

Olsson Associates Project No. 013-1285

Multi-Jurisdictional Hazard Mitigation Plan

Hayes, Frontier, and Hitchcock Counties

May 2018

HAZARD MITIGATION PLAN

[HAYES, FRONTIER, AND HITCHCOCK COUNTIES]

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SECTION ONE [INTRODUCTION]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION ONE [INTRODUCTION]

HAZARD MITIGATION AND PLANNING

Natural hazards, such as severe winter storms, tornados and high winds, severe thunderstorms, flooding, extreme heat, drought, earthquakes, landslides, and wildfires are a part of the world around us. Their occurrence is natural and inevitable, and there is little we can do to control their force and intensity. Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These dollars only partially reflect the true cost of disasters, because additional expenses incurred by insurance companies and non-governmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be reduced or even eliminated. While the threat from hazards may never be fully eliminated, there is much we can do to lessen their potential impact. The concept and practice of reducing risks associated with known hazards is referred to as hazard mitigation.

Hazard mitigation is defined by the Federal Emergency Management Agency (FEMA) as “any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.” The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of \$4 in avoided future losses, in addition to saving lives and preventing injuries (*National Institute of Building Science Multi-Hazard Mitigation Council 2005*).

Hazard mitigation techniques include both structural measures, such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards, and non-structural measures, such as the adoption of sound land use or floodplain management policies or the creation of public awareness programs. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore, it is essential that projected patterns of future development are evaluated and considered in terms of how growth will increase or decrease a jurisdiction’s hazard vulnerability over time.

As a jurisdiction formulates a comprehensive approach to reduce the impacts of hazards, a key means to accomplish this task is through the development, adoption, and regular update of a hazard mitigation plan. A hazard mitigation plan establishes the vision, guiding principles, and specific actions designed to reduce the future hazard vulnerabilities.

PURPOSE OF THE PLAN

The purpose of this plan is to guide hazard mitigation planning to better protect the people and property of the jurisdictions from the effects of hazard events. This plan demonstrates the jurisdiction’s commitment to reducing risks from hazards and serves as a tool to help decision-makers direct mitigation activities and resources. This plan was also developed, among other reasons, to ensure Hayes, Frontier, and Hitchcock Counties’ continued eligibility for certain federal disaster assistance; specifically, the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), and the Flood Mitigation Assistance Program (FMA). Completion also earns credits for the National Flood Insurance Program’s (NFIP) Community Rating System (CRS) which can lower flood insurance premiums for home and business owners in participating CRS communities.

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to jurisdictions and their residents by protecting critical facilities, reducing liability exposure, and minimizing overall impacts and disruptions. The Counties have been affected by hazards in the past and thus are committed to reducing future impacts from hazard events and maintaining eligibility for mitigation-related federal funding.

Section One [Introduction]

All jurisdictions participating in this plan are vulnerable to a wide range of natural hazards that threaten the safety of residents, have the potential to damage or destroy both public and private property, and disrupt the local economy and overall quality of life. The Hayes, Frontier, and Hitchcock Counties Multi-Jurisdictional Hazard Mitigation Plan is an effective means to incorporate hazard mitigation principles and practices into the day-to-day activities of county and municipal governments. This plan recommends specific actions designed to protect residents as well as the built environment from those hazards that pose the greatest risk. Identified mitigation actions go beyond recommending structural solutions to reduce existing vulnerability, such as elevation, retrofitting, and acquisition projects. Local policies on growth and development, incentives tied to natural resource protection, and public awareness and outreach activities are examples of other actions intended to reduce future vulnerability to identified hazards.

MULTI-JURISDICTIONAL BENEFITS AND CHALLENGES

Mitigation is most effective when it is based on a comprehensive, long-term plan that is developed before a disaster occurs. The purpose of mitigation planning is to identify local policies and actions that can be implemented over the long-term to reduce risk and future losses from hazards. These mitigation policies and actions are identified based on an assessment of hazards, vulnerabilities, and risks through the participation of a wide range of stakeholders and the public in the planning process. Mitigation plans form the foundation for a jurisdiction's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The planning process is as important as the plan itself. It creates a framework for risk-based decision making to reduce damages to lives, property, and the economy from future disasters. Local governments benefit from mitigation planning by:

- Identifying cost effective actions for risk reduction that are agreed upon by stakeholders and the public.
- Focusing resources on the greatest risks and vulnerabilities.
- Building partnerships by involving citizens, organizations, and businesses.
- Increasing education and awareness of threats and hazards, as well as their risks.
- Communicating priorities to state and federal officials.
- Aligning risk reduction with other jurisdiction objectives.

According to FEMA, "A multi-jurisdictional hazard mitigation plan is a plan jointly prepared by more than one jurisdiction." The term 'jurisdiction' is equal to any 'local government'. This is defined at 44 CFR §201.2 as Title 44 Part 201, Mitigation Planning in the Code of Federal Regulations (CFR), defines a 'local government' as "any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumental of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization, and any rural community, unincorporated town or village, or other public entity." For the purposes of this plan, any 'taxing authority' was included, except for public power districts. In Nebraska, public power districts are considered a 'quasi-state government' and are required to submit individual plans as an annex to the Nebraska State Hazard Mitigation Plan.

Multi-jurisdictional planning processes can offer the following benefits: improves communication and coordination among jurisdictions and other regional entities, enables comprehensive mitigation approaches to reduce risks that affect multiple jurisdictions, maximizes economies of scale by leveraging individual capabilities and sharing costs and resources, avoids duplication of efforts, and provides an organizational structure that local jurisdictions may find supportive. While offering these potential benefits, a multi-jurisdictional planning process can also present the following challenges: reduces individual control and ownership over the mitigation planning process, involves coordinating participation of multiple jurisdictions, which may have different capabilities, priorities, and histories working together, requires specific information on local risks and mitigation actions for each jurisdiction, and requires the organization of large amounts of information into a single plan document.

LAWS, REGULATIONS, AND GUIDANCE

Local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, provides the legal basis for local governments to undertake a risk-based approach to reducing risks from natural hazards through mitigation planning. The purpose of the Stafford Act, as amended by the Disaster Mitigation Act of 2000, is "to reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters." Section 322 of the Act specifically addresses mitigation planning and requires state and local governments to prepare multi-hazard mitigation plans as a precondition for receiving FEMA mitigation project grants.

The requirements and procedures for Local Mitigation Plans are found in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201 (44 CFR Part 201). FEMA's Multi-Hazard Mitigation Planning Guidance is the official guidance for local governments to meet the requirements of the Mitigation Planning regulations under the Stafford Act and 44 CFR Part 201.

DISASTER MITIGATION ACT OF 2000

In an effort to reduce the nation's mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of the DMA 2000 requires that state and local governments develop, adopt, and routinely update a hazard mitigation plan in order to remain eligible for pre- and post-disaster mitigation funding. These funds include the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), and the Flood Mitigation Assistance Program (FMA), all of which are administered by FEMA under the Department of Homeland Security (DHS). Jurisdictions with an adopted and federally approved hazard mitigation plan thereby become pre-positioned and more apt to receive available mitigation funds before and after the next disaster strikes.

This plan update was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule (IFR) published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. While the Act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288).

This plan was prepared using current FEMA planning guidance in coordination with the Nebraska Emergency Management Agency (NEMA) in order to ensure that it meets all applicable state and federal mitigation planning requirements. This includes conformance with FEMA's latest *Local Multi-Hazard Mitigation Planning Guidance* (dated March 2013). Hayes, Frontier, and Hitchcock Counties utilized the multi-jurisdiction planning process recommended by FEMA (*FEMA Publication Series 386*) to develop this plan.

MITIGATION PLANNING HANDBOOK

A *Local Mitigation Plan Review Guide and Tool* provides a detailed summary of FEMA's current minimum standards of acceptability for compliance with the Disaster Mitigation Act of 2000. The requirements of 44 CFR §201.6 *Local Mitigation Plans* are highlighted throughout the *Local Mitigation Planning Handbook* to provide clear guidance on the Federal regulations that must be met before FEMA will approve a local hazard mitigation plan. References to the IFR throughout the plan provide specific section and subsection notations to aid the planning process.

The *Local Mitigation Planning Handbook* is a tool for local governments to use in developing or updating a local hazard mitigation plan. The purpose of the *Handbook* is the following:

- To provide guidance to local governments on developing or updating hazard mitigation plans to meet the requirements of Title 44 Code of Federal Regulations (CFR) §201.6 for FEMA approval and eligibility to apply for FEMA Hazard Mitigation Assistance grant programs; and

Section One [Introduction]

- To offer practical approaches and examples for how communities can engage in effective planning to reduce long-term risk from natural hazards and disasters.

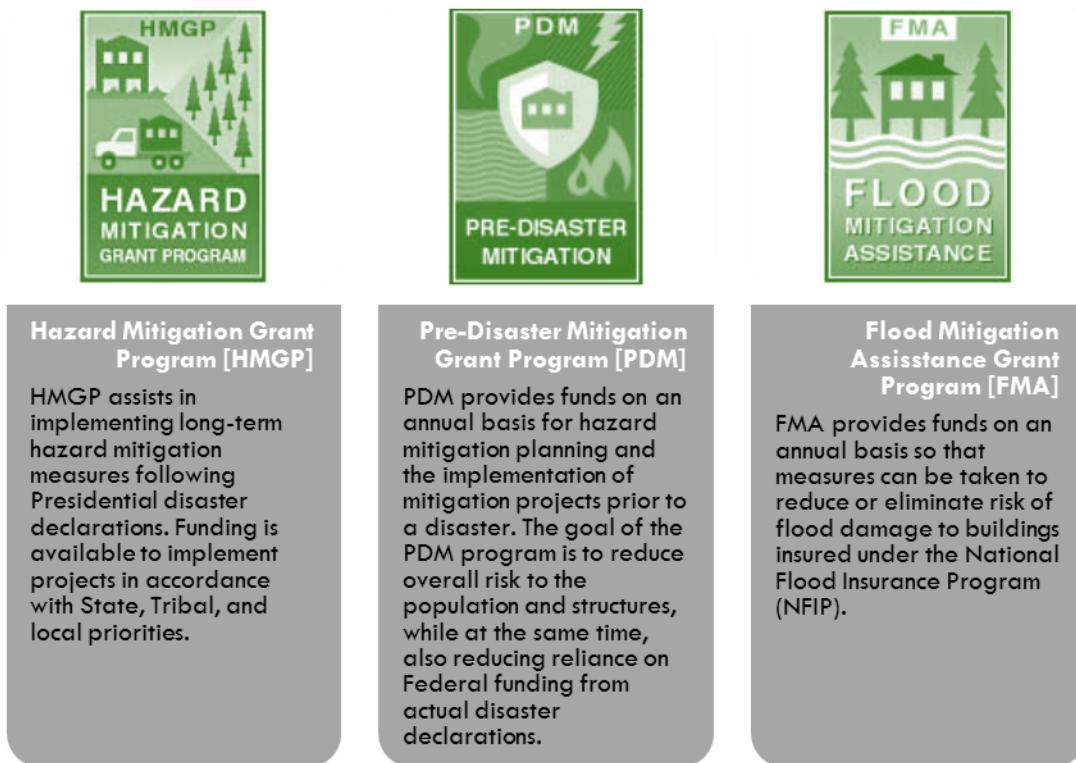
The *Handbook* is a companion to the *Local Mitigation Plan Review Guide* released by FEMA in 2011. While the *Plan Review Guide* is intended to help State and Federal officials review and approve local hazard mitigation plans, the *Handbook* is intended to help local officials develop these plans. The *Handbook* is applicable to new and updated mitigation plans. A jurisdiction must review and revise an existing plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities and resubmit it for approval within five years to continue to be eligible for FEMA mitigation project grant funding. FEMA may accept multi-jurisdictional plans, which must meet all of the requirements of 44 CFR §201.6. The *Handbook* tasks describe how to meet the requirements in a multi-jurisdictional planning effort and are relevant to each participating jurisdiction, whether the plan is for a single or multiple jurisdictions. Federally recognized Tribes may choose to participate in a multi-jurisdictional plan; however, they must meet the requirements for tribal mitigation planning specified in 44 CFR §201.7.

HAZARD MITIGATION ASSISTANCE

Hazard mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards. Local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance. Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. The HMA grant programs provide funding opportunities for pre- and post-disaster mitigation. While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to natural hazards. Brief descriptions of the HMA grant programs can be found below.

For more information on the individual programs, specific plan requirements for the various mitigation grant programs, as well as FEMA funds available for mitigation plan development and mitigation projects, or to see information related to a specific fiscal year, please visit FEMA's HMA website. FEMA administers the HMA grant programs detailed in Figure 1.1 below.

FIGURE 1.1: HAZARD MITIGATION ASSISTANCE [FEMA] GRANT PROGRAMS



PLAN FINANCING AND PREPARATION

In regards to plan financing and preparation, in general, the local government (Hayes, Frontier, and Hitchcock Counties) is the “sub applicant” that is the eligible entity that submits a sub-application for FEMA assistance to the “Applicant”. The “Applicant,” in this case is the State of Nebraska. If HMA funding is awarded, the sub-applicant becomes the “sub-grantee” and is responsible for managing the sub-grant and complying with program requirements and other applicable federal, state, territorial, tribal, and local laws and regulations.

The Hayes, Frontier, and Hitchcock Counties Plan was financed through the HMGP Grant Program. HMGP grants are allocated from FEMA to NEMA using a ‘sliding scale’ formula based on the percentage of funds spent on public and individual assistance programs for each presidentially-declared disaster. For states with a standard state mitigation plan, the formula provides 15 percent of the first \$2 billion of estimated aggregate amounts of disaster assistance; 10 percent for the next portion of amounts between \$2 billion and \$10 billion; and 7.5 percent for the next portion of amounts between \$10 billion and \$35.333 billion.

Hayes, Frontier, and Hitchcock Counties applied for a HMGP planning grant and received federal-cost share in March 2013 to provide 75 percent assistance for the completion of a ‘multi-jurisdictional’ hazard mitigation plan. A multi-jurisdictional plan includes any ‘taxing authority’ such as cities, villages, counties, school districts, natural resources districts, or other special districts. In total 26 jurisdictions were contacted about taking part in the Hayes, Frontier, and Hitchcock Counties Plan. The 26 jurisdictions were contacted and asked to provide input and participation with the plan update. The level of participation for each jurisdiction varied and is explained in more detail in Section Two.

Participates: Medicine Valley Schools, Eustis-Farnam Schools, Maywood Schools, Hayes Center Schools, Hayes Center/Hayes County Rural Fire, Region 15 Emergency Management Agency and Middle Republican Natural Resources District. These jurisdictions provided some input during the plan update but did not meet the requirements of full participation.

Full Participates: Hayes County, Hamlet, Hayes Center, Frontier County, Curtis, Eustis, Hitchcock County, Palisade, Stratton, and Trenton.

All communities or stakeholders were contacted multiple times through emails, phone calls and letter and asked to participate in this plan update.

This plan is an update to previous plans completed for Hayes, Frontier and Hitchcock Counties in the past. Those previous plans were heavily reviewed and may be referenced throughout this plan update. Refer to *Section Six: Participant Profiles* for additional information about the full participants and changes from the previous plans. Specific demographics information for jurisdictions identified in the plan have not changed significantly since the previous plan. Refer to *Section Six: Participant Profiles* for additional information about the ten full participants. As described in *Section Six: Participant Profiles* the population growth in this area since the previous plan has remained flat or decreased. It appears no new substantial infrastructure has been built in the planning area since the previous plan. The critical facilities are listed in *Section Six: Participant Profiles*.

ORGANIZATION OF THE PLAN

The mitigation plan belongs to the local jurisdictions. While FEMA has the authority to approve plans in order for local governments to apply for mitigation project funding, there is no required format for the plan’s organization. When developing the mitigation plan, keep the following guiding principles in mind:

- ❑ **Focus on the mitigation strategy.** The mitigation strategy is the plan’s primary purpose. All other sections contribute to and inform the mitigation strategy and specific hazard mitigation actions.
- ❑ **Process is as important as the plan itself.** In mitigation planning, as with most other planning efforts, the plan is only as good as the process and people involved in its development. The plan should also serve as the written record, or documentation, of the planning process.

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- This is your plan.** To have value, the plan must represent the current needs and values of the jurisdictions and be useful for local officials and stakeholders. Develop the mitigation plan in a way that best serves your jurisdiction's purpose and people.

SECTIONS OF THE PLAN



INTRODUCTION

Section One introduces hazard mitigation planning, including the purpose of the plan, benefits and challenges of utilizing the multi-jurisdictional approach, an overview of the laws, regulations, and guidance, hazard mitigation assistance grant programs, plan financing and preparation, and organization of the plan.



PLANNING PROCESS

Section Two outlines the hazard mitigation planning process utilized for development of the plan, including resource organization, the planning team, key stakeholders, participating jurisdictions, public involvement and participation, and final plan adoption.



HAZARD IDENTIFICATION AND RISK ASSESSMENT

Section Three contains the hazard identification and risk assessment for the plan area, including the hazard profile, previous occurrence of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, varying risks facing the plan area, and overall significance for all participants.



MITIGATION STRATEGY

Section Four discusses the establishment of mitigation goals, objectives, actions, and the action plan for implementation. Goals provide the framework for identifying mitigation actions, the on-the-ground activities to reduce the effects of natural hazards. All actions were evaluated by participants utilizing the FEMA recommended process.



REVIEW, EVALUATION, AND IMPLEMENTATION

Section Five contains recommendations for plan implementation and maintenance, including monitoring and evaluating the hazard identification and risk assessment, integration into existing planning mechanisms, continued public involvement and participation, annual review of mitigation actions, and the process for the five-year plan update.



PARTICIPANT PROFILES

Section Six provides an overall profile of the plan area including geography, demographics, assets inventory, capabilities assessment, and climate as well as hazard identification and risk assessment analysis specific to each individual participant.

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Section Two [Planning Process]

Section Two outlines the hazard mitigation planning process utilized for development of the plan, including resource organization, the planning team, key stakeholders, participating jurisdictions, public involvement and participation, and final plan adoption.

SECTION TWO [PLANNING PROCESS]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION TWO [PLANNING PROCESS]

FEDERAL PLANNING REGULATIONS

REGULATION CHECKLIST 44 CODE OF FEDERAL REGULATIONS (CFR) 201.6 LOCAL MITIGATION PLANS



§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:

- §201.6(b)(1) An opportunity for the public to comment on the plan during the draft stage and prior to plan approval; Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))
- §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; and Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))
- §201.6(b)(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))



§201.6(c)(1) [The plan shall document] 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.

- Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))



§201.6(c)(4)(i) [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

- Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating, and updating the mitigation plan within a five-year cycle)? (Requirement §201.6(c)(4)(i))



§201.6(c)(4)(iii) [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

- Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))

INTRODUCTION

Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. Hazard mitigation activities may be implemented prior to, during, or after an event. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.

As defined by the Federal Emergency Management Agency (FEMA), risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage." The risk assessment process

Section Two [Planning Process]

provides the foundation for the rest of the mitigation planning process. The four basic components of the risk assessment are: 1) identify hazards; 2) profile hazard events; 3) inventory assets; and 4) estimate losses. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards.

Mitigation planning is a process for states and communities to identify policies, activities, and tools to implement mitigation actions. Mitigation core capabilities include planning, public information and warning, operational coordination, community resilience, long-term vulnerability reduction, risk and disaster resilience assessment, and threats and hazard identification. This plan documents Hayes, Frontier, and Hitchcock Counties' hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the jurisdictions will use to decrease vulnerability and increase resiliency and sustainability.

□ What is Mitigation Planning?

- Mitigation planning is a process through which communities assess risks and identify actions to reduce vulnerability to hazards through hazard mitigation.

□ What is a Mitigation Plan?

- A Mitigation Plan is a community-driven, living document that communities use to reduce their vulnerability to hazards.

□ Why assess and plan for risk?

- The plan and its process show the link between land-use decisions and vulnerability. It serves as a tool to be used by planners or other officials to advise and inform decision makers.

□ Why have a Mitigation Plan?

- Communities must have a plan to apply for or receive a mitigation grant. These grants can augment local mitigation activities already being done. Ultimately, these actions reduce vulnerability, and communities are able to recover more quickly from disasters.

Disasters can cause loss of life; damage buildings and infrastructure; and have devastating consequences for a community's economic, social, and environmental well-being. Hazard mitigation reduces disaster damages and is defined as sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Outreach programs that increase risk awareness, projects to protect critical facilities, and the removal of structures from flood hazard areas are all examples of mitigation actions. Local mitigation actions and concepts can also be incorporated into land use plans and building codes.

Local governments have the responsibility to protect the health, safety, and welfare of their citizens. Proactive mitigation policies and actions help reduce risk and create safer, more disaster resilient communities. Mitigation is an investment in your community's future safety and sustainability. Consider the critical importance of mitigation to:

- Protect public safety and prevent loss of life and injury
- Reduce harm to existing and future development
- Prevent damage to a community's unique economic, cultural, and environmental assets
- Minimize operational downtime and accelerate recovery of government and business after disasters
- Reduce the costs of disaster response and recovery and the exposure to risk for first responders
- Help accomplish other community objectives, such as leveraging capital improvements, infrastructure protection, open space preservation, and economic resiliency

HAZARD MITIGATION PLANNING PROCESS

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and man-made hazards. It is the process of organizing local resources, identifying and assessing hazard risks, and determining how best to minimize or manage those risks. This process results in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve both short-term planning objectives and a long-term vision. Plan maintenance procedures were established to implement, as well as evaluate and enhance the plan as necessary. Developing clear plan maintenance procedures ensures that the plan remains a current, dynamic, and effective planning document over time.

State and local officials develop and adopt mitigation plans to meet the requirements of the Stafford Act. The Multi-Hazard Mitigation Planning Guidance provides the official guidance on these requirements and procedures for approval of hazard mitigation plans. The hazard mitigation planning process has four general steps, which include organizing resources, assessing risks, developing a mitigation strategy, and implementing the plan and monitoring the progress. The mitigation planning process is rarely a linear process. It is not unusual that ideas developed while assessing risks should need revision or additional information while developing the mitigation plan, or that implementation of the plan may result in new goals or additional risk assessment. The core steps in the graphic below show the process to complete a mitigation plan.

- **[Organize Resources]** “From the start, communities should focus on the resources needed for a successful mitigation planning process. Essential steps include identifying and organizing interested members of the community as well as the technical expertise required during the planning process”.
- **[Assess Risks]** “Next, communities need to identify the characteristics and potential consequences of hazards. It is important to understand how much of the community can be affected by specific hazards and what the impacts would be on important community assets”.
- **[Develop A Mitigation Plan]** “Armed with an understanding of the risks posed by hazards, communities need to determine what their priorities should be and then look at possible ways to avoid or minimize the undesired effects. The result is a hazard mitigation plan and strategy for implementation”.
- **[Implement Plan And Monitor Progress]** “Communities can bring the plan to life in a variety of ways, ranging from implementing specific mitigation projects to changes in day-to-day organizational operations. To ensure the success of an ongoing program, it is critical that the plan remains relevant. Thus, it is important to conduct periodic evaluations and make revisions as needed”.

Typically, mitigation planning is described as having the potential to produce long-term and recurring benefits by breaking the repetitive cycle of disaster loss. A core assumption of hazard mitigation planning is that pre-disaster investments will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery, and reconstruction. Furthermore, mitigation practices will enable local residents, businesses, and industries to re-establish themselves in the wake of a disaster, getting the local economy back on track sooner and with less interruption.

The benefits of mitigation planning go beyond reducing hazard vulnerability. Measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple local goals, such as preserving open space, improving water quality, maintaining environmental health, and enhancing recreational opportunities. Thus, it is vitally important that any local mitigation planning process be integrated with other concurrent local planning efforts, and any proposed mitigation strategies must take into account other existing local goals or initiatives that will help compliment or hinder their future implementation.

RESOURCE ORGANIZATION

Hayes, Frontier, and Hitchcock Counties began the process for developing a multi-jurisdictional hazard mitigation plan update in March 2013. Olsson Associates was contracted to guide and facilitate the planning process and assemble the multi-jurisdictional hazard mitigation plan. Charlynn Hamilton (Hayes County Emergency Manager) and Patrick Gerdes (Region 15 Emergency Management Director) led the development of the plan at the county level and served as the primary points-of-

Section Two [Planning Process]

contact throughout the plan. The project kick-off meeting provided an overview of the work to be completed over the next 36 months, including the potential participants, establishment of a planning team, number and locations of public meetings, attendance requirements, and a discussion of what types of information would need to be provided to the consultant in order to successfully complete the plan.

To begin the development process for the Hayes, Frontier, and Hitchcock Counties Plan, coordinating efforts with local, state, and federal agencies and organizations was the first activity. The Nebraska Department of Natural Resources (NDNR) and Nebraska Emergency Management Agency (NEMA) became involved in the planning process. Hayes, Frontier, and Hitchcock Counties along with Olsson Associates then worked together to identify elected officials and key stakeholders to lead the planning effort. A planning team was established to coordinate the project and included the following people:

- Charlynn Hamilton, Emergency Manager, Hayes County
- Patrick D. Gerdes, Director Region 15 Emergency Management Agency
- Amy Vrtiska, Planner, Olsson Associates

ELECTED OFFICIALS AND KEY STAKEHOLDERS

At the beginning of the planning process, the planning team, a group of local participants and the consultant, was established to guide the planning process, review the plan, and serve as a liaison to plan participants throughout the planning area. Additional technical support was provided to the planning team through staff from NEMA and NDNR. Table 2.1 below lists the members of the planning team and key stakeholders.

- **[Planning Team]** The core group responsible for making decisions, guiding the planning process, and agreeing upon the final contents of the plan.
- **[Key Stakeholders]** Individuals or groups that affect or can be affected by a mitigation action or policy.

TABLE 2.1: PLANNING TEAM AND KEY STAKEHOLDERS

Jurisdiction	Designated Representative Title	Jurisdiction	Designated Representative Title
Hayes County	Char Hamilton, Emergency Manager	Maywood Schools	Mike Williams
Village of Hamlet	Gloria Fortkamp, Village Clerk	Village of Culbertson	Lynn Kolbet, Clerk
Village of Hayes Center	Jan Singleton, Hay Center Village Clerk	Village of Palisade	Kerry Miller, Clerk
Hayes Center Schools	Ron Howard, Superintendent	Village of Stratton	Lorinda Cheatham, Clerk
Hayes Center/ Hayes County Rural Fire	Mike Christner, President	Village of Trenton	Bill Neely, Board Member
Frontier County	Roger Powell, Region 17 Emergency Manager	Hitchcock County Schools	Mike Apple, Superintendent
City of Curtis	Kevin Brown, Mayor	Palisade Fire and Rescue	Rodney Hunt, Palisade Fire and Rescue
Village of Eustis	Susan Strong, Clerk	Wauneta-Palisade Schools	Randy Geier, Superintendent
Village of Maywood	Rebecca Merritt, City Official	Educational Service Unit 15	Paul Calvert, ESU 15
Village of Moorefield	Jody Kotschwan, Clerk	Region 17 Emergency Management Agency	Roger Powell, Region 17 Emergency Manager
Village of Stockville	Darla Walther, Clerk	Middle Republican Natural Resources District	Daniel Smith, Board Member
Medicine Valley Schools	Alan Garey, Superintendent	Southwest Public Power District	Gary Hanken, System Engineer
Eustis-Farnam Schools	Steve Sampy, Superintendent	Region 17 Emergency Management Agency	Roger Powell, Region 17 Emergency Manager

PUBLIC INVOLVEMENT AND PARTICIPATION

Public involvement was a vital component to the development of this multi-jurisdictional plan. Elected officials, key stakeholders, and residents of Hayes, Frontier, and Hitchcock Counties have experienced the area hazards first hand. The public was responsible for providing information necessary to complete the plan, such as identification of hazards, records of historical occurrences, establishment of goals and objectives, and potential mitigation action items.

Public involvement was the highest priority for the planning team, so meeting attendance requirements were established at the beginning of the planning process. In order to participate in the plan, at least one representative from each jurisdiction had to be present at one of the 'hazard identification' and one of the 'mitigation alternative' public meetings. Sign-in sheets from all public meetings can be found in Appendix B. For those jurisdictions unable to attend the scheduled public meetings, presenting the information at their respective public meeting and completing the meeting materials would meet the attendance requirement. These jurisdictions were instructed by a planning team member to place 'participation in the Hayes, Frontier, and Hitchcock Counties Plan' on their meeting agenda, review the project summary materials, and take formal action to participate in the plan. They had to return the completed meeting materials along with a copy of their sign-in sheet and minutes. This effort enabled jurisdictions which could not attend a scheduled public meeting to participate in the plan.

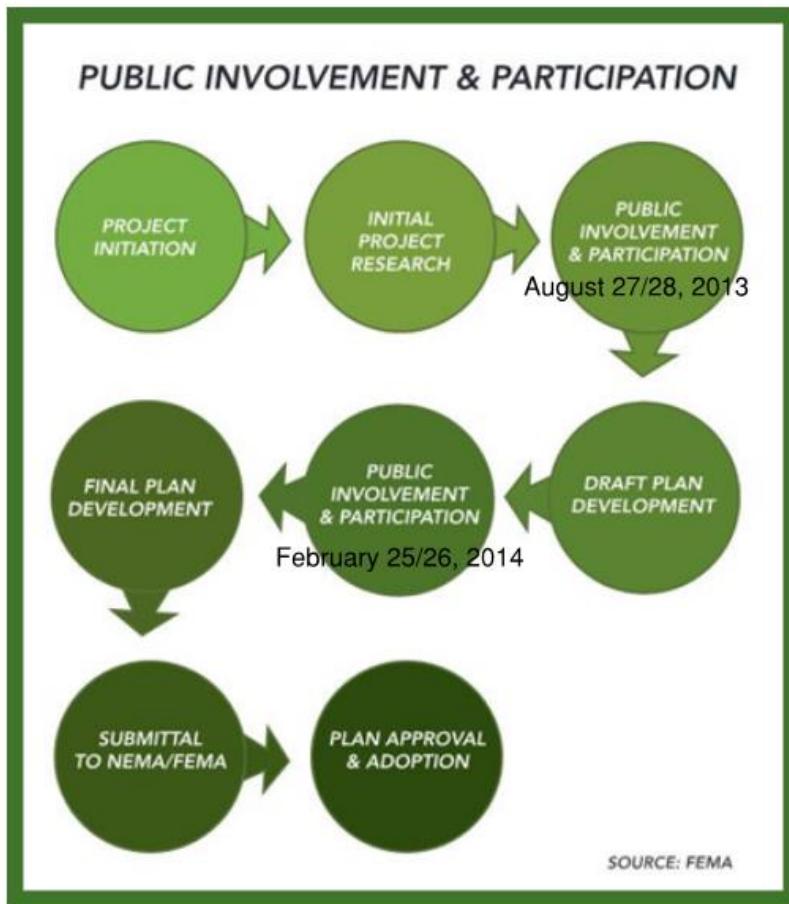
The 'hazard identification' meetings provided the public an overview of the work to be completed over the next 30 months and discuss what types of information would need to be provided to complete the plan. The 'hazard identification' meetings were held on August 27, 2013 in Palisade and on August 28, 2013 in Curtis. Meeting worksheets were distributed to provide an opportunity for public input on the identification of hazards, records of historical occurrences, establishment of goals and objectives, and potential mitigation alternatives (refer to Appendix C). A planning team conference call was held prior to the public meetings.

The 'mitigation alternative' meetings provided an opportunity for the public to review a draft of the plan and collect any additional information necessary to finish the plan. The 'mitigation alternative' meetings were held on February 25, 2014 in Trenton and on February 26, 2014 in Curtis. Meeting worksheets were distributed to provide an opportunity for plan participants to evaluate and prioritize mitigation alternatives, as well as identify critical facilities, highly vulnerable areas and populations, and warning siren locations and ranges (refer to Appendix C). A planning team conference call was held prior to the public meetings.

Additional communication with the key stakeholders took place throughout the duration of the project through email. Plan updates, timelines, and additional questions were all items that were dealt with through email communications.

Section Two [Planning Process]

FIGURE 2.1: PUBLIC INVOLVEMENT AND PARTICIPATION [FEMA] PROCESS



Source: Federal Emergency Management Agency (FEMA).

NEIGHBORING JURISDICTIONS

The efforts taken to inform potential participants and provide opportunity for public involvement and participation in the planning process were also extended to neighboring jurisdictions. The table below displays the neighboring jurisdictions that were notified throughout the planning process. All jurisdictions are located in Nebraska unless otherwise noted.

TABLE 2.2: NEIGHBORING JURISDICTIONS [NOTIFICATION] HAYES, FRONTIER, AND HITCHCOCK COUNTIES

Neighboring Jurisdictions	
Dundy County	Upper Republican Natural Resources District
Chase County	Twin Platte Natural Resources District
Perkins County	Lower Republican Natural Resources District
Lincoln County	Tri-Basin Natural Resources District
Gosper County	Central Platte Natural Resources District
Red Willow County	Furnas County
Rawlins County, KS	Dawson County

PARTICIPATING JURISDICTIONS

This plan was developed through a collaborative effort by Hayes, Frontier, and Hitchcock Counties, the incorporated cities and villages within the counties, Region 17 Emergency Management Agency, and the Middle Republican Natural Resources District.

Representatives from each of the participating jurisdictions were responsible for providing information specific to their jurisdiction such as studies, reports, and plans. In addition, they were responsible for completing meeting worksheets, which provided vital information necessary to successfully complete the plan (refer to Appendix C). The representatives were also responsible for reviewing draft plan materials and final review of the plan prior to submittal to the Federal Emergency Management Agency (FEMA) for approval. Below, Table 2.3 summarizes each participant's attendance requirements throughout the planning process.

All jurisdictions listed in Table 2.3 contributed to the HHF LHMP, but not all of them are considered full participants by FEMA. Only Frontier County, Curtis, Eustis, Hayes County, Hamlet, Hayes Center, Hitchcock County, Palisade, Stratton and Trenton are considered Full participants for this plan. Those ten jurisdictions have each participated in the planning process fully by attending the scheduled meetings and/or providing all the appropriate feedback worksheet per the meeting topic, they have analyzed their risks and vulnerabilities, they have designated mitigation actions that will address these risks and vulnerabilities and they have or will adopt this planning document upon approval. All the other jurisdictions listed in Table 2.3 are stakeholders that completed three or less of the required plan participation criteria. The stakeholders that have mitigation actions listed later in the action plan section will coordinate with their home County to pursue any said actions as projects under any HMA program as able and necessary.

For Information purposes Region 17 Emergency Management Agency was previously the Region 15 Emergency Management Agency. Since the writing of this plan those jurisdictions have changed so both verbiage is acceptable for these planning purposes.

Participates: Medicine Valley Schools, Eustis-Farnam Schools, Maywood Schools, Hayes Center Schools, Hayes Center/Hayes County Rural Fire, Region 15 Emergency Management Agency and Middle Republican Natural Resources District. These jurisdictions provided some input during the plan update but did not meet the requirements of full participation.

Full Participates: Hayes County, Hamlet, Hayes Center, Frontier County, Curtis, Eustis, Hitchcock County, Palisade, Stratton, and Trenton.

All communities or stakeholders were contacted multiple times through emails, phone calls and letter and asked to participate in this plan update.

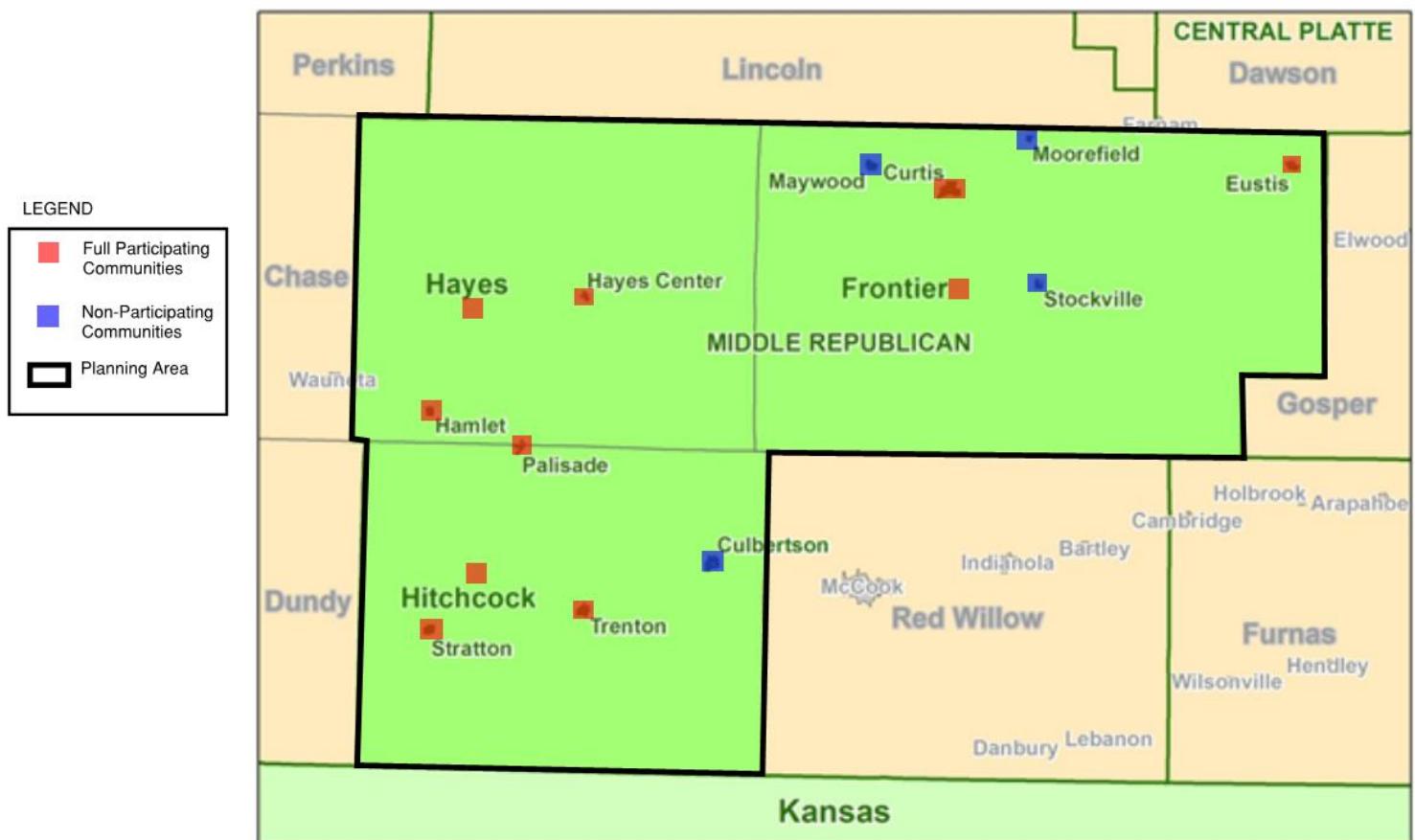
TABLE 2.3: PARTICIPATING JURISDICTIONS [FINAL] HAYES, FRONTIER, AND HITCHCOCK COUNTIES

Jurisdiction	Designated Representative Title	Memorandum of Agreement	Hazard Identification Meeting Attendance	Hazard Identification Worksheets Completed	Mitigation Alternative Meeting Attendance	Mitigation Alternative Worksheets Completed	Final Participation
Hayes County	Char Hamilton, Emergency Manager	X	X	X	X	X	Yes
Village of Hamlet	Gloria Fortkamp, Village Clerk	X	X	X	X	X	Yes
Village of Hayes Center	Jan Singleton, Hay Center Village Clerk	X	X	X	X	X	Yes
Hayes Center Schools	Ron Howard, Superintendent	X	X	X	X	X	No
Hayes Center/ Hayes County Rural Fire	Mike Christner, President	X	X	X	X	X	No
Frontier County	Roger Powell, Region 17 Emergency Manager	X	X	X	X	X	Yes
City of Curtis	Kevin Brown, Mayor	X	X	X	X	X	Yes
Village of Eustis	Susan Strong, Clerk	X	X	X	X	X	Yes

Section Two [Planning Process]

Village of Maywood	Rebecca Merritt, City Official	X	X	--	--	--	No
Village of Moorefield	Jody Kotschwan, Clerk	X	--	--	--	--	No
Village of Stockville	Darla Walther, Clerk	X	X	--	X	X	No
Medicine Valley Schools	Alan Garey, Superintendent	X	X	X	X	X	No
Eustis-Farnam Schools	Steve Sampy, Superintendent	X	X	X	X	X	No
Maywood Schools	Mike Williams	X	X	X	X	X	No
Hitchcock County	Margaret Pollmann, County Clerk and Brandon Myers, Region 51 Emergency Manager	X	X	X	X	X	Yes
Village of Culbertson	Lynn Kolbet, Clerk	X	--	--	--	--	No
Village of Palisade	Kerry Miller, Clerk	X	X	X	X	X	Yes
Village of Stratton	Lorinda Cheatham, Clerk	X	X	X	X	X	Yes
Village of Trenton	Bill Neely, Board Member	X	X	X	X	X	Yes
Hitchcock County Schools	Mike Apple, Superintendent	X	--	X	--	--	No
Palisade Fire and Rescue	Rodney Hunt, Palisade Fire and Rescue	X	--	--	--	--	No
Wauneta-Palisade Schools	Randy Geier, Superintendent	X	--	--	--	--	No
Educational Service Unit 15	Paul Calvert, ESU 15	X	--	--	--	--	No
Region 17 Emergency Management Agency	Roger Powell, Region 17 Emergency Manager	X	X	X	X	X	No
Middle Republican Natural Resources District	Daniel Smith, Board Member	X	X	X	X	X	No
Southwest Public Power District	Gary Hanken, System Engineer	X	--	--	--	--	No

FIGURE 2.2: MAP OF PLANNING AREA



PLAN APPROVAL AND ADOPTION

Based on FEMA requirements, this multi-jurisdictional hazard mitigation plan must be formally adopted by each participant through approval of a resolution. This approval will create 'individual ownership' of the plan by each participant. Formal adoption provides evidence of a participant's full commitment to implement the plan's goals and objectives and action items.

Previous hazard mitigation plans and general local comprehensive plans as well as other resources were reviewed during the development of this Hazard Mitigation Plan Update and used to develop the plan. Those plans are listed below:

- State of Nebraska Hazard Mitigation Plan (2014) <https://nema.nebraska.gov/sites/nema.nebraska.gov/files/doc/hazmitplan.pdf>, NEMA, State of Nebraska Hazard Mitigation Plan, reviewed for pertinent data
- Local Mitigation Plan Review Guide (2013) www.fema.gov
- Local Mitigation Planning Handbook, www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf, reviewed for pertinent data
- Community Comprehensive Plans, Respective Communities, City or Village Comprehensive Plans adopted by the governing bodies, reviewed and added to plan as needed (Hayes County, Hamlet, Hayes, Frontier County, Curtis, Eustis, Hitchcock County, Palisade, Trenton)
- Frontier County Multi-Jurisdictional All-Hazards Mitigation Plan, October 2008, reviewed past plan
- Hayes County, Nebraska Multi-Jurisdictional Hazard Mitigation Plan, September 2009, reviewed past plan
- Hitchcock County Hazard Mitigation Plan, August 2010, reviewed past plan
- National Climatic Data Center, www.ndcd.noaa.gov, Largest active archive of weather data, collected past weather data
- Nebraska Department of Revenue Property Assessment Division, www.revenue.ne.gov, Statewide property assessment database, collected assessments for counties
- Flood Insurance Study, www.fema.gov, Data for flooding within in a community, collected maps and pertinent data
- National Centers for Environmental Information National Oceanic and Atmospheric Administration (NOAA), www.ncdc.noaa.gov, database of storm events, collected past storm events based off Nebraska State Plan's list of Hazards
- National Drought Mitigation Center, <http://drought.unl.edu>, Information about historical occurrence of drought, drought trends and likelihood, collected past drought history
- Federal Emergency Management Agency (FEMA), www.fema.gov, collected pertinent data
- Tornado History Project, www.tornadohistoryproject.com, Database of U.S. tornadoes from 1950 to current, collected past tornado data
- Nebraska Department of Natural Resources, <http://dnrrdata.dnr.ne.us>, collected dam and levee information
- Nebraska Emergency Management Agency (NEMA), www.nema.ne.gov, collected pertinent data
- Various other website with pertinent information in databases

Once adopted, participants are responsible to implement and update the plan within five years. In addition, the plan will need to be reviewed and updated as appropriate when a hazard event occurs that significantly affects the area or individual participants. All participating jurisdictions will also review the plan annually and update as needed. Each jurisdiction's representative shall keep record of updates done to the plan and reviews of the plan. Each participating jurisdiction will need to continue to seek public participation after the plan has been approved either by soliciting public input after hazard events and periodically during the year. Copies of resolutions approved by each participant are located in Appendix A. Participants will need to monitor the implementation of the mitigation action items over time and adjust actions if needed. Routine maintenance of the plan is also needed and will include adding projects as situations change or as additional funding is made available. Removal of projects may also occur as those action items are completed. The designated representatives listed in Table 2.3 above will be responsible for leading the efforts to monitor, evaluate, and update the plan.

Section Two [Planning Process]

FIGURE 2.3: REGULATION CHECKLIST [FEMA] HAZARD MITIGATION PLAN



Source: Federal Emergency Management Agency (FEMA).

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Section Three [Hazard Identification and Risk Assessment]

Section Three contains the hazard identification and risk assessment for the plan area, including the hazard profile, previous occurrence of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, varying risks facing the plan area, and overall significance for all participants.

SECTION THREE [HAZARD IDENTIFICATION AND RISK ASSESSMENT]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION THREE [HAZARD IDENTIFICATION AND RISK ASSESSMENT]

FEDERAL PLANNING REGULATIONS

REGULATION CHECKLIST 44 CODE OF FEDERAL REGULATIONS (CFR) 201.6 LOCAL MITIGATION PLANS



§201.6(c)(2)(i) [The risk assessment shall include a] description on 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.

Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))

Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))



§201.6(c)(2)(ii) [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impacts on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:

§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;

§201.6(c)(2)(ii)(B) An estimate of the potential dollar losses to vulnerable structures identified in...this section and a description of the methodology used to prepare the estimate.

§201.6(c)(2)(ii)(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))



§201.6(c)(2)(iii) For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

INTRODUCTION

Hayes, Frontier, and Hitchcock Counties conducted a risk assessment update to determine and reevaluate the potential impacts of hazards to the people, economy, and built and natural environments of the jurisdictions. The risk assessment provides the foundation for the rest of the mitigation planning process, which is focused on identifying and prioritizing actions to reduce risk to hazards. In addition to informing the mitigation strategy, the risk assessment also can be used to establish emergency preparedness and response priorities, for land use and comprehensive planning, and for decision making by elected officials, city and county departments, businesses, and organizations in the jurisdictions.

Risk, for the purpose of hazard mitigation planning, is the potential for damage, loss, or other impacts created by the interaction of natural hazards with jurisdictions' assets. Hazards are natural processes, such as tornados and earthquakes. The exposure of people, property, and other jurisdictions' assets to natural hazards can result in disasters depending on the

Section Three [Hazard Identification and Risk Assessment]

impacts. Impacts are the consequences or effects of the hazard on the jurisdictions and their assets. The type and severity of impacts are based on the extent of the hazard and the vulnerability of the asset, as well as the jurisdictions' capabilities to mitigate, prepare for, respond to, and recover from events.

Figure 3.1 illustrates the concept of risk as the relationship, or overlap, between hazards and jurisdictions' assets (the smaller the overlap, the lower the risk). Table 3.1 provides definitions for the common risk assessment terminology.

FIGURE 3.1: RISKS [NATURAL HAZARDS VS. COMMUNITY ASSETS] FEMA



Source: Federal Emergency Management Agency (modified from the U.S. Geological Survey and Oregon Partnership for Disaster Resilience Models).

TABLE 3.1: RISK ASSESSMENT TERMINOLOGY [DEFINITIONS] FEMA

Term	Definition
Natural Hazard	Source of harm or difficulty created by a meteorological, environmental, or geological event.
Community Assets	The people, structures, facilities, and systems that have value to the community.
Vulnerability	Characteristics of community assets that make them susceptible to damage from a given hazard.
Impact	The consequences or effects of a hazard on the community and its assets.
Risk	The potential for damage, loss, or other impacts created by the interaction of natural hazards with community assets.
Probability	The extent to which an event is likely to occur.
Risk Assessment	Product or process that collects information and assigns values to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision making.
Threat or Human-Caused Incident	Intentional actions of an adversary, such as a threatened or actual chemical or biological attack or cyber event.

Source: Definitions from FEMA Local Mitigation Plan Review Guide, October, 2011, Threat and Hazard Identification and Risk Assessment Guide: Comprehensive Preparedness Guide (CPG) 201, First Edition, April 2012, and adapted from the Department of Homeland Security Risk Lexicon, 2008.

HAZARD IDENTIFICATION

The hazard identification was conducted to determine the hazards that threaten Hayes, Frontier, and Hitchcock Counties. It was established through public input and information provided by elected officials, key stakeholders, and residents throughout the planning area, as well as conducting research on each hazard type identified in the State of Nebraska Hazard Mitigation Plan. For the purpose of this plan update, nine natural hazards were initially considered, including severe winter storms

Section Three [Hazard Identification and Risk Assessment]

(including extreme cold and severe winter weather), tornados, severe thunderstorms (including hail, lightning, and severe wind), flooding, extreme heat, drought, earthquakes, wildfires, and landslides. All were identified as separate potential hazard events as they often pose different threats and potential losses can vary greatly. Man-made hazards, with the exceptions of dam failure and levee failure, were not included in this plan. Using existing hazards data and input gained through planning and public meetings, Hayes, Frontier, and Hitchcock Counties identified the hazards that could affect the planning area. The following hazards were not considered due to not being deemed a risk for this area: Ag Animal Disease, Chemical Transportation, Chemical Fixed Facility, Ag Plant Disease, Terrorism, Earthquake, Radiological Transportation, Civil Disorder, and Radiological Fixed Site.

In order to best describe the hazards that affect the jurisdictions, Hayes, Frontier, and Hitchcock Counties utilized the following activities for identifying hazards in the planning area:

- Reviewed the State Hazard Mitigation Plan for information on hazards affecting the planning area.
- Documented the disaster declaration history.
- Downloaded weather-related events from online resources, such as the National Climatic Data Center.
- Reviewed existing studies, reports, and plans related to hazards in the planning area.
- Used flood insurance rate maps (FIRM) and non-regulatory flood risk assessment products developed for the planning area by FEMA as part of the National Flood Insurance Program (NFIP) and the RiskMAP program.
- Contacted colleges or universities that have hazard-related academic programs or extension services.
- Interviewed the planning team and stakeholders about which hazards affect the planning area and should be described in the mitigation plan.
- Consulted local resources such as the newspaper, chamber of commerce, local historical society, or other resources with records of past occurrences.
- Referenced hazards previously identified to determine if they were still relevant.

Hazards data from the Nebraska Emergency Management Agency (NEMA) State of Nebraska Mitigation Plan, Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), as well as other sources were analyzed to gage the overall significance of the hazards to Hayes, Frontier, and Hitchcock Counties. Overall significance was calculated based on risk assessment criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur relatively infrequent or have minimal to no impact on the planning area were deemed to be of low significance. This evaluation was used by Hayes, Frontier, and Hitchcock Counties to identify the hazards of greatest overall significance, allowing the Counties to concentrate resources where they are needed most.

The mitigation plan update focuses on how risk has changed since the previous plans were completed, particularly changes related to land use development and new hazard information. New development in hazard-prone areas, areas affected by recent disasters, and new data and reports were incorporated into the plan in order to analyze the current risk and update mitigation actions. The Nebraska State Hazard Mitigation Plan was consulted to assess the potential of new hazards for Hayes, Frontier, and Hitchcock Counties. Hazards from past plans were also reevaluated, and the comments in Section Six: Participant Profiles detail how hazards were updated.

SEVERE WEATHER EVENTS SUMMARY

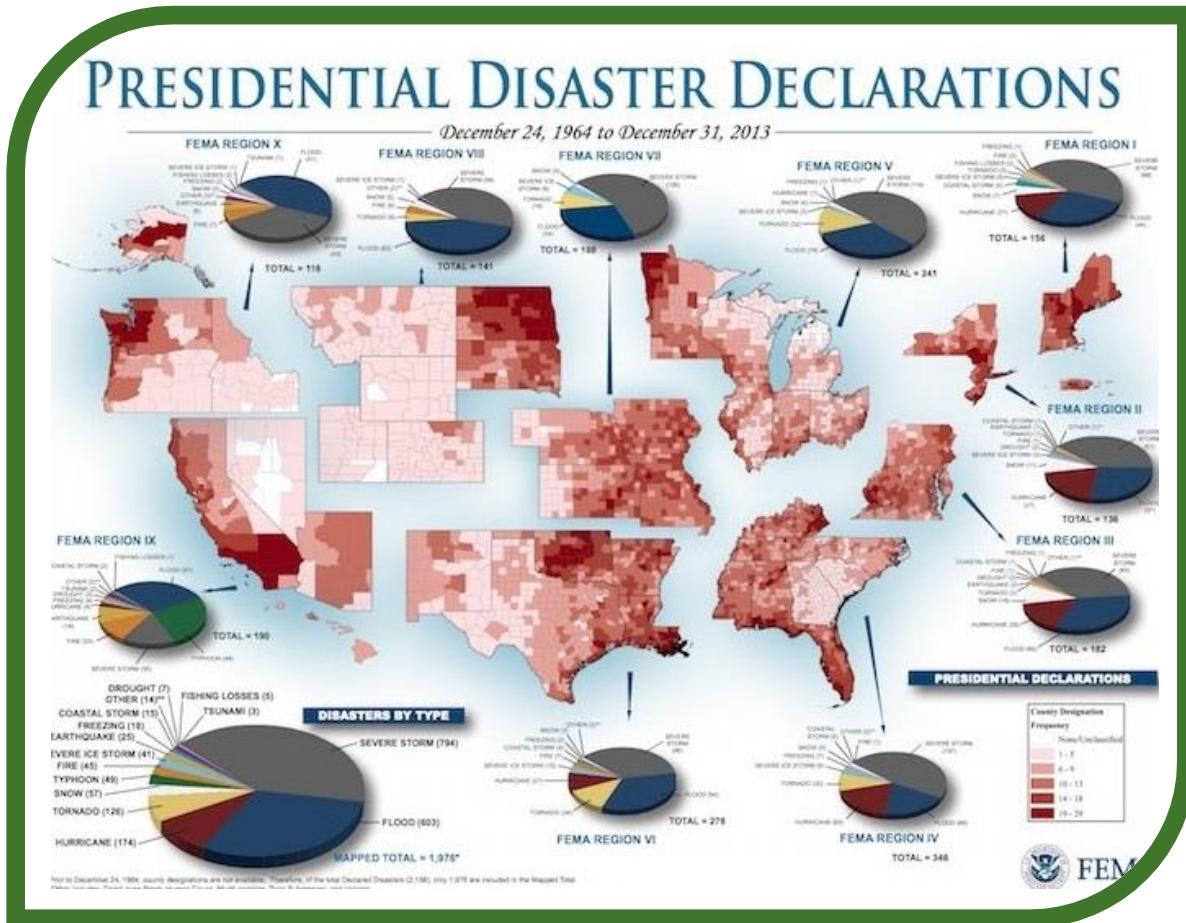
Severe weather refers to any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life.

PRESIDENTIAL DISASTER DECLARATIONS

Hayes, Frontier, and Hitchcock Counties researched past events that triggered federal and/or state disaster declarations, in the planning area, to aid in hazard identification. Federal and/or state declarations are granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. When the local government's capacity has been exceeded, a state disaster declaration may be issued, allowing for assistance. If the disaster is so severe that both local and state governments' capacities are surpassed; a federal declaration may be issued, allowing for further assistance. The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA).

Table 3.2, below, provides details on federal disaster declarations in Hayes, Frontier, and Hitchcock Counties since 1953. Figure 3.2 illustrates the number of presidential disaster declarations from 1964 to 2013 by FEMA Region. Hayes, Frontier, and Hitchcock Counties and the State of Nebraska are located in FEMA Region VII. The review of federal disaster declarations indicates that Hayes, Frontier, and Hitchcock Counties have received 17 declarations between 1953 and 2016 (thus far).

FIGURE 3.2: PRESIDENTIAL DISASTER DECLARATIONS [FEMA] DECEMBER 24, 1964 – DECEMBER 31, 2013



Source: Federal Emergency Management Agency.

TABLE 3.2: PRESIDENTIAL DISASTER DECLARATIONS SUMMARY [FEMA] 1953 – 2015

Disaster Declaration	Disaster Date	Declaration Date	Hazard Type	County
DR – 4225	5/6/2015 – 6/17/2015	6/25/2015	Severe Storms, Tornados, Straight-line winds, and Flooding	Hayes

Section Three [Hazard Identification and Risk Assessment]

DR – 4014	6/19/2011 – 6/21/2011	8/12/2011	Severe Storms, Tornados, Straight-line Winds, and Flooding	Hayes
Disaster Declaration	Disaster Date	Declaration Date	Hazard Type	County
DR – 1924	6/1/2010 – 8/29/2010	7/15/2010	Severe Storms, Flooding, and Tornados	Hayes and Frontier
DR – 1902	3/6/2010 – 4/3/2010	4/21/2010	Severe Storms, Ice Jams, and Flooding	Hayes
DR – 1878	12/22/2009 – 1/8/2010	2/25/2010	Severe Winter Storms and Snowstorm	Frontier
DR – 1770	5/22/2008 – 6/24/2008	6/20/2008	Severe Storms, Tornados, and Flooding	Hayes and Frontier
DR – 1714	5/28/2007 – 6/2/2007	7/24/2007	Severe Storms and Flooding	Hayes, Frontier, and Hitchcock
DR – 1674	12/19/2006 – 1/1/2007	1/7/2007	Severe Winter Storms	Hayes, Frontier, and Hitchcock
DR – 1627	11/27/2005 – 11/28/2005	1/26/2006	Severe Winter Storms	Hayes and Frontier
DR – 1590	5/11/2005 – 5/12/2005	6/23/2005	Severe Storms and Flooding	Frontier
DR – 1373	4/10/2001 – 4/23/2001	5/16/2001	Severe Storms	Hayes
DR – 1190	10/24/1997 – 10/26/1997	11/1/1997	Severe Snow Storms	Hayes, Frontier, and Hitchcock
DR – 1027	4/10/1994 – 4/13/1994	5/9/1994	Snow Storm and Ice Storm	Hayes, Frontier, and Hitchcock
DR – 998	6/23/1993 – 8/5/1993	7/19/1993	Flooding and Severe Storms	Hayes and Frontier
DR – 873	6/10/1990 – 7/30/1990	7/4/1990	Flooding, Severe Storms, and Tornados	Hitchcock
DR – 716	6/11/1984 – 6/22/1984	7/3/1984	Tornados and Flooding	Hayes
DR – 228	7/18/1967	7/18/1967	Severe Storms and Flooding	Hayes and Frontier

Source: Federal Emergency Management Agency.

NATIONAL CLIMATIC DATA CENTER [NCDC]

The National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. The NCDC Storm Events Database contains data on events from January 1, 1950 to January 31, 2016 (at the time of the plan). Data from the NCDC is summarized in the hazard sections below, with full event details in Section Six: Participant Profiles.

RISK ASSESSMENT

The risk assessment identifies and profiles relevant hazards and evaluates the potential loss of life, personal injury, economic injury, and property damage resulting from hazards by assessing the vulnerability of people, buildings, and infrastructure to hazards. The process provides the foundation for the rest of the mitigation planning process. The risk assessment allows for a better understanding of potential risk to hazards and creates a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

Section Three [Hazard Identification and Risk Assessment]

The risk assessment followed the methodology described in FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses* (FEMA 386-2, 2002), which breaks the assessment down into a four-step process. The four basic components of the risk assessment are: 1. Identify Hazards, 2. Profile Hazard Events, 3. Inventory Assets, and 4. Estimate Losses. The desired outcomes of these steps are 1) an evaluation of each hazard's potential impacts on the people, economy, and built and natural environments in the planning area and 2) an understanding of each jurisdiction's overall vulnerability and most significant risks. These potential impacts and the overall vulnerability identify mitigation actions to reduce risk.

RISK ASSESSMENT CRITERIA

The Hayes, Frontier, and Hitchcock Counties Multi-Jurisdictional Hazard Mitigation Plan Update involved a comprehensive review and update of the risk assessment. As part of the update, new data was used (when available) and new analyses were conducted. Each hazard was assessed through the process outlined in Figure 3.3.

FIGURE 3.3: RISK ASSESSMENT [FEMA] CRITERIA



Source: Federal Emergency Management Agency.

HAZARD PROFILE

This section provides a description of the hazard, associated issues, and details on the hazard specific to the planning area.

PREVIOUS OCCURRENCES OF HAZARD EVENTS

This section gives information on historical occurrences. Historical occurrence worksheets were used to obtain information from participating jurisdictions on previous occurrences. This information helps estimate the likelihood of future events and predict potential impacts.

LOCATION AND EXTENT

This section contains information on hazard location and extent, magnitude/ strength, speed of onset/ duration, seasonal patterns, and/or secondary effects (when known).

Location is the geographic areas within the planning area that are affected by the hazard, such as a floodplain. Hazard areas may be further defined, such as high wildfire hazard areas versus low wildfire hazard areas. The entire planning area may be uniformly affected by some hazards, such as drought or winter storm.

Extent is the strength or magnitude of the hazard. The extent of a hazard is not the same as its potential impacts on the jurisdictions. Extent defines the characteristics of the hazard regardless of the people and property it affects, while impact refers to the effect of a hazard on the people and property in the jurisdictions.

Location and Maximum Probable Extent are categorized into the following classifications:

Section Three [Hazard Identification and Risk Assessment]

TABLE 3.3: LOCATION [CLASSIFICATIONS] DEFINITIONS

Classification	Definition
Negligible	Less than 10 percent of planning area or isolated single-point occurrences.
Limited	10 to 25 percent of the planning area or limited single-point occurrences.
Significant	26 to 75 percent of planning area or frequent single-point occurrences.
Extensive	76 to 100 percent of planning area or consistent single-point occurrences.

Location (geographic area affected). Source: Federal Emergency Management Agency.

TABLE 3.4: MAXIMUM PROBABLE EXTENT [CLASSIFICATIONS] DEFINITIONS

Classification	Definition
Weak	Limited classification on scientific scale, slow speed of onset or short duration of event, resulting in little to no damage.
Moderate	Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days.
Severe	Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months.
Extreme	Extreme classification on scientific scale, immediate onset or extended duration of event, resulting in catastrophic damage and uninhabitable conditions.

Maximum Probable Extent (magnitude/ strength based on historic events or future probability). Source: Federal Emergency Management Agency.

TABLE 3.5: MAXIMUM PROBABLE EXTENT [MAGNITUDE/STRENGTH] DROUGHT, EARTHQUAKE, AND TORNADO

Hazard	Scale/ Index	Weak	Moderate	Severe	Extreme
Drought	Palmer Drought Severity Index ¹	-1.99 to +1.99	-2.00 to -2.99	-3.00 to -3.99	-4.00 and below
Earthquake	Modified Mercalli Scale ²	I to IV	V to VII	VIII	IX to XII
	Richter Magnitude ³	2, 3	4, 5	6	7, 8
Tornado	Enhance Fujita Tornado Damage Scale ⁵	F0	F1, F2	F3	F4, F5

¹Cumulative meteorological drought and wet conditions: <http://ncdc.noaa.gov/>. ²Earthquake intensity and effect on population and structures: <http://earthquake.usgs.gov>. ³Earthquake magnitude as a logarithmic scale, measured by a seismograph: <http://earthquake.usgs.gov>. ⁴Tornado rating based on wind speed and associated damage: <http://spc.noaa.gov>.

HAZARD IMPACT AND VULNERABILITY TO THE HAZARD

This section evaluates the planning areas' exposure to hazards, taking into account assets at risk, critical facilities, and future development trends. Vulnerability is expressed in general, qualitative terms. It assesses the possible impact based on previous occurrences, spatial extent, and damage/ life-threatening potential. Vulnerability is categorized into the following classifications:

TABLE 3.6: HAZARD IMPACT AND VULNERABILITY TO THE HAZARD [CLASSIFICATIONS] DEFINITIONS

Classification	Definition
Extremely Low	The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
Low	Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

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Classification	Definition
Medium	Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
High	Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
Extremely High	Very widespread with catastrophic impact.

Source: Federal Emergency Management Agency.

ESTIMATE OF POTENTIAL LOSSES

This section of the risk analysis involves evaluating vulnerable assets, describing potential impacts, and estimating losses for each hazard. The purpose of this analysis is to help the jurisdictions understand the greatest risks facing the planning area. Methods for analyzing risk include exposure analysis, historical analysis, and scenario analysis. These methods can be expressed qualitatively or quantitatively. Qualitative evaluations describe the types of impacts that might occur during a hazard event. Quantitative evaluations assign values and measure the potential losses to the assets at risk.

TABLE 3.7: RISK ANALYSIS [METHODS] DEFINITIONS

Method	Definition
Exposure Analysis	An exposure analysis identifies the existing and future assets located in identified hazard areas. This also takes into account the magnitude of the hazard, such as assets located in high, medium, or low wildfire hazard areas or assets located in different flood frequency areas (1% annual flood and 0.2% annual flood risk). Exposure analysis quantifies the number, type, and value of structures, critical facilities, and infrastructure located in identified hazard areas, as well as assets exposed to multiple hazards. It is also used to quantify the number of future structures and infrastructure possible in hazard prone areas based on current zoning and building codes.
Historical Analysis	Historical analysis uses information on impacts and losses from previous hazard events to predict potential impacts and losses during a similar future event. This is especially useful for weather-related hazards, such as severe winter storms, hail, and drought. Because of the frequency of these events, communities are more likely to have experience with and data on impacts and losses. For recent events, consider not only what was damaged, but what might have been damaged if the event had been of greater magnitude. For hazard events that have not occurred recently, consider new development and infrastructure that would now be vulnerable in a similar event.
Scenario Analysis	Scenario analysis predicts the impacts of a particular event. Scenarios can be an especially helpful tool for low frequency, high consequence events, such as earthquakes, for which historical information is not available. Scenario analysis asks "what if" a particular event occurred and predicts potential impacts and losses in terms of monetary costs, casualties, infrastructure downtime, and other risk elements. This type of analysis can also be used to describe possible impacts for different growth and development scenarios.

Source: Federal Emergency Management Agency, Local Mitigation Planning Handbook, March 2013.

Vulnerability and potential losses can be quantified in locations where there is a known, identified hazard area, such as a mapped floodplain, breach or inundation area. In those locations, the numbers and types of buildings at risk can be counted and their values calculated. Other data can be collected, such as locations of critical facilities, historic structures, and natural resources. This information further illustrates the impact and vulnerability of the area to the identified hazard.

Vulnerability and potential losses from other identified hazards, which do not have specific mapped areas or data to support additional analysis, are discussed in more general, qualitative terms.

Section Three [Hazard Identification and Risk Assessment]

Hayes, Frontier, and Hitchcock Counties identified two hazards for which specific geographical hazard areas and adequate data exists to support a quantitative analysis – floods and dam failure. The planning area evaluated the following, to the extent possible, in order to quantify vulnerability in the identified floodplains and inundation areas:

- Impacts to life, safety, and health
- Land and improvements (including types, numbers, and value)
- Populations (based on land use and occupancy)
- Critical facilities
- Cultural and natural resources
- Development trends

PROBABILITY OF FUTURE HAZARD EVENTS

Probability is the likelihood of a specific hazard occurring in the future, and can be described in a variety of ways. Probability may be defined using historical frequencies or statistical probabilities. Statistical probabilities often refer to events of a specific size or strength. Hazard likelihood can also be compared using general descriptions or rankings. Some hazards are most likely to occur during a specific time of year, but others may occur at any time.

In this section, frequency of historical occurrences was used to assess the likelihood of future hazard events. The historical frequency was determined utilizing existing data (when available). It was calculated by dividing the number of recorded events by the number of years on record, then multiplying by 100, to determine the percent chance of the hazard occurring in any given year. The likelihood of future hazard events was classified into categories defined below in Table 3.8.

TABLE 3.8: PROBABILITY OF FUTURE HAZARD EVENTS [CLASSIFICATIONS] DEFINITIONS

Classification	Definition
Unlikely	Less than 1 percent probability of occurrence in the next year.
Occasional	1 to 10 percent probability of occurrence in the next year.
Likely	11 to 90 percent probability of occurrence in the next year.
Highly Likely	91 to 100 percent probability of occurrence in the next year.

Source: Federal Emergency Management Agency.

OVERALL SIGNIFICANCE

In this section the overall significance was calculated based on risk assessment criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur relatively infrequent or have minimal to no impact on the planning area were deemed to be of low significance.

This evaluation was used by Hayes, Frontier, and Hitchcock Counties to identify the hazards of greatest overall significance, allowing the Counties to concentrate resources where they are needed most.

TABLE 3.9: OVERALL SIGNIFICANCE [CLASSIFICATIONS] DEFINITIONS

Classification	Definition
Low	Two or more criteria fall in lower classifications or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.
Medium	The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.
High	The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

Source: Federal Emergency Management Agency.

VARYING RISKS FACING THE PLANNING AREA

In this section, for the multi-jurisdictional plan, the risk assessment evaluates the potential impacts and overall vulnerability for each participating jurisdiction to further development specific mitigation actions. Assets, vulnerabilities, and overall risk that are unique to each jurisdiction are addressed in this multi-jurisdictional plan. Although hazards may be described for the entire planning area, the plan also explains any hazards that are unique or varied within jurisdictions.

The risk assessment information, as provided by individual participants, in *Section Six: Participant Profiles* varies in large part due to the extent of the geographical area and the jurisdictions designated representatives (who were responsible for completing meeting worksheets) personal opinion on the identification of hazards and the presence and risk of each hazard type. Individual hazard identification tables for each participant, including all eleven hazards initially considered, as well as any hazards that are unique or varied within jurisdictions can be found in their respective sections in *Section Six: Participant Profiles*.

RISK ASSESSMENT SUMMARY

The Disaster Mitigation Act requires that Hayes, Frontier, and Hitchcock Counties evaluate the risks associated with each hazard identified in the planning process. The overall risk assessment for the identified hazard types represents the presence and vulnerability to each hazard type throughout the planning area. The individual hazard identification tables, based on the public input and information received, identify those hazard types which have occurred, have a significant likelihood to occur again, or have reason to potentially occur in Hayes, Frontier, and Hitchcock Counties. These tables were compiled after receiving responses from the public, discussing the public responses with the State Hazard Mitigation Officer, and conducting detailed research on the presence and risk of each hazard type. The individual participant hazard identification tables and responses may or may not reflect the consensus for risk and vulnerability to each hazard type for the planning area. Individual hazard identification tables for each participant, including all eleven hazards initially considered, can be found in their respective sections in *Section Six: Participant Profiles*.

Table 3.10 summarizes the results of the hazard identification and risk assessment for Hayes, Frontier, and Hitchcock Counties, based on the hazard data and input from the public. For each hazard identified, this table includes the location, maximum probable extent, probability of future events, and overall significance for the planning area. Each jurisdiction chose the classifications for their area on a hazard worksheet and the classifications for each category are defined as follows:

Location (Geographic Area Affected)

Negligible: Less than 10 percent of planning area or isolated single-point occurrences.

Limited: 10 to 25 percent of planning area or limited single-point occurrences.

Significant: 25 to 75 percent of planning area or frequent single-point occurrences.

Extensive: 75 to 100 percent of planning area or consistent single-point occurrences.

Maximum Probable Extent (Magnitude/Strength Based on Historic Events or Future Probability)

Weak: Limited classification on scientific scale, slow speed of onset or short duration of event, resulting in little to no damage.

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Moderate: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days.

Severe: Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months.

Extreme: Extreme classification on scientific scale, immediate onset or extended duration of event, resulting in catastrophic damage and uninhabitable conditions.

Probability of Future Events

Unlikely: Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years.

Occasional: 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 years.

Likely: 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years.

Highly Likely: 90 to 100 percent probability of occurrence in the next year or a recurrence interval of less than 1 year.

Overall Significance

Low: Two or more criteria fall in lower classifications or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.

Medium: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.

High: The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

TABLE 3.10: HAZARD IDENTIFICATION & RISK ASSESSMENT [HAYES, FRONTIER, AND HITCHCOCK COUNTIES] 2016

Hazard	Location	Maximum Probable Extent	Probability of Future Events	Overall Significance
Severe Winter Storms	Extensive	Moderate	Highly Likely	Medium
Severe Thunderstorms	Significant	Moderate	Highly Likely	High
Tornados	Negligible	Severe	Likely	Medium
Hazard	Location	Maximum Probable Extent	Probability of Future Events	Overall Significance
Floods	Significant	Moderate	Likely	High
Extreme Heat	Extensive	Severe	Occasional	High
Drought	Extensive	Severe	Likely	High
Dam Failure	Significant	Severe	Unlikely	Low

Earthquakes, landslides, wildfires, and levee failure were not evaluated in the plan update. During the hazard identification and risk assessment these hazards were deemed to be of low significance to Hayes, Frontier, and Hitchcock Counties. The planning team eliminated these hazards from further consideration in development of mitigation actions due to: the risk of a hazard event in the planning area is unlikely or non-existent; the vulnerability of the planning area is low; and/or capabilities are already in place to mitigate negative impacts. Additional the following reasons were used to decide to not evaluate these four hazards:

Earthquakes

- Hitchcock County, NE has a very low earthquake risk, with a total of 0 earthquakes since 1931. The USGS database shows that there is a 0.22% chance of a major earthquake within 50km of Hitchcock County, NE within the next 50 years.
- Hayes County, NE has a very low earthquake risk, with a total of 0 earthquakes since 1931. The USGS database shows that there is a 0.19% chance of a major earthquake within 50km of Hayes County, NE within the next 50 years.

- Frontier County, NE has a very low earthquake risk, with a total of 1 earthquakes since 1931. The USGS database shows that there is a 0.36% chance of a major earthquake within 50km of Frontier County, NE within the next 50 years. The largest earthquake within 30 miles of Frontier County, NE was a 3.0 Magnitude in 2016.

These facts lead were the main reason for not including earthquakes in the evaluation.

Landslides

- Hitchcock County, NE currently has 1 recognized landslide that is active. However it is located in pasture land and does not currently present any danger to the population.
- Hayes County, NE does not have any current landslides.
- Frontier County, NE does not have any current landslides.

Wildfires

In referencing the Nebraska Statewide Forest Action Plan there are minimal forested areas in the planning region and thereby the threat of wildfires is low to minimal. Most trees in this region only follow the rivers and streams and are in the more urban areas. There is one small piece of the Loess Canyon area in northern Frontier County but its size is relatively small. With a predominance of prairie or pasture land in the planning area prairie-fires are more likely to occur but not a high enough threat probability to warrant a full assessment for this plan. Ultimately the main actions that can occur for this hazard is to have appropriate grass-fire-fighting equipment at the volunteer fire departments and MOA's within the districts to assist as necessary along with the potential of tilling under the prairie as a means of providing a fire-break. Both of these measures are really an operationally focused endeavor and not rooted in mitigation.

Levee Failure

Review of state and federal databases indicated that there are no levees in, or proximate to, the planning area. There may be an undetermined number of agricultural levees present in the three county area, but their potential failure would be limited to crop or pasture land and would have minimal or no impact on critical infrastructure, such as roads, bridges, buildings or any population center.

The following hazard sections describe the possible impacts and quantify, to the extent feasible using the best available data, Hayes, Frontier, and Hitchcock Counties' risk and vulnerability to each of the identified hazards. When hazards vary across the Counties, additional information can be found in *Section Six: Participant Profiles*. The hazards evaluated as part of the plan update include: Severe Winter Storms (including extreme cold and severe winter weather), Severe Thunderstorms (including hail, lightning, and severe wind), Tornados, Floods, Extreme Heat, Drought, and Dam Failure.

The assessment covers the entire geographical extent of Hayes, Frontier, and Hitchcock Counties.



Section Three [Severe Winter Storms]

A *winter storm* is an event in which the varieties of precipitation are formed that only occur at low temperatures, such as snow or sleet, or a rainstorm where ground temperatures are low enough to allow ice to form (*freezing rain*).

SECTION THREE [SEVERE WINTER STORMS]

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SECTION THREE [SEVERE WINTER STORMS]

SEVERE WINTER STORMS

This sub-section outlines the risk assessment for the hazard event severe winter storms, including hazard profile, previous occurrences of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, and overall significance. Data on previous occurrences of hazard events from the National Climatic Data Center (NCDC) is summarized below, with full event details in Section Six: Participant Profiles. Geographic, demographic, assets inventory, capabilities assessment, and climate summaries are also provided in Section Six: Participant Profiles, with varying risks facing the planning area discussed in the appropriate sub-sections.

HAZARD PROFILE

The hazard profile provides a description of the hazard, associated issues, and details on the hazard specific to the planning area.

While the danger from winter weather varies across the country, nearly all Americans, regardless of where they live, are likely to face some type of severe winter weather at some point in their lives. Winter storms can range from a moderate snow over a few hours to a blizzard with blinding, wind-driven snow that lasts for several days. Many winter storms are accompanied by dangerously low temperatures and sometimes by strong winds, icing, sleet, and freezing rain (ready.gov).

Severe winter storms are an annual occurrence in Nebraska. Winter storms can bring extreme cold, freezing rain, and heavy or drifting snow creating blizzards. Blizzards are particularly dangerous due to drifting snow and the potential for rapidly occurring whiteout conditions which greatly inhibit vehicular traffic. Generally, winter storms occur between the months of November and March, but can occur as early as October and as late as April. Heavy snow is usually the most defining element of a winter storm. Large snow events can cripple an entire jurisdiction by hindering transportation, knocking down tree limbs and utility lines, and causing structural damage to buildings.

Along with snow events, winter storms also have the potential to deposit significant amounts of ice. Ice buildup on tree limbs and power lines can cause them to collapse. This is most likely to occur when ice falls in the form of rain that freezes upon contact, especially in the presence of wind. Ice can also lead to many problems on the roads as it makes them slick, causing automobile accidents, and making vehicle travel difficult. Along with snow and ice storm events, extreme cold can be dangerous to the well-being of people and animals. Extreme cold can lead to hypothermia and frostbite, and when exposure lasts long enough, it can cause death.

Nearly every winter, hard freeze warnings are issued advising residents to protect exposed pipes, plants and outdoor pets. Additionally, shelter locations are given and those who do not live in heated homes can go to shelters overnight. The National Weather Service refers to winter storms as the “Deceptive Killers” because most deaths are indirectly related to the storm. Instead, people die in traffic accidents on icy roads and of hypothermia from prolonged exposure to cold. Table 3.11 provides descriptions for the most common severe winter storm events.

TABLE 3.11: SEVERE WINTER STORM EVENTS [DESCRIPTIONS] NWS

Event	Description
Blizzard	Winds of 35 miles per hour (mph) or more with snow and blowing snow reducing visibility to less than ¼ 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.

Event	Description
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	Measurable rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, 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.
Heavy Snow	Two to four inches or more in a 12 hour period.
Ice Storm	Any accumulation of ice $\frac{1}{4}$ inch or more within a 12- to 24-hour period.
Winter Storm	Any combination of ice or snow above. A mixture of snow and freezing rain would trigger a winter storm warning issued by the NWS.

Source: National Weather Service (NWS).

PREVIOUS OCCURRENCES OF HAZARD EVENTS

Pervious occurrences of hazard events gives information on historical occurrences. Historical occurrence worksheets were used to capture information from participating jurisdictions on past occurrences.

The NCDC reported 109 severe winter storm events for Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016. None of the reported events recorded any deaths, injuries, property damage, or crop damage. Data from the NCDC is available in Section Six: Participant Profiles. However, 46 of these events took place across multiple counties and thus counted multiple times. This means that 63 separate severe winter storm events occurred in Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016.

Due to insufficient statistical data from the NCDC to perform a historical analysis, pertinent presidential disaster declarations are summarized in Table 3.12 below to express the magnitude of previous events, with all event details in Section Three: Hazard Identification and Risk Assessment – Severe Weather Events Summary.

TABLE 3.12: PRESIDENTIAL DISASTER DECLARATIONS SUMMARY [FEMA] NEBRASKA 2006 – 2015

Disaster Declaration	Total Public Assistance Grants	Emergency Work (Categories A – B)	Permanent Work (Categories C – G)
DR - 1878	\$6,577,021.37	\$3,133,357.82	\$3,340,563.19
DR - 1674	\$124,357,843.32	\$4,764,531.32	\$119,436,182.08
DR - 1627	\$5,444,137.27	\$87,046.64	\$5,357,090.63
DR - 1190	*Data not currently available		
DR - 1027	*Data not currently available		

Source: Federal Emergency Management Agency.

LOCATION AND EXTENT

Location and extent contain information on hazard location and extent, magnitude/ strength, speed of onset/ duration, seasonal patterns, and/or secondary effects (when known).

LOCATION [GEOGRAPHIC AREA AFFECTED]

- ✓ [Extensive] 76 to 100 percent of planning area or consistent single-point occurrences.

Section Three [Severe Winter Storms]

MAXIMUM PROBABLE EXTENT [MAGNITUDE/ STRENGTH BASED ON HISTORIC EVENTS OR FUTURE PROBABILITY]

- ✓ [Moderate] Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days.

Severe winter storms occur on a regional scale, and can equally affect the entire planning area. All building stock and infrastructure, including critical facilities, are at risk of being damaged or affected by a severe winter storm. One of the primary concerns is the winter weather's ability to knock out heat, power, and communications services, sometimes for days at a time. Heavy snowfall and extreme cold can immobilize an entire region.

The collection of snow and ice on power lines and electrical equipment, or trees within close proximity, can cause equipment damage, downed power lines, and a loss of electricity. Snow and ice accumulations on transportation routes can lead to obstruction of traffic flow and hinder emergency response. Severe winter storms can also cause significant damage to trees, with branches downing electrical lines, blocking roadways, or causing building and property damage.

Severe winter storms can cause immense economic losses to the State of Nebraska. Hampered transportation routes caused by closed or blocked roads and airports can prevent the movement of essential economic goods. Other secondary problems included flooding from melting ice and snow, and rainfall on heavily glazed and saturated surfaces. Icy, snow-covered areas can create a hazard to drivers and to walkers with increased accidents. Downed power lines can create a risk of electrocution to residents and to electric power workers. Finally, frozen and broken water lines in homes are not only costly to repair, but create additional hazards from electrocution.

HAZARD IMPACT AND VULNERABILITY TO THE HAZARD

Impact and vulnerability assesses the planning areas' exposure to hazards; considering assets at risk, critical facilities, and future development trends. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage/ casualty potential.

- ✓ [Medium] Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

Power outages, which occur almost on an annual basis with severe winter storms in Nebraska, in combination with cold temperatures and below zero wind-chill, can pose a significant threat to human life. Highly vulnerable populations such as nursing homes and young children, elderly, and those living in less than adequate environments are most at risk. Critical facilities and infrastructure necessary for basic survival such as emergency response and recovery operations, warning and communication systems, wells and water treatment, and many other services vital for returning the jurisdiction's functions to normal are at risk with power outages and severe winter storms.

The primary risks for severe winter storms are exposure, driving, and post-event behaviors and not to direct damages. Not looking at public losses to electric infrastructure, the most common types of private damage are from downed trees falling on private property and from power outages causing frozen food to thaw.

ESTIMATE OF THE POTENTIAL LOSSES

Vulnerability and potential losses can be quantified in locations where there is a known, identified hazard area, such as a mapped floodplain. In those locations, the numbers and types of buildings at risk to the identified hazard can be counted and their values calculated. Other data can be collected in regards to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources. This information illustrates the impact and vulnerability of the area to the identified hazard. The vulnerability and potential losses from the other identified hazards, which do not have specific mapped areas or the data to support additional analysis, are discussed in more general, qualitative terms.

Due to insufficient statistical data from the NCDC to perform a historical analysis, a scenario analysis was performed assuming that if a severe winter storm occurred within the planning area, the event (table below) could potentially cause 0.05 percent damage to the total assessed value in an incorporated jurisdiction and throughout rural areas of the Counties.

TABLE 3.13: ASSUMED DAMAGE [SEVERE WINTER STORMS] SCENARIO ANALYSIS BY JURISDICTION

Jurisdiction	Total Assessed Value	Assumed Damage [0.05%]
Hayes County		
Hamlet	\$1,349,766	\$675
Hayes Center	\$6,248,351	\$3,124
Frontier County		
Curtis	\$25,276,297	\$12,638
Eustis	\$18,525,879	\$9,263
Hitchcock County		
Palisade	\$9,316,396	\$4,658
Stratton	\$9,892,655	\$4,946
Trenton	\$13,762,777	\$6,881

Source: Nebraska Department of Revenue Property Assessment Division.

PROBABILITY OF FUTURE HAZARD EVENTS

The frequency of historical occurrences was used to gauge the likelihood of future occurrences. Frequency was calculated based on existing data (when available). It was determined by dividing the number of events recorded by the number of years on record, and then multiplying by 100 to calculate a percent. This gives the percent chance of the event occurring in any given year.

- ✓ [Highly Likely] 91 to 100 percent probability of occurrence in the next year.

OVERALL SIGNIFICANCE

Overall significance was determined based on criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Impacts could be deemed to be devastating but have a low probability so that will affect how each hazard is classified. Overall significance is a combination of the severity and probability.

- ✓ [Medium] The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.



Section Three [Severe Thunderstorms]

A thunderstorm is defined as a storm of heavy rain accompanied by lightning, thunder, wind, and sometimes hail.

SECTION THREE [SEVERE THUNDERSTORMS]

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SECTION THREE [SEVERE THUNDERSTORMS]

SEVERE THUNDERSTORMS

This sub-section outlines the risk assessment for the hazard event severe thunderstorms, including hazard profile, previous occurrences of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, and overall significance. Data on previous occurrences of hazard events from the National Climatic Data Center (NCDC) is summarized below, with full event details in Section Six: Participant Profiles. Geographic, demographic, assets inventory, capabilities assessment, and climate summaries are also provided in Section Six: Participant Profiles, with varying risks facing the planning area discussed in the appropriate sub-sections.

HAZARD PROFILE

The hazard profile provides a description of the hazard, associated issues, and details on the hazard specific to the planning area.

Thunderstorms are responsible for the development and formation of many severe weather events, posing great threats to the population and built environment. Damage that results from thunderstorms is mainly inflicted by severe winds, large hailstones, and flash flooding (discussed in Section Three: Hazard Identification and Risk Assessment – Floods) caused by heavy precipitation. Stronger thunderstorms are capable of producing tornados (discussed in Section Three: Hazard Identification and Risk Assessment – Tornados).

The majority of thunderstorms do not cause damage, but when they escalate to the point of becoming severe, the potential damages include crop losses from wind and hail, property losses due to buildings and automobiles damaged by hail, wind, or flash flooding, and death or injury to humans and animals from lightning, drowning, or being struck by falling or flying debris. Flash floods often result from the heavy rainfall of thunderstorm systems and nationally are considered the number one thunderstorm-related killer because they often occur at night and people in affected areas may not be able to see the extent of the rapidly rising water. Approximately ten percent of the thunderstorms that occur each year in the United States are classified as severe.

A thunderstorm is classified as severe when it contains one or more of the following events:

- Hail that is one inch or greater;
- Winds in excess of 50 knots (57.5 mph); or
- The presence of tornado activity.

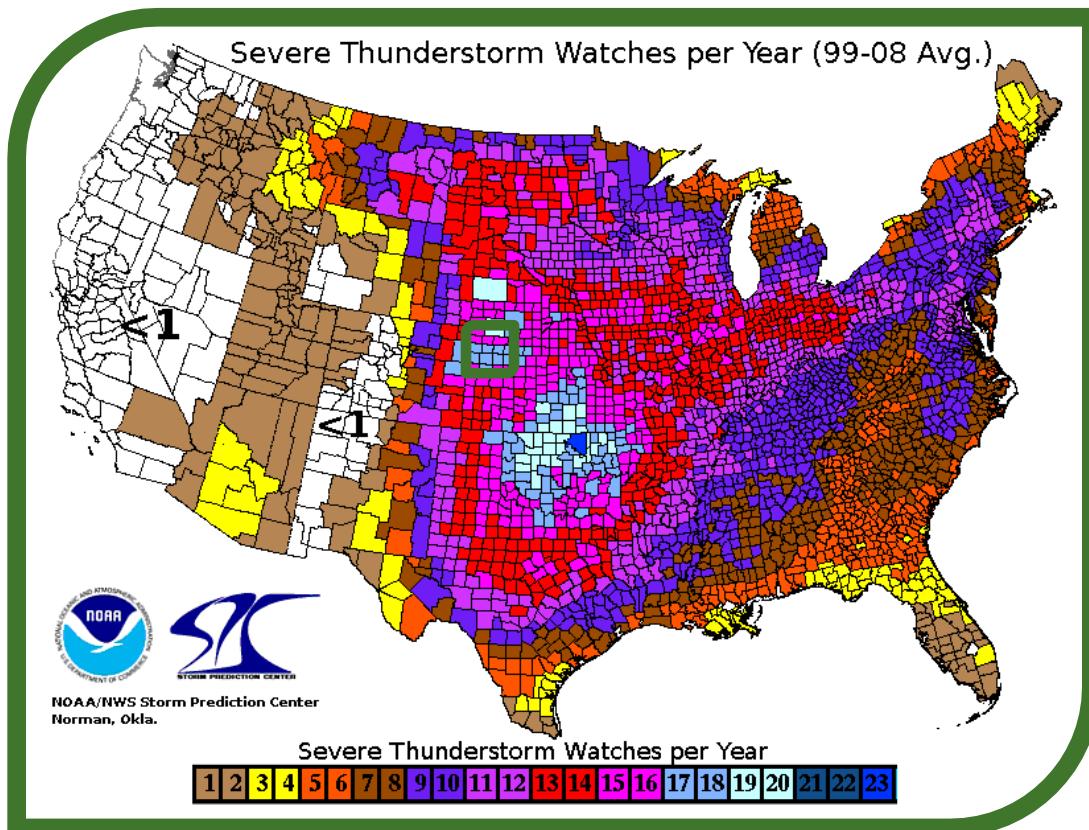
Severe thunderstorms usually occur in the evening during the spring and summer months. These often massive storms can include heavy rain, hail, lightning, high wind, and tornados. Furthermore, heavy rains can cause flooding, lightning can cause wildfires, and high winds can down trees, cause power outages, and destroy property with their shear force. The National Weather Service issues two types of alerts for severe thunderstorms:

- [Severe Thunderstorm Watch]** indicates when and where severe thunderstorms are likely to occur. Citizens are urged to watch the sky and stay tuned to NOAA Weather Radio, commercial radio, or television for information. Severe Thunderstorm Watches are issued by the Storm Prediction Center.
- [Severe Thunderstorm Warning]** is issued when severe weather has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property to those in the path of the storm. Severe Thunderstorm Warnings are issued by the National Weather Service.

Thunderstorms can develop in less than 30 minutes, and can grow to an elevation of eight miles into the atmosphere. In the United States, approximately 100,000 thunderstorms occur annually. Lightning, by definition, is present in all thunderstorms and can be harmful to humans and animals, cause fires to buildings and agricultural lands, and cause electrical outages in municipal electrical systems. Lightning can strike up to 10 miles from the portion of the storm depositing precipitation. Damaging hailstones are also common in severe thunderstorms. Hail measuring just three-quarters of an inch can approach speeds of 100 mph. Hail causes nearly \$1 billion in damage to property and crops annually.

Figure 3.4 displays the average number of severe thunderstorm watches per year for the continental United States from 1999 to 2008 (with the planning area outlined in green). Hayes, Frontier, and Hitchcock Counties experienced between 15 to 18 severe thunderstorm watches on average per year from 1999 to 2008.

FIGURE 3.4: SEVERE THUNDERSTORM WATCHES [PER YEAR AVERAGE] 1999 – 2008



Source: National Oceanic and Atmospheric Administration/ National Weather Service Storm Prediction Center.

LIGHTNING

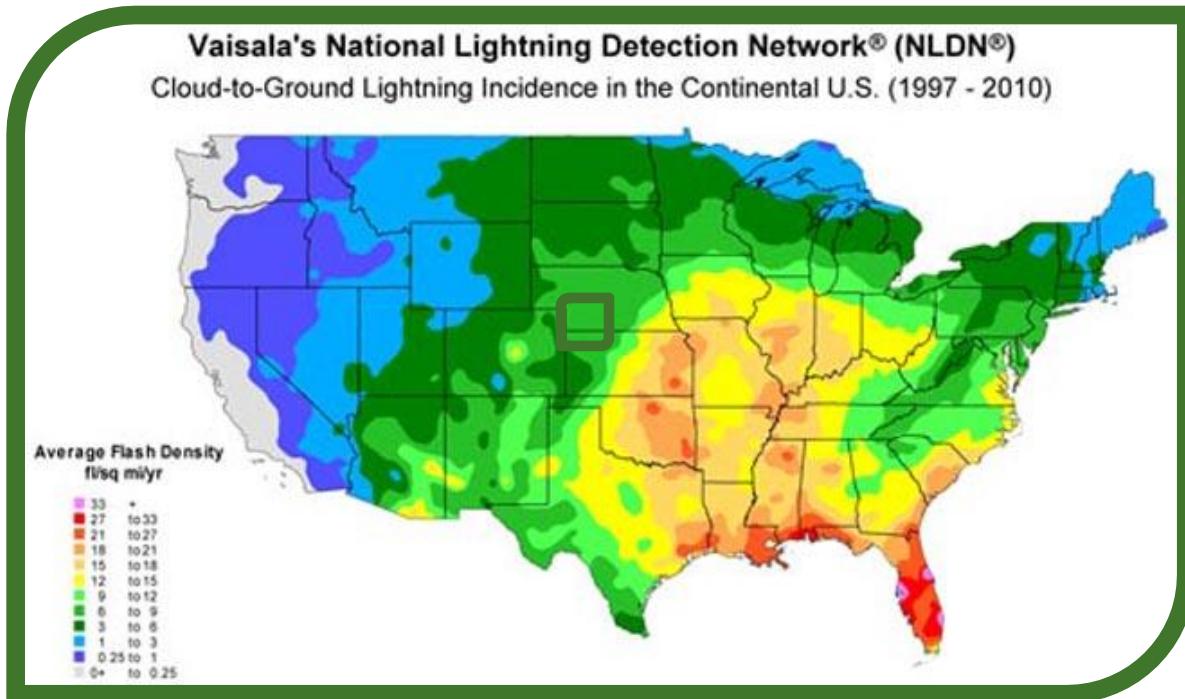
All thunderstorms are dangerous. Every thunderstorm produces lightning. While lightning fatalities have decreased over the past 30 years, lightning continues to be one of the top three storm-related killers in the United States. In 2010 there were 29 fatalities and 182 injuries from lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms (ready.gov).

Lightning is one of the more dangerous weather hazards in the United States. Each year, lightning is responsible for deaths, injuries, and millions of dollars in property damage, including damage to buildings, communications systems, power lines, and electrical systems. Lightning also causes forest and brush fires, and deaths and injuries to livestock and other animals. According to the National Lightning Safety Institute, lightning causes more than 26,000 fires in the United States each year. The Institute estimates property damage, increased operating costs, production delays, and lost revenue from lightning and secondary effects to be in excess of \$6 billion per year. Impacts can be direct or indirect. People or objects can be directly

Section Three [Severe Thunderstorms]

struck, or damage can occur indirectly when the current passes through or near it. Using a network of lightning detection systems, the United States monitors an average of 25 million strokes of lightning from the cloud-to-ground every year. Figure 3.5 displays the cloud-to-ground lightning strikes per year for the continental United States from 1997 to 2010 (with the planning area outlined in green). Hayes, Frontier, and Hitchcock Counties experienced between six to nine cloud-to-ground lightning strikes on average per year from 1997 to 2010.

FIGURE 3.5: CLOUD-TO-GROUND LIGHTNING INCIDENCES [CONTINENTAL UNITED STATES] 1997 – 2010



Source: VAISALA National Lightning Detection Network.

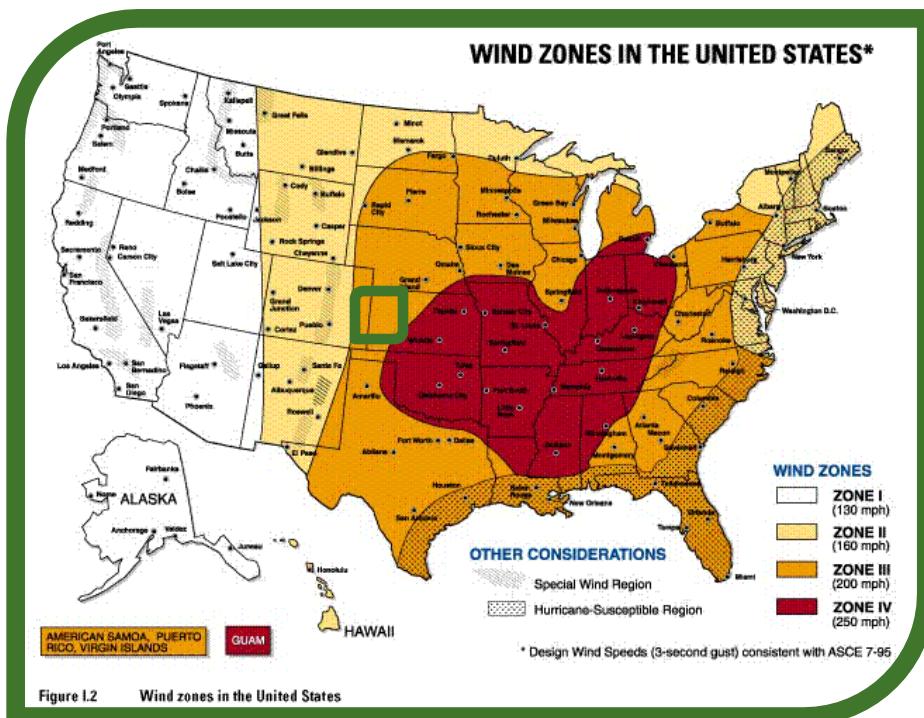
HAIL

Hail is often associated with severe thunderstorms. Hailstorms occur throughout the spring, summer, and into the fall, but are more frequent in late spring and early summer. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 mph. Hail causes nearly \$1 billion in damage to crops and property each year in the United States. Hail is also one of the requirements which the National Weather Service uses to classify thunderstorms as 'severe'. If hail more than ¾ of an inch is produced in a thunderstorm, it qualifies as severe.

HIGH WINDS

High winds, often accompanying severe thunderstorms, can cause significant property damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., not tornadic). These winds can overturn mobile homes, tear roofs off of houses, topple trees, snap power lines, shatter windows, and sandblast paint from cars. Other associated hazards include utility outages, arcing power lines, debris blocking streets, dust storms, and an occasional structure fire. Strong winds, when combined with saturated ground conditions, can down very mature trees. Figure 3.6 displays the wind zones in the United States (with the planning area outlined in green). Hayes, Frontier, and Hitchcock Counties are located in Wind Zone III.

FIGURE 3.6: WIND ZONES [UNITED STATES] FEMA



Source: Federal Emergency Management Agency.

PREVIOUS OCCURRENCES OF HAZARD EVENTS

Pervious occurrences of hazard events gives information on historical occurrences. Historical occurrence worksheets were used to capture information from participating jurisdictions on past occurrences.

Presidential disaster declarations are summarized in Section Three: Hazard Identification and Risk Assessment – Severe Weather Events Summary. Data from the NCDC is summarized in Table 3.14 below, with full event details in Section Six: Participant Profiles.

The NCDC reported 826 severe thunderstorm events for Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016. Of the reported events, 190 events recorded damages, with \$19,221,050 in total property damages and \$25,088,000 in total crop damages. However, 519 of these events took place across multiple counties and thus counted multiple times. This means that 307 separate severe thunderstorm events occurred in Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016.

TABLE 3.14: NCDC EVENTS SUMMARY [SEVERE THUNDERSTORMS] JANUARY 1, 1950 – JANUARY 31, 2016

	Hayes County	Frontier County	Hitchcock County	Totals
Events	229	332	265	826
Deaths	0	0	1	1
Injuries	0	0	0	0
Property Damage	\$3,059,500	\$10,900,300	\$5,261,250	\$19,221,050
Crop Damage	\$3,963,000	\$21,059,000	\$0	\$25,088,000

Source: United States Department of Commerce, National Oceanic Atmospheric Administration, National Environmental Satellite, Data, and Information Service, National Climatic Data Center.

Section Three [Severe Thunderstorms]

LOCATION AND EXTENT

Location and extent contain information on hazard location and extent, magnitude/ strength, speed of onset/ duration, seasonal patterns, and/or secondary effects (when known).

LOCATION [GEOGRAPHIC AREA AFFECTED]

- ✓ [Significant] 26 to 75 percent of planning area or frequent single-point occurrences.

MAXIMUM PROBABLE EXTENT [MAGNITUDE/ STRENGTH BASED ON HISTORIC EVENTS OR FUTURE PROBABILITY]

- ✓ [Moderate] Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days.

Severe thunderstorms are a common and unpredictable annual event throughout the Midwest, especially in Nebraska.

Thunderstorms differ from many other hazards in that they are generally large in magnitude, have a long duration, and travel across large areas and through multiple jurisdictions within a single region. Additionally, thunderstorms often occur in series, with one area having the potential to be hit multiple times in one day.

Severe thunderstorms occur on an irregular basis, and can equally affect the entire planning area. Severe thunderstorms can produce heavy rain, flooding, damaging hail, lightning, and high winds during and after the event. All building stock and infrastructure including critical facilities, vehicles, power lines, trees, and utilities are at risk of being damaged or affected by severe thunderstorms.

HAZARD IMPACT AND VULNERABILITY TO THE HAZARD

Impact and vulnerability assesses the planning areas' exposure to hazards; considering assets at risk, critical facilities, and future development trends. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage/ casualty potential.

- ✓ [Medium] Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

Severe thunderstorms can cause property damage or loss, downed power lines, loss of electricity, obstruction to traffic flow, significant damage to trees, and pose a threat to human life. The electrical infrastructure is highly vulnerable to damages from lightning strikes and downed tree branches, roadways are vulnerable to wash outs and surface damages from flash floods, and building stock and personal property are vulnerable to damages from large hail stones. Severe thunderstorms can also cause significant damage to crops and dams throughout the rural areas of the planning area.

ESTIMATE OF THE POTENTIAL LOSSES

Vulnerability and potential losses can be quantified in locations where there is a known, identified hazard area, such as a mapped floodplain. In those locations, the numbers and types of buildings at risk to the identified hazard can be counted and their values calculated. Other data can be collected in regards to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources. This information illustrates the impact and vulnerability of the area to the identified hazard. The vulnerability and potential losses from the other identified hazards, which do not have specific mapped areas or the data to support additional analysis, are discussed in more general, qualitative terms.

The event damage and frequency estimate formulas were determined based upon recorded historical occurrences since 1950. This does not include loss of displacement, functional downtime, economic loss, injury, or loss of life. It should be noted that the total crop damages were included in the event details to express the magnitude of the event, but were not calculated into the estimate (crop damages are not mitigated by FEMA).

If a severe thunderstorm occurred within the planning area, the table below assumes the event could potentially cause 0.2 percent damage to the total assessed value in an incorporated jurisdiction and throughout rural areas of the Counties.

Section Three [Severe Thunderstorms]

TABLE 3.15: EVENT DAMAGE AND FREQUENCY ESTIMATE [SEVERE THUNDERSTORMS] HISTORICAL ANALYSIS

Event Damage and Frequency Estimate Formulas		
Average Annual Damage	\$295,708	Total Damages Recorded [\$19,221,050] / Total Years on Record [65]
Average Damage per Event	\$62,609	Total Damages Recorded [\$19,221,050] / Total Events Recorded [307]
Annual Event Frequency	4.7/year	Total Events Recorded [307] / Total Years on Record [65]
Structural Valuation Damage Estimate	0.2%	Average Annual Damage [\$295,708] / Total Structural Valuation [\$125,631,048]

TABLE 3.16: ASSUMED DAMAGE [SEVERE THUNDERSTORMS] BY JURISDICTION

Jurisdiction	Total Assessed Value	Assumed Damage [0.2%]
Hayes County		
Hamlet	\$1,349,766	\$2,700
Hayes Center	\$6,248,351	\$12,497
Frontier County		
Curtis	\$25,276,297	\$50,553
Eustis	\$18,525,879	\$37,052
Hitchcock County		
Palisade	\$9,316,396	\$18,633
Stratton	\$9,892,655	\$19,785
Trenton	\$13,762,777	\$27,526

Source: Nebraska Department of Revenue Property Assessment Division.

PROBABILITY OF FUTURE HAZARD EVENTS

The frequency of historical occurrences was used to gauge the likelihood of future occurrences. Frequency was calculated based on existing data (when available). It was determined by dividing the number of events recorded by the number of years on record, and then multiplying by 100 to calculate a percent. This gives the percent chance of the event occurring in any given year.

- ✓ [Highly Likely] 91 to 100 percent probability of occurrence in the next year.

OVERALL SIGNIFICANCE

Overall significance was determined based on criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Impacts could be deemed to be devastating but have a low probability so that will affect how each hazard is classified. Overall significance is a combination of the severity and probability.

- ✓ [High] The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.



Section Three [Tornados]

A tornado is defined as a mobile, destructive vortex of violently rotating winds having the appearance of a funnel-shaped cloud and advancing beneath a large storm system.

SECTION THREE [TORNADOS]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION THREE [TORNADOS]

TORNADOS

This sub-section outlines the risk assessment for the hazard event tornados, including hazard profile, previous occurrences of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, and overall significance. Data on previous occurrences of hazard events from the National Climatic Data Center (NCDC) is summarized below, with full event details in Section Six: Participant Profiles. Geographic, demographic, assets inventory, capabilities assessment, and climate summaries are also provided in Section Six: Participant Profiles, with varying risks facing the planning area discussed in the appropriate sub-sections.

HAZARD PROFILE

The hazard profile provides a description of the hazard, associated issues, and details on the hazard specific to the planning area.

A tornado is defined by FEMA as — a violently rotating column of air, pendant from a cumulonimbus, with circulation reaching the ground. It nearly always starts as a funnel cloud and may be accompanied by a loud roaring noise. A tornado is typically associated with a supercell thunderstorm. In order for rotations to be classified as tornados, three characteristics must be met:

- ❑ There must be a microscale rotating area of wind, ranging in size from a few feet to a few miles wide;
- ❑ The rotating wind, or vortex, must be attached to a convective cloud base and must be in contact with the ground; and
- ❑ The spinning vortex of air must have caused enough damage to be classified by the Fujita Scale as a tornado.

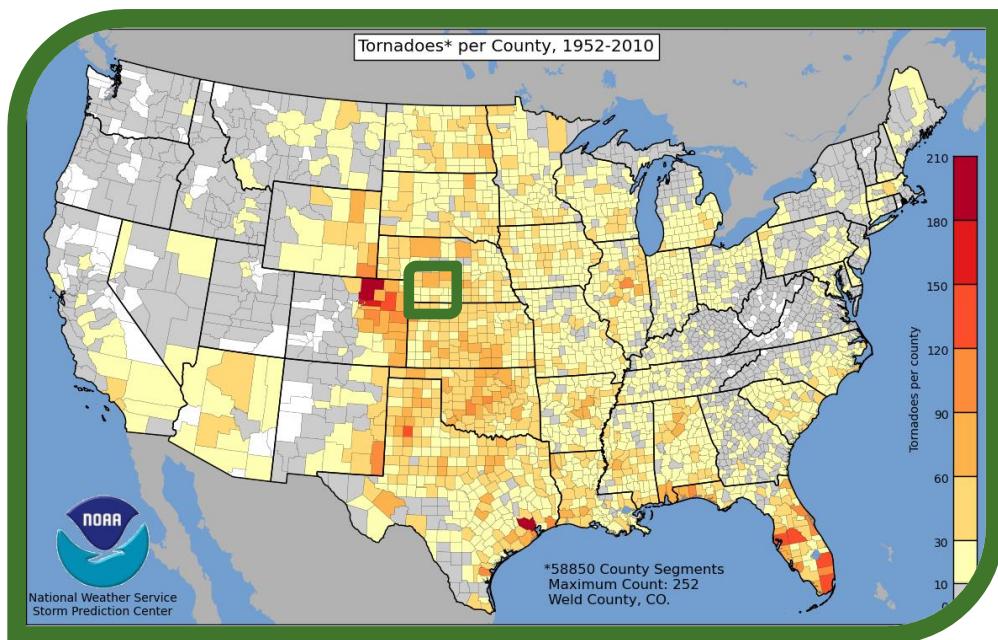
On a local scale, tornados are the most destructive of all atmospheric phenomena. Tornados are nature's most violent storm. Spawned from powerful thunderstorms, tornados can cause fatalities and devastate a neighborhood in seconds with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long.

Once tornados are formed, they can be extremely violent and destructive. They have been recorded all over the world, but are most prevalent in the American Midwest and South, in an area known as "Tornado Alley." Approximately 1,000 tornados are reported annually in the contiguous United States. Tornados can travel distances over 100 miles and reach over 11 miles above ground. Tornados usually stay on the ground no more than 20 minutes. Nationally, the tornado season typically occurs between March and April. On average, 80 percent of tornados occur between noon and midnight.

Some tornados are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornados develop so rapidly that little, if any, advance warning is possible. Before a tornado hits, the wind may die down and the air becomes very still. A cloud of debris can mark the location of a tornado even if a funnel is not evident. Tornados generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

According to FEMA, Nebraska is ranked 5th in the nation for the average number of tornados each year, but 23rd in number of tornado fatalities and 24th in injuries. Nebraska averages 39 tornados per year, with the record being 102 in 1999. All 93 counties in Nebraska have experienced tornados. The peak month for tornados in Nebraska is June, with 78 percent of all tornados having occurred between May and July. Historically in Nebraska, 71 percent of all tornados have occurred between 3:00 and 9:00 pm. Figure 3.7 shows the number of tornados per county for the continental United States from 1952 to 2010 (with the planning area outlined in green). Hayes, Frontier, and Hitchcock Counties are shaded in the 10 to 30 tornados category. The State of Nebraska experienced 51 tornados on average annually from 1981 to 2010.

FIGURE 3.7: TORNADOS PER COUNTY [CONTINENTAL UNITED STATES] 1952 – 2010



Source: National Oceanic and Atmospheric Administration Storm Prediction Center.

After a tornado has passed through an area, an official rating category is determined, which provides a common benchmark that allows comparisons to be made between different tornados. The magnitude of tornados is measured by intensity on the Fujita Scale. The Fujita Scale does not measure tornados by their size or width, but rather the amount of damage it causes on human-built structures and trees. The Fujita Scale was updated in 2007 with the Enhanced F-Scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis, and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. The enhanced scale classifies F0-F5 damage as determined by engineers and meteorologists across the 28 different types of damage indicators, including different types of building and tree damage. In order to establish a rating, engineers and meteorologists examine the damage, analyze the ground-swirl patterns, review damage imagery, collect media reports, and sometimes utilize photogrammetry and videogrammetry. Based on the most severe damage to any well-built frame house, or any comparable damage as determined by an engineer, an F-Scale number is assigned to the tornado. Table 3.17 shows the wind speeds and damage indicators associated with the Enhanced Fujita Scale ratings and Figure 3.8 illustrates the potential impacts and damage from a tornado.

TABLE 3.17: ENHANCED FUJITA SCALE [EF] DAMAGE INDICATORS

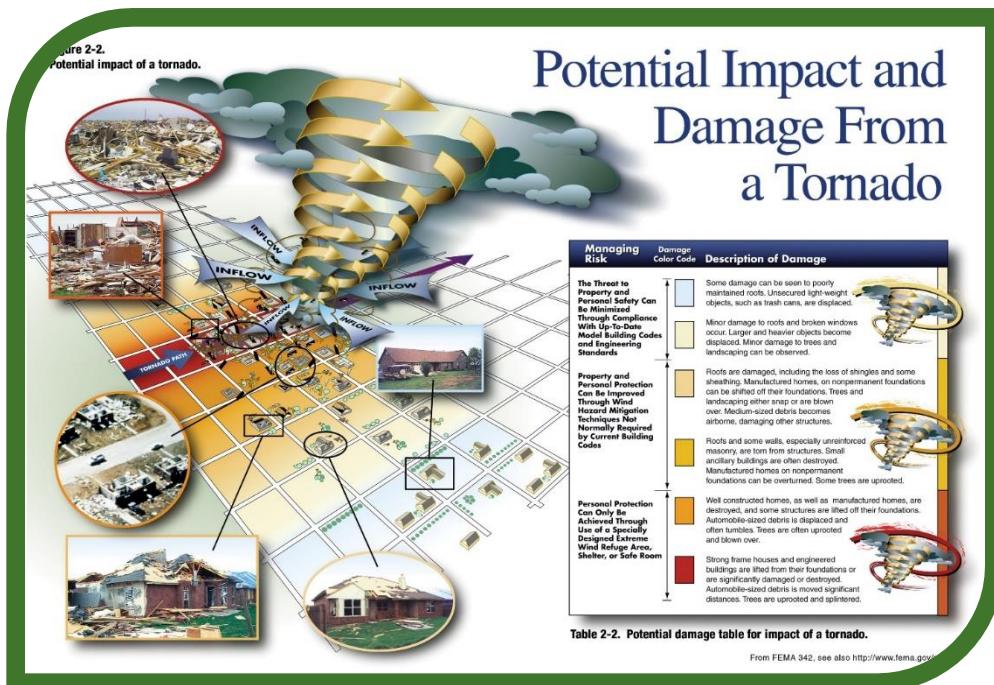
EF Rating	Wind Speeds	Expected Damage
EF-0	65 – 85 MPH	[Minor Damage] shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.
EF-1	86 – 110 MPH	[Moderate Damage] more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.
EF-2	111 – 135 MPH	[Considerable Damage] roofs torn off well-constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.
EF-3	136 – 165 MPH	[Severe Damage] entire stories of well-constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.
EF-4	166 – 200 MPH	[Extreme Damage] well-constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.

Section Three [Tornadoes]

EF Rating	Wind Speeds	Expected Damage
EF-5	> 200 MPH	[Massive/Incredible Damage] Well-constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.

Source: National Oceanic and Atmospheric Administration Storm Prediction Center.

FIGURE 3.8: POTENTIAL IMPACTS AND DAMAGE [TORNADO] FEMA



Source: Federal Emergency Management Agency.

PREVIOUS OCCURRENCES OF HAZARD EVENTS

Pervious occurrences of hazard events gives information on historical occurrences. Historical occurrence worksheets were used to capture information from participating jurisdictions on past occurrences.

Presidential disaster declarations are summarized in Section Three: Hazard Identification and Risk Assessment – Severe Weather Events Summary. Data from the NCDC is summarized in Table 3.18 below, with full event details in Section Six: Participant Profiles.

The Tornado History Project was launched in 2005. The Tornado History Project is a free, searchable database of all reported U.S. tornadoes from 1950 to 2015. There are over 60,000 tornadoes currently in the database, each with its own map and forum. The Project's main goal is to combine historical data with user submitted items (eyewitness memories, photos, videos, etc.) to recreate the history of as many tornadoes as possible. Figure 3.9 displays the Project's data for Hayes, Frontier, and Hitchcock Counties.

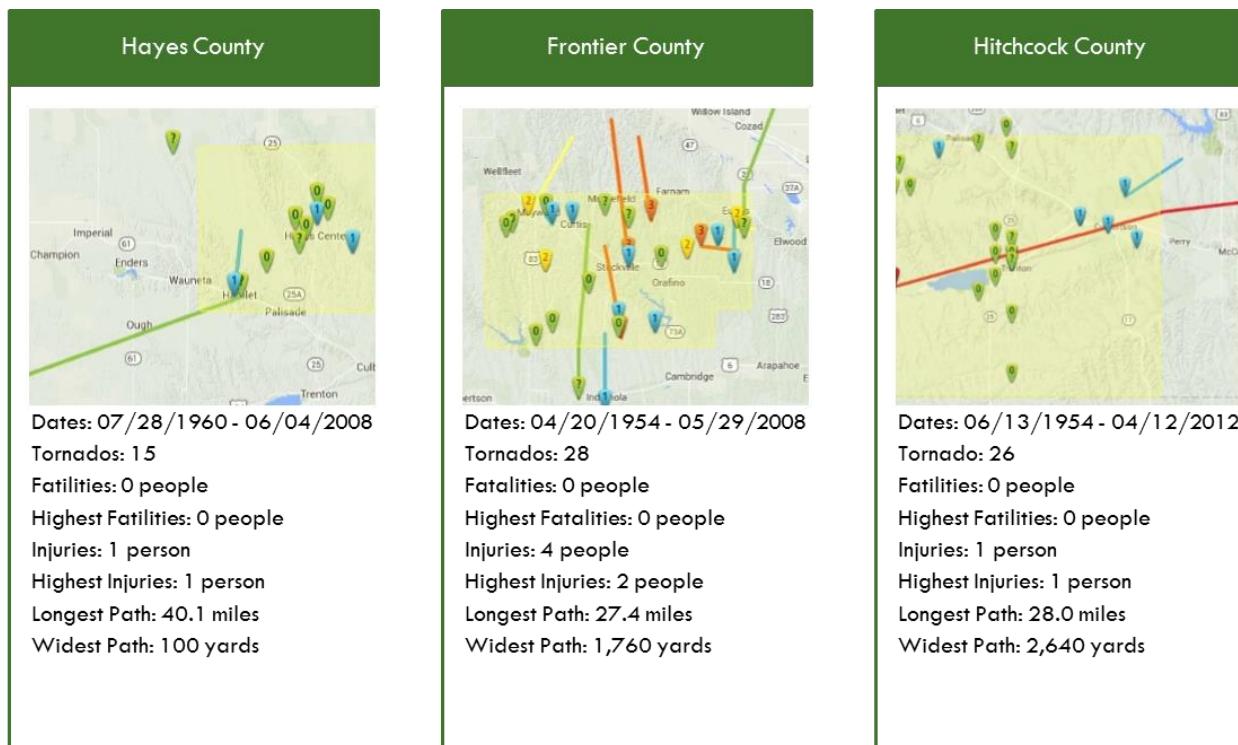
The NCDC reported 52 tornado events for Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016. Of the reported events, 31 events recorded damages, with \$4,142,250 in total property damages and zero dollars in total crop damages. However, 7 of these events took place across multiple counties and thus counted multiple times. This means that 45 separate tornado events occurred in Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016.

TABLE 3.18: NCDC EVENTS SUMMARY [TORNADOS] JANUARY 1, 1950 – JANUARY 31, 2016

	Hayes County	Frontier County	Hitchcock County	Totals
Events	11	23	18	52
Deaths	0	0	0	0
Injuries	0	2	1	3
Property Damage	\$210,250	\$1,252,000	\$2,680,000	\$4,142,250
Crop Damage	\$0	\$0	\$0	\$0

Source: United States Department of Commerce, National Oceanic Atmospheric Administration, National Environmental Satellite, Data, and Information Service, National Climatic Data Center.

FIGURE 3.9: TORNADO HISTORY [HAYES, FRONTIER, AND HITCHCOCK COUNTIES] 1950 – 2014



Data shown in these charts varies slightly from the NCDC data due to inconsistencies on classifying Tornado's severity. NCDC data was used for plan.

Source: <http://www.tornadohistoryproject.com/>.

LOCATION AND EXTENT

Location and extent contain information on hazard location and extent, magnitude/ strength, speed of onset/ duration, seasonal patterns, and/or secondary effects (when known).

LOCATION [GEOGRAPHIC AREA AFFECTED]

- ✓ [Negligible] Less than 10 percent of planning area or isolated single-point occurrences.

MAXIMUM PROBABLE EXTENT [MAGNITUDE/ STRENGTH BASED ON HISTORIC EVENTS OR FUTURE PROBABILITY]

- ✓ [Severe] Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months.

Section Three [Tornados]

Tornados are nature's most violent storms. Spawned from powerful thunderstorms, tornados can cause fatalities and devastate a neighborhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Every state is at some risk from this hazard. Some tornados are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornados develop so rapidly that little, if any, advance warning is possible. Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornados generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado (ready.gov).

HAZARD IMPACT AND VULNERABILITY TO THE HAZARD

Impact and vulnerability assesses the planning areas' exposure to hazards; considering assets at risk, critical facilities, and future development trends. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage/ casualty potential.

- ✓ [Medium] Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

Tornados occur on an irregular basis, and can equally affect the entire planning area. All building stock and above ground infrastructure, including critical facilities, are at risk of being damaged or affected by tornados. Tornados can cause structure loss, downed power lines, loss of electricity, obstruction to traffic flow, and significant damage to trees and center-pivot irrigation systems. A catastrophic event could lead to major economic loss for the jurisdictions. High wind speeds and flying debris can pose a significant threat to human life.

ESTIMATE OF THE POTENTIAL LOSSES

Vulnerability and potential losses can be quantified in locations where there is a known, identified hazard area, such as a mapped floodplain. In those locations, the numbers and types of buildings at risk to the identified hazard can be counted and their values calculated. Other data can be collected in regards to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources. This information illustrates the impact and vulnerability of the area to the identified hazard. The vulnerability and potential losses from the other identified hazards, which do not have specific mapped areas or the data to support additional analysis, are discussed in more general, qualitative terms.

The event damage and frequency estimate formulas were determined based upon recorded historical occurrences since 1950. This does not include loss of displacement, functional downtime, economic loss, injury, or loss of life. It should be noted that the total crop damages were included in the event details to express the magnitude of the event, but were not calculated into the estimate (crop damages are not mitigated by FEMA).

If an EF-3 tornado occurred within the planning area, the table below assumes the event could potentially cause 0.05 percent damage to the total assessed value in an incorporated jurisdiction and throughout rural areas of the Counties.

TABLE 3.19: EVENT DAMAGE AND FREQUENCY ESTIMATE [TORNADOS] HISTORICAL ANALYSIS

Event Damage and Frequency Estimate Formulas		
Average Annual Damage	\$64,723	Total Damages Recorded [\$4,142,250] / Total Years on Record [64]
Average Damage per Event	\$92,050	Total Damages Recorded [\$4,142,250] / Total Events Recorded [45]
Annual Event Frequency	0.7/year	Total Events Recorded [45] / Total Years on Record [64]
Structural Valuation Damage Estimate	0.05%	Average Annual Damage [\$64,723] / Total Structural Valuation [\$125,631,048]

TABLE 3.20: ASSUMED DAMAGE [TORNADOS] BY JURISDICTION

Jurisdiction	Total Assessed Value	Assumed Damage [0.05%]
Hayes County		
Hamlet	\$1,349,766	\$675
Hayes Center	\$6,248,351	\$3,124
Frontier County		
Curtis	\$25,276,297	\$12,638
Eustis	\$18,525,879	\$9,263
Hitchcock County		
Palisade	\$9,316,396	\$4,658
Stratton	\$9,892,655	\$4,946
Trenton	\$13,762,777	\$6,881

Source: Nebraska Department of Revenue Property Assessment Division.

PROBABILITY OF FUTURE HAZARD EVENTS

The frequency of historical occurrences was used to gauge the likelihood of future occurrences. Frequency was calculated based on existing data (when available). It was determined by dividing the number of events recorded by the number of years on record, and then multiplying by 100 to calculate a percent. This gives the percent chance of the event occurring in any given year.

- ✓ [Likely] 11 to 90 percent probability of occurrence in the next year.

OVERALL SIGNIFICANCE

Overall significance was determined based on criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Impacts could be deemed to be devastating but have a low probability so that will affect how each hazard is classified. Overall significance is a combination of the severity and probability.

- ✓ [Medium] The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.



Section Three [Floods]

A flood is defined as an overflowing of a large amount of water beyond its normal confines, especially over what is normally dry land.

SECTION THREE [FLOODS]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION THREE [FLOODS]

FLOODS

This sub-section outlines the risk assessment for the hazard event floods, including hazard profile, previous occurrences of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, and overall significance. Data on previous occurrences of hazard events from the National Climatic Data Center (NCDC) is summarized below, with full event details in Section Six: Participant Profiles. Geographic, demographic, assets inventory, capabilities assessment, and climate summaries are also provided in Section Six: Participant Profiles, with varying risks facing the planning area discussed in the appropriate sub-sections.

HAZARD PROFILE

The hazard profile provides a description of the hazard, associated issues, and details on the hazard specific to the planning area.

Flood events are the most damaging and costly hazard in the United States, and account for 90 percent of all presidential disaster declarations. Floods are one of the most common hazards in the United States, however not all floods are alike. Some floods develop slowly, while others such as flash floods, can develop in just a few minutes and without visible signs of rain. Additionally, floods can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states.

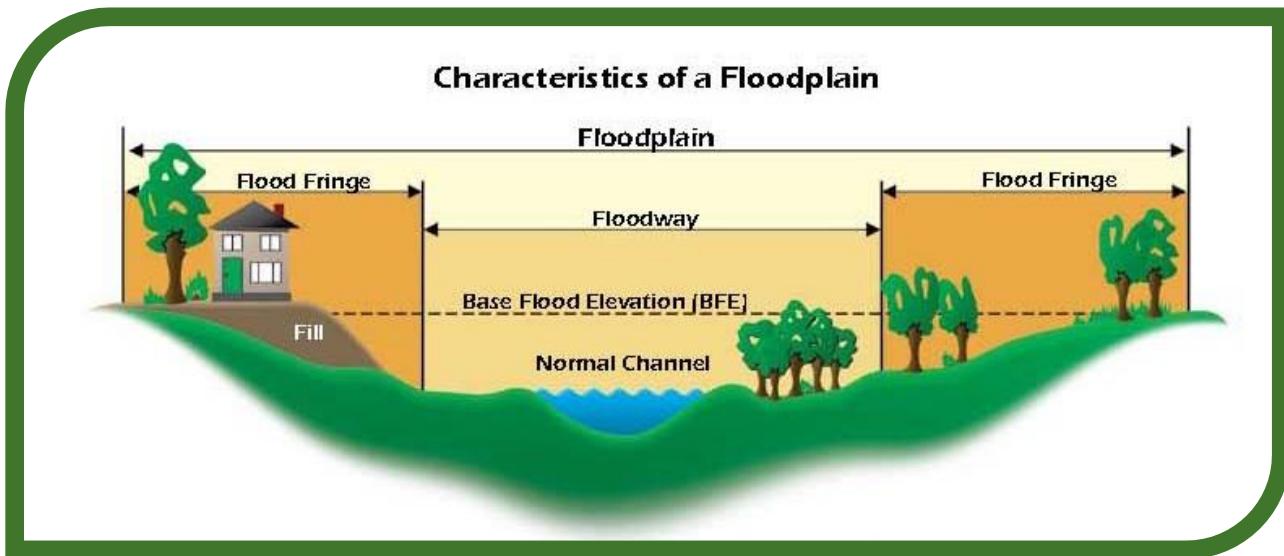
Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Flash floods often have a dangerous wall of roaring water carrying rocks, mud and other debris. Overland flooding, the most common type of flooding event typically occurs when waterways such as rivers or streams overflow their banks as a result of rainwater or a possible levee breach and cause flooding in surrounding areas. It can also occur when rainfall or snowmelt exceeds the capacity of underground pipes, or the capacity of streets and drains designed to carry flood water away from urban areas. The principal type of flood most common to Nebraska, due to geographic location and topography, is riverine flooding.

In Hayes, Frontier, and Hitchcock Counties, most flooding can be defined as riverine, drainage, or flash flooding.

- **[Riverine Flooding]** Riverine floods, slower in nature, occur when water from sustained rainfall or rapid snow melt overflows a waterway once the volume of water exceeds the capacity of the waterway.
- **[Flash or Rapid Flooding]** Flash floods, faster in nature, are usually the result of heavy, localized rainfall, associated with slow-moving intense thunderstorms, or sudden release from an upstream impoundment created by the collapse of an ice jam, or a man-made structure, such as a dam or levee. Flash floods are distinguished from a regular flood by a timescale of less than six hours. Flooding from excessive rainfall in Nebraska usually occurs between late spring and early fall. In the planning area, flash floods are most common when rainfall on built-up areas where impervious surfaces, gutters, and storm sewers speed up the flow of run-off. Flash floods most often occur in normally dry areas that have recently received precipitation when the ground becomes saturated with water that has fallen too quickly to be absorbed. Flash floods are extremely dangerous because of their sudden nature.
- **[Drainage Flooding]** Drainage flooding occurs primarily in urban or developed areas when the volume of runoff exceeds the capacity of the drainage system. Flooding of this nature can be the result of increased development, inadequate drainage structures, riverine flooding, or a combination of these causes.

The area adjacent to a river or channel is the floodplain, which most often refers to the area that is inundated by the 100-year flood, the flood that has a 1% chance in any given year of being equaled or exceeded. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which are areas covered by the flood, but do not experience a strong current. Floodplains are made when floodwaters exceed the capacity of the main channel or escape the channel by eroding its banks. When this occurs, sediments (including rocks and debris) are deposited and gradually build up over time to create the floor of the floodplain. Floodplains generally contain unconsolidated sediments, often extending below the bed of the stream. Figure 3.10 below diagrams the basic characteristics of a floodplain.

FIGURE 3.10: CHARACTERISTICS OF A FLOODPLAIN [FLOOD] FLOODSMART



Source: FloodSmart.gov

NATIONAL FLOOD INSURANCE PROGRAM

The National Flood Insurance Program (NFIP) goal is to reduce the impact of flooding on private and public structures by providing affordable insurance for property owners. The program encourages communities to adopt and enforce floodplain management regulations, which will mitigate the effects of flooding on new and improved structures.

Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary.

Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage is reduced by nearly \$1 billion a year through communities implementing sound floodplain management requirements and property owners purchasing of flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance.

In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the nation's floodplains. Mapping flood hazards creates broad-based awareness of the flood hazards and provides the data needed for floodplain management programs and to actuarially rate new construction for flood insurance.

Section Three [Floods]

There are specific requirements for facilities located within the Special Flood Hazard Area (SFHA). These requirements are not technically insurance issues but are related to the NFIP. These requirements apply to flood damaged buildings and the contents of buildings located in the 100-year floodplain.

If your community is not participating in the NFIP, FEMA will not provide Public Assistance funds for damages to your buildings, or the contents of such buildings, that are located within the 100-year floodplain. FEMA will also not provide funding for damages within the floodplain if you have been sanctioned by NFIP (i.e., if your community was suspended from the program by NFIP).

If your community is participating in the NFIP, FEMA will reduce all grants for buildings and the contents of buildings located within the 100-year floodplain. The amount of the reduction will be the maximum amount of insurance proceeds available for the work under a standard NFIP flood insurance policy or the actual insurance proceeds received, whichever is greater.

FLOOD MAPS [FLOOD INSURANCE RATE MAPS OR FIRMS]

According to the official National Flood Insurance Program website, FloodSmart.gov, many conditions can result in a flood, including dam failures, wildfires, heavy rains, ice jams, levee failures, mudflows, new development, snowmelt, spring thaw, and a winter rainy season. Flood risk isn't just based on history, it's also based on a number of factors, including rainfall, river-flow data, topography, flood-control measures, and changes due to building and development.

Flood Insurance Rate Maps (FIRM) are the official map of a community on which the FEMA has delineated both the Special Flood Hazard Areas (SFHA) and the risk premium zones applicable to the community. The 100-year flood, which is the minimum standard used by most federal and state agencies, is also used by the NFIP as the standard for floodplain management and to determine the need for flood insurance. The Flood Insurance Study (FIS) defines the probability of flooding as flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 100-year period (recurrence intervals) or the 100-year flood zone has a one percent probability of being equaled or exceeded during any given year.

<https://msc.fema.gov/portal/search> - Map based search

<https://msc.fema.gov/portal/advanceSearch> – Address based search

The firm maps for the full participants that have a mapped floodplain are included for reference in *Section Six: Participants Profiles*. Also refer to Table 3.22 for the specific FIRM maps that can be accessed on FEMA's website for all participants that have a mapped floodplain.

Participation in the NFIP requires adoption of a local floodplain management ordinance and its enforcement within a mapped SFHA. A jurisdiction's eligibility to participate is based on their adoption and enforcement of state and community floodplain management regulations intended to prevent unsafe development in the floodplain and reducing future flood damages. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the federal government will make flood insurance available within the community as a financial protection against flood losses.

Since floods have an annual probability of occurrence, have a known magnitude, depth, and velocity for each event, and in most cases, have a map indicating where they will occur, they are in many ways often the most predictable and manageable hazard. Private citizens and insurance agents use FIRMs to determine whether or not specific properties are located within flood hazard areas. Community officials use FIRMs to administer floodplain management regulations and to mitigate flood damage. Lending institutions and federal agencies use FIRMs to locate properties and buildings in relation to mapped flood hazards, and to determine whether flood insurance is required when making loans or providing grants following a disaster for the purchase or construction of a building.

Flooding can happen anywhere, but certain areas are especially prone to serious flooding. To help communities understand their risk, flood maps (Flood Insurance Rate Maps or FIRMs) have been created to show the locations of high-risk, moderate-to-low risk, and undetermined-risk areas.

- High-Risk Areas [Special Flood Hazard Area or SFHA]** In high-risk areas, there is at least a 1 in 4 chance of flooding during a 30-year mortgage. All home and business owners in these areas with mortgages from federally regulated or insured lenders are required to buy flood insurance. They are shown on the flood maps as zones labeled with the letters A or V.
- Moderate-to-Low Risk Areas [Non-Special Flood Hazard Area or NSFA]** In moderate-to-low risk areas, the risk of being flooded is reduced but not completely removed. These areas submit over 20% of NFIP claims and receive one-third of disaster assistance for flooding. Flood insurance isn't federally required in moderate-to-low areas, but it is recommended for all property owners and renters. They are shown on flood maps as zones labeled with the letters B, C or X (or a shaded X).
- Undetermined-Risk Areas** No flood-hazard analysis has been conducted in these areas, but a flood risk still exists. Flood insurance rates reflect the uncertainty of the flood risk. These areas are labeled with the letter D on the flood maps.

PREVIOUS OCCURRENCES OF HAZARD EVENTS

Pervious occurrences of hazard events gives information on historical occurrences. Historical occurrence worksheets were used to capture information from participating jurisdictions on past occurrences.

Presidential disaster declarations are summarized in Section Three: *Hazard Identification and Risk Assessment – Severe Weather Events Summary*. Data from the NCDC is summarized in Table 3.21 below, with full event details in *Section Six: Participant Profiles*.

The NCDC reported 47 flood events for Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016. Of the reported events, 30 events recorded damages, with \$4,423,000 in total property damages and \$157,000 in total crop damages. However, 11 of these events took place across multiple counties and thus counted multiple times. This means that 36 separate flood events occurred in Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016.

TABLE 3.21: NCDC EVENTS SUMMARY [FLOODS] JANUARY 1, 1950 – JANUARY 31, 2016

	Hayes County	Frontier County	Hitchcock County	Totals
Events	19	18	10	47
Deaths	0	0	0	0
Injuries	0	0	0	0
Property Damage	\$2,978,000	\$755,000	\$690,000	\$4,423,000
Crop Damage	\$86,000	\$71,000	\$0	\$157,000

Source: United States Department of Commerce, National Oceanic Atmospheric Administration, National Environmental Satellite, Data, and Information Service, National Climatic Data Center.

LOCATION AND EXTENT

Location and extent contain information on hazard location and extent, magnitude/ strength, speed of onset/ duration, seasonal patterns, and/or secondary effects (when known).

LOCATION [GEOGRAPHIC AREA AFFECTED]

- ✓ [Significant] 26 to 75 percent of planning area or frequent single-point occurrences.

Section Three [Floods]

MAXIMUM PROBABLE EXTENT [MAGNITUDE/ STRENGTH BASED ON HISTORIC EVENTS OR FUTURE PROBABILITY]

- ✓ [Moderate] Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days.

At the time of the plan, all participating counties, cities, and villages had delineated 100-year floodplains, according to the FEMA Map Service Center website (www.msfc.fema.gov). The jurisdictions with a delineated 100-year floodplain, generally due to the presence and close proximity of a significant floodway, are more vulnerable to riverine and flash flooding. The potential for localized low-land flooding, especially flash floods with heavy rains, for properties in or near low-lying areas as well as areas where drainage is inadequate, is still present for jurisdictions or rural areas of the counties without a delineated 100-year floodplain.

Table 3.22 below summarizes Hayes, Frontier, and Hitchcock Counties participation in the National Flood Insurance Program, including Flood Insurance Rate Map panels and effective dates. All current and effective FIRM panels can be found in the respective sections in Section Six: Participant Profiles. Table 3.23 details the flood zones and corresponding descriptions as referenced on the Flood Insurance Rate Maps.

TABLE 3.22: NFIP STATUS AND FIRM PANELS [FEMA] MAPS AND DATES

Jurisdiction	NFIP Participation	Eligible Regular Program	FIRM Panel	Map Effective Date
Hayes County	Yes	05/05/2008	--	02/06/2008
Hamlet	Yes	03/30/2009	31085C0290A	02/06/2008
Hayes Center	Yes	04/10/2009	31085C0195A	02/06/2008
Frontier County	Yes	04/02/2008	--	04/02/2008
Curtis	Yes	04/02/2008	31063C0075C/31063C0100C	04/02/2008
Eustis	Yes	03/01/1990	31063C0175C	04/02/2008
Maywood	Yes	04/02/2008	31063C0050C/31063C0075C	04/02/2008
Moorefield	No	NA	31063C0100C	NA
Stockville	Yes	04/02/2008	31063C03005C	04/02/2008
Hitchcock County	Yes	04/04/2008	--	03/18/2008
Culbertson	Yes	09/01/1986	31087C0230C	03/18/2008
Palisade	Yes	06/03/1986	31087C0055C	03/18/2008
Stratton	Yes	09/24/1984	31087C0165C	03/18/2008
Trenton	Yes	09/01/1986	31087C0195C	03/18/2008

Source: Federal Emergency Management Agency (FEMA).

TABLE 3.23: SIGNIFICANT FLOOD HAZARD AREAS [FEMA] ZONE AND DESCRIPTION

Zone	Description
Zone A	Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
Zone AE and A1-30	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Zone AH	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between one and three feet. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.
Zone AO	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply. Some Zone AO have been designated in areas with high flood velocities such as alluvial fans and washes. Communities are encouraged to adopt more restrictive requirements for these areas.
Zone AR	Areas that result from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide base flood protection. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Zone	Description
Zone A99	Areas subject to inundation by the 1-percent-annual-chance flood event, but which will ultimately be protected upon completion of an under-construction Federal flood protection system. These are areas of special flood hazard where enough progress has been made on the construction of a protection system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes. Zone A99 may only be used when the flood protection system has reached specified statutory progress toward completion. No Base Flood Elevations (BFEs) or depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
Zone V	Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
Zone VE and V1-30	Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Source: Federal Emergency Management Agency (FEMA).

REPETITIVE LOSS STRUCTURES

A repetitive loss structure is an NFIP-insured structure that has had at least two paid flood losses of more than \$1,000 each in any 10-year period since 1978.

The Nebraska Department of Natural Resources (NDNR) was contacted to determine if any existing buildings, infrastructure, or critical facilities are classified as NFIP Repetitive Loss Structures. According to the NDNR, the planning area has no NFIP Repetitive Loss Structures.

HAZARD IMPACT AND VULNERABILITY TO THE HAZARD

Impact and vulnerability assesses the planning areas' exposure to hazards; considering assets at risk, critical facilities, and future development trends. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage/ casualty potential.

- ✓ [Medium] Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

Flooding can also cause extensive property damage, contributing to significant structural damage and in some cases structural failure from velocity associated with moving water and from saturation from flood waters. In nearly all cases of structural

Section Three [Floods]

flooding unless personal property is relocated above the anticipated flood stage, it is also at risk. Localized, stormwater flooding also occurs throughout the planning area. Urban storm drainpipes and pump stations have a finite capacity. When rainfall exceeds this capacity, or the system is clogged, water accumulates in the street until it reaches a level of overland release. This type of flooding may occur when intense storms occur over the planning area.

In addition to flooding, damage to these areas during heavy storms includes pavement deterioration, washouts, mudslides, debris areas, and downed trees. The frequency and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff.

Various health hazards are also common following flood events. One comes from the actual floodwaters. Floodwaters can carry anything on the ground upstream through runoff, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where livestock are kept can contribute to polluted waters downstream. Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. If wastewater treatment plants are flooded, there is nowhere for sewage to go. Infiltration and lack of treatment ability can cause overloaded sewer lines to back up into low-lying areas and homes. Untreated sewage can contain bacteria such as e. coli and other diseases. Post flooding, stagnant pools of standing water can become breeding grounds for mosquitoes, and wet areas in homes and buildings, that have not been properly cleaned, can lead to mold and mildew. A structure that is not properly and thoroughly cleaned can become a health hazard, especially for small children and the elderly.

ESTIMATE OF THE POTENTIAL LOSSES

Vulnerability and potential losses can be quantified in locations where there is a known, identified hazard area, such as a mapped floodplain. In those locations, the numbers and types of buildings at risk to the identified hazard can be counted and their values calculated. Other data can be collected in regards to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources. This information illustrates the impact and vulnerability of the area to the identified hazard. The vulnerability and potential losses from the other identified hazards, which do not have specific mapped areas or the data to support additional analysis, are discussed in more general, qualitative terms.

The event damage and frequency estimate formulas were determined based upon recorded historical occurrences since 1950. This does not include loss of displacement, functional downtime, economic loss, injury, or loss of life. It should be noted that the total crop damages were included in the event details to express the magnitude of the event, but were not calculated into the estimate (crop damages are not mitigated by FEMA).

Potential losses associated with a flood event vary greatly depending on the severity of the event. Properties in or near low lying areas as well as areas where drainage is inadequate could experience localized flooding. Potential losses could include water damage, disruption in transportation, or health issues due to insects and stagnant water.

If a flood or flash flood occurred within the planning area, the table below assumes the event could potentially cause 0.05 percent damage to the total assessed value in an incorporated jurisdiction and throughout rural areas of the Counties.

TABLE 3.24: EVENT DAMAGE AND FREQUENCY ESTIMATE [FLOODS] HISTORICAL ANALYSIS

Event Damage and Frequency Estimate Formulas		
Average Annual Damage	\$68,046	Total Damages Recorded [\$4,423,000] / Total Years on Record [65]
Average Damage per Event	\$122,861	Total Damages Recorded [\$4,423,000] / Total Events Recorded [36]
Annual Event Frequency	0.55/year	Total Events Recorded [36] / Total Years on Record [65]
Structural Valuation Damage Estimate	0.05%	Average Annual Damage [\$68,046] / Total Structural Valuation [\$125,631,048]

Total events used for event frequency calculation is $47 - 11 = 36$ events due to 11 events being counted multiple times based on the collected data.

TABLE 3.25: ASSUMED DAMAGE [FLOODS] BY JURISDICTION

Jurisdiction	Total Assessed Value	Assumed Damage [0.05%]
Hayes County		
Hamlet	\$1,349,766	\$3,124.18
Hayes Center	\$6,248,351	\$12,638.15
Frontier County		
Curtis	\$25,276,297	\$9,262.94
Eustis	\$18,525,879	\$4,658.20
Hitchcock County		
Palisade	\$9,316,396	\$4,946.33
Stratton	\$9,892,655	\$6,881.39
Trenton	\$13,762,777	\$4,946.33

Source: Nebraska Department of Revenue Property Assessment Division.

PROBABILITY OF FUTURE HAZARD EVENTS

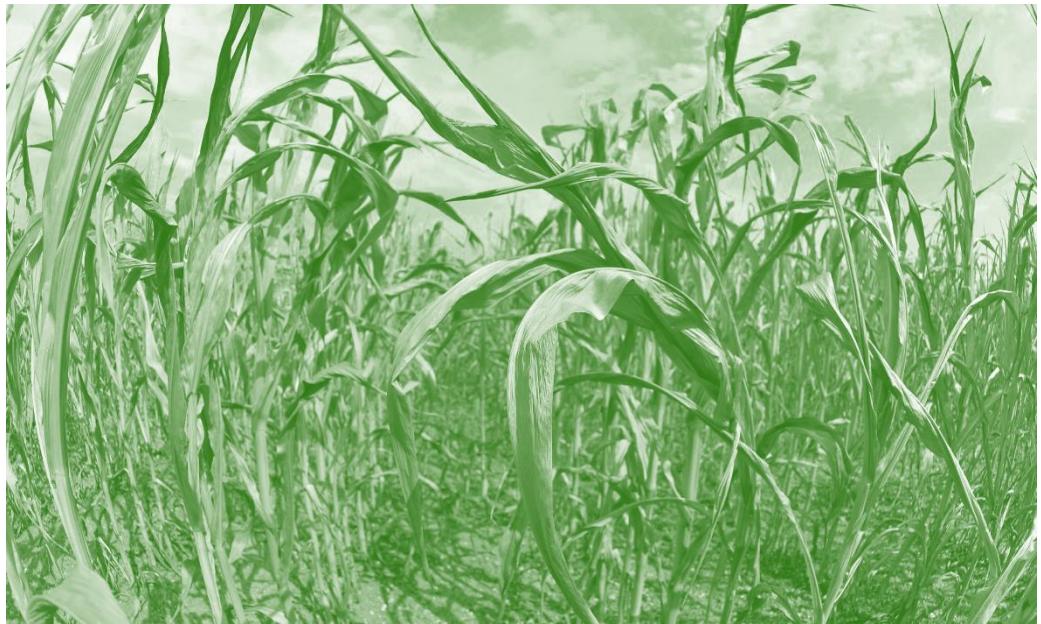
The frequency of historical occurrences was used to gauge the likelihood of future occurrences. Frequency was calculated based on existing data (when available). It was determined by dividing the number of events recorded by the number of years on record, and then multiplying by 100 to calculate a percent. This gives the percent chance of the event occurring in any given year.

- ✓ [Likely] 11 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years.

OVERALL SIGNIFICANCE

Overall significance was determined based on criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Impacts could be deemed to be devastating but have a low probability so that will affect how each hazard is classified. Overall significance is a combination of the severity and probability.

- ✓ [High] The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.



Section Three [Extreme Heat]

Extreme heat is defined as temperatures that hover ten degrees or more above the average high temperature for the region and last for several weeks. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a “dome” of high atmospheric pressure traps hazy, damp air near the ground.

SECTION THREE [EXTREME HEAT]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION THREE [EXTREME HEAT]

EXTREME HEAT

This sub-section outlines the risk assessment for the hazard event extreme heat, including hazard profile, previous occurrences of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, and overall significance. Data on previous occurrences of hazard events from the National Climatic Data Center (NCDC) is summarized below, with full event details in Section Six: Participant Profiles. Geographic, demographic, assets inventory, capabilities assessment, and climate summaries are also provided in Section Six: Participant Profiles, with varying risks facing the planning area discussed in the appropriate sub-sections.

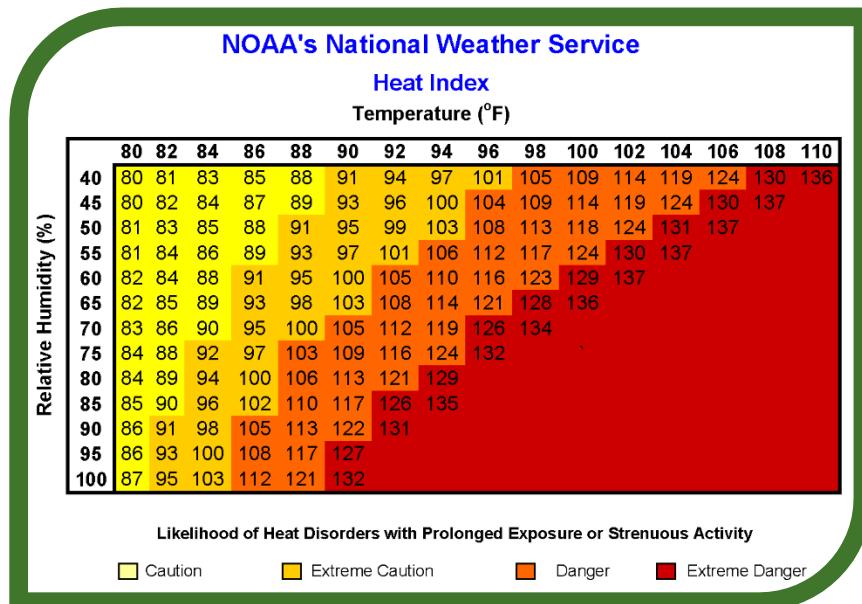
HAZARD PROFILE

The hazard profile provides a description of the hazard, associated issues, and details on the hazard specific to the planning area.

A heat wave is an extended period of extreme heat, and is often accompanied by high humidity. These conditions can be dangerous and even life-threatening for humans who don't take the proper precautions. Extreme heat is described as "Temperatures that hover ten degrees or more above the average high temperature for the region and last for several weeks."

In Nebraska, it is not unusual for temperatures to reach and exceed 90° Fahrenheit during July, August, and into September. On occasion, the temperature may approach or exceed 100° Fahrenheit. The Midwest Nebraska climate introduces humidity into the air and combined with the temperature, can result in dangerous conditions for strenuous outdoor activity. In weather terms, the combination of heat and humidity is referred to as heat index. Figure 3.11 below displays the National Weather Service's heat index of temperature and relative humidity with the likelihood of heat disorders with prolonged exposure or strenuous activity.

FIGURE 3.11 HEAT INDEX [NOAA] TEMPERATURE AND RELATIVE HUMIDITY



Source: National Oceanic and Atmospheric Administration Storm Prediction Center.

The NOAA National Weather Service has developed a guide for prediction of heat index or the “as felt” temperature that reveals the following:

- A temperature of 90° Fahrenheit with 50% humidity results in heat index or “as felt” temperature of 95° F triggering High Caution for heat related disorders with prolonged outdoor activity.
- A temperature of 90° Fahrenheit with 70% relative humidity results in heat index of 105° F, in the Danger level for heat disorders with prolonged exposure or strenuous activity.
- A temperature of 90° Fahrenheit and relative humidity of 95% results in heat index of 127° F, a temperature considered Extremely Dangerous for likelihood of heat disorders with prolonged exposure or strenuous activity.

PREVIOUS OCCURRENCES OF HAZARD EVENTS

Pervious occurrences of hazard events gives information on historical occurrences. Historical occurrence worksheets were used to capture information from participating jurisdictions on past occurrences.

Presidential disaster declarations are summarized in *Section Three: Hazard Identification and Risk Assessment – Severe Weather Events Summary*. Data from the NCDC is summarized in Table 3.26 below, with full event details in *Section Six: Participant Profiles*.

The NCDC reported two extreme heat events for Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016. None of the reported events recorded any deaths, injuries, property damage, or crop damage. Data from the NCDC is available in *Section Six: Participant Profiles*. However, these 2 events took place across multiple counties and thus counted multiple times. This means that 1 separate extreme heat events occurred in Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016.

TABLE 3.26: NCDC EVENTS SUMMARY [EXTREME HEAT] JANUARY 1, 1950 – JANUARY 31, 2016

	Hayes County	Frontier County	Hitchcock County	Totals
Events	1	1	0	2
Deaths	0	0	0	0
Injuries	0	0	0	0
Property Damage	\$0	\$0	\$0	\$0
Crop Damage	\$0	\$0	\$0	\$0

Source: United States Department of Commerce, National Oceanic Atmospheric Administration, National Environmental Satellite, Data, and Information Service, National Climatic Data Center.

LOCATION AND EXTENT

Location and extent contain information on hazard location and extent, magnitude/ strength, speed of onset/ duration, seasonal patterns, and/or secondary effects (when known).

LOCATION [GEOGRAPHIC AREA AFFECTED]

- ✓ [Extensive] 76 to 100 percent of planning area or consistent single-point occurrences.

MAXIMUM PROBABLE EXTENT [MAGNITUDE/ STRENGTH BASED ON HISTORIC EVENTS OR FUTURE PROBABILITY]

- ✓ [Severe] Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months.

Section Three [Extreme Heat]

Extreme heat is often associated with periods of drought and can be characterized by long periods of high temperatures in combination with high humidity. During these conditions, the human body has difficulties cooling through the normal method of the evaporation of perspiration. Health risks rise when a person is over exposed to heat. Extreme heat can also cause people to over use air conditioners, which can lead to power failures.

Periods of high temperatures can make people vulnerable to heatstroke, heat cramps, heat exhaustion, and pose a threat to human life. Most at risk are young children, elderly, and those working and living in non-air conditioned environments. Building stock, such as critical facilities, are not at risk, however periods of extreme heat place a significant demand on utilities, such as water and electricity, which can cause a failure in the system. Power loss could occur with the high demand on energy, making an extreme heat event even more dangerous.

The agricultural economy, especially livestock, is highly vulnerable and at great risk during periods of extreme heat. Heat stress in feedlot cattle can cause reduced performance, and in the most severe cases, death of the animals, resulting in millions of dollars in losses to the cattle industry.

HAZARD IMPACT AND VULNERABILITY TO THE HAZARD

Impact and vulnerability assesses the planning areas' exposure to hazards; considering assets at risk, critical facilities, and future development trends. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage/ casualty potential.

- ✓ [High] Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.

Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the "urban heat island effect."

Most heat disorders occur because a person has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children and those who are sick or overweight are more likely to succumb to extreme heat, especially during heat waves in areas where moderate climate usually prevails.

ESTIMATE OF THE POTENTIAL LOSSES

Vulnerability and potential losses can be quantified in locations where there is a known, identified hazard area, such as a mapped floodplain. In those locations, the numbers and types of buildings at risk to the identified hazard can be counted and their values calculated. Other data can be collected in regards to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources. This information illustrates the impact and vulnerability of the area to the identified hazard. The vulnerability and potential losses from the other identified hazards, which do not have specific mapped areas or the data to support additional analysis, are discussed in more general, qualitative terms.

The direct and indirect effects of extreme heat are difficult to quantify. There is no way to place a value on the loss of human life. Potential losses such as power outages could affect businesses, homes, and critical facilities. High demand and intense use of air conditioning can overload the electrical systems and cause damages to infrastructure.

According to the FEMA publication "What is a Benefit: Guidance on Benefit-Cost Analysis of Hazard Mitigation Project (June 2009)", if an extreme heat event occurred within the planning area, the table below assumes the event could potentially cause a loss of electricity for ten percent of the population at a cost of \$126 per person per day. In rural areas, the percent of the population affected and duration may increase during extreme events. The assumed damages do not take into account physical damages to utility equipment and infrastructure.

TABLE 3.27: LOSS OF ELECTRICITY [FEMA] ASSUMED DAMAGES BY JURISDICTION

Jurisdiction	Population (2010)	Population Affected (Assumed)	Electric Loss of Use (Assumed Damages)
Hayes County	967	97	\$12,184
Hamlet	57	6	\$718
Hayes Center	214	21	\$2,696
Frontier County	2,756	276	\$34,726
Curtis	939	94	\$11,831
Eustis	401	40	\$5,053
Hitchcock County	2,908	291	\$36,641
Palisade	351	35	\$4,423
Stratton	343	34	\$4,322
Trenton	560	56	\$7,056

Source: Federal Emergency Management Agency.

PROBABILITY OF FUTURE HAZARD EVENTS

The frequency of historical occurrences was used to gauge the likelihood of future occurrences. Frequency was calculated based on existing data (when available). It was determined by dividing the number of events recorded by the number of years on record, and then multiplying by 100 to calculate a percent. This gives the percent chance of the event occurring in any given year.

- ✓ [Occasional] 1 to 10 percent probability of occurrence in the next year.

OVERALL SIGNIFICANCE

Overall significance was determined based on criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Impacts could be deemed to be devastating but have a low probability so that will affect how each hazard is classified. Overall significance is a combination of the severity and probability.

- ✓ [Medium] The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.



Section Three [Drought]

A drought is defined as a period of below-average precipitation in a given region, resulting in prolonged shortages in its water supply, whether atmospheric, surface, or groundwater. A drought can last for months or years, or may be declared after as few as fifteen days.

SECTION THREE [DROUGHT]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION THREE [DROUGHT]

DROUGHT

This sub-section outlines the risk assessment for the hazard event drought, including hazard profile, previous occurrences of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, and overall significance. Data on previous occurrences of hazard events from the National Climatic Data Center (NCDC) is summarized below, with full event details in Section Six: Participant Profiles. Geographic, demographic, assets inventory, capabilities assessment, and climate summaries are also provided in Section Six: Participant Profiles, with varying risks facing the planning area discussed in the appropriate sub-sections.

HAZARD PROFILE

The hazard profile provides a description of the hazard, associated issues, and details on the hazard specific to the planning area.

According to the National Drought Mitigation Center at the University of Nebraska-Lincoln, “Drought is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another.” A drought is an extremely dry period in a region where the water availability drops below the region’s requirements, often coexisting with periods of extreme heat.

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

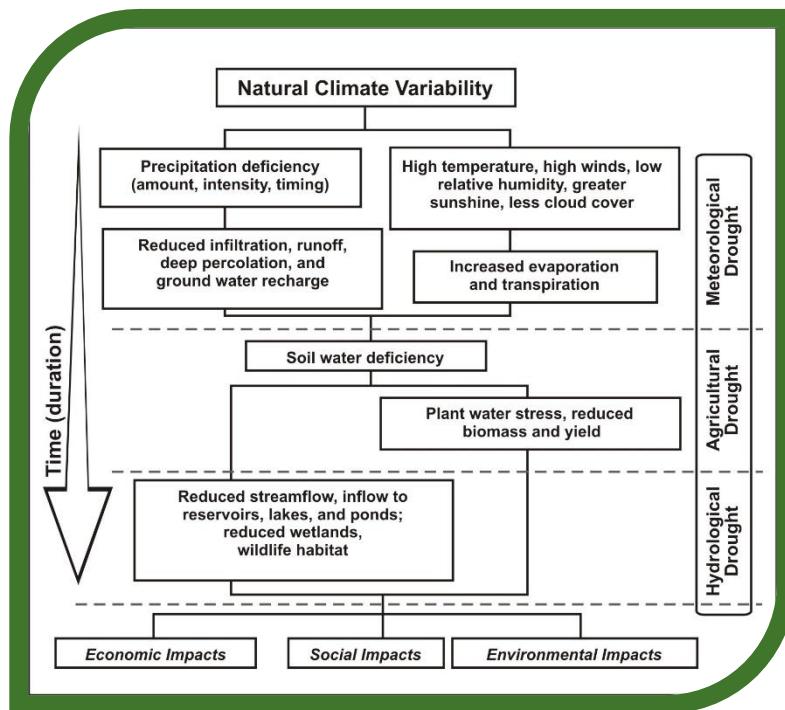
Drought is a natural part of most climatic areas, but the severity of drought differs based on duration, geographic extent, and intensity. In Nebraska, droughts can affect municipal and industrial water supply, surface water quality, recreation, power generation, agriculture, and natural resources. Droughts can increase the threat or likelihood of other disasters. Droughts can be accompanied by unusually hot weather, leading to heat-related illnesses and other hazards associated with extreme heat. Also droughts can make the risk of wildfire greater, both by drying vegetation making it more susceptible to fire, and by depleting water supplies needed to fight the fire.

Drought is a complex issue involving many factors—it occurs when a normal amount of moisture is not available to satisfy an area’s usual water-consuming activities. Drought can often be defined regionally based on its effects metrological, agricultural, hydrologic, and socioeconomic, as outlined below. Figure 3.12 displays the causes (metrological, agricultural, hydrologic) and impacts (economic, social, environmental) of drought by increased time or duration.

- ❑ [Metrological Drought] occurs when there is a prolonged period with below average precipitation.
- ❑ [Agricultural Drought] occurs when there is not enough moisture to produce average crop or range production. This situation can arise even when the area of interest receives average precipitation. This is due to soil conditions and agricultural techniques.
- ❑ [Hydrologic Drought] occurs when water available in aquifers, lakes, and reservoirs falls below the statistical average (deficiencies in surface and subsurface water supplies). This situation can arise even where the area of interest receives average precipitation. This is due to the reserves diminishing from increased water usage usually from agricultural use. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.

- ❑ [Socioeconomic Drought] occurs when the demand for water is greater than the supply. This can be caused by an increase in demand and/or reduction in supply. Socioeconomic drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

FIGURE 3.12: CAUSES AND IMPACTS OF DROUGHT [NDMC] BY INCREASED DURATION



Source: National Drought Mitigation Center.

Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the National Drought Mitigation Center (NDMC), and the United States Department of Agriculture's (USDA) Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in Nebraska are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Voluntary conservation measures are typically implemented during extended droughts. Water quality deterioration is also a potential problem. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

PREVIOUS OCCURRENCES OF HAZARD EVENTS

Pervious occurrences of hazard events gives information on historical occurrences. Historical occurrence worksheets were used to capture information from participating jurisdictions on past occurrences.

Presidential disaster declarations are summarized in *Section Three: Hazard Identification and Risk Assessment – Severe Weather Events Summary*. Data from the NCDC is summarized in Table 3.28 below, with full event details in *Section Six: Participant Profiles*.

The NCDC reported 82 drought events for Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016. Of the reported events, four events recorded damages, with \$2,000,000 in total property damages and \$1,800,000

Section Three [Drought]

in total crop damages. However, 50 of these events took place across multiple counties and thus counted multiple times. This means that 32 separate drought events occurred in Hayes, Frontier, and Hitchcock Counties from January 1, 1950 to January 31, 2016.

TABLE 3.28: NCDC EVENTS SUMMARY [DROUGHT] JANUARY 1, 1950 – JANUARY 31, 2016

	Hayes County	Frontier County	Hitchcock County	Totals
Events	26	25	31	82
Deaths	0	0	0	0
Injuries	0	0	0	0
Property Damage	\$1,000,000	\$1,000,000	\$0	\$2,000,000
Crop Damage	\$1,500,000	\$1,300,000	\$0	\$1,800,000

Source: United States Department of Commerce, National Oceanic Atmospheric Administration, National Environmental Satellite, Data, and Information Service, National Climatic Data Center.

LOCATION AND EXTENT

Location and extent contain information on hazard location and extent, magnitude/ strength, speed of onset/ duration, seasonal patterns, and/or secondary effects (when known).

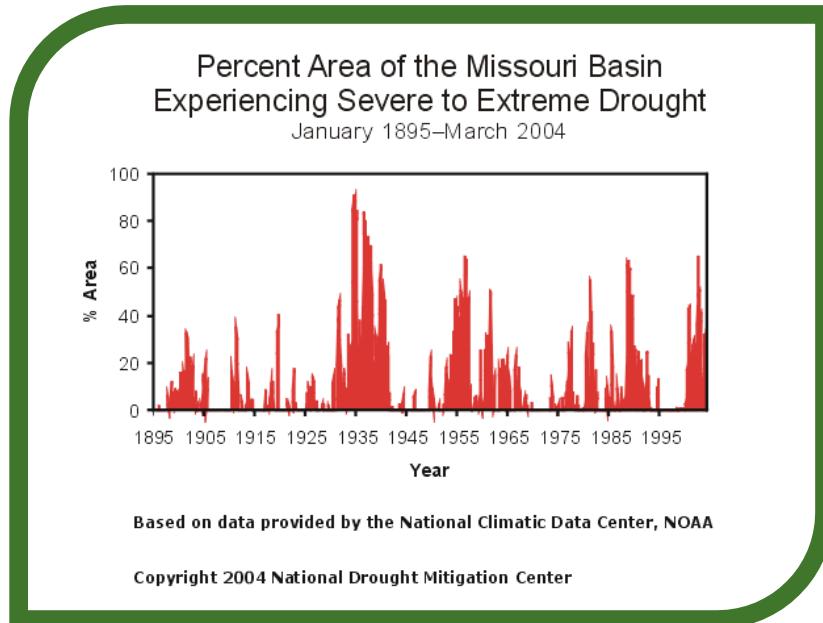
LOCATION [GEOGRAPHIC AREA AFFECTED]

- ✓ [Extensive] 76 to 100 percent of planning area or consistent single-point occurrences.

MAXIMUM PROBABLE EXTENT [MAGNITUDE/ STRENGTH BASED ON HISTORIC EVENTS OR FUTURE PROBABILITY]

- ✓ [Severe] Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months.

FIGURE 3.13: PERCENT AREA SEVERE TO EXTREME DROUGHT [MISSOURI BASIN] JANUARY 1895 - MARCH 2004



Source: National Drought Mitigation Center.

Drought is a slow-onset, creeping phenomenon and its impacts are largely non-structural. Drought normally affects more people than other natural hazards, and its impacts are spread over a larger geographical area. This makes the detection or early warning of drought conditions, and assessment of impacts, more difficult than that of quick-onset natural hazards that result in more visible impacts. Figure 3.13 (above) displays the percent area of the Missouri Basin (including Nebraska) experiencing severe to extreme drought from January 1895 to March 2004.

HAZARD IMPACT AND VULNERABILITY TO THE HAZARD

Impact and vulnerability assesses the planning areas' exposure to hazards; considering assets at risk, critical facilities, and future development trends. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage/ casualty potential.

- ✓ [High] Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.

Depending on the severity, droughts can have major consequences that are wide spread. Droughts can cause environmental losses due to wildfires, disease, thirst and famine, and crop failure from insufficient moisture to support crop growth. In Nebraska, drought can also contribute to a reduced water supply for the irrigation of crops, a common practice throughout the plan area. In extreme cases, people may even migrate or relocate in search of more productive supplies of water. The National Drought Mitigation Center at the University of Nebraska – Lincoln identified the following potential social drought impacts by relevant sector:

- ❑ Health: mental and physical stress (e.g., anxiety, depression, loss of security, domestic violence), health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations, reduced firefighting capability, etc.), reductions in nutrition (e.g., high-cost food limitations, stress-related dietary deficiencies), loss of human life (e.g., from heat stress, suicides), public safety from forest and range fires, increased respiratory ailments, increased disease caused by wildlife concentrations
- ❑ Increased conflicts: water user conflicts, political conflicts, management conflicts, other social conflicts (e.g., scientific, media-based)
- ❑ Reduced quality of life, changes in lifestyle: in rural areas, in specific urban areas, population migrations (rural to urban areas, migrants into the United States), loss of aesthetic values, disruption of cultural belief systems (e.g., religious and scientific views of natural hazards), reevaluation of social values (e.g., priorities, needs, rights), public dissatisfaction with government drought response, perceptions of inequity in relief, possibly related to socioeconomic status, ethnicity, age, gender, seniority, loss of cultural sites, increased data/information needs, coordination of dissemination activities, recognition of institutional restraints on water use

Environmental drought impacts include those on both human and animal habitats and hydrologic units. During periods of drought, the amount of available water decreases in lakes, streams, aquifers, soil, wetlands, springs, and other surface and subsurface water sources. This decrease in water availability can affect water quality by altering the salinity, bacteria, turbidity, temperature, and pH levels. Changes in any of these levels can have a significant effect on the aquatic habitat of numerous plants and animals found throughout the State. Low water flow may result in decreased sewage flows and subsequent increases in contaminants in the water supply. Decreased availability of water decreases the drinking water supply and the food supply. This disruption can work its way up the food chain within a habitat. Loss of biodiversity and increases in mortality can lead to increases in disease and endangered species. The National Drought Mitigation Center at the University of Nebraska – Lincoln identified the following potential environmental drought impacts by relevant sector:

- ❑ Damage to animal species: reduction and degradation of fish and wildlife habitat, lack of feed and drinking water, greater mortality due to increased contact with agricultural producers, as animals seek food from farms and producers are less tolerant of the intrusion, disease, increased vulnerability to predation (from species concentrated near water), migration and concentration (loss of wildlife in some areas and too many wildlife in other areas), increased stress to endangered species, loss of biodiversity

Section Three [Drought]

- Hydrological effects: lower water levels in reservoirs, lakes, and ponds, reduced flow from springs, reduced streamflow, loss of wetlands, estuarine impacts (e.g., changes in salinity levels), increased groundwater depletion, land subsidence, reduced recharge, water quality effects (e.g., salt concentration, increased water temperature, pH, dissolved oxygen, turbidity)
- Damage to plant communities: loss of biodiversity, loss of trees from urban landscapes, shelterbelts, wooded conservation areas, increased number and severity of fires, wind and water erosion of soils, reduced soil quality, air quality effects (e.g., dust, pollutants), visual and landscape quality (e.g., dust, vegetative cover, etc.)

Periods of drought can often result in significant economic, environmental, and social impacts. Agriculture is the primary sector affected by periods of drought; however impacts on rural and municipal water supplies, fish and wildlife, tourism, recreation, water quality, soil erosion, the incidence of wildland fires, electricity demand, and other sectors are also important. The indirect impacts of drought on personal and business incomes, tax revenues, unemployment, and other areas are also significant. The National Drought Mitigation Center at the University of Nebraska – Lincoln identified the following potential economic drought impacts by relevant sector:

- Costs and losses to agricultural producers: annual and perennial crop losses, damage to crop quality, income loss for farmers due to reduced crop yields, reduced productivity of cropland (wind erosion, long-term loss of organic matter, etc.), insect infestation, plant disease, wildlife damage to crops, increased irrigation costs, cost of new or supplemental water resource development (wells, dams, pipelines)
- Costs and losses to livestock producers: reduced productivity of rangeland, reduced milk production, forced reduction of foundation stock, closure/limitation of public lands to grazing, high cost/unavailability of water for livestock, cost of new or supplemental water resource development (wells, dams, pipelines), high cost/unavailability of feed for livestock, increased feed transportation costs, high livestock mortality rates, disruption of reproduction cycles (delayed breeding, more miscarriages), decreased stock weights, increased predation, range fires
- Loss from timber production: wildland fires, tree disease, insect infestation, impaired productivity of forest land, direct loss of trees, especially young ones
- Loss from fishery production: damage to fish habitat, loss of fish and other aquatic organisms due to decreased flows
- General economic effects: decreased land prices, loss to industries directly dependent on agricultural production (e.g., machinery and fertilizer manufacturers, food processors, dairies, etc.), unemployment from drought-related declines in production, strain on financial institutions (foreclosures, more credit risk, capital shortfalls), revenue losses to federal, state, and local governments (from reduced tax base), reduction of economic development, fewer agricultural producers (due to bankruptcies, new occupations), rural population loss
- Loss to recreation and tourism industry: loss to manufacturers and sellers of recreational equipment, losses related to curtailed activities: hunting and fishing, bird watching, boating, etc.
- Energy-related effects: increased energy demand and reduced supply because of drought-related power curtailments, costs to energy industry and consumers associated with substituting more expensive fuels (oil) for hydroelectric power
- Water suppliers: revenue shortfalls and/or windfall profits, cost of water transport or transfer, cost of new or supplemental water resource development
- Transportation industry: loss from impaired navigability of streams, rivers, and canals
- Decline in food production/disrupted food supply: increase in food prices, increased importation of food (higher costs)

Drought can cause a severe drop in the availability of both surface and groundwater for domestic, municipal, and agricultural uses. Extended periods of drought typically occur in combination with periods of extreme heat, placing a larger demand on electricity and water supplies. The agricultural industry would be highly vulnerable to the affects from an extend drought, with the sources of irrigation water becoming limited or unavailable. Drought can negatively impact the economy, social structure, and environment in and around the entire planning area.

ESTIMATE OF THE POTENTIAL LOSSES

Vulnerability and potential losses can be quantified in locations where there is a known, identified hazard area, such as a mapped floodplain. In those locations, the numbers and types of buildings at risk to the identified hazard can be counted and their values calculated. Other data can be collected in regards to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources. This information illustrates the impact and vulnerability of the area to the identified hazard. The vulnerability and potential losses from the other identified hazards, which do not have specific mapped areas or the data to support additional analysis, are discussed in more general, qualitative terms.

The event damage and frequency estimate formulas were determined based upon recorded historical occurrences since 1950. This does not include loss of displacement, functional downtime, economic loss, injury, or loss of life. It should be noted that the total crop damages were included in the event details to express the magnitude of the event, but were not calculated into the estimate (crop damages are not mitigated by FEMA).

If a drought occurred within the planning area, the table below assumes the event could potentially cause 0.02 percent damage to the total assessed value in an incorporated jurisdiction and throughout rural areas of the Counties. It should be noted that the structural valuation damage estimate is not realistic, as the majority of potential losses associated with drought are non-structural in nature.

TABLE 3.29: EVENT DAMAGE AND FREQUENCY ESTIMATE [DROUGHT] HISTORICAL ANALYSIS

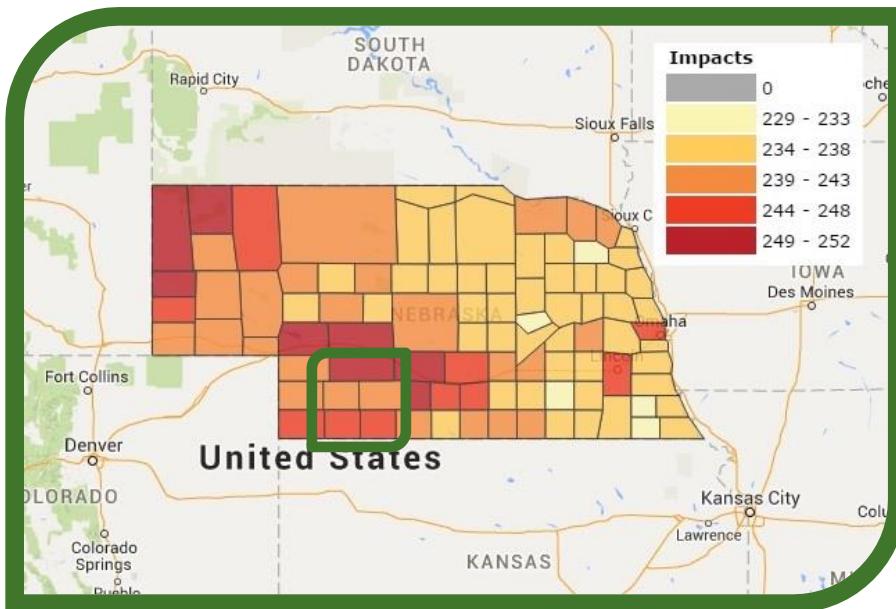
Event Damage and Frequency Estimate Formulas		
Average Annual Damage	\$30,769	Total Damages Recorded [\$2,000,000] / Total Years on Record [65]
Average Damage per Event	\$62,500	Total Damages Recorded [\$2,000,000] / Total Events Recorded [32]
Annual Event Frequency	0.49/year	Total Events Recorded [32] / Total Years on Record [65]
Structural Valuation Damage Estimate	0.02%	Average Annual Damage [\$30,769] / Total Structural Valuation [\$125,631,048]

Periods of drought are characterized by intensity, duration, and frequency of occurrence, which make potential losses extremely hard to determine. It can be assumed that a drought significant in nature, lasting at least five years, would have a devastating financial impact on the area. The majority of losses associated with drought are crop and livestock related, which can cause significant damage and harm to the local agricultural industry and economy, with loss in profits and resulting economic downfall. Periods of drought can cause monetary loss of crops and livestock, environmental losses, economic losses, as well as losses associated with disruption of the social structure. Drought can pose a significant threat to human life.

The National Drought Mitigation Center launched the Drought Impact Reporter (DIR) in July 2005 as the nation's first comprehensive database of drought impacts. Drought Impacts from January 1, 2006 to December 31, 2015 for Hayes, Frontier, and Hitchcock Counties are shown in Figure 3.14 and detailed in Table 3.30 below.

Section Three [Drought]

FIGURE 3.14: DROUGHT IMPACTS [NDMC] JANUARY 1, 2006 – DECEMBER 31, 2015



Source: National Drought Mitigation Center.

TABLE 3.30: DROUGHT IMPACTS [NDMC] JANUARY 1, 2006 – DECEMBER 31, 2015

Category and Total Impacts			
Agriculture	217	Business and Industry	45
Energy	8	Fire	27
Plants and Wildlife	44	Relief, Response and Restrictions	97
Society and Public Health	57	Tourism and Recreation	8
Water Supply and Quality	80	--	--

Source: National Drought Mitigation Center.

PROBABILITY OF FUTURE HAZARD EVENTS

The frequency of historical occurrences was used to gauge the likelihood of future occurrences. Frequency was calculated based on existing data (when available). It was determined by dividing the number of events recorded by the number of years on record, and then multiplying by 100 to calculate a percent. This gives the percent chance of the event occurring in any given year.

- ✓ [Likely] 11 to 90 percent probability of occurrence in the next year.

OVERALL SIGNIFICANCE

Overall significance was determined based on criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Impacts could be deemed to be devastating but have a low probability so that will affect how each hazard is classified. Overall significance is a combination of the severity and probability.

- ✓ [High] The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

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Section Three [Dam Failure]

Dam failure is defined as the collapse, structural failure, or breach of a dam that causes a catastrophic event characterized by the sudden, rapid, and uncontrolled release of impounded water.

SECTION THREE [DAM FAILURE]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION THREE [DAM FAILURE]

DAM FAILURE

This sub-section outlines the risk assessment for the hazard event dam failure, including hazard profile, previous occurrences of hazard events, location and extent, hazard impact and vulnerability to the hazard, estimate of potential losses, probability of future hazard events, and overall significance. Data on previous occurrences of hazard events from the National Climatic Data Center (NCDC) is summarized below, with full event details in Section Six: Participant Profiles. Geographic, demographic, assets inventory, capabilities assessment, and climate summaries are also provided in Section Six: Participant Profiles, with varying risks facing the planning area discussed in the appropriate sub-sections.

HAZARD PROFILE

The hazard profile provides a description of the hazard, associated issues, and details on the hazard specific to the planning area.

A dam is a barrier constructed across flowing water that stores, controls, or diverts water. The water stored behind a dam is referred to as the reservoir, lake or impoundment, and is measured in acre-feet. One acre-foot is the volume of water that covers one acre of land to a depth of one foot. Most dams have a section called a spillway or weir over which, or through which, water flows, either intermittently or continuously. Dams can benefit farm land, provide recreation areas, generate electrical power, and help control erosion and flooding issues.

A dam failure is the collapse, structural failure, or breach of a dam that causes downstream flooding. Dam failures usually occur when the spillway capacity is inadequate and water overtops the dam, or when internal erosion, or piping, occurs in the dam foundation. If internal erosion or overtopping cause a full structural breach, a high-velocity, debris-laden wall of water is released downstream, damaging or destroying anything in its path. Due to the lack of advanced warning, failures resulting from natural events, such as earthquakes or landslides, may be quite severe.

Dam failures may be caused by natural events, human-caused events, or a combination. Overtopping, due to prolonged rainfall and subsequent flooding, is the most common cause of dam failure in the United States. Dam failures can also result from any one, or a combination, of the following:

- Prolonged periods of rainfall and flooding or excessive rainfall or snowmelt
- Inadequate spillway capacity, resulting in excess overtopping flows and large discharge through spillway
- Internal erosion caused by embankment or foundation leakage or piping
- Improper maintenance, especially of gates, valves, outlet pipes, and other operational components
- Improper design, including the use of sub-standard construction materials and construction practices
- Negligent operation, including failure to remove or open gates or valves during high flow periods
- Failure of upstream dams on the same waterway
- Extreme reservoir inflows in excess of design flows
- Natural disasters

Dam failure may cause loss of life or serious damage to residential, industrial, or commercial buildings, public utilities, highways, or railroads. The classifications of high, significant, low, or minimal do not apply to the quality of the structure, but rather the potential for death or exposure to property damage according to what lies downstream, as well as the expected impact of a dam failure. Dams constructed in residential, commercial, or industrial areas are classified as high hazard, unless otherwise classified on a case-by-case basis. Dams constructed where there is potential for development receive a high hazard classification. The Nebraska Department of Natural Resources (NDNR) regulates dam safety and classifies dams by the potential hazard each pose to human life and economic loss.

Dams in Nebraska are categorized primarily by the potential for loss of life and damages to property if the dam were to fail. The hazard potential classification is not an assessment of the dam's condition or its likelihood of failure. The four hazard potential classifications for dams are as follows:

TABLE 3.31: DAM FAILURE [CLASSIFICATIONS] DESCRIPTIONS

Hazard Potential	Classification Description
High Hazard	High hazard potential means a hazard potential classification such that failure or misoperation of the dam resulting in loss of human life is probable.
Significant Hazard	Significant hazard potential means a hazard potential classification such that failure or misoperation of the dam would result in no probable loss of human life but could result in major economic loss, environmental damage, or disruption of lifeline facilities.
Low Hazard	Low hazard potential means a hazard potential classification such that failure or misoperation of the dam would result in no probable loss of human life and in low economic loss.
Minimal Hazard	Minimal hazard potential means a hazard potential classification such that failure or misoperation of the dam would likely result in no economic loss beyond the cost of the structure itself and losses principally limited to the owner's property.

Source: Nebraska Department of Natural Resources (NDNR).

Dams that are classified with high hazard potential require the development of an Emergency Action Plan (EAP). The EAP defines responsibilities and provides procedures designed to identify unusual and unlikely conditions which may endanger the structural integrity of the dam within sufficient time to take mitigating actions and to notify the appropriate emergency management officials if possible, impending, or actual failure of the dam. The EAP may also be used to provide notification when flood releases will create major flooding. An emergency situation can occur at any time; however, emergencies are more likely to happen when extreme conditions are present. The EAP includes information regarding the efficiency of emergency response entities so that proper action can be taken to prevent the loss of life and property. Local emergency response entities generally involved in an EAP include, but are not limited to, 911 dispatch, county sheriffs, local fire departments, emergency management agency director, county highway department, and the National Weather Service.

PREVIOUS OCCURRENCES OF HAZARD EVENTS

Pervious occurrences of hazard events gives information on historical occurrences. Historical occurrence worksheets were used to capture information from participating jurisdictions on past occurrences.

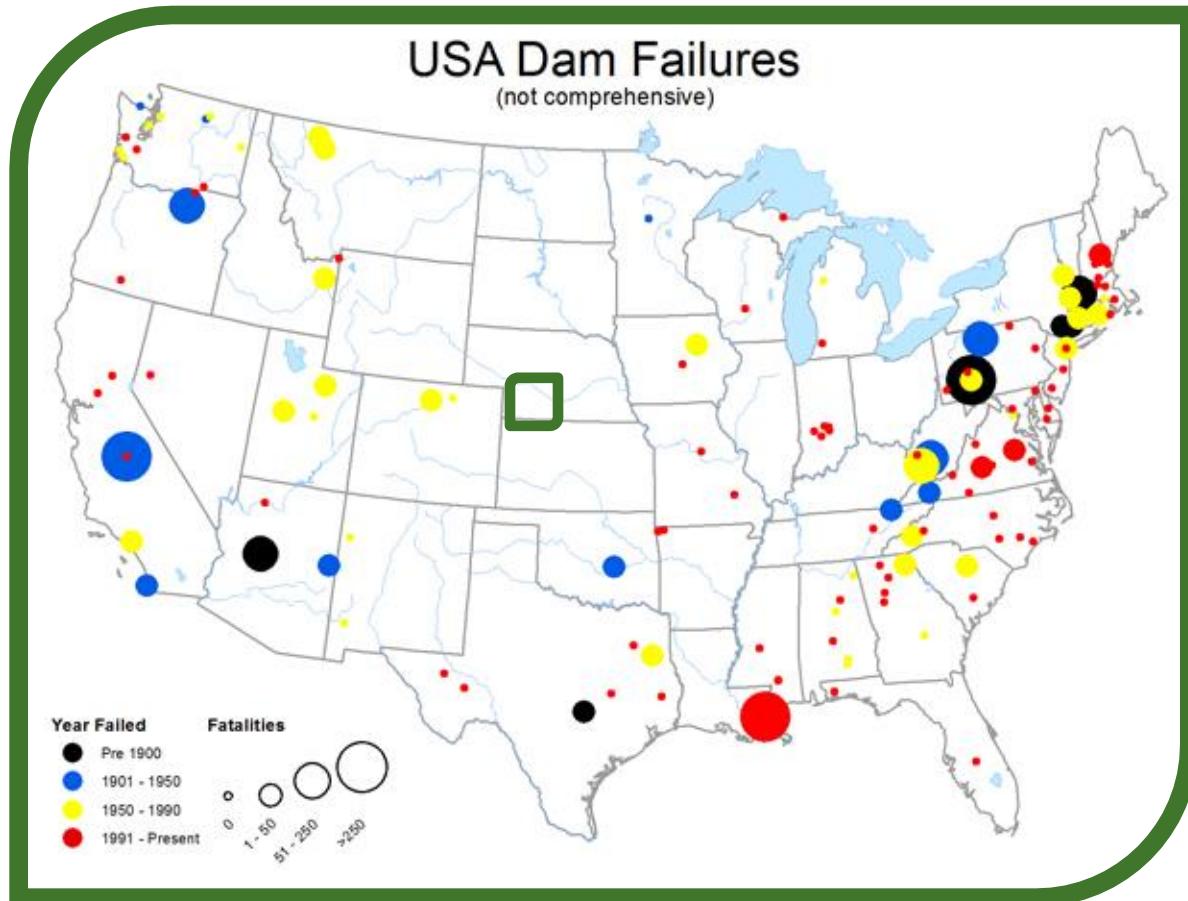
There have been no reports of public dam failure within the Hayes, Frontier, and Hitchcock Counties planning area. There may have been private dams that have failed but at this time no historical data was located on the NDNR's database. Any private dam failure would mostly likely result in low damage potential due to failure and minimal risk of loss of human life.

Hundreds of dam failures have occurred throughout U.S. history. These failures have caused immense property and environmental damages and have taken thousands of lives. As the nation's dams age and population increases, the potential for deadly dam failures grows. No one knows precisely how many dam failures have occurred in the U.S., but they have been documented in every state. From January 1, 2005 through June 2013, state dam safety programs reported 173 dam failures and 587 "incidents" – episodes that, without intervention, would likely have resulted in dam failure.

Section Three [Dam Failure]

The map below is based on a non-comprehensive list of dam and levee failures compiled by the Association of State Dam Safety Officials (ASDSO). The map demonstrates that dam failures are not particularly common but they do continue to occur. Locations are approximate. The large red dot on the Gulf Coast represents the New Orleans levee failures resulting from Hurricane Katrina. A few other levee failures are included such as all of those indicated in Northern California. If levee failures from the 1993 floods were included, more failures would be indicated in the center of the map.

FIGURE 3.15: HISTORICAL DAM FAILURES [ASDSO] CONTINENTAL UNITED STATES



Source: Association of State Dam Safety Officials (ASDSO).

LOCATION AND EXTENT

Location and extent contain information on hazard location and extent, magnitude/ strength, speed of onset/ duration, seasonal patterns, and/or secondary effects (when known).

LOCATION [GEOGRAPHIC AREA AFFECTED]

- ✓ [Significant] 26 to 75 percent of planning area or frequent single-point occurrences.

MAXIMUM PROBABLE EXTENT [MAGNITUDE/ STRENGTH BASED ON HISTORIC EVENTS OR FUTURE PROBABILITY]

- ✓ [Severe] Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months.

According to the NDNR Dam Inventory database, there are three high hazard dams located within the planning area. The inundation maps for high hazard dams in Nebraska are not available for public viewing. More detailed information regarding inundation areas is available through the Nebraska Department of Natural Resources. Table 3.32 below summarizes the total

Section Three [Dam Failure]

number of dams located within the planning area by county and classification. Refer to Figure 3.16 also for a map showing the location of the dams in these three counties.

FIGURE 3.16: MAP OF DAM INVENTORY FOR HAYES, FRONTIER AND HITCHCOCK COUNTIES

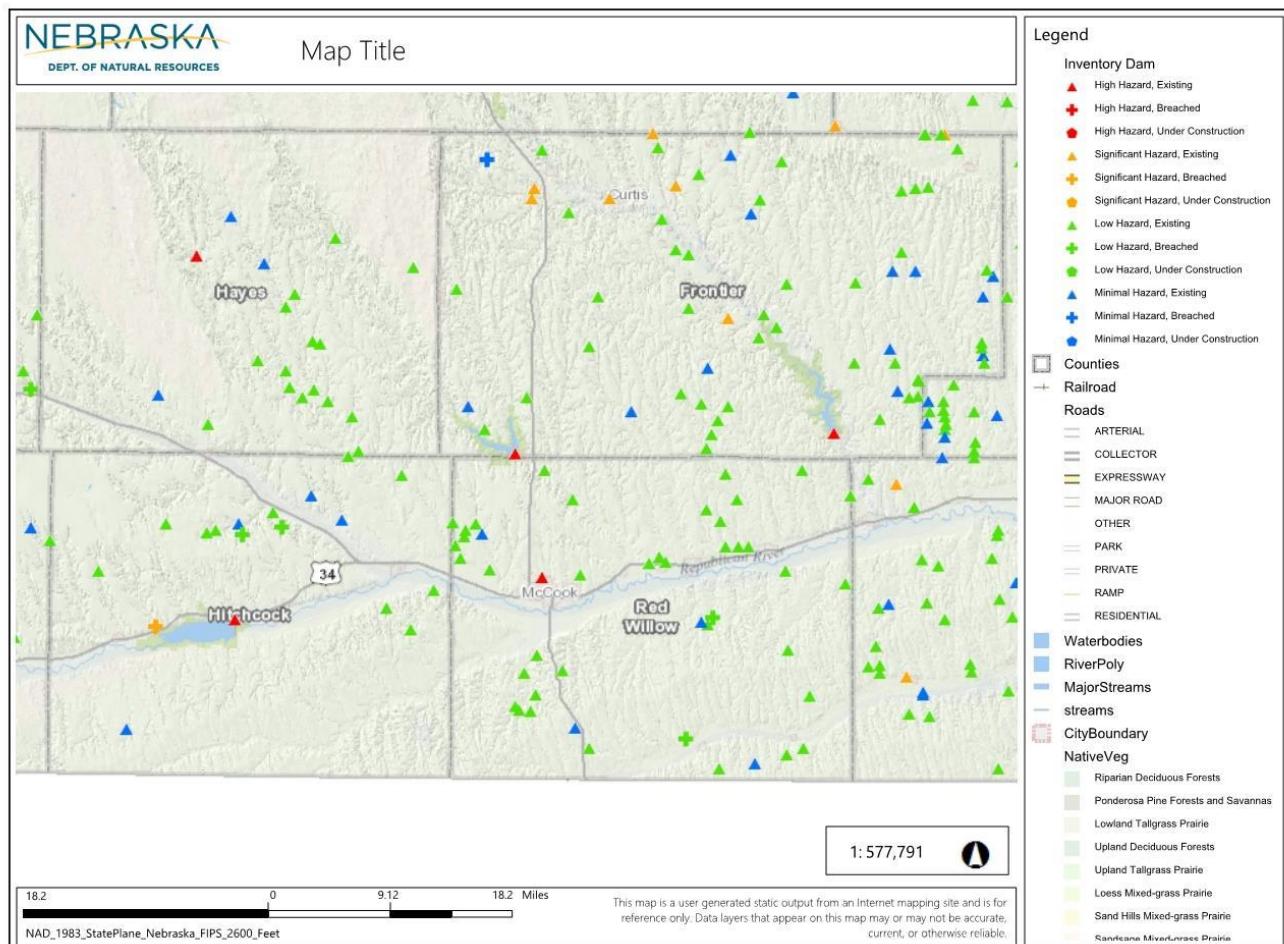


TABLE 3.32: Total Number of Dams [NDNR] County and Classification

County	Classification				Total
	High	Significant	Low	Minimal	
Hayes County	0	0	14	0	14
Frontier County	2	6	41	0	49
Hitchcock County	1	1	11	0	13
Total	3	7	66	0	76

Source: Nebraska Department of Natural Resources (NDNR).

HAZARD IMPACT AND VULNERABILITY TO THE HAZARD

Section Three [Dam Failure]

Impact and vulnerability assesses the planning areas' exposure to hazards; considering assets at risk, critical facilities, and future development trends. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage/ casualty potential.

- ✓ [High] Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major casualties and loss of life could result, as well as water quality and health issues. Potentially catastrophic effects to roads, bridges, and homes are also of major concern. Associated water quality and health concerns could also be issues. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

ESTIMATE OF THE POTENTIAL LOSSES

Vulnerability and potential losses can be quantified in locations where there is a known, identified hazard area, such as a mapped floodplain. In those locations, the numbers and types of buildings at risk to the identified hazard can be counted and their values calculated. Other data can be collected in regards to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources. This information illustrates the impact and vulnerability of the area to the identified hazard. The vulnerability and potential losses from the other identified hazards, which do not have specific mapped areas or the data to support additional analysis, are discussed in more general, qualitative terms.

Potential losses associated with a dam failure event vary greatly depending on the severity of the event. All dams are inspected on a regular basis and after flash flood events. If issues are found during an inspection, the proper course of action is taken to ensure the structural integrity of the dam is preserved. In the event that dam failure is imminent, the Emergency Action Plan (EAP) governs the course of action.

- ❑ [Hayes County] Enders County Reservoir (Chase County), located approximately 25 miles to the northwest on Frenchman Creek, would affect the Village of Hamlet and rural portions of Hayes County in the event of a dam failure.
- ❑ [Frontier County] There are two major lakes in Frontier County, which are created by dams operated by the federal government. These lakes, Hugh Butler and Harry Strunk, are in the very southern end of the county. If these dams creating this major lake were to break, flooding would occur in some of the rural agricultural land areas in only the extreme southern townships in the county below the dam.
- ❑ [Hitchcock County] The Trenton Dam is on the Republican River, and normally holds approximately 112,000 acre-feet. The dam is earthen in construction and was completed in 1953. The owner is the Bureau of Reclamation, which has an Emergency Action Plan in place. The dam's primary purpose is for irrigation, and secondary purposes are flood control and storm water management. Dam breach would impact only the City of Trenton and perhaps some of the surrounding unincorporated county. The exact dam breach inundation area is not available for including in the plan for security reasons.

PROBABILITY OF FUTURE HAZARD EVENTS

The frequency of historical occurrences was used to gauge the likelihood of future occurrences. Frequency was calculated based on existing data (when available). It was determined by dividing the number of events recorded by the number of years on record, and then multiplying by 100 to calculate a percent. This gives the percent chance of the event occurring in any given year.

- ✓ [Unlikely] Less than 1 percent probability of occurrence in the next year.

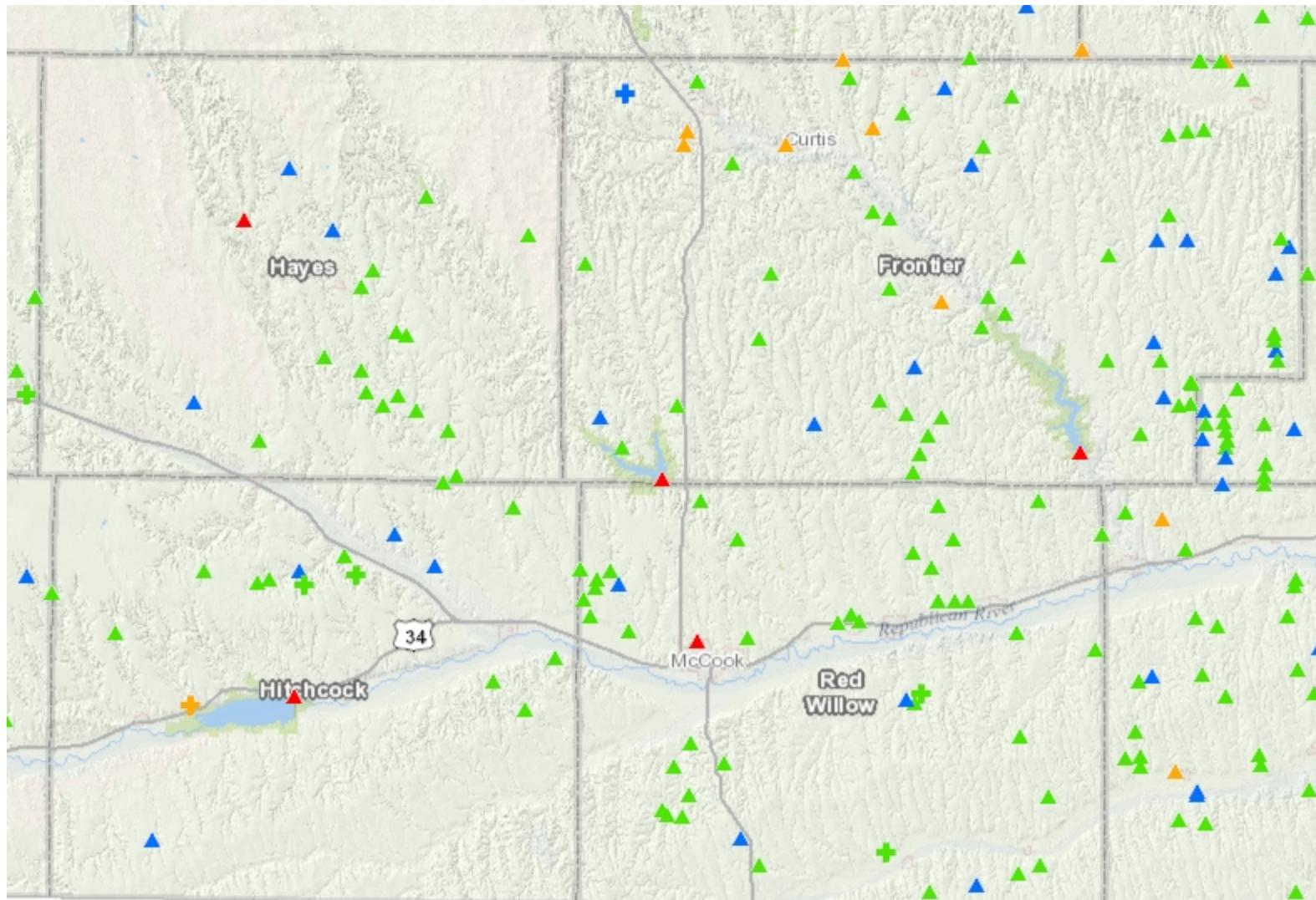
OVERALL SIGNIFICANCE

Overall significance was determined based on criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Impacts could be deemed to be devastating but have a low probability so that will affect how each hazard is classified. Overall significance is a combination of the severity and probability.

- ✓ [Low] Two or more criteria fall in lower classifications or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.

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Map Title



Legend

Inventory Dam	
▲	High Hazard, Existing
✚	High Hazard, Breached
★	High Hazard, Under Construction
▲	Significant Hazard, Existing
✚	Significant Hazard, Breached
★	Significant Hazard, Under Construction
▲	Low Hazard, Existing
✚	Low Hazard, Breached
★	Low Hazard, Under Construction
▲	Minimal Hazard, Existing
✚	Minimal Hazard, Breached
★	Minimal Hazard, Under Construction
□	Counties
—	Railroad
Roads	
—	ARTERIAL
—	COLLECTOR
—	EXPRESSWAY
—	MAJOR ROAD
—	OTHER
—	PARK
—	PRIVATE
—	RAMP
—	RESIDENTIAL
■	Waterbodies
■	RiverPoly
—	MajorStreams
—	streams
■	CityBoundary
NativeVeg	
■	Riparian Deciduous Forests
■	Ponderosa Pine Forests and Savannas
■	Lowland Tallgrass Prairie
■	Upland Deciduous Forests
■	Upland Tallgrass Prairie
■	Loess Mixed-grass Prairie
■	Sand Hills Mixed-grass Prairie
■	Sandsage Mixed-grass Prairie

1: 577,791



18.2

0

9.12

18.2 Miles

NAD_1983_StatePlane_Nebraska_FIPS_2600_Feet

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.



Section Four [Mitigation Strategy]

Section Four discusses the establishment of mitigation goals, objectives, actions, and the action plan for implementation. Goals provide the framework for identifying mitigation actions, the on-the-ground activities to reduce the effects of natural hazards. All actions were evaluated by participants utilizing the FEMA recommended process.

SECTION FOUR [MITIGATION STRATEGY]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION FOUR [MITIGATION STRATEGY]

FEDERAL PLANNING REGULATIONS

REGULATION CHECKLIST 44 CODE OF FEDERAL REGULATIONS (CFR) 201.6 LOCAL MITIGATION PLANS



§201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

- Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))
- Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))



§201.6(c)(3)(ii): [The mitigation strategy shall include 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.

- Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))
- Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))



§201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

- Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))



§201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) 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.

- Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)), (Requirement §201.6(c)(3)(iii))



§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.

Source: Federal Emergency Management Agency.

Section Four [Mitigation Strategy]

INTRODUCTION

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the jurisdictions will accomplish the overall purpose, or mission, of the plan.

Mitigation focuses on breaking the cycle of disaster damage, reconstruction, and repeated damage. Mitigation efforts provide value to the American people by creating safer cities and reducing loss of life and property. Mitigation includes activities such as:

- ❑ Complying with, or exceeding, the National Floodplain Insurance Program (NFIP) floodplain management regulations
- ❑ Enforcing stringent building codes, flood-proofing requirements, seismic design standards, and wind-bracing requirements for new construction or repairing existing buildings
- ❑ Adopting zoning ordinances that steer development away from areas subject to flooding
- ❑ Retrofitting public buildings to withstand tornado-strength winds or ground shaking
- ❑ Acquiring damaged homes or businesses in flood-prone areas, relocating the structures, and returning the property to open space, wetlands, or recreational uses
- ❑ Building tornado shelters and safe rooms to help protect people in their homes, public buildings, and schools in tornado-prone areas

THE MITIGATION STRATEGY

The mitigation strategy is comprised of three main required components: mitigation goals, mitigation actions, and the action plan for implementation. These provide the framework to identify, prioritize, and implement actions to reduce risks to hazards. Mitigation goals are general guidelines that explain what the jurisdictions want to achieve with the plan. They are broad policy-type statements that are long-term, and represent visions for reducing or avoiding losses from the identified hazards.

Mitigation objectives are optional, but help better define or organize mitigation actions. Objectives define strategies to attain the goals and are more specific and measurable. Objectives connect goals with the actual mitigation actions.

Mitigation actions are specific projects and activities that help achieve the goals. The action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the jurisdictions' existing planning mechanisms.

FIGURE 4.1: MITIGATION STRATEGY [FEMA] GOALS, ACTIONS, AND ACTION PLAN



Source: Federal Emergency Management Agency.

MITIGATION GOALS

The hazard mitigation goals represent what the jurisdictions seek to achieve through plan implementation. Clear goals that were agreed upon by the planning team, elected officials, and public provided the basis for prioritizing mitigation actions. Mitigation goals are required to be consistent with hazards identified in the risk assessment.

Hayes, Frontier, and Hitchcock Counties reviewed the results of the hazard identification, vulnerability assessment, and capability assessment. This analysis of the risk assessment identified areas where improvements could be made and provided the framework to reevaluate and formulate goals, objectives, and actions, which ultimately led to the action plan and overall mitigation strategy.

Hayes, Frontier, and Hitchcock Counties were provided with the previous goals in order to reaffirm or modify them based on current conditions and priorities. Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that represent basic desires of the jurisdictions, encompass all aspects of the jurisdictions, public and private, refer to the quality (not the quantity) of the outcome, and are future-oriented.

Based on the risk assessment review and goal setting process, Hayes, Frontier, and Hitchcock Counties identified the following goals and objectives, which provide direction for reducing future hazard-related losses within the planning area.

FIGURE 4.2: MITIGATION GOALS AND OBJECTIVES [HMP] HAYES, FRONTIER, AND HITCHCOCK COUNTIES

Goal 1: Protect Health and Safety of Residents

- Objective 1.1: Reduce or prevent damage to property, loss of life, or serious injury.

Goal 2: Reduce Future Losses from Hazard Events

- Objective 2.1: Provide protection for existing structures, future development, critical facilities, vulnerable areas and populations, services, and utilities to the extent possible.
- Objective 2.2: Develop hazard specific plans, conduct studies or assessments, and retrofit jurisdictions to mitigate for hazards and minimize their impacts.
- Objective 2.3: Minimize and control the impacts of hazard events through enacting or updating ordinances, permits, laws, or regulations.

Goal 3: Increase Public Awareness and Educate on Vulnerability to Hazards

- Objective 3.1: Develop and provide information to residents and businesses on the types of hazards they are exposed to, what the effects may be, where they may occur, and what they can do to be better prepared.

Goal 4: Improve Emergency Management Capabilities

- Objective 4.1: Develop or improve emergency response plan, procedures, and abilities.
- Objective 4.2: Develop or improve evacuation plan and procedures.
- Objective 4.3: Improve warning systems and ability to communicate to residents and businesses during and after a disaster or emergency.

Goal 5: Pursue Multi-Objective Opportunities

- Objective 5.1: When possible, utilize existing resources, agencies, and programs to implement projects.
- Objective 5.2: When possible, implement projects that achieve several goals.

Section Four [Mitigation Strategy]

MITIGATION ACTIONS

Mitigation actions are a specific project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards. Implementing mitigation actions helps achieve the plan's mission and goals. The mitigation actions are a key outcome of the planning process and form the core of the plan. The primary types of actions include: Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, and Education and Awareness Programs.

The mitigation planning regulations require that each participating jurisdiction identify and analyze a comprehensive range of specific actions and projects to reduce the impacts of hazards identified in the risk assessment. The emphasis was on impacts or vulnerabilities identified, not the actual hazards themselves. Jurisdictions considered actions that would reduce risk to existing buildings and infrastructure, as well as limit risk to new development and redevelopment. In addition to reviewing the mitigation actions from the previous plans, Hayes, Frontier, and Hitchcock Counties also considered and defined several new actions.

Mitigation actions reduce or eliminate long-term risk and differ from actions taken to prepare for or respond to hazard events. Mitigation activities lessen or eliminate the need for preparedness or response resources in the future. After analyzing risks and identifying mitigation actions, the jurisdictions also considered emergency response or operational preparedness actions including:

- ❑ Creating mutual aid agreements with neighboring jurisdictions to meet emergency response needs
- ❑ Purchasing radio communications equipment
- ❑ Developing procedures for notifying citizens of available shelter locations during and following an event

For some hazards, such as tornados, including preparedness actions in the mitigation plan are necessary and practical. The mitigation plan is the best place for jurisdictions to capture and justify the need for these actions.

Funding and support may not be immediately available for every action in the plan, or the actions may lead to future opportunities for implementation. For example, some actions can be implemented following a disaster when additional funding, political, and public support are available, such as acquiring homes in a flood hazard area. Additionally, if actions are not included in the plan, securing funding may be more difficult once it becomes available.

The below is the list of hazard considered followed by potential Mitigation Strategies

- ❑ Severe Winter Storms – Design and Construction of Storm Shelters, Public education and awareness, Better Warning Systems
- ❑ Severe Thunderstorms – Design and Construction of Storm Shelters, Public education and awareness, Better Warning Systems
- ❑ Tornados – Design and Construction of Storm Shelters, Education, Better Warning Systems
- ❑ Floods – Limit or restrict development in flood-prone areas, participate in the NFIP, Acquire property or flood-proofing of structures in floodplain
- ❑ Extreme Heat – Public education, Increased monitoring and community awareness, Developing a vulnerable populations database within the community
- ❑ Drought – Identify and develop new/additional water sources, Develop ground water/irrigation management plans, Establish drought best management practices and develop an implementation plan, Upgrade rural water infrastructure
- ❑ Dam Failure – Evacuation plan, Dam failure exercise, Public education and awareness

PRIORITIES AND ACTIONS

Hayes, Frontier, and Hitchcock Counties analyzed viable mitigation options that supported the identified goals and objectives, then prioritized the actions for implementation by assessing the importance of each option relative to the risks and capabilities. The actions identified through the evaluation and prioritization process are the most acceptable and practical for addressing the hazards in the risk assessment.

Prioritization may vary over time in response to changes in the jurisdictions' characteristics, risks, or to take advantage of available resources. Addressing changes in priorities allowed jurisdictions to redirect actions to reflect current conditions, including financial and political realities, or any changes due to disaster events. Factors that may influence future changes in priorities include:

- ❑ Altered conditions due to disaster events and recovery priorities
- ❑ New or changing local partners, interests, resources, needs, and capabilities
- ❑ New State or Federal policies and funding resources
- ❑ New hazard impacts identified in the updated risk assessment
- ❑ Changes in development patterns that could influence the effects of hazards

The action items referenced in this plan are very similar to those that were identified in the previous plan. The reason for this is that there has been very little change in the area demographics, infrastructure, and critical facilities. For the most part, the participating jurisdictions' priorities have remained unchanged since the previous plan. Refer to *Section Six: Participant Profiles*, for additional details.

New actions were identified based on the updated risk and capability assessments, and prioritized in combination with the actions carried forward from the previous plans. Mitigation actions identified in the previous plans had yet to be completed, with no previous efforts noted, due to lack of political support, funding, or personnel availability. All previously identified actions were still deemed relevant and included as part of the updated plan, either as stand-alone actions or combined with similar goal-oriented actions.

Hayes, Frontier, and Hitchcock Counties considered the benefits that would result from a mitigation action versus the cost. A planning level benefit-cost assessment and review of whether the costs were reasonable, compared to the probable benefits, was a key part of the evaluation and prioritization process. Cost estimates are not exact, but based on experience and best judgment. Benefits included losses avoided such as the number and value of structures, infrastructure and critical facilities, and the population protected from serious injury or loss of life. Qualitative benefits, such as quality of life or natural and beneficial functions of ecosystems, were also included in the review.

For each action, jurisdictions evaluated the potential benefits and/or likelihood of successful implementation by ranking each criteria (outlined below) with a (-1) ineffective or not feasible, (0) neutral, or (+1) highly effective or feasible. Mitigation actions that received an overall ranking greater than zero are detailed in the action plan. The criteria and questions used to evaluate each mitigation action, as recommended by the Federal Emergency Management Agency (FEMA) included:

Section Four [Mitigation Strategy]

FIGURE 4.3: EVALUATION CRITERIA [FEMA] MITIGATION ACTIONS



Source: Federal Emergency Management Agency.

THE ACTION PLAN

The action plan lays the groundwork for implementation. The plan was developed to present the recommendations established by Hayes, Frontier, and Hitchcock Counties on how the participating jurisdictions can reduce risk and vulnerability of people, property, infrastructure, and natural resources to future disaster losses. The action plan identifies how mitigation actions will be implemented, including who is responsible for which actions, what funding mechanisms and other resources are available or will be pursued, when actions will be completed, and how they are prioritized.

Plan updates reflect progress in local mitigation efforts. The integration of the plan into existing planning mechanisms and the implementation of mitigation actions demonstrate progress in risk reduction. Details describing how the current mitigation strategy, including goals and actions, will be incorporated into existing mechanisms are discussed in Section Five: Review, Evaluation, and Implementation in more detail. However in general each jurisdiction (county, city, or village) will need to take all the mitigation action items into account when local plans (comprehensive plans, zoning ordinance updates, subdivision regulations, capital improvement plans, etc) are redone or revised. Each mitigation item will be looked at to see if the jurisdiction can add each individual mitigation item into a current plan so it can be accomplished. Also each jurisdiction will make sure all the local plans do not contradict with the proposed mitigation action items but instead work in coordination with them. This process has been done on the local plans between the 2008 plan and this current 2016 plan and is reflected in which current mitigation action items have been included in this plan.

Listed below are the current authorities, policies, programs and resources for the ten full participants. These existing documents or programs will be used along with the proposed mitigation action items as the action plan is completed.

TABLE 4.1: EXISTING AUTHORITIES, POLICIES, PROGRAMS AND RESOURCES

Participating Jurisdiction	Authorities, Policies, Programs and Resources
Hayes County	Comprehensive Plan, Capital Improvements Plan, Economic Development Plan, Local Emergency Operation Plan, Stormwater Management Plan, Zoning/Subdivision Regulations, Floodplain Ordinances, NFIP
Hamlet	Comprehensive Plan, Capital Improvements Plan, Local emergency Operations Plan, Continuity of Operations Plan, NFIP
Hayes Center	Comprehensive Plan, Local emergency Operations Plan, Zoning/Subdivision Regulations, Floodplain Ordinances, NFIP
Frontier County	Comprehensive Plan, Capital Improvements Plan, Economic Development Plan, Local Emergency Operation Plan, Transportation Plan, Stormwater Management Plan, Zoning/Subdivision Regulations, Floodplain Ordinances, NFIP
Curtis	Local emergency Operations Plan, Zoning/Subdivision Regulations, Floodplain Ordinances, NFIP
Eustis	Comprehensive Plan, Capital Improvements Plan, Economic Development Plan, Local emergency Operations Plan, Transportation Plan, Stormwater Management Plan, Zoning Regulations, Floodplain Ordinances, NFIP
Hitchcock County	Comprehensive Plan, Local emergency Operations Plan, Zoning/Subdivision Regulations, Floodplain Ordinance, NFIP
Palisade	Comprehensive Plan, Local emergency Operations Plan, Community Wildfire Protection Plan, Zoning Regulations, Floodplain Ordinances, NFIP
Stratton	Local emergency Operations Plan, Subdivision Regulations, NFIP
Trenton	Comprehensive Plan, Economic Development Plan, Local Emergency Operations Plan, Zoning/Subdivision Regulations, Floodplain Ordinance, NFIP

The action plan detailed below contains both new actions developed for this plan update, as well as viable actions that had yet to be completed from the previous plans. Each action item is listed with a current status statement. The status will be one of the following three option:

- New – Mitigation Action Items that are new in the 2016 plan
- Continued Action (Ongoing Action) – These previous action items have been completed to a certain point but require continued review and work on them
- Continued Action (Insufficient Funding) – These previous action items have not been completed due to insufficient funding. The jurisdictions still intend to complete these action items if funding becomes available.

The actions are also listed by Priority with High being listed first. Each jurisdiction ranked the chosen action items by priority during the planning process and that ranking will be utilized if and when funding becomes available. The selected action item will be determined from discussions between the individual jurisdiction, specific county and pertinent Emergency Manager. Priority rankings, available funding, local needs, and other specific criteria will be used to select which action items will be completed.

LOCAL PLANS AND REGULATIONS

Section Four [Mitigation Strategy]

These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built. Each county is listed with each jurisdiction listed under the county with their specific mitigation actions they are part of. The Emergency Managers for each county will ultimately be responsible for the implementation of each mitigation action.

Roger Powell (Region 17 Emergency Manager) – Frontier County

Char Hamilton (Emergency Manager) – Hayes County

Brandon Myers (Region 51 Emergency Manager) – Hitchcock County

HAYES COUNTY

HAYES COUNTY

Hayes County determined that their power systems, warning systems, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Hayes County and/or Floodplain Management Department

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

DRAINAGE ASSESSMENT FOR BRIDGE AND CULVERT IMPROVEMENTS

[Background] Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding/drainage issues to reduce and/or alleviate flooding. Stormwater master plans can

be conducted to perform a community-wide stormwater evaluation, identifying multiple problem areas and potential drainage improvements.

[Benefits] Proactive steps to identify all potential problems/issues can lead to effectively addressing improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. This ensures that the most beneficial projects are done first and could possibly eliminate the need for others.

[Responsible Agency & Partners] Hayes County Engineering, Roads Department, and Middle Republican Natural Resource Districts

[Cost Estimate & Funding] \$10,000 to \$100,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

UNDERGROUND OR IDENTIFY AND RETROFIT POWER AND SERVICE LINES

[Background] Communities can work with their local Public Power District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County or Natural Resources District to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.

[Benefits] To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments, Public Power Districts, Rural Water Districts, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$60,000 to \$80,000/mile (electrical); Hazard Mitigation Assistance Grant Programs, Public Power Districts, Rural Water Districts, Natural Resources Districts

Section Four [Mitigation Strategy]

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

ELECTRICAL SYSTEM GENERATION, LOOPED DISTRIBUTION, AND REDUNDANCIES

[Background] Provide looped distribution service and other redundancies in the electrical system as a backup power supply in the event the primary system is destroyed or fails.

[Benefits] More reliable and resistant power distribution system.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments, Public Power Districts

[Cost Estimate & Funding] \$40,000/mile; Hazard Mitigation Assistance Grant Programs, Public Power Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

STREAM BANK STABILIZATION

[Background] Stream bank/bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures including sheet-pile weirs, rock weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection for critical and/or highly vulnerable facilities, areas, populations, and infrastructure is key.

[Benefits] Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$50,000 to \$100,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WARNING SYSTEMS

[Background] Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments

[Cost Estimate & Funding] \$75/radio; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments, Natural Resources Districts

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

Section Four [Mitigation Strategy]

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

FLOOD-PRONE PROPERTY ACQUISITION

[Background] Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the National Flood Insurance Program. Repetitive loss structures are typically highest priority.

[Benefits] Voluntary acquisition and demolition of properties prone to flooding will reduce the damages associated with flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the National Flood Insurance Program. Communities must be in good standing with National Flood Insurance Program in order to be eligible for Hazard Mitigation Grant Program.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

PUBLIC AWARENESS AND EDUCATION CAMPAIGNS

[Background] Through activities such as outreach projects, distribution of maps and environmental education increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.

[Benefits] Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Departments (Fire, Police, Administration, Public Works, Parks, Floodplain Management, Utility, Roads, and/or Emergency Management Department(s); School Boards; Neighborhood/Homeowner Associations), Middle Republican Natural Resources District, Nebraska Emergency Management Agency, Nebraska Department of Environmental Quality, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$1,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

TREE CITY U.S.A.

[Background] Work to become a Tree City U.S.A. through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.

[Benefits] Better maintained trees and hazardous tree removal will eliminate damages to power lines and personal property during hazards events. Participation in Tree City U.S.A. will support community actions to mitigate damages from trees.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments or Parks Departments

[Cost Estimate & Funding] \$5,000+; Arbor Day Foundation, United States/State Forest Service

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that requires ongoing action.

EVACUATION PLAN

[Background] Prepare and implement an emergency evacuation plan for when the immediate and urgent movement of people away from the threat or actual occurrence of a hazard is necessary.

[Benefits] Emergency evacuation plans are developed to ensure the safest and most efficient evacuation time of all expected residents when hazards are serious and require mandatory evacuations. Proper planning will implement an all-hazards approach so that plans can be reused for multiple hazards that could exist.

[Responsible Agency & Partners] Hayes County Board, Emergency Management, and/or Roads Department

[Cost Estimate & Funding] \$40,000; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

NEW WATER WELL, TOWER, AND STAND PIPE

[Background] Evaluate the need to expand water storage capacity through a new water tower, stand pipe, etc. to provide a safe water supply for the community and additional water for fire protection. Communities can evaluate the need to install a

Section Four [Mitigation Strategy]

new well to provide a safe backup water supply for the community, replace existing wells affected by drought, and additional water for fire protection.

[Benefits] Establish back-up supplies of municipal water to supply the needs of citizens. Identify adequate water sources to mitigate potential damages or expenses due to drought. Provide a dependable and ready supply of water so fire districts don't have to rely on equipment and personnel to move water from local water sources to the fire.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$150,000 to \$450,000; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, State Revolving Loan Fund

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

DAM ENGINEERING ANALYSIS, REPAIRS, AND REINFORCEMENTS

[Background] Conduct a preliminary engineering analysis for dam repairs and reinforcement. Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection. The Emergency Action Plan, Dam Breech Analysis, and/or inspection/safety equipment training may need to be updated along with improvements.

[Benefits] Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

HAMLET

Hamlet determined that maintaining their good standing in the NFIP was their high concern. This item and concern was discussed and used to create their Mitigation Action Item. Hamlet's Mitigation Action Items changed from the previous plan as most of their previous concerns do not appear to be issues or high priority at this time.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates. Hayes County will be the main manager of Hamlet's participation in the NFIP. Hayes County will monitor and fully enforce floodplain management regulations as part of NFIP participation.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Hamlet Administration (Village Board), Hayes County

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] Continuous

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

HAYES CENTER

Hayes Center determined that their power systems, warning systems, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates. Hayes County will be the main manager of Hayes Center's participation in the NFIP. Hayes County will monitor and fully enforce floodplain management regulations as part of NFIP participation.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Hayes Center (Village Board) and/or Floodplain Management Department, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

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DRAINAGE ASSESSMENT FOR BRIDGE AND CULVERT IMPROVEMENTS

[Background] Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding/drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform a community-wide stormwater evaluation, identifying multiple problem areas and potential drainage improvements.

[Benefits] Proactive steps to identify all potential problems/issues can lead to effectively addressing improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. This ensures that the most beneficial projects are done first and could possibly eliminate the need for others.

[Responsible Agency & Partners] Hayes Center Public Works, Utility, Roads, and/or Floodplain Management Department, Middle Republican Natural Resource District

[Cost Estimate & Funding] \$10,000 to \$100,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Planning, and/or Emergency Management Departments

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

UNDERGROUND OR IDENTIFY AND RETROFIT POWER AND SERVICE LINES

[Background] Communities can work with their local Public Power District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County or Natural Resources District to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.

[Benefits] To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Planning, Public Works, Utility, and/or Emergency Management Departments, Public Power Districts, Rural Water Districts, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$60,000 to \$80,000/mile (electrical); Hazard Mitigation Assistance Grant Programs, Public Power Districts, Rural Water Districts, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ELECTRICAL SYSTEM GENERATION, LOOPED DISTRIBUTION, AND REDUNDANCIES

[Background] Provide looped distribution service and other redundancies in the electrical system as a backup power supply in the event the primary system is destroyed or fails.

[Benefits] More reliable and resistant power distribution system.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Planning, Public Works, Utility, and/or Emergency Management Departments, Public Power Districts

[Cost Estimate & Funding] \$40,000/mile; Hazard Mitigation Assistance Grant Programs, Public Power Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

STREAM BANK STABILIZATION

[Background] Stream bank/bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures including sheet-pile weirs, rock weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection for critical and/or highly vulnerable facilities, areas, populations, and infrastructure is key.

[Benefits] Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, Utility, and/or Floodplain Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$50,000 to \$100,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WARNING SYSTEMS

[Background] Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.

Section Four [Mitigation Strategy]

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$75/radio; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps,

etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

FLOOD-PRONE PROPERTY ACQUISITION

[Background] Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the National Flood Insurance Program. Repetitive loss structures are typically highest priority.

[Benefits] Voluntary acquisition and demolition of properties prone to flooding will reduce the damages associated with flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the National Flood Insurance Program. Communities must be in good standing with National Flood Insurance Program in order to be eligible for Hazard Mitigation Grant Program.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, Natural Resources Districts

[Timeline] 1-3 years

Section Four [Mitigation Strategy]

[Priority] Medium

[Status] New Action

PUBLIC AWARENESS AND EDUCATION CAMPAIGNS

[Background] Through activities such as outreach projects, distribution of maps and environmental education increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.

[Benefits] Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.

[Responsible Agency & Partners] Hayes Center Fire, Police, Administration (Village Board), Public Works, Parks, Floodplain Management, Utility, Roads, and/or Emergency Management Departments; School Boards; Neighborhood/Homeowner Associations, Middle Republican Natural Resources District, Nebraska Emergency Management Agency, Nebraska Department of Environmental Quality, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$1,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

TREE CITY U.S.A.

[Background] Work to become a Tree City U.S.A. through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.

[Benefits] Better maintained trees and hazardous tree removal will eliminate damages to power lines and personal property during hazards events. Participation in Tree City U.S.A. will support community actions to mitigate damages from trees.

[Responsible Agency & Partners] Hayes Center Public Works (Village Board) and Parks Department

[Cost Estimate & Funding] \$5,000+; Arbor Day Foundation, United States/State Forest Service

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that requires ongoing action.

EVACUATION PLAN

[Background] Prepare and implement an emergency evacuation plan for when the immediate and urgent movement of people away from the threat or actual occurrence of a hazard is necessary.

[Benefits] Emergency evacuation plans are developed to ensure the safest and most efficient evacuation time of all expected residents when hazards are serious and require mandatory evacuations. Proper planning will implement an all-hazards approach so that plans can be reused for multiple hazards that could exist.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Emergency Management, and/or Roads Department(s))

[Cost Estimate & Funding] \$40,000; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

NEW WATER WELL, TOWER, AND STAND PIPE

[Background] Evaluate the need to expand water storage capacity through a new water tower, stand pipe, etc. to provide a safe water supply for the community and additional water for fire protection. Communities can evaluate the need to install a new well to provide a safe backup water supply for the community, replace existing wells affected by drought, and additional water for fire protection.

[Benefits] Establish back-up supplies of municipal water to supply the needs of citizens. Identify adequate water sources to mitigate potential damages or expenses due to drought. Provide a dependable and ready supply of water so fire districts don't have to rely on equipment and personnel to move water from local water sources to the fire.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Utility Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$150,000 to \$450,000; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, State Revolving Loan Fund

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

DAM ENGINEERING ANALYSIS, REPAIRS, AND REINFORCEMENTS

[Background] Conduct a preliminary engineering analysis for dam repairs and reinforcement. Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection. The Emergency Action Plan, Dam Breech Analysis, and/or inspection/safety equipment training may need to be updated along with improvements.

[Benefits] Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Utility Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

Section Four [Mitigation Strategy]

HAYES CENTER SCHOOL

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Hayes Center Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed. Potentially had a new weather tower constructed to increase radio service to larger coverage areas.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Hayes Center, Emergency Management Department and Hayes County Board

[Cost Estimate & Funding] \$300,000; Hazard Mitigation Assistance Grant Programs, Tax Funding

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

HAYES CENTER/HAYES COUNTY RURAL FIRE

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Hayes Center Administration, Public Works, and/or Emergency Management Department(s))

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

FRONTIER COUNTY**FRONTIER COUNTY**

Frontier County determined that their warning systems, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan but more there is more concern with warning systems with the current plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Frontier County Board of Commissioners and Planning and Zoning Commission

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] Continuous

[Priority] High

[Status] This a continued action from past plan that is an ongoing action.

COMPREHENSIVE PLAN AND ZONING REGULATIONS DEVELOPMENT AND UPDATE

[Background] Continue to update Frontier County's existing comprehensive plan and zoning regulations to help guide public policy in terms of transportation, utilities, land use, recreation, and housing.

[Benefits] Through public policy, the comprehensive plan and zoning regulations will help guide future development away from hazard prone areas.

[Responsible Agency & Partners] Frontier County Board of Commissioners and Planning and Zoning Commission

[Cost Estimate & Funding] \$15,000; Tax Revenue, grants, bequeaths

[Timeline] Continuous

[Priority] High

[Status] New Action

EMERGENCY OPERATIONS CENTER

[Background] Construct a regional emergency operations tower and install NOAA all hazards transmitter.

[Benefits] The existing system is not able to communicate to the central part of Frontier County due to the existing terrain. The new tower will provide the public with warnings due emergency situations.

[Responsible Agency & Partners] Frontier County, Emergency Management Agency; National Weather Service/Local Offices

[Cost Estimate & Funding] \$140,000; Hazard Mitigation Assistance Grant Programs and Local Funds

[Timeline] 2-3 years

Section Four [Mitigation Strategy]

[Priority] High

[Status] New Action

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to the Courthouse emergency power backup.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Frontier County Board and local city/village governments.

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-2 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

WARNING SYSTEMS

[Background] Install an outdoor weather warning system at the Stockville Fairgrounds and two county lakes.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Frontier County; Nebraska Game and Parks, Bureau of Reclamation

[Cost Estimate & Funding] \$100,000; Hazard Mitigation Assistance Grant Programs, local funds

[Timeline] 2-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

FLOODPLAIN DEVELOPMENT ORDINANCE ENFORCEMENT

[Background] Continue or improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in significant flood hazard areas), floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the National Flood Insurance Program, Community Rating System (CRS), and participation in Federal Emergency Management Agency's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process. Continue to enforce local floodplain regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of floodplain development permits by any the County. Continue education of building inspectors or Certified Floodplain Managers. Encourage building regulations for storm resistance structures.

[Benefits] Continue compliance with the National Flood Insurance Program. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share. Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.

[Responsible Agency & Partners] Frontier County Board of Commissioners and Planning and Zoning Commission

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant

[Timeline] 1-3 years

[Priority] Medium

[Status] This a continued action from past plan that is an ongoing action.

ROAD AND EMBANKMENT IMPROVEMENTS

[Background] Identify, design, and construct road and embankment improvements as necessary for proper drainage and to adequately manage the traffic load.

[Benefits] Properly designed and constructed roads and embankments promote safer travel and allow for increased emergency response.

[Responsible Agency & Partners] Frontier County Board of Commissioners and Planning and Zoning Commission

[Cost Estimate & Funding] \$50,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] This a continued action from past plan that is an ongoing action.

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Emergency Management Agency and Frontier County

[Cost Estimate & Funding] \$75/radio; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Emergency Management Agency and Frontier County

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

Section Four [Mitigation Strategy]

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Emergency Management Agency and Frontier County

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CITY OF CURTIS

Curtis determined that their power systems and warning systems are high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board)

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

UNDERGROUND OR IDENTIFY AND RETROFIT POWER AND SERVICE LINES

[Background] Bury power or service lines for protection during weather events.

[Benefits] To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board), Curtis Municipal Power

[Cost Estimate & Funding] \$60,000 to \$80,000/mile (electrical); Hazard Mitigation Assistance Grant Programs, City of Curtis

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board)

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board)

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board) and Frontier County

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

Section Four [Mitigation Strategy]

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

DAM ENGINEERING ANALYSIS, REPAIRS, AND REINFORCEMENTS

[Background] Conduct a preliminary engineering analysis for dam repairs and reinforcement. Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection. The Emergency Action Plan, Dam Breech Analysis, and/or inspection/safety equipment training may need to be updated along with improvements.

[Benefits] Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board)/or Floodplain Management Department and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

NEW ALTERNATE POWER SOURCE

[Background] Investigate, develop, and implement new alternative sources of power.

[Benefits] Diversifying sources of power for a community will decrease reliance on sole-source power generation and provide multiple options and redundancies in the event of a natural disaster.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board) and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

VILLAGE OF EUSTIS

Eustis determined that their backup power systems and warning systems are high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

BACKUP GENERATORS

[Background] Provide a backup power source for the water wells generators, provide a generator for the control building.

[Benefits] Reduce the danger to human life/health by keeping water services and sewer services active at all times.

[Responsible Agency & Partners] Village of Eustis (Village Board)

[Cost Estimate & Funding] \$25,000 – \$30,000; Hazard Mitigation Assistance Grant Programs, Eustis Foundation, Bank Loan

[Timeline] 5 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Provide radio controls for warning sirens and install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Village of Eustis (Village Board)

[Cost Estimate & Funding] \$10,000+; Financial Bank, local funds

[Timeline] 5 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

NEW WATER WELL, TOWER, AND STAND PIPE

[Background] Construct a new water well due to the contamination of an existing well.

[Benefits] Provide additional water service and better volume.

[Responsible Agency & Partners] Village of Eustis (Village Board)

[Cost Estimate & Funding] \$100,000; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, State Revolving Loan Fund, Bank Loan, Eustis Area Foundation

[Timeline] 5 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include adding additional trained Fireman and EMTs.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Eustis Fire Protection District and Village of Eustis (Village Board)

[Cost Estimate & Funding] \$5,000+ for equipment, \$1,500 per person; Hazard Mitigation Assistance Grant Programs, Eustis Area Community Foundation

[Timeline] 5 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

Section Four [Mitigation Strategy]

MEDICINE VALLEY SCHOOLS

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Medicine Valley School Board, City or Village part of Medicine Valley Jurisdiction

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed. Potentially had a new weather tower constructed to increase radio service to larger coverage areas.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Emergency Management Department and Frontier County Board

[Cost Estimate & Funding] \$300,000; Hazard Mitigation Assistance Grant Programs, Tax Funding

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

EUSTIS-FARNAM SCHOOLS

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Eustis-Farnam School Board, City or Village part of Medicine Valley Jurisdiction

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed. Potentially had a new weather tower constructed to increase radio service to larger coverage areas.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Emergency Management Department and Frontier County Board

[Cost Estimate & Funding] \$300,000; Hazard Mitigation Assistance Grant Programs, Tax Funding

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

MAYWOOD PUBLIC SCHOOLS**BACKUP GENERATORS**

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Maywood Public School Board, City or Village part of Medicine Valley Jurisdiction

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed. Potentially had a new weather tower constructed to increase radio service to larger coverage areas.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Emergency Management Department and Frontier County Board

[Cost Estimate & Funding] \$300,000; Hazard Mitigation Assistance Grant Programs, Tax Funding

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

Section Four [Mitigation Strategy]

HITCHCOCK COUNTY

HITCHCOCK COUNTY

Hitchcock County determined that their warning systems and existing/future flooding potential are high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Hitchcock County Administration and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

FLOODPLAIN DEVELOPMENT ORDINANCE ENFORCEMENT

[Background] Continue or improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in significant flood hazard areas), floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the National Flood Insurance Program, Community Rating System (CRS), and participation in Federal Emergency Management Agency's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process. Continue to enforce local floodplain regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of floodplain development permits by any community or County. Continue education of building inspectors or Certified Floodplain Managers. Encourage building regulations for storm resistance structures.

[Benefits] Continue compliance with the National Flood Insurance Program. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share. Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.

[Responsible Agency & Partners] Hitchcock County Administration and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Hitchcock County Administration, Planning, and/or Emergency Management Departments

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Install warnings sirens at Trenton Lake that currently do not have any system.

[Benefits] Having early warning equipment to warn occupants on the lake to take shelter in the event of inclement weather.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board) and/or Emergency Management Department(s))

[Cost Estimate & Funding] \$52,000+; Hazard Mitigation Assistance Grant Programs, Local Taxes

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

PALISADE

Palisade determined that their backup power systems, safety rooms, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates. Hitchcock County will be the main manager of Palisade's participation in the NFIP. Hitchcock County will monitor and fully enforce floodplain management regulations as part of NFIP participation.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board) and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

Section Four [Mitigation Strategy]

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies for existing wells and Village office.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Village of Palisade (Village Board)

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs, Tax Revenue

[Timeline] 1 year

[Priority] High

[Status] New Action

FLOODPLAIN DEVELOPMENT ORDINANCE ENFORCEMENT

[Background] Continue or improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in significant flood hazard areas), floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the National Flood Insurance Program, Community Rating System (CRS), and participation in Federal Emergency Management Agency's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process. Continue to enforce local floodplain regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of floodplain development permits by any community or County. Continue education of building inspectors or Certified Floodplain Managers. Encourage building regulations for storm resistance structures.

[Benefits] Continue compliance with the National Flood Insurance Program. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share. Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board) and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board), Planning, and/or Emergency Management Departments

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board) and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STRATTON

Stratton determined that their backup power systems and safety rooms are high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to for the current village shelter.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Village of Stratton (Village Board)

[Cost Estimate & Funding] \$40,000/generator; Hazard Mitigation Assistance Grant Programs, Tax Revenue

[Timeline] 1 year

[Priority] High

Section Four [Mitigation Strategy]

[Status] New Action

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe room in new village building.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Village of Stratton (Village Board)

[Cost Estimate & Funding] \$500,000; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Village of Stratton Administration (Village Board) and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

TRENTON

Trenton determined that their safety rooms, power systems, warning systems, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates. Hitchcock County will be the main manager of Trenton's participation in the NFIP. Hitchcock County will monitor and fully enforce floodplain management regulations as part of NFIP participation.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Village of Trenton Administration (Village Board) and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe room for use by residents of Village of Trenton during weather events.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Village of Trenton Administration (Village Board) and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

FLOODPLAIN DEVELOPMENT ORDINANCE ENFORCEMENT

[Background] Continue or improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in significant flood hazard areas), floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the National Flood Insurance Program, Community Rating System (CRS), and participation in Federal Emergency Management Agency's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping

Section Four [Mitigation Strategy]

process. Continue to enforce local floodplain regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of floodplain development permits by any community or County. Continue education of building inspectors or Certified Floodplain Managers. Encourage building regulations for storm resistance structures.

[Benefits] Continue compliance with the National Flood Insurance Program. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share. Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.

[Responsible Agency & Partners] Village of Trenton Administration (Village Board) and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

ELECTRICAL SYSTEM GENERATION, LOOPED DISTRIBUTION, AND REDUNDANCIES

[Background] Provide looped distribution service and other redundancies in the electrical system as a backup power supply in the event the primary system is destroyed or fails.

[Benefits] More reliable and resistant power distribution system.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$40,000/mile; Hazard Mitigation Assistance Grant Programs, Public Power Districts

[Timeline] 4-5 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

WARNING SYSTEMS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Also look into additional methods of warning systems such as smart phone warning system.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$75/radio; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 4-5 years

[Priority] Medium

[Status] New Action

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 4-5 years

[Priority] Medium

[Status] New Action

PUBLIC AWARENESS AND EDUCATION CAMPAIGNS

[Background] Through activities such as outreach projects, distribution of maps and environmental education increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.

Section Four [Mitigation Strategy]

[Benefits] Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$1,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] Medium

[Status] New Action

EVACUATION PLAN

[Background] Prepare and implement an emergency evacuation plan for when the immediate and urgent movement of people away from the threat or actual occurrence of a hazard is necessary.

[Benefits] Emergency evacuation plans are developed to ensure the safest and most efficient evacuation time of all expected residents when hazards are serious and require mandatory evacuations. Proper planning will implement an all-hazards approach so that plans can be reused for multiple hazards that could exist.

[Responsible Agency & Partners] Village of Trenton Administration (Village Board), Emergency Management, and/or Roads Departments

[Cost Estimate & Funding] \$40,000; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

DROUGHT MONITORING PLAN

[Background] Develop and implement a plan/program to monitor the effects of drought.

[Benefits] Communities can be proactive and well prepared to act as the effects of drought become an issue. Through monitoring systems, communities can mitigate potential damages or costs from the results of a drought event.

[Responsible Agency & Partners] Village of Trenton Public Works, Utility, Administration, and/or Emergency Management Departments, Middle Republican Natural Resource District

[Cost Estimate & Funding] \$45,000+; Hazard Mitigation Assistance Grant Programs, Natural Resource Districts

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

NEW ALTERNATE POWER SOURCE

[Background] Investigate, develop, and implement new alternative sources of power.

[Benefits] Diversifying sources of power for a community will decrease reliance on sole-source power generation and provide multiple options and redundancies in the event of a natural disaster.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$5,000,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] Low

[Status] New Action

SEWAGE PLANT UPGRADES

[Background] Identify, design, and construct plant upgrades as necessary.

[Benefits] Upgrades will allow the plant to run at maximum efficiency and adequately serve the community.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$250,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

REGION 17 EMERGENCY MANAGEMENT AGENCY

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Region 17 Emergency Management

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

EMERGENCY OPERATIONS CENTER

[Background] Investigate, design, and construct a regional emergency operations center.

[Benefits] A regional emergency operations center will allow for a central command and control facility responsible for carrying out emergency preparedness and management functions at a strategic level during an emergency to ensure the continuity of operation.

Section Four [Mitigation Strategy]

[Responsible Agency & Partners] Region 17 Emergency Management Agency and Frontier County and City of Curtis

[Cost Estimate & Funding] \$100,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] Medium

[Status] New Action

MIDDLE REPUBLICAN NATURAL RESOURCES DISTRICT

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

UNDERGROUND OR IDENTIFY AND RETROFIT POWER AND SERVICE LINES

[Background] Communities can work with their local Public Power District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County or Natural Resources District to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.

[Benefits] To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments, Public Power Districts, Rural Water Districts

[Cost Estimate & Funding] \$60,000 to \$80,000/mile (electrical); Hazard Mitigation Assistance Grant Programs, Public Power Districts, Rural Water Districts, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WARNING SYSTEMS

[Background] Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

Section Four [Mitigation Strategy]

[Status] New Action

DAM ENGINEERING ANALYSIS, REPAIRS, AND REINFORCEMENTS

[Background] Conduct a preliminary engineering analysis for dam repairs and reinforcement. Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection. The Emergency Action Plan, Dam Breech Analysis, and/or inspection/safety equipment training may need to be updated along with improvements.

[Benefits] Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection.

[Responsible Agency & Partners] Individual City or Village Administration, Public Works, and/or Emergency Management Departments and Floodplain Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that requires ongoing action.

NEW ALTERNATE POWER SOURCE

[Background] Investigate, develop, and implement new alternative sources of power.

[Benefits] Diversifying sources of power for a community will decrease reliance on sole-source power generation and provide multiple options and redundancies in the event of a natural disaster.

[Responsible Agency & Partners] Individual City or Village Administration, Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

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Section Five [Review, Evaluation, and Implementation]

Section Five contains recommendations for plan implementation and maintenance, including monitoring and evaluating the hazard identification and risk assessment, integration into existing planning mechanisms, continued public involvement and participation, annual review of mitigation actions, and the process for the five-year update.

SECTION FIVE [REVIEW, EVALUATION, AND IMPLEMENTATION]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION FIVE [REVIEW, EVALUATION, AND IMPLEMENTATION]

FEDERAL PLANNING REGULATIONS

REGULATION CHECKLIST 44 CODE OF FEDERAL REGULATIONS (CFR) 201.6 LOCAL MITIGATION PLANS



§§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 if for approval within five years in order to continue to be eligible for mitigation project grant funding.

- Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))
- Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))
- Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))

INTRODUCTION

The Federal Emergency Management Agency (FEMA) Mitigation Directorate states “Mitigation is the cornerstone of emergency management. Mitigation focuses on breaking the cycle of disaster damage, reconstruction, and repeated damage. Mitigation lessens the impact disasters have on people's lives and property through damage prevention, appropriate development standards, and affordable flood insurance. Through measures such as avoiding building in damage-prone areas, stringent building codes, and floodplain management regulations, the impact on lives and communities is lessened”.

The mitigation plan is a living document that guides action over time. As conditions change, new information becomes available, or actions progress over the life of the plan, plan adjustments may be necessary to maintain its relevance. Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Mitigation is taking action now—before the next disaster—to reduce human and financial consequences later (analyzing risk, reducing risk, insuring against risk). Effective mitigation requires that everyone understands local risks, addresses the hard choices, and invests in long-term community well-being. Without mitigation actions, communities jeopardize their safety, financial security, and self-reliance.

- ❑ Disasters can happen at anytime and anywhere; their human and financial consequences are hard to predict.
- ❑ The number of disasters each year is increasing, but only 50% of events trigger Federal assistance.
- ❑ FEMA's mitigation programs help reduce the impact of events—and our dependence on taxpayers and the Treasury for disaster relief. Disasters can cause loss of life; damage buildings and infrastructure; and have devastating consequences for a jurisdiction's economic, social, and environmental well-being.

The goal of the mitigation plan is to reduce the risk to life and property, which includes existing structures and future construction, in the pre and post-disaster environments. This is achieved through regulations, local ordinances, land use and building practices, and mitigation projects that reduce or eliminate long-term risk from hazards and their effects. Outreach programs that increase risk awareness, projects to protect critical facilities, and the removal of structures from flood hazard areas are all examples of mitigation actions. Local mitigation actions and concepts can also be incorporated into land use plans and building codes. Mitigation is valuable to society in these ways:

Section Five [Review, Evaluation, and Implementation]

- It creates safer communities by reducing loss of life and property damage. For example, the rigorous building standards adopted by 20,000 communities across the country are saving the nation more than \$1.1 billion a year in prevented flood damages.
- It allows individuals to minimize post-flood disaster disruptions and recover more rapidly. For example, homes built to NFIP standards incur less damage from floods. When floods cause damage, flood insurance protects the homeowner's investment, as it did for the more than 200,000 Gulf Coast residents who received more than \$23 billion in payments following the 2005 hurricanes.
- It lessens the financial impact on individuals, communities, and society as a whole. For example, a recent study by the Multi-hazard Mitigation Council shows that each dollar spent on mitigation saves society an average of four dollars.

PLAN MAINTENANCE PROCESS

The plan contains many worthwhile actions, Hayes, Frontier, and Hitchcock Counties will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms, such as the comprehensive plans. Hayes, Frontier, and Hitchcock Counties already implements policies and programs to reduce losses to life and property from hazards. Those policies and programs are included in current local plans (comprehensive plans, zoning ordinance updates, subdivision regulations, capital improvement plans, etc) and those local plans will be updated or revised based off information in this plan. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. Each mitigation item will be looked at to see if the jurisdictions can add individual mitigation items into a current plan so it can be accomplished. Also each jurisdiction will make sure all the local plans do not contradict with the proposed mitigation action items but instead work in coordination with them. This process has been done on the local plans between the 2008 plan and this current 2016 plan and is reflected in which current mitigation action items have been included in this plan.

Plan maintenance is a process the planning team established to track the plan's implementation progress and to inform the plan update, including a description of the method and schedule for monitoring, evaluating, and updating within a five-year cycle. The Hazard Mitigation Planning Committee is responsible for initiating plan reviews. In order to monitor progress and update the mitigation strategies identified in the action plan, the committee will revisit the plan annually and following a hazard event. Those listed in Section Two, Table 2.3 will generally be responsible for ensuring plan maintenance is occurring. Also the designated Emergency Managers will ultimately responsible for ensuring review, evaluation, and implementation is taking place. The committee will submit a five year written update to the State and FEMA Region VII, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. These procedures help to:

- Ensure that the mitigation strategy is implemented according to the plan.
- Provide the foundation for an ongoing mitigation program in your community.
- Standardize long-term monitoring of hazard-related activities.
- Integrate mitigation principles into community officials' daily job responsibilities and department roles.
- Maintain momentum through continued engagement and accountability in the plan's progress.

HAZARD MITIGATION PLANNING COMMITTEE

With adoption of the plan, Hayes, Frontier, and Hitchcock Counties will be responsible for the plan implementation and maintenance. The Counties agree to continue their relationships with the Federal Emergency Management Agency (FEMA), Nebraska Emergency Management Agency (NEMA), and to promote hazard mitigation through the follow efforts:

- Act as a forum for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants
- Pursue the implementation of high-priority, low/no-cost recommended actions
- Ensure hazard mitigation remains a consideration for community decision makers
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists
- Monitor and assist in implementation and update of this plan
- Report on plan progress and recommended changes to the various governing boards or councils of all participating jurisdictions
- Inform and solicit input from the public

The primary duty is to see the plan successfully carried out and report to Hayes, Frontier, and Hitchcock Counties, FEMA, NEMA, and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on applicable websites (and others as deemed pertinent). The Emergency Managers for each county will ultimately be responsible for the implementation of each mitigation action and maintenance of the plan.

Roger Powell (Region 17 Emergency Manager) – Frontier County

Char Hamilton (Emergency Manager) – Hayes County

Brandon Myers (Region 51 Emergency Manager) – Hitchcock County

MONITORING IMPLEMENTATION AND EVALUATING EFFECTIVENESS

Each participant's governing body, (City Council, Village Board, County Board, School Board, or other governing bodies) will be responsible for the monitoring, implementation and evaluating of the recommended projects. The responsible bodies for each implementation action will provide reports on the status of all projects and include implementation processes worked well, which caused issues, how coordination efforts are progressing, and which strategies could/should be revised. Each participant's governing body will work to incorporate each mitigation action into their existing planning guidelines according to their current voting process.

Plan monitoring means tracking the implementation of the plan over time, and implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

Evaluating means assessing the effectiveness of the plan at achieving its stated purpose and goals. Plan evaluation may not occur as frequently as plan monitoring, but it is an important step to ensure that the plan continues to serve a purpose.

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions
- Increased vulnerability as a result of failed or ineffective mitigation actions
- Increased vulnerability as a result of new development (and/or further annexation)

In order to best evaluate any changes in vulnerability as a result of plan implementation, the Hazard Mitigation Planning Committee will adhere to the following process:

Section Five [Review, Evaluation, and Implementation]

- A representative from the responsible office identified in each mitigation measure will be responsible for tracking and reporting on an annual basis to the committee lead on action status and provide input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the action does not meet identified objectives, the action lead will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government. Implementation will be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the planning area. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting safe, sustainable communities. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities. Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions.

This would include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, Hayes, Frontier, and Hitchcock Counties will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal earmarked funds, and other grant programs, including those that can serve or support multi-objective applications.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be done by written changes and submissions, as is appropriate and necessary, and as approved by the Hazard Mitigation Planning Committee. In keeping with the five-year update process, the committee will convene public meetings to solicit public input on the plan and its routine maintenance and the final product will be adopted by the local entities.

UPDATING THE PLAN

Updating means reviewing and revising the plan at least once every five years to reflect changes in development, progress in local mitigation efforts, and changes in priorities. Vulnerabilities and mitigation priorities often change following a disaster, and additional funding sources may become available, such as FEMA's Hazard Mitigation Grant Program or Public Assistance. Generally, public awareness increases, and the demand and support for mitigation frequently increases following a disaster. Updating the current is vital to ensure the correct mitigation action items are included in the current plan or if additional items will need to be added to the new plan. This process was completed between the 2008 plan and this plan and is reflected in what mitigation items were included in this plan. Prior mitigation items were analyzed to determine if the communities wanted to change priorities, timelines, budgets, responsible parties, remove current items or add new items.

As this plan is an update to the previous Hayes, Frontier, and Hitchcock Counties Mitigation Plans, the previous plan was heavily reviewed. Much of the specific demographics for each jurisdiction remained the same as they were in the original plan. The jurisdiction's priorities for hazard mitigation actions reflect the fact that there has been minimal change in the risk and vulnerabilities present for each jurisdiction since the previous plan. It is also important to understand that no new substantial infrastructure has been built in the planning area since the previous plan, as indicated by the public input gathered and compiled in Appendices B and C. The communities perceived that their risk and vulnerabilities have remained very similar to what was identified in the previous plan, and prioritized their mitigation actions accordingly. Plan updates provide the opportunity to consider how well the procedures established in the previously approved plan worked and revise them as needed. Updates to this plan will:

- Consider changes in vulnerability due to action implementation
- Document success stories where mitigation efforts have proven effective

- Document areas where mitigation actions were not effective
- Document any new hazards that may arise or were previously overlooked
- Incorporate new data or studies on hazards and risks
- Incorporate new capabilities or changes in capabilities
- Incorporate growth and development-related changes to infrastructure inventories
- Incorporate new action recommendations or changes in action prioritization

The below table is a comparison between the original 2010 and this plan update. The status updates in Section 4: Mitigation Strategy also detail changes in mitigation action priorities for participating jurisdictions.

TABLE 5.1: MITIGATION ACTION ITEMS PRIORITIES

Participating Jurisdiction	Past Priorities	Current Priorities
Hayes County	Backup Generators, Electrical System Looped Distribution/Redundancies, NFIP, Public Awareness/Education, Weather Radios, Civil Service Improvements, Flood-Prone Property Acquisition, and Drainage Assessment for Bridge and Culvert Improvements	NFIP, Backup Generators, Drainage Assessments, Storm Shelter and Safe Rooms, Underground or identify and Retrofit Power and Service Lines, Electrical System Generation, Looped Distribution, and Redundancies, Stream bank Stabilization, Warning Systems, Weather Radios, Alert and Warning Sirens, Civil Service Improvements, Emergency Communications, Flood-Prone Property Acquisition, Public Awareness and Education Campaigns, Tree City USA, Evacuation Plan, New Water Well, Tower, and Stand Pipe, and Dam Engineering Analysis, Repairs, and Reinforcements.
Hamlet	Backup Generators, Storm Shelter/Safe Rooms, Electrical System Looped Distribution/Redundancies, NFIP, Tree City USA, Public Awareness/Education, Warning Systems, Weather Radios, Alert/Warning Sirens, Evacuation Plan, and Sandbagging	NFIP
Hayes Center	Backup Generators, Electrical System Looped Distribution/Redundancies, Drainage Assessment for Bridge and Culvert Improvements, New Water Tower/Stand Pipe, Tree City USA, NFIP, Public Awareness/Education, Civil Service Improvements, Weather Radios, Emergency Communications, Alert/Warning Sirens, and Warning Systems	NFIP, Backup Generators, Drainage Assessments, Storm Shelter and Safe Rooms, Electrical System Generation, Looped Distribution, and Redundancies, Stream bank Stabilization, Warning Systems, Weather Radios, Alert and Warning Sirens, Civil Service Improvements, Emergency Communications, Flood-Prone Property Acquisition, Public Awareness and Education Campaigns, Tree City USA, Evacuation Plan, and Dam Engineering Analysis, Repairs, and Reinforcements.
Frontier County	Portable Backup Generators, Bury Overhead Electric Lines, New Electric Substation, Embankment Improvements, Control Dam work, and Automated Dialing System.	NFIP, Comprehensive Plan and Zoning Regulations Development and Update, Emergency Operations Center, Backup Generators, Warning Systems, Floodplain Development Ordinance Enforcement, Road and Embankment Improvements, Weather Radios, Alert and Warning Sirens, and Emergency Communications

Section Five [Review, Evaluation, and Implementation]

Participating Jurisdiction	Past Priorities	Current Priorities
Curtis	Portable Backup Generators, Bury Overhead Electric Lines, New Electric Substation, Embankment Improvements, Control Dam work, and Automated Dialing System.	Backup Generators, Underground or identify and Retrofit Power and Service Lines, Alert and Warning Sirens, Civil Service Improvements, Emergency Communications, Dam Engineering Analysis, Repairs, and Reinforcements, and New Alternate Power Source
Eustis	Portable Backup Generators, Bury Overhead Electric Lines, New Electric Substation, Embankment Improvements, Control Dam work, and Automated Dialing System.	Backup Generators, Alert and Warning Sirens, New Water Well, Tower, and Stand Pipe, and Civil Service Improvements.
Hitchcock County	NFIP, Restrict construction in SFHA, Additional Fire-fighting Equipment, Safe Rooms/Shelters,	NFIP, Floodplain Development Ordinance Enforcement, Storm Shelter and Safe Rooms, and Civil Service Improvements.
Palisade	NFIP, Restrict construction in SFHA, Additional Fire-fighting Equipment, Safe Rooms/Shelters, Sewage Plant Upgrade, Electrical Distribution System Upgrade, and Generation System Upgrade	NFIP, Backup Generators, Floodplain Development Ordinance Enforcement, Storm Shelter and Safe Rooms, and Civil Service Improvements.
Stratton	NFIP, Restrict construction in SFHA, Additional Fire-fighting Equipment, Safe Rooms/Shelters, Sewage Plant Upgrade, Electrical Distribution System Upgrade, and Generation System Upgrade	Backup Generators, Storm Shelter and Safe Rooms, and Civil Service Improvements.
Trenton	NFIP, Restrict construction in SFHA, Additional Fire-fighting Equipment, Safe Rooms/Shelters, Sewage Plant Upgrade, Electrical Distribution System Upgrade, and Generation System Upgrade	NFIP, Storm Shelter and Safe Rooms, Civil Service Improvements, Floodplain Development Ordinance Enforcement, Electrical System Generation, Looped Distribution, and Redundancies, Warning Systems, Weather Radios, Alert and Warning Sirens, Emergency Communications, Public Awareness and Education Campaigns, Evacuation Plan, Drought Monitoring Plan, New Alternate Power Source, and Sewage Plant Upgrades.

CONTINUED PUBLIC INVOLVEMENT AND PARTICIPATION

Keeping the plan current also means continuing to provide opportunities for public involvement in the plan and its implementation. Continued public involvement is imperative to the overall success of the plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the plan implementation and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings.

The Hazard Mitigation Planning Committee also may identify specific procedures for keeping elected officials involved, either through the monitoring and evaluation procedures and/or through the process for continuing public participation. The local governing body usually adopts the plan, so reporting back to them annually or at other regular intervals can help maintain support and provide accountability for those responsible for the plan's maintenance and implementation.

When the Hazard Mitigation Planning Committee reconvenes for the update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan. In reconvening, the committee may identify a public outreach subcommittee, which would be responsible for coordinating the activities necessary to involve the greater public. The subcommittee would develop a plan for public

involvement and be responsible for disseminating information through a variety of media channels detailing the plan update process. As part of this effort, public hearings would be held and public comments would be solicited on the plan update draft.

INCORPORATION INTO EXISTING PLANNING MECHANISMS

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development.

As described in *Section Six: Participant Profiles*, Hayes, Frontier, and Hitchcock Counties already implements policies and programs to reduce losses to life and property from hazards. The plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- Comprehensive Plans
- Emergency Operations Plans
- Emergency Response Plans
- Ordinances
- Capital improvement plans and budgets
- Other plans, regulations, and practices with a mitigation focus

As mentioned in *Section Four: Mitigation Strategy* and *Section Six: Participant Profiles*, each of the ten full participates have existing authorities, policies, programs, and resources that need to be reviewed and used along with this plan to complete any mitigation action item.

Those involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of the plan with these other plans, programs, etc., as appropriate. Incorporation into existing planning mechanisms will be done through the routine actions of:

- Monitoring other planning/program agendas
- Attending other planning/program meetings
- Participating in other planning processes
- Monitoring community budget meetings for other community program opportunities

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community. Efforts should continuously be made to monitor the progress of mitigation actions implemented through other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan. In general each jurisdiction (county, city, or village) will need to take all the mitigation action items into account when local plans (comprehensive plans, zoning ordinance updates, subdivision regulations, capital improvement plans, etc) are redone or revised. Each mitigation item will be looked at to see if the jurisdiction can add each individual mitigation item into a current plan so it can be accomplished. Also each jurisdiction will make sure all the local plans do not contradict with the proposed mitigation action items but instead work in coordination with them.

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Section Six [Participant Profiles – Hayes County]

Section Six provides an overall profile of the plan area including geography, demographics, assets inventory, capabilities assessment, and climate as well as hazard identification and risk assessment analysis specific to each individual participant.

SECTION SIX [HAYES COUNTY]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION SIX [PARTICIPANT PROFILES]

HAYES COUNTY

Local governments have the responsibility to protect the health, safety, and welfare of citizens. Proactive mitigation policies and actions help reduce risk and create safer, more disaster resilient jurisdictions. Mitigation is an investment in the jurisdiction's future safety and sustainability. Consider the critical importance of mitigation to:

- Protect public safety and prevent loss of life and injury.
- Reduce harm to existing and future development.
- Prevent damage to a jurisdiction's unique economic, cultural, and environmental assets.
- Minimize operational downtime and accelerate recovery of government and business after disasters.
- Reduce the costs of disaster response and recovery and the exposure to risk for first responders.
- Help accomplish other jurisdiction objectives, such as leveraging capital improvements, infrastructure protection, open space preservation, and economic resiliency.

Demographics, assets, and capabilities information can be used to determine differing levels of vulnerability by analyzing data on population and housing, structural inventories and valuations, critical facilities, highly vulnerable areas and populations, as well as future land use and development for each participating jurisdiction. These analyses directly impact the hazard identification and risk assessment, which ultimately are reflected in the jurisdiction's priorities and mitigation alternatives.

HISTORY

Hayes County was created by an act of the Legislature on Feb. 19, 1877 and named for President Rutherford B. Hayes. It was not until the latter part of 1884, however, that the county officially organized. The following year, Hayes Center was founded with the intent of it being the county seat.

The early history of Hayes County, like so many others in Southwest Nebraska, centers around the cattle herds that were driven from Texas to Ogallala. Pre-dating that were the days when the Pawnee and Sioux tribes roamed the grasslands in this area and hunted buffalo. It was the buffalo that resulted in one of the most significant events in the history of what today is Hayes County.

In October 1871, President Ulysses S. Grant revealed that Grand Duke Alexis of Russia would be making a tour of the United States. One of the Duke's desires was to shoot a buffalo during his visit. Arrangements were quickly made for the Duke and his party of hunt on the central plains in the Nebraska Territory. Leading the hunt would be Gen. George Custer and Gen. Phil Sheridan. Buffalo Bill Cody, at age 25, would serve as the guide.

Cody asked Sioux Chief Spotted Tail to help round up a buffalo herd. In exchange for his assistance, Spotted Tail would receive 1,000 pounds of tobacco.

An elaborate camp was set up one mile west of Red Willow Creek, just inside what today is the eastern boundary of the county. It included two hospital tents for royal meals, ten wall tents for guests and generals, and a dormitory tent for orderlies and Russian servants.

Section Six [Participant Profiles I Hayes County]

The hunt took place in January 1872. The scouts and the Sioux found a herd of buffalo near Medicine Creek. After Duke Alexis emptied two pistols, Cody gave him a .50 caliber Springfield rifle. On his first shot, the Duke dropped a buffalo bull. Russian servants immediately brought out a basket of champagne to celebrate. Before the hunt ended, the Duke shot a total of eight buffalo.

GEOGRAPHIC SUMMARY

Geographic information, including topographic and soils data, play key roles in land planning and heavily influence land use and development. Understanding the unique, local land composition and characteristics will reduce harm to existing and future development by deterring growth into hazard prone areas.

Hayes County is located in southwestern Nebraska. Incorporated areas within the County include Hamlet and Hayes Center. The county seat and largest community is Hayes Center. Table 6.1, below, summarizes the County's total area composition and elevation.

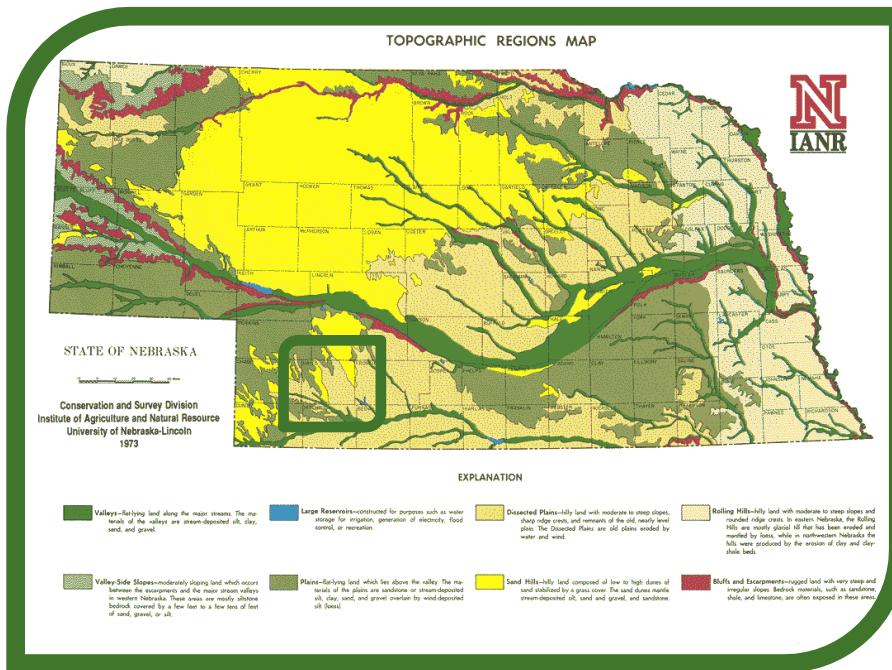
TABLE 6.1: GENERAL GEOGRAPHIC SUMMARY [CASDE] HAYES COUNTY

Jurisdiction	Area [sq. mi.]			Elevation [ft.]
	Total	Land	Water	
Hayes County	713	713	0.2	--
Hamlet	0.31	0.31	0.0	2,838
Hayes Center	0.27	0.27	0.0	3,045

Source: University of Nebraska – Lincoln. Virtual Nebraska. www.casde.unl.edu.

Hayes County contains four primary topographic regions according to the Conservation and Survey Division of the University of Nebraska- Lincoln. These include 'valleys', 'plains', 'dissected plains', and 'sand hills'. The County is also comprised of four main soil series, including Kuma-Keith-Colby, Hord-McCook-Hobbs, Valentine-Elsmere-Tryon, and Satanta-Keith. The figures and tables below display topographic and soils data, with Hayes County outlined.

FIGURE 6.1: GENERAL TOPOGRAPHIC REGIONS [IANR] STATE OF NEBRASKA – HAYES COUNTY



Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

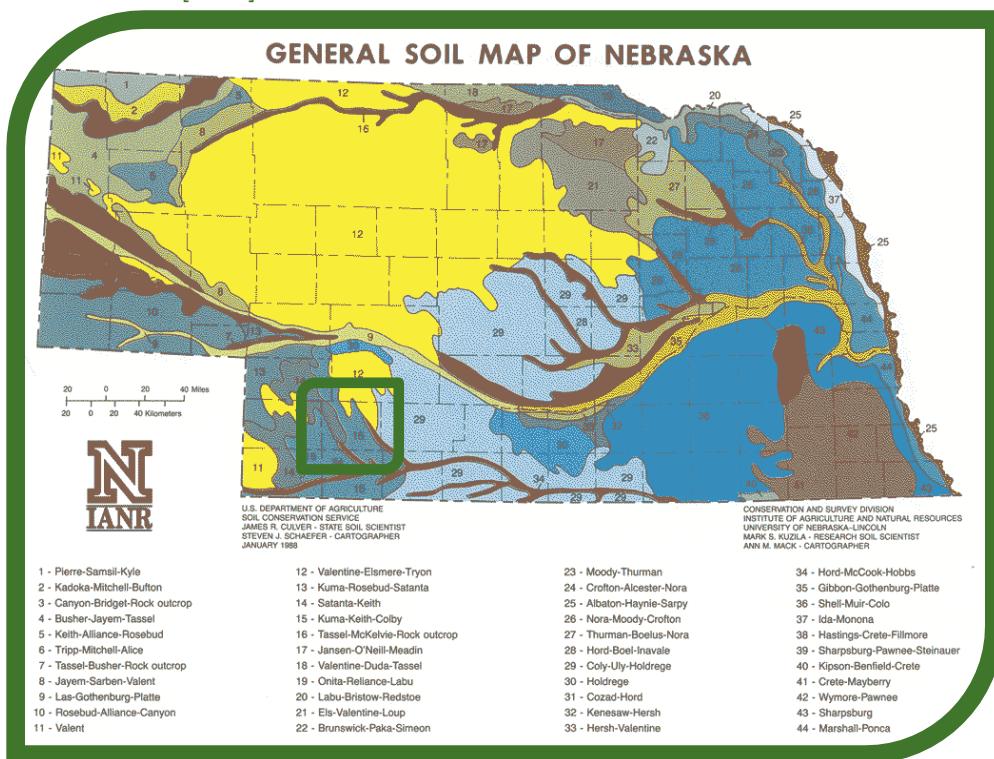
Section Six [Participant Profiles I Hayes County]

TABLE 6.2: GENERAL TOPOGRAPHIC DESCRIPTIONS [IANR] STATE OF NEBRASKA – HAYES COUNTY

Topographic Region	Description
Valleys	Flat-lying land along the major streams. The materials of the valleys are stream-deposited silt, clay, sand, and gravel.
Plains	Flat-lying land which lies above the valley. The materials of the plains are sandstone or stream-deposited silt, clay, sand, and gravel overlain by wind-deposited silt (loess).
Dissected Plains	Hilly land with moderate to steep slopes, sharp ridge crests, and remnants of the old, nearly level plains. The Dissected Plains are old plains eroded by water or wind.
Sand Hills	Hilly land comprised of low to high dunes of sand stabilized by a grass cover. The sand dunes meet stream-deposited silt, sand and gravel, and sandstone.

Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

FIGURE 6.2: GENERAL SOILS [IANR] STATE OF NEBRASKA – HAYES COUNTY



Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

TABLE 6.3: GENERAL SOILS DESCRIPTIONS [IANR] STATE OF NEBRASKA – HAYES COUNTY

Soil Association	Description
Kuma-Keith-Colby	The Kuma series consists of very deep, well drained soils that formed in medium to moderately fine textured calcareous eolian deposits with an age discontinuity marked by a paleosol. Kuma soils are on tableland plains and upland hillslopes. Slopes range from 0 to 8 percent. Mean annual precipitation is about 41 centimeters (16 inches) and the mean annual temperature is about 10 degrees C (50 degrees F).
	The Keith series consists of very deep, well drained, soils that formed in calcareous loess. Keith soils are on upland hillslopes, tableland plains, and valley terraces. Slopes range from 0 to 6 percent. Mean annual precipitation is about 46 centimeters (18 inches) and the mean annual air temperature is 11 degrees C (52 degrees F).

Section Six [Participant Profiles | Hayes County]

Soil Association	Description
Kuma-Keith-Colby	The Colby series consists of very deep, well drained and somewhat excessively drained, moderately permeable soils that formed in loess. Colby soils are on plains and hillslopes on tableland in the Central High Tableland (MLRA 72). Slopes range from 0 to 60 percent. Mean annual precipitation is about 450 millimeters (18 inches) and the mean annual temperature is about 11 degrees C (52 degrees F).
Hord-McCook-Hobbs	The Hord series consists of very deep, well drained, moderately permeable soils that formed in mixed loess and alluvium on foot slopes and stream terraces. Slope is dominantly less than 1 percent, but can range from 0 to 7 percent. Mean annual temperature is about 51 degrees F, and mean annual precipitation is about 23 inches at the type location.
	The McCook series consists of very deep, well drained, moderately permeable soils that formed in stratified, calcareous alluvium. These soils are on flood plains and have slopes that range from 0 to 3 percent. Mean annual temperature is 11 degrees C (52 degrees F), and mean annual precipitation is 51 centimeters (20 inches) at the type location.
	The Hobbs series consists of very deep, well drained soils that formed in stratified, silty alluvium. These soils are on flood plains, foot slopes, and alluvial fans in river valleys of Central Loess Plains, MLRA 75. Slopes range from 0 to 6 percent. Mean annual temperature is 11 degrees C (52 degrees F), and mean annual precipitation is 640 millimeters (25 inches) at the type location.
Valentine-Elsmere-Tryon	The Valentine series consists of very deep excessively drained soils formed in eolian sands. Valentine soils are on interdunes, dunes and valley sides of sandhills. A few areas are on stream terraces of valleys. These soils have slopes ranging from 0 to 80 percent. Mean annual temperature is about 9 degrees C. (48 degrees F), and mean annual precipitation is about 51 centimeters (20 inches).
	The Elsmere series consists of very deep, somewhat poorly drained soils that formed in mostly eolian sands on interdunes on sandhills. Some areas formed in alluvial sands on stream terraces on valleys. They formed in eolian sands. Slopes range from 0 to 3 percent. Mean annual temperature is 10 degrees C (49 degrees F), and mean annual precipitation is 53 centimeters (21 inches) at the type location.
	The Tryon series consists of very deep, poorly and very poorly drained soils formed in eolian and alluvial sediments in sandhill interdunes and on stream terraces. Slopes range from 0 to 2 percent. The mean annual precipitation is about 53 centimeters (21 inches), and the mean annual air temperature is about 10 degrees C. (49 degrees F.) at the type location.
Satanta-Keith	The Satanta series consists of very deep well drained soils that formed in eolian deposits. These soils are on sand sheets on paleoterraces of tablelands in the Central High Tableland (MLRA 72). Slopes range from 0 to 15 percent. Mean annual temperature is 13 degrees C. (55 degrees F.) and mean annual precipitation is 48 centimeters (19 inches) at the type location.
	The Keith series consists of very deep, well drained, soils that formed in calcareous loess. Keith soils are on upland hillslopes, tableland plains, and valley terraces. Slopes range from 0 to 6 percent. Mean annual precipitation is about 46 centimeters (18 inches) and the mean annual air temperature is 11 degrees C (52 degrees F).

Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

DEMOGRAPHICS SUMMARY

Demographic statistics aid decision-makers by developing a picture of Hayes County. This picture tells the County and communities where they've been and where they're now, helping decision-makers orient themselves to the most appropriate path to reduce risk and create safer, more disaster resilient jurisdictions. A jurisdiction's population is the driving force behind its housing, employment, economic stability, and potential for change. Proactive mitigation by decision-makers will help prevent future damage to these unique assets.

Tables 6.4-6.7 and Figures 6.3-6.4 below summarize various population and housing characteristics such as population trends, population by age, housing occupancy and tenure, and age of structures. Table 6.8 highlights selected demographic characteristics including housing units lacking complete facilities, no telephone service, mobile home housing units, no vehicles available, population with a disability, and percentage of low-to-moderate income population.

POPULATION

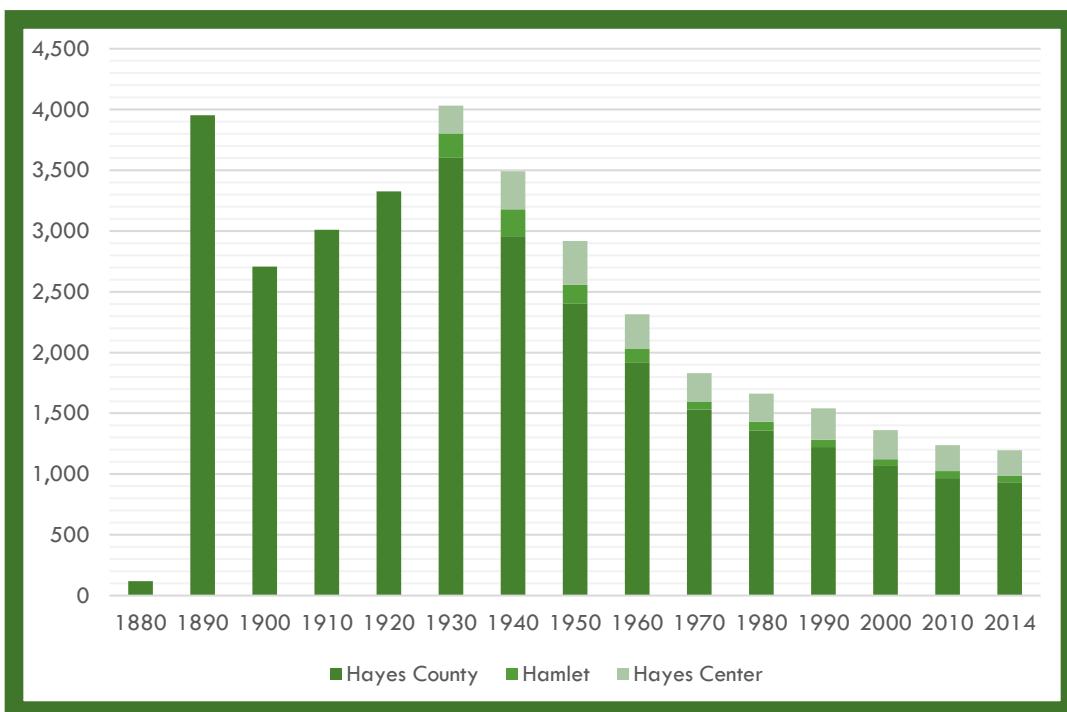
TABLE 6.4: POPULATION TRENDS [CENSUS] HAYES COUNTY 1980 – 2010

Jurisdiction	1980 Population	1990 Population	2000 Population	2010 Population	Change '80 - '10
Hamlet	74	60	54	57	-29.8%
Hayes Center	231	259	240	214	-7.9%
Hayes County	1,356	1,222	1,068	967	-40.2%

Source: United States Census Bureau.

Overall, Hayes County's population was 1,661 persons in 1980 and 1,238 persons in 2010. This is a decrease of 423 people or 34.2 percent in 30 years. This is the result of a decrease in both the urban and rural populations. For the purpose of this plan, the term urban is equal to the population within an incorporated jurisdiction. The rural population was 1,356 persons in 1980 and 967 persons in 2010, a decrease of 389 people or 40.2 percent. The urban population was 305 persons in 1980 and 271 persons in 2010, a decrease of 34 people or 12.5 percent.

FIGURE 6.3: HISTORICAL POPULATION AND TRENDS [CENSUS] HAYES COUNTY 1880 – 2014



Source: United States Census Bureau.

TABLE 6.5: POPULATION BY AGE [CENSUS] HAYES COUNTY

Jurisdiction	< 5 – 9	10 – 19	20 – 34	35 – 54	55 – 64	65 – 84	85 <		18 <	21 <	65 <	Median	Total
	Hayes County	103	134	129	256	154	176		744	725	191	47.7	967
Hayes County	10.7%	13.8%	13.3%	26.4%	15.9%	18.2%	1.6		76.9%	75.0%	19.8%		100%
	0	7	2	21	21	15	2		51	50	17	54.6	57
Hamlet	0.0%	12.3%	3.6%	36.9%	17.6%	26.3%	3.5%		89.5%	87.7	29.8%		100%

Section Six [Participant Profiles | Hayes County]

Jurisdiction	< 5 – 9	10 – 19	20 – 34	35 – 54	55 – 64	65 – 84	85 <		18 <	21 <	65 <	Median	Total
Hayes Center	27	24	39	39	31	50	4		164	163	54	46.8	214
	12.6%	11.2%	18.2%	18.2%	14.5%	23.4%	1.9%		76.6%	76.2%	25.2%		100%

Source: United States Census Bureau.

Overall, Hayes County's median age is 47.7. The largest age cohort of 35-54 represents 26.4 percent of the total population or 265 persons. The smallest age cohort of 85 and greater represents 1.6 percent or 15 persons. Hamlet has the largest percentage of the population 65 and older, with 29.8 percent or 17 persons.

HOUSING

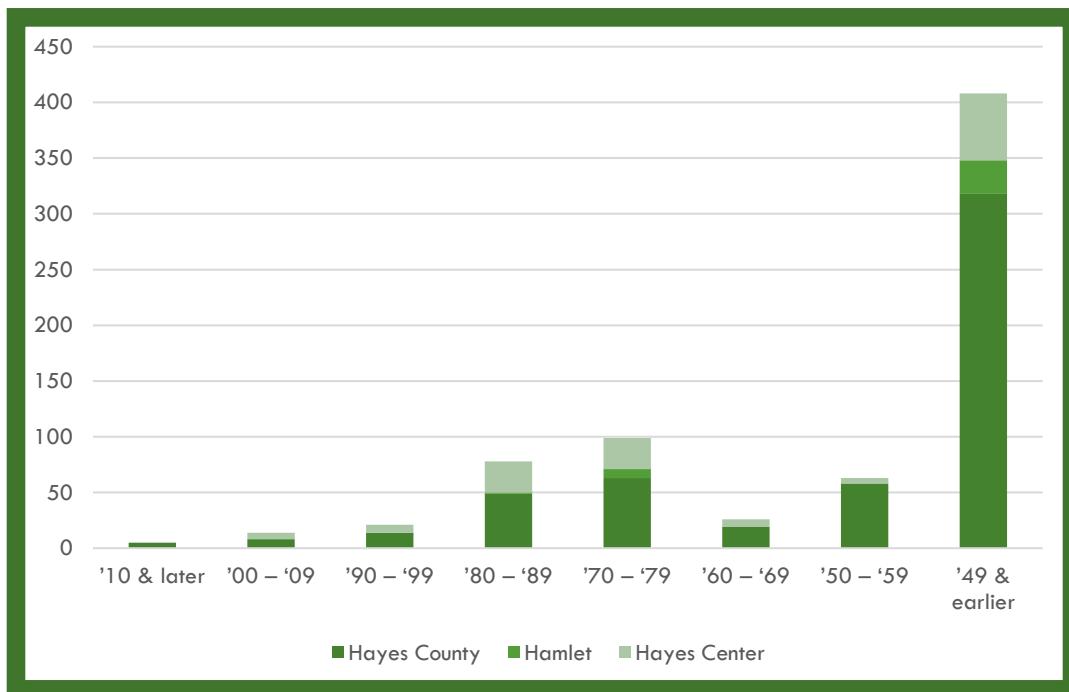
TABLE 6.6: HOUSING OCCUPANCY AND TENURE [CENSUS] HAYES COUNTY

Jurisdiction	Total Housing Units					Occupied Housing Units				
	Occupied		Vacant			Owner		Renter		
	Number	Percent	Number	Percent		Number	Percent	Number	Percent	
Hayes County	462	86.5%	72	13.5%		320	69.3%	142	30.7%	
Hamlet	28	80.0%	7	20.0%		22	78.6%	6	21.4%	
Hayes Center	101	82.8%	21	17.2%		67	66.3%	34	33.7%	

Source: United States Census Bureau.

Overall, the housing occupancy and tenure in Hayes County is owner-occupied units. Of the total housing units, 462 units or 86.5 percent are occupied units and 320 units or 69.3 percent are owner-occupied units. Hamlet has the largest percentage of vacant housing units, with 7 units or 20.0 percent.

FIGURE 6.4: AGE OF STRUCTURES [CENSUS] HAYES COUNTY



Source: United States Census Bureau.

Section Six [Participant Profiles I Hayes County]

TABLE 6.7: AGE OF STRUCTURES [CENSUS] HAYES COUNTY

Jurisdiction	'10 & later	'00 – '09	'90 – '99	'80 – '89	'70 – '79	'60 – '69	'50 – '59	'49 & earlier	Total
Hayes County	5	8	14	49	63	19	58	318	534
Hamlet	0	0	0	1	8	0	0	30	39
Hayes Center	0	6	7	28	28	7	5	60	141

Source: United States Census Bureau.

Overall, there are a total of 534 housing units in Hayes County. Of those, 395 units, or 74.0 percent were constructed prior to 1970. Another 63 units were built between 1970 and 1979, meaning the vast majority of the housing stock is at least 35 years old.

TABLE 6.8: SELECTED DEMOGRAPHIC CHARACTERISTICS [CENSUS] HAYES COUNTY

Jurisdiction	Lack Complete Plumbing Facilities		Lack Complete Kitchen Facilities		No Telephone Service		Mobile Home		No Vehicles Available		Disability	LMI
	#	%	#	%	#	%	#	%	#	%	#	
Hayes County	0	0.0%	0	0.0%	5	1.1%	28	5.2%	14	3.0%	n/a	35.1%
Hamlet	0	0.0%	0	0.0%	0	0.0%	7	17.9%	0	0.0%	n/a	46.1%
Hayes Center	0	0.0%	0	0.0%	0	0.0%	15	10.6%	11	8.2%	n/a	46.9%

Source: United States Census Bureau.

The selected housing characteristics include housing units that lack complete plumbing facilities, lack complete kitchen facilities, are mobile homes, have no telephone service, or have no vehicles available. The selected population characteristics include the disability status of the civilian non-institutionalized population, and the low to moderate income percentage of the population. Overall, Hayes County has a small percentage of housing units with the selected characteristics.

This information impacts the vulnerability of these jurisdictions to the effects of all hazards listed in the plan.

ASSETS INVENTORY

Each jurisdiction has a unique set of assets and capabilities available. By reviewing the existing assets and capabilities, each jurisdiction can identify assets and capabilities that currently reduce disaster losses or could be used to reduce losses in the future, as well as capabilities that inadvertently increase risks. This is especially useful for multi-jurisdictional plans where local capability varies widely. Assessing the jurisdictions' existing assets and capabilities available is a critical step to accomplish mitigation, and how to leverage resources for long-term vulnerability reduction in the mitigation strategy.

CRITICAL FACILITIES AND INFRASTRUCTURE

Critical facilities are structures and institutions necessary for a community's response to and recovery from emergencies. Critical facilities must continue to operate during and following a disaster to reduce the severity of impacts and accelerate recovery. When identifying vulnerabilities, consider both the structural integrity and content value of critical facilities and the effects of interrupting their services to the community.

Infrastructure systems are critical for life, safety, and economic viability and include transportation, power, communication, and water and wastewater systems. Many critical facilities depend on infrastructure to function. For example, hospitals need electricity, water, and sewer to continue helping patients. As with critical facilities, the continued operations of infrastructure systems during and following a disaster are key factors in the severity of impacts and the speed of recovery.

Section Six [Participant Profiles I Hayes County]

According to FEMA, "A critical facility is a structure that, if flooded (or damaged), would present an immediate threat to life, public health, and safety." Examples of critical facilities include hospitals, emergency operations centers, schools, wells, and sanitary sewer lift stations, etc.

Each participating jurisdiction identified critical facilities vital for disaster response, providing shelter to the public, and essential for returning the jurisdiction's functions to normal during and after a disaster. Critical facilities were identified at the 'mitigation alternative' public meetings through the meeting worksheets (refer to Appendix C). Table 6.9 below summarizes the critical facilities and infrastructure identified by participants.

TABLE 6.9: CRITICAL FACILITIES AND INFRASTRUCTURE [FEMA] HAYES COUNTY

Facility / Infrastructure	Hayes County	Hamlet	Hayes Center
School	X		
Courthouse/ Jail	X		X
Fire Station	X		X
Maintenance/ Shop Building	X		
Sub Station	X		X
Church		X	
Weight Station		X	
Well/ Well House			X

VULNERABLE AREAS AND POPULATIONS

People are your most important asset. The risk assessment can identify areas of greater population density, as well as populations that may have unique vulnerabilities or be less able to respond and recover during a disaster. These include visiting populations and access and functional needs populations. In addition, the risk assessment can identify locations that provide health or social services that are critical to post-disaster response or recovery capabilities.

Visiting populations include students, second home owners, migrant farm workers, and visitors for special events. Special events could include large sporting events and festivals where large numbers of people are concentrated and vulnerable to hazards and threats. Visiting populations may be less familiar with the local environment and hazards and less prepared to protect themselves during an event.

The term "access and functional needs populations" describes groups that may not comfortably or safely access the standard resources offered in emergencies. These populations may include children, the elderly, the physically or mentally disabled, non-English speakers, or the medically or chemically dependent. Facility locations and support service operations for these populations (e.g., hospitals, dependent care facilities, oxygen delivery, and accessible transportation) also need to be considered.

Highly vulnerable areas and populations are those considered to be more at risk or susceptible to the effects of hazards. These may include, but are not limited to mobile home parks, nursing homes, campgrounds, fairgrounds, parks, etc.

Each participating jurisdiction identified highly vulnerable areas and populations where residents and visitors to the plan area may be more open or exposed to hazards both during and after an event and require additional response. Highly vulnerable areas and populations were identified at the 'mitigation alternative' public meetings through the meeting worksheets (Appendix C). Table 6.10 below summarizes the highly vulnerable areas and populations identified by participants.

TABLE 6.10: VULNERABLE AREAS AND POPULATIONS [FEMA] HAYES COUNTY

Area/ Population	Hayes County	Hamlet	Hayes Center
School	X		X
Courthouse/ Jail	X		X
Church		X	

NATIONAL HISTORIC REGISTRY

The National Register of Historic Places is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

The historic sites located within Hayes County, according to the National Historic Registry, are listed in Table 6.11 below. These sites were not evaluated for proximity to hazard prone areas.

TABLE 6.11: NATIONAL HISTORIC REGISTRY [NPS] HAYES COUNTY

Site Name	Date Listed	Location
John M. Daniel School	05/30/1985	Hayes County (near Hamlet)
John M. Daniel House	05/30/1985	Hayes County (near Hamlet)
St. John's Evangelical Lutheran German Church and Cemetery	05/16/1985	Hayes County (near Hayes Center)

Source: National Park Service.

CAPABILITIES ASSESSMENT

Local mitigation capabilities are existing resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Each participating jurisdiction completed a capabilities assessment at the 'hazard identification' public meetings through the meeting worksheets (refer to Appendix C). The sections below summarize the primary types of capabilities for reducing long-term vulnerability through mitigation planning including planning and regulatory, administrative and technical, financial, and education and outreach identified by participants.

PLANNING AND REGULATORY

Planning and regulatory capabilities are based on the implementation of ordinances, policies, local laws and State statutes, and plans and programs that relate to guiding and managing growth and development. Examples of planning capabilities that can either enable or inhibit mitigation include comprehensive land use plans, capital improvements programs, transportation plans, small area development plans, disaster recovery and reconstruction plans, and emergency preparedness and response plans. Plans describe specific actions or policies that support goals and drive decisions. Likewise, examples of regulatory capabilities include the enforcement of zoning ordinances, subdivision regulations, and building codes that regulate how and where land is developed and structures are built. Planning and regulatory capabilities refer not only to the current plans and regulations, but also to the jurisdictions' ability to change and improve those plans and regulations as needed.

Tables 6.12-6.14 below summarize the planning and regulatory capabilities currently available in the participating jurisdictions to help prevent and reduce the impacts of hazards.

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TABLE 6.12: PLANNING AND REGULATORY [CAPABILITY ASSESSMENT] HAYES COUNTY

Plans	Hayes County	Hamlet	Hayes Center
Comprehensive/ Master Plan	Yes	Yes	Yes
Capital Improvements Plan	Yes	Yes	No
Economic Development Plan	Yes	No	No
Local Emergency Operations Plan	Yes	Yes	Yes
Continuity of Operations Plan	No	Yes	No
Transportation Plan	No	No	No
Stormwater Management Plan	Yes	No	No
Community Wildfire Protection Plan	No	No	No
Other special plans (e.g., brownfields redevelopment, disaster recovery, climate change adaption, etc.)	No	No	No

Questions to consider for future updates: Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?

TABLE 6.13: BUILDING CODE, PERMITTING, AND INSPECTIONS [CAPABILITY ASSESSMENT] HAYES COUNTY

Building Code, Permitting, and Inspections	Hayes County	Hamlet	Hayes Center
Building Code	No	No	Yes
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	No	No
Fire Department ISO Rating	Yes	Yes	No
Site Plan Review Requirements	No	No	No

Questions to consider for future updates: Are codes adequately enforced?

TABLE 6.14: LAND USE PLANNING AND ORDINANCES [CAPABILITY ASSESSMENT] HAYES COUNTY

Land Use Planning and Ordinances	Hayes County	Hamlet	Hayes Center
Zoning Ordinance	Yes	No	Yes
Subdivision Ordinance	Yes	No	Yes
Floodplain Ordinance	Yes	No	Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	No	No	No
Flood Insurance Rate Maps	Yes	No	Yes
Acquisition of land for open space and public recreation uses	Yes	No	No
Other	No	No	Yes

Questions to consider for future updates: Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced? How can these capabilities be expanded and improved to reduce risk?

ADMINISTRATIVE AND TECHNICAL

Administrative and technical capability refers to the jurisdictions' staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. It also refers to the ability to access and coordinate these resources effectively. These include engineers, planners, emergency managers, GIS analysts, building inspectors, grant writers, floodplain managers, and more. The level of knowledge and technical expertise from personnel employed by each jurisdiction, the public and private sector, or resources available through other government entities, such as counties or special districts, may be accessed to implement mitigation activities in the jurisdiction or provide assistance with limited resources. The degree of intergovernmental coordination among departments also affects administrative capability.

Tables 6.15-6.17 below summarize the administrative and technical capabilities currently available in the participating jurisdictions, including staff and their skills and tools, that can be used for mitigation planning and to implement specific mitigation actions. For smaller jurisdictions without local staff resources, there may be public resources at the next higher level government that can provide technical assistance.

TABLE 6.15: ADMINISTRATION [CAPABILITY ASSESSMENT] HAYES COUNTY

Administration	Hayes County	Hamlet	Hayes Center
Planning Commission	Yes	No	Yes
Mitigation Planning Committee	Yes	Yes	Yes
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems, etc.)	Yes	Yes	Yes
Mutual Aid Agreements	Yes	Yes	No

Questions to consider for future updates: Describe capability. Is coordination effective?

TABLE 6.16: STAFF [CAPABILITY ASSESSMENT] HAYES COUNTY

Staff	Hayes County	Hamlet	Hayes Center
Chief Building Official	Yes	No	No
Floodplain Administrator	Yes	No	Yes
Emergency Manager	Yes	No	Yes
Community Planner	No	No	No
Civil Engineer	No	No	Yes
GIS Coordinator	Yes	No	No
Other	No	No	No

Questions to consider for future updates: Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?

Section Six [Participant Profiles I Hayes County]

TABLE 6.17: TECHNICAL [CAPABILITY ASSESSMENT] HAYES COUNTY

Technical	Hayes County	Hamlet	Hayes Center
Warning systems/ services (Reverse 911, outdoor warning signals)	Yes	Yes	Yes
Hazard Data and Information	No	Yes	No
Grant Writing	Yes	No	Yes
HAZUS Analysis	No	No	No
Other	No	No	No

Questions to consider for future updates: Describe capability. Has capability been used to assess/ mitigate risk in the past? How can these capabilities be expanded and improved to reduce risk?

FINANCIAL

Financial capabilities are the resources that a jurisdiction has access to or is eligible to use to fund mitigation actions. The costs associated with implementing mitigation activities vary. Some mitigation actions such as building assessment or outreach efforts require little to no costs other than staff time and existing operating budgets. Other actions, such as the acquisition of flood-prone properties, could require a substantial monetary commitment from local, State, and Federal funding sources.

Local governments may have access to a recurring source of revenue beyond property, sales, and income taxes, such as stormwater utility or development impact fees. These jurisdictions may be able to use the funds to support local mitigation efforts independently or as the local match or cost-share often required for grant funding.

Table 6.18 below summarizes the financial capabilities currently available in the participating jurisdictions to help fund hazard mitigation activities.

TABLE 6.18: FUNDING RESOURCE [CAPABILITY ASSESSMENT] HAYES COUNTY

Funding Resource	Hayes County	Hamlet	Hayes Center
Capital improvements project funding	Yes	No	Yes
Authority to levy taxes for specific purposes	Yes	Yes	Yes
Fees for water, sewer, gas, or electric services	No	No	Yes
Impact fees for new development	No	No	Yes
Storm water utility fee	No	No	No
Incur debt through general obligation bonds and/ or special tax bonds	Yes	Yes	Yes
Incur debt through private activities	No	No	No
Community Development Block Grant	Yes	No	Yes
Other federal funding programs	Yes	Yes	Yes
State funding programs	Yes	Yes	Yes
Other	No	No	No

Questions to consider for future updates: Has the funding resource been used in the past and for what type of activities? Could the resource be used to fund future mitigation actions? How can these capabilities be expanded and improved to reduce risk?

EDUCATION AND OUTREACH

This type of capability refers to education and outreach programs, methods, and initiatives already in place to implement mitigation activities and communicate hazard-related information. Examples include fire safety programs that fire departments deliver to students at local schools; participation in community programs, such as Firewise or StormReady; and activities conducted as part of hazard awareness campaigns, such as Tornado or Flood Awareness Month.

Table 6.19 below identifies the education and outreach capabilities currently available in the participating jurisdictions to increase hazard mitigation awareness.

TABLE 6.19: EDUCATION AND OUTREACH [CAPABILITY ASSESSMENT] HAYES COUNTY

Program/ Organization	Hayes County	Hamlet	Hayes Center
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	Yes	No
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education, etc.)	Yes	Yes	Yes
Natural disaster or safety related school programs	No	No	No
Storm Ready Certification	No	No	No
Fire Wise Communities Certification	No	No	No
Public-private partnership initiatives addressing disaster-related issues	No	No	No
Other	No	No	No

Questions to consider for future updates: Describe the program/ organization and how it relates to disaster resilience and mitigation. Could the program/ organization help implement future mitigation activities? How can these capabilities be expanded and improved to reduce risk?

SAFE GROWTH

One way to assess the impact of planning and regulatory capabilities is to complete a safe growth audit. The purpose of the safe growth audit is to analyze the impacts of current policies, ordinances, and plans on community safety from hazard risks due to growth. A safe growth audit helps identify gaps in jurisdictions' growth guidance instruments and improvements that could be made to reduce vulnerability to future development.

Tables 6.20-6.27 below summarize the safe growth audit in terms of land use, transportation, environmental management, public safety, zoning ordinances, subdivision regulations, and capital improvements currently available in the participating jurisdictions to help prevent and reduce the impacts of hazards.

TABLE 6.20: LAND USE [SAFE GROWTH] HAYES COUNTY

Comprehensive Plan (Land Use)	Hayes County	Hamlet	Hayes Center
Does the Future Land Use Map clearly identify natural hazard areas?	Yes	No	No
Do the land-use policies discourage development or redevelopment within natural hazard areas?	Yes	No	No
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	Yes	No	Yes

Section Six [Participant Profiles I Hayes County]

TABLE 6.21: TRANSPORTATION [SAFE GROWTH] HAYES COUNTY

Comprehensive Plan (Transportation)	Hayes County	Hamlet	Hayes Center
Does the Transportation Plan limit access to hazard areas?	No	No	No
Is transportation policy used to guide growth to safe locations?	No	No	No
Are movement systems designed to function under disaster conditions (e.g., evacuation)?	No	Yes	No

TABLE 6.22: ENVIRONMENTAL MANAGEMENT [SAFE GROWTH] HAYES COUNTY

Comprehensive Plan (Environmental Management)	Hayes County	Hamlet	Hayes Center
Are environmental systems that protect development from hazards identified and mapped?	Yes	No	No
Do environmental policies maintain and restore protective ecosystems?	Yes	No	No
Do environmental policies provide incentives to development that is located outside protective ecosystems?	No	No	No

TABLE 6.23: PUBLIC SAFETY [SAFE GROWTH] HAYES COUNTY

Comprehensive Plan (Public Safety)	Hayes County	Hamlet	Hayes Center
Are the goals and policies of the Comprehensive Plan related to those of the FEMA Local Hazard Mitigation Plan?	Yes	Yes	Yes
Is safety explicitly included in the plan's growth and development policies?	Yes	Yes	Yes
Does the monitoring and implementation section of the plan cover safe growth objectives?	Yes	No	Yes

TABLE 6.24: ZONING ORDINANCE [SAFE GROWTH] HAYES COUNTY

Zoning Ordinance	Hayes County	Hamlet	Hayes Center
Does the Zoning Ordinance conform to the Comprehensive Plan in terms of discouraging development or redevelopment within natural hazard areas?	Yes	No	Yes
Does the ordinance contain natural hazard overlay zones that set conditions for land uses within such zones?	Yes	No	Yes
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?	Yes	No	Yes
Does the ordinance prohibit development within, or filling of, wetlands, floodways, and floodplains?	Yes	No	Yes

Section Six [Participant Profiles | Hayes County]

TABLE 6.25: SUBDIVISION REGULATIONS [SAFE GROWTH] HAYES COUNTY

Subdivision Regulations	Hayes County	Hamlet	Hayes Center
Do the Subdivision Regulations restrict the subdivision of land within or adjacent to natural hazard areas?	No	No	No
Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?	No	No	No
Do the regulations allow density transfers where hazard areas exist?	No	No	No

TABLE 6.26: CAPITAL IMPROVEMENTS [SAFE GROWTH] HAYES COUNTY

Capital Improvement Program and Infrastructure Policies	Hayes County	Hamlet	Hayes Center
Does the Capital Improvement Program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?	No	Yes	No
Do Infrastructure Policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?	No	Yes	No
Does the Capital Improvement Program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?	No	No	No

TABLE 6.27: ADDITIONAL PLANNING MECHANISMS [SAFE GROWTH] HAYES COUNTY

Additional Planning Mechanisms	Hayes County	Hamlet	Hayes Center
Do small area or corridor plans recognize the need to avoid or mitigate natural hazards?	Yes	Yes	No
Does the Building Code contain provisions to strengthen or elevate construction to withstand hazard forces?	No	No	No
Do economic development or redevelopment strategies include provisions for mitigating natural hazards?	Yes	No	No
Is there an adopted evacuation and shelter plan to deal with emergencies from natural hazards?	Yes	Yes	No

CLIMATE SUMMARY

The monthly climate normals information displayed in the figures and table below is taken from weather station 253690, near Hayes Center. The data from this station is provided by the High Plains Regional Climate Center.

Normals are produced by the National Climatic Data Center (NCDC). Climate normals are an arithmetic average of a variable such as temperature over a prescribed 30-year period. This base period changes every 10 years to reflect the previous 30 years of data. The current period is 1981-2010. Note that NCDC normals may not be the same as a straight average over the 30-year period, due to adjustments for discontinuities such as station moves or changes in observation time.

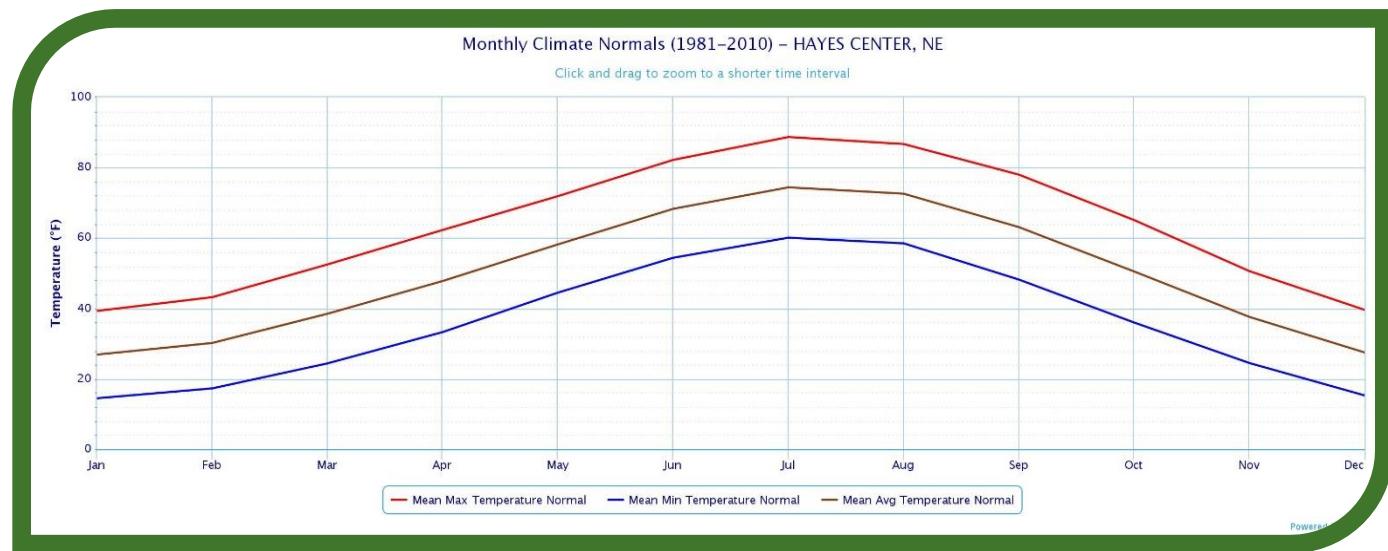
Section Six [Participant Profiles I Hayes County]

TABLE 6.28: GENERAL CLIMATE STATISTICS [HPRCC] MONTHLY COMPARISONS

Month	Mean Maximum Temperature (F)	Mean Minimum Temperature (F)	Mean Average Temperature (F)	Total Precipitation (in.)	Total Snowfall (in.)
January	39.3	14.5	26.9	0.46	6.3
February	43.2	17.3	30.2	0.52	5
March	52.5	24.4	38.5	1.43	6
April	62.3	33.3	47.8	2.14	3.9
May	71.9	44.5	58.2	3.28	0.1
June	82.2	54.4	68.3	3.28	0
July	88.7	60.1	74.4	3.13	0
August	86.7	58.5	72.6	2.83	0
September	78	48.2	63.1	1.65	0.1
October	65.1	36	50.5	1.77	2.3
November	50.6	24.5	37.6	0.84	3.9
December	39.6	15.3	27.5	0.53	5.3

Source: High Plains Regional Climate Center.

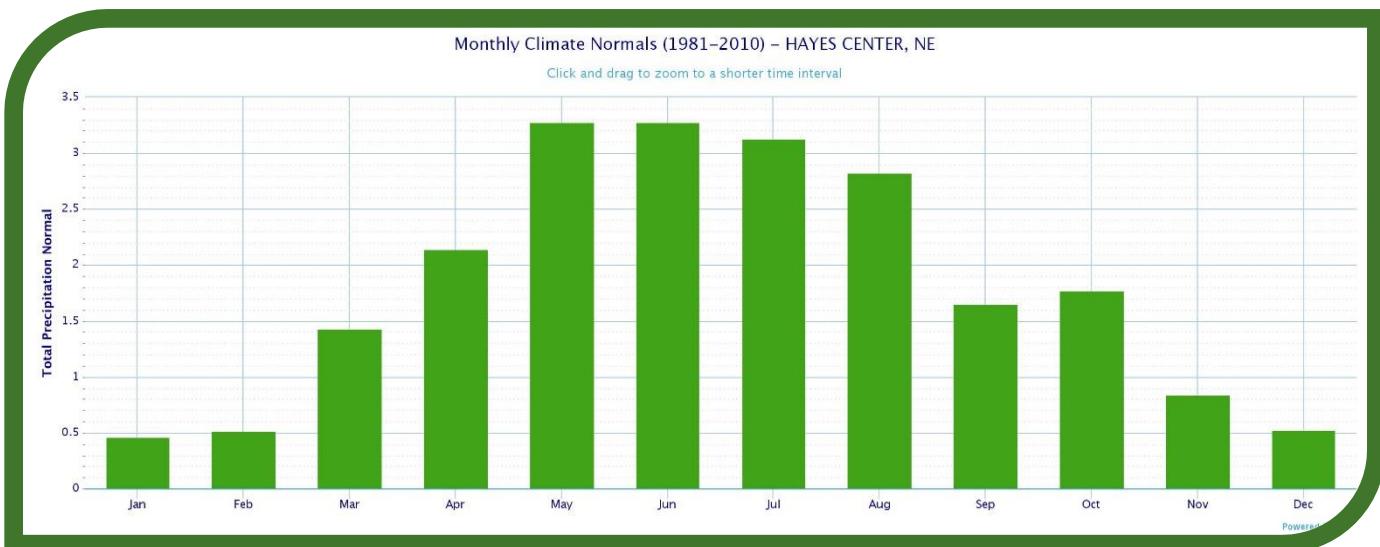
FIGURE 6.5: TEMPERATURE NORMALS [HPRCC] MONTHLY COMPARISONS



Source: High Plains Regional Climate Center.

In Figure 6.5, the monthly climate normals for temperature, including mean maximum, mean minimum, and mean average are shown. Hayes Center (and Hayes County in general) experiences a period of warming generally from February to July and a period of cooling from August to January. Average temperatures range from 26.9 degrees Fahrenheit in January to 74.4 degrees Fahrenheit in July.

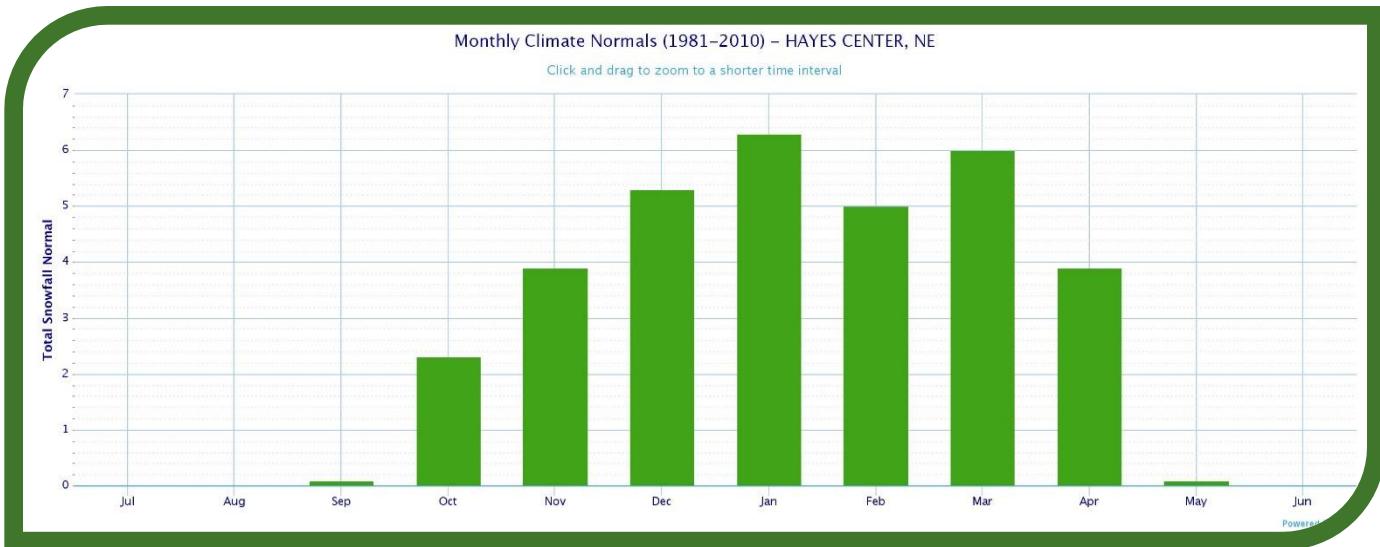
FIGURE 6.6: TOTAL PRECIPITATION NORMALS [HPRCC] MONTHLY COMPARISONS



Source: High Plains Regional Climate Center.

Figure 6.6 shows the monthly climate normals for precipitation. Hayes Center (and Hayes County in general) receives the maximum total precipitation during the months of May and June of 3.28 inches, with an annual total of 21.86 inches of precipitation.

FIGURE 6.7: TOTAL SNOWFALL [HPRCC] MONTHLY COMPARISONS



Source: High Plains Regional Climate Center.

In Figure 6.7, the monthly climate normals for snowfall are shown. Hayes Center (and Hayes County in general) experiences snowfall generally from October until April, with the maximum total snowfall during the month of January of 6.3 inches, and an annual total of 32.9 inches of snowfall.

Section Six [Participant Profiles I Hayes County]

HAZARD IDENTIFICATION AND RISK ASSESSMENT SUMMARY

The hazard identification was conducted to determine the hazards that threaten Hayes, Frontier, and Hitchcock Counties. It was established through public input and information provided by elected officials, key stakeholders, and residents throughout the planning area, as well as conducting research on each hazard type identified in the State of Nebraska Hazard Mitigation Plan. For the purpose of this plan update, nine natural hazards were initially considered, including severe winter storms (including extreme cold and severe winter weather), tornados, severe thunderstorms (including hail, lightning, and severe wind), flooding, extreme heat, drought, earthquakes, wildfires, and landslides. All were identified as separate potential hazard events as they often pose different threats and potential losses can vary greatly. Man-made hazards, with the exceptions of dam failure and levee failure, were not included in this plan. Using existing hazards data and input gained through planning and public meetings, Hayes, Frontier, and Hitchcock Counties identified the hazards that could affect the planning area.

In order to best describe the hazards that affect the jurisdictions, Hayes, Frontier, and Hitchcock Counties utilized the following activities for identifying hazards in the planning area:

- Reviewed the State Hazard Mitigation Plan for information on hazards affecting the planning area.
- Documented the disaster declaration history.
- Downloaded weather-related events from online resources, such as the National Climatic Data Center.
- Reviewed existing studies, reports, and plans related to hazards in the planning area.
- Used flood insurance rate maps (FIRM) and non-regulatory flood risk assessment products developed for the planning area by FEMA as part of the National Flood Insurance Program (NFIP) and the RiskMAP program.
- Contacted colleges or universities that have hazard-related academic programs or extension services.
- Interviewed the planning team and stakeholders about which hazards affect the planning area and should be described in the mitigation plan.
- Consulted local resources such as the newspaper, chamber of commerce, local historical society, or other resources with records of past occurrences.
- Referenced hazards previously identified to determine if they were still relevant.

Hazards data from the Nebraska Emergency Management Agency (NEMA) State of Nebraska Mitigation Plan, Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), as well as other sources were analyzed to gage the overall significance of the hazards to Hayes, Frontier, and Hitchcock Counties. Overall significance was calculated based on risk assessment criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur relatively infrequent or have minimal to no impact on the planning area were deemed to be of low significance. This evaluation was used by Hayes, Frontier, and Hitchcock Counties to identify the hazards of greatest overall significance, allowing the Counties to concentrate resources where they are needed most.

The mitigation plan update focuses on how risk has changed since the previous plans were completed, particularly changes related to land use development and new hazard information. New development in hazard-prone areas, areas affected by recent disasters, and new data and reports were incorporated into the plan in order to analyze the current risk and update mitigation actions. The Nebraska State Hazard Mitigation Plan was consulted to assess the potential of new hazards for Hayes, Frontier, and Hitchcock Counties. The previous Hayes County Plan was also reevaluated, and the comments in Table 6.29 detail how hazards were updated.

Section Six [Participant Profiles I Hayes County]

TABLE 6.29: HAYES COUNTY HAZARD IDENTIFICATION [COMPARISON] 2010-2016

2016 Hazards	2009 Hazards*	2016 Comment
Dam Failure	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Drought	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Earthquake	Hazard identified and evaluated.	Hazard identified but not evaluated.
Extreme Cold	Hazard identified and evaluated (included under Severe Winter Storms).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Winter Storms).
Extreme Heat	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Flood	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Hail	Hazard identified and evaluated (included under Severe Thunderstorms).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Landslide	Hazard identified and evaluated.	Hazard identified but not evaluated.
Lightning	Hazard identified and evaluated (included under Severe Thunderstorms).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Severe Wind	Hazard identified and evaluated (included under Tornados and High Winds).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Severe Winter Weather	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Tornado	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Wildfire	Hazard identified and evaluated.	Hazard identified but not evaluated.
Levee Failure	Hazard identified but not evaluated.	Hazard identified but not evaluated.

Source: Hayes County Hazard Mitigation Plan, 2009.

The Disaster Mitigation Act requires that Hayes, Frontier, and Hitchcock Counties evaluate the risks associated with each hazard identified in the planning process. Refer to Section Three for additional explanations on which hazards were evaluated and why certain hazards were not evaluated in this plan. The overall risk assessment for the identified hazard types represents the presence and vulnerability to each hazard type throughout the planning area. The individual hazard identification tables, based on the public input and information received, identify those hazard types which have occurred, have a significant likelihood to occur again, or have reason to potentially occur in Hayes, Frontier, and Hitchcock Counties. These tables were compiled after receiving responses from the public, discussing the public responses with the State Hazard Mitigation Officer, and conducting detailed research on the presence and risk of each hazard type. The individual participant hazard identification tables and responses may or may not reflect the consensus for risk and vulnerability to each hazard type for the planning area.

Tables 6.30-6.34 summarizes the results of the hazard identification and risk assessment for Hayes County, based on the hazard data and input from the public. For each hazard identified, this table includes the location, maximum probable extent, probability of future events, and overall significance for the County and incorporated jurisdictions.

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TABLE 6.30: HAZARD IDENTIFICATION & RISK ASSESSMENT [HAYES COUNTY] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Extensive	Severe	High
Extreme Cold	Extensive	Moderate	High
Extreme Heat	Extensive	Weak	Medium
Flood	Significant	Moderate	Medium
Hail	Significant	Weak	Medium
Lightning	Significant	Weak	Low
Severe Wind	Extensive	Moderate	Medium
Severe Winter Weather	Extensive	Moderate	High
Tornado	Negligible	Severe	Medium

TABLE 6.31: HAZARD IDENTIFICATION & RISK ASSESSMENT [HAYES CENTER SCHOOLS] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Significant	Moderate	Medium
Extreme Cold	Limited	Moderate	Low
Extreme Heat	Significant	Moderate	Medium
Flood	Limited	Moderate	Low
Hail	Significant	Moderate	Medium
Lightning	Significant	Moderate	Medium
Severe Wind	Significant	Moderate	Medium
Severe Winter Weather	Significant	Moderate	Medium
Tornado	Significant	Moderate	Medium

TABLE 6.32: HAZARD IDENTIFICATION & RISK ASSESSMENT [HAYES COUNTY FIRE] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Extensive	Severe	High
Extreme Cold	Extensive	Moderate	High
Extreme Heat	Extensive	Moderate	Medium
Flood	Significant	Moderate	Medium
Hail	Extensive	Severe	High
Lightning	Extensive	Moderate	High
Severe Wind	Extensive	Severe	High
Severe Winter Weather	Extensive	Severe	Medium
Tornado	Significant	Severe	Medium

TABLE 6.33: HAZARD IDENTIFICATION & RISK ASSESSMENT [HAMLET] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure			
Drought			
Extreme Cold			Medium
Extreme Heat			
Flood	Limited		Medium
Hail	Significant		Medium
Lightning	Significant		Medium
Severe Wind	Significant		Medium
Severe Winter Weather	Extensive		Medium
Tornado	Extensive		Medium

TABLE 6.34: HAZARD IDENTIFICATION & RISK ASSESSMENT [HAYES CENTER] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Extensive	Severe	High
Extreme Cold	Extensive	Moderate	High
Extreme Heat	Extensive	Moderate	Medium
Flood	Negligible	Weak	Low
Hail	Extensive	Severe	High
Lightning	Extensive	Weak	Low
Severe Wind	Extensive	Moderate	High
Severe Winter Weather	Extensive	Moderate	High
Tornado	Significant	Severe	High

THE ACTION PLAN – HAYES COUNTY

The action plan lays the groundwork for implementation. The plan was developed to present the recommendations established by Hayes, Frontier, and Hitchcock Counties on how the participating jurisdictions can reduce risk and vulnerability of people, property, infrastructure, and natural resources to future disaster losses. The action plan identifies how mitigation actions will be implemented, including who is responsible for which actions, what funding mechanisms and other resources are available or will be pursued, when actions will be completed, and how they are prioritized.

Plan updates reflect progress in local mitigation efforts. The integration of the plan into existing planning mechanisms and the implementation of mitigation actions demonstrate progress in risk reduction. Details describing how the current mitigation strategy, including goals and actions, will be incorporated into existing mechanisms are discussed in *Section Five: Review, Evaluation, and Implementation*.

The action plan detailed below contains both new actions developed for this plan update, as well as viable actions that had yet to be completed from the previous Hayes County Plan.

Section Six [Participant Profiles | Hayes County]

LOCAL PLANS AND REGULATIONS

These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.

HAYES COUNTY

Hayes County determined that their power systems, warning systems, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Hayes County and/or Floodplain Management Department

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

DRAINAGE ASSESSMENT FOR BRIDGE AND CULVERT IMPROVEMENTS

[Background] Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding/drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform a community-wide stormwater evaluation, identifying multiple problem areas and potential drainage improvements.

[Benefits] Proactive steps to identify all potential problems/issues can lead to effectively addressing improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within

jurisdictions, preventing interior localized flooding resulting in damages. This ensures that the most beneficial projects are done first and could possibly eliminate the need for others.

[Responsible Agency & Partners] Hayes County Engineering, Roads Department, and Middle Republican Natural Resource Districts

[Cost Estimate & Funding] \$10,000 to \$100,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

UNDERGROUND OR IDENTIFY AND RETROFIT POWER AND SERVICE LINES

[Background] Communities can work with their local Public Power District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County or Natural Resources District to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.

[Benefits] To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments, Public Power Districts, Rural Water Districts, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$60,000 to \$80,000/mile (electrical); Hazard Mitigation Assistance Grant Programs, Public Power Districts, Rural Water Districts, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

Section Six [Participant Profiles I Hayes County]

[Status] New Action

ELECTRICAL SYSTEM GENERATION, LOOPED DISTRIBUTION, AND REDUNDANCIES

[Background] Provide looped distribution service and other redundancies in the electrical system as a backup power supply in the event the primary system is destroyed or fails.

[Benefits] More reliable and resistant power distribution system.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments, Public Power Districts

[Cost Estimate & Funding] \$40,000/mile; Hazard Mitigation Assistance Grant Programs, Public Power Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

STREAM BANK STABILIZATION

[Background] Stream bank/bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures including sheet-pile weirs, rock weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection for critical and/or highly vulnerable facilities, areas, populations, and infrastructure is key.

[Benefits] Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$50,000 to \$100,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WARNING SYSTEMS

[Background] Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments

[Cost Estimate & Funding] \$75/radio; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments, Natural Resources Districts

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

Section Six [Participant Profiles I Hayes County]

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

FLOOD-PRONE PROPERTY ACQUISITION

[Background] Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the National Flood Insurance Program. Repetitive loss structures are typically highest priority.

[Benefits] Voluntary acquisition and demolition of properties prone to flooding will reduce the damages associated with flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the National Flood Insurance Program. Communities must be in good standing with National Flood Insurance Program in order to be eligible for Hazard Mitigation Grant Program.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

PUBLIC AWARENESS AND EDUCATION CAMPAIGNS

[Background] Through activities such as outreach projects, distribution of maps and environmental education increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.

[Benefits] Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Departments (Fire, Police, Administration, Public Works, Parks, Floodplain Management, Utility, Roads, and/or Emergency Management Department(s); School Boards; Neighborhood/Homeowner Associations), Middle Republican Natural Resources District, Nebraska Emergency Management Agency, Nebraska Department of Environmental Quality, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$1,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

TREE CITY U.S.A.

[Background] Work to become a Tree City U.S.A. through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.

[Benefits] Better maintained trees and hazardous tree removal will eliminate damages to power lines and personal property during hazards events. Participation in Tree City U.S.A. will support community actions to mitigate damages from trees.

[Responsible Agency & Partners] Hayes County, Individual City or Villages Public Works Departments or Parks Departments

[Cost Estimate & Funding] \$5,000+; Arbor Day Foundation, United States/State Forest Service

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that requires ongoing action.

EVACUATION PLAN

[Background] Prepare and implement an emergency evacuation plan for when the immediate and urgent movement of people away from the threat or actual occurrence of a hazard is necessary.

[Benefits] Emergency evacuation plans are developed to ensure the safest and most efficient evacuation time of all expected residents when hazards are serious and require mandatory evacuations. Proper planning will implement an all-hazards approach so that plans can be reused for multiple hazards that could exist.

[Responsible Agency & Partners] Hayes County Board, Emergency Management, and/or Roads Department

[Cost Estimate & Funding] \$40,000; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

NEW WATER WELL, TOWER, AND STAND PIPE

[Background] Evaluate the need to expand water storage capacity through a new water tower, stand pipe, etc. to provide a safe water supply for the community and additional water for fire protection. Communities can evaluate the need to install a new well to provide a safe backup water supply for the community, replace existing wells affected by drought, and additional water for fire protection.

Section Six [Participant Profiles I Hayes County]

[Benefits] Establish back-up supplies of municipal water to supply the needs of citizens. Identify adequate water sources to mitigate potential damages or expenses due to drought. Provide a dependable and ready supply of water so fire districts don't have to rely on equipment and personnel to move water from local water sources to the fire.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$150,000 to \$450,000; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, State Revolving Loan Fund

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

DAM ENGINEERING ANALYSIS, REPAIRS, AND REINFORCEMENTS

[Background] Conduct a preliminary engineering analysis for dam repairs and reinforcement. Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection. The Emergency Action Plan, Dam Breech Analysis, and/or inspection/safety equipment training may need to be updated along with improvements.

[Benefits] Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection.

[Responsible Agency & Partners] Hayes County, Public Works, Utility, and/or Floodplain Management Department, and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

HAMLET

Hamlet determined that maintaining their good standing in the NFIP was their high concern. This item and concern was discussed and used to create their Mitigation Action Item. Hamlet's Mitigation Action Items changed from the previous plan as most of their previous concerns do not appear to be issues or high priority at this time.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates. Hayes County will be the main manager of Hamlet's participation in the NFIP. Hayes County will monitor and fully enforce floodplain management regulations as part of NFIP participation.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Hamlet Administration (Village Board)

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] Continuous

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

HAYES CENTER

Hayes Center determined that their power systems, warning systems, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates. Hayes County will be the main manager of Hayes Center's participation in the NFIP. Hayes County will monitor and fully enforce floodplain management regulations as part of NFIP participation.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Hayes Center (Village Board) and/or Floodplain Management Department, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

DRAINAGE ASSESSMENT FOR BRIDGE AND CULVERT IMPROVEMENTS

[Background] Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding/drainage issues to reduce and/or alleviate flooding. Stormwater master plans can

Section Six [Participant Profiles I Hayes County]

be conducted to perform a community-wide stormwater evaluation, identifying multiple problem areas and potential drainage improvements.

[Benefits] Proactive steps to identify all potential problems/issues can lead to effectively addressing improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. This ensures that the most beneficial projects are done first and could possibly eliminate the need for others.

[Responsible Agency & Partners] Hayes Center Public Works, Utility, Roads, and/or Floodplain Management Department, Middle Republican Natural Resource District

[Cost Estimate & Funding] \$10,000 to \$100,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Planning, and/or Emergency Management Departments

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

UNDERGROUND OR IDENTIFY AND RETROFIT POWER AND SERVICE LINES

[Background] Communities can work with their local Public Power District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County or Natural Resources District to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.

[Benefits] To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Planning, Public Works, Utility, and/or Emergency Management Departments, Public Power Districts, Rural Water Districts, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$60,000 to \$80,000/mile (electrical); Hazard Mitigation Assistance Grant Programs, Public Power Districts, Rural Water Districts, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ELECTRICAL SYSTEM GENERATION, LOOPED DISTRIBUTION, AND REDUNDANCIES

[Background] Provide looped distribution service and other redundancies in the electrical system as a backup power supply in the event the primary system is destroyed or fails.

[Benefits] More reliable and resistant power distribution system.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Planning, Public Works, Utility, and/or Emergency Management Departments, Public Power Districts

[Cost Estimate & Funding] \$40,000/mile; Hazard Mitigation Assistance Grant Programs, Public Power Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

STREAM BANK STABILIZATION

[Background] Stream bank/bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures including sheet-pile weirs, rock weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection for critical and/or highly vulnerable facilities, areas, populations, and infrastructure is key.

[Benefits] Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, Utility, and/or Floodplain Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$50,000 to \$100,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WARNING SYSTEMS

[Background] Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

Section Six [Participant Profiles I Hayes County]

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$75/radio; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

FLOOD-PRONE PROPERTY ACQUISITION

[Background] Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the National Flood Insurance Program. Repetitive loss structures are typically highest priority.

[Benefits] Voluntary acquisition and demolition of properties prone to flooding will reduce the damages associated with flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the National Flood Insurance Program. Communities must be in good standing with National Flood Insurance Program in order to be eligible for Hazard Mitigation Grant Program.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

Section Six [Participant Profiles I Hayes County]

PUBLIC AWARENESS AND EDUCATION CAMPAIGNS

[Background] Through activities such as outreach projects, distribution of maps and environmental education increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.

[Benefits] Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.

[Responsible Agency & Partners] Hayes Center Fire, Police, Administration (Village Board), Public Works, Parks, Floodplain Management, Utility, Roads, and/or Emergency Management Departments; School Boards; Neighborhood/Homeowner Associations), Middle Republican Natural Resources District, Nebraska Emergency Management Agency, Nebraska Department of Environmental Quality, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$1,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

TREE CITY U.S.A.

[Background] Work to become a Tree City U.S.A. through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.

[Benefits] Better maintained trees and hazardous tree removal will eliminate damages to power lines and personal property during hazards events. Participation in Tree City U.S.A. will support community actions to mitigate damages from trees.

[Responsible Agency & Partners] Hayes Center Public Works (Village Board) and Parks Department

[Cost Estimate & Funding] \$5,000+; Arbor Day Foundation, United States/State Forest Service

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that requires ongoing action.

EVACUATION PLAN

[Background] Prepare and implement an emergency evacuation plan for when the immediate and urgent movement of people away from the threat or actual occurrence of a hazard is necessary.

[Benefits] Emergency evacuation plans are developed to ensure the safest and most efficient evacuation time of all expected residents when hazards are serious and require mandatory evacuations. Proper planning will implement an all-hazards approach so that plans can be reused for multiple hazards that could exist.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Emergency Management, and/or Roads Department(s))

[Cost Estimate & Funding] \$40,000; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

NEW WATER WELL, TOWER, AND STAND PIPE

[Background] Evaluate the need to expand water storage capacity through a new water tower, stand pipe, etc. to provide a safe water supply for the community and additional water for fire protection. Communities can evaluate the need to install a new well to provide a safe backup water supply for the community, replace existing wells affected by drought, and additional water for fire protection.

[Benefits] Establish back-up supplies of municipal water to supply the needs of citizens. Identify adequate water sources to mitigate potential damages or expenses due to drought. Provide a dependable and ready supply of water so fire districts don't have to rely on equipment and personnel to move water from local water sources to the fire.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Utility Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$150,000 to \$450,000; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, State Revolving Loan Fund

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

DAM ENGINEERING ANALYSIS, REPAIRS, AND REINFORCEMENTS

[Background] Conduct a preliminary engineering analysis for dam repairs and reinforcement. Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection. The Emergency Action Plan, Dam Breech Analysis, and/or inspection/safety equipment training may need to be updated along with improvements.

[Benefits] Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection.

[Responsible Agency & Partners] Hayes Center Administration (Village Board), Public Works, and/or Utility Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

HAYES CENTER SCHOOL

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Hayes Center Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed. Potentially had a new weather tower constructed to increase radio service to larger coverage areas.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Hayes Center, Emergency Management Department and Hayes County Board

[Cost Estimate & Funding] \$300,000; Hazard Mitigation Assistance Grant Programs, Tax Funding

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

HAYES CENTER/HAYES COUNTY RURAL FIRE

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Hayes Center Administration, Public Works, and/or Emergency Management Department(s))

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

PROPERTY VALUES AND TAXES [NDR] HAYES COUNTY

FIGURE 6.8: 2015 PROPERTY VALUES AND TAXES [HAYES COUNTY] DEPARTMENT OF REVENUE

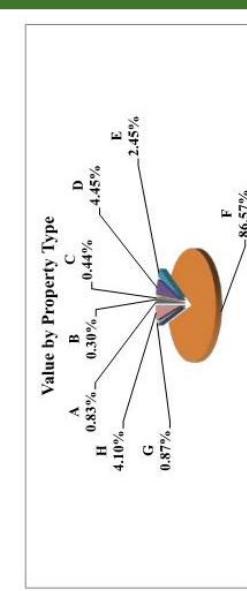
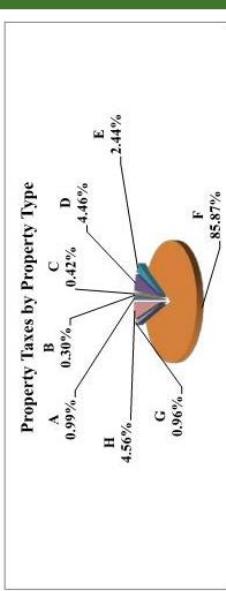
Table 19 2015 Value & Taxes Levied by Taxing Subdivision & by Property Type

County Seat:		Hayes Center, NE		2015		Taxes		% of Total	
County Population:				VALUE		TAXES		Tax Rate	
Residential & Recreational Records:		275		\$39,002,912		70,507		0.18%	
Commercial, Indust., & Mineral Records:		71		538,999,883		137,648		0.27%	
Agricultural Records:		2,042		538,999,882		70,507		0.14%	
Total Taxable Real Property Records:		2,388		\$51,890,49		451,890,49		1.14%	

Hayes Learning Community and all School Bonds

Property Type:		2015		2015		Average		Taxes		% of Total	
		VALUE		TAXES		Tax Rate		% of Total			
A	RAILROADS	\$4,459,884	\$61,121	18,440	1,370,55	1.3705%	0.99%				
B	PUBLIC SERV ENTITIES	1,598,001	1,153,90	1,153,90	1,153,90	0.1539%	0.30%				
C	COMMERCIAL & INDUST. EQUIP.	2,390,855	26,276	26,276	1,0990	0.272%					
D	AGRIC. MACHINERY & EQUIP.	23,978,494	276,140	276,140	1,1516	0.46%					
E	AG-OUTBLDG & FARM SITE LAND	13,197,418	151,238	151,238	1,1460	2.44%					
F	AGRICULTURAL LAND	466,606,880	5,316,778	5,316,778	1,1395	85.67%					
G	COMMERCIAL, INDUST., & MINERAL	4,679,935	59,670	59,670	1,2750	0.96%					
H	RESIDENTIAL **	22,088,415	282,205	282,205	1,2776	4.56%					
	HAYES COUNTY	\$538,999,882	\$6,191,867	1,1488	1,1488	100.00%					

* Includes Learning Community and all School Bonds



Property Type:		2015		2015		Value		% of Total		
		VALUE		TAXES		Tax Rate				
A	RAILROADS	\$4,459,884	\$61,121	18,440	1,370,55	1.3705%	0.83%			
B	PUBLIC SERV ENTITIES	1,598,001	1,153,90	1,153,90	1,153,90	0.1539%	0.30%			
C	COMMERCIAL & INDUST. EQUIP.	2,390,855	26,276	26,276	1,0990	0.272%				
D	AGRIC. MACHINERY & EQUIP.	23,978,494	276,140	276,140	1,1516	0.46%				
E	AG-OUTBLDG & FARM SITE LAND	13,197,418	151,238	151,238	1,1460	2.44%				
F	AGRICULTURAL LAND	466,606,880	5,316,778	5,316,778	1,1395	85.67%				
G	COMMERCIAL, INDUST., & MINERAL	4,679,935	59,670	59,670	1,2750	0.96%				
H	RESIDENTIAL **	22,088,415	282,205	282,205	1,2776	4.56%				
	HAYES COUNTY	\$538,999,882	\$6,191,867	1,1488	1,1488	100.00%				

** Residential includes ag-dwelling & farm home site land.

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FLOOD INSURANCE RATE MAPS [FIRM]

FEDERAL EMERGENCY MANAGEMENT AGENCY

FIGURE 6.9: FLOOD INSURANCE RATE MAP [VILLAGE OF HAMLET] HAYES COUNTY

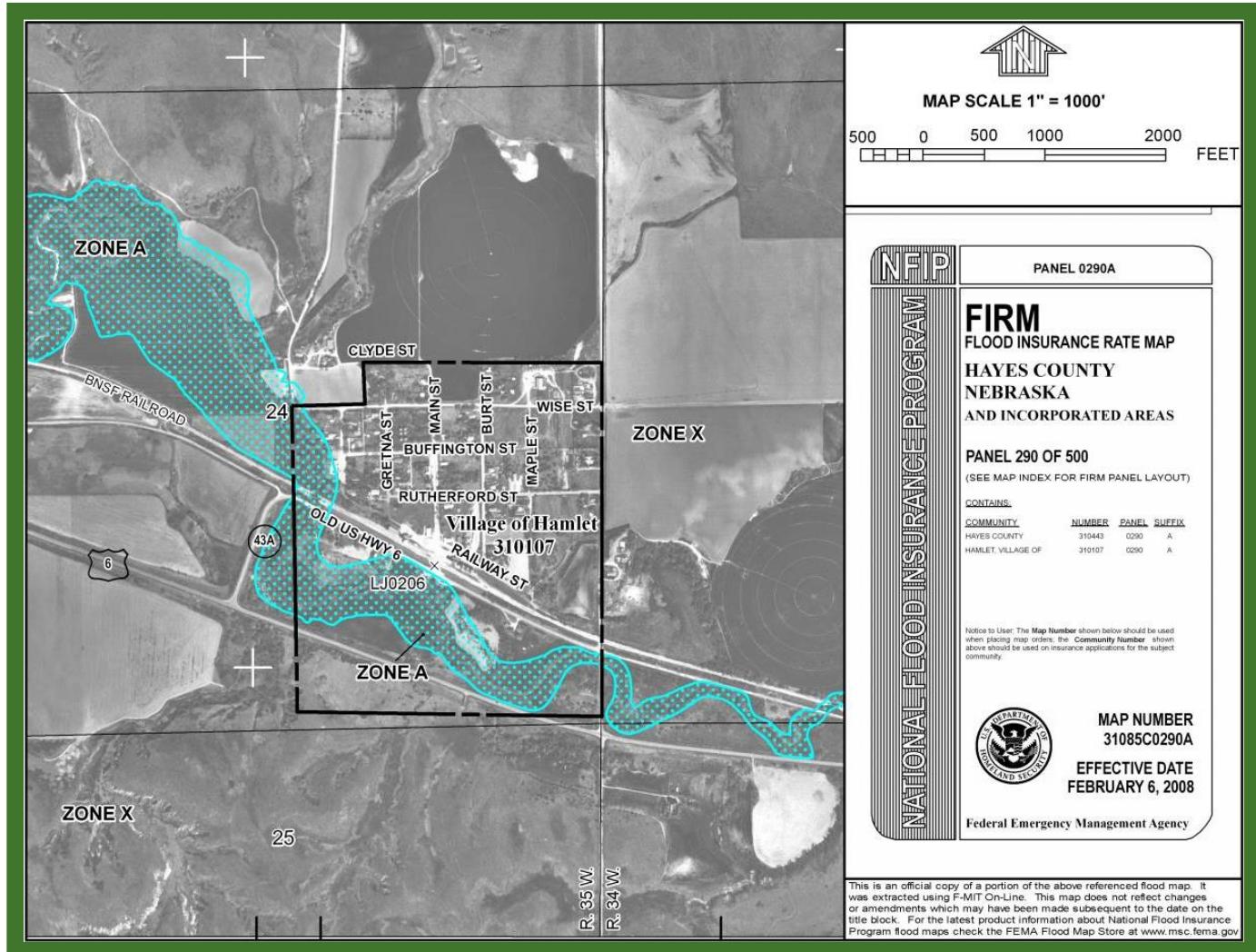
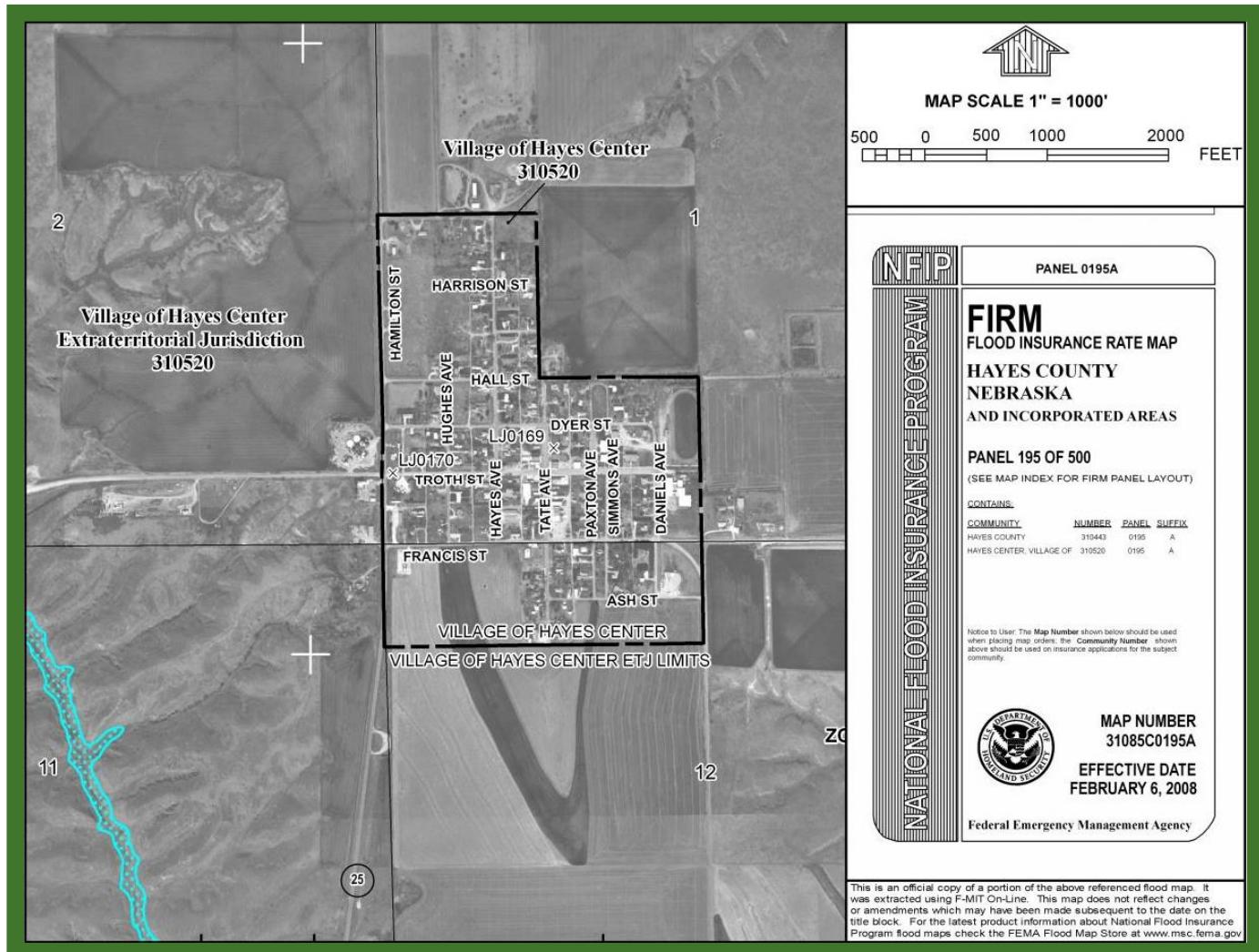


FIGURE 6.10: FLOOD INSURANCE RATE MAP [VILLAGE OF HAYES CENTER] HAYES COUNTY



NATIONAL CLIMATIC DATA CENTER [NCDC]

HAZARD EVENT DETAILS

TABLE 6.35: NCDC EVENTS [SEVERE WINTER STORMS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County/ Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES (ZONE)	HAYES (ZONE)	1/17/1996	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	3/24/1996	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	11/14/1996	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/5/1997	Blizzard		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/9/1997	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/24/1997	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/20/1998	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/25/1998	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	3/6/1998	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	3/30/1998	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	11/11/2000	Heavy Snow		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/29/2001	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/27/2001	Heavy Snow		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	3/1/2002	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/29/2002	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/23/2003	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/6/2003	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/4/2004	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/4/2004	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	11/28/2004	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/5/2005	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	3/19/2006	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	12/19/2006	Blizzard		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	12/29/2006	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/20/2007	Heavy Snow		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/24/2007	Blizzard		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/10/2008	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/4/2009	Blizzard		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/29/2009	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	12/7/2009	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/14/2011	Blizzard		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/3/2012	Winter Storm		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	12/19/2012	Blizzard		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/20/2013	Heavy Snow		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/22/2014	Winter Storm		0	0	0.00K	0.00K

Section Six [Participant Profiles I Hayes County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES (ZONE)	HAYES (ZONE)	12/31/2014	Extreme Cold/wind Chill		0	0	0.00K	0.00K
				Totals [36]	0	0	0.00K	0.00K

TABLE 6.36: NCDC EVENTS [SEVERE THUNDERSTORMS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES CENTER	HAYES CO.	5/30/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/5/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/5/1996	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/6/1996	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/11/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/7/1996	Hail	1.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/23/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/25/1996	Hail	1.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/25/1996	Hail	0.88 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	8/14/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/21/1996	Hail	0.88 in.	0	0	0.00K	0.00K
WAUNETA	HAYES CO.	10/16/1996	Hail	0.88 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/20/1997	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/25/1997	Hail	0.75 in.	0	0	0.00K	250.00K
HAMLET	HAYES CO.	8/21/1997	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/21/1997	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/28/1997	Hail	1.50 in.	0	0	1.00K	250.00K
HAYES CENTER	HAYES CO.	8/28/1997	Hail	1.25 in.	0	0	500.00K	1.00M
HAYES CENTER	HAYES CO.	8/28/1997	Hail	1.75 in.	0	0	8.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/11/1997	High Wind		0	0	6.00K	40.00K
HAYES (ZONE)	HAYES (ZONE)	11/1/1997	High Wind		0	0	0.00K	20.00K
HAYES CENTER	HAYES CO.	5/21/1998	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/21/1998	Hail	4.50 in.	0	0	100.00K	200.00K
HAMLET	HAYES CO.	8/9/1998	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/19/1998	Hail	1.25 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	10/16/1998	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	3/27/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	3/27/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/2/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/25/1999	Hail	1.00 in.	0	0	0.00K	2.00K
HAMLET	HAYES CO.	7/25/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/25/1999	Hail	2.75 in.	0	0	5.00K	20.00K

Section Six [Participant Profiles | Hayes County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES CENTER	HAYES CO.	8/10/1999	Thunderstorm Wind		0	0	1.00K	0.00K
HAMLET	HAYES CO.	8/17/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	9/2/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/17/2000	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/26/2000	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/26/2000	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/28/2000	Thunderstorm Wind	52 kts. E	0	0	0.50K	0.00K
HAYES CENTER	HAYES CO.	6/12/2000	Thunderstorm Wind	52 kts. E	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/29/2000	Hail	1.00 in.	0	0	0.00K	5.00K
HAYES CENTER	HAYES CO.	7/5/2000	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/21/2000	Thunderstorm Wind	52 kts. E	0	0	0.00K	0.00K
HAMLET	HAYES CO.	9/8/2000	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	10/31/2000	Hail	1.25 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	10/31/2000	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	4/6/2001	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/11/2001	High Wind	40 kts. E	0	0	0.00K	0.00K
HAMLET	HAYES CO.	4/20/2001	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	4/20/2001	Thunderstorm Wind	70 kts. E	0	0	250.00K	0.00K
HAYES CENTER	HAYES CO.	4/29/2001	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/12/2001	Hail	1.00 in.	0	0	9.00K	3.00K
HAYES CENTER	HAYES CO.	7/19/2001	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/20/2001	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/31/2001	Thunderstorm Wind	52 kts. E	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/9/2002	High Wind	50 kts. E	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/5/2002	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	5/21/2002	High Wind	50 kts. E	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/15/2002	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/15/2002	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/22/2002	Thunderstorm Wind	52 kts. E	0	0	15.00K	25.00K
HAMLET	HAYES CO.	5/8/2003	Thunderstorm Wind	52 kts. EG	0	0	60.00K	0.00K
HAYES CENTER	HAYES CO.	5/8/2003	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
HAYES CENTER	HAYES CO.	5/8/2003	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/23/2003	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/23/2003	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/23/2003	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/23/2003	Hail	1.25 in.	0	0	3.00K	15.00K

Section Six [Participant Profiles | Hayes County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAMLET	HAYES CO.	6/24/2003	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/24/2003	Hail	1.75 in.	0	0	3.00K	30.00K
HAYES CENTER	HAYES CO.	6/24/2003	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	5/22/2004	Hail	0.88 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	5/22/2004	Hail	1.00 in.	0	0	4.00K	3.00K
HAMLET	HAYES CO.	5/22/2004	Hail	1.00 in.	0	0	4.00K	3.00K
HAYES CENTER	HAYES CO.	5/22/2004	Thunderstorm Wind	52 kts. EG	0	0	0.00K	4.00K
HAYES CENTER	HAYES CO.	5/29/2004	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/15/2004	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/3/2004	Hail	1.75 in.	0	0	2.00K	8.00K
HAYES CENTER	HAYES CO.	7/3/2004	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/15/2004	Hail	0.88 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/21/2004	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	12/20/2004	High Wind	50 kts. EG	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	3/10/2005	High Wind	40 kts. ES	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	4/10/2005	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/7/2005	Hail	1.50 in.	0	0	3.00K	0.00K
HAMLET	HAYES CO.	5/11/2005	Hail	1.00 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	5/11/2005	Hail	4.25 in.	0	0	15.00K	0.00K
HAYES CENTER	HAYES CO.	5/11/2005	Hail	1.75 in.	0	0	2.00K	0.00K
HAYES CENTER	HAYES CO.	5/11/2005	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/11/2005	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/11/2005	Hail	2.50 in.	0	0	2.00K	0.00K
HAMLET	HAYES CO.	5/11/2005	Hail	1.75 in.	0	0	2.00K	0.00K
HAYES CENTER	HAYES CO.	5/11/2005	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/11/2005	Hail	1.75 in.	0	0	5.00K	0.00K
HAMLET	HAYES CO.	6/9/2005	Hail	1.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/9/2005	Hail	2.00 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/24/2005	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/4/2005	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/9/2005	Thunderstorm Wind	52 kts. EG	0	0	4.00K	1.00K
HAYES CENTER	HAYES CO.	9/24/2005	Hail	1.75 in.	0	0	5.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	11/28/2005	High Wind	50 kts. EG	0	0	5.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/2/2006	High Wind	50 kts. EG	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/7/2006	High Wind	51 kts. EG	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/19/2006	High Wind	52 kts. EG	0	0	0.00K	0.00K
HAMLET	HAYES CO.	5/21/2006	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	5/21/2006	Hail	1.25 in.	0	0	0.00K	2.00K
HAYES CENTER	HAYES CO.	6/5/2006	Hail	1.00 in.	0	0	5.00K	0.00K

Section Six [Participant Profiles | Hayes County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAMLET	HAYES CO.	3/28/2007	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	4/20/2007	Hail	1.00 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/13/2007	Hail	1.75 in.	0	0	40.00K	0.00K
HAMLET	HAYES CO.	8/22/2007	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	9/28/2007	Hail	1.75 in.	0	0	5.00K	7.00K
HAYES CENTER	HAYES CO.	9/28/2007	Hail	2.00 in.	0	0	10.00K	9.00K
HAYES CENTER	HAYES CO.	9/28/2007	Hail	2.00 in.	0	0	10.00K	9.00K
HAYES CENTER	HAYES CO.	9/29/2007	Hail	2.00 in.	0	0	5.00K	5.00K
HAMLET	HAYES CO.	9/29/2007	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	4/23/2008	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	4/24/2008	Hail	0.88 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	5/6/2008	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/6/2008	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/29/2008	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/29/2008	Hail	1.75 in.	0	0	1.50K	0.00K
HAYES CENTER	HAYES CO.	6/4/2008	Hail	2.75 in.	0	0	20.00K	50.00K
HAYES CENTER	HAYES CO.	6/4/2008	Hail	4.00 in.	0	0	1.000M	0.00K
HAMLET	HAYES CO.	6/4/2008	Hail	4.25 in.	0	0	50.00K	75.00K
HAYES CENTER	HAYES CO.	6/4/2008	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/4/2008	Hail	1.75 in.	0	0	1.50K	0.00K
HAYES CENTER	HAYES CO.	6/5/2008	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/17/2008	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
HAYES CENTER	HAYES CO.	6/18/2008	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/12/2009	High Wind	55 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/25/2009	Hail	1.75 in.	0	0	60.00K	10.00K
HAMLET	HAYES CO.	6/25/2009	Hail	1.75 in.	0	0	5.00K	10.00K
HAMLET	HAYES CO.	6/25/2009	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/26/2009	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/17/2009	Hail	1.50 in.	0	0	2.00K	2.00K
HAYES CENTER	HAYES CO.	7/17/2009	Hail	1.75 in.	0	0	5.00K	2.00K
HAYES CENTER	HAYES CO.	7/17/2009	Hail	1.75 in.	0	0	4.00K	2.00K
HAMLET	HAYES CO.	7/17/2009	Hail	1.75 in.	0	0	4.00K	4.00K
HAYES (ZONE)	HAYES (ZONE)	4/13/2010	High Wind	52 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/21/2010	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/21/2010	Hail	1.00 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/22/2010	Hail	2.00 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/22/2010	Hail	2.00 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/10/2010	Hail	1.25 in.	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAMLET	HAYES CO.	7/10/2010	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
HAMLET	HAYES CO.	7/10/2010	Hail	1.25 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/10/2010	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/3/2010	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/27/2010	High Wind	38 kts. MS	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/19/2011	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.25 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.75 in.	0	0	5.00K	25.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.25 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	2.50 in.	0	0	5.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Heavy Rain		0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	2.50 in.	0	0	5.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.50 in.	0	0	2.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Heavy Rain		0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Heavy Rain		0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.00 in.	0	0	1.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/25/2011	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/25/2011	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/10/2011	Thunderstorm Wind	62 kts. MG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/10/2011	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/10/2011	Thunderstorm Wind	61 kts. EG	0	0	50.00K	0.00K
HAYES CENTER	HAYES CO.	7/10/2011	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/28/2011	Hail	1.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/28/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/28/2011	Hail	1.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/28/2011	Hail	1.50 in.	0	0	5.00K	0.00K
HAMLET	HAYES CO.	8/8/2011	Hail	2.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/9/2011	Hail	2.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/9/2011	Hail	1.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/9/2011	Hail	1.75 in.	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES (ZONE)	HAYES (ZONE)	10/6/2011	High Wind	53 kts. MG	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	11/26/2011	High Wind	35 kts. MS	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	12/31/2011	High Wind	35 kts. ES	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/22/2012	High Wind	35 kts. ES	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	3/18/2012	Hail	1.00 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	5/19/2012	Hail	1.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/19/2012	Hail	1.25 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/30/2012	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/30/2012	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/30/2012	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/7/2012	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/18/2012	High Wind	52 kts. EG	0	0	0.00K	0.00K
HAYES CO.	HAYES CO.	4/8/2013	Thunderstorm Wind	52 kts. EG	0	0	10.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/9/2013	Strong Wind	48 kts. EG	0	0	60.00K	0.00K
HAYES CO.	HAYES CO.	4/9/2013	Thunderstorm Wind	65 kts. EG	0	0	60.00K	0.00K
HAYES CENTER	HAYES CO.	5/16/2013	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/25/2013	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/29/2013	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/29/2013	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/29/2013	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/22/2013	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/22/2013	Hail	2.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/22/2013	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CO.	HAYES CO.	8/5/2013	Hail	1.75 in.	0	0	0.00K	80.00K
HAYES CO.	HAYES CO.	8/5/2013	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CO.	HAYES CO.	8/5/2013	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CO.	HAYES CO.	8/30/2013	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	10/10/2013	Thunderstorm Wind	59 kts. MG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/7/2014	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/7/2014	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/7/2014	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/7/2014	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/19/2014	Hail	0.88 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	5/19/2014	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/14/2014	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/18/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/18/2014	Thunderstorm Wind	52 kts. EG	0	0	25.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES CENTER	HAYES CO.	6/18/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/27/2014	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/27/2014	Thunderstorm Wind	87 kts. EG	0	0	1.00K	0.00K
HAYES CENTER	HAYES CO.	6/27/2014	Thunderstorm Wind	70 kts. EG	0	0	10.00K	0.00K
HAYES CENTER	HAYES CO.	6/29/2014	Hail	1.00 in.	0	0	0.00K	10.00K
HAYES CENTER	HAYES CO.	5/29/2015	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/16/2015	Hail	1.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/21/2015	Hail	1.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/30/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/5/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/5/1996	Hail	1.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/6/1996	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/11/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/7/1996	Hail	1.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/23/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/25/1996	Hail	1.50 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/25/1996	Hail	0.88 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	8/14/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/21/1996	Hail	0.88 in.	0	0	0.00K	0.00K
WAUNETA	HAYES CO.	10/16/1996	Hail	0.88 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/20/1997	Hail	0.88 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/25/1997	Hail	0.75 in.	0	0	0.00K	250.00K
HAMLET	HAYES CO.	8/21/1997	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/21/1997	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/28/1997	Hail	1.50 in.	0	0	1.00K	250.00K
HAYES CENTER	HAYES CO.	8/28/1997	Hail	1.25 in.	0	0	500.00K	1.00M
HAYES CENTER	HAYES CO.	8/28/1997	Hail	1.75 in.	0	0	8.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/11/1997	High Wind		0	0	6.00K	40.00K
HAYES (ZONE)	HAYES (ZONE)	11/1/1997	High Wind		0	0	0.00K	20.00K
HAYES CENTER	HAYES CO.	5/21/1998	Hail	1.00 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/21/1998	Hail	4.50 in.	0	0	100.00K	200.00K
HAMLET	HAYES CO.	8/9/1998	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/19/1998	Hail	1.25 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	10/16/1998	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	3/27/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	3/27/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	3/27/1999	Hail	1.50 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/2/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/25/1999	Hail	1.00 in.	0	0	0.00K	2.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAMLET	HAYES CO.	7/25/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	7/25/1999	Hail	2.75 in.	0	0	5.00K	20.00K
HAYES CENTER	HAYES CO.	8/10/1999	Thunderstorm Wind		0	0	1.00K	0.00K
HAMLET	HAYES CO.	8/17/1999	Hail	0.75 in.	0	0	0.00K	0.00K
HAMLET	HAYES CO.	9/2/1999	Hail	0.75 in.	0	0	0.00K	0.00K
Totals [229]					0	0	3.060M	3.963M
							7.023M	

TABLE 6.37: NCDC EVENTS [TORNADOS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES CO.	HAYES CO.	7/28/1960	Tornado	F1	0	0	25.00K	0.00K
HAYES CO.	HAYES CO.	10/15/1980	Tornado	F1	0	0	25.00K	0.00K
HAYES CO.	HAYES CO.	6/28/1989	Tornado	F0	0	0	0.25K	0.00K
HAYES CO.	HAYES CO.	8/24/1989	Tornado	F0	0	0	0.00K	0.00K
HAYES CO.	HAYES CO.	5/2/1991	Tornado	F0	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/9/1998	Tornado	F0	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/9/1998	Tornado	F0	0	0	0.00K	0.00K
HAMLET	HAYES CO.	10/31/2000	Tornado	F1	0	0	160.00K	0.00K
HAYES CENTER	HAYES CO.	6/24/2003	Tornado	F0	0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	3/24/2007	Tornado	EFO	0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/4/2008	Tornado	EFO	0	0	0.00K	0.00K
Totals [11]					0	0	210.25k	0.00k
							210.25K	

TABLE 6.38: NCDC EVENTS [DROUGHT] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES (ZONE)	HAYES (ZONE)	6/20/2012	Drought		0	0	0.00K	500.00K
HAYES (ZONE)	HAYES (ZONE)	7/1/2012	Drought		0	0	1.000M	1.000M
HAYES (ZONE)	HAYES (ZONE)	8/1/2012	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	9/1/2012	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/1/2012	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	11/1/2012	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	12/1/2012	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	3/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	5/1/2013	Drought		0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES (ZONE)	HAYES (ZONE)	6/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	7/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	8/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	9/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	10/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	11/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	12/1/2013	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	1/1/2014	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	2/1/2014	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	3/1/2014	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	4/1/2014	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	5/1/2014	Drought		0	0	0.00K	0.00K
HAYES (ZONE)	HAYES (ZONE)	6/1/2014	Drought		0	0	0.00K	0.00K
Totals [26]					0	0	1.00M	1.50M
							2.50M	

TABLE 6.39: NCDC EVENTS [FLOODS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HAYES CENTER	HAYES CO.	7/31/1997	Flash Flood		0	0	50.00K	0.00K
COUNTYWIDE	HAYES CO.	8/28/1999	Flash Flood		0	0	2.000M	0.00K
HAYES CENTER	HAYES CO.	7/11/2004	Flash Flood		0	0	10.00K	6.00K
NORTHEAST PORTION	HAYES CO.	6/3/2005	Flash Flood		0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	5/28/2007	Flash Flood		0	0	300.00K	20.00K
HAMLET	HAYES CO.	5/29/2007	Flash Flood		0	0	200.00K	10.00K
HAMLET	HAYES CO.	6/4/2008	Flash Flood		0	0	10.00K	0.00K
HAYES CENTER	HAYES CO.	6/5/2008	Flash Flood		0	0	100.00K	25.00K
HAYES CENTER	HAYES CO.	8/9/2008	Flash Flood		0	0	200.00K	0.00K
HAYES CENTER	HAYES CO.	6/28/2009	Flash Flood		0	0	25.00K	0.00K
HAMLET	HAYES CO.	6/12/2010	Flood		0	0	75.00K	25.00K
HAMLET	HAYES CO.	6/21/2010	Flash Flood		0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/19/2011	Flash Flood		0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/19/2011	Flash Flood		0	0	0.00K	0.00K
HAMLET	HAYES CO.	6/22/2011	Flood		0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	7/28/2011	Flash Flood		0	0	3.00K	0.00K
HAYES CENTER	HAYES CO.	6/22/2014	Flash Flood		0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	6/22/2014	Flash Flood		0	0	0.00K	0.00K
HAYES CENTER	HAYES CO.	8/8/2015	Flash Flood		0	0	5.00K	0.00K
Totals [19]					0	0	2.978M	86.00K
							3.064M	

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Section Six [Participant Profiles – Frontier County]

Section Six provides an overall profile of the plan area including geography, demographics, assets inventory, capabilities assessment, and climate as well as hazard identification and risk assessment analysis specific to each individual participant.

SECTION SIX [FRONTIER COUNTY]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION SIX [PARTICIPANT PROFILES]

FRONTIER COUNTY

Local governments have the responsibility to protect the health, safety, and welfare of citizens. Proactive mitigation policies and actions help reduce risk and create safer, more disaster resilient jurisdictions. Mitigation is an investment in the jurisdiction's future safety and sustainability. Consider the critical importance of mitigation to:

- Protect public safety and prevent loss of life and injury.
- Reduce harm to existing and future development.
- Prevent damage to a jurisdiction's unique economic, cultural, and environmental assets.
- Minimize operational downtime and accelerate recovery of government and business after disasters.
- Reduce the costs of disaster response and recovery and the exposure to risk for first responders.
- Help accomplish other jurisdiction objectives, such as leveraging capital improvements, infrastructure protection, open space preservation, and economic resiliency.

Demographics, assets, and capabilities information can be used to determine differing levels of vulnerability by analyzing data on population and housing, structural inventories and valuations, critical facilities, highly vulnerable areas and populations, as well as future land use and development for each participating jurisdiction. These analyses directly impact the hazard identification and risk assessment, which ultimately are reflected in the jurisdiction's priorities and mitigation alternatives.

The Villages of Maywood, Moorefield, and Stockville did not participate in this hazard mitigation plan update.

HISTORY

Frontier County, Nebraska, located in the southwestern portion of the state, was organized on January 17, 1872. The early history of the area was dominated by stockraising. The cattlemen's desire to make the surrounding area "stock country" induced them to urge organization of the county. A small community, Stockville, was designated as the county seat simply because it was the only location where records could be maintained.

Settlement into the area was slow through the 1870s. By the 1880s, however, farmers began to settle the fertile lowlands which were conducive to farming operations. This trend continued and increased the following years. Frontier County reached its peak population in 1940 at 6,417 persons. Stockmen remained the most influential factor in the county.

Unlike most areas of Nebraska, a considerable number of settlers had arrived in the county prior to the coming of the railroad. The Burlington and Missouri River Railroad connected the county with the rest of the state in the 1880s. Soon after several town sites were platted by the enterprising "Lincoln Land Company." One of these towns, Curtis, possibly owes its very existence to this company. Col. Harry Phillips, secretary of the Lincoln Land Company, persuaded most of the residents and businesses of Stockville, then the county seat, to move to Curtis.

Section Six [Participant Profiles I Frontier County]

GEOGRAPHIC SUMMARY

Geographic information, including topographic and soils data, play key roles in land planning and heavily influence land use and development. Understanding the unique, local land composition and characteristics will reduce harm to existing and future development by deterring growth into hazard prone areas.

Frontier County is located in southwestern Nebraska. Incorporated areas within the County include Curtis, Eustis, Maywood, Moorefield, and Stockville. The county seat is Stockville and largest community is Curtis. Table 6.40, below, summarizes the County's total area composition and elevation.

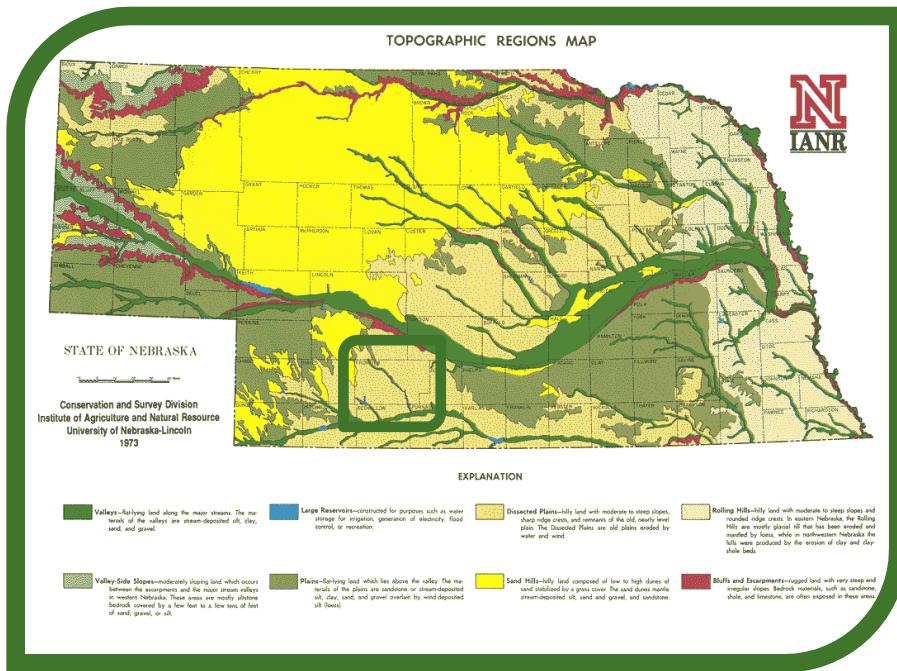
TABLE 6.40: GENERAL GEOGRAPHIC SUMMARY [CASDE] FRONTIER COUNTY

Jurisdiction	Area [sq. mi.]			Elevation [ft.]
	Total	Land	Water	
Frontier County	980	975	5.5	--
Curtis	1.20	1.20	0.0	2,572
Eustis	0.42	0.42	0.0	2,635

Source: University of Nebraska – Lincoln. Virtual Nebraska. www.casde.unl.edu.

Frontier County contains four primary topographic regions according to the Conservation and Survey Division of the University of Nebraska- Lincoln. These include 'valleys', 'dissected plains', 'sand hills', and 'large reservoirs'. The County is also comprised of three main soil series, including Kuma-Keith-Colby, Hord-McCook-Hobbs, and Coly-Uly-Holdrege. The figures and tables below display topographic and soils data, with Frontier County outlined.

FIGURE 6.11: GENERAL TOPOGRAPHIC REGIONS [IANR] STATE OF NEBRASKA – FRONTIER COUNTY



Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

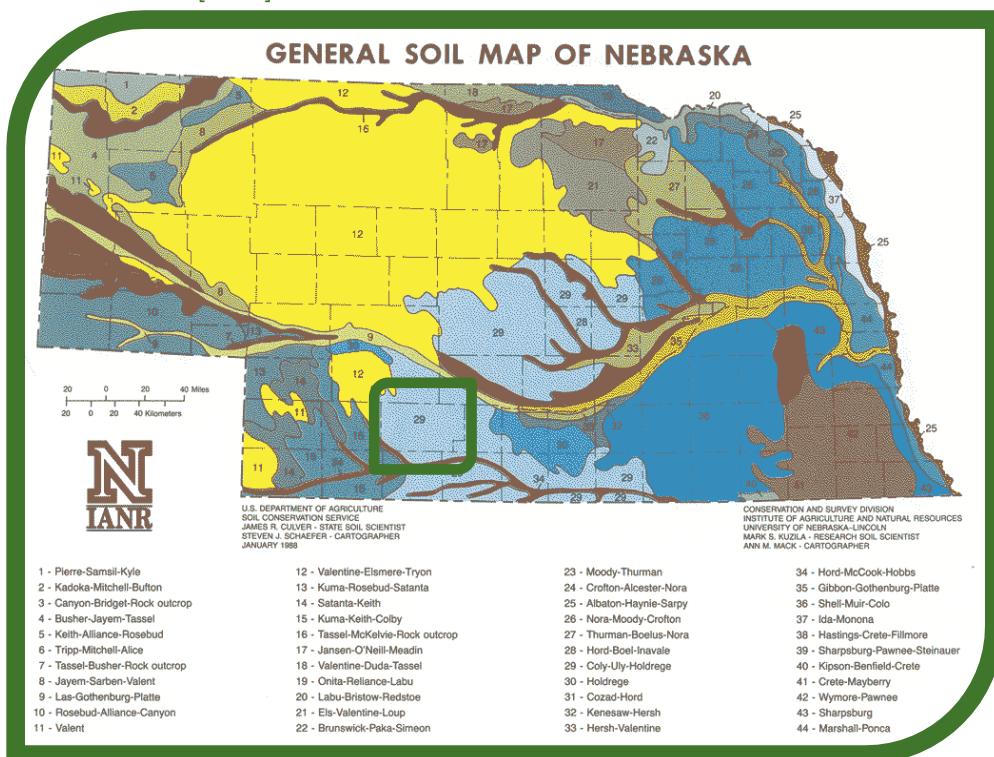
Section Six [Participant Profiles I Frontier County]

TABLE 6.41: GENERAL TOPOGRAPHIC DESCRIPTIONS [IANR] STATE OF NEBRASKA – FRONTIER COUNTY

Topographic Region	Description
Valleys	Flat-lying land along the major streams. The materials of the valleys are stream-deposited silt, clay, sand, and gravel.
Dissected Plains	Hilly land with moderate to steep slopes, sharp ridge crests, and remnants of the old, nearly level plains. The Dissected Plains are old plains eroded by water or wind.
Sand Hills	Hilly land comprised of low to high dunes of sand stabilized by a grass cover. The sand dunes meet stream-deposited silt, sand and gravel, and sandstone.
Large Reservoirs	Constructed for purposes such as water storage for irrigation, generation of electricity, flood control, or recreation.

Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

FIGURE 6.12: GENERAL SOILS [IANR] STATE OF NEBRASKA – FRONTIER COUNTY



Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

TABLE 6.42: GENERAL SOILS DESCRIPTIONS [IANR] STATE OF NEBRASKA – FRONTIER COUNTY

Soil Association	Description
Kuma-Keith-Colby	The Kuma series consists of very deep, well drained soils that formed in medium to moderately fine textured calcareous eolian deposits with an age discontinuity marked by a paleosol. Kuma soils are on tableland plains and upland hillslopes. Slopes range from 0 to 8 percent. Mean annual precipitation is about 41 centimeters (16 inches) and the mean annual temperature is about 10 degrees C (50 degrees F).
	The Keith series consists of very deep, well drained, soils that formed in calcareous loess. Keith soils are on upland hillslopes, tableland plains, and valley terraces. Slopes range from 0 to 6 percent. Mean annual precipitation is about 46 centimeters (18 inches) and the mean annual air temperature is 11 degrees C (52 degrees F).

Section Six [Participant Profiles | Frontier County]

Soil Association	Description
Kuma-Keith-Colby	The Colby series consists of very deep, well drained and somewhat excessively drained, moderately permeable soils that formed in loess. Colby soils are on plains and hillslopes on tableland in the Central High Tableland (MLRA 72). Slopes range from 0 to 60 percent. Mean annual precipitation is about 450 millimeters (18 inches) and the mean annual temperature is about 11 degrees C (52 degrees F).
Hord-McCook-Hobbs	The Hord series consists of very deep, well drained, moderately permeable soils that formed in mixed loess and alluvium on foot slopes and stream terraces. Slope is dominantly less than 1 percent, but can range from 0 to 7 percent. Mean annual temperature is about 51 degrees F, and mean annual precipitation is about 23 inches at the type location.
	The McCook series consists of very deep, well drained, moderately permeable soils that formed in stratified, calcareous alluvium. These soils are on flood plains and have slopes that range from 0 to 3 percent. Mean annual temperature is 11 degrees C (52 degrees F), and mean annual precipitation is 51 centimeters (20 inches) at the type location.
	The Hobbs series consists of very deep, well drained soils that formed in stratified, silty alluvium. These soils are on flood plains, foot slopes, and alluvial fans in river valleys of Central Loess Plains, MLRA 75. Slopes range from 0 to 6 percent. Mean annual temperature is 11 degrees C (52 degrees F), and mean annual precipitation is 640 millimeters (25 inches) at the type location.
Coly-Uly-Holdrege	The Coly series consists of very deep, well drained, moderately permeable soils formed in loess. Coly soils are on sideslopes of uplands in MLRA 73-Rolling Plains and Breaks. Slopes range from 1 to 60 percent. Mean annual temperature is 10 degrees C (50 degrees F), and mean annual precipitation is 53 centimeters (21 inches) at the type location.
	The Uly series includes very deep, well drained formed in loess on uplands. Slopes range from 0 to 30 percent. Mean annual temperature is 10 degrees C (50 degrees F), and mean annual precipitation is 53 centimeters (21 inches) at the type location.
	The Holdrege series consists of very deep, well drained, moderately permeable soils formed in calcareous loess. These upland soils have slopes ranging from 0 to 15 percent. Mean annual temperature is about 54 degrees F, and mean annual precipitation is about 23 inches at the type location.

Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

DEMOGRAPHICS SUMMARY

Demographic statistics aid decision-makers by developing a picture of Frontier County. This picture tells the County and communities where they've been and where they're now, helping decision-makers orient themselves to the most appropriate path to reduce risk and create safer, more disaster resilient jurisdictions. A jurisdiction's population is the driving force behind its housing, employment, economic stability, and potential for change. Proactive mitigation by decision-makers will help prevent future damage to these unique assets.

Tables 6.43-6.46 and Figures 6.13-6.14 below summarize various population and housing characteristics such as population trends, population by age, housing occupancy and tenure, and age of structures. Table 6.47 highlights selected demographic characteristics including housing units lacking complete facilities, no telephone service, mobile home housing units, no vehicles available, population with a disability, and percentage of low-to-moderate income population.

POPULATION

TABLE 6.43: POPULATION TRENDS [CENSUS] FRONTIER COUNTY 1980 – 2010

Jurisdiction	1980 Population	1990 Population	2000 Population	2010 Population	Change '80 - '10
Curtis	1,010	791	832	939	-7.6%
Eustis	460	452	464	401	-14.7%

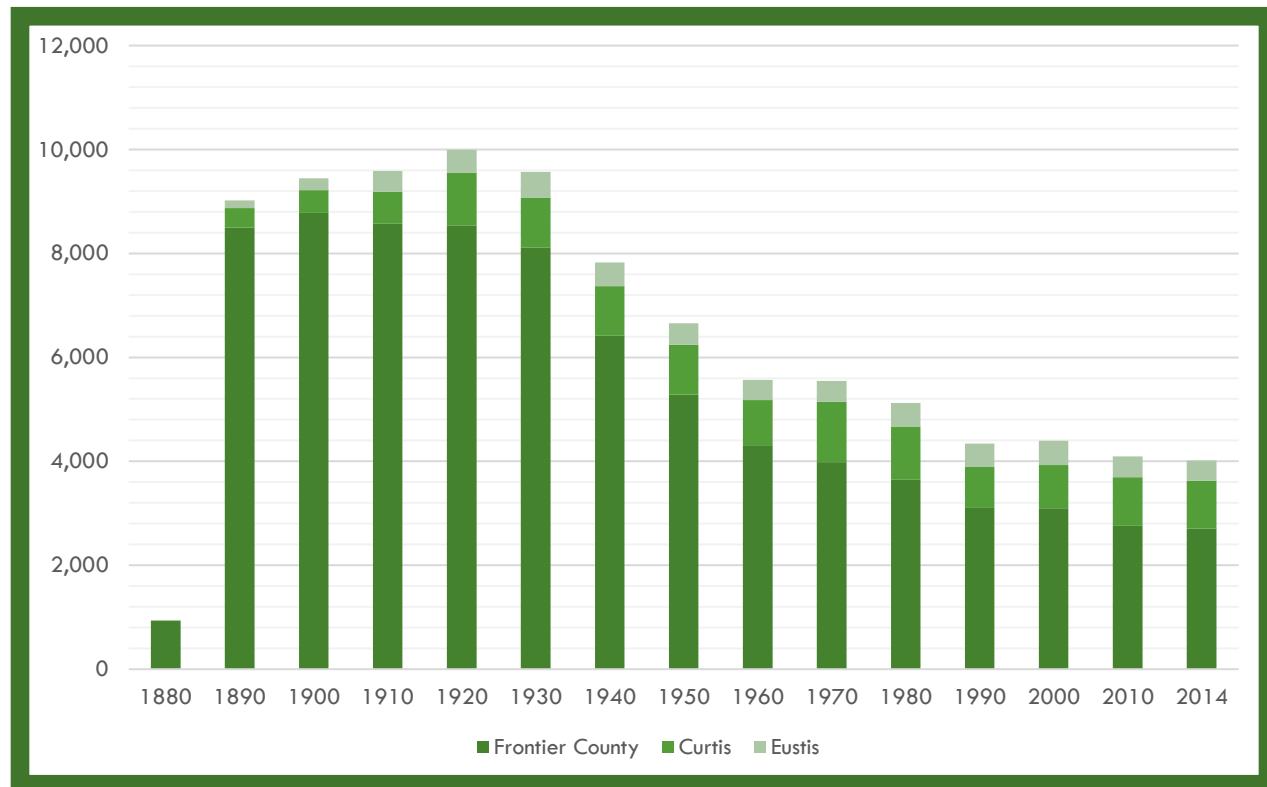
Section Six [Participant Profiles I Frontier County]

Jurisdiction	1980 Population	1990 Population	2000 Population	2010 Population	Change '80 - '10
Frontier County	3,647	3,101	3,099	2,756	-32.3

Source: United States Census Bureau.

Overall, Frontier County's population was 5,117 persons in 1980 and 4,096 persons in 2010. This is a decrease of 1,021 people or 24.9 percent in 30 years. This is the result of a decrease in both the urban and rural populations. For the purpose of this plan, the term urban is equal to the population within an incorporated jurisdiction. The rural population was 3,647 persons in 1980 and 2,756 persons in 2010, a decrease of 891 people or 32.3 percent. The urban population was 1,470 persons in 1980 and 1,340 persons in 2010, a decrease of 130 people or 9.7 percent.

FIGURE 6.13: HISTORICAL POPULATION AND TRENDS [CENSUS] FRONTIER COUNTY 1880 – 2014



Source: United States Census Bureau.

TABLE 6.44: POPULATION BY AGE [CENSUS] FRONTIER COUNTY

Jurisdiction	< 5 – 9	10 – 19	20 – 34	35 – 54	55 – 64	65 – 84	85 <	18 <	21 <	65 <	Median	Total
Frontier County	285	438	431	692	387	455	68	2,162	1,973	523	43.1	2,756
	10.4%	15.9%	15.6%	25.2%	14.1%	16.5%	2.5%					
Curtis	105	211	222	177	89	102	33	730	574	135	27.6	939
	11.2%	22.4%	23.7%	18.9%	9.5%	10.8%	3.5%					
Eustis	45	52	54	114	52	73	11	306	304	84	47.8	401
	11.2%	13.0%	13.5%	28.5%	13.0%	18.2%	2.7%					

Source: United States Census Bureau.

Section Six [Participant Profiles I Frontier County]

Overall, Frontier County's median age is 43.1. The largest age cohort of 35-54 represents 25.2 percent of the total population or 692 persons. The smallest age cohort of 85 and greater represents 2.5 percent or 68 persons. Eustis has the largest percentage of the population 65 and older, with 20.9 percent or 84 persons.

HOUSING

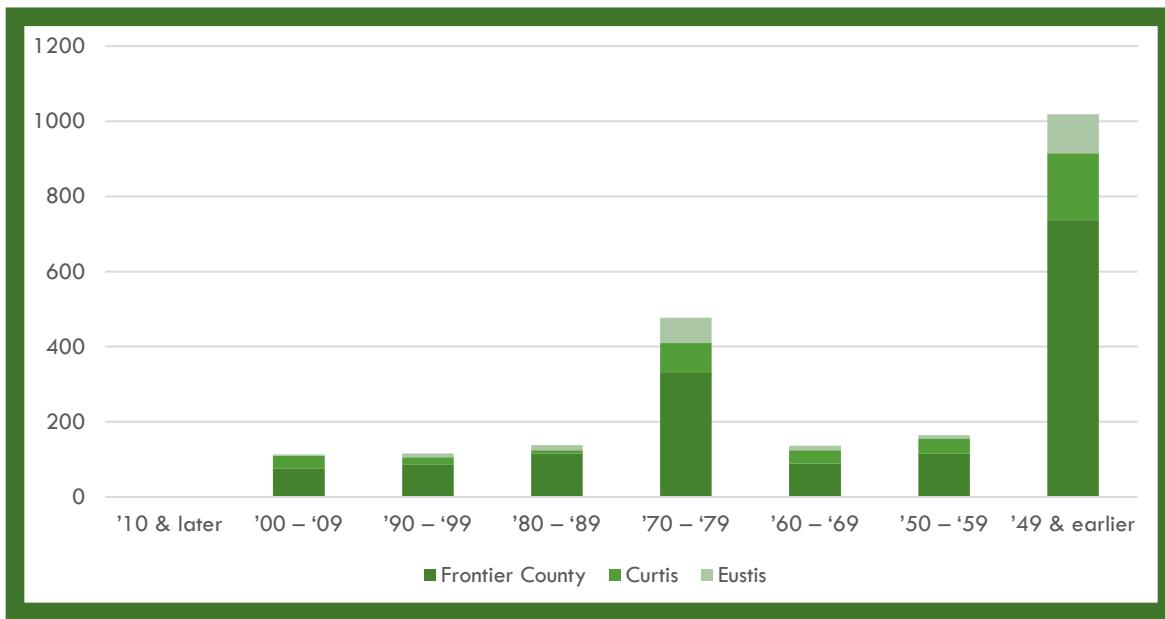
TABLE 6.45: HOUSING OCCUPANCY AND TENURE [CENSUS] FRONTIER COUNTY

Jurisdiction	Total Housing Units					Occupied Housing Units				
	Occupied		Vacant			Owner		Renter		
	Number	Percent	Number	Percent		Number	Percent	Number	Percent	
Frontier County	1,168	74.2%	406	25.8%		825	70.6%	343	29.4%	
Curtis	335	85.0%	59	15.0%		232	69.3%	103	30.7%	
Eustis	193	88.5%	25	11.5%		166	86.0%	27	14.0%	

Source: United States Census Bureau.

Overall, the housing occupancy and tenure in Frontier County is owner-occupied units. Of the total housing units, 1,168 units or 74.2 percent are occupied units and 825 units or 70.6 percent are owner-occupied units. Curtis has the largest percentage of vacant housing units, with 59 units or 15.0 percent.

FIGURE 6.14: AGE OF STRUCTURES [CENSUS] FRONTIER COUNTY



Source: United States Census Bureau.

TABLE 6.46: AGE OF STRUCTURES [CENSUS] FRONTIER COUNTY

Jurisdiction	'10 & later	'00 - '09	'90 - '99	'80 - '89	'70 - '79	'60 - '69	'50 - '59	'49 & earlier	Total
Frontier County	0	75	87	116	332	89	115	737	1,551
Curtis	0	35	19	8	78	35	41	178	394
Eustis	0	3	10	14	67	12	8	104	218

Source: United States Census Bureau.

Section Six [Participant Profiles I Frontier County]

Overall, there are a total of 1,551 housing units in Frontier County. Of those, 841 units, or 54.2 percent were constructed prior to 1970. Another 332 units were built between 1970 and 1979, meaning the vast majority of the housing stock is at least 35 years old.

TABLE 6.47: SELECTED DEMOGRAPHIC CHARACTERISTICS [CENSUS] FRONTIER COUNTY

Jurisdiction	Lack Complete Plumbing Facilities		Lack Complete Kitchen Facilities		No Telephone Service		Mobile Home		No Vehicles Available		Disability	LMI
	#	%	#	%	#	%	#	%	#	%	#	
Frontier County	0	0.0%	13	1.2%	16	1.5%	202	13.0%	46	4.3%	109	40.5%
Curtis	0	0.0%	13	3.9%	3	0.3%	14	3.6%	28	8.4%	26	56.9%
Eustis	0	0.0%	0	0.0%	0	0.0%	14	6.4%	7	3.6%	25	37.0%

Source: United States Census Bureau.

The selected housing characteristics include housing units that lack complete plumbing facilities, lack complete kitchen facilities, are mobile homes, have no telephone service, or have no vehicles available. The selected population characteristics include the disability status of the civilian non-institutionalized population, and the low to moderate income percentage of the population. Overall, Frontier County has a small percentage of housing units with the selected characteristics.

This information impacts the vulnerability of these jurisdictions to the effects of all hazards listed in the plan.

ASSETS INVENTORY

Each jurisdiction has a unique set of assets and capabilities available. By reviewing the existing assets and capabilities, each jurisdiction can identify assets and capabilities that currently reduce disaster losses or could be used to reduce losses in the future, as well as capabilities that inadvertently increase risks. This is especially useful for multi-jurisdictional plans where local capability varies widely. Assessing the jurisdictions' existing assets and capabilities available is a critical step to accomplish mitigation, and how to leverage resources for long-term vulnerability reduction in the mitigation strategy.

CRITICAL FACILITIES AND INFRASTRUCTURE

Critical facilities are structures and institutions necessary for a community's response to and recovery from emergencies. Critical facilities must continue to operate during and following a disaster to reduce the severity of impacts and accelerate recovery. When identifying vulnerabilities, consider both the structural integrity and content value of critical facilities and the effects of interrupting their services to the community.

Infrastructure systems are critical for life, safety, and economic viability and include transportation, power, communication, and water and wastewater systems. Many critical facilities depend on infrastructure to function. For example, hospitals need electricity, water, and sewer to continue helping patients. As with critical facilities, the continued operations of infrastructure systems during and following a disaster are key factors in the severity of impacts and the speed of recovery.

According to FEMA, "A critical facility is a structure that, if flooded (or damaged), would present an immediate threat to life, public health, and safety." Examples of critical facilities include hospitals, emergency operations centers, schools, wells, and sanitary sewer lift stations, etc.

Each participating jurisdiction identified critical facilities vital for disaster response, providing shelter to the public, and essential for returning the jurisdiction's functions to normal during and after a disaster. Critical facilities were identified at the 'mitigation alternative' public meetings through the meeting worksheets (refer to Appendix C). Table 6.48 below summarizes the critical facilities and infrastructure identified by participants.

Section Six [Participant Profiles I Frontier County]

TABLE 6.48: CRITICAL FACILITIES AND INFRASTRUCTURE [FEMA] FRONTIER COUNTY

Facility/ Infrastructure	Frontier County	Curtis	Eustis
School	X		
County/ City Office			X
Courthouse/ Jail	X		
Police Station	X		
Fire Station			X
Radio / Communication Tower	X		
Lift Station			X
Well/ Well House			X
Water Tower/ Tank			X
Lagoon			X
Maintenance/ Shop Building	X		X
Fairgrounds	X		X
Phone Building			X
Roads and Bridges	X		
Feed Lots	X		

VULNERABLE AREAS AND POPULATIONS

People are your most important asset. The risk assessment can identify areas of greater population density, as well as populations that may have unique vulnerabilities or be less able to respond and recover during a disaster. These include visiting populations and access and functional needs populations. In addition, the risk assessment can identify locations that provide health or social services that are critical to post-disaster response or recovery capabilities.

Visiting populations include students, second home owners, migrant farm workers, and visitors for special events. Special events could include large sporting events and festivals where large numbers of people are concentrated and vulnerable to hazards and threats. Visiting populations may be less familiar with the local environment and hazards and less prepared to protect themselves during an event.

The term “access and functional needs populations” describes groups that may not comfortably or safely access the standard resources offered in emergencies. These populations may include children, the elderly, the physically or mentally disabled, non-English speakers, or the medically or chemically dependent. Facility locations and support service operations for these populations (e.g., hospitals, dependent care facilities, oxygen delivery, and accessible transportation) also need to be considered.

Highly vulnerable areas and populations are those considered to be more at risk or susceptible to the effects of hazards. These may include, but are not limited to mobile home parks, nursing homes, campgrounds, fairgrounds, parks, etc.

Each participating jurisdiction identified highly vulnerable areas and populations where residents and visitors to the plan area may be more open or exposed to hazards both during and after an event and require additional response. Highly vulnerable areas and populations were identified at the ‘mitigation alternative’ public meetings through the meeting worksheets (Appendix C). Table 6.49 below summarizes the highly vulnerable areas and populations identified by participants.

Section Six [Participant Profiles | Frontier County]

TABLE 6.49: VULNERABLE AREAS AND POPULATIONS [FEMA] FRONTIER COUNTY

Area/ Population	Frontier County	Curtis	Eustis
Senior Center			X
Community Center / Hall			X
Event Center / Arena			X
Church			X
School	X		
Courthouse/ Jail	X		
Fairgrounds	X		X
Fire Hall			X
Downtown Commercial Area			X
Reservoir/ Lake/ River	X		
Floodplain Properties	X		
Museum/ Library	X		

NATIONAL HISTORIC REGISTRY

The National Register of Historic Places is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

The historic sites located within Frontier County, according to the National Historic Registry, are listed in Table 6.50 below. These sites were not evaluated for proximity to hazard prone areas.

TABLE 6.50: NATIONAL HISTORIC REGISTRY [NPS] FRONTIER COUNTY

Site Name	Date Listed	Location
Mowry Bluff Archeological Site	07/12/1974	Frontier County (near Curtis)
Red Smoke Archeological Site	10/01/1974	Frontier County (near Stockville)

Source: National Park Service.

CAPABILITIES ASSESSMENT

Local mitigation capabilities are existing resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Each participating jurisdiction completed a capabilities assessment at the 'hazard identification' public meetings through the meeting worksheets (refer to Appendix C). The sections below summarize the primary types of capabilities for reducing long-term vulnerability through mitigation planning including planning and regulatory, administrative and technical, financial, and education and outreach identified by participants.

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PLANNING AND REGULATORY

Planning and regulatory capabilities are based on the implementation of ordinances, policies, local laws and State statutes, and plans and programs that relate to guiding and managing growth and development. Examples of planning capabilities that can either enable or inhibit mitigation include comprehensive land use plans, capital improvements programs, transportation plans, small area development plans, disaster recovery and reconstruction plans, and emergency preparedness and response plans. Plans describe specific actions or policies that support goals and drive decisions. Likewise, examples of regulatory capabilities include the enforcement of zoning ordinances, subdivision regulations, and building codes that regulate how and where land is developed and structures are built. Planning and regulatory capabilities refer not only to the current plans and regulations, but also to the jurisdictions' ability to change and improve those plans and regulations as needed.

Tables 6.51-6.53 below summarize the planning and regulatory capabilities currently available in the participating jurisdictions to help prevent and reduce the impacts of hazards.

TABLE 6.51: PLANNING AND REGULATORY [CAPABILITY ASSESSMENT] FRONTIER COUNTY

Plans	Frontier County	Curtis	Eustis
Comprehensive/ Master Plan	Yes	No	Yes
Capital Improvements Plan	Yes	No	Yes
Economic Development Plan	Yes	No	Yes
Local Emergency Operations Plan	Yes	Yes	Yes
Continuity of Operations Plan	No	No	No
Transportation Plan	Yes	No	Yes
Stormwater Management Plan	Yes	No	Yes
Community Wildfire Protection Plan	No	No	No
Other special plans (e.g., brownfields redevelopment, disaster recovery, climate change adaption, etc.)	No	No	No

Questions to consider for future updates: Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?

TABLE 6.52: BUILDING CODE, PERMITTING, AND INSPECTIONS [CAPABILITY ASSESSMENT] FRONTIER COUNTY

Building Code, Permitting, and Inspections	Frontier County	Curtis	Eustis
Building Code	No	Yes	No
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	No	No
Fire Department ISO Rating	No	No	Yes
Site Plan Review Requirements	Yes	No	No

Questions to consider for future updates: Are codes adequately enforced?

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TABLE 6.53: LAND USE PLANNING AND ORDINANCES [CAPABILITY ASSESSMENT] FRONTIER COUNTY

Land Use Planning and Ordinances	Frontier County	Curtis	Eustis
Zoning Ordinance	Yes	Yes	Yes
Subdivision Ordinance	Yes	Yes	No
Floodplain Ordinance	Yes	Yes	Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	No	No	No
Flood Insurance Rate Maps	Yes	No	No
Acquisition of land for open space and public recreation uses	Yes	No	No
Other	Yes	No	No

Questions to consider for future updates: Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced? How can these capabilities be expanded and improved to reduce risk?

ADMINISTRATIVE AND TECHNICAL

Administrative and technical capability refers to the jurisdictions' staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. It also refers to the ability to access and coordinate these resources effectively. These include engineers, planners, emergency managers, GIS analysts, building inspectors, grant writers, floodplain managers, and more. The level of knowledge and technical expertise from personnel employed by each jurisdiction, the public and private sector, or resources available through other government entities, such as counties or special districts, may be accessed to implement mitigation activities in the jurisdiction or provide assistance with limited resources. The degree of intergovernmental coordination among departments also affects administrative capability.

Tables 6.54-6.56 below summarize the administrative and technical capabilities currently available in the participating jurisdictions, including staff and their skills and tools, that can be used for mitigation planning and to implement specific mitigation actions. For smaller jurisdictions without local staff resources, there may be public resources at the next higher level government that can provide technical assistance.

TABLE 6.54: ADMINISTRATION [CAPABILITY ASSESSMENT] FRONTIER COUNTY

Administration	Frontier County	Curtis	Eustis
Planning Commission	Yes	No	Yes
Mitigation Planning Committee	Yes	Yes	No
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems, etc.)	Yes	Yes	Yes
Mutual Aid Agreements	Yes	Yes	Yes

Questions to consider for future updates: Describe capability. Is coordination effective?

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TABLE 6.55: STAFF [CAPABILITY ASSESSMENT] FRONTIER COUNTY

Staff	Frontier County	Curtis	Eustis
Chief Building Official	No	No	No
Floodplain Administrator	Yes	Yes	No
Emergency Manager	Yes	Yes	Yes
Community Planner	No	No	No
Civil Engineer	Yes	No	Yes
GIS Coordinator	Yes	No	No
Other	No	No	No

Questions to consider for future updates: Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?

TABLE 6.56: TECHNICAL [CAPABILITY ASSESSMENT] FRONTIER COUNTY

Technical	Frontier County	Curtis	Eustis
Warning systems/ services (Reverse 911, outdoor warning signals)	Yes	Yes	Yes
Hazard Data and Information	No	No	No
Grant Writing	Yes	No	No
HAZUS Analysis	No	No	No
Other	No	No	No

Questions to consider for future updates: Describe capability. Has capability been used to assess/ mitigate risk in the past? How can these capabilities be expanded and improved to reduce risk?

FINANCIAL

Financial capabilities are the resources that a jurisdiction has access to or is eligible to use to fund mitigation actions. The costs associated with implementing mitigation activities vary. Some mitigation actions such as building assessment or outreach efforts require little to no costs other than staff time and existing operating budgets. Other actions, such as the acquisition of flood-prone properties, could require a substantial monetary commitment from local, State, and Federal funding sources.

Local governments may have access to a recurring source of revenue beyond property, sales, and income taxes, such as stormwater utility or development impact fees. These jurisdictions may be able to use the funds to support local mitigation efforts independently or as the local match or cost-share often required for grant funding.

Table 6.57 below summarizes the financial capabilities currently available in the participating jurisdictions to help fund hazard mitigation activities.

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TABLE 6.57: FUNDING RESOURCE [CAPABILITY ASSESSMENT] FRONTIER COUNTY

Funding Resource	Frontier County	Curtis	Eustis
Capital improvements project funding	Yes	Yes	Yes
Authority to levy taxes for specific purposes	Yes	Yes	Yes
Fees for water, sewer, gas, or electric services	Yes	Yes	No
Impact fees for new development	No	No	Yes
Storm water utility fee	No	No	No
Incur debt through general obligation bonds and/ or special tax bonds	Yes	Yes	No
Incur debt through private activities	No	No	No
Community Development Block Grant	Yes	Yes	No
Other federal funding programs	Yes	Yes	Yes
State funding programs	Yes	Yes	Yes
Other	Yes	No	Yes

Questions to consider for future updates: Has the funding resource been used in the past and for what type of activities? Could the resource be used to fund future mitigation actions? How can these capabilities be expanded and improved to reduce risk?

EDUCATION AND OUTREACH

This type of capability refers to education and outreach programs, methods, and initiatives already in place to implement mitigation activities and communicate hazard-related information. Examples include fire safety programs that fire departments deliver to students at local schools; participation in community programs, such as Firewise or StormReady; and activities conducted as part of hazard awareness campaigns, such as Tornado or Flood Awareness Month.

Table 6.58 below identifies the education and outreach capabilities currently available in the participating jurisdictions to increase hazard mitigation awareness.

TABLE 6.58: EDUCATION AND OUTREACH [CAPABILITY ASSESSMENT] FRONTIER COUNTY

Program/ Organization	Frontier County	Curtis	Eustis
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	No	Yes
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education, etc.)	Yes	No	Yes
Natural disaster or safety related school programs	Yes	No	No
Storm Ready Certification	No	No	No
Fire Wise Communities Certification	No	No	No
Public-private partnership initiatives addressing disaster-related issues	No	No	No
Other	No	No	No

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Questions to consider for future updates: Describe the program/ organization and how it relates to disaster resilience and mitigation. Could the program/ organization help implement future mitigation activities? How can these capabilities be expanded and improved to reduce risk?

SAFE GROWTH

One way to assess the impact of planning and regulatory capabilities is to complete a safe growth audit. The purpose of the safe growth audit is to analyze the impacts of current policies, ordinances, and plans on community safety from hazard risks due to growth. A safe growth audit helps identify gaps in jurisdictions' growth guidance instruments and improvements that could be made to reduce vulnerability to future development.

Tables 6.59-6.66 below summarize the safe growth audit in terms of land use, transportation, environmental management, public safety, zoning ordinances, subdivision regulations, and capital improvements currently available in the participating jurisdictions to help prevent and reduce the impacts of hazards.

TABLE 6.59: LAND USE [SAFE GROWTH] FRONTIER COUNTY

Comprehensive Plan (Land Use)	Frontier County	Curtis	Eustis
Does the Future Land Use Map clearly identify natural hazard areas?	Yes	No	Yes
Do the land-use policies discourage development or redevelopment within natural hazard areas?	Yes	No	Yes
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	Yes	No	Yes

TABLE 6.60: TRANSPORTATION [SAFE GROWTH] FRONTIER COUNTY

Comprehensive Plan (Transportation)	Frontier County	Curtis	Eustis
Does the Transportation Plan limit access to hazard areas?	No	No	Yes
Is transportation policy used to guide growth to safe locations?	No	No	Yes
Are movement systems designed to function under disaster conditions (e.g., evacuation)?	Yes	No	Yes

TABLE 6.61: ENVIRONMENTAL MANAGEMENT [SAFE GROWTH] FRONTIER COUNTY

Comprehensive Plan (Environmental Management)	Frontier County	Curtis	Eustis
Are environmental systems that protect development from hazards identified and mapped?	Yes	No	No
Do environmental policies maintain and restore protective ecosystems?	Yes	No	No
Do environmental policies provide incentives to development that is located outside protective ecosystems?	No	No	Yes

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TABLE 6.62: PUBLIC SAFETY [SAFE GROWTH] FRONTIER COUNTY

Comprehensive Plan (Public Safety)	Frontier County	Curtis	Eustis
Are the goals and policies of the Comprehensive Plan related to those of the FEMA Local Hazard Mitigation Plan?	No	No	Yes
Is safety explicitly included in the plan's growth and development policies?	Yes	No	No
Does the monitoring and implementation section of the plan cover safe growth objectives?	No	No	Yes

TABLE 6.63: ZONING ORDINANCE [SAFE GROWTH] FRONTIER COUNTY

Zoning Ordinance	Frontier County	Curtis	Eustis
Does the Zoning Ordinance conform to the Comprehensive Plan in terms of discouraging development or redevelopment within natural hazard areas?	Yes	Yes*	Yes
Does the ordinance contain natural hazard overlay zones that set conditions for land uses within such zones?	Yes	Yes	No
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?	Yes	Yes	No
Does the ordinance prohibit development within, or filling of, wetlands, floodways, and floodplains?	Yes	Yes	Yes

*While Curtis does not have a Comprehensive Plan, the Zoning Ordinance does discourage development/redevelopment within natural hazard areas.

TABLE 6.64: SUBDIVISION REGULATIONS [SAFE GROWTH] FRONTIER COUNTY

Subdivision Regulations	Frontier County	Curtis	Eustis
Do the Subdivision Regulations restrict the subdivision of land within or adjacent to natural hazard areas?	Yes	Yes	No
Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?	Yes	Yes	No
Do the regulations allow density transfers where hazard areas exist?	No	Yes	No

TABLE 6.65: CAPITAL IMPROVEMENTS [SAFE GROWTH] FRONTIER COUNTY

Capital Improvement Program and Infrastructure Policies	Frontier County	Curtis	Eustis
Does the Capital Improvement Program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?	Yes	No	No
Do Infrastructure Policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?	Yes	No	No
Does the Capital Improvement Program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?	No	No	No

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TABLE 6.66: ADDITIONAL PLANNING MECHANISMS [SAFE GROWTH] FRONTIER COUNTY

Additional Planning Mechanisms	Frontier County	Curtis	Eustis
Do small area or corridor plans recognize the need to avoid or mitigate natural hazards?	No	Yes	No
Does the Building Code contain provisions to strengthen or elevate construction to withstand hazard forces?	No	Yes	No
Do economic development or redevelopment strategies include provisions for mitigating natural hazards?	No	No	No
Is there an adopted evacuation and shelter plan to deal with emergencies from natural hazards?	Yes	No	No

CLIMATE SUMMARY

The monthly climate normals information displayed in the figures and table below is taken from weather station 252100, near Curtis. The data from this station is provided by the High Plains Regional Climate Center.

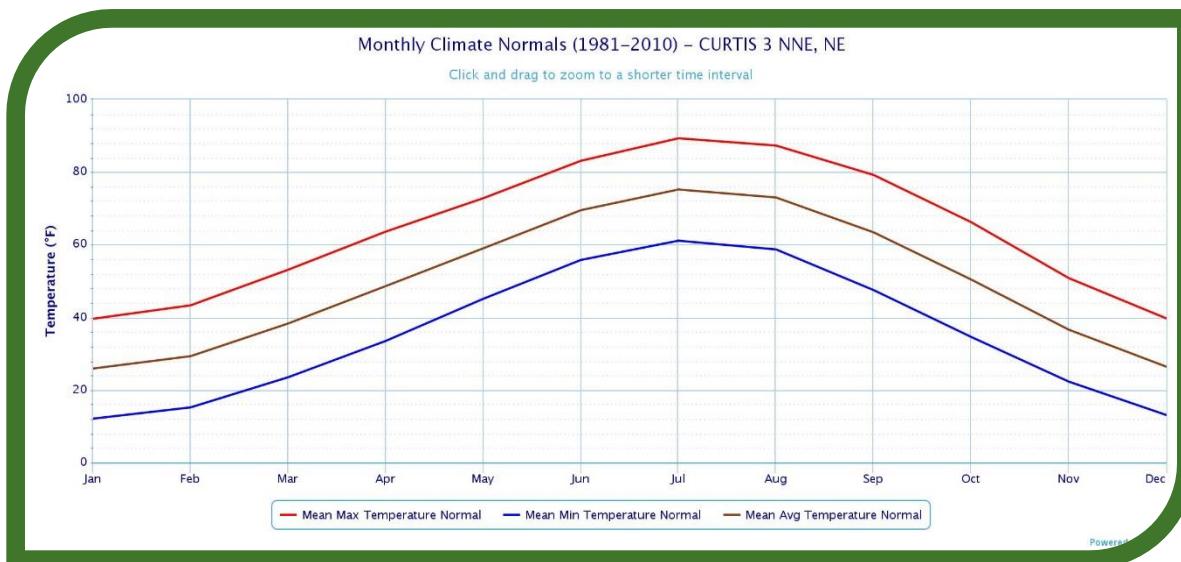
Normals are produced by the National Climatic Data Center (NCDC). Climate normals are an arithmetic average of a variable such as temperature over a prescribed 30-year period. This base period changes every 10 years to reflect the previous 30 years of data. The current period is 1981-2010. Note that NCDC normals may not be the same as a straight average over the 30-year period, due to adjustments for discontinuities such as station moves or changes in observation time.

TABLE 6.67: GENERAL CLIMATE STATISTICS [HPRCC] MONTHLY COMPARISONS

Month	Mean Maximum Temperature (F)	Mean Minimum Temperature (F)	Mean Average Temperature (F)	Total Precipitation (in.)	Total Snowfall (in.)
January	39.6	12.1	25.9	0.41	6.6
February	43.3	15.2	29.3	0.48	4.1
March	53.1	23.5	38.3	1.21	5.9
April	63.6	33.5	48.6	2.15	2.2
May	72.8	45.1	59	3.29	0.0
June	83.1	55.8	69.5	3.65	0.0
July	89.3	61.1	75.2	2.93	0.0
August	87.3	58.7	73	2.87	0.0
September	79.2	47.5	63.4	1.64	0.3
October	66.2	34.6	50.4	1.70	0.8
November	50.8	22.3	36.6	0.81	3.3
December	39.7	13.1	26.4	0.45	5.4

Source: High Plains Regional Climate Center.

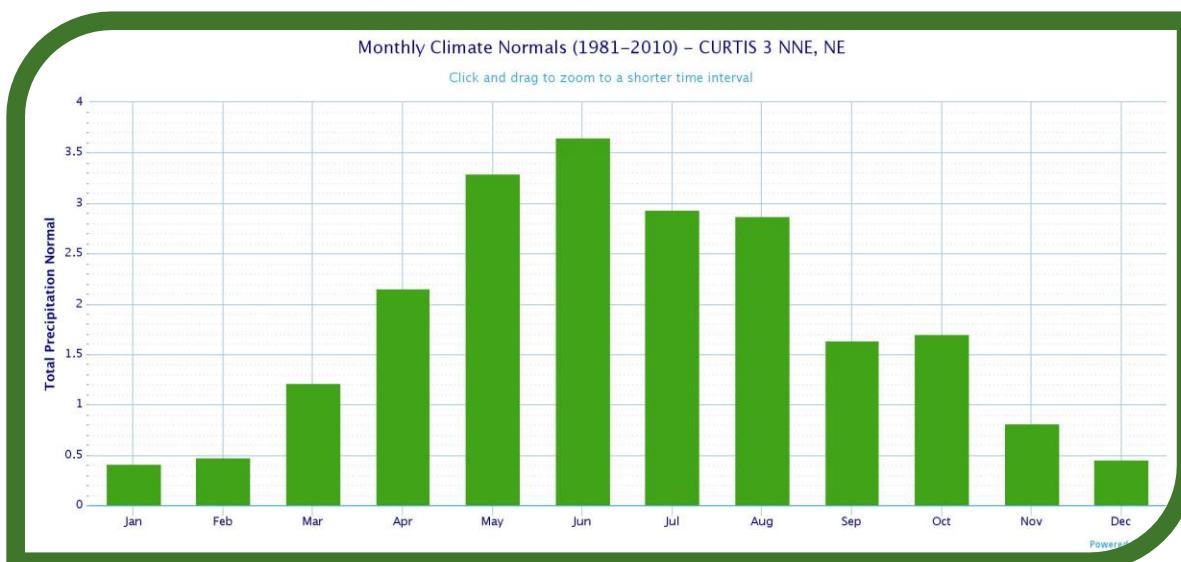
FIGURE 6.15: TEMPERATURE NORMALS [HPRCC] MONTHLY COMPARISONS



Source: High Plains Regional Climate Center.

In Figure 6.15, the monthly climate normals for temperature, including mean maximum, mean minimum, and mean average are shown. Curtis (and Frontier County in general) experiences a period of warming generally from February to July and a period of cooling from August to January. Average temperatures range from 25.9 degrees Fahrenheit in January to 75.2 degrees Fahrenheit in July.

FIGURE 6.16: TOTAL PRECIPITATION NORMALS [HPRCC] MONTHLY COMPARISONS

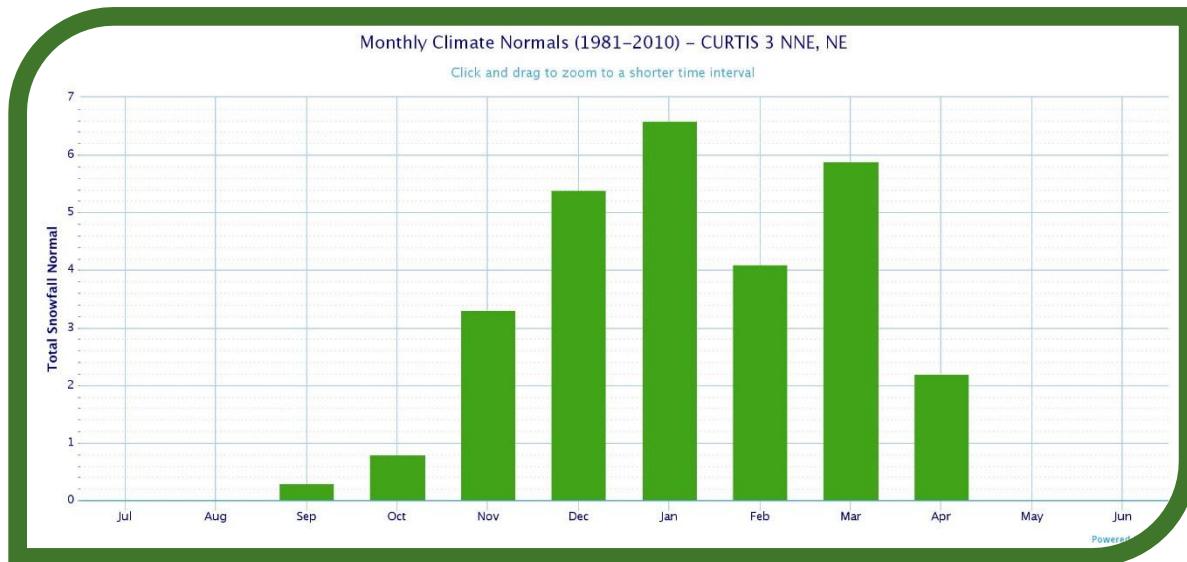


Source: High Plains Regional Climate Center.

Figure 6.16 shows the monthly climate normals for precipitation. Curtis (and Frontier County in general) receives the maximum total precipitation during the month of June of 3.65 inches, with an annual total of 21.59 inches of precipitation.

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FIGURE 6.17: TOTAL SNOWFALL [HPRCC] MONTHLY COMPARISONS



Source: High Plains Regional Climate Center.

In Figure 6.17, the monthly climate normals for snowfall are shown. Curtis (and Frontier County in general) experiences snowfall generally from October until April, with the maximum total snowfall during the month of January of 6.6 inches, and an annual total of 28.6 inches of snowfall.

HAZARD IDENTIFICATION AND RISK ASSESSMENT SUMMARY

The hazard identification was conducted to determine the hazards that threaten Hayes, Frontier, and Hitchcock Counties. It was established through public input and information provided by elected officials, key stakeholders, and residents throughout the planning area, as well as conducting research on each hazard type identified in the State of Nebraska Hazard Mitigation Plan. For the purpose of this plan update, nine natural hazards were initially considered, including severe winter storms (including extreme cold and severe winter weather), tornados, severe thunderstorms (including hail, lightning, and severe wind), flooding, extreme heat, drought, earthquakes, wildfires, and landslides. All were identified as separate potential hazard events as they often pose different threats and potential losses can vary greatly. Man-made hazards, with the exceptions of dam failure and levee failure, were not included in this plan. Using existing hazards data and input gained through planning and public meetings, Hayes, Frontier, and Hitchcock Counties identified the hazards that could affect the planning area.

In order to best describe the hazards that affect the jurisdictions, Hayes, Frontier, and Hitchcock Counties utilized the following activities for identifying hazards in the planning area:

- Reviewed the State Hazard Mitigation Plan for information on hazards affecting the planning area.
- Documented the disaster declaration history.
- Downloaded weather-related events from online resources, such as the National Climatic Data Center.
- Reviewed existing studies, reports, and plans related to hazards in the planning area.
- Used flood insurance rate maps (FIRM) and non-regulatory flood risk assessment products developed for the planning area by FEMA as part of the National Flood Insurance Program (NFIP) and the RiskMAP program.
- Contacted colleges or universities that have hazard-related academic programs or extension services.

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- Interviewed the planning team and stakeholders about which hazards affect the planning area and should be described in the mitigation plan.
- Consulted local resources such as the newspaper, chamber of commerce, local historical society, or other resources with records of past occurrences.
- Referenced hazards previously identified to determine if they were still relevant.

Hazards data from the Nebraska Emergency Management Agency (NEMA) State of Nebraska Mitigation Plan, Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), as well as other sources were analyzed to gage the overall significance of the hazards to Hayes, Frontier, and Hitchcock Counties. Overall significance was calculated based on risk assessment criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur relatively infrequent or have minimal to no impact on the planning area were deemed to be of low significance. This evaluation was used by Hayes, Frontier, and Hitchcock Counties to identify the hazards of greatest overall significance, allowing the Counties to concentrate resources where they are needed most.

The mitigation plan update focuses on how risk has changed since the previous plans were completed, particularly changes related to land use development and new hazard information. New development in hazard-prone areas, areas affected by recent disasters, and new data and reports were incorporated into the plan in order to analyze the current risk and update mitigation actions. The Nebraska State Hazard Mitigation Plan was consulted to assess the potential of new hazards for Hayes, Frontier, and Hitchcock Counties. The previous Frontier County Plan was also reevaluated, and the comments in Table 6.68 detail how hazards were updated.

TABLE 6.68: FRONTIER COUNTY HAZARD IDENTIFICATION [COMPARISON] 2010-2016

2016 Hazards	2008 Hazards*	2016 Comment
Dam Failure	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Drought	Hazard identified but not evaluated.	New hazard.
Earthquake	Hazard identified but not evaluated.	Hazard identified but not evaluated.
Extreme Cold	Hazard not identified.	New hazard (included under Severe Winter Storms).
Extreme Heat	Hazard not identified.	New hazard.
Flood	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Hail	Hazard identified and evaluated (included under Summer Storms).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Landslide	Hazard identified but not evaluated.	Hazard identified but not evaluated.
Lightning	Hazard identified and evaluated (included under Summer Storms).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Severe Wind	Hazard identified and evaluated (included under Summer Storms).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Severe Winter Weather	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Tornado	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.

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2016 Hazards	2008 Hazards*	2016 Comment
Wildfire	Hazard identified and evaluated.	Hazard identified but not evaluated.
Levee Failure	Hazard identified but not evaluated.	Hazard identified but not evaluated.

Source: Frontier County Hazard Mitigation Plan, 2008.

The Disaster Mitigation Act requires that Hayes, Frontier, and Hitchcock Counties evaluate the risks associated with each hazard identified in the planning process. Refer to Section Three for additional explanations on which hazards were evaluated and why certain hazards were not evaluated in this plan. The overall risk assessment for the identified hazard types represents the presence and vulnerability to each hazard type throughout the planning area. The individual hazard identification tables, based on the public input and information received, identify those hazard types which have occurred, have a significant likelihood to occur again, or have reason to potentially occur in Hayes, Frontier, and Hitchcock Counties. These tables were compiled after receiving responses from the public, discussing the public responses with the State Hazard Mitigation Officer, and conducting detailed research on the presence and risk of each hazard type. The individual participant hazard identification tables and responses may or may not reflect the consensus for risk and vulnerability to each hazard type for the planning area.

Tables 6.69-6.76 summarizes the results of the hazard identification and risk assessment for Hayes County, based on the hazard data and input from the public. For each hazard identified, this table includes the location, maximum probable extent, probability of future events, and overall significance for the County and incorporated jurisdictions. Add descriptions from Hazard worksheet and that these come from individual participants.

TABLE 6.69: HAZARD IDENTIFICATION & RISK ASSESSMENT [FRONTIER COUNTY] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Limited	Moderate	Low
Drought	Extensive	Severe	Medium
Extreme Cold	Significant	Moderate	Medium
Extreme Heat	Significant	Moderate	Medium
Flood	Limited	Moderate	Low
Hail	Limited	Moderate	Medium
Lightning	Negligible	Moderate	Medium
Severe Wind	Significant	Moderate	High
Severe Winter Weather	Significant	Moderate	Medium
Tornado	Significant	Severe	Medium

TABLE 6.70: HAZARD IDENTIFICATION & RISK ASSESSMENT [CURTIS] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Limited	Moderate	Low
Drought	Extensive	Severe	Medium
Extreme Cold	Significant	Moderate	Medium
Extreme Heat	Significant	Moderate	Medium
Flood	Limited	Moderate	Low
Hail	Limited	Moderate	Medium

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Lightning	Negligible	Moderate	Medium
Severe Wind	Significant	Moderate	High
Hazard	Location	Maximum Probable Extent	Overall Significance
Severe Winter Weather	Significant	Moderate	Medium
Tornado	Significant	Severe	Medium

TABLE 6.71: HAZARD IDENTIFICATION & RISK ASSESSMENT [EUSTIS] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Limited	Moderate	Low
Drought	Extensive	Moderate	High
Extreme Cold	Extensive	Moderate	Low
Extreme Heat	Limited	Moderate	Low
Flood	Limited	Moderate	Medium
Hail	Negligible	Moderate	High
Lightning	Extensive	Weak	Low
Severe Wind	Extensive	Moderate	Medium
Severe Winter Weather	Extensive	Severe	High
Tornado	Extensive	Extreme	High

TABLE 6.72: HAZARD IDENTIFICATION & RISK ASSESSMENT [MAYWOOD SCHOOLS] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Extensive	Extreme	High
Earthquake	Negligible	Weak	Low
Extreme Cold	Extensive	Severe	Medium
Extreme Heat	Extensive	Extreme	Medium
Flood	Significant	Moderate	Medium
Hail	Extensive	Severe	High
Lightning	Extensive	Weak	Medium
Severe Wind	Extensive	Moderate	High
Severe Winter Weather	Extensive	Severe	High
Tornado	Extensive	Extreme	High

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TABLE 6.73: HAZARD IDENTIFICATION & RISK ASSESSMENT [EUSTIS-FARNAM SCHOOLS] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Extensive	Extreme	Medium
Extreme Cold	Significant	Moderate	High
Extreme Heat	Significant	Severe	Medium
Flood	Negligible	Weak	Medium
Hail	Extensive	Extreme	High
Lightning	Extensive	Severe	High
Severe Wind	Extensive	Severe	High
Severe Winter Weather	Extensive	Severe	Medium
Tornado	Extensive	Extreme	

TABLE 6.74: HAZARD IDENTIFICATION & RISK ASSESSMENT [MEDICINE VALLEY SCHOOLS] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Extensive	Extreme	High
Extreme Cold	Extensive	Moderate	Medium
Extreme Heat	Extensive	Moderate	Medium
Flood	Limited	Weak	Low
Hail	Extensive	Extreme	High
Lightning	Extensive	Severe	High
Severe Wind	Extensive	Severe	High
Severe Winter Weather	Extensive	Severe	High
Tornado	Extensive	Extreme	High

TABLE 6.75: HAZARD IDENTIFICATION & RISK ASSESSMENT [Middle Republican NRD] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Limited	Severe	Low
Drought	Extensive	Severe	High
Extreme Cold	Extensive	Moderate	Medium
Extreme Heat	Extensive	Moderate	Medium
Flood	Limited	Severe	Medium
Hail	Limited	Moderate	Medium
Lightning	Negligible	Weak	Low

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Severe Wind	Extensive	Severe	Medium
Severe Winter Weather	Extensive	Severe	Medium
Tornado	Limited	Severe	Medium

TABLE 6.76: HAZARD IDENTIFICATION & RISK ASSESSMENT [REGION 15 EMA] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Medium
Drought	Significant	Severe	High
Extreme Cold	Limited	Moderate	Medium
Extreme Heat	Limited	Moderate	Medium
Flood	Limited	Moderate	Medium
Hail	Significant	Moderate	Medium
Lightning	Limited	Moderate	Medium
Severe Wind	Significant	Moderate	Medium
Severe Winter Weather	Limited	Moderate	Medium
Tornado	Limited	Moderate	Medium

THE ACTION PLAN – FRONTIER COUNTY

The action plan lays the groundwork for implementation. The plan was developed to present the recommendations established by Hayes, Frontier, and Hitchcock Counties on how the participating jurisdictions can reduce risk and vulnerability of people, property, infrastructure, and natural resources to future disaster losses. The action plan identifies how mitigation actions will be implemented, including who is responsible for which actions, what funding mechanisms and other resources are available or will be pursued, when actions will be completed, and how they are prioritized.

Plan updates reflect progress in local mitigation efforts. The integration of the plan into existing planning mechanisms and the implementation of mitigation actions demonstrate progress in risk reduction. Details describing how the current mitigation strategy, including goals and actions, will be incorporated into existing mechanisms are discussed in *Section Five: Review, Evaluation, and Implementation*.

The action plan detailed below contains both new actions developed for this plan update, as well as viable actions that had yet to be completed from the previous Frontier County Plan.

LOCAL PLANS AND REGULATIONS

These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.

FRONTIER COUNTY

Frontier County determined that their warning systems, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan but more there is more concern with warning systems with the current plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

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[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Frontier County Board of Commissioners and Planning and Zoning Commission

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] Continuous

[Priority] High

[Status] This a continued action from past plan that is an ongoing action.

COMPREHENSIVE PLAN AND ZONING REGULATIONS DEVELOPMENT AND UPDATE

[Background] Continue to update Frontier County's existing comprehensive plan and zoning regulations to help guide public policy in terms of transportation, utilities, land use, recreation, and housing.

[Benefits] Through public policy, the comprehensive plan and zoning regulations will help guide future development away from hazard prone areas.

[Responsible Agency & Partners] Frontier County Board of Commissioners and Planning and Zoning Commission

[Cost Estimate & Funding] \$15,000; Tax Revenue, grants, bequeaths

[Timeline] Continuous

[Priority] High

[Status] New Action

EMERGENCY OPERATIONS CENTER

[Background] Construct a regional emergency operations tower and install NOAA all hazards transmitter.

[Benefits] The existing system is not able to communicate to the central part of Frontier County due to the existing terrain. The new tower will provide the public with warnings due emergency situations.

[Responsible Agency & Partners] Frontier County, Emergency Management Agency; National Weather Service/Local Offices

[Cost Estimate & Funding] \$140,000; Hazard Mitigation Assistance Grant Programs and Local Funds

[Timeline] 2-3 years

[Priority] High

[Status] New Action

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to the Courthouse emergency power backup.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Frontier County Board and local city/village governments.

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-2 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

WARNING SYSTEMS

[Background] Install an outdoor weather warning system at the Stockville Fairgrounds and two county lakes.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Frontier County; Nebraska Game and Parks, Bureau of Reclamation

[Cost Estimate & Funding] \$100,000; Hazard Mitigation Assistance Grant Programs, local funds

[Timeline] 2-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

FLOODPLAIN DEVELOPMENT ORDINANCE ENFORCEMENT

[Background] Continue or improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in significant flood hazard areas), floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the National Flood Insurance Program, Community Rating System (CRS), and participation in Federal Emergency Management Agency's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process. Continue to enforce local floodplain regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of floodplain development permits by any the County. Continue education of building inspectors or Certified Floodplain Managers. Encourage building regulations for storm resistance structures.

[Benefits] Continue compliance with the National Flood Insurance Program. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share. Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.

[Responsible Agency & Partners] Frontier County Board of Commissioners and Planning and Zoning Commission

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant

[Timeline] 1-3 years

[Priority] Medium

[Status] This a continued action from past plan that is an ongoing action.

ROAD AND EMBANKMENT IMPROVEMENTS

[Background] Identify, design, and construct road and embankment improvements as necessary for proper drainage and to adequately manage the traffic load.

Section Six [Participant Profiles I Frontier County]

[Benefits] Properly designed and constructed roads and embankments promote safer travel and allow for increased emergency response.

[Responsible Agency & Partners] Frontier County Board of Commissioners and Planning and Zoning Commission

[Cost Estimate & Funding] \$50,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] This a continued action from past plan that is an ongoing action.

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Emergency Management Agency and Frontier County

[Cost Estimate & Funding] \$75/radio; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Emergency Management Agency and Frontier County

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Emergency Management Agency and Frontier County

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CITY OF CURTIS

Curtis determined that their power systems and warning systems are high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board)

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

UNDERGROUND OR IDENTIFY AND RETROFIT POWER AND SERVICE LINES

[Background] Bury power or service lines for protection during weather events.

[Benefits] To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board), Curtis Municipal Power

[Cost Estimate & Funding] \$60,000 to \$80,000/mile (electrical); Hazard Mitigation Assistance Grant Programs, City of Curtis

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

Section Six [Participant Profiles I Frontier County]

[Responsible Agency & Partners] City of Curtis (Mayor and City Board)

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board)

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board) and Frontier County

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

DAM ENGINEERING ANALYSIS, REPAIRS, AND REINFORCEMENTS

[Background] Conduct a preliminary engineering analysis for dam repairs and reinforcement. Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection. The Emergency Action Plan, Dam Breech Analysis, and/or inspection/safety equipment training may need to be updated along with improvements.

[Benefits] Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board)/or Floodplain Management Department and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

NEW ALTERNATE POWER SOURCE

[Background] Investigate, develop, and implement new alternative sources of power.

[Benefits] Diversifying sources of power for a community will decrease reliance on sole-source power generation and provide multiple options and redundancies in the event of a natural disaster.

[Responsible Agency & Partners] City of Curtis (Mayor and City Board) and Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

VILLAGE OF EUSTIS

Eustis determined that their backup power systems and warning systems are high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

BACKUP GENERATORS

[Background] Provide a backup power source for the water wells generators, provide a generator for the control building.

[Benefits] Reduce the danger to human life/health by keeping water services and sewer services active at all times.

[Responsible Agency & Partners] Village of Eustis (Village Board)

[Cost Estimate & Funding] \$25,000 – \$30,000; Hazard Mitigation Assistance Grant Programs, Eustis Foundation, Bank Loan

[Timeline] 5 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

ALERT AND WARNING SIRENS

[Background] Provide radio controls for warning sirens and install new sirens where lacking and remote activation.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

Section Six [Participant Profiles I Frontier County]

[Responsible Agency & Partners] Village of Eustis (Village Board)

[Cost Estimate & Funding] \$10,000+; Financial Bank, local funds

[Timeline] 5 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

NEW WATER WELL, TOWER, AND STAND PIPE

[Background] Construct a new water well due to the contamination of an existing well.

[Benefits] Provide additional water service and better volume.

[Responsible Agency & Partners] Village of Eustis (Village Board)

[Cost Estimate & Funding] \$100,000; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant, State Revolving Loan Fund, Bank Loan, Eustis Area Foundation

[Timeline] 5 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include adding additional trained Fireman and EMTS.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Eustis Fire Protection District and Village of Eustis (Village Board)

[Cost Estimate & Funding] \$5,000+ for equipment, \$1,500 per person; Hazard Mitigation Assistance Grant Programs, Eustis Area Community Foundation

[Timeline] 5 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

MEDICINE VALLEY SCHOOLS

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Medicine Valley School Board, City or Village part of Medicine Valley Jurisdiction

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed. Potentially had a new weather tower constructed to increase radio service to larger coverage areas.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Emergency Management Department and Frontier County Board

[Cost Estimate & Funding] \$300,000; Hazard Mitigation Assistance Grant Programs, Tax Funding

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

EUSTIS-FARNAM SCHOOLS

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Eustis-Farnam School Board, City or Village part of Medicine Valley Jurisdiction

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed. Potentially had a new weather tower constructed to increase radio service to larger coverage areas.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Emergency Management Department and Frontier County Board

Section Six [Participant Profiles I Frontier County]

[Cost Estimate & Funding] \$300,000; Hazard Mitigation Assistance Grant Programs, Tax Funding

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

MAYWOOD PUBLIC SCHOOLS

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Maywood Public School Board, City or Village part of Medicine Valley Jurisdiction

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed. Potentially had a new weather tower constructed to increase radio service to larger coverage areas.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Emergency Management Department and Frontier County Board

[Cost Estimate & Funding] \$300,000; Hazard Mitigation Assistance Grant Programs, Tax Funding

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

PROPERTY VALUES AND TAXES [NDR]

FRONTIER COUNTY

FIGURE 6.18: 2015 PROPERTY VALUES AND TAXES [FRONTIER COUNTY] DEPARTMENT OF REVENUE

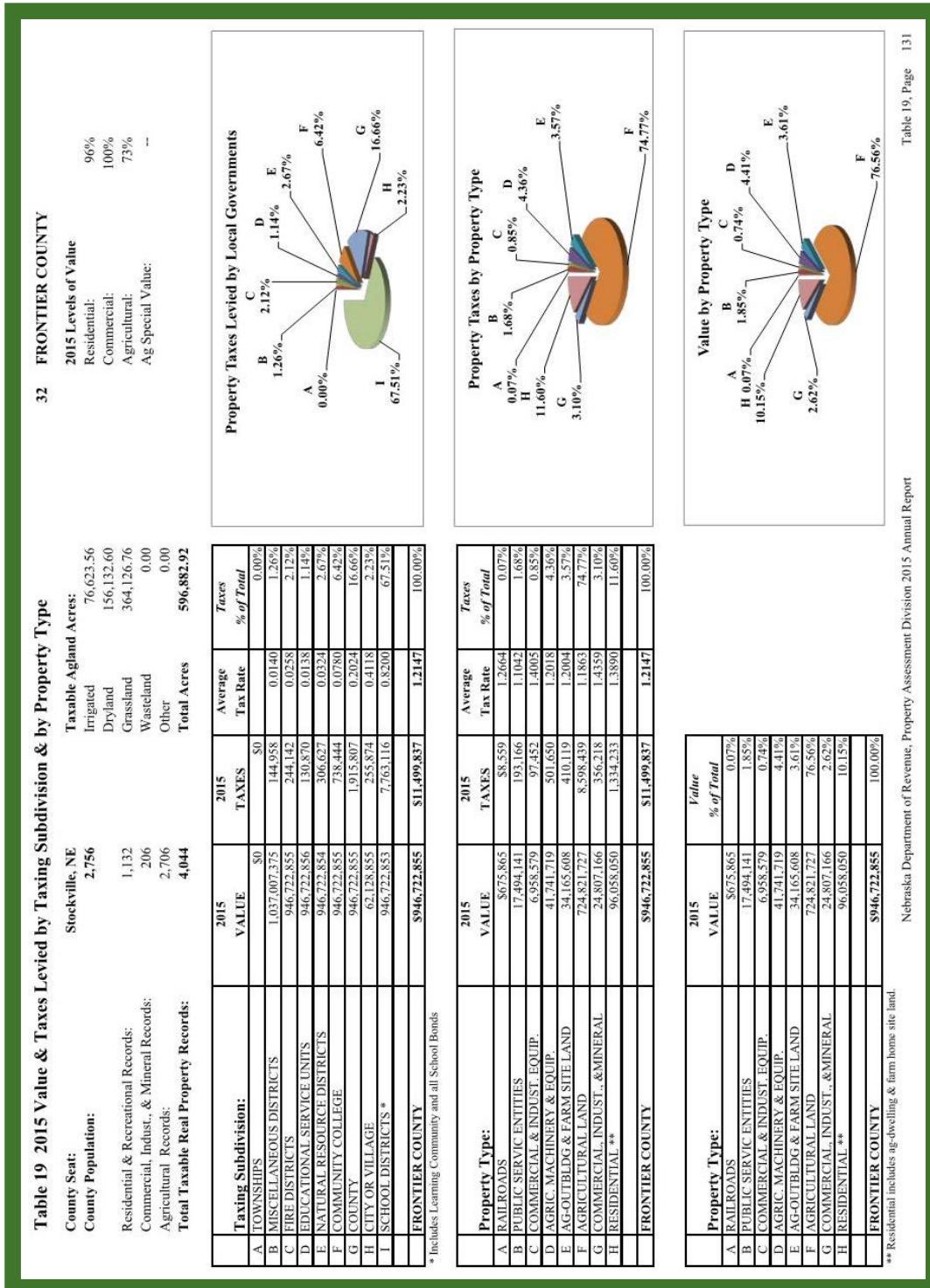


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Nebraska Department of Revenue, Property Assessment Division 2015 Annual Report

FLOOD INSURANCE RATE MAPS [FIRM]

FEDERAL EMERGENCY MANAGEMENT AGENCY

FIGURE 6.19: FLOOD INSURANCE RATE MAP – PANEL #1 [CITY OF CURTIS] FRONTIER COUNTY

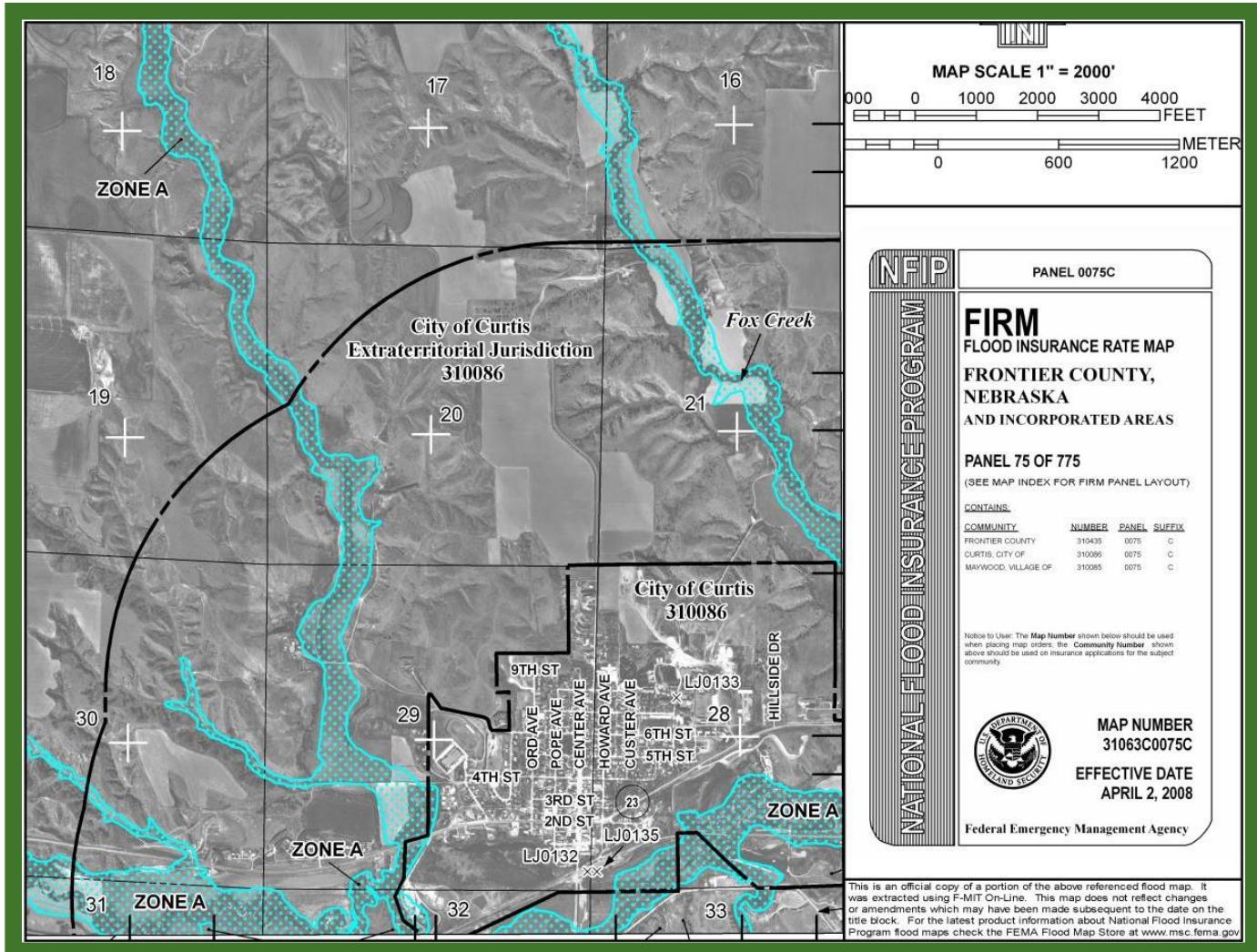


FIGURE 6.20: FLOOD INSURANCE RATE MAP – PANEL #2 [CITY OF CURTIS] FRONTIER COUNTY

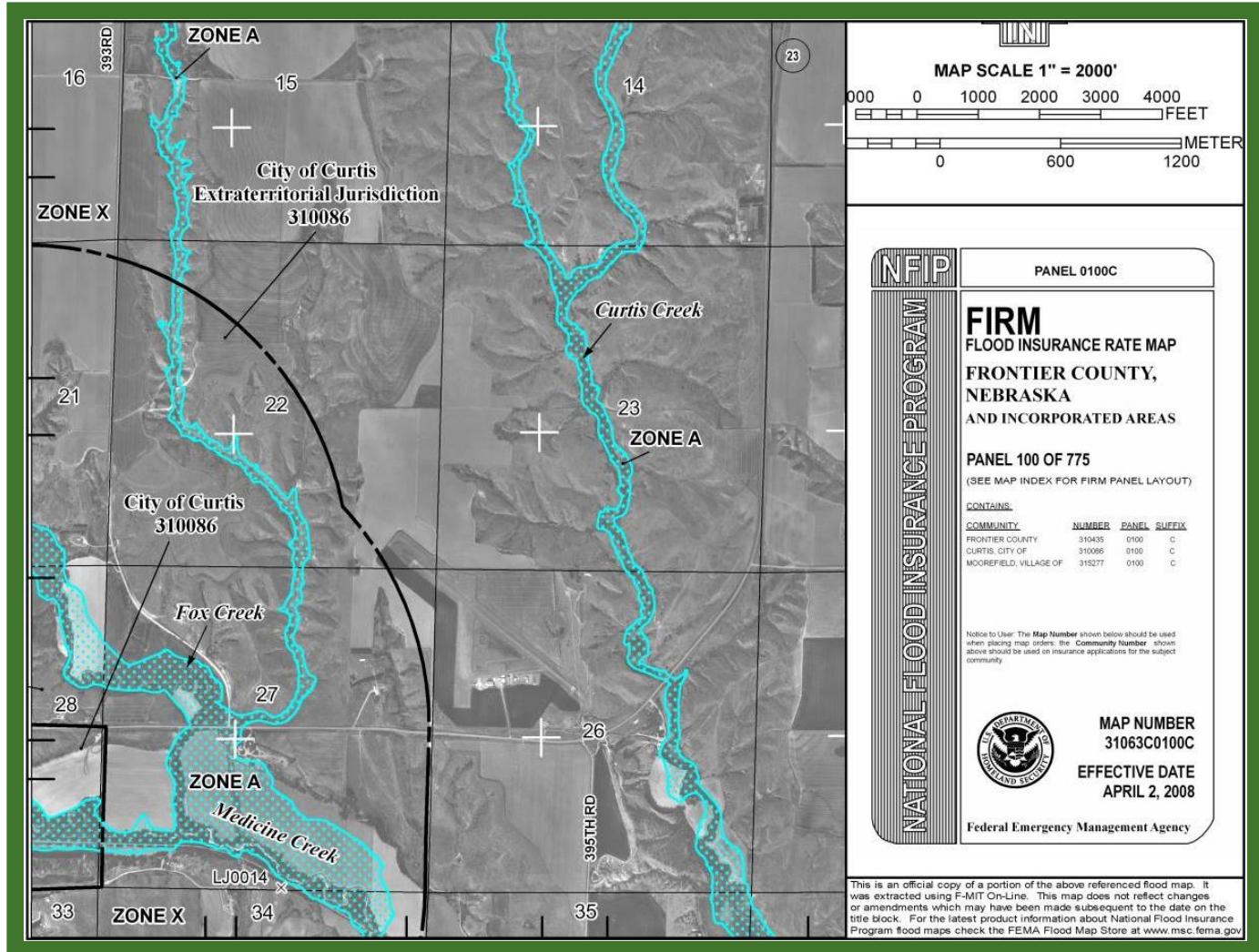
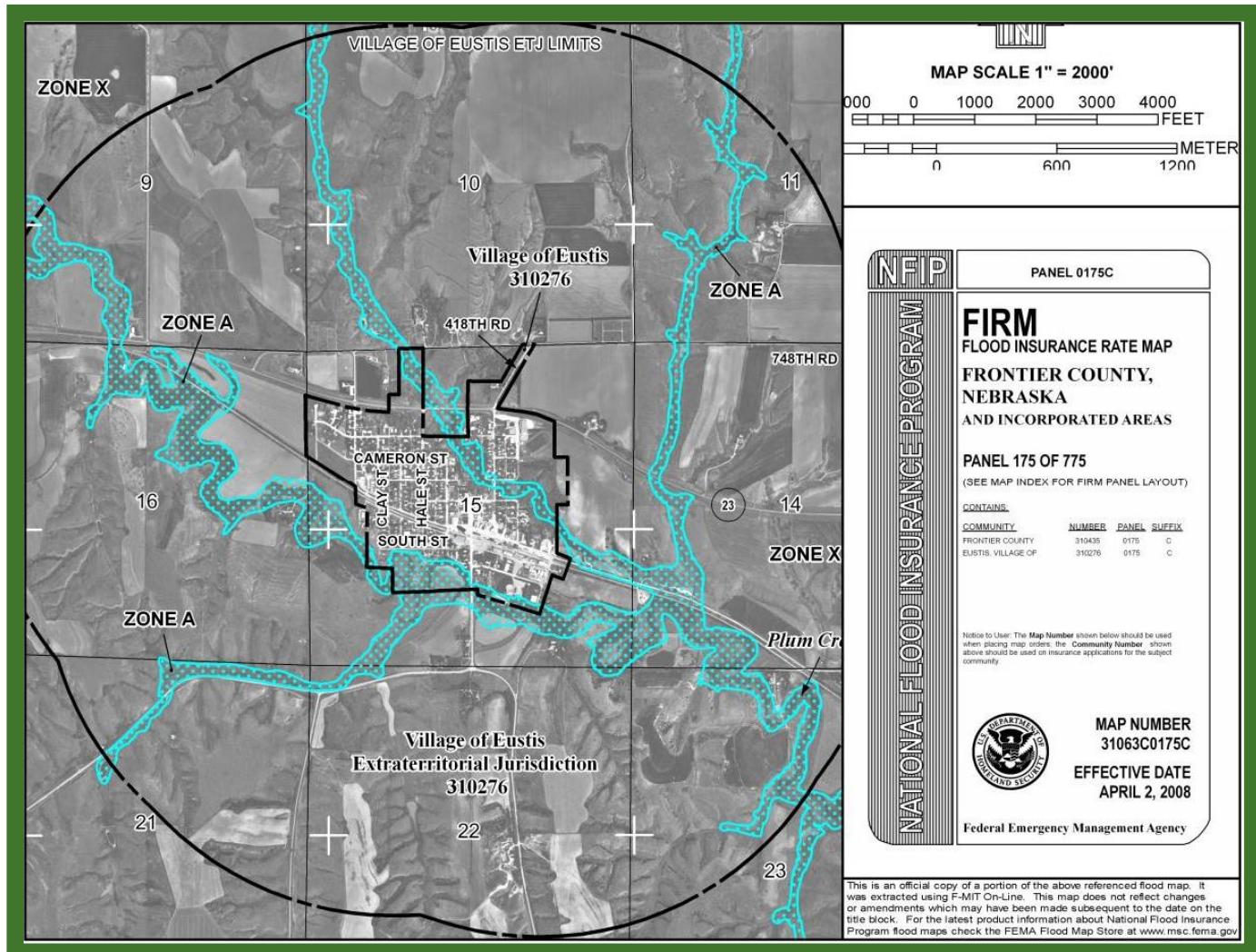


FIGURE 6.21: FLOOD INSURANCE RATE MAP [VILLAGE OF EUSTIS] FRONTIER COUNTY



NATIONAL CLIMATIC DATA CENTER [NCDC]

HAZARD EVENT DETAILS

TABLE 6.77: NCDC EVENTS [SEVERE WINTER STORMS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County/ Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
FRONTIER (ZONE)	FRONTIER (ZONE)	1/17/1996	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	3/24/1996	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	11/14/1996	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	4/5/1997	Blizzard		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	4/9/1997	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	10/24/1997	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	1/20/1998	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	2/25/1998	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	3/6/1998	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	3/30/1998	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	11/11/2000	Heavy Snow		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	1/29/2001	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	2/27/2001	Heavy Snow		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	1/31/2002	Heavy Snow		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	3/1/2002	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	4/6/2003	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	1/4/2004	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	2/4/2004	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	11/28/2004	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	1/5/2005	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	11/27/2005	Blizzard		0	0	32.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	3/19/2006	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	12/19/2006	Winter Storm		0	0	50.00K	0.00K

Section Six [Participant Profiles | Frontier County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
FRONTIER (ZONE)	FRONTIER (ZONE)	12/29/2006	Winter Storm		0	0	10.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	1/20/2007	Heavy Snow		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	4/10/2008	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	2/13/2009	Heavy Snow		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	10/29/2009	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	12/7/2009	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	12/3/2011	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	2/3/2012	Winter Storm		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	12/19/2012	Blizzard		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	2/20/2013	Heavy Snow		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	12/31/2014	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Totals [34]					0	0	0.00K	0.00K
							0.00K	

TABLE 6.78: NCDC EVENTS [SEVERE THUNDERSTORMS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
MC COOK	FRONTIER CO.	6/5/1996	Hail	1.75 in.	0	0	0.00K	0.00K
MAYWOOD	FRONTIER CO.	6/6/1996	Hail	1.75 in.	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	6/21/1996	Hail	0.88 in.	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	6/21/1996	Hail	1.00 in.	0	0	0.00K	0.00K
EUSTIS	FRONTIER CO.	7/3/1996	Hail	0.75 in.	0	0	0.00K	0.00K
MOOREFIELD	FRONTIER CO.	7/7/1996	Hail	0.88 in.	0	0	0.00K	0.00K
MOOREFIELD	FRONTIER CO.	7/7/1996	Thunderstorm Wind	90 kts.	0	0	0.10K	2.000M
STOCKVILLE	FRONTIER CO.	7/7/1996	Hail	0.75 in.	0	0	0.00K	0.00K
MOOREFIELD	FRONTIER CO.	7/22/1996	Hail	1.75 in.	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	7/22/1996	Hail	0.88 in.	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	7/25/1996	Hail	1.00 in.	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	7/25/1996	Hail	2.75 in.	0	0	0.00K	0.00K
EUSTIS	FRONTIER CO.	8/10/1996	Hail	1.75 in.	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	8/10/1996	Hail	1.00 in.	0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	10/29/1996	High Wind	40 kts.	0	0	0.00K	0.00K
EUSTIS	FRONTIER CO.	4/19/1997	Hail	0.75 in.	0	0	0.00K	0.00K
EUSTIS	FRONTIER CO.	4/19/1997	Hail	1.50 in.	0	0	0.00K	0.00K

Section Six [Participant Profiles | Frontier County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>CURTIS</u>	FRONTIER CO.	6/11/1997	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/11/1997	Hail	1.00 in.	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	6/11/1997	Hail	1.75 in.	0	0	0.00K	6.000M
<u>CURTIS</u>	FRONTIER CO.	6/11/1997	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/11/1997	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/11/1997	Thunderstorm Wind		0	0	35.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/19/1997	Hail	0.75 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/25/1997	Hail	1.75 in.	0	0	3.000M	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/25/1997	Thunderstorm Wind		0	0	300.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/25/1997	Thunderstorm Wind		0	0	2.00K	11.000M
<u>CURTIS</u>	FRONTIER CO.	8/21/1997	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	8/28/1997	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	10/8/1997	Thunderstorm Wind		0	0	50.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/21/1998	Hail	2.75 in.	0	0	10.00K	30.00K
<u>EUSTIS</u>	FRONTIER CO.	5/21/1998	Hail	1.00 in.	0	0	5.00K	10.00K
<u>CURTIS</u>	FRONTIER CO.	5/21/1998	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/21/1998	Hail	1.75 in.	0	0	10.00K	10.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/21/1998	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/21/1998	Hail	2.75 in.	0	0	5.00K	15.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/21/1998	Hail	2.75 in.	0	0	1.00K	21.00K
<u>MOOREFIELD</u>	FRONTIER CO.	5/21/1998	Hail	1.75 in.	0	0	50.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/21/1998	Hail	2.00 in.	0	0	10.00K	30.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/21/1998	Hail	1.75 in.	0	0	3.00K	10.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/21/1998	Hail	2.50 in.	0	0	8.00K	20.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/21/1998	Hail	1.75 in.	0	0	7.00K	10.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/9/1998	Hail	0.88 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/21/1998	Thunderstorm Wind		0	0	25.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	9/29/1998	Hail	1.25 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	10/4/1998	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	10/16/1998	Hail	0.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	10/16/1998	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	10/16/1998	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	10/16/1998	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/9/1999	Hail	1.75 in.	0	0	9.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/14/1999	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/14/1999	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/22/1999	Hail	0.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/30/1999	Hail	0.88 in.	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>STOCKVILLE</u>	FRONTIER CO.	6/22/1999	Thunderstorm Wind	65 kts.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/27/1999	Hail	0.75 in.	0	0	2.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	8/10/1999	Thunderstorm Wind		0	0	1.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	8/10/1999	Thunderstorm Wind		0	0	150.00K	200.00K
<u>CURTIS</u>	FRONTIER CO.	8/10/1999	Thunderstorm Wind		0	0	5.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	8/17/1999	Thunderstorm Wind		0	0	50.00K	100.00K
<u>STOCKVILLE</u>	FRONTIER CO.	8/17/1999	Hail	0.88 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/17/1999	Thunderstorm Wind	60 kts.	0	0	3.00K	15.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/7/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/17/2000	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/17/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/4/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/19/2000	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/23/2000	Hail	0.75 in.	0	0	1.00K	5.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/29/2000	Hail	1.75 in.	0	0	50.00K	100.00K
<u>EUSTIS</u>	FRONTIER CO.	6/29/2000	Hail	4.50 in.	0	0	500.00K	400.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/29/2000	Hail	1.75 in.	0	0	50.00K	100.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/3/2000	Hail	0.88 in.	0	0	0.00K	5.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/3/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	7/3/2000	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/20/2000	Hail	1.00 in.	0	0	0.00K	15.00K
<u>MAYWOOD</u>	FRONTIER CO.	7/21/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/26/2000	Thunderstorm Wind		0	0	1.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	8/13/2000	Hail	2.00 in.	0	0	10.00K	40.00K
<u>MAYWOOD</u>	FRONTIER CO.	8/13/2000	Hail	1.00 in.	0	0	0.00K	5.00K
<u>MAYWOOD</u>	FRONTIER CO.	8/13/2000	Hail	1.00 in.	0	0	10.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	10/31/2000	Hail	1.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	10/31/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	4/11/2001	High Wind	40 kts. E	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	4/20/2001	Thunderstorm Wind	52 kts. E	0	0	1.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/13/2001	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/13/2001	Hail	0.75 in.	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	6/13/2001	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	7/5/2001	Hail	1.00 in.	0	0	5.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	7/12/2001	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/20/2001	Thunderstorm Wind	62 kts. E	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>MOOREFIELD</u>	FRONTIER CO.	8/12/2001	Hail	1.00 in.	0	0	10.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/23/2001	Hail	0.75 in.	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	2/9/2002	High Wind	50 kts. E	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	5/21/2002	High Wind	50 kts. E	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/26/2002	Hail	1.75 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/28/2002	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/15/2002	Hail	0.88 in.	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	6/15/2002	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/19/2002	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/19/2002	Hail	1.75 in.	0	0	4.00K	5.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/19/2002	Hail	2.75 in.	0	0	15.00K	20.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/19/2002	Hail	1.00 in.	0	0	12.00K	10.00K
<u>EUSTIS</u>	FRONTIER CO.	8/8/2002	Thunderstorm Wind	52 kts. E	0	0	1.00K	1.00K
<u>EUSTIS</u>	FRONTIER CO.	8/17/2002	Thunderstorm Wind	52 kts. E	0	0	2.00K	1.00K
<u>EUSTIS</u>	FRONTIER CO.	8/17/2002	Hail	0.88 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/22/2002	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	8/23/2002	Thunderstorm Wind	52 kts. E	0	0	15.00K	2.00K
<u>STOCKVILLE</u>	FRONTIER CO.	4/14/2003	Hail	1.00 in.	0	0	2.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/24/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/11/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/11/2003	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/23/2003	Hail	1.75 in.	0	0	5.00K	10.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/23/2003	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/23/2003	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/23/2003	Thunderstorm Wind	61 kts. EG	0	0	5.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/24/2003	Hail	1.50 in.	0	0	5.00K	20.00K
<u>CURTIS</u>	FRONTIER CO.	6/24/2003	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/24/2003	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/24/2003	Lightning		0	0	8.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/24/2003	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	7/7/2003	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/20/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	7/21/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/9/2003	Thunderstorm Wind	52 kts. EG	0	0	1.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	3/27/2004	Hail	0.88 in.	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>CURTIS</u>	FRONTIER CO.	5/22/2004	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/29/2004	Thunderstorm Wind	70 kts. EG	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/29/2004	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/10/2004	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/15/2004	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/15/2004	Thunderstorm Wind	52 kts. EG	0	0	0.00K	3.00K
<u>CURTIS</u>	FRONTIER CO.	7/8/2004	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	7/15/2004	Hail	2.00 in.	0	0	50.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	7/15/2004	Hail	1.75 in.	0	0	0.50K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	8/4/2004	Hail	0.75 in.	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	3/10/2005	High Wind	40 kts. ES	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	3/29/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	3/29/2005	Hail	1.75 in.	0	0	8.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	4/10/2005	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/11/2005	Hail	0.88 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/11/2005	Hail	2.75 in.	0	0	5.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/11/2005	Hail	1.25 in.	0	0	4.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/11/2005	Hail	2.50 in.	0	0	5.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/11/2005	Hail	2.50 in.	0	0	5.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/11/2005	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/11/2005	Hail	0.88 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/28/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/28/2005	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/6/2005	Hail	1.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/6/2005	Hail	1.50 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/6/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/6/2005	Hail	2.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/6/2005	Hail	2.50 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/27/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	7/8/2005	Hail	0.88 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/28/2005	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	8/28/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	9/11/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	4/2/2006	High Wind	51 kts. EG	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	4/7/2006	High Wind	51 kts. EG	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	4/19/2006	High Wind	52 kts. EG	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>STOCKVILLE</u>	FRONTIER CO.	5/7/2006	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/7/2006	Hail	1.75 in.	0	0	1.20K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/5/2006	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/5/2006	Hail	1.75 in.	0	0	5.00K	5.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/5/2006	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/5/2006	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/1/2006	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/1/2006	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/1/2006	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/1/2006	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	8/9/2006	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/9/2006	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	3/24/2007	Hail	1.25 in.	0	0	0.50K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	4/20/2007	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	4/20/2007	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/16/2007	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/16/2007	Thunderstorm Wind	56 kts. MG	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/22/2007	Hail	1.75 in.	0	0	3.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/22/2007	Hail	1.00 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	7/8/2007	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	7/12/2007	Hail	0.75 in.	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	8/7/2007	Thunderstorm Wind	52 kts. EG	0	0	20.00K	15.00K
<u>EUSTIS</u>	FRONTIER CO.	8/21/2007	Hail	1.25 in.	0	0	10.00K	35.00K
<u>EUSTIS</u>	FRONTIER CO.	8/21/2007	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/21/2007	Hail	1.75 in.	0	0	25.00K	75.00K
<u>EUSTIS</u>	FRONTIER CO.	8/21/2007	Hail	2.75 in.	0	0	45.00K	150.00K
<u>EUSTIS</u>	FRONTIER CO.	8/21/2007	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/21/2007	Hail	0.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/21/2007	Hail	1.75 in.	0	0	55.00K	125.00K
<u>STOCKVILLE</u>	FRONTIER CO.	9/29/2007	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	10/14/2007	Hail	0.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	10/14/2007	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	4/23/2008	Hail	2.00 in.	0	0	5.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	4/23/2008	Hail	1.75 in.	0	0	10.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	4/23/2008	Hail	2.00 in.	0	0	5.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	4/23/2008	Hail	1.75 in.	0	0	10.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	4/23/2008	Hail	0.88 in.	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>CURTIS</u>	FRONTIER CO.	4/23/2008	Hail	1.50 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/6/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/6/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/6/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>HARRY STRUNK LAKE</u>	FRONTIER CO.	5/9/2008	Thunderstorm Wind	61 kts. EG	0	0	25.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/23/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/23/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	5/23/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/29/2008	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/29/2008	Hail	1.75 in.	0	0	1.50K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/29/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	5/29/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/29/2008	Hail	1.50 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/29/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HARRY STRUNK LAKE</u>	FRONTIER CO.	6/3/2008	Hail	1.50 in.	0	0	1.50K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/4/2008	Hail	1.75 in.	0	0	5.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/4/2008	Hail	1.50 in.	0	0	1.50K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/4/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	6/4/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/4/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/4/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/4/2008	Hail	1.75 in.	0	0	1.50K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/4/2008	Hail	2.50 in.	0	0	6.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/4/2008	Hail	2.50 in.	0	0	6.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/4/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/4/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/4/2008	Hail	1.75 in.	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	6/4/2008	Hail	2.75 in.	0	0	10.00K	50.00K
<u>CURTIS</u>	FRONTIER CO.	6/4/2008	Hail	3.00 in.	0	0	10.00K	50.00K
<u>CURTIS</u>	FRONTIER CO.	6/4/2008	Hail	2.75 in.	0	0	15.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/4/2008	Hail	1.75 in.	0	0	1.50K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	6/4/2008	Hail	1.75 in.	0	0	1.50K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	6/21/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/21/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/23/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	6/26/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/26/2008	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>HARRY STRUNK LAKE</u>	FRONTIER CO.	6/26/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	8/11/2008	Hail	1.00 in.	0	0	0.00K	15.00K
<u>MOOREFIELD</u>	FRONTIER CO.	8/11/2008	Hail	1.00 in.	0	0	0.00K	15.00K
<u>MOOREFIELD</u>	FRONTIER CO.	9/21/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	1/12/2009	High Wind	55 kts. EG	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/5/2009	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/16/2009	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/16/2009	Hail	1.75 in.	0	0	5.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	7/17/2009	Hail	0.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	7/22/2009	Thunderstorm Wind	61 kts. EG	0	0	0.00K	50.00K
<u>EUSTIS</u>	FRONTIER CO.	7/22/2009	Thunderstorm Wind	52 kts. EG	0	0	0.00K	10.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	7/31/2009	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	8/4/2009	Thunderstorm Wind	70 kts. EG	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	8/4/2009	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/5/2009	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/5/2009	Hail	1.00 in.	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	4/13/2010	High Wind	35 kts. ES	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/23/2010	Hail	1.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/1/2010	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	7/10/2010	Hail	1.50 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	7/10/2010	Hail	1.50 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/3/2010	Hail	2.75 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	8/3/2010	Hail	1.75 in.	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	8/5/2010	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	8/5/2010	Thunderstorm Wind	60 kts. EG	0	0	41.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	8/5/2010	Hail	1.00 in.	0	0	0.00K	0.00K
<u>MOOREFIELD</u>	FRONTIER CO.	8/5/2010	Heavy Rain		0	0	0.00K	0.00K
<u>HARRY STRUNK LAKE</u>	FRONTIER CO.	8/19/2010	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	8/30/2010	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	8/30/2010	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	10/27/2010	High Wind	35 kts. MS	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/1/2011	Hail	1.00 in.	0	0	0.00K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	6/1/2011	Hail	1.50 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/1/2011	Hail	1.00 in.	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>STOCKVILLE</u>	FRONTIER CO.	6/16/2011	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/19/2011	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	6/19/2011	Hail	1.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/19/2011	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/19/2011	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	6/19/2011	Hail	1.75 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/2/2011	Hail	1.25 in.	0	0	0.00K	0.00K
<u>STOCKVILLE</u>	FRONTIER CO.	7/10/2011	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	10/6/2011	High Wind	35 kts. MS	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	11/26/2011	High Wind	35 kts. MS	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	12/31/2011	High Wind	35 kts. ES	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	5/19/2012	Hail	1.00 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/19/2012	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	6/14/2012	Hail	1.50 in.	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	9/30/2012	Hail	1.25 in.	0	0	0.00K	0.00K
<u>FRONTIER (ZONE)</u>	FRONTIER (ZONE)	10/18/2012	High Wind	52 kts. EG	0	0	0.00K	0.00K
<u>HARRY STRUNK LAKE</u>	FRONTIER CO.	3/29/2013	Hail	1.75 in.	0	0	0.00K	0.00K
<u>FRONTIER CO.</u>	FRONTIER CO.	4/8/2013	Thunderstorm Wind	70 kts. EG	0	0	6.000M	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/24/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	5/25/2013	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/25/2013	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CURTIS</u>	FRONTIER CO.	5/29/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	6/20/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/22/2013	Hail	0.88 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/22/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>MAYWOOD</u>	FRONTIER CO.	6/22/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HARRY STRUNK LAKE</u>	FRONTIER CO.	6/22/2013	Thunderstorm Wind	43 kts. EG	0	0	0.00K	250.00K
<u>CURTIS</u>	FRONTIER CO.	7/8/2013	Hail	1.25 in.	0	0	0.00K	0.00K
<u>HARRY STRUNK LAKE</u>	FRONTIER CO.	7/9/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	9/10/2013	Thunderstorm Wind	56 kts. EG	0	0	0.50K	0.00K
<u>HUGH BUTLER LAKE</u>	FRONTIER CO.	9/10/2013	Thunderstorm Wind	52 kts. EG	0	0	0.50K	0.00K
<u>EUSTIS</u>	FRONTIER CO.	5/7/2014	Hail	1.50 in.	0	0	0.00K	0.00K

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Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HUGH BUTLER LAKE	FRONTIER CO.	6/14/2014	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
MAYWOOD	FRONTIER CO.	6/20/2014	Hail	1.00 in.	0	0	0.00K	0.00K
HUGH BUTLER LAKE	FRONTIER CO.	6/20/2014	Thunderstorm Wind	61 kts. EG	0	0	40.00K	0.00K
MOOREFIELD	FRONTIER CO.	6/20/2014	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
EUSTIS	FRONTIER CO.	6/20/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
HARRY STRUNK LAKE	FRONTIER CO.	6/21/2014	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	6/27/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
MAYWOOD	FRONTIER CO.	7/9/2014	Hail	1.75 in.	0	0	0.00K	0.00K
MAYWOOD	FRONTIER CO.	8/20/2014	Hail	1.00 in.	0	0	0.00K	0.00K
MAYWOOD	FRONTIER CO.	8/20/2014	Hail	1.75 in.	0	0	1.00K	0.00K
MAYWOOD	FRONTIER CO.	8/20/2014	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	5/16/2015	Hail	1.00 in.	0	0	0.00K	0.00K
MAYWOOD	FRONTIER CO.	6/21/2015	Hail	1.00 in.	0	0	0.00K	0.00K
HUGH BUTLER LAKE	FRONTIER CO.	6/21/2015	Hail	1.75 in.	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	7/10/2015	Hail	1.00 in.	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	7/10/2015	Hail	1.25 in.	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	7/10/2015	Hail	1.00 in.	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	7/10/2015	Hail	1.00 in.	0	0	0.00K	0.00K
MAYWOOD	FRONTIER CO.	7/10/2015	Hail	1.75 in.	0	0	0.00K	0.00K
HUGH BUTLER LAKE	FRONTIER CO.	7/23/2015	Hail	1.75 in.	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	7/23/2015	Hail	0.88 in.	0	0	0.00K	0.00K
HUGH BUTLER LAKE	FRONTIER CO.	7/23/2015	Hail	1.75 in.	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	7/23/2015	Hail	0.88 in.	0	0	0.00K	0.00K
MOOREFIELD	FRONTIER CO.	7/23/2015	Hail	1.75 in.	0	0	0.00K	0.00K
HUGH BUTLER LAKE	FRONTIER CO.	7/23/2015	Hail	2.75 in.	0	0	0.00K	0.00K
MOOREFIELD	FRONTIER CO.	7/23/2015	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
CURTIS	FRONTIER CO.	8/13/2015	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	8/13/2015	Thunderstorm Wind	61 kts. EG	0	0	0.00K	1.00K
HARRY STRUNK LAKE	FRONTIER CO.	9/9/2015	Hail	1.75 in.	0	0	0.00K	0.00K
HARRY STRUNK LAKE	FRONTIER CO.	11/16/2015	Hail	1.00 in.	0	0	0.00K	0.00K
Totals [332]					0	0	10.900M	21.059M
							31.959M	

Section Six [Participant Profiles I Frontier County]

TABLE 6.79: NCDC EVENTS [TORNADOS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
FRONTIER CO.	FRONTIER CO.	4/20/1954	Tornado	F3	0	0	25.00K	0.00K
FRONTIER CO.	FRONTIER CO.	7/2/1957	Tornado	F2	0	0	0.00K	0.00K
FRONTIER CO.	FRONTIER CO.	5/18/1960	Tornado	F2	0	1	250.00K	0.00K
FRONTIER CO.	FRONTIER CO.	6/15/1960	Tornado	F1	0	1	25.00K	0.00K
FRONTIER CO.	FRONTIER CO.	5/18/1962	Tornado	F2	0	0	25.00K	0.00K
FRONTIER CO.	FRONTIER CO.	8/31/1964	Tornado	F1	0	0	25.00K	0.00K
FRONTIER CO.	FRONTIER CO.	5/30/1971	Tornado	F0	0	0	0.00K	0.00K
FRONTIER CO.	FRONTIER CO.	6/18/1975	Tornado	F3	0	0	2.50K	0.00K
FRONTIER CO.	FRONTIER CO.	6/18/1975	Tornado	F3	0	0	2.50K	0.00K
FRONTIER CO.	FRONTIER CO.	7/3/1976	Tornado	F1	0	0	2.50K	0.00K
FRONTIER CO.	FRONTIER CO.	5/30/1977	Tornado	F2	0	0	0.00K	0.00K
FRONTIER CO.	FRONTIER CO.	8/6/1981	Tornado	F1	0	0	250.00K	0.00K
FRONTIER CO.	FRONTIER CO.	5/26/1985	Tornado	F0	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	7/3/2000	Tornado	F0	0	0	0.00K	0.00K
EUSTIS	FRONTIER CO.	10/29/2000	Tornado	F1	0	0	100.00K	0.00K
EUSTIS	FRONTIER CO.	10/31/2000	Tornado	F1	0	0	250.00K	0.00K
STOCKVILLE	FRONTIER CO.	5/26/2002	Tornado	F0	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	5/26/2002	Tornado	F0	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	6/23/2003	Tornado	F0	0	0	5.00K	0.00K
MAYWOOD	FRONTIER CO.	5/11/2005	Tornado	F1	0	0	50.00K	0.00K
MOOREFIELD	FRONTIER CO.	4/20/2007	Tornado	EF2	0	0	240.00K	0.00K
MAYWOOD	FRONTIER CO.	5/6/2008	Tornado	EF0	0	0	0.00K	0.00K
STOCKVILLE	FRONTIER CO.	5/29/2008	Tornado	EF0	0	0	0.00K	0.00K
Totals [23]					0	2	1.252M	0.00K
							1.252M	

TABLE 6.80: NCDC EVENTS [DROUGHT] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
FRONTIER (ZONE)	FRONTIER (ZONE)	6/20/2012	Drought		0	0	0.00K	800.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	7/1/2012	Drought		0	0	1.000M	500.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	8/1/2012	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	9/1/2012	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	10/1/2012	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	11/1/2012	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	12/1/2012	Drought		0	0	0.00K	0.00K

Section Six [Participant Profiles I Frontier County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
FRONTIER (ZONE)	FRONTIER (ZONE)	1/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	2/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	3/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	4/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	5/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	6/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	7/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	8/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	9/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	10/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	11/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	12/1/2013	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	1/1/2014	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	2/1/2014	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	3/1/2014	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	4/1/2014	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	5/1/2014	Drought		0	0	0.00K	0.00K
FRONTIER (ZONE)	FRONTIER (ZONE)	6/1/2014	Drought		0	0	0.00K	0.00K
Totals [25]					0	0	1.00M	1.30M
							2.30M	

TABLE 6.81: NCDC EVENTS [FLOODS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
FRONTIER CO.	6/25/1997	Flash Flood			0	0	50.00K	0.00K
FRONTIER CO.	7/3/2000	Flash Flood			0	0	10.00K	0.00K
FRONTIER CO.	8/13/2000	Flash Flood			0	0	10.00K	0.00K
FRONTIER CO.	4/22/2001	Flash Flood			0	0	0.00K	0.00K
FRONTIER CO.	4/22/2001	Flash Flood			0	0	0.00K	0.00K
FRONTIER CO.	6/24/2003	Flash Flood			0	0	20.00K	25.00K
FRONTIER CO.	7/11/2004	Flash Flood			0	0	0.00K	6.00K
FRONTIER CO.	5/11/2005	Flash Flood			0	0	5.00K	0.00K

Section Six [Participant Profiles | Frontier County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
FRONTIER CO.	6/2/2005	Flash Flood			0	0	0.00K	0.00K
FRONTIER CO.	5/28/2007	Flash Flood			0	0	300.00K	30.00K
FRONTIER CO.	5/29/2007	Flash Flood			0	0	75.00K	10.00K
FRONTIER CO.	7/8/2007	Flash Flood			0	0	5.00K	0.00K
FRONTIER CO.	8/7/2007	Flash Flood			0	0	0.00K	0.00K
FRONTIER CO.	5/23/2008	Flash Flood			0	0	150.00K	0.00K
FRONTIER CO.	5/29/2008	Flash Flood			0	0	25.00K	0.00K
FRONTIER CO.	8/9/2008	Flash Flood			0	0	100.00K	0.00K
FRONTIER CO.	7/22/2009	Flash Flood			0	0	5.00K	0.00K
FRONTIER CO.	5/24/2011	Flash Flood			0	0	0.00K	0.00K
Totals [19]					0	0	\$755.0K	71.0K
								\$826.0K

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Section Six [Participant Profiles]

Section Six provides an overall profile of the plan area including geography, demographics, assets inventory, capabilities assessment, and climate as well as hazard identification and risk assessment analysis specific to each individual participant.

SECTION SIX [HITCHCOCK COUNTY]

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HAZARD MITIGATION PLAN

HAYES, FRONTIER, AND HITCHCOCK COUNTIES

SECTION SIX [PARTICIPANT PROFILES]

HITCHCOCK COUNTY

Local governments have the responsibility to protect the health, safety, and welfare of citizens. Proactive mitigation policies and actions help reduce risk and create safer, more disaster resilient jurisdictions. Mitigation is an investment in the jurisdiction's future safety and sustainability. Consider the critical importance of mitigation to:

- ❑ Protect public safety and prevent loss of life and injury.
- ❑ Reduce harm to existing and future development.
- ❑ Prevent damage to a jurisdiction's unique economic, cultural, and environmental assets.
- ❑ Minimize operational downtime and accelerate recovery of government and business after disasters.
- ❑ Reduce the costs of disaster response and recovery and the exposure to risk for first responders.
- ❑ Help accomplish other jurisdiction objectives, such as leveraging capital improvements, infrastructure protection, open space preservation, and economic resiliency.

Demographics, assets, and capabilities information can be used to determine differing levels of vulnerability by analyzing data on population and housing, structural inventories and valuations, critical facilities, highly vulnerable areas and populations, as well as future land use and development for each participating jurisdiction. These analyses directly impact the hazard identification and risk assessment, which ultimately are reflected in the jurisdiction's priorities and mitigation alternatives.

The Village of Culbertson did not participate in this hazard mitigation plan update.

HISTORY

Hitchcock County was formed in 1873 and named in honor of United States Senator Phineas Warren Hitchcock. The early settlers were cattleman, populating the prairie with large numbers of cattle grazing the plains.

Early in its history, Hitchcock County was the site of one of the last battles fought between the Sioux and Pawnee Indians at Massacre Canyon Battle, just outside of the City of Trenton. In 1930, a monument to the battle was dedicated and is one of the most significant historical places within the County. A Pawnee Pow is still held on the first weekend in August in memoriam and celebration. The monument was the first historical monument erected in Nebraska by federal grant.

Irrigation was established in Hitchcock County in 1892 by Frenchman Valley Irrigation, and provided opportunities for agriculture producers in the area. In 1935, the Republican River flooded and threaten the communities of Stratton and Trenton. In 1949, the Trenton Dam was built and the Swanton Reservoir established. Swanton Reservoir offers many recreational opportunities for residents and visitors to the area.

GEOGRAPHIC SUMMARY

Geographic information, including topographic and soils data, play key roles in land planning and heavily influence land use and development. Understanding the unique, local land composition and characteristics will reduce harm to existing and future development by deterring growth into hazard prone areas.

Section Six [Participant Profiles I Hitchcock County]

Hitchcock County is located in southwestern Nebraska, along the state border with Kansas. Incorporated areas within the County include Culbertson, Palisade, Stratton, and Trenton. The county seat is Trenton and the largest community is Culbertson. Table 6.82, below, summarizes the County's total area composition and elevation.

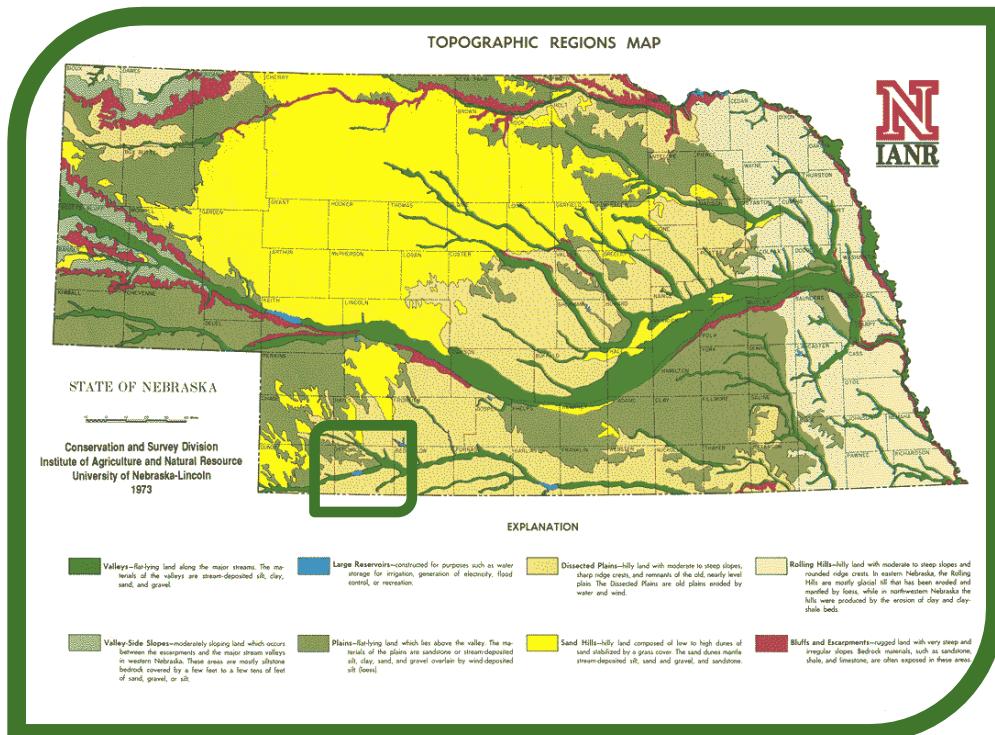
TABLE 6.82: GENERAL GEOGRAPHIC SUMMARY [CASDE] HITCHCOCK COUNTY

Jurisdiction	Area [sq. mi.]			Elevation [ft.]
	Total	Land	Water	
Hitchcock County	718.5	710	8.5	--
Palisade	0.36	0.36	0.0	2,759
Stratton	0.43	0.43	0.0	2,802
Trenton	0.58	0.58	0.0	2,674

Source: University of Nebraska – Lincoln. Virtual Nebraska. www.casde.unl.edu.

Hitchcock County contains four primary topographic regions according to the Conservation and Survey Division of the University of Nebraska- Lincoln. These include 'valleys', 'plains', 'dissected plains', and 'large reservoirs'. The County is also comprised of two main soil series, including Kuma-Keith-Colby and Hord-McCook-Hobbs. The figures and tables below display topographic and soils data, with Hitchcock County outlined.

FIGURE 6.22: GENERAL TOPOGRAPHIC REGIONS [IANR] STATE OF NEBRASKA – HITCHCOCK COUNTY



Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

TABLE 6.83: GENERAL TOPOGRAPHIC DESCRIPTIONS [IANR] STATE OF NEBRASKA – HITCHCOCK COUNTY

Topographic Region	Description
Valleys	Flat-lying land along the major streams. The materials of the valleys are stream-deposited silt, clay, sand, and gravel.

Section Six [Participant Profiles I Hitchcock County]

Topographic Region	Description
Plains	Flat-lying land which lies above the valley. The materials of the plains are sandstone or stream-deposited silt, clay, sand, and gravel overlain by wind-deposited silt (loess).
Dissected Plains	Hilly land with moderate to steep slopes, sharp ridge crests, and remnants of the old, nearly level plains. The Dissected Plains are old plains eroded by water or wind.
Large Reservoirs	Constructed for purposes such as water storage for irrigation, generation of electricity, flood control, or recreation.

Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

FIGURE 6.23: GENERAL SOILS [IANR] STATE OF NEBRASKA – HITCHCOCK COUNTY



Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

TABLE 6.84: GENERAL SOILS DESCRIPTIONS [IANR] STATE OF NEBRASKA – HITCHCOCK COUNTY

Soil Association	Description
Kuma-Keith-Colby	The Kuma series consists of very deep, well drained soils that formed in medium to moderately fine textured calcareous eolian deposits with an age discontinuity marked by a paleosol. Kuma soils are on tableland plains and upland hillslopes. Slopes range from 0 to 8 percent. Mean annual precipitation is about 41 centimeters (16 inches) and the mean annual temperature is about 10 degrees C (50 degrees F).
	The Keith series consists of very deep, well drained, soils that formed in calcareous loess. Keith soils are on upland hillslopes, tableland plains, and valley terraces. Slopes range from 0 to 6 percent. Mean annual precipitation is about 46 centimeters (18 inches) and the mean annual air temperature is 11 degrees C (52 degrees F).
	The Colby series consists of very deep, well drained and somewhat excessively drained, moderately permeable soils that formed in loess. Colby soils are on plains and hillslopes on tableland in the Central High Tableland (MLRA 72). Slopes range from 0 to 60 percent. Mean annual precipitation is about 450 millimeters (18 inches) and the mean annual temperature is about 11 degrees C (52 degrees F).

Soil Association	Description
Hord-McCook-Hobbs	The Hord series consists of very deep, well drained, moderately permeable soils that formed in mixed loess and alluvium on foot slopes and stream terraces. Slope is dominantly less than 1 percent, but can range from 0 to 7 percent. Mean annual temperature is about 51 degrees F, and mean annual precipitation is about 23 inches at the type location.
	The McCook series consists of very deep, well drained, moderately permeable soils that formed in stratified, calcareous alluvium. These soils are on flood plains and have slopes that range from 0 to 3 percent. Mean annual temperature is 11 degrees C (52 degrees F), and mean annual precipitation is 51 centimeters (20 inches) at the type location.
	The Hobbs series consists of very deep, well drained soils that formed in stratified, silty alluvium. These soils are on flood plains, foot slopes, and alluvial fans in river valleys of Central Loess Plains, MLRA 75. Slopes range from 0 to 6 percent. Mean annual temperature is 11 degrees C (52 degrees F), and mean annual precipitation is 640 millimeters (25 inches) at the type location.

Source: University of Nebraska – Lincoln. Institute of Agriculture and Natural Resources. Conservation and Survey Division.

DEMOGRAPHICS SUMMARY

Demographic statistics aid decision-makers by developing a picture of Hitchcock County. This picture tells the County and communities where they've been and where they're now, helping decision-makers orient themselves to the most appropriate path to reduce risk and create safer, more disaster resilient jurisdictions. A jurisdiction's population is the driving force behind its housing, employment, economic stability, and potential for change. Proactive mitigation by decision-makers will help prevent future damage to these unique assets.

Tables 6.85-6.88 and Figures 6.24-6.25 below summarize various population and housing characteristics such as population trends, population by age, housing occupancy and tenure, and age of structures. Table 6.89 highlights selected demographic characteristics including housing units lacking complete facilities, no telephone service, mobile home housing units, no vehicles available, population with a disability, and percentage of low-to-moderate income population.

POPULATION

TABLE 6.85: POPULATION TRENDS [CENSUS] HITCHCOCK COUNTY 1980 – 2010

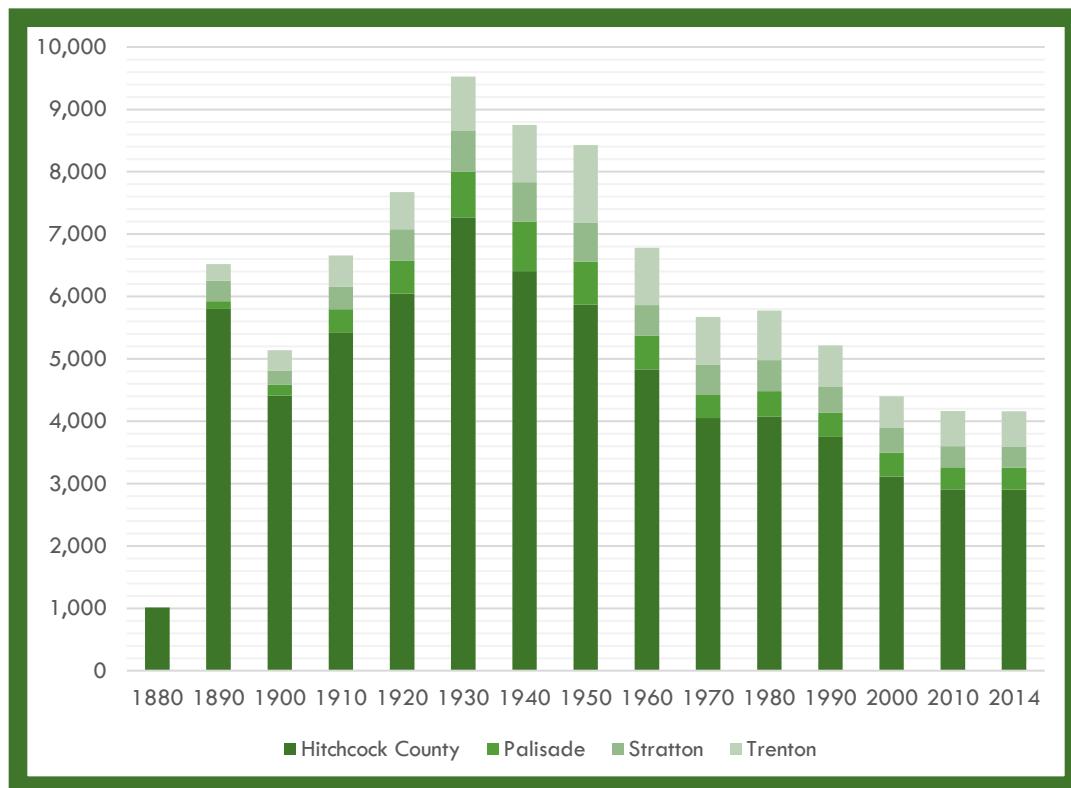
Jurisdiction	1980 Population	1990 Population	2000 Population	2010 Population	Change '80 - '10
Palisade	401	381	386	351	-12.5%
Stratton	499	427	396	343	-31.3%
Trenton	796	656	507	560	-29.6%
Hitchcock County	4,079	3,750	3,111	2,908	-28.7%

Source: United States Census Bureau.

Overall, Hitchcock County's population was 5,775 persons in 1980 and 4,162 persons in 2010. This is a decrease of 1,613 people or 27.9 percent in 30 years. This is the result of a decrease in both the urban and rural populations. For the purpose of this plan, the term urban is equal to the population within an incorporated jurisdiction. The rural population was 4,079 persons in 1980 and 2,908 persons in 2010, a decrease of 1,171 people or 28.7 percent. The urban population was 1,696 persons in 1980 and 1,254 persons in 2010, a decrease of 442 people or 26.1 percent.

Section Six [Participant Profiles I Hitchcock County]

FIGURE 6.24: HISTORICAL POPULATION AND TRENDS [CENSUS] HITCHCOCK COUNTY 1880 – 2014



Source: United States Census Bureau.

TABLE 6.86: POPULATION BY AGE [CENSUS] HITCHCOCK COUNTY

Jurisdiction	< 5 – 9	10 – 19	20 – 34	35 – 54	55 – 64	65 – 84	85 <	18 <	21 <	65 <	Median	Total
	12.0%	10.8%	13.4%	25.4%	15.6%	19.0%	3.8%					
Hitchcock County	347	314	390	737	455	555	110	2,287	2,215	665	48.2	2,908
	12.0%	10.8%	13.4%	25.4%	15.6%	19.0%	3.8%	78.6%	76.2%	22.9%		100%
Palisade	45	37	52	83	49	72	13	275	262	85	47.3	351
	12.8%	10.6%	14.8%	23.6%	14.0%	20.5%	3.7%	78.3%	74.6%	24.2%		100%
Stratton	42	12	14	70	50	86	23	275	269	109	52.5	343
	12.2%	3.5%	4.1%	20.3%	14.6%	25.0%	6.7%	80.2%	78.4%	31.8%		100%
Trenton	70	42	92	129	72	119	36	456	439	155	50.7	560
	12.5%	7.5%	16.4%	23.2%	12.8%	21.3%	6.4%	81.4%	78.4%	27.7%		100%

Source: United States Census Bureau.

Overall, Hitchcock County's median age is 48.2. The largest age cohort of 35-54 represents 25.4 percent of the total population or 737 persons. The smallest age cohort of 85 and greater represents 3.8 percent or 110 persons. Stratton has the largest percentage of the population 65 and older, with 31.8 percent or 109 persons.

HOUSING

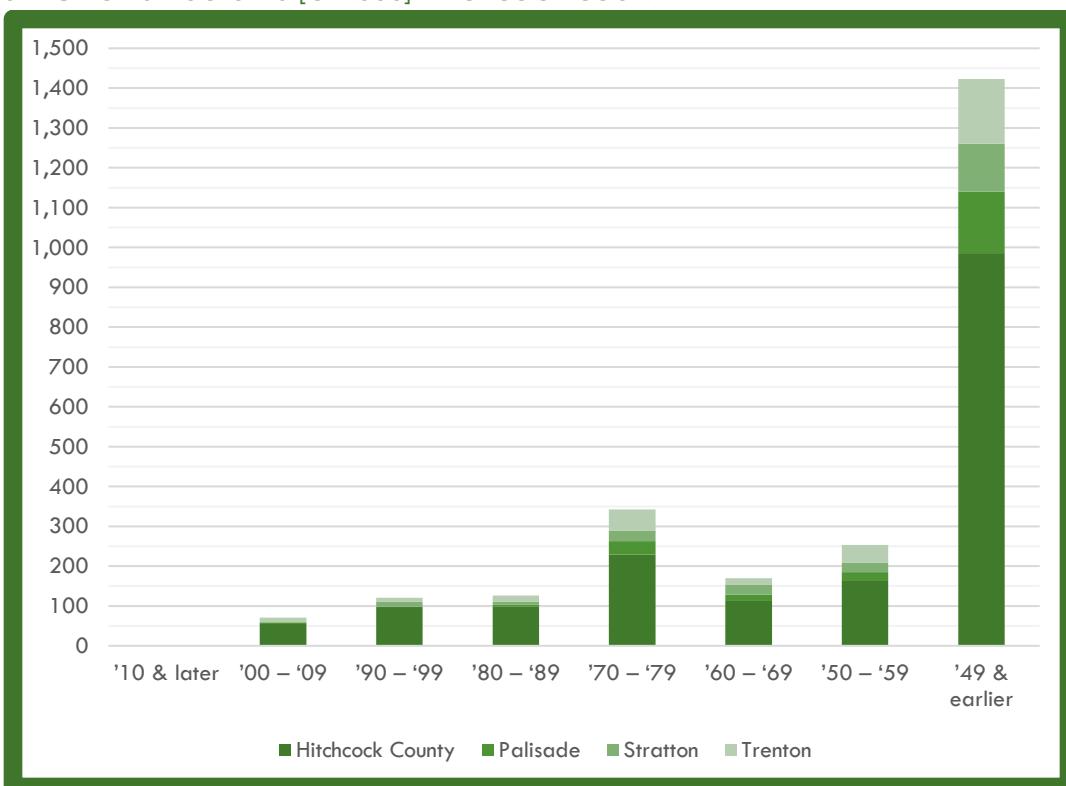
TABLE 6.87: HOUSING OCCUPANCY AND TENURE [CENSUS] HITCHCOCK COUNTY

Jurisdiction	Total Housing Units					Occupied Housing Units				
	Occupied		Vacant			Owner		Renter		
	Number	Percent	Number	Percent		Number	Percent	Number	Percent	
Hitchcock County	1,301	73.8%	462	26.2%		986	75.8%	315	24.2%	
Palisade	162	83.1%	33	16.9%		129	79.6%	33	20.4%	
Stratton	168	77.4%	49	22.6%		136	81.0%	32	19.0%	
Trenton	264	80.5%	64	19.5%		183	69.3%	81	30.7%	

Source: United States Census Bureau.

Overall, the housing occupancy and tenure in Hitchcock County is owner-occupied units. Of the total housing units, 1,301 units or 73.8 percent are occupied units and 986 units or 75.8 percent are owner-occupied units. Stratton has the largest percentage of vacant housing units, with 49 units or 22.6 percent.

FIGURE 6.25: AGE OF STRUCTURES [CENSUS] HITCHCOCK COUNTY



Source: United States Census Bureau.

TABLE 6.88: AGE OF STRUCTURES [CENSUS] HITCHCOCK COUNTY

Jurisdiction	'10 & later	'00 - '09	'90 - '99	'80 - '89	'70 - '79	'60 - '69	'50 - '59	'49 & earlier	Total
Hitchcock County	0	55	97	98	229	113	165	986	1,743
Palisade	0	3	1	5	34	16	20	154	233

Section Six [Participant Profiles I Hitchcock County]

Jurisdiction	'10 & later	'00 – '09	'90 – '99	'80 – '89	'70 – '79	'60 – '69	'50 – '59	'49 & earlier	Total
Stratton	0	3	13	8	26	24	23	121	218
Trenton	0	10	10	15	53	17	45	162	312

Source: United States Census Bureau.

Overall, there are a total of 1,743 housing units in Hitchcock County. Of those, 1,264 units, or 72.5 percent were constructed prior to 1970. Another 229 units were built between 1970 and 1979, meaning the vast majority of the housing stock is at least 35 years old. Palisade (96.1 percent) is above the County average of 72.5 percent of the housing stock built before 1980.

TABLE 6.89: SELECTED DEMOGRAPHIC CHARACTERISTICS [CENSUS] HITCHCOCK COUNTY

Jurisdiction	Lack Complete Plumbing Facilities		Lack Complete Kitchen Facilities		No Telephone Service		Mobile Home		No Vehicles Available		Disability	LMI
	#	%	#	%	#	%	#	%	#	%	#	
Hitchcock County	32	2.4%	9	0.7%	25	1.9%	215	12.3%	37	2.7%	223	46.8%
Palisade	0	0.0%	0	0.0%	1	0.5%	11	4.7%	8	4.4%	81	23.5%
Stratton	0	0.0%	1	0.6%	1	0.6%	22	10.1%	7	4.0%	25	54.8%
Trenton	13	5.1%	4	1.6%	10	4.0%	9	2.9%	7	2.8%	58	59.0%

Source: United States Census Bureau.

The selected housing characteristics include housing units that lack complete plumbing facilities, lack complete kitchen facilities, are mobile homes, have no telephone service, or have no vehicles available. The selected population characteristics include the disability status of the civilian non-institutionalized population, and the low to moderate income percentage of the population. Overall, Hitchcock County has a small percentage of housing units with the selected characteristics. Trenton (5.1 percent) is above the County average of 2.4 percent of housing units that lack complete plumbing facilities; Trenton (1.6 percent) is above the average of 0.7 percent of housing units that lack complete kitchen facilities; Trenton (1.6 percent) is also above the County average of 1.9 percent that have no telephone service; Stratton (10.1 percent) is near the average of 12.3 percent that are mobile homes; and Palisade (4.4 percent) and Stratton (4.0 percent) are above the County average of 2.7 percent that have no vehicles available.

This information impacts the vulnerability of these jurisdictions to the effects of all hazards listed in the plan.

ASSETS INVENTORY

Each jurisdiction has a unique set of assets and capabilities available. By reviewing the existing assets and capabilities, each jurisdiction can identify assets and capabilities that currently reduce disaster losses or could be used to reduce losses in the future, as well as capabilities that inadvertently increase risks. This is especially useful for multi-jurisdictional plans where local capability varies widely. Assessing the jurisdictions' existing assets and capabilities available is a critical step to accomplish mitigation, and how to leverage resources for long-term vulnerability reduction in the mitigation strategy.

CRITICAL FACILITIES AND INFRASTRUCTURE

Critical facilities are structures and institutions necessary for a community's response to and recovery from emergencies. Critical facilities must continue to operate during and following a disaster to reduce the severity of impacts and accelerate recovery. When identifying vulnerabilities, consider both the structural integrity and content value of critical facilities and the effects of interrupting their services to the community.

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Infrastructure systems are critical for life, safety, and economic viability and include transportation, power, communication, and water and wastewater systems. Many critical facilities depend on infrastructure to function. For example, hospitals need electricity, water, and sewer to continue helping patients. As with critical facilities, the continued operations of infrastructure systems during and following a disaster are key factors in the severity of impacts and the speed of recovery.

According to FEMA, “A critical facility is a structure that, if flooded (or damaged), would present an immediate threat to life, public health, and safety.” Examples of critical facilities include hospitals, emergency operations centers, schools, wells, and sanitary sewer lift stations, etc.

Each participating jurisdiction identified critical facilities vital for disaster response, providing shelter to the public, and essential for returning the jurisdiction’s functions to normal during and after a disaster. Critical facilities were identified at the ‘mitigation alternative’ public meetings through the meeting worksheets (refer to Appendix C). Table 6.90 below summarizes the critical facilities and infrastructure identified by participants.

TABLE 6.90: CRITICAL FACILITIES AND INFRASTRUCTURE [FEMA] HITCHCOCK COUNTY

Facility/ Infrastructure	Hitchcock County	Palisade	Stratton	Trenton
Community Center/ Hall			X	
School			X	
County/ City Office		X	X	
Post Office			X	
Courthouse/ Jail	X			
Fire Station		X	X	X
Radio / Communication Tower		X		
Sub Station			X	
Water/ Wastewater Treatment Facility				
Lift Station		X	X	
Well/ Well House		X	X	X
Water Tower/ Tank			X	
Reservoir/ Lake/ River	X	X		
Industrial / Business Operations	X			
Water Pressure Valve		X		
Lagoons		X	X	X
Maintenance/ Shop Building			X	
Electrical Distribution System				X

VULNERABLE AREAS AND POPULATIONS

People are your most important asset. The risk assessment can identify areas of greater population density, as well as populations that may have unique vulnerabilities or be less able to respond and recover during a disaster. These include visiting populations and access and functional needs populations. In addition, the risk assessment can identify locations that provide health or social services that are critical to post-disaster response or recovery capabilities.

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Visiting populations include students, second home owners, migrant farm workers, and visitors for special events. Special events could include large sporting events and festivals where large numbers of people are concentrated and vulnerable to hazards and threats. Visiting populations may be less familiar with the local environment and hazards and less prepared to protect themselves during an event.

The term “access and functional needs populations” describes groups that may not comfortably or safely access the standard resources offered in emergencies. These populations may include children, the elderly, the physically or mentally disabled, non-English speakers, or the medically or chemically dependent. Facility locations and support service operations for these populations (e.g., hospitals, dependent care facilities, oxygen delivery, and accessible transportation) also need to be considered.

Highly vulnerable areas and populations are those considered to be more at risk or susceptible to the effects of hazards. These may include, but are not limited to mobile home parks, nursing homes, campgrounds, fairgrounds, parks, etc.

Each participating jurisdiction identified highly vulnerable areas and populations where residents and visitors to the plan area may be more open or exposed to hazards both during and after an event and require additional response. Highly vulnerable areas and populations were identified at the ‘mitigation alternative’ public meetings through the meeting worksheets (Appendix C). Table 9.61 below summarizes the highly vulnerable areas and populations identified by participants.

TABLE 6.91: VULNERABLE AREAS AND POPULATIONS [FEMA] HITCHCOCK COUNTY

Area/ Population	Hitchcock County	Palisade	Strytan	Trenton
Assisted Living/ Nursing Home	X			X
Senior Center			X	
Community Center/ Hall		X	X	
Multi-Family Housing/ Apartment Complex		X		
Mobil Home Park			X	
Unincorporated Community	X			
Church		X	X	
School	X	X	X	X
Park/ Fields			X	
Well/ Well House		X		
Fire Station		X		
County/ City Office		X		
Lagoons		X		
Lift Station		X		
Recreation Complex / Pool			X	
Industrial / Business Operations			X	
Hotels / Motels			X	
Courthouse/ Jail				X

NATIONAL HISTORIC REGISTRY

The National Register of Historic Places is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

The historic sites located within Hitchcock County, according to the National Historic Registry, are listed in Table 6.92 below. These sites were not evaluated for proximity to hazard prone areas.

TABLE 6.92: NATIONAL HISTORIC REGISTRY [NPS] HITCHCOCK COUNTY

Site Name	Date Listed	Location
Massacre Canyon Battlefield and Woodland Site	1974/07/25	Hitchcock County (near Trenton)
St. Paul's Methodist Protestant Church	1979/01/25	Hitchcock County (near Culbertson)
Bridge (along old Highway 34)	1992/06/29	Hitchcock County (near Stratton)
Weyl Service Station	2002/07/11	Trenton

Source: National Park Service.

CAPABILITIES ASSESSMENT

Local mitigation capabilities are existing resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Each participating jurisdiction completed a capabilities assessment at the 'hazard identification' public meetings through the meeting worksheets (refer to Appendix C). The sections below summarize the primary types of capabilities for reducing long-term vulnerability through mitigation planning including planning and regulatory, administrative and technical, financial, and education and outreach identified by participants.

PLANNING AND REGULATORY

Planning and regulatory capabilities are based on the implementation of ordinances, policies, local laws and State statutes, and plans and programs that relate to guiding and managing growth and development. Examples of planning capabilities that can either enable or inhibit mitigation include comprehensive land use plans, capital improvements programs, transportation plans, small area development plans, disaster recovery and reconstruction plans, and emergency preparedness and response plans. Plans describe specific actions or policies that support goals and drive decisions. Likewise, examples of regulatory capabilities include the enforcement of zoning ordinances, subdivision regulations, and building codes that regulate how and where land is developed and structures are built. Planning and regulatory capabilities refer not only to the current plans and regulations, but also to the jurisdictions' ability to change and improve those plans and regulations as needed.

Tables 6.93-6.95 below summarize the planning and regulatory capabilities currently available in the participating jurisdictions to help prevent and reduce the impacts of hazards.

TABLE 6.93: PLANNING AND REGULATORY [CAPABILITY ASSESSMENT] HITCHCOCK COUNTY

Plans	Hitchcock County	Palisade	Stratton	Trenton
Comprehensive/ Master Plan	Yes	Yes	No	Yes
Capital Improvements Plan	No	No	No	No
Economic Development Plan	No	No	No	Yes

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Plans	Hitchcock County	Palisade	Stratton	Trenton
Local Emergency Operations Plan	Yes	Yes	Yes	Yes
Continuity of Operations Plan	No	No	No	No
Transportation Plan	No	No	No	No
Stormwater Management Plan	No	No	No	No
Community Wildfire Protection Plan	No	Yes	No	No
Other special plans (e.g., brownfields redevelopment, disaster recovery, climate change adaption, etc.)	No	No	Yes	No

Questions to consider for future updates: Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?

TABLE 6.94: BUILDING CODE, PERMITTING, AND INSPECTIONS [CAPABILITY ASSESSMENT] HITCHCOCK COUNTY

Building Code, Permitting, and Inspections	Hitchcock County	Palisade	Stratton	Trenton
Building Code	No	Yes	Yes	No
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	No	No	No
Fire Department ISO Rating	N/A	No	No	Yes
Site Plan Review Requirements	No	Yes	Yes	No

Questions to consider for future updates: Are codes adequately enforced?

TABLE 6.95: LAND USE PLANNING AND ORDINANCES [CAPABILITY ASSESSMENT] HITCHCOCK COUNTY

Land Use Planning and Ordinances	Hitchcock County	Palisade	Stratton	Trenton
Zoning Ordinance	Yes	Yes	No	Yes
Subdivision Ordinance	Yes	No	Yes	Yes
Floodplain Ordinance	Yes	Yes	No	Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	No	No	No	Yes
Flood Insurance Rate Maps	Yes	No	Yes	Yes
Acquisition of land for open space and public recreation uses	Yes	No	Yes	No
Other	No	No	No	No

Questions to consider for future updates: Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced? How can these capabilities be expanded and improved to reduce risk?

ADMINISTRATIVE AND TECHNICAL

Administrative and technical capability refers to the jurisdictions' staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. It also refers to the ability to access and coordinate these resources effectively. These include engineers, planners, emergency managers, GIS analysts, building inspectors, grant writers, floodplain managers, and more. The level of knowledge and technical expertise from personnel employed by each jurisdiction, the public and private sector, or resources available through other government entities, such as counties or special districts, may be accessed to implement mitigation activities in the jurisdiction or provide assistance with limited resources. The degree of intergovernmental coordination among departments also affects administrative capability.

Tables 6.96-6.98 below summarize the administrative and technical capabilities currently available in the participating jurisdictions, including staff and their skills and tools, that can be used for mitigation planning and to implement specific mitigation actions. For smaller jurisdictions without local staff resources, there may be public resources at the next higher level government that can provide technical assistance.

TABLE 6.96: ADMINISTRATION [CAPABILITY ASSESSMENT] HITCHCOCK COUNTY

Administration	Hitchcock County	Palisade	Stratton	Trenton
Planning Commission	Yes	Yes	Yes	Yes
Mitigation Planning Committee	No	No	Yes	No
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems, etc.)	Yes	Yes	Yes	Yes
Mutual Aid Agreements	Yes	Yes	No	Yes

Questions to consider for future updates: Describe capability. Is coordination effective?

TABLE 6.97: STAFF [CAPABILITY ASSESSMENT] HITCHCOCK COUNTY

Staff	Hitchcock County	Palisade	Stratton	Trenton
Chief Building Official	No	Yes	No	No
Floodplain Administrator	Yes	Yes	No	Yes
Emergency Manager	Yes	No	No	No
Community Planner	No	No	No	No
Civil Engineer	Yes	Yes	Yes	No
GIS Coordinator	Yes	Yes	No	No
Other	No	Yes	Yes	No

Questions to consider for future updates: Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?

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TABLE 6.98: TECHNICAL [CAPABILITY ASSESSMENT] HITCHCOCK COUNTY

Technical	Hitchcock County	Palisade	Stratton	Trenton
Warning systems/ services (Reverse 911, outdoor warning signals)	Yes	Yes	Yes	Yes
Hazard Data and Information	Yes	No	No	No
Grant Writing	No	No	No	No
HAZUS Analysis	No	No	No	No
Other	No	No	No	No

Questions to consider for future updates: Describe capability. Has capability been used to assess/ mitigate risk in the past? How can these capabilities be expanded and improved to reduce risk?

FINANCIAL

Financial capabilities are the resources that a jurisdiction has access to or is eligible to use to fund mitigation actions. The costs associated with implementing mitigation activities vary. Some mitigation actions such as building assessment or outreach efforts require little to no costs other than staff time and existing operating budgets. Other actions, such as the acquisition of flood-prone properties, could require a substantial monetary commitment from local, State, and Federal funding sources.

Local governments may have access to a recurring source of revenue beyond property, sales, and income taxes, such as stormwater utility or development impact fees. These jurisdictions may be able to use the funds to support local mitigation efforts independently or as the local match or cost-share often required for grant funding.

Table 6.99 below summarizes the financial capabilities currently available in the participating jurisdictions to help fund hazard mitigation activities.

TABLE 6.99: FUNDING RESOURCE [CAPABILITY ASSESSMENT] HITCHCOCK COUNTY

Funding Resource	Hitchcock County	Palisade	Stratton	Trenton
Capital improvements project funding	No	Yes	Yes	No
Authority to levy taxes for specific purposes	Yes	Yes	No	Yes
Fees for water, sewer, gas, or electric services	No	Yes	Yes	Yes
Impact fees for new development	No	No	No	No
Storm water utility fee	No	No	No	No
Incur debt through general obligation bonds and/ or special tax bonds	Yes	Yes	Yes	Yes
Incur debt through private activities	No	No	Yes	No
Community Development Block Grant	Yes	Yes	Yes	No
Other federal funding programs	Yes	Yes	Yes	Yes
State funding programs	Yes	Yes	Yes	Yes
Other	No	Yes	No	No

Questions to consider for future updates: Has the funding resource been used in the past and for what type of activities? Could the resource be used to fund future mitigation actions? How can these capabilities be expanded and improved to reduce risk?

EDUCATION AND OUTREACH

This type of capability refers to education and outreach programs, methods, and initiatives already in place to implement mitigation activities and communicate hazard-related information. Examples include fire safety programs that fire departments deliver to students at local schools; participation in community programs, such as Firewise or StormReady; and activities conducted as part of hazard awareness campaigns, such as Tornado or Flood Awareness Month.

Table 6.100 below identifies the education and outreach capabilities currently available in the participating jurisdictions to increase hazard mitigation awareness.

TABLE 6.100: EDUCATION AND OUTREACH [CAPABILITY ASSESSMENT] HITCHCOCK COUNTY

Program/ Organization	Hitchcock County	Palisade	Stratton	Trenton
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	Yes	No	No
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education, etc.)	Yes	No	Yes	Yes
Natural disaster or safety related school programs	Yes	No	Yes	No
Storm Ready Certification	No	No	No	No
Fire Wise Communities Certification	No	No	No	No
Public-private partnership initiatives addressing disaster-related issues	No	No	No	No
Other	No	No	No	No

Questions to consider for future updates: Describe the program/ organization and how it relates to disaster resilience and mitigation. Could the program/ organization help implement future mitigation activities? How can these capabilities be expanded and improved to reduce risk?

SAFE GROWTH

One way to assess the impact of planning and regulatory capabilities is to complete a safe growth audit. The purpose of the safe growth audit is to analyze the impacts of current policies, ordinances, and plans on community safety from hazard risks due to growth. A safe growth audit helps identify gaps in jurisdictions' growth guidance instruments and improvements that could be made to reduce vulnerability to future development.

Tables 6.101-6.108 below summarize the safe growth audit in terms of land use, transportation, environmental management, public safety, zoning ordinances, subdivision regulations, and capital improvements currently available in the participating jurisdictions to help prevent and reduce the impacts of hazards.

TABLE 6.101: LAND USE [SAFE GROWTH] HITCHCOCK COUNTY

Comprehensive Plan (Land Use)	Hitchcock County	Palisade	Stratton	Trenton
Does the Future Land Use Map clearly identify natural hazard areas?	No	No	No	No
Do the land-use policies discourage development or redevelopment within natural hazard areas?	Yes	No	No	No

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Comprehensive Plan (Land Use)	Hitchcock County	Palisade	Stratton	Trenton
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	Yes	Yes	No	Yes

TABLE 6.102: TRANSPORTATION [SAFE GROWTH] HITCHCOCK COUNTY

Comprehensive Plan (Transportation)	Hitchcock County	Palisade	Stratton	Trenton
Does the Transportation Plan limit access to hazard areas?	No	No	No	No
Is transportation policy used to guide growth to safe locations?	No	No	No	No
Are movement systems designed to function under disaster conditions (e.g., evacuation)?	No	No	No	No

TABLE 6.103: ENVIRONMENTAL MANAGEMENT [SAFE GROWTH] HITCHCOCK COUNTY

Comprehensive Plan (Environmental Management)	Hitchcock County	Palisade	Stratton	Trenton
Are environmental systems that protect development from hazards identified and mapped?	Yes	No	No	No
Do environmental policies maintain and restore protective ecosystems?	No	No	No	Yes
Do environmental policies provide incentives to development that is located outside protective ecosystems?	No	No	No	No

TABLE 6.104: PUBLIC SAFETY [SAFE GROWTH] HITCHCOCK COUNTY

Comprehensive Plan (Public Safety)	Hitchcock County	Palisade	Stratton	Trenton
Are the goals and policies of the Comprehensive Plan related to those of the FEMA Local Hazard Mitigation Plan?	No	No	No	Yes
Is safety explicitly included in the plan's growth and development policies?	No	No	No	Yes
Does the monitoring and implementation section of the plan cover safe growth objectives?	No	No	No	Yes

TABLE 6.105: ZONING ORDINANCE [SAFE GROWTH] HITCHCOCK COUNTY

Zoning Ordinance	Hitchcock County	Palisade	Stratton	Trenton
Does the Zoning Ordinance conform to the Comprehensive Plan in terms of discouraging development or redevelopment within natural hazard areas?	Yes	No	No	Yes
Does the ordinance contain natural hazard overlay zones that set conditions for land uses within such zones?	No	No	No	Yes

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Zoning Ordinance	Hitchcock County	Palisade	Stratton	Trenton
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?	No	No	No	No
Does the ordinance prohibit development within, or filling of, wetlands, floodways, and floodplains?	No	No	No	No

TABLE 6.106: SUBDIVISION REGULATIONS [SAFE GROWTH] HITCHCOCK COUNTY

Subdivision Regulations	Hitchcock County	Palisade	Stratton	Trenton
Do the Subdivision Regulations restrict the subdivision of land within or adjacent to natural hazard areas?	Yes	No	No	Yes
Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?	No	No	No	Yes
Do the regulations allow density transfers where hazard areas exist?	No	No	No	No

TABLE 6.107: CAPITAL IMPROVEMENTS [SAFE GROWTH] HITCHCOCK COUNTY

Capital Improvement Program and Infrastructure Policies	Hitchcock County	Palisade	Stratton	Trenton
Does the Capital Improvement Program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?	No	No	No	No
Do Infrastructure Policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?	No	No	No	No
Does the Capital Improvement Program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?	No	No	No	No

TABLE 6.108: ADDITIONAL PLANNING MECHANISMS [SAFE GROWTH] HITCHCOCK COUNTY

Additional Planning Mechanisms	Hitchcock County	Palisade	Stratton	Trenton
Do small area or corridor plans recognize the need to avoid or mitigate natural hazards?	No	No	No	No
Does the Building Code contain provisions to strengthen or elevate construction to withstand hazard forces?	No	No	No	No
Do economic development or redevelopment strategies include provisions for mitigating natural hazards?	No	No	No	Yes
Is there an adopted evacuation and shelter plan to deal with emergencies from natural hazards?	No	No	No	Yes

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CLIMATE SUMMARY

The monthly climate normals information displayed in the figures and table below is taken from weather station 258628, near Trenton (Trenton Dam). The data from this station is provided by the High Plains Regional Climate Center.

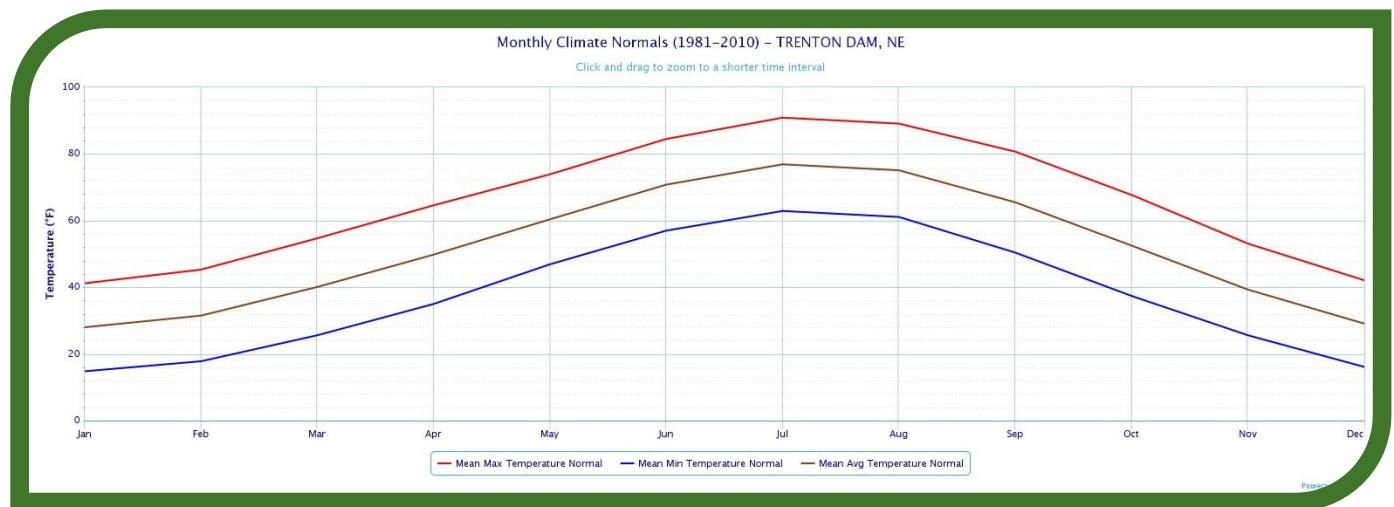
Normals are produced by the National Climatic Data Center (NCDC). Climate normals are an arithmetic average of a variable such as temperature over a prescribed 30-year period. This base period changes every 10 years to reflect the previous 30 years of data. The current period is 1981-2010. Note that NCDC normals may not be the same as a straight average over the 30-year period, due to adjustments for discontinuities such as station moves or changes in observation time.

TABLE 6.109: GENERAL CLIMATE STATISTICS [HPRCC] MONTHLY COMPARISONS

Month	Mean Maximum Temperature (F)	Mean Minimum Temperature (F)	Mean Average Temperature (F)	Total Precipitation (in.)	Total Snowfall (in.)
January	41.2	14.8	28.0	0.45	4.7
February	45.3	17.8	31.5	0.45	3.8
March	54.7	25.6	40.1	1.23	4.8
April	64.6	35.0	49.8	2.16	2.0
May	73.9	46.9	60.4	3.21	0.0
June	84.5	57.0	70.8	3.15	0.0
July	90.9	62.9	76.9	3.42	0.0
August	89.1	61.1	75.1	2.89	0.0
September	80.7	50.4	65.5	1.49	0.2
October	67.7	37.4	52.5	1.66	1.2
November	53.1	25.6	39.3	0.89	3.4
December	42.1	16.1	29.1	0.52	4.6

Source: High Plains Regional Climate Center.

FIGURE 6.26: TEMPERATURE NORMALS [HPRCC] MONTHLY COMPARISONS

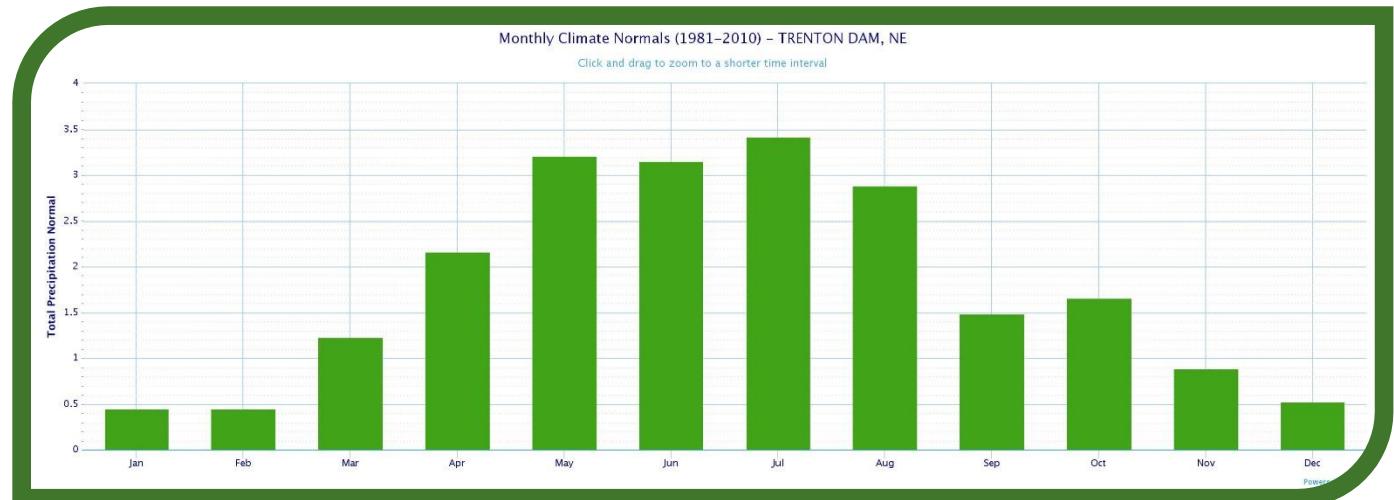


Source: High Plains Regional Climate Center.

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In Figure 6.26, the monthly climate normals for temperature, including mean maximum, mean minimum, and mean average are shown. Trenton (and Hitchcock County in general) experiences a period of warming generally from February to July and a period of cooling from August to January. Average temperatures range from 28.0 degrees Fahrenheit in January to 76.9 degrees Fahrenheit in July.

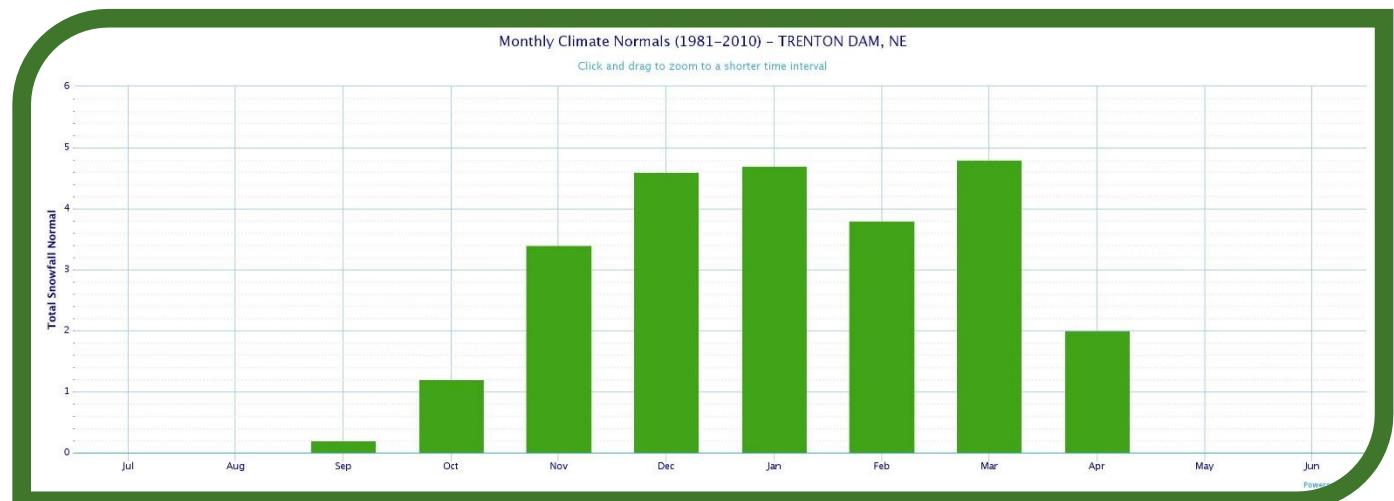
FIGURE 6.27: TOTAL PRECIPITATION NORMALS [HPRCC] MONTHLY COMPARISONS



Source: High Plains Regional Climate Center.

Figure 6.27 shows the monthly climate normals for precipitation. Trenton (and Hitchcock County in general) receives the maximum total precipitation during the month of July of 3.42 inches, with an annual total of 21.52 inches of precipitation.

FIGURE 6.28: TOTAL SNOWFALL [HPRCC] MONTHLY COMPARISONS



Source: High Plains Regional Climate Center.

In Figure 6.28, the monthly climate normals for snowfall are shown. Trenton (and Hitchcock County in general) experiences snowfall generally from October until April, with the maximum total snowfall during the month of March of 4.8 inches, and an annual total of 24.7 inches of snowfall.

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HAZARD IDENTIFICATION AND RISK ASSESSMENT SUMMARY

The hazard identification was conducted to determine the hazards that threaten Hayes, Frontier, and Hitchcock Counties. It was established through public input and information provided by elected officials, key stakeholders, and residents throughout the planning area, as well as conducting research on each hazard type identified in the State of Nebraska Hazard Mitigation Plan. For the purpose of this plan update, nine natural hazards were initially considered, including severe winter storms (including extreme cold and severe winter weather), tornados, severe thunderstorms (including hail, lightning, and severe wind), flooding, extreme heat, drought, earthquakes, wildfires, and landslides. All were identified as separate potential hazard events as they often pose different threats and potential losses can vary greatly. Man-made hazards, with the exceptions of dam failure and levee failure, were not included in this plan. Using existing hazards data and input gained through planning and public meetings, Hayes, Frontier, and Hitchcock Counties identified the hazards that could affect the planning area.

In order to best describe the hazards that affect the jurisdictions, Hayes, Frontier, and Hitchcock Counties utilized the following activities for identifying hazards in the planning area:

- Reviewed the State Hazard Mitigation Plan for information on hazards affecting the planning area.
- Documented the disaster declaration history.
- Downloaded weather-related events from online resources, such as the National Climatic Data Center.
- Reviewed existing studies, reports, and plans related to hazards in the planning area.
- Used flood insurance rate maps (FIRM) and non-regulatory flood risk assessment products developed for the planning area by FEMA as part of the National Flood Insurance Program (NFIP) and the RiskMAP program.
- Contacted colleges or universities that have hazard-related academic programs or extension services.
- Interviewed the planning team and stakeholders about which hazards affect the planning area and should be described in the mitigation plan.
- Consulted local resources such as the newspaper, chamber of commerce, local historical society, or other resources with records of past occurrences.
- Referenced hazards previously identified to determine if they were still relevant.

Hazards data from the Nebraska Emergency Management Agency (NEMA) State of Nebraska Mitigation Plan, Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), as well as other sources were analyzed to gage the overall significance of the hazards to Hayes, Frontier, and Hitchcock Counties. Overall significance was calculated based on risk assessment criteria such as frequency and damage, including deaths and injuries, as well as property, crop, and economic damage. Hazards that occur relatively infrequent or have minimal to no impact on the planning area were deemed to be of low significance. This evaluation was used by Hayes, Frontier, and Hitchcock Counties to identify the hazards of greatest overall significance, allowing the Counties to concentrate resources where they are needed most.

The mitigation plan update focuses on how risk has changed since the previous plans were completed, particularly changes related to land use development and new hazard information. New development in hazard-prone areas, areas affected by recent disasters, and new data and reports were incorporated into the plan in order to analyze the current risk and update mitigation actions. The Nebraska State Hazard Mitigation Plan was consulted to assess the potential of new hazards for Hayes, Frontier, and Hitchcock Counties. The previous Hitchcock County Plan was also reevaluated, and the comments in Table 6.110 detail how hazards were updated.

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TABLE 6.110: HITCHCOCK COUNTY HAZARD IDENTIFICATION [COMPARISON] 2010-2016

2016 Hazards	2010 Hazards*	2016 Comment
Dam Failure	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Drought	Hazard identified but not evaluated.	New hazard.
Earthquake	Hazard identified but not evaluated.	Hazard identified but not evaluated.
Extreme Cold	Hazard not identified.	New hazard (included under Severe Winter Storms).
Extreme Heat	Hazard not identified.	New hazard.
Flood	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Hail	Hazard identified and evaluated (included under Thunderstorms/ High Wind/ Lightning/ Hail).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Landslide	Hazard not identified.	Hazard identified but not evaluated.
Lightning	Hazard identified and evaluated (included under Thunderstorms/ High Wind/ Lightning/ Hail).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Severe Wind	Hazard identified and evaluated (included under Thunderstorms/ High Wind/ Lightning/ Hail).	Hazard identified and evaluated with updated data, analysis, and risk assessment (included under Severe Thunderstorms).
Severe Winter Weather	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Tornado	Hazard identified and evaluated.	Hazard identified and evaluated with updated data, analysis, and risk assessment.
Wildfire	Hazard identified and evaluated.	Hazard identified but not evaluated.
Levee Failure	Hazard identified but not evaluated.	Hazard identified but not evaluated.

Source: Hitchcock County Hazard Mitigation Plan, 2010.

The Disaster Mitigation Act requires that Hayes, Frontier, and Hitchcock Counties evaluate the risks associated with each hazard identified in the planning process.. Refer to Section Three for additional explanations on which hazards were evaluated and why certain hazards were not evaluated in this plan. The overall risk assessment for the identified hazard types represents the presence and vulnerability to each hazard type throughout the planning area. The individual hazard identification tables, based on the public input and information received, identify those hazard types which have occurred, have a significant likelihood to occur again, or have reason to potentially occur in Hayes, Frontier, and Hitchcock Counties. These tables were compiled after receiving responses from the public, discussing the public responses with the State Hazard Mitigation Officer, and conducting detailed research on the presence and risk of each hazard type. The individual participant hazard identification tables and responses may or may not reflect the consensus for risk and vulnerability to each hazard type for the planning area.

Tables 6.111-6.114 summarizes the results of the hazard identification and risk assessment for Hitchcock County, based on the hazard data and input from the public. For each hazard identified, this table includes the location, maximum probable extent, probability of future events, and overall significance for the County and incorporated jurisdictions.

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TABLE 6.111: HAZARD IDENTIFICATION & RISK ASSESSMENT [HITCHCOCK COUNTY] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Significant	Moderate	Low
Drought	Significant	Severe	High
Extreme Cold	Limited	Moderate	Medium
Extreme Heat	Significant	Moderate	Medium
Flood	Limited	Moderate	Medium
Hail	Significant	Moderate	High
Lightning	Significant	Moderate	Medium
Severe Wind	Limited	Moderate	Medium
Severe Winter Weather	Significant	Moderate	Medium
Tornado	Limited	Moderate	Medium

TABLE 6.112: HAZARD IDENTIFICATION & RISK ASSESSMENT [PALISADE] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Significant	Moderate	High
Extreme Cold	Significant	Moderate	High
Extreme Heat	Significant	Moderate	Medium
Flood	Limited	Weak	Low
Hail	Significant	Moderate	High
Lightning	Significant	Extreme	High
Severe Wind	Extensive	Extreme	High
Severe Winter Weather	Significant	Moderate	High
Tornado	Significant	Extreme	High

TABLE 6.113: HAZARD IDENTIFICATION & RISK ASSESSMENT [STRATTON] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Negligible	Weak	Low
Drought	Extensive	Severe	High
Extreme Cold	Extensive	Moderate	Medium
Extreme Heat	Extensive	Moderate	Medium
Flood	Limited	Weak	Low
Hail	Extensive	Moderate	Medium
Lightning	Limited	Weak	Medium
Severe Wind	Significant	Moderate	Medium
Severe Winter Weather	Significant	Moderate	Medium
Tornado	Limited	Weak	Medium

TABLE 6.114: HAZARD IDENTIFICATION & RISK ASSESSMENT [TRENTON] 2016

Hazard	Location	Maximum Probable Extent	Overall Significance
Dam Failure	Limited	Weak	Low
Drought	Significant	Extreme	High
Extreme Cold	Significant	Moderate	Medium
Extreme Heat	Significant	Moderate	Medium
Flood	Negligible	Weak	Low
Hail	Significant	Moderate	Medium
Lightning	Significant	Moderate	Medium
Severe Wind	Significant	Moderate	High
Severe Winter Weather	Significant	Moderate	Medium
Tornado	Limited	Moderate	Low

THE ACTION PLAN – HITCHCOCK COUNTY

The action plan lays the groundwork for implementation. The plan was developed to present the recommendations established by Hayes, Frontier, and Hitchcock Counties on how the participating jurisdictions can reduce risk and vulnerability of people, property, infrastructure, and natural resources to future disaster losses. The action plan identifies how mitigation actions will be implemented, including who is responsible for which actions, what funding mechanisms and other resources are available or will be pursued, when actions will be completed, and how they are prioritized.

Plan updates reflect progress in local mitigation efforts. The integration of the plan into existing planning mechanisms and the implementation of mitigation actions demonstrate progress in risk reduction. Details describing how the current mitigation strategy, including goals and actions, will be incorporated into existing mechanisms are discussed in *Section Five: Review, Evaluation, and Implementation*.

The action plan detailed below contains both new actions developed for this plan update, as well as viable actions that had yet to be completed from the previous Hitchcock County Plan.

LOCAL PLANS AND REGULATIONS

These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.

HITCHCOCK COUNTY

Hitchcock County determined that their warning systems and existing/future flooding potential are high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

Section Six [Participant Profiles I Hitchcock County]

[Responsible Agency & Partners] Hitchcock County Administration and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequeaths

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

FLOODPLAIN DEVELOPMENT ORDINANCE ENFORCEMENT

[Background] Continue or improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in significant flood hazard areas), floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the National Flood Insurance Program, Community Rating System (CRS), and participation in Federal Emergency Management Agency's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process. Continue to enforce local floodplain regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of floodplain development permits by any community or County. Continue education of building inspectors or Certified Floodplain Managers. Encourage building regulations for storm resistance structures.

[Benefits] Continue compliance with the National Flood Insurance Program. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share. Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.

[Responsible Agency & Partners] Hitchcock County Administration and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Hitchcock County Administration, Planning, and/or Emergency Management Departments

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Install warning sirens at Trenton Lake that currently do not have any system.

[Benefits] Having early warning equipment to warn occupants on the lake to take shelter in the event of inclement weather.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board) and/or Emergency Management Department(s)

[Cost Estimate & Funding] \$52,000+; Hazard Mitigation Assistance Grant Programs, Local Taxes

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

PALISADE

Palisade determined that their backup power systems, safety rooms, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates. Hitchcock County will be the main manager of Palisade's participation in the NFIP. Hitchcock County will monitor and fully enforce floodplain management regulations as part of NFIP participation.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board) and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequests

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies for existing wells and Village office.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Village of Palisade (Village Board)

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs, Tax Revenue

[Timeline] 1 year

Section Six [Participant Profiles I Hitchcock County]

[Priority] High

[Status] New Action

FLOODPLAIN DEVELOPMENT ORDINANCE ENFORCEMENT

[Background] Continue or improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in significant flood hazard areas), floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the National Flood Insurance Program, Community Rating System (CRS), and participation in Federal Emergency Management Agency's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process. Continue to enforce local floodplain regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of floodplain development permits by any community or County. Continue education of building inspectors or Certified Floodplain Managers. Encourage building regulations for storm resistance structures.

[Benefits] Continue compliance with the National Flood Insurance Program. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share. Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board) and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board), Planning, and/or Emergency Management Departments

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps,

etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Village of Palisade Administration (Village Board) and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

STRATTON

Stratton determined that their backup power systems and safety rooms are high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to for the current village shelter.

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Village of Stratton (Village Board)

[Cost Estimate & Funding] \$40,000/generator; Hazard Mitigation Assistance Grant Programs, Tax Revenue

[Timeline] 1 year

[Priority] High

[Status] New Action

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe room in new village building.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Village of Stratton (Village Board)

[Cost Estimate & Funding] \$500,000; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

Section Six [Participant Profiles I Hitchcock County]

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Village of Stratton Administration (Village Board) and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

TRENTON

Trenton determined that their safety rooms, power systems, warning systems, and existing/future flooding potential are all high concerns. These items and concerns were discussed and used to create most of the Mitigation Action Items. These Mitigation Action Items are fairly similar to the items listed in the previous plan.

PARTICIPATE OR MAINTAIN GOOD STANDING IN THE NATIONAL FLOOD INSURANCE PROGRAM

[Background] Participate in the National Flood Insurance Program (NFIP) or maintain good standing with the NFIP including floodplain management practices/requirements and regulation enforcements and updates. Hitchcock County will be the main manager of Trenton's participation in the NFIP. Hitchcock County will monitor and fully enforce floodplain management regulations as part of NFIP participation.

[Benefits] Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share.

[Responsible Agency & Partners] Village of Trenton Administration (Village Board) and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000, Tax Revenue, grants, bequests

[Timeline] 1-3 years

[Priority] High

[Status] Continued Action from previous plan that requires ongoing action.

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe room for use by residents of Village of Trenton during weather events.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Village of Trenton (Village Board)

Section Six [Participant Profiles I Hitchcock County]

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] High

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Village of Trenton Administration (Village Board) and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

FLOODPLAIN DEVELOPMENT ORDINANCE ENFORCEMENT

[Background] Continue or improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in significant flood hazard areas), floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the National Flood Insurance Program, Community Rating System (CRS), and participation in Federal Emergency Management Agency's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process. Continue to enforce local floodplain regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of floodplain development permits by any community or County. Continue education of building inspectors or Certified Floodplain Managers. Encourage building regulations for storm resistance structures.

[Benefits] Continue compliance with the National Flood Insurance Program. Good standing enables participants to apply for Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program cost-share. Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.

[Responsible Agency & Partners] Village of Trenton Administration (Village Board) and/or Floodplain Management Departments, Nebraska Department of Natural Resources

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Community Development Block Grant

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that requires ongoing action.

Section Six [Participant Profiles I Hitchcock County]

ELECTRICAL SYSTEM GENERATION, LOOPED DISTRIBUTION, AND REDUNDANCIES

[Background] Provide looped distribution service and other redundancies in the electrical system as a backup power supply in the event the primary system is destroyed or fails.

[Benefits] More reliable and resistant power distribution system.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$40,000/mile; Hazard Mitigation Assistance Grant Programs, Public Power Districts

[Timeline] 4-5 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

WARNING SYSTEMS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Also look into additional methods of warning systems such as smart phone warning system.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WEATHER RADIOS

[Background] Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.

[Benefits] Reduces the risk of death/injury associated with severe weather conditions by communication.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$75/radio; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

ALERT AND WARNING SIRENS

[Background] Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$25,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 4-5 years

[Priority] Medium

[Status] New Action

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Natural Resources Districts

[Timeline] 4-5 years

[Priority] Medium

[Status] New Action

PUBLIC AWARENESS AND EDUCATION CAMPAIGNS

[Background] Through activities such as outreach projects, distribution of maps and environmental education increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.

[Benefits] Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$1,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] Medium

[Status] New Action

EVACUATION PLAN

[Background] Prepare and implement an emergency evacuation plan for when the immediate and urgent movement of people away from the threat or actual occurrence of a hazard is necessary.

Section Six [Participant Profiles I Hitchcock County]

[Benefits] Emergency evacuation plans are developed to ensure the safest and most efficient evacuation time of all expected residents when hazards are serious and require mandatory evacuations. Proper planning will implement an all-hazards approach so that plans can be reused for multiple hazards that could exist.

[Responsible Agency & Partners] Village of Trenton Administration (Village Board), Emergency Management, and/or Roads Departments

[Cost Estimate & Funding] \$40,000; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

DROUGHT MONITORING PLAN

[Background] Develop and implement a plan/program to monitor the effects of drought.

[Benefits] Communities can be proactive and well prepared to act as the effects of drought become an issue. Through monitoring systems, communities can mitigate potential damages or costs from the results of a drought event.

[Responsible Agency & Partners] Village of Trenton Public Works, Utility, Administration, and/or Emergency Management Departments, Middle Republican Natural Resource District

[Cost Estimate & Funding] \$45,000+; Hazard Mitigation Assistance Grant Programs, Natural Resource Districts

[Timeline] 3-5 years

[Priority] Low

[Status] New Action

NEW ALTERNATE POWER SOURCE

[Background] Investigate, develop, and implement new alternative sources of power.

[Benefits] Diversifying sources of power for a community will decrease reliance on sole-source power generation and provide multiple options and redundancies in the event of a natural disaster.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$5,000,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] Low

[Status] New Action

SEWAGE PLANT UPGRADES

[Background] Identify, design, and construct plant upgrades as necessary.

[Benefits] Upgrades will allow the plant to run at maximum efficiency and adequately serve the community.

[Responsible Agency & Partners] Village of Trenton (Village Board)

[Cost Estimate & Funding] \$250,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

REGION 17 EMERGENCY MANAGEMENT AGENCY

STORM SHELTER AND SAFE ROOMS

[Background] Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofitting.

[Benefits] Reduce the risk of death or injury in areas vulnerable to tornados, severe thunderstorms and other hazards.

[Responsible Agency & Partners] Region 17 Emergency Management

[Cost Estimate & Funding] \$400 to \$500/square foot (stand-alone), \$350 to 400/square foot (addition/retrofit); Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

EMERGENCY OPERATIONS CENTER

[Background] Investigate, design, and construct a regional emergency operations center.

[Benefits] A regional emergency operations center will allow for a central command and control facility responsible for carrying out emergency preparedness and management functions at a strategic level during an emergency to ensure the continuity of operation.

[Responsible Agency & Partners] Region 17 Emergency Management Agency and Frontier County and City of Curtis

[Cost Estimate & Funding] \$100,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 4-5 years

[Priority] Medium

[Status] New Action

MIDDLE REPUBLICAN NATURAL RESOURCES DISTRICT

BACKUP GENERATORS

[Background] Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters.

Section Six [Participant Profiles I Hitchcock County]

[Benefits] Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$20,000 to \$35,000/generator; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] High

[Status] New Action

UNDERGROUND OR IDENTIFY AND RETROFIT POWER AND SERVICE LINES

[Background] Communities can work with their local Public Power District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County or Natural Resources District to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.

[Benefits] To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments, Public Power Districts, Rural Water Districts

[Cost Estimate & Funding] \$60,000 to \$80,000/mile (electrical); Hazard Mitigation Assistance Grant Programs, Public Power Districts, Rural Water Districts, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

WARNING SYSTEMS

[Background] Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.

[Benefits] Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

CIVIL SERVICE IMPROVEMENTS

[Background] Improve emergency rescue and response equipment and facilities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/truck, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles, identifying and training additional personnel for emergency response, or continuing educational opportunities for current personnel.

[Benefits] Having appropriate and up to date equipment along with adequately trained and numbered personnel increases safety and reduces the risk of damage.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$5,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

EMERGENCY COMMUNICATIONS

[Background] Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish inner-operable communications.

[Benefits] Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.

[Responsible Agency & Partners] Middle Republican Natural Resources District, Individual City or Village Administration, Public Works, and/or Emergency Management Departments

[Cost Estimate & Funding] \$10,000+; Hazard Mitigation Assistance Grant Programs, Middle Republican Natural Resources District

[Timeline] 1-3 years

[Priority] Medium

[Status] New Action

DAM ENGINEERING ANALYSIS, REPAIRS, AND REINFORCEMENTS

[Background] Conduct a preliminary engineering analysis for dam repairs and reinforcement. Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection. The Emergency Action Plan, Dam Breech Analysis, and/or inspection/safety equipment training may need to be updated along with improvements.

[Benefits] Dams serve to provide flood protection to businesses and residents during large storm events. Improvements to existing dams will increase flood protection.

[Responsible Agency & Partners] Individual City or Village Administration, Public Works, and/or Emergency Management Departments and Floodplain Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

Section Six [Participant Profiles I Hitchcock County]

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that requires ongoing action.

NEW ALTERNATE POWER SOURCE

[Background] Investigate, develop, and implement new alternative sources of power.

[Benefits] Diversifying sources of power for a community will decrease reliance on sole-source power generation and provide multiple options and redundancies in the event of a natural disaster.

[Responsible Agency & Partners] Individual City or Village Administration, Public Works, and/or Emergency Management Departments, Middle Republican Natural Resources District

[Cost Estimate & Funding] \$500,000+; Hazard Mitigation Assistance Grant Programs

[Timeline] 3-5 years

[Priority] Low

[Status] Continued Action from previous plan that has not been completed yet due to insufficient funding.

PROPERTY VALUES AND TAXES [NDR]

HITCHCOCK COUNTY

FIGURE 6.29: 2015 PROPERTY VALUES AND TAXES [HITCHCOCK COUNTY] DEPARTMENT OF REVENUE

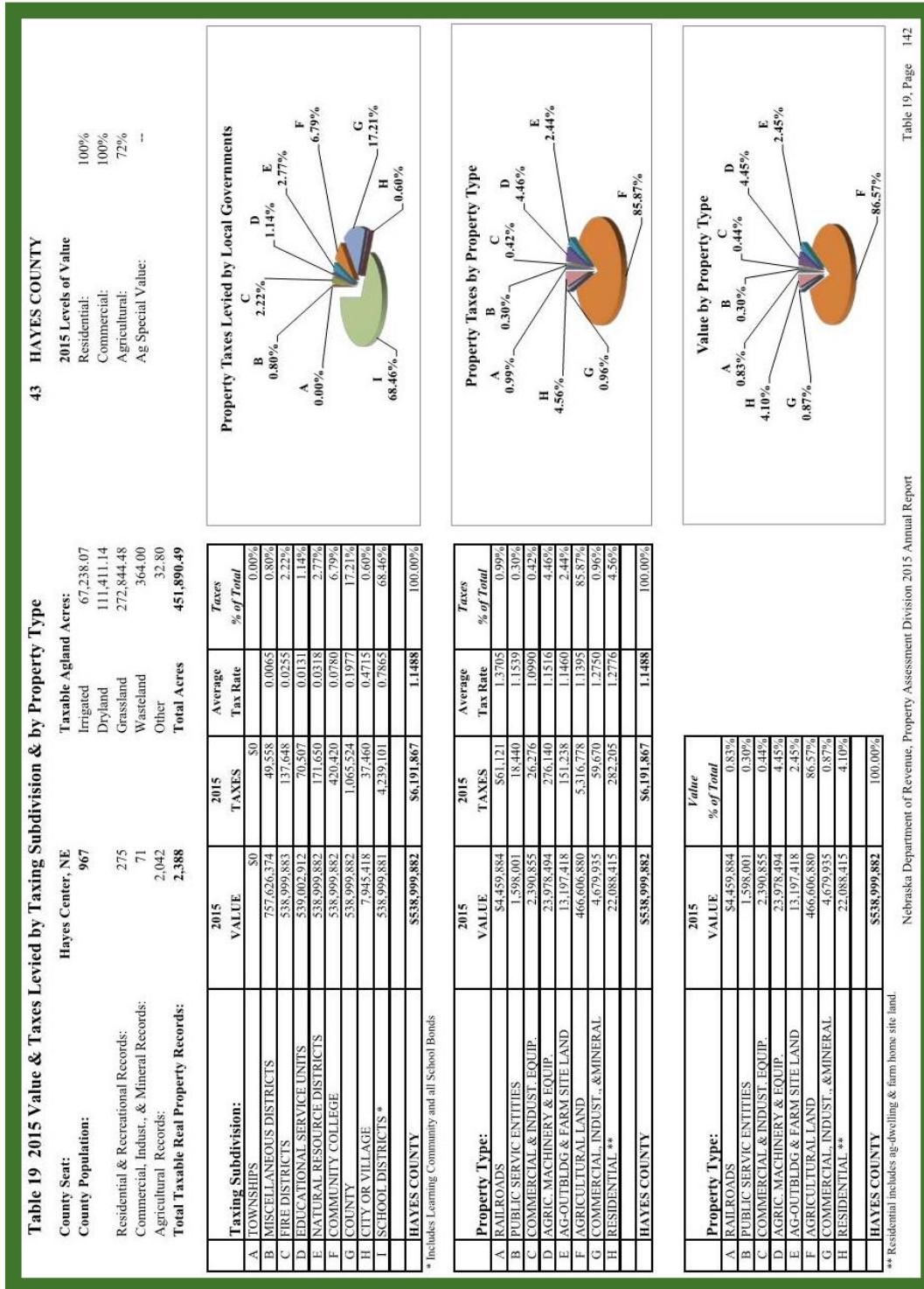


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FLOOD INSURANCE RATE MAPS [FIRM] FEDERAL EMERGENCY MANAGEMENT AGENCY

FIGURE 6.30: FLOOD INSURANCE RATE MAP [VILLAGE OF PALISADE] HITCHCOCK COUNTY

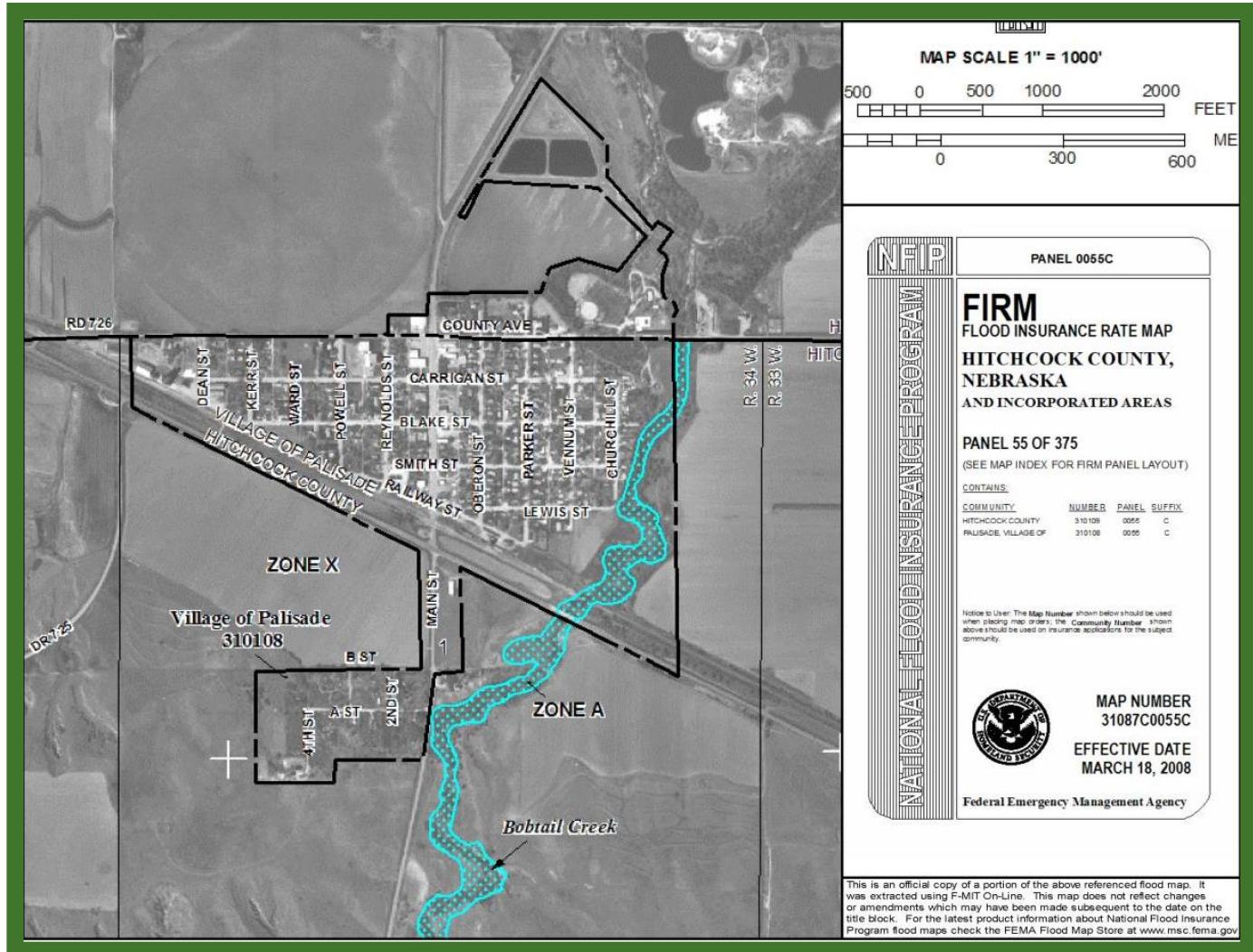


FIGURE 6.31: FLOOD INSURANCE RATE MAP [VILLAGE OF STRATTON] HITCHCOCK COUNTY

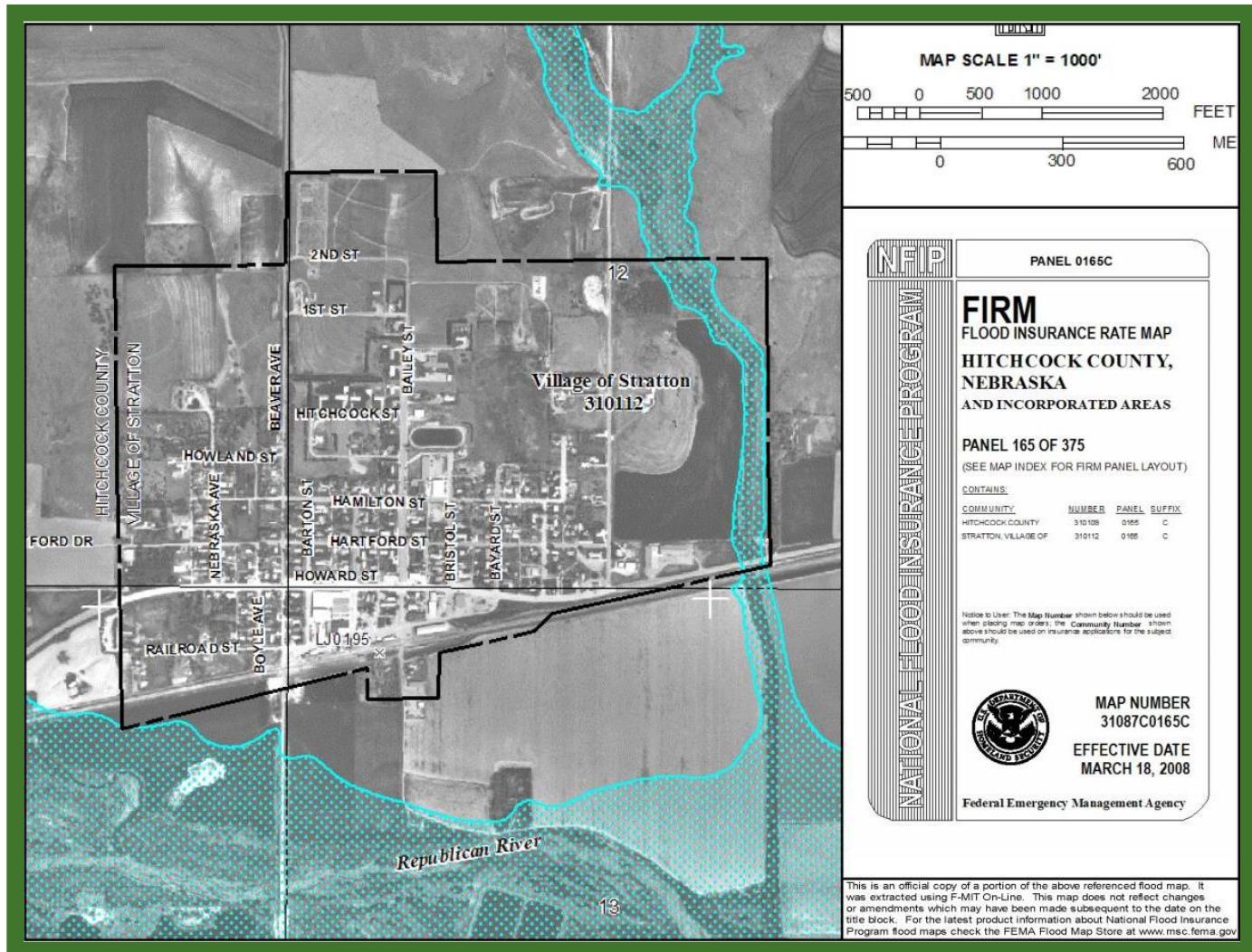
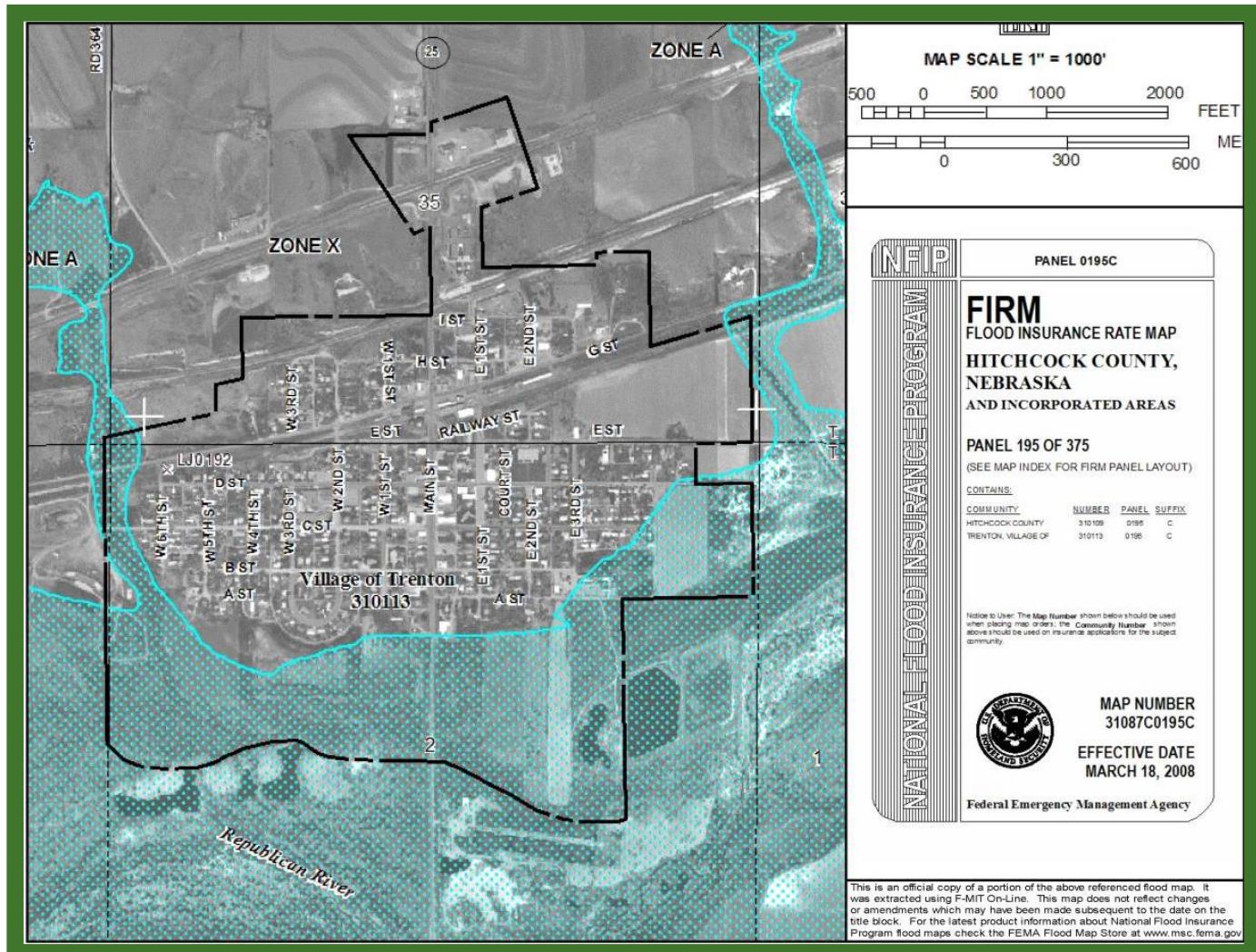


FIGURE 6.32: FLOOD INSURANCE RATE MAP [VILLAGE OF TRENTON] HITCHCOCK COUNTY



NATIONAL CLIMATIC DATA CENTER [NCDC]

HAZARD EVENT DETAILS

TABLE 6.115: NCDC EVENTS [SEVERE WINTER STORMS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County/ Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HITCHCOCK CO.	HITCHCOCK CO.	3/24/1996	Blizzard		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	10/25/1997	Blizzard		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	12/24/1997	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	3/7/1998	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	3/12/1999	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	11/22/1999	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/10/2000	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	11/10/2000	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	1/13/2001	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	1/27/2001	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	1/29/2001	Blizzard		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/26/2001	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	1/30/2002	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/9/2002	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	3/1/2002	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/22/2003	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	4/5/2003	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/4/2004	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	4/12/2004	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	11/28/2004	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	11/27/2005	Blizzard		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	3/20/2006	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	12/19/2006	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	12/29/2006	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/24/2007	Blizzard		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/5/2008	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	4/10/2008	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	10/29/2009	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	12/8/2009	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	4/14/2011	Blizzard		0	0	40.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	12/3/2011	Winter Storm		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	12/19/2012	Blizzard		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/20/2013	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	3/9/2013	Winter Weather		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	3/22/2013	Heavy Snow		0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County/ Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HITCHCOCK CO.	HITCHCOCK CO.	1/30/2014	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	12/31/2014	Extreme Cold/wind Chill		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	11/17/2015	Heavy Snow		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	12/15/2015	Ice Storm		0	0	0.00K	0.00K
Totals [39]					0	0	0.00K	0.00K
							0.00K	

TABLE 6.116: NCDC EVENTS [SEVERE THUNDERSTORMS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County/ Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	1/17/1996	High Wind	56 kts.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/22/1996	Hail	0.88 in.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	5/22/1996	Hail	1.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/22/1996	Hail	1.25 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	6/6/1996	Hail	3.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	6/11/1996	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	6/21/1996	Hail	1.00 in.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	7/15/1996	Thunderstorm Wind	57 kts.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	7/25/1996	Hail	0.88 in.	0	0	0.00K	0.00K
BEVERLY	HITCHCOCK CO.	7/25/1996	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	7/28/1996	Hail	0.88 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	7/28/1996	Hail	0.75 in.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	8/2/1996	Hail	1.75 in.	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	8/6/1996	Hail	0.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	9/6/1996	Hail	0.75 in.	0	0	0.00K	0.00K
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	10/29/1996	High Wind	55 kts.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	6/20/1997	Hail	0.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	10/8/1997	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	2/25/1998	High Wind	51 kts.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	5/18/1998	Thunderstorm Wind	65 kts.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	5/22/1998	Hail	0.75 in.	0	0	0.00K	0.00K
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	6/13/1998	High Wind	61 kts.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	6/23/1998	Thunderstorm Wind	61 kts.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	6/23/1998	Thunderstorm Wind	61 kts.	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	7/3/1998	Hail	0.75 in.	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	7/15/1998	Hail	0.88 in.	0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>STRATTON</u>	HITCHCOCK CO.	8/20/1998	Hail	1.00 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	10/16/1998	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	10/16/1998	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	3/27/1999	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	4/8/1999	High Wind	65 kts.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/9/1999	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/14/1999	Hail	1.50 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/14/1999	Hail	0.88 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/22/1999	Thunderstorm Wind	60 kts.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	6/22/1999	Hail	0.75 in.	0	0	0.00K	0.00K
<u>SWANSON LAKE</u>	HITCHCOCK CO.	7/25/1999	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/17/1999	Hail	1.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/17/1999	Hail	1.75 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	3/8/2000	High Wind	61 kts. E	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/26/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	6/12/2000	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	6/23/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	7/3/2000	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/5/2000	Hail	1.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/5/2000	Hail	1.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	7/5/2000	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/10/2000	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/20/2000	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	9/8/2000	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	10/31/2000	Hail	0.75 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	12/16/2000	High Wind	61 kts. E	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	4/6/2001	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	4/6/2001	Thunderstorm Wind	52 kts. E	0	0	0.00K	0.00K
<u>SWANSON LAKE</u>	HITCHCOCK CO.	4/6/2001	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	4/11/2001	High Wind	58 kts. E	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	4/20/2001	Hail	0.75 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	4/20/2001	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	4/20/2001	Thunderstorm Wind	78 kts. E	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/13/2001	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/13/2001	Thunderstorm Wind	57 kts. E	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/29/2001	Hail	0.75 in.	0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>STRATTON</u>	HITCHCOCK CO.	6/29/2001	Thunderstorm Wind	52 kts. E	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/12/2001	Thunderstorm Wind	65 kts. E	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/12/2001	Hail	1.00 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/5/2002	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/27/2002	Thunderstorm Wind	52 kts. E	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/25/2002	Thunderstorm Wind	52 kts. E	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	8/11/2002	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	8/11/2002	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	8/11/2002	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/26/2002	Hail	4.00 in.	0	0	1.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/26/2002	Thunderstorm Wind	65 kts. E	0	0	1.50K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/26/2002	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/26/2002	Thunderstorm Wind	61 kts. E	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	4/15/2003	Hail	0.88 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	4/16/2003	High Wind	56 kts. MG	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	5/8/2003	High Wind	52 kts. EG	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	5/8/2003	High Wind	56 kts. MG	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	5/8/2003	High Wind	56 kts. EG	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/8/2003	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/8/2003	Hail	1.50 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/8/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/8/2003	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/8/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/23/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/24/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/24/2003	Hail	1.00 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/24/2003	Hail	0.88 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/24/2003	Hail	0.88 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/24/2003	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	6/28/2003	Hail	1.00 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	7/7/2003	Thunderstorm Wind	50 kts. MG	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/7/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	8/8/2003	Hail	0.75 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	4/18/2004	High Wind	50 kts. MG	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/16/2004	Hail	1.00 in.	0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	5/22/2004	High Wind	60 kts. MG	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/22/2004	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	5/29/2004	High Wind	50 kts. MG	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/29/2004	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/29/2004	Thunderstorm Wind	64 kts. MG	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/29/2004	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/29/2004	Thunderstorm Wind	50 kts. MG	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/29/2004	Thunderstorm Wind	69 kts. EG	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	6/4/2004	Thunderstorm Wind	54 kts. MG	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/8/2004	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	7/2/2004	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	7/3/2004	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	7/8/2004	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	7/15/2004	Hail	0.88 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	7/30/2004	Thunderstorm Wind	53 kts. MG	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/9/2004	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/9/2004	Hail	2.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/25/2004	Hail	1.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	9/14/2004	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	9/14/2004	Hail	1.00 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	4/5/2005	High Wind	37 kts. MS	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/11/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	5/11/2005	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/11/2005	Hail	1.75 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	5/11/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	5/11/2005	Hail	1.00 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/6/2005	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/6/2005	Hail	0.75 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/9/2005	Hail	1.75 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/9/2005	Hail	2.00 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/9/2005	Hail	1.75 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/12/2005	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	6/13/2005	High Wind	37 kts. MS	0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
TRENTON	HITCHCOCK CO.	7/3/2005	Hail	0.88 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	7/4/2005	Hail	0.75 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	7/4/2005	Hail	0.88 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	9/4/2005	Thunderstorm Wind	51 kts. MG	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	9/24/2005	Hail	0.75 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	9/24/2005	Hail	1.25 in.	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	5/7/2006	Hail	1.00 in.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	5/21/2006	Hail	1.50 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/21/2006	Hail	0.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/21/2006	Hail	1.50 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/21/2006	Hail	1.00 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	6/10/2006	Hail	0.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	6/10/2006	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	6/16/2006	Hail	0.75 in.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	8/18/2006	Hail	1.00 in.	0	0	0.00K	0.00K
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	11/14/2006	High Wind	50 kts. EG	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	5/29/2007	Hail	1.00 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	5/29/2007	Hail	1.00 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	5/29/2007	Hail	1.75 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	5/29/2007	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	5/29/2007	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/29/2007	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	5/29/2007	Hail	0.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/29/2007	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/31/2007	Hail	0.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/31/2007	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/31/2007	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/31/2007	Hail	0.75 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	7/13/2007	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	7/13/2007	Hail	1.00 in.	0	0	0.00K	0.00K
BEVERLY	HITCHCOCK CO.	8/6/2007	Lightning		0	0	5.00K	0.00K
TRENTON	HITCHCOCK CO.	8/6/2007	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	8/6/2007	Thunderstorm Wind	65 kts. EG	0	0	5.00K	0.00K
PALISADE	HITCHCOCK CO.	8/22/2007	Hail	1.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	4/24/2008	Hail	0.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	4/24/2008	Hail	0.75 in.	0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>STRATTON</u>	HITCHCOCK CO.	4/24/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	5/2/2008	High Wind	52 kts. EG	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/6/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/6/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>SWANSON LAKE</u>	HITCHCOCK CO.	5/23/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/23/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/29/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/29/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/3/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	6/4/2008	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	6/18/2008	Hail	0.88 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	7/17/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	7/17/2008	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/26/2008	Hail	0.75 in.	0	0	0.00K	0.00K
<u>HITCHCOCK (ZONE)</u>	HITCHCOCK (ZONE)	1/12/2009	High Wind	50 kts. MG	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/5/2009	Hail	1.00 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/5/2009	Hail	1.25 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/5/2009	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	6/7/2009	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/15/2009	Hail	1.50 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/17/2009	Hail	1.00 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	7/17/2009	Hail	1.00 in.	0	0	0.00K	0.00K
<u>SWANSON LAKE</u>	HITCHCOCK CO.	7/17/2009	Hail	1.75 in.	0	0	3.00K	0.00K
<u>SWANSON LAKE</u>	HITCHCOCK CO.	7/20/2009	Lightning		0	0	1.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/31/2009	Hail	1.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/31/2009	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/14/2009	Lightning		0	0	0.75K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	5/24/2010	Hail	1.00 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/24/2010	Hail	1.50 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/24/2010	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	6/1/2010	Hail	0.88 in.	0	0	0.00K	0.00K
<u>PALISADE RICH ARPT</u>	HITCHCOCK CO.	6/20/2010	Hail	0.75 in.	0	0	0.00K	0.00K
<u>PALISADE RICH ARPT</u>	HITCHCOCK CO.	7/10/2010	Hail	1.75 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	7/10/2010	Hail	2.75 in.	0	0	1.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/10/2010	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	7/10/2010	Hail	0.88 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/3/2010	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	8/3/2010	Thunderstorm Wind	74 kts. MG	0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
TRENTON	HITCHCOCK CO.	10/22/2010	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	10/22/2010	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON ARPT	HITCHCOCK CO.	5/23/2011	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/23/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	5/30/2011	High Wind	58 kts. MG	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	7/2/2011	Hail	1.25 in.	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	7/10/2011	Thunderstorm Wind	52 kts. EG	0	0	0.50K	0.00K
CULBERTSON	HITCHCOCK CO.	7/28/2011	Hail	0.88 in.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	8/8/2011	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
PALISADE RICH ARPT	HITCHCOCK CO.	8/8/2011	Hail	2.00 in.	0	0	0.00K	0.00K
PALISADE RICH ARPT	HITCHCOCK CO.	8/8/2011	Hail	2.75 in.	0	0	6.00K	0.00K
CULBERTSON	HITCHCOCK CO.	8/9/2011	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	8/9/2011	Hail	1.75 in.	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	8/9/2011	Hail	1.00 in.	0	0	0.00K	0.00K
PALISADE RICH ARPT	HITCHCOCK CO.	8/9/2011	Hail	1.75 in.	0	0	0.00K	0.00K
PALISADE	HITCHCOCK CO.	8/9/2011	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	8/9/2011	Hail	2.00 in.	0	0	50.00K	0.00K
TRENTON	HITCHCOCK CO.	8/9/2011	Hail	1.75 in.	0	0	0.00K	0.00K
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	1/22/2012	High Wind	52 kts. EG	0	0	3.00K	0.00K
STRATTON	HITCHCOCK CO.	4/12/2012	Hail	0.75 in.	0	0	0.00K	0.00K
SWANSON LAKE	HITCHCOCK CO.	4/12/2012	Hail	2.50 in.	0	0	0.00K	0.00K
TRENTON ARPT	HITCHCOCK CO.	4/12/2012	Hail	2.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	4/12/2012	Hail	1.75 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	4/12/2012	Hail	1.00 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	4/12/2012	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
SWANSON LAKE	HITCHCOCK CO.	4/12/2012	Hail	1.50 in.	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	4/12/2012	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	5/19/2012	Hail	1.75 in.	0	0	0.00K	0.00K
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	5/26/2012	High Wind	56 kts. EG	0	0	0.00K	0.00K
SWANSON LAKE	HITCHCOCK CO.	6/28/2012	Hail	1.00 in.	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	9/30/2012	Hail	1.75 in.	0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	9/30/2012	Hail	0.75 in.	0	0	0.00K	0.00K
HITCHCOCK (ZONE)	HITCHCOCK (ZONE)	10/18/2012	High Wind	51 kts. MG	0	0	0.00K	0.00K
STRATTON	HITCHCOCK CO.	3/29/2013	Hail	1.00 in.	0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
<u>STRATTON</u>	HITCHCOCK CO.	4/8/2013	Hail	1.75 in.	0	0	0.00K	0.00K
<u>PALISADE RICH ARPT</u>	HITCHCOCK CO.	4/8/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>BEVERLY</u>	HITCHCOCK CO.	4/8/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	4/9/2013	Thunderstorm Wind	57 kts. MG	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	4/9/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	5/29/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	5/29/2013	Hail	0.75 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	5/29/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	6/22/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	6/24/2013	Thunderstorm Wind	55 kts. MG	0	0	0.00K	0.00K
<u>PALISADE RICH ARPT</u>	HITCHCOCK CO.	7/31/2013	Hail	1.75 in.	0	0	10.00K	0.00K
<u>SIRATION</u>	HITCHCOCK CO.	7/31/2013	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
<u>PALISADE RICH ARPT</u>	HITCHCOCK CO.	8/5/2013	Hail	0.75 in.	0	0	0.00K	0.00K
<u>PALISADE RICH ARPT</u>	HITCHCOCK CO.	8/5/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>PALISADE RICH ARPT</u>	HITCHCOCK CO.	8/5/2013	Hail	1.50 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/5/2013	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	6/6/2014	Hail	0.75 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	6/14/2014	Hail	1.25 in.	0	0	0.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	6/27/2014	Thunderstorm Wind	70 kts. EG	0	0	2.50K	0.00K
<u>BEVERLY</u>	HITCHCOCK CO.	8/20/2014	Hail	1.00 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	7/10/2015	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	7/10/2015	Thunderstorm Wind	78 kts. EG	0	0	31.00K	0.00K
<u>TRENTON</u>	HITCHCOCK CO.	8/4/2015	Hail	1.00 in.	0	0	0.00K	0.00K
<u>STRATTON</u>	HITCHCOCK CO.	8/7/2015	Thunderstorm Wind	87 kts. EG	1	0	1.040M	0.00K
<u>PALISADE</u>	HITCHCOCK CO.	8/7/2015	Thunderstorm Wind	83 kts. EG	0	0	4.100M	0.00K
<u>PALISADE RICH ARPT</u>	HITCHCOCK CO.	8/7/2015	Hail	1.75 in.	0	0	0.00K	0.00K
<u>CULBERTSON</u>	HITCHCOCK CO.	8/13/2015	Hail	0.88 in.	0	0	0.00K	0.00K
Totals [265]					1		0	
					5.261M		0.00K	
							5.261M	

Section Six [Participant Profiles I Hitchcock County]

TABLE 6.117: NCDC EVENTS [TORNADOS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HITCHCOCK CO.	HITCHCOCK CO.	6/13/1954	Tornado	F1	0	0	2.50K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	4/19/1957	Tornado	F1	0	0	0.03K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/18/1960	Tornado	F0	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/28/1962	Tornado	F1	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	6/17/1975	Tornado	F1	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/31/1984	Tornado	F0	0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/29/1985	Tornado	F1	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/29/1985	Tornado	F1	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	7/2/1986	Tornado	F0	0	0	0.03K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	9/16/1986	Tornado	F0	0	0	0.03K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	7/14/1988	Tornado	F0	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	6/24/1989	Tornado	F1	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	6/1/1990	Tornado	F1	0	0	2.50K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	6/15/1990	Tornado	F4	0	1	2.500M	0.00K
Trenton	HITCHCOCK CO.	9/6/1994	Tornado	F0	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/22/1999	Tornado	F0	0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	5/11/2005	Tornado	F0	0	0	0.00K	0.00K
TRENTON ARPT	HITCHCOCK CO.	4/12/2012	Tornado	EF0	0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	6/13/1954	Tornado	F1	0	0	2.50K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	4/19/1957	Tornado	F1	0	0	0.03K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/18/1960	Tornado	F0	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/28/1962	Tornado	F1	0	0	25.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	6/17/1975	Tornado	F1	0	0	25.00K	0.00K
Totals [18]					0	1	2.680M	0.00K
							2.680M	

TABLE 6.118: NCDC EVENTS [DROUGHT] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County / Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HITCHCOCK CO.	HITCHCOCK CO.	6/1/2000	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	7/1/2000	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	8/1/2000	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	9/1/2000	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/1/2002	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	6/1/2002	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	7/1/2002	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	7/1/2012	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	8/1/2012	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	9/1/2012	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	10/1/2012	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	11/1/2012	Drought		0	0	0.00K	0.00K

Section Six [Participant Profiles I Hitchcock County]

Location	County/ Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
HITCHCOCK CO.	HITCHCOCK CO.	12/1/2012	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	1/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	2/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	3/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	4/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	5/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	6/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	7/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	8/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	9/1/2013	Drought		0	0	0.00K	0.00K
HITCHCOCK CO.	HITCHCOCK CO.	10/1/2013	Drought		0	0	0.00K	0.00K
Totals [31]					0	0	0.00K	0.00K
							0.00K	

TABLE 6.119: NCDC EVENTS [FLOODS] JANUARY 1, 1950 – JANUARY 31, 2016

Location	County/ Zone	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
SWANSON LAKE	HITCHCOCK CO.	9/6/1996	Flash Flood		0	0	10.00K	0.00K
STRATTON	HITCHCOCK CO.	8/26/2002	Flash Flood		0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	8/26/2002	Flash Flood		0	0	0.00K	0.00K
CULBERTSON	HITCHCOCK CO.	4/24/2007	Flash Flood		0	0	25.00K	0.00K
CULBERTSON	HITCHCOCK CO.	5/29/2007	Flash Flood		0	0	200.00K	0.00K
CULBERTSON	HITCHCOCK CO.	5/29/2007	Flash Flood		0	0	200.00K	0.00K
CULBERTSON	HITCHCOCK CO.	8/9/2008	Flash Flood		0	0	250.00K	0.00K
CULBERTSON HOCK ARPT	HITCHCOCK CO.	5/29/2013	Flash Flood		0	0	0.00K	0.00K
TRENTON	HITCHCOCK CO.	8/4/2015	Flash Flood		0	0	5.00K	0.00K
STRATTON	HITCHCOCK CO.	5/28/2015	Flood		0	0	0.00K	0.00K
Totals [10]					0	0	690.00K	0.00K
							2.680M	