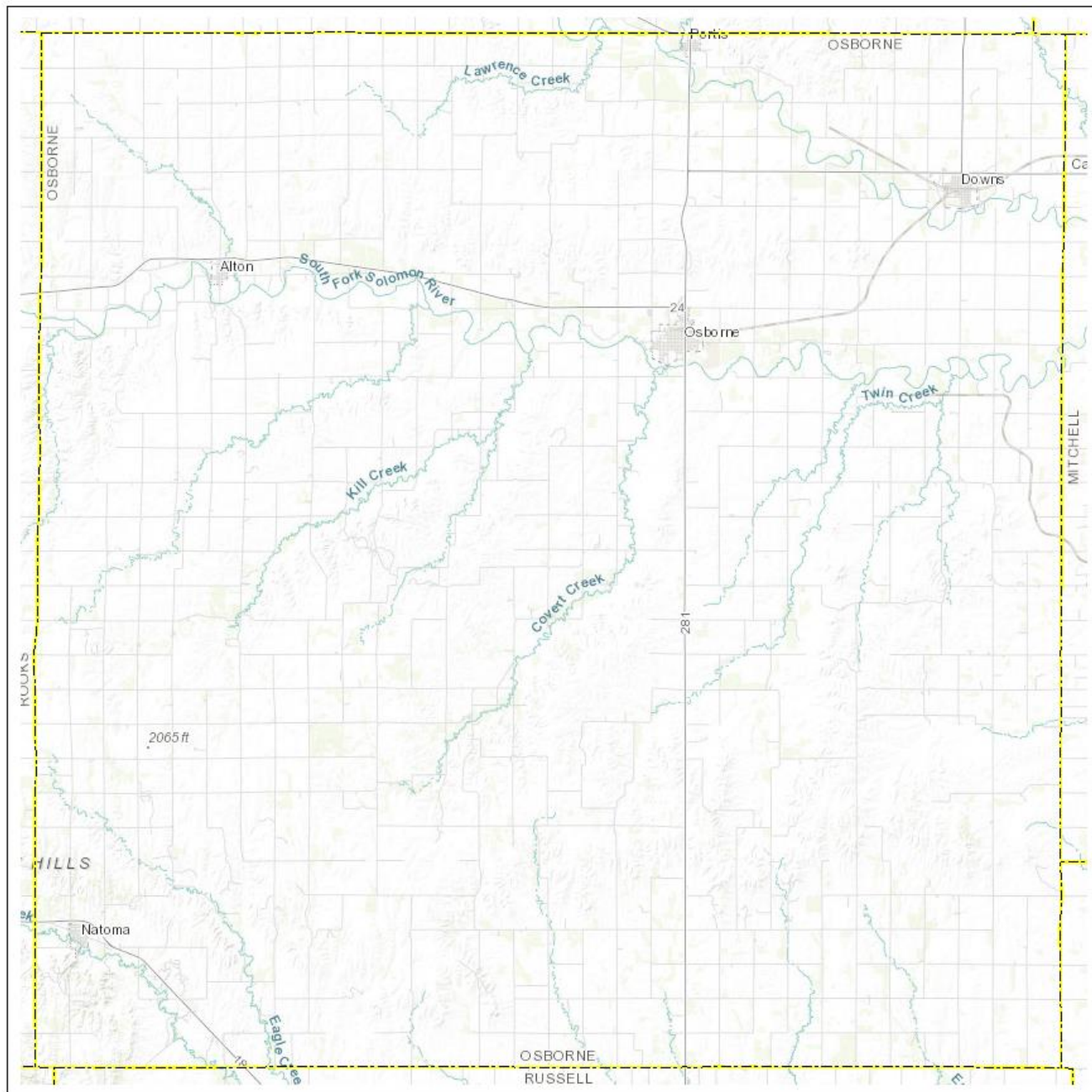
### Map of Mitchell County





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

### Map of Osborne County

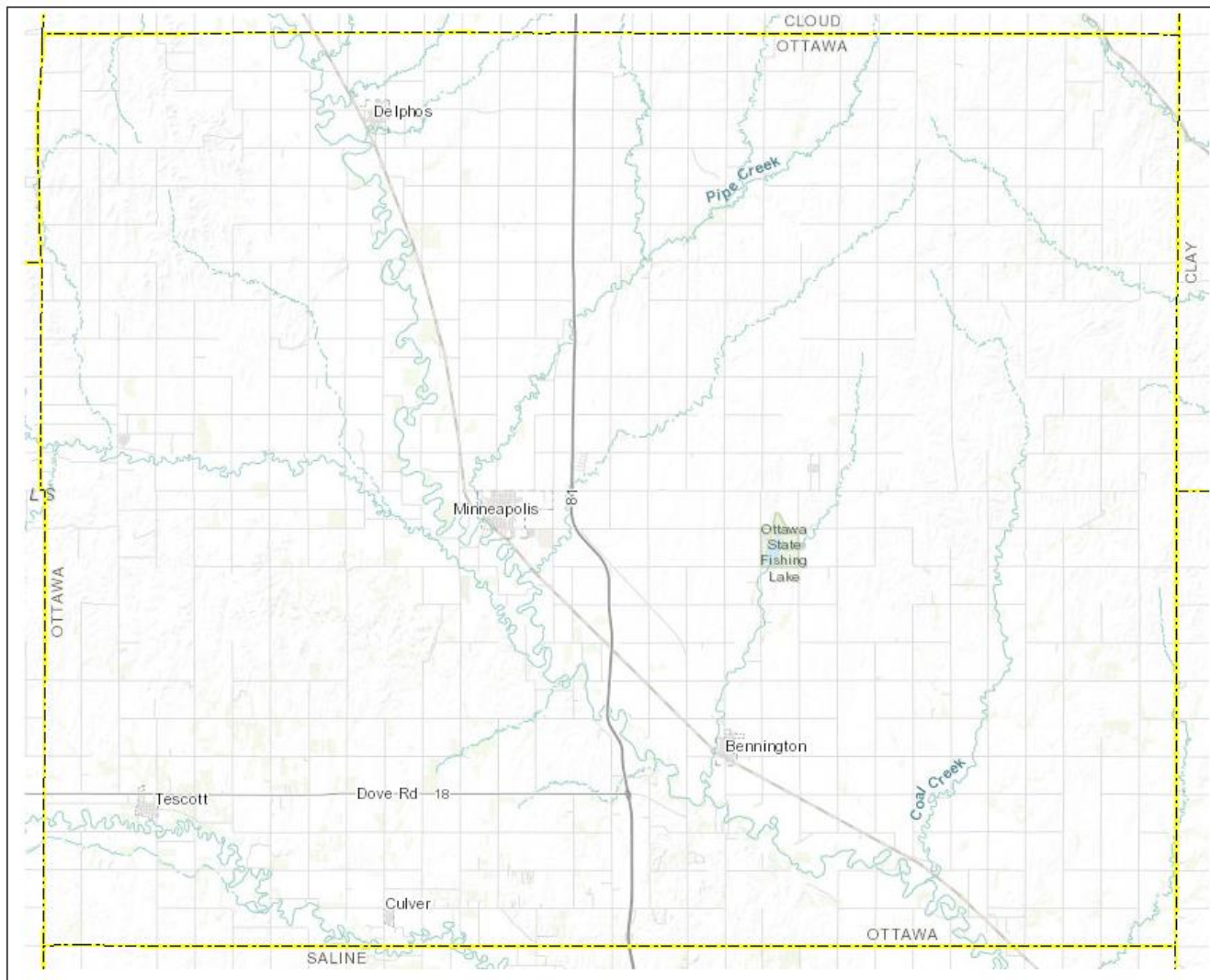






The following is a map of **Ottawa County**, provided by KDOT.

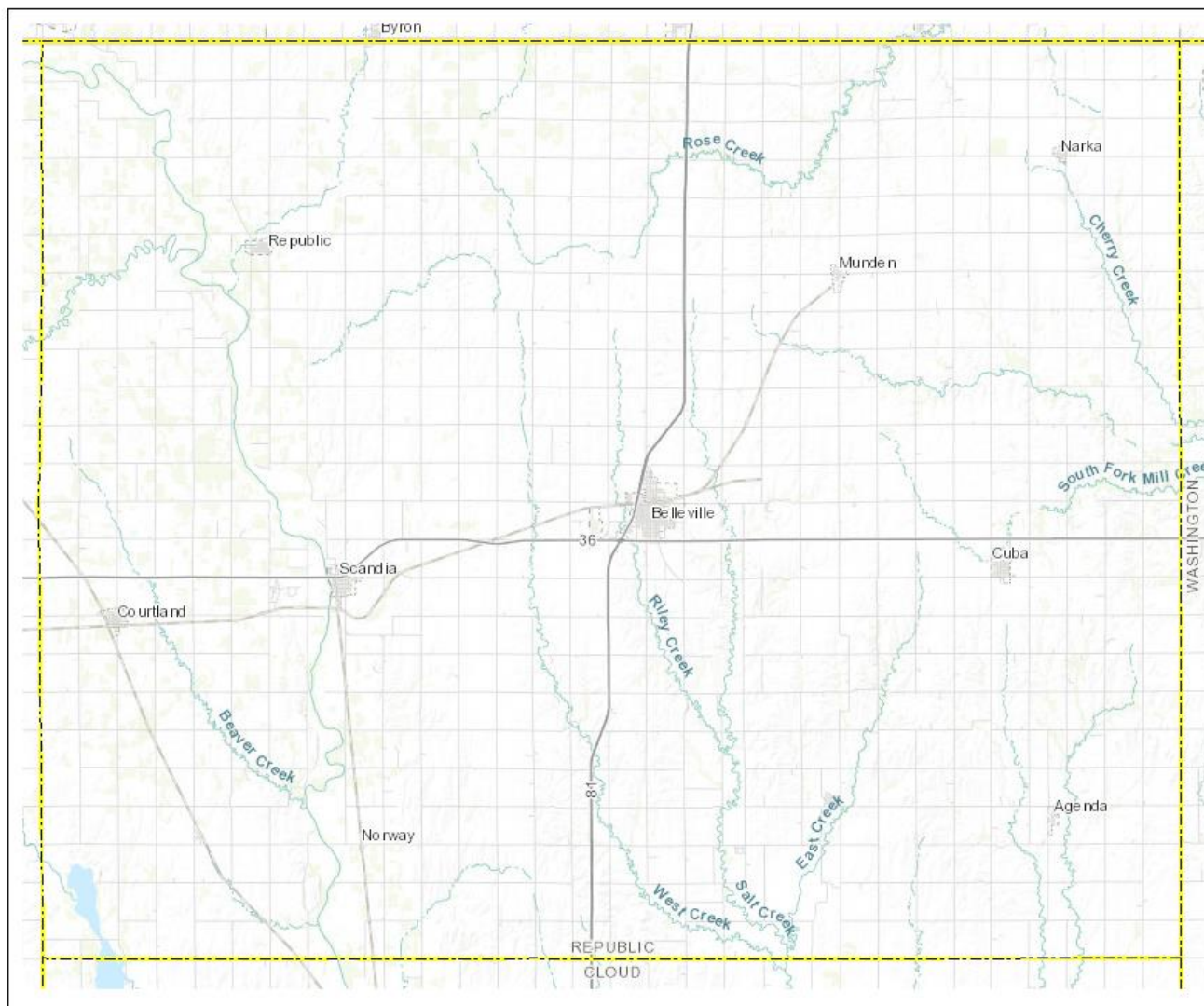
### Map of Ottawa County





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

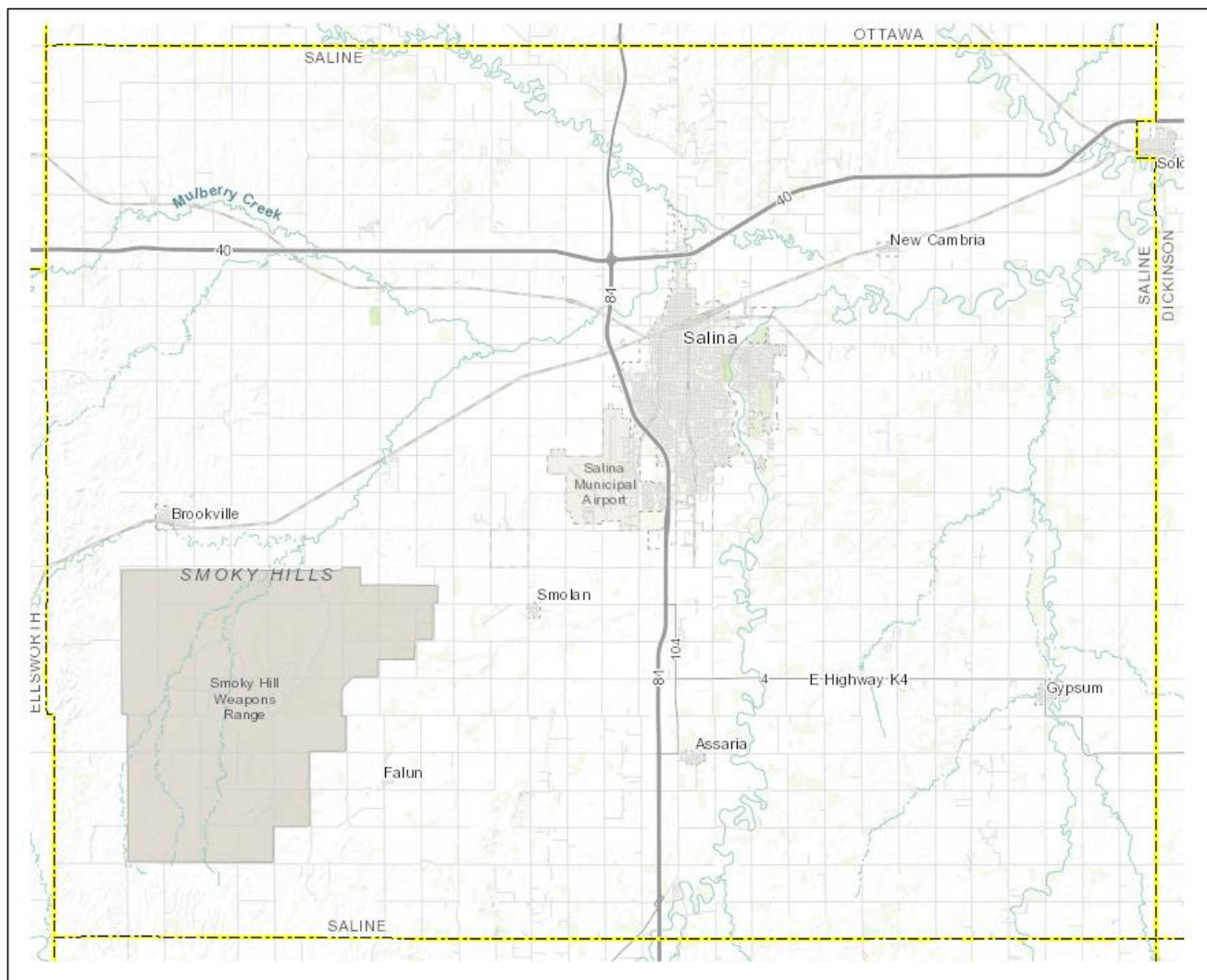
### Map of Republic County





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

### Map of Saline County

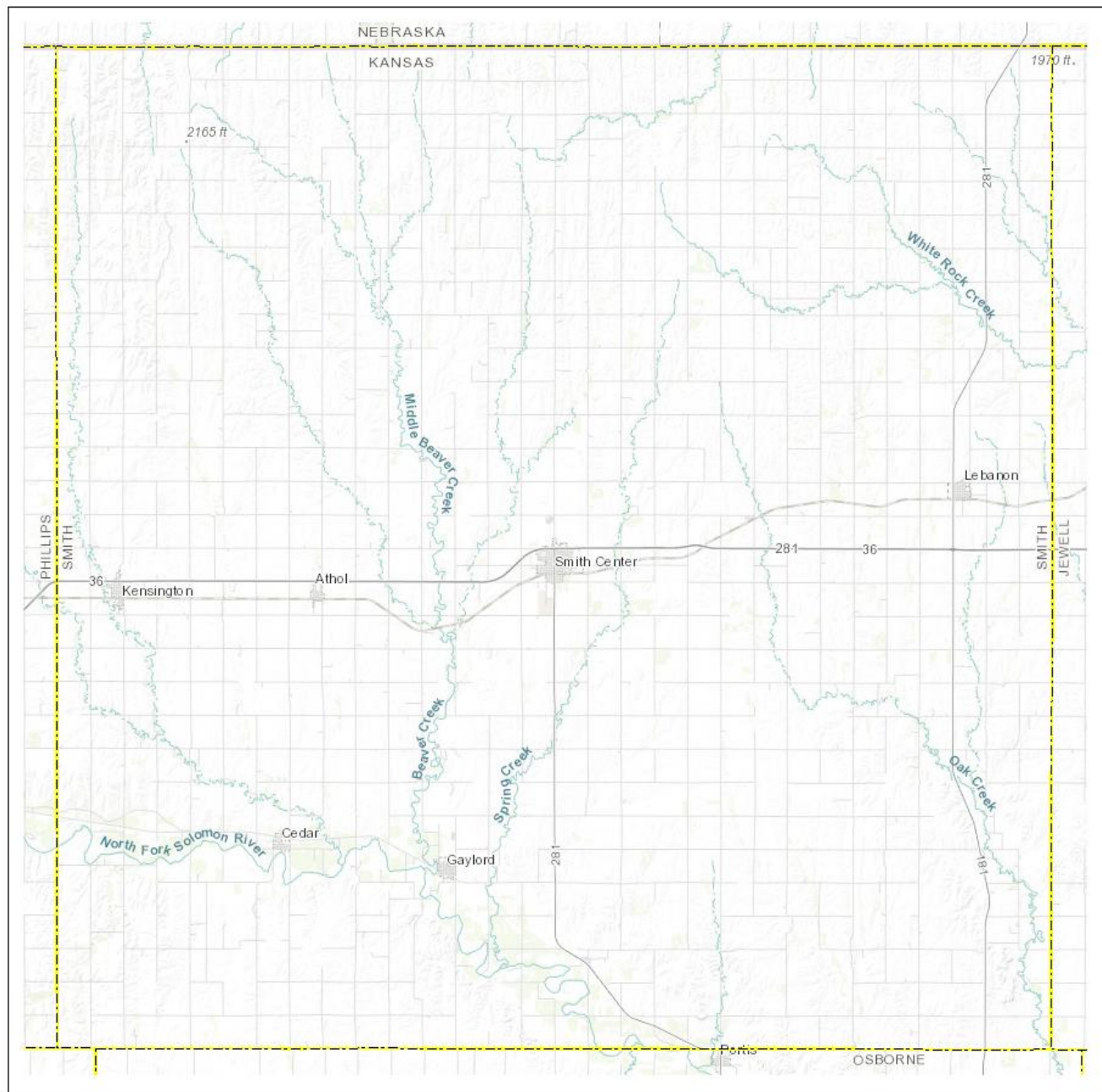






The following is a map of **Smith County**, provided by KDOT.

### Map of Smith County



## 3.2 – Regional Population Data

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



**Table 3.1: Clay County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Clay County</b>	<b>8,822</b>	<b>8,535</b>	<b>7,997</b>	<b>-825</b>	<b>-9.4%</b>	<b>12</b>
City of Clay Center	4,564	4,334	3,989	-575	-12.6%	1,295
City of Longford	94	79	72	-22	-23.4%	480
City of Morganville	198	192	188	-10	-5.1%	553
City of Oak Hill	35	24	23	-12	-34.3%	460
City of Wakefield	838	980	932	94	11.2%	1,864

Source: US Census Bureau

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

- A population loss was noted in Clay County, -9.4% as a whole
- Population losses were noted in four of the five participating cities

**Table 3.2: Cloud County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Cloud County</b>	<b>10,268</b>	<b>9,533</b>	<b>8,729</b>	<b>-1,539</b>	<b>-15.0%</b>	<b>12</b>
City of Aurora	79	36	60	-19	-24.1%	600
City of Clyde	740	716	652	-88	-11.9%	973
City of Concordia	5,714	5,395	4,956	-758	-13.3%	1,147
City of Glasco	536	498	453	-83	-15.5%	1,373
City Jamestown	399	286	260	-139	-34.8%	897
City of Miltonvale	523	539	485	-38	-7.3%	638
City of Simpson	114	86	81	-33	-28.9%	324

Source: US Census Bureau

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

- A population loss was noted in Cloud County, -15.0% as a whole
- Population losses were noted in all participating cities

**Table 3.3: Dickinson County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Dickinson County</b>	<b>19,344</b>	<b>19,754</b>	<b>18,717</b>	<b>-627</b>	<b>-3.2%</b>	<b>22</b>
City of Abilene	6,543	6,844	6,300	-243	-3.7%	1,525
City of Carlton	38	42	43	5	13.2%	269
City of Chapman	1,241	1,393	1,357	116	9.3%	1,786
City of Enterprise	836	855	794	-42	-5.0%	1,203



**Table 3.3: Dickinson County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
City of Herington	2,563	2,526	2,304	-259	-10.1%	1,118
City of Hope	372	368	334	-38	-10.2%	742
City of Manchester	102	95	96	-6	-5.9%	369
City of Solomon	1,071	1,094	1,015	-56	-5.2%	1,562
City of Woodbine	207	170	167	-40	-19.3%	1,193

Source: US Census Bureau

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

- A population loss was noted in Dickinson County, 21.4% as a whole
- Population losses were noted in seven of nine participating cities

**Table 3.4: Ellsworth County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Ellsworth County</b>	<b>6,525</b>	<b>6,497</b>	<b>6,196</b>	<b>-329</b>	<b>-5.0%</b>	<b>9</b>
City of Ellsworth	2,965	3,120	2,999	34	1.1%	1,234
City of Holyrood	464	447	422	-42	-9.1%	981
City of Kanopolis	543	492	461	-82	-15.1%	384
City of Lorraine	136	138	129	-7	-5.1%	516
City of Wilson	799	781	736	-63	-7.9%	1,227

Source: US Census Bureau

-: No data available

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

- A population loss was noted in Ellsworth County, -5.0% as a whole
- Population losses were noted in all participating cities

**Table 3.5: Jewell County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Jewell County</b>	<b>3,791</b>	<b>3,077</b>	<b>2,841</b>	<b>-950</b>	<b>-25.1%</b>	<b>3</b>
City of Burr Oak	265	174	159	-106	-40.0%	192
City of Esbon	148	99	91	-57	-38.5%	294
City of Formoso	129	93	84	-45	-34.9%	300
City of Jewell	483	432	398	-85	-17.6%	926
City of Mankato	946	869	807	-139	-14.7%	799
City of Randall	90	65	62	-28	-31.1%	344



**Table 3.5: Jewell County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
City of Weber	37	25	23	-14	-37.8%	209

Source: US Census Bureau

-: No data available

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

- A population loss was noted in Jewell County, -25.1% as a whole
- Population losses were noted in all participating cities

**Table 3.6: Lincoln County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Lincoln County</b>	<b>3,578</b>	<b>3,241</b>	<b>3,023</b>	<b>-555</b>	<b>-15.5%</b>	<b>4</b>
City of Barnard	123	70	65	-58	-47.2%	295
City of Beverly	199	162	148	-51	-25.6%	740
City of Lincoln Center	1,349	1,297	1,202	-147	-10.9%	969
City of Sylvan Grove	324	279	272	-52	-16.0%	735

Source: US Census Bureau

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

- A population loss was noted in Lincoln County, -15.5% as a whole
- Population losses were noted in all participating cities

**Table 3.7: Mitchell County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Mitchell County</b>	<b>6,932</b>	<b>6,373</b>	<b>6,150</b>	<b>-782</b>	<b>-11.3%</b>	<b>9</b>
City of Beloit	4,019	3,835	3,726	-293	-7.3%	932
City of Cawker City	521	469	447	-74	-14.2%	452
City of Glen Elder	439	445	433	-6	-1.4%	1,110
City of Hunter	77	57	56	-21	-27.3%	267
City of Scottsville	21	25	24	3	14.3%	96
City of Simpson	114	86	81	-33	-28.9%	352
City of Tipton	243	210	198	-45	-18.5%	792

Source: US Census Bureau

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





- A population loss was noted in Mitchell County, -11.3% as a whole
- Population losses were noted in six of seven participating cities

**Table 3.8: Osborne County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Osborne County</b>	<b>4,452</b>	<b>3,858</b>	<b>3,475</b>	<b>-977</b>	<b>-21.9%</b>	<b>4</b>
City of Alton	117	103	92	-25	-21.4%	297
City of Downs	1,038	900	822	-216	-20.8%	747
City of Natoma	367	335	299	-68	-18.5%	712
City of Osborne	1,607	1,431	1,291	-316	-19.7%	861

Source: US Census Bureau

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

- A population loss was noted in Osborne County, -21.9% as a whole
- Population losses were noted in all participating cities

**Table 3.9: Ottawa County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Ottawa County</b>	<b>6,163</b>	<b>6,091</b>	<b>5,802</b>	<b>-361</b>	<b>-5.9%</b>	<b>8</b>
City of Bennington	623	672	626	3	0.5%	1,490
City of Culver	164	121	117	-47	-28.7%	780
City of Delphos	469	359	336	-133	-28.4%	525
City of Minneapolis	2,046	2,032	1,933	-113	-5.5%	1,098
City of Tescott	339	319	298	-41	-12.1%	828

Source: US Census Bureau

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

- A population loss was noted in Ottawa County, -5.9% as a whole
- Population losses were noted in four of five participating cities

**Table 3.10: Republic County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Republic County</b>	<b>5,835</b>	<b>4,980</b>	<b>4,664</b>	<b>-1,171</b>	<b>-20.1%</b>	<b>6</b>
City of Agenda	81	68	66	-15	-18.5%	440
City of Bellville	2,239	1,991	1,887	-352	-15.7%	953
City of Courtland	334	285	267	-67	-20.1%	989





**Table 3.10: Republic County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
City of Cuba	231	156	145	-86	-37.2%	483
City of Munden	122	100	93	-29	-23.8%	465
City of Narka	93	94	86	-7	-7.5%	478
City of Republic	161	116	108	-53	-32.9%	415
City of Scandia	436	372	345	-91	-20.9%	734

Source: US Census Bureau

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

- A population loss was noted in Republic County, -20.1% as a whole
- Population losses were noted in all participating cities

**Table 3.11: Saline County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Saline County</b>	<b>53,597</b>	<b>55,606</b>	<b>54,401</b>	<b>804</b>	<b>1.5%</b>	<b>75</b>
City of Assaria	438	413	407	-31	-7.1%	2,035
City of Brookville	259	262	254	-5	-1.9%	431
City of Gypsum	414	405	391	-23	-5.6%	909
City of New Cambria	150	126	123	-27	-18.0%	1,230
City of Salina	46,679	47,707	46,716	37	0.1%	2,052
City of Smolan	218	215	210	-8	-3.7%	1,500

Source: US Census Bureau

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

- A population gain was noted in Saline County, 1.5% as a whole
- Population losses were noted in five of six participating cities

**Table 3.12: Smith County Population Data**

Jurisdiction	Population 2000	Population 2010	Population 2018	Numeric Population Change 2000 - 2018	Percent Population Change 2000 to 2018	Population Density, per Square Mile 2018
<b>Smith County</b>	<b>4,536</b>	<b>3,853</b>	<b>3,603</b>	<b>-933</b>	<b>-20.6%</b>	<b>4</b>
City of Cedar	26	14	13	-13	-50.0%	72
City of Gaylord	145	114	105	-40	-27.6%	420
City of Kensington	529	473	439	-90	-17.0%	1,372
City of Lebanon	303	218	199	-104	-34.3%	622
City of Smith Center	1,931	1,665	1,581	-350	-18.1%	1,363

Source: US Census Bureau





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

- A population loss was noted in Smith County, -20.6% as a whole
- Population losses were noted in all participating cities

### 3.3 – At-Risk Population Data

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

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

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

The following tables present information on select potential at risk populations within each participating Region F jurisdiction, by county. The higher a jurisdiction’s at-risk population the greater the potential vulnerability to identified hazards.

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

Jurisdiction	Percentage of Population 5 and Under (2018)	Percentage of Population 65+ (2018)	Percentage of Population Speaking Language Other Than English (2018)	Percentage of Population Living Below Poverty Level (2018)	Persons with a Disability, Under the Age of 65 (2018)
Clay County	6.5%	23.0%	2.9%	10.6%	10.6%
Cloud County	5.6%	21.6%	2.8%	12.6%	9.5%
Dickinson County	5.9%	19.8%	2.8%	9.9%	12.3%
Ellsworth County	4.6%	20.9%	3.2%	11.5%	11.3%
Jewell County	5.5%	30.1%	1.8%	12.8%	11.4%
Lincoln County	5.4%	24.4%	3.2%	11.8%	10.7%
Mitchell County	6.9%	23.6%	2.9%	12.0%	7.5%
Osborne County	5.5%	25.0%	1.3%	12.5%	12.7%
Ottawa County	4.9%	20.4%	80.0%	11.4%	7.8%
Republic County	5.5%	27.7%	2.5%	11.7%	10.5%
Saline County	6.1%	17.9%	9.7%	11.8%	9.6%
Smith County	5.7%	27.7%	90.0%	12.8%	13.0%

Source: US Census Bureau

Of note for Kansas Region F and its participating jurisdictions:

- Regionally, 5.7% of the total population is under the age of 5
- Regionally, 23.5% of the total population is above the age of 65





- Regionally, 2.9% of the total population speak a language other than English at home
- Regionally, 10.6% of the total population is living below the poverty line
- Regionally, 11.8% of persons under the age of 65 have an identified disability

### 3.4 – Regional Housing Data

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

**Table 3.14: Clay County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Clay County</b>	<b>4,084</b>	<b>4,069</b>	<b>-15</b>	<b>-0.4%</b>	<b>3.4%</b>	<b>6</b>
Elsmore	2191	2152	-39	-1.8%	2.1%	699
Gas	54	52	-2	-3.7%	17.3%	347
Humboldt	88	102	14	15.9%	1.0%	300
Iola	20	37	17	85.0%	18.9%	740
LaHarpe	362	499	137	37.8%	8.0%	998
Moran	4,084	4,069	-15	-0.4%	3.4%	6
Savonburg	2191	2152	-39	-1.8%	2.1%	699

Source: US Census Bureau

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

- A housing loss was noted in Clay County, -0.4% as a whole
- Housing losses were noted in four of seven participating cities

**Table 3.15: Cloud County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Cloud County</b>	<b>4,838</b>	<b>4,637</b>	<b>-201</b>	<b>-4.2%</b>	<b>2.1%</b>	<b>6</b>
City of Aurora	39	52	13	33.3%	1.2%	520
City of Clyde	377	415	38	10.1%	1.2%	619
City of Concordia	2671	2538	-133	-5.0%	1.8%	588
City of Glasco	285	298	13	4.6%	0.7%	903
City Jamestown	169	169	0	0.0%	5.3%	583
City of Miltonvale	266	352	86	32.3%	2.0%	463
City of Simpson	58	48	-10	-17.2%	12.5%	192

Source: US Census Bureau





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

- A housing loss was noted in Cloud County, -4.2% as a whole
- Housing losses were noted in two of seven participating cities

**Table 3.16: Dickinson County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Dickinson County</b>	<b>8,686</b>	<b>9,173</b>	<b>487</b>	<b>5.6%</b>	<b>6.5%</b>	<b>11</b>
City of Abilene	3104	3239	135	4.3%	4.5%	784
City of Carlton	20	20	0	0.0%	5.0%	125
City of Chapman	534	618	84	15.7%	7.0%	813
City of Enterprise	334	362	28	8.4%	7.5%	548
City of Herington	1305	1402	97	7.4%	5.3%	681
City of Hope	185	220	35	18.9%	7.7%	489
City of Manchester	52	77	25	48.1%	20.8%	296
City of Solomon	451	439	-12	-2.7%	2.5%	675
City of Woodbine	89	84	-5	-5.6%	0.0%	600

Source: US Census Bureau

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

- A small gain was noted in Dickinson County, 5.6% as a whole
- Housing gains were noted in seven of nine participating cities

**Table 3.17: Ellsworth County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Ellsworth County</b>	<b>3,228</b>	<b>3,231</b>	<b>3231</b>	<b>0.1%</b>	<b>9.8%</b>	<b>4</b>
City of Ellsworth	1,141	1,200	59	5.2%	3.7%	494
City of Holyrood	265	297	32	12.1%	3.0%	691
City of Kanopolis	295	274	-21	-7.1%	2.9%	228
City of Lorraine	66	80	14	21.2%	6.3%	320
City of Wilson	406	361	-45	-11.1%	5.8%	602

Source: US Census Bureau

-: No data available

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

- A small housing gain was noted in Ellsworth County, 0.1% as a whole
- Housing gains were noted in three of five participating cities



**Table 3.18: Jewell County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Jewell County</b>	<b>2,103</b>	<b>2,033</b>	<b>-70</b>	<b>-3.3%</b>	<b>8.4%</b>	<b>2</b>
City of Burr Oak	163	152	-11	-6.7%	10.5%	183
City of Esbon	87	102	15	17.2%	0.0%	329
City of Formoso	78	58	-20	-25.6%	13.0%	207
City of Jewell	267	314	47	17.6%	3.8%	730
City of Mankato	509	500	-9	-1.8%	3.4%	495
City of Randall	72	56	-16	-22.2%	3.6%	311
City of Weber	25	34	9	36.0%	35.3%	309

-: No data available

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

- A housing loss was noted in Jewell County, -3.3% as a whole
- Housing losses were noted in four of seven participating cities

**Table 3.19: Lincoln County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Lincoln County</b>	<b>1,853</b>	<b>1,853</b>	<b>0</b>	<b>0.0%</b>	<b>6.4%</b>	<b>3</b>
City of Barnard	77	61	-16	-20.8%	1.6%	277
City of Beverly	88	100	12	13.6%	14.0%	500
City of Lincoln Center	724	774	50	6.9%	3.1%	624
City of Sylvan Grove	195	194	-1	-0.5%	6.7%	524

Source: US Census Bureau

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

- Housing amounts remained static in Lincoln County
- Housing losses were noted in two of four participating cities

**Table 3.20: Mitchell County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Mitchell County</b>	<b>3,340</b>	<b>3,299</b>	<b>-41</b>	<b>-1.2%</b>	<b>4.1%</b>	<b>5</b>
City of Beloit	1851	1995	144	7.8%	1.0%	499
City of Cawker City	521	363	-158	-30.3%	11.6%	367



**Table 3.20: Mitchell County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
City of Glen Elder	439	278	-161	-36.7%	13.3%	713
City of Hunter	77	62	-15	-19.5%	9.7%	295
City of Scottsville	21	13	-8	-38.1%	15.4%	52
City of Simpson	58	48	-10	-17.2%	12.5%	209
City of Tipton	118	136	18	15.3%	4.4%	544

Source: US Census Bureau

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

- A housing loss was noted in Mitchell County, -1.2% as a whole
- Housing losses were noted in five of seven participating cities

**Table 3.21: Osborne County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Osborne County</b>	<b>2,419</b>	<b>2,185</b>	<b>-234</b>	<b>-9.7%</b>	<b>3.3%</b>	<b>2</b>
City of Alton	79	77	-2	-2.5%	0.0%	248
City of Downs	543	521	-22	-4.1%	3.1%	474
City of Natoma	244	213	-31	-12.7%	7.5%	507
City of Osborne	841	840	-1	-0.1%	3.6%	560

Source: US Census Bureau

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

- A small housing loss was noted in Osborne County, -9.7% as a whole
- Housing losses were noted in all participating cities

**Table 3.22: Ottawa County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Ottawa County</b>	<b>2,755</b>	<b>2,789</b>	<b>34</b>	<b>1.2%</b>	<b>6.3%</b>	<b>4</b>
City of Bennington	266	309	43	16.2%	8.4%	736
City of Culver	62	65	3	4.8%	32.3%	433
City of Delphos	238	242	4	1.7%	7.4%	378
City of Minneapolis	914	875	-39	-4.3%	6.7%	497
City of Tescott	151	129	-22	-14.6%	2.3%	358

Source: US Census Bureau





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

- A housing gain was noted in Ottawa County, 1.2% as a whole
- Housing gains were noted in three of five participating cities

**Table 3.23: Republic County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Republic County</b>	<b>3,113</b>	<b>2,888</b>	<b>-225</b>	<b>-7.2%</b>	<b>3.2%</b>	<b>4</b>
City of Agenda	54	51	-3	-5.6%	0.0%	340
City of Bellville	1259	1142	-117	-9.3%	2.8%	577
City of Courtland	174	186	12	6.9%	1.6%	689
City of Cuba	148	173	25	16.9%	4.0%	577
City of Munden	71	86	15	21.1%	8.1%	430
City of Narka	55	74	19	34.5%	2.7%	411
City of Republic	108	90	-18	-16.7%	3.3%	346
City of Scandia	239	241	2	0.8%	2.1%	513

Source: US Census Bureau

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

- A housing loss was noted in Republic County, -7.2% as a whole
- Housing losses were noted in three of seven participating cities

**Table 3.24: Saline County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Saline County</b>	<b>22,695</b>	<b>24,350</b>	<b>1,655</b>	<b>7.3%</b>	<b>4.1%</b>	<b>34</b>
City of Assaria	160	184	24	15.0%	1.6%	920
City of Brookville	115	114	-1	-0.9%	17.5%	193
City of Gypsum	179	186	7	3.9%	13.4%	433
City of New Cambria	66	56	-10	-15.2%	42.9%	560
City of Salina	19,599	21,183	1,584	8.1%	3.2%	930
City of Smolan	83	109	26	31.3%	10.1%	779

Source: US Census Bureau

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

- A housing gain was noted in Saline County, 7.3% as a whole
- Housing gains were noted in four of six participating cities







**Table 3.25: Smith County Housing Data**

Jurisdiction	Housing Units 2000	Housing Units 2017	Numeric Housing Change 2000 - 2017	Percentage Housing Change 2000 - 2017	Percentage Mobile Homes 2017	Housing Density, per Square Mile 2017
<b>Smith County</b>	<b>2,326</b>	<b>2,250</b>	<b>-76</b>	<b>-3.3%</b>	<b>2.4%</b>	<b>3</b>
City of Cedar	17	15	-2	-11.8%	0.0%	83
City of Gaylord	96	104	8	8.3%	1.0%	416
City of Kensington	264	283	19	7.2%	4.2%	884
City of Lebanon	204	210	6	2.9%	6.2%	656
City of Smith Center	987	932	-55	-5.6%	0.9%	803

Source: US Census Bureau

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

- A housing loss was noted in Smith County, -3.3% as a whole
- Housing losses were noted in two of five participating cities

### 3.5 – Regional Property Valuations

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

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

County	Residential	Commercial	Industrial
Clay	\$773,478,000	\$125,761,000	\$46,200,000
Cloud	\$791,261,000	\$154,830,000	\$29,463,000
Dickinson	\$1,785,470,000	\$321,006,000	\$63,799,000
Ellsworth	\$574,834,000	\$88,303,000	\$37,982,000
Jewell	\$347,301,000	\$41,784,000	\$18,731,000
Lincoln	\$391,668,000	\$44,689,000	\$10,496,000
Mitchell	\$616,068,000	\$122,773,000	\$48,679,000
Osborne	\$341,376,000	\$81,545,000	\$68,343,000
Ottawa	\$573,325,000	\$70,629,000	\$20,114,000
Republic	\$580,602,000	\$83,036,000	\$15,181,000
Saline	\$4,871,442,000	\$1,012,492,000	\$335,226,000
Smith	\$403,020,000	\$58,463,000	\$21,607,000

Source: HAZUS

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

County	Agriculture	Government	Education
Clay	\$30,122,000	\$7,308,000	\$17,506,000
Cloud	\$19,073,000	\$8,047,000	\$39,504,000







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

County	Agriculture	Government	Education
Dickinson	\$42,221,000	\$13,867,000	\$32,613,000
Ellsworth	\$20,706,000	\$11,421,000	\$21,229,000
Jewell	\$15,449,000	\$6,280,000	\$16,101,000
Lincoln	\$16,837,000	\$5,931,000	\$8,672,000
Mitchell	\$24,465,000	\$4,650,000	\$18,215,000
Osborne	\$19,371,000	\$3,705,000	\$7,650,000
Ottawa	\$18,534,000	\$4,931,000	\$16,147,000
Republic	\$27,417,000	\$6,892,000	\$11,924,000
Saline	\$37,196,000	\$43,216,000	\$94,629,000
Smith	\$17,623,000	\$3,295,000	\$9,394,000

Source: HAZUS

**Table 3.28: Kansas Region F Property Total Valuations**

County	Total
Clay	\$1,023,498,000
Cloud	\$1,082,981,000
Dickinson	\$2,316,840,000
Ellsworth	\$774,908,000
Jewell	\$454,048,000
Lincoln	\$587,611,000
Mitchell	\$856,638,000
Osborne	\$538,604,000
Ottawa	\$736,439,000
Republic	\$740,126,000
Saline	\$6,516,698,000
Smith	\$525,625,000

Source: HAZUS

### 3.6 – Critical Facility Data

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

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

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





### 3.7 – Unified School Districts

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

**Table 3.29: Participating USD Information**

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
<b>Clay County</b>			
USD #379 - Clay Center	1,309	14	-
<b>Cloud County</b>			
USD #224 - Clifton/Clyde	306	7	-
USD #333 - Concordia	1,111	11	-
USD #334 - Southern Cloud	179	8	-
<b>Dickinson County</b>			
USD #393 - Solomon	311	6	-
USD #435 - Abilene	1,605	11	-
USD #473 - Chapman	1,064	12	-
USD #481 - Rural Vista	488	8	-
USD #487 - Herington	488	8	-
<b>Ellsworth County</b>			
USD #112 - Central Plains	514	9	-
USD #327 - Ellsworth	647	8	-
<b>Jewell County</b>			
USD #107 - Rock Hill	313	6	-
<b>Lincoln County</b>			
USD #298 - Lincoln	352	7	-
USD #299 - Sylvan Grove	250	6	-
<b>Mitchell County</b>			
USD #272 - Waconda	291	11	-
USD #273 - Beloit	790	10	-
<b>Osborne County</b>			
USD #272 - Waconda	291	11	-
USD #392 - Osborne	273	7	-
USD #399 - Natoma	116	6	-
<b>Ottawa County</b>			
USD #239 - North Ottawa County	613	8	-
USD #240 - Twin Valley	607	8	-
<b>Republic County</b>			
USD #109 - Republic County	519	8	-
USD #426 - Pike Valley	206	8	-
<b>Saline County</b>			
USD #240 - Twin Valley	607	8	-





**Table 3.29: Participating USD Information**

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
USD #305 - Salina	7,421	23	-
USD #306 - Southeast of Saline	662	6	-
USD #307 - Ell/Saline	454	6	-
<b>Smith County</b>			
USD #110 Thunder Ridge	199	5	-
USD #237 - Smith Center	399	7	-

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

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

**Table 3.30: Participating College and University Information**

School District	Estimated Enrollment (2018)	Number of Offices and Schools (2018)	Total Insured Valuation of Structures (2018)
<b>Cloud County</b>			
Cloud County Community College	2,733	9	-
<b>Mitchell County</b>			
North Central Technical College	846	42	-
<b>Saline County</b>			
Kansas Wesleyan University	852	13	-
Salina Area Technical College	1,206	10	-

Source: Participating Institution  
-: Information unavailable

### 3.8 – Regional Land Use

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

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





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

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

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

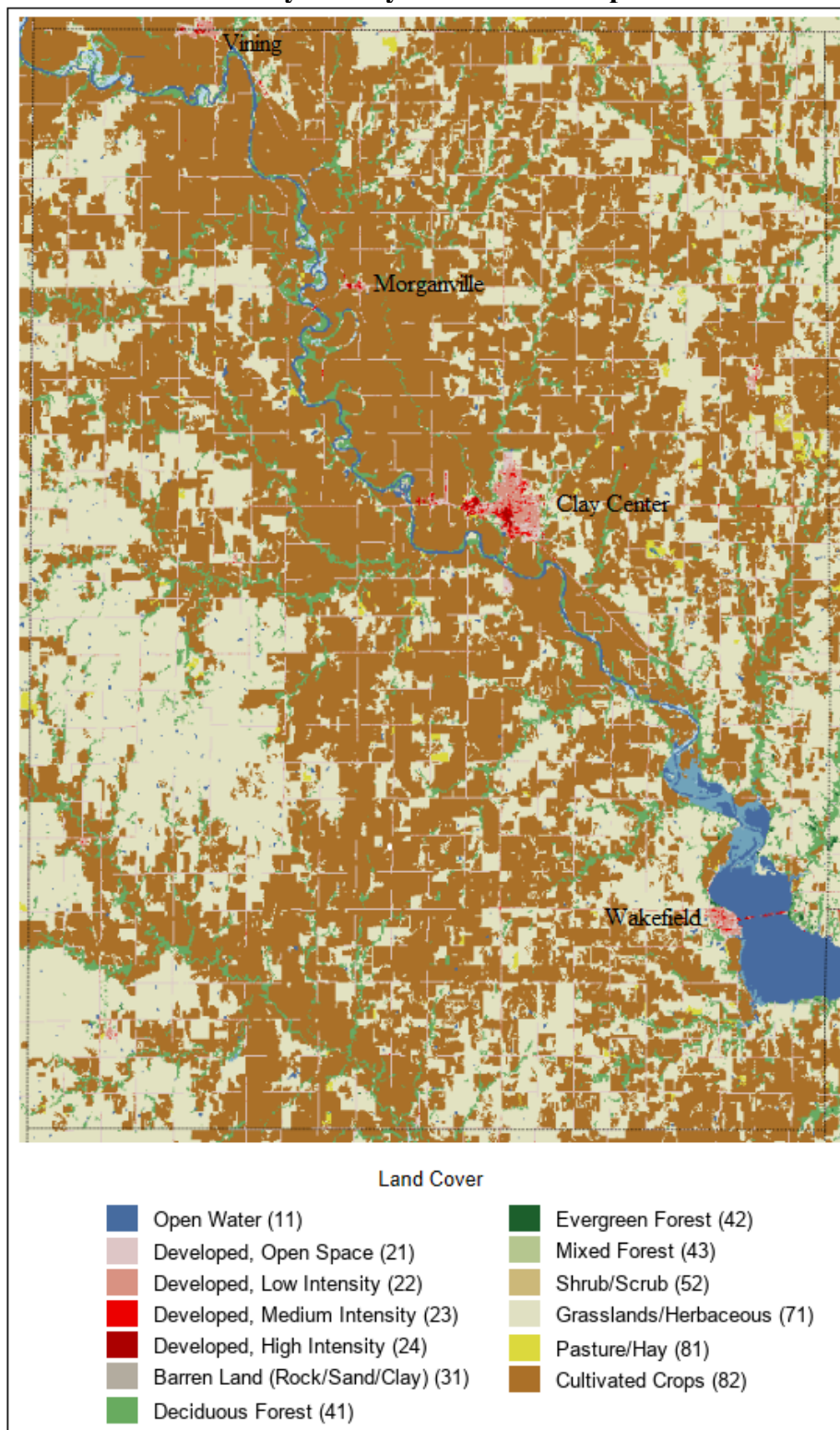
### **3.9 – Regional Land Cover**

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





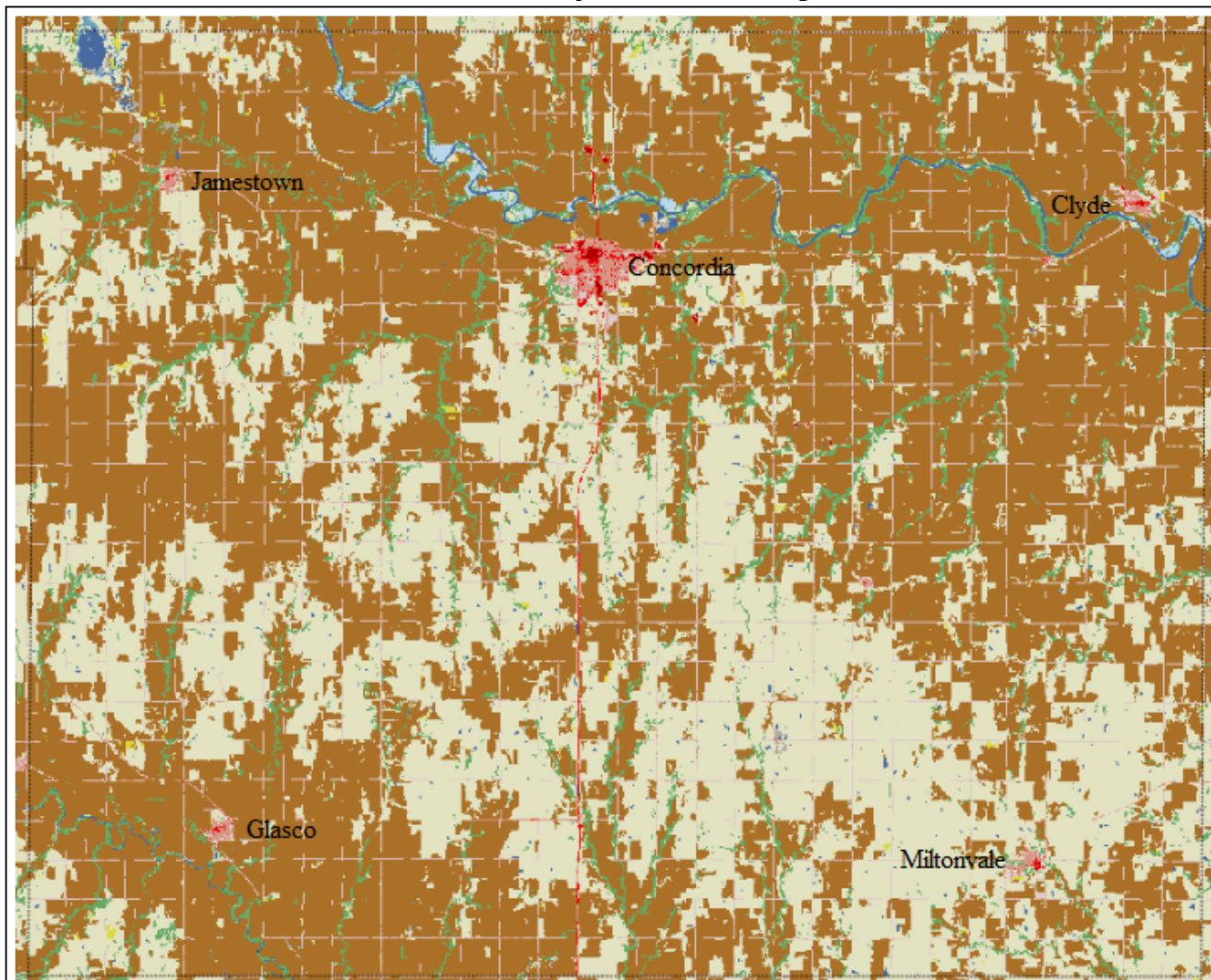
## Clay County Land Cover Map







## Cloud County Land Cover Map



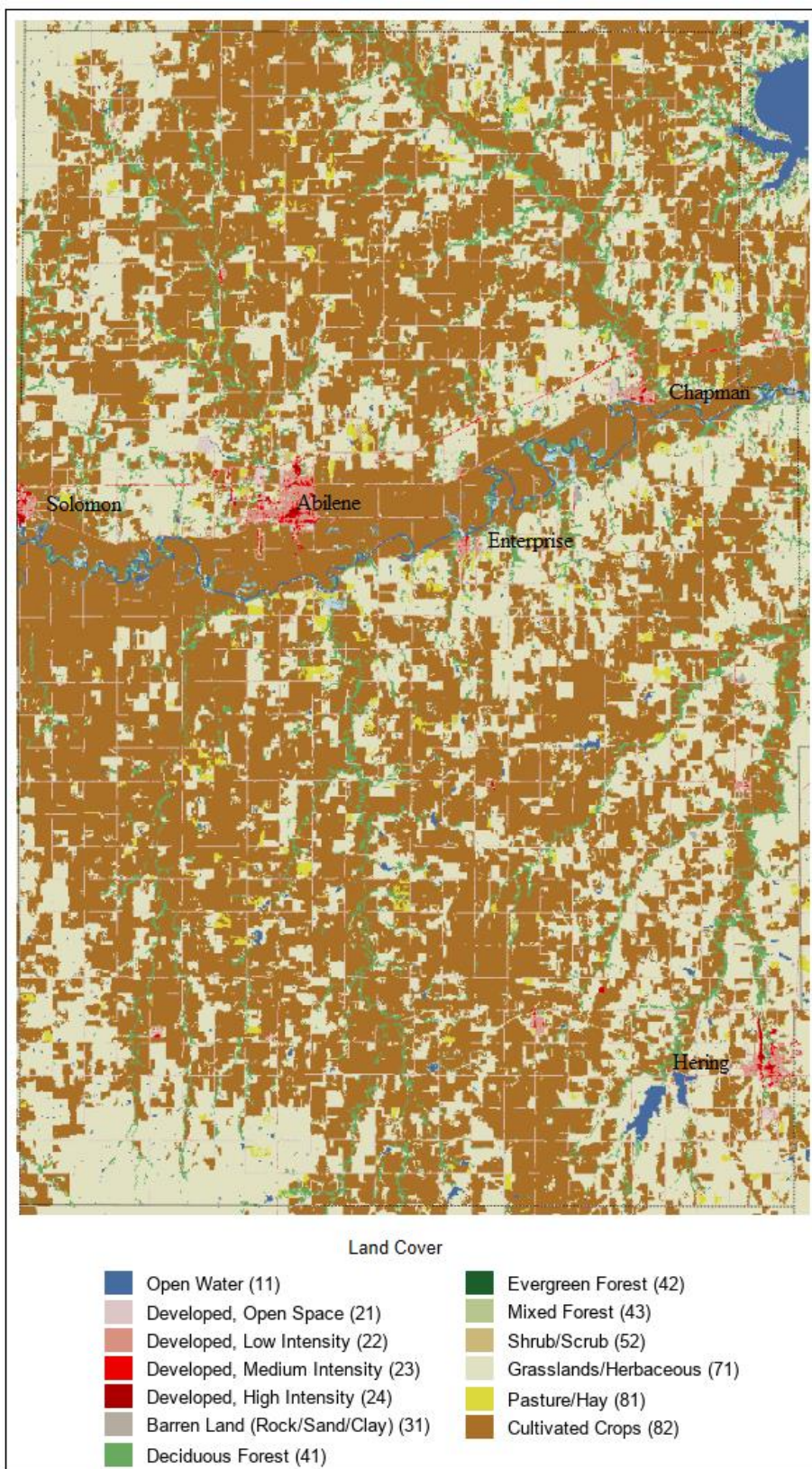
### Land Cover

Open Water (11)	Evergreen Forest (42)
Developed, Open Space (21)	Mixed Forest (43)
Developed, Low Intensity (22)	Shrub/Scrub (52)
Developed, Medium Intensity (23)	Grasslands/Herbaceous (71)
Developed, High Intensity (24)	Pasture/Hay (81)
Barren Land (Rock/Sand/Clay) (31)	Cultivated Crops (82)
Deciduous Forest (41)	





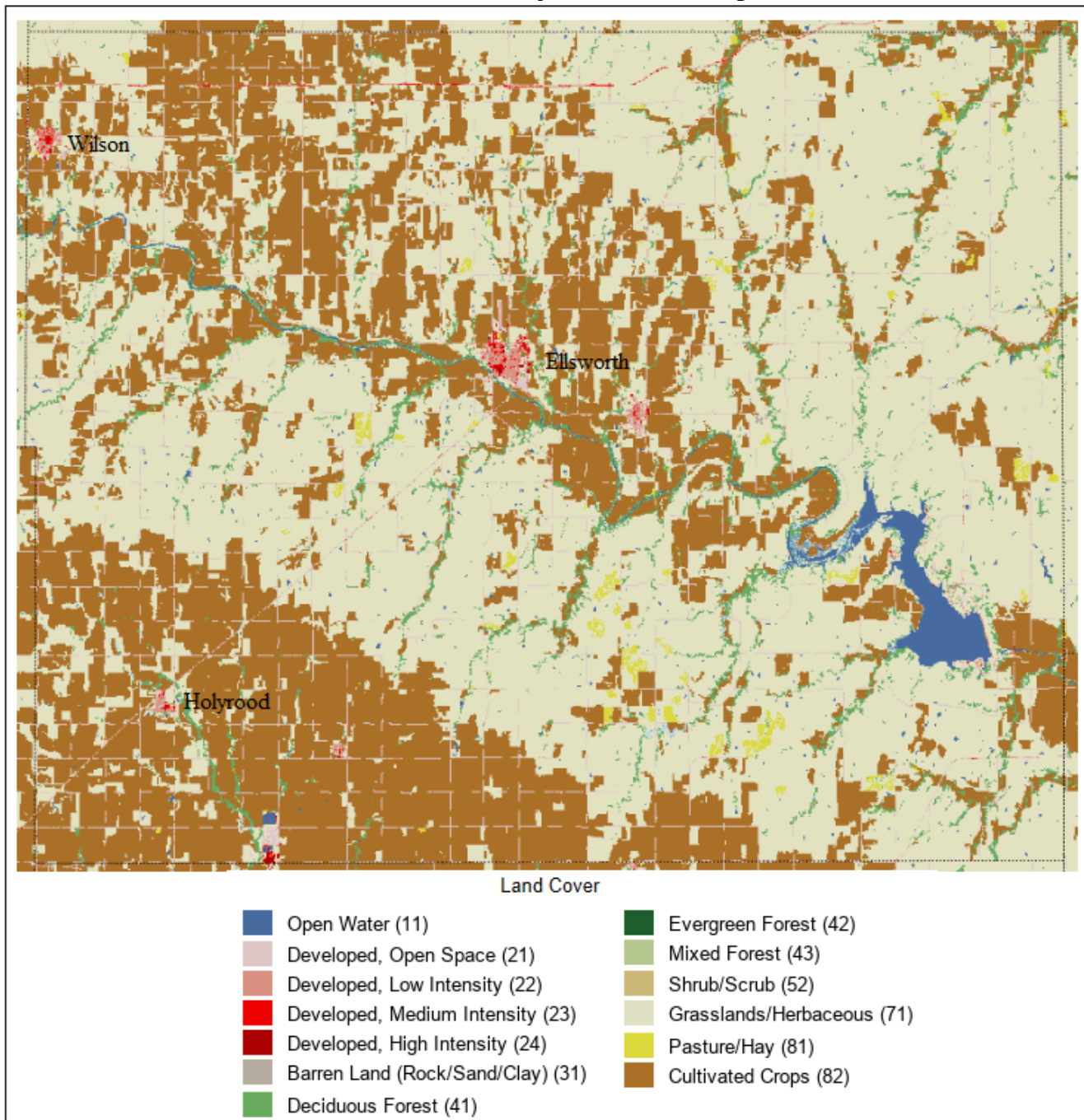
## Dickinson County Land Cover Map







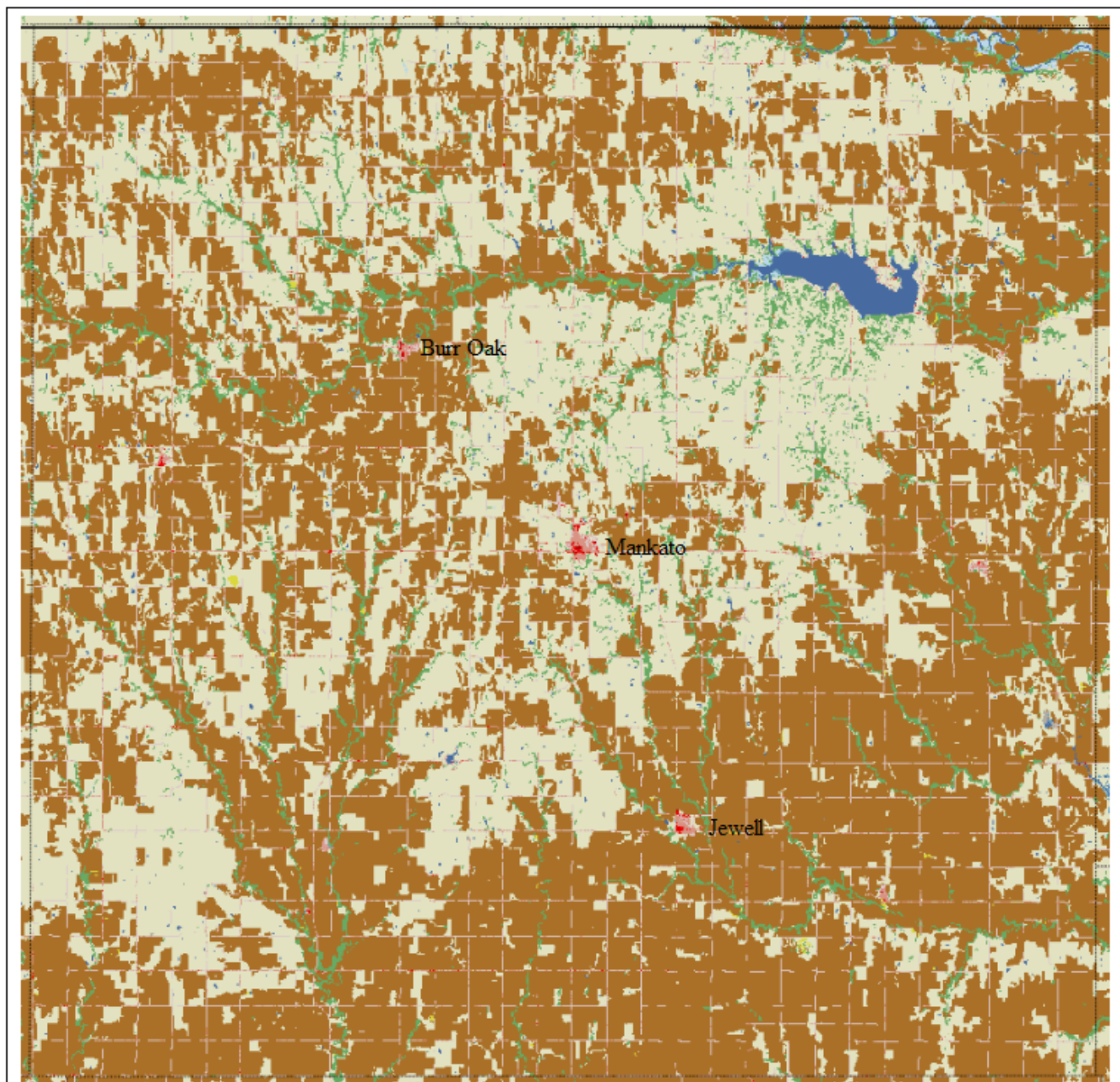
## Ellsworth County Land Cover Map




















## Jewell County Land Cover Map



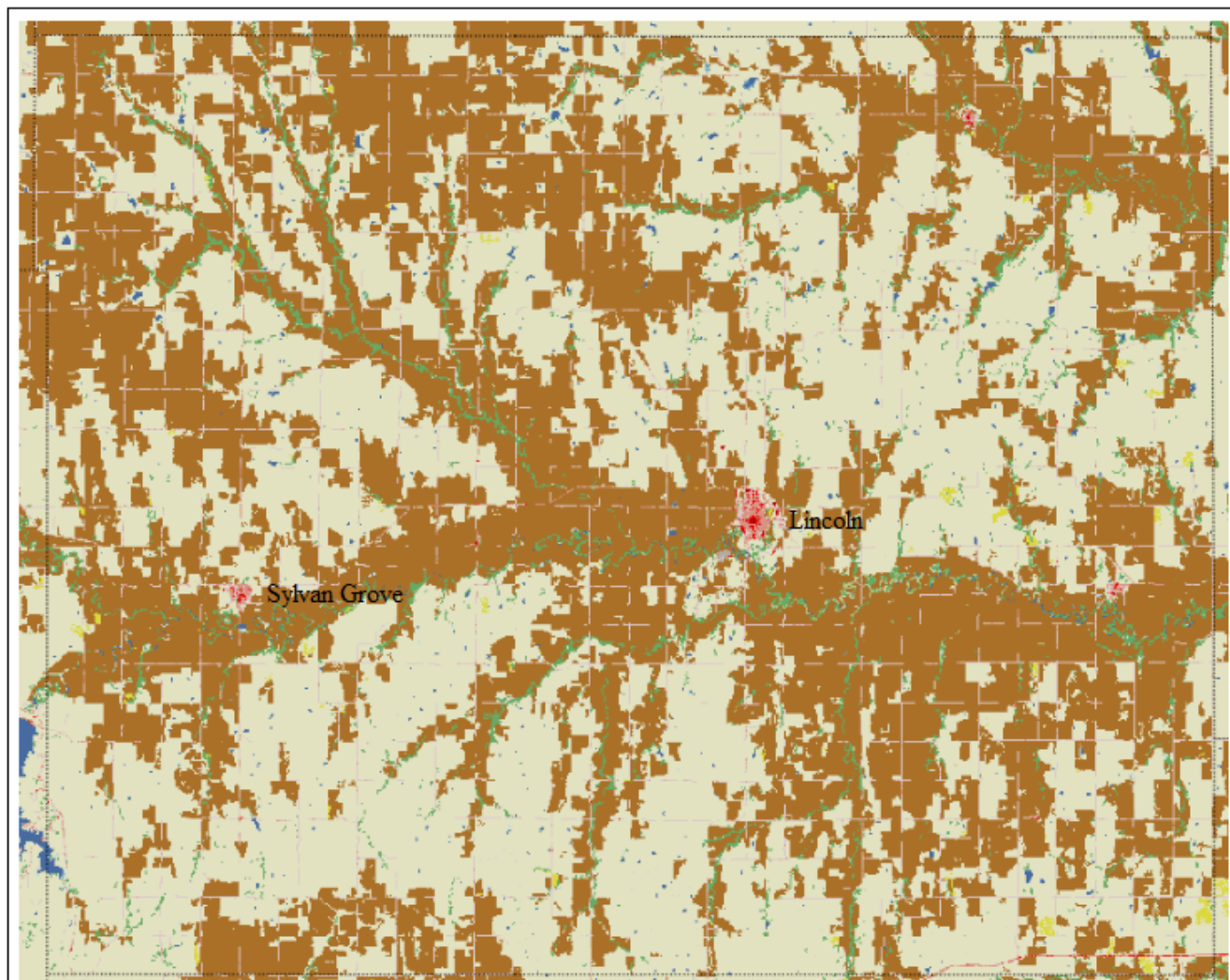
### Land Cover

 Open Water (11)	 Evergreen Forest (42)
 Developed, Open Space (21)	 Mixed Forest (43)
 Developed, Low Intensity (22)	 Shrub/Scrub (52)
 Developed, Medium Intensity (23)	 Grasslands/Herbaceous (71)
 Developed, High Intensity (24)	 Pasture/Hay (81)
 Barren Land (Rock/Sand/Clay) (31)	 Cultivated Crops (82)
 Deciduous Forest (41)	


















## Lincoln County Land Cover Map



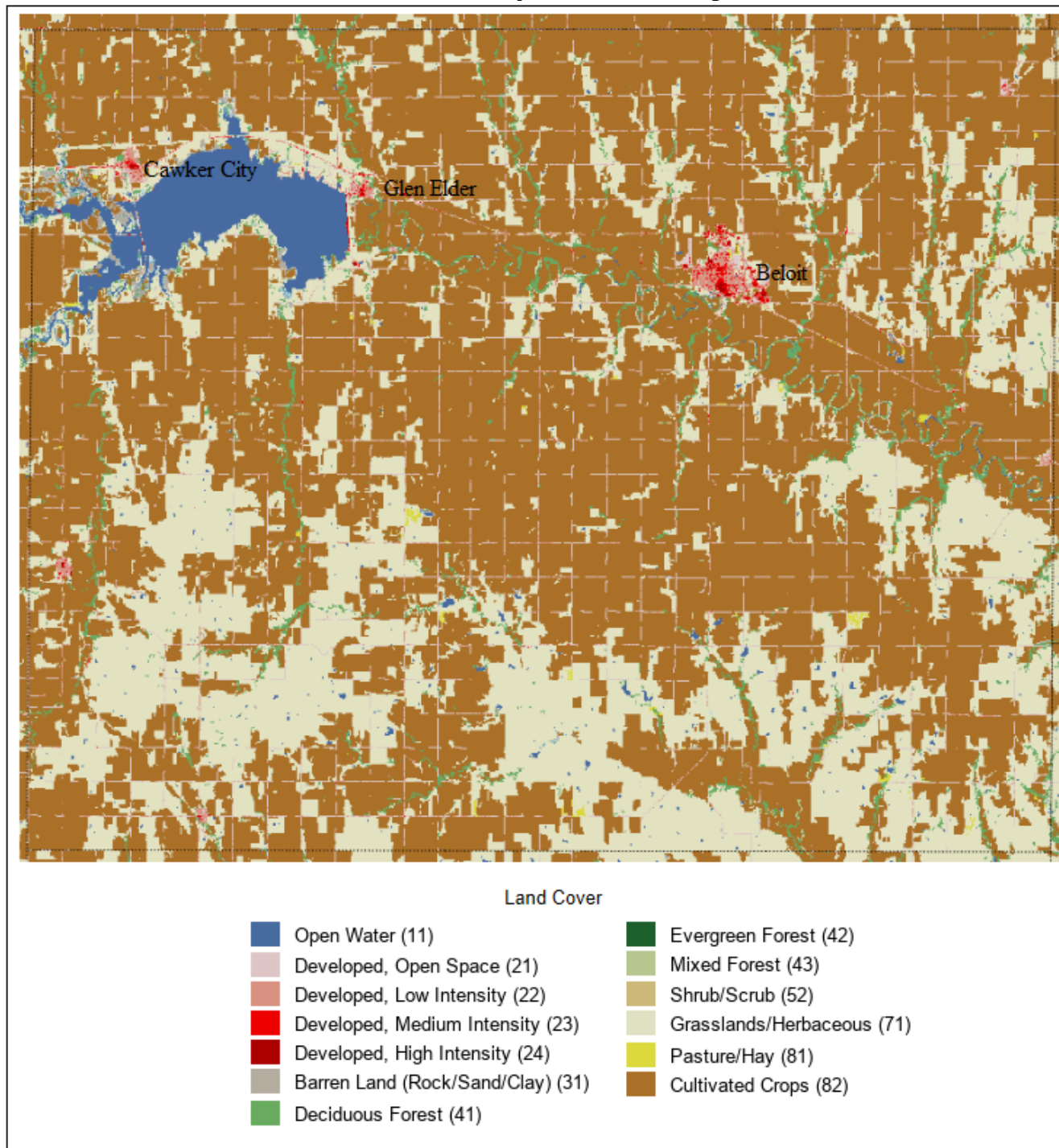
### Land Cover

 Open Water (11)	 Evergreen Forest (42)
 Developed, Open Space (21)	 Mixed Forest (43)
 Developed, Low Intensity (22)	 Shrub/Scrub (52)
 Developed, Medium Intensity (23)	 Grasslands/Herbaceous (71)
 Developed, High Intensity (24)	 Pasture/Hay (81)
 Barren Land (Rock/Sand/Clay) (31)	 Cultivated Crops (82)
 Deciduous Forest (41)	





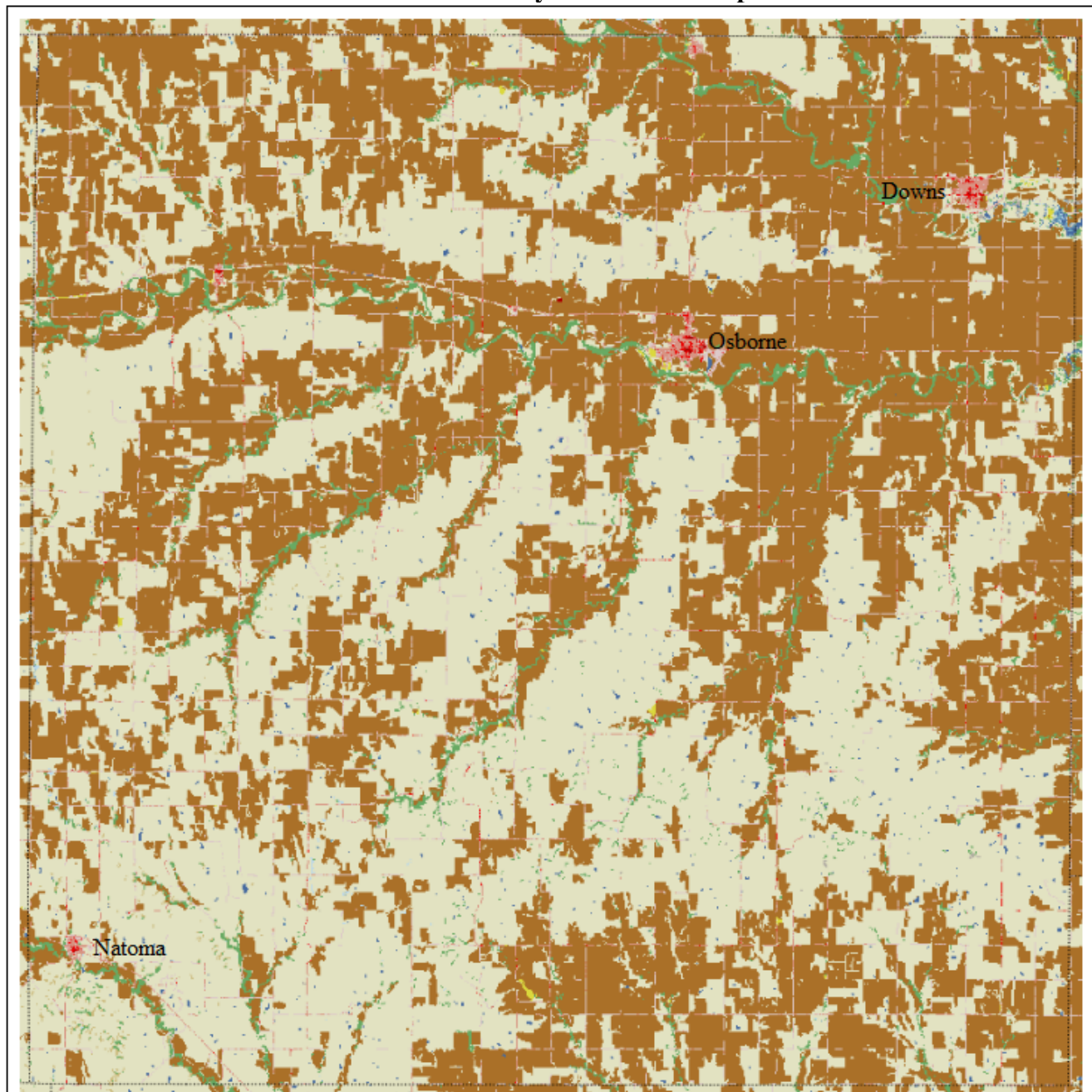
## Mitchell County Land Cover Map




















## Osborne County Land Cover Map



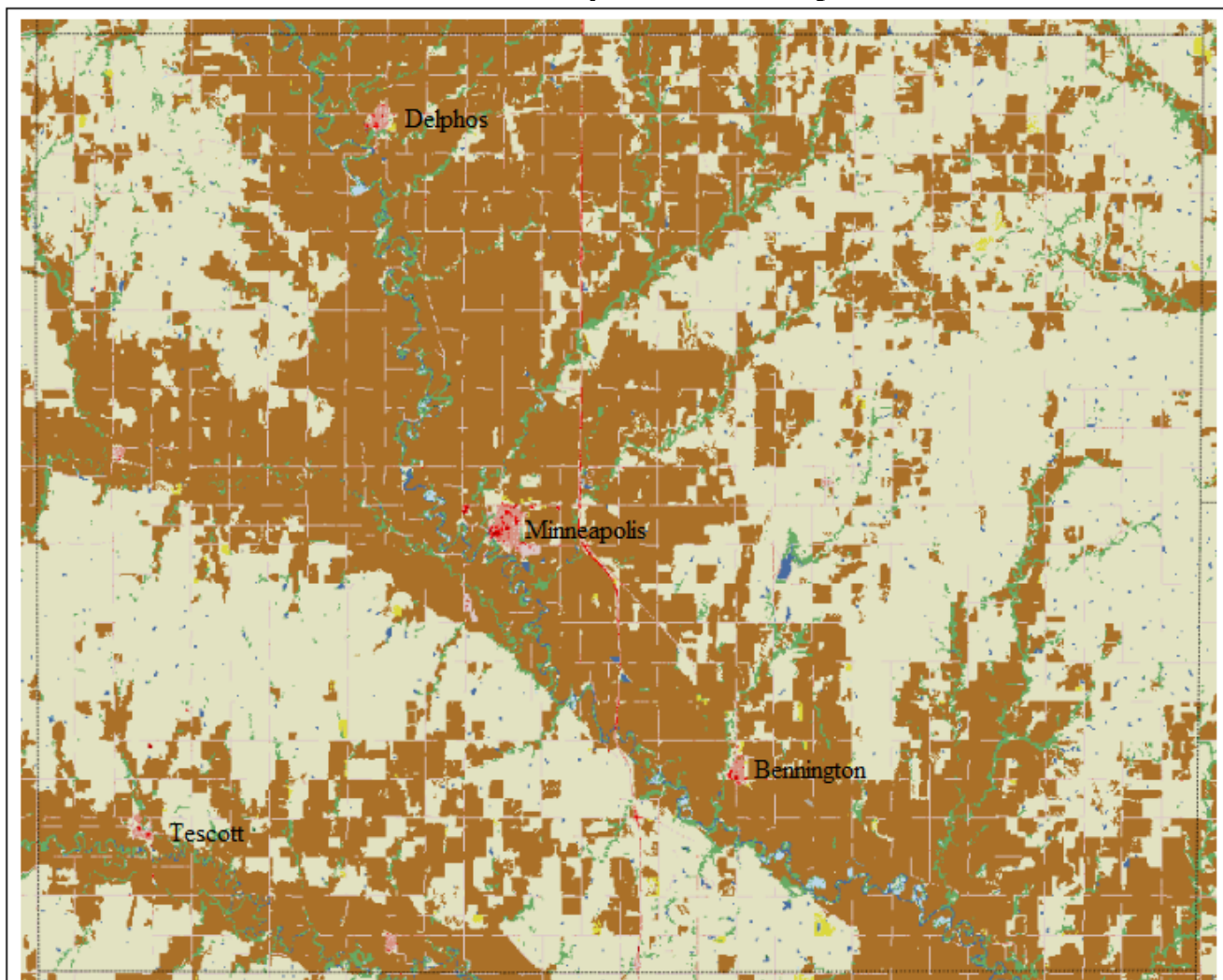
### Land Cover

 Open Water (11)	 Evergreen Forest (42)
 Developed, Open Space (21)	 Mixed Forest (43)
 Developed, Low Intensity (22)	 Shrub/Scrub (52)
 Developed, Medium Intensity (23)	 Grasslands/Herbaceous (71)
 Developed, High Intensity (24)	 Pasture/Hay (81)
 Barren Land (Rock/Sand/Clay) (31)	 Cultivated Crops (82)
 Deciduous Forest (41)	





## Ottawa County Land Cover Map



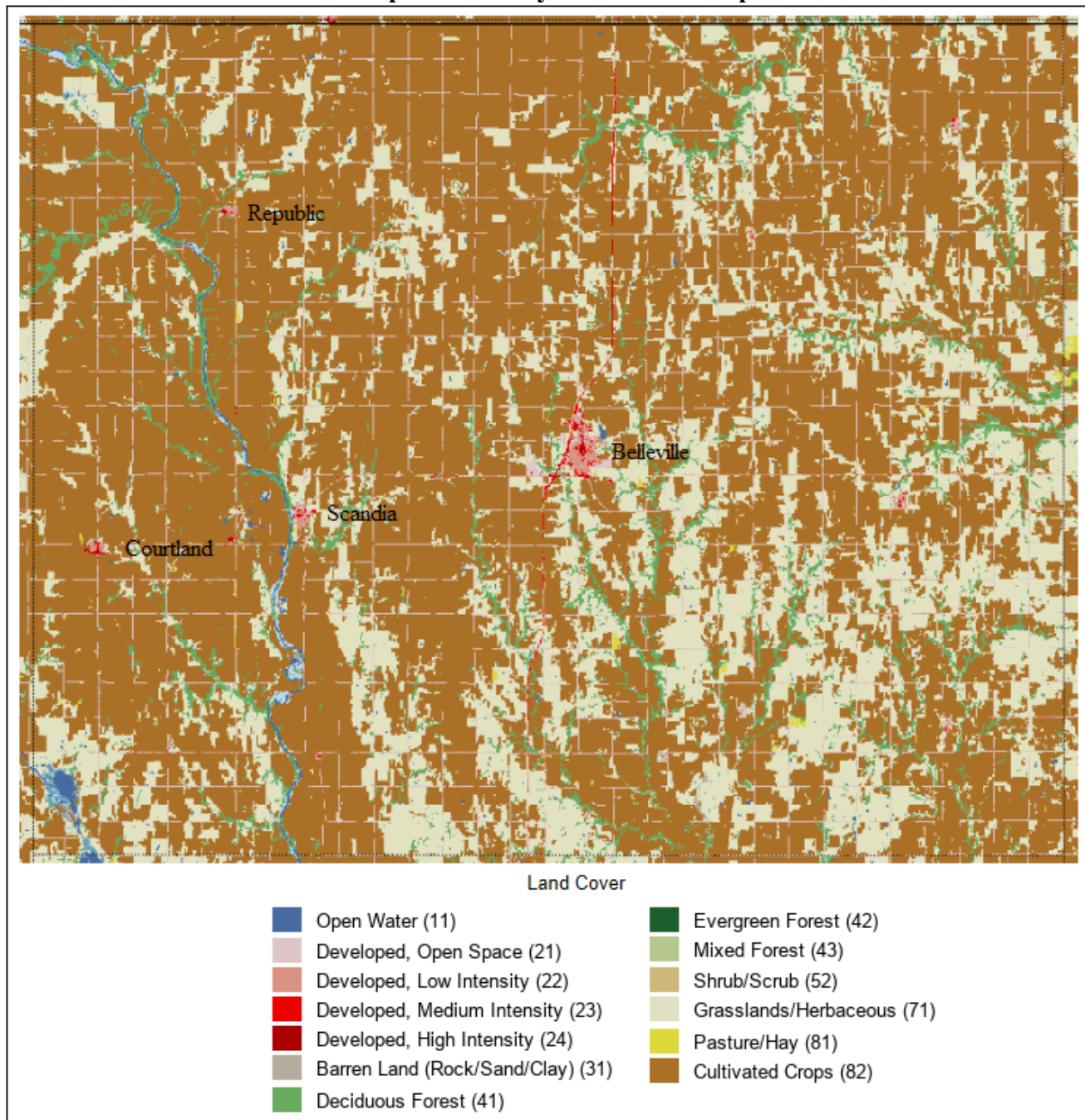
Land Cover

Open Water (11)	Evergreen Forest (42)
Developed, Open Space (21)	Mixed Forest (43)
Developed, Low Intensity (22)	Shrub/Scrub (52)
Developed, Medium Intensity (23)	Grasslands/Herbaceous (71)
Developed, High Intensity (24)	Pasture/Hay (81)
Barren Land (Rock/Sand/Clay) (31)	Cultivated Crops (82)
Deciduous Forest (41)	





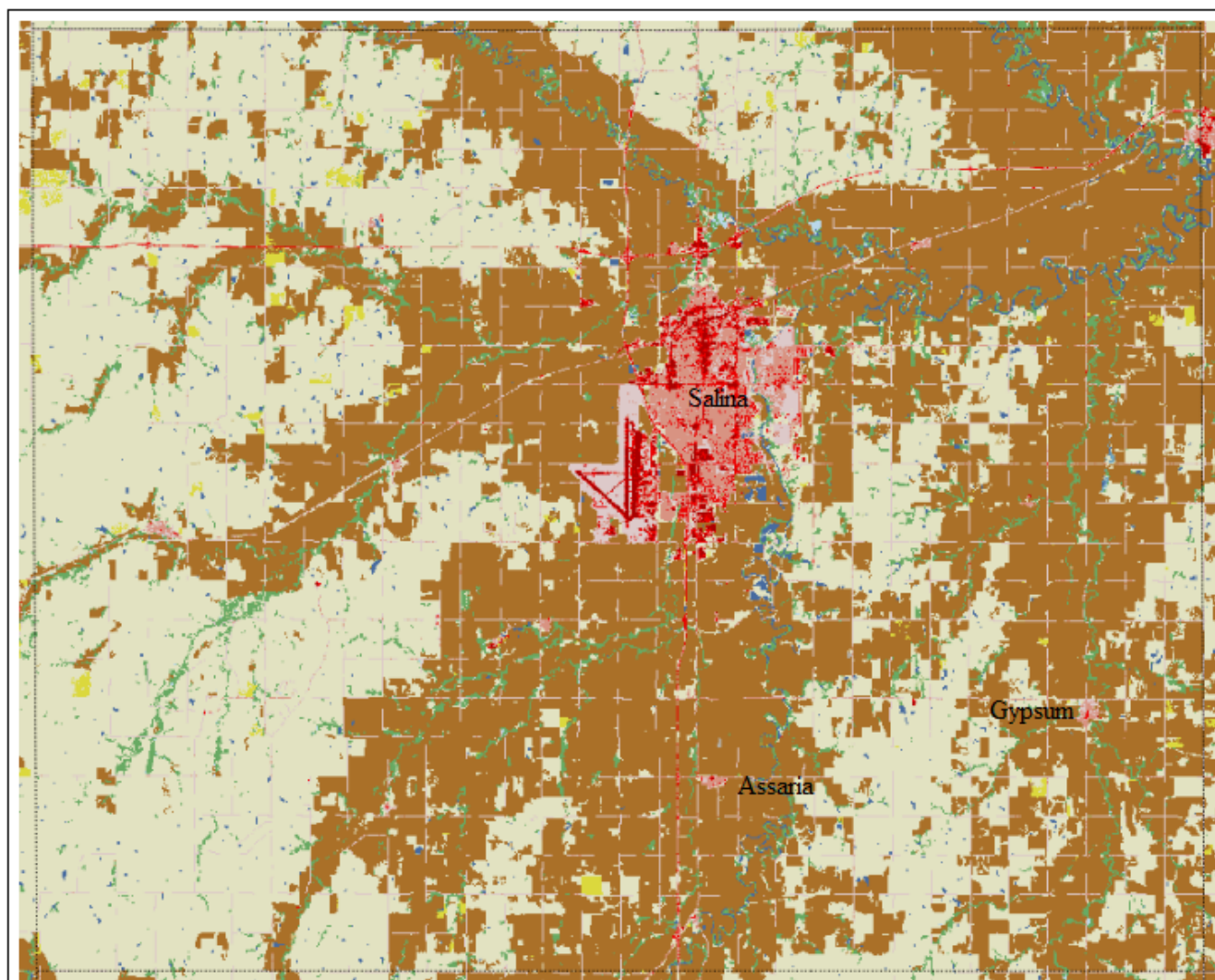
## Republic County Land Cover Map







## Saline County Land Cover Map



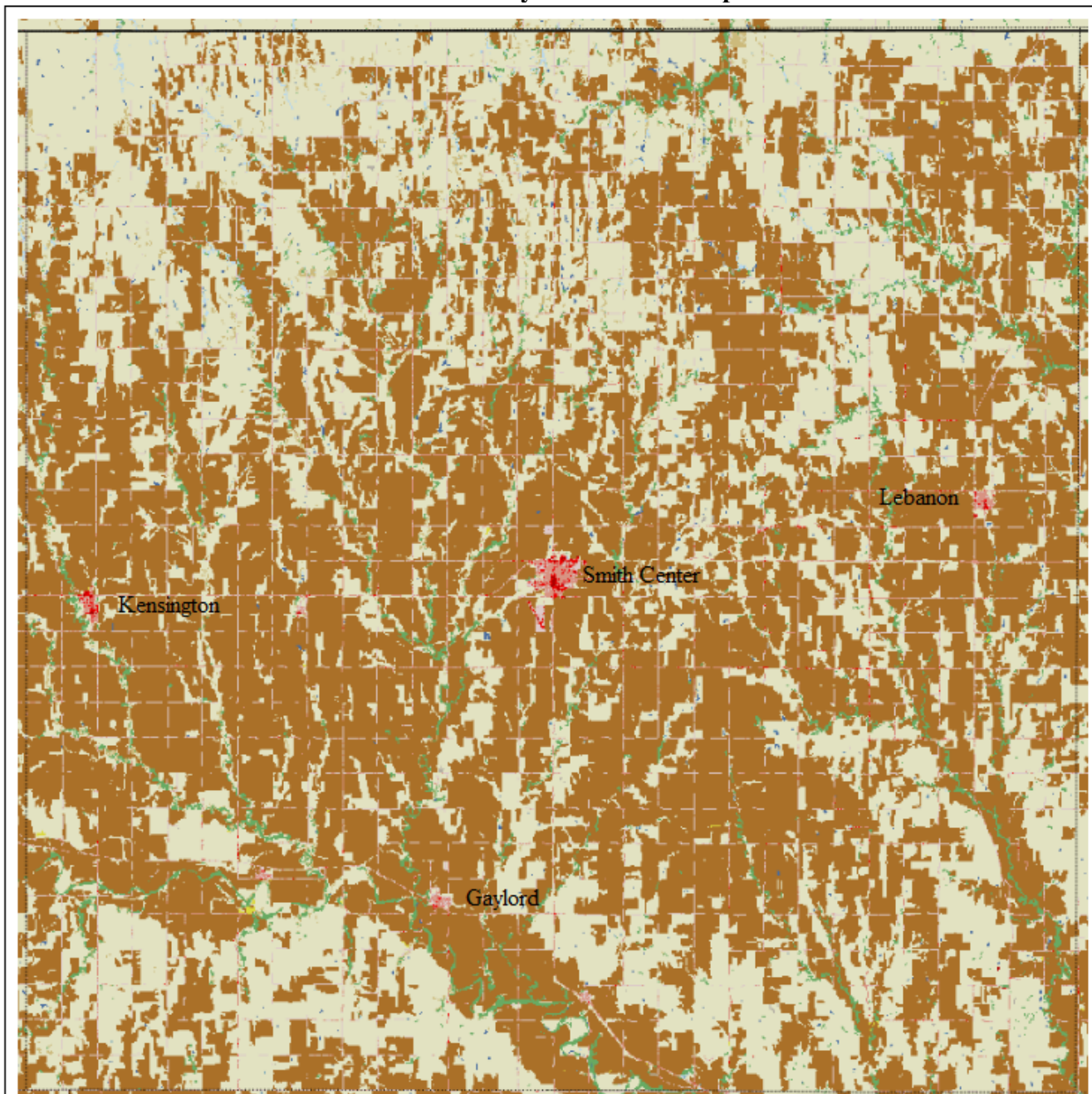
### Land Cover

Open Water (11)	Evergreen Forest (42)
Developed, Open Space (21)	Mixed Forest (43)
Developed, Low Intensity (22)	Shrub/Scrub (52)
Developed, Medium Intensity (23)	Grasslands/Herbaceous (71)
Developed, High Intensity (24)	Pasture/Hay (81)
Barren Land (Rock/Sand/Clay) (31)	Cultivated Crops (82)
Deciduous Forest (41)	


















## Smith County Land Cover Map



Land Cover

 Open Water (11)	 Evergreen Forest (42)
 Developed, Open Space (21)	 Mixed Forest (43)
 Developed, Low Intensity (22)	 Shrub/Scrub (52)
 Developed, Medium Intensity (23)	 Grasslands/Herbaceous (71)
 Developed, High Intensity (24)	 Pasture/Hay (81)
 Barren Land (Rock/Sand/Clay) (31)	 Cultivated Crops (82)
 Deciduous Forest (41)	







### 3.10 – Regional Agricultural Data

Agriculture is a major component of the economy of Kansas. According to the Kansas Department of Agriculture, Agriculture is the largest economic driver in Kansas, valued at nearly \$67.5 billion and accounting for 44.5 percent of the state's total economy. In Kansas, there are approximately 46,000,000 acres of farmland, which accounts for 88% of all Kansas land.

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

**Table 3.31: Kansas Region F 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)
Clay	547	386,077	67.00%	29.00%	4.00%	\$121,175,000
Cloud	412	322,034	63.00%	33.00%	4.00%	\$77,485,000
Dickinson	919	519,171	70.00%	24.00%	5.00%	\$149,543,000
Ellsworth	384	390,042	51.00%	46.00%	2.00%	\$48,318,000
Jewell	455	463,206	63.00%	34.00%	3.00%	\$149,501,000
Lincoln	392	384,740	52.00%	45.00%	3.00%	\$58,151,000
Mitchell	355	414,220	72.00%	26.00%	2.00%	\$126,462,000
Osborne	319	437,083	52.00%	44.00%	3.00%	\$62,499,000
Ottawa	438	439,335	55.00%	41.00%	4.00%	\$108,378,000
Republic	561	373,206	72.00%	24.00%	4.00%	\$187,529,000
Saline	609	358,243	62.00%	33.00%	5.00%	\$73,581,000
Smith	425	541,472	97.00%	29.00%	4.00%	\$129,261,000

Source: United States Department of Agriculture National Agricultural Statistics Service

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

County	Cattle	Hogs and Pigs
Clay	32,673	54,035
Cloud	31,821	-
Dickinson	78,274	1,731
Ellsworth	33,215	-
Jewell	31,442	-
Lincoln	35,198	56
Mitchell	32,254	-
Osborne	29,651	-
Ottawa	48,147	43
Republic	50,498	-
Saline	29,868	153
Smith	31,443	1,629

Source: United States Department of Agriculture National Agricultural Statistics Service

:- Data not reported





### 3.11 – Regional Development Trends

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

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

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

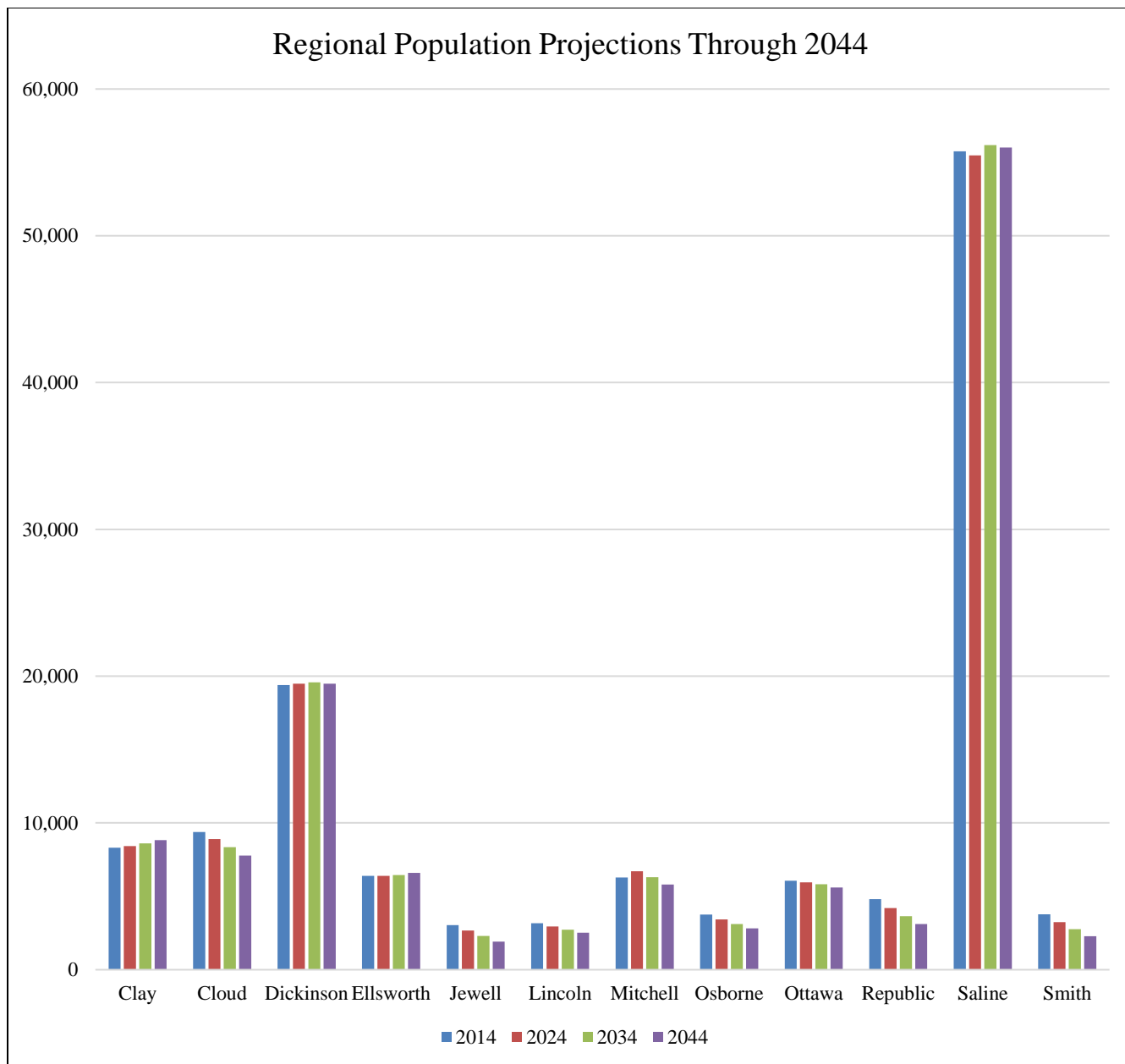
**Table 3.33: Kansas Region F Population Projections Through 2044**

County	2014	2024	2034	2044	Projected Growth Percentage Through 2044
Clay	8,317	8,428	8,607	8,835	6.2%
Cloud	9,385	8,896	8,355	7,782	-17.1%
Dickinson	19,394	19,487	19,584	19,481	0.4%
Ellsworth	6,392	6,391	6,445	6,589	3.1%
Jewell	3,043	2,674	2,304	1,913	-37.1%
Lincoln	3,167	2,941	2,729	2,515	-20.6%
Mitchell	6,284	6,708	6,295	5,798	-7.7%
Osborne	3,756	3,422	3,109	2,809	-25.2%
Ottawa	6,065	5,950	5,824	5,605	-7.6%
Republic	4,803	4,199	3,639	3,104	-35.4%
Saline	55,755	55,487	56,187	56,012	0.5%
Smith	3,769	3,244	2,754	2,274	-39.7%

Source: University of Kansas Institute for Policy and Social Research

The following chart illustrates the above data.





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

**Table 3.34: Kansas Region F Housing Projections Through 2051**

County	2000	2017	2034	2051	Projected Growth Percentage Through 2051
Clay	4,084	4,069	4,054	4,039	-0.4%
Cloud	4,838	4,637	4,444	4,260	-4.2%
Dickinson	8,686	9,173	9,687	10,230	5.6%
Ellsworth	3,228	3,231	3,234	3,237	0.1%
Jewell	2,103	2,033	1,965	1,900	-3.3%



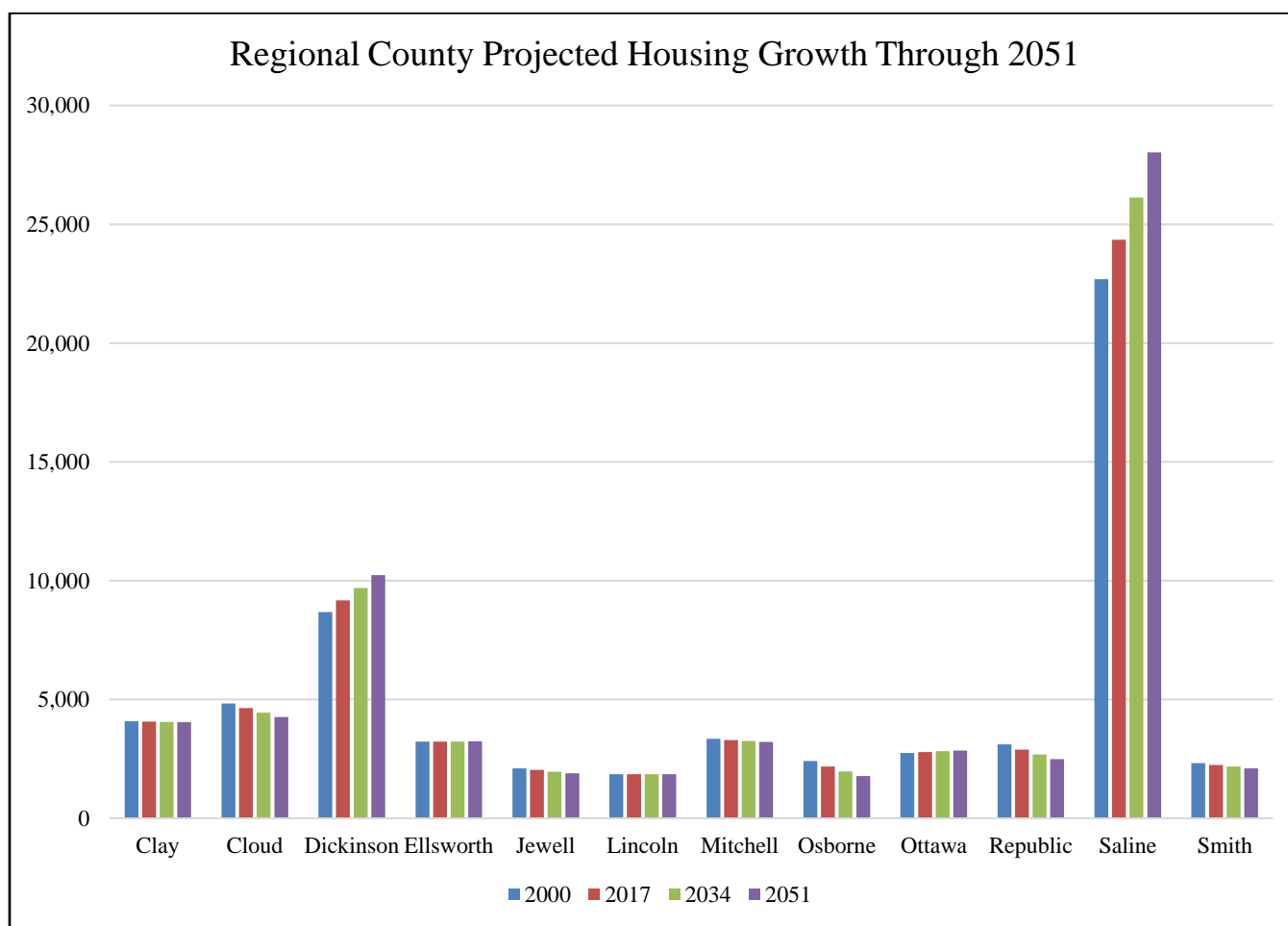


**Table 3.34: Kansas Region F Housing Projections Through 2051**

County	2000	2017	2034	2051	Projected Growth Percentage Through 2051
Lincoln	1,853	1,853	1,853	1,853	0.0%
Mitchell	3,340	3,299	3,259	3,219	-1.2%
Osborne	2,419	2,185	1,974	1,783	-9.7%
Ottawa	2,755	2,789	2,823	2,858	1.2%
Republic	3,113	2,888	2,679	2,486	-7.2%
Saline	22,695	24,350	26,126	28,031	7.3%
Smith	2,326	2,250	2,176	2,105	-3.3%

Source: US Census Bureau

The following chart illustrates the above data.



FEMA’s loss estimation software HAZUS data was used to developed property valuation projections for the region using historical and trend data. Indications are the region will experience steady growth in the property valuation through the year 2030.



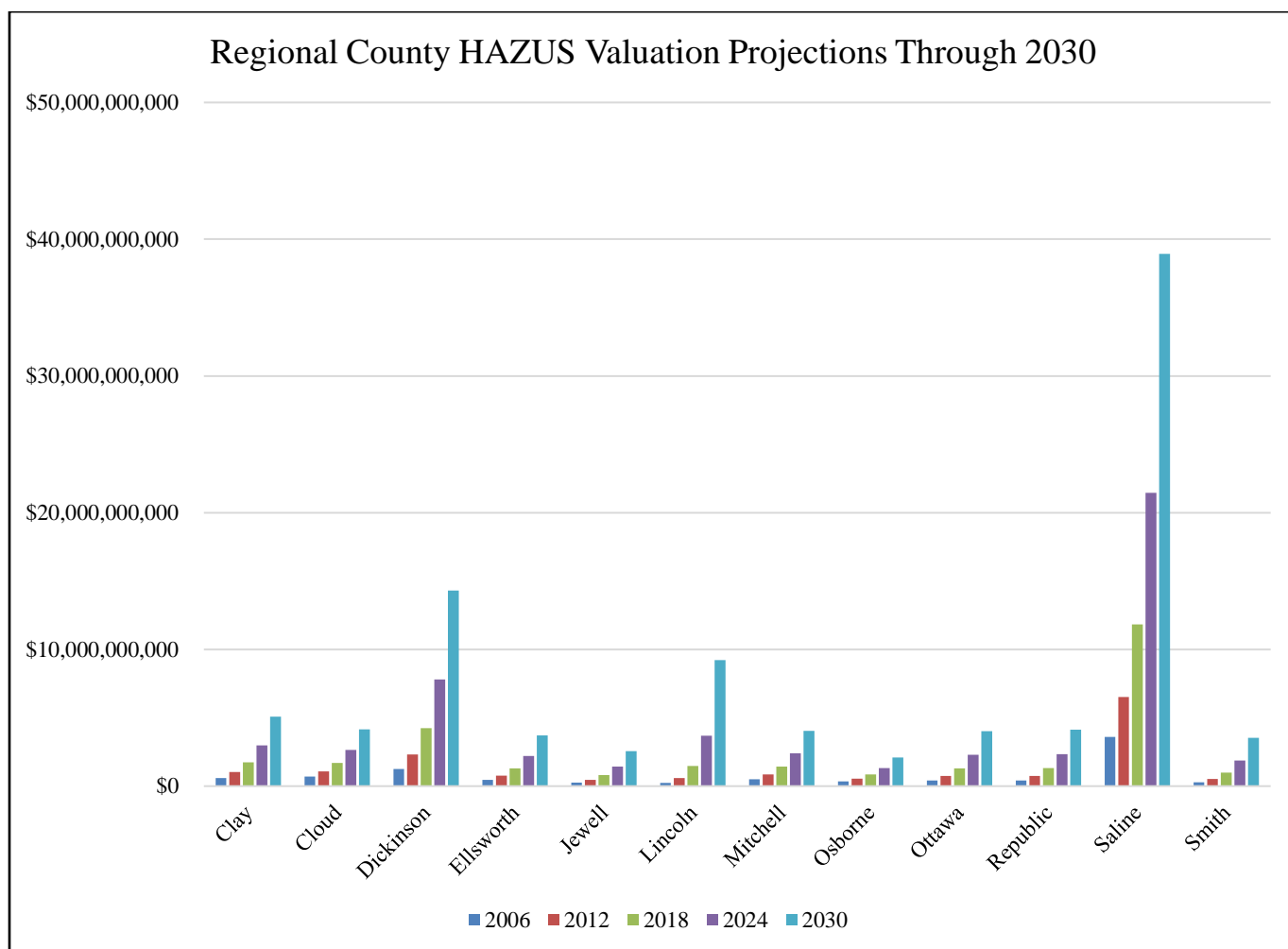


**Table 3.35: Kansas Region F Property Valuation Projections Through 2030**

County	2000	2010	2020	2030	Projected Growth Percentage Through 2030
Clay	\$599,823,000	\$1,023,498,000	\$1,746,428,790	\$2,979,989,720	\$5,084,855,896
Cloud	\$691,783,000	\$1,082,981,000	\$1,695,398,480	\$2,654,133,364	\$4,155,025,498
Dickinson	\$1,262,865,000	\$2,316,840,000	\$4,250,452,412	\$7,797,839,173	\$14,305,840,853
Ellsworth	\$459,624,000	\$774,908,000	\$1,306,464,433	\$2,202,647,687	\$3,713,577,433
Jewell	\$254,815,000	\$454,048,000	\$809,055,928	\$1,441,635,014	\$2,568,810,685
Lincoln	\$234,746,000	\$587,611,000	\$1,470,894,871	\$3,681,911,538	\$9,216,479,602
Mitchell	\$510,997,000	\$856,638,000	\$1,436,072,351	\$2,407,439,078	\$4,035,843,257
Osborne	\$343,004,000	\$538,604,000	\$845,746,023	\$1,328,037,547	\$2,085,358,582
Ottawa	\$418,316,000	\$736,439,000	\$1,296,489,737	\$2,282,450,600	\$4,018,219,809
Republic	\$417,216,000	\$740,126,000	\$1,312,956,588	\$2,329,137,204	\$4,131,804,634
Saline	\$3,591,872,000	\$6,516,698,000	\$11,823,181,011	\$21,450,680,883	\$38,917,759,099
Smith	\$278,296,000	\$525,625,000	\$992,761,810	\$1,875,055,431	\$3,541,466,679

Source: HAZUS

The following chart illustrates the above data.





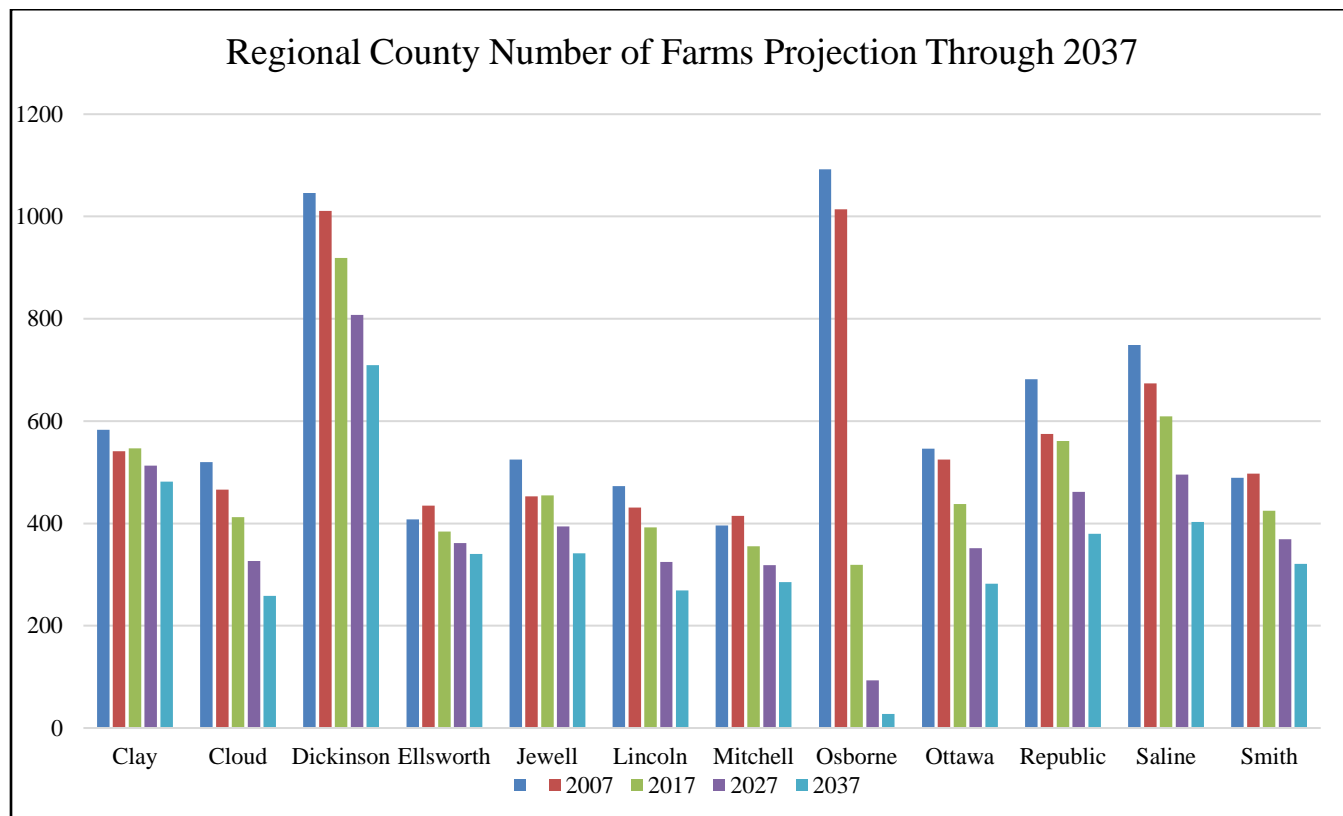
The United States Department of Agriculture (USDA) National Agricultural Statistics Service data was used to develop agricultural projections for the region using historical and trend data. Indications are the region will experience a steady increase in the number of farms through the year 2037.

**Table 3.36: Kansas Region F Number of Farms Data Projections Through 2037**

County	Number of Farms, 2007	Number of Farms, 2012	Number of Farms, 2017	Number of Farms, 2022	Projected Growth Percentage Through 2037
Clay	541	547	513	482	-6.2%
Cloud	466	412	326	259	-20.8%
Dickinson	1011	919	807	709	-12.1%
Ellsworth	435	384	361	340	-5.9%
Jewell	453	455	394	342	-13.3%
Lincoln	431	392	325	269	-17.1%
Mitchell	415	355	318	285	-10.4%
Osborne	1014	319	93	27	-70.8%
Ottawa	525	438	351	282	-19.8%
Republic	575	561	461	380	-17.7%
Saline	674	609	495	403	-18.7%
Smith	497	425	369	321	-13.1%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.





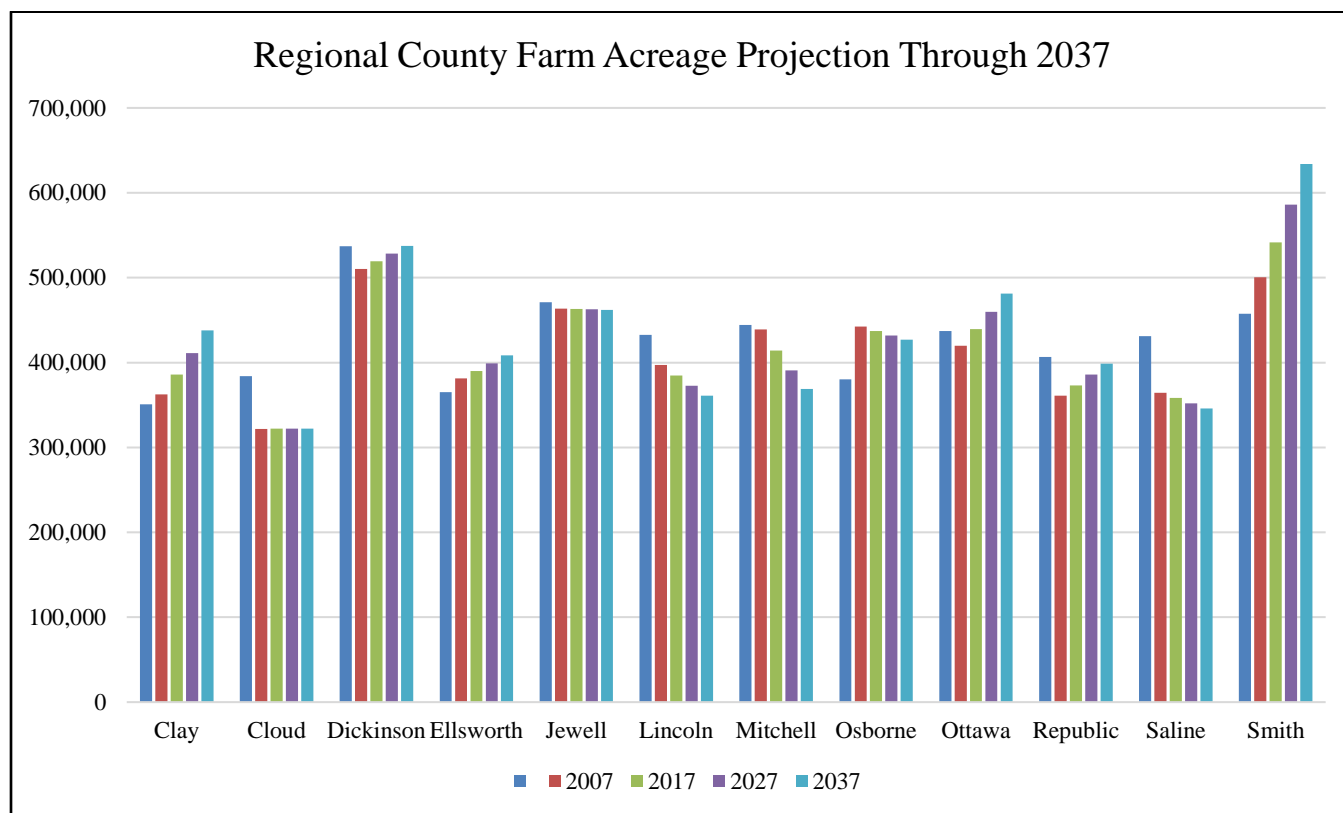
USDA National Agricultural Statistics Service data indicates the region will experience an overall increase in farm acreage through the year 2037.

**Table 3.37: Kansas Region F Farm Acreage Data Projections, Through 2037**

County	Farm Acreage, 2007	Farm Acreage, 2012	Farm Acreage, 2017	Farm Acreage, 2022	Projected Growth Percentage Through 2037
Clay	362,520	386,077	411,165	437,883	6.5%
Cloud	321,962	322,034	322,106	322,178	0.0%
Dickinson	510,193	519,171	528,307	537,604	1.8%
Ellsworth	381,185	390,042	399,105	408,378	2.3%
Jewell	463,695	463,206	462,718	462,230	-0.1%
Lincoln	397,172	384,740	372,697	361,031	-3.1%
Mitchell	438,999	414,220	390,840	368,779	-5.6%
Osborne	442,279	437,083	431,948	426,873	-1.2%
Ottawa	419,823	439,335	459,754	481,122	4.6%
Republic	361,076	373,206	385,743	398,702	3.4%
Saline	364,468	358,243	352,124	346,110	-1.7%
Smith	500,364	541,472	585,957	634,097	8.2%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.





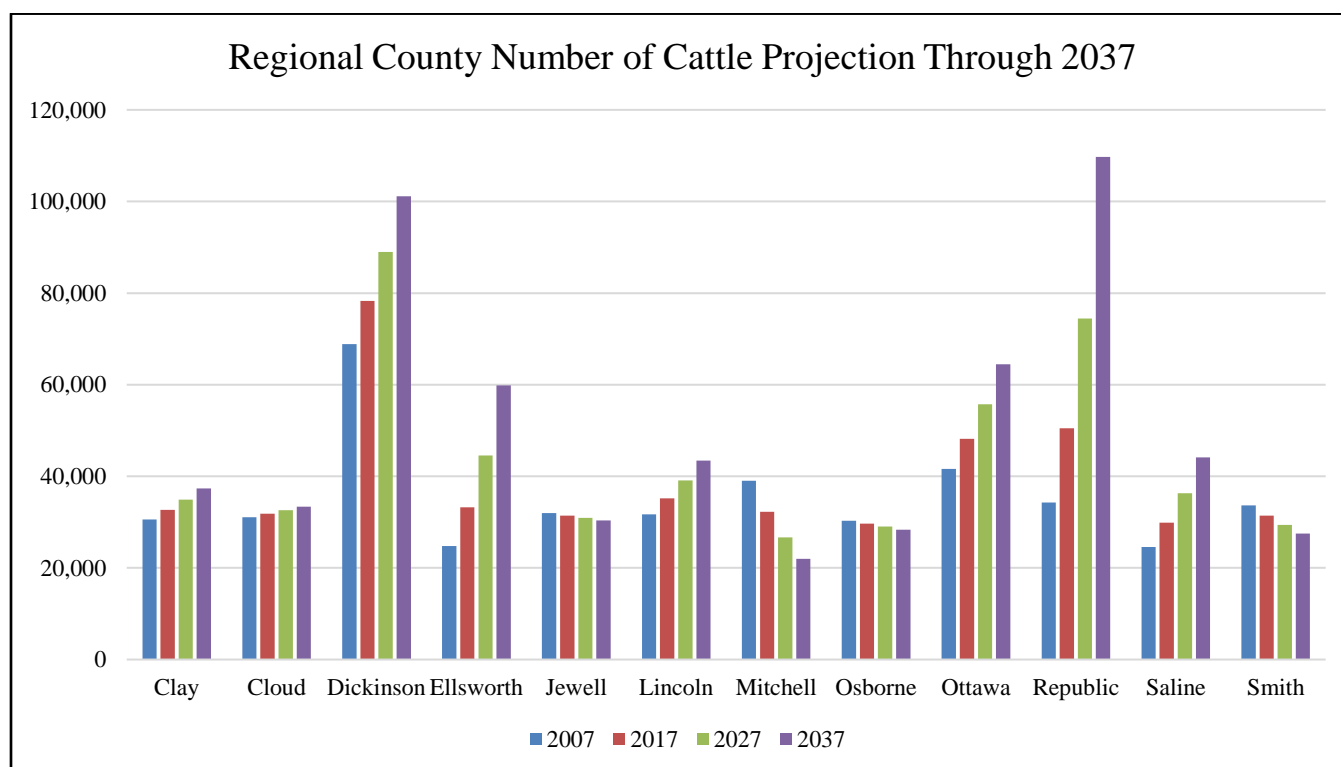
USDA National Agricultural Statistics Service data indicates the region will experience steady increase in the number of cattle through the year 2037.

**Table 3.38: Kansas Region F Total Cattle Data Projections Through 2037**

County	Cattle, 2012	Cattle, 2017	Cattle, 2027	Cattle, 2037	Projected Growth Percentage Through 2037
Clay	30,552	32,673	34,941	37,367	6.9%
Cloud	31,067	31,821	32,593	33,384	2.4%
Dickinson	68,864	78,274	88,970	101,127	13.7%
Ellsworth	24,747	33,215	44,581	59,835	34.2%
Jewell	31,978	31,442	30,915	30,397	-1.7%
Lincoln	31,692	35,198	39,092	43,416	11.1%
Mitchell	39,063	32,254	26,632	21,990	-17.4%
Osborne	30,311	29,651	29,005	28,374	-2.2%
Ottawa	41,602	48,147	55,722	64,488	15.7%
Republic	34,253	50,498	74,447	109,755	47.4%
Saline	24,578	29,868	36,297	44,109	21.5%
Smith	33,636	31,443	29,393	27,477	-6.5%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.



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





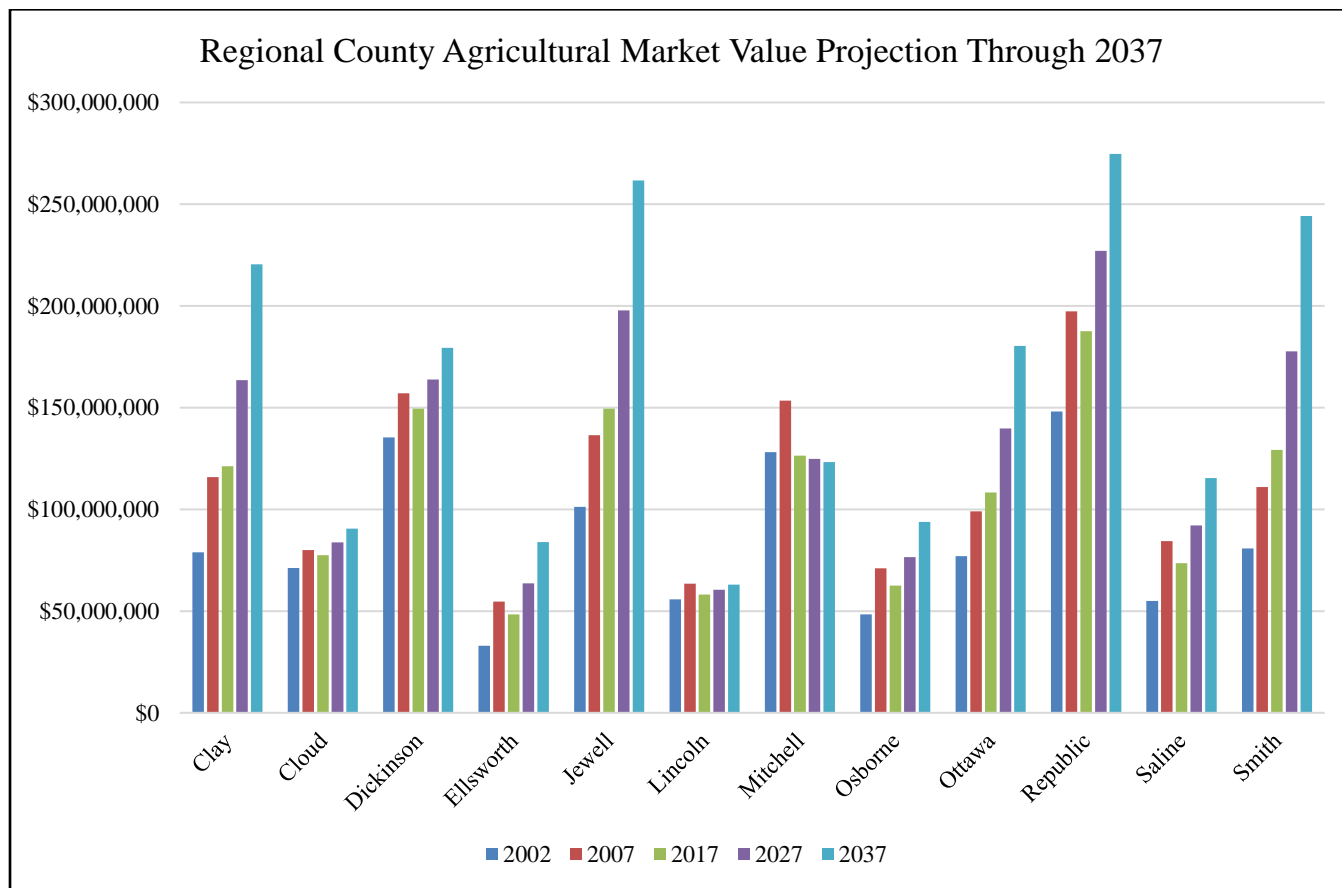


**Table 3.39: Kansas Region F Agricultural Market Value Data Projections, Through 2037**

County	Market Value, 2007	Market Value, 2012	Market Value, 2017	Market Value, 2022	Projected Growth Percentage Through 2037
Clay	\$115,868,000	\$121,175,000	\$163,460,000	\$220,500,694	34.9%
Cloud	\$80,042,000	\$77,485,000	\$83,786,000	\$90,599,391	8.1%
Dickinson	\$157,051,000	\$149,543,000	\$163,793,000	\$179,400,887	9.5%
Ellsworth	\$54,634,000	\$48,318,000	\$63,681,000	\$83,928,759	31.8%
Jewell	\$136,479,000	\$149,501,000	\$197,768,000	\$261,618,195	32.3%
Lincoln	\$63,510,000	\$58,151,000	\$60,516,000	\$62,977,185	4.1%
Mitchell	\$153,497,000	\$126,462,000	\$124,869,000	\$123,296,066	-1.3%
Osborne	\$71,007,000	\$62,499,000	\$76,549,000	\$93,757,491	22.5%
Ottawa	\$99,031,000	\$108,378,000	\$139,805,000	\$180,345,070	29.0%
Republic	\$197,267,000	\$187,529,000	\$227,000,000	\$274,778,834	21.0%
Saline	\$84,424,000	\$73,581,000	\$92,168,000	\$115,450,187	25.3%
Smith	\$110,965,000	\$129,261,000	\$177,680,000	\$244,235,944	37.5%

Source: United States Department of Agriculture National Agricultural Statistics Service

The following chart illustrates the above data.





Future development speaks to the potential impacts of land use and demographic changes in hazard prone areas. Future development data is speculative as future conditions are subject to numerous unpredictable factors. While past trends are used to inform the discussion, these historical trends are no guarantee of future conditions.

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

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

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

### 3.12 – Regional Economic Activity Patterns

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

Gross domestic product (GDP) is a measure of the entire output of a defined economy, and roughly equals the total dollar amount of all goods and services produced within a defined area. GDP is the most comprehensive measure of economic activity and business growth. The following table, using data from the Bureau of Economic Analysis, details GDP for all Kansas Region F counties for the period 2012 to 2015 (the latest available data).

**Table 3.40: Kansas Region F Gross Domestic Product, 2012 to 2015**

County	2012	2013	2014	2015	State Rank in 2015 (out of 105)
Clay	\$239,645	\$253,759	\$241,168	\$232,888	60
Cloud	\$376,928	\$306,907	\$299,504	\$297,386	48
Dickinson	\$581,520	\$600,605	\$585,035	\$571,774	30
Ellsworth	\$216,102	\$258,060	\$256,571	\$246,075	57
Jewell	\$93,955	\$111,945	\$99,749	\$100,335	96
Lincoln	\$117,523	\$124,073	\$115,862	\$109,725	89
Mitchell	\$272,867	\$308,478	\$289,199	\$274,417	52
Osborne	\$125,165	\$122,584	\$113,765	\$110,061	88
Ottawa	\$114,785	\$130,716	\$119,737	\$119,380	85
Republic	\$178,313	\$197,994	\$174,589	\$168,006	72
Saline	\$2,339,010	\$2,338,710	\$2,406,388	\$2,464,527	8
Smith	\$127,830	\$139,632	\$131,874	\$125,180	82

Source: Bureau of Economic Analysis





The following table, using data from the Bureau of Economic Analysis, details the percentage GDP change from the preceding period for 2012 to 2015 (the latest available data).

**Table 3.41: Kansas Region F GDP Percentage Change from Preceding Period, 2012 to 2015**

County	2013	2014	2015	State Rank in 2015 (out of 105)
Clay	5.9%	-5.0%	-3.4%	72
Cloud	-18.6%	-2.4%	-0.7%	51
Dickinson	3.3%	-2.6%	-2.3%	64
Ellsworth	19.4%	-0.6%	-4.1%	79
Jewell	19.1%	-10.9%	0.6%	34
Lincoln	5.6%	-6.6%	-5.3%	85
Mitchell	13.1%	-6.2%	-5.1%	84
Osborne	-2.1%	-7.2%	-3.3%	71
Ottawa	13.9%	-8.4%	-0.3%	42
Republic	11.0%	-11.8%	-3.8%	76
Saline	0.0%	2.9%	2.4%	22
Smith	9.2%	-5.6%	-5.1%	82

Source: Bureau of Economic Analysis

The average Kansas Region F unemployment rate for September 2019 of 2.35% is lower than the average State of Kansas unemployment rate of 3.2%. The following table details the regional unemployment rates, using data from the Kansas Department of Labor, for the months of September 2018 and September 2019.

**Table 3.42: Kansas Region F Unemployment Rate, September 2018 to September 2019**

County	September 2018	September 2019
Clay	2.6%	2.6%
Cloud	3.0%	3.0%
Dickinson	2.8%	3.0%
Ellsworth	2.6%	2.6%
Jewell	2.4%	2.3%
Lincoln	2.0%	2.0%
Mitchell	2.1%	1.9%
Osborne	2.5%	1.6%
Ottawa	2.5%	2.3%
Republic	2.5%	2.2%
Saline	2.7%	2.6%
Smith	2.2%	2.1%

Source: Kansas Department of Labor

### 3.13 – Climate Change

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





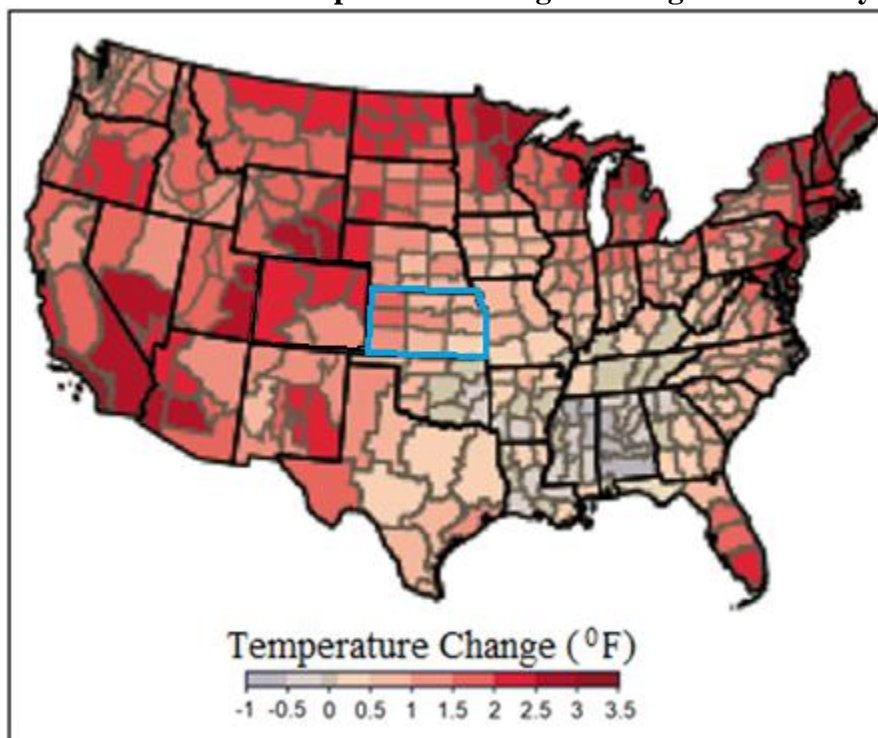
- Longer and hotter heat waves
- An increased risk of wildfires
- Higher wind speeds
- Greater rainfall intensity
- Increased tornado activity.

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

According to the United State Environmental Protection Agency (USEPA) “What Climate Change Means for Kansas” (August 2016), “In the past century, most of the state has warmed by at least half a degree (F). The soil is becoming drier. Rainstorms are becoming more intense, and floods are becoming more severe. Warming winters and changes in the timing and size of rainfall events have altered crop yields. In the coming decades, summers are likely to become increasingly hot and dry, creating problems for agriculture and possibly human health.”

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

**USEPA Modeled Temperature Changes During Last Century**



Concerning potential impacts on agriculture, the report states “Rising temperatures, drier soils, and decreasing water availability are likely to present challenges for Kansas’s farms. Yields would decline by about 50 percent in fields that can no longer be irrigated. Even where ample water is available, higher





temperatures would reduce yields of corn. Increased concentrations of carbon dioxide, however, may increase yields of wheat and soybean enough to offset the impact of higher temperature. Although warmer and shorter winters may allow for a longer growing season, they may also promote the growth of weeds and pests, and shorten the dormancy for many winter crops, which could increase crop losses during spring freezes. The early flowering of winter wheat could have negative repercussions on livestock farmers who depend on it for feed. Livestock themselves may also be affected by more intense heat waves and lack of water. Hot weather causes cows to eat less, grow more slowly, and produce less milk, and it can threaten their health.”

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

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

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



# 4.0 Hazard Profiles

## 4.1 – Introduction

The ultimate purpose of this HMP is to minimize the loss of life and property. To accomplish this, all relevant hazards and vulnerabilities the region faces have been identified. Once this identification has been completed, Kansas Region F 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 F 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. Ten-year data sets from the United States Department of Agriculture (USDA) Risk Management Agency (2009 to 2018, with 2013 and 2018 being full data set years) were used to determine agricultural losses. The ten-year data set was used to reflect the change in the climate and more accurately depict changes in the region. Where data sets were unavailable for a hazard, local reporting from participating jurisdictions was relied upon.

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

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

## 4.3 – Declared Federal Disasters

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

- DR 4449: Declared on June 20, 2019 – Severe Storms, Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides







- DR 4417: Declared on February 25, 2019 – Severe Storms, Straight-Line Winds and Flooding
- DR 4304: Declared on February 24, 2017 – Severe Winter Storm
- DR 4230: July 20, 2015 – Severe Storms, Tornados, Straight-line Winds, and Flooding

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

- FM 5172: Declared on March 06, 2017

For the 20-year period from 1999 to 2018 (data set includes full years for 2009 and 2018), Kansas Region F has had 16 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 F’s MPC met to discuss previously identified hazards and deliberate on any changes or additions. Based on this review, no changes, additions or subtractions were indicated for any identified hazard. Additionally, a thorough and comprehensive revision of data for each hazard was completed as part of this plan update.

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

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





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

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

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

## 4.5 – Hazard Planning Significance

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

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

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

**Table 4.1: CPRI Element Ratings**

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

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

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





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

**Table 4.2: CPRI Planning Significance Range**

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

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

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

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Agricultural Infestation	1.5	2.0	1.0	4.0	1.8
Dam and Levee Failure	1.0	2.5	2.0	3.0	1.8
Drought	3.0	2.0	1.0	4.0	2.4
Earthquake	1.0	1.5	4.0	1.0	1.6
Expansive Soils	1.5	1.0	1.5	4.0	1.5
Extreme Temperature	3.0	1.5	1.5	3.0	2.2
Flood	3.5	3.0	2.0	3.0	2.9
Hailstorm	4.0	2.5	3.0	1.0	2.9
Land Subsidence	1.0	1.0	1.5	4.0	1.3
Landslide	1.0	1.0	3.5	1.5	1.4
Lightning	1.0	1.0	4.0	1.0	1.4
Soil Erosion & Dust	2.5	1.0	1.0	4.0	1.9
Tornado	3.5	3.0	4.0	1.5	3.1
Wildfire	3.0	2.0	4.0	2.0	2.6
Windstorm	4.0	3.0	2.5	2.0	3.1
Winter Storm	4.0	3.0	2.0	3.0	3.1

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

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Civil Disorder	1.0	1.0	4.0	1.0	1.4
Hazardous Materials Event	1.5	1.5	4.0	2.0	1.9
Major Disease Outbreak	1.0	2.5	1.0	4.0	1.7
Radiological Event	1.0	1.0	3.5	4.0	1.6
Terrorism, Agri-Terrorism	1.5	2.0	3.5	1.5	1.9
Utility / Infrastructure Failure	2.5	2.0	4.0	2.0	2.4





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

## 4.6 – Hazard Profiles

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

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

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

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





## 4.7 – Agricultural Infestation

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



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

### 4.7.1 –Location and Extent

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

#### Animal Disease

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

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





- Clay County: 24
- Cloud County: 6
- Dickinson County: 29
- Ellsworth County: 4
- Jewell County: 11
- Lincoln County: 3
- Mitchell County: 18
- Osborne County: 12
- Ottawa County: 9
- Republic County: 9
- Saline County: 8
- Smith County: 15

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

### **Crop Pests and Diseases**

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

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

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

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

### **Tree Pests**

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

- 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 to the east of Kansas Region F. However, no instances of EAB have been detected in Kansas Region F or in any adjacent counties.

### Wildlife Pests

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

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

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

These diseases can seriously damage the populations of the captive deer and elk farms and the wild deer populations but also affect the annual \$350 million-dollar regional and statewide hunting economy.

### 4.7.2 – Previous Occurrences

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

Crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of agricultural infestation on the region’s agricultural base. Crop loss data for the ten-year period of 2009- 2018 (with 2009 and 2018 being full data years) for the region indicates 258 claims on 27,974 acres for \$2,691,737.

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

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	23	1,625	\$104,674
Cloud	21	3,204	\$274,895
Dickinson	12	1,672	\$152,394
Ellsworth	26	2,973	\$298,533
Jewell	20	1,926	\$218,392
Lincoln	18	3,127	\$357,670
Mitchell	32	3,723	\$409,265





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

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Osborne	28	2,324	\$116,921
Ottawa	14	928	\$70,308
Republic	35	2,745	\$234,209
Saline	12	1,438	\$110,063
Smith	17	2,289	\$344,413

Source: USDA Farm Service Agency

### 4.7.3 – Hazard Probability Analysis

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

### 4.7.4 – Vulnerability Assessment

Regional populations and facilities are not directly vulnerable to losses as a result of agricultural infestation. The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. The USDA Risk Management Agency provides information on insured crop losses related to identified hazards, with data from the ten-year period of 2009 to 2018 (with 2009 and 2018 being full data set years) used for analysis. The higher the percentage loss, the higher the potential vulnerability the county has to agricultural infestation events.

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

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	162	0.04%	\$121,175,000	\$10,467	0.01%
Cloud	322,034	320	0.10%	\$77,485,000	\$27,489	0.04%
Dickinson	519,171	167	0.03%	\$149,543,000	\$15,239	0.01%
Ellsworth	390,042	297	0.08%	\$48,318,000	\$29,853	0.06%
Jewell	436,206	193	0.04%	\$149,501,000	\$21,839	0.01%
Lincoln	384,740	313	0.08%	\$58,151,000	\$35,767	0.06%
Mitchell	414,220	372	0.09%	\$126,462,000	\$40,927	0.03%
Osborne	437,083	232	0.05%	\$62,499,000	\$11,692	0.02%
Ottawa	439,335	93	0.02%	\$108,378,000	\$7,031	0.01%
Republic	373,206	275	0.07%	\$187,529,000	\$23,421	0.01%
Saline	358,243	144	0.04%	\$73,581,000	\$11,006	0.01%
Smith	541,742	229	0.04%	\$129,261,000	\$34,441	0.03%

Source: USDA





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

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

**Table 4.7: Potential High-Risk Plant Pests**

Pest (Disease Insect, or weed)	Crop or Host Plant	Current Distribution	Type of Loss
Rust, Austro-Asian	Soybean	Australia, Japan, Pacific, Gulf of Mexico	Direct Loss to production
Aspergillus ear rot (Alfatoxin)	Corn	Worldwide, endemic to Kansas	Toxin renders the grain unusable
Black Stem Rust UG99 strain	Wheat	Africa, Asia	Direct Loss to production
Blast – South American strains	Wheat	South America	Direct Loss to production
Stripe Rust (new races)	Wheat	North America	Direct Loss to production
Leaf Rust (new races)	Wheat	North America	Direct Loss to production
Karnal Bunt	Wheat	Asia, Mexico, Arizona	International export quarantines, degradation of flour quality
Thousand Cankers	Walnut	Western US states and PA, VA, TN	Death of municipal trees, loss of nut crop, loss of timber
Emerald Ash Borer	Ash	North Central and North Eastern U.S., including northeast Kansas	Death of trees. Cost of removal and re-vegetation.
Asian Longhorned Beetle	Maples, Birches, Willows, Mimosa, Ash, Sycamore, Poplar trees	Small parts of Ohio, New York, and Massachusetts	Death of trees. Cost of removal and re-vegetation.
Hydrilla	Water Bodies	Southern U.S. and one park pond in Olathe	Economic and environmental.

#### 4.7.5 – Impact and Consequence Analysis

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

**Table 4.8: Agricultural Infestation Consequence Analysis**

Subject	Impacts of Agricultural Infestation
Health and Safety of the Public	Impact in the area would be minimal. If the infestation is unrecognized, then there is the potential for the food supply to be contaminated.
Health and Safety of Responders	Impact would be minimal with protective clothing, gloves, etc. as these diseases cause no risk to humans.
Continuity of Operations	Minimal expectation of execution of the COOP.





**Table 4.8: Agricultural Infestation Consequence Analysis**

<b>Subject</b>	<b>Impacts of Agricultural Infestation</b>
Property, Facilities, and Infrastructure	Localized impact to facilities and infrastructure in the incident area is minimal to non-existent.
Environment	Impact could be severe to the incident area, specifically, plants, trees, bushes, and crops.
Economic Conditions	Impacts to the economy will depend on the severity of the infestation. The potential for economic loss to the community and state could be severe if the infestation is hard to contain, eliminate, or reduce. Impact could be minimized due to crop insurance.
Public Confidence in the Jurisdiction's Governance	Confidence could be in question depending on timeliness and steps taken to warn the producers and public, and treat/eradicate the infestation.





## 4.8 – Dam and Levee Failure

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

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



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

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

### 4.8.1 – Dam Location and Extent

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

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

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

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





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

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

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

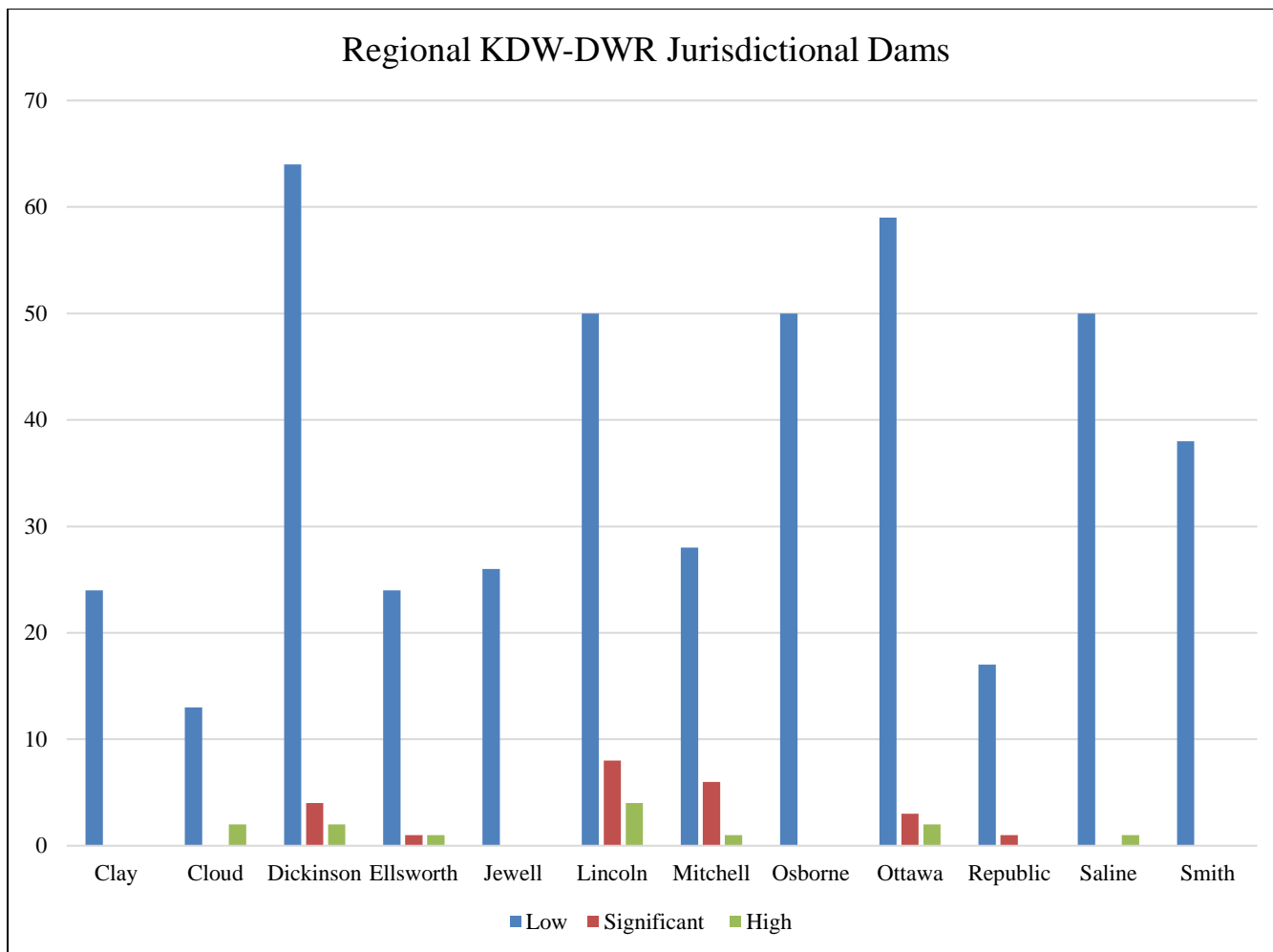
**Table 4.9: Kansas Region F KDA-DWR Jurisdictional Dams**

County	Low	Significant	High	High Hazard Without EAP
Clay	24	0	0	0
Cloud	13	0	2	0
Dickinson	64	4	2	0
Ellsworth	24	1	1	0
Jewell	26	0	2	0
Lincoln	50	8	4	3
Mitchell	28	6	4	0
Osborne	50	0	0	0
Ottawa	59	3	2	0
Republic	17	1	0	0
Saline	50	0	1	0
Smith	38	0	0	0

Source: KDA-DWR





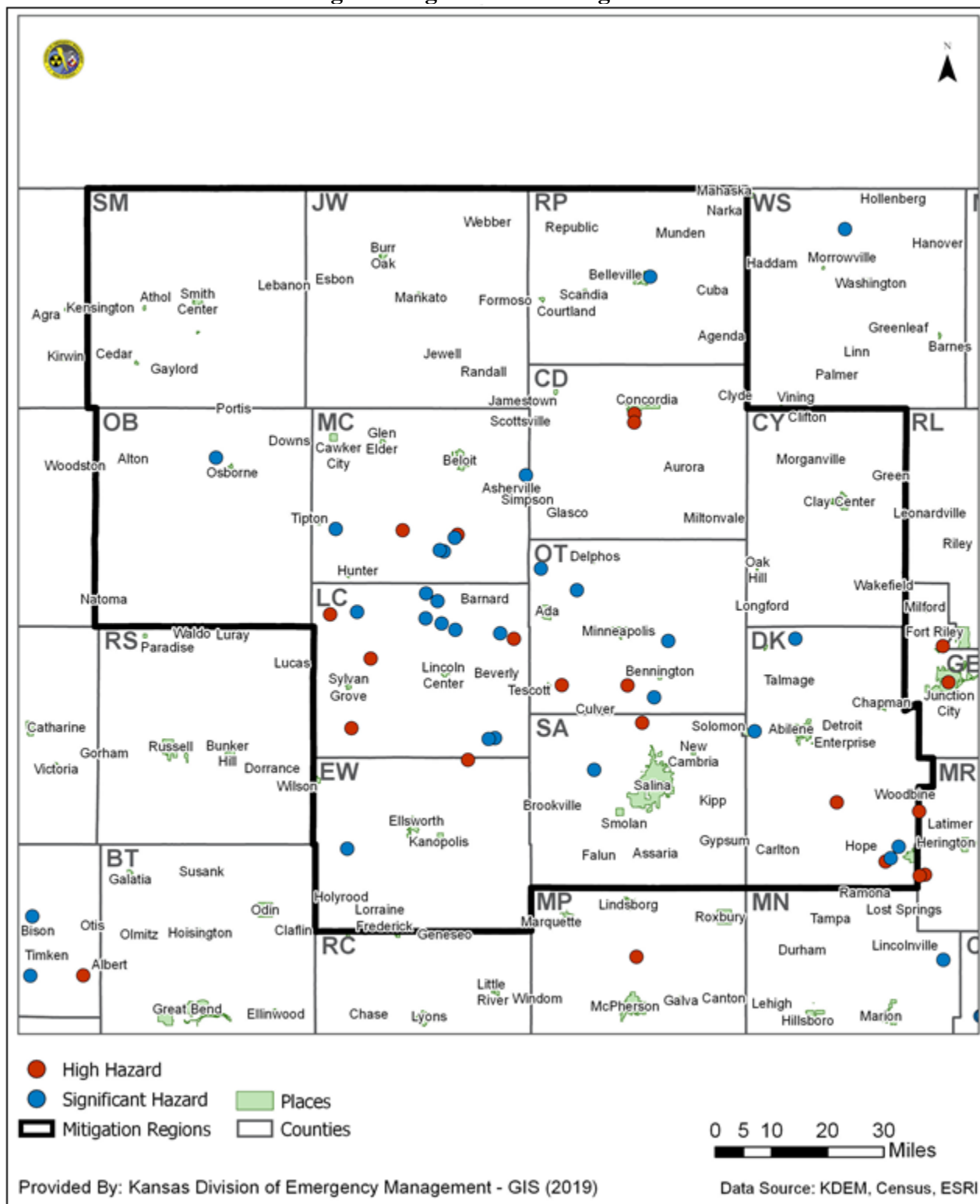


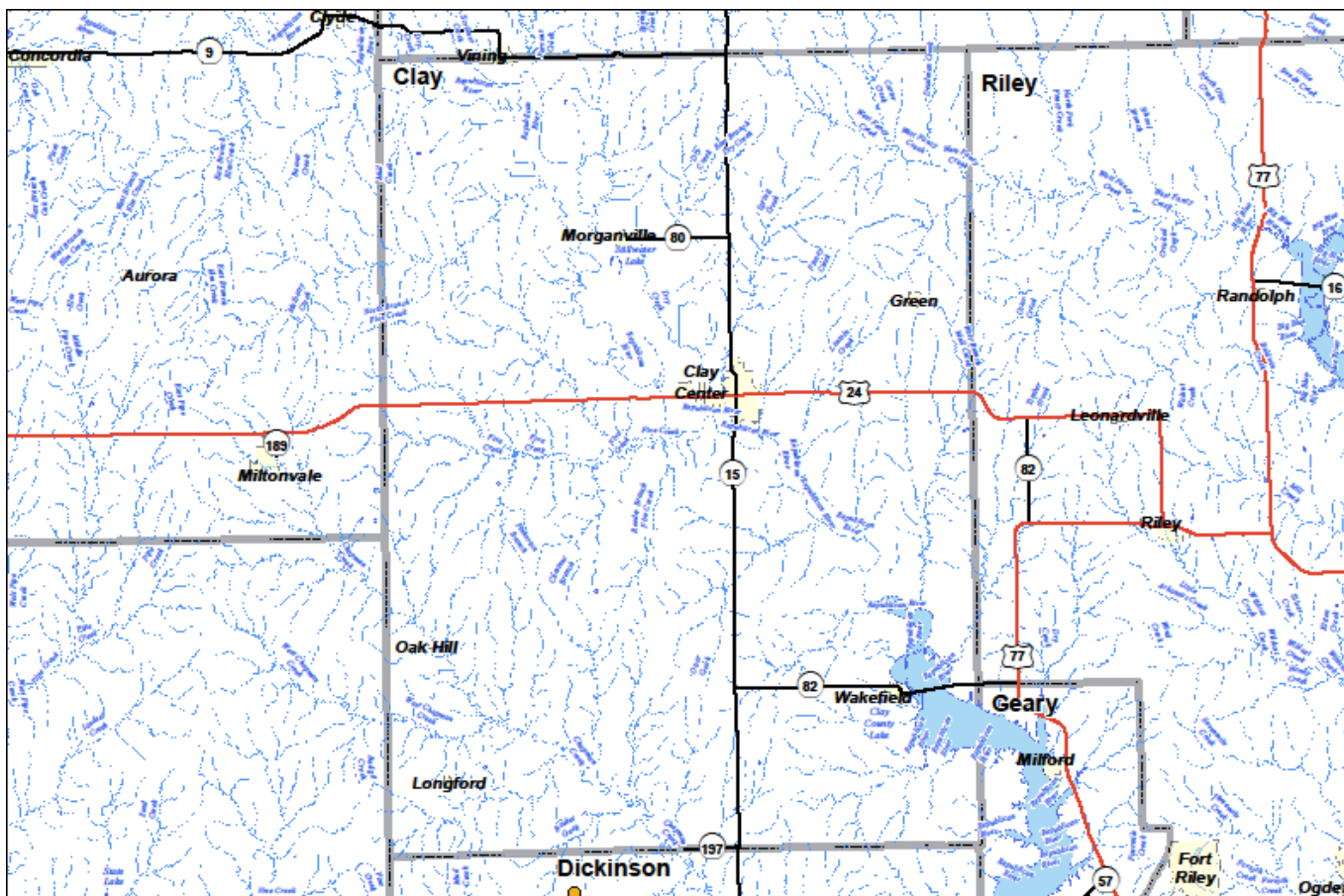
The following maps show all identified dams within Kansas Region F with a Significant or High classification, and available inundation and location mapping. Please note that information related to dams may have been classified and unable for review.





# Kansas Region F Significant and High Hazard Dams





**KS Department of Agriculture - High and Significant Hazard Dams**

**Clay  
County, KS**

- Hazard Class**
- Dams: Hazard Class**
- High
- Significant
- Interstates
- US Highways
- Kansas Highways
- Lake
- Streams
- County Boundaries
- Cities (Census 2010)

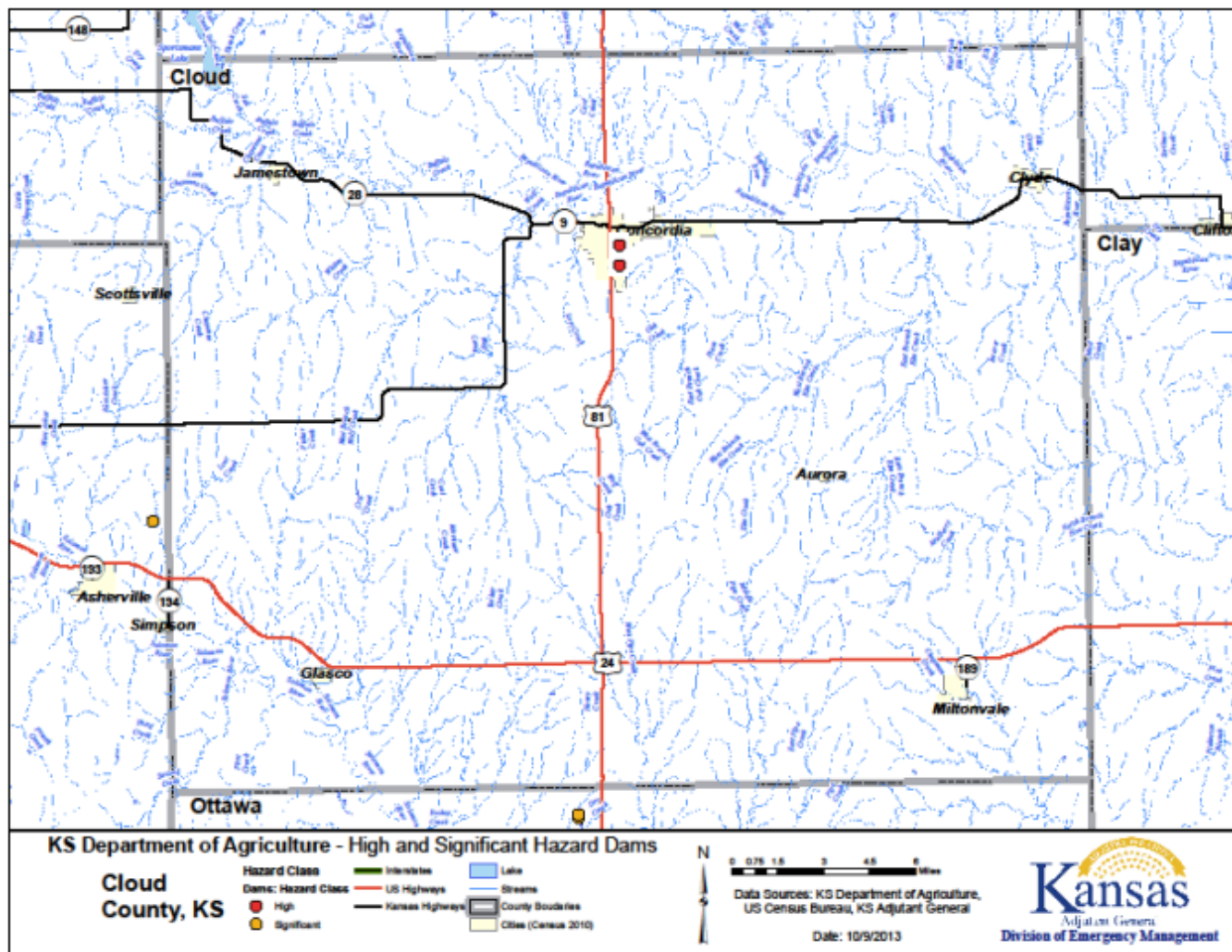


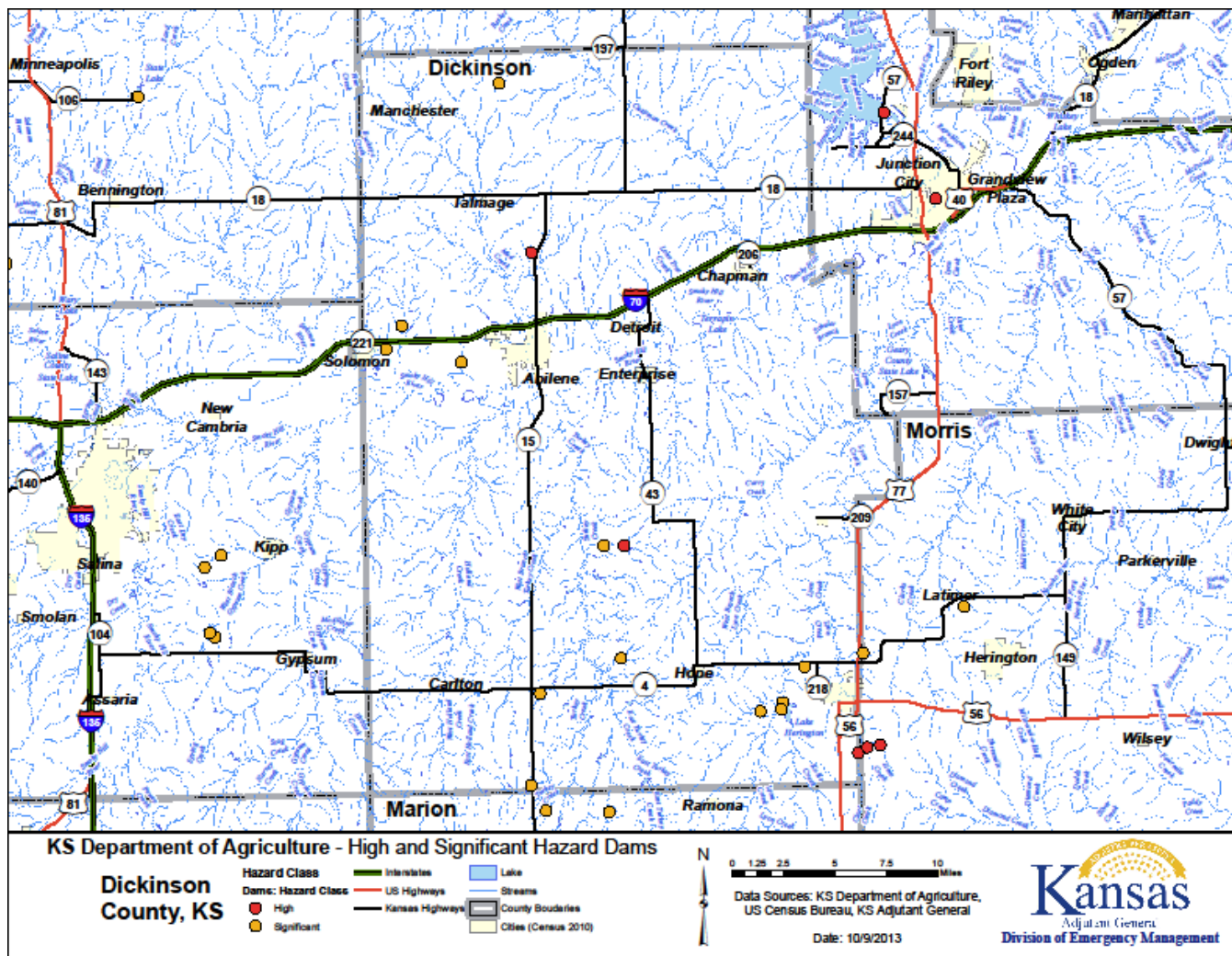
0 1 2 4 6 8 Miles

Data Sources: KS Department of Agriculture,  
US Census Bureau, KS Adjutant General

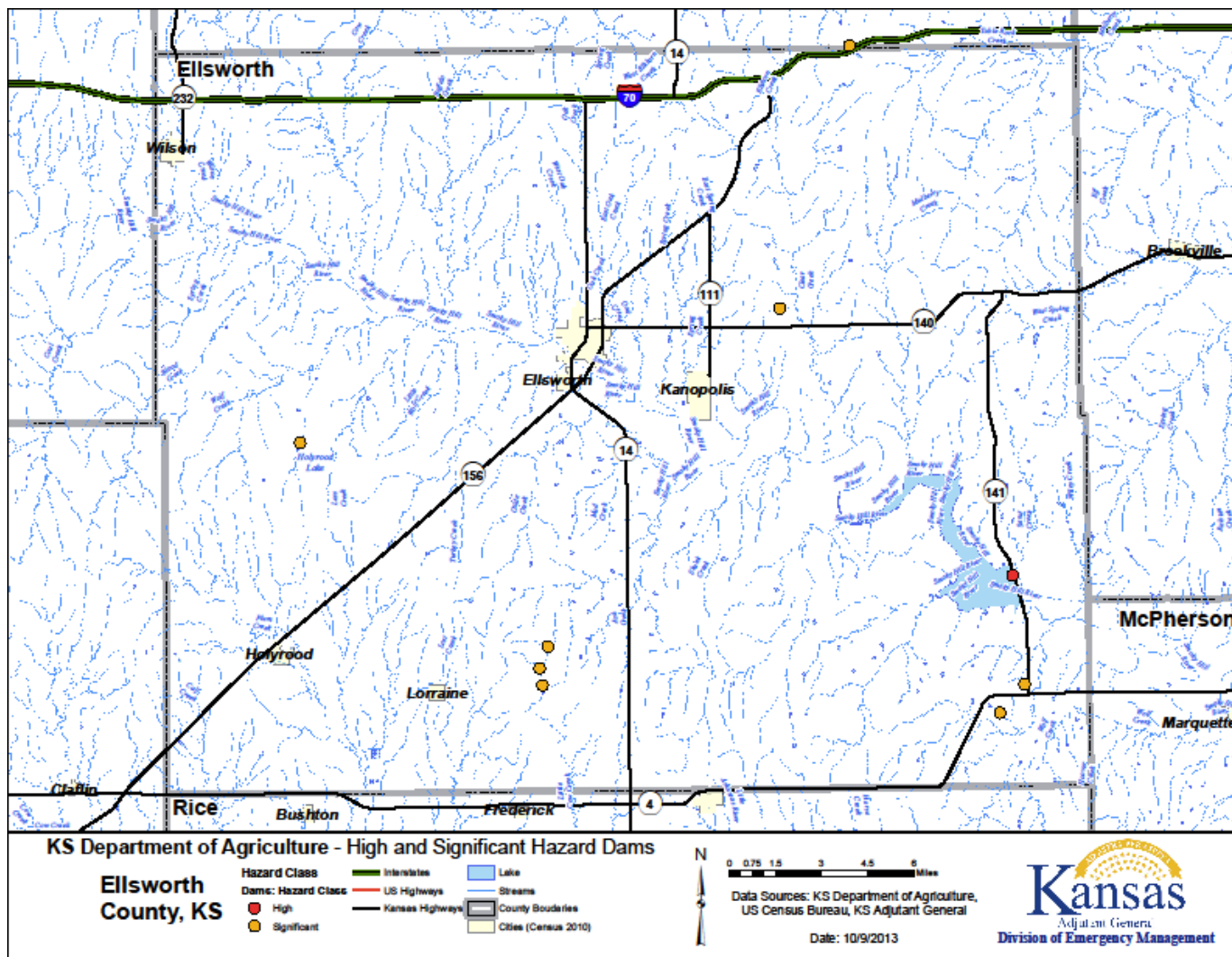
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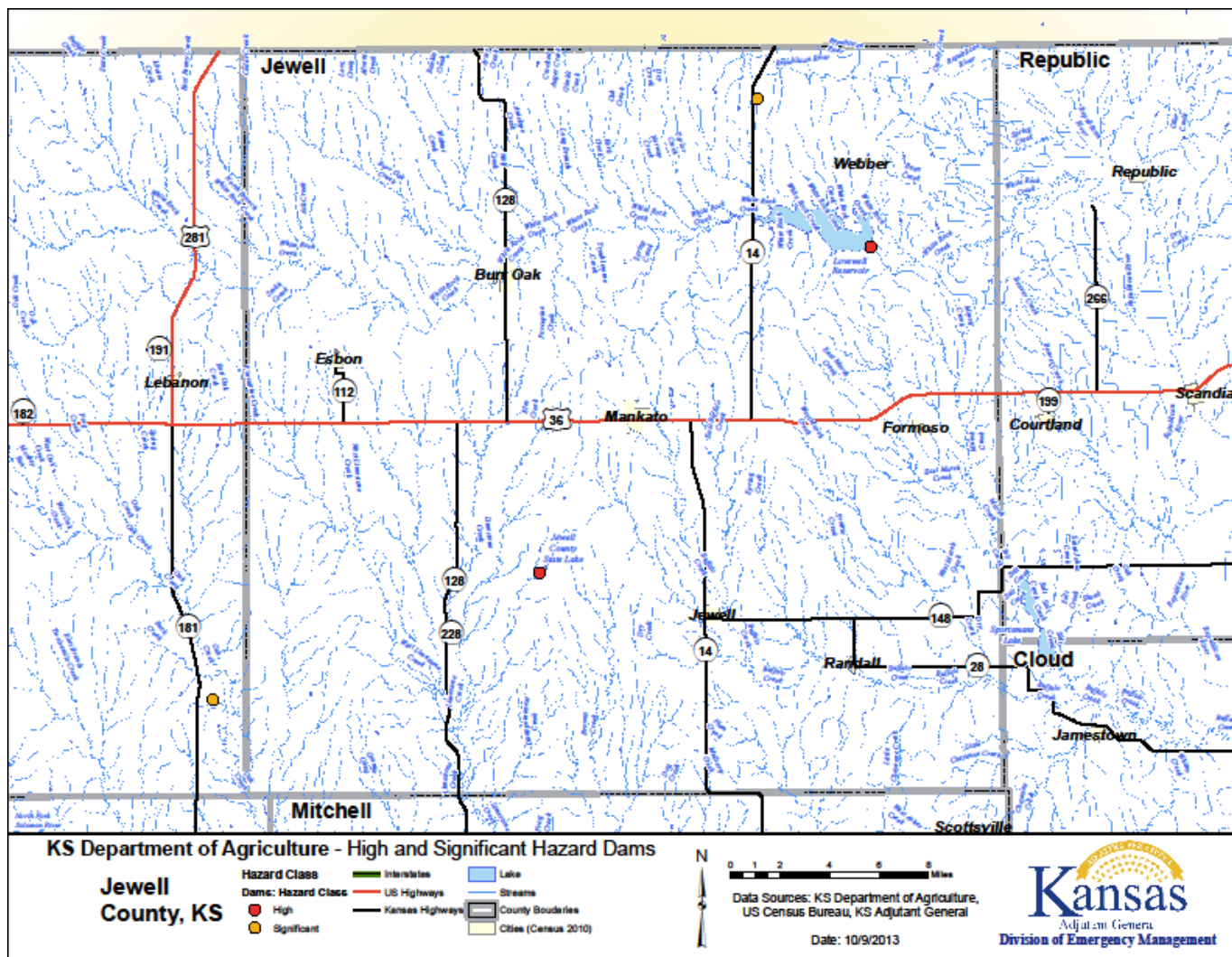


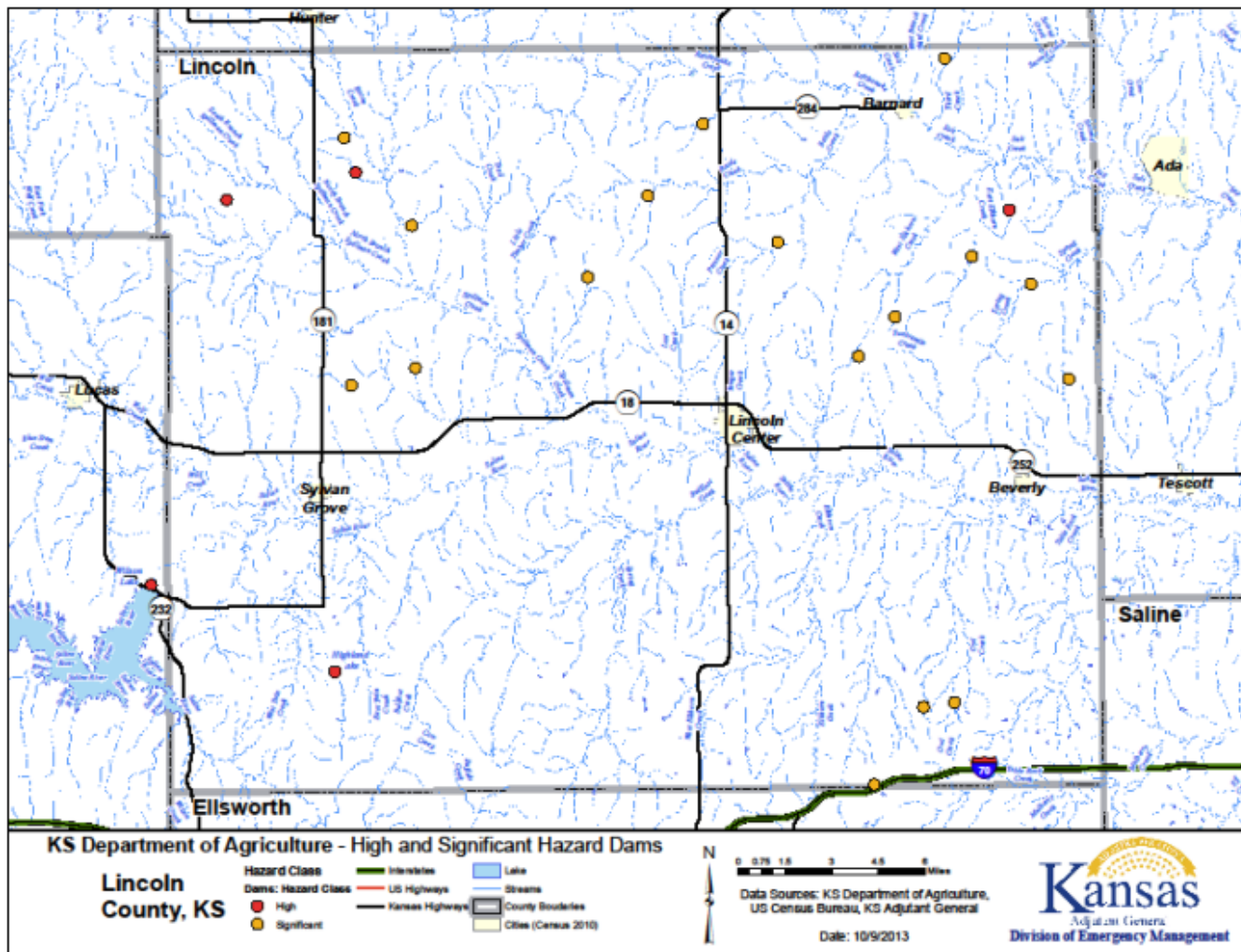


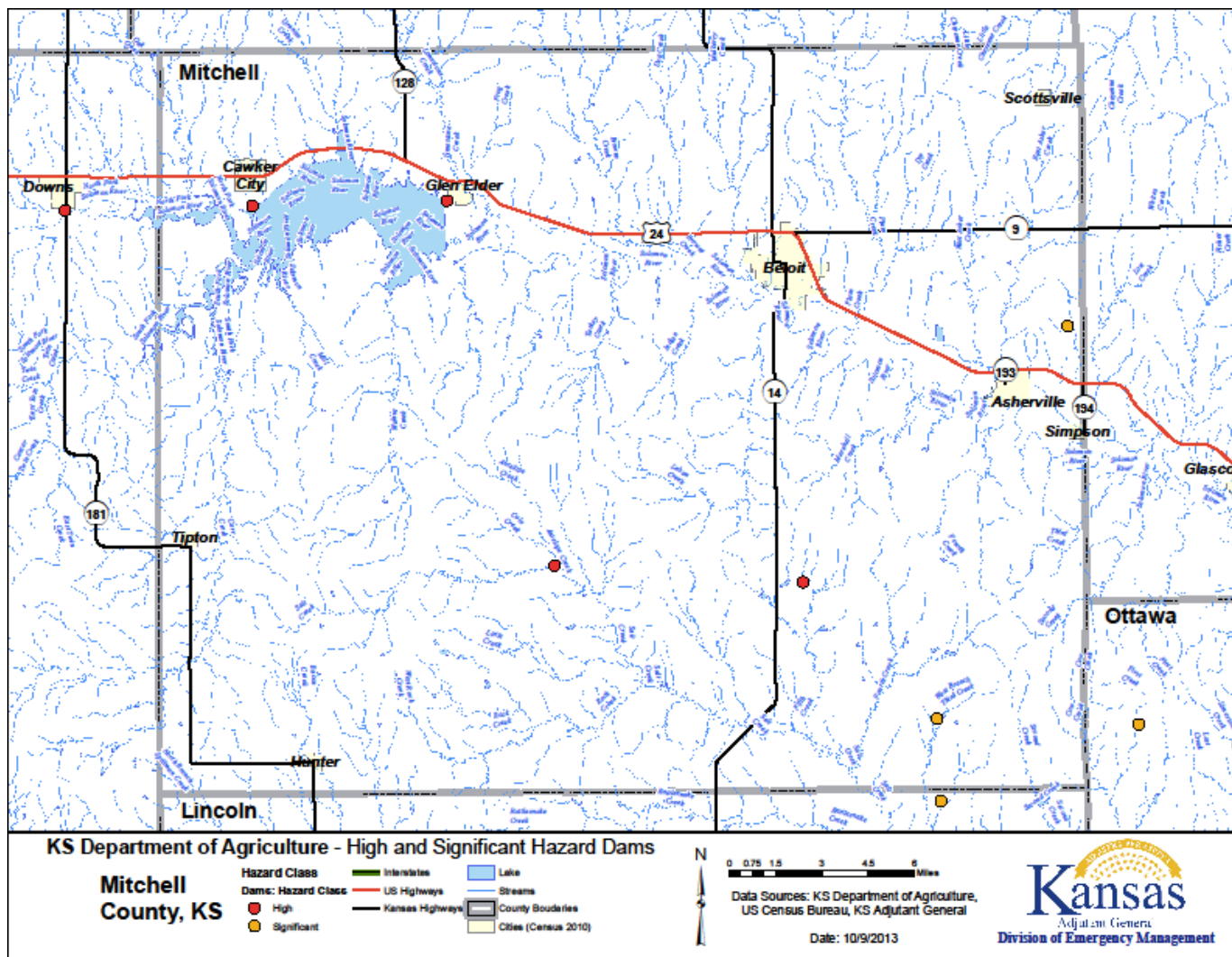


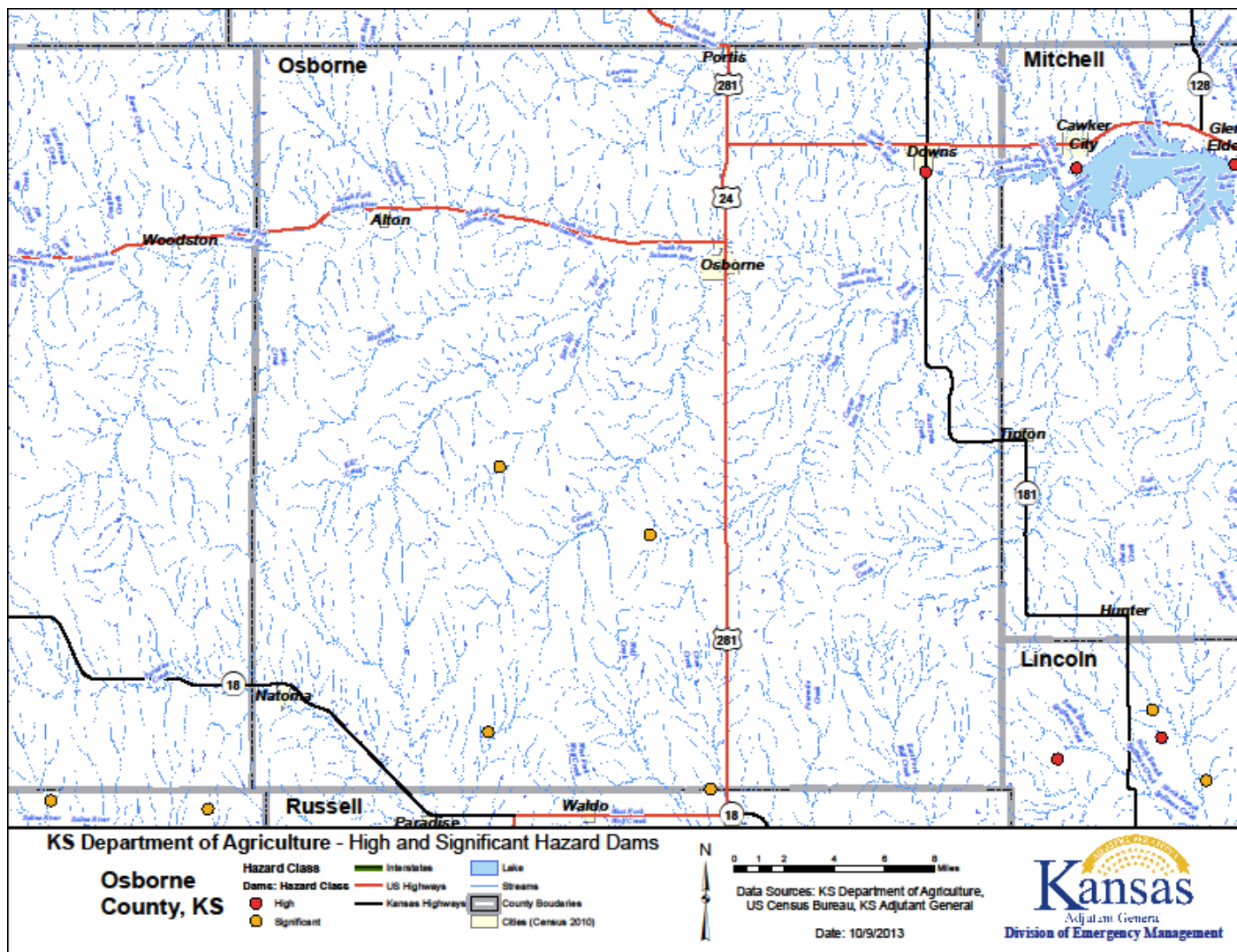




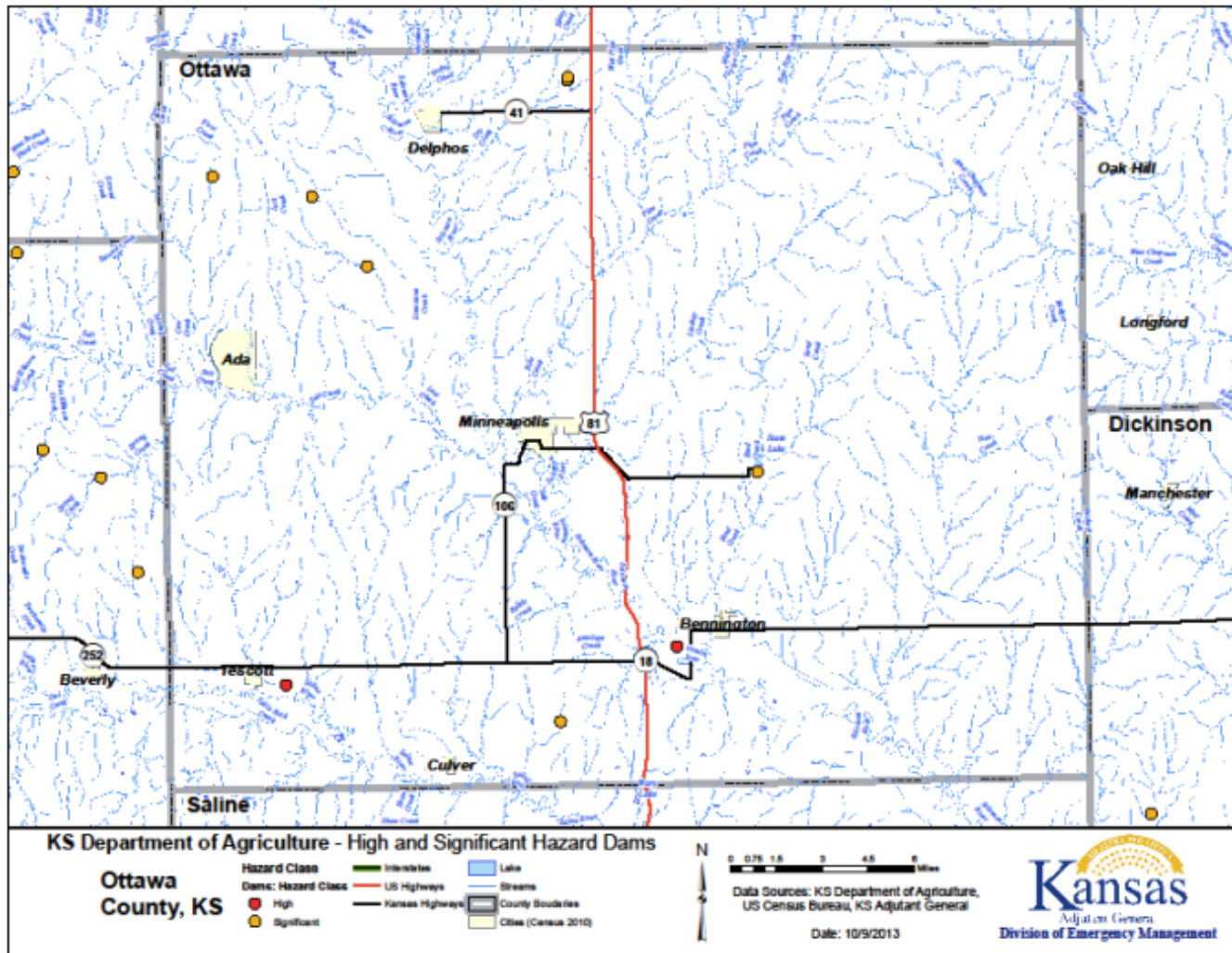


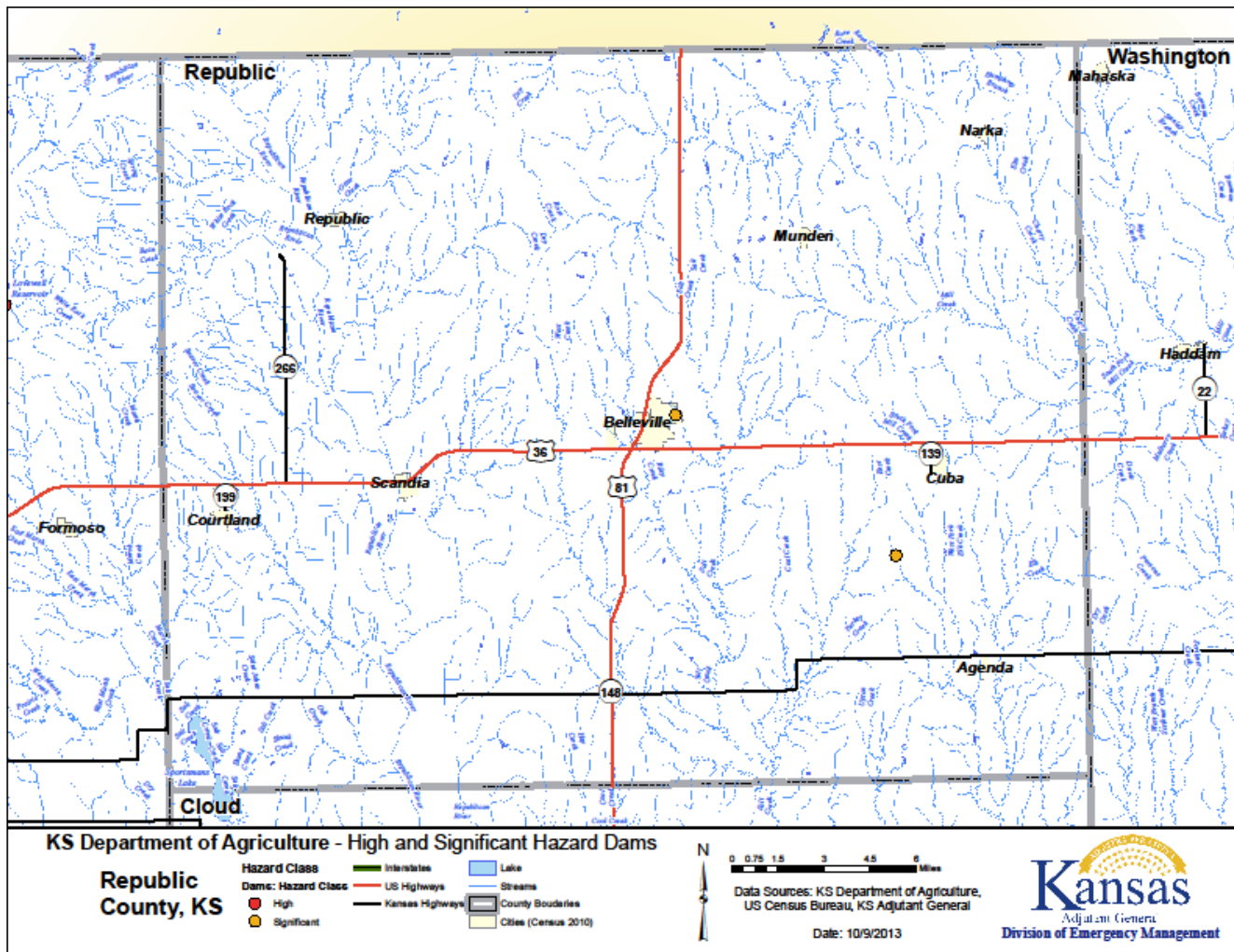




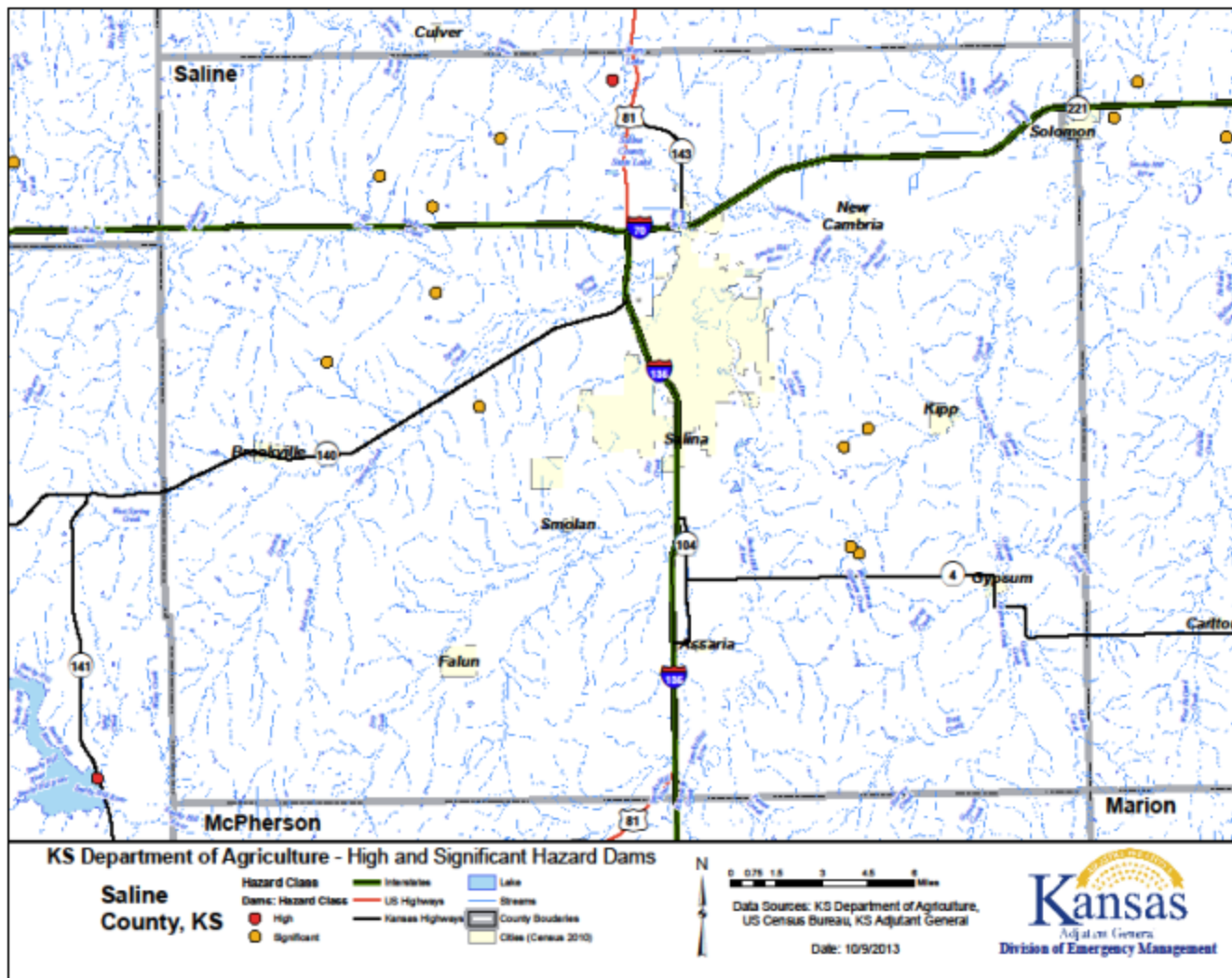


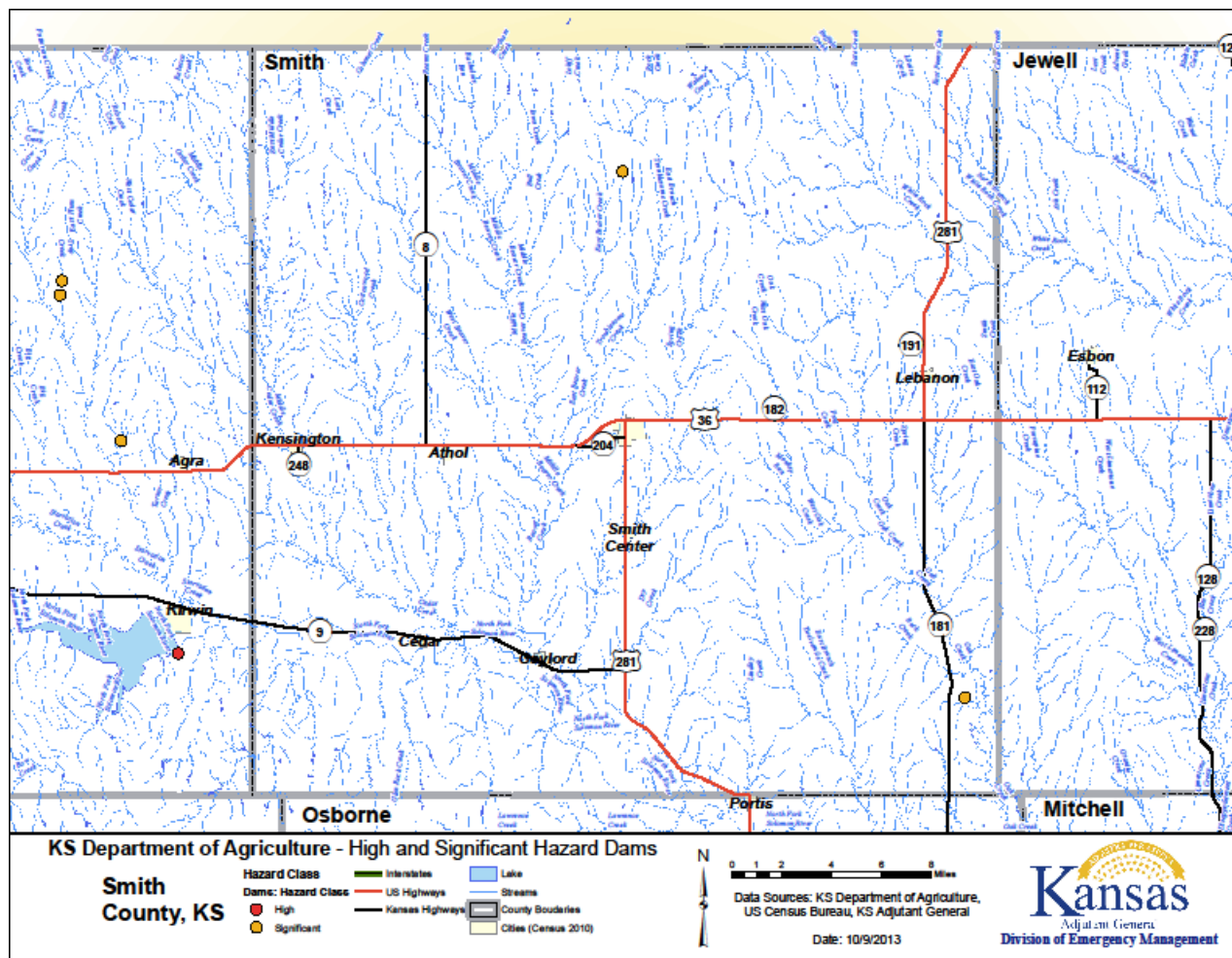












## Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program

The HHPD grant program provides technical, planning, design, and construction assistance in the form of grants for rehabilitation of eligible high hazard potential dams. Eligible high hazard dams are:

- Located in a state or territory with a state or territorial dam safety program
- Classified as ‘high hazard potential’ by the dam safety agency in the state or territory where the dam is located
- Have an emergency action plan approved by the state or territory dam safety agency
- Have been determined by the state or territory in which the dam is located to either fail to meet minimum dam safety standards or pose an unacceptable risk to the public.

Eligible activities under the HHPD include

- Repair
- Removal
- Structural / nonstructural rehabilitation of eligible high hazard potential dams





The following available inundation maps, from dams within the region that have been classified as high hazard, are provided to allow for potential future application to the HHPD program to address regional dams of concern.

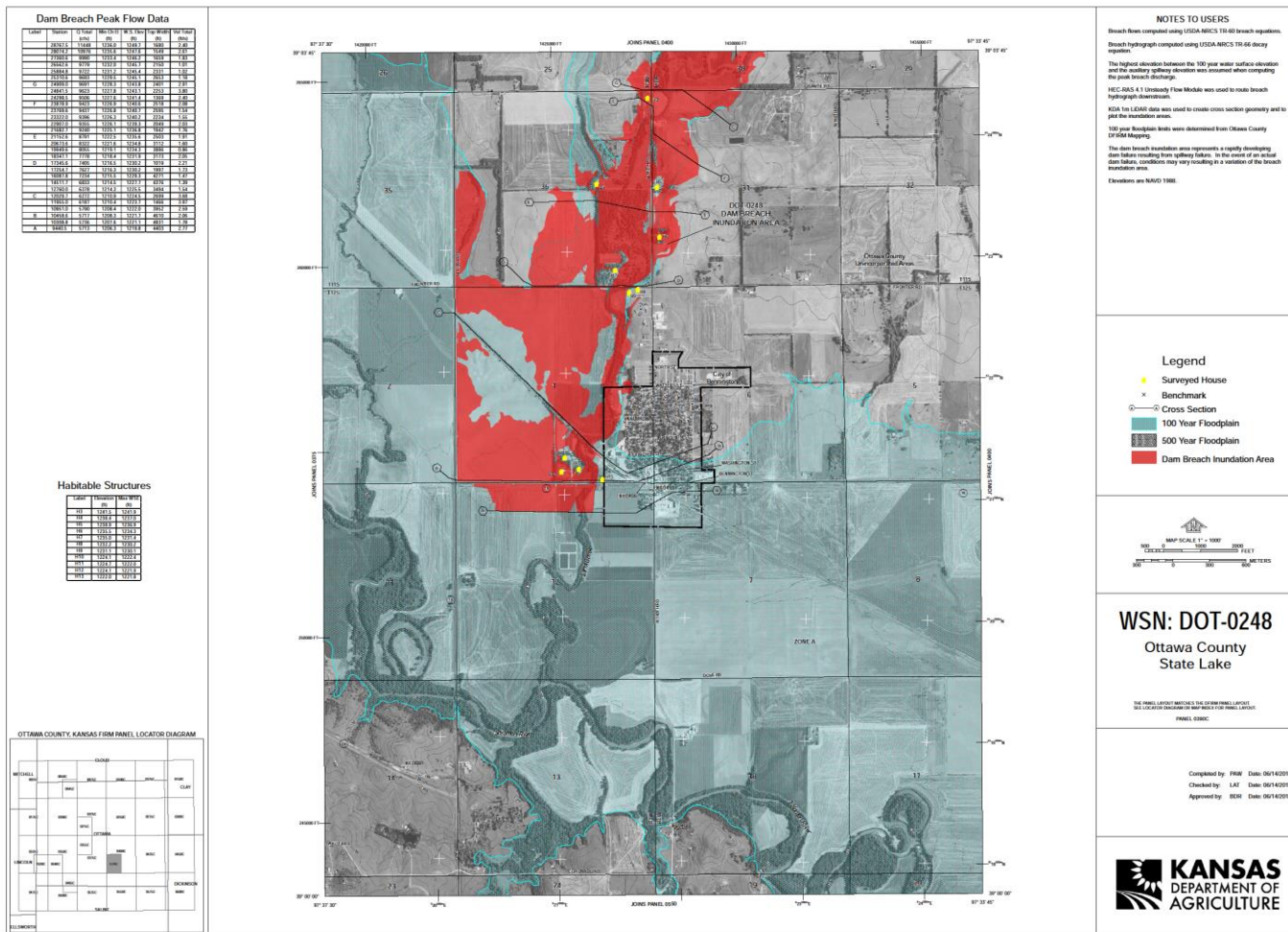
### Lovewell Lake Dam Inundation Map, Jewell County





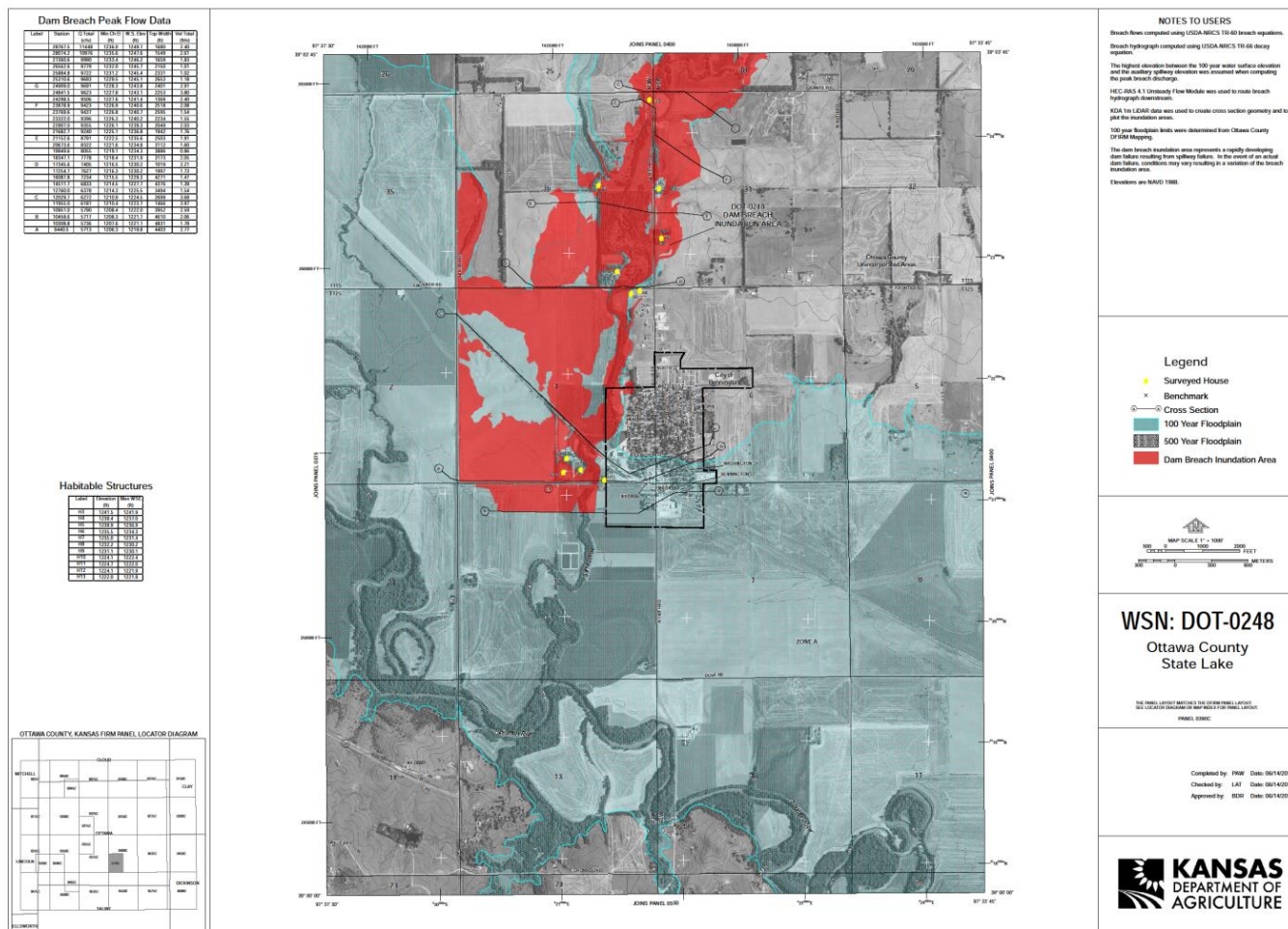


# Ottawa State Fishing Lake Map, Ottawa County





# Ottawa State Fishing Lake Map, Ottawa County



Based on an August 27, 2019 Dam Safety Report, KDA has recommended for Ottawa State Fishing Lake the following:

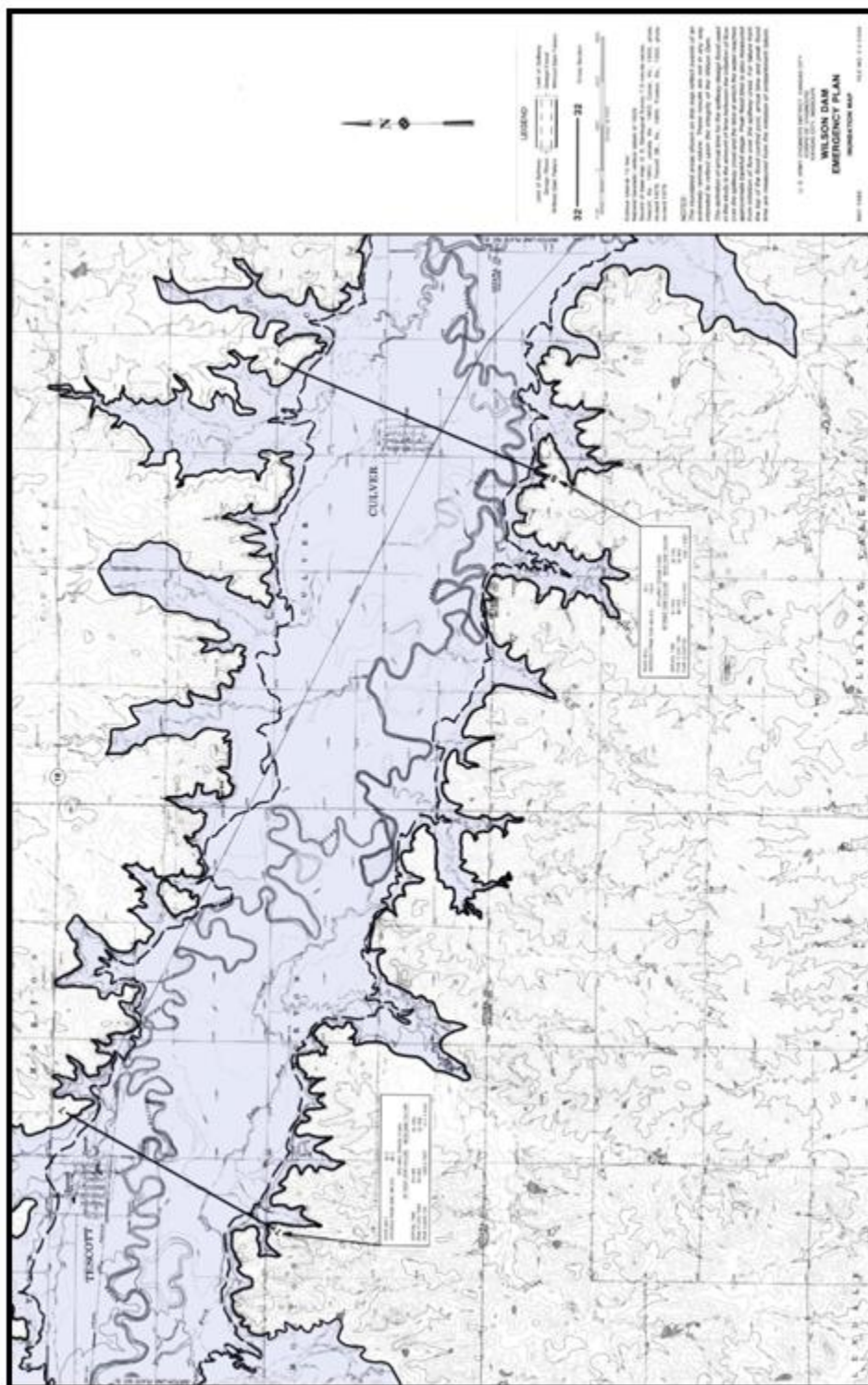
- Remove trees and other undesirable vegetation along the upstream slope, downstream slope, and around the stilling basin.
- Monitor concrete deterioration, erosion, and the settlement of concrete panels. If conditions worsen contact your engineer. If repairs are needed contact DWR prior to construction as a permit may be required.
- Submit a high hazard Emergency Action Plan (EAP) to DWR and any other interested parties. A high hazard EAP template can be found on the Kansas Department of Agriculture website.
- The standing water beyond the toe of the dam should be monitored. If conditions change contact your engineer as a larger problem may be occurring.







# Wilson Dam Inundation Map, Saline County



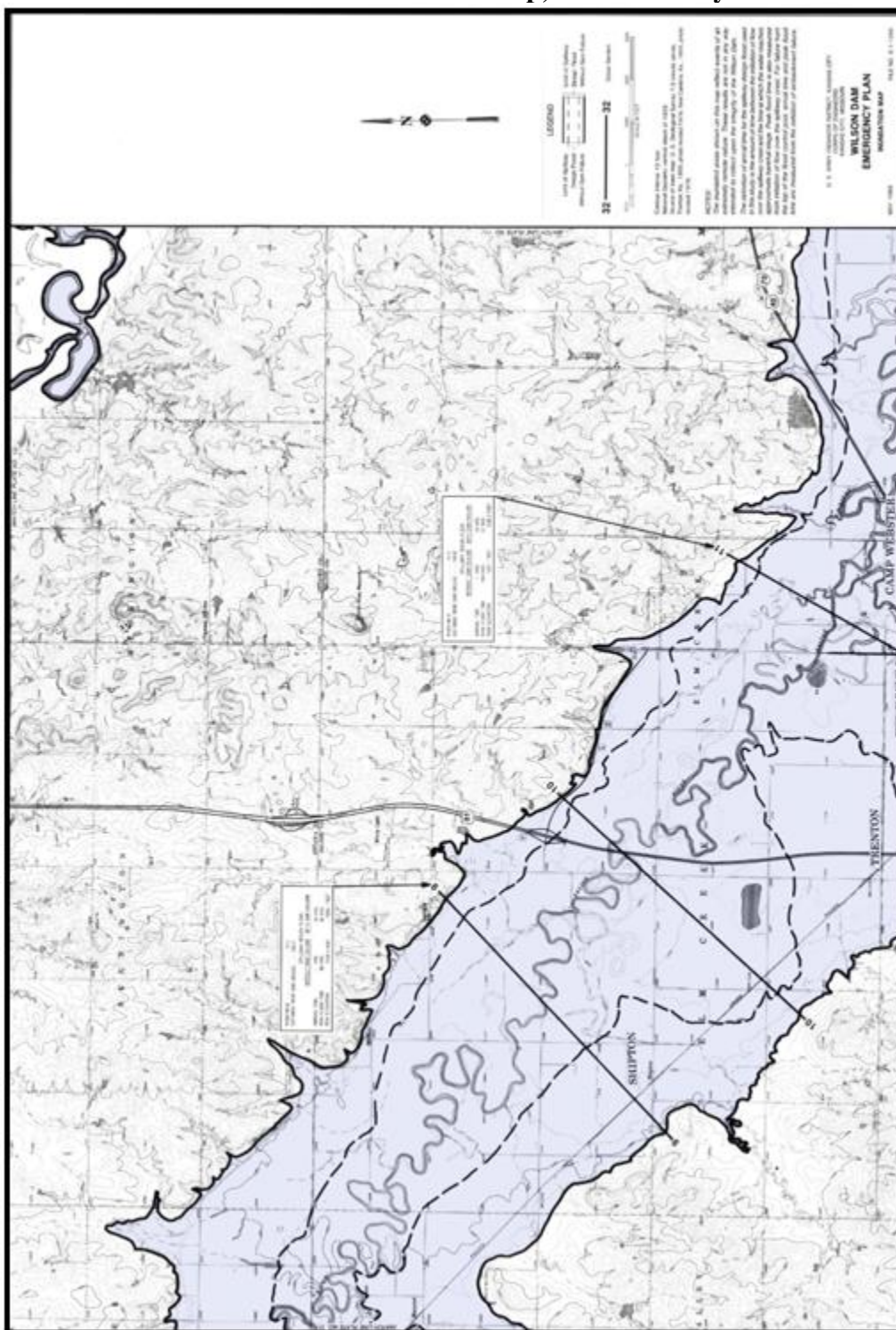
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# Wilson Dam Inundation Map, Saline County

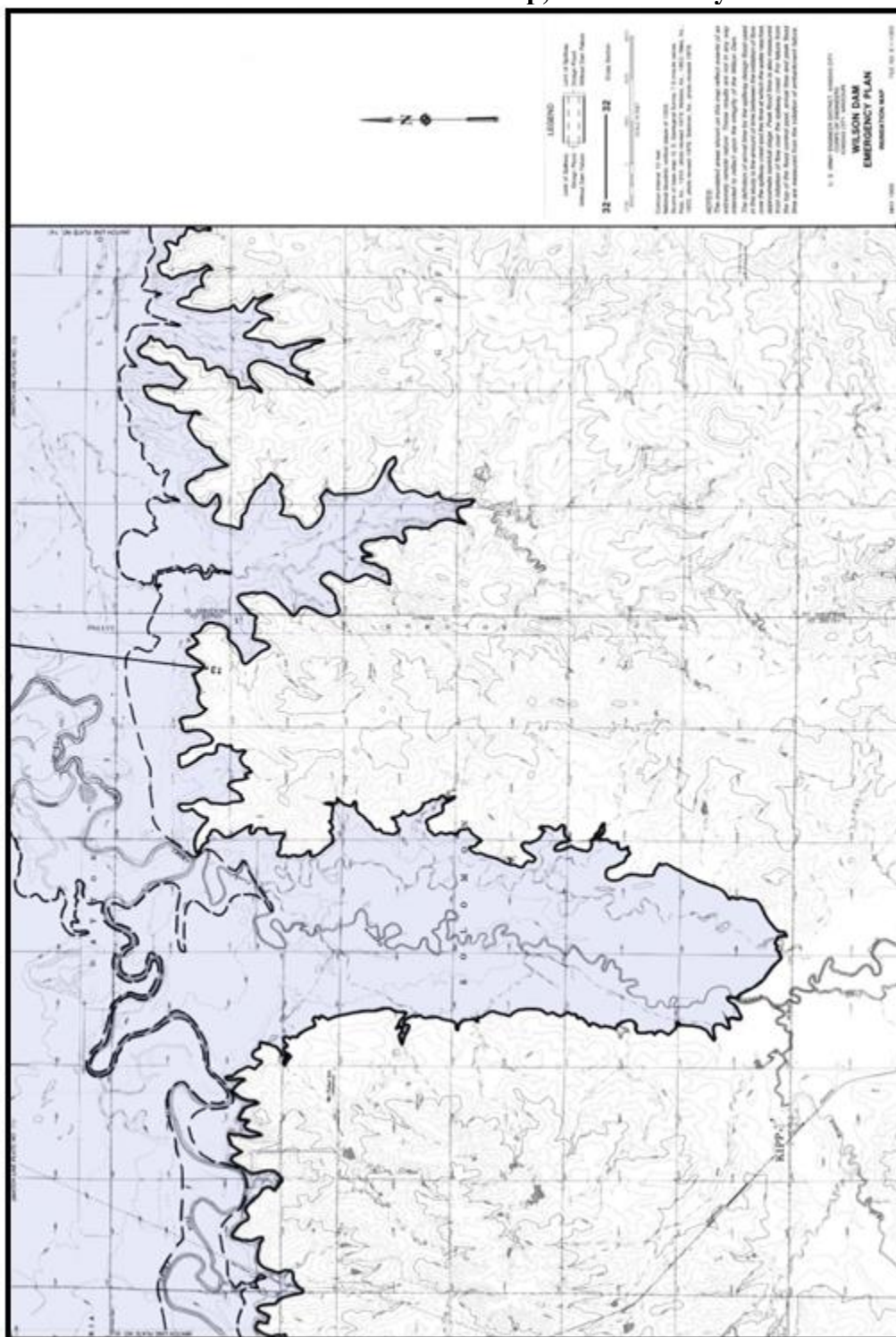


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## Wilson Dam Inundation Map, Saline County



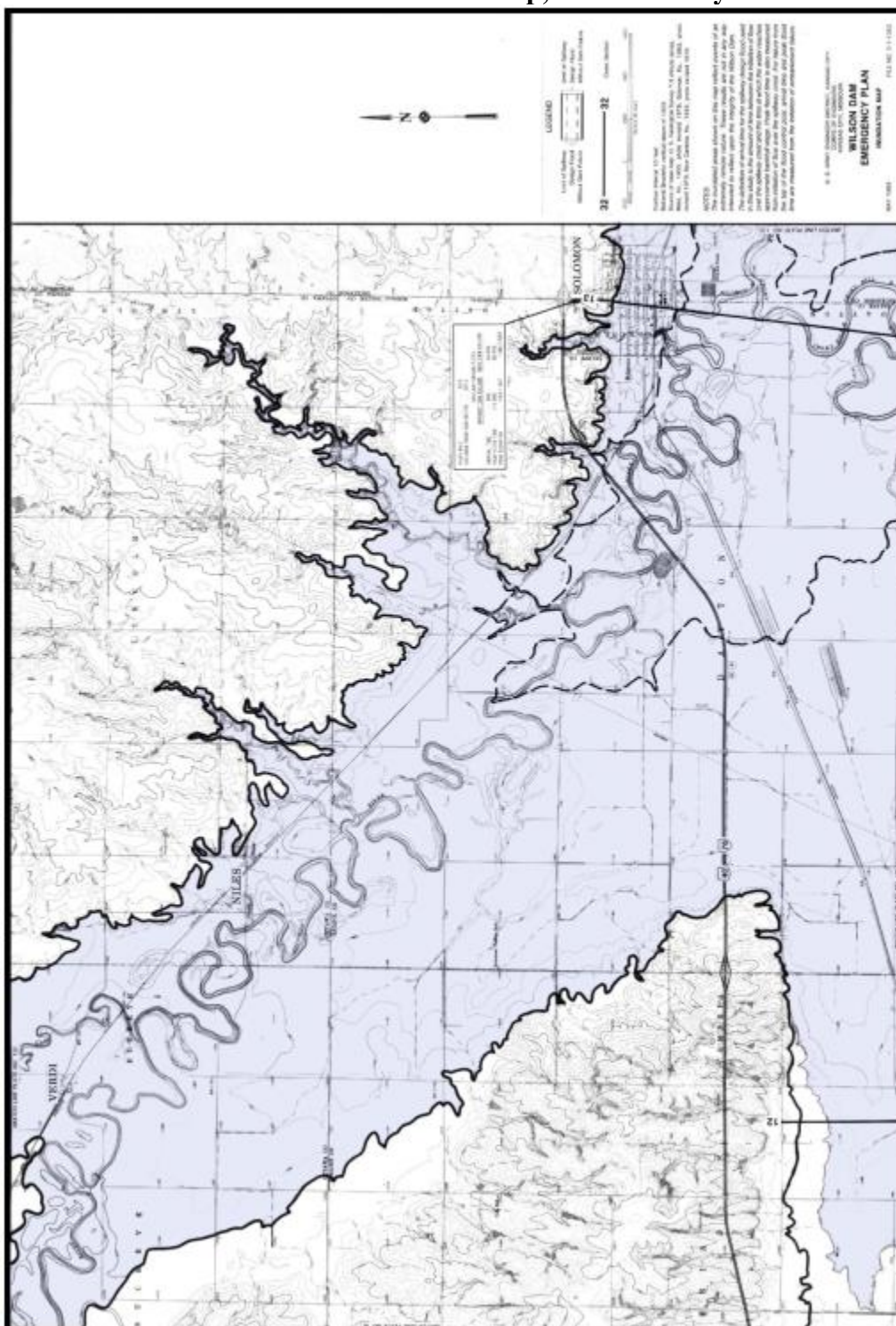
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# Wilson Dam Inundation Map, Saline County





# Kanopolis Dam Inundation Map, Ellsworth County



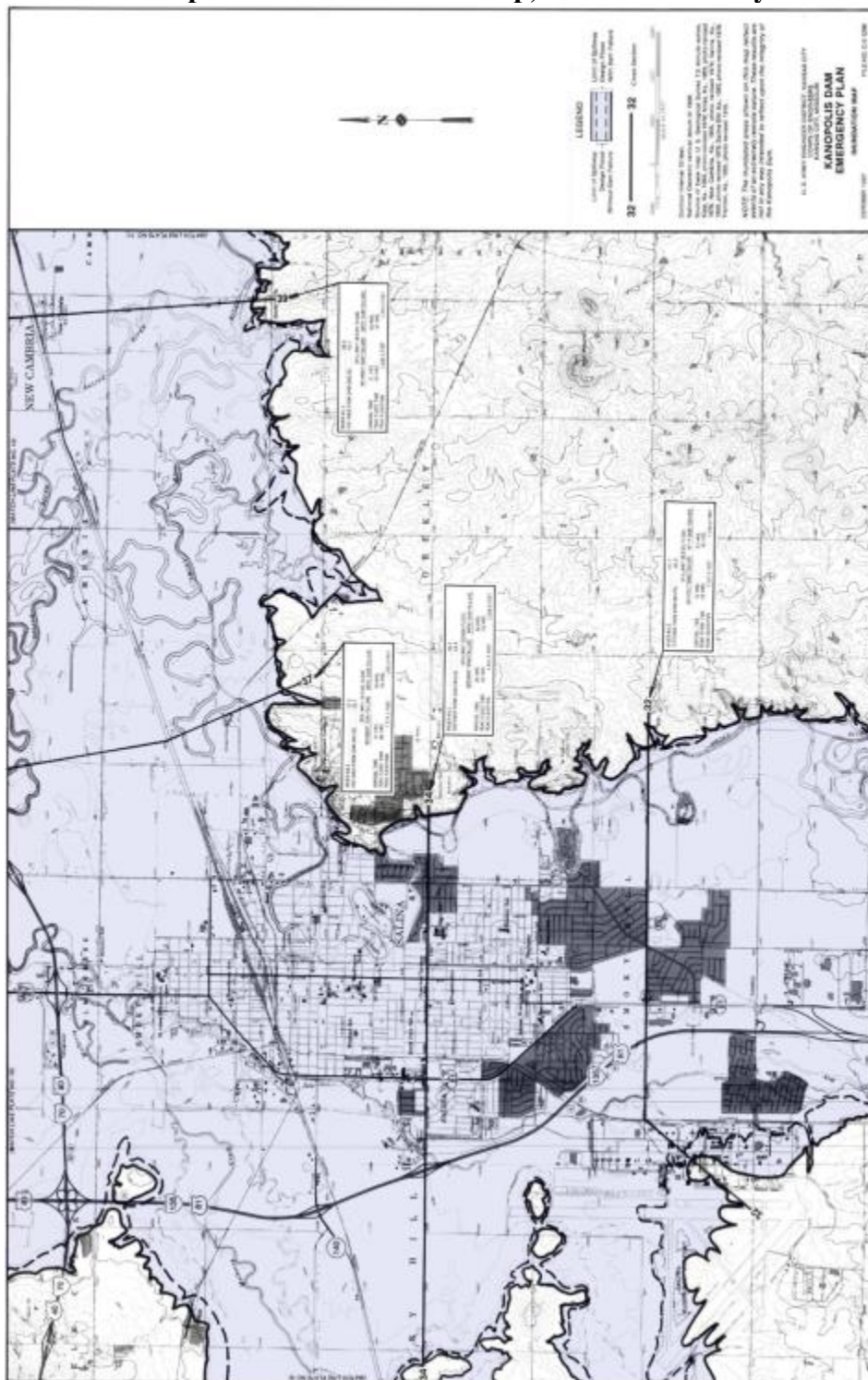
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## Kanopolis Dam Inundation Map, Ellsworth County



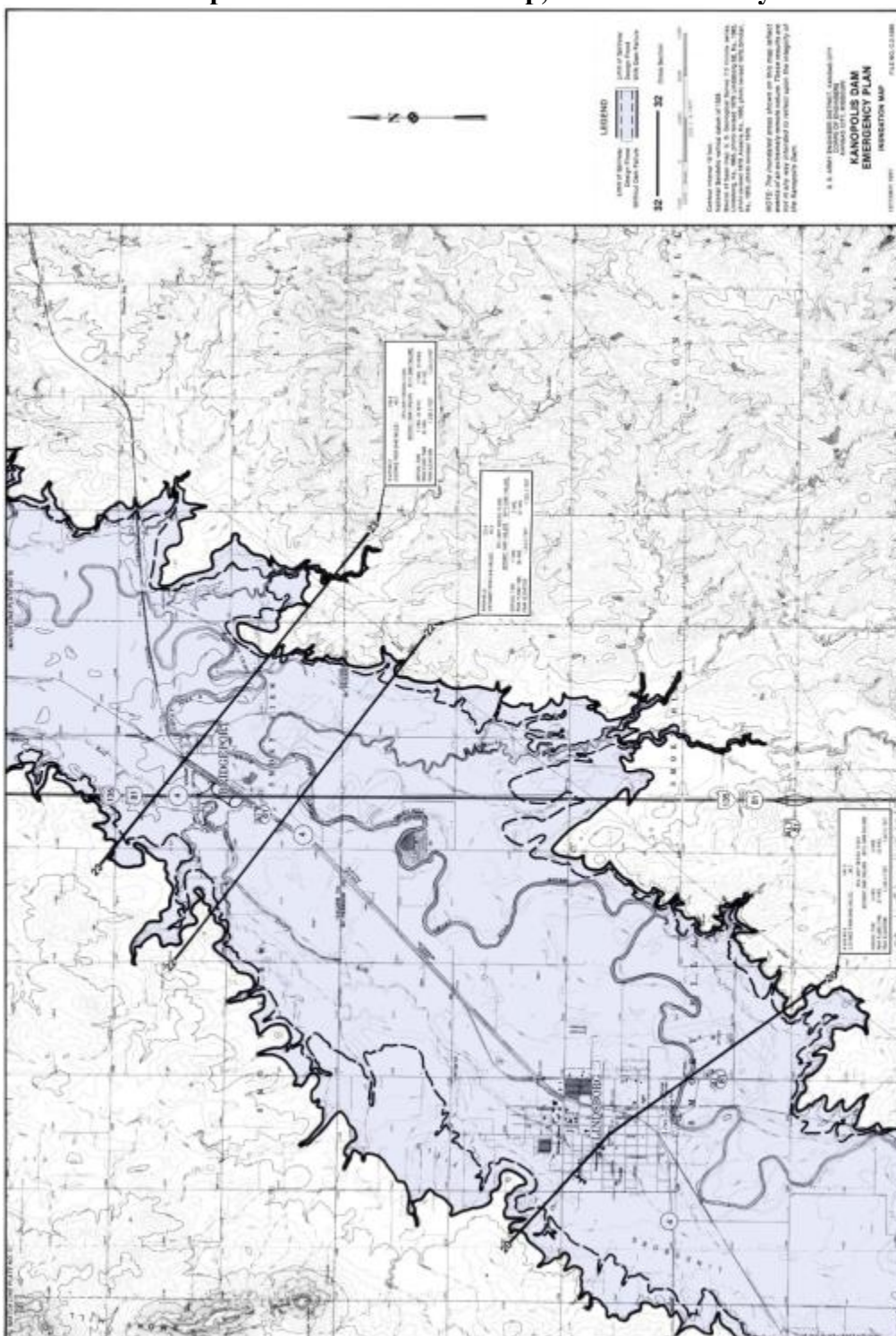
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## Kanopolis Dam Inundation Map, Ellsworth County

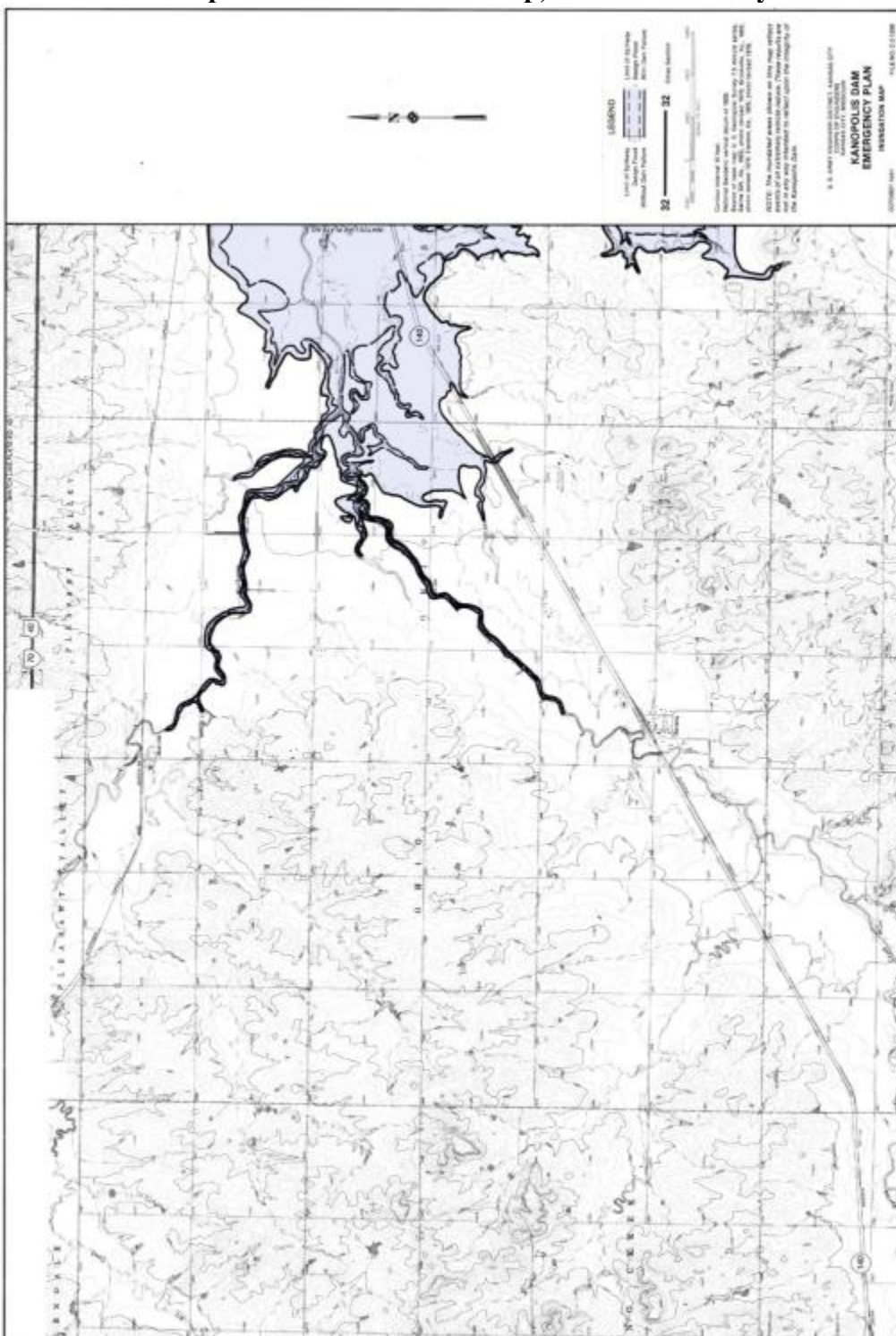


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# Kanopolis Dam Inundation Map, Ellsworth County

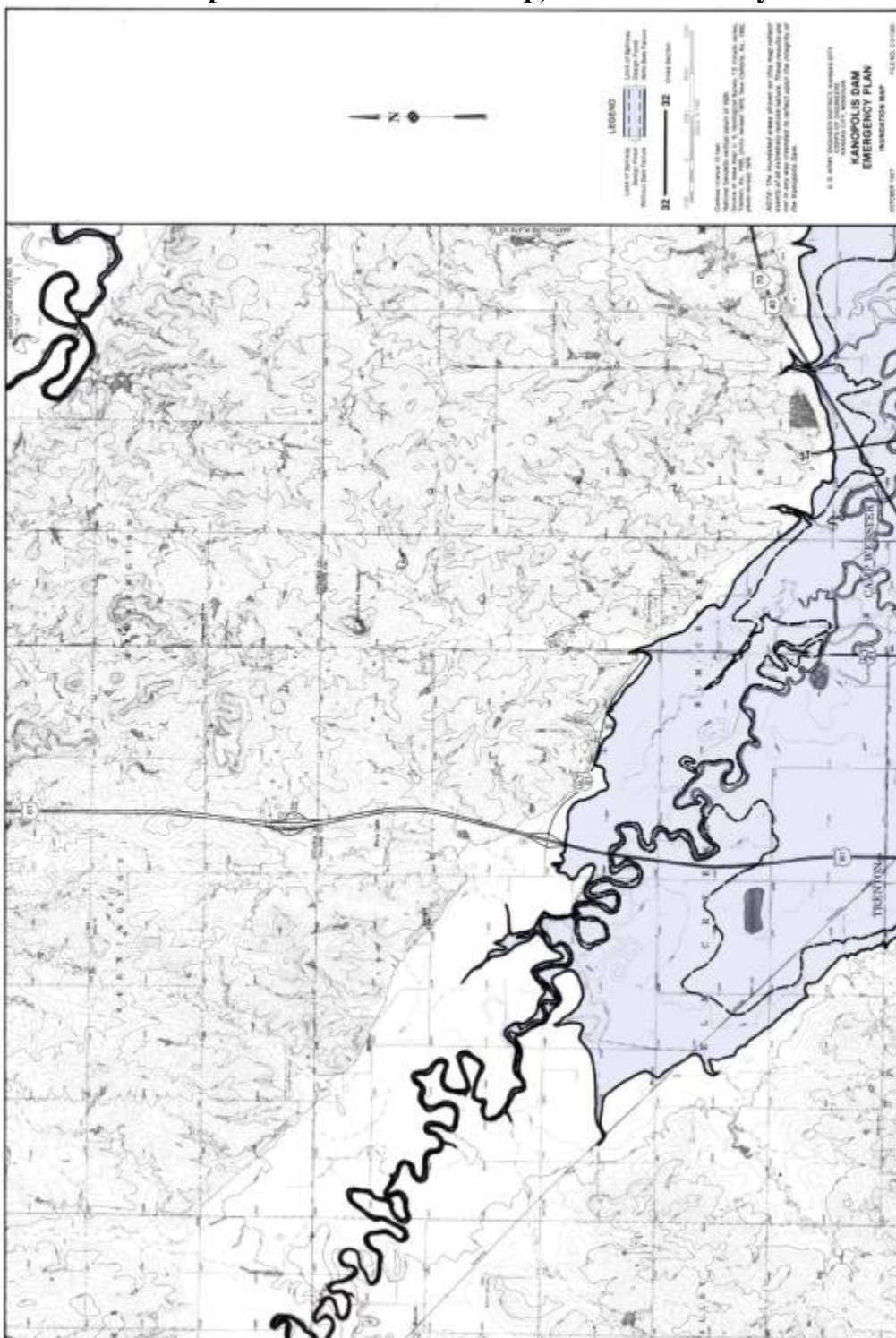


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### Kanopolis Dam Inundation Map, Ellsworth County



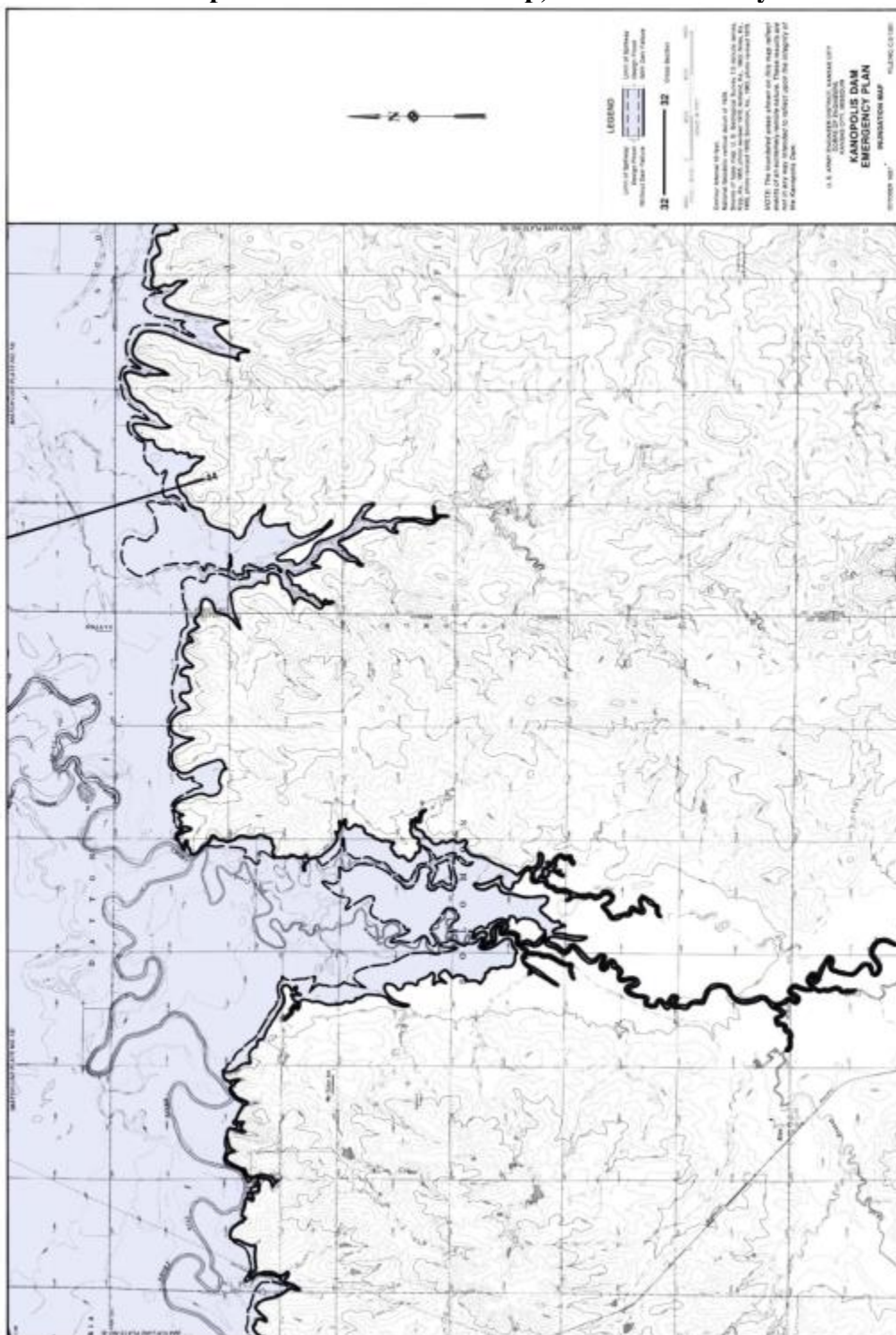
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## Kanopolis Dam Inundation Map, Ellsworth County

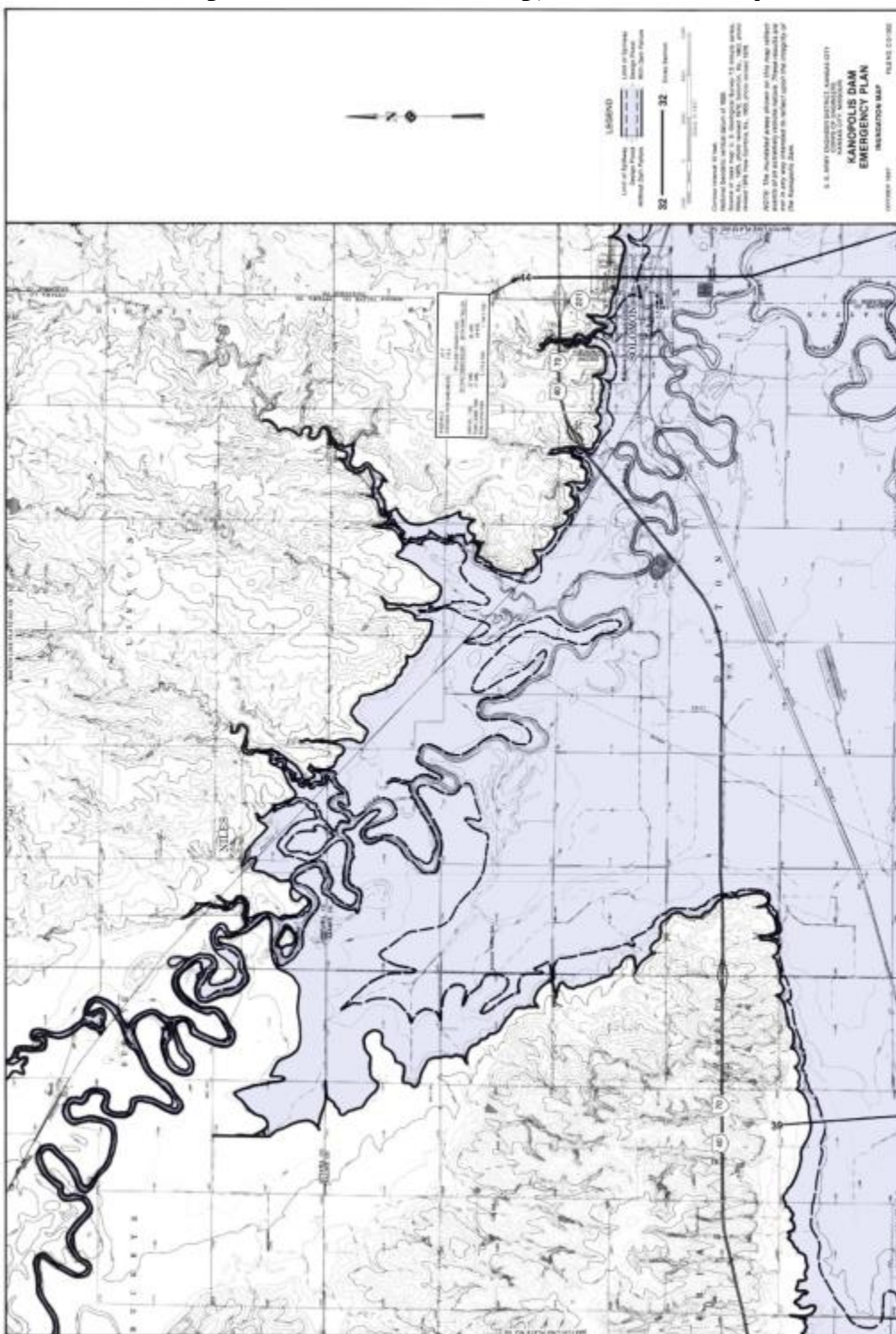


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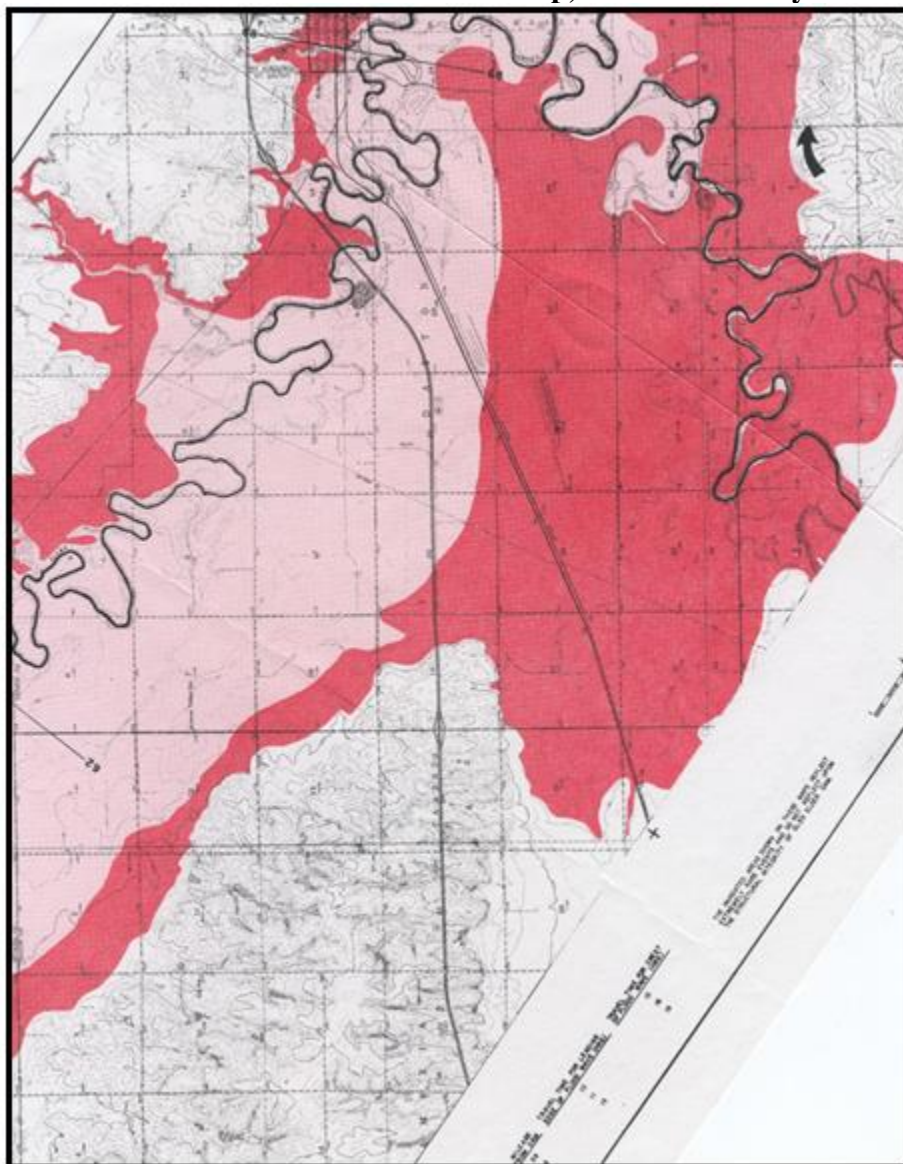
# Kanopolis Dam Inundation Map, Ellsworth County







### Glen Elder Dam Inundation Map, Mitchell County

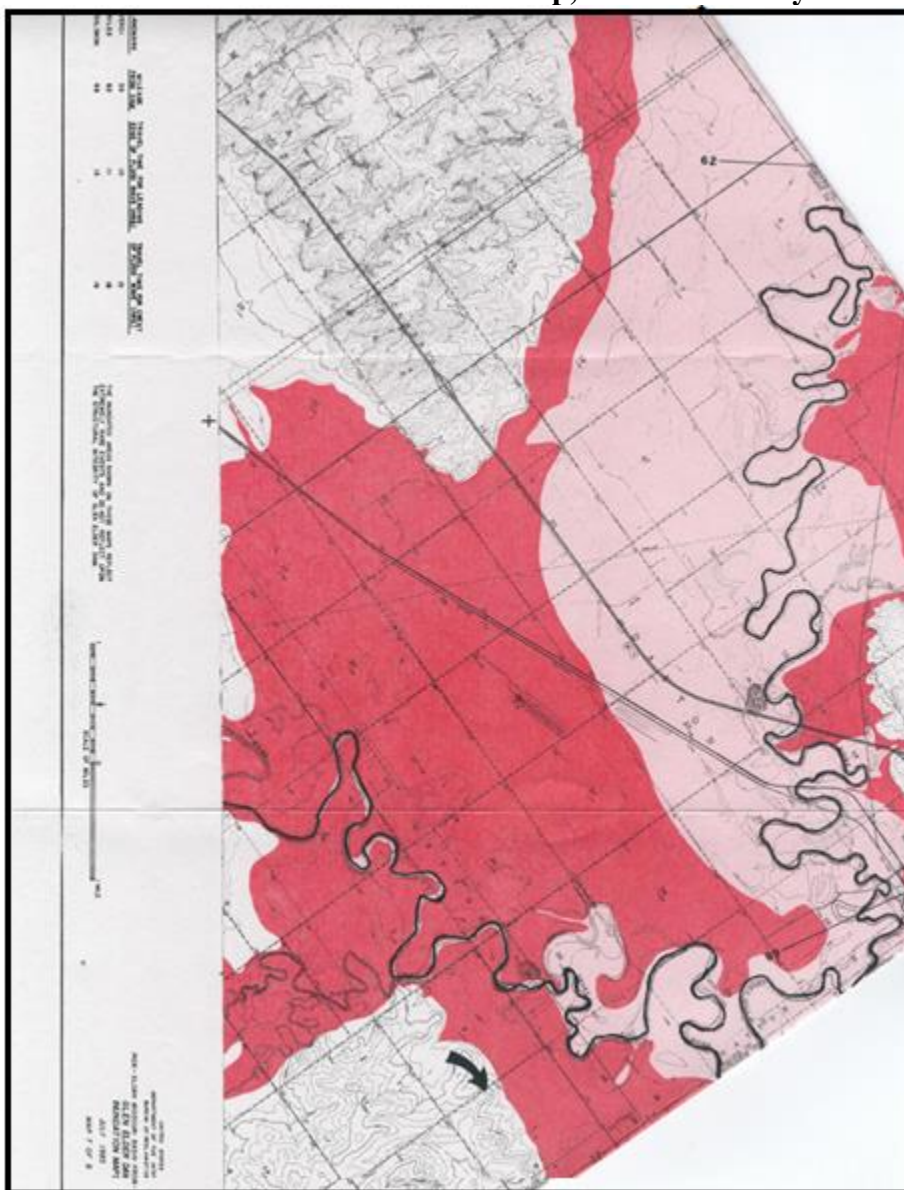


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### Glen Elder Dam Inundation Map, Mitchell County





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

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

Reservoir	County	Year Storage Began	Operating Agency	River Basin	Contributing Drainage Area (Square Miles)	Surface Area (Acres)	Estimated Storage Capacity (Acre Feet)
Lovewell	Jewell	1957	Bureau of Reclamation	Missouri	364	2,986	41,690
Kanopolis	Ellsworth	1948	USACE-KC	Missouri	2,327	3,252	43,121
Milford	Clay	1964	USACE-KC	Missouri	3,796	15,314	351,577

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

Of additional potential concern are high hazard dams in neighboring regions. There are three high hazard dams in southern Nebraska that could potentially impact the region:

- Hitchcock County - Trenton Dam
- Red Willow County - Kelly Creek West Dam
- Harlan County - Harlan County Dam

However, given the size of the dams and their distance upstream of the state line, it is unlikely that failure of any of these dams would have a significant impact on Kansas Region F.

No other dams in surrounding regions have been identified as potential concerns to Region F.

#### 4.8.2 – Levee Location and Extent

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

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

According to the USACE Integrated NLD, there are 63 levees in the NLSP in Kansas Region F. However, the majority of these levees are farm levees (45 of the 63) providing no protection to either structures or people with minimal information available in the system. The following table provides available information on the eight identified levees that provide protection to people and/or structures. levees.





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

County(ies)	Jurisdiction(s)	Name	Waterway	Segments	Levee Miles	Leveed Area in Square Miles	Inspection Rating Description	Sponsors
Cloud	Clyde	Clyde	Elk Creek	1.17	0.24		City of Clyde	Cloud
Cloud	Concordia	LCD-0011		2.47	1.42			Cloud
Dickinson	Abilene	Abilene Unit Left Bank	Mud Creek	1.75	1.34		City of Abilene	Dickinson
Dickinson		Abilene Unit Right Bank	Mud Creek	1.63	1.18	Minimally Acceptable	City of Abilene	Dickinson
Lincoln	Barnard	Barnard	Salt Creek	1.97	0.29		City of Barnard	Lincoln
Saline	Salina	Salina, KS FPP	Mulberry Creek	18.2	22.46		City of Salina	Saline
Saline	Salina	City of Salina Dry Creek Levee	Dry Creek	0.93	0.3		City of Salina	Saline
Saline	Gypsum	Gypsum	Gypsum Creek	6.22	1.23		City of Gypsum	Saline

Source: USACE

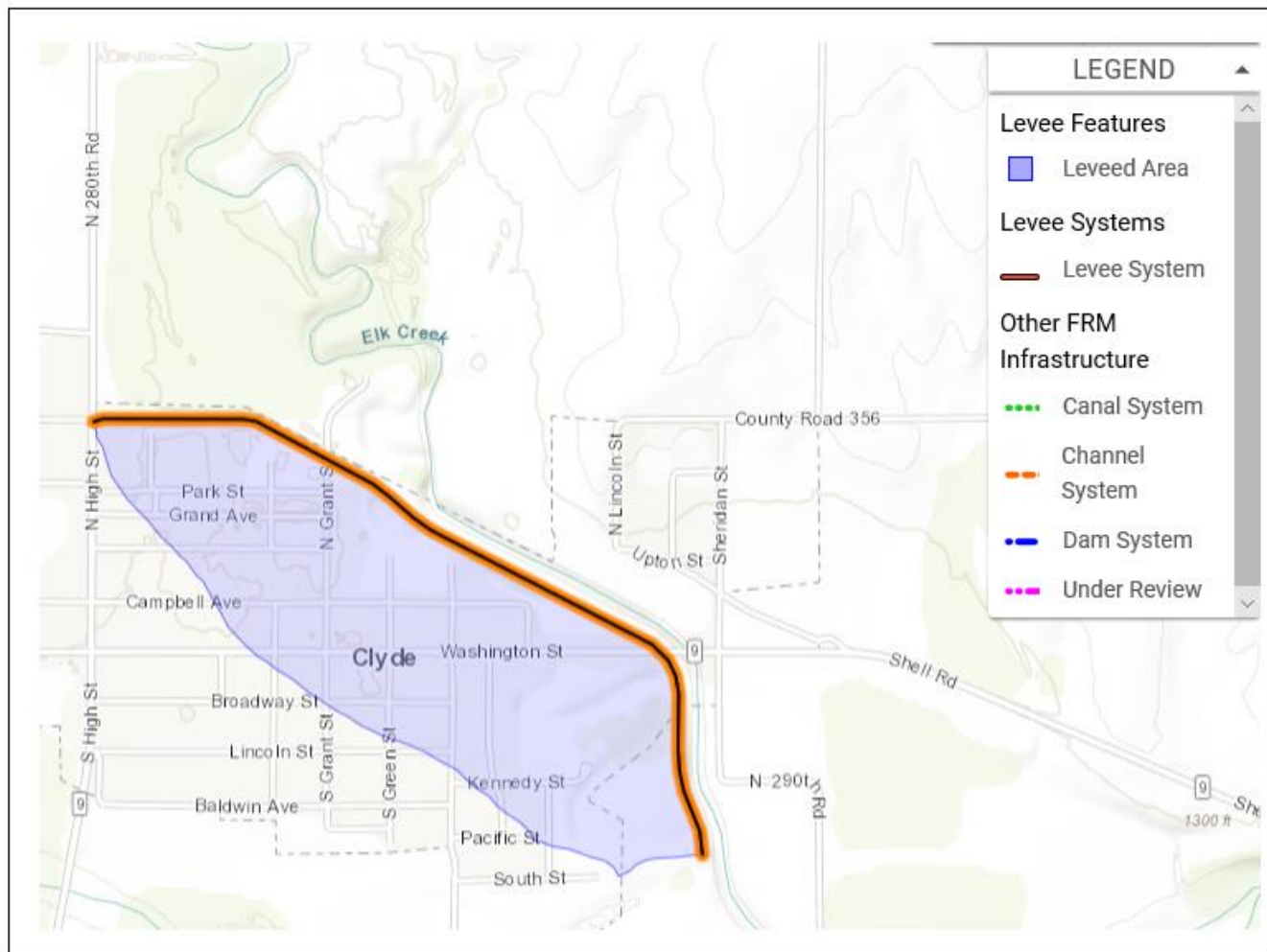
-: Data not available

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





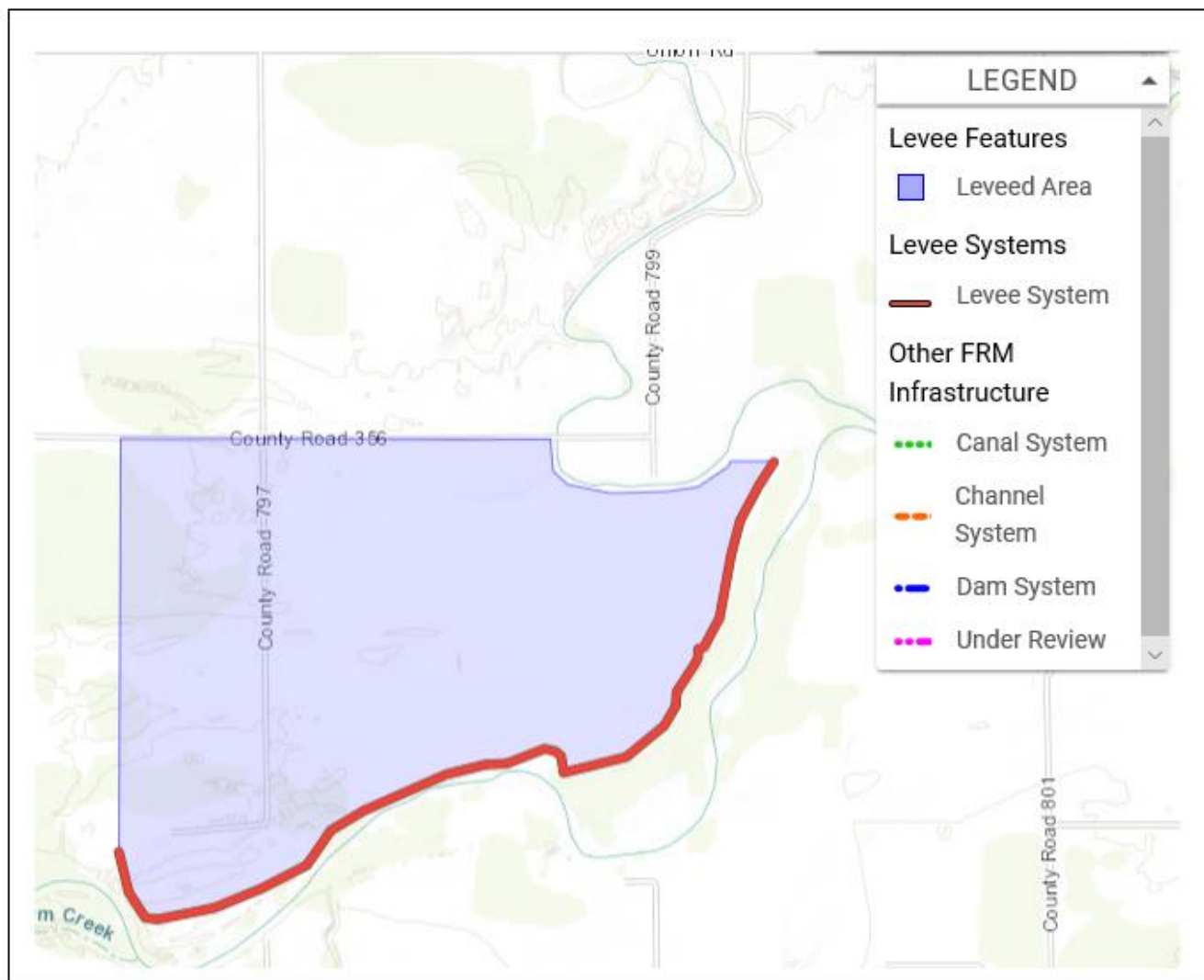
### Clyde Levee (Clyde, Cloud County)





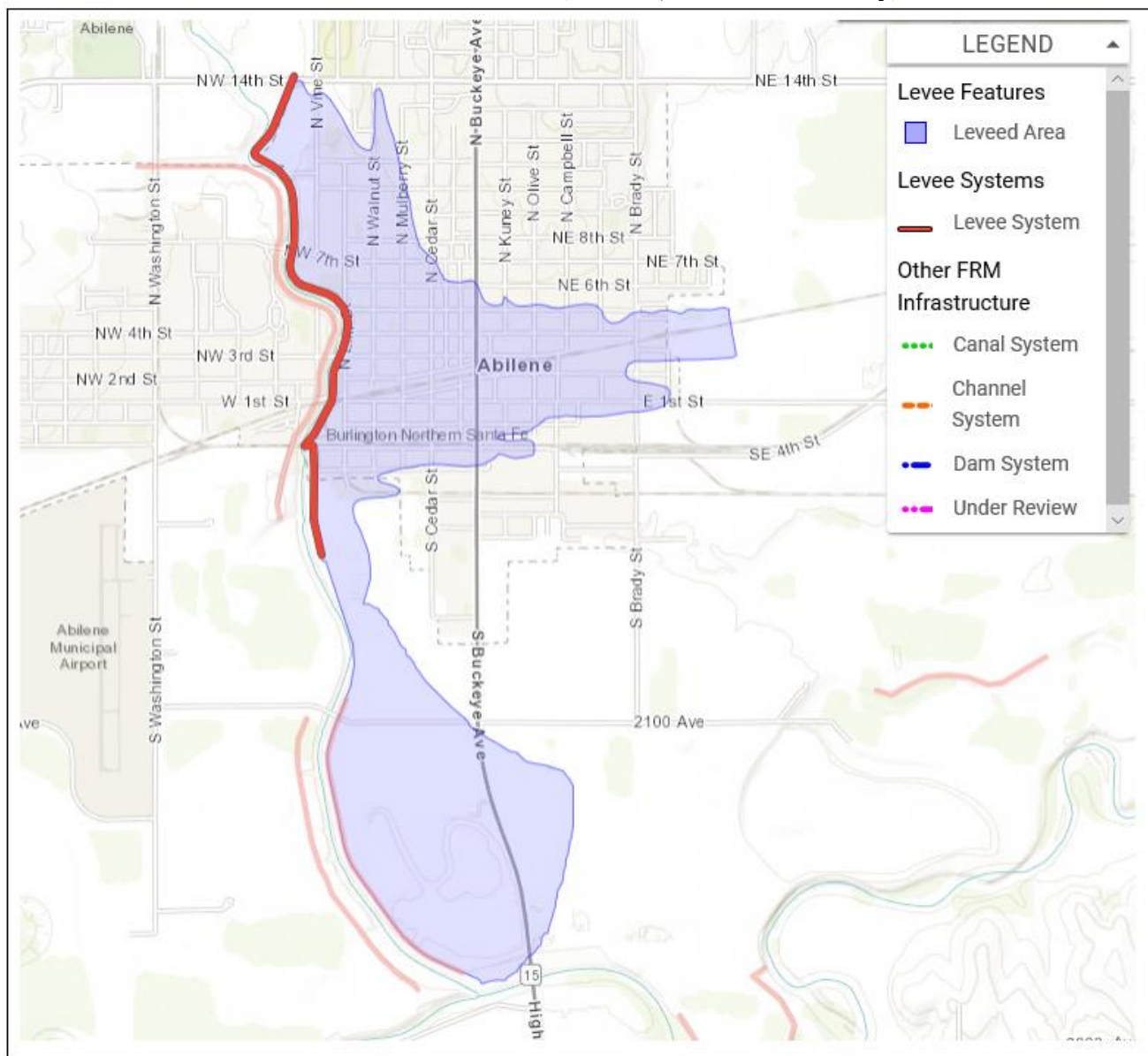


### LCD-0011 (Concordia, Cloud County)



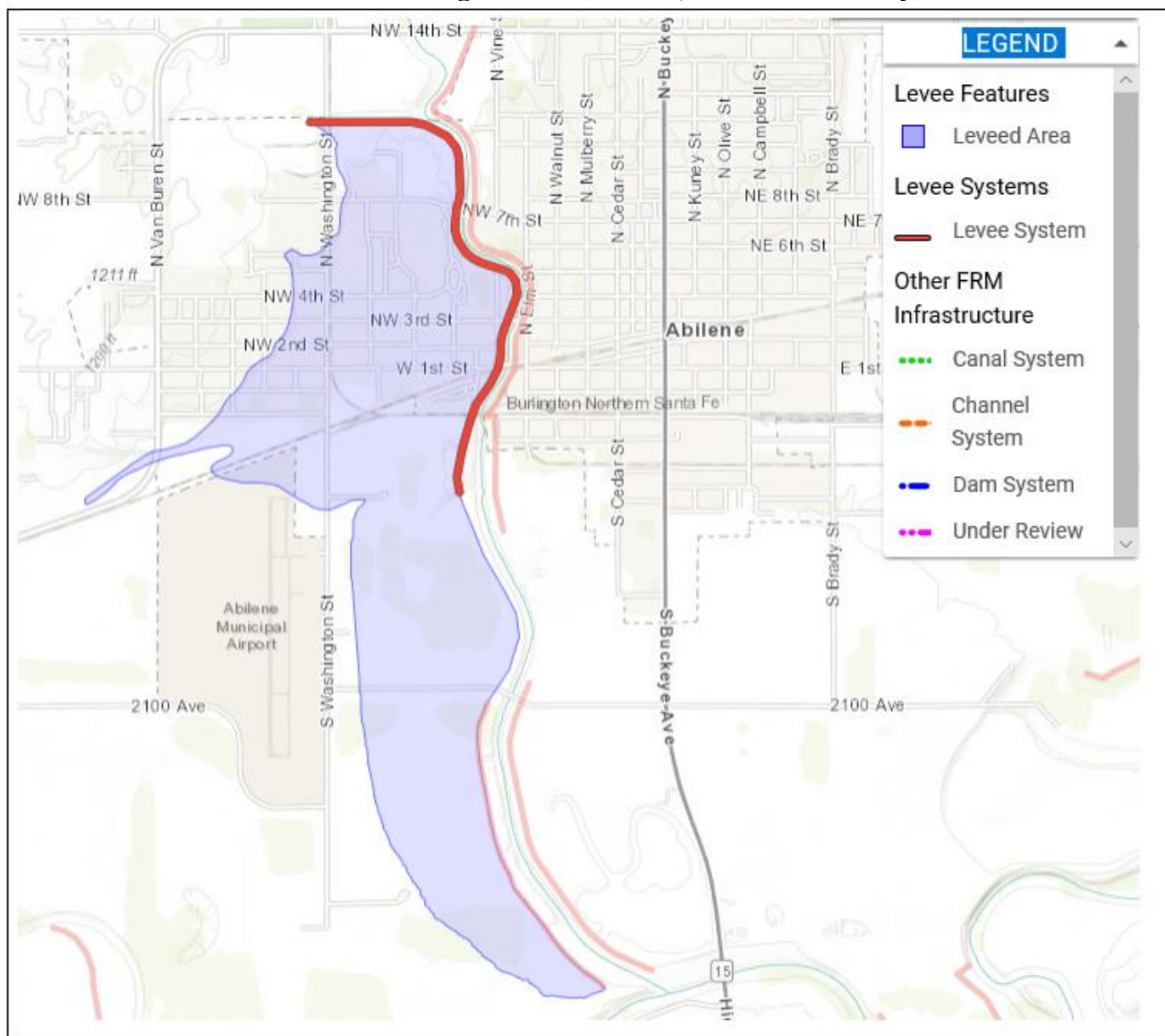


### Abilene Unit Left Bank (Abilene, Dickinson County)



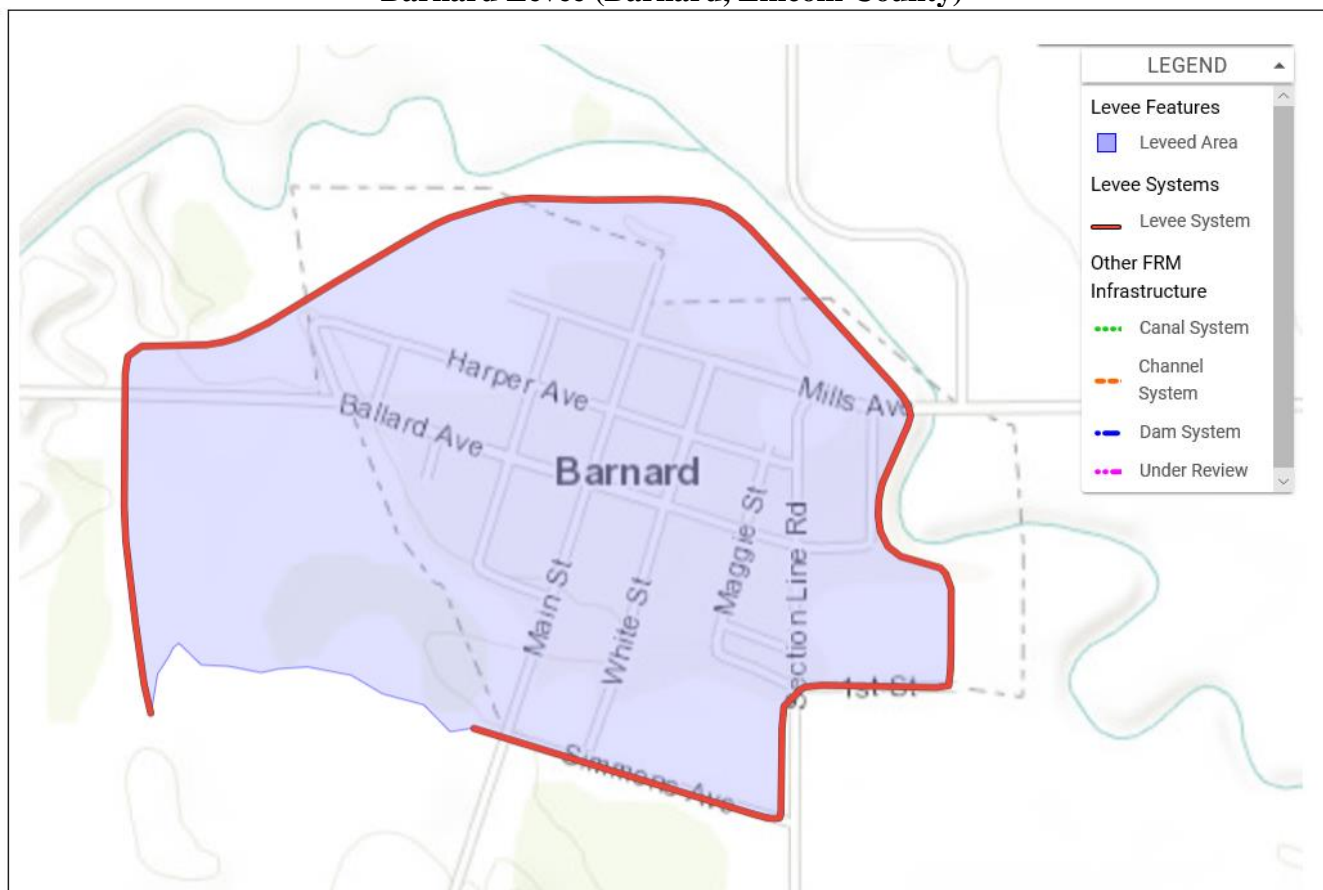


### Abilene Unit Right Bank (Abilene, Dickinson County)



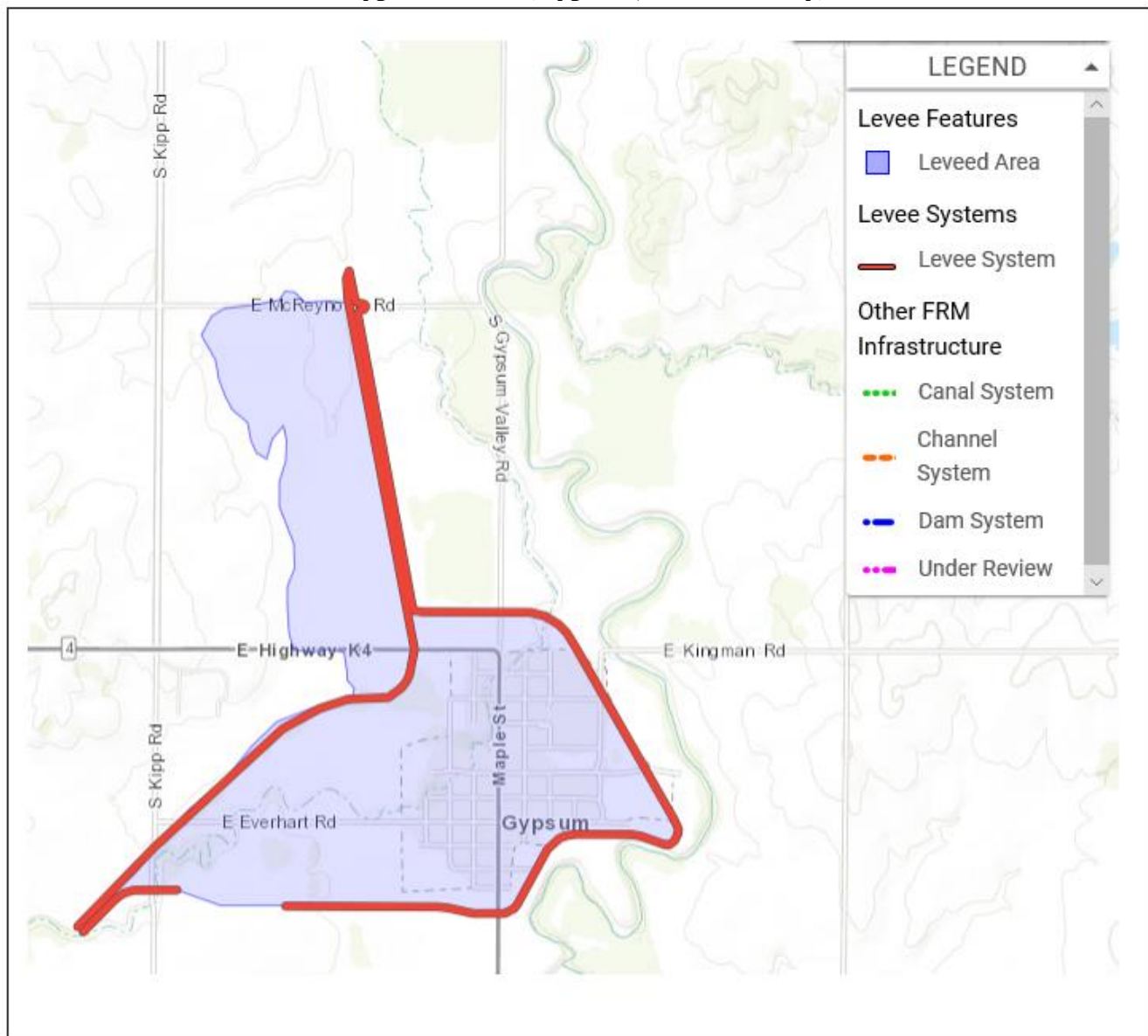


### Barnard Levee (Barnard, Lincoln County)





### Gypsum Levee (Gypsum, Saline County)





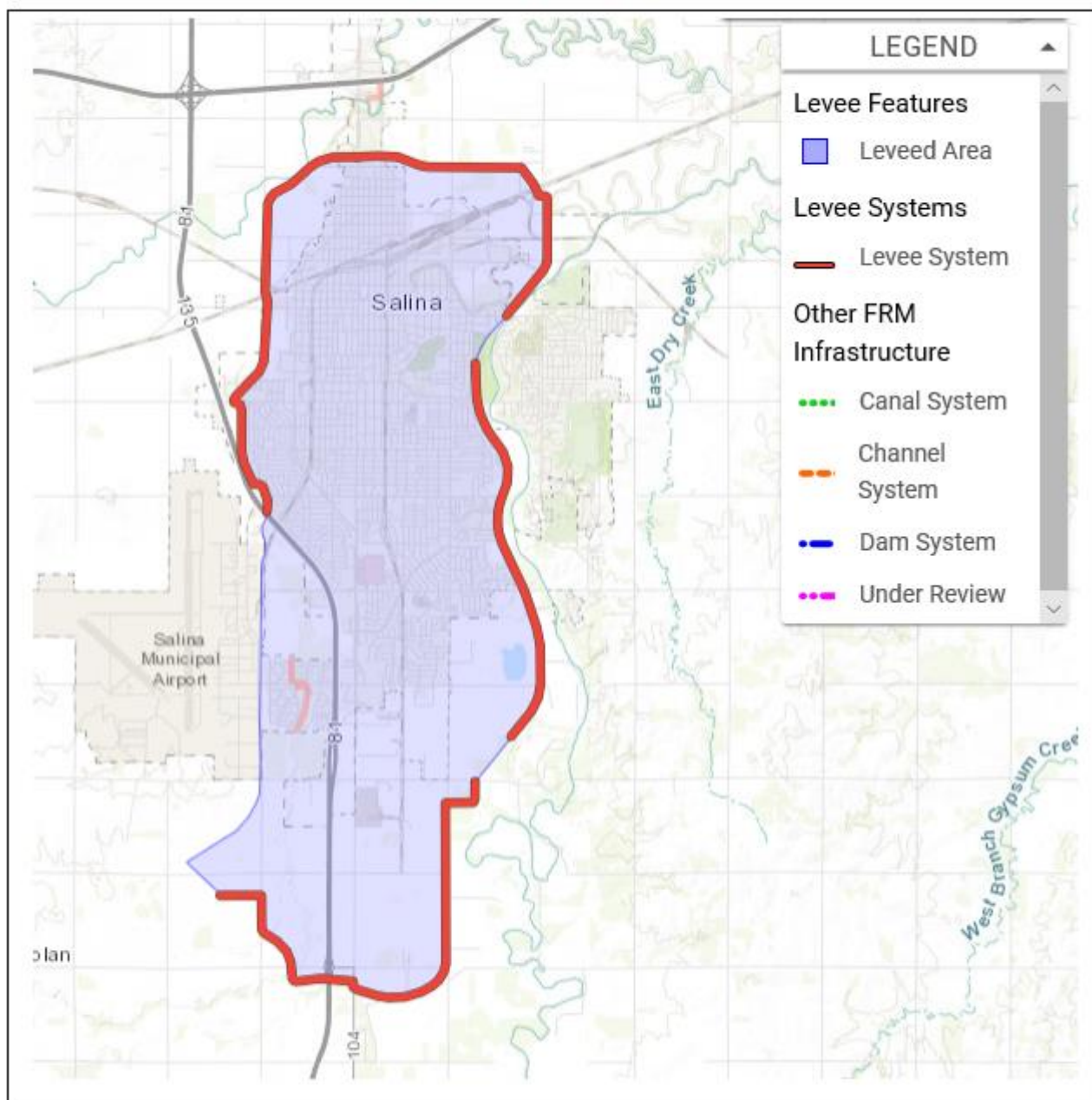


### City of Salina Dry Creek Levee (Salina, Saline County)





### Salina, KS FPP Levee (Salina, Saline County)



#### 4.8.3 – Previous Occurrences

According to the National Inventory of Dams, Kansas Region F has had two reported incidents, both in 2001, one in Lincoln County and one in Saline County. Neither one of these incidents resulted in either loss of life or property damages.

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





- **2007:** Heavy rains in caused widespread flooding in Kansas, and damaged levees in Dickinson and Saline Counties



#### 4.8.4 – Hazard Probability Analysis

Due to the variability of the size and construction of the dams in Region F, 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 two reported dam failure events in Kansas Region F over a 20-year period. Using the binomial probability equation (number of years with an event divided by total number of years in reporting period) we derive a 10% probability of a dam failure in a given year. However, it is worth noting that the historically reported event did not in a failure, had no loss of life, and no property damages.

Historically, the limited available data indicates there has been one reported levee failure event) on two levee systems) in Kansas Region F over a 20-year period. Using the binomial probability equation, we derive a probability of 5% for a levee failure in a given year. However, because past non-occurrence does not guarantee future non-occurrence, both federal and nonfederal levees may be damaged in future catastrophic regional flood events.

#### 4.8.5 – Vulnerability Assessment, Dams

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





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

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

**Table 4.12: Dam Vulnerability Rating Schedule**

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

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

**Table 4.13: Kansas Region F 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
Clay	24	0	0	0	1	27	Medium-Low
Cloud	13	0	2	0		19	Low
Dickinson	64	4	2	0		78	Medium
Ellsworth	24	1	1	0	1	32	Medium-Low
Jewell	26	0	0	0	1	29	Medium-Low
Lincoln	50	8	4	3		84	Medium
Mitchell	28	6	1	0	1	46	Medium-Low
Osborne	50	0	0	0		50	Medium-Low
Ottawa	59	3	2	0		71	Medium
Republic	17	1	0	0		19	Low
Saline	50	0	1	0		53	Medium-Low
Smith	38	0	0	0		38	Medium-Low

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

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

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

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%





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

County	2018 Population	Percent Population Change 2000 to 2018
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

Source: US Census Bureau

### 4.8.6 – Vulnerability Assessment, Levees

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

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

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

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

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

- **Very High (1):** Based on risk drivers, take immediate action to implement interim risk reduction measures. Increase frequency of levee monitoring, communicate risk characteristics to the community within an expedited timeframe; verify emergency plans and flood inundation maps are







current; ensure community is aware of flood warning systems and evacuation procedures; and, recommend purchase of flood insurance. Support risk reduction actions as very high priority. Likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences results in very high risk.

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

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

**Table 4.15: Kansas Region F 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
Cloud	Clyde	Clyde	668	482	\$81,300,000	Low	Non-Accredited
Cloud	Concordia	LCD-0011	4	3	\$471,000	Not Screened	
Dickinson	Abilene	Abilene Unit Left Bank	1,842	1,147	\$317,000,000	Low	Accredited





**Table 4.15: Kansas Region F 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
Dickinson		Abilene Unit Right Bank	783	418	\$96,100,000	Low	Accredited
Lincoln	Barnard	Barnard	65	87	\$16,900,000	Low	
Saline	Gypsum	Gypsum	384	309	\$83,300,000	Low	Accredited
Saline	Salina	City of Salina Dry Creek Levee	1,298	504	\$111,000,000	Not Screened	Accredited
Saline	Salina	Salina, KS FPP	44,676	17,115	\$10,000,000,000	Moderate	Accredited

Source: USACE NLD  
 -: No data available

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

**Table 4.16: Kansas Region F Vulnerability Data for Levee Failure**

County	Structures Identified as at Risk to Levee Failure	Percentage of Structures Identified at Risk	Population Identified as at Risk to Levee Failure	Percentage of Population Identified at Risk
Clay	0	0.0%	0	0.0%
Cloud	485	10.5%	672	7.7%
Dickinson	1,565	17.1%	2,625	14.0%
Ellsworth	0	0.0%	0	0.0%
Jewell	0	0.0%	0	0.0%
Lincoln	87	4.7%	65	2.2%
Mitchell	0	0.0%	0	0.0%
Osborne	0	0.0%	0	0.0%
Ottawa	0	0.0%	0	0.0%
Republic	0	0.0%	0	0.0%
Saline	17,928	73.6%	46,358	85.2%
Smith	0	0.0%	0	0.0%

Source: US Census Bureau and FEMA

#### 4.8.7 – Impact and Consequence Analysis

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

**Table 4.17: Dam and Levee Failure Consequence Analysis**

Subject	Impacts of Dam and Levee Failure
Health and Safety of the Public	In areas of inundation, the impact to the public is expected to be severe. Impacts to the public in adjacent or minimally impacted areas is expected to be minimal to moderate.





**Table 4.17: Dam and Levee Failure Consequence Analysis**

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





## 4.9 – Drought

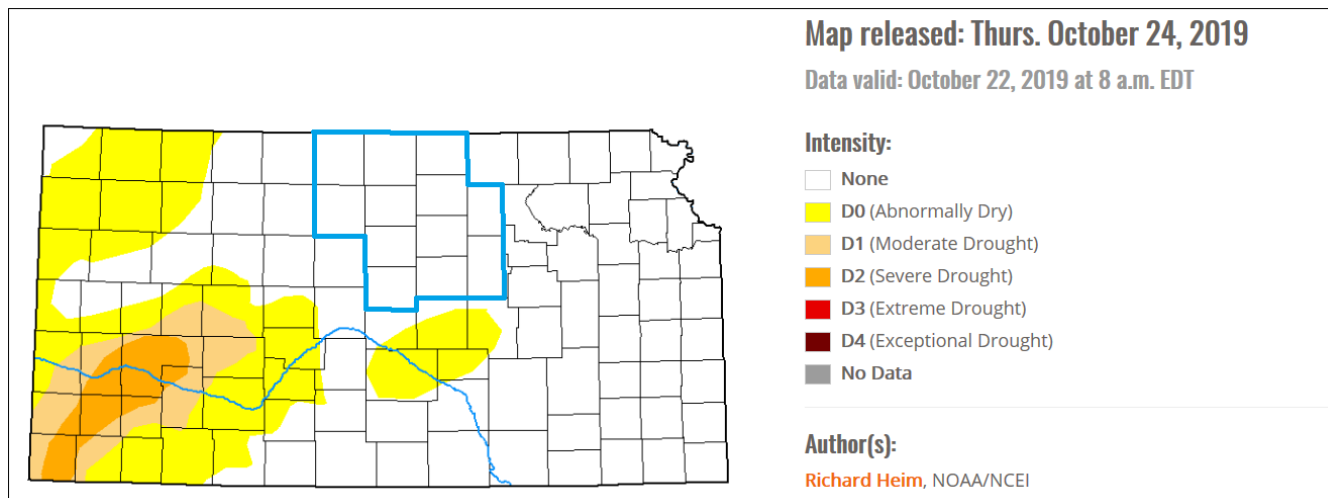
Drought is an abnormally dry period lasting months or years when an area has a deficiency of water and precipitation in its surface and/or underground water supply. The hydrological imbalance can be grouped into the following non-exclusive categories.



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

### 4.9.1 – Location and Extent

While all of Kansas Region F 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 F.



### 4.9.2 – Previous Occurrences

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





**Table 4.18: U.S. Drought Monitor Categories**

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

Source: U.S. Drought Monitor

Historical data was gathered from the U.S. Drought Monitor weekly reports from the 10-year period 2009 through 2018 (data set includes full years for 2009 and 2018), and the partial information from 2019 through October. This data was compiled and aggregated to provide a yearly estimate of the percentage of the year Kansas Region F was in each Drought Monitor category.

**Table 4.19: Percentage of Kansas Region F in U.S. Drought Monitor Category, 2009-2018**

Year	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2019	99.6%	0.4%	0.0%	0.0%	0.0%	0.0%
2018	40.4%	59.6%	35.8%	0.0%	0.0%	0.0%
2017	58.7%	41.3%	14.8%	0.0%	0.0%	0.0%
2016	93.8%	6.2%	0.0%	0.0%	0.0%	0.0%
2015	39.2%	60.8%	0.0%	0.0%	0.0%	0.0%
2014	15.0%	85.0%	59.2%	20.8%	0.0%	0.0%
2013	29.2%	70.8%	50.4%	34.8%	2.4%	0.0%
2012	38.5%	61.5%	58.1%	53.3%	21.6%	0.0%
2011	38.7%	61.3%	18.2%	0.0%	0.0%	0.0%
2010	98.1%	1.9%	0.0%	0.0%	0.0%	0.0%
2009	68.6%	31.4%	0.0%	0.0%	0.0%	0.0%

Source: U.S. Drought Monitor

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

**Table 4.20: Kansas Region F Secretarial Drought Declarations, 2014 - 2018**

Year	Number of Secretarial Drought Disaster Declarations
2018	7
2017	0
2016	0
2015	1
2014	7

Source: USDA

Crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of drought on the Region’s agricultural base. Crop loss data for the five-year period of 2009 - 2018, for the region, indicates 436 drought related claims on 129,779 acres for \$8,982,653







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

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	164	111,501	\$9,239,501
Cloud	156	158,784	\$15,835,014
Dickinson	177	313,027	\$28,822,341
Ellsworth	154	156,556	\$13,417,285
Jewell	173	239,954	\$18,705,449
Lincoln	197	245,438	\$21,611,959
Mitchell	200	317,275	\$31,281,908
Osborne	247	435,426	\$42,694,921
Ottawa	156	210,310	\$16,996,612
Republic	172	154,984	\$14,941,102
Saline	208	235,648	\$18,701,192
Smith	193	462,653	\$57,010,385

Source: USDA

### 4.9.3 – Hazard Probability Analysis

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

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

None	D0-D4	D1-D4	D2-D4	D3-D4	D4
62.0	48.0	23.7	10.9	2.4	0.5

Source: U.S. Drought Monitor

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

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	164
Average Number of Claims per Year	16
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	111,501
Average Number of Acres Damaged per Year	11,150
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$9,239,501
Average Crop Damage per Year	\$923,950

Source: USDA

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





- 16 insurance claims
- 11,150 acres impacted
- \$923,950 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	156
Average Number of Claims per Year	16
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	158,784
Average Number of Acres Damaged per Year	15,878
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$15,835,014
Average Crop Damage per Year	\$1,583,501

Source: USDA

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

- 16 insurance claims
- 15,878 acres impacted
- \$1,583,501 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	177
Average Number of Claims per Year	18
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	313,027
Average Number of Acres Damaged per Year	31,303
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$28,822,341
Average Crop Damage per Year	\$2,882,234

Source: USDA

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

- 18 insurance claims
- 31,303 acres impacted
- \$2,882,234 insurance claims

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





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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	154
Average Number of Claims per Year	15
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	156,556
Average Number of Acres Damaged per Year	15,656
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$13,417,285
Average Crop Damage per Year	\$1,341,729

Source: USDA

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

- 15 insurance claims
- 15,656 acres impacted
- \$1,341,729 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	173
Average Number of Claims per Year	17
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	239,954
Average Number of Acres Damaged per Year	23,995
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$18,705,449
Average Crop Damage per Year	\$1,870,545

Source: USDA

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

- 17 insurance claims
- 23,995 acres impacted
- \$1,870,545 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	197
Average Number of Claims per Year	20
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	245,438
Average Number of Acres Damaged per Year	24,544
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$21,611,959
Average Crop Damage per Year	\$2,161,196

Source: USDA





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

- 20 insurance claims
- 24,544 acres impacted
- \$2,161,196 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	200
Average Number of Claims per Year	20
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	317,275
Average Number of Acres Damaged per Year	31,728
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$31,281,908
Average Crop Damage per Year	\$3,128,191

Source: USDA

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

- 20 insurance claims
- 31,728 acres impacted
- \$3,128,191 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	247
Average Number of Claims per Year	25
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	435,426
Average Number of Acres Damaged per Year	43,543
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$42,694,921
Average Crop Damage per Year	\$4,269,492

Source: USDA

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

- 25 insurance claims
- 43,543 acres impacted
- \$4,269,492 in insurance claims

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





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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	156
Average Number of Claims per Year	16
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	210,310
Average Number of Acres Damaged per Year	21,031
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$16,996,612
Average Crop Damage per Year	\$1,699,661

Source: USDA

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

- 16 insurance claims
- 21,031 acres impacted
- \$1,699,661 in insurance claims

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

**Table 4.31: Republic County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	172
Average Number of Claims per Year	17
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	154,984
Average Number of Acres Damaged per Year	15,498
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$14,941,102
Average Crop Damage per Year	\$1,494,110

Source: USDA

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

- 17 insurance claims
- 15,498 acres impacted
- \$1,494,110 in insurance claims

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

**Table 4.32: Saline County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	208
Average Number of Claims per Year	21
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	235,648
Average Number of Acres Damaged per Year	23,565
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$18,701,192
Average Crop Damage per Year	\$1,870,119

Source: USDA







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

- 21 insurance claims
- 23,565 acres impacted
- \$1,870,119 in insurance claims

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

**Table 4.33: Smith County Drought Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	193
Average Number of Claims per Year	19
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	462,653
Average Number of Acres Damaged per Year	46,265
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$57,010,385
Average Crop Damage per Year	\$5,701,039

Source: USDA

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

- 19 insurance claims
- 46.265 acres impacted
- \$5,701,039 in insurance claims

#### 4.9.4 Vulnerability Analysis

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

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

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

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	11,150	2.89%	\$121,175,000	\$923,950	0.76%
Cloud	322,034	15,878	4.93%	\$77,485,000	\$1,583,501	2.04%
Dickinson	519,171	31,303	6.03%	\$149,543,000	\$2,882,234	1.93%





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

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Ellsworth	390,042	15,656	4.01%	\$48,318,000	\$1,341,729	2.78%
Jewell	436,206	23,995	5.50%	\$149,501,000	\$1,870,545	1.25%
Lincoln	384,740	24,544	6.38%	\$58,151,000	\$2,161,196	3.72%
Mitchell	414,220	31,728	7.66%	\$126,462,000	\$3,128,191	2.47%
Osborne	437,083	43,543	9.96%	\$62,499,000	\$4,269,492	6.83%
Ottawa	439,335	21,031	4.79%	\$108,378,000	\$1,699,661	1.57%
Republic	373,206	15,498	4.15%	\$187,529,000	\$1,494,110	0.80%
Saline	358,243	23,565	6.58%	\$73,581,000	\$1,870,119	2.54%
Smith	541,742	46,265	8.54%	\$129,261,000	\$5,701,039	4.41%

Source: USDA

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

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

- **Basic Source Limitation** - The supplier's primary raw water source is particularly sensitive to drought as evidenced by depleted streamflow, depleted reservoir inflow and storage, or by declining water levels in wells. Restrictions imposed due to inability to use a well(s) because water quality problems were considered indicative of a basic source limitation.
- **Contractual Limitation** - The supplier's sole water source is purchased from another system that is drought vulnerable and there is a drought-cut-off clause in their water purchase contract. In such situations where there is not a drought cut-off clause, the purchaser is considered drought vulnerable under the same limitation category as the seller.
- **Distribution System Limitation** - The supplier has difficulty or is unable to meet drought-induced customer demand for water because of inadequate finished water storage capacity, inadequate finished water pumping capacity, inadequate transmission line sizes.
- **Minimum Desirable Streamflow** - The supplier reported imposing restrictions because of minimum desirable streamflow administration. Water rights junior to those granted for maintenance of established minimum desirable flows are subject to such administration.
- **Single Well Source** - The supplier relies upon a single well as its sole source for raw water. Suppliers with one active well and one emergency well were considered drought vulnerable because emergency wells are not a dependable long-term water source. Excessive hours of operation to meet drought-induced customer demand for water will result in the increased likelihood of mechanical breakdown with no alternative water supply source available.





- **Treatment Capacity Limitation** - The supplier has difficulty or is unable to meet drought-induced customer demand for water due to inadequate raw water treatment capacity.
- **Water Right Limitation** - The supplier reported imposing restrictions because the quantity of water they are authorized to divert under their water right(s) was insufficient to meet customer demands.

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

#### 4.9.5 – Impact and Consequence Analysis

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

**Table 4.35: Drought Consequence Analysis**

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





## 4.10 – Earthquake

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

### 4.10.1 – Location and Extent

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



**Humboldt Fault Zone**



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

The following table equates the above referenced earthquake scales.





**Table 4.36: Earthquake Magnitude Scale Comparison**

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

### 4.10.2 – Previous Occurrences

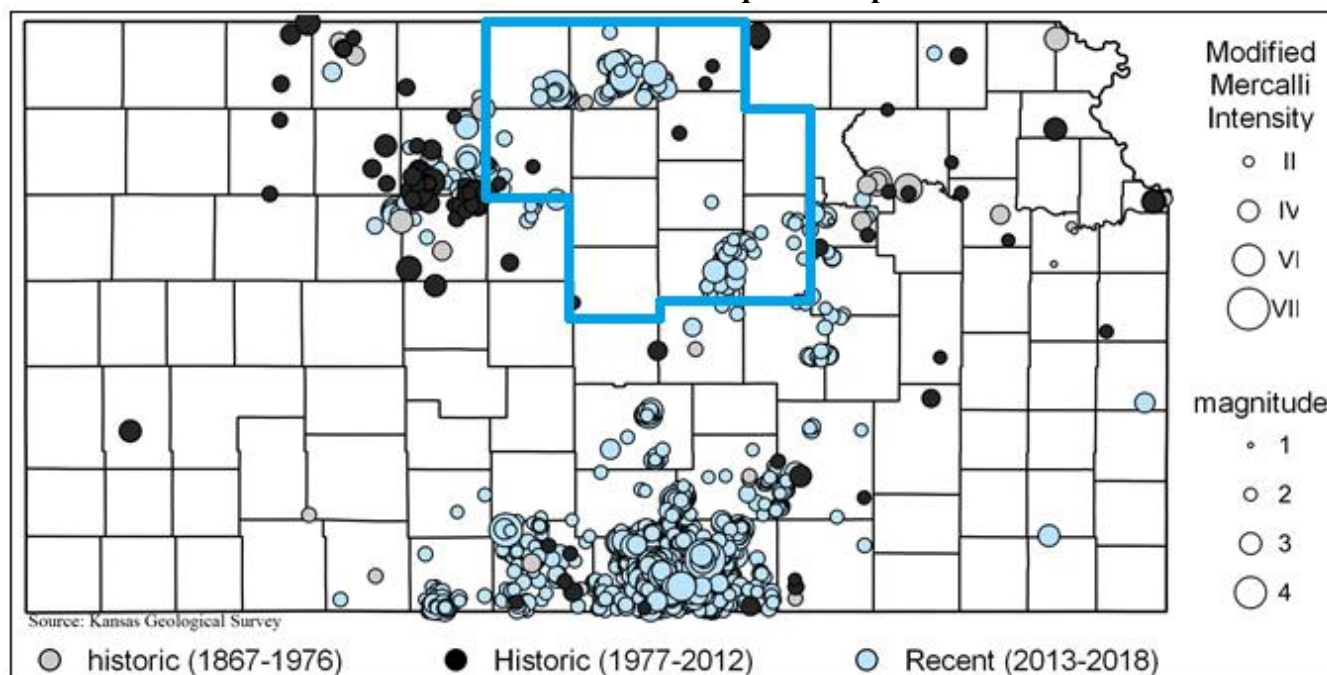
The following map, from the KGS, shows all recorded earthquakes from 1867 through 2018.







### KGS Historic Earthquake Map



The KGS Earthquake Catalog records earthquake events from 1979 through present. The following table details the Richter Scale Magnitude of any recorded events in the catalog.

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

	0.1 -3.9	4.0 – 4.9	5.0 – 5.9	6.0 – 6.9	7.0- 7.9	8.0 +	Highest
Clay	0	0	0	0	0	0	-
Cloud	1	0	0	0	0	0	2.16
Dickinson	12	0	0	0	0	0	2.3
Ellsworth	1	0	0	0	0	0	2.02
Jewell	88	1	0	0	0	0	4.1
Lincoln	0	0	0	0	0	0	-
Mitchell	0	0	0	0	0	0	-
Osborne	10	0	0	0	0	0	2.3
Ottawa	1	0	0	0	0	0	2.1
Republic	13	0	0	0	0	0	3.0
Saline	49	0	0	0	0	0	3.2
Smith	23	0	0	0	0	0	3.9

Source: KGS

According to this archive, Kansas Region F has had one earthquake over magnitude 4.0 (recorded at a magnitude 4.1) earthquake since 1979.

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



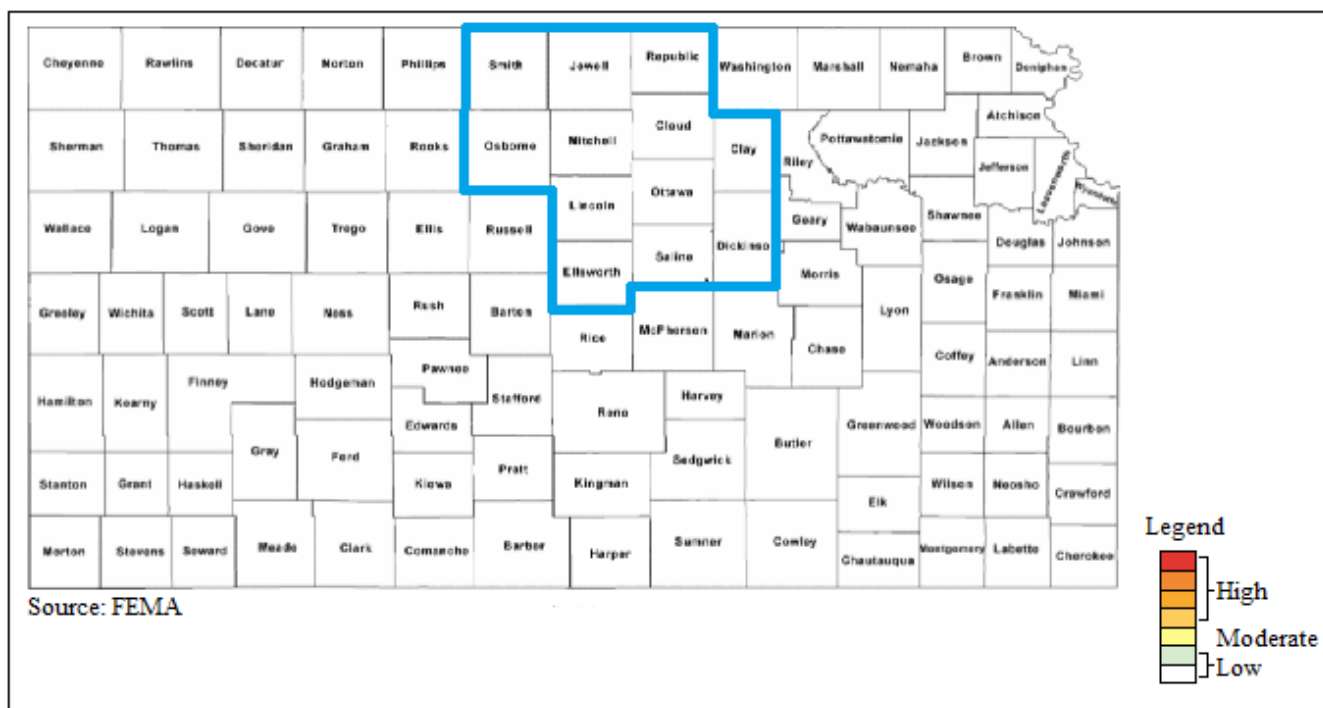


to the KGS, linking earthquakes to wastewater injection is difficult. Complex subsurface geology and limited data about that geology make it hard to pinpoint the cause seismic events. However, an established pattern of increased earthquake activity in an area over time may indicate a correlation between injection and seismic events.

### 4.10.3 – Hazard Probability Analysis

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

FEMA Seismic Risk Map

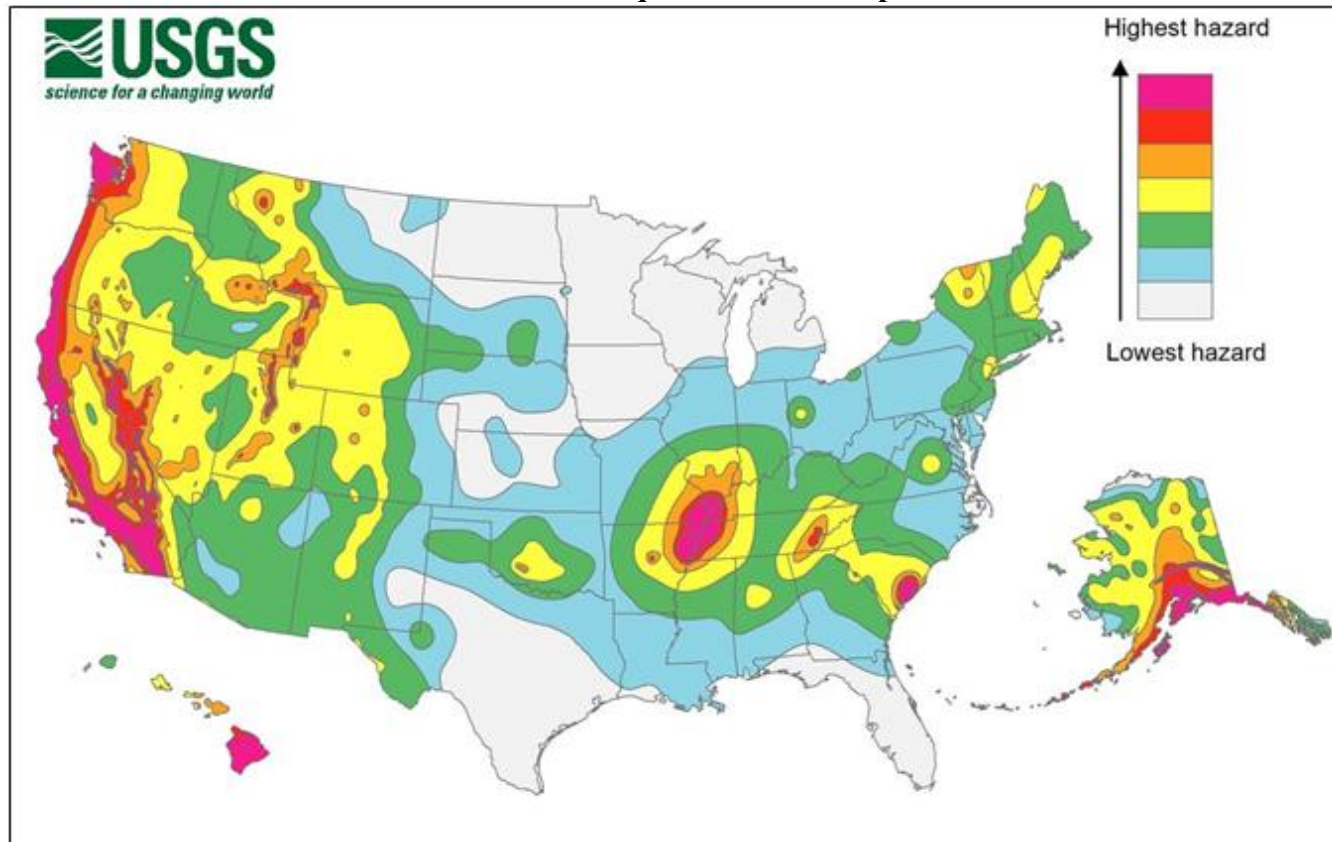


The USGS also published a map that indicates hazard rankings based on acceleration (%g) for the United States, with the data correlating with the indicated FEMA risk. This map indicates the probability that ground shaking will exceed a certain level over a 50-year period. The low-hazard areas have a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





## USGS Earthquake Hazard Map



### 4.10.4 – Vulnerability Analysis

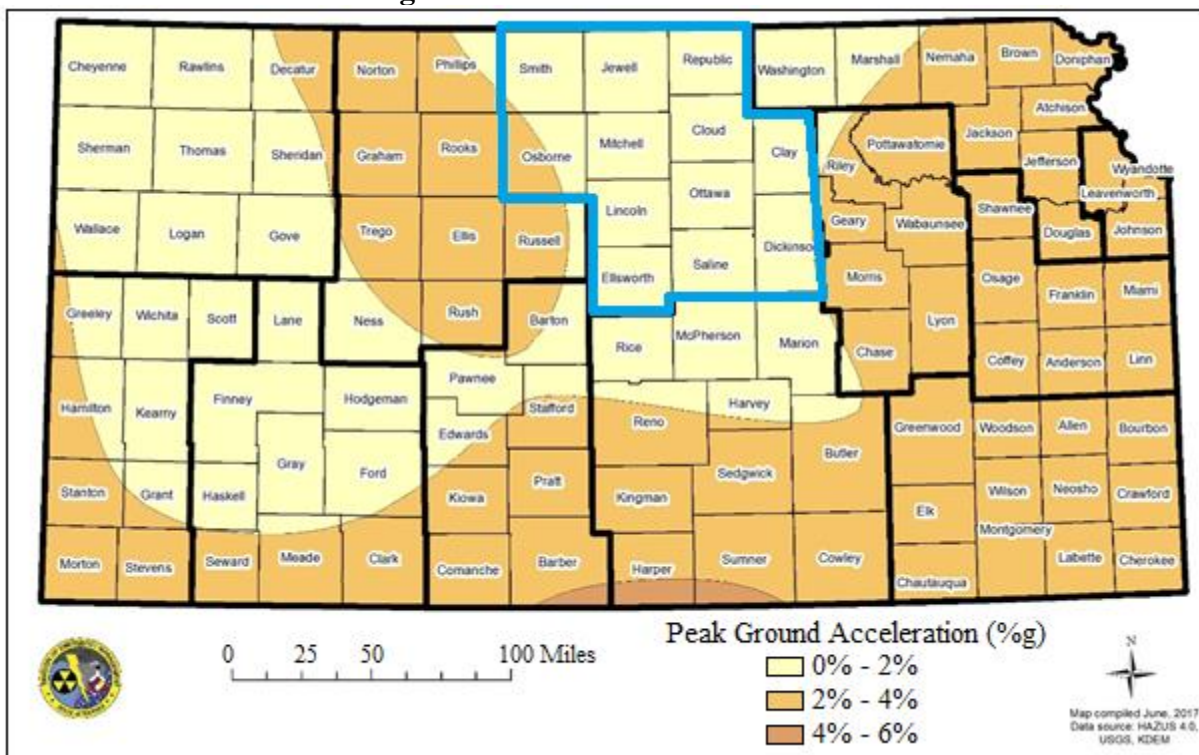
HAZUS, using the default inventory 2010 building valuations, was used to analyze vulnerability and estimate potential losses to earthquakes. A probabilistic, 2,500 Year 6.7 magnitude earthquake scenario was chosen to reveal areas of the region and state that are most vulnerable. These results are not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

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





### Regional Peak Ground Acceleration



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

**Table 4.38: Kansas Region F Probabilistic 6.7 Magnitude Earthquake Damages**

County	Total Earthquake Losses	Displaced Households
Clay	\$3,004,000	1
Cloud	\$2,917,000	1
Dickinson	\$7,436,000	2
Ellsworth	\$2,340,000	<1
Jewell	\$1,059,000	<1
Mitchell	\$1,220,000	<1
Lincoln	\$2,241,000	1
Osborne	\$1,845,000	<1
Ottawa	\$1,861,000	1
Republic	\$1,724,000	<1
Saline	\$19,245,000	10
Smith	\$1,359,000	<1

Source: KDEM and HAZUS

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



**Table 4.39: Kansas Region F Population Vulnerability Data for Earthquakes**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

Source: US Census Bureau

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

**Table 4.40: Kansas Region F Structure Vulnerability Data for Earthquakes**

County	2017 Housing Units	Percent Change 2000 to 2017
Clay	4,069	-0.4%
Cloud	4,637	-4.2%
Dickinson	9,173	5.6%
Ellsworth	3,231	0.1%
Jewell	2,033	-3.3%
Lincoln	1,853	0.0%
Mitchell	3,299	-1.2%
Osborne	2,185	-9.7%
Ottawa	2,789	1.2%
Republic	2,888	-7.2%
Saline	24,350	7.3%
Smith	2,250	-3.3%

Source: US Census Bureau

#### 4.10.5 – Consequence Analysis

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

**Table 4.41: Earthquake Consequence Analysis**

Subject	Impacts of Earthquake
Health and Safety of the Public	Severity and location dependent. Impacts on persons near the epicenter are expected to be severe.







**Table 4.41: Earthquake Consequence Analysis**

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





## 4.11 – Expansive Soils

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

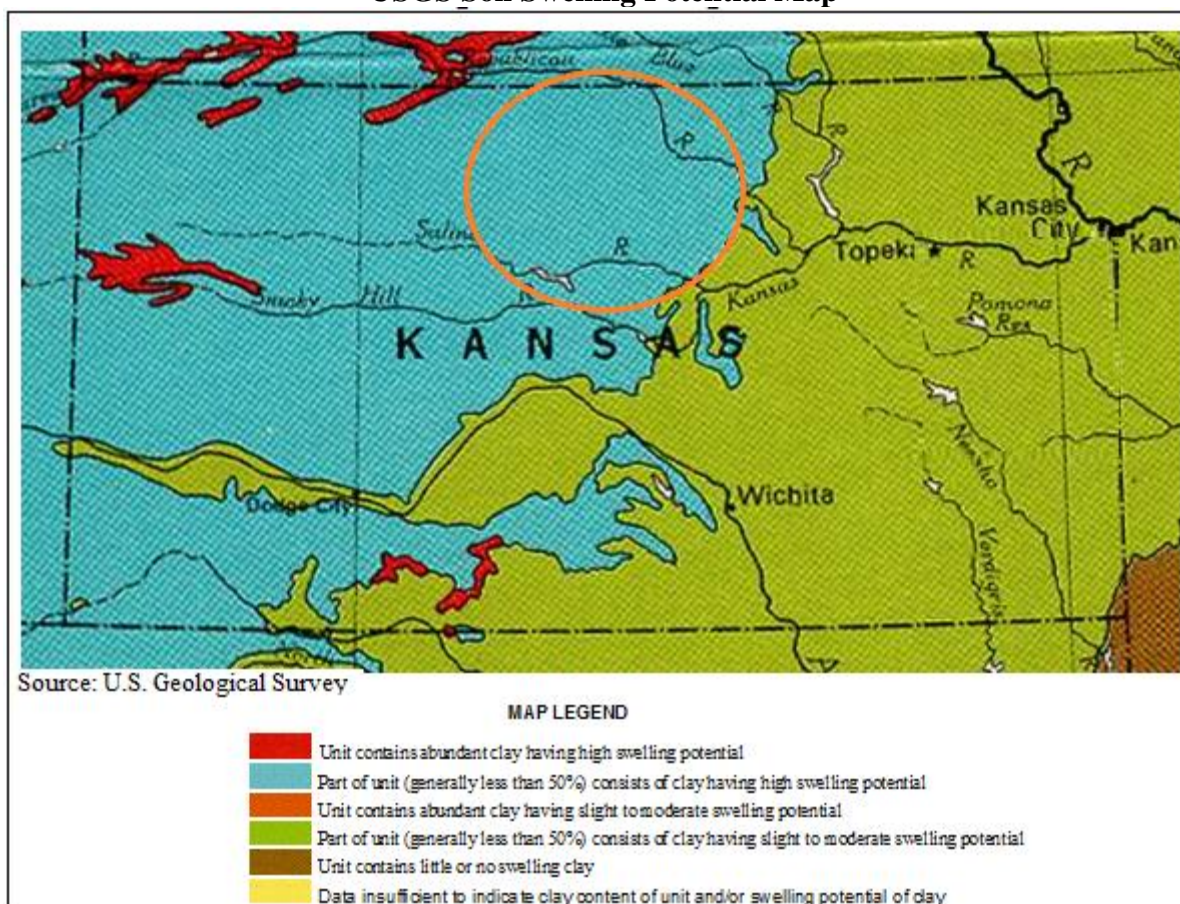


### 4.11.1 – Location and Extent

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

**USGS Soil Swelling Potential Map**





### 4.11.2 – Previous Occurrences

No statewide database of expansive soils events is available.

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

### 4.11.3 – Hazard Probability Analysis

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

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

### 4.11.4 – Vulnerability Analysis

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

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

County	HAZUS Property Valuation	Property Valuation for 10% of Building Stock	Estimated 50% Damage
Clay	\$1,023,498,000	\$102,349,800	\$51,174,900
Cloud	\$1,082,981,000	\$108,298,100	\$54,149,050
Dickinson	\$2,316,840,000	\$231,684,000	\$115,842,000
Ellsworth	\$774,908,000	\$77,490,800	\$38,745,400
Jewell	\$454,048,000	\$45,404,800	\$22,702,400
Lincoln	\$587,611,000	\$58,761,100	\$29,380,550
Mitchell	\$856,638,000	\$85,663,800	\$42,831,900
Osborne	\$538,604,000	\$53,860,400	\$26,930,200
Ottawa	\$736,439,000	\$73,643,900	\$36,821,950
Republic	\$740,126,000	\$74,012,600	\$37,006,300
Saline	\$6,516,698,000	\$651,669,800	\$325,834,900
Smith	\$525,625,000	\$52,562,500	\$26,281,250

Source: US Census Bureau and HAZUS

### 4.11.5 – Consequence Analysis

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





**Table 4.43: Expansive Soils Consequence Analysis**

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





## 4.12 – Extreme Temperatures

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

### 4.12.1 – Location and Extent

The Midwest climate region is known for extremes in temperature. Specifically, Kansas lacks any mountain ranges that could act as a barrier to cold air masses from the north or hot, humid air masses from the south or any oceans or large bodies of water that could provide a moderating effect on the climate. The polar jet stream is often located over the region during the winter, bringing frequent storms and precipitation. Kansas summers are generally warm and 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 F is vulnerable to both extreme heat and extreme cold, defined as follows.

**Table 4.44: Extreme Temperature Definitions**

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

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

**Table 4.45: Regional Average Temperatures**

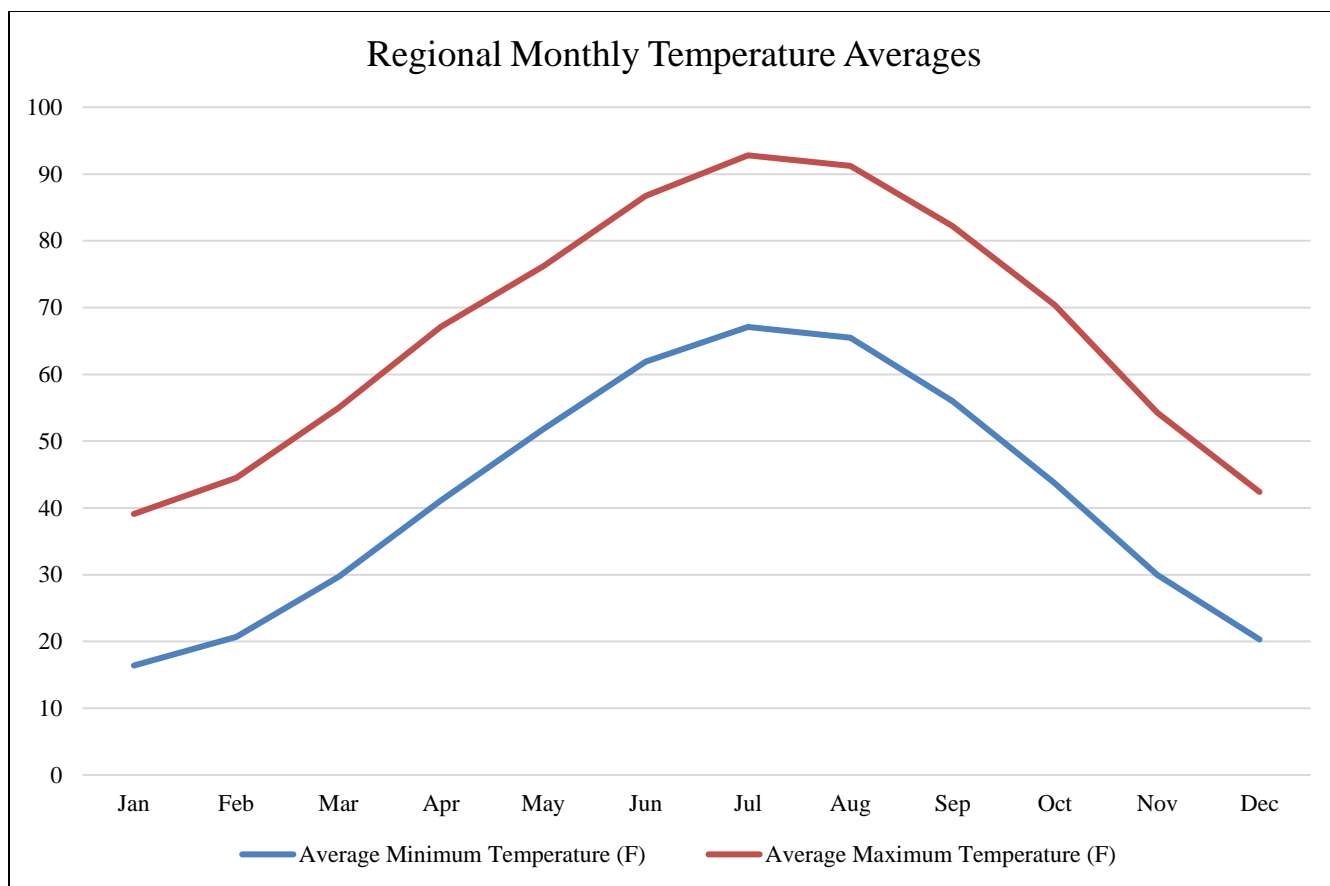
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Minimum Temperature (F)	16.4	20.7	29.7	41.1	51.8	61.9	67.1	65.5	56.0	43.7	30.0	20.3	42.0
Average Maximum Temperature (F)	39.1	44.5	55.0	67.1	76.2	86.7	92.8	91.2	82.2	70.4	54.3	42.4	66.8

Source: High Plains Regional Climate Center

The following graph illustrates the above data.







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

#### 4.12.2 – Previous Occurrences

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

**Table 4.46: Kansas Region F Historic Temperatures**

County	Historic Low Temperature (F)	Historic High Temperature (F)
Clay	-35 (1905)	<b>117 (1936)</b>
Cloud	-33 (1886)	116 (1934)
Dickinson	-29 (1899)	113 (1954)
Ellsworth	-30 (1913)	117 (1936)
Jewell	-25 (1982)	111 (1964)
Lincoln	-27 (1989)	119 (1934)



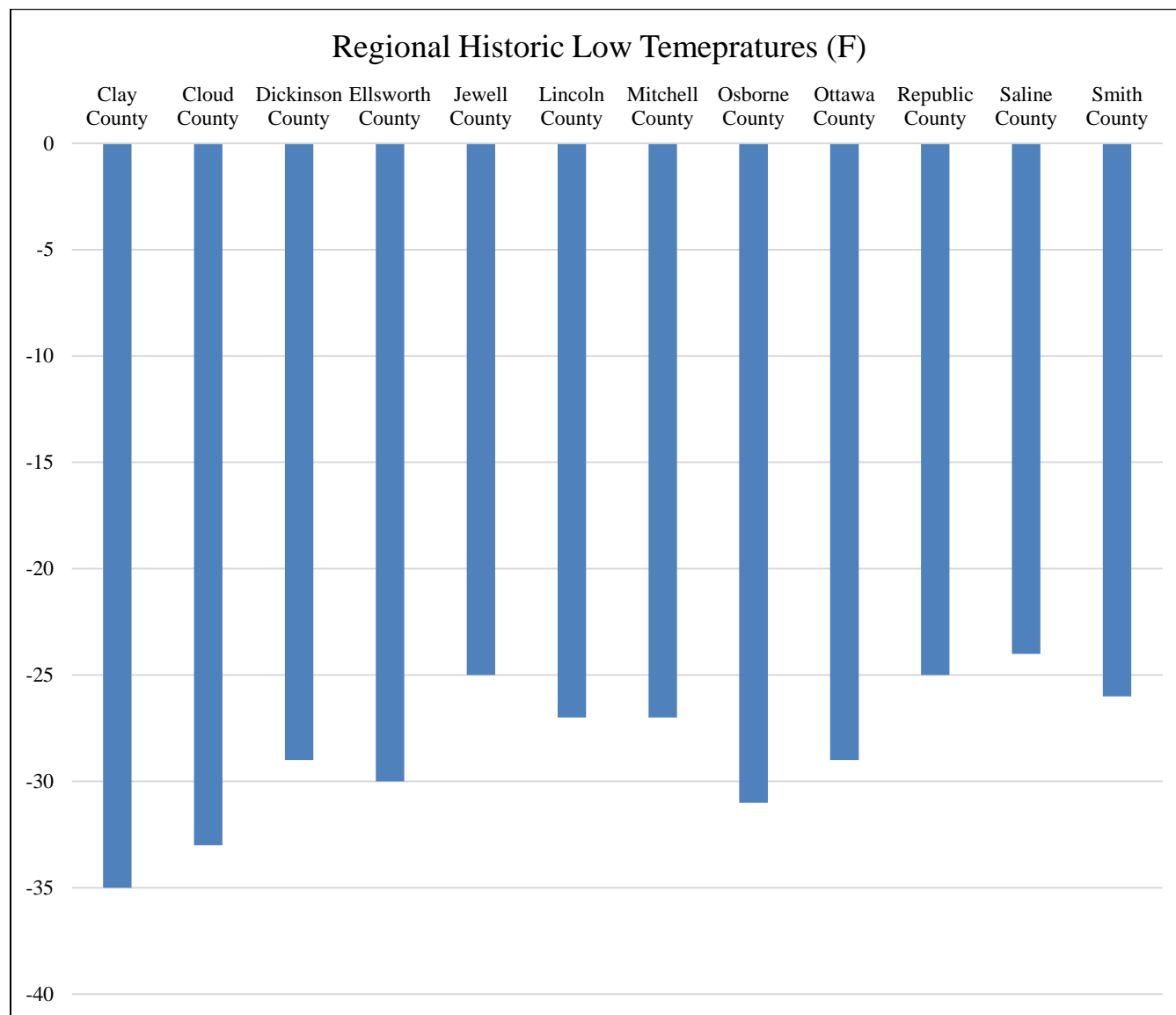


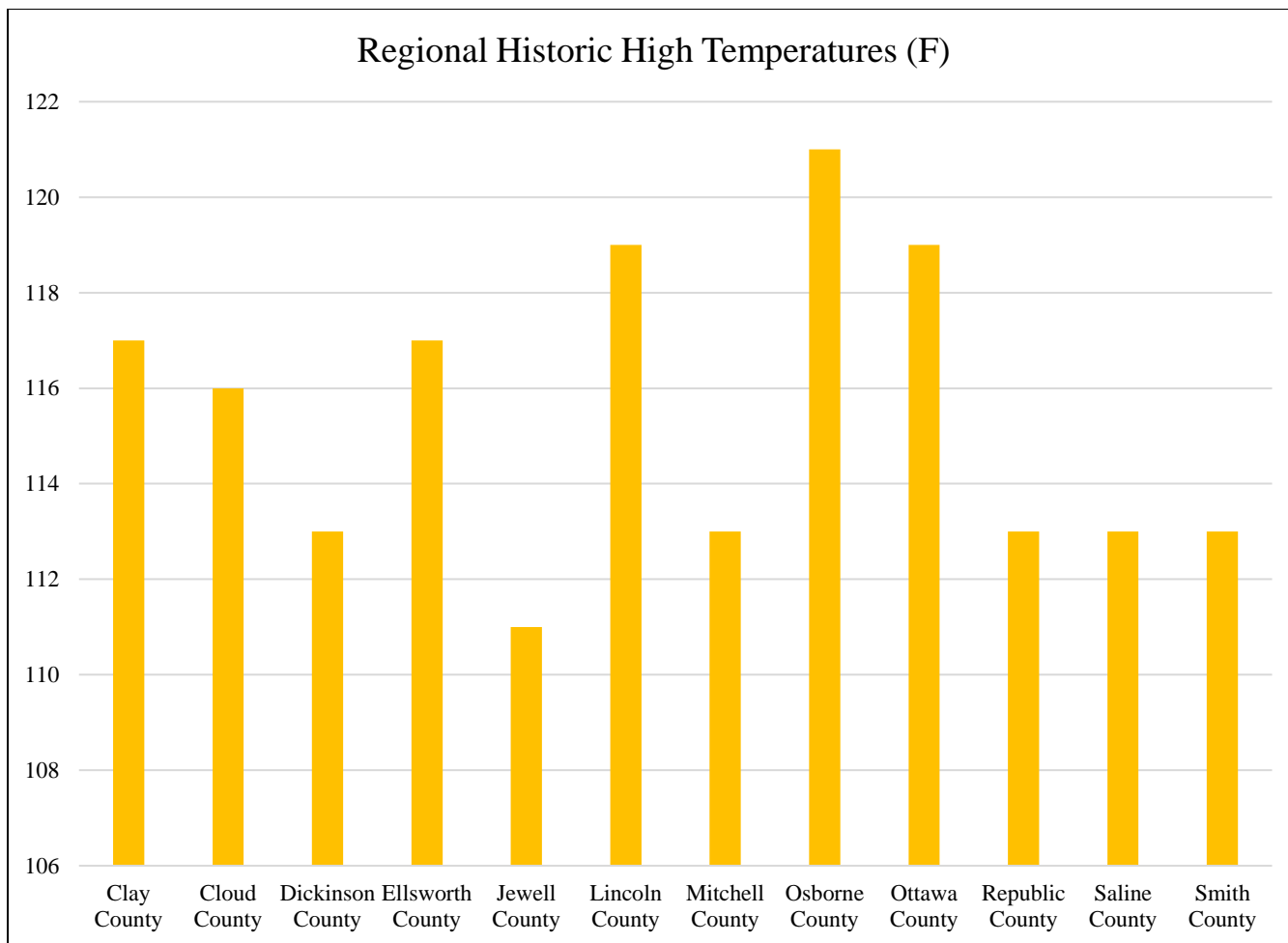
**Table 4.46: Kansas Region F Historic Temperatures**

County	Historic Low Temperature (F)	Historic High Temperature (F)
Mitchell	-27 (1913)	113 (1964)
Osborne	-31 (1989)	121 (1936)
Ottawa	-29 (1899)	119 (1936)
Republic	-25 (1989)	113 (1936)
Saline	-24 (1989)	113 (2011)
Smith	-26 (1989)	113 (2012)

Source: High Plains Regional Climate Center

The following graphs represent the above historic temperature data.





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

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

County	Event Type	Number of Events	Property Damage	Deaths	Injuries
Kansas Region F	Cold	2	\$0	0	0
	Heat	10	\$240,000	0	0

Source: NOAA NCEI

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

- July 19, 2010: Ottawa County**  
 Several hundred head of cattle perished at a feedlot in Bennington, Kansas due to the heat. The cattle refuse to eat and starved to death due to the heat. Excessive heat warning criteria were not exceeded in this area however the prolonged nature of the heat and the conditions of the feedlot





contributed to the losses. The estimates of dollars losses are rough estimates based on the number of cattle lost and the estimated price per head of cattle. Damages were reported at \$240,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of extreme temperatures on the Region’s agricultural base. Crop loss data for the five-year period 2009 - 2018 (data set includes full years for 2009 and 2018), for the region, indicates 855 extreme temperature related claims on 200,825 acres for \$24,117,819.

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

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	64	13,799	\$1,305,506
Cloud	80	12,383	\$1,266,916
Dickinson	71	32,464	\$4,022,037
Ellsworth	65	12,338	\$1,474,419
Jewell	55	8,372	\$1,027,733
Lincoln	62	12,805	\$1,600,788
Mitchell	110	28,459	\$3,787,782
Osborne	127	27,790	\$3,382,336
Ottawa	65	25,571	\$2,584,534
Republic	59	7,157	\$772,623
Saline	12	557	\$83,390
Smith	85	19,130	\$2,809,755

Source: USDA Farm Service Agency

### 4.12.3 – Hazard Probability Analysis

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

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

**Table 4.49: Kansas Region F Extreme Temperature Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	12
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$240,000
Average Property Damage per Year	\$24,000

Source: NCEI





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

- One event
- No deaths
- No injuries
- \$24,000 in property damages

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	64
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	13,799
Average Number of Acres Damaged per Year	1,380
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,305,506
Average Crop Damage per Year	\$130,551

Source: USDA

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

- Six insurance claims
- 1,380 acres impacted
- \$130,551 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	80
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	12,383
Average Number of Acres Damaged per Year	1,238
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,266,916
Average Crop Damage per Year	\$126,692

Source: USDA

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

- Eight insurance claims
- 1,238 acres impacted
- \$126,692 in insurance claims







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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	71
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	32,464
Average Number of Acres Damaged per Year	3,246
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$4,022,037
Average Crop Damage per Year	\$402,204

Source: USDA

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

- Seven insurance claims
- 3,246 acres impacted
- \$402,204 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	65
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	12,338
Average Number of Acres Damaged per Year	1,234
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,474,419
Average Crop Damage per Year	\$147,442

Source: USDA

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

- Seven insurance claims
- 1,234 acres impacted
- \$147,442 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	55
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	8,372
Average Number of Acres Damaged per Year	837
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,027,733





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

Data	Recorded Impact
Average Crop Damage per Year	\$102,773

Source: USDA

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

- Six insurance claims
- 837 acres impacted
- \$102.773 in insurance claims

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	62
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	12,805
Average Number of Acres Damaged per Year	1,280
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,600,788
Average Crop Damage per Year	\$160,079

Source: USDA

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

- Six insurance claims
- 1,280 acres impacted
- \$160,079 in insurance claims

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

**Table 4.56: Mitchell County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	110
Average Number of Claims per Year	11
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	28,459
Average Number of Acres Damaged per Year	2,846
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,787,782
Average Crop Damage per Year	\$378,778

Source: USDA

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

- 11 insurance claims





- 2,846 acres impacted
- \$378,778 in insurance claims

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

**Table 4.57: Osborne County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	127
Average Number of Claims per Year	13
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	27,790
Average Number of Acres Damaged per Year	2,779
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,382,336
Average Crop Damage per Year	\$338,234

Source: USDA

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

- 13 insurance claims
- 2,779 acres impacted
- \$338,234 in insurance claims

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

**Table 4.58: Ottawa County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	65
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	25,571
Average Number of Acres Damaged per Year	2,557
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,584,534
Average Crop Damage per Year	\$258,453

Source: USDA

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

- Seven insurance claims
- 2,557 acres impacted
- \$258,453 in insurance claims

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





**Table 4.59: Republic County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	59
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	7,157
Average Number of Acres Damaged per Year	716
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$772,623
Average Crop Damage per Year	\$77,262

Source: USDA

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

- Six insurance claims
- 716No acres impacted
- \$77,262 in insurance claims

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

**Table 4.60: Saline County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	12
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	557
Average Number of Acres Damaged per Year	56
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$83,390
Average Crop Damage per Year	\$8,339

Source: USDA

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

- One insurance claim
- 56 acres impacted
- \$8,339 in insurance claims

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

**Table 4.61: Smith County Extreme Temperatures Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	85
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	19,130
Average Number of Acres Damaged per Year	1,913
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,809,755
Average Crop Damage per Year	\$280,976

Source: USDA





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

- Nine insurance claims
- 1,913 acres impacted
- \$280,976 in insurance claims

#### 4.12.4 – Vulnerability Analysis

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

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

**Table 4.62: Extreme Heat Impacts on Human Health**

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

Source: National Weather Service Heat Index Program

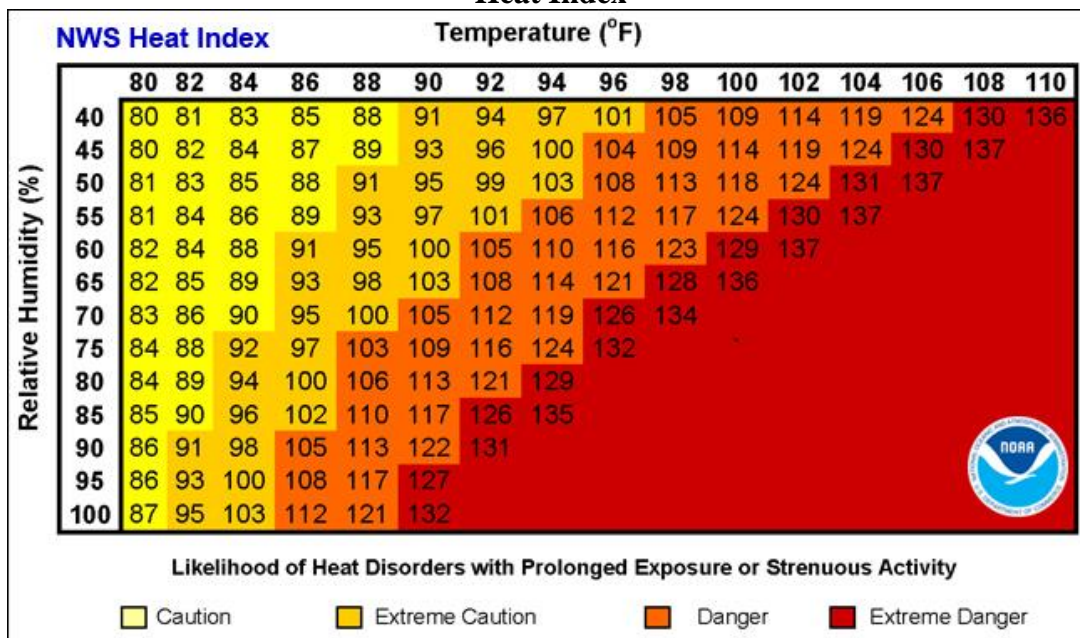
The following graph, from the NWS, indicates Heat Index values.







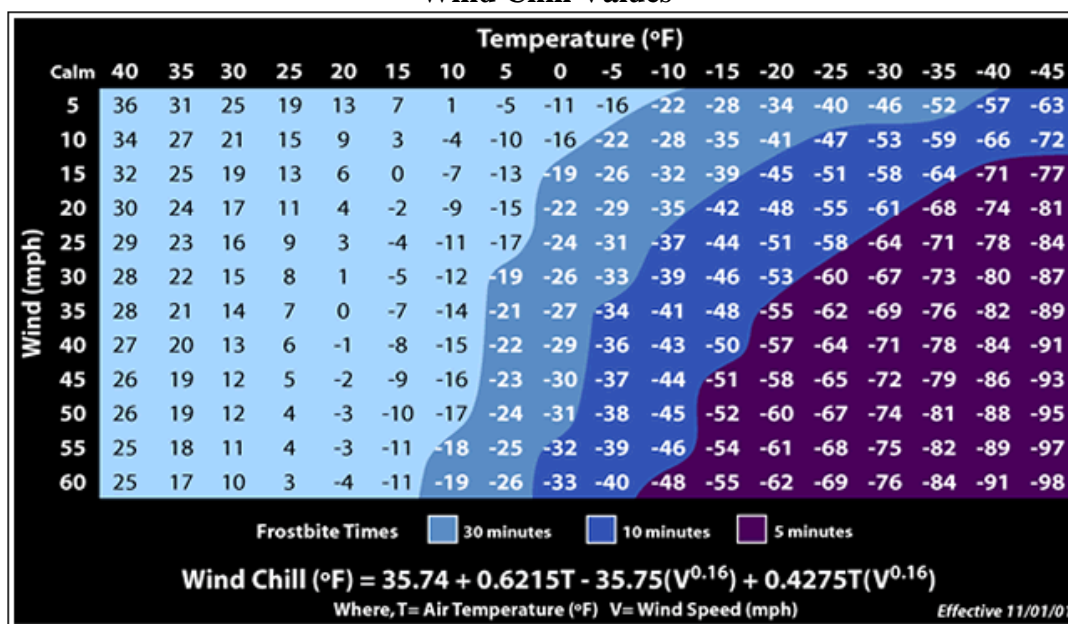
### Heat Index



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

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

### Wind Chill Values





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

**Table 4.63: Kansas Region F Population Vulnerability Data for Extreme Temperatures**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

Source: US Census Bureau

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

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

County	Percentage of Population 5 and Under (2018)	Percentage of Population 65+ (2018)
Clay	6.5%	23.0%
Cloud	5.6%	21.6%
Dickinson	5.9%	19.8%
Ellsworth	4.6%	20.9%
Jewell	5.5%	30.1%
Lincoln	5.4%	24.4%
Mitchell	6.9%	23.6%
Osborne	5.5%	25.0%
Ottawa	4.9%	20.4%
Republic	5.5%	27.7%
Saline	6.1%	17.9%
Smith	5.7%	27.7%

Source: US Census Bureau

In addition, extreme temperatures may exacerbate agricultural and economic losses. The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. USDA Risk Management Agency crop loss data for the five-year period 2009 - 2018 (data set includes full years for 2009 and 2018) allows us to quantify





the monetary impact of extreme temperature conditions on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to extreme temperature events.

**Table 4.65: Extreme Temperature Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	1,380	0.36%	\$121,175,000	\$130,551	0.11%
Cloud	322,034	1,238	0.38%	\$77,485,000	\$126,692	0.16%
Dickinson	519,171	3,246	0.63%	\$149,543,000	\$402,204	0.27%
Ellsworth	390,042	1,234	0.32%	\$48,318,000	\$147,442	0.31%
Jewell	436,206	837	0.19%	\$149,501,000	\$102,773	0.07%
Lincoln	384,740	1,280	0.33%	\$58,151,000	\$160,079	0.28%
Mitchell	414,220	2,846	0.69%	\$126,462,000	\$378,778	0.30%
Osborne	437,083	2,779	0.64%	\$62,499,000	\$338,234	0.54%
Ottawa	439,335	2,557	0.58%	\$108,378,000	\$258,453	0.24%
Republic	373,206	716	0.19%	\$187,529,000	\$77,262	0.04%
Saline	358,243	56	0.02%	\$73,581,000	\$8,339	0.01%
Smith	541,742	1,913	0.35%	\$129,261,000	\$280,976	0.22%

Source: USDA

#### 4.12.5 – Consequence Analysis

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

**Table 4.66: Extreme Temperature Consequence Analysis**

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





**Table 4.66: Extreme Temperature Consequence Analysis**

<b>Subject</b>	<b>Impacts of Extreme Temperatures</b>
Public Confidence in the Jurisdiction's Governance	Confidence will be dependent on how well utilities hold up as they are stretched to provide heat and cool air, depending on the extreme. Planning and response could be challenged.





## 4.13 – Flood

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

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



### 4.13.1 – Location and Extent

#### Flash Flooding

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

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

In general, flash flooding occurs in those locations in the planning area that are low-lying and/or do not have adequate drainage. Data from University of Kansas indicates that the average annual precipitation for Kansas Region F counties for 2013 - 2018 (the latest available data):

- Clay County: 32.7 inches
- Cloud County: 31.2 inches
- Dickinson County: 34.5 inches
- Ellsworth County: 30.4 inches
- Jewell County: 27.5 inches
- Lincoln County: 26.9 inches
- Mitchell County: 28.6 inches
- Osborne County: 26.5 inches
- Ottawa County: 31.8 inches
- Republic County: 29.5 inches
- Saline County: 21.3 inches
- Smith County: 26.9 inches



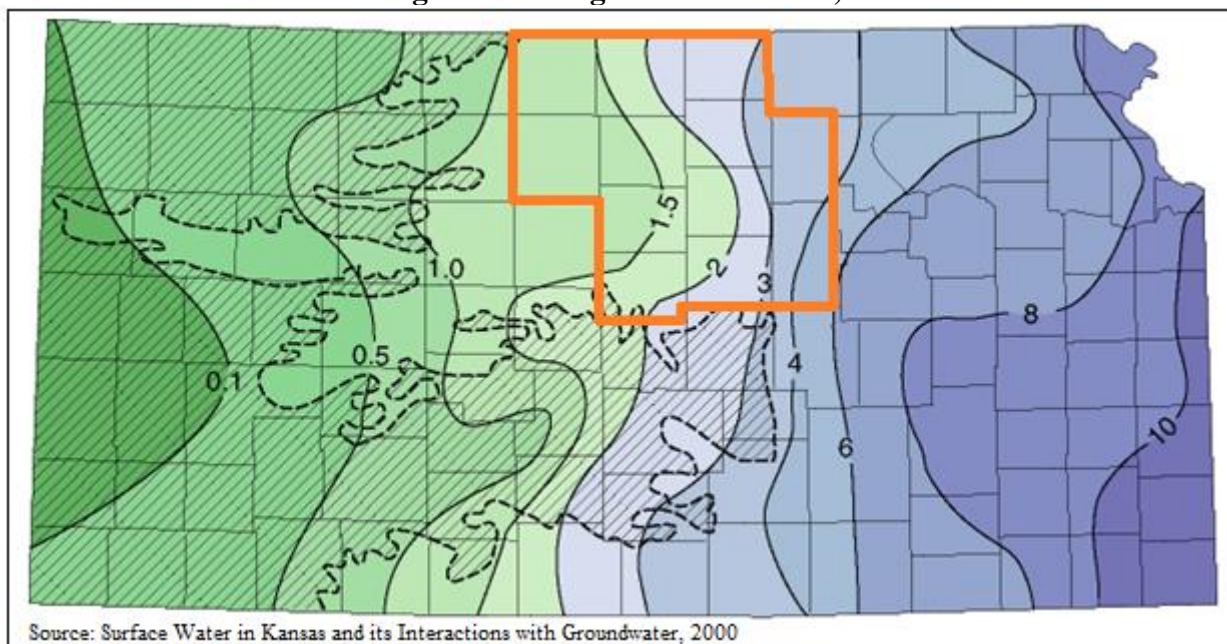




This equates to a regional average of 26.4 inches of precipitation for the six-year period 2013 - 2018.

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

**Kansas Region F Average Annual Runoff, In Inches**



## Riverine Flooding

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

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





All areas of Kansas Region F 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.

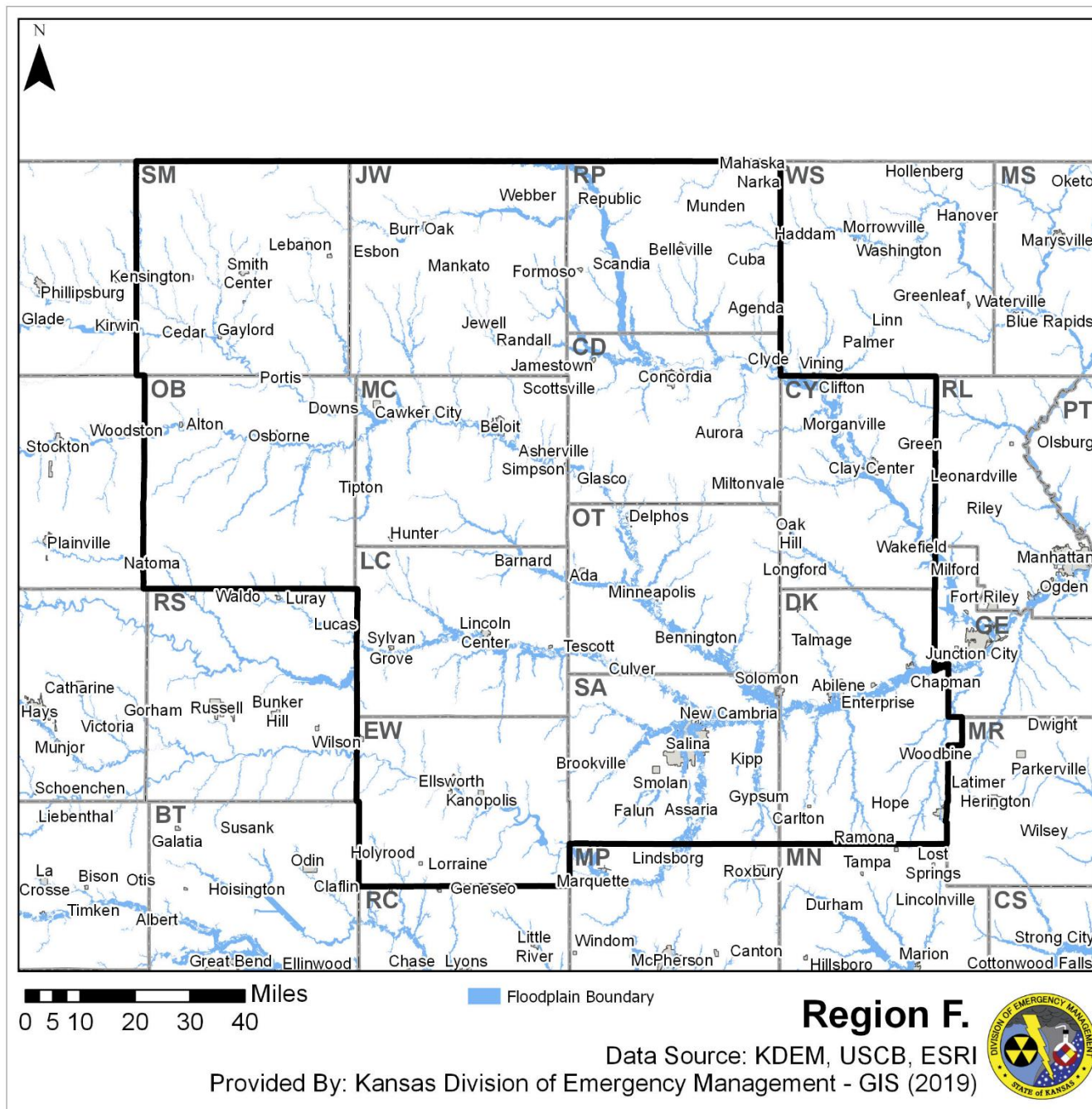
**Table 4.67: Flood Recurrence Interval Probability**

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

Source: FEMA

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





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





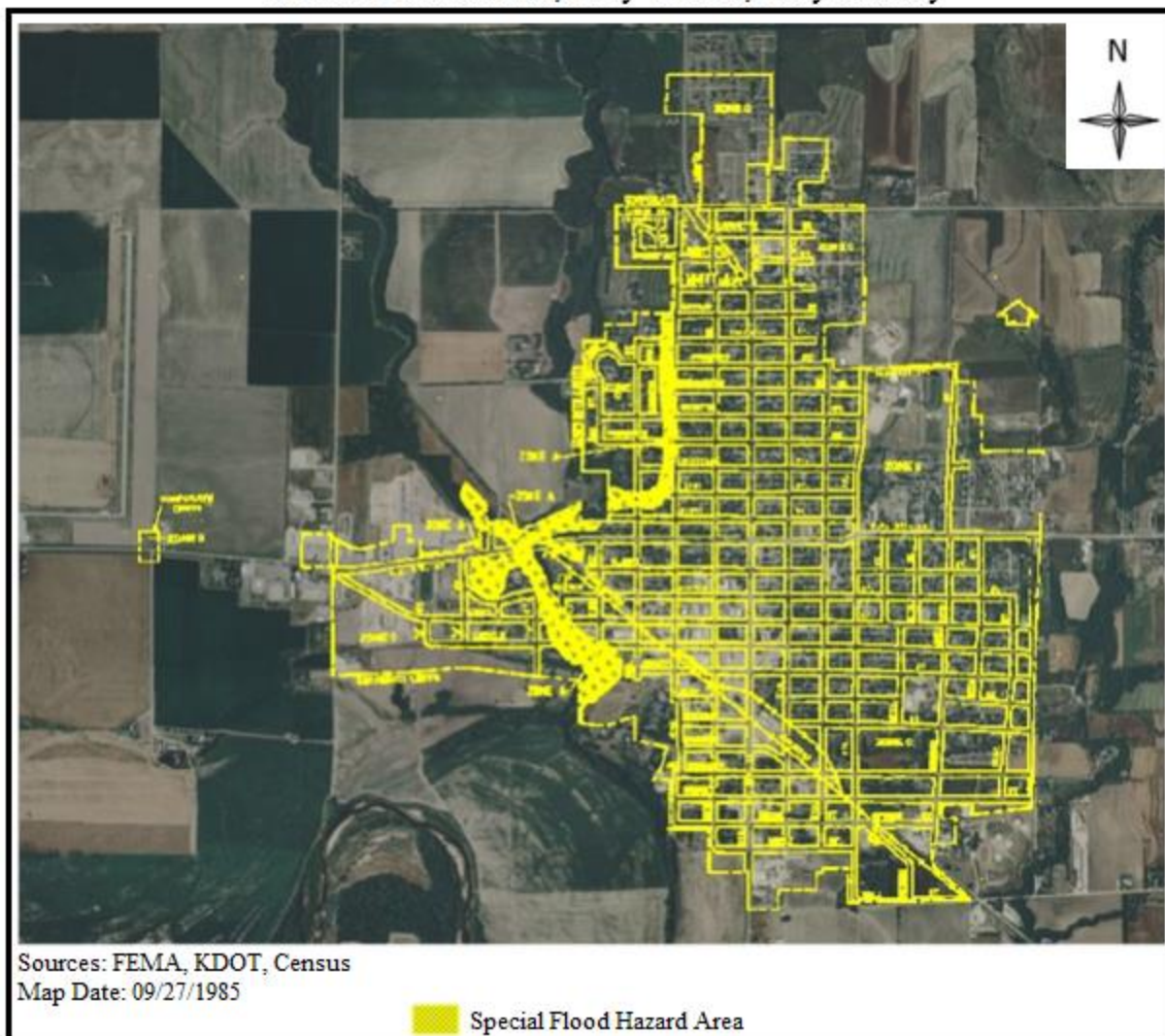


### FEMA FIRM Panels, Clay County





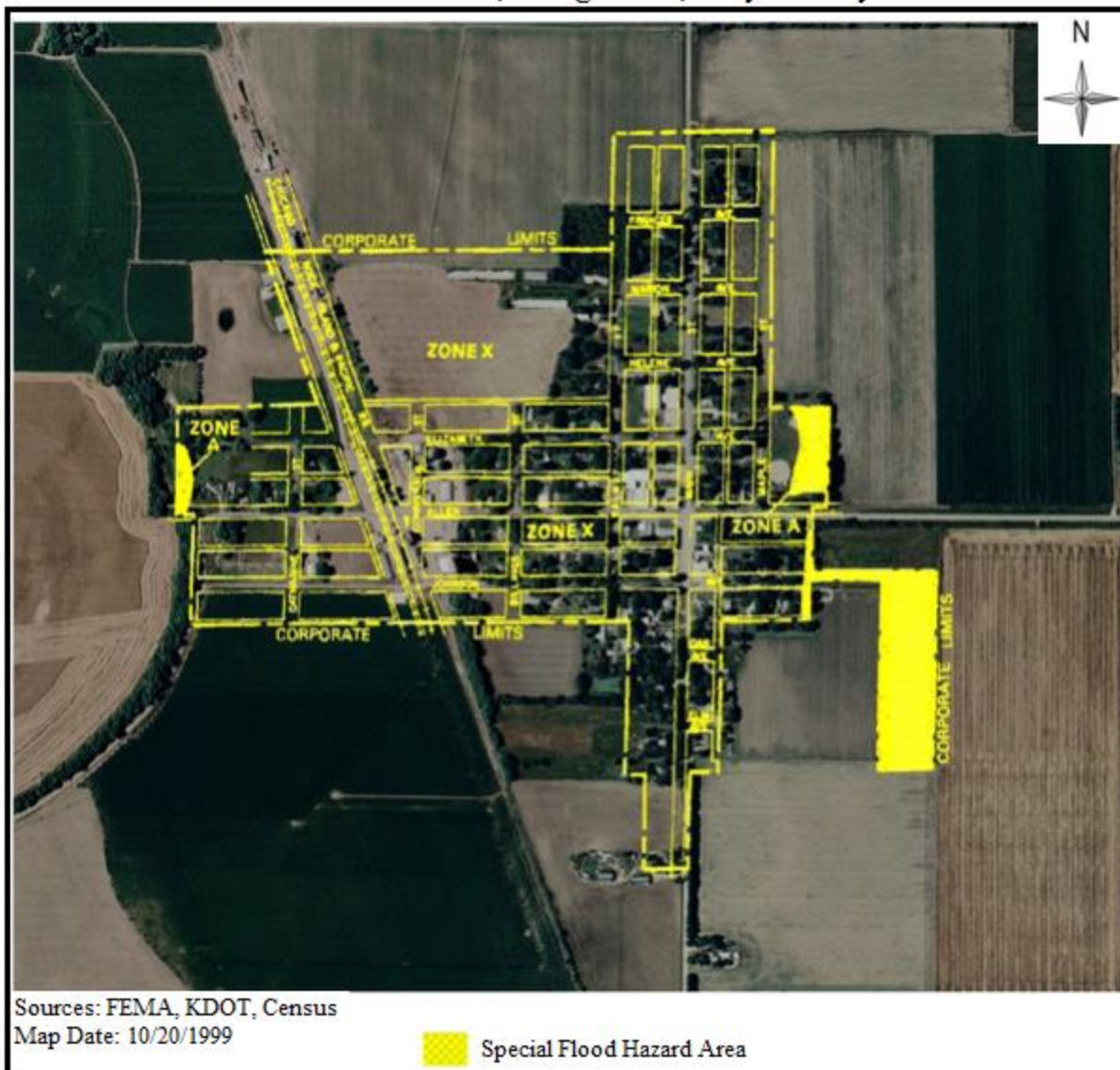
# FEMA FIRM Panel, Clay Center, Clay County

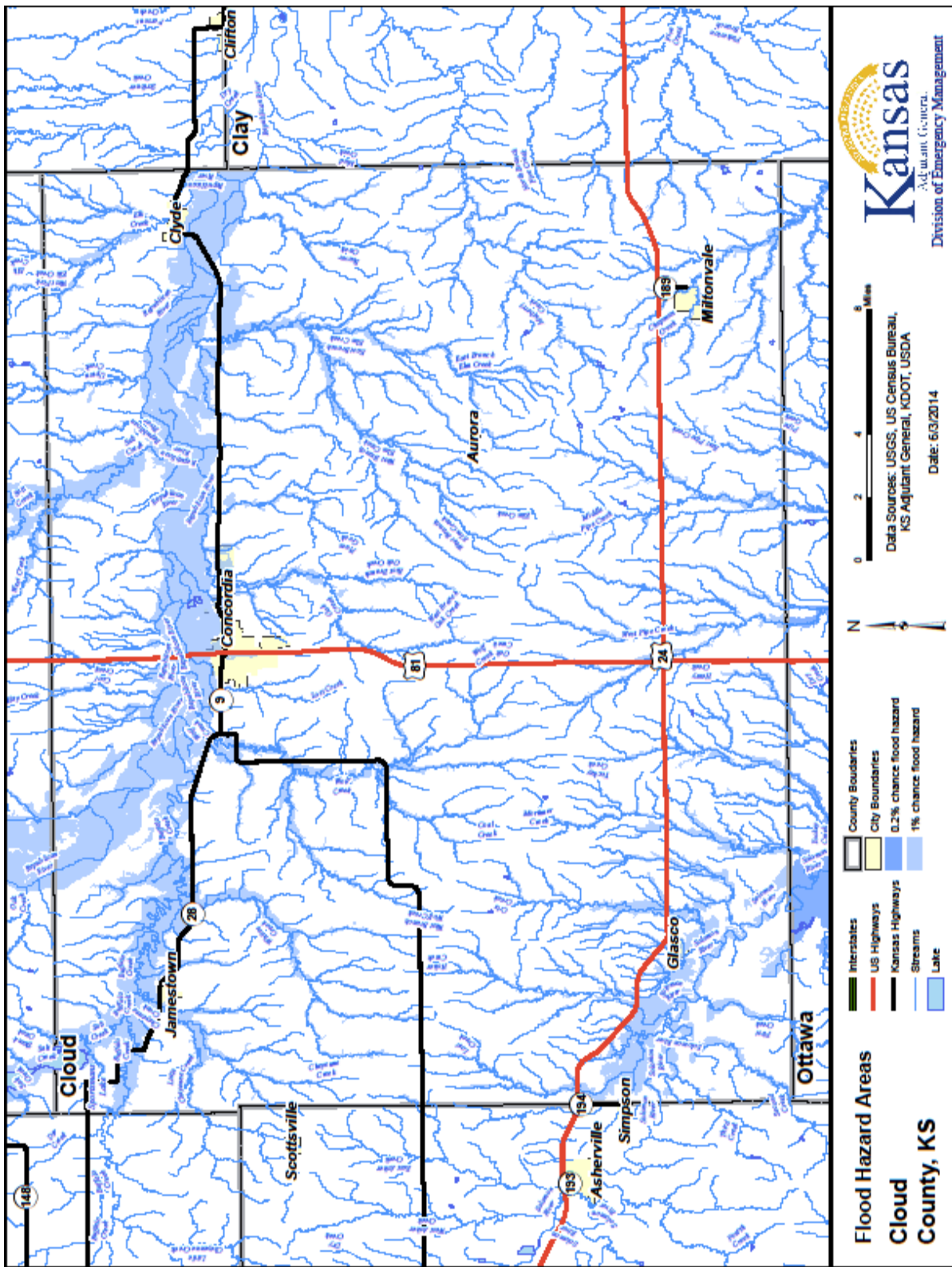






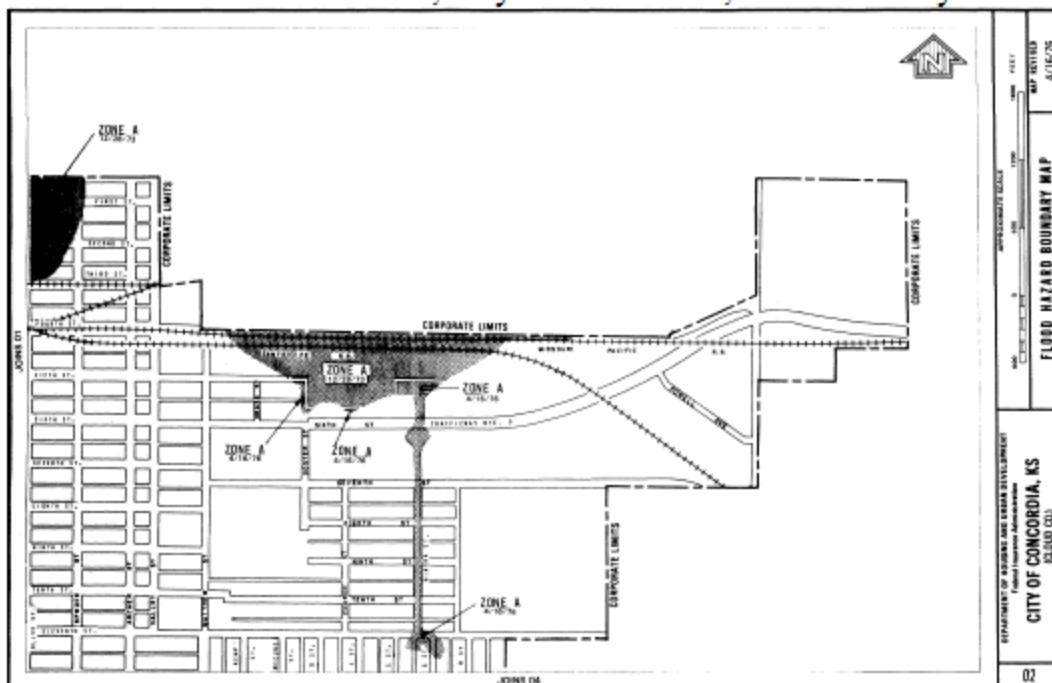
# FEMA FIRM Panel, Morganville, Clay County







### FEMA FIRM Panel, City of Concordia, Cloud County



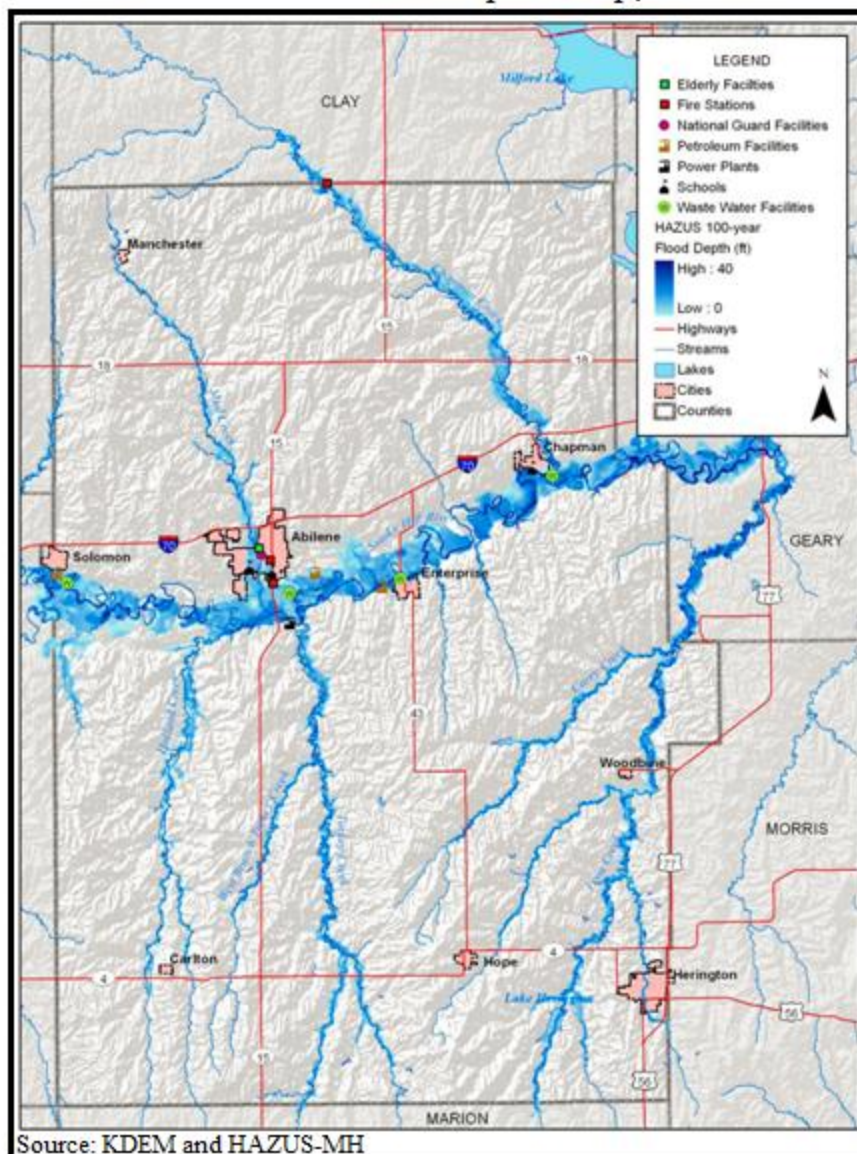
### FEMA FIRM Panel, City of Miltonvale, Cloud County





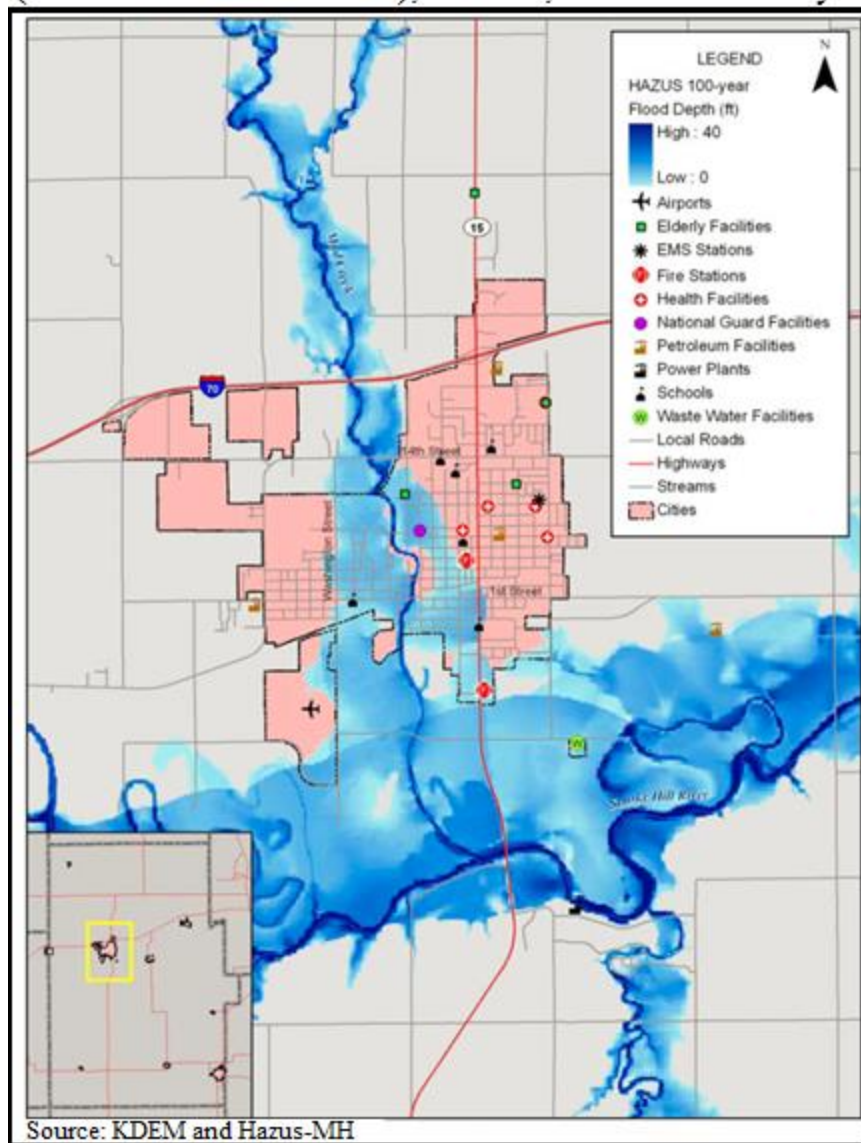


# HAZUS Generated 100 Year Floodplain Map, Dickinson County





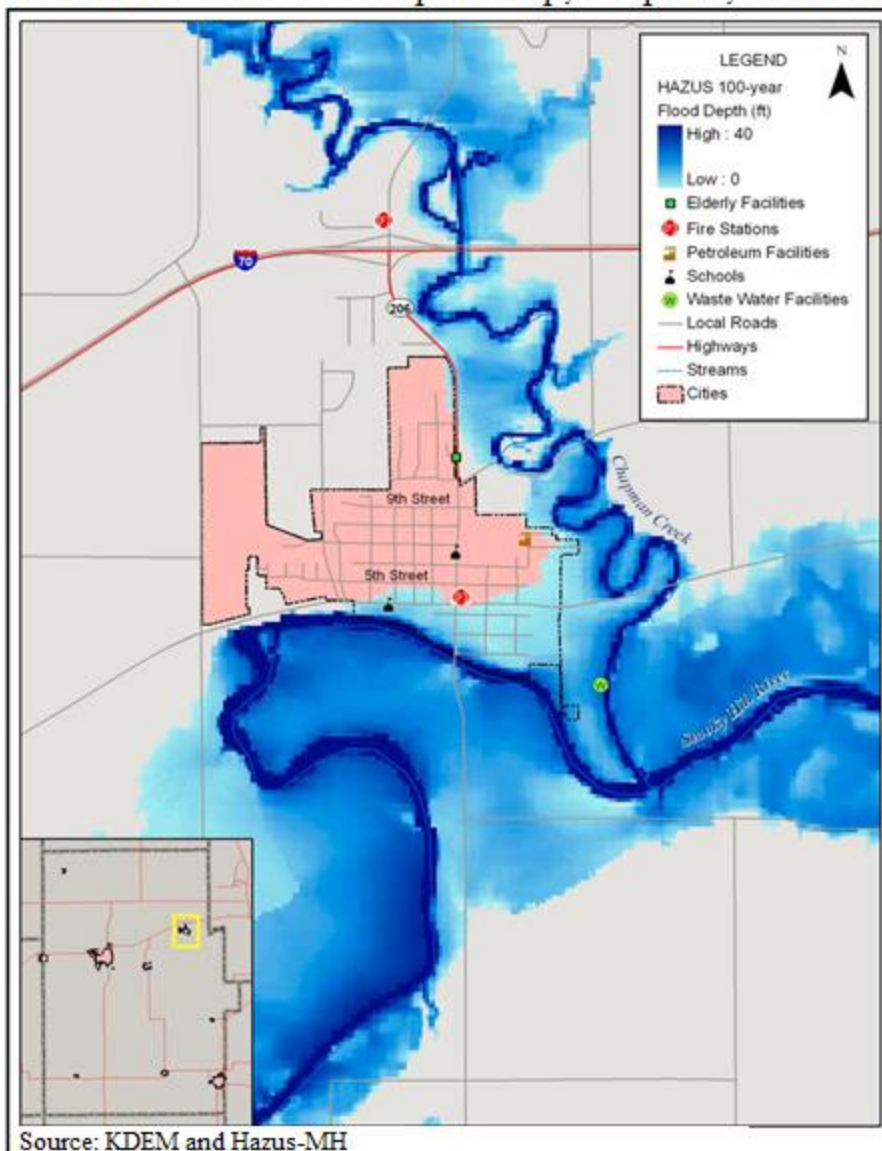
# HAZUS Generated 100 Year Floodplain Map (without Levee Protection), Abilene, Dickinson County





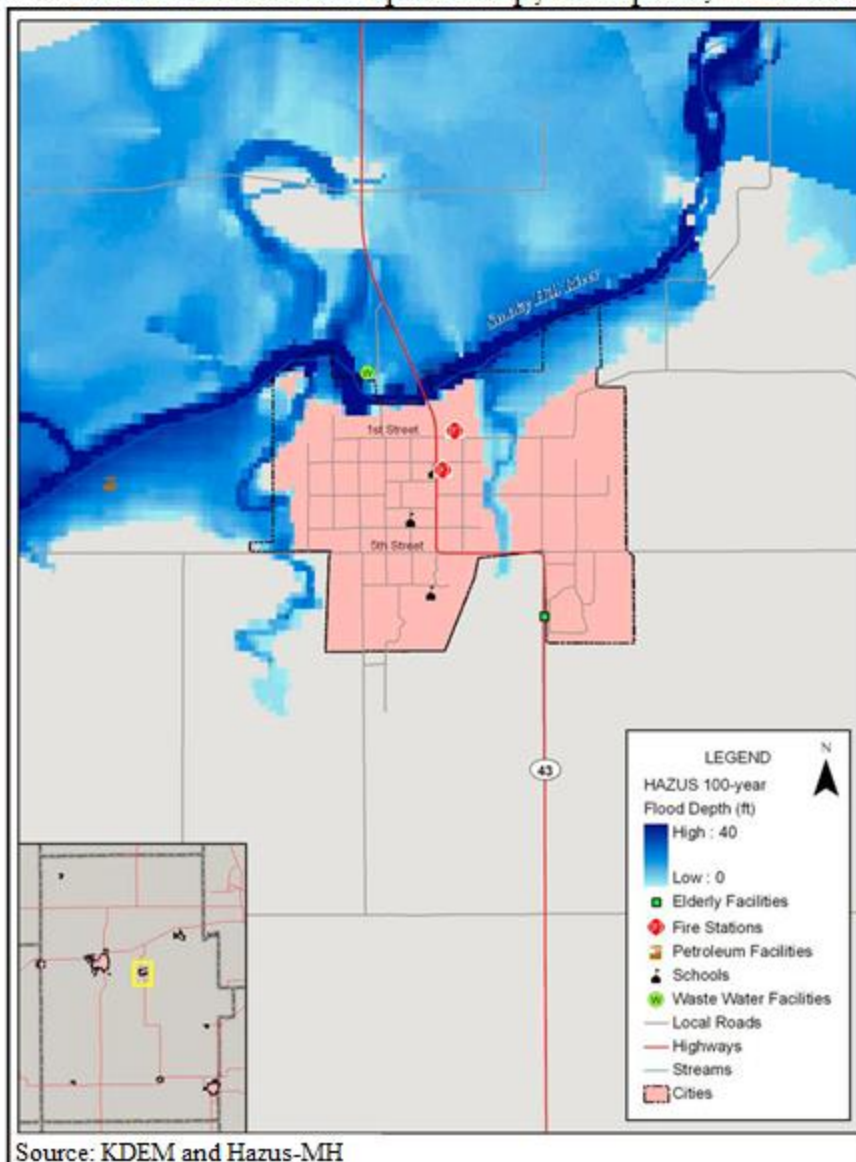


# HAZUS Generated 100 Year Floodplain Map, Chapman, Dickinson County



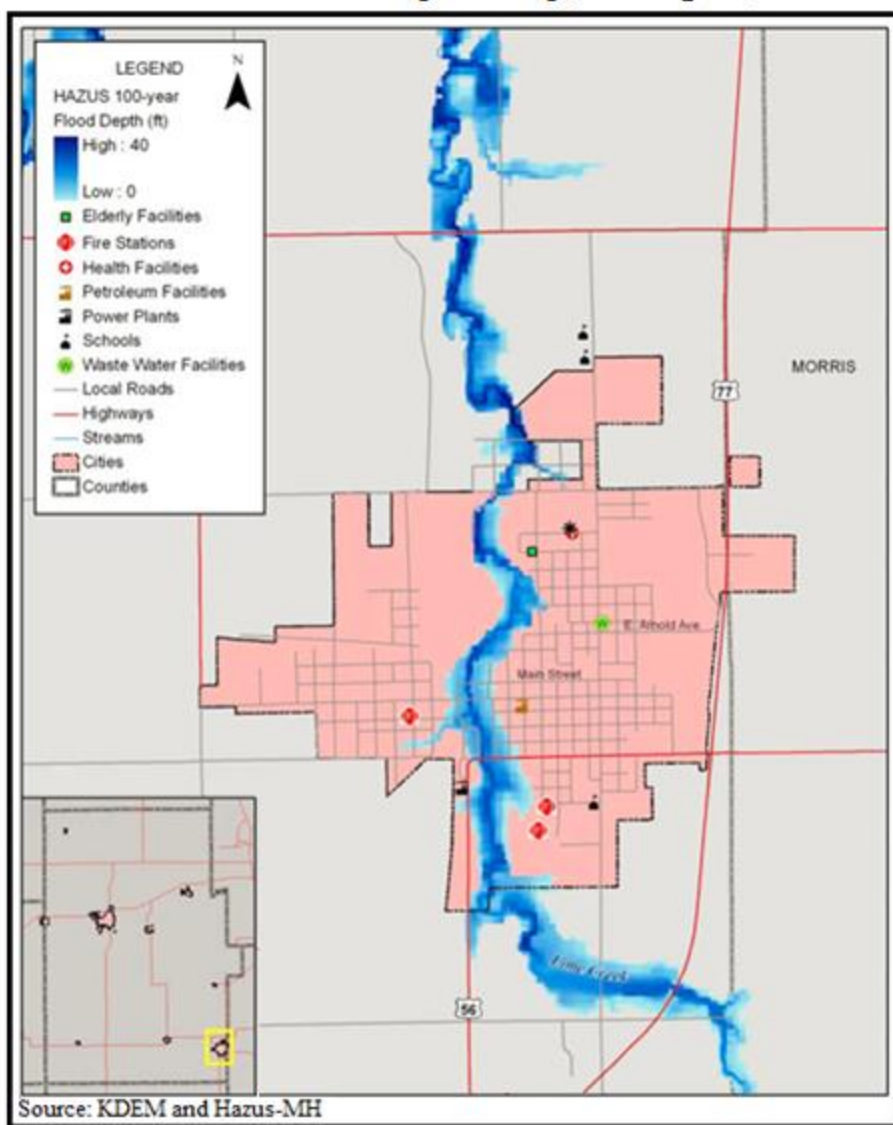


# Hazus Generated 100 Year Floodplain Map, Enterprise, Dickinson County



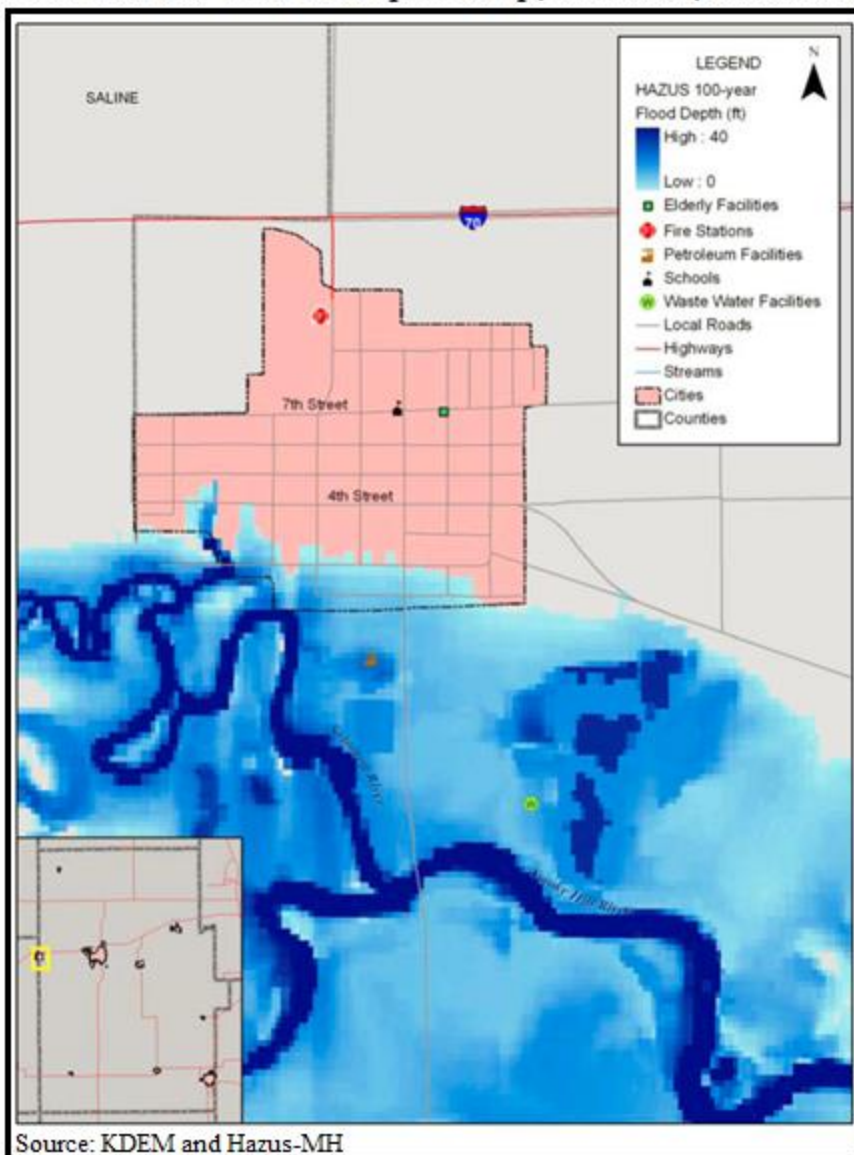


# HAZUS Generated 100 Year Floodplain Map, Herrington, Dickinson County

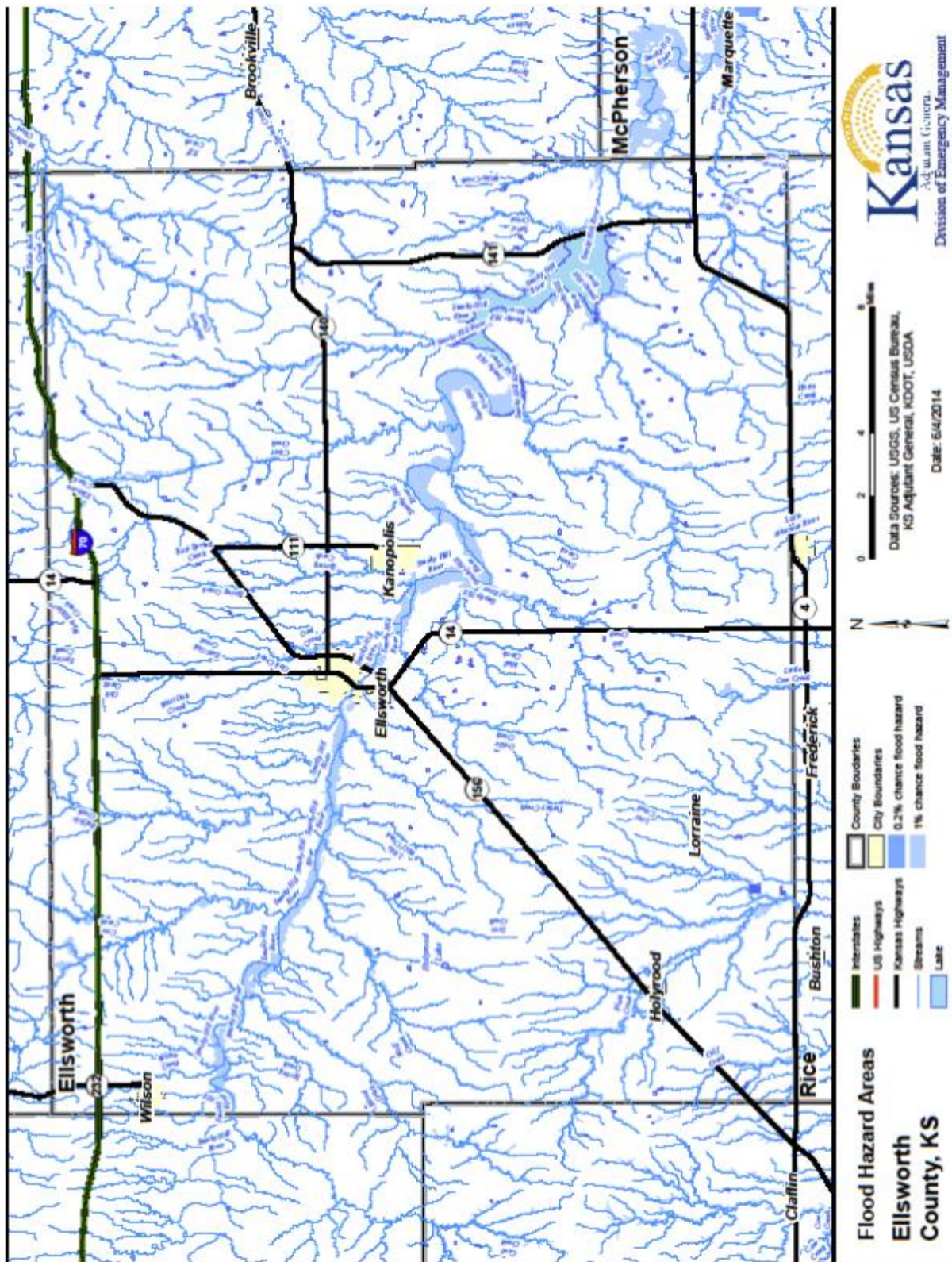




# HAZUS Generated 100 Year Floodplain Map, Solomon, Dickinson County



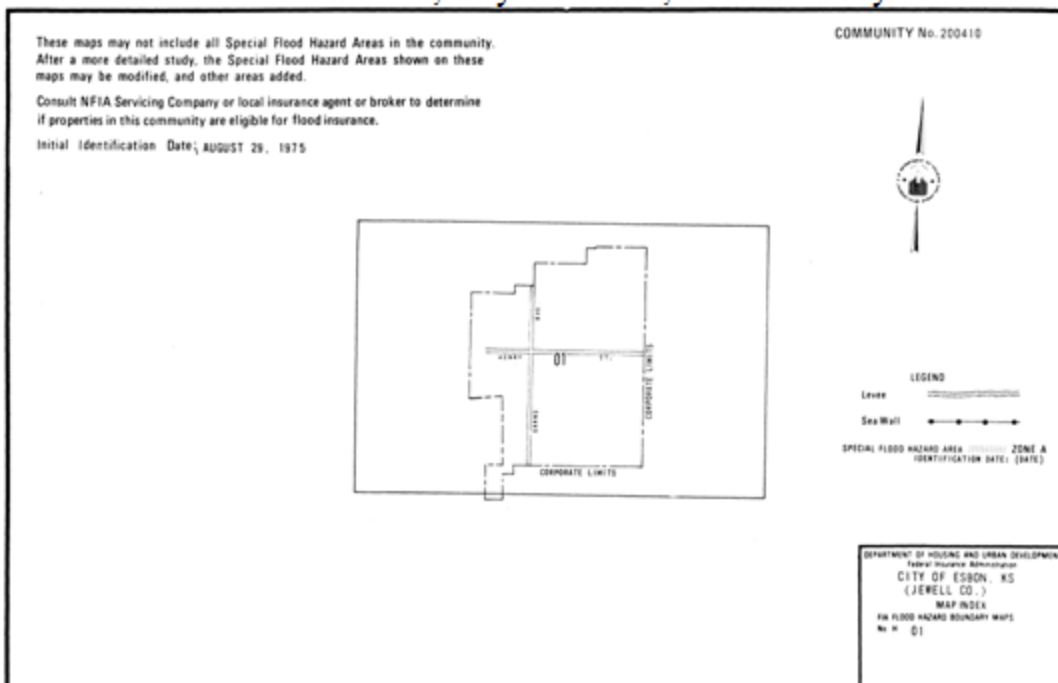




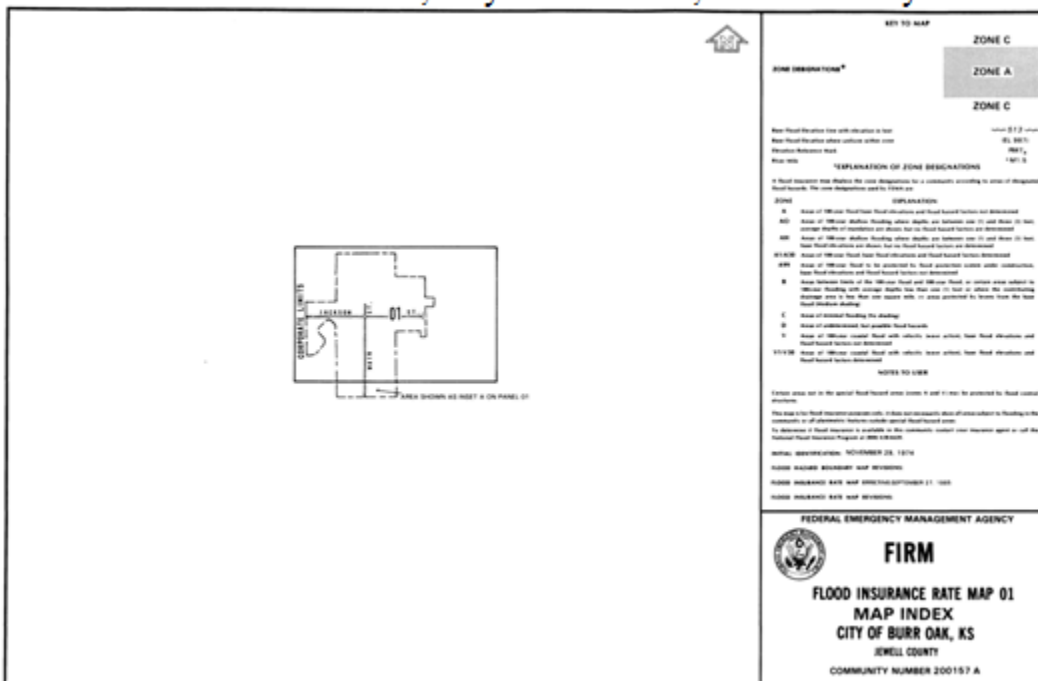




## FEMA FIRM Panel, City of Esbon, Jewell County

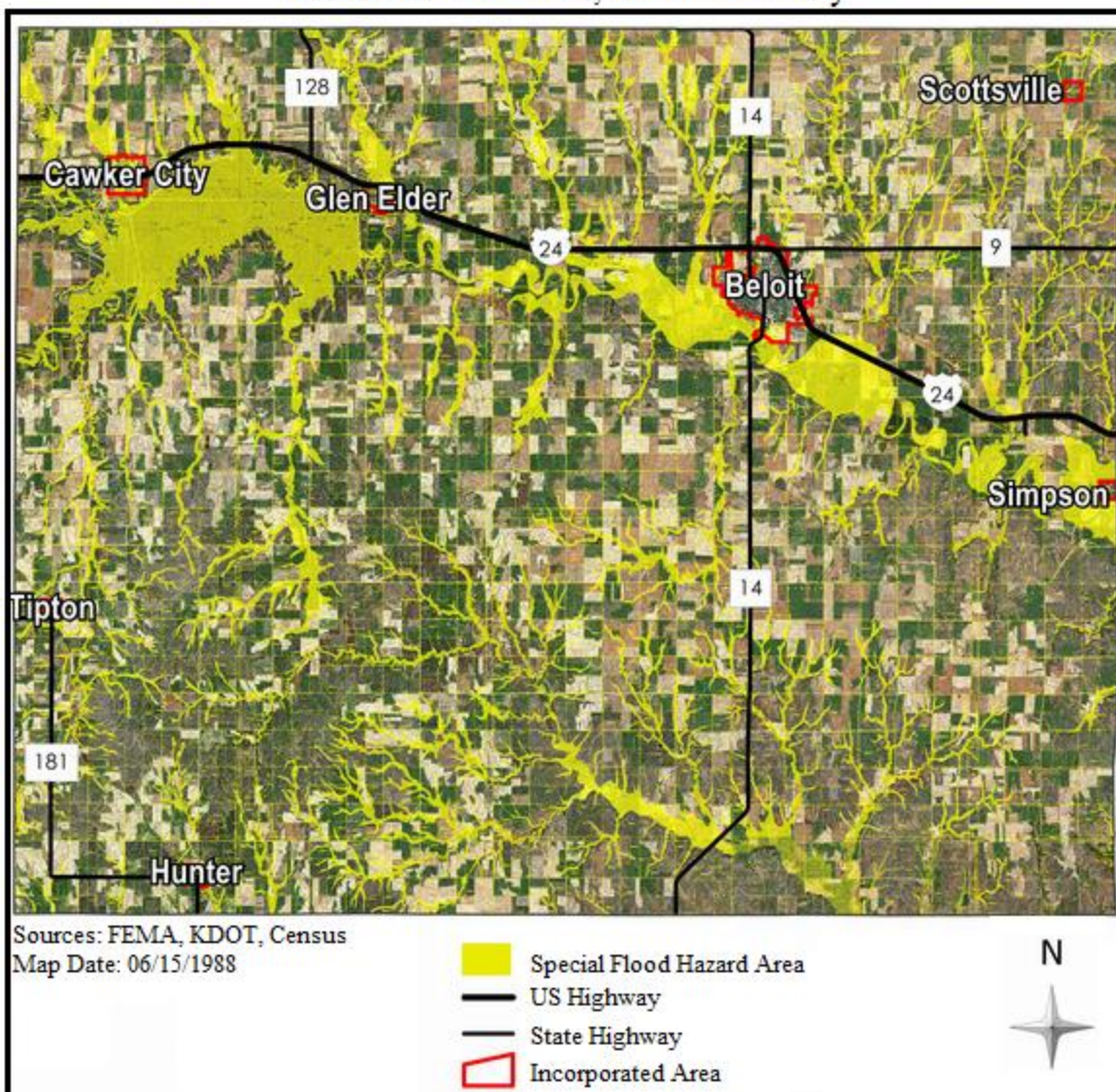


## FEMA FIRM Panel, City of Burr Oak, Jewell County



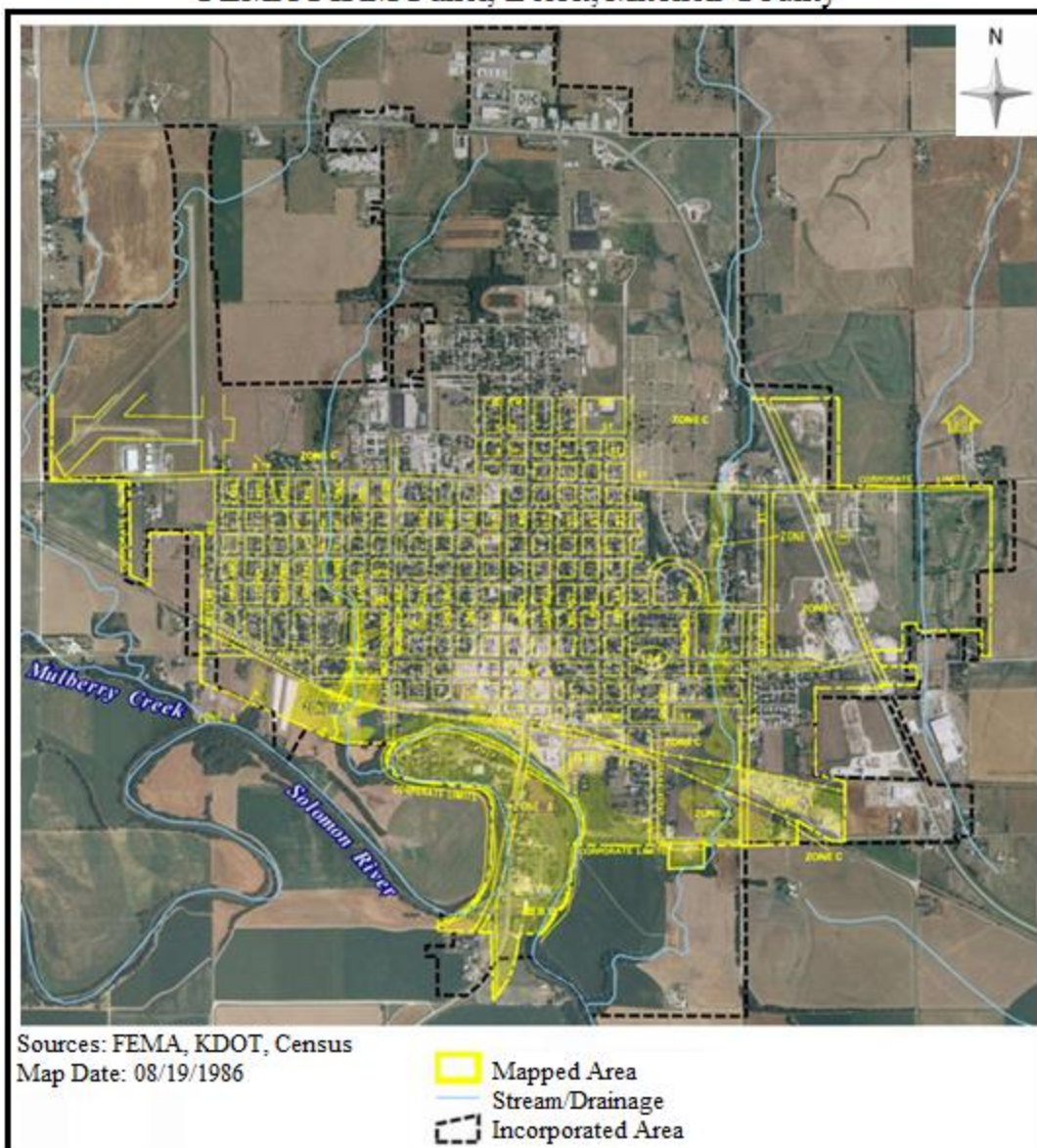


### FEMA FIRM Panels, Mitchell County





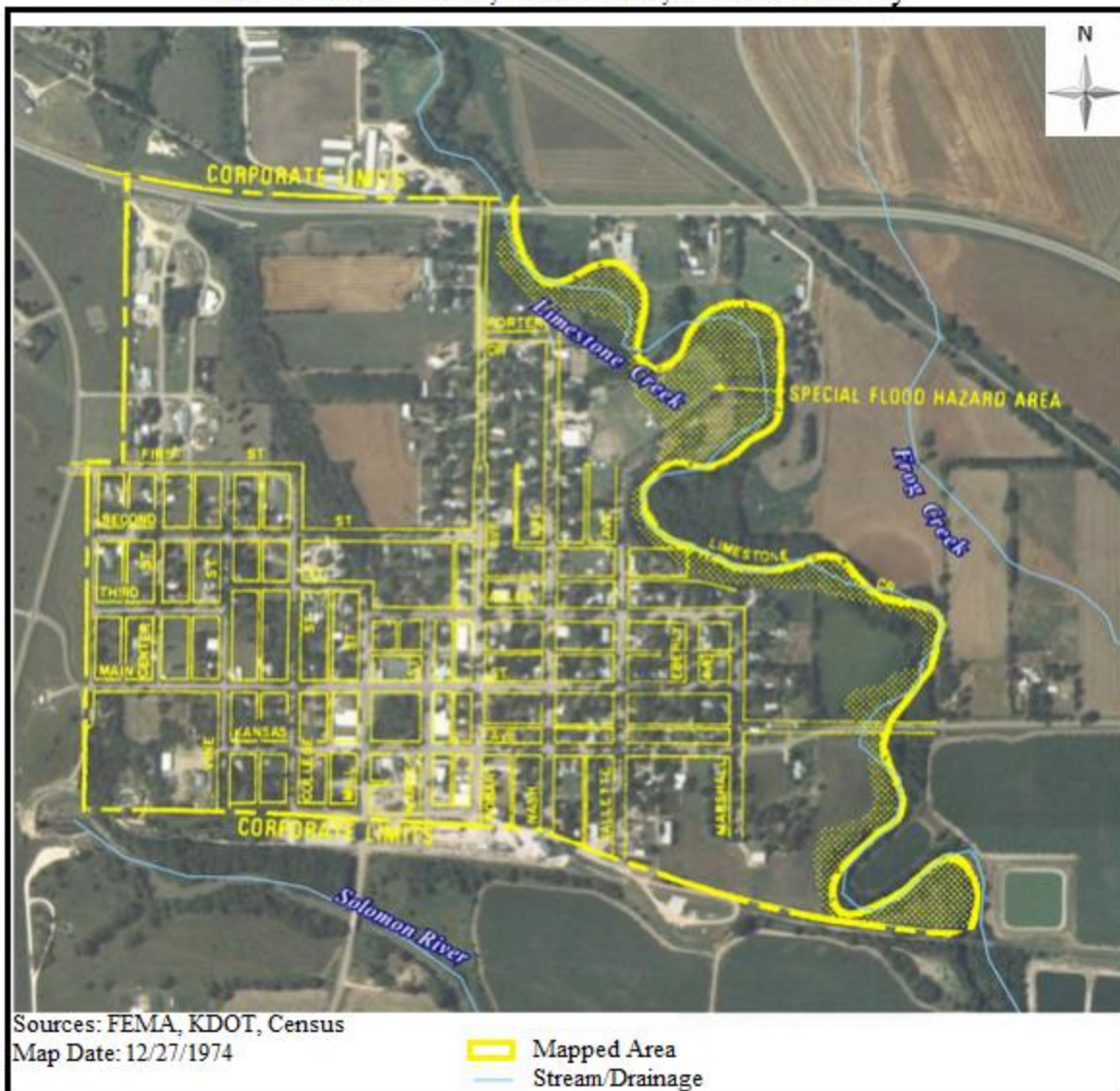
### FEMA FIRM Panel, Beloit, Mitchell County





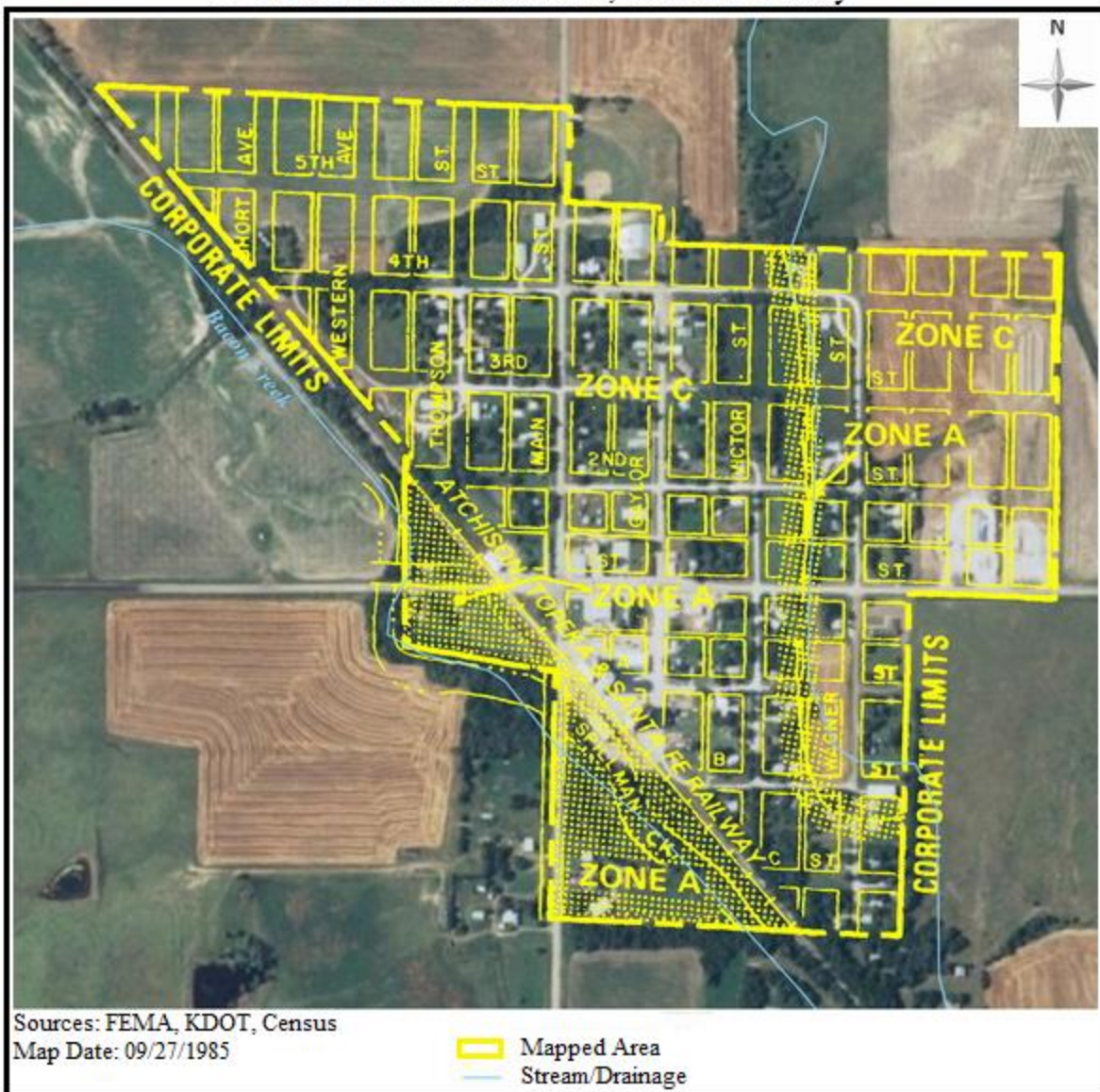


# FEMA FIRM Panel, Glen Elder, Mitchell County





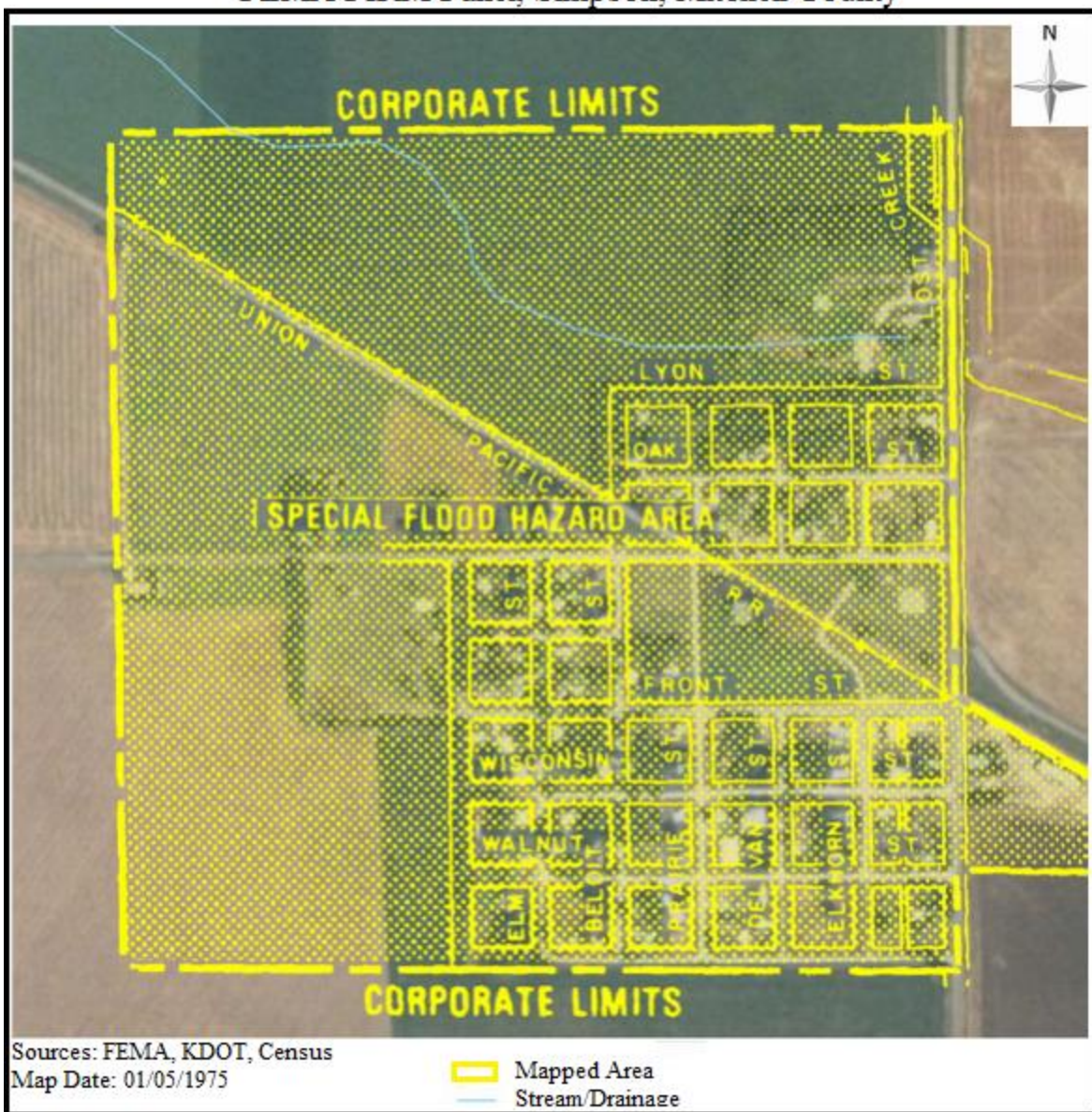
# FEMA FIRM Panel. Hunter, Mitchell County





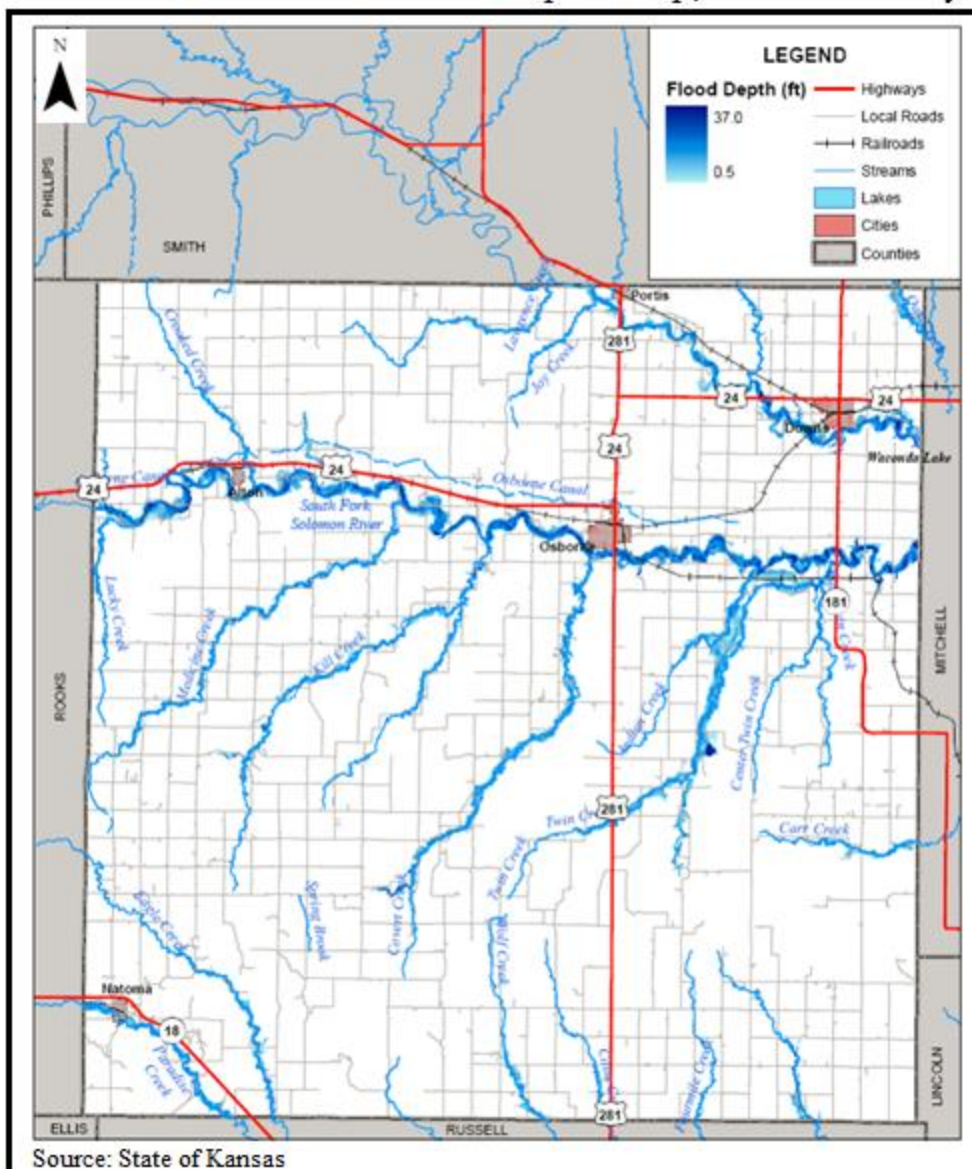


# FEMA FIRM Panel, Simpson, Mitchell County



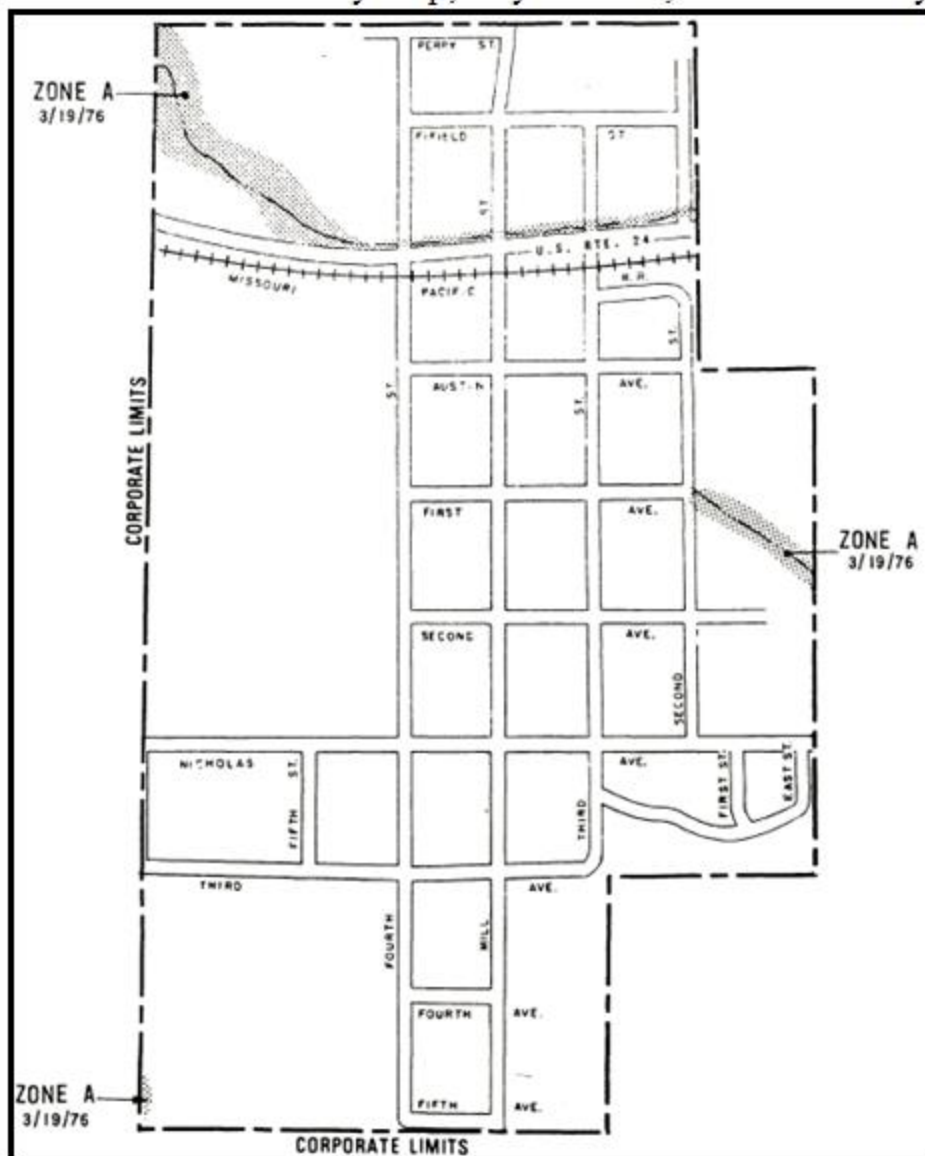


# HAZUS Generated 100 Year Floodplain Map, Osborne County





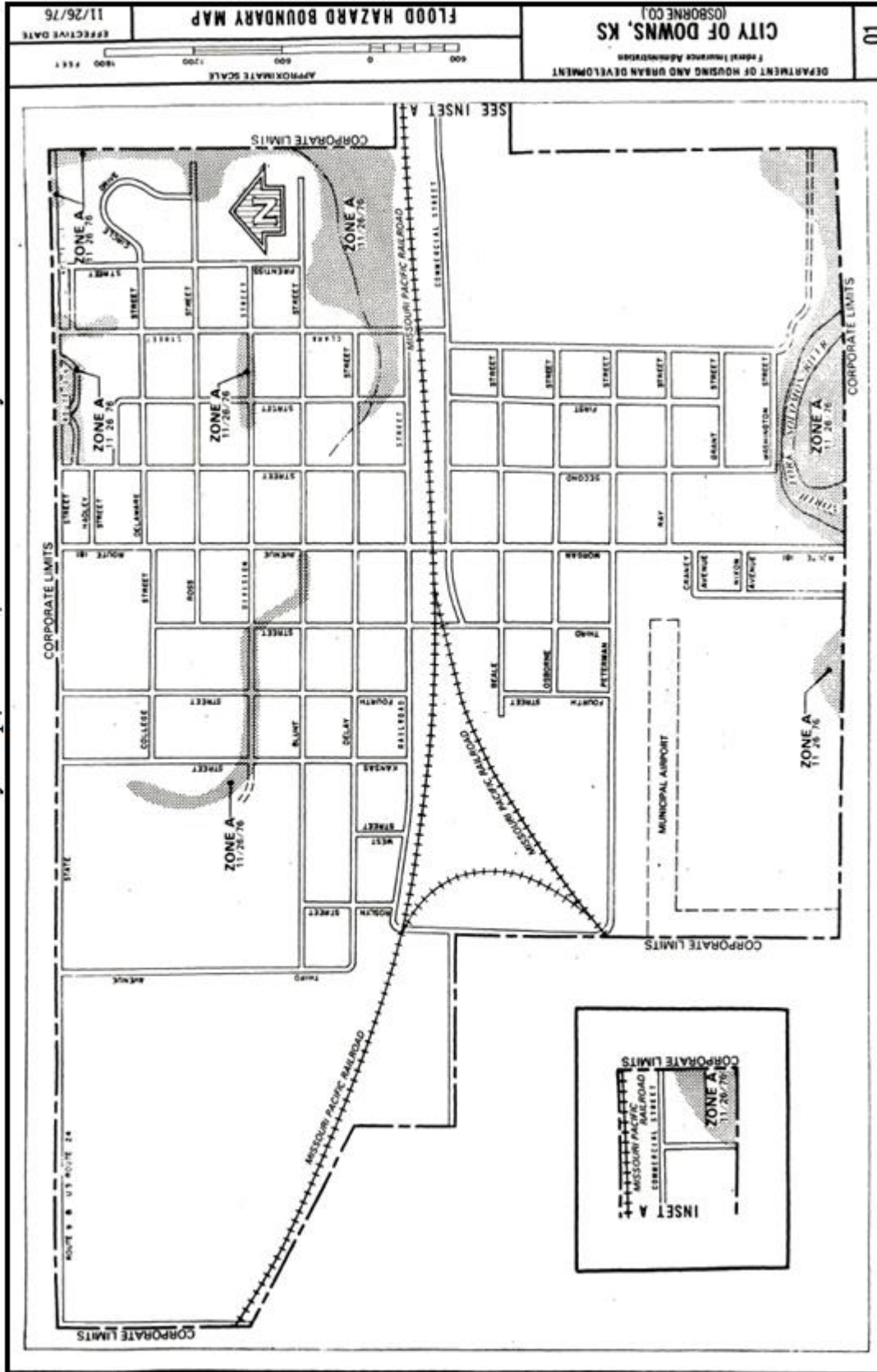
# Flood Hazard Boundary Map, City of Alton, Osborne County





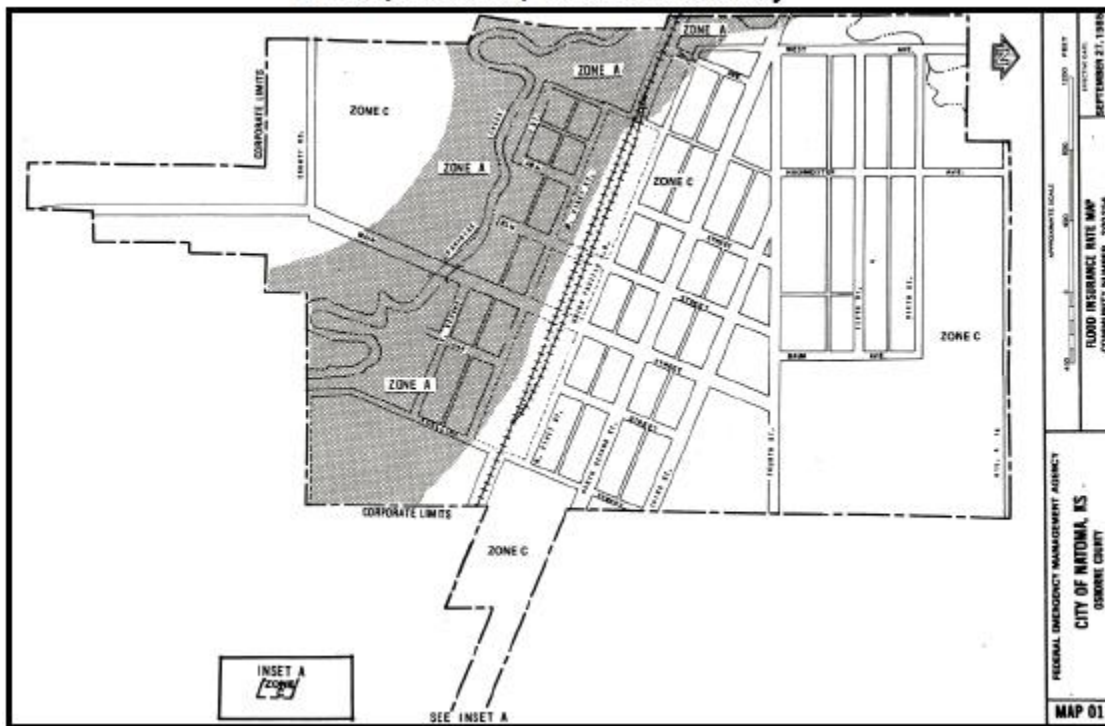


# Flood Hazard Boundary Map, Downs, Osborne County

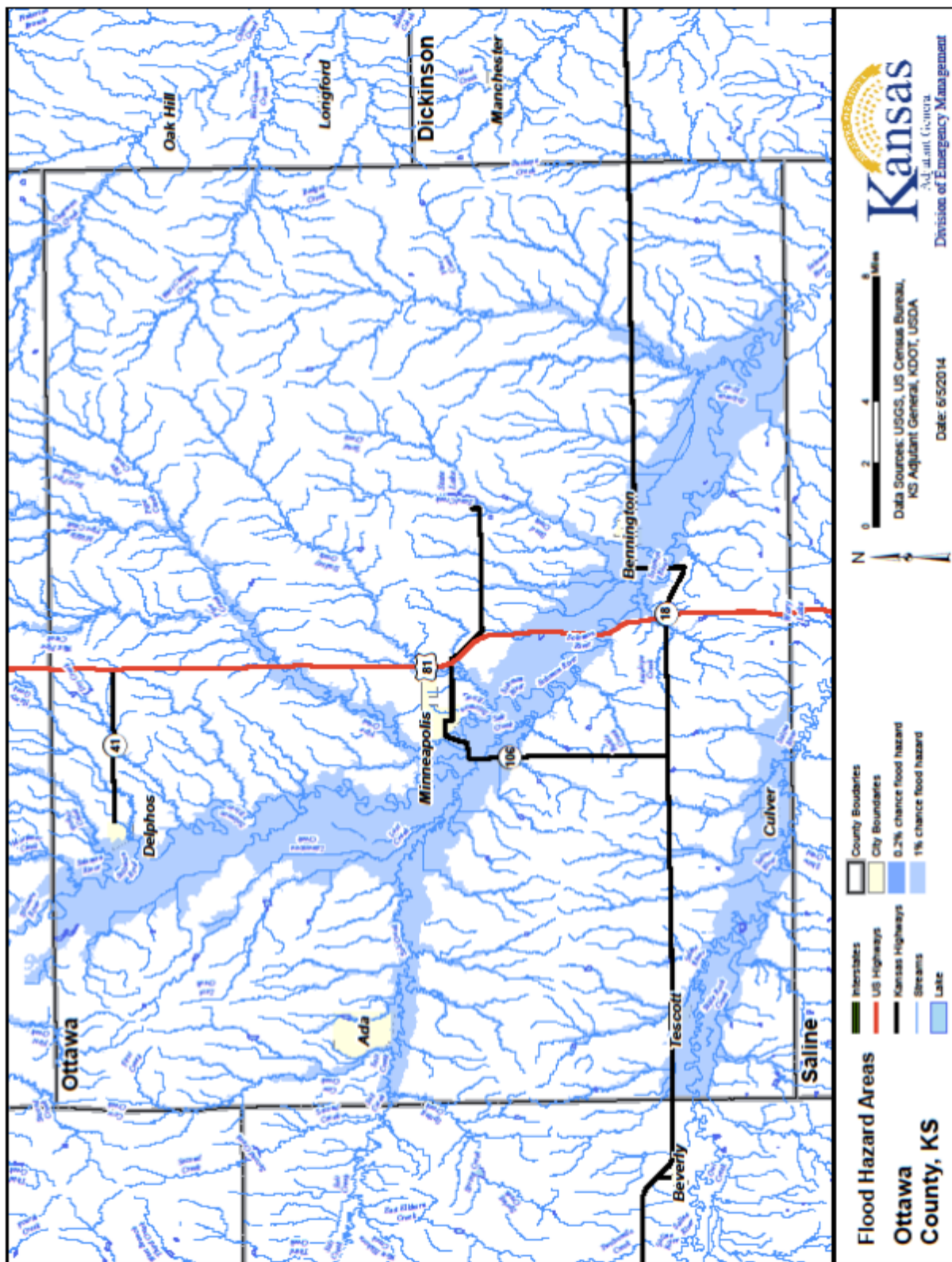




# FIRM, Natoma, Osborne County

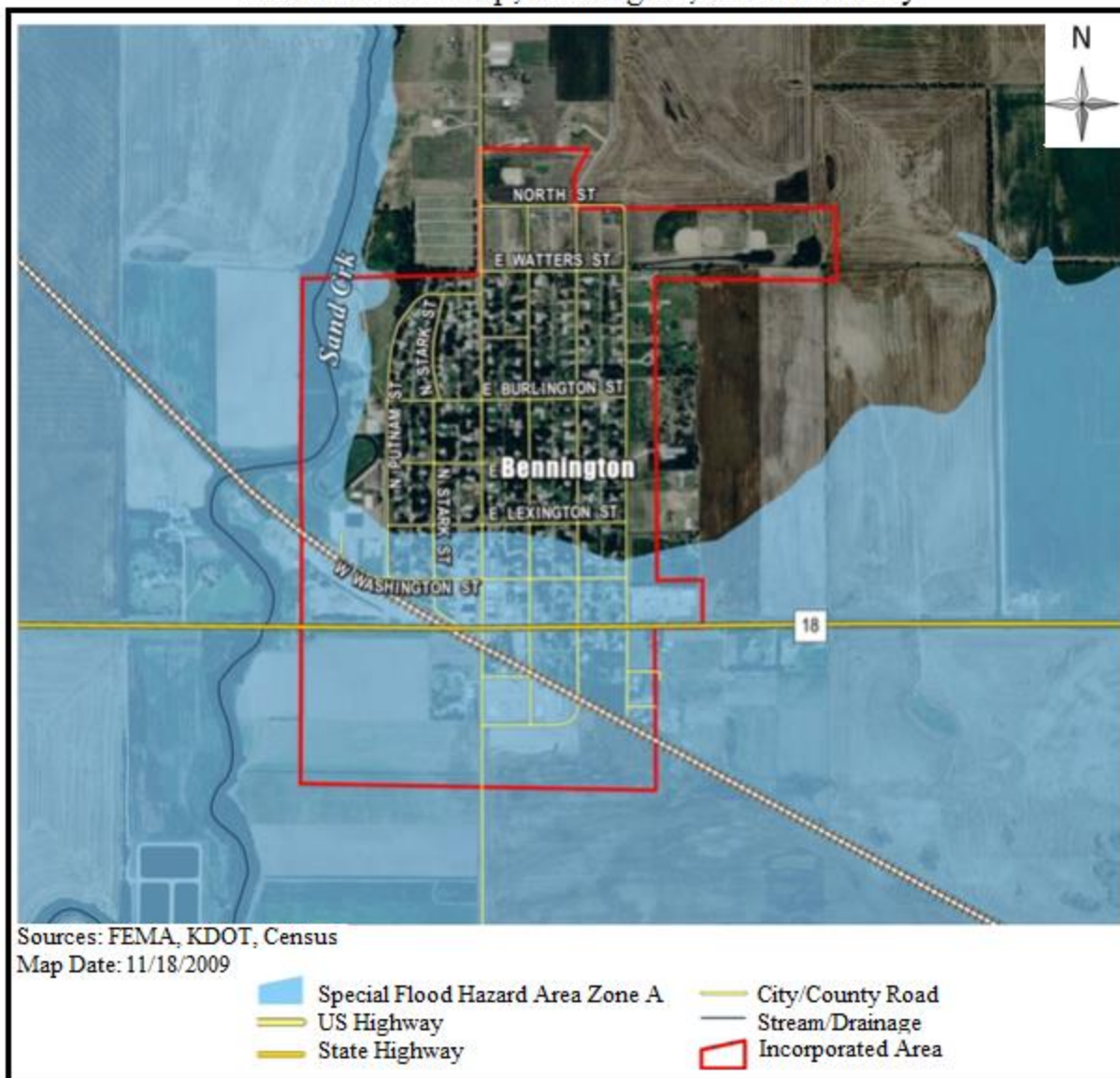






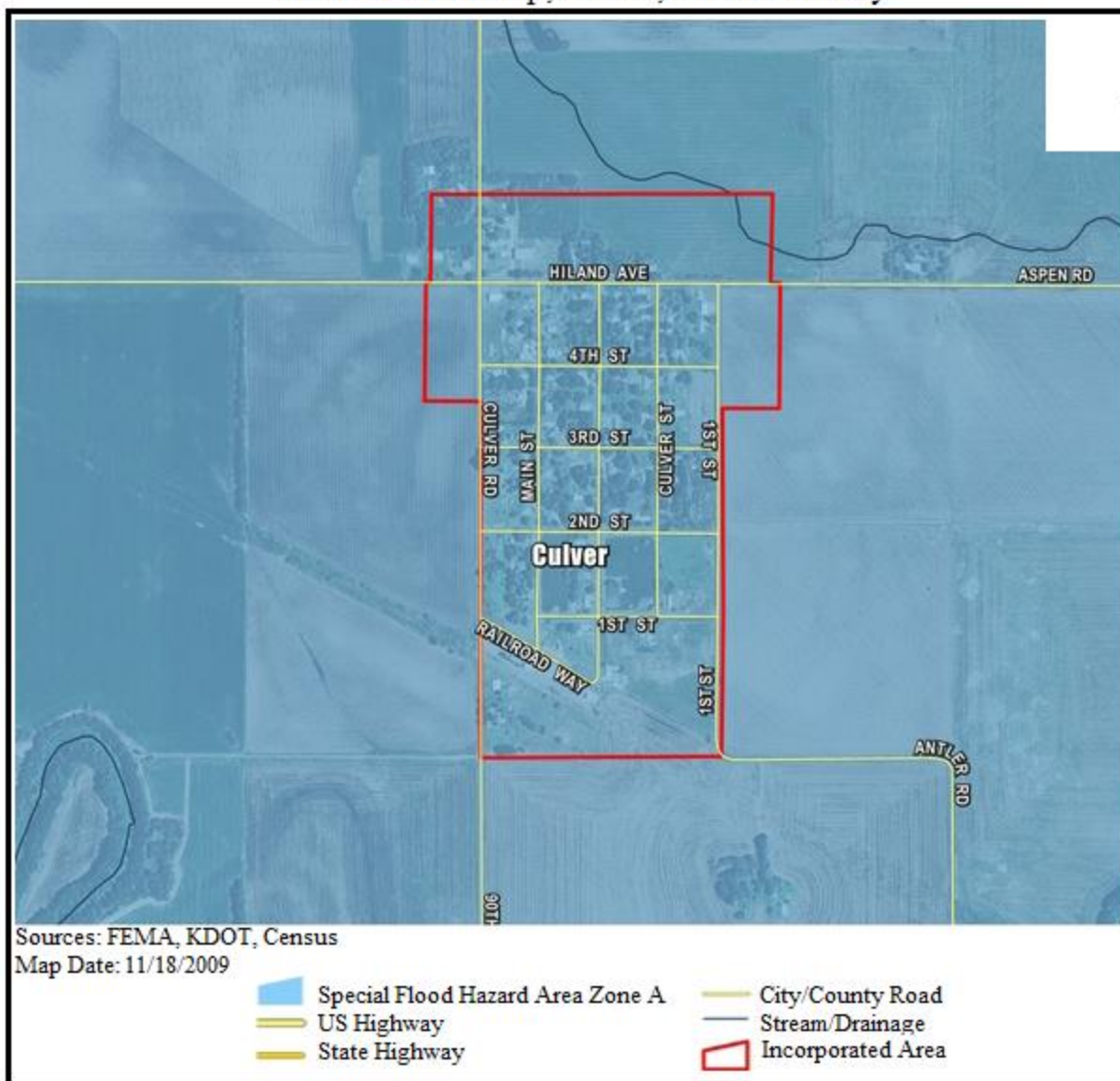


# FEMA SFHA Map, Bennington, Ottawa County





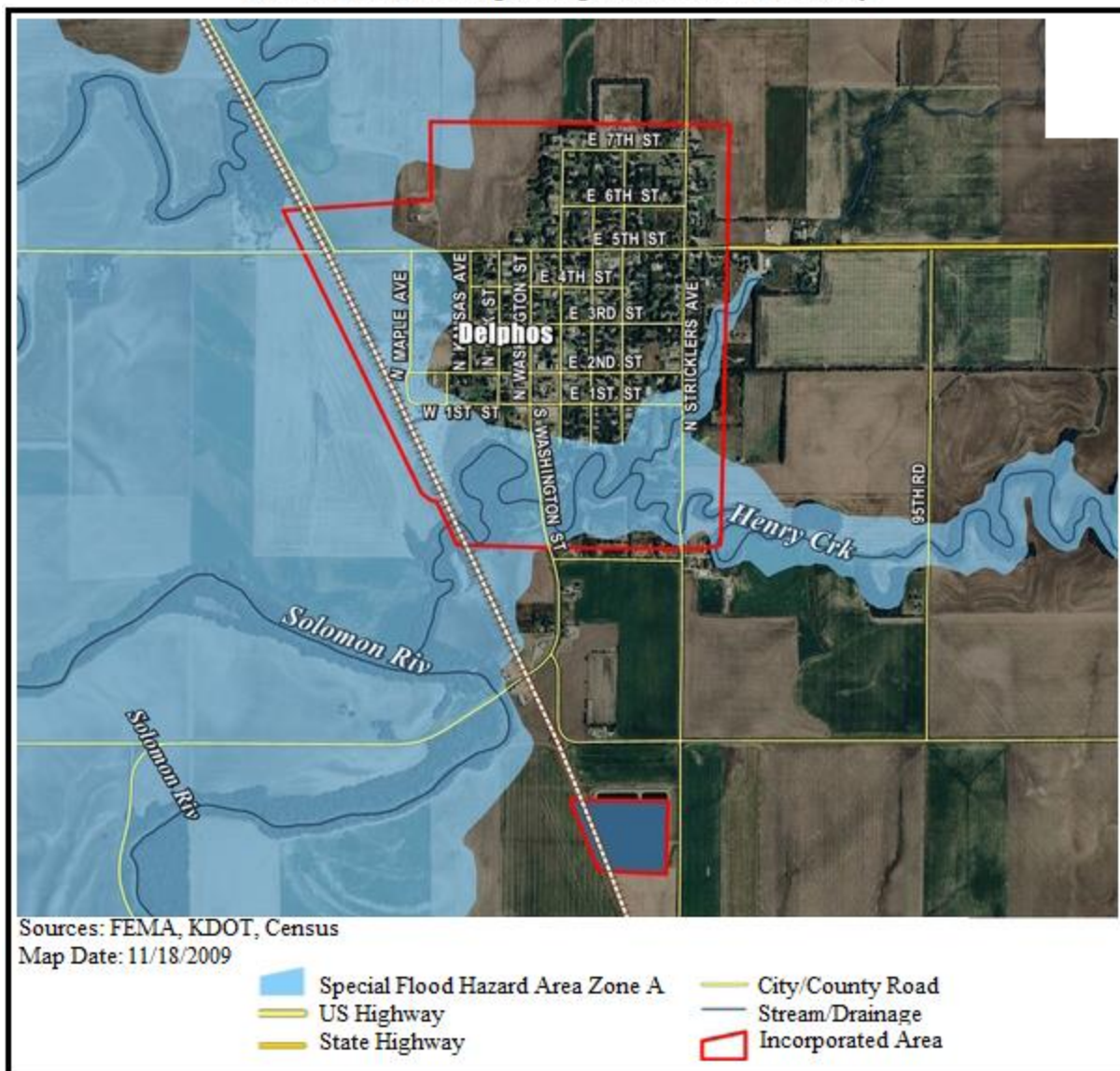
# FEMA SFHA Map, Culver, Ottawa County





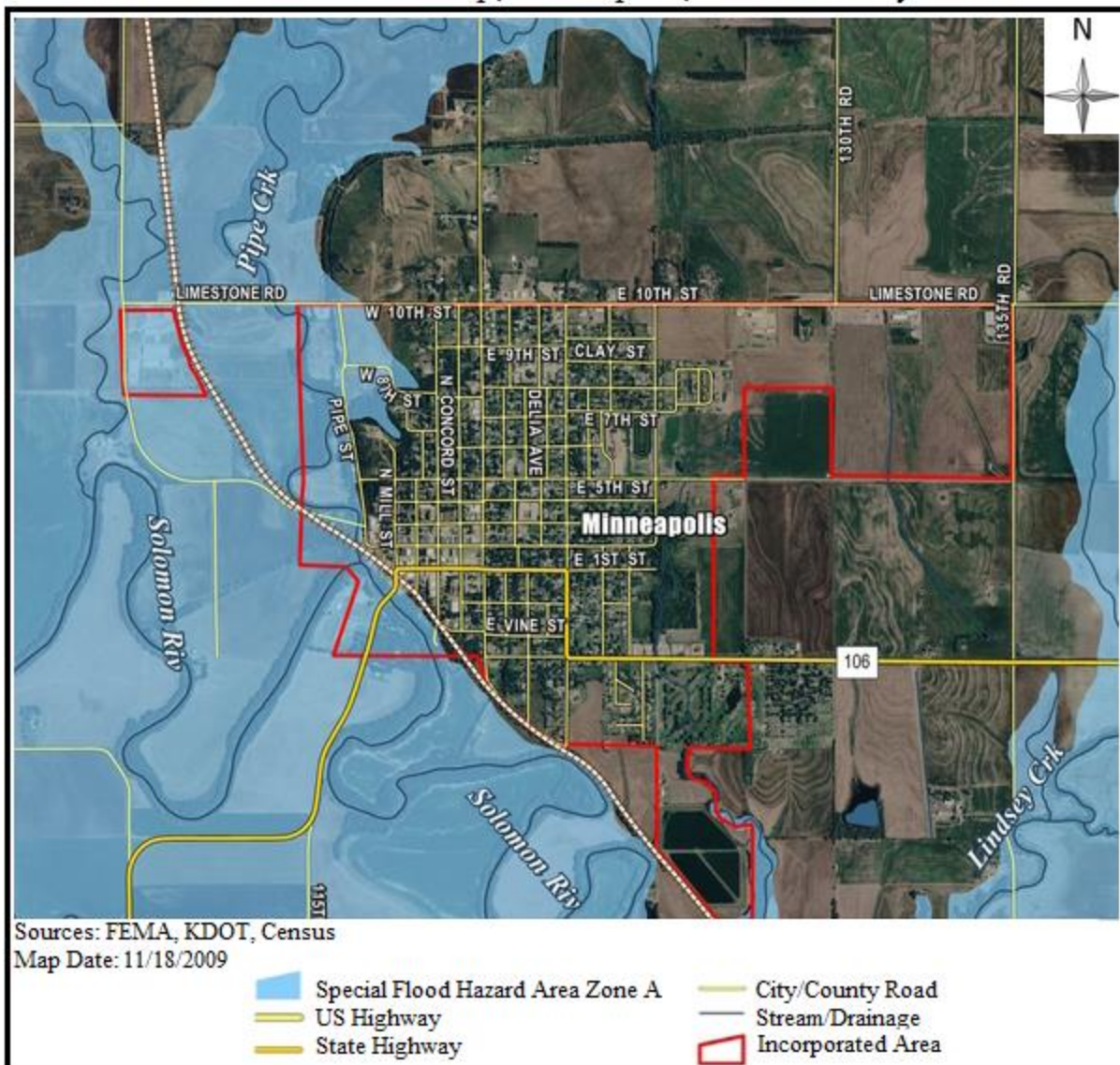


# FEMA SFHA Map, Delphos, Ottawa County





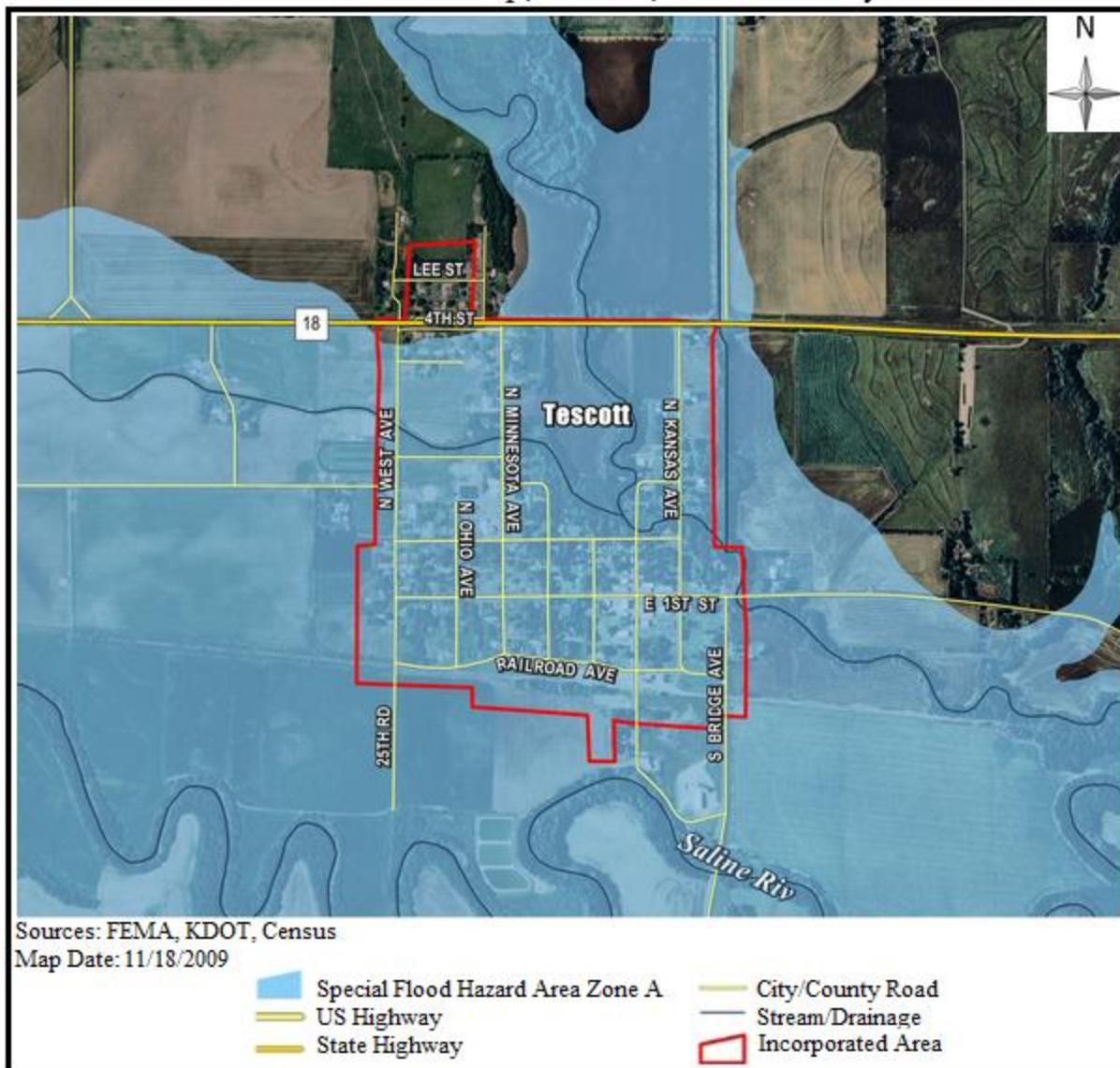
# FEMA SFHA Map, Minneapolis, Ottawa County

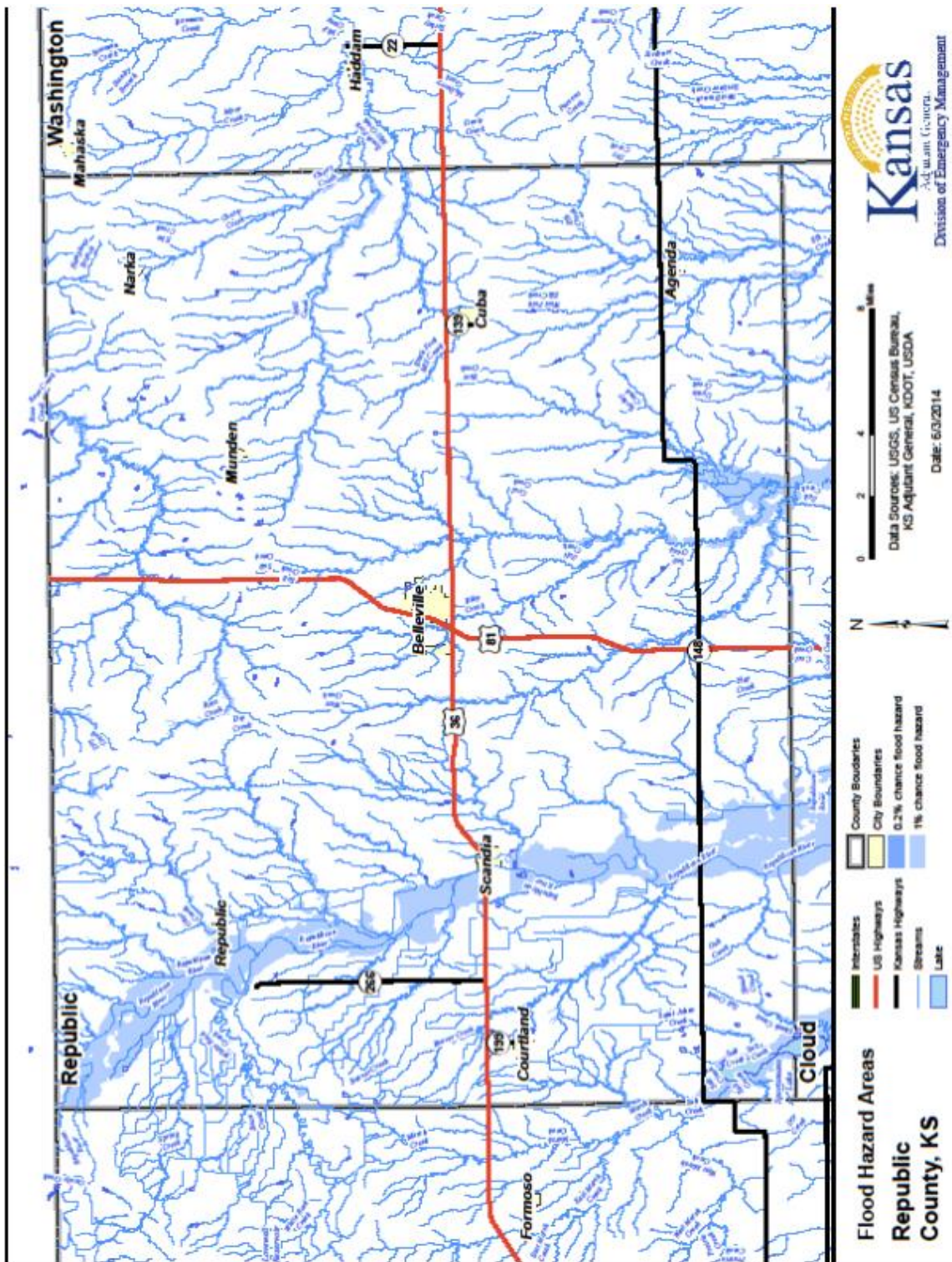






# FEMA SFHA Map, Tescott, Ottawa County

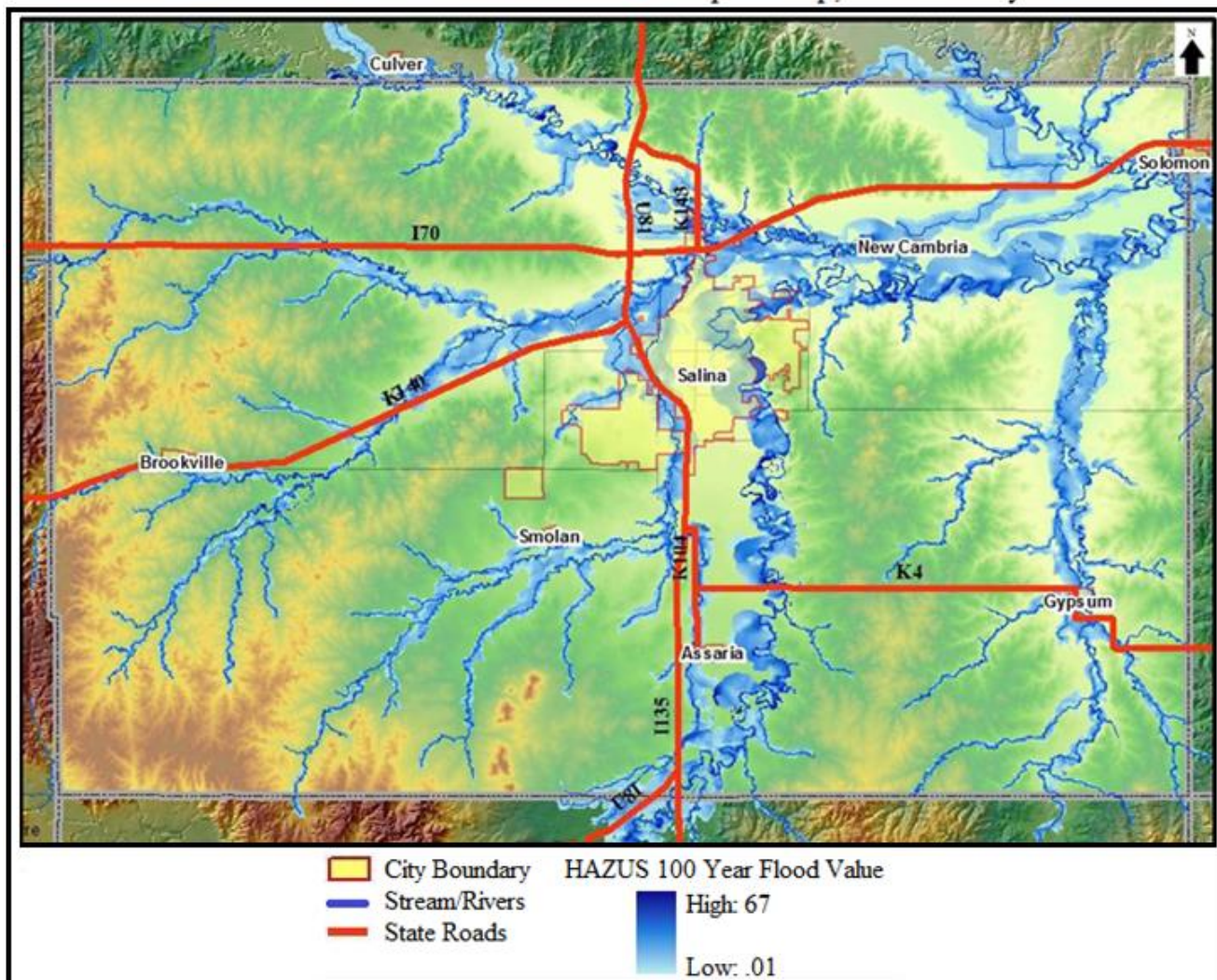






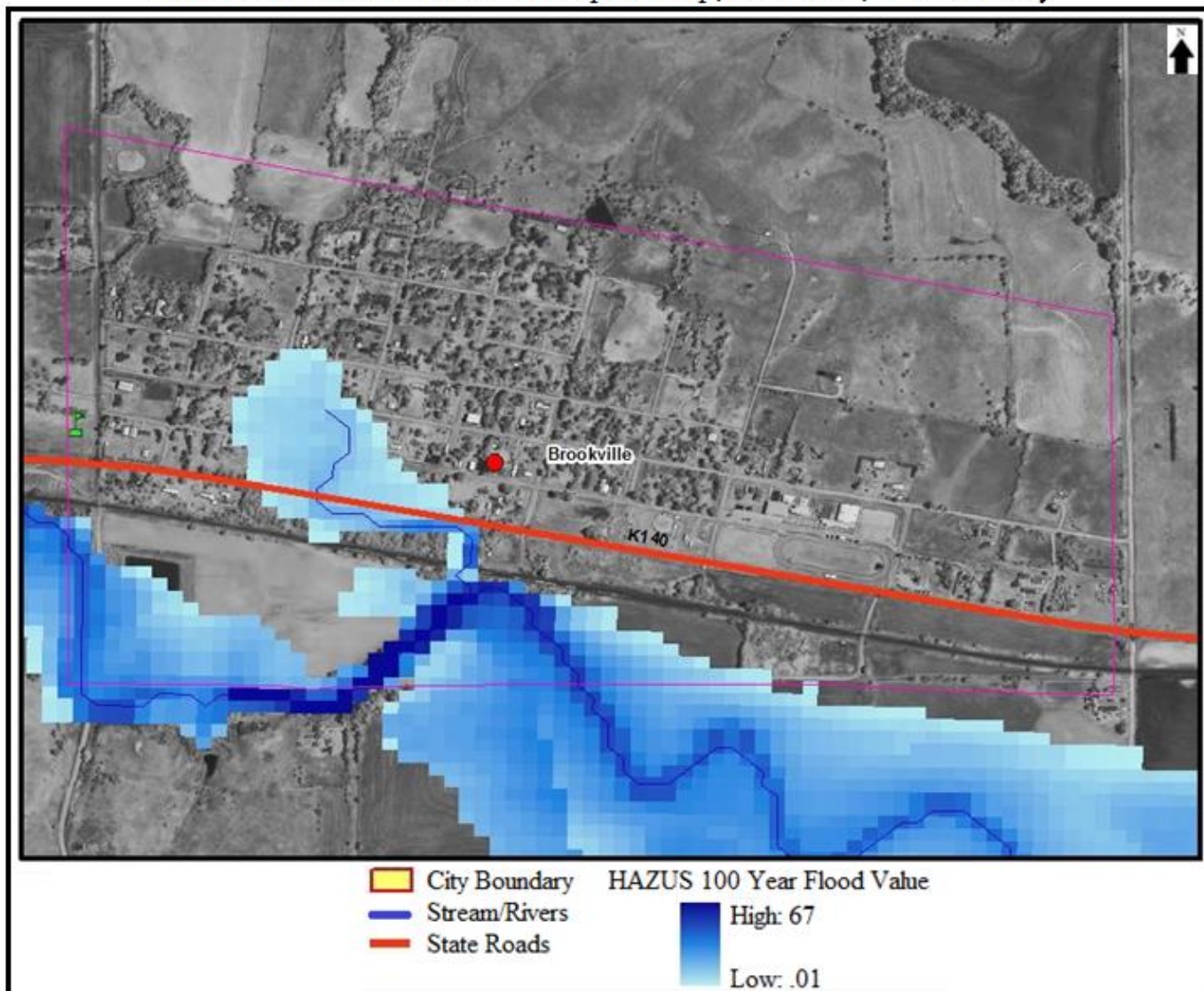


### HAZUS Generated 100 Year Floodplain Map, Saline County





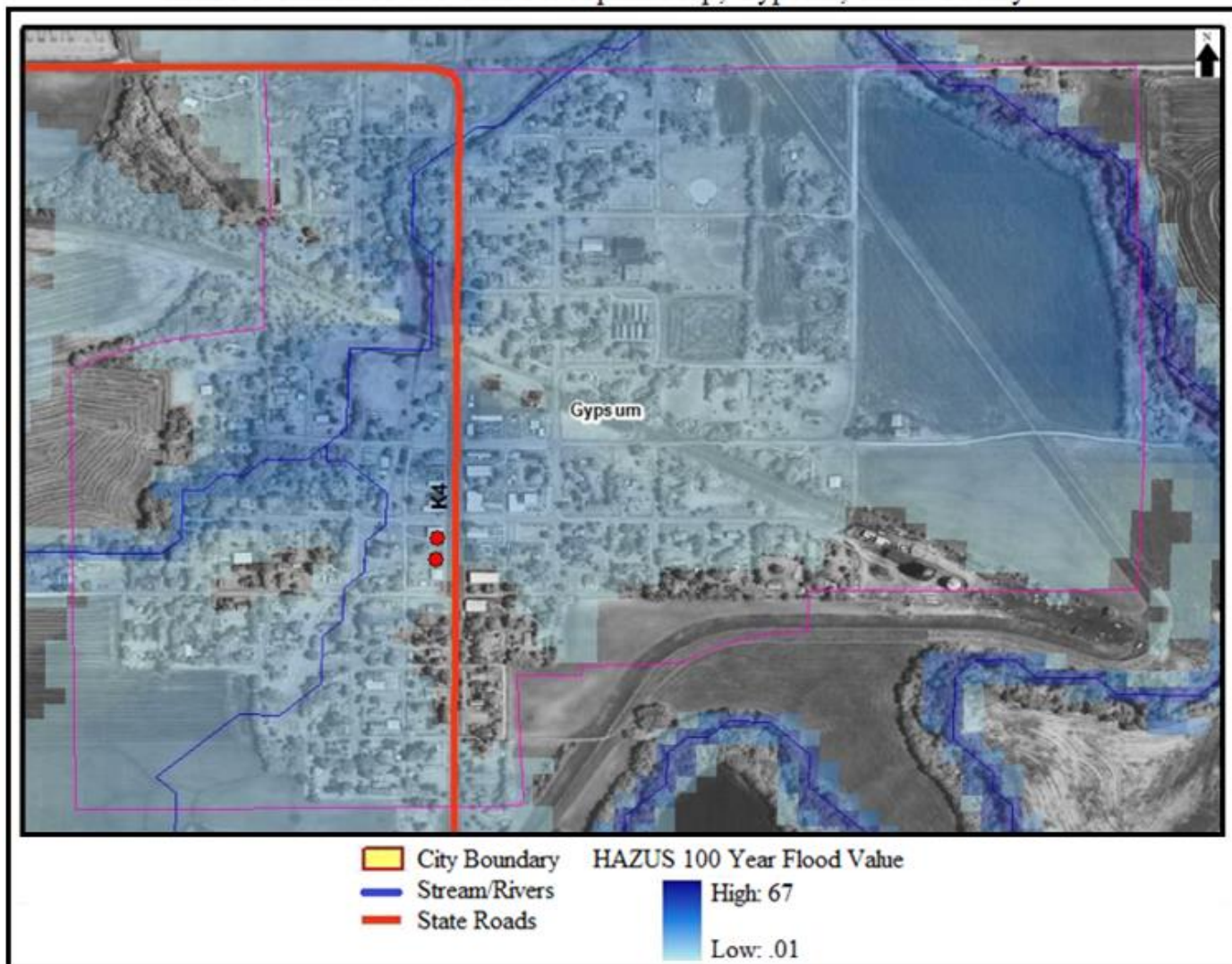
# HAZUS Generated 100 Year Floodplain Map, Brookville, Saline County







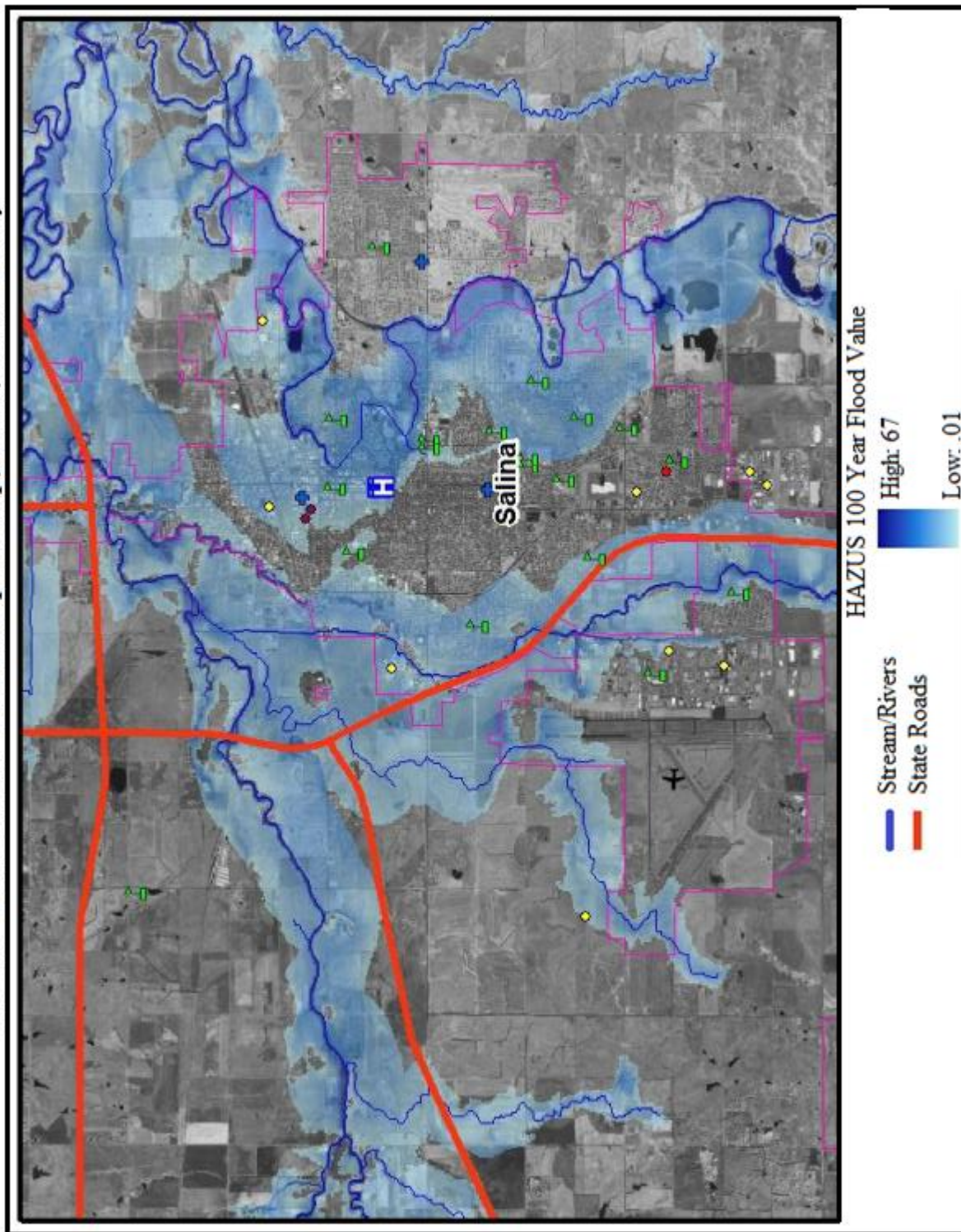
### HAZUS Generated 100 Year Floodplain Map, Gypsum, Saline County





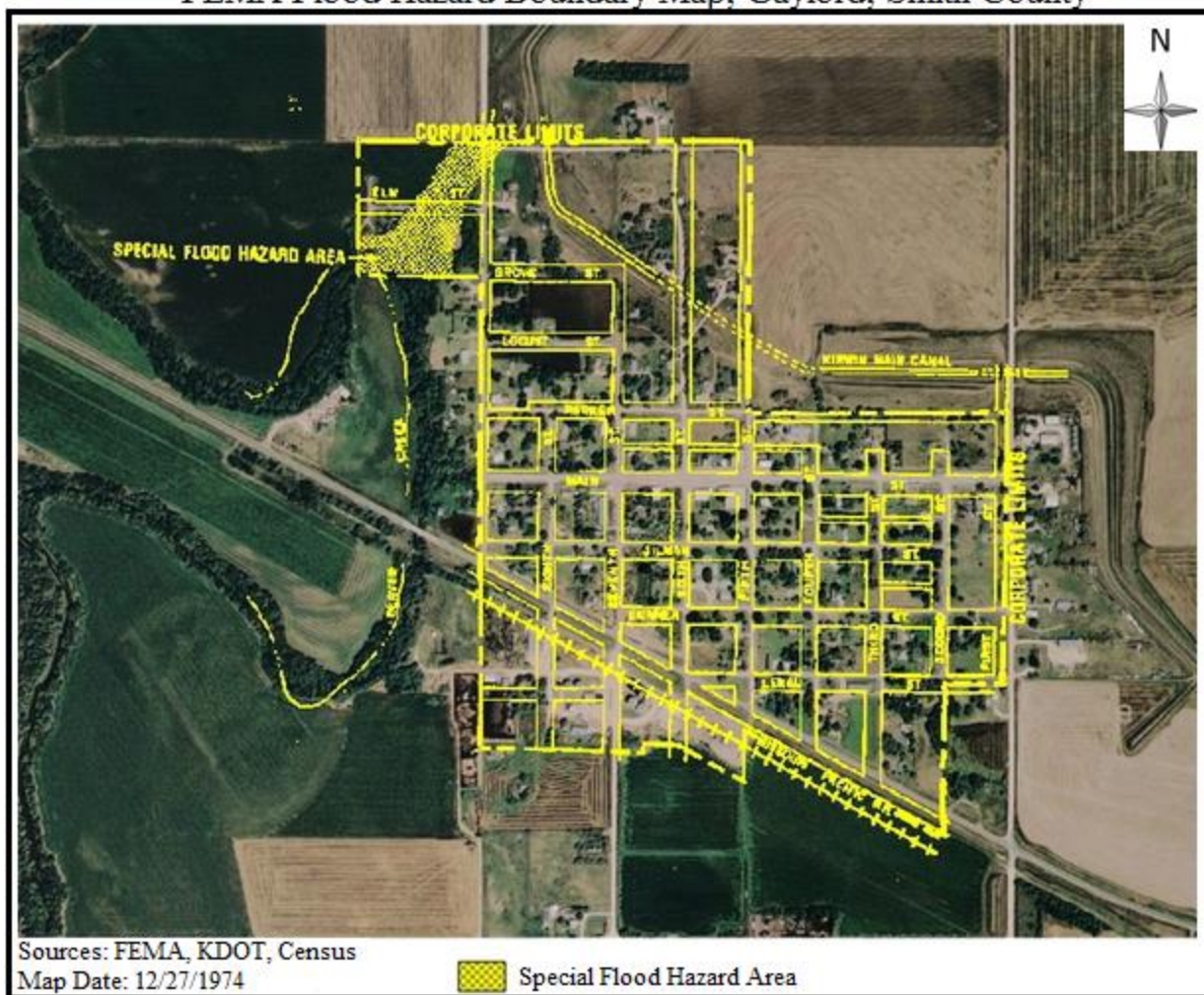


HAZUS Generated 100 Year Floodplain Map, Salina, Saline County





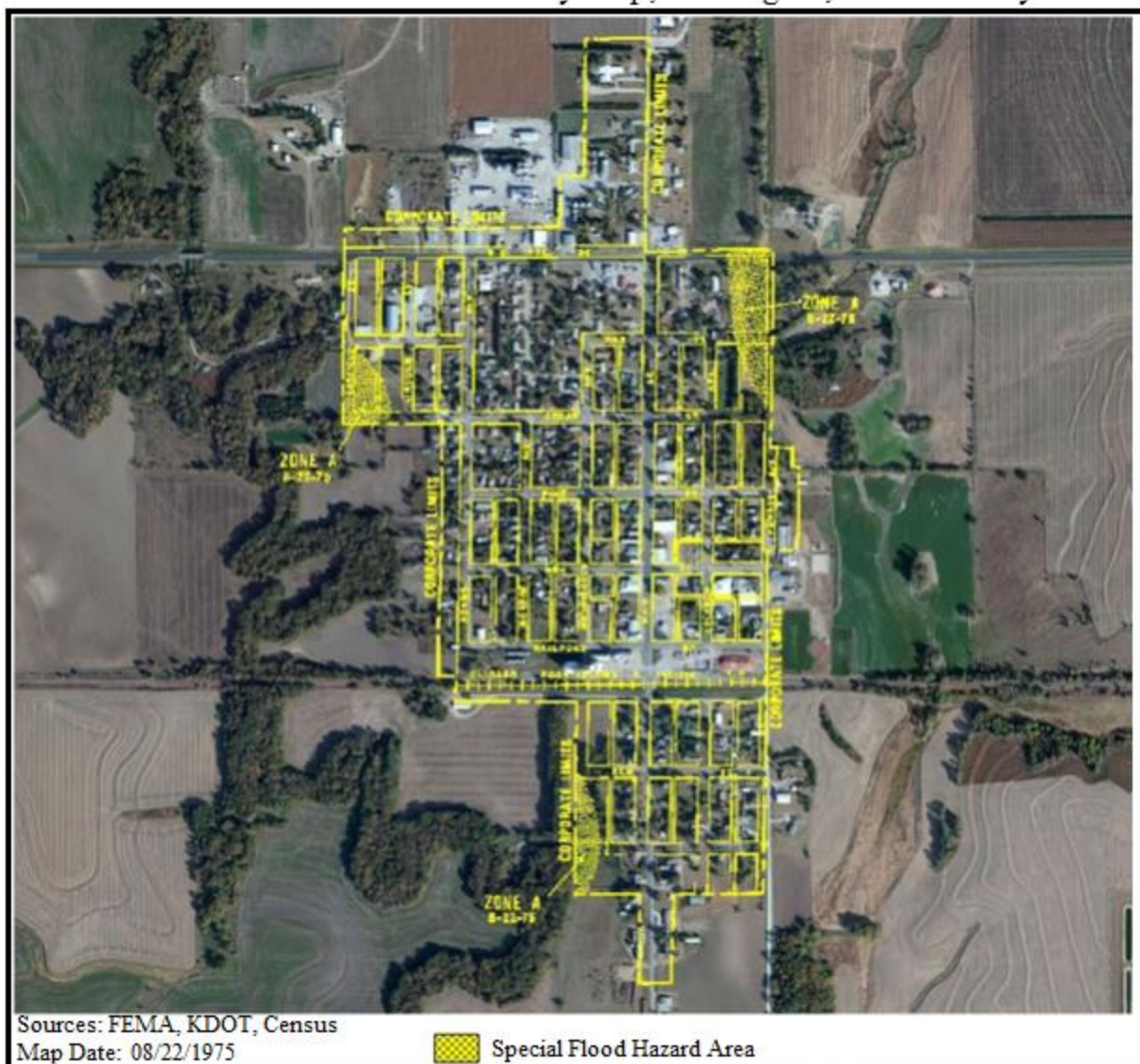
# FEMA Flood Hazard Boundary Map, Gaylord, Smith County







## FEMA Flood Hazard Boundary Map, Kensington, Smith County



### Local Concerns

The following detail specific local concerns as related to flooding:

- In Clay County, Clay Center has a SFHA in the western third of the city that follows a narrow band south along 4th Street for seven blocks. There is a designated SFHA along Dry Creek that stretches northwest from this confluence with Spring Creek to Dry Creek's intersection with the city limits. Huntress Park and the length of Huntress Creek are also designated Zone A. The City of Morganville has three designated SFHAs within the corporate limits of the city. On the extreme western edge, there is a SFHA comprised of a narrow band along the city limits of which the southern half appears to be residential. On the far eastern edge of the city limits there is a





designated SFHA which appears to be in a city park area. The third designated area is in and adjacent to a sewage treatment lagoon area.

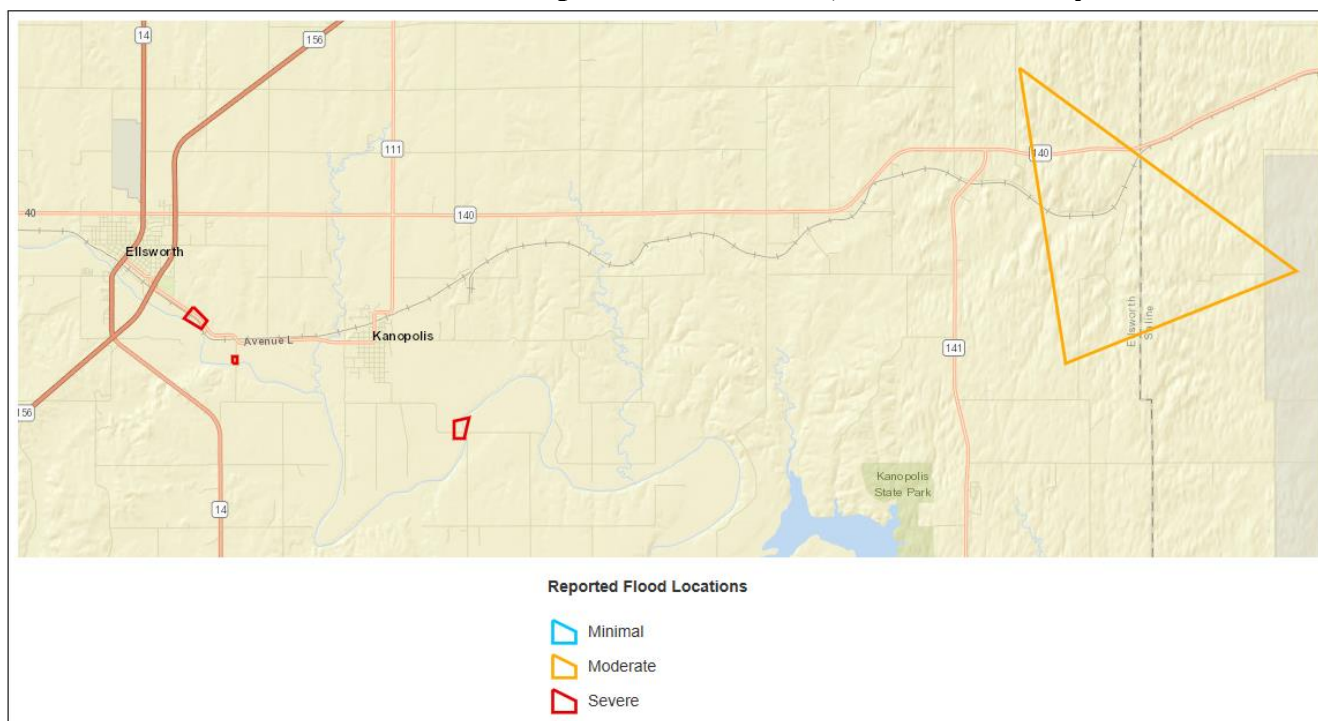
- In Dickinson County, the City of Abilene and the unincorporated areas of the County are at most risk to flood losses. Risk to flood losses was also noted in Chapman, Enterprise, Herington, and Solomon. In Carlton, Hope, Manchester, and Woodbine there is little risk to property. It should be noted that Abilene has levee protection for city.
- In Ellsworth County, the county unincorporated areas and the towns of Holyrood, Kanopolis, Lorraine, and Wilson all have little flood history. The City of Ellsworth has some businesses, critical facilities, elderly, and low income families located in the hazard area. The types of residential structures include brick and mortar, wood, and modular homes.
- In Mitchell County, the City of Hunter is located along Bacon Creek and includes two areas that are included in the SFHA Flood Hazard Area Zone A. The areas are located on the southwest side of the railroad tracks along Spillman Creek, and a tributary of Bacon Creek that flows through the eastern portion of the town.
- In Osborne County, the city of Natoma waste water treatment facility is located in a floodplain.
- In Ottawa County, Bennington has a Zone A SFHA on the west side of the city along Sand Creek that includes the southwestern half of the high school football field and the southern portion of the school grounds. In addition, the city south of Lexington Street is generally encompassed by Zone A SFHA which includes a residential area. The entire city of Culver is within the Saline River floodplain and is designated a Zone A SFHA. Delphos has a Zone A SFHA that lies in a horseshoe-shape to the west, south, and east sides of Delphos within its corporate limits. Minneapolis lies northeast of the Solomon River with a short length of the river cutting inside the corporate limits of the city in the extreme southwest corner of the city. In addition, the very western extremity of the city lies in a Zone A SFHA, including an industrial park. Tescott is situated just north of the Saline River and two smaller tributaries of the river pass through the corporate limits of the city. The great majority of the city is within the Zone A SFHA of the Saline River floodplain.
- In Smith County, the city of Cedar reported that during periods of heavy rain they have had instances of minor road and property flooding due to the overflow of the existing drainage system. The city of Gaylord has a Zone A SFHA located in the northwestern portion of the city, in the area of Beaver Creek and the Kirwin Main Canal that includes developed areas. The city of Kensington has Zone A SFHA located in the northwestern, northeastern, and southwestern portions of the city, including some developed areas.

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





### KDA/Silver Jackets Repeat Flood Location, Ellsworth County



#### 4.13.2 – Previous Occurrences

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

**Table 4.68: Kansas Region F FEMA Flood Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28– 07/12/2019)	Severe Storms, Straight-line Winds, Tornados, <b>Flooding</b> , Landslides, and Mudslides	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$590,356
<b>4417</b>	02/25/2019 (10/04- 10/15/2018)	Severe Storms, Straight-line Winds, And <b>Flooding</b>	Ottawa	\$445,154
<b>4230</b>	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, Tornados, Straight-line Winds, and <b>Flooding</b>	Clay, Cloud, Doniphan, Ellsworth, Jewell, and Republic	\$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	Severe Storms, Straight-line Winds, Tornados, and <b>Flooding</b>	Clay, Cloud, Dickinson, Ellsworth, Ottawa, Republic, and Saline	\$11,412,827







**Table 4.68: Kansas Region F FEMA Flood Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4063	05/24/2012 (4/14-4/15/2012)	Severe Storms, Tornadoes, Straight-line Winds and <b>Flooding</b>	Ellsworth, Jewell, Mitchell, and Osborne	\$6,923,919
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, Straight-line Winds, Tornadoes and <b>Flooding</b>	Clay, Cloud, Jewell, Lincoln, Mitchell, Morton, Osborne, Ottawa, Republic, and Smith	\$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	Severe Storms, <b>Flooding</b> and Tornadoes	Clay, Cloud, Jewell, Mitchell, Osborne, Republic, and Smith	\$9,279,257
1776	07/09/2008	Severe Storms, <b>Flooding</b> , and Tornadoes	Clay, Dickinson, Ellsworth, Franklin, Jewell, Osborne, Republic, Saline, Seward, and Smith	\$70,629,544
1699	5/6/2007 (5/4/2007)	Severe Storms, Tornadoes, and <b>Flooding</b>	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$117,565,269
1535	8/3/2004 (6/12-7/25/2004)	Severe Storms, <b>Flooding</b> , and Tornadoes	Jewell, Mitchell, Osborne, and Smith	\$12,845,892

Source: FEMA

-: Data unavailable

The following provides details concerning Presidential Disaster Declarations DR 4230 for Kansas Region F. FEMA summary writeups concerning declarations DR-4449 and DR-4417 were unavailable.

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

**FEMA-4230-DR**

Declared July 20, 2015

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

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





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

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

**Table 4.69: Kansas Region F NCEI Flood and Flash Flood Events, 2009 - 2018**

County	Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Clay	Flood	2	\$0	0	0
	Flash Flood	6	\$0	0	0
Cloud	Flood	2	\$0	0	0
	Flash Flood	2	\$0	0	0
Dickinson	Flood	4	\$0	0	0
	Flash Flood	8	\$1,000	0	0
Ellsworth	Flood	7	\$500	0	0
	Flash Flood	2	\$200	0	0
Jewell	Flood	3	\$130,000	0	0
	Flash Flood	2	\$280,000	0	0
Lincoln	Flood	8	\$10,200	0	0
	Flash Flood	3	\$0	0	0
Mitchell	Flood	2	\$65,000	0	0
	Flash Flood	4	\$65,000	0	0
Osborne	Flood	5	\$1,015,000	0	0
	Flash Flood	4	\$50,000	0	0
Ottawa	Flood	3	\$0	0	0
	Flash Flood	7	\$0	0	0
Republic	Flood	0	\$0	0	0
	Flash Flood	7	\$2,000	0	0
Saline	Flood	13	\$20,500	0	0
	Flash Flood	1	\$100,000	0	0
Smith	Flood	4	\$1,045,000	0	0
	Flash Flood	2	\$115,000	0	0

Source: FEMA

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

- May 1, 2018: Asherville, Mitchell County**  
Ground-truth rainfall of 3 to 6 inches were recorded, though radar estimates in some locations were at least a few inches higher. The main impact from this heavy rain was water running over multiple county roads. Property damage was recorded at \$30,000.
- June 5, 2015: Salina, Saline County**  
Law enforcement reported water over several roads across town. Rainfall amounts ranged from 2 to 4 inches. Property damage was recorded at \$100,000.





- May 6, 2015: Burr Oak, Ellsworth County**  
 A swath of 5 to 9 inches of rain, with locally higher amounts, was reported across an area stretching from west-central to north-northeastern portions of the county. The Republican River along the northern edge of the county flooded, and numerous county roads were under water. Property damage was recorded at \$250,000.
- June 4, 2011: Osborne County**  
 Heavy rain in excess of 4 inches caused flooding in northeast Osborne County along the North Fork of the Solomon River, the Twelve-mile Creek and the Oak Creek. Property damage was recorded at \$1,000,000.
- June 2, 2011: Lebanon, Smith County**  
 Heavy rain in excess of 4 inches cause widespread flooding in southeast Smith County. The worst flood conditions were felt along the Oak Creek near Dispatch and its upstream tributaries. Property damage was recorded at \$1,000,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of flooding on the region’s agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 264 flooding related claims on 35,565 acres for \$3,373,584.

**Table 4.70: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Flooding**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	66	12,058	\$1,514,073
Cloud	37	4,254	\$342,918
Dickinson	13	1,225	\$56,899
Ellsworth	4	740	\$24,161
Jewell	23	1,841	\$247,568
Lincoln	15	5,850	\$431,229
Mitchell	12	608	\$53,103
Osborne	20	920	\$52,121
Ottawa	27	5,814	\$493,136
Republic	15	608	\$60,864
Saline	20	1,165	\$57,752
Smith	12	482	\$39,760

Source: USDA Farm Service Agency

### 4.13.3 – Hazard Probability Analysis

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





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

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

Source: NCEI

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

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

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

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

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

Source: NCEI

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

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

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	66
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	12,058
Average Number of Acres Damaged per Year	1,206
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,514,073
Average Crop Damage per Year	\$151,407

Source: USDA





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

- Seven insurance claims
- 1,206 acres impacted
- \$151,407 in insurance claims

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

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

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

Source: NCEI

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

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

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

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

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

Source: NCEI

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

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







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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	37
Average Number of Claims per Year	4
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	4,254
Average Number of Acres Damaged per Year	425
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$342,918
Average Crop Damage per Year	\$34,292

Source: USDA

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

- Four insurance claims
- 425 acres impacted
- \$34,292 in insurance claims

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

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

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	4
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$40

Source: NCEI

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

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

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

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

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





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

Data	Recorded Impact
Average Property Damage per Year	\$100

Source: NCEI

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

- One event
- No deaths or injuries
- \$100 in property damages

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	13
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,225
Average Number of Acres Damaged per Year	123
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$56,899
Average Crop Damage per Year	\$5,690

Source: USDA

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

- One insurance claim
- 123 acres impacted
- \$5,690 in insurance claims

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

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

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	7
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$500
Average Property Damage per Year	\$50

Source: NCEI

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

- One event





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

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

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

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	2
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$200
Average Property Damage per Year	\$20

Source: NCEI

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

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

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

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

<b>Data</b>	<b>Recorded Impact</b>
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	4
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	740
Average Number of Acres Damaged per Year	74
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$24,161
Average Crop Damage per Year	\$2,416

Source: USDA

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

- <1 insurance claim
- 74 acres impacted
- \$2,416 in insurance claims

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





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

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$130,000
Average Property Damage per Year	\$13,000

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$13,000 in property damages

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

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

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	2
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$280,000
Average Property Damage per Year	\$28,000

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$28,000 in property damages

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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	23
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,841
Average Number of Acres Damaged per Year	184
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$247,568
Average Crop Damage per Year	\$24,757

Source: USDA





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

- Two insurance claims
- 184 acres impacted
- \$24,757 in insurance claims

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

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

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	8
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$10,200
Average Property Damage per Year	\$1,020

Source: NCEI

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

- One event
- No deaths or injuries
- \$1,020 in property damages

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

**Table 4.87: Lincoln County Flash 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
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0

Source: NCEI

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

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







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

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

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	15
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	5,850
Average Number of Acres Damaged per Year	585
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$431,229
Average Crop Damage per Year	\$43,123

Source: USDA

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

- Two insurance claims
- 585 acres impacted
- \$43,123 in insurance claims

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

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

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	2
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$65,000
Average Property Damage per Year	\$6,500

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$6,500 in property damages

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

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

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	4
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0





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

Data	Recorded Impact
Total Reported NCEI Property Damage (2009-2018)	\$65,000
Average Property Damage per Year	\$6,500

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$6,500 in property damages

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

Source: USDA

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

- One insurance claim
- 61 acres impacted
- \$5,310 in insurance claims

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

**Table 4.91: Osborne County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	5
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$1,015,000
Average Property Damage per Year	\$101,500

Source: NCEI

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

- One event
- No deaths or injuries
- \$101,500 in property damages

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





**Table 4.92: Osborne County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	4
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$50,000
Average Property Damage per Year	\$5,000

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$5,000 in property damages

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

**Table 4.93: Osborne County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	20
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	920
Average Number of Acres Damaged per Year	92
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$52,121
Average Crop Damage per Year	\$5,212

Source: USDA

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

- Two insurance claims
- 92 acres impacted
- \$5,212 in insurance claims

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

**Table 4.94: Ottawa County Riverine Flood Probability Summary**

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





Source: NCEI

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

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

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

**Table 4.95: Ottawa County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	7
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0

Source: NCEI

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

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

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

**Table 4.96: Ottawa County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	27
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	5,814
Average Number of Acres Damaged per Year	581
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$493,136
Average Crop Damage per Year	\$49,314

Source: USDA

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

- Three insurance claim
- 581 acres impacted
- \$49,314 in insurance claims





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

**Table 4.97: Republic County Riverine Flood Probability Summary**

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

Source: NCEI

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

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

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

**Table 4.98: Republic County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	7
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$2,000
Average Property Damage per Year	\$200

Source: NCEI

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

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

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

**Table 4.99: Republic County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	15
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	608







**Table 4.99: Republic County Flooding Agricultural Probability Summary**

Data	Recorded Impact
Average Number of Acres Damaged per Year	61
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$60,864
Average Crop Damage per Year	\$6,086

Source: USDA

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

- Two insurance claims
- 61 acres impacted
- \$6,086 in insurance claims

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

**Table 4.100: Saline County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	13
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$20,500
Average Property Damage per Year	\$2,050

Source: NCEI

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

- One event
- No deaths or injuries
- \$2,050 in property damages

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

**Table 4.101: Saline County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	1
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$100,000
Average Property Damage per Year	\$10,000

Source: NCEI

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





- <1 event
- No deaths or injuries
- \$10,000 in property damages

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

**Table 4.102: Saline County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	20
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,165
Average Number of Acres Damaged per Year	117
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$57,752
Average Crop Damage per Year	\$5,775

Source: USDA

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

- Two insurance claims
- 117 acres impacted
- \$5,775 in insurance claims

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

**Table 4.103: Smith County Riverine Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	4
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$1,045,000
Average Property Damage per Year	\$104,500

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$104,500 in property damages

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





**Table 4.104: Smith County Flash Flood Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	2
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Days with a Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$115,000
Average Property Damage per Year	\$11,500

Source: NCEI

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

- <1 event
- No deaths or injuries
- \$11,500 in property damages

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

**Table 4.105: Smith County Flooding Agricultural Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	12
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	482
Average Number of Acres Damaged per Year	48
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$39,760
Average Crop Damage per Year	\$3,976

Source: USDA

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

- One insurance claim
- 48 acres impacted
- \$3,976 in insurance claims

In addition, Kansas Region F has had 10 Presidentially Declared Disasters relating to flooding (and other causes) in the last 20 years. This represents an average of one declared flood disaster every year.

#### 4.13.4 – Vulnerability Analysis

The results of the HAZUS analysis were utilized to estimate potential losses for riverine flooding. The intent of this analysis was to enable Kansas Region F to estimate where flood losses could occur and the degree of severity using a consistent methodology. The HAZUS model helps quantify risk along known flood-hazard corridors as well as lesser streams and rivers that have a drainage area of 10 square miles or more.





HAZUS determines the displaced population based on the inundation area, not necessarily impacted buildings. As a result, there may be population vulnerable to displacement even if the structure is not vulnerable to damage. Individuals and households will be displaced from their homes even when the home has suffered little or no damage either because they were evacuated or there was no physical access to the property because of flooded roadways.

Flood sheltering needs are based on the displaced population, not the damage level of the structure. HAZUS determines the number of individuals likely to use government-provided short-term shelters through determining the number of displaced households as a result of the flooding. To determine how many of those households and the corresponding number of individuals will seek shelter in government-provided shelters, the number is modified by factors accounting for income and age. Displaced people using shelters will most likely be individuals with lower incomes and those who do not have family or friends within the immediate area. Since the income and age factors are taken into account, the proportion of displaced population and those seeking shelter will vary from county to county.

Additionally, HAZUS takes into account flood depth when modeling damage (based on FEMA’s depth-damage functions). Generated reports capture damage by occupancy class (in terms of square footage impacted) by damage percent classes. Occupancy classes include agriculture, commercial, education, government, industrial, religion, and residential. Damage percent classes are grouped by 10 percent increments up to 50%. Buildings that sustain more than 50% damage are considered to be substantially damaged.

The following table provides the HAZUS results for vulnerable populations and the population estimated to seek short term shelter as well as the numbers of damaged and substantially damaged buildings for each Kansas Region F county.

**Table 4.106: Kansas Region F 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
Clay	238	29	249	8	238
Cloud	279	84	78	37	279
Dickinson	2,133	893	1,252	309	2,133
Ellsworth	93	1	92	5	93
Jewell	108	4	141	6	108
Lincoln	210	18	136	44	210
Mitchell	170	7	78	14	170
Osborne	130	8	102	9	130
Ottawa	561	85	261	64	561
Republic	127	4	128	10	127
Saline	14,607	12,350	9814	3,290	14,607
Smith	44	0	33	1	44

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 4.107: Kansas Region F 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
Clay	\$4,394,000	\$5,352,000	\$314,000	\$10,060,000	\$36,000	\$10,096,000
Cloud	\$2,891,000	\$2,347,000	\$52,000	\$5,290,000	\$33,000	\$5,323,000
Dickinson	\$27,485,000	\$31,641,000	\$1,067,000	\$60,193,000	\$450,000	\$60,643,000
Ellsworth	\$1,829,000	\$2,095,000	\$114,000	\$4,038,000	\$7,000	\$4,045,000
Jewell	\$2,122,000	\$1,414,000	\$18,000	\$3,554,000	\$4,000	\$3,558,000
Lincoln	\$4,931,000	\$2,937,000	\$36,000	\$7,904,000	\$17,000	\$7,921,000
Mitchell	\$3,758,000	\$3,198,000	\$108,000	\$7,064,000	\$19,000	\$7,083,000
Osborne	\$2,918,000	\$3,206,000	\$229,000	\$6,353,000	\$5,000	\$6,358,000
Ottawa	\$6,972,000	\$5,803,000	\$171,000	\$12,946,000	\$163,000	\$13,109,000
Republic	\$2,040,000	\$1,118,000	\$8,000	\$3,166,000	\$1,000	\$3,167,000
Saline	\$209,386,000	\$203,237,000	\$5,663,000	\$418,286,000	\$2,276,000	\$420,562,000

Source: FEMA and HAZUS

The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. USDA Risk Management Agency crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years) allows us to quantify the monetary impact of flood conditions on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to flood events.







**Table 4.108: Flood Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	1,206	0.31%	\$121,175,000	\$151,407	0.12%
Cloud	322,034	425	0.13%	\$77,485,000	\$34,292	0.04%
Dickinson	519,171	123	0.02%	\$149,543,000	\$5,690	0.00%
Ellsworth	390,042	74	0.02%	\$48,318,000	\$2,416	0.01%
Jewell	436,206	184	0.04%	\$149,501,000	\$24,757	0.02%
Lincoln	384,740	585	0.15%	\$58,151,000	\$43,123	0.07%
Mitchell	414,220	61	0.01%	\$126,462,000	\$5,310	0.00%
Osborne	437,083	92	0.02%	\$62,499,000	\$5,212	0.01%
Ottawa	439,335	581	0.13%	\$108,378,000	\$49,314	0.05%
Republic	373,206	61	0.02%	\$187,529,000	\$6,086	0.00%
Saline	358,243	117	0.03%	\$73,581,000	\$5,775	0.01%
Smith	541,742	48	0.01%	\$129,261,000	\$3,976	0.00%

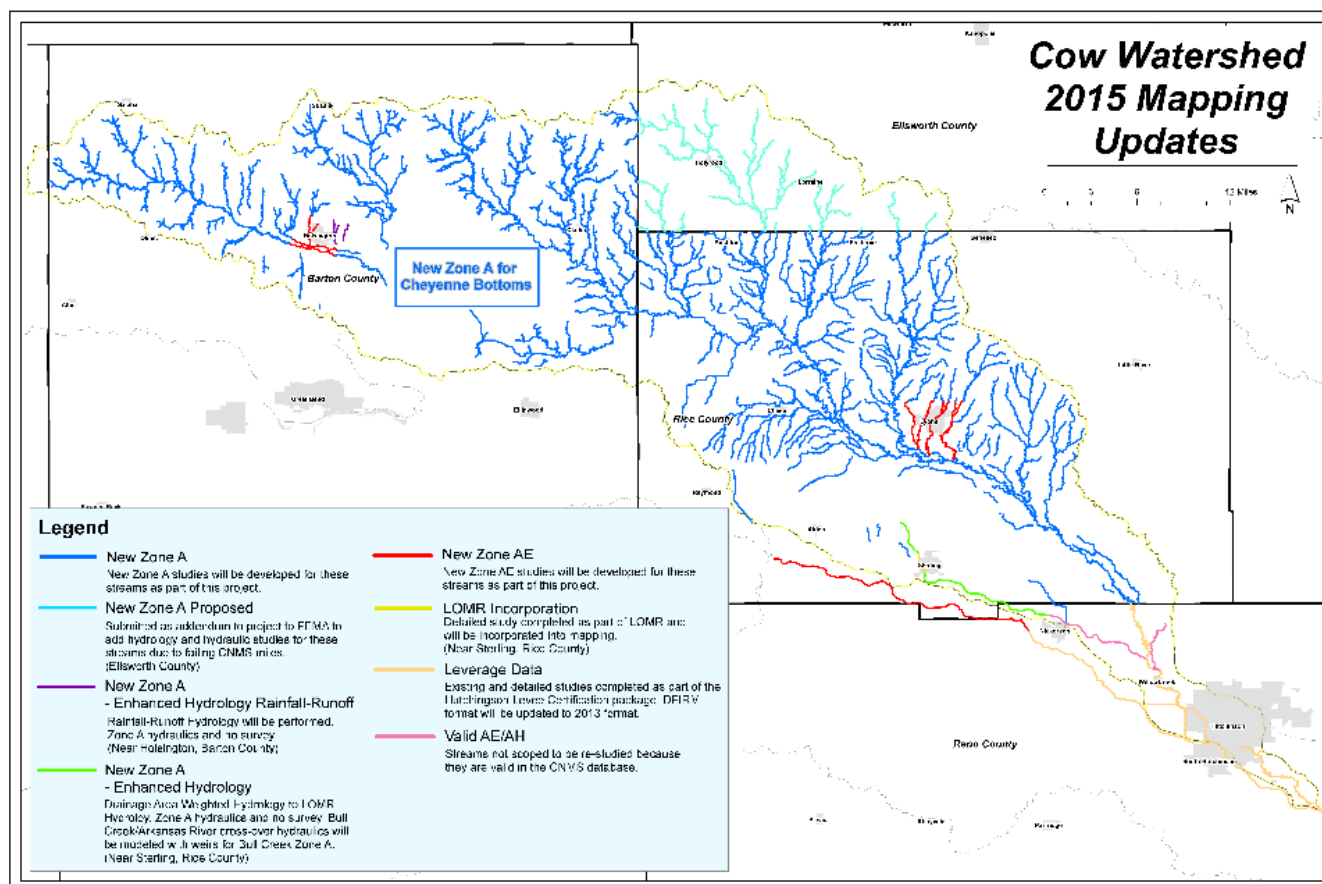
Source: USDA

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.

In 2015, a mapping project was completed on the Cow Watershed (HUC8 11030011), which lies within the Kansas Counties of Barton, Ellsworth, Reno, and Rice. This project consisted of new detailed hydrologic and hydraulic studies using watershed characteristics and detailed topography for 51 stream miles of streams that were modeled by detailed methods resulting in Zone AE floodplains with a floodway, and 912 stream miles of streams that were studied by approximate methods resulting in updated Zone A floodplains. Additional work was performed to enhanced hydrology on approximately 7.0 stream miles of Zone A streams based on a rainfall-runoff model, and to distribute enhanced hydrology on approximately 15.6 stream miles of Bull Creek, a Zone A stream, based on the extrapolation of flows from an effective Letter of Map Revision. In addition, statistical gage analysis was performed for approximately 66.4 stream miles of Cow Creek, which is a Zone A stream. For streams not included in a detailed hydrologic study, approximate Zone A hydrology was performed using localized regression equations, generated from the results of the detailed rainfall-runoff models that were developed for this watershed. The mapping results of this project are presented below.





## Mold

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

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

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

### 4.13.5 – National Flood Insurance Program Communities

The National Flood Insurance Program (NFIP) is a federal program, managed by FEMA, that exists to provide flood insurance for property owners in participating communities, to improve floodplain





management practices, and to develop maps of flood hazard areas. The following table presents the number of NFIP participating communities in each county.

**Table 4.109: Kansas Region F NFIP Communities**

Community	Initial Flood Hazard Boundary Map Identified	Initial Flood Insurance Rate Map Identified	Current Effective Map Date
<b>Clay County</b>			
Clay County	03/29/1974	03/18/1986	03/18/1986(M)
Clay Center	-	09/27/1985	09/27/1985(M)
Morganville	12/20/1974	10/20/1999	10/20/1999
Wakefield	-	05/05/2014	05/05/2014(M)
<b>Cloud County</b>			
Cloud County	08/23/1977	02/01/2008	02/01/2008(L)
Clyde	05/31/1974	08/05/1985	08/05/1985(M)
Concordia	12/21/1973	07/01/1987	07/01/1987(L)
Glasco	06/21/1974	07/01/1987	07/01/1987(L)
Miltonvale	09/12/1975	-	05/07/1976
<b>Dickinson County</b>			
Dickinson County	06/21/1977	12/16/1988	06/02/2004
Abilene	12/28/1973	12/16/1988	12/16/1988
Chapman	12/28/1973	12/16/1988	12/16/1988
Enterprise	04/23/1976	12/16/1988	12/16/1988
Herington	05/01/1974	08/04/1988	08/04/1988
Solomon	12/28/1973	03/01/1979	06/02/2004
<b>Ellsworth County</b>			
Ellsworth County	-	08/18/09	08/18/09
City of Ellsworth	12/28/1974	05/2004/89	08/18/09
Holyrood	02/18/1977	08/18/09	08/18/09
Kanopolis	08/15/1975	04/08/1977	08/18/09(M)
Lorraine	-	08/18/2009	08/18/2009
Wilson	08/08/1975	08/18/2009	08/18/2009
<b>Jewell County</b>			
Burr Oak	11/29/1974	09/27/1985	09/27/1985(M)
Esbon	08/29/1975	-	08/29/1975
City of Jewell	08/22/1975	-	(NSFHA)
Mankato	08/06/1976	-	(NSFHA)
Randall	-	-	(NSFHA)
<b>Lincoln County</b>			
Lincoln County	-	-	01/03/1950
Lincoln Center	03/2008/1974	-	(NSFHA)
Sylvan Grove	03/26/1976	-	(NSFHA)
Lincoln County	-	-	01/03/1950
<b>Mitchell County</b>			
Mitchell County	-	06/15/1988	06/15/1988(M)
Beloit	12/7/1973	09/27/1985	08/19/1986(M)
Glen Elder	12/27/1974	-	12/27/1974





**Table 4.109: Kansas Region F NFIP Communities**

<b>Community</b>	<b>Initial Flood Hazard Boundary Map Identified</b>	<b>Initial Flood Insurance Rate Map Identified</b>	<b>Current Effective Map Date</b>
Hunter	12/13/1974	09/27/1985	09/27/1985(M)
Simpson	01/03/1975	01/01/1987	01/01/1987
<b>Osborne County</b>			
Alton	03/19/1976	-	03/19/1976
Downs	11/26/1976	-	11/26/1976
Natoma	06/28/1974	09/27/85	09/27/1985(M)
City of Osborne	03/15/1974	-	(NSFHA)
Portis	12/27/1974	-	(NSFHA)
<b>Ottawa County</b>			
Ottawa County	-	11/18/2009	11/18/2009(M)
Bennington	03/26/1976	08/01/2009	11/18/2009(M)
Culver	01/03/1975	01/01/1987	11/18/2009(M)
Delphos	08/15/1975	07/01/1988	11/18/2009(M)
Tescott	01/03/1975	06/01/1987	11/18/2009(M)
Minneapolis	08/06/1976	11/18/2009	11/18/2009
<b>Republic County</b>			
Republic County	-	12/17/2010	12/17/2010
Courtland	05/21/1976	12/17/2010	12/17/10(M)
Cuba	07/25/1975	12/17/2010	12/17/2010
City of Republic	12/6/1974	12/17/2010	12/17/2010
Scandia	05/10/1974	07/16/1979	12/17/2010
<b>Saline County</b>			
Saline County	06/28/1977	02/05/1986	02/05/1986
Assaria	08/22/1975	01/04/1985	01/04/1985(M)
Brookville	09/19/1975	01/04/1985	01/04/1985(M)
Gypsum	02/01/1974	11/25/1980	11/25/1980(M)
New Cambria	12/27/1974	12/4/1985	12/4/1985
Salina	05/24/1974	02/05/1986	02/05/1986
<b>Smith County</b>			
Cedar	-	-	-
Gaylord	12/27/1974	-	12/27/1974
Kensington	08/22/1975	-	08/22/1975
Smith Center	06/28/1974	-	(NSFHA)

Notes: NSFHA: No Special Flood Hazard Area - All Zone C

(L): Original FIRM by letter - All Zone A, C and X

(M): No elevation determined - All Zone A, C and X

Additionally, the NFIP's Community Rating System (CRS) incentive rewards communities for the work they do managing their floodplains. Eligible communities that qualify for this voluntary program go above the minimum NFIP requirements and can offer their citizens discounted flood insurance in both Special Flood Hazard Areas (SFHAs) areas or non-SFHA areas. Additionally, work already being done by the state of Kansas (e.g., dam safety program and state freeboard requirements) gives communities additional discounts. The following Region F communities are currently CRS participants:





**Table 4-110: Kansas Region F CRS Participating Jurisdictions**

Jurisdiction	County	CRS Entry Date	CRS Class	% Discount for SFHA	% Discount for Non-SFHA	Status
Assaria	Saline	05/01/2014	9	5%	5%	Current
Gypsum	Saline	10/01/2017	9	5%	5%	Current

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

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

**Table 4.111: Kansas Region F 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>Clay County</b>				
Clay Center	8	\$579,000	0	\$0
Morganville	13	\$1,070,100	0	\$0
<b>Cloud County</b>				
Cloud County	10	\$1,230,500	0	\$0
Clyde	1	\$70,000	0	\$0
Concordia	50	\$6,274,400	0	\$0
Glasco	3	\$66,100	0	\$0
Miltonvale	1	\$41,000	0	\$0
<b>Dickinson County</b>				
Dickinson County	25	\$3,347,500	6	\$28,512
Abilene	35	\$3,188,900	15	\$19,927
Chapman	32	\$4,107,800	33	\$42,523
Enterprise	0	\$0	1	\$21,182
Herington	5	\$671,800	2	\$1,221
Solomon	16	\$1,567,300	19	\$63,357
<b>Ellsworth County</b>				
Ellsworth County	5	\$677,600	0	\$0
City of Ellsworth	26	\$1,358,700	6	\$54,534







**Table 4.111: Kansas Region F NFIP Policy and Loss Statistics, As of December 31, 2018**

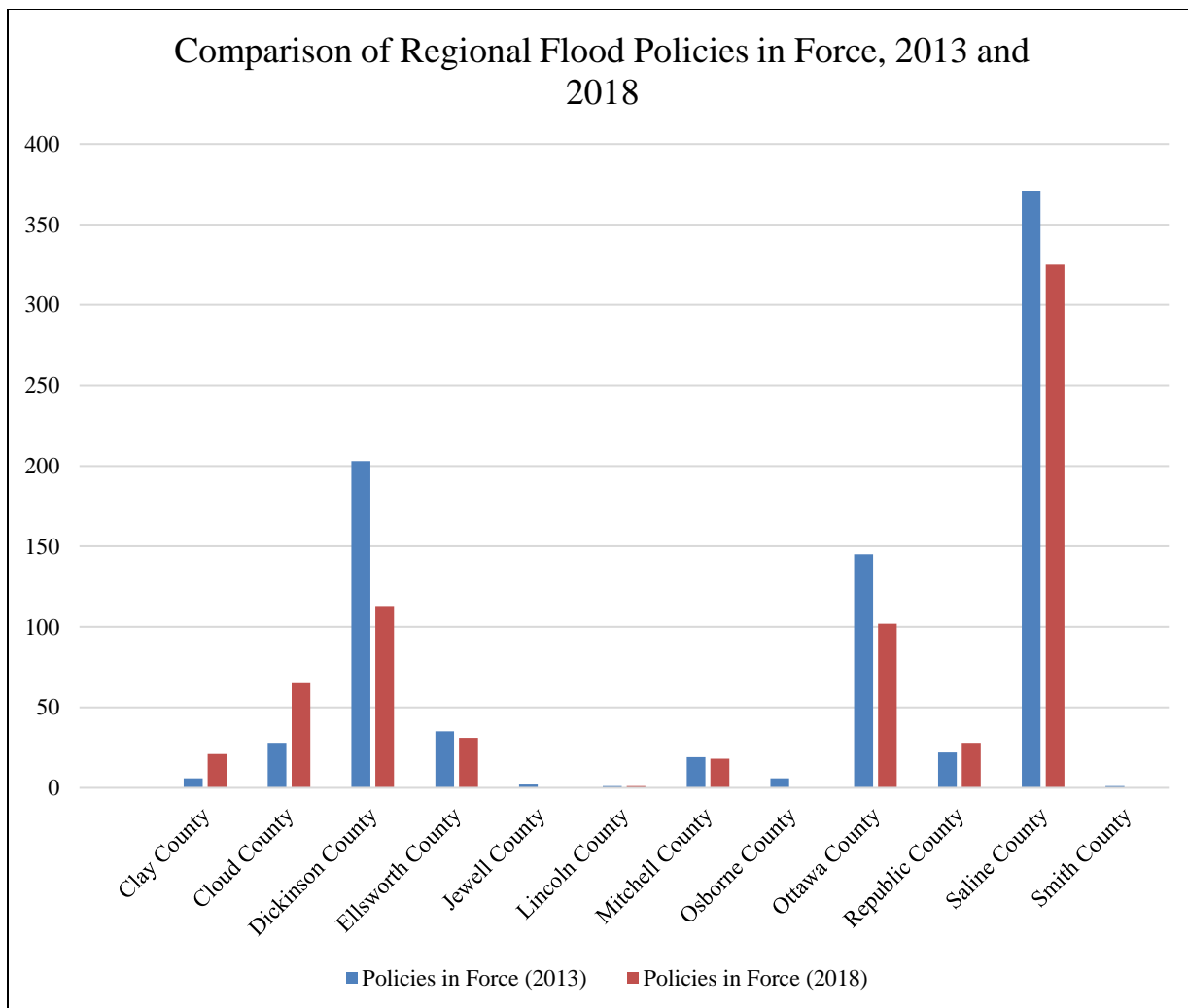
Jurisdiction	Number of Policies in Force	Insurance in Force	Number of Closed Losses	Total Payments
<b>Jewell County</b>				
Randall	0	\$0	1	\$11,856
<b>Lincoln County</b>				
Lincoln County	1	\$45,000		\$1,276
<b>Mitchell County</b>				
Mitchell County	8	\$861,700	1	\$3,409
Beloit	10	\$787,800	7	\$47,964
Hunter	0	\$0	4	\$50,742
Simpson	0	\$0	1	\$1,105
<b>Osborne County</b>				
Natoma	0	\$0	6	\$167,600
<b>Ottawa County</b>				
Ottawa County	26	\$2,672,400	1	\$2,197
Bennington	33	\$2,159,800	0	\$0
Culver	7	\$372,400	5	\$32,349
Delphos	1	\$350,000	0	\$0
Tescott	35	\$1,496,700	18	\$105,958
<b>Republic County</b>				
Republic County	6	\$819,000	2	\$2,375
Belleville	2	\$525,000		\$0
Courtland	1	\$49,000		\$0
Scandia	19	\$3,450,300	5	\$120,626
<b>Saline County</b>				
Saline County	126	\$17,940,400	54	\$1,156,272
Assaria	8	\$961,800	0	\$0
Brookville	7	\$508,600	0	\$0
New Cambria	19	\$1,078,300	9	\$50,062
Salina	165	\$40,122,900	88	3,260,815
<b>Smith County</b>				
-	-	-	-	-

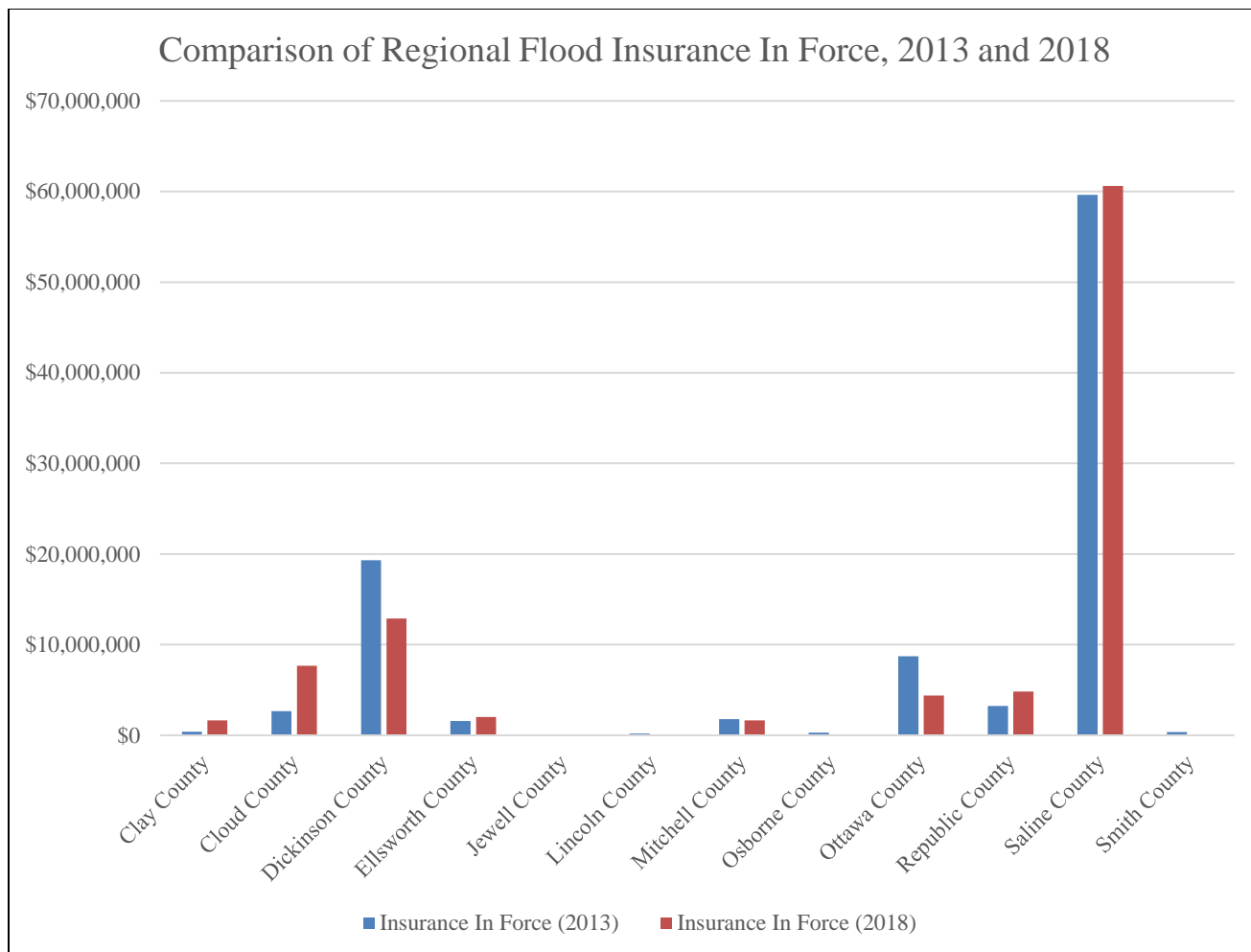
Source: FEMA, "Policy and Loss Data by Community with County and State Data"

The following graphs summarize data from the above table for Kansas Region F in comparison to 2012 data. Of note:

- Regionally the number of flood policies has decreased from 2013 to 2018, from 839 to 704
- Regionally the amount of flood insurance in-force decreased from 2013 to 2018, from \$98,217,900 to \$95,782,072







#### 4.13.7 – Repetitive Loss Properties

A high priority to Kansas Region F 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 F.

**Table 4.112: Kansas Region F Repetitive Loss Properties, As of December 2018**

County Name	Community Name	Mitigated	Insured	Occupancy	Total Building Payment	Total Contents Payment	Losses	Total Paid
Dickinson County	Dickinson County	No	Yes	Single Family	\$11,227	\$0	2	\$11,227
Ellsworth	City of Ellsworth	Yes	No	Single Family	\$24,128	\$0	2	\$24,128
Mitchell	Beloit	No	Yes	Business Non-Residential	\$82,037	\$11,871	7	\$93,908
Saline	New Cambria	No	No	Single Family	\$25,059	\$0.00	2	\$25,059.83
Saline	Salina	No	No	Single Family	\$7,737	\$0	2	\$7,737
Saline	Salina	No	Yes	Single Family	\$29,613	\$0	2	\$29,613
Saline	Salina	No	No	Single Family	\$73,589	\$0	2	\$73,589
Saline	Salina	No	No	Single Family	\$59,370	\$34,949	7	\$94,319
Saline	Salina	No	No	ASSMD Condo	\$498,702	\$232,410	2	\$731,112
Saline	Salina	No	No	Other Non-Residential	\$254,321	\$500,000	2	\$754,321
Saline	Salina	No	Yes	Single Family	\$60,103	\$0	2	\$60,103
Saline	Salina	No	No	Single Family	\$11,858	\$0	3	\$11,858
Saline	Salina	No	No	Single Family	\$27,643	\$0	2	\$27,643
Saline	Salina	No	Yes	Single Family	\$19,374	\$0	2	\$19,374
Saline	Salina	No	No	Single Family	\$30,720	\$0	2	\$30,720
Saline	Salina	No	Yes	Other Non-Residential	\$46,513	\$0	2	\$46,513
Saline	Salina	No	No	Other Non-Residential	\$64,858	\$0	4	\$64,858





#### 4.13.8 – Consequence Analysis

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

**Table 4.113: 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.







## 4.14 – Hailstorms

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



### 4.14.1 – Location and Extent

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

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

**Table 4.114: Hailstorm Intensity Scale**

Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	21-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	31-40	1.2-1.6	Pigeon's egg > squash ball	Widespread glass damage, vehicle bodywork damage
Destructive	41-50	1.6-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	51-60	2.0-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	61-75	2.4-3.0	Tennis ball > cricket ball	Severe roof damage, risk of serious injuries
Destructive	76-90	3.0-3.5	Large orange > Soft ball	Severe damage to aircraft bodywork
Super Hailstorms	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

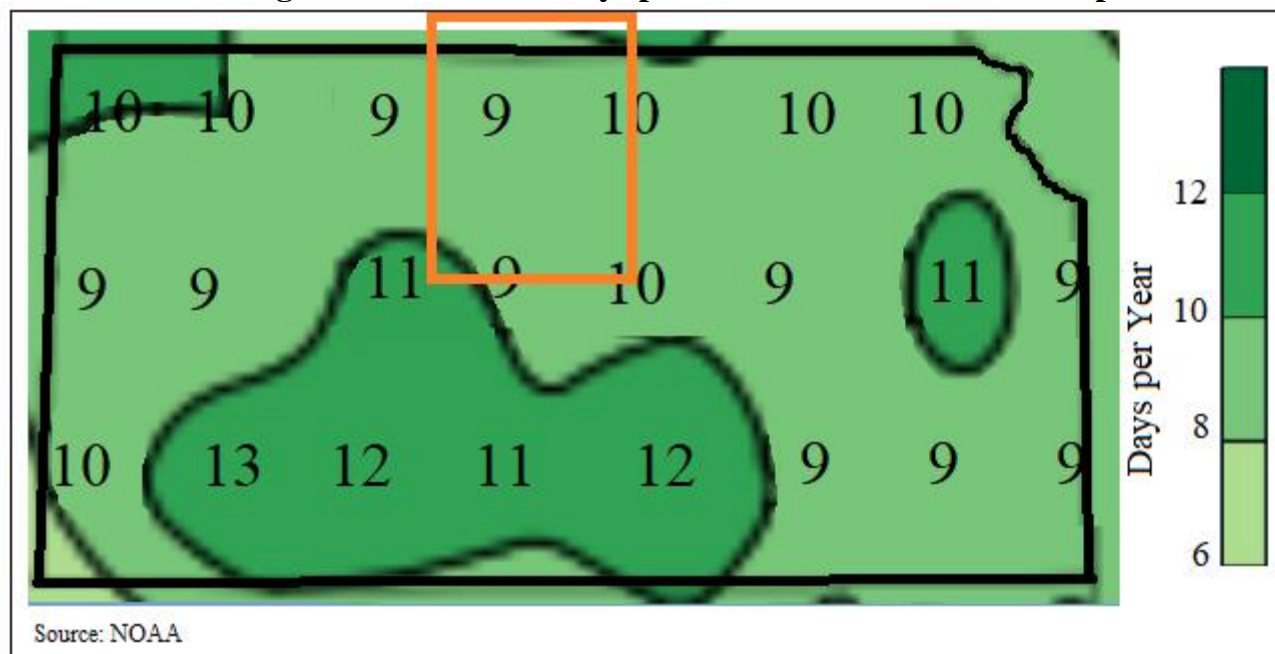
Source: Tornado and Storm Research Organization





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

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



#### 4.14.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 10 Presidential Disaster Declarations for Kansas Region F for severe storms (along with other associates hazard event), of which hail may be a component. The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on hail events that have impacted Kansas Region F. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

**Table 4.115: Kansas Region F FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28– 07/12/2019)	<b>Severe Storms</b> , Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$590,356
<b>4417</b>	02/25/2019 (10/04- 10/15/2018)	<b>Severe Storms</b> , Straight-line Winds, And Flooding	Ottawa	\$445,154
<b>4230</b>	07/20/2015 (05/04/2015 – 06/21/2015)	<b>Severe Storms</b> , Tornadoes, Straight-line Winds, and Flooding	Clay, Cloud, Doniphan, Ellsworth, Jewell, and Republic	\$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	<b>Severe Storms</b> , Straight-line Winds, Tornadoes, and Flooding	Clay, Cloud, Dickinson, Ellsworth, Ottawa, Republic, and Saline	\$11,412,827





**Table 4.115: Kansas Region F FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4063	05/24/2012 (4/14-4/15/2012)	<b>Severe Storms</b> , Tornadoes, Straight-line Winds and Flooding	Ellsworth, Jewell, Mitchell, and Osborne	\$6,923,919
4010	07/29/2011 (5/19-6/4/2011)	<b>Severe Storms</b> , Straight-line Winds, Tornadoes and Flooding	Clay, Cloud, Jewell, Lincoln, Mitchell, Morton, Osborne, Ottawa, Republic, and Smith	\$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	<b>Severe Storms</b> , Flooding and Tornadoes	Clay, Cloud, Jewell, Mitchell, Osborne, Republic, and Smith	\$9,279,257
1776	07/09/2008	<b>Severe Storms</b> , Flooding, and Tornadoes	Clay, Dickinson, Ellsworth, Franklin, Jewell, Osborne, Republic, Saline, Seward, and Smith	\$70,629,544
1699	5/6/2007 (5/4/2007)	<b>Severe Storms</b> , Tornadoes, and Flooding	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$117,565,269
1535	8/3/2004 (6/12-7/25/2004)	<b>Severe Storms</b> , Flooding, and Tornadoes	Jewell, Mitchell, Osborne, and Smith	\$12,845,892

Source: FEMA

-: Data unavailable

The following provides details concerning Presidential Disaster Declarations DR 4230 for Kansas Region F. FEMA summary writeups concerning declarations DR-4449 and DR-4417 were unavailable.

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

**FEMA-4230-DR**

Declared July 20, 2015

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

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





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

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

**Table 4.116: Kansas Region F NCEI Hailstorm Events, 2009 - 2018**

County	Number of Days with Events	Property Damage	Deaths	Injuries
Clay	27	\$500	0	0
Cloud	46	\$0	0	0
Dickinson	42	\$0	0	0
Ellsworth	32	\$125,000	0	0
Jewell	52	\$1,349,000	0	0
Lincoln	43	\$75,000	0	0
Mitchell	51	\$2,335,000	0	0
Osborne	55	\$1,100,000	0	0
Ottawa	50	\$0	0	0
Republic	32	\$5,000	0	0
Saline	29	\$0	0	0
Smith	37	\$820,000	0	0

Source: NOAA NCEI

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

- September 9, 2018: Osborne County**  
Hail ranging in size from quarters to tennis balls was reported. Property damage was recorded at \$150,000.
- October 1, 2017: Kensington, Smith County**  
Hail ranging in size from golf balls to hen eggs was reported in and near Kensington. Property damage was recorded at \$250,000.
- September 10, 2015: Burr Oak, Jewell County**  
Hail up to the size of golf balls was accompanied by the 80 MPH winds. Hail was approximately 4 inches deep and broke the vehicle's windshield. Numerous home windows were broken in Burr Oak. Property damage was recorded at \$150,000.
- October 2, 2014: Asherville, Mitchell County**  
At 640 am CDT, law enforcement reported that there were fields with destroyed crops due to the combination of golf ball size hail and strong wind. These fields were on both the north and south sides of Highway 24 from Roads 350 to 380. At 651 am CDT, Law enforcement reported that golf ball size hail was covering Highway 24. A semi-truck slid off the road and overturned at the intersection of Highway 24 and Road 380 due to the copious amount of hail on the road. Property damage was recorded at \$1,500,000.





- August 31, 2014: Beloit, Mitchell County**  
 Both law enforcement and observers reported a significant hailstorm in Beloit, with comments including: all tender vegetation destroyed and damage to trees, buildings and automobiles. Property damage was recorded at \$250,000.
- May 27, 2013: Jewell County**  
 Numerous tennis ball to softball size hail stones reported, with the largest measuring 5.25 inches. Property damage was recorded at \$550,000.
- July 2, 2011: Ellsworth, Ellsworth County**  
 Golf ball to tennis ball size hail affected Ellsworth. The only reported damage included windows broken out near the Ellsworth golf course. However, other hail damage not reported likely occurred, especially to area roofs and vehicles. Property damage was recorded at \$100,000.
- May 27, 2013: Jewell County**  
 Numerous tennis ball to softball size hail stones reported, with the largest measuring 5.25 inches. Property damage was recorded at \$550,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of hail on the region’s agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 762 hail related claims on 387,487 acres for \$40,498,034.

**Table 4.117: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Hail**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	33	8,958	\$682,119
Cloud	70	38,955	\$4,469,738
Dickinson	27	10,472	\$830,609
Ellsworth	55	19,483	\$2,488,709
Jewell	98	55,456	\$5,077,274
Lincoln	82	20,847	\$1,764,886
Mitchell	74	71,242	\$9,602,447
Osborne	83	61,079	\$5,672,191
Ottawa	43	14,499	\$1,094,962
Republic	67	45,596	\$5,188,072
Saline	36	3,889	\$298,008
Smith	94	37,011	\$3,329,019

Source: USDA Farm Service Agency

### 4.12.3 – Hazard Probability Analysis

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







**Table 4.118: Clay County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	27
Average Events per Year	3
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$500
Average Property Damage per Year	\$50
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	33
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	8,958
Average Number of Acres Damaged per Year	896
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$682,119
Average Crop Damage per Year	\$68,212

Source: NCEI and USDA

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

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

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

- Three insurance claims
- 896 acres impacted
- \$68,212 in insurance claims

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

**Table 4.119: Cloud County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	46
Average Events per Year	5
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	70
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	38,955
Average Number of Acres Damaged per Year	3,895
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$4,469,738
Average Crop Damage per Year	\$446,974

Source: NCEI and USDA





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

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

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

- Seven insurance claims
- 3,895 acres impacted
- \$446,974 in insurance claims

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

**Table 4.120: Dickinson County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	42
Average Events per Year	4
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	27
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	10,472
Average Number of Acres Damaged per Year	1,047
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$830,609
Average Crop Damage per Year	\$83,061

Source: NCEI and USDA

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

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

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

- Three insurance claims
- 1,047 acres impacted
- \$83,061 in insurance claims

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





**Table 4.121: Ellsworth County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	32
Average Events per Year	3
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$125,000
Average Property Damage per Year	\$12,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	55
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	19,483
Average Number of Acres Damaged per Year	1,948
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,488,709
Average Crop Damage per Year	\$248,871

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- \$12,500 in property damages

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

- Six insurance claim
- 1,948ne acre impacted
- \$248,871 in insurance claims

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

**Table 4.122: Jewell County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	52
Average Events per Year	5
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$1,349,000
Average Property Damage per Year	\$134,900
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	98
Average Number of Claims per Year	10
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	55,456
Average Number of Acres Damaged per Year	5,546
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	5,077,274
Average Crop Damage per Year	507,727

Source: NCEI and USDA





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

- Five events
- No deaths or injuries
- \$134,900 in property damages

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

- Ten insurance claims
- 5,546 acres impacted
- \$507,727 in insurance claims

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

**Table 4.123: Lincoln County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	43
Average Events per Year	4
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$75,000
Average Property Damage per Year	\$7,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	82
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	20,847
Average Number of Acres Damaged per Year	2,085
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,764,886
Average Crop Damage per Year	\$176,489

Source: NCEI and USDA

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

- Four events
- No deaths or injuries
- \$7,500 in property damages

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

- Eight insurance claims
- 2,085 acres impacted
- \$176,489 in insurance claims

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





**Table 4.124: Mitchell County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	51
Average Events per Year	5
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$2,335,000
Average Property Damage per Year	\$233,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	74
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	71,242
Average Number of Acres Damaged per Year	7,124
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$9,602,447
Average Crop Damage per Year	\$960,245

Source: NCEI and USDA

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

- Five events
- No deaths or injuries
- \$233,500 in property damages

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

- Seven insurance claims
- No acres impacted
- \$960,245 in insurance claims

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

**Table 4.125: Osborne County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	55
Average Events per Year	6
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$1,100,000
Average Property Damage per Year	\$110,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	83
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	61,079
Average Number of Acres Damaged per Year	6,108
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$5,672,191
Average Crop Damage per Year	\$567,219

Source: NCEI and USDA







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

- Six events
- No deaths or injuries
- \$110,000 in property damages

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

- Eight insurance claims
- 6,108 acres impacted
- \$567,219 in insurance claims

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

**Table 4.126: Ottawa County Hailstorm Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	50
Average Events per Year	5
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	43
Average Number of Claims per Year	4
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	14,499
Average Number of Acres Damaged per Year	1,450
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,094,962
Average Crop Damage per Year	\$109,496

Source: NCEI and USDA

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

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

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

- Four insurance claims
- 1,450 acres impacted
- \$109,496 in insurance claims

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





**Table 4.127: Republic County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	32
Average Events per Year	3
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$5,000
Average Property Damage per Year	\$500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	67
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	45,596
Average Number of Acres Damaged per Year	4,560
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$5,188,072
Average Crop Damage per Year	\$518,807

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- \$500 in property damages

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

- Seven insurance claim
- 4,560 acres impacted
- \$518,807 in insurance claims

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

**Table 4.128: Saline County Hailstorm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	29
Average Events per Year	3
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	36
Average Number of Claims per Year	4
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	3,889
Average Number of Acres Damaged per Year	389
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$298,008
Average Crop Damage per Year	\$29,801

Source: NCEI and USDA





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

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

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

- Four insurance claims
- 389 acres impacted
- \$29,801 in insurance claims

The following table summarizes hailstorm probability data for Smith County.

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

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	37
Average Events per Year	4
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$820,000
Average Property Damage per Year	\$82,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	94
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	37,011
Average Number of Acres Damaged per Year	3,701
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,329,019
Average Crop Damage per Year	\$332,902

Source: NCEI and USDA

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

- Four events
- No deaths or injuries
- \$82,000 in property damages

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

- Nine insurance claims
- 3,701 acres impacted
- \$332,902 in insurance claims





In addition, Kansas Region F has had 10 Presidentially Declared Disasters relating to severe storms (of which hail is a potential component) in the last 20 years. This represents an average one declared severe storm (hailstorm) related disaster per year.

#### 4.14.4 – Vulnerability Analysis

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

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region F county incurring damage over the period 2009 to 2018 from hailstorm events. In general, the greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.130: Kansas Region F Structural Vulnerability Data for Hailstorms, 2009-2018**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Clay	\$1,023,498,000	\$500	0.00%
Cloud	\$1,082,981,000	\$0	0.00%
Dickinson	\$2,316,840,000	\$0	0.00%
Ellsworth	\$774,908,000	\$125,000	0.02%
Jewell	\$454,048,000	\$1,349,000	0.30%
Lincoln	\$587,611,000	\$75,000	0.01%
Mitchell	\$856,638,000	\$2,335,000	0.27%
Osborne	\$538,604,000	\$1,100,000	0.20%
Ottawa	\$736,439,000	\$0	0.00%
Republic	\$740,126,000	\$5,000	0.00%
Saline	\$6,516,698,000	\$0	0.00%
Smith	\$525,625,000	\$820,000	0.16%

Source: NCEI and HAZUS

The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of hailstorm conditions on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to hailstorm events.

**Table 4.131: Hailstorm Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	896	0.23%	\$121,175,000	\$68,212	0.06%
Cloud	322,034	3,895	1.21%	\$77,485,000	\$446,974	0.58%
Dickinson	519,171	1,047	0.20%	\$149,543,000	\$83,061	0.06%





**Table 4.131: Hailstorm Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Ellsworth	390,042	1,948	0.50%	\$48,318,000	\$248,871	0.52%
Jewell	436,206	5,546	1.27%	\$149,501,000	\$507,727	0.34%
Lincoln	384,740	2,085	0.54%	\$58,151,000	\$176,489	0.30%
Mitchell	414,220	7,124	1.72%	\$126,462,000	\$960,245	0.76%
Osborne	437,083	6,108	1.40%	\$62,499,000	\$567,219	0.91%
Ottawa	439,335	1,450	0.33%	\$108,378,000	\$109,496	0.10%
Republic	373,206	4,560	1.22%	\$187,529,000	\$518,807	0.28%
Saline	358,243	389	0.11%	\$73,581,000	\$29,801	0.04%
Smith	541,742	3,701	0.68%	\$129,261,000	\$332,902	0.26%

Source: USDA

#### 4.14.5 – Impact and Consequence Analysis

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

**Table 4.132: Hailstorm Consequence Analysis**

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







## 4.15 – Land Subsidence

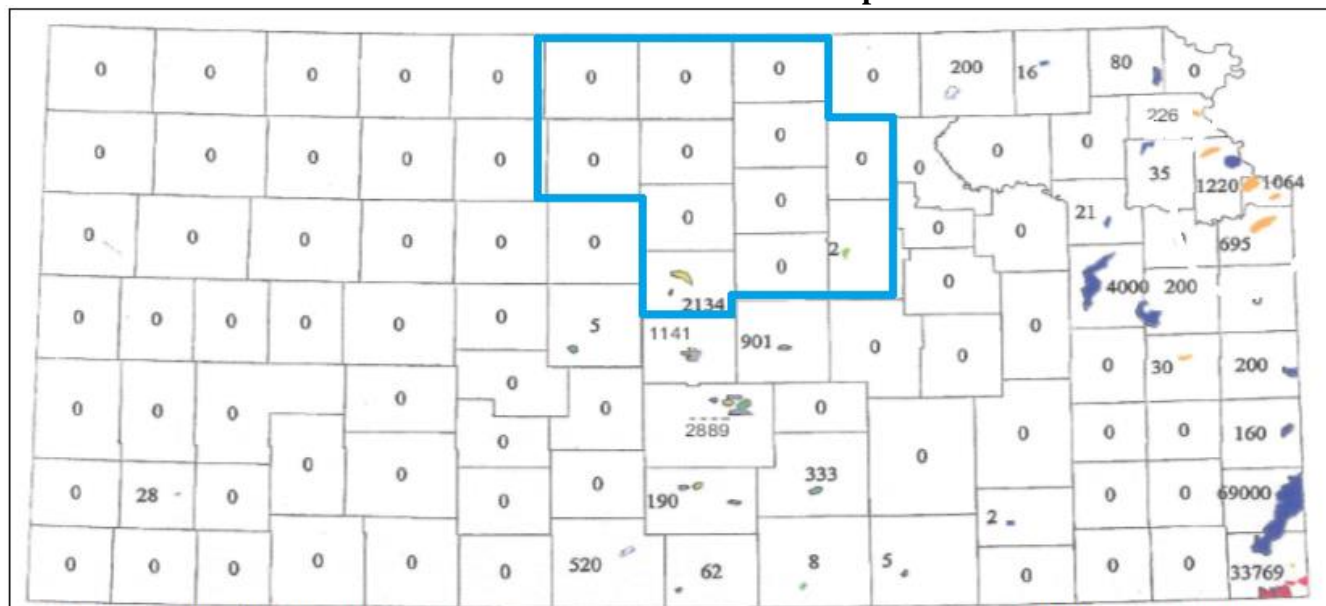
Land subsidence is caused when the ground above manmade or natural voids collapses. Subsidence can be related to mine collapse, water and oil withdrawal, or natural causes such as shrinking of expansive soils, salt dissolution (which may also be related to mining activities), and cave collapses. The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



### 4.15.1 – Location and Extent

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

**KDHE Total Subsurface Void Space**



Source: Kansas State University College of Engineering

Note: Void space reported in acres

- Lead and Zinc Mines
- Coal Mines
- Limestone Mines
- Gypsum Mines
- Salt Solution Mining
- Rock Salt Mines
- Hydrocarbon Storage Cavems





The following table details the total amount of subsurface void space as calculated using data from the KDHE map.

**Table 4.133: Kansas Region F Sub-Surface Void Space**

County	Total Sub-Surface Void Space
Clay	0
Cloud	0
Dickinson	2
Ellsworth	2,134
Jewell	0
Lincoln	0
Mitchell	0
Osborne	0
Ottawa	0
Republic	0
Saline	0
Smith	0

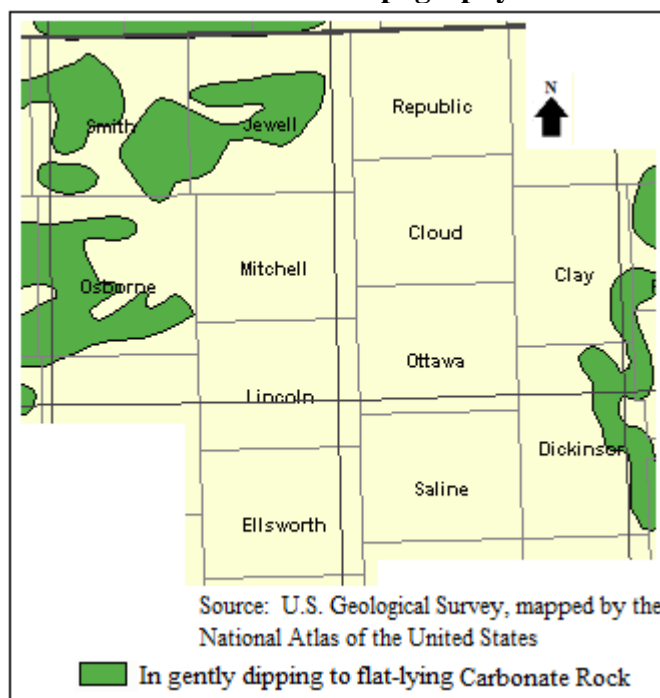
Source: KDHE

Of additional concern to Kansas Region F is Karst topography. The following map from the United States Geologic Survey (USGS) indicates areas of Karst topography in the region. The green areas shown in the map show fissures, tubes, and caves generally less than 1,000 feet long with 50 feet or less vertical extent in gently dipping to flat-lying carbonate rock. Brown areas have similar features in gently dipping to flat lying gypsum beds. Light pink colored areas are features analogous to karst with fissures and voids present to a depth of 250 feet or more in areas of subsidence from piping in thick unconsolidated material. Darker pink areas contain fissures and voids (analogous to karst) to a depth of 50 feet. There are limited documented problems associated with natural limestone subsidence and sinkholes in Kansas Region F.





### USGS Karst Topography



#### 4.15.2 – Previous Occurrences

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

#### 4.15.3 – Hazard Probability Analysis

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

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

#### 4.15.4 Vulnerability Analysis

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

Vulnerability to land subsidence in Kansas Region F was analyzed using the KDHE “Subsurface Void Space and Sinkhole/Subsidence Area Inventory for the State of Kansas” report. All documented acres of





subsurface void space were classified according to these risk categories for each of the following causes of void space:

- Lead and Zinc Mines
- Coal Mines
- Limestone Mines
- Gypsum Mines
- Salt Solution Mining
- Rock Salt Mines
- Hydrocarbon Storage Caverns

Based on these classifications, a risk category was assigned to each of the subsurface void acres:

- Category I: High Risk
- Category II: Medium Risk
- Category III: Low Risk

The following table shows the classification of the void space in each of Kansas Region F counties. Please note that not all classifications with identified acreage are shown.

**Table 4.134: Kansas Region F Sub-Surface Void Space Acreage**

County	Salt Solution Category I	Salt Solution Category II	Rock Salt Category I	Hydrocarbon Storage Category I	Total Sub-Surface Void Space
Clay	0	0	0	0	0
Cloud	0	0	0	0	0
Dickinson	2	0	0	0	2
Ellsworth	24	0	1,825	285	2,134
Jewell	0	0	0	0	0
Mitchell	0	0	0	0	0
Lincoln	0	0	0	0	0
Osborne	0	0	0	0	0
Ottawa	0	0	0	0	0
Republic	0	0	0	0	0
Saline	0	0	0	0	0
Smith	0	0	0	0	0

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

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





**Table 4.135: Kansas Region F 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
Clay	412,160	0	0.00%
Cloud	459,520	0	0.00%
Dickinson	545,280	2	0.00%
Ellsworth	462,720	2,134	0.46%
Jewell	584,960	0	0.00%
Mitchell	460,800	0	0.00%
Lincoln	460,160	0	0.00%
Osborne	572,160	0	0.00%
Ottawa	461,440	0	0.00%
Republic	460,800	0	0.00%
Saline	461,440	0	0.00%
Smith	574,080	0	0.00%

Source: KDHE

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region F county incurring damage over the period 2009 to 2018 from land subsidence events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.136: Kansas Region F Structural Vulnerability Data for Land Subsidence, 2009-2018**

County	HAZUS Building Valuation	Reported Structure Damage	Percentage of Building Valuation Damaged
Clay	\$1,023,498,000	\$0	0.0%
Cloud	\$1,082,981,000	\$0	0.0%
Dickinson	\$2,316,840,000	\$0	0.0%
Ellsworth	\$774,908,000	\$0	0.0%
Jewell	\$454,048,000	\$0	0.0%
Lincoln	\$587,611,000	\$0	0.0%
Mitchell	\$856,638,000	\$0	0.0%
Osborne	\$538,604,000	\$0	0.0%
Ottawa	\$736,439,000	\$0	0.0%
Republic	\$740,126,000	\$0	0.0%
Saline	\$6,516,698,000	\$0	0.0%
Smith	\$525,625,000	\$0	0.0%

Source: HAZUS

\*: Data estimated from destruction of Green Parrot Bar in 2006

### 4.15.5 – Impact and Consequence Analysis

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







**Table 4.137: Land Subsidence Consequence Analysis**

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





## 4.16 – Landslides

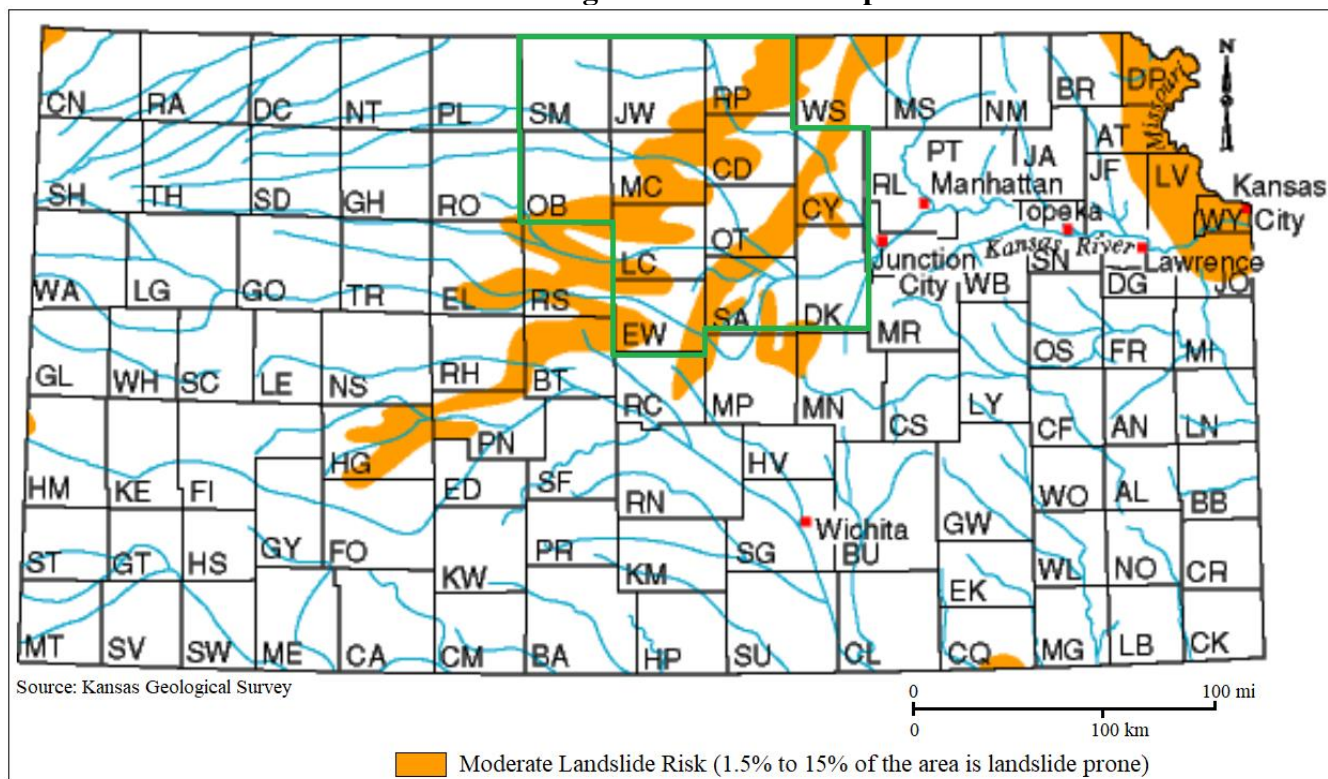
Landslides are the downward and outward movement of slopes. Landslides include a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on and over steepened slopes is the primary reason for a landslide, landslides are often prompted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



### 4.16.1 – Location and Extent

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

**KGS Regional Landslide Map**





### 4.16.2 – Previous Occurrences

At present there is no centralized and complete database containing historical records for landslides in Kansas. For Kansas Region F there have been no reported or recorded landslides impacting either participating jurisdictions or the region in the past 10 years.

### 4.16.3 – Hazard Probability Analysis

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

As indicated in the map above, small areas of Kansas Region F (in Dickinson County) have a moderate susceptibility to landslides. However, the limited available past occurrence data indicate that there is a very low rate of occurrence. Based on limited available data, and bearing in mind that many landslides may be unreported as they have no impact on human activities, it is not likely that a major landslide will impact the region based on zero reported occurrences in 10 years.

### 4.16.4 Vulnerability Analysis

Based on landslide mapping by the KGS, the area for each county with a moderate landslide risk was estimated. The higher percentage of acreage in a moderate landslide risk area the higher the vulnerability. However, landslides require an earth or rock covered slope, and so flatter areas have a much-decreased risk of occurrence.

**Table 4.138: Kansas Region F 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
Clay	412,160	136,013	33.00%
Cloud	459,520	151,642	33.00%
Dickinson	545,280	27,264	5.00%
Ellsworth	462,720	185,088	40.00%
Jewell	584,960	87,744	15.00%
Mitchell	460,800	207,360	45.00%
Lincoln	460,160	299,104	65.00%
Osborne	572,160	114,432	20.00%
Ottawa	461,440	207,648	45.00%
Republic	460,800	230,400	50.00%
Saline	461,440	230,720	50.00%
Smith	574,080	0	0.00%

Source: ADEM and HAZUS

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region F county incurring damage over the period 2009





to 2018 from landslide events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.139: Kansas Region F Structural Vulnerability Data for Landslides, 2009-2018**

County	HAZUS Building Valuation	Reported Structure Damage	Percentage of Building Valuation Damaged
Clay	\$1,023,498,000	\$0	0.0%
Cloud	\$1,082,981,000	\$0	0.0%
Dickinson	\$2,316,840,000	\$0	0.0%
Ellsworth	\$774,908,000	\$0	0.0%
Jewell	\$454,048,000	\$0	0.0%
Lincoln	\$587,611,000	\$0	0.0%
Mitchell	\$856,638,000	\$0	0.0%
Osborne	\$538,604,000	\$0	0.0%
Ottawa	\$736,439,000	\$0	0.0%
Republic	\$740,126,000	\$0	0.0%
Saline	\$6,516,698,000	\$0	0.0%
Smith	\$525,625,000	\$0	0.0%

Source: HAZUS

Population vulnerabilities to landslide events are expected to be minimal.

#### 4.16.5 – Impact and Consequence Analysis

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

**Table 4.140: Landslide Consequence Analysis**

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





## 4.17 – Lightning

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

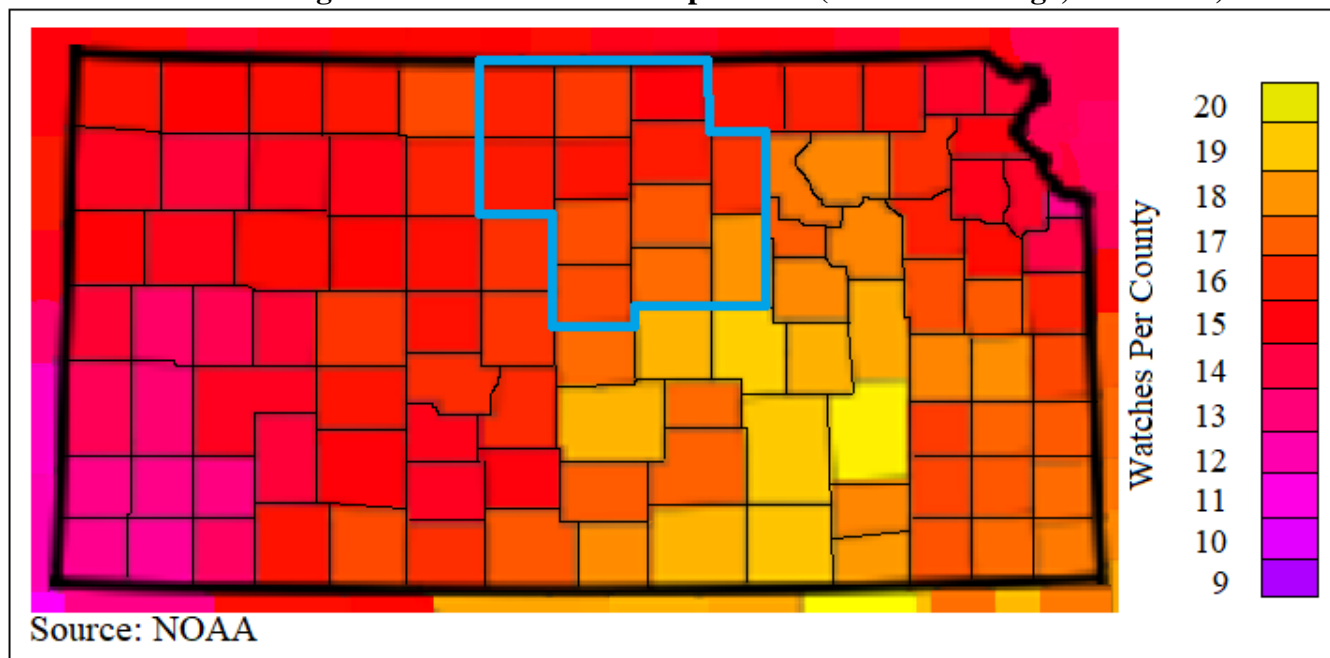


### 4.17.1 – Location and Extent

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

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



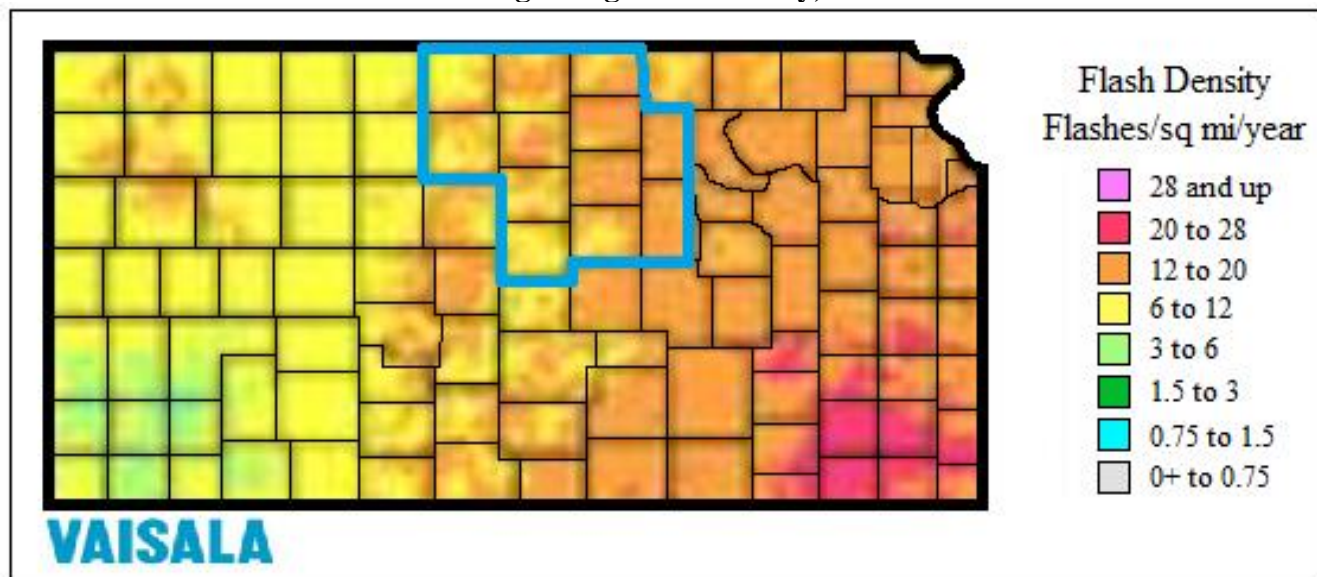
The following map, generated by Vaisala, indicates the average number of lightning flashes per square mile per year for Kansas Region F. In general, the more recorded flashes the greater the potential for lightning strikes.







### Vaisala Lightning Flash Density, 2008-2017



#### 4.17.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been 10 Presidential Disaster Declarations for Kansas Region F for severe storms (along with other associates hazard event), of which lightning may be a component. The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on hail events that have impacted Kansas Region F. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

**Table 4.141: Kansas Region F FEMA Severe Storm Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28– 07/12/2019)	<b>Severe Storms</b> , Straight-line Winds, Tornadoes, Flooding, Landslides, and Mudslides	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$590,356
<b>4417</b>	02/25/2019 (10/04- 10/15/2018)	<b>Severe Storms</b> , Straight-line Winds, And Flooding	Ottawa	\$445,154
<b>4230</b>	07/20/2015 (05/04/2015 – 06/21/2015)	<b>Severe Storms</b> , Tornadoes, Straight-line Winds, and Flooding	Clay, Cloud, Doniphan, Ellsworth, Jewell, and Republic	\$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	<b>Severe Storms</b> , Straight-line Winds, Tornadoes, and Flooding	Clay, Cloud, Dickinson, Ellsworth, Ottawa, Republic, and Saline	\$11,412,827
4063	05/24/2012 (4/14-4/15/2012)	<b>Severe Storms</b> , Tornadoes, Straight-line Winds and Flooding	Ellsworth, Jewell, Mitchell, and Osborne	\$6,923,919





**Table 4.141: Kansas Region F 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>
4010	07/29/2011 (5/19-6/4/2011)	<b>Severe Storms</b> , Straight-line Winds, Tornadoes and Flooding	Clay, Cloud, Jewell, Lincoln, Mitchell, Morton, Osborne, Ottawa, Republic, and Smith	\$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	<b>Severe Storms</b> , Flooding and Tornadoes	Clay, Cloud, Jewell, Mitchell, Osborne, Republic, and Smith	\$9,279,257
1776	07/09/2008	<b>Severe Storms</b> , Flooding, and Tornadoes	Clay, Dickinson, Ellsworth, Franklin, Jewell, Osborne, Republic, Saline, Seward, and Smith	\$70,629,544
1699	5/6/2007 (5/4/2007)	<b>Severe Storms</b> , Tornadoes, and Flooding	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$117,565,269
1535	8/3/2004 (6/12-7/25/2004)	<b>Severe Storms</b> , Flooding, and Tornadoes	Jewell, Mitchell, Osborne, and Smith	\$12,845,892

Source: FEMA

-: Data unavailable

The following provides details concerning Presidential Disaster Declarations DR 4230 for Kansas Region F. FEMA summary writeups concerning declarations DR-4449 and DR-4417 were unavailable.

**Kansas – Severe Storms, Tornadoes, Straight-Line Winds, and Flooding  
FEMA-4230-DR**

Declared July 20, 2015

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

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





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

**Table 4.142: Kansas Region F NCEI Lightning Events, 2009 - 2018**

County	Number of Events	Property Damage	Crop Damage	Deaths	Injuries
Clay	0	\$0	\$0	0	0
Cloud	0	\$0	\$0	0	0
Dickinson	0	\$0	\$0	0	0
Ellsworth	0	\$0	\$0	0	0
Jewell	0	\$0	\$0	0	0
Mitchell	0	\$0	\$0	0	0
Lincoln	0	\$0	\$0	0	0
Osborne	0	\$0	\$0	0	0
Ottawa	0	\$0	\$0	0	0
Republic	0	\$0	\$0	0	0
Saline	2	\$0	\$25,000	0	0
Smith	0	\$0	\$0	0	0

Source: NOAA NCEI

The following local events were reported.

- **August 5, 2011: Salina, Saline County**

Lightning struck an automobile and a radio station which burned the vehicle antenna, damaged a door and windshield, and shattered the back window. At the radio station, damage occurred to the transmitter, satellites and other equipment. Property damages were reported at \$02,000.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of lightning on the region’s agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates no related claims.

**Table 4.143: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Lightning**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	0	0	\$0
Cloud	0	0	\$0
Dickinson	0	0	\$0
Ellsworth	0	0	\$0
Jewell	0	0	\$0
Lincoln	0	0	\$0
Mitchell	0	0	\$0
Osborne	0	0	\$0
Ottawa	0	0	\$0
Republic	0	0	\$0
Saline	0	0	\$0
Smith	0	0	\$0

Source: USDA Farm Service Agency





### 4.17.3 – Hazard Probability Analysis

Predicting the probability of lightning occurrences is tremendously challenging due to the large number of factors involved and the random nature of strikes. Data from the NCEI indicates that Region F counties can expect on a yearly basis, relevant to lightning events:

- Two impactful events
- No deaths or injuries
- \$25,000 in property damages

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

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

In addition, Kansas Region F has had 10 Presidentially Declared Disasters relating to severe storms (of which lightning is a potential component) in the last 20 years. This represents an average of less than one declared severe storm (lightning) related disaster per year.

### 4.17.4 – Vulnerability Analysis

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region F county incurring damage over the period 2009 to 2018 from lightning events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.144: Kansas Region F Structural Vulnerability Data for Lightning, 2009 -2018**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Clay	\$1,023,498,000	\$0	0.0%
Cloud	\$1,082,981,000	\$0	0.0%
Dickinson	\$2,316,840,000	\$0	0.0%
Ellsworth	\$774,908,000	\$0	0.0%
Jewell	\$454,048,000	\$0	0.0%
Lincoln	\$587,611,000	\$0	0.0%
Mitchell	\$856,638,000	\$0	0.0%
Osborne	\$538,604,000	\$0	0.0%
Ottawa	\$736,439,000	\$0	0.0%
Republic	\$740,126,000	\$0	0.0%
Saline	\$6,516,698,000	\$0	0.0%
Smith	\$525,625,000	\$0	0.0%

Source: NCEI and HAZUS





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

**Table 4.145: Kansas Region F Population Vulnerability Data for Lightning**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

Source: US Census Bureau

In addition, lightning may exacerbate agricultural and economic losses. The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. USDA Risk Management Agency crop loss data (2014 – 2018) allows us to quantify the monetary impact of lightning strikes on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to lightning events.

**Table 4.146: Lightning Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	0	0.0%	\$121,175,000	\$0	0.0%
Cloud	322,034	0	0.0%	\$77,485,000	\$0	0.0%
Dickinson	519,171	0	0.0%	\$149,543,000	\$0	0.0%
Ellsworth	390,042	0	0.0%	\$48,318,000	\$0	0.0%
Jewell	436,206	0	0.0%	\$149,501,000	\$0	0.0%
Lincoln	384,740	0	0.0%	\$58,151,000	\$0	0.0%
Mitchell	414,220	0	0.0%	\$126,462,000	\$0	0.0%
Osborne	437,083	0	0.0%	\$62,499,000	\$0	0.0%
Ottawa	439,335	0	0.0%	\$108,378,000	\$0	0.0%
Republic	373,206	0	0.0%	\$187,529,000	\$0	0.0%
Saline	358,243	0	0.0%	\$73,581,000	\$0	0.0%
Smith	541,742	0	0.0%	\$129,261,000	\$0	0.0%

Source: USDA







#### 4.17.5 – Impact and Consequence Analysis

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

**Table 4.147: Lightning Consequence Analysis**

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





## 4.18 – Soil Erosion and Dust

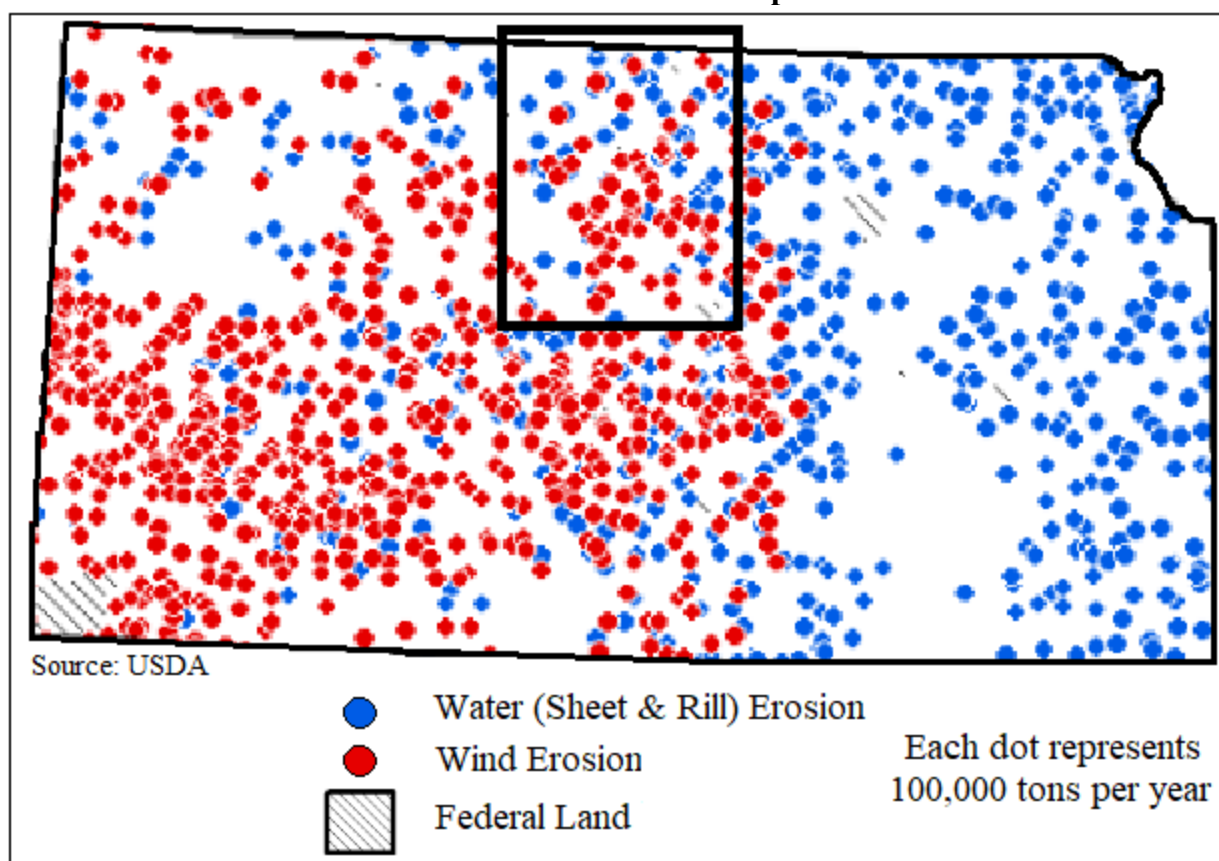
Soil erosion, in general, is a process that removes topsoil through the application of water, wind, or farming activities. Soil erosion can be a slow, unobserved process or can happen quickly due to extreme environmental factors. The United States is losing soil 10 times faster than the natural replenishment rate, and related production losses cost the country about \$44,000,000,000 each year. On average, wind erosion is responsible for about 40% of this loss and can increase markedly in drought years.



### 4.18.1 – Location and Extent

Soil erosion and dust occurs over broad geographic regions. The entire Kansas Region F planning area, including all participating jurisdictions, is at risk to soil erosion and dust.

**Wind and Water Erosion on Cropland 2012**



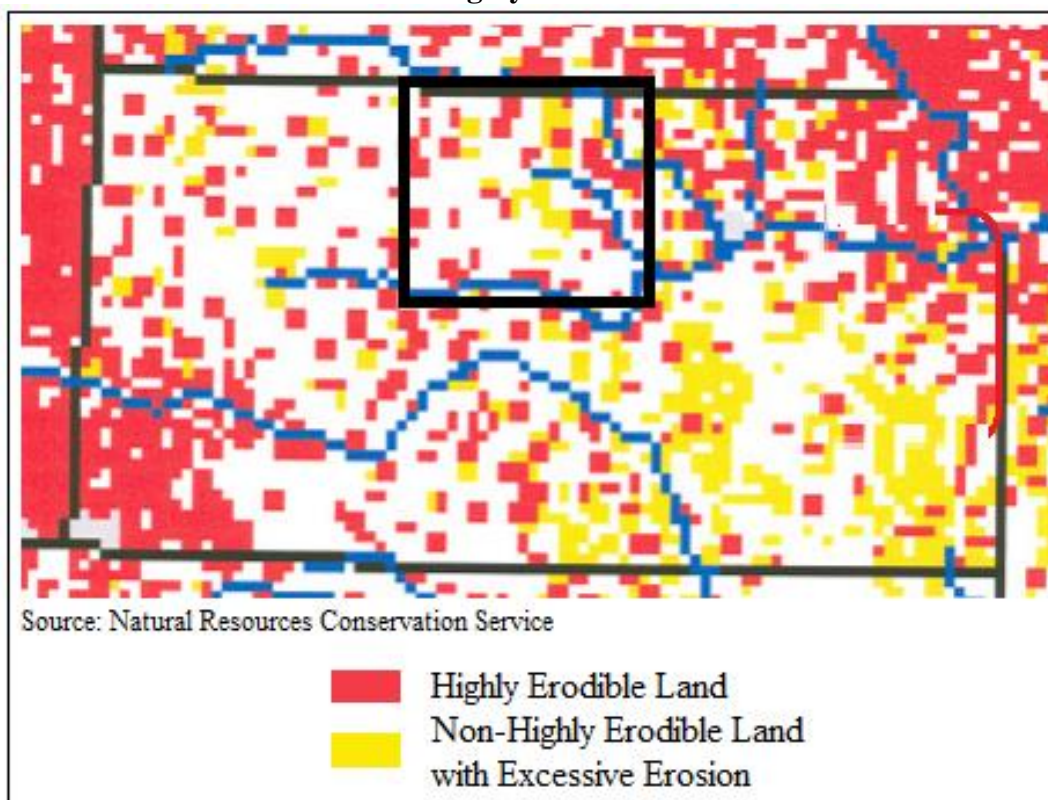
The following figure, from the Natural Resources Conservation Service (NRCS) shows areas of excessive erosion of farmland in Kansas. Each red dot represents 5,000 acres of highly erodible land, and each





yellow dot represents 5,000 acres of non-highly erodible land with excessive erosion above the tolerable soil erosion rate.

### NRCS Highly Erodible Land



#### 4.18.2 – Previous Occurrences

At present there is no centralized and complete database containing historical records for soil erosion in Kansas. For Kansas Region F there have been no reported or recorded soil erosion or dust events impacting either participating jurisdictions or the region in the past 10 years.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of soil erosion and dust on the Region’s agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates no related claims

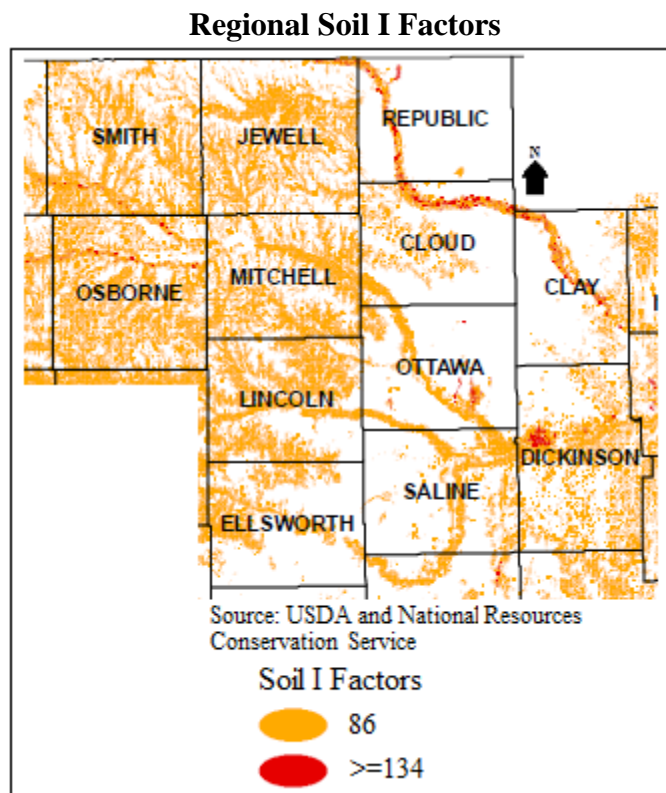
#### 4.18.3 – Hazard Probability Analysis

Predicting future erosion amounts is problematic as much relies on farm management practices, available moisture and crop type. Due to the on-going nature of this hazard, and the small agricultural base for the region, it is expected that future events causing minimally measurable impact to the regions crops and farmers will continue occur. Again, the rate of occurrence and potential future occurrence will be predicated on farm management practices and drought and water conditions.





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



#### 4.18.4 – Vulnerability Analysis

For purposes of this assessment, all counties within the region were determined to be at equal risk to soil erosion and dust events. Additionally, as this hazard disproportionately impacts the agricultural sector, only data on that sector was reviewed for potential vulnerability. Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of soil erosion on the region’s agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates no soil erosion related claims.

**Table 4.148: Soil Erosion and Dust Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	0	0.0%	\$121,175,000	\$0	0.0%
Cloud	322,034	0	0.0%	\$77,485,000	\$0	0.0%
Dickinson	519,171	0	0.0%	\$149,543,000	\$0	0.0%
Ellsworth	390,042	0	0.0%	\$48,318,000	\$0	0.0%
Jewell	436,206	0	0.0%	\$149,501,000	\$0	0.0%
Lincoln	384,740	0	0.0%	\$58,151,000	\$0	0.0%





**Table 4.148: Soil Erosion and Dust Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Mitchell	414,220	0	0.0%	\$126,462,000	\$0	0.0%
Osborne	437,083	0	0.0%	\$62,499,000	\$0	0.0%
Ottawa	439,335	0	0.0%	\$108,378,000	\$0	0.0%
Republic	373,206	0	0.0%	\$187,529,000	\$0	0.0%
Saline	358,243	0	0.0%	\$73,581,000	\$0	0.0%
Smith	541,742	0	0.0%	\$129,261,000	\$0	0.0%

Source: USDA

### 4.18.5 – Impact and Consequence Analysis

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

**Table 4.149: Soil Erosion and Dust Consequence Analysis**

Subject	Impacts of Soil Erosion and Dust
Health and Safety of the Public	Impact tends to be agricultural; however, dust can be a danger to susceptible individuals in the form of air pollutants.
Health and Safety of Responders	With proper preparedness and protection, impact to the responders is expected to be minimal.
Continuity of Operations	Minimal expectation for utilization of the COOP.
Property, Facilities, and Infrastructure	Impact to property, facilities, and infrastructure could be severe, depending on the site of the soil erosion. This could adversely affect utility poles/lines, and facilities. Dust can also adversely affect machinery, air conditioners, etc.
Environment	The impact to the environment could be severe. Soil erosion and dust can severely affect farming, ranching, wildlife and plants due to production losses and habitat changes.
Economic Conditions	Impacts to the economy will be dependent on how extreme the soil erosion and dust are. Potentially it could severely affect crop yield and productivity. Seedling survival and growth is stressed by erosion and dust, as is the top soil which agriculture is dependent on.
Public Confidence in the Jurisdiction's Governance	Planning, response, and recovery may be questioned if not timely and effective.







## 4.19 – Tornado

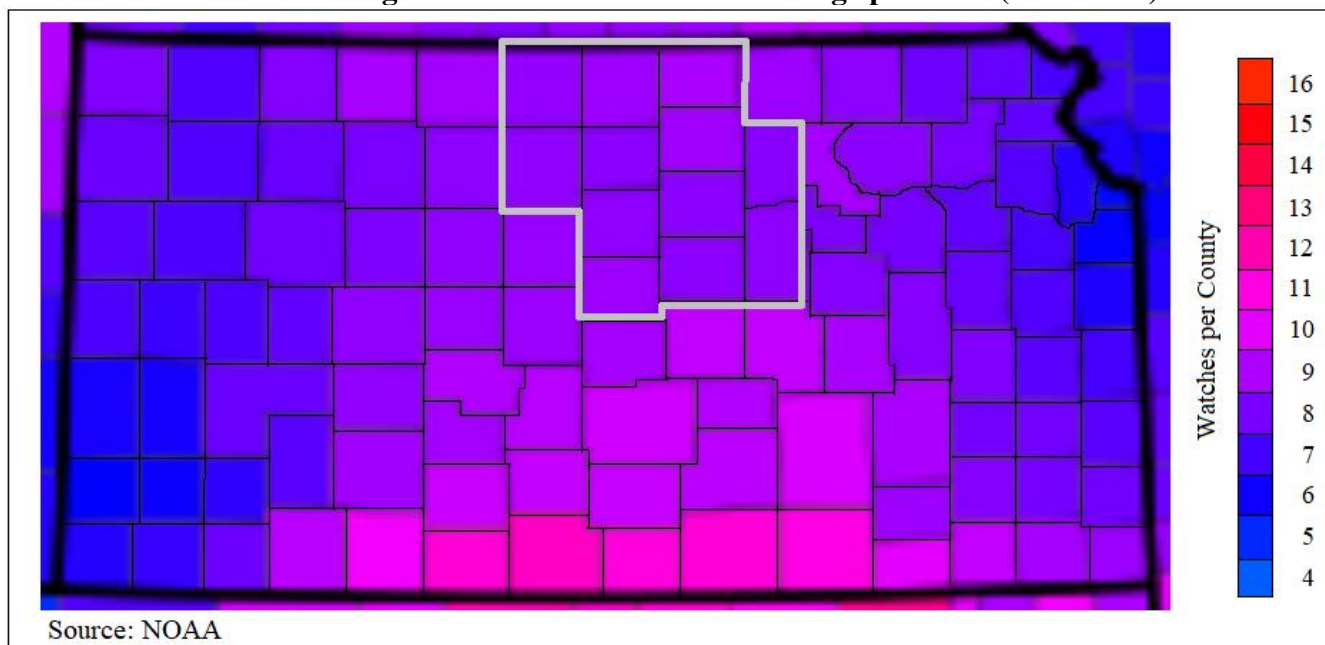
A tornado is a violently rotating column of air in contact with the ground. Often referred to as a twister or a cyclone, they can strike anywhere and with little warning. Tornadoes come in many shapes and sizes but are typically in the form of a visible condensation funnel, whose narrow end touches the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



### 4.19.1 – Location and Extent

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

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

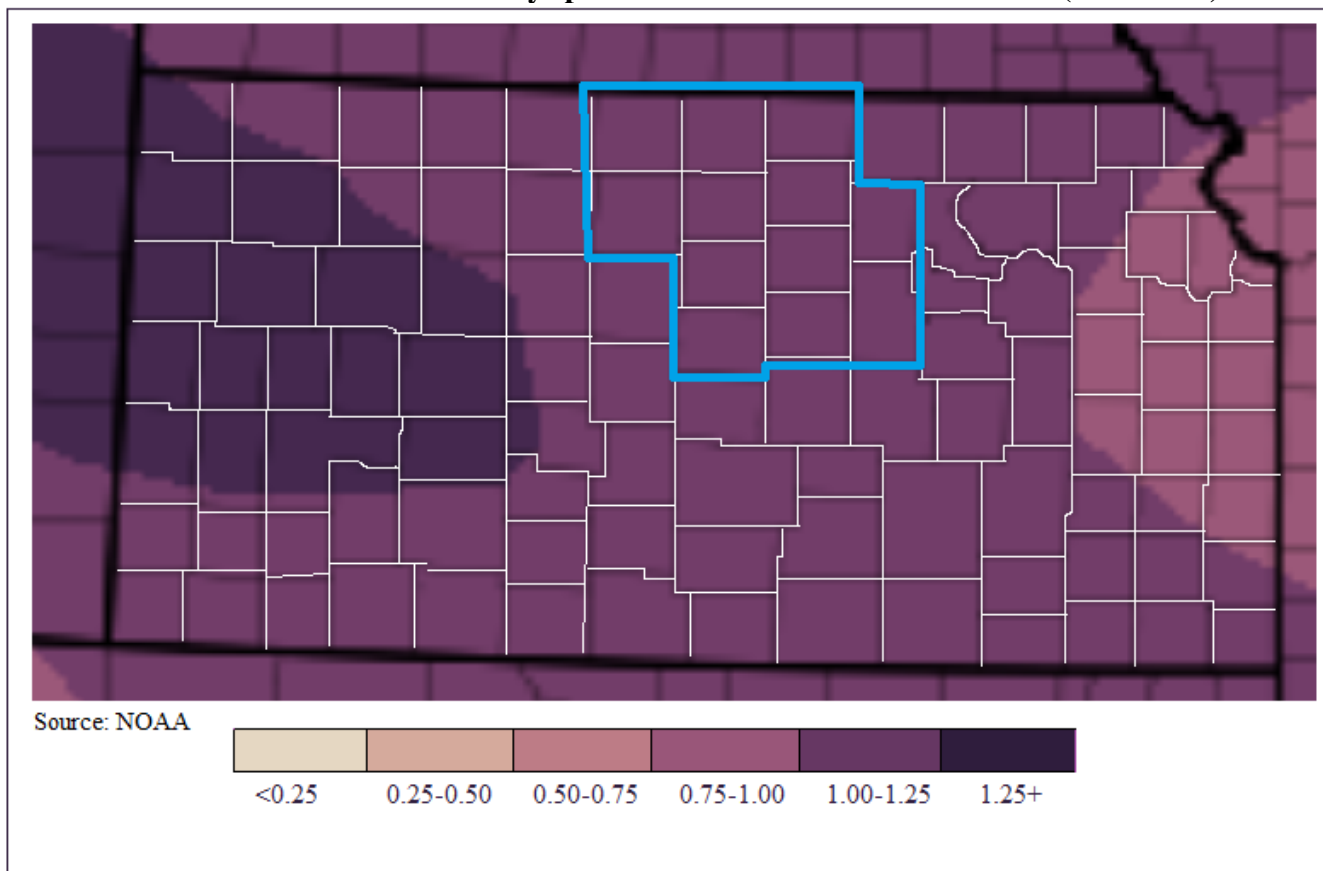


Additionally, NOAA generated the following map indicating the mean number of tornado days per year, using data compiled from the years 1986 to 2015.





### Mean Number of Tornado Days per Year Within 25 Miles of a Point (1986-2015)



Many tornados only exist for a few seconds in the form of a touchdown. The most extreme tornados can attain wind speeds of more than 200 miles per hour, stretch more than two miles across, and travel dozens of miles.

A tornado may arrive with a squall line or cold front and touch down quickly. Smaller tornados can strike without warning. Other times tornado watches and sirens will alert communities of high potential tornado producing weather or an already formed tornado and its likely path.

Since 2007, the United States uses the Enhanced Fujita Scale to categorize tornados. The scale correlates wind speed values per F level and provides a rubric for estimating damage.





**Table 4.150: Enhanced Fujita Scale**

Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
EF0	65-85	53.5%	Light. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornados with no reported damage (i.e. those that remain in open fields) are always rated EF0.
EF1	86-110	31.6%	Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	10.7%	Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes complete destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	0.7%	Devastating. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	<0.1%	Explosive. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur.

Source: NOAA Storm Prediction Center

#### 4.19.2 – Previous Occurrences

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

**Table 4.151: Kansas Region F FEMA Tornado Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28– 07/12/2019)	Severe Storms, Straight-line Winds, <b>Tornados</b> , Flooding, Landslides, and Mudslides	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$590,356
<b>4230</b>	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, <b>Tornados</b> , Straight-line Winds, and Flooding	Clay, Cloud, Doniphan, Ellsworth, Jewell, and Republic	\$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	Severe Storms, Straight-line Winds, <b>Tornados</b> , and Flooding	Clay, Cloud, Dickinson, Ellsworth, Ottawa, Republic, and Saline	\$11,412,827





**Table 4.151: Kansas Region F FEMA Tornado Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
4063	05/24/2012 (4/14-4/15/2012)	Severe Storms, <b>Tornados</b> , Straight-line Winds and Flooding	Ellsworth, Jewell, Mitchell, and Osborne	\$6,923,919
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, Straight-line Winds, <b>Tornados</b> and Flooding	Clay, Cloud, Jewell, Lincoln, Mitchell, Morton, Osborne, Ottawa, Republic, and Smith	\$8,259,620
1932	08/10/2010 (6/7-7/21/2010)	Severe Storms, Flooding and <b>Tornados</b>	Clay, Cloud, Jewell, Mitchell, Osborne, Republic, and Smith	\$9,279,257
1776	07/09/2008	Severe Storms, Flooding, and <b>Tornados</b>	Clay, Dickinson, Ellsworth, Franklin, Jewell, Osborne, Republic, Saline, Seward, and Smith	\$70,629,544
1699	5/6/2007 (5/4/2007)	Severe Storms, <b>Tornados</b> , and Flooding	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$117,565,269
1535	8/3/2004 (6/12-7/25/2004)	Severe Storms, Flooding, and <b>Tornados</b>	Jewell, Mitchell, Osborne, and Smith	\$12,845,892

Source: FEMA

-: Data unavailable

The following provides details concerning Presidential Disaster Declarations DR 4230 for Kansas Region F. A FEMA summary writeup concerning declarations DR-4449 was unavailable.

**Kansas – Severe Storms, Tornados, Straight-Line Winds, and Flooding  
FEMA-4230-DR**

Declared July 20, 2015

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

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





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

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

**Table 4.152: Kansas Region F NCEI Tornado Events, 2009 - 2018**

County	Number of Days with Event	Property Damage	Deaths	Injuries	Highest Rated Tornado
Clay	7	\$0	0	0	EF1
Cloud	5	\$0	0	0	EF4
Dickinson	3	\$0	0	5	EF
Ellsworth	4	\$0	0	0	EF4
Jewell	6	\$3,490,000	0	2	EF4
Lincoln	5	\$175,000	0	0	EF1
Mitchell	3	\$125,000	0	0	EF1
Osborne	5	\$497,000	0	0	EF2
Ottawa	8	\$10,000	0	0	EF3
Republic	6	\$6	0	0	EF3
Saline	11	\$145,000	0	0	EF3
Smith	3	\$1,420,000	0	1	EF3

Source: NOAA NCEI

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

- **May 1, 2018: Saline County**

A supercell thunderstorm produced a tornado, across northern portions of Saline county, Kansas, 7 miles northwest of Salina, Kansas. When the tornado touched down, it produced damage to a metal barn. Part of the roof had been blown off and some of the side walls had been blown out. The tornado continued to track to the northwest and moved into Ottawa county, Kansas, just to the east of the town of Tescott. Property damage was recorded at \$100,000.

- **May 25, 2016: Dickinson County**

The tornado tracked 2-3 miles north of the city of Abilene following a meandering path approximately east along 2700 avenue in Dickinson county before veering southeast and crossing interstate 70 approx. 2 miles west of the city of Chapman. The tornado then moved ESE and then east along a path around 1 mile south of Chapman destroying 1 farmstead and several other homes in the area. The worst damage was done to a farmstead 1 mile southwest of Chapman along old highway 40 where the home was destroyed, and all outbuildings were blown away. The sub floor of the home was removed from a bolted sill plate and the poured concrete foundation was cracked on the south side exposing the rebar where the strongest forces from the lifting structure occurred as it was being removed and blown away likely occurred. Much of the brick facade of the home did remain where it fell around the structure however, so the area was not swept clean. Winds approaching 200 mph were likely in this area while a woman home at the time took shelter in the







basement and was ok with only superficial injuries. The approximate number of minor injuries was 5 reported to NWS however none required a hospital visit.

- **May 6, 2015: Jewell County**

This tornado started west of Mankato, traveling north and passing approximately 1 mile to the west of Burr Oak before turning more to the northeast and lifting. One woman was injured at her home approximately 4 miles south-southwest of Burr Oak. This tornado was rated an EF2, with an estimated peak wind speed of 130 MPH. Along the path of this tornado, at least 4 homes sustained damage, including roof, window and siding damage. One home lost a large section of its roof. A garage was destroyed, with the vehicles inside moved 30-50 feet from their original location. Other outbuildings, grain bins, power poles and trees were damaged or destroyed. Property damage was recorded at \$3,005,000.

- **May 27, 2013: Jewell County**

This tornado affected two counties in north central Kansas, touching down north of Lebanon in Smith County and lifting north of Esbon in Jewell County. Along its path, this tornado caused minor to major tree damage, overturned irrigation pivots, snapped power poles and damaged or destroyed grain bins and outbuildings. One person suffered minor injuries and was treated and released from an area hospital. Property damage was recorded at \$400,000.

- **May 27, 2013: Smith County**

This tornado affected two counties in north central Kansas, touching down north of Lebanon in Smith County and lifting north of Esbon in Jewell County. Along its path, this tornado caused minor to major tree damage, overturned irrigation pivots, snapped power poles and damaged or destroyed grain bins and outbuildings. Four homesteads suffered damage, with the hardest hit locations approximately three miles northeast of Lebanon in Smith County. Two homes in this area were heavily damaged or destroyed, with one losing its entire second level. This location also completely lost grain bins, a large outbuilding and newly constructed garage. One person suffered minor injuries and was treated and released from an area hospital. Property damage was recorded at \$3,000,000.

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 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 14 tornado related claims on 1,190 acres for \$91,798.

**Table 4.153: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Tornados**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	3	286	\$16,676
Cloud	1	12	\$1,376
Dickinson	1	62	\$8,005
Ellsworth	1	105	\$3,809
Jewell	1	105	\$3,809
Lincoln	0	0	\$0
Mitchell	0	0	\$0





**Table 4.153: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Tornadoes**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Osborne	0	0	\$0
Ottawa	2	72	\$14,511
Republic	1	175	\$21,232
Saline	1	61	\$3,914
Smith	3	312	\$18,466

Source: USDA Farm Service Agency

### 4.19.3 – Hazard Probability Analysis

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

**Table 4.154: Clay County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	7
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	3
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	286
Average Number of Acres Damaged per Year	29
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$16,676
Average Crop Damage per Year	\$1,668

Source: NCEI and USDA

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

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

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

- <1 insurance claim
- 29 acres impacted
- \$1,668 in insurance claims

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





**Table 4.155: Cloud County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	5
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	12
Average Number of Acres Damaged per Year	1
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,376
Average Crop Damage per Year	\$138

Source: NCEI and USDA

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

- One event
- No deaths or injuries
- \$70,000 in property damages

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

- <1 insurance claim
- One acres impacted
- \$138 in insurance claims

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

**Table 4.156: Dickinson County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Deaths or Injuries (2009-2018)	5
Average Number of Deaths or Injuries	1
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	62
Average Number of Acres Damaged per Year	6
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$8,005
Average Crop Damage per Year	\$801

Source: NCEI and USDA





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

- <1 event
- One death or injury
- \$0 in property damages

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

- <1 insurance claim
- Six acres impacted
- \$801 in insurance claims

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

**Table 4.157: Ellsworth County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	4
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	105
Average Number of Acres Damaged per Year	11
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,809
Average Crop Damage per Year	\$381

Source: NCEI and USDA

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

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

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

- <1 insurance claim
- 11 acres impacted
- \$381 in insurance claims

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





**Table 4.158: Jewell County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	6
Average Events per Year	1
Deaths or Injuries (2009-2018)	2
Average Number of Deaths or Injuries	<1
Total Reported NCEI Property Damage (2009-2018)	\$3,490,000
Average Property Damage per Year	\$349,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	105
Average Number of Acres Damaged per Year	11
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	3,809
Average Crop Damage per Year	381

Source: NCEI and USDA

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

- One event
- <1 death or injury
- \$349,000 in property damages

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

- <1 insurance claim
- 11 acres impacted
- \$381 in insurance claims

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

**Table 4.159: Lincoln County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	5
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$175,000
Average Property Damage per Year	\$17,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA







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

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

According to the USDA Risk Management Agency, Lincoln 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 **Mitchell County**.

**Table 4.160: Mitchell County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$125,000
Average Property Damage per Year	\$12,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

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

- <1 event
- No deaths or injuries
- \$125,000 in property damages

According to the USDA Risk Management Agency, Mitchell 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 **Osborne County**.

**Table 4.161: Osborne County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	5
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$497,000
Average Property Damage per Year	\$49,700
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: NCEI and USDA

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

- One event
- No deaths or injuries
- \$49,700 in property damages

According to the USDA Risk Management Agency, Osborne 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 **Ottawa County**.

**Table 4.162: Ottawa County Tornado Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	8
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$10,000
Average Property Damage per Year	\$1,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	2
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	72
Average Number of Acres Damaged per Year	7





**Table 4.162: Ottawa County Tornado Probability Summary**

Data	Recorded Impact
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$14,511
Average Crop Damage per Year	\$1,451

Source: NCEI and USDA

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

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

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

- <1 insurance claim
- Seven acres impacted
- \$1,451 in insurance claims

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

**Table 4.163: Republic County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	6
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$0
Average Property Damage per Year	\$0
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	175
Average Number of Acres Damaged per Year	18
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$21,232
Average Crop Damage per Year	\$2,123

Source: NCEI and USDA

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

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

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





- <1 insurance claim
- 18 acres impacted
- \$2,123 in insurance claims

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

**Table 4.164: Saline County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	11
Average Events per Year	1
Deaths or Injuries (2009-2018)	0
Average Number of Deaths or Injuries	0
Total Reported NCEI Property Damage (2009-2018)	\$145,000
Average Property Damage per Year	\$14,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	1
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	61
Average Number of Acres Damaged per Year	6
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,914
Average Crop Damage per Year	\$391

Source: NCEI and USDA

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

- One event
- No deaths or injuries
- \$14,500 in property damages

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

- <1 insurance claim
- Six acres impacted
- \$391 in insurance claims

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

**Table 4.165: Smith County Tornado Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	3
Average Events per Year	<1
Deaths or Injuries (2009-2018)	1
Average Number of Deaths or Injuries	<1
Total Reported NCEI Property Damage (2009-2018)	\$1,420,000
Average Property Damage per Year	\$142,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	3





**Table 4.165: Smith County Tornado Probability Summary**

Data	Recorded Impact
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	312
Average Number of Acres Damaged per Year	31
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$18,466
Average Crop Damage per Year	\$1,847

Source: NCEI and USDA

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

- <1 event
- <1 death or injury
- \$142,000 in property damages

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

- <1 insurance claim
- 31 acres impacted
- \$1,847 in insurance claims

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

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

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

- **Probability of an EF2 or greater tornado:** One event per year

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

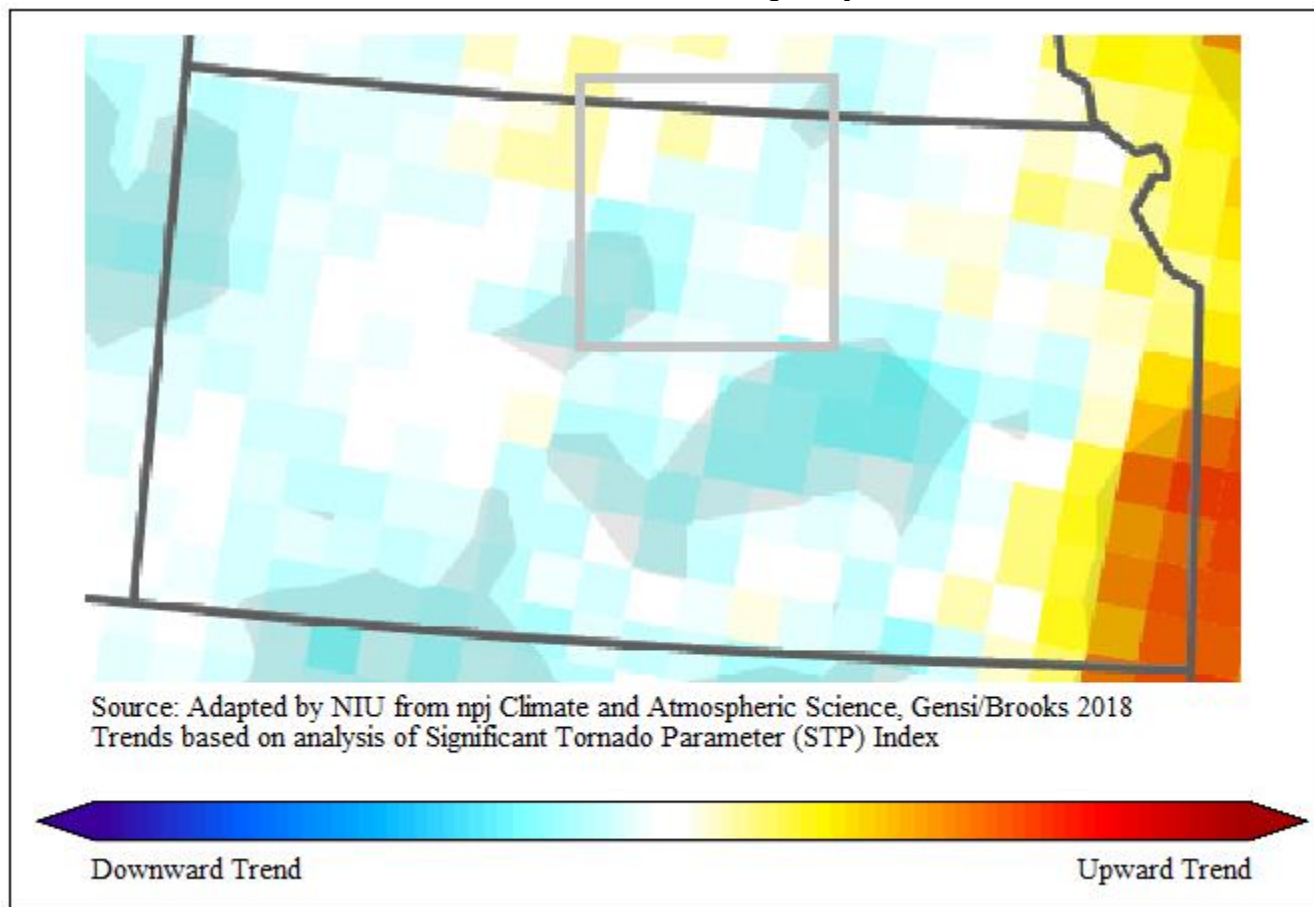
Research conducted by the National Severe Storms Lab looked at Significant Tornado Parameter (STP) to help determine future tornado probability. STP is a measurement of the major parameters of tornado conditions, including wind speed and direction, wind at differing altitudes, unstable air patterns,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







### Tornado Environmental Frequency Trends



#### 4.19.4 – Vulnerability Analysis

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

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region F county incurring damage over the period 2009 to 2018 from tornado events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.166: Kansas Region F Structural Vulnerability Data for Tornadoes, 2009-2018**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Clay	\$1,023,498,000	\$0	0.00%
Cloud	\$1,082,981,000	\$0	0.00%
Dickinson	\$2,316,840,000	\$0	0.00%
Ellsworth	\$774,908,000	\$0	0.00%
Jewell	\$454,048,000	\$3,490,000	0.77%
Lincoln	\$587,611,000	\$175,000	0.03%





**Table 4.166: Kansas Region F Structural Vulnerability Data for Tornadoes, 2009-2018**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Mitchell	\$856,638,000	\$125,000	0.01%
Osborne	\$538,604,000	\$497,000	0.09%
Ottawa	\$736,439,000	\$10,000	0.00%
Republic	\$740,126,000	\$6	0.00%
Saline	\$6,516,698,000	\$145,000	0.00%
Smith	\$525,625,000	\$1,420,000	0.27%

Source: NCEI and HAZUS

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

**Table 4.167: Kansas Region F Population Vulnerability Data for Tornadoes**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

Source: US Census Bureau

The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of tornadoes on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to tornado events.

**Table 4.168: Tornado Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	29	0.01%	\$121,175,000	\$1,668	0.00%
Cloud	322,034	1	0.00%	\$77,485,000	\$138	0.00%
Dickinson	519,171	6	0.00%	\$149,543,000	\$801	0.00%
Ellsworth	390,042	11	0.00%	\$48,318,000	\$381	0.00%
Jewell	436,206	11	0.00%	\$149,501,000	\$381	0.00%





**Table 4.168: Tornado Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Lincoln	384,740	0	0.00%	\$58,151,000	\$0	0.00%
Mitchell	414,220	0	0.00%	\$126,462,000	\$0	0.00%
Osborne	437,083	0	0.00%	\$62,499,000	\$0	0.00%
Ottawa	439,335	7	0.00%	\$108,378,000	\$1,451	0.00%
Republic	373,206	18	0.00%	\$187,529,000	\$2,123	0.00%
Saline	358,243	6	0.00%	\$73,581,000	\$391	0.00%
Smith	541,742	31	0.01%	\$129,261,000	\$1,847	0.00%

Source: USDA

Between 2001 and 2010 51% of those killed by tornados were living in mobile homes, according to the NOAA. A 2012 “Kansas Severe Weather Awareness Week” report indicates that people living in mobile homes are killed by tornados at a rate 20 times higher than people living in permanent homes. Additionally, a new study from Michigan State University reported that the two biggest factors related to tornado fatalities were housing quality (measured by mobile homes as a proportion of housing units) and income level. When a tornado strikes, a county with double the number of mobile homes as a proportion of all homes will experience 62% more fatalities than a county with fewer mobile homes, according to the study data.

The following participating jurisdictions may have increased vulnerability to tornado events due to having greater than 20% of housing stock as mobile homes:

- **Manchester** (Dickinson County)
- **Weber** (Jewell County)
- **Culver** (Ottawa County)
- **New Cambria** (Saline County)

#### 4.19.5 – Impact and Consequence Analysis

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

**Table 4.169: Tornado Consequence Analysis**

Subject	Impacts of Tornado
Health and Safety of the Public	Impact of the immediate area could be severe depending on whether individuals were able to seek shelter and get out of the trajectory of the tornado. Casualties are dependent on warning systems and warning times.
Health and Safety of Responders	Impact to responders is expected to be minimal unless responders live within the affected area.
Continuity of Operations	Temporary to permanent relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the trajectory path. Roads, buildings, and communications could be adversely affected. Damage could be severe.





**Table 4.169: Tornado Consequence Analysis**

<b>Subject</b>	<b>Impacts of Tornado</b>
Environment	Impact will be severe for the immediate impacted area. Impact will lessen as distance increases from the immediate incident area.
Economic Conditions	Impacts to the economy will greatly depend on the trajectory of the tornado. If a jurisdiction takes a direct hit, then the economic conditions will be severe. With an indirect hit the impact could be low to severe.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Warning systems and warning time will also be questioned.





## 4.20 – Wildfire

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



### 4.20.1 – Location and Extent

Wildfires in Kansas Region F 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 F, do pose fire management issues due to the expansion of the Wildland Urban Interface (WUI) in recent decades.

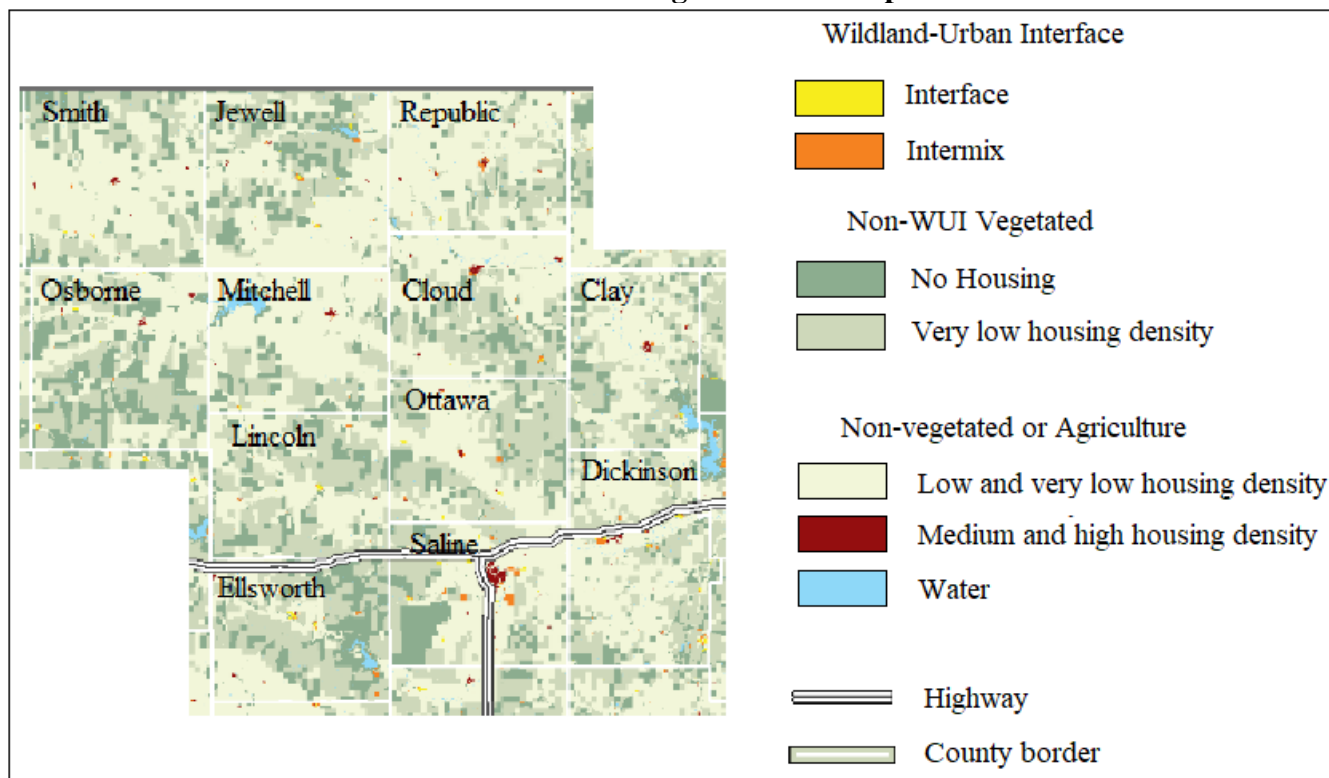
The WUI creates an environment in which fire can move readily between structural and vegetation fuels. Two types of WUI are mapped: intermixed and interface. Intermix WUI are areas where housing and vegetation intermingle; interface WUI are areas with housing in the vicinity of dense, contiguous wildland vegetation. The following maps detail WUI areas and information for Kansas Region F.





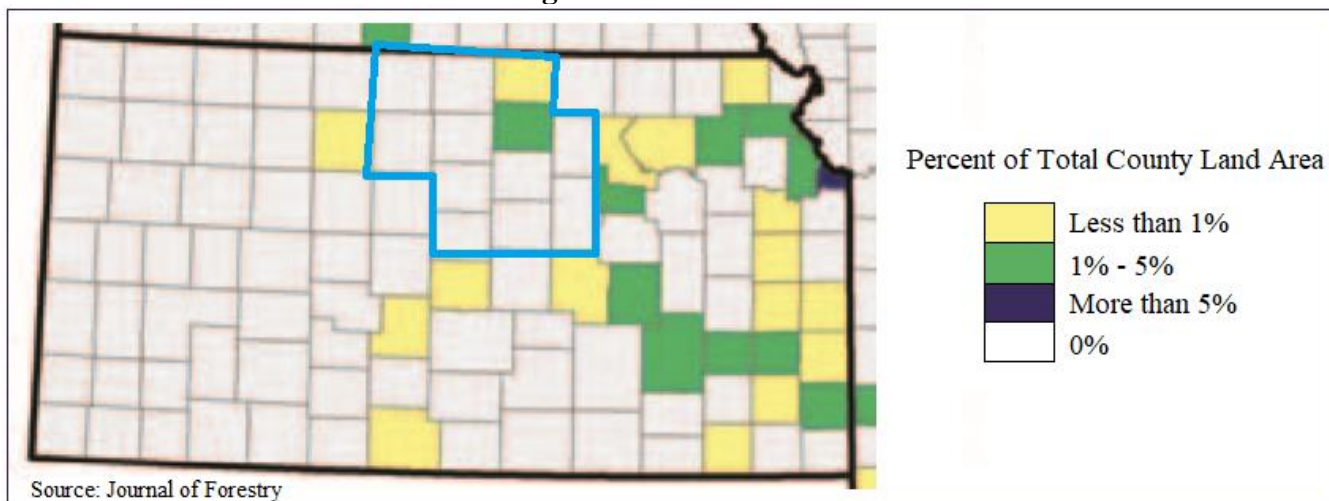


### SILVIS Labs Regional WUI Map



The Eastern Redcedar is of concern to Kansas Region F. This invasive evergreen species can take over fence rows and un-planted fields, adding to wildfire fuel and risk. The following 2012 map, from the Journal of Forestry, indicates the percent of the total regional acreage impacted by Eastern Redcedar.

### Percent of Total Regional Land Area of Eastern Redcedar





## 4.20.2 – Previous Occurrences

In the 20-year period from 1999 to present, there one Fire Management Assistance Declaration for Kansas Region F.

- FM 5172: Declared on March 06, 2017  
Incident Period: March 04, 2017 - March 15, 2017  
Regional Counties: Ellsworth and Lincoln  
Dollars Obligated: \$142,453  
Acres Burned: Estimated at 656,000 acres Over 21 Kansas counties

In the 20-year period from 1999 to present, there have been no Presidential Disaster Declarations for Kansas Region F for wildfires.

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

**Table 4.170: Kansas Region F State Fire Marshall Recorded Wildfire Events, 2013-2018**

County	Number of Reported Fires	Deaths	Injuries	Buildings Burned	Burned Acres
Clay	64	0	0	0	3,727
Cloud	53	0	0	2	4,384
Dickinson	87	1	2	0	6,642
Ellsworth	47	0	0	0	6,595
Jewell	23	0	0	0	1,415
Lincoln	9	0	0	0	393
Mitchell	30	0	0	0	937
Osborne	11	0	0	0	1,110
Ottawa	44	0	0	0	4,025
Republic	20	0	0	0	572
Saline	68	0	0	0	4,926
Smith	15	0	0	1	2,140

Source: KSFM

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of wildfires on the region’s agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates one wildfire related claims on six acres for \$169.

**Table 4.171: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Wildfires**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	0	0	\$0
Cloud	0	0	\$0
Dickinson	0	0	\$0
Ellsworth	6	256	\$27,801
Jewell	0	0	\$0





**Table 4.171: USDA Risk Management Agency Cause of Loss Indemnities 2009-2018, Wildfires**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Lincoln	3	74	\$14,933
Mitchell	0	0	\$0
Osborne	0	0	\$0
Ottawa	0	0	\$0
Republic	0	0	\$0
Saline	0	0	\$0
Smith	0	0	\$0

Source: USDA Farm Service Agency

### 4.20.3 – Hazard Probability Analysis

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

**Table 4.172: Clay County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	64
Average Events per Year	11
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	3,727
Average Burned Acres per Year	621
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

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

- 11 events
- No deaths or injuries
- No buildings burned
- 621 acres burned

According to the USDA Risk Management Agency, Clay 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 **Cloud County**.

**Table 4.173: Cloud County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	53
Average Events per Year	9
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	2
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	4,384
Average Burned Acres per Year	731
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

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

- Nine events
- No deaths or injuries
- <1 building burned
- 731 acres burned

According to the USDA Risk Management Agency, Cloud 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 **Dickinson County**.

**Table 4.174: Dickinson County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	87
Average Events per Year	15
Number Deaths or Injuries (2013-2018)	3
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)	6,642
Average Burned Acres per Year	1,107
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0





**Table 4.174: Dickinson County Wildfire Probability Summary**

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

Source: KSFM and NOAA

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

- 15 events
- One death or injury
- No buildings burned
- 1,107 acres burned

According to the USDA Risk Management Agency, Dickinson 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 **Ellsworth County**.

**Table 4.175: Ellsworth County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	47
Average Events per Year	8
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	6,595
Average Burned Acres per Year	1,099
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	6
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	256
Average Number of Acres Damaged per Year	26
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$27,801
Average Crop Damage per Year	\$2,780

Source: KSFM and NOAA

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

- Eight events







- No deaths or injuries
- No buildings burned
- 1,099 acres burned

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

- One insurance claim
- 26 acres impacted
- \$2,780 in insurance claims

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

**Table 4.176: Jewell County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	23
Average Events per Year	4
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	1,415
Average Burned Acres per Year	236
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

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

- 23 events
- No deaths or injuries
- No buildings burned
- 236 acres burned

According to the USDA Risk Management Agency, Jewell 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 **Lincoln County**.





**Table 4.177: Lincoln County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	9
Average Events per Year	2
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	393
Average Burned Acres per Year	66
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	3
Average Number of Claims per Year	<1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	74
Average Number of Acres Damaged per Year	7
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$14,933
Average Crop Damage per Year	\$1,493

Source: KSFM and NOAA

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

- Two events
- No deaths or injuries
- No buildings burned
- 66 acres burned

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

- <1 insurance claim
- Seven acres impacted
- \$1,493 in insurance claims

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

**Table 4.178: Mitchell County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	30
Average Events per Year	5
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	937
Average Burned Acres per Year	156
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0





**Table 4.178: Mitchell County Wildfire Probability Summary**

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

Source: KSFM and NOAA

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

- Five events
- No deaths or injuries
- No buildings burned
- 156 acres burned

According to the USDA Risk Management Agency, Mitchell 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 **Osborne County**.

**Table 4.179: Osborne County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	11
Average Events per Year	2
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	1,110
Average Burned Acres per Year	185
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

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

- Two events





- No deaths or injuries
- No buildings burned
- 185 acres burned

According to the USDA Risk Management Agency, Osborne 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 **Ottawa County**.

**Table 4.180: Ottawa County Wildfire Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of KSFM Reported Events (2013-2018)	44
Average Events per Year	7
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	4,025
Average Burned Acres per Year	671
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

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

- Seven events
- No deaths or injuries
- No buildings burned
- 671 acres burned

According to the USDA Risk Management Agency, Ottawa 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 **Republic County**.

**Table 4.181: Republic County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	20
Average Events per Year	3
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	572
Average Burned Acres per Year	95
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

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

- Three events
- No deaths or injuries
- No buildings burned
- 95 acres burned

According to the USDA Risk Management Agency, Republic 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 **Saline County**.

**Table 4.182: Saline County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	68
Average Events per Year	11
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	0
Average Burned Buildings per Year	0
Total Reported Burned Acres (2013-2018)	4,926
Average Burned Acres per Year	821







**Table 4.182: Saline County Wildfire Probability Summary**

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

Source: KSFM and NOAA

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

- 11 events
- No deaths or injuries
- No buildings burned
- 821 acres burned

According to the USDA Risk Management Agency, Saline 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 **Smith County**.

**Table 4.183: Smith County Wildfire Probability Summary**

Data	Recorded Impact
Number of KSFM Reported Events (2013-2018)	15
Average Events per Year	3
Number Deaths or Injuries (2013-2018)	0
Average Number of Yearly Deaths and Injuries (2013-2018)	0
Total Reported Burned Buildings (2013-2018)	1
Average Burned Buildings per Year	<1
Total Reported Burned Acres (2013-2018)	2,140
Average Burned Acres per Year	357
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	0
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	0
Average Number of Acres Damaged per Year	0
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$0
Average Crop Damage per Year	\$0

Source: KSFM and NOAA

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

- Three events





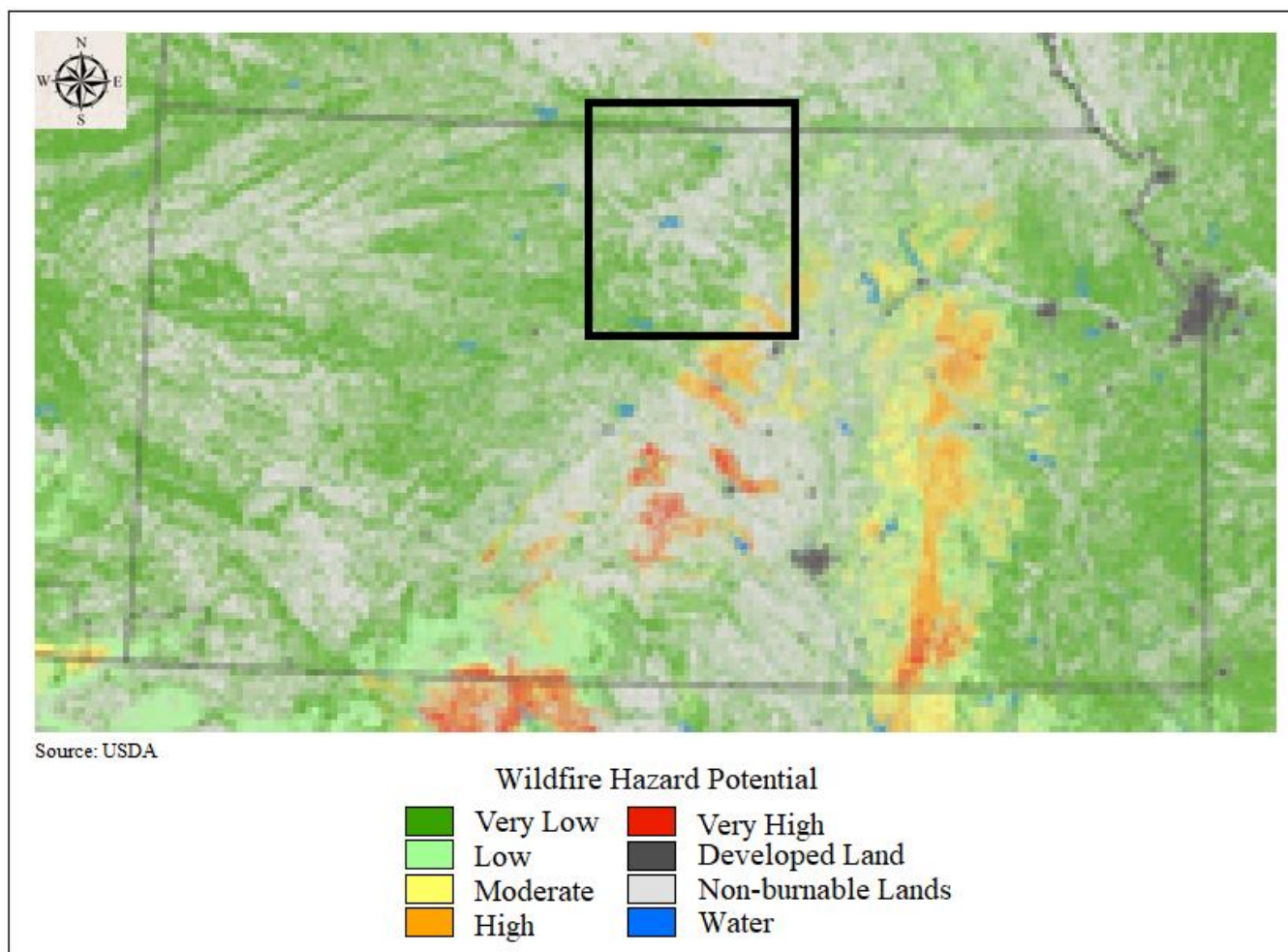
- No deaths or injuries
- <1 building burned
- 357 acres burned

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

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

Mapping created by the USDA in 2018 indicates the Wildfire Hazard Potential for the United States. In general, the map indicates that Kansas Region F is the low and very low class.

### USDA Wildfire Potential Map



#### 4.20.4 – Vulnerability Analysis





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

The following table presents data from HAZUS and KSFM concerning the structures and the percentage of structures for each Kansas Region F county incurring damage over the six-year period of 2013 to 2018 (current available data) from wildfire events. As KSFM did not assign a value to the structures burned, an estimate of \$32,000 per structure (value determined using a commercial cost calculator for an 800 square foot general purpose barn at \$40 per square foot) was used as reports indicate the majority of structures burned were farm out-buildings. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.184: Kansas Region F Structural Vulnerability Data for Wildfires, 2009-2018**

County	HAZUS Building Valuation	KSFM Structure Damage	Percentage of Building Valuation Damaged
Clay	\$1,023,498,000	\$0	0.00%
Cloud	\$1,082,981,000	\$64,000	0.01%
Dickinson	\$2,316,840,000	\$0	0.00%
Ellsworth	\$774,908,000	\$0	0.00%
Jewell	\$454,048,000	\$0	0.00%
Lincoln	\$587,611,000	\$0	0.00%
Mitchell	\$856,638,000	\$0	0.00%
Osborne	\$538,604,000	\$0	0.00%
Ottawa	\$736,439,000	\$0	0.00%
Republic	\$740,126,000	\$0	0.00%
Saline	\$6,516,698,000	\$0	0.00%
Smith	\$525,625,000	\$32,000	0.01%

Source: NCEI and HAZUS

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

**Table 4.185: Kansas Region F Population Vulnerability Data for Wildfires**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%





**Table 4.185: Kansas Region F Population Vulnerability Data for Wildfires**

County	2018 Population	Percent Population Change 2000 to 2018
Smith	3,603	-20.6%

Source: US Census Bureau

The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of wildfires on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to wildfire events.

**Table 4.186: Wildfire Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	0	0.00%	\$121,175,000	\$0	0.00%
Cloud	322,034	0	0.00%	\$77,485,000	\$0	0.00%
Dickinson	519,171	0	0.00%	\$149,543,000	\$0	0.00%
Ellsworth	390,042	26	0.01%	\$48,318,000	\$2,780	0.01%
Jewell	436,206	0	0.00%	\$149,501,000	\$0	0.00%
Lincoln	384,740	7	0.00%	\$58,151,000	\$1,493	0.00%
Mitchell	414,220	0	0.00%	\$126,462,000	\$0	0.00%
Osborne	437,083	0	0.00%	\$62,499,000	\$0	0.00%
Ottawa	439,335	0	0.00%	\$108,378,000	\$0	0.00%
Republic	373,206	0	0.00%	\$187,529,000	\$0	0.00%
Saline	358,243	0	0.00%	\$73,581,000	\$0	0.00%
Smith	541,742	0	0.00%	\$129,261,000	\$0	0.00%

Source: USDA

Potentially lessening future vulnerability to wildfires are Community Wildfire Protection Plans (CWPPs). A CWPP is the most effective way to take advantage of various Federal programs to include the Healthy Forests Restoration Act. By having a CWPP, communities are given priority for funding of Healthy Forests Restoration Act hazardous fuels reduction projects. The three main components of a CWPP are:

- Collaboration between all affected or potentially affected jurisdictions,
- Assessment of the wildfire hazards in an area that leads to recommendation for prioritized fuel reduction, and
- A section on recommendations towards reducing structural ignitability.

Currently the following Kansas Region F county has a pending approval CWPP.

- Osborne County

#### 4.20.5 – Impact and Consequence Analysis

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





**Table 4.187: Wildfire Consequence Analysis**

<b>Subject</b>	<b>Impacts of Wildfire</b>
Health and Safety of the Public	Impact could be severe for people living and working in the immediate area. Surrounding communities may also be impacted by evacuees.
Health and Safety of Responders	Impact to responders could be severe depending on the size and scope of the fire, especially for firefighters. Impact will be low to moderate for support responders with the main threat as smoke inhalation.
Continuity of Operations	Temporary relocation may be necessary if government facilities experience damage.
Property, Facilities, and Infrastructure	Delivery of services could be affected if there is any disruption to the roads and/or utilities due to damages sustained.
Environment	Impact will be severe for the immediate area with regards to trees, bushes, animals, and crops. Impact will lessen as distance increases.
Economic Conditions	Impacts to the economy could be moderate in the immediate area.
Public Confidence in the Jurisdiction's Governance	Response and recovery will be in question if not timely and effective. Evacuation orders and shelter availability could be called in to question.







## 4.21 – Windstorm

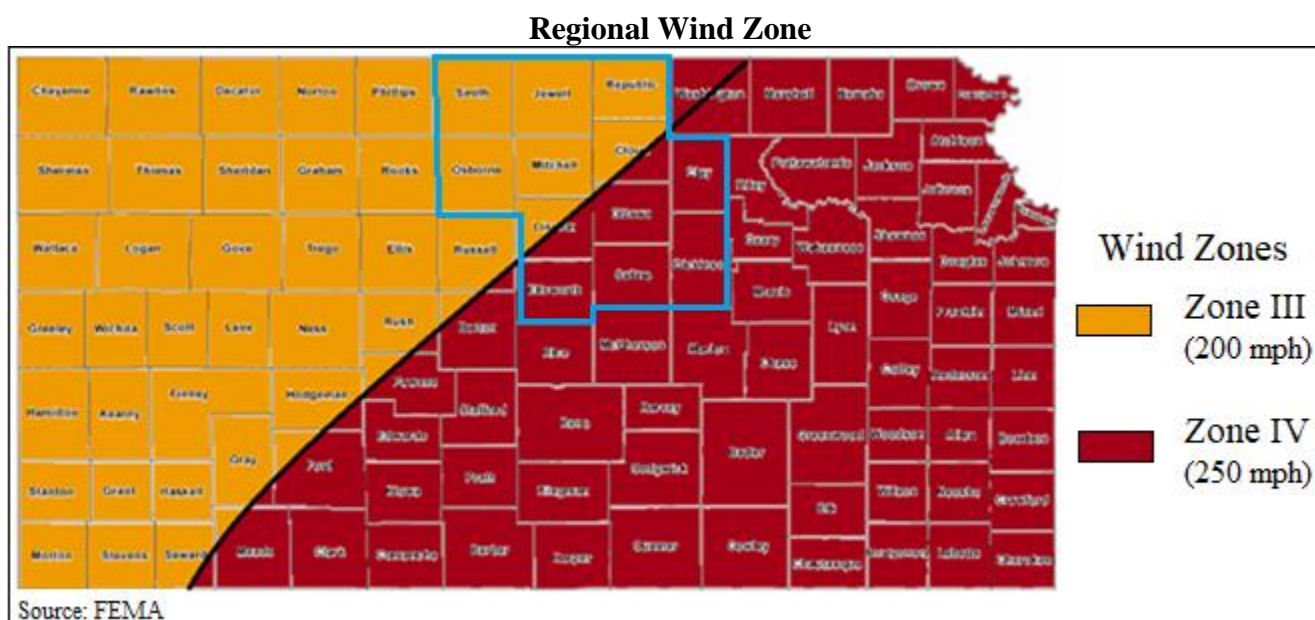
Straight-line winds are generally any thunderstorm wind that is not associated with rotation. It is these winds, which can exceed 100 mph that represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks like tornados, the associated wind damage can be extensive and affect entire counties or regions. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase.



### 4.21.1 – Location and Extent

High winds occur over broad geographic regions. The entire Kansas Region F 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 F is located within wind zones III and IV, the highest inland categories.



Severe thunderstorms strike Kansas Region F 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

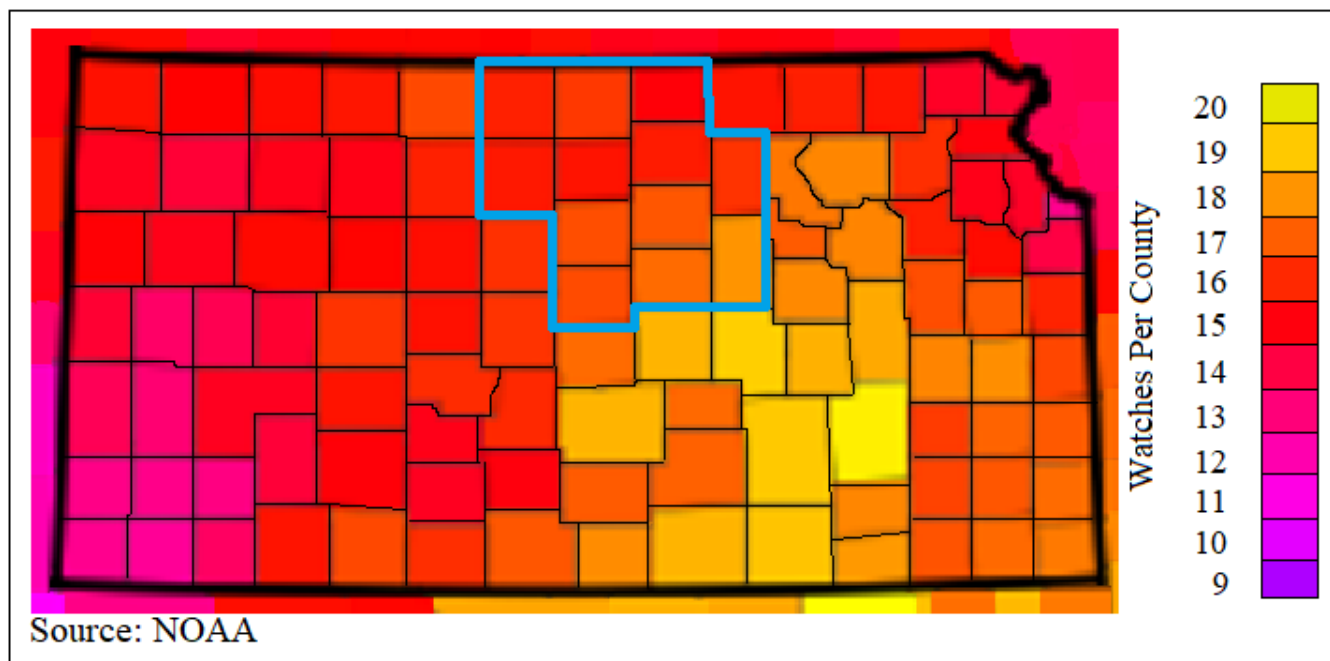




- **Enhanced:** Numerous severe storms possible, more persistent and/or widespread, a few intense
- **Moderate:** Widespread severe storms likely, long-lived, widespread and intense
- **High:** Widespread severe storms expected, long-lived, very widespread and particularly intense

The following map, generated by NOAA, indicates the average number severe thunderstorm watches per year for Kansas Region F.

**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 4.188: Beaufort Scale**

Beaufort Number	Wind Speed (mph)	Effects on Land
0	Under 1	Calm, smoke rises vertically
1	1-3	Smoke drift indicates wind direction, vanes do not move
2	4-7	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Leaves, small twigs in constant motion. Light flags extended.
4	13-18	Dust, leaves and loose paper raised up, small branches move
5	19-24	Small trees begin to sway
6	25-31	Large branches of trees in motion, whistling heard in wires
7	32-38	While trees in motion, resistance felt in walking against the wind
8	39-46	Twigs and small branches broken off trees
9	47-54	Slight structural damage occurs, slate blown from roofs
10	55-63	Seldom experienced on land, trees broken, structural damage occurs
11	64-72	Very rarely experienced on land, usually with widespread damage
12	73 or higher	Violence and destruction





### 4.21.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been six Presidential Disaster Declarations for Kansas Region F for Straight-Line Winds (along with other associated hazard events). The following 20-year information (with 1999 and 2018 being full data years) on past declared disasters is presented to provide a historical perspective on high wind events that have impacted Kansas Region F. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

**Table 4.189: Kansas Region F FEMA Straight-Line Winds Disaster and Emergency Declarations, 1999 -2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4449</b>	06/20/2019 (04/28 – 07/12/2019)	Severe Storms, <b>Straight-line Winds</b> , Tornadoes, Flooding, Landslides, and Mudslides	Clay, Cloud, Dickinson, Ellsworth, Lincoln, Osborne, Ottawa, Saline, and Smith	\$590,356
<b>4417</b>	02/25/2019 (10/04-10/15/2018)	Severe Storms, <b>Straight-line Winds</b> , And Flooding	Ottawa	\$445,154
<b>4230</b>	07/20/2015 (05/04/2015 – 06/21/2015)	Severe Storms, Tornadoes, <b>Straight-line Winds</b> , and Flooding	Clay, Cloud, Doniphan, Ellsworth, Jewell, and Republic	\$13,848,325
4150	10/22/2013 (07/22/2013 – 08/15/2013)	Severe Storms, <b>Straight-line Winds</b> , Tornadoes, and Flooding	Clay, Cloud, Dickinson, Ellsworth, Ottawa, Republic, and Saline	\$11,412,827
4063	05/24/2012 (4/14-4/15/2012)	Severe Storms, Tornadoes, <b>Straight-line Winds</b> and Flooding	Ellsworth, Jewell, Mitchell, and Osborne	\$6,923,919
4010	07/29/2011 (5/19-6/4/2011)	Severe Storms, <b>Straight-line Winds</b> , Tornadoes and Flooding	Clay, Cloud, Jewell, Lincoln, Mitchell, Morton, Osborne, Ottawa, Republic, and Smith	\$8,259,620

Source: FEMA

-: Data unavailable

The following provides details concerning Presidential Disaster Declarations DR 4230 for Kansas Region F. FEMA summary writeups concerning declarations DR-4449 and DR-4417 were unavailable.

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

##### **FEMA-4230-DR**

Declared July 20, 2015

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





such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.

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

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

**Table 4.190: Kansas Region F NCEI High Wind Events, 2009 - 2018**

County	Number of Days with Events	Property Damage	Highest Recorded Wind Speed	Deaths	Injuries
Clay	32	\$22,000	76 Knots	0	0
Cloud	43	\$46,000	70 Knots	0	0
Dickinson	49	\$35,000	78 Knots	0	1
Ellsworth	48	\$191,100	78 Knots	0	0
Jewell	28	\$904,000	75 Knots	0	0
Lincoln	45	\$814,000	74 Knots	0	0
Mitchell	44	\$2,147,000	78 Knots	0	0
Osborne	33	\$713,000	70 Knots	0	0
Ottawa	47	\$31,500	70 Knots	0	0
Republic	32	\$25,000	70 Knots	0	10
Saline	43	\$846,500	65 Knots	0	0
Smith	29	\$760,000	70 Knots	0	0

Source: NOAA NCEI

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

- October 6, 2018: Kanopolis Reservoir, Ellsworth County**  
Ten to fifteen power poles were knocked down along Kansas Highway 4 near the Ellsworth and McPherson county line. Property damage was recorded at \$70,000.
- September 1, 2018: Mankato, Jewell County**  
Wind gusts estimated to be near 70 MPH resulted in tree limbs being downed in Mankato and a power pole being snapped near Montrose. In the Lovewell State Park area, a roof of an old radio





communications building was torn off and nearby crops were damaged. Property damage was recorded at \$50,000.

- **May 1, 2018: Wilson, Ellsworth County**  
The Kansas Highway Patrol reported that a semi had jack knifed on Interstate 70 due to the strong winds. Property damage was recorded at \$20,000.
- **December 25, 2016: Lincoln County**  
High winds blew a roof off a barn. Property damage was recorded at \$500,000.
- **September 10, 2015: Burr Oak, Jewell County**  
High winds resulted in \$150,000 in property damage.
- **September 7, 2015: Dickinson County**  
A roof was blown off a farmhouse at 1600 Eden rd. Minor injuries reported.
- **October 2, 2014: Mitchell County**  
Significant home damage was reported in this area. Approximately another mile and a half east, a farm Quonset was destroyed. Property damage was recorded at \$1,500,000.
- **August 9, 2014: Lebanon, Smith County**  
Wind gusts were estimated to be upwards of 80 MPH. Emergency management reported that 14 power poles and numerous tree limbs were downed. Property damage was recorded at \$350,000.
- **May 6, 2010: Courtland, Republic County**  
Numerous trees were blown down. Powers lines were blown down in town. A total for 4 buildings on the north edge of town were blown down. Ten injuries were reported.

Available crop loss data from the USDA Risk Management Agency detailing cause of loss was researched to determine the financial impacts of high on the region’s agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 173 high wind related claims on 16,833 acres for \$1,507,774.

**Table 4.191: USDA Risk Management Agency Cause of Loss Indemnities  
2009-2018, High Winds**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	4	466	\$20,807
Cloud	20	1,879	\$242,923
Dickinson	11	932	\$105,802
Ellsworth	12	583	\$46,935
Jewell	26	4,210	\$409,854
Lincoln	12	587	\$37,545
Mitchell	14	788	\$54,220
Osborne	22	2,748	\$282,219
Ottawa	14	1,074	\$48,833
Republic	18	1,068	\$93,236







**Table 4.191: USDA Risk Management Agency Cause of Loss Indemnities  
2009-2018, High Winds**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Saline	10	1,293	\$74,752
Smith	10	1,255	\$90,648

Source: USDA Farm Service Agency

### 4.21.3 – Hazard Probability Analysis

The following table summarizes high wind probability data for **Clay County**.

**Table 4.192: Clay County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	32
Average Events per Year	3
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$22,000
Average Property Damage per Year	\$2,200
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	4
Average Number of Claims per Year	0
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	466
Average Number of Acres Damaged per Year	47
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$20,807
Average Crop Damage per Year	\$2,081

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- \$2,200 in property damages

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

- <1 insurance claim
- 27 acres impacted
- \$990 in insurance claims

The following table summarizes high wind probability data for **Cloud County**.

**Table 4.193: Cloud County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	43
Average Events per Year	4
Deaths or Injuries (2009-2018)	0





Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$46,000
Average Property Damage per Year	\$4,600
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	20
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,879
Average Number of Acres Damaged per Year	188
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$242,923
Average Crop Damage per Year	\$24,292

Source: NCEI and USDA

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

- Four events
- No deaths or injuries
- \$4,600 in property damages

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

- Two insurance claims
- 188 acres impacted
- \$24,292 in insurance claims

The following table summarizes High wind probability data for **Dickinson County**.

**Table 4.194: Dickinson County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	49
Average Events per Year	5
Deaths or Injuries (2009-2018)	1
Average Number of Days with Death or Injury	<1
Total Reported NCEI Property Damage (2009-2018)	\$35,000
Average Property Damage per Year	\$3,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	11
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	932
Average Number of Acres Damaged per Year	93
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$105,802
Average Crop Damage per Year	\$10,580

Source: NCEI and USDA

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

- Five events





- <1 death or injury
- \$3,500 in property damages

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

- One insurance claims
- 93 acres impacted
- \$10,580 in insurance claims

The following table summarizes high wind probability data for **Ellsworth County**.

**Table 4.195: Ellsworth County High Wind Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	48
Average Events per Year	5
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$191,100
Average Property Damage per Year	\$19,110
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	12
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	583
Average Number of Acres Damaged per Year	58
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$46,935
Average Crop Damage per Year	\$4,694

Source: NCEI and USDA

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

- Five events
- No deaths or injuries
- \$19,110 in property damages

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

- One insurance claim
- 58 acres impacted
- \$4,694 in insurance claims

The following table summarizes high wind probability data for **Jewell County**.





**Table 4.196: Jewell County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	28
Average Events per Year	3
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$904,000
Average Property Damage per Year	\$90,400
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	26
Average Number of Claims per Year	3
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	4,210
Average Number of Acres Damaged per Year	421
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$409,854
Average Crop Damage per Year	\$40,985

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- \$90,400 in property damages

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

- Three insurance claims
- 421 acres impacted
- \$40,985 in insurance claims

The following table summarizes high wind probability data for **Lincoln County**.

**Table 4.197: Lincoln County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	45
Average Events per Year	5
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$814,000
Average Property Damage per Year	\$81,400
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	12
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	587
Average Number of Acres Damaged per Year	59
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$37,545
Average Crop Damage per Year	\$3,755

Source: NCEI and USDA





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

- Five events
- No deaths or injuries
- \$81,400 in property damages

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

- One insurance claim
- 59 acres impacted
- \$3,755 in insurance claims

The following table summarizes High wind probability data for **Mitchell County**.

**Table 4.198: Mitchell County High Wind Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Number of Days with NCEI Reported Event (2009-2018)	44
Average Events per Year	4
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$2,147,000
Average Property Damage per Year	\$214,700
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	14
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	788
Average Number of Acres Damaged per Year	79
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$54,220
Average Crop Damage per Year	\$5,422

Source: NCEI and USDA

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

- Four events
- No deaths or injuries
- \$214,700 in property damages

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

- One insurance claim
- 79 acres impacted
- \$5,422 in insurance claims







The following table summarizes high wind probability data for **Osborne County**.

**Table 4.199: Osborne County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	33
Average Events per Year	3
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$713,000
Average Property Damage per Year	\$71,300
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	22
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	2,748
Average Number of Acres Damaged per Year	275
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$282,219
Average Crop Damage per Year	\$28,222

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- \$71,300 in property damages

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

- Two insurance claims
- 275 acres impacted
- \$28,222 in insurance claims

The following table summarizes high wind probability data for **Ottawa County**.

**Table 4.200: Ottawa County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	47
Average Events per Year	5
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$31,500
Average Property Damage per Year	\$3,150
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	14
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,074
Average Number of Acres Damaged per Year	107
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$48,833





**Table 4.200: Ottawa County High Wind Probability Summary**

Data	Recorded Impact
Average Crop Damage per Year	\$4,883

Source: NCEI and USDA

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

- Five events
- No deaths or injuries
- \$3,150 in property damages

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

- One insurance claim
- 107 acres impacted
- \$4,883 in insurance claims

The following table summarizes high wind probability data for **Republic County**.

**Table 4.201: Republic County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	32
Average Events per Year	3
Deaths or Injuries (2009-2018)	10
Average Number of Days with Death or Injury	1
Total Reported NCEI Property Damage (2009-2018)	\$25,000
Average Property Damage per Year	\$2,500
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	18
Average Number of Claims per Year	2
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,068
Average Number of Acres Damaged per Year	107
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$93,236
Average Crop Damage per Year	\$9,324

Source: NCEI and USDA

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

- Three events
- One death or injury
- \$2,500 in property damages

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





- Two insurance claims
- 107 acres impacted
- \$9,324 in insurance claims

The following table summarizes high wind probability data for **Saline County**.

**Table 4.202: Saline County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	43
Average Events per Year	4
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$846,500
Average Property Damage per Year	\$84,650
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	10
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,293
Average Number of Acres Damaged per Year	129
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$74,752
Average Crop Damage per Year	\$7,475

Source: NCEI and USDA

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

- Four events
- No deaths or injuries
- \$84,650 in property damages

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

- One insurance claim
- 129 acres impacted
- \$7,475 in insurance claims

The following table summarizes high wind probability data for **Smith County**.

**Table 4.203: Smith County High Wind Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	29
Average Events per Year	3
Deaths or Injuries (2009-2018)	0
Average Number of Days with Death or Injury	0
Total Reported NCEI Property Damage (2009-2018)	\$760,000





**Table 4.203: Smith County High Wind Probability Summary**

<b>Data</b>	<b>Recorded Impact</b>
Average Property Damage per Year	\$76,000
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	10
Average Number of Claims per Year	1
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	1,255
Average Number of Acres Damaged per Year	126
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$90,648
Average Crop Damage per Year	\$9,065

Source: NCEI and USDA

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

- Three events
- No deaths or injuries
- \$76,000 in property damages

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

- One insurance claim
- 126 acres impacted
- \$9,065 in insurance claims

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

#### **4.21.4 – Vulnerability Analysis**

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

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region F county incurring damage over the period 2009 to 2018 from high wind events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

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**Table 4.204: Kansas Region F Structural Vulnerability Data for High Winds, 2009-2018**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Clay	\$1,023,498,000	\$22,000	0.00%
Cloud	\$1,082,981,000	\$46,000	0.00%
Dickinson	\$2,316,840,000	\$35,000	0.00%
Ellsworth	\$774,908,000	\$191,100	0.02%
Jewell	\$454,048,000	\$904,000	0.20%
Lincoln	\$587,611,000	\$814,000	0.14%
Mitchell	\$856,638,000	\$2,147,000	0.25%
Osborne	\$538,604,000	\$713,000	0.13%
Ottawa	\$736,439,000	\$31,500	0.00%
Republic	\$740,126,000	\$25,000	0.00%
Saline	\$6,516,698,000	\$846,500	0.01%
Smith	\$525,625,000	\$760,000	0.14%

Source: NCEI and HAZUS

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

**Table 4.205: Kansas Region F Population Vulnerability Data for High Winds**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

Source: US Census Bureau

The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of high wind on the agricultural sector. The higher the percentage loss, the higher the potential vulnerability the county has to high wind events.







**Table 4.206: High Wind Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	47	0.01%	\$121,175,000	\$2,081	0.00%
Cloud	322,034	188	0.06%	\$77,485,000	\$24,292	0.03%
Dickinson	519,171	93	0.02%	\$149,543,000	\$10,580	0.01%
Ellsworth	390,042	58	0.01%	\$48,318,000	\$4,694	0.01%
Jewell	436,206	421	0.10%	\$149,501,000	\$40,985	0.03%
Lincoln	384,740	59	0.02%	\$58,151,000	\$3,755	0.01%
Mitchell	414,220	79	0.02%	\$126,462,000	\$5,422	0.00%
Osborne	437,083	275	0.06%	\$62,499,000	\$28,222	0.05%
Ottawa	439,335	107	0.02%	\$108,378,000	\$4,883	0.00%
Republic	373,206	107	0.03%	\$187,529,000	\$9,324	0.00%
Saline	358,243	129	0.04%	\$73,581,000	\$7,475	0.01%
Smith	541,742	126	0.02%	\$129,261,000	\$9,065	0.01%

Source: USDA

As with tornados, the following participating jurisdictions may have increased vulnerability to windstorm events due to having greater than 20% of housing stock as mobile homes:

- **Manchester** (Dickinson County)
- **Weber** (Jewell County)
- **Culver** (Ottawa County)
- **New Cambria** (Saline County)

#### 4.21.5 – Impact and Consequence Analysis

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

**Table 4.207: 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 4.207: 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.





## 4.22 – Winter Storms

Winter weather in Kansas Region F usually come in the form of light to heavy snow or freezing rain. A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. Heavy accumulations of ice, often the result of freezing rain, can bring down trees, utility poles, and communications towers and disrupt communications and power for days.



### 4.22.1 – Location and Extent

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

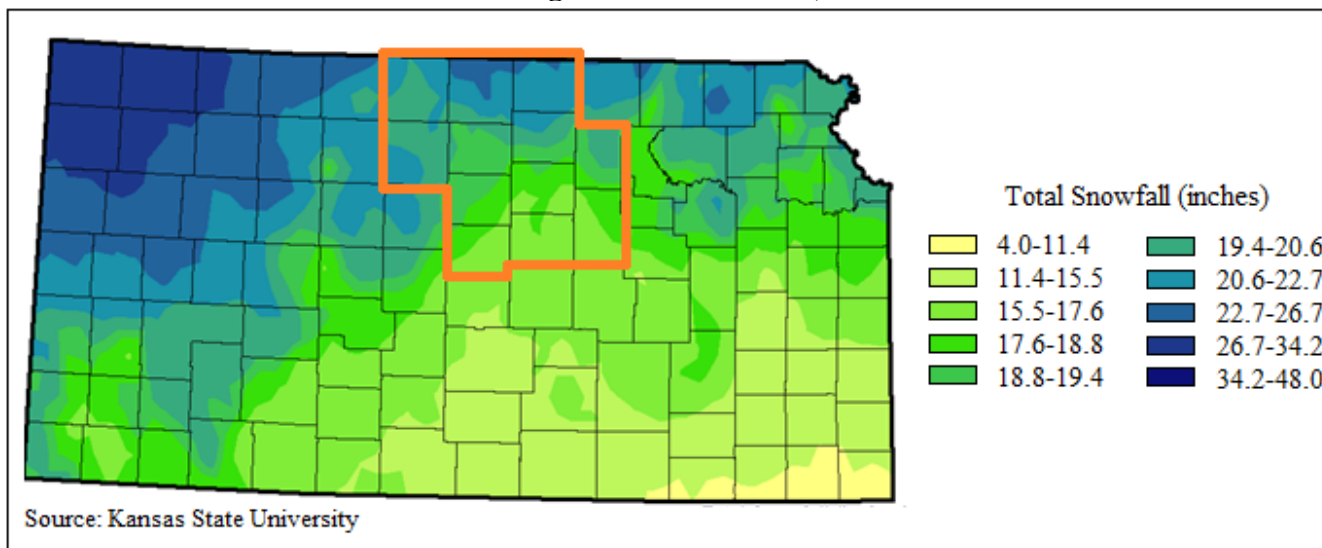
- **Blizzard:** Winds of 35 mph or more with snow and blowing snow reducing visibility to less than 1/4 mile for at least three hours.
- **Blowing Snow:** Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls:** Brief,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

The following map, generated Kansas State University, using the latest available data, indicates the average annual snowfall for Kansas Region F for a given year.



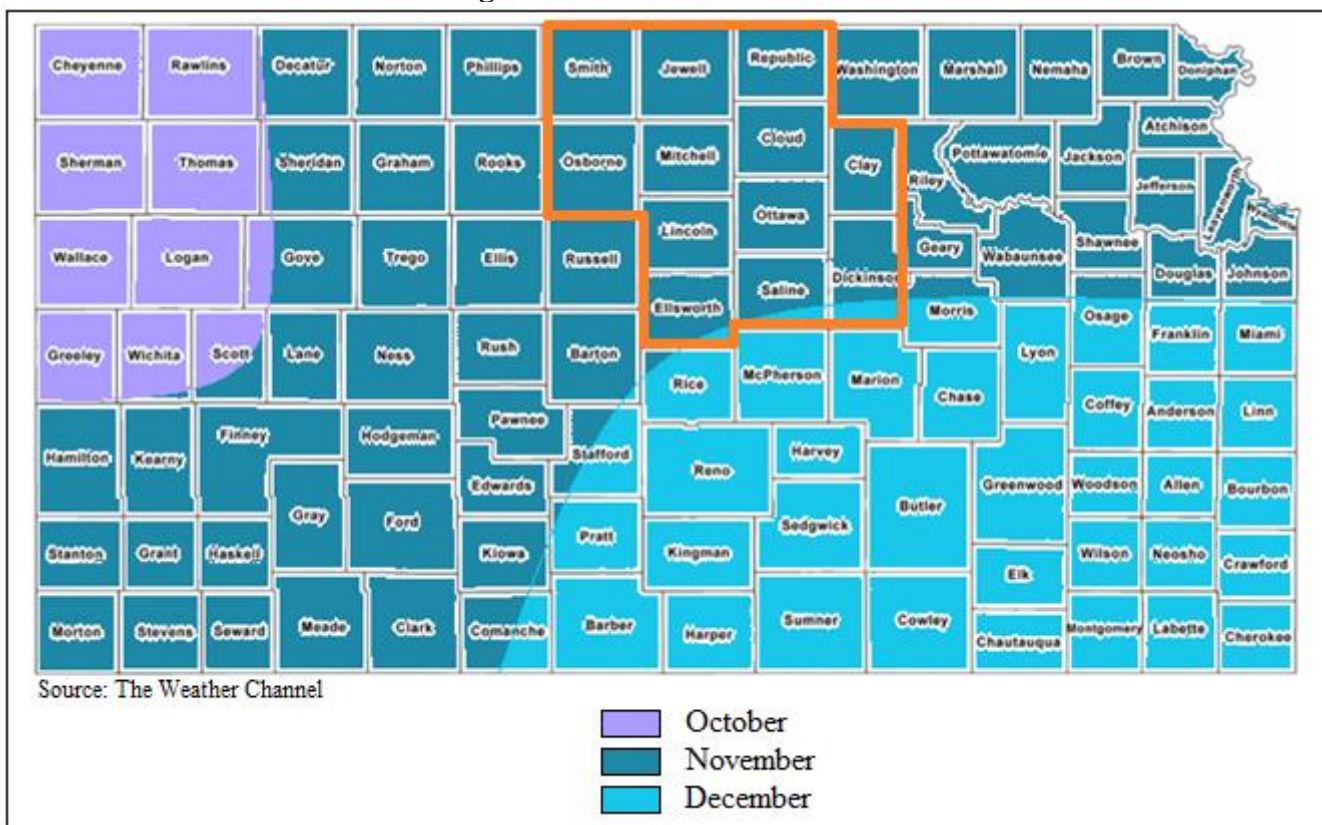


### Average Annual Snowfall, 1981-2010



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

### Average Date of First Measurable Snow





#### 4.22.2 – Previous Occurrences

In the 20-year period from 1999 to present, there have been six Presidential Disaster Declarations for Kansas Region F for severe winter storms. The following information is presented to provide a historical perspective on severe winter storm events that have impacted Kansas Region F. Declaration numbers in bold indication declared disaster that have occurred since the previous mitigation plan update in 2014.

**Table 4.208: Kansas Region F FEMA Severe Winter Storms Disaster and Emergency Declarations, 1999 - 2018**

Declaration Number	Incident Period	Disaster Description	Regional Counties Involved	Dollars Obligated
<b>4304</b>	02/24/2017 (01/13/2017 – 01/16/2017)	<b>Severe Winter Storm</b>	Ellsworth, Jewell, and Kiowa	\$8,027,446
4112	04/26/2013 (02/20-02/23/2013)	<b>Snowstorm</b>	Dickinson, Osborne, and Smith	\$1,102,861
1885	03/09/2010 (12/9/2009-1/8/2010)	<b>Severe Winter Storms and Snowstorm</b>	Clay, Jewell, and Republic	\$19,100,658
1848	06/24/2009 (3/26-29/2009)	<b>Severe Winter Storm and Record and Near Record Snow</b>	Dickinson	\$20,174,657
1741	02/01/2008	<b>Severe Winter Storms</b>	Clay, Cloud, Dickinson, Ellsworth, Jewell, Lincoln, Mitchell, Osborne, Ottawa, Republic, Saline, and Smith	\$359,557,345
1675	1/7/2007 (12/28-30/2006)	<b>Severe Winter Storm</b>	Jewell, Osborne, and Smith	\$315,201,639

Source: FEMA

The following provides details concerning Presidential Disaster Declarations DR 4304 for Kansas Region F.

**FEMA-4304-DR**  
**Kansas – Severe Winter Storm**  
Declared February 24, 2017

On February 13, 2017, Governor Sam Brownback requested a major disaster declaration due to a severe winter storm during the period of January 13-16, 2017. The Governor requested a declaration for Public Assistance for 23 counties and Hazard Mitigation statewide. During the period of January 25 to February 7, 2017, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.







On February 24, 2017, President Trump declared that a major disaster exists in the State of Kansas. This declaration made Public Assistance requested by the Governor available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe winter storm in Barton, Clark, Comanche, Edwards, Ellsworth, Ford, Hodgeman, Jewell, Kiowa, Meade, Ness, Pawnee, Pratt, Rush, Seward, Sheridan, Stafford, and Trego Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

The following presents NOAA NCEI data concerning winter storm events in Kansas Region F for the 10-year period of 2009 – 2018 (2009 and 2018 are full data set years). It is worth noting that the NCEI data is regional, and sometimes statewide. As such reported damage is not specific to a regional county nor to any of the participating jurisdictions.

**Table 4.209: Kansas Region F NCEI Winter Storm Events, 2009 - 2018**

Event Type	Number of Days with Events	Property Damage	Deaths	Injuries
Blizzards	6	\$0	1	0
Ice Storm	5	\$100,000	0	0
Winter Storms	25	\$620,000	0	0

Source: NOAA NCEI

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

- **November 25, 2018: Mitchell County**

Snowfall amounts across the area ranged from 4 to 8 inches. There was one fatality. A woman had attempted to go to work on Sunday, but due to dangerous conditions, turned back to go home. She was reported missing when she didn't report for work on Monday, and her abandoned car was found in a ditch along Highway 24 near Glen Elder State Park. Her body was found on Tuesday in a field near Waconda Lake, about 3 miles from her car.

- **January 11, 2018: Regional (Saline County)**

A wintry mix of freezing rain, sleet and snow led to treacherous driving conditions across most of Saline County, Kansas. Numerous accidents and slide offs were reported along Interstate 70 and Interstate 135 near Salina. The heaviest snowfall occurred to the northwest of Salina where 4 to 5 inches were reported. 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 winter storms on the region's agricultural base. Crop loss data for the years 2009 - 2018 (with 2009 and 2018 being full data years), for the region, indicates 946 winter storm related claims on 443,505 acres for \$36,365,503.





**Table 4.210: USDA Risk Management Agency Cause of Loss Indemnities  
2009-2018, Winter Storms**

County	Number of Reported Claims	Acres Lost	Total Amount of Loss
Clay	72	14,280	\$1,084,769
Cloud	94	54,585	\$5,718,983
Dickinson	64	29,773	\$2,503,045
Ellsworth	68	34,004	\$2,608,745
Jewell	63	31,722	\$2,047,935
Lincoln	95	42,589	\$3,375,279
Mitchell	74	64,254	\$5,407,221
Osborne	98	41,286	\$3,484,639
Ottawa	70	32,812	\$2,550,451
Republic	97	29,720	\$2,688,032
Saline	71	42,874	\$3,121,436
Smith	80	25,606	\$1,774,968

Source: USDA Farm Service Agency

### 4.22.3 – Hazard Probability Analysis

For probability purposes, each component of severe winter storms was examined and combined. The following table summarizes winter storm event data for **Kansas Region F**.

**Table 4.211: Kansas Region F Winter Storm Probability Summary**

Data	Recorded Impact
Number of Days with NCEI Reported Event (2009-2018)	31
Average Event Days per Year	3
Deaths or Injuries (2009-2018)	1
Average Number of Yearly Deaths and Injuries (2009-2018)	<1
Total Reported NCEI Property Damage (2009-2018)	\$720,000
Average Property Damage per Year	\$72,000

Source: NCEI

Data from the NCEI indicates that Kansas Region F can expect on a yearly basis, relevant to winter storm events:

- Three events
- <1 death or injury
- \$72,000 in property damages

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

**Table 4.212: Clay County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	72
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	14,280





**Table 4.212: Clay County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
Average Number of Acres Damaged per Year	1,428
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,084,769
Average Crop Damage per Year	\$108,477

Source: USDA

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

- Seven insurance claims
- 1,428 acres impacted
- \$108,477in insurance claims

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

**Table 4.213: Cloud County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	94
Average Number of Claims per Year	9
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	54,585
Average Number of Acres Damaged per Year	5,459
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$5,718,983
Average Crop Damage per Year	\$571,898

Source: USDA

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

- Nine insurance claims
- 5,459 acres impacted
- \$571,898 in insurance claims

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

**Table 4.214: Dickinson County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	64
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	29,773
Average Number of Acres Damaged per Year	2,977
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,503,045
Average Crop Damage per Year	\$250,305

Source: USDA





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

- Six insurance claims
- 2,977 acres impacted
- \$250,305 in insurance claims

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

**Table 4.215: Ellsworth County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	68
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	34,004
Average Number of Acres Damaged per Year	3,400
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,608,745
Average Crop Damage per Year	\$260,875

Source: USDA

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

- Seven insurance claims
- 3,400 acres impacted
- \$260,875 in insurance claims

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

**Table 4.216: Jewell County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	63
Average Number of Claims per Year	6
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	31,722
Average Number of Acres Damaged per Year	3,172
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	2,047,935
Average Crop Damage per Year	204,793

Source: USDA

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

- Six insurance claims
- 3,172 acres impacted
- \$204,793 in insurance claims





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

**Table 4.217: Lincoln County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	95
Average Number of Claims per Year	10
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	42,589
Average Number of Acres Damaged per Year	4,259
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,375,279
Average Crop Damage per Year	\$337,528

Source: USDA

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

- Ten insurance claims
- 4,259 acres impacted
- \$337,528 in insurance claims

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

**Table 4.218: Mitchell County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	74
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	64,254
Average Number of Acres Damaged per Year	6,425
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$5,407,221
Average Crop Damage per Year	\$540,722

Source: USDA

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

- Seven insurance claim
- 6,425 acres impacted
- \$540,722 in insurance claims

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

**Table 4.219: Osborne County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	98
Average Number of Claims per Year	10







**Table 4.219: Osborne County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	41,286
Average Number of Acres Damaged per Year	4,129
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,484,639
Average Crop Damage per Year	\$348,464

Source: USDA

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

- Ten insurance claims
- 4,129 acres impacted
- \$348,464 in insurance claims

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

**Table 4.220: Ottawa County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	70
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	32,812
Average Number of Acres Damaged per Year	3,281
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,550,451
Average Crop Damage per Year	\$255,045

Source: USDA

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

- Seven insurance claims
- 3,281 acres impacted
- \$255,045 in insurance claims

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

**Table 4.221: Republic County Winter Storm Probability Summary (Agricultural)**

Data	Recorded Impact
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	97
Average Number of Claims per Year	10
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	29,720
Average Number of Acres Damaged per Year	2,972
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$2,688,032
Average Crop Damage per Year	\$268,803

Source: USDA





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

- Ten insurance claims
- 2,972 acres impacted
- \$268,803 in insurance claims

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

**Table 4.222: Saline County Winter Storm Probability Summary (Agricultural)**

<b>Data</b>	<b>Recorded Impact</b>
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	71
Average Number of Claims per Year	7
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	42,874
Average Number of Acres Damaged per Year	4,287
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$3,121,436
Average Crop Damage per Year	\$312,144

Source: USDA

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

- Seven insurance claims
- 4,287 acres impacted
- \$312,144 in insurance claims

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

**Table 4.223: Smith County Winter Storm Probability Summary (Agricultural)**

<b>Data</b>	<b>Recorded Impact</b>
USDA Farm Service Agency Number of Crop Damage Claims (2009-2018)	80
Average Number of Claims per Year	8
USDA Farm Service Agency Number of Acres Damaged (2009-2018)	25,606
Average Number of Acres Damaged per Year	2,561
USDA Farm Service Agency Crop Damage Claims Amount (2009-2018)	\$1,774,968
Average Crop Damage per Year	\$177,497

Source: USDA

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

- Eight insurance claims
- 2,561 acres impacted
- \$177,497 in insurance claims





In addition, Kansas Region F has had six Presidentially Declared Disasters relating to winter storms (and other concurrent events) in the last 20 years. This represents an average of less than one declared winter storm related disaster per year.

#### 4.22.4 – Vulnerability Analysis

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

The following table presents data from the NOAA NCEI and HAZUS concerning the value of structures and the percentage of structures for each Kansas Region F county (in total, due to the regional nature of both storms and NCEI reporting) incurring damage over the period 2009 to 2018 from winter storm events. The greater the percentage of structures damaged the greater overall vulnerability going forward.

**Table 4.224: Kansas Region F Structural Vulnerability Data for Winter Storms, 2009-2018**

County	HAZUS Building Valuation	NCEI Structure Damage	Percentage of Building Valuation Damaged
Regional Counties	\$16,154,016,000	\$720,000	0,00%

Source: NCEI and HAZUS

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

**Table 4.225: Kansas Region F Population Vulnerability Data for Winter Storms**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

Source: US Census Bureau

The USDA 2017 Census of Agriculture (the latest available data) provides data on the crop exposure value, the total dollar value of all crops, for each Kansas Region F County. USDA Risk Management Agency crop loss data allows us to quantify the monetary impact of winter storms on the agricultural





sector. The higher the percentage loss, the higher the potential vulnerability the county has to winter storm events.

**Table 4.226: Winter Storm Acres Impacted and Crop Insurance Paid per County from 2009-2018**

County	Farm Acreage	Annualized Acres Impacted	Percentage of Total Acres Impacted Yearly	Market Value of Products Sold	Annualized Crop Insurance Paid	Percentage of Market Value Impacted Yearly
Clay	386,077	1,428	0.37%	\$121,175,000	\$108,477	0.09%
Cloud	322,034	5,459	1.70%	\$77,485,000	\$571,898	0.74%
Dickinson	519,171	2,977	0.57%	\$149,543,000	\$250,305	0.17%
Ellsworth	390,042	3,400	0.87%	\$48,318,000	\$260,875	0.54%
Jewell	436,206	3,172	0.73%	\$149,501,000	\$204,793	0.14%
Lincoln	384,740	4,259	1.11%	\$58,151,000	\$337,528	0.58%
Mitchell	414,220	6,425	1.55%	\$126,462,000	\$540,722	0.43%
Osborne	437,083	4,129	0.94%	\$62,499,000	\$348,464	0.56%
Ottawa	439,335	3,281	0.75%	\$108,378,000	\$255,045	0.24%
Republic	373,206	2,972	0.80%	\$187,529,000	\$268,803	0.14%
Saline	358,243	4,287	1.20%	\$73,581,000	\$312,144	0.42%
Smith	541,742	2,561	0.47%	\$129,261,000	\$177,497	0.14%

Source: USDA

#### 4.22.5 – Impact and Consequence Analysis

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

**Table 4.227: Winter Storm Consequence Analysis**

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





## 4.23 – Civil Disorder

Civil disorder is a term that generally refers to a public disturbance by three or more people involving acts of violence that cause immediate danger, damage, or injury to others or their property. However, it is important to remember that gatherings in protest are recognized rights of any person or group, and this right is protected under the United States Constitution.

### 4.23.1 – Location and Extent

Historically civil disorder has been most commonly associated with urban areas and college campuses. And while the entire planning area may be affected by civil disorder, with its generally small population and low population density, the magnitude of such an event would likely be limited to the major cities within the region.

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

- **Public disorder:** Public disorder is a basic breach of civic order. Individuals or small groups assembling have a tendency to disrupt the normal flow of things around them.
- **Public disturbance:** Public disturbance is designed to cause turmoil on top of the disruption. Individuals and groups assembling into a crowd begin chanting, yelling, singing, and voicing individual or collective opinions.
- **Riot:** A riot is a disturbance that turns violent. Assembled crowds become a mob that violently expresses itself by destroying property, assaulting others, and creating an extremely volatile environment.

While civil disorder is not an everyday occurrence in the planning area, when they do occur they are extremely disruptive and difficult to control. Should a civil disorder event occur in the planning area the result could be measured in loss of life, economic upheaval, and destruction of property.

### 4.23.2 – Previous Occurrences

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

### 4.23.3 – Hazard Probability Analysis

By nature, acts of civil disorder are difficult to foresee. However, the probability of a major civil disorder event in Kansas Region F is considered very low due the lack of any recent documented historical events. Again, it is worth noting that no previous occurrences in no way guarantees no future occurrences.







#### 4.23.4 Vulnerability Analysis

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

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

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

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

**Riot:** The riot began to take shape as the game came to a close, with some spectators throwing bottles and other objects. Small fires were started and soon some rioters overturned a vehicle and set it alight. Fist fights broke out and in a nearby parking lot and two police cars were also set on fire. Riot police eventually managed to disperse the rioters and all fires were extinguished.

**Results:** The following table presents potential event results:

**Table 4.228: Hypothetical Riot Outcomes**

Category	Result
<b>Total Traumatic Injuries</b>	250 persons
<b>Total Urgent Care Injuries</b>	1,000 persons
<b>Injuries not Requiring Hospitalization</b>	2,500 persons
<b>Damage to Vehicles</b>	Glass replacement cost for approximately 200 vehicles: \$ 8,000 Repair / repainting cost for approximately 200 vehicles: \$800,000
<b>Damage to Buildings</b>	Window replacement cost for approximately 50 buildings: \$80,000

Source: Kansas State Hazard Mitigation Plan

#### 4.23.5 – Impact and Consequence Analysis

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

**Table 4.229: Civil Disorder Consequence Analysis**

Subject	Potential Impacts
Health and Safety of the Public	Impact could be severe for persons in the incident area.
Health and Safety of Responders	Impact to responders could be severe if not trained and properly equipped. Responders that are properly trained and equipped will have a low to moderate impact.





**Table 4.229: Civil Disorder Consequence Analysis**

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





## 4.24 – Hazardous Materials

Hazardous materials (HazMat) are any substances that pose a risk to health, life, or property when released or improperly handled. Generally, the term refers to materials with hazardous chemical or physical properties, though sometimes biological agents can fall under this category. The basic types of hazardous materials may be categorized according to more than six different systems; but the categories of U.S. Emergency Planning and Community Right-to-Know Act (42 U.S.C. 11002) provide a general guide to hazardous materials:



- **Extremely Hazardous Substances:** Materials that have acutely toxic chemical or physical properties and may cause irreversible damage or death to people or harm the environment if released or used outside their intended use.
- **Hazardous Substances:** Materials posing a threat to human health and/or the environment, or any substance designated by the EPA to be reported if a designated quantity of the substance is spilled into waterways, aquifers, or water supplies or is otherwise released into the environment.

### 4.24.1 – Location and Extent

In Kansas Region F, HazMat incidents are generally classified as:

- **Fixed Facility Incidents:** Commercial Facilities and Superfund Sites
- **Transportation Incidents:** Highway, Railway, Pipeline, Air, and Water

#### *Fixed Facilities*

When facilities have hazardous materials in quantities at or above the threshold planning quantity, they must submit Tier II information to appropriate federal and state agencies to facilitate emergency planning in accordance with the Community Right to Know Act. The forms are known as Tier II reports and the facilities included are referred to as Tier II facilities. According to data provided by KDEM, there are 3,424 Tier II Facilities housing hazardous chemicals in Kansas Region F. The following table details the number of Tier II facilities by county.

**Table 4.230: Kansas Region F Tier II Facilities by County**

County	Tier II Facilities
Clay	19
Cloud	19
Dickinson	46
Ellsworth	160
Jewell	11
Lincoln	14
Mitchell	30



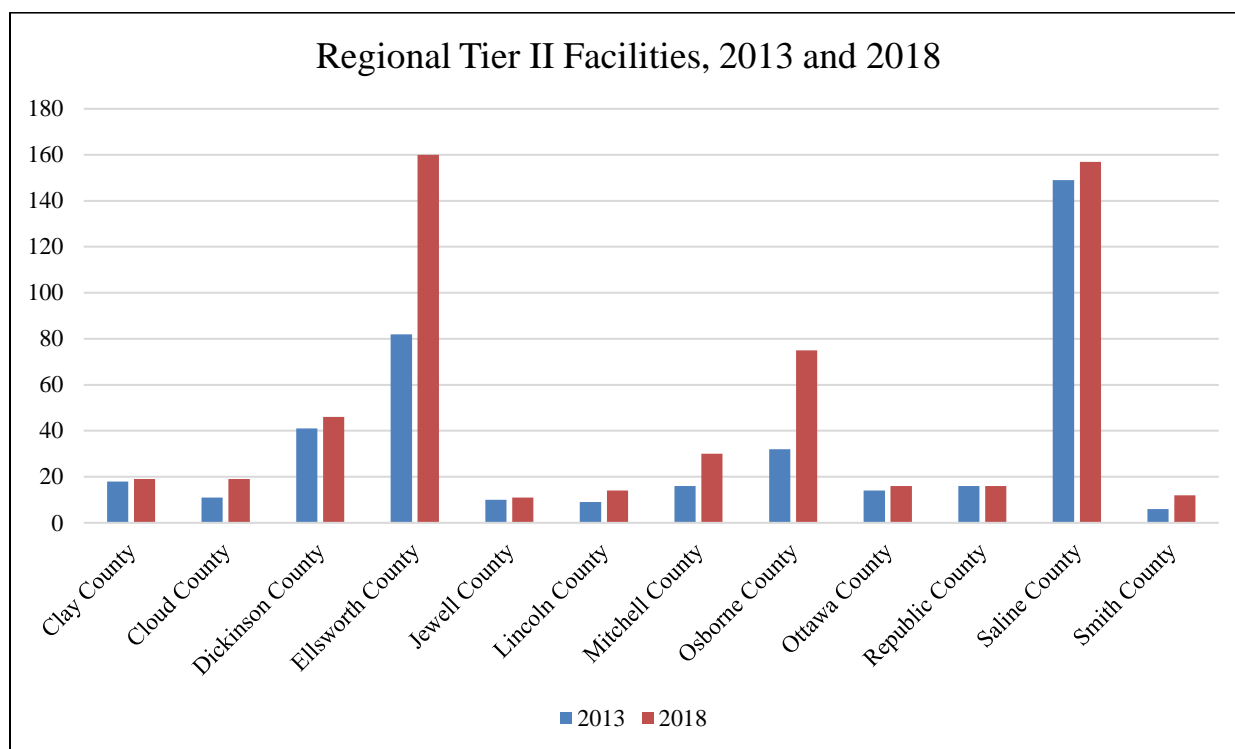


**Table 4.230: Kansas Region F Tier II Facilities by County**

County	Tier II Facilities
Osborne	75
Ottawa	16
Republic	16
Saline	157
Smith	12

Source: KDEM

As illustrated in the following graph, the number of Tier II facilities has decreased for the region, primarily to due to an extensive outreach effort by KDHE to facilities that house hazardous chemicals.



The National Priorities List (NPL) is a published list of hazardous waste sites in the country that are eligible for extensive, long-term cleanup under the Superfund program. A Superfund site is an uncontrolled or abandoned location where hazardous waste is located which may affect local ecosystems and/or people. The EPA has indicated no Superfund sites are located with Kansas Region F.

**Transportation**

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

**Table 4.231: Kansas Region F Total Roadway Mileage by County**

County	Roadways (Miles)
Clay	1,235
Cloud	1,385





**Table 4.231: Kansas Region F Total Roadway Mileage by County**

County	Roadways (Miles)
Dickinson	1,778
Ellsworth	1,205
Jewell	1,651
Lincoln	1,176
Mitchell	1,317
Osborne	1,294
Ottawa	1,238
Republic	1,440
Saline	1,517
Smith	1,576

Source: KDOT

Kansas Region F 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 F providing service with long-haul deliveries to national market areas and intermodal rail/truck service providers:

- Burlington Northern and Santa Fe Railway
- Kansas and Oklahoma Railroad
- KYLE Railroad Systems
- Union Pacific Railroad

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

**Table 4.232: Kansas Region F Total Class I Railroad Mileage by County**

County	Interstates (Miles)
Clay	11
Cloud	64
Dickinson	110
Ellsworth	36
Jewell	51
Lincoln	35
Mitchell	62
Osborne	60
Ottawa	39
Republic	63
Saline	66
Smith	33

Source: KDOT

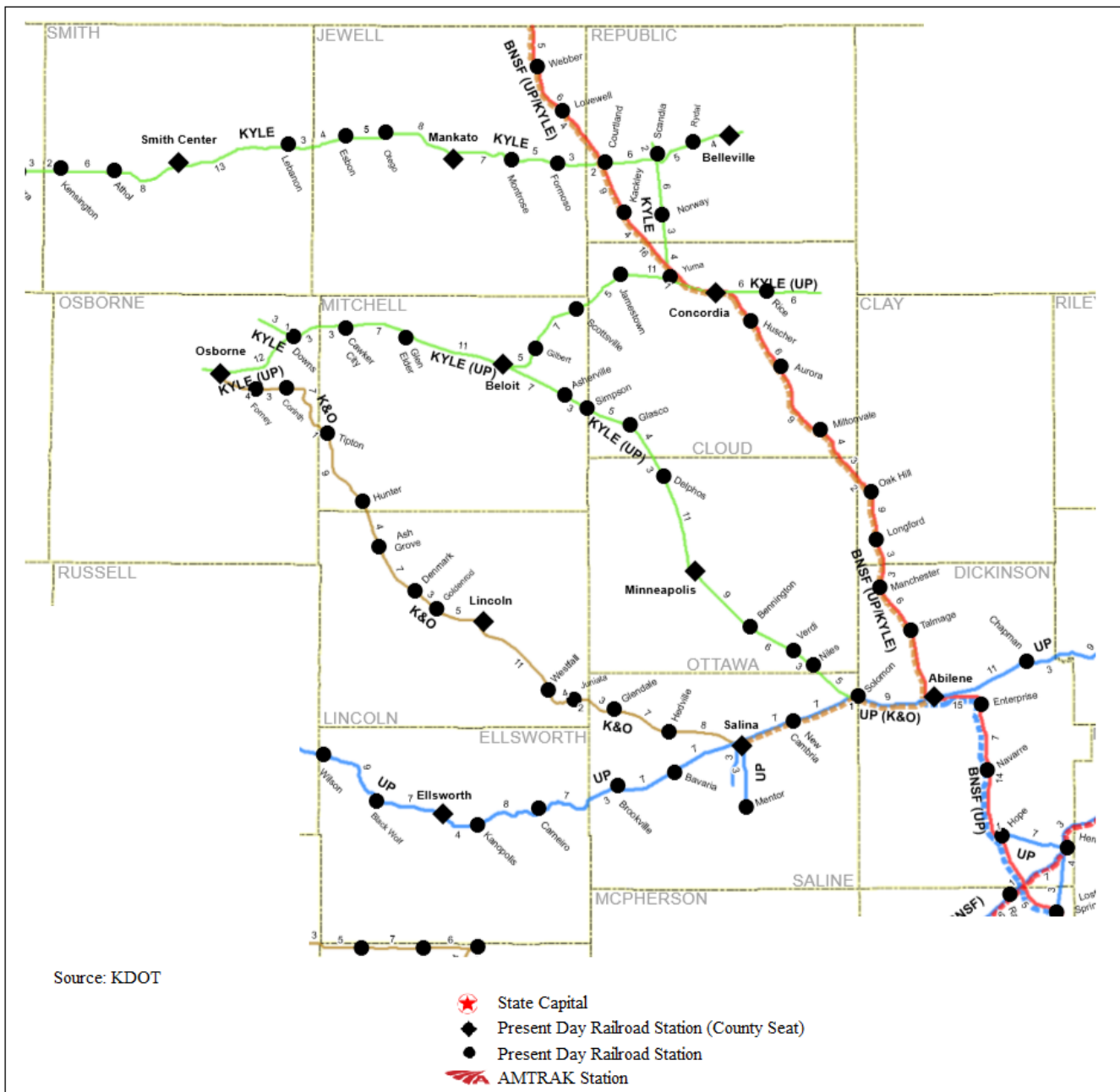
The following map, from KDOT, shows Class I track locations in Kansas Region F.







## Regional Class I Railway Lines



### Pipelines

The following data, provided by KDEM and the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA), indicates the total number of gas and liquid pipeline mileage per county.





**Table 4.233: PHMSA Pipeline Mileage by County**

County	Gas (miles)	Liquid (miles)
Clay		
Cloud	94	170
Dickinson	163	81
Ellsworth	196	130
Jewell	216	137
Lincoln	67	0
Mitchell	235	51
Osborne	55	0
Ottawa	15	44
Republic	213	141
Saline	82	52
Smith	51	162

Source: KDEM and PHMSA

### 4.24.2 – Previous Occurrences

The following table, with data from KDEM, lists the number of hazardous materials incidents, injuries, fatalities and people evacuated from the public and facilities for each Kansas Region F county over the ten-year period 2009-2018.

**Table 4.234: Kansas Region F HazMat KDEM Reported Incidents, 2009-2018**

Jurisdiction	Incidents	Injuries	Fatalities	People Evacuated
Clay	0	0	0	0
Cloud	1	0	0	0
Dickinson	2	0	0	0
Ellsworth	0	0	0	0
Jewell	0	0	0	0
Lincoln	1	0	0	0
Mitchell	2	0	0	0
Osborne	0	0	0	0
Ottawa	3	0	0	5
Republic	1	0	0	0
Saline	1	0	0	0
Smith	0	0	0	0

Source: KDEM

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





**Table 4.235: Kansas Region F OHMS HazMat Incidents, 2000-2018**

Jurisdiction	Highway	Air	Rail	Damages	Injuries	Deaths
<b>Clay County</b>						
Clay Center	1	0	0	\$3,000	0	0
<b>Cloud County</b>						
Concordia	1	0	0	\$	0	0
<b>Dickinson County</b>						
Herington	2	0	12	\$395,742	0	0
<b>Ellsworth County</b>						
-	-	-	-	-	-	-
<b>Jewell County</b>						
-	-	-	-	-	-	-
<b>Osborne County</b>						
-	-	-	-	-	-	-
<b>Ottawa County</b>						
Minneapolis	1	0	0	\$0	0	0
<b>Saline County</b>						
Salina	39	0	2	\$42,588	0	0

Source: PHMSA OHMS

-: No reported events

Data from PHMSA provides significant incident reports for the pipeline systems in Kansas Region F. Data from the period 2013 to 2017 indicate that there were six pipeline incidents with no fatalities, no injuries and \$545,736 in damages. The following table details reported pipeline incident details for each county with a reported event.

**Table 4.236: Kansas Region F PHMSA Reported Pipeline Incidents by County, 2013 to 2017**

County	Number of Incidents	Fatalities	Injuries	Total Damage	Gross Barrels Spilled
Clay	-	-	-	-	-
Cloud	1	0	0	\$30,400	3
Dickinson	1	0	0	\$0	0
Ellsworth	-	-	-	-	-
Jewell	-	-	-	-	-
Lincoln	1	0	0	\$242,520	-
Mitchell	-	-	-	-	-
Osborne	-	-	-	-	-
Ottawa	2	0	0	\$168,910	0
Republic	-	-	-	-	-
Saline	1	0	0	\$103,906	0
Smith	-	-	-	-	-

Source: PHMSA

-: No reported events





### 4.24.3 – Hazard Probability Analysis

HazMat incidents are not predictable. However, probabilities can be estimated using past occurrence data as a guide.

The following tables summarize occurrence data and probability for all related HazMat events for **Clay County** using data from KDEM.

**Table 4.237: Clay County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- No events
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Cloud County** using data from KDEM.

**Table 4.238: Cloud County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	1
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- <1 event
- No deaths
- No injuries





- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Dickinson County** using data from KDEM.

**Table 4.239: Dickinson County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	2
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- <1 event
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Ellsworth County** using data from KDEM.

**Table 4.240: Ellsworth County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- No events
- No deaths
- No injuries
- No evacuations







The following tables summarize occurrence data and probability for all related HazMat events for **Jewell County** using data from KDEM.

**Table 4.241: Jewell County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- No events
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Lincoln County** using data from KDEM.

**Table 4.242: Lincoln County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	1
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- <1 event
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Mitchell County** using data from KDEM.





**Table 4.243: Mitchell County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	2
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- <1 event
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Osborne County** using data from KDEM.

**Table 4.244: Osborne County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- No events
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Ottawa County** using data from KDEM.





**Table 4.245: Ottawa County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	3
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	5
Average Injuries per Year	1
Number of Reported Evacuations (2013-2015)	5
Average Evacuations per Year	1

Source: KDEM

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

- <1 event
- No deaths
- No injuries
- One evacuation

The following tables summarize occurrence data and probability for all related HazMat events for **Republic County** using data from KDEM.

**Table 4.246: Republic County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	1
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- <1 event
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Saline County** using data from KDEM.





**Table 4.247: Saline County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	1
Average Events per Year	<1
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- <1 event
- No deaths
- No injuries
- No evacuations

The following tables summarize occurrence data and probability for all related HazMat events for **Smith County** using data from KDEM.

**Table 4.248: Smith County HazMat Incident Probability Summary**

Data	Recorded Impact
Number of Reported Events (2016-2018)	0
Average Events per Year	0
Number of Reported Deaths (2000-2018)	0
Average Deaths per Year	0
Number of Reported Injuries (2000-2018)	0
Average Injuries per Year	0
Number of Reported Evacuations (2013-2015)	0
Average Evacuations per Year	0

Source: KDEM

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

- No events
- No deaths
- No injuries
- No evacuations

#### 4.24.4 – Vulnerability Analysis

Special populations are particularly vulnerable to the impacts of a hazardous materials incident because of the potential difficulties involved in the evacuation. The following table details the number of special population facilities in each Kansas Region F county located within ½ mile of a chemical facility. The locations of colleges, educational and correctional institution facilities is from the Kansas Data Access &





Support Center, health facilities data is from HAZUS, aging facilities is from KDEM and childcare facilities is from KDHE.

**Table 4.249: Kansas Region F Special Population Facilities Within 0.5 Miles of a Chemical Facility**

County	Health Facilities	Colleges	Educational Facilities	Aging Facilities	Child Care	Correctional Institutions
Clay	0	0	3	1	27	1
Cloud	2	1	3	3	39	1
Dickinson	2	0	8	5	43	2
Ellsworth	0	0	5	2	15	1
Jewell	1	0	6	1	7	1
Lincoln	1	0	2	1	18	1
Mitchell	1	0	7	0	19	1
Osborne	1	0	6	3	9	1
Ottawa	1	0	4	2	19	1
Republic	1	0	7	4	15	1
Saline	2	2	5	13	109	2
Smith	0	0	5	4	26	1

Source: KDEM

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

**Table 4.250: Kansas Region F Population Vulnerability Data for HazMat**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

Source: US Census Bureau

#### 4.24.5 – Impact and Consequence Analysis

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







**Table 4.251: HazMat Incident Consequence Analysis**

<b>Subject</b>	<b>Impacts of Hazardous Materials Incident</b>
Health and Safety of Persons in the Area of the Incident	Impact in the immediate area could be severe and long lasting.
Responders	Impact to responders is expected to be moderate to severe, potentially even with required safety equipment.
Continuity of Operations	Long term relocation may be necessary if government facilities experience contamination or damage.
Property, Facilities, and Infrastructure	Localized impact could be severe in the incident area. Facilities may need to be abandoned and razed. Large areas may become inaccessible.
Environment	Impact could be severe for the immediate area. Impact will lessen with distance. The proximity of open bodies of water could compound the impact.
Economic Conditions	Local economy and finances may be adversely affected, depending on the nature, extent and duration of the event.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Warning systems and the timeliness of those warnings could be questioned.





## 4.25 – Major Disease

For this plan, major disease is classified as infectious diseases caused by microscopic agents, including viruses, bacteria, parasites, and fungi or by their toxins, that may impact humans. They may be spread by direct contact with an infected person or animal, ingesting contaminated food or water, vectors such as mosquitoes or ticks, contact with contaminated surroundings such as animal droppings, infected droplets, or by aerosolization.

### 4.25.1 – Location and Extent

Human transmissible disease and infectious diseases are illnesses caused by microscopic agents, including viruses, bacteria, parasites, and fungi or by their toxins. They may be spread by direct contact with an infected person or animal, ingesting contaminated food or water, vectors such as mosquitoes or ticks, contact with contaminated surroundings such as animal droppings, infected droplets, or by aerosolization.

The entire planning area is susceptible to a transmissible disease outbreak. However, more densely populated areas may be more susceptible.

### 4.25.2 – Previous Occurrences

The KDHE was contacted concerning the epidemiological tracking of contagious and/or human transmissible diseases. Data was solicited concerning the following diseases of concern:

- Haemophilus Influenzae Invasive Disease
- Measles (Rubeola)
- Meningococcal Infections
- Mumps
- Pertussis
- Streptococcus pneumoniae, Invasive
- West Nile Virus
- Zika Virus

A review of available data indicates there have been no unusual or concerning spikes in these diseases. Additionally, no new novel pathogens of concern have been tracked or reported.

### 4.25.3 – Hazard Probability Analysis

Each year the Centers for Disease Control (CDC) produces a report detailing the legally reportable diseases in the United States. While over time this report can serve as a predictor of the likelihood of future disease, it is impossible to predict outbreaks. However, data from the CDC report does not indicate any areas of concern for Kansas Region F. Based on the relatively limited/controlled outbreak history and population density factors in Kansas Region F the possibility of a large-scale major disease outbreak to be limited.





#### 4.25.4 – Vulnerability Analysis

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

Due to the person to person transmission of many diseases of concern counties with a higher identified population are to be considered to have a potentially greater vulnerability. The following table indicates the total county population and registered growth over the period 2000 to 2018.

**Table 4.252: Kansas Region F Population Vulnerability Data for Major Disease**

County	2018 Population	Percent Population Change 2000 to 2018
Clay	7,997	-9.4%
Cloud	8,729	-15.0%
Dickinson	18,717	-3.2%
Ellsworth	6,196	-5.0%
Jewell	2,841	-25.1%
Lincoln	3,023	-15.5%
Mitchell	6,150	-11.3%
Osborne	3,475	-21.9%
Ottawa	5,802	-5.9%
Republic	4,664	-20.1%
Saline	54,401	1.5%
Smith	3,603	-20.6%

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 4.253: Kansas Region F Vulnerable Population Vulnerability Data for Major Disease**

County	Percentage of Population 5 and Under (2018)	Percentage of Population 65+ (2018)
Clay	6.5%	23.0%
Cloud	5.6%	21.6%
Dickinson	5.9%	19.8%
Ellsworth	4.6%	20.9%
Jewell	5.5%	30.1%
Lincoln	5.4%	24.4%
Mitchell	6.9%	23.6%
Osborne	5.5%	25.0%
Ottawa	4.9%	20.4%
Republic	5.5%	27.7%
Saline	6.1%	17.9%
Smith	5.7%	27.7%

Source: US Census Bureau





#### 4.25.5 – Impact and Consequence Analysis

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

**Table 4.254: Major Disease Consequence Analysis**

<b>Subject</b>	<b>Impacts of Major Disease Outbreak</b>
Health and Safety of Persons in the Area of the Incident	Impact over a widespread area could be severe depending on type of outbreak and whether it is a communicable disease. Casualties are dependent on warning systems, warning times and the availability of vaccines, antidotes, and medical svc.
Responders	Impact to responders could be severe, especially if they reside in the area and or their type of exposure during response. With proper precautions and safety nets in place the impact is lessened.
Continuity of Operations	Continuity of Operations will be greatly dependent on availability of healthy individuals. COOP is not expected to be exercised.
Property, Facilities, and Infrastructure	Access to facilities and infrastructure could be affected until decontamination is completed
Environment	Impact could be severe for the immediate impacted area depending on the source of the outbreak. Impact could have far-reaching implications if disease is transferable between humans and animals or to wildlife.
Economic Conditions	Impacts to the economy could be severe if the disease is communicable. Loss of tourism, revenue, and business as usual will greatly affect the local economy and the state as a whole.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Availability of medical supplies, vaccines, and treatments will come into question.





## 4.26 – Radiological Incident

For purposes of this plan, a radiological incident is considered an accident involving a release of radioactive materials from a nuclear reactor. Radiological accidents could cause injury or death, contaminate property and valuable environmental resources, as well as disrupt the functioning of communities and their economies. Since 1980, each utility that owns a commercial nuclear power plant in the United States has been required to have both an onsite and offsite emergency response plan as a condition of obtaining and maintaining a license to operate that plant. Onsite emergency response plans are approved by the U.S. Nuclear Regulatory Commission (NRC).



### 4.26.1 – Location and Extent

The only active commercial nuclear reactor within the State of Kansas is the Wolf Creek Nuclear Power Plant (Wolf Creek) in Coffey County. Kansas Region F is well outside of both the 10-mile 50-mile emergency planning zones for Wolf Creek. The entire planning region is at risk from a radiological event due to transportation accidents.

### 4.26.2 – Previous Occurrences

There have been no reported major radiological events recorded in Kansas Region F

### 4.26.3 – Hazard Probability Analysis

There have been no reported nuclear failure and/or release events in Kansas Region F.

### 4.26.4 – Vulnerability Assessment

The major usage of radioactive materials in the region are for medical diagnostics and therapy, soil density testing in the construction industry, and in radiography cameras in pipeline construction and repair. During all lawful operations of radioactive materials, the licensee is responsible for ensuring that the area around the source material is cordoned off or shielding is used to prevent unnecessary exposures. Inspections of practices and security measures are regularly conducted to ensure compliance and conformity to regulations in order to protect the public. The frequency of inspections can be adjusted in response to perceived risk. Public risk can be reduced by minimizing the duration of exposure, shielding the source material and maximizing the distance from the source.

It is common for materials, including pharmaceuticals, industrial sources and nuclear fuel rods destined to nuclear reactors, to be transported via highways and railroads. Areas near interstates and major highways have an increased risk of transportation accidents. Remote areas also have to account for long response times from hazardous materials and health physics personnel.







#### 4.26.5 – Impact and Consequence Analysis

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

**Table 4.255: Radiological Incident Consequence Analysis**

<b>Subject</b>	<b>Impacts of Nuclear Incident</b>
Health and Safety of Persons in the Area of the Incident	Impact in the immediate area could be severe and long lasting.
Responders	Impact to responders is expected to be severe, potentially even with required safety equipment.
Continuity of Operations	Long term relocation may be necessary if government facilities experience contamination.
Property, Facilities, and Infrastructure	Localized impact could be severe in the incident area. Facilities may need to be abandoned and razed. Large areas may become inaccessible.
Environment	Impact could be severe for the immediate area. Impact will lessen with distance.
Economic Conditions	Local economy and finances may be adversely affected, depending on the nature, extent and duration of the event.
Public Confidence in Governance	Response and recovery will be in question if not timely and effective. Warning systems and the timeliness of those warnings could be questioned.





## 4.27 – Terrorism

The United States does not have a standardized definition of terrorism that is agreed upon by all agencies. The Federal Bureau of Investigation generally defines terrorism as:

"the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."

### 4.27.1 – Location and Extent

Kansas is home to a wide variety of criminal extremist groups. The Southern Poverty Law Center reported that in 2018 there were three active hate groups in Kansas: one neo-Nazi group, the National Socialist Movement in Lansing, one racist skinhead group, the Midland Hammerskins in Wichita, and one anti-homosexual group, the Westboro Baptist Church in Topeka. Other groups, such as the Animal Liberation Front, Earth Liberation Front, and People for the Ethical Treatment of Animals may have sympathizers in the region. Although no major terrorist acts have been attributed to any of these latter groups, their involvement in violent acts is meant to disrupt governmental functions and cannot be discounted.

### 4.27.2 – Previous Occurrences

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

### 4.27.3 – Hazard Probability Analysis

By nature, acts of terrorism are difficult to foresee. However, the probability of a major terrorist event in Kansas Region F is considered very low due the lack of any documented historical events. Again, it is worth noting that no previous occurrences in no way guarantees no future occurrences.

### 4.27.4 – Vulnerability Analysis

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

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

It is difficult to quantify potential losses of terrorism due to the many variables and human elements and lack of historical precedence. Therefore, for the purposes of this plan, the loss estimates will take into account three hypothetical scenarios. The estimated impact of each event was calculated using the Electronic Mass Casualty Assessment and Planning Scenarios developed by Johns Hopkins University.

Please note that the hypothetical scenarios are included for illustrative purposes only.





## Scenario #1: Mustard Gas Release

**Event:** Mustard gas is released from a light aircraft onto the stadium during a home football game. The agent directly contaminates the stadium and the immediate surrounding area. This attack would cause harm to humans and could render portions of the stadium unusable for a short time period in order to allow for a costly clean-up. There might also be a fear by the public of long-term contamination of the stadium and subsequent boycott of games resulting in a loss of revenue and tourism dollars.

**Event Assumptions:** For this scenario the number of people in the stadium is 50,000 with an additional 5,000 persons remain outside the stadium in the adjacent parking areas. The agent used, mustard gas, is extremely toxic and may damage eyes, skin and respiratory tract with death sometimes resulting from secondary respiratory infections. Death rate from exposure estimated to be 3%. The estimated decontamination cost is \$12 person. For this scenario it is assumed that all persons with skin injuries will require decontamination.

**Results:** The following table presents the estimated human and economic impacts of the scenario.

**Table 4.256: 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 4.257: 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 4.258: Estimated Impact of Scenario #3, Improvised Explosive Device**

Impact	Effect
Deaths	1,391 persons
Trauma Injuries	2,438 persons
Urgent Care Injuries	11,935
Injuries not Requiring Hospitalization	4,467
Repair Costs for 100 Vehicles	\$400,000
Replacement Costs for 50 Vehicles	\$1,000,000

Source: Electronic Mass Casualty Assessment and Planning Scenarios by Johns Hopkins University

**4.27.5 – Impact and Consequence Analysis**

There is no consensus on estimates of potential fatalities and injuries for terrorism events. Injury and death tolls would be dependent on the type, size and weapon used. Areas with higher population densities would likely result in a greater number of casualties.

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





**Table 4.259: Terrorism Consequence Analysis**

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







## 4.28 – Utility/Infrastructure Failure

Critical infrastructure involves several different types of facilities and systems including:

- Electric power
- Transportation routes
- Natural gas and oil pipelines
- Water and sewer systems, storage networks
- Internet/telecommunications systems



Failure of utilities or infrastructure components in south-southwest Kansas can seriously impact public health, functioning of communities and the region's economy. Disruptions to utilities can occur from many of the hazards detailed in this plan, but the most likely causes include:

- Floods
- Lightning
- Tornadoes and Windstorms
- Winter Storms

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

### 4.28.1 – Location and Extent

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





### ***Transportation Routes***

Transportation routes can also be impacted by many of the hazards discussed in this plan. The primary hazards that impact transportation are flood, hazardous materials, and winter weather. Flood events can make roads and bridges impassible due to high water. Flood waters can also erode or scour roadbeds and bridge abutments. Highway and railroad accidents that involve hazardous materials can impact transportation routes through closures and/or evacuations. Winter weather frequently impacts transportation as roads become treacherous or impassible due to ice and snow. Other hazards that impact transportation routes include dam and levee failures if routes are in inundation areas, extreme temperatures that can cause damage to pavement, land subsidence that can damage roads/railroads, landslides that can cause debris and rock falls onto roadways, terrorism that can target routes, tornados that can directly damage infrastructure or deposit debris in routes, wildfires that can cause decreased visibility on transportation routes due to smoke, and windstorms that can cause vehicle accidents or overturning.

### ***Pipelines Systems***

Hazards that can impact natural gas and oil pipelines include earthquakes, expansive soils, land subsidence, landslide, and terrorism

### ***Water and Sewer Systems***

The primary hazards that can impact water supply systems include drought, floods, hazardous materials, and terrorism. Water district boundary maps are available for review at <https://krwa.net/ONLINE-RESOURCES/RWD-Maps>.

### ***Internet and Telecommunications***

Internet and telecommunications infrastructure can be impacted by floods, lightning, tornados, windstorms, and winter weather. Land line phone lines often utilize the same poles as electric lines, so when weather events such as windstorm or winter weather cause lines to break both electricity and telephone services may experience outages. With the increasing utilization of cellular phones, hazard events such as tornado that can damage cellular repeaters can cause outages. In addition, during any hazard event, internet and telecommunications systems can become overwhelmed due to the surge in call and usage volume. A map indicating telephone service providers in Kansas Region F is available at [www.kcc.state.ks.us/maps/ks\\_telephone\\_certified\\_areas.pdf](http://www.kcc.state.ks.us/maps/ks_telephone_certified_areas.pdf).

#### **4.28.2 – Previous Occurrences**

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

#### **4.28.3 – Hazard Probability Analysis**

Minor utility failures occur annually across the region, with larger failures usually tied to other disaster events such as tornados, winter storms and windstorms. As discussed throughout this plan, these concurrent events occur regularly. As such, it is expected that occasional, and largely concurrent utility failure events will occur.





#### 4.28.4 – Vulnerability Assessment

Regionally, smaller utility suppliers generally have limited resources for mitigation. Thus, the large number of small utility service providers could mean greater vulnerability in the event of a major, widespread disaster, such as a major flood, severe winter storm or ice storm.

In recent years, regional electric power grid system failures in the western and east-central United States have demonstrated that similar failures could happen in Kansas Region F. 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 4.260: FEMA Benefit-Cost Analysis**

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

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

#### 4.28.5 – Impact and Consequence Analysis

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

**Table 4.261: Utility/Infrastructure Failure Consequence Analysis**

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





**Table 4.261: Utility/Infrastructure Failure Consequence Analysis**

<b>Subject</b>	<b>Impacts of Utility/Infrastructure Incident</b>
Economic Conditions	Economic conditions could be adversely affected depending on damages suffered, extent of damages, etc. (minimal)
Public Confidence in Governance	Impact will be dependent on whether or not the government or non-government entities response, recovery, and planning were not timely and effective (minimal).



# 5.0 Capability Assessment

## 5.1 – Introduction

*44 CFR 201.6 does not require a capability assessment to be completed for local hazard mitigation plans. However, 201.6(c)(3) states "A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools."*

This section of the plan discusses the current capacity of regional communities to mitigate the effects of identified hazards. A capability assessment is conducted to determine the ability of a jurisdiction to execute a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs or projects.

A capability assessment helps to determine which mitigation actions are practical based on a jurisdiction's fiscal, staffing and political resources. A capability assessment consists of:

- An inventory of relevant plans, ordinances, or programs already in place
- An analysis capacity to carry them out.

A thoughtful review of jurisdictional capabilities will assist in determining gaps that could limit current or proposed mitigation activities, or potentially aggravate a jurisdiction's vulnerability to an identified hazard. Additionally, a capability assessment can detail current successful mitigation actions that should continue to receive support.

For this plan each participating jurisdiction was given an opportunity to present their capability assessment information.

## 5.2 – Granted Authority

In implementing a mitigation plan or specific action, a local jurisdiction may utilize any or all of the four broad types of government authority granted by the State of Kansas. The four types of authority are defined as:

- Regulation
- Acquisition
- Taxation
- Spending

### ***Regulation***

The scope of this local authority is subject to constraints, however, as all of Kansas' political subdivisions must not act without proper delegation from the State. Under a principle known as "Dillon's Rule," all power is vested in the State and can only be exercised by local governments to the extent it is delegated.







## ***Acquisition***

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely “hazard-proofing” a particular piece of property or area is to acquire the property, thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Kansas legislation empowers cities, towns, counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain (County Home Rule Powers, K.S.A. 19-101, 19-101a, 19-212).

## ***Taxation***

The power to levy taxes and special assessments is an important tool delegated to local governments by Kansas law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the community. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood control within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development. Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.

## ***Spending***

The Kansas General Assembly allocated the ability to local governments to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption of annual budgets and a Capital Improvement Plan. A Capital Improvement Plan is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a community can control growth to some extent. In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to services. A Capital Improvement Plan that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the Capital Improvement Plan is effective in directing growth away from environmentally sensitive or high hazard areas.





## 5.3 – Governance

All counties within Kansas Region F operate under a county commissioner form of governance, with the elected board of commissioners overseeing county operations.

**Table 5.1: County Governance**

Jurisdiction	Government Structure	Number of Commissioners
Clay County	Commission	3
Cloud County	Commission	3
Dickinson County	Commission	3
Ellsworth County	Commission	3
Jewell County	Commission	3
Lincoln County	Commission	3
Mitchell County	Commission	3
Osborne County	Commission	3
Ottawa County	Commission	3
Republic County	Commission	3
Saline County	Commission	3
Smith County	Commission	3

In general, the participating towns and cities in Kansas Region F operate either under a Mayoral form of governance or an elected city council form of governance.

## 5.4 – Jurisdictional Capabilities

Information as to the current capacity of participating jurisdictions is summarized in the following sections and tables. All capability information was provided by jurisdictional officials through the above referenced questions and through outreach from the MPC.

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Many smaller jurisdictions have very limited to no planning, management, response or mitigation capabilities. Often these jurisdictions rely on the county or nearby larger municipalities for assistance. This lack of capabilities is reflected in the following tables. Additionally, many very small or extremely limited participating small jurisdictions, largely townships, are not listed on the capability list. This in no way diminishes the participation in the process of these jurisdictions. Finally, special district capabilities are included in their overarching jurisdiction.





## 5.4.1 – Planning Capabilities

The planning capability assessment is designed to provide a general overview of the key planning and regulatory tools or programs in place or under development. This information helps identify opportunities to address existing planning gaps and provides an opportunity to review areas that mitigation planning actions can be utilized with existing plans. Jurisdictions were asked if they had completed the following:

***Comprehensive Plan:*** A comprehensive plan establishes the overall vision for a jurisdiction and serves as a guide to decision making, and generally contains information on demographics, land use, transportation, and facilities. As a comprehensive plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.

***Critical Facilities Plan:*** A critical facilities plan is used to identify a jurisdiction’s critical facilities, including fire stations, police stations, hospitals, schools, day care centers, senior care facilities, major roads and bridges, critical utility sites, and hazardous material storage areas. Additionally, this plan may be used to determine methods to mitigate damage to these facilities.

***Debris Management Plan:*** A debris management plan covers the response and recovery from debris-causing incidents such as tornados or floods. Planning considerations include debris removal and disposal, disposal locations, equipment availability, and personnel training.

***Emergency Operations Plan:*** An emergency operations plan outlines responsibility, means and methods by which resources are deployed during and following an emergency or disaster.

***Evacuation Plan:*** A plan that outlines routes and methods by which populations are evacuated during and following an emergency or disaster.

***Fire Mitigation Plan:*** A fire mitigation plan is used to mitigate a jurisdictions wildfire risk and vulnerability. The plan documents areas with an elevated risk of wildfires, and identifies the actions taken to decrease the risk. A fire mitigaion plan can influence and prioritize future funding for hazardous fuel reduction projects, including where and how federal agencies implement fuel reduction projects on federal lands.

***Flood Mitigation Assistance Plan:*** The purpose of the flood mitigation assistance plan is to reduce or eliminate the long-term risk of flood damage to buildings and other structures insured under the NFIP.

***Recovery Plan:*** A disaster recovery plan guides the recovery and reconstruction process following a disaster. Hazard mitigation principles should be incorporated into disaster recovery plans to assist in breaking the cycle of disaster loss.

***Vulnerable Population Plan and/or Inventory:*** A vulnerable populations plan is used to develop a strategic approach for support to persons with functional or special needs before, during and following a disaster.

The table below summarizes relevant jurisdictional planning capabilities.





**Table 5.2: Jurisdictional Planning Capabilities**

<b>Jurisdiction</b>	<b>Comprehensive Plan</b>	<b>Critical Facilities Plan</b>	<b>Debris Management Plan</b>	<b>Emergency Operations Plan</b>	<b>Evacuation Plan</b>	<b>Firewise or other Fire Mitigation Plan</b>	<b>Flood Mitigation Assistance Plan</b>	<b>Recovery Plan</b>	<b>Vulnerable Population Plan and/or Inventory</b>
<b>Clay County</b>	x	x	x	x	x				
City of Clay Center	x					x			
City of Longford									
City of Morganville									
City of Oak Hill									
City of Wakefield				x					
<b>Cloud County</b>	x	x	x	x		x	x		
City of Aurora									
City of Clyde				x					
City of Concordia	x		x	x		x			
City of Glasco				x					
City Jamestown				x					
City of Miltonvale				x					
City of Simpson									
<b>Dickinson County</b>	x		x	x					
City of Abilene	x								
City of Chapman									
City of Carlton								x	
City of Enterprise									
City of Herington									
City of Hope	x		x	x					
City of Manchester				x				x	
City of Solomon									
City of Woodbine	x		x	x					
<b>Ellsworth County</b>	x		x	x			x		
City of Ellsworth	x	x	x	x	x	x	x	x	
City of Holyrood		x							
City of Kanopolis		x							
City of Lorraine									
City of Wilson		x							
<b>Jewell County</b>				x					
City of Burr Oak									





**Table 5.2: Jurisdictional Planning Capabilities**

<b>Jurisdiction</b>	<b>Comprehensive Plan</b>	<b>Critical Facilities Plan</b>	<b>Debris Management Plan</b>	<b>Emergency Operations Plan</b>	<b>Evacuation Plan</b>	<b>Firewise or other Fire Mitigation Plan</b>	<b>Flood Mitigation Assistance Plan</b>	<b>Recovery Plan</b>	<b>Vulnerable Population Plan and/or Inventory</b>
City of Esbon									
City of Formoso		x				x		x	
City of Jewell				x					
City of Mankato									
City of Randall									
City of Weber	x	x	x	x	x	x	x		
<b>Lincoln County</b>	x	x	x	x	x	x	x	x	
City of Barnard									
City of Beverly				x					
City of Lincoln Center	x			x					
City of Sylvan Grove	x			x					
<b>Mitchell County</b>	x	x	x	x	x	x		x	
City of Beloit	x	x		x		x			x
City of Cawker City	x	x	x	x					
City of Glen Elder	x	x	x	x	x		x	x	x
City of Hunter				x					
City of Scottsville				x					
City of Simpson				x					
City of Tipton				x				x	x
<b>Osborne County</b>	x			x				x	
City of Alton				x					
City of Downs				x					
City of Natoma				x					
City of Osborne				x					
City of Portis				x					
<b>Ottawa County</b>	x	x	x	x			x	x	x
City of Bennington	x	x	x						
City of Culver	x								x
City of Delphos	x		x	x					
City of Minneapolis	x	x	x	x					
City of Tescott	x	x	x	x	x		x	x	x
<b>Republic County</b>		x	x	x					
City of Agenda									







**Table 5.2: Jurisdictional Planning Capabilities**

<b>Jurisdiction</b>	<b>Comprehensive Plan</b>	<b>Critical Facilities Plan</b>	<b>Debris Management Plan</b>	<b>Emergency Operations Plan</b>	<b>Evacuation Plan</b>	<b>Firewise or other Fire Mitigation Plan</b>	<b>Flood Mitigation Assistance Plan</b>	<b>Recovery Plan</b>	<b>Vulnerable Population Plan and/or Inventory</b>
City of Bellville									
City of Courtland									
City of Cuba									
City of Munden									
City of Narka									
City of Republic									
City of Scandia									
<b>Saline County</b>									
City of Assaria	x	x		x			x		
City of Brookville									
City of Gypsum	x								
City of New Cambria									
City of Salina	x	x	x	x	x		x		
City of Smolan									
<b>Smith County</b>									
City of Cedar				x					
City of Gaylord				x					
City of Kensington				x					
City of Lebanon				x					
City of Smith Center				x	x				





## 5.4.2 – Policies and Ordinances

Participating jurisdictions were asked if the following policies and ordinances and plans were established and enforced:

**Building Code:** Many structural mitigation measures involve constructing and retrofitting homes, businesses and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through the building code.

**Floodplain Ordinance:** In general, floodplain ordinances are used to:

- Minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage.
- Prevent and minimize loss of life, injuries, and property damage in flood hazard areas.
- Promote the public health, safety and welfare of citizens in flood hazard areas.

Floodplain ordinances may allow jurisdictions to:

- Manage planned growth
- Adopt local ordinances to regulate uses in flood hazard areas
- Enforce those ordinances
- Grant permits for use in flood hazard areas that are consistent with the ordinance

These ordinances can also help ensure meeting the minimum requirements of participation in the NFIP. The incentive for local governments adopting such ordinances is that they will afford their residents the ability to purchase flood insurance through the NFIP.

**Stormwater Ordinance:** The purpose of a stormwater ordinance is to protect the quality and quantity of local, regional and state waters from the potential harm of unmanaged stormwater. Stormwater ordinances include protection from activities that result in the degradation of properties, water quality, stream channels, and other natural resources.

**Nuisance Ordinance:** Local governments may use their ordinance-making power to abate “nuisances,” which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

**Zoning:** Zoning is the traditional and most common tool available to local jurisdictions to control the use of land. Zoning is used to promote health, safety, and the general welfare of the community. Zoning is used to dictate the type of land use and to set minimum specifications for use such as lot size, building height and setbacks, and density of population. Local governments are authorized to divide their jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, special use districts or conditional use districts. Zoning ordinances consist of maps and written text.

The table below summarizes relevant jurisdictional policies and ordinances.





**Table 5.3: Jurisdictional Policies and Ordinances**

<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>Clay County</b>		X			X
City of Clay Center	X	X	X		X
City of Longford					
City of Morganville		X			
City of Oak Hill					
City of Wakefield	X	X	X		X
<b>Cloud County</b>					
City of Aurora					
City of Clyde	X	X	X		
City of Concordia	X	X	X	X	X
City of Glasco					
City of Jamestown					
City of Miltonvale					
City of Simpson					
<b>Dickinson County</b>		X			X
City of Abilene	X	X	X		
City of Chapman					
City of Carlton	X	X			X
City of Enterprise	X	X	X	X	X
City of Herington	X		X		
City of Hope		X		X	
City of Manchester	X	X	X	X	X
City of Solomon					
City of Woodbine		X			X
<b>Ellsworth County</b>					
City of Ellsworth		X	X		X
City of Holyrood			X	X	
City of Kanopolis			X		
City of Lorraine			X		
City of Wilson			X	X	
<b>Jewell County</b>					
City of Burr Oak					
City of Esbon					
City of Formoso			X		
City of Jewell			X		
City of Mankato			X		
City of Randall					
City of Weber	X	X	X	X	X





**Table 5.3: Jurisdictional Policies and Ordinances**

<b>Jurisdiction</b>	<b>Building Code</b>	<b>Floodplain Ordinance</b>	<b>Nuisance Ordinance</b>	<b>Storm Water Ordinance</b>	<b>Zoning Ordinance</b>
<b>Lincoln County</b>		X			
City of Barnard			X		
City of Beverly			X		
City of Lincoln Center	X	X	X		
City of Sylvan Grove			X		
<b>Mitchell County</b>		X			
City of Beloit	X	X	X	X	X
City of Cawker City	X		X		
City of Glen Elder	X		X	X	
City of Hunter		X	X		
City of Scottsville		X	X		
City of Simpson		X	X		
City of Tipton			X		
<b>Osborne County</b>					
City of Alton			X		
City of Downs			X		
City of Natoma			X		
City of Osborne			X		
City of Portis			X		
<b>Ottawa County</b>	X	X	X		X
City of Bennington	X	X	X	X	X
City of Culver		X	X		
City of Delphos		X	X		
City of Minneapolis	X		X		X
City of Tescott	X	X	X	X	X
<b>Republic County</b>					
City of Agenda			X		
City of Bellville			X		X
City of Courtland			X		
City of Cuba			X		
City of Munden			X		
City of Narka			X		
City of Republic			X		
City of Scandia			X		
<b>Saline County</b>	X	X	X	X	X
City of Assaria	X	X	X	X	X
City of Brookville					
City of Gypsum	X	X	X		
City of New Cambria		X	X		





**Table 5.3: Jurisdictional Policies and Ordinances**

Jurisdiction	Building Code	Floodplain Ordinance	Nuisance Ordinance	Storm Water Ordinance	Zoning Ordinance
City of Salina	x	x	x	x	x
City of Smolan	x				
<b>Smith County</b>					x
City of Cedar		x	x	x	x
City of Gaylord					
City of Kensington					
City of Lebanon					
City of Smith Center		x			

### 5.4.3 – Programs

This part of the capability’s assessment includes the identification and evaluation of existing programs for each participating jurisdiction:

**Community Rating System program under the National Flood Insurance Program:** The NFIP's Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Participants are offered flood insurance premium rates at a discount to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS. These goals are the reduction of flood damage to insurable property, the strengthening and support of insurance aspects of the NFIP, and the encouragement of a comprehensive approach to floodplain management.

**Firewise Community Certification:** The Firewise Communities Program encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes from the risk of wildfire. Firewise is a key component of Fire Adapted Communities, a collaborative approach that connects all those who play a role in wildfire education, planning and action with comprehensive resources to help reduce risk. The program is co-sponsored by the USDA Forest Service, the US Department of the Interior, and the National Association of State Foresters.

**ISO Fire Rating:** This assessment also includes the identification and evaluation of existing ISO fire ratings. The Fire Suppression Rating Schedule is a manual containing the criteria ISO uses in reviewing the fire prevention and fire suppression capabilities of individual communities or fire protection areas. The schedule measures the major elements of a community’s fire protection system and develops a numerical grading called a Public Protection Classification.

**National Flood Insurance Program:** In 1968, Congress created the NFIP to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to







homeowners, renters, and business owners if their community participates in the NFIP. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding.

**National Weather Service StormReady Program:** StormReady uses a grassroots approach to help communities develop plans to handle all types of severe weather. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations

The table below summarizes relevant local programs.

**Table 5.4: Jurisdictional Programs**

Jurisdiction	Community Rating System program	Firewise Community Certification	ISO Fire Rating	National Flood Insurance Program	National Weather Service Storm Ready Certification
<b>Clay County</b>				x	
City of Clay Center			4	x	
City of Longford					
City of Morganville				x	
City of Oak Hill					
City of Wakefield			x	x	
<b>Cloud County</b>			x	x	x
City of Aurora					
City of Clyde				x	
City of Concordia			x	x	x
City of Glasco				x	
City Jamestown					
City of Miltonvale				x	
City of Simpson					
<b>Dickinson County</b>			x	x	x
City of Abilene			x	x	
City of Chapman			x	x	
City of Carlton			6		
City of Enterprise			5	x	
City of Herington			8	x	
City of Hope					
City of Manchester					
City of Solomon				x	
City of Woodbine			x		x





**Table 5.4: Jurisdictional Programs**

<b>Jurisdiction</b>	<b>Community Rating System program</b>	<b>Firewise Community Certification</b>	<b>ISO Fire Rating</b>	<b>National Flood Insurance Program</b>	<b>National Weather Service Storm Ready Certification</b>
<b>Ellsworth County</b>				X	
City of Ellsworth			4	X	
City of Holyrood			X	X	
City of Kanopolis			X	X	
City of Lorraine			X	X	
City of Wilson			X	X	
<b>Jewell County</b>					
City of Burr Oak				X	
City of Esbon				X	
City of Formoso			8		
City of Jewell			8	X	
City of Mankato				X	
City of Randall				X	
City of Weber					
<b>Lincoln County</b>			X	X	X
City of Barnard					
City of Beverly					
City of Lincoln Center			5	X	
City of Sylvan Grove			6	X	X
<b>Mitchell County</b>			X	X	X
City of Beloit			X	X	
City of Cawker City			X		
City of Glen Elder			X	X	X
City of Hunter			X	X	
City of Scottsville			X		
City of Simpson			X	X	
City of Tipton			X		
<b>Osborne County</b>					
City of Alton				X	
City of Downs				X	
City of Natoma				X	
City of Osborne					
City of Portis					
<b>Ottawa County</b>	X		X	X	X
City of Bennington	X		X	X	
City of Culver	X		X	X	





**Table 5.4: Jurisdictional Programs**

<b>Jurisdiction</b>	<b>Community Rating System program</b>	<b>Firewise Community Certification</b>	<b>ISO Fire Rating</b>	<b>National Flood Insurance Program</b>	<b>National Weather Service Storm Ready Certification</b>
City of Delphos			X	X	
City of Minneapolis			X	X	
City of Tescott			X	X	
<b>Republic County</b>				X	
City of Agenda					
City of Bellville					
City of Courtland				X	
City of Cuba				X	
City of Munden					
City of Narka					
City of Republic				X	
City of Scandia				X	
<b>Saline County</b>		X	X	X	
City of Assaria	X		X	X	
City of Brookville				X	
City of Gypsum	X		X	X	
City of New Cambria			X	X	
City of Salina			X	X	
City of Smolan					
<b>Smith County</b>			X		X
City of Cedar			X	X	X
City of Gaylord			X	X	X
City of Kensington			X	X	X
City of Lebanon			X		X
City of Smith Center			X	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</b>	<b>NFIP Floodplain Administrator</b>	<b>Planning Department</b>	<b>Public Works Official</b>
<b>Clay County</b>		X	X	X	X		X
City of Clay Center	X	X	X		X		X
City of Longford							
City of Morganville					X		
City of Oak Hill							
City of Wakefield	X			X	X		
<b>Cloud County</b>		X	X	X	X		
City of Aurora							
City of Clyde					X		
City of Concordia	X				X		X
City of Glasco					X		
City Jamestown							
City of Miltonvale					X		
City of Simpson							
<b>Dickinson County</b>		X	X	X	X	X	X
City of Abilene	X		X	X	X		X
City of Chapman					X		X
City of Carlton	X		X	X			X
City of Enterprise	X		X		X		X
City of Herington					X		X
City of Hope		X	X				
City of Manchester	X						X
City of Solomon					X		
City of Woodbine		X	X	X		X	X
<b>Ellsworth County</b>		X	X		X		X
City of Ellsworth	X	X	X		X	X	X
City of Holyrood					X		X
City of Kanopolis					X		X
City of Lorraine					X		X
City of Wilson					X		X
<b>Jewell County</b>		X	X	X			X
City of Burr Oak					X		
City of Esbon					X		
City of Formoso			X				X
City of Jewell					X		X
City of Mankato					X		
City of Randall					X		







**Table 5.5: Staffing and Departmental Capabilities**

<b>Jurisdiction</b>	<b>Building Code Official or Inspector</b>	<b>Emergency Management Coordinator</b>	<b>Local Emergency Planning Committee</b>	<b>Mapping Specialist</b>	<b>NFIP Floodplain Administrator</b>	<b>Planning Department</b>	<b>Public Works Official</b>
City of Weber	x	x	x	x		x	x
<b>Lincoln County</b>		x	x	x	x		x
City of Barnard							
City of Beverly							x
City of Lincoln Center					x		x
City of Sylvan Grove					x		x
<b>Mitchell County</b>		x	x	x	x		x
City of Beloit	x	x	x	x	x	x	x
City of Cawker City			x			x	x
City of Glen Elder	x		x		x	x	x
City of Hunter	x				x		x
City of Scottsville							x
City of Simpson	x				x		x
City of Tipton							x
<b>Osborne County</b>		x	x	x			x
City of Alton					x		x
City of Downs					x		x
City of Natoma					x		x
City of Osborne					x		x
City of Portis							
<b>Ottawa County</b>		x	x	x	x	x	x
City of Bennington					x	x	x
City of Culver	x				x		x
City of Delphos					x		x
City of Minneapolis	x		x		x	x	x
City of Tescott	x						x
<b>Republic County</b>		x	x		x		
City of Agenda							
City of Bellville							
City of Courtland					x		
City of Cuba					x		
City of Munden							
City of Narka							
City of Republic					x		
City of Scandia					x		
<b>Saline County</b>	x	x	x	x	x	x	x
City of Assaria	x	x	x		x	x	x





**Table 5.5: Staffing and Departmental Capabilities**

Jurisdiction	Building Code Official or Inspector	Emergency Management Coordinator	Local Emergency Planning Committee	Mapping Specialist	NFIP Floodplain Administrator	Planning Department	Public Works Official
City of Brookville					x		
City of Gypsum	x	x			x		x
City of New Cambria		x			x		
City of Salina	x	x	x	x	x	x	x
City of Smolan							
<b>Smith County</b>		x	x				x
City of Cedar					x		
City of Gaylord					x		x
City of Kensington					x		x
City of Lebanon							x
City of Smith Center					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 F receive the majority of their revenue through state and local sales tax and federal and state pass through dollars. Based on available revenue information, and





given that both the state and counties are experiencing budget deficits, funding for mitigation programs and disaster response is at a premium. Adding to the budget crunch is the increased reliance on local accountability by the federal government.

The following provide brief definitions of applicable fiscal programs:

**Application and Management of Grant Funding:** The jurisdiction has the staffing and capabilities to apply for grant funding and oversee all necessary provisions of the funding.

**Authority to Levy Taxes:** The authority to levy taxes would allow the jurisdiction to tax its population base.

**Authority to Withhold Spending in Hazard Prone Areas:** The ability of a jurisdiction to not provide funding for activities or actions in an area that is known to be prone to specific hazards.

**Incur Debt through General Obligation Bonds:** General obligation bonds are issued with the belief that a municipality will be able to repay its debt obligation through taxation or revenue from projects. General obligation bonds can be used to generate funds for mitigation projects.

**Usage of Capital Improvement Funding for Mitigation Projects:** Capital improvement allows for spending on identified capital projects and for equipment purchases, in this context related to mitigation projects.

The following table highlights each jurisdiction’s fiscal capabilities.

**Table 5.6: Jurisdictional Financial Capabilities**

Jurisdiction	Apply for and Manage Grant Funding	Authority to levy taxes for specific purposes	Authority to Withhold spending in hazard prone areas	Incur Debt through General Obligation Bonds	Usage of Capital Improvement Funding for Mitigation Projects
<b>Clay County</b>	x	x		x	x
City of Clay Center	x	x		x	x
City of Longford	x	x		x	x
City of Morganville	x	x		x	x
City of Oak Hill	x	x		x	x
City of Wakefield	x	x		x	x
<b>Cloud County</b>	x	x		x	x
City of Aurora	x	x		x	x
City of Clyde	x	x		x	x
City of Concordia	x	x		x	x
City of Glasco	x	x		x	x





**Table 5.6: Jurisdictional Financial Capabilities**

<b>Jurisdiction</b>	<b>Apply for and Manage Grant Funding</b>	<b>Authority to levy taxes for specific purposes</b>	<b>Authority to Withhold spending in hazard prone areas</b>	<b>Incur Debt through General Obligation Bonds</b>	<b>Usage of Capital Improvement Funding for Mitigation Projects</b>
City Jamestown	x	x		x	x
City of Miltonvale	x	x		x	x
City of Simpson	x	x		x	x
<b>Dickinson County</b>	x	x		x	x
City of Abilene	x	x		x	x
City of Chapman	x	x		x	x
City of Carlton	x	x		x	x
City of Enterprise	x	x		x	x
City of Herington	x	x		x	x
City of Hope	x	x		x	x
City of Manchester	x	x		x	x
City of Solomon	x	x		x	x
City of Woodbine	x	x		x	x
<b>Ellsworth County</b>	x	x		x	x
City of Ellsworth	x	x		x	x
City of Holyrood	x	x		x	x
City of Kanopolis	x	x		x	x
City of Lorraine	x	x		x	x
City of Wilson	x	x		x	x
<b>Jewell County</b>	x	x		x	x
City of Burr Oak	x	x		x	x
City of Esbon	x	x		x	x
City of Formoso	x	x		x	x
City of Jewell	x	x		x	x
City of Mankato	x	x		x	x
City of Randall	x	x		x	x
City of Weber	x	x		x	x
<b>Lincoln County</b>	x	x		x	x
City of Barnard	x	x		x	x
City of Beverly	x	x		x	x
City of Lincoln Center	x	x		x	x
City of Sylvan Grove	x	x		x	x
<b>Mitchell County</b>	x	x		x	x
City of Beloit	x	x	x	x	x
City of Cawker City	x	x	x		





**Table 5.6: Jurisdictional Financial Capabilities**

<b>Jurisdiction</b>	<b>Apply for and Manage Grant Funding</b>	<b>Authority to levy taxes for specific purposes</b>	<b>Authority to Withhold spending in hazard prone areas</b>	<b>Incur Debt through General Obligation Bonds</b>	<b>Usage of Capital Improvement Funding for Mitigation Projects</b>
City of Glen Elder	x	x		x	x
City of Hunter	x	x		x	x
City of Scottsville	x	x		x	x
City of Simpson	x	x		x	x
City of Tipton	x	x		x	x
<b>Osborne County</b>	x	x		x	x
City of Alton	x	x		x	x
City of Downs	x	x		x	x
City of Natoma	x	x		x	x
City of Osborne	x	x		x	x
City of Portis	x	x		x	x
<b>Ottawa County</b>	x	x		x	x
City of Bennington	x	x	x	x	x
City of Culver	x	x		x	x
City of Delphos	x	x		x	x
City of Minneapolis	x	x		x	x
City of Tescott	x	x	x	x	x
<b>Republic County</b>	x	x		x	x
City of Agenda	x	x		x	x
City of Bellville	x	x		x	x
City of Courtland	x	x		x	x
City of Cuba	x	x		x	x
City of Munden	x	x		x	x
City of Narka	x	x		x	x
City of Republic	x	x		x	x
City of Scandia	x	x		x	x
<b>Saline County</b>	x	x	x	x	x
City of Assaria	x	x	x	x	x
City of Brookville	x	x	x	x	x
City of Gypsum	x	x	x	x	x
City of New Cambria	x	x	x	x	x
City of Salina	x	x	x	x	x
City of Smolan	x	x		x	x
<b>Smith County</b>	x	x		x	x
City of Cedar	x	x		x	x
City of Gaylord	x	x		x	x







**Table 5.6: Jurisdictional Financial Capabilities**

<b>Jurisdiction</b>	<b>Apply for and Manage Grant Funding</b>	<b>Authority to levy taxes for specific purposes</b>	<b>Authority to Withhold spending in hazard prone areas</b>	<b>Incur Debt through General Obligation Bonds</b>	<b>Usage of Capital Improvement Funding for Mitigation Projects</b>
City of Kensington	x	x		x	x
City of Lebanon	x	x		x	x
City of Smith Center	x	x		x	x

**5.4.7 – School Capability Assessment**

Participating school districts were provided with a different set of questions that participating governmental jurisdictions. These questions were asked to ascertain the level of preparedness of the institution.

The following provides brief definitions of terms used in the capability assessment of schools. Please note that some definitions have been provided in previous sections.

**Access to Local, Regional and State Funds:** The ability to use local, regional and state funding on school activities and improvements.

**Active Shooter Plan:** An active shooter plan outlines responsibility, means and methods by which resources are deployed during an active shooter scenario.

**Capital Improvement Plan:** A capital improvement plan guides scheduling of, and spending on, school improvements. A capital improvement plan can guide future development away from identified hazard areas, an incorporate identified mitigation strategies.

**District Master Plan:** A master plan establishes the overall vision and serves as a guide to decision making. A master plan generally contains information on demographics, land use, transportation, and facilities. As a master plan is broad in scope the integration of hazard mitigation measures can enhance the likelihood of achieving risk reduction goals.

**Emergency Operations Plan/Evacuation Plan:** An emergency operations plan outlines responsibility, means and methods by which resources are deployed during and following an emergency or disaster. Often included in these plans are detailed evacuation procedures and policies.

**Incur Debt through General Obligation Bonds:** General obligation bonds are issued with the belief that an entity will be able to repay its debt obligation through taxation or revenue from projects. General obligation bonds can be used to generate funds for mitigation projects.





**School Safety or Resource Officer:** A person with overall responsibility for safety of the school, students and staff.

Information as to the current capacity of participating schools, colleges and universities is summarized in the following table.

**Table 5.7: College, Unified School District or University Capabilities**

Jurisdiction	Access to Local, Regional and State funds	Active Shooter Plan or Policy	Capital Improvement Plan	District Master Plan	School Emergency and Evacuation Plans	School Safety or Resource Officers or Dedicated Law Enforcement
<b>Clay County</b>						
USD #379 - Clay Center	x	x			x	
<b>Cloud County</b>						
USD #224 - Clifton/Clyde	x	x			x	
USD #333 - Concordia	x	x			x	
USD #334 - Southern Cloud	x	x			x	
<b>Dickinson County</b>						
USD #393 - Solomon	x	x			x	
USD #435 - Abilene	x	x			x	
USD #473 - Chapman	x	x			x	
USD #481 - Rural Vista	x	x			x	
USD #487 - Herington	x	x			x	
<b>Ellsworth County</b>						
USD #112 - Central Plains	x	x			x	
USD #327 - Ellsworth	x	x			x	
<b>Jewell County</b>						
USD #107 - Rock Hill	x	x			x	
<b>Lincoln County</b>						
USD #298 - Lincoln	x	x	x	x	x	
USD #299 - Sylvan Grove	x	x			x	
<b>Mitchell County</b>						
North Central Technical College	x	x	x	x	x	
Tipton Catholic High School	x	x			x	
USD #272 - Waconda	x	x			x	
USD #273 - Beloit	x	x	x	x	x	
<b>Osborne County</b>						
USD #272 - Waconda	x	x			x	
USD #392 - Osborne	x	x	x	x	x	





**Table 5.7: College, Unified School District or University Capabilities**

Jurisdiction	Access to Local, Regional and State funds	Active Shooter Plan or Policy	Capital Improvement Plan	District Master Plan	School Emergency and Evacuation Plans	School Safety or Resource Officers or Dedicated Law Enforcement
USD #399 - Natoma	x	x		x	x	
<b>Ottawa County</b>						
USD #239 - North Ottawa County	x	x			x	
USD #240 - Twin Valley	x	x			x	
<b>Republic County</b>						
USD #109 - Republic County	x	x		x	x	
USD #426 - Pike Valley	x	x	x	x	x	
<b>Saline County</b>						
Kansas Wesleyan University		x	x		x	x
Salina Area Technical College	x	x	x		x	
USD #240 – Twin Valley	x	x			x	x
USD #305 - Salina	x	x	x	x	x	x
USD #306 - Southeast of Saline	x	x	x	x	x	x
USD #307 - Ell/Saline	x	x	x	x	x	x
<b>Smith County</b>						
USD #237 - Smith Center	x	x			x	
USD #272 - Waconda	x	x			x	

Additionally, under K.S.A. 72-5457 (General Provisions for the Issuance of Bonds), all Kansas USDs may issue general obligation bonds to:

- Purchase or improve any site or sites necessary for school district purposes including housing and boarding pupils enrolled in an area vocational school
- Acquire, construct, equip, furnish, repair, remodel or make additions to buildings including housing and boarding pupils enrolled in an area vocational school operated under the board of education of a school district

## 5.5 – Opportunities for Capability Improvement

As part of this plan update, the MPC identified the following opportunities for improvement across the region concerning current capabilities:

- **Local Funding**
  - Integration of mitigation plans with other local plans and programs, such as capital improvement plans





- Adoption of cost-effective mitigation measures when developing capital improvement projects
- **Public Education and Outreach**
  - Regular deployment of hazard awareness campaigns to enhance public awareness
- **Land Use Planning and Regulations**
  - Continued encouragement of using land use planning to identify areas at risk to natural hazards
  - Stormwater retention/detention projects to reduce flooding
  - Locally funded buyouts of hazard prone properties
- **Floodplain Management**
  - Encourage and support new participation in the NFIP and in the CRS
  - Continue the promotion and enforcement of NFIP and CRS floodplain management programs



# 6.0 Mitigation Strategy

## 6.1 – Introduction

As part of this planning effort, Kansas Region F 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 and physical risks





- Establishment of hazard warning and communication procedures
- Redundancy or duplication of essential personnel, critical systems, equipment, and information materials.

### 6.3 – Problem Statements

Based on the regionally identified hazards, problem statements have been developed to detail identified major concerns that can potentially be addressed through proposed mitigation actions. Problems statements were developed using the following inputs:

- Identify a key point of concern
- Is the problem getting worse, better, or staying the same?
- What are the identified or potential impacts?

The following table present regional problem statements to be utilized in informing the review, modification and development of hazard mitigation actions.

**Table 6.1: Kansas Region F Problem Statements**

Identified Hazard	Problem Statement
All Hazards	Current public outreach initiatives need to be expanded
Flood	The number of flood insurance policies have decreased from 2012 to 2018

County specific problem statements were generated through discussions with participating jurisdictions within that county, to be utilized in informing the review, modification and development of hazard mitigation actions. Additionally, problem statements from the public survey are incorporated to provide a community wide view. Problems statements were developed using the following inputs:

- Location
- Identified hazard
- Key point of concern

The following table present problem statements for each county

**Table 6.2: Kansas Region F Community Problem Statements**

Jurisdiction	Identified Hazard	Problem Statement
Clay County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Clay County	Utility Failure	Water treatment plants are located near or in flood zones and subject to flooding causing water quality issues downstream.
Cloud County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Cloud County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Cloud County	Windstorm	Tree damage and downed limbs may cause loss of utilities.







**Table 6.2: Kansas Region F Community Problem Statements**

<b>Jurisdiction</b>	<b>Identified Hazard</b>	<b>Problem Statement</b>
Cloud County	Winter Storm	Ice storms may damage utilities causing loss of heat and power.
Dickinson County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Dickinson County	Utility Failure	Power infrastructure is above ground and subject to a range of hazards.
Ellsworth County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Ellsworth County	Utility Failure	Power infrastructure is above ground and subject to a range of hazards.
Lincoln County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Lincoln County	Utility Failure	Power infrastructure is above ground and subject to a range of hazards.
Mitchell County	Tornado	County does not have adequate number of safe rooms throughout county to protect residents.
Mitchell County	Preparedness	County has not identified adequate number or specific facilities for shelter/unification locations.
Osborne County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Osborne County	Utility Failure	Power infrastructure is above ground and subject to a range of hazards.
Ottawa County	Dam and Levee Failure	Ottawa State Fishing Lake dam has been identified by KDA as requiring mitigation measures to correct identified deficiencies.
Ottawa County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Ottawa County	Utility Failure	Water treatment plants are located near or in flood zones and subject to flooding causing water quality issues downstream.
Ottawa County	Windstorm	Tree damage and downed limbs may cause loss of utilities.
Republic County	Windstorm	Tree damage and downed limbs may cause loss of utilities.
Republic County	Winter Storm	Ice storms may damage utilities causing loss of heat and power.
Saline County	Flood	Many low water crossing frequently flood.
Saline County	Tornado	County does not have an adequate number of safe rooms and/or shelters to protect citizens.
Saline County	Tornado	County does not have an adequate number of outdoor sirens in unincorporated communities.
Smith County	Utility Failure	Power infrastructure is above ground and subject to a range of hazards.
Smith County	Winter Storm	Winter storms may damage utilities causing loss of heat and power.





## 6.4 – Identification of Goals

*44 CFR 201.6 (c)(3)(i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Through thorough discussions at stakeholder meetings, the MPC determined that the four previously identified primary hazard mitigation goals remained relevant and applicable. This was because the priorities of Kansas Region F 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 F vision for hazard mitigation and disaster resilience.

- **Goal 1:** Reduce or eliminate risk to the people and property of Kansas Region F 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 F 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 F faces due to the impacts of the identified hazards.
- **Goal 4:** Enhance communication and coordination among all agencies and between agencies and the public.

## 6.5 – Completed Mitigation Actions

Sine the completion of the previous HMP, each jurisdiction has been tracking the completion status of all identified hazard mitigation actions. Each of the following completed actions should be viewed as a testament to the effectiveness of the HMP and a positive step in creating safer and more resilient communities.

**Table 6.3: Region F Participating Jurisdictions Completed Hazard Mitigation Actions**

Jurisdiction	Action Description
USD#239-2	Pursue, purchase, and install a better communication system.

Kansas Region F remains committed to pursuing funding to complete all major hazard mitigation projects.





## 6.6 – Review and Addition of Mitigation Actions

For this plan update, members of the MPC and participating jurisdictions were asked to complete a thorough review of all not completed mitigation actions. Additionally, MPC members and participating jurisdictions were provided with the opportunity to identify and incorporate newly identified actions based on:

- Hazard events that have occurred since the last plan revision
- Updated risk assessments
- Identified goals and objectives
- Changing local capabilities
- New vulnerabilities.

In identifying new, or reviewing existing mitigation actions, the following general categories were considered:

**Local Plans and Regulations:** Actions that influence the way land and buildings are developed or constructed. Actions may include:

- Revision or institution planning and zoning ordinances
- Revision or institution of building codes
- Open space preservation
- Revision or institution floodplain regulations
- Revision or institution stormwater management regulations
- Drainage system maintenance
- Requirements for riverine setbacks

**Structure and Infrastructure Projects:** Actions that involve the modification of existing structures to protect, or remove from, a hazard or hazard area., such as:

- Acquisition of hazard prone properties
- Relocation of hazard prone properties
- Revision or institution of building elevation requirements
- Critical facilities protection
- Installation or retrofitting of community safe rooms
- Requiring insurance
- Installation or update of warning systems

**Natural Systems Protection:** Actions that minimize hazard losses to natural systems. 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 – Clay County Mitigation Actions

**Table 6.4: Clay County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Clay County-1	Clay County is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Clay County-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year ( <b>NFIP</b> ).	Flood	Emergency Manager, NFIP Administrator	High	3, 4	Staff Time	Local	Continuous	In progress
Clay County-3	Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	New
Clay County-4	Collect educational materials on individual and family preparedness and/or mitigation measures for property owners and display at both the library and routinely visited jurisdiction offices.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Clay County-5	Construct safe rooms and storm shelters in rural and underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$1,000,000 per shelter	Local, State, Federal	Five years	Not started, lack of funding
Clay County-6	Educate residents of Clay County about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	3	Staff Time	Local	Continuous	Not started, lack of staff time
Clay County-7	Promote and educate Clay County’s public and private sectors on potential agricultural issues that can severely impact the county and regional economies and develop and implement plans to address these issues.	Terrorism, Agri-Terrorism, Civil Disorder	Extension Agent, Emergency Manager	Medium	3	Staff Time	Local, State	Four years	Not started, lack of staff time
Clay County-8	Develop and implement a wildfire prevention/education program for Clay County.	Wildfire	Sheriff, Emergency Manager, Fire Departments	High	1,2,3,4	Staff Time	Local, State	Continuous	In progress





**Table 6.4: Clay County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Clay County-9	Purchase generators for the county's vital / critical facilities.	All Hazards	Emergency Manager; County Commission	Medium	2	\$20,000 per generator	State	Four years	Not started, lack of staff
Clay Center-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	City Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Clay Center-2	Install flood controls at Clay Center wastewater treatment plant. ( <b>NFIP</b> )	Flood	City Administrator	High	1,2	\$2,000,000	Local, State, Federal	Four years	Not started, lack of funding
Clay Center-3	Make improvements to the existing Clay Center storm water system. ( <b>NFIP</b> )	Flood	City Administrator	High	1,2	\$500,000 - \$750,000	Local, State, Federal	Four years	Not started, lack of funding
Clay Center-4	Request a review and update of floodplain maps for the City of Clay Center. ( <b>NFIP</b> )	Flood	City Administrator	Medium	1,2	Staff Time	Local, Federal	Four years	Not started, lack of staff
Clay Center-5	Construct community safe room.	Tornado, Windstorm	City Administrator	High	1,2	\$350,000	Local, State, Federal	Continuous	Not started, lack of funding
Clay Center-6	Construct a new recreation center to be used in time of disaster as a community shelter for the residents of Clay Center and center for emergency resources.	All Hazards	City Administrator	High	1,2	\$500,000 - \$1,000,000	Local, State, Federal	Four years	Not started, lack of funding
Clay Center-7	Develop brochures for educating Clay Center residents on the use of sirens, where and when to seek shelter, and outlining general safety guidelines during a tornado warning.	Tornado	Fire Chief, Council Member	High	3	\$1,000	Local	Four years	Not started, lack of funding
Clay Center-8	Conduct a survey to evaluate the city's response and recovery to Winter Storm and develop plan for clearing of transportation routes.	Winter Storm	City Administrator	High	1,2,3	\$5,000 - \$7,000	Local	Four years	Not started, lack of funding
Clay Center-9	Fund and purchase weather radios to equip 75% of Clay Center businesses and residences.	All Hazards	City Administrator	High	1,2	\$15,000	Local, State	Four years	Not started, lack of funding
Clay Center-10	Develop a program to remove tree limbs, over-hanging branches, and dead trees from near power lines to avoid utility	Utility/ Infrastructure Failure	Director Public Utilities	High	1,2	\$15,000 year	Local	Continuous	Not started, lack of funding





**Table 6.4: Clay County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	failure from downed lines during severe weather events.								
Langford-1	Construct a community safe room.	Tornado, Windstorm	City Administrator	High	1,2	\$400,000	Local, State, Federal	Continuous	Not started, lack of funding
Langford-2	Seek funding to purchase weather radios for the community and residents.	All Hazards	City Administrator	Medium	1,2	\$5,000	Local, State, Federal	Four years	Not started, lack of funding
Morganville-1	The City of Morganville is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	City Administrator	High	1,2,4	Staff Time	Local	Continuous	In progress
Morganville-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year. ( <b>NFIP</b> )	Flood	City Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Morganville-3	Construct a community safe room.	Tornado, Windstorm	City Administrator	High	1,2	\$400,000	Local, State, Federal	Five years	Not started, lack of funding
Morganville-4	Promote the use of NOAA All Hazards Weather Radios for the entire community of Morganville. Seek funding to subsidize purchase and distribution of weather radios.	All Hazards	City Administrator	Medium	1,2	\$4,000	Local, State, Federal	Four years	Not started, lack of funding
Oak Hill-1	Construct a community safe room.	Tornado, Windstorm	City Administrator	High	1,2	\$300,000	Local, State, Federal	Four years	Not started, lack of funding
Oak Hill-2	Promote the use of NOAA All Hazards Weather Radios for the entire community of Oak Hill. Seek funding to subsidize purchase and distribution of weather radios.	All Hazards	City Administrator	Medium	1,2	\$4,000	Local, State, Federal	Four years	Not started, lack of funding
Wakefield -1	The City of Wakefield is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	City Administrator	High	1,2,4	Staff Time	Local	Continuous	In progress
Wakefield -2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year. ( <b>NFIP</b> )	Flood	City Administrator	High	1,2	Staff Time	Local	Continuous	In progress





**Table 6.4: Clay County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Wakefield-3	Promote the use of NOAA All Hazards Weather Radios for the entire community of Wakefield. Seek funding to subsidize purchase and distribution of weather radios.	All Hazards	City Administrator	Medium	1,2	\$3,000	Local, State, Federal	Four years	Not started, lack of funding
Wakefield-4	Seek funding to design and construct a community tornado shelter.	Tornado	City Administrator	Low	1,2	\$350,000	Federal	Four years	Not started, lack of funding
Wakefield-5	Identify critical facilities that are vulnerable to natural and man-made hazards and purchase and install emergency generators for these sites.	Utility / Infrastructure Failure	City Council	High	2	\$150,000	Local, State, Federal	Four years	In progress
USD #379-1	Develop and fund mitigation projects for the construction of tornado safe rooms for all Unified School District 379 schools.	Tornado	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Four years	Not started, lack of funding
Blue Stem REC -1	Enhance and upgrade all power lines within Clay County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$20,000,000	Local, State, Federal	Five years	Not started, lack of funding
Rolling Hills REC-1	Replace damaged copperweld conductor with equivalent but not less than 2 ACSR conductor throughout county.	Utility/ Infrastructure Failure	Director	High	1,2	\$1,000,000	Local, State, Federal	Four years	Not started, lack of funding
Rolling Hills REC-2	Upgrade and enhanced CWC single-phase power lines throughout the county with new lines.	Utility / Infrastructure Failure	Director	High	1,2	\$2,000,000	HMGP, PDM, Local, Other Grants	Four years	Not started, lack of funding
Prairie Land REC -1	Enhance and upgrade all power lines within Clay County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$20,000,000	Local, State, Federal	Five years	In progress
RWDs (all)-1	Acquire a permanent back-up generator for each critical facility and pump station.	Utility / Infrastructure Failure	Director	High	1,2	\$50,000 each	Local, State, Federal	Four years	On-going, lack of funding





## 6.8.2 – Cloud County Mitigation Actions

Table 6.5: Cloud County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Cloud County-1	Cloud County is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Cloud County-2	Purchase and demolish properties located in the floodplains in the county. ( <b>NFIP</b> )	Dam and Levee Failure, Flood	NFIP Administrator	Low	1,2	\$100,000 per property	HMGP, PDM, Local	Five years	On-going, lack of funding
Cloud County-3	Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	New
Cloud County-4	Install electronic water level warning devices at key areas upstream to notify the emergency management department of possible impending floods. ( <b>NFIP</b> )	Dam and Levee Failure, Flood, Winter Storm	Emergency Manager	High	1,2	\$500 per device	HMGP, PDM, Local	3 - 5 years	On-going, lack of funding
Cloud County-5	Purchase and install a multi-purpose public address and warning system.	All Hazards	Emergency Manager	High	1,2	\$40,000 per system	HMGP, PDM, Local	Three years	On-going, lack of funding
Cloud County-6	Build community storm shelters around the county to be prepared for all hazard events.	All Hazards	Emergency Manager	High	1,2	\$200,000 - \$500,000 per shelter	HMGP, PDM, Local	Five years	On-going, lack of funding
Cloud County-7	Build an Emergency Operations Center/911 Call Center/Community Safe room.	All Hazards	Emergency	Medium	1,2	\$500,000	HMGP, PDM, Local	Ten years	On-going, lack of funding
Cloud County-8	Conduct county-wide tree-trimming program to cut down branches and trees away from power lines and drainage areas.	All Hazards	Emergency Manager, REC Directors	High	1,2	Staff Time and Equipment Use	HMGP, PDM, Local	Three years	On-going, no progress made
Cloud County-10	Purchase backup generators for all county critical facilities, as well as two portable units for locations as needed throughout the county.	Utility/ Infrastructure Failure	Emergency Manager	High	2	\$10,000 to \$15,000 per unit	HMGP, PDM, Local	Three years	On-going, lack of funding
Cloud County-11	Provide a reimbursement program for residents to purchase generators needed at their homes or businesses.	Utility/ Infrastructure Failure	Emergency Manager	High	1,2	\$50,000	HMGP, PDM, Local	Five years	On-going, lack of funding





**Table 6.5: Cloud County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Cloud County-12	Purchase protective window film for all county, city and school building windows to reduce the risk of airborne debris injuries during extreme hazard events.	Earthquake, Hail, Windstorm, Lightning, Tornado	Emergency Manager	High	1,2	\$25,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Cloud County-13	Purchase pumper trucks and/or fire and response equipment for each fire station within the county.	Hazardous Material, Wildfire	Emergency Manager	Medium	1,2	\$40,000 per unit	HMGP, PDM, Local	Five years	On-going, lack of funding
Cloud County-14	The county would like to offer an individual safe room program. The county would manage the grant program and reimburse individuals that have a safe room built.	Earthquake, Hail, Windstorm, Lightning, Tornado	Emergency Manager	High	1,2	Staff Time	HMGP, PDM, Local	Five years	On-going, lack of funding
Cloud County-15	Construct snow fences along the highways to reduce the risk of blowing snow build up on the roads.	Winter Storm	Emergency Manager	Low	1,2	\$500,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Cloud County-16	Have the rural and local fire departments, State Forestry Service, and area farmers conduct controlled burns on highly vegetative fields to reduce the threat of wildfires.	Wildfire	Emergency Manager	High	1,2,3,4	\$20,000 per year	HMGP, PDM, Local	Three years	On-going, 40% progress made.
Cloud County-17	Purchase a reverse 911 system for the community.	All Hazards	Emergency Manager	Medium	1,2,3,4	\$50,000 per system	HMGP, PDM, Local	Three years	On-going, lack of funding
Aurora-1	Provide a NOAA Weather Radio to all residents.	All Hazards	City Administrator	High	1,2	\$3,000	HMGP, PDM, Local	Three years	On-going, lack of funding
Aurora-2	Build community FEMA approved safe room(s).	All Hazards	City Administrator	High	1,2	\$350,000	HMGP, PDM, Local	Three years	On-going, lack of funding
Aurora-3	Purchase and install backup generators for all critical facilities.	Utility/ Infrastructure Failure	City Administrator	High	2	\$10,000 to \$15,000 per unit	HMGP, PDM, Local	Three years	On-going, lack of funding
Clyde-1	Continue participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress







**Table 6.5: Cloud County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Clyde-2	Continued enforcement of floodplain ordinance. (NFIP)	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Clyde-3	Provide a NOAA Weather Radio to students and residents in the county to warn them of weather events (including lightning and hail events).	All Hazards	City Administrator	High	1,2	\$8,000	HMGP, PDM, Local	Three years	On-going, lack of funding
Clyde-4	Construct FEMA approved community safe room(s).	All Hazards	City Administrator	High	1,2	\$300,000	HMGP, PDM, Local	Three years	On-going, lack of funding
Clyde-5	Have a communitywide tree-trimming program to cut down branches and trees away from power lines and drainage areas.	All Hazards	City Administrator	High	1,2	Staff Time and Equipment Use	HMGP, PDM, Local	Three years	On-going, minimal progress made
Clyde-6	Purchase and install backup generators for all critical facilities.	Utility/ Infrastructure Failure	City Administrator	High	2	\$10,000 to \$15,000 per unit	HMGP, PDM, Local	Five years	On-going, lack of funding
Concordia-1	Continue participation in the NFIP.	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Concordia-2	Continued enforcement of floodplain ordinance. (NFIP)	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Concordia-3	Provide a NOAA Weather Radio to students and residents in the county to warn them of weather events (including lightning and hail events).	All Hazards	City Administrator	High	1,2	5,000	HMGP, PDM, Local	Three years	On-going, lack of funding
Concordia-4	Purchase backup generators for City Hall, police department, Fire stations and community centers.	Utility/ Infrastructure Failure	City Administrator	High	2	\$10,000 to \$15,000 per unit	HMGP, PDM, Local	Three years	On-going, lack of funding
Concordia-5	Become Firewise Community.	Drought, Wildfire	City Administrator	High	1,2,4	\$10,000 plus	HMGP, PDM, Local	Five years	On-going, no progress made
Glasco-1	Continue participation in the NFIP.	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Glasco-2	Continued enforcement of floodplain ordinance. (NFIP)	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress





**Table 6.5: Cloud County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Glasco-3	Conduct a flood plain study to determine the number of properties located in floodplains and demolish purchase properties as needed.	Dam and Levee Failure, Flood (NFIP)	City Administrator	Low	1,2	\$300,000	HMGP, PDM, Local	Three years	On-going, lack of funding
Glasco-4	Provide a NOAA Weather Radio to students and residents in the county to warn them of weather events.	All Hazards	City Administrator	High	1,2	\$5,000	HMGP, PDM, Local	Three years	On-going, lack of funding
Glasco-5	Construct a community safe room.	All Hazards	City Administrator	High	1,2	\$350,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Glasco-6	Tree trimming and branch removal program.	All Hazards	City Administrator	High	1,2	Staff Time and Equipment Use	HMGP, PDM, Local	Three years	On-going, 50% complete
Glasco-7	Purchase backup generators for critical facilities.	Utility/ Infrastructure Failure	City Administrator	High	2	\$10,000 to \$15,000 per unit	HMGP, PDM, Local	Five years	On-going, lack of funding
Jamestown-1	Provide a NOAA Weather Radio to students and residents in the county to warn them of weather events. The program would allow residents to purchase the radios at a reduced price.	All Hazards	City Administrator	High	1,2	\$3,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Jamestown-2	Build community FEMA approved safe room(s).	All Hazards	City Administrator	High	1,2	\$250,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Jamestown-3	Purchase generators for critical facilities.	All Hazards	City Administrator	Medium	1,2,4	\$50,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Miltonvale-1	Continue participation in the NFIP.	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Miltonvale-2	Continued enforcement of floodplain ordinance. (NFIP)	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Miltonvale-3	Institute a drainage and storm water management program. (NFIP)	Dam and Levee Failure, Flood, Winter Storm	City Administrator	Low	1,2	\$1,000,000	HMGP, PDM, Local	Five years	On-going, lack of funding





**Table 6.5: Cloud County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Miltonvale-4	Provide a NOAA Weather Radio to students and residents in the county to warn them of weather events. The program would allow residents to purchase the radios at a reduced price.	All Hazards	City Administrator	High	1,2	\$3,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Miltonvale-5	Construct FEMA approved community safe room(s).	All Hazards	City Administrator	High	1,2	\$300,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Miltonvale-6	Tree trimming and branch removal program.	All Hazards	City Administrator	High	1,2	Staff Time and Equipment Use	HMGP, PDM, Local	Three years	On-going, no progress made
Simpson-1	Provide a NOAA Weather Radio to students and residents in the county to warn them of weather events.	All Hazards	City Administrator	High	1,2	\$3,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Simpson-2	Build community FEMA approved safe room(s).	All Hazards	City Administrator	High	1,2	\$300,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Simpson-3	Purchase generators for critical facilities.	Utility/ Infrastructure Failure	City Administrator	High	1,2	\$10,000 to \$15,000 per unit	HMGP, PDM, Local	Five years	On-going, lack of funding
USD #224-1	Purchase and install backup generators for all schools.	All Hazards	Superintendent	High	1,2	\$50,000	Local, State, Federal	Five years	On-going, lack of funding
USD #224-2	Construct FEMA approved safe rooms for all USD #224 schools.	All Hazards	Superintendent	High	1,2	\$1,000,000	Local	Five years	On-going, lack of funding
USD #333-1	Purchase and install backup generators for all schools.	All Hazards	Superintendent	High	1,2	\$50,000	Local, State, Federal	Five years	On-going, lack of funding
USD #333-2	Construct FEMA approved safe rooms for all USD #333 schools.	All Hazards	Superintendent	High	1,2	\$1,000,000	Local	Five years	On-going, lack of funding
USD #334-1	Purchase and install backup generators for all schools.	All Hazards	Superintendent	High	1,2	\$50,000	Local, State, Federal	Five years	On-going, lack of funding





**Table 6.5: Cloud County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD #334-2	Construct FEMA approved safe rooms for all USD #334 schools.	All Hazards	Superintendent	High	1,2	\$1,000,000	Local	Five years	On-going, lack of funding
Cloud County Community College-1	Purchase and install backup generators for campus buildings.	All Hazards	Superintendent	High	1,2	\$50,000	Local, State, Federal	Five years	On-going, lack of funding
Cloud County Community College-2	Construct FEMA approved safe rooms for campus.	All Hazards	Superintendent	High	1,2	\$1,000,000	Local	Five years	On-going, lack of funding
Prairie Land REC -1	Enhance and upgrade all power lines within Cloud County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$20,000,000	Local, State, Federal	Five years	On-going, lack of funding
Rolling Hills REC-1	Enhance and upgrade all power lines within Cloud County to better withstand all hazard events.	Utility / Infrastructure Failure	Director	High	1,2	\$20,000,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Rural Water Districts-1	Purchase and install backup generators at all critical facilities integral to the provision of water and services.	All Hazards	Director	High	1,2	\$20,000 per facility	HMGP, PDM, Local	Five years	On-going, lack of funding





### 6.8.3 – Dickinson County Mitigation Actions

**Table 6.6: Dickinson County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Dickinson County-1	Dickinson County is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Dickinson County-2	Purchase and demolish properties located in the floodplains in the county. ( <b>NFIP</b> )	Dam and Levee Failure, Flood	NFIP Administrator	Low	1,2	\$100,000 per property	HMGP, PDM, Local	Five years	On-going, lack of funding
Dickinson County-3	Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	New
Dickinson County-4	Update current effective Flood Insurance Rate Maps. ( <b>NFIP</b> )	Flood ( <b>NFIP</b> )	NFIP Administrator	Medium	1,2	Staff Time	Staff Time, FEMA	Five years	On-going, lack of staff
Dickinson County-5	Identify and construct additional community shelters.	Tornados, Windstorm	Emergency Manager	High	1,2	\$1,000,000	HMGP, PDM, Staff Time, Local	Five years	On-going, lack of funding
Dickinson County-6	Update countywide warning system.	All Hazards	Emergency Manager	High	1,2	\$400,000	Homeland Security Grant, NWS Grants	Five years	On-going, lack of funding
Dickinson County-7	Educate residents of the county about driving in winter storms and handling winter-related health effects.	All Hazards	Emergency Manager	Medium	1,2	\$5,0000	Local, State, NWS Grants	Five years	On-going, lack of funding
Dickinson County-8	Provide mobile generators for water/wastewater system operations.	All Hazards	Emergency Manager	Medium	1,2	\$200,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Dickinson County-9	Continue tornado spotter training and Community Emergency Response Team.	Tornados, Windstorm	Emergency Manager	Medium	1,2,3	\$2,400	Local, NWS Grant	Annually	In progress
Dickinson County-10	Increase public and fire department training on wildland urban interface fires.	Wildfire	Fire Chief	Medium	1,2,3	\$30 per student	Kansas Forest Service	Five years	On-going, lack of funding
Dickinson County-11	Reduce hazardous fuels in prioritized wildfire risk areas.	Wildfire	Fire Chief	Medium	1,2	\$85 per acre	Kansas Forest Service	Five years	On-going, lack of funding





**Table 6.6: Dickinson County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Dickinson County-12	Provide homeowner education on wildfire mitigation in wildland-urban interface.	Wildfire	Fire Chief	Medium	3	\$500 per session	Kansas Forest Service, Federal Grants	On-going	On-going, lack of funding
Dickinson County-13	Develop emergency water conservation plan.	Drought, Wildfire	Emergency Manager, Public Utilities Director	Low	1,2	\$50,000	USACE, State, Local	Five years	On-going, lack of funding
Dickinson County-14	Install a switch in order to maintain power at the courthouse during an outage.	Utility / Infrastructure Failure	Emergency Manager	High	1,2	\$6,000	Local, State, Federal	Five years	New
Abilene-1	Continue participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Abilene-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Abilene-3	Identify and construct additional community shelters.	Tornados, Windstorm	City Administrator	High	1,2	\$600,000	HMGP, PDM, Staff Time, Local	Five years	On-going, lack of funding
Abilene-4	Provide battery backup for storm sirens.	All Hazards	City Administrator	Medium	1,2	\$15,000	Local, NWS Grants	Five years	On-going, lack of funding
Abilene-5	Provide mobile generators for critical facilities.	All Hazards	City Administrator	Medium	1,2	\$50,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Abilene-6	Conduct levee maintenance and vegetation control.	Flood, Dam and Levee Failure	NFIP Administrator	High	1,2	Staff Time	HMGP, PDM, Local	Continuous	On-going, continuous
Carlton-1	Identify and construct additional community shelters.	Tornados, Windstorm	City Administrator	High	1,2	\$500,000	HMGP, PDM, Staff Time, Local	Five years	On-going, lack of funding
Carlton-2	Provide battery backup for storm sirens.	All Hazards	City Administrator	Medium	1,2	\$10,000	Local, NWS Grants	Five years	On-going, lack of funding
Carlton-3	Provide mobile generators for critical facilities.	All Hazards	City Administrator	Medium	1,2	\$25,0000	HMGP, PDM, Local	Five years	On-going, lack of funding







**Table 6.6: Dickinson County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Chapman-1	Continue participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Chapman-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Chapman-3	Study drainage in the City of Chapman due to the constriction caused by the highway and railroad bridges over Chapman Creek. Would like to put concrete boxes or tubes installed under highway 40 and railroad to allow water to pass freely and not be backed up, flooding the city.	Flood	NFIP Administrator	High	1.2	\$100,000	Local, State, Federal	Four years	On-going, lack of funding
Chapman-4	Identify and construct additional community shelters.	Tornados, Windstorm	City Administrator	High	1,2	\$600,000	HMGP, PDM, Staff Time, Local	Five years	On-going, lack of funding
Chapman-5	Provide battery backup for storm sirens.	All Hazards	City Administrator	Medium	1,2	\$15,000	Local, NWS Grants	Five years	On-going, lack of funding
Chapman-6	Provide mobile generators for critical facilities.	All Hazards	City Administrator	Medium	1,2	\$50,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Chapman-7	Update address system for residents of the City of Chapman.	All Hazards	Emergency Manager, City Administrator	High	1,2	\$9,000	Local	Five years	On-going, lack of funding
Enterprise-1	Continue participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Enterprise-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Enterprise-3	Identify and construct additional community shelters.	Tornados, Windstorm	City Administrator	High	1,2	Unknown	HMGP, PDM, Staff Time, Local	Within 1 year	On-going, lack of funding
Enterprise-4	Provide battery backup for storm sirens.	All Hazards	City Administrator	Medium	1,2	\$15,000	Local, NWS Grants	Five years	On-going, lack of funding





**Table 6.6: Dickinson County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Enterprise-5	Provide mobile generators for critical facilities.	All Hazards	City Administrator	Medium	1,2	\$50,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Herington-1	Continue participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Herington-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Herington-3	Identify and construct additional community shelters.	Tornados, Windstorm	City Administrator	High	1,2	\$700,000	HMGP, PDM, Staff Time, Local	Five years	On-going, lack of funding
Herington-4	Provide battery backup for storm sirens.	All Hazards	City Administrator	Medium	1,2	\$15,000	Local, NWS Grants	Five years	On-going, lack of funding
Herington-5	Provide mobile generators for critical facilities.	All Hazards	City Administrator	Medium	1,2	\$50,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Herington-6	There are 2 lakes that have large camping areas. There are no warning devices in this area to warn campers. By installing 1 or 2 sirens we could have warning sirens to alert campers in this area.	Tornados, Windstorm	Fire Chief	Medium	1,2	\$40,000	Local, State, Federal	Three years	On-going, lack of funding
Hope-1	Identify and construct additional community shelters.	Tornados, Windstorm	City Administrator	High	1,2	\$600,000	HMGP, PDM, Staff Time, Local	Five years	On-going, lack of funding
Hope-2	Provide battery backup for storm sirens.	All Hazards	City Administrator	Medium	1,2	\$15,000	Local, NWS Grants	Five years	On-going, lack of funding
Hope-3	Provide mobile generators for water/wastewater system operations.	All Hazards	City Administrator	Medium	1,2	\$25,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Manchester-1	Identify and construct additional community shelters.	Tornados, Windstorm	City Administrator	High	1,2	\$600,000	HMGP, PDM, Staff Time, Local	Five years	On-going, lack of funding





**Table 6.6: Dickinson County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Manchester-2	Provide battery backup for storm sirens.	All Hazards	City Administrator	Medium	1,2	\$15,000	Local, NWS Grants	Five years	On-going, lack of funding
Manchester-3	Provide mobile generators for water/wastewater system operations	All Hazards	City Administrator	Medium	1,2	\$25,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Solomon-1	Continue participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Solomon-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Solomon-3	Relocate building and equipment located in flood zones. ( <b>NFIP</b> )	Flood	City Clerk	Medium	1,2	\$3,000,000	Local, State and Federal	Five years	On-going, no progress but remains viable
Solomon-4	Provide battery backup for storm sirens.	All Hazards	City Administrator	Medium	1,2	\$15,000	Local, NWS Grants	Five years	On-going, lack of funding
Solomon-5	Provide mobile generators for water/wastewater system operations.	All Hazards	City Administrator	Medium	1,2	\$25,000	HMGP, PDM, Local	Five years	On-going, lack of funding
Solomon-6	Identify and construct additional community shelters.	Tornados, Windstorm	City Administrator	High	1,2	\$600,000	HMGP, PDM, Staff Time, Local	Five years	On-going, lack of funding
Woodbine-1	Construct community safe rooms	Tornado, Windstorm	Mayor	Medium	1,2	\$200,000	Local, State, Federal	Five years	On-going, lack of funding
Woodbine-2	Installation of a generator transfer switch for critical facilities.	Utility/ Infrastructure Failure	Mayor	Medium	1,2	\$5,000	Local, State, Federal	Five years	On-going, lack of funding
USD#393-1	Install shutoffs at pole outside of buildings.	Wildfire	Facility Director	Medium	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
USD#393-2	Construct safe rooms for all USD #392 buildings.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	HMPG, Local	Five years	On-going, lack of funding





**Table 6.6: Dickinson County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD#435-1	Construct safe rooms for all USD #435 buildings.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	HMPG, Local	Five years	On-going, lack of funding
USD#473-1	Construct safe rooms for all USD #473 buildings.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	Bond, FEMA, Local	Five years	On-going, lack of funding
USD#481-1	Construct safe rooms for all USD #481 buildings.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	HMPG, Local	Five years	On-going, lack of funding
USD#487-1	Construct safe rooms for all USD #487 buildings.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	HMPG, Local	Five years	On-going, lack of funding
USD#487-2	Acquire audio and visual emergency communication and notification systems for interior and exterior of school grounds. .	All Hazards	Superintendent	Medium	1,2	\$50,000	Local, State, Federal	Three years	On-going, lack of funding
DS&O Electric-1	Enhance and upgrade all regional power lines to better withstand all hazard events.	All Hazards	Director	High	1,2	\$20,000,000	Local, State, Federal	Five years	On-going, lack of funding
Flint Hills REC-1	By retrofitting distribution lines with #2 ACSR and 1/0 ACSR (multiphase), larger pole class size and shorter span lengths. Significant improvements can be made to better handle ice loading events.	Winter Storm, All Hazards	Director	Medium	1,2	\$140,000	Local, State, Federal	Three year	On-going, lack of funding
RWDs (all)-1	Acquire a permanent back-up generator for each critical facility and pump station.	Utility / Infrastructure Failure	Director	High	1,2	\$50,000 each	Local, State, Federal	Five years	On-going, lack of funding





## 6.8.4 – Ellsworth County Mitigation Actions

**Table 6.7: Ellsworth County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Ellsworth County-1	Ellsworth County is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Ellsworth County-2	Purchase and demolish properties located in the floodplains in the county. <b>(NFIP)</b>	Dam and Levee Failure, Flood	NFIP Administrator	Low	1,2	\$100,000 per property	HMGP, PDM, Local	Five years	On-going, lack of funding
Ellsworth County-3	Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance. <b>(NFIP)</b>	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	New
Ellsworth County-4	Dredge the lakes, watersheds and river channels located near communities within the county to allow a larger capacity of water and water flow during heavy snows and thunderstorms. <b>(NFIP)</b>	Dam and Levee Failure, Flood, Drought, Extreme Heat, Winter Storm	Emergency Manager, NFIP Administrator	Low	1,2	\$1,000,000 plus	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-5	Conduct a flood plain study to determine the number of properties located in the floodplains in the county and purchase properties that are located in the 100- and 500-year floodplain after the properties have been determined. <b>(NFIP)</b>	Dam and Levee Failure, Flood	Emergency Manager, NFIP Administrator	Low	1,2	\$60,000 per property	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-6	Purchase and install a multi-purpose public address and warning system.	All Hazards	Emergency Manager	High	1,2	\$40,000 per system	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-7	Provide a NOAA Weather Radio to all residents in the county.	All Hazards	Emergency Manager	High	1,2	\$20,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-8	Build community storm shelters in underserved rural areas and communities.	All Hazards	Emergency Manager	High	1,2	\$500,000 per shelter	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding





**Table 6.7: Ellsworth County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Ellsworth County-9	Have a community wide drainage and stormwater cleanup days to remove all trash and debris from local drainage ways.	All Hazards	Emergency Manager	High	1,2,3	Staff Time	HMGP, PDM, Local, Other Grants	Three years	On-going, no progress made
Ellsworth County-10	Conduct countywide tree-trimming program to remove branches and trees from power lines.	Utility/ Infrastructure Failure	Emergency Manager, REC Directors	High	1,2	\$18,000	HMGP, PDM, Local, Other Grants	Three years	On-going, program on-going with a proactive stance
Ellsworth County-11	Purchase backup generators for City Halls, Emergency Operations Centers, the Police Departments, the Fire Departments, Community Centers, as well as two portable units for locations as needed throughout the county.	Utility/ Infrastructure Failure	Emergency Manager	High	2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Ellsworth County-12	Provide a reimbursement program for local residents to purchase generators needed at their homes or businesses.	Utility/ Infrastructure Failure	Emergency Manager	High	1,2	Dependent on participation	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-13	Purchase a computer backup system for county.	All Hazards	Emergency Manager	Medium	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-14	Purchase an EM Mobile Unit to serve as a command post during a hazard event.	All Hazards	Emergency Manager	Medium	1,2	\$50,000 per unit	HMGP, PDM, Other Grants	Five years	On-going, lack of funding
Ellsworth County-15	Purchase lightning detection systems to provide warnings at city parks, campgrounds, and school recreation areas.	Lightning	Emergency Manager	High	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-16	Purchase pumper trucks and/or fire and response equipment for each fire station within the county.	Hazardous Material, Wildfire	Emergency Manager	Medium	1,2	\$40,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-17	The county would like to offer an individual safe room program with FEMA funding.	Earthquake, Hail, Windstorm, Lightning, Tornado	Emergency Manager	High	1,2	Staff Time	HMGP, PDM, Local, Other Grants	Five years	On-going, no progress made







**Table 6.7: Ellsworth County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Ellsworth County-18	Help cities become Firewise Communities by having each community have a Firewise Plan.	Drought, Wildfire	Emergency Manager	High	1,2,4	\$10,000 plus	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Ellsworth County-19	Install a saferoom in the Ellsworth County Medical Center	Tornado	Emergency Preparedness Director for Medical Center	High	1,2	207750	Local, State, Federal, In Kind, Donations, Grants	Four years	On-going, lack of funding
City of Ellsworth-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Ellsworth-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Ellsworth-3	Acquire and demolish properties located in floodplains. ( <b>NFIP</b> )	Flood	City Administrator	Low	1,2	\$60,000 per property	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
City of Ellsworth-4	Have a community wide drainage and stormwater cleanup days to remove all trash and debris from local drainage ways.	Flood, Winter Storm	City Administrator	High	1,2,3	Staff Time and \$5,000	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
City of Ellsworth-5	Purchase backup generators critical facilities.	Utility/ Infrastructure Failure	City Administrator	High	2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
City of Ellsworth-6	Purchase a computer backup system city.	All Hazards	City Administrator	Medium	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
City of Ellsworth-7	Purchase remote weather cameras to view incoming weather events around the city.	All Hazards	City Administrator	High	1,2	\$15,000 per system	HMGP, PDM, Other Grants	Five years	On-going, lack of funding
City of Ellsworth-8	Purchase above ground gas pumps for city vehicles in times of disasters with a backup generator.	Utility/ Infrastructure Failure	City Administrator	High	1,2	\$15,000 per setup	HMGP, PDM, Other Grants	Five years	On-going, lack of funding
City of Ellsworth-9	Become a Firewise Community by having a Firewise Plan.	Drought, Wildfire	City Administrator	High	1,2,4	\$10,000 plus	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding





**Table 6.7: Ellsworth County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
City of Ellsworth-58	Construct community safe rooms	Tornado, Windstorm	Mayor	Medium	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
City of Holyrood-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Holyrood-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Holyrood-3	Construct community safe rooms	Tornado, Windstorm	Mayor	Medium	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
City of Holyrood-4	Purchase backup generators critical facilities	Utility/ Infrastructure Failure	Mayor	High	2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
City of Kannapolis-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Kannapolis-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Kannapolis-3	Construct community safe rooms	Tornado, Windstorm	Mayor	Medium	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
City of Kannapolis-4	Purchase backup generators critical facilities	Utility/ Infrastructure Failure	City Administrator	High	2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
City of Lorraine-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Lorraine-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Lorraine-3	Construct community safe rooms	Tornado, Windstorm	Mayor	Medium	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
City of Lorraine-4	Purchase backup generators critical facilities	Utility/ Infrastructure Failure	City Administrator	High	2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding





**Table 6.7: Ellsworth County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
City of Lorraine-5	Become a Firewise Community by having a Firewise Plan.	Drought, Wildfire	City Administrator	High	1,2,4	\$10,000 plus	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
City of Wilson-1	Continued participation in the NFIP.	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Wilson-2	Continued enforcement of floodplain ordinance. (NFIP)	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Wilson-3	Construct community safe rooms	Tornado, Windstorm	Mayor	Medium	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
City of Wilson-4	Purchase backup generators critical facilities	Utility/ Infrastructure Failure	City Administrator	High	2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
City of Wilson-5	Become a Firewise Community by having a Firewise Plan.	Drought, Wildfire	City Administrator	High	1,2,4	\$10,000 plus	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
USD#112-1	Construct FEMA approved safe rooms for all USD#112 facilities.	All Hazards	Superintendent	High	1,2	\$200,000 to \$500,000 per shelter	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
USD#112-2	Purchase and install backup generator for all USD#112 facilities.	All Hazards	Superintendent	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
USD#112-3	Purchase and install school computer systems backup to prevent data loss.	All Hazards	Superintendent	High	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
USD#327-1	Construct FEMA approved safe rooms for all USD#112 facilities.	All Hazards	Superintendent	High	1,2	\$200,000 to \$500,000 per shelter	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
USD#327-2	Purchase and install backup generator for all USD#112 facilities.	All Hazards	Superintendent	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding





**Table 6.7: Ellsworth County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD#327-3	Purchase and install school computer systems backup to prevent data loss.	All Hazards	Superintendent	High	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Arkansas Valley REC-1	Upgrade and enhance power lines throughout the county to include the replacement of older single-phase line with lines of an enhanced design.	Utility / Infrastructure Failure	Director	High	1,2	\$1,160,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Arkansas Valley REC-2	Support a communitywide tree-trimming program to cut down branches and trees away from power lines and drainage areas	Multi-Hazard	Director	High	1,2,3	Staff Time	HMGP, PDM, Local, Other Grants	Three years	On-going, no progress made
Arkansas Valley REC-3	Purchase backup generators for critical facilities to ensure continuous delivery of power and services	Multi-Hazard	Director	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Arkansas Valley REC-4	Report all hazard related incidents to the county emergency management department to keep an updated Hazard Event Database for proper tracking and reporting procedures.	All Hazards	Director	High	1,2,4	\$5,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Arkansas Valley REC-5	Purchase and install computer backup systems to prevent data loss.	All Hazards	Director	High	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Arkansas Valley REC-6	Help to change ordinances to require the burying of electrical lines from the transformer to the house on any new construction. Also, bury electrical cables on existing houses through grant programs that may become available.	All Hazards	Director	Medium	1,2	Staff Time and \$50,000,000	Local	Five years	On-going, lack of funding
MidWest REC-1	Upgrade and enhance power lines throughout the county to include the replacement of older single-phase line with lines of an enhanced design.	Utility / Infrastructure Failure	Director	High	1,2	\$1,160,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
MidWest REC-2	Support a communitywide tree-trimming program to cut down branches and trees away from power lines and drainage areas	Multi-Hazard	Director	High	1,2,3	Staff Time	HMGP, PDM, Local, Other Grants	Three years	On-going, no progress made





**Table 6.7: Ellsworth County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
MidWest REC-3	Purchase backup generators for critical facilities to ensure continuous delivery of power and services	Multi-Hazard	Director	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
MidWest REC-4	Purchase and install computer backup systems to prevent data loss.	All Hazards	Director	High	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
MidWest REC-5	Help to change ordinances to require the burying of electrical lines from the transformer to the house on any new construction. Also, bury electrical cables on existing houses through grant programs that may become available.	All Hazards	Director	Medium	1,2	Staff Time and \$50,000,000	Local	Five years	On-going, lack of funding
Rolling Hills REC-1	Upgrade and enhance power lines throughout the county to include the replacement of older single-phase line with lines of an enhanced design.	Utility / Infrastructure Failure	Director	High	1,2	\$1,160,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Rolling Hills REC-2	Support a communitywide tree-trimming program to cut down branches and trees away from power lines and drainage areas	Multi-Hazard	Director	High	1,2,3	Staff Time	HMGP, PDM, Local, Other Grants	Three years	On-going, no progress made
Rolling Hills REC-3	Purchase backup generators for critical facilities to ensure continuous delivery of power and services	Multi-Hazard	Director	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Rolling Hills REC-4	Purchase and install computer backup systems to prevent data loss.	All Hazards	Director	High	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Rolling Hills REC-5	Help to change ordinances to require the burying of electrical lines from the transformer to the house on any new construction. Also, bury electrical cables on existing houses through grant programs that may become available.	All Hazards	Director	Medium	1,2	Staff Time and \$50,000,000	Local	Five years	On-going, lack of funding
Rural Water Districts (all)-1	Acquire a permanent back-up generator for all critical facilities.	All Hazards	Director	Medium	1,2	\$25,000 per generator	HMGP, PDM, Local, Other Grants	Five years	On-going. no progress but remains viable





**Table 6.7: Ellsworth County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Rural Water Districts (all)-2	Commission a Corps of Engineer Action Plan for all applicable dams.	Dam and Levee Failure	Director	Medium	1,2	Staff Time, undetermined additional costs	HMGP, PDM, Local, Other Grants	Five years	On-going. no progress but remains viable
Rural Water Districts (all)-3	Install lightning prevention measures to decrease the radio equipment damages caused by lightning.	Lightning	Director	Medium	1,2	\$5,000 to \$7,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going. no progress but remains viable
Rural Water Districts (all)-4	Replace existing waterlines in jeopardy of being damaged due to expansive soils.	Expansive Soils	Director	Medium	1,2	\$1,000,000	HMGP, PDM, Local, Other Grants	Five years	On-going. no progress but remains viable







## 6.8.5 – Jewell County Mitigation Actions

**Table 6.8: Jewell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Jewell County-1	Encourage local participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff Time	Local	Continuous	In progress
Jewell County-2	Provide public education on both the potential impacts of hazard events and potential mitigation strategies.	All Hazards	Emergency Manager	High	3	\$1,000 annually	HMGP, PDM, Local, Other Grants	Continuous	In progress
Jewell County-3	Provide a NOAA Weather Radio to students and residents in the county to warn them of weather events at reduced prices	Multi-Hazard	Emergency Manager	High	1,2	\$8,000	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Jewell County-4	Purchase backup generators for all county critical facilities.	Multi-Hazard	Emergency Manager	High	1,2	\$10,000 - \$100,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Jewell County-5	Purchase above ground gas pumps for county and city vehicles in times of disasters with a backup generator.	Multi-Hazard	Emergency Manager	High	1,2	\$15,000 per setup	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Jewell County-6	Build storm shelters around the county to be prepared for all hazard events.	Multi-Hazard	Emergency Manager	High	1,2	\$1,000,000 per shelter	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Jewell County-7	Work with the NWS to hold storm spotter training seminar in the communities or a nearby areas to train interested individuals.	Dam and Levee Failure, Hail, Windstorm, Lightning, Tornado	Emergency Manager	High	1,2,3	Staff Time	HMGP, PDM, Local, Other Grants	Five years	On-Going, no progress
Jewell County-8	Continue to keep 911 systems up to date so that when NG 911 becomes online we will be prepared.	All Hazards	911 Coordinator	Medium	1,2,4	Staff time	HMGP, PDM, Local, Other Grants	Continuous	On-going, no progress but remains viable
Jewell County-9	Continue to support the BOCC in their efforts to promote fire safety and to safeguard the citizens of Jewell County. Educate the public and make them aware of any changes in County policies and procedures.	Wildfire	Emergency Manager, Fire Chiefs	High	1,2,4	Staff time	HMGP, PDM, Local, Other Grants	Continuous	On-going, no progress but remains viable





**Table 6.8: Jewell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Jewell County-10	Continue to upgrade equipment for emergency responders, including the purchase of necessary equipment.	All Hazards	Emergency Manager	High	1,2,4	Price varies per equipment	HMGP, PDM, Local, Other Grants	Continuous	On-going. no progress but remains viable
Burr Oak-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Burr Oak-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Burr Oak-3	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens and radios.	All Hazards	City Administrator	High	1,2	\$40,000 per system	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
Burr Oak-4	Purchase and install a permanent backup generator for the city office to provide electricity in the event of a power outage during any emergency.	All Hazards	City Administrator	High	1,2	\$100,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
Burr Oak-5	Purchase and install a permanent backup generator for the fire house to provide electricity in the event of a power outage during any emergency.	Multi-Hazard	City Administrator, Fire Chief	Medium	1,2	\$100,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
Burr Oak-6	Purchase an emergency portable light tower.	All Hazards	City Administrator, Fire Chief	High	1,2	\$50,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
Esbon-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Esbon-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Esbon-3	Purchase and install a multi-purpose public address and warning system.	All Hazards	City Administrator	High	1,2	\$40,000 per system	HMGP, PDM, Local, Other Grants	Three years	On-going, no progress made
Esbon-4	Provide a NOAA Weather Radio to students and residents in the city to warn them of weather events at reduced prices	All Hazards	City Administrator	High	1,2	\$2,000	HMGP, PDM, Local, Other Grants	Three years	On-going, no progress made





**Table 6.8: Jewell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Esbon-5	Build community storm shelters.	All Hazards	City Administrator	High	1,2	\$200,000 - \$500,000 per shelter	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Esbon-6	Have the rural and city fire departments work with local farmers and landowners to remove wild evergreen trees from their fields.	Drought, Wildfire	City Administrator	High	1,2	\$20,000 a year	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Formoso-1	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens and radios.	All Hazards	City Administrator	High	1,2	\$40,000 per system	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
Formoso-2	Purchase and install a permanent backup generators for the critical city facilities.	All Hazards	City Administrator	High	1,2	\$100,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress but remains viable
Formoso-3	Build community storm shelters.	All Hazards	City Administrator	High	1,2	\$200,000 - \$500,000 per shelter	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
City of Jewell-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Jewell-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Jewell-3	Inform the public with hazard information on drought, dam failure, earthquakes, extreme heat, hazardous materials, pandemic, thunderstorms, tornados, wildfire, and winter storms in hazard awareness literature and presentations.	All Hazards	City Administrator	High	3	\$1,000 annually	HMGP, PDM, Local, Other Grants	Continuous	In progress
City of Jewell-4	Purchase and install a permanent backup generator for the city office/community center to provide electricity in the event of a power outage during any emergency.	All Hazards	City Administrator	High	1,2	\$100,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress due to lack of funding





**Table 6.8: Jewell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
City of Jewell-5	Purchase and install a permanent backup generator for the fire house to provide electricity in the event of a power outage during any emergency.	Multi-Hazard	City Administrator, Fire Chief	Medium	1,2	\$100,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress due to lack of funding
City of Jewell-6	Purchase an emergency portable light tower. When responding to a fire or emergency it would be helpful to have lighting that may be set up at any locale.	All Hazards	City Administrator, Fire Chief	High	1,2	\$50,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going. no progress due to lack of funding
Mankato-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Mankato-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Mankato-3	Provide educational materials about hazards to the public in their utility bills.	All Hazards	City Administrator	High	3	\$600 annually	Local, Other Grants	Continuous	On-going. no progress but remains viable
Mankato-4	Build community storm shelters.	All Hazards	City Administrator	High	1,2	\$200,000 - \$500,000 per shelter	HMGP, PDM, Local, Other Grants	Three years	On-going. lack of funding
Mankato-5	Have a communitywide tree-trimming program to cut down branches and trees away from power lines and drainage areas.	Multi-Hazard	City Administrator	High	1,2,3	Staff Time	HMGP, PDM, Local, Other Grants	Continuous	On-going. no progress but remains viable
Mankato-6	Continue and enhance housing rehabilitation program, to include installing updated heating and air conditioning units and weatherization measures.	Extreme Temperatures, Winter Storm	City Administrator	High	1,2	\$250,000	HMGP, PDM, Local, Other Grants	Four years	On-going. no progress but remains viable
Randall-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Randall-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Randall-3	Purchase and install a permanent backup generator for the city office to provide electricity in the event of a power outage during any emergency.	All Hazards	City Administrator	High	1,2	\$100,000 per unit	HMGP, PDM, Local, Other Grants	1 - 3 years	On-going. no progress but remains viable





**Table 6.8: Jewell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Randall-4	Purchase and install a permanent backup generator for the fire house to provide electricity in the event of a power outage during any emergency.	Multi-Hazard	City Administrator, Fire Chief	Medium	1,2	\$100,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Randall-4	Purchase an emergency portable light tower.	All Hazards	City Administrator, Fire Chief	High	1,2	\$50,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Randall-5	Purchase and install outdoor warning systems and other early warning devices within the city limits, to include sirens and radios	Multi-Hazard	City Administrator	High	1,2	\$50,000+ per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Webber-1	Purchase and install a permanent backup generator for the city office to provide electricity in the event of a power outage during any emergency.	All Hazards	City Administrator	High	1,2	\$100,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Webber-2	Purchase and install outdoor warning systems and other early warning devices within the city limits, to include sirens and radios	Multi-Hazard	City Administrator	High	1,2	\$50,000+ per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
Webber-3	Build community storm shelters.	All Hazards	City Administrator	High	1,2	\$200,000 - \$500,000 per shelter	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
USD#107-1	Construct FEMA approved safe rooms in all schools and associated facilities.	Tornado, High Wind	Superintendent	High	1,2	\$200,000 to \$500,000 per shelter	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding
USD#107-2	Purchase and install backup generator for Jr/Sr high school in Mankato and other school as required. Generator is needed as school is designated as an emergency shelter.	Multi-Hazard	Superintendent	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, no progress but remains viable
Prairie Land REC -2	Enhance and upgrade all power lines within the County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$20,000,000	Local, State, Federal	Ten years	On-going, lack of funding
Rolling Hills REC-1	Enhance and upgrade all power lines within the County to better withstand all hazard events.	Utility / Infrastructure Failure	Director	High	1,2	\$20,000,000	Local, State, Federal	Ten years	On-going, lack of funding





**Table 6.8: Jewell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Rural Water Districts (all)-1	Construct flood walls/levees around critical facilities, or move from the floodplain, to ensure the continued provision of services.	Dam and Levee Failure, Flood, Hail, Winter Storm	Director	Medium	1,2	\$1,000,000 plus	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Rural Water Districts (all)-2	Purchase backup generators for critical facilities to ensure the continued provision of services.	Multi-Hazard	Director	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Rural Water Districts (all)-3	Purchase and install computer backup systems to prevent data loss.	All Hazards	Director	High	1,2	\$5,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding
Rural Water Districts (all)-4	Enact a waterline insulation program where the poor or elderly could have their waterlines insulated at no or reduced cost to reduce the risk of pipe breaks during the winter months.	Winter Storm	Director	High	1,2	Volunteer Labor and Volunteer Materials	Staff Time, Volunteers	Five years	On-going, lack of staff time
Rural Water Districts (all)-5	Create a list of farmers willing to assist other farmers in developing irrigation lanes in their crop fields.	Drought, Wildfire	Director	High	1,2,3	Staff Time, and Volunteer Labor	Local	Five years	On-going, lack of staff time
Jewell County Hospital-1	Construct hospital safe room to protect patients and community.	Tornado, Windstorm	Emergency Manager	High	1,2	\$500,000	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding







## 6.8.6 – Lincoln County and Participating Jurisdiction Mitigation Actions

Table 6.9: Lincoln County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Lincoln County-1	Lincoln County is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff Time	Local	Continuous	In progress
Lincoln County-2	The County will work with the KDA-DWR to educate and promote local jurisdictional participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2,3,4	Staff Time	Local	Continuous	In progress
Lincoln County-3	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. ( <b>NFIP</b> )	Flood	NFIP Administrator, County Planners	Low	1,2	Staff time, acquisition cost property dependent	Local, State, Federal, Grants	Four years	On-going, lack of funding
Lincoln County-4	Design a riverbed cleaning program for Yauger Creek and seek funding to clean and maintain the creek bed by remaining debris and silt to improve stream flow. ( <b>NFIP</b> )	Flood	Emergency Manager	High	1,2	\$100,000	Local, State, Federal, Grants	Four years	On-going. No progress but remains viable
Lincoln County-5	Collect educational materials on individual and family preparedness / mitigation measures for property owners and display at both the library and routinely visited county offices.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Lincoln County-6	Educate residents of Lincoln County about driving in winter storms and handling winter-related health effects.	All Hazards	Emergency Manager	High	3	\$2,500 per workshop	Local	Continuous	On-going. lack of staff time
Lincoln County-7	Construct safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.	Tornado, Windstorm	Emergency Manager	Low	1,2	\$500,000	Local, State, Federal, Grants	Ten years	On-going, lack of funding
Lincoln County-8	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues that can severely impact the county and regional economies and develop and implement plans to address these issues.	Terrorism, Agri-Terrorism, Civil Disorder	Emergency Manager	High	1,2,3	Staff Time	Local, State, Federal, Grants	Continuous	On-going. lack of staff time





**Table 6.9: Lincoln County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Lincoln County-9	Coordinate county and local government mitigation efforts with RECs, encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies.	Utility / Infrastructure Failure	Highway Department Director	Low	4	Staff Time	Local	Five years	On-going, lack of staff time
Lincoln County-10	Develop and implement a wildfire prevention/education program. In addition to providing education to the general public, the program should also target children, fire and equipment users, builders and developers, and homeowners.	Wildfire	Fire Chief, Emergency Manager	High	3	\$500 per workshop	Local	Continuous	On-going. No progress but project remains viable
Lincoln County-11	Develop an annex to the Local Emergency Operations Plan (LEOP) for dam/levee failure response and evacuation plans for high hazard dams/levees in or near Lincoln County.	Dam and Levee Failure	Emergency Manager	High	1,2	Staff Time	Local	Four years	On-going. No progress but project remains viable
Lincoln County-12	Research and recommend appropriate building codes for the County that include wind-resistant design techniques for new construction.	Windstorm, Tornado	County Commissioner	Medium	1,2	Staff Time	Local	Four years	On-going. No progress but project remains viable
Lincoln County-13	Research, develop, and recommend a Comprehensive Land Use Plan for Lincoln County.	All Hazards	County Commissioner	Medium	1,2	Staff Time	Local	Four years	On-going. No progress but project remains viable
Lincoln County-14	Purchase and install 300 KW generator for a critical county owned building.	Utility / Infrastructure Failure	Commission Chair	High	1,2	\$200,000	Local, State, Federal, Grants	Four years	New
Barnard-1	Construct community safe rooms	Tornado, Windstorm	City Administrator	High	1,2	\$500,000	Local, State, Federal, Grants	Five years	On-going, lack of funding





**Table 6.9: Lincoln County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Barnard-2	Complete an inspection of the culverts/discharge pipes and perform a pump testing of any wells associated with the levee.	Dam and Levee Failure	City Administrator	Medium	1,2	Staff Time	Local, State, Federal, Grants	Four years	On-going, no progress made but remains a viable project
Beverly-1	Construct community safe rooms	Tornado, Windstorm	City Administrator	High	1,2	\$500,000	Local, State, Federal, Grants	Five years	On-going, lack of funding
Lincoln Center-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Lincoln Center-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Lincoln Center-3	Assess flood prone areas and recommend flood reduction measures to city planners. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Four years	On-going. No progress but remains viable
Lincoln Center-4	Construct community safe rooms	Tornado, Windstorm	City Administrator	High	1,2	\$500,000	Local, State, Federal, Grants	Five years	On-going, lack of funding
Lincoln Center-6	Develop and implement a wildfire prevention/education program.	Wildfire	Fire Chief, Emergency Manager	High	1,2,3	\$500 per workshop	Local	Continuous	On-going, lack of funding
Sylvan Grove-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Sylvan Grove-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Sylvan Grove-3	Assess flood prone areas and recommend flood reduction measures to city planners. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Four years	On-going. No progress but remains viable
Sylvan Grove-4	Construct community safe rooms.	Tornado, Windstorm	City Administrator	High	1,2	\$500,000	Local, State, Federal, Grants	Five years	On-going, lack of funding





**Table 6.9: Lincoln County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD298-1	Construct tornado safe rooms for all Unified School District 298 schools.	Tornado	Superintendent	High	1,2	\$1,000,000	Local, State, Federal, Grants	Four years	On-going, lack of funding
USD299-1	Construct tornado safe rooms for all Unified School District 299 schools.	Tornado	Superintendent	High	1,2	\$1,000,000	Local, State, Federal, Grants	Four years	On-going, lack of funding
Rolling Hills REC-1	Replace damaged copperweld conductor with equivalent but not less than 2 ACSR conductor. Reconductor existing copper-weld lines with aluminum steel reinforced conductor and replace poles as needed.	Utility/ Infrastructure Failure	Director	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Rolling Hills REC-2	Upgrade and enhanced power lines. Replacement of CWC single-phase line of enhanced design.	Utility / Infrastructure Failure	Director	High	1,2	\$2,000,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-1	Acquire a permanent back-up generator for the Rural Water District treatment plants and water stations.	All Hazards	Director	Medium	1,2	\$250,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-2	Commission a Corps of Engineer Action Plan for all applicable dams.	Dam and Levee Failure	Director	Medium	1,2	Staff Time, additional costs	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-3	Install lightning prevention measures to decrease the radio equipment damages caused by lightning.	Lightning	Director	Medium	1,2	\$5,000 to \$7,000 per unit	HMGP, PDM, Local, Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-4	Replace existing waterlines in jeopardy of being damaged due to expansive soils.	Expansive Soils	Director	Medium	1,2	\$1,000,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding





## 6.8.7 – Mitchell County and Participating Jurisdictions Mitigation Actions

**Table 6.10: Mitchell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Mitchell County-1	The County is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff Time	Local	Continuous	In progress
Mitchell County-2	Conduct <b>NFIP</b> community workshops to provide information and incentives for property owners to acquire flood insurance.	Flood	NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	New
Mitchell County-3	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. ( <b>NFIP</b> )	Flood	NFIP Administrator, County Planners	Low	1,2	Staff time, acquisition cost property dependent	Local, State, Federal, Grants	Five years	On-going, lack of funding
Mitchell County-4	Initiate a planning committee to identify flash-flood prone areas to consider flood reduction measures to county planners. ( <b>NFIP</b> )	Flood	County Planner	Medium	1,2,4	Staff Time	Local	Five years	On-going. no progress but remains viable
Mitchell County-5	Collect educational materials on individual and family preparedness / mitigation measures for property owners and display at both the library and routinely visited county offices.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	On-going. no progress but remains viable
Mitchell County-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues that can severely impact the county and regional economies and develop and implement plans to address these issues.	Terrorism, Agri-Terrorism, Civil Disorder	Emergency Manager	Medium	3	Staff Time	Local, State, Federal	Continuous	On-going. no progress but remains viable
Mitchell County-7	Purchase and install a warning siren for the City of the unincorporated town of Asherville.	Tornado, Windstorm	Emergency Manager	High	1,2	\$30,000	Local, State, Federal	Five years	On-going. lack of funding
Mitchell County-8	Install safe rooms in Mitchell County Hospital Health Systems as per FEMA standards.	Multi-Hazard	Emergency Preparedness Manager	High	1,2	\$1,000,000	Local, State and Federal	Four years	On-going. lack of funding





**Table 6.10: Mitchell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Beloit-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Beloit-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Beloit-3	Develop and recommend amending the city's Flood Damage Prevention Ordinance to include "no-rise in base Flood elevation" clause for the city. ( <b>NFIP</b> )	Flood	City Planner	Medium	1,2,4	\$1,000	Local	Four years	On-going. no progress but remains viable
Beloit-4	Work with the KDA-DWR to educate and promote local jurisdictional participation in the <b>NFIP</b> .	Flood	City Administrator	Medium	1,2,4	\$1,000	Local, State	Five years	On-going. no progress but remains viable
Beloit-5	Construct community safe rooms.	Tornado, Windstorm	City Administrator	High	1,2	\$500,000	Local, State, Federal, Grants	Five years	On-going, lack of funding
Beloit-6	Create a working group to evaluate the firefighting water supply resources within the City.	Wildfire	Fire Chief, Emergency Manager	Medium	1,2,4	\$1,000	Local	Four years	On-going. no progress but remains viable
Beloit-7	Appoint an emergency planning committee to develop an evacuation plan for the City of Beloit for dam/levee failure response.	Dam and Levee Failure	Mitigation Officer, Emergency Manager, Planner	Medium	1,2	\$1,000	Local	Four years	On-going. no progress but remains viable
Beloit-8	Develop and fund mitigation projects for the construction of tornado safe rooms in St. John's Catholic Elementary School and High School.	Tornado, Windstorm	Superintendent	High	1,2	\$2,500	Federal	Four years	On-going, lack of funding
Beloit-9	Purchase and promote the use of severe weather alert radios for each classroom of the St. John's Catholic Schools.	All Hazards	Superintendent	Medium	1,2	\$5,000	Local, State, Federal	Continuous	On-going, lack of funding
Cawker City-1	Construct community safe rooms.	Tornado, Windstorm	City Administrator	High	1,2	\$500,000	Local, State, Federal, Grants	Five years	On-going, lack of funding







**Table 6.10: Mitchell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Cawker City-2	Seek funding to install new warning sirens for Cawker City.	All Hazards	City Clerk, City Administrator	Medium	1,2	\$60,000	Local, State, Federal	5 years	On-going, lack of funding
Glen Elder-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Glen Elder-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Glen Elder-3	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Mayor	High	3	Staff Time	Local	Continuous	On-going, no progress but remains viable
Glen Elder-4	Seek funding to outfit critical facilities with storm shutters to reduce the physical damage sustained by buildings and subsequent funds needed for repairs following a major hail event.	Hail	Mayor	Medium	2	\$10,000	Local, State, Federal	Five years	On-going, lack of funding
Glen Elder-5	Seek funding through FEMA to hire engineer to design and construct a public storm shelter.	Tornado, Windstorm	Mayor, Emergency Manager	High	1,2	\$1,000,000	Federal	Five years	On-going, lack of funding
Hunter-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Hunter-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Hunter-3	Work with the KDA-DWR to educate and promote local jurisdictional participation in the <b>NFIP</b> .	Flood ( <b>NFIP</b> )	City Clerk	Medium	1,2,4	Staff Time	Local, State	Five years	On-going, no progress but remains viable
Hunter-4	Appoint a committee to identify flash-flood prone areas and recommend Flood reduction measures to the city council.	Flood ( <b>NFIP</b> )	City Clerk	Medium	1,2,4	Staff Time	Local	Five years	On-going, no progress but remains viable
Hunter-5	Seek funding to install new warning sirens for Hunter.	All Hazards	City Clerk	Medium	1,2	\$50,000	Local, State, Federal	Five years	On-going, lack of funding





**Table 6.10: Mitchell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Hunter-6	Seek funding to design and build a tornado shelter for the City of Hunter.	Tornado, Windstorm	City Clerk	High	1,2	\$1,500,000	Local, State, Federal	Five years	On-going, lack of funding
Scottsville-1	Construct community safe rooms.	Tornado, Windstorm	Mayor	High	1,2	\$500,000	Local, State, Federal, Grants	Five years	On-going, lack of funding
Scottsville-2	Seek funding to install new warning sirens.	All Hazards	Mayor	High	1,2	\$75,000	Local, State, Federal	5 years	On-going, lack of funding
Simpson-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Simpson-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Simpson-3	Educate and promote the use of severe weather alert radios for the entire community of Simpson. Seek funding to subsidize purchase and distribution of weather radios.	All Hazards	Mayor	Medium	3	\$3,000	Local, State, Federal	Continuous	On-going, lack of funding
Simpson-4	Seek funding for the purchase and installation of an outdoor warning siren.	All Hazards	Mayor	High	1,2	\$8,000	Local, State, Federal	Four years	On-going, lack of funding
Simpson-5	Construct community safe rooms.	Tornado, Windstorm	Mayor	High	1,2	\$1,000,000	Local, State, Federal, Grants	Five years	On-going, lack of funding
Tipton-1	Seek funding to purchase and install an outdoor warning siren for the community.	All Hazards	City Superintendent	High	1,2	\$60,000	Local, State, Federal	Five years	On-going, Lack of funding
Tipton-2	Seek funding through FEMA's mitigation program for the construction of tornado safe rooms in the City of Tipton and at the Tipton Catholic High School.	Tornado, Windstorm	City Superintendent	Medium	1,2	\$1,500,000	Federal	Five years	On-going, lack of funding
North Central Technical College-1	Develop and fund mitigation projects for the construction of tornado safe rooms on the North Central Kansas Technical College campus.	Tornado, Windstorm	Director	Medium	1,2	\$1,000,000	Federal	Five years	On-going, lack of funding





**Table 6.10: Mitchell County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD#272-1	Construct tornado safe rooms for all USD 272 schools (to include Tipton Community School).	Tornado, Windstorm	Superintendent	Medium	1,2	\$500,000 - \$1,000,000	Federal	Five years	On-going, lack of funding
USD#273-1	Construct tornado safe rooms for all USD 273 schools.	Tornado, Windstorm	Superintendent	High	1,2	\$500,000 - \$1,000,000	Federal	Four years	On-going, lack of funding
USD#273-2	Purchase and install backup generators at both the Beloit Elementary and Jr./Sr. High School.	Winter Storm	Superintendent	Medium	1,2	\$30,000	Local, State, Federal	Four years	On-going, lack of funding
Tipton Catholic High School-1	Develop and fund mitigation projects for the construction of tornado safe rooms.	Tornado, Windstorm	Principal	High	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
RWDs (all)-1	Acquire a permanent back-up generator for each RWD water plan.	Utility / Infrastructure Failure	Director	High	1,2	\$50,000 each	Local, State, Federal	Four years	On-going, lack of funding
RWDs (all)-2	Acquire a series of variable speed pumps to assure the ability of Water Districts to supply water during natural and man-made disasters.	Utility / Infrastructure Failure	Director	High	1,2	\$100,000 each	Local, State, Federal	Four years	On-going, lack of funding
Prairie Land REC -1	Enhance and upgrade all power lines within Mitchell County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$5,000,000	Local, State, Federal	Ten years	On-going, lack of funding
Rolling Hills REC-1	Enhance and upgrade all power lines within Mitchell County to better withstand all hazard events.	Utility / Infrastructure Failure	Director	High	1,2	\$5,000,000	Local, State, Federal	Ten years	On-going, lack of funding
Rural Water Districts (all)-1	Purchase backup generators for critical facilities to ensure the continued provision of services.	Multi-Hazard	Director	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Five years	On-going, lack of funding





## 6.8.8 – Osborne County and Participating Jurisdictions Mitigation Actions

**Table 6.11: Osborne County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Osborne County-1	Community Safe room. There are insufficient community saferooms in Osborne County communities. Construct community storm shelter (saferoom) in accordance with FEMA design standards 361.	Tornado, Windstorm	Emergency Manager	High	1,2	\$500,000	HMGP, CDBG	Within Two years	On-going, lack of funding
Osborne County-2	Promote NOAA “All-Hazards” weather radios in homes & businesses.	All Hazards	Emergency Manager	High	3	Staff Time	NWS, AMR, Midland Radios	Continuous	On-going, no progress made but remains viable
Osborne County-3	Enhance GIS capabilities for usage with emergency management and planning.	All Hazards	Emergency Manager	High	1,2,4	\$30,000	Local	Continuous	On-going, lack of funding
Osborne County-4	Conduct wildfire public education workshops.	Wildfire	Fire Chief, Emergency Manager	High	1,2,3	\$500 per workshop	KS Forest Service and Local	Continuous	On-going, no progress made but remains viable
Osborne County-5	Increase public and fire department training on wildland urban interface fires	Wildfire	Fire Chief, Emergency Manager	Low	1,2,3	\$30 per student per session	Local, KS Forest Service	Continuous	On-going, no progress made but remains viable
Osborne County-6	Reduce hazardous fuels in prioritized wildfire risk areas.	Wildfire	Fire Chief, Emergency Manager	Low	1,2	\$85/acre	KS Forest Service and Local	Continuous	On-going, no progress made but remains viable
Alton-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Alton-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress





**Table 6.11: Osborne County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Alton-3	Increase public and fire department training on wildland urban interface fires.	Wildfire	Mayor	Low	3,4	\$30 per student per session	Local, KS Forest Service	Continuous	On-going, lack of funding
Alton-4	Reduce hazardous fuels in prioritized wildfire risk areas.	Wildfire	Mayor	Low	1,2	\$85/acre	KS Forest Service and Local	Continuous	On-going, lack of funding
Alton-5	Purchase generator for municipal water supply.	Multi-Hazard	Mayor	High	1,2	1\$5,000	Local, State, Federal	Five years	On-going, lack of funding
Alton-6	Fund and construct saferoom(s) as per FEMA requirements and standards to protect citizens	Tornado, Windstorm	Mayor	Medium	1,2	\$1,000,000	HMGP	Five years	On-going, lack of funding
Downs-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Downs-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Downs-3	Conduct tree trimming along city streets and emergency routes.	All Hazards	Mayor	Medium	1,2	\$15,000	Local	Five years	On-going, lack of funding
Downs-4	Fund and construct saferoom(s) as per FEMA requirements and standards to protect citizens	Tornado, Windstorm	Mayor	Medium	1,2	\$1,000,000	HMGP	Five years	On-going, lack of funding
Natoma-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Natoma-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Natoma-3	Fund and construct saferoom(s) as per FEMA requirements and standards to protect citizens	Tornado, Windstorm	Mayor	Medium	1,2	\$1,000,000	HMGP	2 - 5 years	On-going, lack of funding
City of Osborne-1	Continued participation in the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Osborne-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress





**Table 6.11: Osborne County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
City of Osborne-3	Conduct drainage ditch flow improvements. (NFIP)	Flood	Mayor	Medium	1,2	\$20,000	Local, State, Federal	Five years	On-going, lack of funding
City of Osborne-4	Conduct wildfire public education workshops.	Wildfire	Mayor	High	3	\$500 per workshop	KS Forest Service and Local	Continuous	On-going, no progress made but remains viable
City of Osborne-5	Increase public and fire department training on wildland urban interface fires.	Wildfire	Mayor	Low	3,4	\$30 per student per session	Local, KS Forest Service	Continuous	On-going, no progress made but remains viable
City of Osborne-6	Reduce hazardous fuels in prioritized wildfire risk areas.	Wildfire	Mayor	Low	1,2	\$85/acre	KS Forest Service and Local	Continuous	On-going, lack of funding
City of Osborne-7	Annual tree trimming in and along power distribution system to minimize the power outages in the City owing to high winds and storms.	All Hazards	Mayor	Medium	1,2	\$5,000	Local	Annually	On-going, lack of funding
City of Osborne-8	Fund and construct saferoom(s) as per FEMA requirements and standards to protect citizens.	Tornado, Windstorm	Mayor	Medium	1,2	\$1,000,000	HMGP	Five years	On-going, lack of funding
Portis-1	Continued participation in the NFIP.	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Portis-2	Continued enforcement of floodplain ordinance. (NFIP)	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Portis-3	Fund and construct saferoom(s) as per FEMA requirements and standards to protect citizens.	Tornado, Windstorm	Mayor	Medium	1,2	\$1,000,000	HMGP	Five years	On-going, lack of funding
Osborne County Memorial Hospital-1	Fund and construct saferoom(s) as per FEMA requirements and standards to protect hospital staff, patients and community members.	Tornado, Windstorm	Administrative Assistant	Medium	1,2	\$1,000,000	HMGP	Six months	In progress
USD#272-1	Conduct fire drills and tornado drills.	Wildfire, Tornado	Principal	High	1,2	Staff Time	Local	Continuous	In progress







**Table 6.11: Osborne County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
USD#272-2	Fund and construct saferoom(s) as per FEMA requirements and standards for all school buildings.	Tornado, Windstorm	Superintendent	Medium	1,2	\$1,000,000	HMGP, CDBG	Five years	On-going, lack of funding
USD#392-1	Fund and construct saferoom(s) as per FEMA requirements and standards for all school buildings.	Tornado, Windstorm	Superintendent	High	1,2	1000000	HMGP, CDBG	Five years	On-going, lack of funding
USD#399-1	Fund and construct saferoom(s) as per FEMA requirements and standards for all school buildings.	Tornado, Windstorm	Superintendent	Low	1,2	\$1,000,000	HMGP, CDBG	Five years	On-going, lack of funding
Midwest REC-1	Enhance and upgrade all power lines within the County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$5,000,000	Local, State, Federal	Ten years	On-going, lack of funding
Rolling Hills REC-1	Enhance and upgrade all power lines within the County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$5,000,000	Local, State, Federal	Ten years	On-going, lack of funding
Rolling Hills REC-2	ACSR Conductor. Replace damaged copperweld conductor with equivalent but not less than 2 ACSR conductor. Copperweld conductor is no longer readily available and the cost of copper has risen to where it is no longer economically feasible to use. Reconductor existing copper-weld lines with aluminum steel reinforced conductor and replace poles as needed.	Utility/ Infrastructure Failure	Director	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Prairie Land REC -1	Enhance and upgrade all power lines within the County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$5,000,000	Local, State, Federal	Ten years	On-going, lack of funding
RFD#3-1	Purchase preparedness equipment, pagers and the required Bunker Rangeland Protective clothing.	Wildfire	Fire Chief, Emergency Manager	High	1,2	\$25,000	KS Forest Service and Local	Five years	On-going, lack of funding
RFD#3-2	Purchase and install stationary generator(s) for all facilities.	Utility / Infrastructure Failure, Wildfire	Fire Chief, Emergency Manager	High	1,2	\$30,000	KS Forest Service and Local	Five years	On-going, lack of funding





**Table 6.11: Osborne County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
RFD#3-3	Conduct wildfire public education workshops.	Wildfire	Fire Chief, Emergency Manager	High	3	\$500 per workshop	KS Forest Service and Local	Continuous	On-going, lack of funding
RFD#3-4	Increase public and fire department training on wildland urban interface fires.	Wildfire	Fire Chief, Emergency Manager	Low	3,4	\$30 per student per session	Local, KS Forest Service	Continuous	On-going, lack of funding
RFD#3-5	Reduce hazardous fuels in prioritized wildfire risk areas.	Wildfire	Fire Chief, Emergency Manager	Low	1,2	\$85/acre	KS Forest Service and Local	Continuous	On-going, lack of funding
Rural Water Districts (all)-1	Acquire a permanent back-up generator for water treatment plants and water stations.	All Hazards	Director	Medium	1,2	\$250,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-2	Commission a Corps of Engineer Action Plan for all applicable dams.	Dam and Levee Failure	Director	Medium	1,2	Staff Time, additional costs	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-3	Install lightning prevention measures to decrease the radio equipment damages caused by lightning.	Lightning	Director	Medium	1,2	\$5,000 to \$7,000 per unit	HMGP, PDM, Local, Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-4	Replace existing waterlines in jeopardy of being damaged due to expansive soils.	Expansive Soils	Director	Medium	1,2	\$1,000,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding





## 6.8.9 – Ottawa County and Participating Jurisdictions Mitigation Actions

Table 6.12: Ottawa County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Ottawa County-1	Continue to participate in <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Ottawa County-2	Develop an educational flyer targeting <b>NFIP</b> policyholders on the Increased Costs of Compliance (ICC) coverage to be disseminated following a flood event that results in substantial damage determinations by Ottawa County.	Flood	NFIP Administrator, Mitigation Officer	High	3	Staff Time	Local	On-going	On-going, 50% complete
Ottawa County-3	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program, in addition to other flood protection measures. ( <b>NFIP</b> )	Flood	Mitigation Officer, NFIP Administrator	High	1,2,3	Staff Time	Local	Continuous	On-going, sustained
Ottawa County-4	Research and design an appropriate stream buffer ordinance to further protect Ottawa County's water resources and to limit future flood damages adjacent to major waterways. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$40,000	Local, State, Federal	Four years	On-going, lack of funding
Ottawa County-5	Develop and adopt a Flood Damage Prevention Ordinance including a “no-rise in base flood elevation” clause for the county. ( <b>NFIP</b> )	Flood	County Appraiser	High	1,2	Staff Time	Local	Four years	On-going, no progress made but remains viable
Ottawa County-6	Collect educational materials on individual and family preparedness and/or mitigation measures for property owners and display at both the library and routinely visited jurisdiction offices.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Ottawa County-7	Annually host a public “hazards workshop” for the residents of the county, in combination with local	All Hazards	Emergency Manager	Medium	3	\$30 per attendee	Local	Continuous	On-going, no progress made but





**Table 6.12: Ottawa County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	festivals, fairs, or other appropriate events.								remains viable
Ottawa County-8	Encourage and fund the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities	Tornado, Windstorm	Emergency Manager	High	1,2	\$500,000	Local, State, Federal	Four years	On-going, lack of funding
Ottawa County-9	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	3	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Ottawa County-10	Develop and implement plans and education programs to better protect Ottawa County's agriculture-based economy from highly infectious animal disease and acts of terrorism.	Terrorism/ Agri-Terrorism, Civil Disorder	Emergency Manager	Medium	1,2,3	Staff Time	Local, State, Federal	Continuous	On-going, continuous, 90% complete
Ottawa County-11	Work with KDOT and the KDOA to obtain EAPs for high hazard dams in the county and develop an annex to the Local Emergency Operations Plan (LEOP) for dam failure response and evacuation. breach or dam failure.	Dam and Levee Failure	Emergency Manager	High	1,2,4	Staff Time	Local	Four years	On-going, 50% complete
Ottawa County-12	Encourage collaborative effort among code officials from Ottawa County and the cities of Minneapolis, Delphos, Culver, Tescott, and Bennington to discuss, review, and propose standardization and implementation of building codes.	All Hazards	Zoning Administrator	High	1,2,4	Staff Time	Local	Continuous	On-going, Continuous, 50% complete
Ottawa County-13	Coordinate Ottawa County and local government mitigation efforts with RECs, encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to	Utility / Infrastructure Failure	Highway Administrator, Emergency Manager	High	1,2,4	Staff Time	Local	Four years	On-going, no progress made but remains viable





**Table 6.12: Ottawa County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	these hazards, and identification of mitigation strategies.								
Ottawa County-14	Educate developers and homeowners on the value of including wind-resistant design techniques for new residential construction.	Tornado, Windstorm	Zoning Administrator	High	3	Staff Time	Local	On-going	On-going, 10% complete
Ottawa County-15	Develop and implement a wildfire prevention/education program.	Wildfire	Fire Chief, Emergency Manager	High	1,2,3	\$30 per attendee	Local	On-going	On-going, 50% complete
Ottawa County-16	Examine the current agreements within Ottawa County and assess the need to expand or update cooperative agreements for firefighting resources.	Wildfire	Fire Chief, Emergency Manager	High	1,2,4	Staff Time	Local	Four years	On-going, no progress made but remains viable
Ottawa County-17	Authorize a working group to evaluate the firefighting water supply resources within Ottawa County.	Wildfire	Fire Chief, Emergency Manager	High	1,2,4	Staff Time	Local	Four years	On-going, no progress made but remains viable
Ottawa County-18	Identify Ottawa County's most at-risk vital / critical facilities and evaluate the potential mitigation techniques for protecting each facility in a cost-effective manner.	All Hazards	Emergency Manager	Medium	2	Staff Time	Local	Four years	On-going, 20% complete
Ottawa County-19	Remove trees and other undesirable vegetation along the upstream slope, downstream slope, and around the stilling basin near Ottawa State Fishing Lake.	Dam and Levee Failure	Emergency Manager	High	1,2	\$15,000	Local, State, Federal	One year	New
Ottawa County-20	Submit a high hazard Emergency Action Plan (EAP) to DWR and any other interested parties for Ottawa State Fishing Lake	Dam and Levee Failure	Emergency Manager	Medium	1,2	\$1,000	Local, State, Federal	One year	New
Ottawa County-21	Conduct recommended corrective actions identified by licensed engineer to	Dam and Levee Failure	Emergency Manager	High	1,2	Dependent on study	Local, State, Federal	Two years	New





**Table 6.12: Ottawa County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	bring Ottawa State Fishing Lake into compliance with KDA requirements.								
Bennington-1	The city of Bennington is committed to continued participation and compliance with the <b>NFIP</b> . regulations	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Bennington-2	Acquire and demolish flood prone properties. ( <b>NFIP</b> ).	Flood	NFIP Administrator	High	3	Market dependent	Local	Not started, lack of funding	On-going, 50% complete
Bennington-3	Collect educational materials on individual and family preparedness and/or mitigation measures for property owners and display at both the library and routinely visited jurisdiction offices.	All Hazards	City Manager	High	3	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Bennington-4	Construct community safe rooms.	Tornado, Windstorm	City Manager	High	1,2	\$350,000	Local, State, Federal	Four years	On-going, lack of funding
Bennington-5	Encourage collaborative effort among code officials from Ottawa County and the cities of Minneapolis, Delphos, Culver, Tescott, and Bennington to discuss, review, and propose standardization and implementation of building codes.	All Hazards	Zoning Administrator	High	4	Staff Time	Local	Continuous	On-going, continuous, 50% complete
Bennington-6	Develop an emergency alert system to contact each household and business in Bennington in the event of severe weather or other public emergency requiring citizen response.	All Hazards	City Manager	Medium	1,2,4	\$50,000 and Staff Time	Local, State, Federal	Four years	On-going, no progress made but remains viable
Culver-1	The city of Culver is committed to continued participation and compliance with the <b>NFIP</b> . regulations	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Culver-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Staff Time	Continuous	In progress
Culver-3	Reduce the damage from flooding by improving drainage throughout the city. ( <b>NFIP</b> )	Flood	Mayor	High	1,2	\$100,000	Local, State, Federal	Four years	On-going, lack of funding







**Table 6.12: Ottawa County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Culver-4	Construct community safe rooms.	Tornado, Windstorm	Mayor	High	1,2	\$500,000	Local, State, Federal	Four years	On-going, lack of funding
Culver-5	Encourage collaborative effort among code officials from Ottawa County and the cities of Minneapolis, Delphos, Culver, Tescott, and Bennington to discuss, review, and propose standardization and implementation of building codes.	All Hazards	Zoning Administrator	High	4	Staff Time	Local	Continuous	On-going, continuous, 50% complete
Delphos-1	The city of Delphos is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Delphos-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Delphos-3	Construct community safe rooms.	Tornado, Windstorm	Mayor	High	1,2	\$500,000	Local, State, Federal	Four years	On-going, lack of funding
Delphos-4	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	City Manager	High	3	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Delphos-5	Encourage collaborative effort among code officials from Ottawa County and the cities of Minneapolis, Delphos, Culver, Tescott, and Bennington to discuss, review, and propose standardization and implementation of building codes.	All Hazards	Zoning Administrator	High	4	Staff Time	Local	Continuous	On-going, continuous, 50% complete
Minneapolis-1	The city of Minneapolis is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	On-going, sustained
Minneapolis-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress





**Table 6.12: Ottawa County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Minneapolis-3	Collect educational materials on individual and family preparedness and/or mitigation measures for property owners and display at both the library and routinely visited jurisdiction offices.	All Hazards	City Manager	High	3	Staff Time	Local	Continuous	On-going, 50% complete
Minneapolis-4	Construct community safe rooms.	Tornado, Windstorm	Mayor	High	1,2	\$500,000	Local, State, Federal	Four years	On-going, lack of funding
Minneapolis-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	City Manager	High	3	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Minneapolis-6	Encourage collaborative effort among code officials from Ottawa County and the cities of Minneapolis, Delphos, Culver, Tescott, and Bennington to discuss, review, and propose standardization and implementation of building codes.	All Hazards	Zoning Administrator	High	4	Staff Time	Local	Continuous	On-going, continuous, 50% complete
Minneapolis-7	Purchase generators for the city critical facilities.	All Hazards	City Administrator	High	1,2	\$20,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, no progress due to lack of funding
Tescott-1	The city of Tescott is committed to continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Tescott-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Tescott-3	Move/Replace lift station controls. This action is needed to keep lift station operational during flood ( <b>NFIP</b> ).	Flood	City Clerk	High	1,2	\$100,000	Local, State, Federal	Four years	On-going, lack of funding
Tescott-4	Encourage collaborative effort among code officials from Ottawa County and the cities of Minneapolis, Delphos, Culver, Tescott, and Bennington to	All Hazards	Zoning Administrator	High	4	Staff Time	Local	Continuous	On-going, continuous, 50% complete





**Table 6.12: Ottawa County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	discuss, review, and propose standardization and implementation of building codes.								
Tescott-5	Promote and fund the use of NOAA All Hazards Weather Radios for the entire community of Tescott. Seek funding to subsidize purchase and distribution of weather radios.	All Hazards	City Manager	Medium	1,2	\$8,000	Local, State, Federal	Four years	On-going, 90% complete.
Tescott-6	Construct community safe rooms.	Tornado, Windstorm	Mayor	High	1,2	\$500,000	Local, State, Federal	Four years	On-going, lack of funding
Tescott-7	Purchase backup generator(s) for critical facilities, to include pump and lift stations.	Utility / Infrastructure Failure	City Clerk	High	1,2	\$25,000	Local, State, Federal	Four years	On-going, lack of funding
USD#239-1	Develop and fund mitigation projects for the construction of tornado safe rooms for USD#239 schools.	Tornado, Windstorm	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
USD#240-1	Develop and fund mitigation projects for the construction of tornado safe rooms for USD#240 schools.	Tornado, Windstorm	Superintendent	Low	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
USD#240-2	Purchase flood insurance for school facilities identified within the floodplain.	Flood	Superintendent	High	1,2	\$20,000	Local, State	Four years	On-going, lack of funding
Ottawa County Health Center-1	Construct a FEMA approved saferoom for health center.	Tornado	Director	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Rural Water Districts (all)-1	Acquire a permanent back-up generator for the all water treatment plants and water stations.	All Hazards	Director	Medium	1,2	\$250,000	HMGP, PDM, Local\	Ten years	On-going, lack of funding
Rural Water Districts (all)-2	Commission a Corps of Engineer Action Plan for all applicable dams.	Dam and Levee Failure	Director	Medium	1,2	Staff Time, additional costs	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-3	Install lightning prevention measures to decrease the radio equipment damages.	Lightning	Director	Medium	1,2	\$7,000 per unit	HMGP, PDM, Local, Grants	Ten years	On-going, lack of funding





**Table 6.12: Ottawa County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Rural Water Districts (all)-1	Replace existing waterlines in jeopardy of being damaged due to expansive soils.	Expansive Soils	Director	Medium	1,2	\$1,000,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
DS&O Electric -1	Enhance and upgrade all power lines within the county.	All Hazards	Director	High	1,2	\$8,000,000	Local, State, Federal	Ten years	New
Rolling Hills REC-1	Replace damaged copperweld conductor with equivalent but not less than 2 ACSR conductor.	Utility/ Infrastructure Failure	Director	High	1,2	\$1,000,000	Local, State, Federal	Ten years	New
Rolling Hills REC-2	Enhance and upgrade all power lines within the county.	All Hazards	Director	High	1,2	\$2,000,000	HMGP, PDM, Local,	Ten years	New





## 6.8.10 – Republic County and Participating Jurisdictions Mitigation Actions

**Table 6.13: Republic County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Republic County-1	Continue to participate in <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Republic County-2	Ditch Cleaning/Deepening. Clean and deepen ditches in the county. ( <b>NFIP</b> )	Flood	Emergency Manager	High	1,2	\$20,000	Local	Continuous	On-going, lack of funding
Republic County-3	Develop minimum performance standards in flood prone areas to comply with <b>NFIP</b> guidelines.	Flood	Emergency Manager	High	1,2	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Republic County-4	Monitor floodplain Activities. Continue to monitor floodplain activities to ensure that structures are reasonably safe from flooding. ( <b>NFIP</b> )	Flood	Emergency Manager, NFIP Administrator	High	1,2	Staff Time	Local	Continuous	On-going, sustained
Republic County-5	Acquire Light Detection and ranging (LIDAR) mapping system to assist with flood control projects. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$100,000	Local, State, Federal	Four years	On-going, lack of funding
Republic County-6	Integrate GIS into emergency mitigation. Use GIS equipment to map critical infrastructure and hazard prone areas.	All Hazards	Emergency Manager	High	1,2,4	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Republic County-7	Acquire a permanent back-up generator for Republic County Highway Department.	Utility/ Infrastructure Failure	Director Highway Department	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Republic County-8	Acquire and install permanently mounted emergency generators for the Republic County Courthouse and the County Health Department.	Utility/ Infrastructure Failure	Emergency Manager, Health Department Administrator	High	1,2	\$200,000	Local, State, Federal	Four years	On-going, lack of funding
Republic County-9	Establish a livestock disposal plan and compost team to address livestock fatality during extreme heat events.	Major Disease Outbreak	Emergency Manager	High	1,2	\$50,000	Local, State, Federal	Four years	New
Agenda-1	Improve Public Awareness of Hazard Risks. Improve public awareness of	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	On-going, no progress





**Table 6.13: Republic County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	hazard risks through educational programs								made but remains viable
Agenda-2	Construct a safe room located within the city.	Windstorm, Tornadoes	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Agenda-3	Acquire a permanent back-up generator for the city critical facilities.	Utility / Infrastructure Failure	Mayor	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Agenda-4	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens, radios.	All Hazards	Mayor	High	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
Agenda-5	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Agenda-6	Acquire a permanent back-up generator for the Fire House.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Belleville-1	Improve public awareness of hazard risks through educational programs	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Belleville-2	Promote and seek funding for the use of NOAA weather radios including citizen purchase of receivers	All Hazards	Mayor	High	1,2	\$8,000	Local	Continuous	On-going, lack of funding
Belleville-3	Acquire a permanent back-up generator for the city critical facilities.	Utility / Infrastructure Failure	Mayor	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Belleville-5	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens, radios.	All Hazards	Mayor	High	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
Belleville-6	Construct a safe room located within the city	Windstorm, tornadoes	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding







**Table 6.13: Republic County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Belleville-7	Acquire a permanent back-up generator for the Fire House.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Belleville-8	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Courtland-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Courtland-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Courtland-3	Continue to monitor floodplain activities. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Courtland-4	Upgrade/Expand/Improve the storm water management system. ( <b>NFIP</b> )	Flood	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Courtland-5	Update water drought emergency ordinances	Drought	Mayor	High	1,2	Staff Time	Local	Continuous	On-going, no progress
Courtland-6	Construct a safe room located within the city.	Windstorm, tornados	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Courtland-7	Acquire a permanent back-up generator for city critical facilities.	Utility / Infrastructure Failure	Mayor	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Courtland-8	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens, radios.	All Hazards	Mayor	High	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
Courtland-9	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Courtland-10	Acquire a permanent back-up generator for the Fire House.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Cuba-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress





**Table 6.13: Republic County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Cuba-2	Continued enforcement of floodplain ordinance. (NFIP)	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Cuba-3	Promote Water Conservation and Education.	Drought	Mayor	High	3	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Cuba-4	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens, radios.	All Hazards	Mayor	High	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
Cuba-5	Acquire a permanent back-up generator for city critical facilities.	Utility / Infrastructure Failure	Mayor	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Cuba-6	Construct a safe room located within the city.	tornado, Windstorm	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Cuba-7	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Cuba-8	Acquire a permanent back-up generator for the Fire House.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Munden-1	Purchase and install additional emergency alert siren to be located in the northwest.	Tornado	Mayor	High	1,2	\$13,000	Local, State, Federal	Within 5 years	On-going, lack of funding
Munden-2	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens, radios.	All Hazards	Mayor	High	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
Munden-3	Construct a safe room located within the city.	tornado, Windstorm	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Munden-4	Acquire a permanent back-up generator for city critical facilities.	Utility / Infrastructure Failure	Mayor	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding





**Table 6.13: Republic County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Munden-5	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Narka-1	Improve public awareness of hazard risks through educational programs.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	On-going, no progress made but remains viable
Narka-2	Construct a safe room located within the city.	tornado, Windstorm	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Narka-3	Acquire a permanent back-up generator for city critical facilities.	Utility / Infrastructure Failure	Mayor	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Narka-4	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Narka-5	Construct a safe room located within the city.	tornado, Windstorm	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Norway-1	Acquire a permanent back-up generator for the Fire House.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Norway-2	Construct a safe room located within the city.	tornado, Windstorm	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Norway-3	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
City of Republic-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Republic-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
City of Republic-3	Improve public awareness of hazard risks through educational programs.	All Hazards	Mayor	High	3	Staff Time	Local	Continuous	On-going, no progress made but





**Table 6.13: Republic County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
									remains viable
City of Republic-4	Purchase and promote the use of NOAA weather radios for discount citizen purchase.	All Hazards	Mayor	High	1,2,3	Low	Local	Continuous	On-going, lack of funding
City of Republic-5	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens, radios.	All Hazards	Mayor	High	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
City of Republic-6	Construct a safe room located within the city.	tornado, Windstorm	Mayor	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
City of Republic-7	Acquire a permanent back-up generator for city critical facilities.	Utility / Infrastructure Failure	Mayor	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
City of Republic-8	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
City of Republic-9	Acquire a permanent back-up generator for the Fire House.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Scandia-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Scandia-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Scandia-3	Continue to monitor floodplain activities. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Scandia-4	Upgrade/expand/improve the storm water management system. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
Scandia-5	Replace sewer lines within the city	Utility / Infrastructure Failure	Mayor	High	1,2	\$2,000,000	Local	Five years	On-going, lack of funding
Scandia-6	There are four cement bridges in the community that cause water to backup and need to be replaced	Utility / Infrastructure Failure	Mayor	High	1,2	\$10,000,000	Local, State, Federal	Ten years	On-going, lack of funding





**Table 6.13: Republic County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Scandia-7	Upgrade water infrastructure, to include electric, pumps, and controls.	Utility / Infrastructure Failure	Mayor	Medium	1,2	\$200,000	Local, State, Federal	Four years	On-going, lack of funding
Scandia-8	Acquire a permanent back-up generator for city critical facilities.	Utility / Infrastructure Failure	Mayor	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Scandia-9	Acquire outdoor warning systems and other early warning devices within the city limits, to include sirens, radios.	All Hazards	Mayor	High	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
Scandia-10	Acquire an emergency portable light tower.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
USD#109-1	Construct FEMA approved saferooms for all school buildings in the district that currently do not have saferooms.	Tornado	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Four years	Updated, lack of funding
USD#109-2	Key personnel in the school district will attend EMS training	All Hazards	Superintendent	High	4	Staff Time	Local	Continuous	On-going, no progress made but remains viable
USD#109-3	Acquire audio and visual emergency communication and notification systems for interior and exterior of school grounds:	All Hazards	Superintendent	High	1,2	\$100,000	Local, State, Federal	Four years	On-going, lack of funding
USD#426-1	Construct FEMA approved saferooms for all school buildings in the district that currently do not have saferooms.	Tornado	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
USD#426-2	Key personnel in the school district will attend EMS training	All Hazards	Superintendent	High	4	Staff Time	Local	Continuous	On-going, no progress made but remains viable
USD#426-3	Acquire audio and visual emergency communication and notification systems for interior and exterior of school grounds:	All Hazards	Superintendent	High	1,2	\$100,000	Local, State, Federal	Four years	On-going, lack of funding





**Table 6.13: Republic County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
RWDs (all)-1	Acquire a permanent back-up generator for the critical facilities.	Utility / Infrastructure Failure	Chairman of the Board	High	1,2	\$50,000	Local, State, Federal	Five years	On-going, lack of funding
RWDs (all)-2	Acquire a series of variable speed pumps.	Utility / Infrastructure Failure	Chairman of the Board	High	1,2	\$100,000	Local, State, Federal	Five years	On-going, lack of funding
Rural Fire Districts (all)-1	Acquire an emergency portable light tower.	Multi-Hazard	Fire Chief	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Rural Fire Districts (all)-2	Acquire a permanent back-up generator for the Fire Houses.	Utility / Infrastructure Failure	Fire Chief	High	1,2	\$50,000	Local, State, Federal	Four years	On-going, lack of funding
Prairie Land REC -1	Enhance and upgrade all power lines within Republic County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$20,000,000	Local, State, Federal	Ten years	On-going, lack of funding
Rolling Hills REC -1	Enhance and upgrade all power lines within Republic County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$20,000,000	Local, State, Federal	Ten years	On-going, lack of funding
Rolling Hills REC-2	Distribution line upgrade throughout county.	Utility / Infrastructure Failure	Director	Medium	1,2	\$20,000,000	Local, State, Federal	Ten years	On-going, lack of funding
Republic County Hospital-1	Fund and construct a FEMA approved saferoom for the hospital to protect patients and staff.	Tornado, Windstorm	Director	High	1,2	\$1,000,000	Local, State, Federal	Five years	On-going, lack of funding







## 6.8.11 – Saline County and Participating Jurisdictions Mitigation Actions

Table 6.14: Saline County Mitigation Actions

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Saline County-1	Continue to comply with <b>NFIP</b> regulations by enforcing Floodplain Management Regulations.	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Saline County-2	Continue to identify areas with limited access due to flooding ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Saline County-3	Continue public awareness and educational programs on all hazards.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Saline County-4	Approximately 40 miles are scheduled each year for a seal coat. As part of the program, high volume asphalt roads are scheduled for a hot mix overlay rather than a seal coat.	Utility/ Infrastructure Failure	Road and Bridge Director	High	1,2	\$50,000	Local	On-going	In progress
Saline County-5	Replace or rehabilitate critical bridges in Saline County.	Utility/ Infrastructure Failure	Road and Bridge Director, Public Works Director	High	1,2	\$10,000,000	Local, State, Federal	On-going	On-going, lack of funding
Saline County-6	The Bridge and Culvert Replacement Program includes a broader list of bridges and culverts to be enhanced or replaced.	Utility/ Infrastructure Failure	Road and Bridge Director, Public Works Director	High	1,2	Unknown	Tax Levy	On-going	On-going, no progress made but remains viable
Saline County-7	Evaluate unincorporated areas and vulnerable, uncovered or underserved areas and install an outdoor warning siren in the area or other early warning device to warn residents of imminent threats.	All Hazards	Emergency Manager	High	1,2,3	\$250,000	Local, State, Federal	Four years	On-going, no progress made but remains viable
Saline County-8	Enhance and sustain existing GIS program to improve capabilities in mitigation, preparedness, and response for all hazards. Evaluate and implement a long-range plan to fund for additional flights for Pictometry imagery, LIDAR data, software upgrades, equipment upgrades to sustain and enhance GIS	All Hazards	GIS Director	High	1,2	\$250,000	Local, State, Federal	Three years	On-going, lack of funding





**Table 6.14: Saline County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	capabilities and programs for Saline County								
Saline County-9	Ensure the maintenance and enhancement of established disaster evacuation routes. Continue to use local funds and grant opportunities to maintain and enhance critical access routes, roadways, bridges etc. Also, evaluate heavy travel roadways and bridges and monitor for needs of improvement.	All Hazards	Road & Bridge and Engineer	High	3	\$100,000 - \$2,000,000	Local, State, Federal	Continuous	On-going, lack of funding
Saline County-10	Continue to have an awareness plan to educate people about the dangers of naturally occurring diseases such as influenza and vaccine-preventable diseases.	Major Disease	Public Health Director	High	1,2	\$2,500	Local	On-going	On-going, no progress made but remains viable
Saline County-11	Acquire and install a permanently mounted emergency generator for the Saline County building – county offices.	Director, Building Authority	Emergency Manager	High	1,2	\$500,000	Local, State, Federal	New	Director, Building Authority
Assaria-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Assaria-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Assaria-3	The City shall verify and maintain a record of the actual elevation of the lowest floor, including basement, of all new or substantially improved structures. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Assaria-4	Evaluate and make improvements to the storm water management in Assaria that will encompass all needs current and future to allow for expansion of the city. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$175,000 - \$250,000	Local, State, Federal	Five years	On-going, lack of funding
Assaria-5	Survey, inspect, prioritize and replace all water lines. An overall solid plan for replacement for the entire city that	All Hazards	City Mayor	High	1,2	\$500,000 to \$1,000,000	Local, State, Federal	Five years	On-going, no progress made but





**Table 6.14: Saline County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	includes lines made from the same materials would improve water quality, water flow, and reduce damages due to age of the lines.								remains viable
Assaria-6	Install permanent back-up generator for the community building.	All Hazards	City Mayor	High	1,2	\$350,000	Local, State, Federal	Five years	On-going, lack of funding
Assaria-7	Have a storm shelter added onto the existing community building for residents and city workers to utilize during severe weather for safety from the storm.	Tornado	City Mayor	High	1,2	\$250,000	Local, State, Federal	Five years	On-going, lack of funding
Assaria-8	Purchase and affix a permanent generator on the water wells throughout city.	All Hazards	City Mayor	High	1, 2	\$20,0000	Local, State, Federal	Five years	On-going, lack of funding
Assaria-10	Support electric power upgrade program designed to protect lines including tree trimming and pole replacement.	All Hazards	City Mayor	Medium	1,2	\$5,000,000	Local, State, Federal	Five years	On-going, lack of funding
Assaria-11	Purchase and install a voice over system to enhance storm siren. Assaria purchased a new outdoor warning siren in 2011; however, did not choose the option of a voice over capability.	All Hazards	City Mayor	Medium	1,2, 3	\$10,000	Local, State, Federal	Five years	On-going, lack of funding
Brookville-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Brookville-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Brookville-3	Continue to monitor floodplain activities. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Brookville-4	Continue public awareness and educational programs on all hazards.	All Hazards	City Manager	High	3	Staff Time	Local	Continuous	On-going, sustained
Brookville-5	Install a new two-way outdoor warning siren with battery back-up and possibly solar power.	Multi-Hazard	City Manager	High	1,2	\$25,000	Local	Four years	On-going, lack of funding





**Table 6.14: Saline County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Brookville-6	Install fixed generators on city hall and fire station.	Multi-Hazard	City Manager	High	1,2	\$200,000	Local	Five years	On-going, lack of funding
Gypsum-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Gypsum-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Gypsum-7	Installation of a new culverts to improve drainage of storm water and improve creek flow through the City of Gypsum and reduce hazards of Flooding in the city. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$18,000	Local, State, Federal	Five years	On-going, lack of funding
Gypsum-8	Debris cleared in and around Spring Creek that flows through the City of Gypsum. ( <b>NFIP</b> )	Flood	NFIP Administrator	Medium	1,2	\$7,000	Local, State, Federal	Five years	On-going, lack of funding
Gypsum-3	Hire an engineer to do a drainage study for the City to highlight the improvements that would need to be made to improve drainage during heavy rain/flood events. Add gutters and curbs to a majority of the city to have water flow out to the retention pond and reduce any damages to the city streets. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
Gypsum-2	Construct a public storm shelter as per FEMA guidelines.	Tornado, Windstorm	City Mayor	High	1,2	\$250,000	Local, State, Federal	Five years	On-going, lack of funding
Gypsum-4	Purchase and install permanent generators at the City Offices that would be used as the City's Emergency Operations Center during time of disaster, and for Fixed City Well pumps.	Multi-Hazard	City Mayor	High	1,2	\$30,000 to \$75,000 per generator	Local, State, Federal	Three years	On-going, lack of funding
Gypsum-5	Affix permanent generator on radio repeater located in Gypsum that helps to provide extended radio coverage for communications between public safety	Multi-Hazard	City Mayor	High	1,2	\$18,500	Local, State, Federal	Five years	On-going, lack of funding





**Table 6.14: Saline County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
	and the public safety answering point/911 Dispatch center located in Salina.								
Gypsum-6	Purchase a new warning siren that is either tied into the other sirens in Saline County or purchase radio control for the siren currently in Gypsum so that it can be set off via radio tones.	Tornado, Windstorm	City Mayor	High	1,2	\$32,000	Local, State, Federal	Three years	On-going, lack of funding
Gypsum-9	Purchase new or used firefighting equipment not to be limited to trucks, bunker gear, SCUBA, to bring the City of Gypsum Fire Department up to NFPA Compliance with gear and equipment. Purchase of front-end loader and a tractor with a grapple fork that will aid in the City of Gypsum's ability to respond and manage debris clearing efforts during a disaster.	Multi-Hazard	City Mayor	Medium	1,2	\$450,000	Local, State, Federal	Five years	On-going, lack of funding
Gypsum-10	Hold training classes with certified instructors to provide education opportunities to the Volunteer City of Gypsum Fire Department and have the ability for the volunteers to obtain certifications that are compliant with NFPA for better protection of life and property in the City of Gypsum.	Multi-Hazard	City Mayor	Medium	1,2	\$2,500	Local, State, Federal	Two years	On-going, no progress made but remains viable
Gypsum-11	Identify, and if necessary, purchase an easy system that can be utilized by the City of Gypsum as well as the first responders in the City to quickly identify vulnerable households in the city to better plan for disasters and/or emergencies at those residences.	Multi-Hazard	City Mayor	Medium	1,2	\$10,000	Local, State, Federal	Three years	On-going, no progress made but remains viable
New Cambria-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress





**Table 6.14: Saline County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
New Cambria-2	Continued enforcement of floodplain ordinance. <b>(NFIP)</b>	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
New Cambria-3	Continue to monitor floodplain activities to ensure that structures are reasonably safe from flooding. <b>(NFIP)</b>	Flood	City Manager	High	1,2	Staff Time	Local	Continuous	In progress
New Cambria-4	Continue public awareness and educational programs on all hazards.	All Hazards	City Manager	High	3	Staff Time	Local	Continuous	In progress
New Cambria-5	Install a new two-way outdoor warning siren with battery back-up and possibly solar power.	Multi-Hazard	City Manager	High	1,2	\$25,000	Local, State, Federal	Three years	On-going, lack of funding
New Cambria-6	Install fixed generators on city hall, fire station and other critical facilities.	Multi-Hazard	City Manager	High	1,2	\$250,000	Local, State, Federal	Five years	On-going, lack of funding
Salina-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Salina-2	Continued enforcement of floodplain ordinance. <b>(NFIP)</b>	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Salina-3	Obtain funding to conduct a levee reconnaissance study to determine the nature and scope of potential levee issues and to determine if further Corps of Engineers involvement is warranted. <b>(NFIP)</b>	Flood, Dam and Levee Failure	City Manager	High	1,2	\$100,000	Local, State, Federal	Ten years	On-going, lack of funding
Salina-4	Upgrade Farrelly Road from 9th Street to Ohio Street to a standard suitable for traffic associated with potential industrial traffic.	Utility / Infrastructure Failure	City Manager	High	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
Salina-5	Construct FEMA approved community shelter(s) in low income sectors of city.	Tornado, Windstorm	City Manager	High	1,2	\$150,000 each	Local, State, Federal	Five years	On-going, lack of funding
Salina-6	Acquire and install a permanent emergency generator or improve existing generator for critical facilities such as City building, fire stations, police station, and Bicentennial Center.	Multi-Hazard	City Manager	High	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding







**Table 6.14: Saline County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Salina-7	Outdoor warning siren replacement and upgrades. Evaluate current outdoor warning siren coverage and determine best placement to incorporate city growth and have ample coverage for warning residents of threatening weather. Replace sirens and have the capabilities for battery back-up.	Multi-Hazard	City Manager	High	1,2	\$250,000	Local, State, Federal	Three years	On-going, lack of funding
Salina-8	Improve coordination, planning, and investment in long-term water supplies to meet the demands of ongoing growth and development. Evaluate and develop actions to take to improve the long-term water supplies especially during drought.	Multi-Hazard	City Manager	Medium	1,2	\$500,000	Local, State, Federal	Three years	On-going, lack of funding
Salina-9	Street improvements, street lighting improvements, way findings and entryway signs, clearly designated evacuation routes. Evaluate and make improvements to city streets to reduce high water, improve drainage, and lessen damage. Evaluate and make improvements to street lighting to improve safety of motorists. Evaluate existing main thoroughfares to determine evacuation routes that could be used for emergency evacuation of residents.	Multi-Hazard	City Public Works Director	High	1,2,3	\$1,500,000	Local, State, Federal	Four years	On-going, lack of funding
Salina-10	Survey and inspect, prioritize and replace water lines.	All Hazards	City Utilities Manager	High	1,2	\$1,000,000	Local, State, Federal	Five years	New
Smolan-1	Obtain funding to redirect water runoff through town to the west of town.	Flood, Utility/ Infrastructure Failure	City Manager	High	1,2	\$500,000	Local, State, Federal	Five years	On-going, lack of funding
Smolan-2	Purchase land from residents for the construction of a new sewer lagoon system (complete) and construct the facility.	Flood, Utility/ Infrastructure Failure	City Manager	High	1,2	\$3,000,000	Local	Five years	On-going, lack of funding





**Table 6.14: Saline County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Smolan-3	Install a new two-way outdoor warning siren with battery back-up and possibly solar power.	Multi-Hazard	City Manager	High	1,2	\$25,000	Local	Five years	On-going, lack of funding
Smolan-4	Install fixed generators on city hall, fire station and other critical facilities.	Multi-Hazard	City Manager	High	1,2	\$250,000	Local	Five years	On-going, lack of funding
KWU-1	Purchase and install a lightning detector on all sporting venues.	Lightning	Emergency Management Professor	High	1,2	\$3,000 per unit	Local, State and Federal	Two years	On-going, lack of funding
KWU-2	Purchase and install an outdoor warning system and/or siren.	Multi-Hazard	Emergency Management Professor	High	1,2	\$25,000	Local, State, Federal	Four years	On-going, lack of funding
KWU-3	Purchase and install a permanent backup generator for campus.	Multi-Hazard	Emergency Management Professor	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
Salina Area Technical College-1	Update all emergency response and preparedness plans.	Lightning	Emergency Management Professor	High	1,2	\$30,000	Local, State and Federal	Four years	On-going, lack of funding
Salina Area Technical College-2	Purchase and install an outdoor warning system and/or siren.	Multi-Hazard	Emergency Management Professor	High	1,2	\$25,000	Local, State, Federal	Four years	On-going, lack of funding
Salina Area Technical College-3	Purchase and install a permanent backup generator for campus.	Multi-Hazard	Emergency Management Professor	High	1,2	\$20,000	Local, State, Federal	Four years	On-going, lack of funding
USD#240-1	Construct FEMA approved saferooms for all school buildings in the district.	Tornado	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
USD#305-1	Construct FEMA approved saferooms for all school buildings in the district.	Tornado	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
USD#306-1	Construct FEMA approved saferooms for all school buildings in the district.	Tornado	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
USD#307-1	Construct FEMA approved saferooms for all school buildings in the district.	Tornado	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding





**Table 6.14: Saline County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Arkansas Valley REC-1	Distribution Line Upgrade. Replace and Upgrade an Undetermined Number of Miles of Distribution Line. Obtain Reconductoring Grant from FEMA, Determine Lines in Need of Upgrade, Replace/Upgrade Distribution Line	Utility / Infrastructure Failure	Director	High	1,2	Staff Time	Local, State, Federal	Ten years	On-going, lack of funding
DS&O REC-1	Identify Areas in Need of Distribution Line Upgrade. Obtain Reconductoring Grant from FEMA, Identify Lines in Need of Upgrade, Replace/Upgrade Distribution Line	Utility / Infrastructure Failure	Director	High	1,2	Staff Time	Local, State, Federal	Ten years	On-going, lack of funding
Rolling Hills REC-1	Upgrade and enhanced power lines to include replacement of CWC single-phase line with line of an enhanced design.	Utility / Infrastructure Failure	Director	High	1,2	\$2,000,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-1	Acquire a permanent back-up generator for critical facilities.	All Hazards	Director	Medium	1,2	\$250,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-2	Commission a Corps of Engineer Action Plan for all applicable dams.	Dam and Levee Failure	Director	Medium	1,2	Staff Time, additional costs	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-3	Install lightning prevention measures to decrease the radio equipment damages caused by lightning.	Lightning	Director	Medium	1,2	\$5,000 to \$7,000 per unit	HMGP, PDM, Local, Grants	Ten years	On-going, lack of funding
Rural Water Districts (all)-4	Replace existing waterlines in jeopardy of being damaged due to expansive soils.	Expansive Soils	Director	Medium	1,2	\$1,000,000	HMGP, PDM, Local, Other Grants	Ten years	On-going, lack of funding





## 6.8.12 – Smith County and Participating Jurisdictions Mitigation Actions

**Table 6.15: Smith County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Smith County-1	The County and local governments will work with the KDA-DWR to educate and promote local jurisdictional participation in the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2,4	Staff Time	Local, State	Continuous	In progress
Smith County-2	Research and recommend completion of an application for admittance to the <b>NFIP</b> .	Flood	Emergency Manager	High	1,2	Staff Time	Local	Two years	On-going, no progress made but remains viable
Smith County-3	Collect educational materials on individual and family preparedness and/or mitigation measures for property owners and display at both the library and routinely visited public offices.	All Hazards	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Smith County-4	Construct safe rooms and storm shelters in underserved areas of the county.	Tornado, Windstorm	Emergency Manager	High	1,2	\$1,000,000	Local, State, Federal	Five years	On-going, lack of funding
Smith County-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storm	Emergency Manager	High	3	Staff Time	Local	Continuous	In progress
Smith County-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues that can severely impact the county and regional economies and develop and implement plans to address these issues.	Terrorism/ Agri-Terrorism, Civil Disorder	Emergency Manager	Medium	3	Staff Time	Local, State, Federal	Three years	On-going, lack of staff
Smith County-7	Coordinate county and local government mitigation efforts with RECs, encourage identification of hazards and vulnerabilities potentially affecting their infrastructure, and identify mitigation strategies.	Utility / Infrastructure Failure	Director Public Works, Emergency Manager	High	4	Staff Time	Local	Two years	Not started, lack of staff





**Table 6.15: Smith County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Smith County-8	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. Install sirens in underserved areas	All Hazards	Emergency Manager	Medium	1,2,4	\$100,000	Local, State, Federal	Four years	Not started, lack of funding
Smith County-9	Encourage the repositioning of as many utility lines as possible underground.	Utility / Infrastructure Failure	Director Public Works, Emergency Manager	High	1,2,4	Staff Time	Local	Three years	On-going, no progress made but remains viable
Smith County-10	Develop an annex to the Local Emergency Operations Plan for dam failure response and evacuation for the Kirwin Reservoir.	Dam and Levee Failure	Emergency Manager	High	1,2	Staff Time	Local	Four years	On-going, no progress made but remains viable
Smith County-11	Develop and implement a wildfire prevention/education program.	Wildfire	Fire Chiefs, Emergency Manager	Medium	1,2,3	\$30 per attendee	Local	Four years	On-going, lack of staff
Smith County-12	Seek funding to subsidize purchase and distribution of NOAA weather radios.	All Hazards	City Manager	Medium	1,2	\$8,000	Local, State, Federal	Four years	On-going, lack of funding
Smith County-13	Evaluate the firefighting resources and purchase needed equipment.	Wildfire	Fire Chiefs, Emergency Manager	High	1,2	Staff Time	Local	Four years	On-going, no progress made but remains viable
Smith County-14	Research and recommend building codes for the County that include wind-resistant design techniques for new construction.	Tornado, Windstorm	Emergency Manager	High	1,2	Staff Time	Local	Four years	On-going, no progress made but remains viable
Smith County-15	Research and recommend development of a Comprehensive Land Use Plan for Smith County.	All Hazards	Emergency Manager	Medium	1,2	Staff Time	Local	Four years	Not started, lack of staff





**Table 6.15: Smith County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Smith County-16	Seek funding to retain an engineer to design a tornado safe room in the planned Sheriff's Office / Communications Center addition and apply for grant funding for construction.	Tornado, Windstorm	Emergency Manager	Medium	1,2	\$450,000	Local, State, Federal	Four years	On-going, lack of funding
Smith County-17	Purchase and install emergency generators and/or transfer switches to provide backup power for Smith County critical facilities, as well as additional County entities, including the Road Department and the County Landfill.	Utility / Infrastructure Failure	Emergency Manager	Medium	1,2	\$100,000	Local, State, Federal	Four years	Not started, lack of funding
Smith County-18	Seek funding to retain an engineer to design a tornado safe room in the Smith County Memorial Hospital and apply for grant funding for construction.	Tornado, Windstorm	Emergency Manager	Medium	1,2	\$450,000	Local, State, Federal	Four years	On-going, lack of funding
Cedar-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Cedar-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Cedar-3	Purchase and install an outside warning system for the city of Cedar.	All Hazards	City Manager	Medium	1,2	\$75,000	Local, State, Federal	Four years	On-going, lack of funding
Cedar-4	Seek funding to subsidize purchase and distribution of NOAA weather radios.	All Hazards	City Manager	Medium	1,2	\$2,000	Local, State, Federal	Four years	On-going, lack of funding
Cedar-5	Seek funding to design a community tornado shelter and apply for grant funding for construction.	Tornado, Windstorm	City Manager	Medium	1,2	\$300,000	Local, State, Federal	Four years	On-going, lack of funding
Gaylord-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Gaylord-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Gaylord-3	Prepare and adopt an Outdoor Warning Sirens Plan for the city and purchase and install sirens as per recommendations.	All Hazards	City Manager	Medium	1,2	\$25,000	Local, State, Federal	Four years	On-going, lack of funding







**Table 6.15: Smith County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Gaylord-4	Evaluate the firefighting resources within the city and purchase needed equipment.	Wildfire	Fire Chiefs	High	1,2,4	Dependent on review	Local	Four years	On-going, no progress made but remains viable
Gaylord-5	Design and construct a community tornado shelter.	Tornado, Windstorm	City Manager	Medium	1,2	\$300,000	Local, State, Federal	Four years	On-going, lack of funding
Kensington-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Kensington-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Kensington-3	Design and construct a community tornado shelter.	Tornado, Windstorm	City Manager	Medium	1,2	\$300,000	Local, State, Federal	Four years	On-going, lack of funding
Kensington-4	Prepare and adopt an Outdoor Warning Sirens Plan for the city and purchase and install sirens as per recommendations.	All Hazards	City Manager	Medium	1,2	\$10,000	Local, State, Federal	Four years	On-going, lack of funding
Kensington-5	Evaluate the firefighting resources within the city and purchase needed equipment.	Wildfire	Fire Chiefs	High	1,2,4	Dependent on review	Local	Four years	On-going, no progress made but remains viable
Kensington-6	Purchase of emergency generators and/or transfer switches to provide backup power for the Critical Facilities in the city of Kensington.	Utility / Infrastructure Failure	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Four years	On-going, lack of funding
Lebanon-1	Prepare and adopt an Outdoor Warning Sirens Plan for the city and purchase and install sirens as per recommendations.	All Hazards	City Manager	Medium	1,2	Staff Time	Local, State, Federal	Four years	On-going, lack of funding
Lebanon-2	Evaluate the firefighting resources within the city and purchase needed equipment.	Wildfire	Fire Chiefs	High	1,2,4	Dependent on review	Local	Four years	On-going, no progress made but remains viable





**Table 6.15: Smith County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Lebanon-3	Purchase emergency generators and/or transfer switches to provide backup power for the critical facilities, including the potable water supply system.	Utility / Infrastructure Failure	City Manager	Medium	1,2	\$30,000	Local, State, Federal	Four years	On-going, lack of funding
Lebanon-4	Construct a community safe room.	Tornado, Windstorm	City Manager	Medium	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
Smith Center-1	Continued participation and compliance with the <b>NFIP</b> .	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Smith Center-2	Continued enforcement of floodplain ordinance. ( <b>NFIP</b> )	Flood	NFIP Administrator	High	1,2	Staff Time	Local	Continuous	In progress
Smith Center-3	Prepare and adopt an Outdoor Warning Sirens Plan for the city and purchase and install sirens as per recommendations.	All Hazards	City Manager	Medium	1,2	\$15,000	Local, State, Federal	Four years	On-going, lack of funding
Smith Center-4	Evaluate the firefighting resources within the city and purchase needed equipment.	Wildfire	Fire Chiefs	High	1,2,4	Dependent on review	Local	Four years	On-going, no progress made but remains viable
Smith Center-5	Research funding options and consider the purchase of emergency generators and/or transfer switches to provide backup power for the Critical Facilities, including the potable water supply system and wastewater systems.	Utility / Infrastructure Failure	City Manager	Medium	1,2	\$60,000	Local, State, Federal	Four years	On-going, lack of funding
Smith Center-6	Construct a community safe room.	Tornado, Windstorm	City Manager	Medium	1,2	\$250,000	Local, State, Federal	Four years	On-going, lack of funding
USD#110-1	Develop and fund mitigation projects for the construction of tornado safe rooms for Unified School District 110 schools.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding
USD#237-1	Develop and fund mitigation projects for the construction of tornado safe rooms for Unified School District 237 schools.	Tornado, Windstorm	Superintendent	High	1,2	\$1,000,000	Local, State, Federal	Four years	On-going, lack of funding





**Table 6.15: Smith County Mitigation Actions**

Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Midwest REC-1	Enhance and upgrade all power lines within Smith County to better withstand all hazard events.	Utility/ Infrastructure Failure	Director	High		\$1,000,000	Local, State, Federal	Ten years	Not started, lack of funding
Prairie Land REC -1	Enhance and upgrade all power lines within Smith County to better withstand all hazard events.	All Hazards	Director	High	1,2	\$9,000,000	Local, State, Federal	Ten years	Not started, lack of funding
Rolling Hills REC-2	Enhance and upgrade all power lines within Smith County to better withstand all hazard events.	Utility / Infrastructure Failure	Director	High	1,2	\$2,000,000	HMGP, PDM, Local, Other Grants	Ten years	Not started, lack of funding
Rural Water Districts (all)-1	Purchase backup generators for critical facilities to ensure the continued provision of services.	Multi-Hazard	Director	High	1,2	\$10,000 - \$15,000 per unit	HMGP, PDM, Local, Other Grants	Three years	On-going, lack of funding





## 6.9 –Mitigation Actions No Longer Under Consideration

For this plan update, members of the MPC and participating jurisdictions were asked to consider if all previous mitigation actions were still viable. Due to the thorough nature of the review, and the comprehensive updating of mitigation actions to meet both the needs of the participating jurisdictions and FEMA planning requirements, many actions were either modified or removed from consideration. A full comparison of jurisdictional actions may be completed by comparing the actions detailed in this plan against the actions from the 2014 regional hazard mitigation plan.

## 6.10 – Action Implementation and Monitoring

*44 CFR 201.6 (c)(3)(iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

Kansas Region F 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 F MPC and KDEM, in conjunction with participating jurisdictions, will compile a list of projects funded and completed. Additionally, the MPC and participating jurisdictions will be solicited annually to provide information on any other mitigation projects that were not funded through hazard mitigation grants for tracking and update purposes.

To track mitigation projects from initiation to closeout, participating jurisdictions will use a project tracking methodology that includes, at a minimum, the following information:

- Applicant data
- Grant identifier
- Award date





- Awarded contractor
- Period of Performance
- Total project cost, including local share of project
- Quarterly Reports

Upon completion of a project the awarded participating jurisdiction will conduct a closeout site visit to:

- Review all project documents
- Review all procurement documents and contracts
- Photograph completed project

Project closeout packages will generally be submitted no more than 90 days after a project has been completed, and should include the following:

- All available documentation
- Photographs of completed project
- Materials, labor and equipment documentation
- Close-out certification

## 6.11 – Jurisdictional Compliance with NFIP

*44 CFR 201.6 (c)(3)(ii) All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.*

Participating jurisdictions are committed to continued involvement and compliance with the **NFIP**. To help facilitate compliance, each participating jurisdiction:

- Adopts floodplain regulations through local ordinance
- Enforces floodplain ordinances through building restrictions as detailed in relevant ordinance
- Regulates new construction in Special Flood Hazard Areas as outlined in their floodplain ordinance
- Utilizes FEMA FIRMs
- Monitors floodplain activities

Key to achieving across the board reduction in flood damages is a robust community assistance, education and awareness program. As such, Kansas Region F and its participating jurisdictions will continue to develop both electronic (including social media) and in person outreach activities.

Specific mitigation actions supporting regional commitment to both the NFIP and potential CRS application and compliance were identified above with a bold type **NFIP** in the subsequent mitigation action sections.





## 6.12 –Primary Mitigation Action Funding Sources

It is generally recognized that mitigation actions help communities realize long term savings by preventing future losses due to hazard events. However, many mitigation actions are beyond the budgetary capabilities a jurisdiction and Funding assistance, often in the form of grants, may be required. This following table provides a general description of some of the primary avenues available to jurisdictions to defray the cost of implementing mitigation actions.

**Table 6.16: Primary Hazard Mitigation Funding Mechanisms**

Program	Funding Agency	Funding Match Requirement	Program Description
Community Development Block Grant Program	Department of Housing and Urban Development	N/A	Program is a competitive grant process through which about half of the Funding goes to support the development of community facilities and water and sewer projects. grants in four categories, community improvement, urgent need, Kansas Small Towns Environment Program and economic development.
Federal Public Assistance	FEMA	Varied	Provides Funding used to restore the parts of a structure that was damaged during a disaster. The restoration must provide protection from subsequent events.
Federal Individual Assistance	FEMA	Varied	Provides assistance for qualified homeowners/renters whose primary residence was damaged or destroyed in a declared designated area.
Flood Mitigation Assistance	FEMA	Varied	Program provides funding to States, Territories, federally recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. Funding is also available for management costs.
Hazard Mitigation Grant Program	FEMA	25%	Program is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. Funding is available, when authorized under the Presidential Major Disaster Declaration, in the areas of the state requested by the governor. The amount of Funding available to the applicant is based upon the total federal assistance provided by FEMA for disaster recovery under the major disaster declaration.
Pre-Disaster Mitigation Program	FEMA	25%	Program is designed to assist states, territories, Indian tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on federal Funding from future major disaster declarations.

## 6.13 – Additional Hazard Mitigation Funding Mechanisms

A wide variety of federal and state agencies offer mechanisms for funding mitigation projects. A thorough, but by no means complete, list of potential mitigaion funding sources are detailed in the following table along with a brief program description.







**Table 6.17: Additional Potential Hazard Mitigation Funding Mechanisms**

<b>Department</b>	<b>Program</b>	<b>Program Description</b>
FEMA	High Hazard Potential Dams Grant Program	Provides for the repair, removal or structural / nonstructural rehabilitation of eligible high hazard potential dams
FEMA	Fire Management Assistance Grant Program	Provides for the mitigation, management, and control of fires on publicly or privately-owned forests or grasslands. The process is initiated when the state requests federal assistance for an event where the threat of major disaster exists for either single fires or numerous small fires.
FEMA	Risk Mapping, Assessment, and Planning (Risk Map)	The Risk MAP strategy incorporates floodplain management with hazard mitigation by using tools such as DFIRMs, HAZUS reports, and risk assessment data to deliver quality data that increases public awareness and leads to action to reduce risk to life and property.
National Oceanic and Atmospheric Administration National Weather Service (NOAA NWS)	StormReady Program	StormReady is a voluntary program that was developed by NOAA NWS to help communities better prepare for and mitigate effects of all types of severe weather from tornadoes to flooding. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations.
Mutual Aid	Kansas Water, Wastewater, Gas and Electric Utility Mutual Aid Program (KSMAP)	KSMAP has been developed to serve as the mutual aid program for Kansas utilities to help with provision of equipment, materials and personnel to assist in the restoration and continuation of utility service for those utilities needing assistance. The project is a joint effort of Kansas Municipal Utilities, Kansas Rural Water Association, the Kansas Section – American Water Works Association, the Kansas Water Environment Association, Kansas Corporation Commission, Kansas Department of Health & Environment and the Kansas Division of Emergency Management.
FEMA	Individual & Households, Other Needs Assistance (ONA) Program	The ONA program provides financial assistance to individuals or households who sustain damage or develop serious needs because of a natural or man-made disaster. The funding share is 75% federal funds and 25% state funds. The program gives funds for disaster-related necessary expenses and serious needs, including personal property, transportation, medical and dental, funeral, essential tools, flood insurance, and moving and storage. The current maximum allowable amount for any one disaster to individuals or families is \$25,000.
Kansas Department of Agriculture – Division of Conservation (KDA-DoC)	Multipurpose Small Lakes Program	Provides state cost-share assistance to a government entity for the construction or renovation of a dam for flood control and water supply and/or recreational purposes. It requires a general plan of works and a local nonpoint source pollution control plan. <a href="https://agriculture.ks.gov/divisions-programs/division-of-conservation/flood-control-and-lakes-programs">https://agriculture.ks.gov/divisions-programs/division-of-conservation/flood-control-and-lakes-programs</a>
(KDA-DoC)	State Assistance to Watershed Dam Construction	Provides state cost-share assistance to a government entity for the construction or renovation of a dam for flood control and water supply and/or recreational purposes. It requires a general plan of works and a local nonpoint source pollution control plan.





**Table 6.17: Additional Potential Hazard Mitigation Funding Mechanisms**

<b>Department</b>	<b>Program</b>	<b>Program Description</b>
(KDA-DoC)	State Assistance to Watershed Dam Construction	Provides cost-share assistance to organized watershed districts and other special purpose districts for the implementation of structural and nonstructural practices that reduce flood damage. Structural practices must be approved by the chief engineer of the Division of Water Resources. <a href="https://agriculture.ks.gov/divisions-programs/division-of-conservation/flood-control-and-lakes-programs">https://agriculture.ks.gov/divisions-programs/division-of-conservation/flood-control-and-lakes-programs</a>
(KDA-DoC)	Water Resources Cost Share Program	Provides state cost-share assistance to landowners for the establishment of enduring water conservation practices to protect and improve the quality and quantity of Kansas water resources. <a href="https://agriculture.ks.gov/divisions-programs/division-of-conservation/financial-assistance">https://agriculture.ks.gov/divisions-programs/division-of-conservation/financial-assistance</a>
(KDA-DoC)	Water Conservation Program	Provides financial incentives for voluntary retirements of private water rights in high priority areas. For more information about WRAP enrollment opportunities, please contact
Kansas Department of Agriculture – Division of Water Resources (KDA-DWR)	Community Assistance Program State Support Services Element	This program enhances the State’s capability to provide floodplain management information and technical assistance to help local officials in NFIP and CRS participating communities. It also encourages nonparticipating communities to join the NFIP and CRS.
KDA-DWR	Floodplain Management Program	Program provides technical assistance for local, state and federal floodplain management, including managing the NFIP and floodplain ordinances and regulations adopted by city and county governments. <a href="https://agriculture.ks.gov/divisions-programs/dwr/floodplain/flood-safety-2">https://agriculture.ks.gov/divisions-programs/dwr/floodplain/flood-safety-2</a>
Kansas Department of Commerce (KDC)	Community Service Tax Credit	Program offers Kansas tax credits to for nonprofit organizations for contributions to approved projects. Projects eligible for tax credit awards include community service, crime prevention and health care <a href="https://www.kansascommerce.gov/programs-services/community-development-assistance/community-service-tax-credit-program/">https://www.kansascommerce.gov/programs-services/community-development-assistance/community-service-tax-credit-program/</a>
Kansas Department of Health and Environment—Bureau of Environmental Remediation (KDHE-BER)	Abandoned Mine Land Program	Program provides for the remediation of sites that are an immediate threat to the health and safety of the public. <a href="http://www.kdheks.gov/mining/abandoned_mineland.htm">http://www.kdheks.gov/mining/abandoned_mineland.htm</a>
Kansas Department of Commerce (KDC)	CDBG Urgent Need Grant Abandoned Mine Land Program	This funding is intended to resolve emergency issues created by a severe disaster that pose a threat to the health and safety of citizens. <a href="https://www.kansascommerce.gov/programs-services/community-development-assistance/community-development-block-grant-program/urgent-need/">https://www.kansascommerce.gov/programs-services/community-development-assistance/community-development-block-grant-program/urgent-need/</a>
KDHE-BER	Kansas Brownfields Program	Programs to assist communities with the redevelopment of brownfields properties <a href="http://www.kdheks.gov/brownfields/index.html">http://www.kdheks.gov/brownfields/index.html</a>
KDHE-BER	State Water Plan Contamination Remediation Orphan Sites Program	Program provides Funding for the evaluation, monitoring, and remediation of contaminated groundwater or surface water sites and provides Funding to supply alternate water sources as an emergency <a href="http://www.kdheks.gov/ars/swp/index.html">http://www.kdheks.gov/ars/swp/index.html</a>





**Table 6.17: Additional Potential Hazard Mitigation Funding Mechanisms**

Department	Program	Program Description
Kansas Department of Transportation	Transportation Alternative Program	<p>This is an annual competitive Federal Transportation Alternatives program that can be used for transportation enhancement activities that include: Vegetation Management - improvement of roadway safety; prevention of invasive species; providing erosion control. Stormwater Mitigation - pollution prevention and abatement activities to address stormwater management; water pollution prevention related to highway construction or due to highway runoff. Wildlife Management - reduction of vehicle-caused wildlife mortality; restoration and maintenance of connectivity among terrestrial or aquatic habitats.</p> <p><a href="http://www.ksdot.org/bureaus/burtransplan/TransAlt.asp">http://www.ksdot.org/bureaus/burtransplan/TransAlt.asp</a></p>
Kansas Forest Service (KFS)	Community Forestry Program	<p>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.</p> <p><a href="https://www.kansasforests.org/community_forestry/">https://www.kansasforests.org/community_forestry/</a></p>
KFS	Rural Forestry Program	<p>Professional foresters provide on-site forest management and agro-forestry analysis and recommendations through inventory of forests, woodlands and windbreaks.</p> <p><a href="https://www.kansasforests.org/rural_forestry/">https://www.kansasforests.org/rural_forestry/</a></p>
KFS	Firewise Program	<p>The Kansas Firewise program offers prevention materials for homeowners to reduce the threat of wildland fire in rural and high-risk areas.</p> <p><a href="https://www.kansasforests.org/fire_management/fireprevention.html">https://www.kansasforests.org/fire_management/fireprevention.html</a></p>
KFS	Forest Health Program	<p>Program monitors the impacts of insects, diseases, drought, flooding and other health issues in forests, woodlands, windbreaks and conservation tree plantings by providing diagnosis and control recommendations and mitigation and planning for Emerald Ash Borer, Asian Bush Honeysuckles and other invasive species.</p> <p><a href="https://www.kansasforests.org/forest_health/">https://www.kansasforests.org/forest_health/</a></p>
KFS	Landowner Education	<p>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.</p> <p><a href="https://www.kansasforests.org/forest_health/">https://www.kansasforests.org/forest_health/</a></p>
KFS	Rural Fire Protection	<p>Program provides fire support services to rural fire departments, including wildfire training, Smokey Bear fire prevention materials, and the acquisition and distribution of excess military vehicles for conversion to firefighting units.</p>
Kansas Highway Patrol	Federal Preparedness Grant Program	<p>Through this program, the Department of Homeland Security/FEMA provides Funding to states to prevent, respond to, and recover from acts of terrorism by enhancing and sustaining capabilities.</p> <p><a href="https://www.kansashighwaypatrol.org/">https://www.kansashighwaypatrol.org/</a></p>
Kansas State Fire Marshal's Office	Fire Prevention Program	<p>Program focuses on structural inspection to ensure compliance with the Kansas Fire Prevention Code.</p>





**Table 6.17: Additional Potential Hazard Mitigation Funding Mechanisms**

Department	Program	Program Description
Kansas State Fire Marshal's Office	Hazardous Materials Program	Program provides training, planning, and analysis related to hazardous materials accidents/incidents and WMD events to help local facilities and local, state, and federal agencies before an event occurs.
Kansas Water Office (KWO)	Public Information and Education	This public education program provides information on water resource issues to the general public through publication of articles, pamphlets, news reports, etc. It also provides support for environmental education and local leadership development programs. <a href="https://www.kwo.ks.gov/">https://www.kwo.ks.gov/</a>
KWO	Stream Gauging Program	State financial assistance is provided for the operation of selected gauging stations operated by the U.S. Geological Survey. <a href="https://www.kwo.ks.gov/projects/stream-gauging-network">https://www.kwo.ks.gov/projects/stream-gauging-network</a>
KWO	Technical Assistance to Water Users	Program provides technical assistance to municipalities, irrigators, and other groups to assist in the reduction of water use and improve water use efficiency. (For assistance contact KWO at 785-296-3185.
KWO	Water Resource Planning	As the water planning, policy, coordination and marketing agency for the state the Kansas Water Office works to maintain a comprehensive State Water Plan for the management, conservation and development of the water resources of the state. This includes the collection and compilation of information pertaining to climate, water and soil as related to the usage of water for agricultural, industrial and municipal purposes and the availability of water supplies in the several watersheds of the state; development of a state plan of water resources management, conservation and development for water planning areas; the development and maintenance of guidelines for water conservation plans and practices; and The establishment of guidelines as to when conditions indicative of drought exist. <a href="https://www.kwo.ks.gov/about-the-kwo/kwo">https://www.kwo.ks.gov/about-the-kwo/kwo</a>



# 7.0 Plan Maintenance

## 7.1 – Hazard Mitigation Plan Monitoring and Evaluation

*44 CFR 201.6 (c)(4) A plan maintenance process that includes: (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

The Kansas Region F Hazard Mitigation Plan will be updated then approved by FEMA every five years. During the five-year cycle, the plan will undergo continuous monitoring and evaluation to ensure that the policies, procedures, priorities, and state environment established in the plan reflect current conditions.

To achieve this, the MPC will meet annually after plan approval. If needed, additional meetings will take place during this timeframe. The State of Kansas State Hazard Mitigation Officer will determine the meeting dates and location and is responsible for sending invitations.

During the five-year evaluation phase, the MPC is responsible for assessing the effectiveness of the plan by:

- Reviewing the hazards and determining if any of them have changed
- Determining if there are new hazards that pose a risk to the state
- Ensuring goals and objectives are still relevant
- Determining if any actions have been completed or are deemed irrelevant
- Determining if new actions should be added
- Determining if capabilities have changed

In addition to these meetings, the MPC will monitor and evaluate the progress of mitigation projects via regular reports, site visits, and correspondence. Progress and viability of identified mitigation actions will be measured based on the following variables:

- The number of projects successfully implemented
- The breadth of disbursement of mitigation grant funds
- The disaster losses avoided over time
- Public awareness
- Success of completed mitigation projects in helping address and achieve identified goals and objectives
- Have the completed mitigation actions resulted in a safer Kansas Region F

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 F 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 F, the State of Kansas, and the MPC will facilitate a yearly plan review and the subsequent hazard mitigation plan revision and re-adoption process within the required five-year period.

Information from the annual meetings will be incorporated into the plan update. Starting in calendar year 2022, the formal update process will begin. A thorough review and revision of the plan will take place, following all requirements detailed in 44 CFR 201.4, FEMA guidance documents, and DMA 2000. The following represents a general timeline for the next required plan revision.

- **Three years before plan expiration, Spring:** The MPC will begin updating the plan risk assessment. Hazards will be analyzed for continued relevancy and a review will be conducted to determine and new potential hazards.
- **Three years before plan expiration, Fall:** The MPC will begin updating the vulnerability assessment. Data will be gathered on jurisdictional assets, critical facilities, building stock values, crop losses, jurisdictional damages, etc.
- **Two years before plan expiration, Spring:** The MPC will review all information from previous meetings and determine if hazard mitigation goals and objectives are still relevant. Actions will be reviewed for currency and applicability. Work will begin on HMP revision.
- **Two years before plan expiration, Fall:** The MPC will evaluate the policies, programs, capabilities, and funding sources from the previous plan and plan revision to determine if they are still accurate and determine if additions are required.







- **One year before plan expiration:** Work will begin on the revision of the 2019 HMP.
- **Six months before plan expiration:** The MPC will review the final draft copy of the mitigation plan and make comments and updates if necessary. All participating jurisdictions and the public will be given an opportunity to review and comment on draft HMP.
- **Two months before plan expiration:** Formal submittal to FEMA for re-approval.

As part of the plan maintenance process, and consistently during the five-year HMP approval period, the MPC will continually monitor all elements of the plan, including:

- The incorporation of the HMP into other planning mechanisms
- All revisions and updates to the HMP
- Continued public participation

This monitoring will be done through outreach efforts to include:

- Email communication
- Phone communication
- In person communication at meetings, relevant conferences, and local planning events

Through consistent monitoring the MPC will then be able to efficiently incorporate these elements into the next plan revision.

Upon each successive revision, the plan will need to be re-adopted by all participating jurisdictions. Circumstances, including a major disaster or a change in regulations or laws, may modify the required five-year planning cycle.

## 7.4 – Post-Disaster Declaration Procedures

Following a disaster, each participating jurisdiction and the MPC may review the plan to determine if any additional actions need to be identified, additional funding has become available, or any identified actions need to be re-prioritized.

## 7.5 – Incorporation of HMP into Other Planning Mechanisms

*44 CFR 201.6 (c)(4)(ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

The hazard mitigation plan is an overarching document that is both comprised of, and contributes to, various county and local plans. Under the leadership of the MPC, it is hoped that when each of these other plans is updated, they will be measured against the contents of this HMP.

Below is a list of the various jurisdictional planning efforts, either solely or jointly administered, and relevant planning documents. While each plan can stand alone, each participating jurisdiction, under the





leadership of their MPC member, will actively work to incorporate relevant parts of this hazard mitigation plan into the following:

- All participating jurisdictions Codes and Ordinances
- All participating jurisdictions Comprehensive Plans
- All participating jurisdictions Critical Facilities Plans
- All participating jurisdictions Economic Development Strategic Plans
- All participating jurisdictions Emergency Operations Plans
- All participating jurisdictions Flood Mitigation Assistance Plan
- All participating jurisdiction Land-Use Plans
- Community Wildfire Protection Plans

Additionally, in cooperation with the MPC, each participating jurisdiction will be actively courted on incorporating elements of this hazard mitigation plan for any relevant plan, code or ordinance revision or creation.

Finally, each participating jurisdiction has committed to actively encourage all departments to implement actions that minimize loss of life and property damage. Whenever possible, each participating jurisdiction will use existing plans, policies, procedures and programs to aid in the implementation of identified hazard mitigation actions. Potential avenues for implementation may include:

- Budget revisions or adoptions
- Capital improvement plans
- General or master plans
- Hiring of staff
- Land use planning
- Operation plans
- Ordinances
- Stormwater planning

Participating jurisdictions are encouraged to utilize all available budget avenues for the completion of hazard mitigation items. Budgetary options may include:

- Annual budgets
- Application for grant funding
- Departmental budgets
- In-kind donations

Where appropriate, the MPC will take the lead in integrating this HMP into overarching, countywide plans, code, ordinances and any other relevant documents, policies or procedures.





## 7.6 – Continued Public Involvement

*44 CFR 201.6 (c)(4)(iii) Discussion on how the community will continue public participation in the plan maintenance process.*

Public participation is an important part of the continued mitigation planning process. Every effort will be made to keep the public informed on both relevant mitigation issues and the five-year plan revision cycle. Strategies for continued public involvement may include:

- Postings on electronic media, to include websites
- Notifications, when possible, in local media
- Making plans available for review in public locations
- A review of local mitigation strategies and goals
- A review completed and remaining hazard mitigation actions



# Appendix A

## Adoption Resolutions





**Model Resolution**

Resolution # \_\_\_\_\_: **Adopting the Kansas Homeland Security Region F Hazard Mitigation Plan**

**Whereas**, the (Name of Government/District/Organization) recognizes the threat that natural hazards pose to people and property within our community; and

**Whereas**, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

**Whereas**, the U.S. Congress passed the Disaster Mitigation Act of 2000 (“Disaster Mitigation Act”) emphasizing the need for pre-disaster mitigation of potential hazards;

**Whereas**, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

**Whereas**, an adopted Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

**Whereas**, the (Name of Government/District/Organization) fully participated in the FEMA prescribed mitigation planning process to prepare this Multi-Hazard Mitigation Plan; and

**Whereas**, the Kansas Division of Emergency Management and FEMA Region VII officials have reviewed the Kansas Homeland Security Region F Hazard Mitigation Plan, and approved it contingent upon this official adoption of the participating governing body; and

**Whereas**, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Kansas Homeland Security Region F Hazard Mitigation Plan; and

**Whereas**, adoption by the governing body for the (Name of Government/District/Organization) demonstrates the jurisdictions’ commitment to fulfilling the mitigation goals and objectives outlined in this plan, and

**Whereas**, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

**Now, therefore, be it resolved**, that the (Name of Government/District/Organization) adopts the Kansas Homeland Security Region F Hazard Mitigation Plan as an official plan; and

**Be it further resolved**, the (Name of Government/District/Organization) will submit this Adoption Resolution to the Kansas Division of Emergency Management and FEMA Region VII officials to enable the plan’s final approval.

\_\_\_\_\_:Date \_\_\_\_\_: Approved by



# Appendix B

## FEMA Approval Documents





# Appendix C

## Meeting Minutes and Sign-In Sheets



<b>To</b>	Region F Mitigation Planning Committee
<b>Through</b>	Jeanne Bunting, Mitigation Planner Kansas Division of Emergency Management (KDEM)
<b>From</b>	Matt Eyer
<b>Tel / E-mail</b>	Blue Umbrella, 303-552-1181, matt@blueumbrella.co
<b>Date</b>	May 22 and 23, 2019
<b>Subject</b>	Minutes from the Region F Mitigation Planning Meeting

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.

## Attendees

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See attached sign in sheets

## Introductions

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Matt Eyer began the meeting by welcoming and thanking the attendees. Participants introduced themselves and identified what jurisdiction they represented.

## Introduction to Hazard Mitigation Planning

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Matt Eyer, the plan author contractor, presented information on the purpose and requirements of the Disaster Mitigation Act of 2000. The attendees were reminded that this is a regional planning effort which will update the current Region F mitigation plan. The presentation also addressed the benefits for jurisdictions participating in this mitigation plan update, including eligibility for federal hazard mitigation assistance funding programs.

Matt Eyer described the benefits of participating in a multi-jurisdictional plan as improving coordination and communication among local jurisdictions and that these hazards do not stop at jurisdictional boundaries thus this multi-jurisdictional plan allows for a more comprehensive approach. The group also heard information regarding the significant cost savings being realized by the regional approach to planning. The regional approach now being used allows planning services to be provided to each county for the update at no cost to the county. Matt Eyer with Blue Umbrella will be completing the Region F mitigation plan for committee review.

Mr. Eyer also described the role of the Mitigation Planning Committee (MPC). Each jurisdiction participating in development of the plan must meet the following minimum requirements:

- Designate a representative to serve on the Region F 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**

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The local/regional hazard mitigation plan requirements state that the public must have the opportunity to comment on the plan. The public will be given two opportunities to comment on the plan, once during the drafting stage and another when the plan is complete in the final draft stage. KDEM is planning to utilize a questionnaire on SurveyMonkey.com to ask the public's opinion about hazards that affect them during the drafting stage. The MPC members in the county are also requested to post the SurveyMonkey.com link, once available, on their websites and newsletters to the public and to distribute the survey as widely as possible.

## **Data Collection Process**

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The participating jurisdictions at the meeting were provided hard copies of Data Collection Guides. Local County Emergency Management Agencies will follow-up with jurisdictions that were not in attendance at this meeting to provide an overview of the process being used and copies of data collection guides for completion. Mr. Eyer briefed on the Data Collection Guides and reminded the attendees that they are specific for local units of government and schools. There are two different guides, one for local governments, and one for schools and universities. The jurisdictions were requested to provide data regarding hazards that had occurred in their jurisdiction since the last plan update (2014) for the 22 hazards that are in the Regional Plan. The Data Collection Guides were requested to be returned to Jeanne Bunting July 2019.

## **Plan Format/ Regional and Countywide Risk Assessment**

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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 F. 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**

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The following four Hazard Mitigation Assistance grant programs were outlined, priority activities discussed, deadline of grants, and current funds available for:

- Hazard Mitigation Grant Program (HMGP)
- 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

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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 measurable 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. 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.

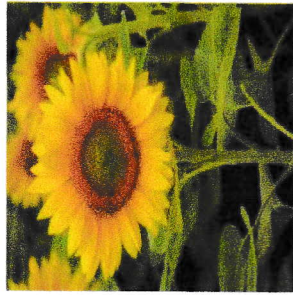
## Next Steps

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The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- July 2019: Data Collection Guides Due to KDEM
- August 2019, TBD: Meeting #2 for Emergency Management Officials
- TBD (Beginning of November 2019): Meeting #3 All Committee Members – Action Priorities
- November 2019 (end of): Submit Plan to FEMA

Wednesday, May 22, 2019



# Region F Mitigation Plan Kickoff Meetings Invitation

Printed Name	County	Agency	E-mail
Rick Horn	Mitchell	EAH	Thor.N@mitchellcountys.gov
Chris Rhoads	Osborne	EM	osbornecountym@gmail.com
Jude Stecklein	Lincoln	USD299	jstecklein@usd299.org
JAMES P HAY	Ottawa	Co. Comm	J.PICKETT@MAIL.POMY
Kalvin Wood		Tallgrass Energy	Kalvin.Wood@tallgrassenergy LP.Com
Jennifer Huelhl	Lincoln	City of Sylvan	sylvancontact@web.com
Kathy Robertson	Lincoln	USD 298	Robertson.Kathy@USD298.com



Kansas Region F Kickoff Meeting

May 23 2019

9:00 AM

Jurisdiction

Phone

Email

Name	Jurisdiction	Phone	Email
Michelle Barkley	Saline Co EM	(785)-714-0389	michelle.barkley@saline.org
Jason Tiller	Saline Co Health Dept	785 3072071	Jason.tiller@sschd.org
Lonnie Booker Jr	Kansas Wesleyan Univ.	785 833-4360	Lonnie.Booker@KwU.edu
Barth Crouch	KGLC/KS PFC	785-452-0780	barth.crouch@gmail.com
Keith Haberer	Ellsworth Russell County EM	785 324 1381	Russell County en@rfd5.org
Bob Jenkins	Rolling Hills Zoo	785 827.9488 ext. 112	bdj@rollinghillszoo.org
Mark Frazier	WESTAR	785-572-0614	mark.frazier@westernenergy.com
DAVE Burnett	REPCO	785-201-4246	dburnett@repcoworld.com
Kristine Trimble	City of Assaria	785-667-5595	assariacity@home.telco.net
Gerilyn Diederich	Salina Surgical Hospital	785-833-2523	gerilyn.diederich@salinasurgical.com
Judy Bawton	DSIO Electric	785-655-2011	jbarten@dsioelectric.com
Phil A. Odgers	DSIO REC	785-499-1783	molberding@DSIOElectric.com



To **Region “F” Hazard Mitigation Planning Committee**

Through **Jeanne Bunting, Mitigation Planner  
Kansas Division of Emergency Management (KDEM)**

From **Jeanne Bunting, State Hazard Mitigation Officer**  
Tel / E-mail **Kansas Division of Emergency Management (KDEM)**

Date **22 August, 2019**

Subject **Minutes from the Region “F” Mitigation Planning Meeting held on 22 August 2019, at the City of Minneapolis for the counties within the region.**

This document is a record of attendance and a summary of the issues discussed during the above meeting. Topics covered during the meeting included: (1) Strategy, (2) Goals, and (3) actions, 4) final steps, 5) draft plan. The meeting concluded with a discussion of the next steps in the planning process and the necessity to open the plan for public comment.

## Attendees

Name	Organization	County
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See attached.

## Agenda

The meeting was scheduled in order to finalize the draft plan of Region F. All of the 12 counties were represented. Matt Eyer, the plan author, reviewed the strategy, goals, and went in depth on the next steps, which include public comments.

## Next Steps

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- **November 7, 2019 – Final Meeting**
- **November 20, 2019 – Submit plan to FEMA**

//s//

**Jeanne Bunting, State Hazard Mitigation Officer, KDEM**

Region F 2<sup>nd</sup> Mtg  
 Minneapolis, K&A at 0930

NAME	Title	County	Signature
Jeanne Bunting	EMMO	State	Jeanne Bunting
Bernard Botson	POPTY DIR	Saline	Bdwt
David Duke	E.M.	Lincoln	David Duke
Ladonna Reinert	Health Dept	Lincoln	Ladonna Reinert
Pam Kemp	EM Director	Clay	Pamela Kemp
Marie Barber	EM Director	Ottawa	Marie V Barber
Rick Horn	EM Dir	Mitchell	Rick W
Jay Casper	Commissioner	Clend	Jay Casper
Chris Rhodes	EM	Osborne	Chris Rhodes
Susan Aaron	EM	Republke	Susan C. Aaron
Michele Barkley	EM	Saline	Michele Barkley
Keith Haber	EM	Russell Ellsworth	Keith Haber
Erik Stewart	EM	KPEM	Erik Stewart
Don Jacobs	Sheriff	Jewell Co.	Don Jacobs
Chancy Sore	EM, JK	DILCO	Chancy Sore
Chad Meyer	EM sm	SMITH	Chad Meyer

**To** Region F Hazard Mitigation Planning Committee  
**Through** Jeanne Bunting, Mitigation Planner  
Kansas Division of Emergency Management (KDEM)  
**From** Jeanne Bunting, State Hazard Mitigation Officer  
**Tel / E-mail** Kansas Division of Emergency Management (KDEM)  
**Date** 7 November, 2019  
**Subject** Minutes from the Region F Final Mitigation Planning Meeting

This document is a record of attendance and a summary of the issues discussed during the above meeting. Topics covered during the meeting included: (1) Strategy, (2) Goals, and (3) actions, 4) final steps, 5) draft plan. The meeting concluded with a discussion of the next steps in the planning process and the necessity to open the plan for public comment.

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## **Attendees**

See attached.

## **Agenda**

The meeting was scheduled in order to finalize the draft plan of Region F. Matt Eyer, the plan author, reviewed the strategy, goals, and went in depth on the next steps, which include public comments.

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## **Next Steps**

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- **November 2019 – Submit Plan to FEMA**

*//s//*

**Jeanne Bunting, State Hazard Mitigation Officer, KDEM**

OTTAWA County

Region F

Name (Legibly!)	County/Organization (Legibly!)	Title (Legibly!)
Hannah Stambaugh	Saline County	Interim County Administrator
Michelle Barkley	Saline county	Director, Emergency management
Marie Ballan	OTTAWA CO. EM	Emergency Mgmt. Coord.
Sam Kemp	Clay County EM	Emergency Management Director
Chancy Smith	DK CO EM	EM Director
Drew Gering	Cloud County EM	EM Director
Jeanne Bunting	KDEM	SHMO
Kirsty Morgan	FEMA	Mit Grants Manager
Erik STEWART	KDEM	REG. COORD.

